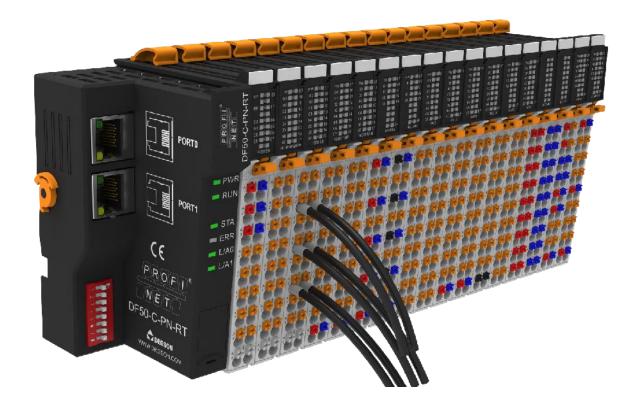


# DF50-C-PN-RT Adapter User Manual





Version History		
date	Version	describe
2024/9/20	V1.0.3	Added DF50-M-32DO-N, DF50-M-32DO-P, DF50-M-32DI-P/N, DF50-M-16DI-16DO-N, DF50-M-16DI-16DO-P module parameters and configuration instructions
2024/4/26	V1.0.2	AddedDF50-M-4IOL, DF50-M-4DOR, DF50-M-4DO-P module parameters; new diagnostic module0xE4 Fault Code;IncreaseDFDF50-M-4IOL, DF50-M-4DOR, DF50-M-4DO-P configuration routines; supplement the missing figures in the DF50-M-4AO-UI-6 voltage/current output module configuration routines; modify the DF50-M-16DI-P/N-TS parameters and modify the routines synchronously; replace the Chinese pictures in the TIA Portal V16 and STEP 7-MicroWIN SMART software configuration routines with English
2024/3/6	v1.0.1	Added STEP 7-MicroWIN SMART, SIMATIC ManagerTwo software operation instructions
2024/2/27	v1.0.0	Release version



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# Preface

### Scope of this document

This document is applicable toDF50Series RemoteIOsystem

#### Introduction

This manual mainly introducesDF50Series RemoteI/OTechnical specifications, installation, and debugging of the module.

The main contents include:

• System Overview: Mainly introduces the product ordering information, product composition, system

architecture, product transportation, storage environment, etc. of the DF50 series remote I/O modules;

- Product Description: Introduces the technical parameters of the DF50 series remote I/O modules;
- Installation and removal guide: Introduces the installation and removal of DF50 series remote I/O

#### modules;

- Mechanical and electrical drawings: DF50 remote IO module dimension drawing and electrical wiring diagram;
- User Guide: Introduces the communication between DF50 series remote I/O modules and mainstream PLCs through examples.

### Precautions

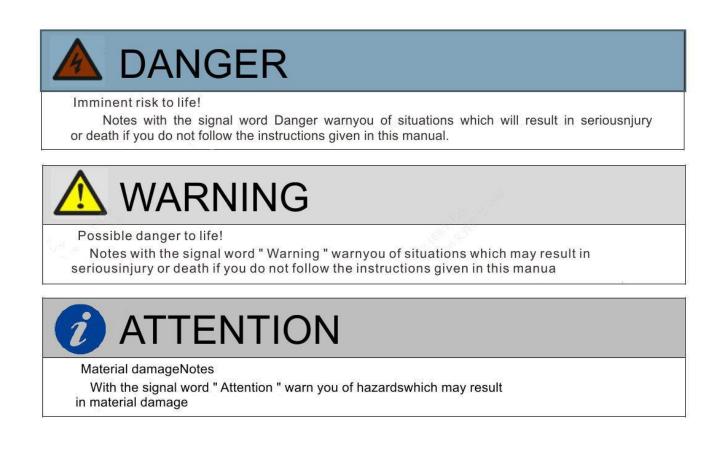
This document describes in detailDF50Series RemoteI/OThe usage of the module is for people with certain engineering experience. DEGSONNo responsibility.



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 aboutDF50Series RemoteI/OInformation on installation and commissioning

of modules, designed for engineers, installers, maintenance personnel, and electricians with general automation

knowledge.

Recycling and Disposal

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

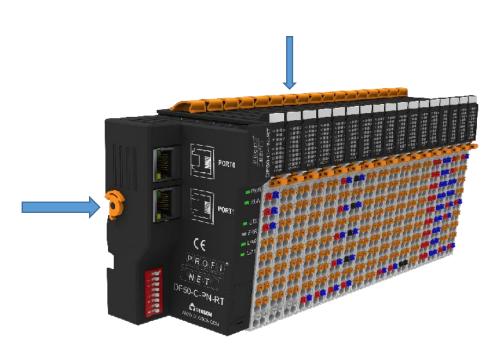
disposal agency.



# **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.
- InstalladapterhourThere is a manual buckle on the upper and left side 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.

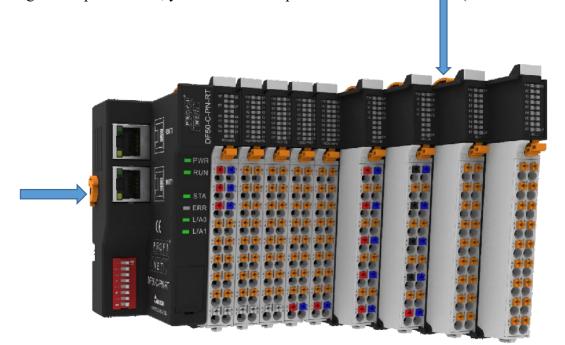




# 1.3. Disassembly method

### 1.3.1. Module disassembly

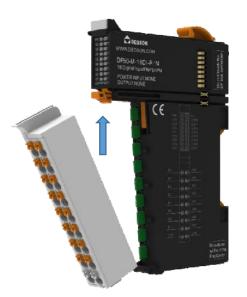
First, remove all signal cables or power cables from the module, then press the latch (arrow above). When removing the adapter module, you also need to open the rail lock clockw is (arrow on the left).





## 1.3.2. TerminalsDisassembly

The terminals can be removed individually by pressing the snaps.



1.3.3. Cold pressed terminal

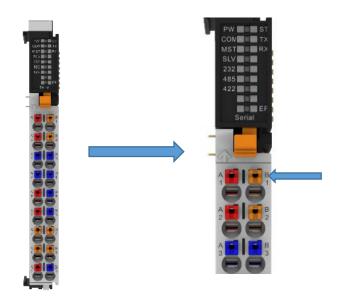
It is recommended to use cables with a core size less than 1.5 mm<sup>2</sup>. The reference for the cold terminal

parameters is as follows





TerminalsButton Recommended Userecommenduse0.4\*2.5Screwdriver press down.



### 1.4. Precautions

ifIf you encounter a module that is difficult to install, do not use brute force to install it.waivedDamage to the current module or other modules; remove the module from the rail and check whether there is any abnormality in the module (Such as foreign body blockagewait),After confirming that there is no problem, plug and unplug.



# 2.Fieldbus Adapter

Fieldbus systems	describe	model
₽ŖŎĘŢ <sup>®</sup> NĖŤ	PROFINET bus, 2 RJ45, expandable to 32	DESC C DN DT
	modules, 24VDC	DF50-C-PN-RT

- 1. PROFINET fieldbus adapter (DF50-C-PN-RT)
- DF50-C-PN-RTThe fieldbus adapter acts as a slave withPROFINET IOConnected,PROFINET IOIt is an open industrial Ethernet standard in the field of automation. It can automatically configure and generate local process images including analog, digital and special function modules. Analog modules and special function modules transmit data in the form of words or bytes.,The data of digital modules are transmitted in bit form.
- > The fieldbus adapter can be used asPROFINET IOThe device is integrated into the application.
- It also comes with a dual-port switch, Line structures can be easily created without using any other network components.
- > The device name can beDCPAgreement for allocation.







# 1.1. Specifications

Technical Information			
Specifications		PROFINET bus, 2 RJ45, expandable to 32 modules, 24VDC	
Product Description		PROFINET	
Connection		2 X RJ45, integrated switch function	
Transfer rate		10/100Mbps, full-duplex	
Transmission distance		100 meters	
PDO Data		1024 bytes	
Expandable number of m	odules	32	
Address Mapping		support	
Bus address setting		PROFINET Specification	
Transmission medium		Category 5 twisted pair	
Isolation method		Electrically isolated from the field	
characteristic		RT, Class C compliant, MRP, automatic addressing/topology	
characteristic		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		24V DC (20.4V DC~ 28.8V DC)	
input	1.4 . 1 . 1		
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)	
DIparameter			
Number of channels		8	
Signal Type		NPN & PNP	
Signal range	"ON" signal voltage	Voltage difference > 11VDC (voltage difference with common input)	

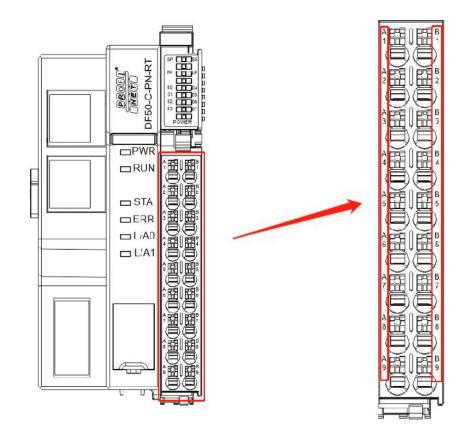


	"OFF" signal voltage	Voltage difference <5VDC (voltage difference with common input)
Data size		1 Byte
Connection Type		1-wire, Type 1/Type 3, according to IEC 61131-2
Filter time		0-40ms configurable
Input Impedance		>7.5kΩ
Input Action Display		When the input is in driving state, the input indicator light is on.
IO Mapping		Support bitwise access
wiringparameter		
Connection technology: 0	Communication/fieldbus	PROFINET IO: 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
Materialparameter		
color		black
Housing Material		PC plastic, PA66
Conformance mark		CE
environmentRequire		
Allowable ambient tempe	erature (operating)	-25~60°C
Permissible ambient temp	perature (storage)	-40~85°C
Protection type		IP20
Pollution degree		2. Comply with IEC 61131-2 standard
Operating altitude		Temperature without derating: $0 \sim 2000$ m
Relative humidity (non-c	ondensing)	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. wiringTerminal Definition



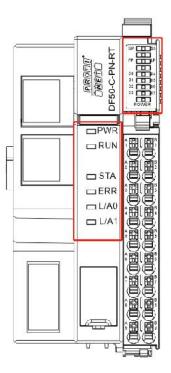
Terminal number	Signal	Terminal number	Signal	illustrate
A1	Sys-24V	B1	Sys-0V	System Power
A2	Field-24V	B2	Field-0V	Load power
A3	Field-24V	B3	Field-0V	supply
A4	PE	B4	PE	Safely
A5	DI0	В5	DI4	
A6	DI1	B6	DI5	
A7	DI2	B7	DI6	DI signal input
A8	DI3	B8	DI7	
A9	COM	B9	СОМ	Public

Note: It is recommended to use two isolated twenty four V power supply Provided for couplers 2-way Power supply to

achievemostExcellent anti-interference performance.



## 1.2.2. LED Indicator definition



Indicator Lights	state	meaning
DW/D	Green Bright	Power supply is operating normally
PWR	Green Kill	Abnormal power supply operation
	Green Bright	The coupler network is operating normally
RUN	Green Flash	Coupler network has link connection
	Green Kill	Coupler network has no link connection
ST A	Green Flash	The module is running normally
STA	Green Kill	Module operation abnormality
EDD	Red Bright	Communication abnormality between coupler and module
ERR	Red Extinction	The communication between the coupler and the module is normal
	Green Bright	Network port 1 is connected successfully
L/A0	Green Flash	Network port 1 has data communication
T (A 1	Green Bright	Network port 2 is connected successfully
L/A1	Green Flash	Network port 2 has data communication
ED	Green light is always on	Load power input is normal
FP	Green light off	Load power input abnormality

DF50-C-PN-RTFieldbus adapter

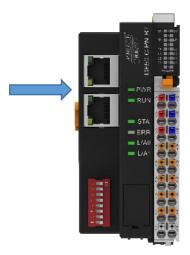


# DF50 series I/O

ΙP	Green light is always on	Load power output is normal
LP	Green light off	Load power output abnormality
CD.	Green light on	System power input is normal
SP	Green light off	System power input abnormality
95	Green light on	System power output is normal
\$5	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

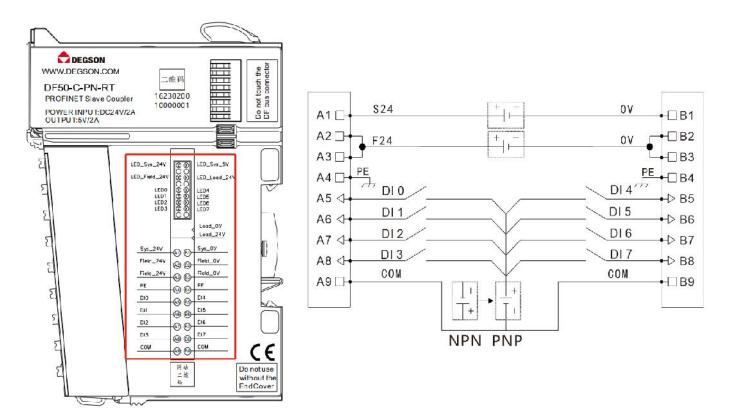
There is function definition, 0: the host computer sets the device name, 1~255: the device name is

dgpn1~dgpn255





#### 1.2.5. Wiring Diagram

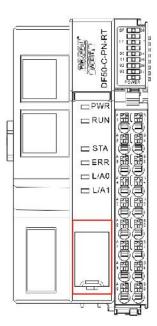


Note: COM is the common terminal, external 24V is used to realize NPN, external 0V is used to realize

PNP.



#### 1.2.6. Configurationinterface



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 module	0x01 represents the first IO module, 0x02 represents the second module, and so on.	
Byte 1	Fault Codes	See fault code table 1 for details	
	Output data: 2 Byte		
Byte No.	illustrate	Remark	
Byte 0	No option required	/	
Byte 1	No action required	/	

Table 1: Fault code table			
Fault Codes	Fault Description	Troubleshooting	
0xE1	Module power supply abnormality	Check the power cord connection	



0xE2	Analog module calibration failure	Contact Supplier
0xE3	Module internal initialization exception	Contact Supplier
0xE4	Overcurrent signal detected	Check peripherals
0xE8	Serial port module communication abnormality	Check signal line wiring

### 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:	2 Byte(Need to operate by word)		
WordNo.	illustrate	Remark		
Word0	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

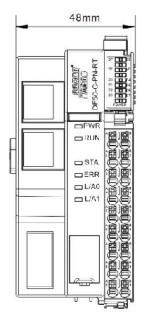
			In	put data: 1 By	te			
Byte 0	Bit7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	DI 07	DI 06	DI 05	DI 04	DI 03	DI 02	DI 01	DI 00

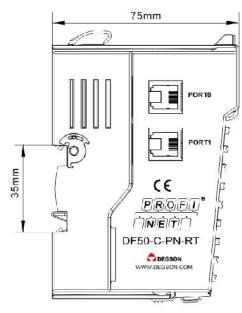


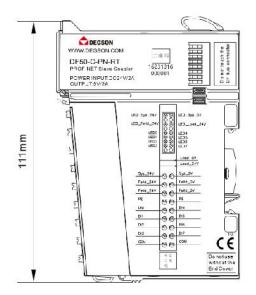
# 1.4. Mechanical Installation

#### 1.4.1. Installsize

InstallSize letterinterestAs shown in the figure below, the unit is (mm) :









# **3.ExpandexhibitionI/O Module**

Function	describe	model
Digital Module	Digital input, 16 inputs, PNP/NPN	DF50-M-16DI-P/N
Digital Module	Digital input, 16 inputs with 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
Digital Module	Digital output,32Input, PNP/NPN	DF50-M-32DI-P/N
Digital Module	Digital output,32Output, NPN	DF50-M-32DO-N
Digital Module	Digital output,32Output,PNP	DF50-M-32DO-P
Digital Module	Digital output,16 inputs and 16 outputs, NPN	DF50-M-16DI-16DO-N
Digital Module	Digital output,16 inputs and 16 outputs, PNP	DF50-M-16DI-16DO-P
Digital Module	Digital output,4 channels, relay	DF50-M-4DO-R
Digital Module	Digital output,4 outputs, PNP, 2A	DF50-M-4DO-P-2A
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/pulseenter, 2 channels, 24V	DF50-M-2CNT-PIL-24
Pulse counting module	Encoder input/pulseenter, 2 channels, 5V	DF50-M-2CNT-PIL-5
Communication serial port module	232/485/422 serial communication, 1 channel	DF50-M-1COM-232/485/422
IO-Link	IO-Link Master, 4 channels	DF50-M-4IOL



communication		
module		
Voltage	24VDC voltage distribution, 16 channels	DF50-M-DC-U-twenty four
distribution		
module		
Voltage	0VDC voltage distribution, 16 channels	DF50-M-DC-U-0
distribution		
module		



- 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
	"ON" signal voltage	Voltage difference > 11VDC (voltage difference with common input)
Signal range	"OFF" signal voltage	Voltage difference <5VDC (voltage difference with common input)
Hardware response tin	ne	200us/200us
Data size		2 Byte
Connection Type		1-wire, Type 1/Type 3, according to IEC 61131-2
Reverse circuit protect	tion	Yes
Isolation method		Photoelectric isolation from the field layer
Error diagnosis		Yes
Filter time		0-40ms configurable
Input Impedance		>7.5kΩ
Input Action Display		When the input is in driving state, the input indicator light is on.
IO Mapping		Support bit-by-bit or word-by-word mapping
Power parameters		
System bus input pow	er rated voltage	5V DC (4.75V DC~ 5.25V DC)
System bus input pow	er rated current	45mA
Terminal power	NPN signal type	24V
supply (common		
terminal) input rated	PNP signal type	0V
voltage		
Wiring parameters		
Connection technolog	y: Input	PUSH-IN Terminal Blocks
Wire crimping area		0.2~1.5mm2/26~16AWG
Stripping length		8~10mm <sup>2</sup>
Installation		DIN-35 rail
Material parameters		
color		black
Housing Material		PC plastic, PA66
Conformance mark		CE
Environmental require	ements	
Allowable ambient ter	nperature (operating)	-25~60°C
Permissible ambient te	emperature (storage)	-40~85°C
Protection type		IP20



Pollution degree	2. Comply with IEC 61131-2 standard	
Operating altitude	Temperature without derating: $0 \sim 2000$ m	
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
Al	DI 0	B1	DI 10	
A2	DI 1	B2	DI 11	
A3	DI 2	В3	DI 12	
A4	DI 3	B4	DI 13	
A5	DI 4	В5	DI 14	DI signal input
A6	DI 5	B6	DI 15	
A7	DI 6	B7	DI 16	
A8	DI 7	B8	DI 17	
A9	СОМ	В9	СОМ	Public



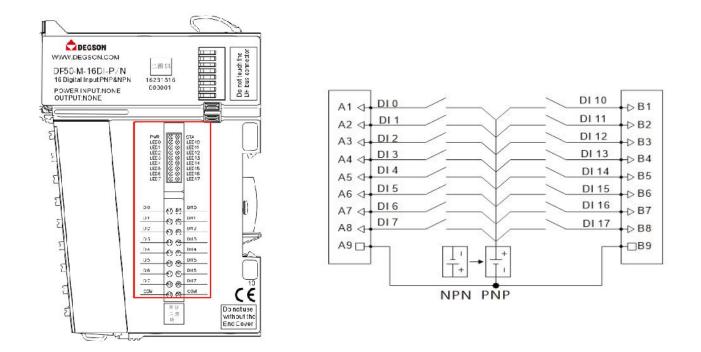
## 1.2.2 LED indicator definition



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



### 1.2.3 Wiring Diagram



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



## 1.3 Module configuration data definition

As shown in the figure, users canunifiedConfigurationSignal filtering of the module.

DF50-M-16DI-P/N Parameter	Setting
SignalFilter Setting:	20ms

## 1.4 Module process data definition

#### DF50-M-16DI-P/NModulesProcess data definition

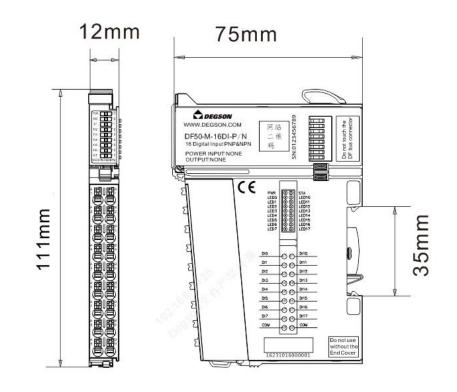
Input Data								
Bit No	Bit7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	DI7	DI6	DI5	DI4	DI3	DI2	DI1	DI0
Byte 1	DI17	DI16	DI15	DI14	DI13	DI12	DI11	DI10





### 1.5 Mechanical Installation

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



DF50 series I/O



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

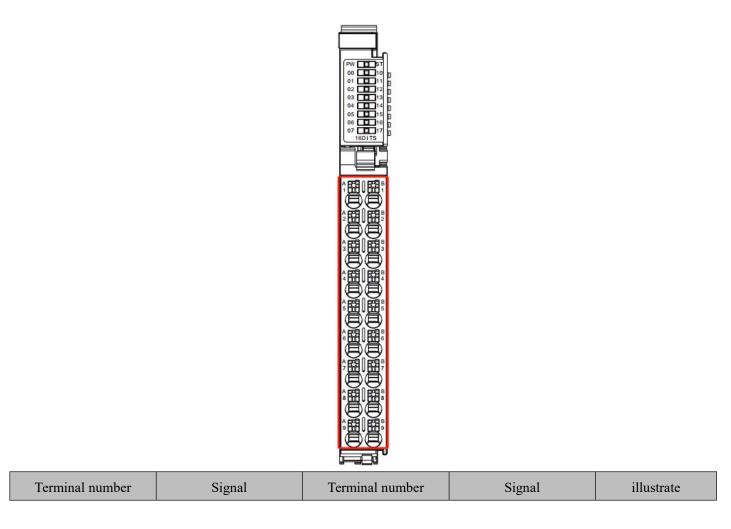
Technical Inform	nation		
Product Description		Digital input counting module, 16 inputs,8 channels have counting function.NPN & PNP, 24VDC	
Number of channels		16	
Signal Type		NPN & PNP	
Signalscope	"ON" signal voltage "OFF" signal voltage	Voltage difference > 11VDC (voltage difference with common input)           Voltage difference <5VDC (voltage difference with common input)	
	Counting Mode	Rising edge counting, falling edge counting, double edge counting, configurable	
Counting	Counting range	0~4294967296	
function Channel parameter	countMaximum input frequency of several channels	1KHz	
information	Count value clear function	support	
Hardware respon	nse time	200us/200us	
Input channel war functionFilter time	c	0~255ms configurable	
Data size		Input 34Byte; Output 1 Byte	
Connection Type	e	1-wire, Type 1/Type 3, according to IEC 61131-2	
Reverse circuit p	protection	Yes	
Isolation method	l	Photoelectric isolation from the field layer	
Error diagnosis		Yes	
Input Impedance	;	>7.5kΩ	
Input Action Dis	play	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 parameter	rs		
System bus inpu	t power rated voltage	5V DC (4.75V DC~ 5.25V DC)	
System bus inpu	t power rated current	45mA	
Terminal power	NPN signal type	24V	
supply (common terminal) input rated voltage	PNP signal type	0V	
Wiring parameter	ers		
Connection tech	nology: Input	PUSH-IN Terminal Blocks	
Wire crimping a	rea	0.2~1.5mm2/26~16AWG	
Stripping length		8~10mm <sup>2</sup>	
Installation		DIN-35 rail	
Material parame	ters		



color	black
Housing Material	PC plastic, PA66
Conformance mark	CE
Environmental requirements	
Allowable ambient temperature (operating)	-25~60°C
Permissible ambient temperature (storage)	-40~85°C
Protection type	IP20
Pollution degree	2. Comply with IEC 61131-2 standard
Operating altitude	Temperature without derating: 0~2000m
Relative humidity (non-condensing)	5~95%RH
Vibration resistance	1g, in accordance with IEC 60068-2-6
Shock resistance	15g, compliant with IEC 60068-2-27
EMC anti-interference level	Compliant with IEC 61000-4
Corrosion resistance	Compliant with IEC 60068-2-42 and IEC 60068-2-43 standards
Permissible H2S contaminant concentration	10
at 75% relative humidity	10ppm
Permissible SO2 pollutant concentration at	25
75% relative humidity	25ppm

### 2.2 Hardware Interface

### 2.2.1 Terminal Block Definition





Al	DI 0	B1	DI 10	
A2	DI 1	B2	DI 11	
A3	DI 2	B3	DI 12	
A4	DI 3	B4	DI 13	Disignation
A5	DI 4	В5	DI 14	DI signal input
A6	DI 5	B6	DI 15	
A7	DI 6	B7	DI 16	
A8	DI 7	B8	DI 17	
A9	СОМ	В9	COM	Public

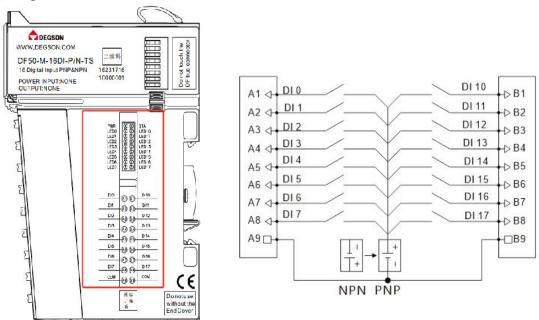
2.2.2 LED indicator definition



Indicator Lights	meaning	
DW	Green:System bus powerSource Inputnormal	
PW	Green Kill:System bus powerSource Inputabnormal	
	Power-on Green: Module initialization error	
ст	stage	Green off: Module initialization is normal
ST	Operational	Green flash: The internal bus of the module is working normally
	stage	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	
00~07,10~17		



#### 2.2.3 Wiring Diagram



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

#### 2.3 Module configuration data definition

As shown in the figure, users can configureCH00~CH07Input channel count trigger mode.

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

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

In addition, users can also set the signal filtering for the input channels CH10~CH17 without counting function.

DF50-M-16DI-P/N	I-TS Non Counting Channel Par	rameter Setting(CH10-CH17)
DF50-M-16DI-	P/N-TS Non Counting Channel	Parameter Setting(CH10-CH17)
	R. R. S.	<b>7</b> .0 0
	SignalFilter :H10-CH17)_ms: 20	

## 2.4 Module process data definition

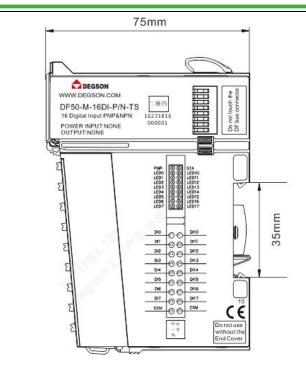
Output data:1Byte		
	Bit0	0: Channel 0 counts normally; 1: Channel 0 count
	Dito	value is cleared
	Bit1	0: Channel 1 counts normally; 1: Channel 1 count
		value is cleared
Byte0	:	:
	Bit6	0: Channel 6 counts normally; 1: Channel 6 count
	Bito	value is cleared
	Bit7	0: Channel 7 counts normally; 1: Channel 7 count
	Dit/	value is cleared
	loseen	terdata:34Byte
	Bit0	Channel 0 signal status
	Bit1	Channel 1 signal status
Byte0	:	:
	Bit6	Channel 6 signal status
	Bit7	Channel 7 signal status
	Bit0	Channel 10 signal status
	Bit1	Channel 11 signal status
Byte1	:	÷
	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
:	:	÷
Byte26-Byte29	DWord	Channel 6 input count value
Byte30-Byte33	DWord	Channel 7 input count value

## 2.5 Mechanical Installation

The installation dimensions are shown in the figure below, in 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	twenty fourV DC
Data size	2 Byte
Connection Type	1-wire
Reverse circuit protection	Yes
Overcurrent protection	Yes
Short circuit protection	Yes
Isolation method	Photoelectric isolation from the field layer
Error diagnosis	Yes
Switching frequency (resistive)	100Hz
Switching frequency (lamp)	10Hz



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



## 3.2 Hardware Interface

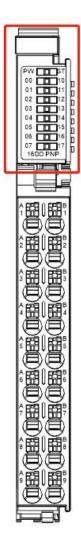
#### 3.2.1 Terminal Block Definition



Terminal number	Signal	Terminal number	Signal	illustrate
A1	DO 00	B1	DO 10	
A2	DO 01	B2	DO 11	
A3	DO 02	В3	DO 12	
A4	DO 03	B4	DO 13	
A5	DO 04	В5	DO 14	DO signal output
A6	DO 05	B6	DO 15	
A7	DO 06	B7	DO 16	
A8	DO 07	B8	DO 17	
A9	24V	В9	0V	Terminal power input



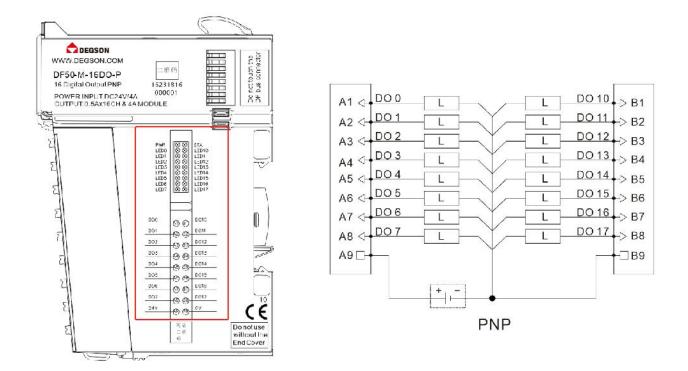
### 3.2.2 LED Indicator definition



Indicator Lights	meaning				
PW	Green:System bus power inputnormal				
F VV	Green Kill:S	ystem bus power inputabnormal			
	Power-on	Green: Module initialization error			
	stage	Green off: Module initialization is normal			
	Onenting	Green flash: The internal bus of the module is working normally			
ST	Operational	Green off/green on: The internal bus of the module is working			
	stage	abnormally or the terminal power input is abnormal			
00 07 10 17	Green: Outpu	ut signal is valid			
00~07,10~17	Green off: O	utput signal is invalid			



#### 3.2.3 Wiring Diagram



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

#### 3.4 Process data definition

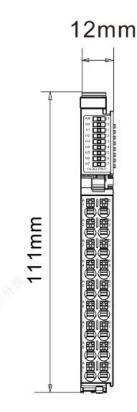
#### DF50-M-16DO-PModulesProcess data definition

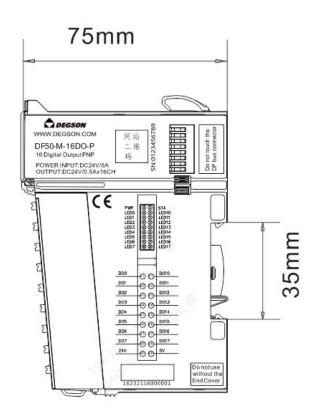
	Output Data							
Bit No	Bit7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	DO7	DO6	DO5	DO4	DO3	DO2	DO1	DO0
Byte 1	DO17	DO16	DO15	DO14	DO13	DO12	DO11	DO10



## 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

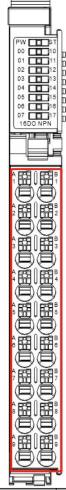


Leakage Current	Maximum value: 10uA
Hardware response time	100us/100us
Output Impedance	<200mΩ
Output delay	OFF to ON:Max.100us, ON to OFF:Max.150us
Protection function	Over temperature shutdown: typical value 135°C
	Overcurrent protection: 1.1A. Typical value 0.5A
	Support short circuit protection
Load 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°C, 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°C when all output points are ON
IO Mapping	Support bit-by-bit or word-by-word mapping
Fault shutdown output status mode	Clear, keep current value or output according to preset value
In stop mode	In the fault shutdown mode, no more refresh
Power parameters	
System bus input power rated voltage	5V DC (4.75V DC~ 5.25V DC)
System bus input power rated current	100mA
Terminal power input rated voltage	24V DC (20.4V DC~ 28.8V DC)
Terminal power input rated current	8A
Wiring parameters	
Connection technology: Output	PUSH-IN Terminal Blocks
Wire crimping area	0.2~1.5mm2/26~16AWG
Stripping length	8~10mm
Installation	DIN-35 rail
Material parameters	
color	black
Housing Material	PC plastic, PA66
Conformance mark	CE
Environmental requirements	
Allowable ambient temperature (operating)	-25~60°C
Permissible ambient temperature (storage)	-40~85°C
Protection type	IP20
Pollution degree	2. Comply with IEC 61131-2 standard
Operating altitude	Temperature without derating: $0 \sim 2000$ m
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	10ppm
75% relative humidity	-11
Permissible SO2 pollutant concentration at 75%	25ppm
relative humidity	



## 4.2 Hardware Interface

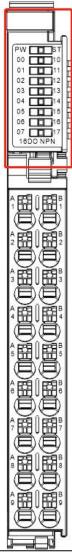
### 4.2.1 WiringTerminal Definition



Terminal number	Signal	Terminal number	Signal	illustrate
A1	DO 00	B1	DO 10	
A2	DO 01	B2	DO 11	
A3	DO 02	B3	DO 12	
A4	DO 03	B4	DO 13	
A5	DO 04	В5	DO 14	DO signal output
A6	DO 05	B6	DO 15	
A7	DO 06	B7	DO 16	
A8	DO 07	B8	DO 17	
A9	24V	В9	0V	Terminal power input



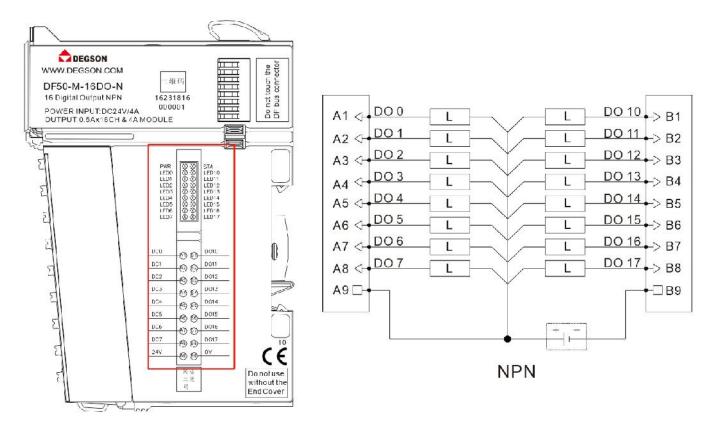
### 4.2.2 LED Indicator definition



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



### 4.2.3 Wiring Diagram



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

### 4.3 Process data definition

DF50-M-16DO-NModulesProcess	data	definition
DI 50 III IODO I IIIOdulesi Iocess	uutu	aerinnion

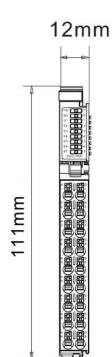
Output Data								
Bit No	Bit7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	DO7	DO6	DO5	DO4	DO3	DO2	DO1	DO0
Byte 1	DO17	DO16	DO15	DO14	DO13	DO12	DO11	DO10

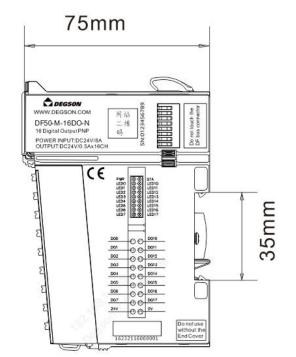
### 4.4 Mechanical Installation

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





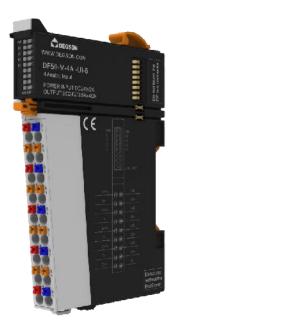






## 5 4-channel analog input/voltage type/current type (DF50-M-4AI-UI-6)

- > 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

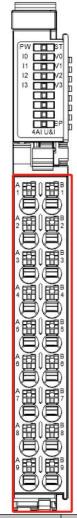


Current input diagnostics	4~20mA supports disconnection detection
Isolation	The interface channels are not isolated, the power supply is isolated
	from the interface, and the interface is isolated from the bus.
Independent channel enable configuration	support
Diagnosis reporting function configuration	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	0.2~1.5mm2/26~16AWG
Stripping length	8~10mm <sup>2</sup>
Installation	DIN-35 rail
Material parameters	
color	black
Housing Material	PC plastic, PA66
Conformance mark	CE
Environmental requirements	
Allowable ambient temperature (operating)	-25~60°C
Permissible ambient temperature (storage)	-40~85°C
Protection type	IP20
Pollution degree	2. Comply with IEC 61131-2 standard
Operating altitude	Temperature without derating: 0~2000m
Relative humidity (non-condensing)	5~95%RH
Vibration resistance	1g, in accordance with IEC 60068-2-6
Shock resistance	15g, compliant with IEC 60068-2-27
EMC anti-interference level	Compliant with IEC 61000-4
Corrosion resistance	Compliant with IEC 60068-2-42 and IEC 60068-2-43 standards
Permissible H2S contaminant concentration at	10ppm
75% relative humidity	
Permissible SO2 pollutant concentration at 75%	25ppm
relative humidity	



## 5.2 Hardware Interface

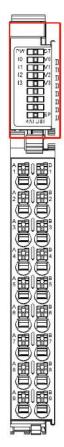
### 5.2.1 WiringTerminal Definition



Terminal number	Signal	Terminal number	Signal	illustrate
A1	24Vo	B1	GND	Terminal power output
A2	I0+	B2	V0+	Current/voltage input channels
A3	24Vo	В3	GND	Terminal power output
A4	I1+	B4	V1+	Current/voltage input channels
A5	24Vo	В5	GND	Terminal power output
A6	I2+	B6	V2+	Current/voltage input channels
A7	24Vo	В7	GND	Terminal power output
A8	I3+	В8	V3+	Current/voltage input channels
A9	24V	В9	0V	Terminal power input



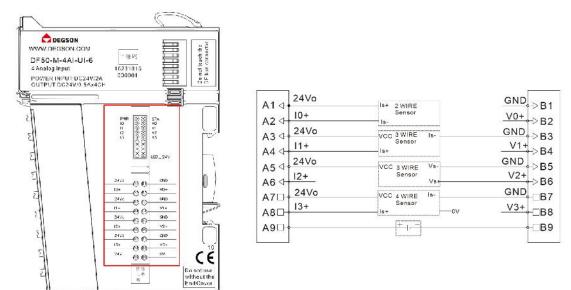
### 5.2.2 LED Indicator definition



Indicator Lights	meaning			
DW/	Green:System bus power inputnormal			
PW	Green Kill:S	ystem bus power inputabnormal		
	Power-on	Green: Module initialization error		
	stage	Green off: Module initialization is normal		
	Onenting	Green flash: The internal bus of the module is working normally		
ST	Operational	Green off/green on: The internal bus of the module is working		
	stage	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			
10, ~13, 00, ~ 03	put 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, the user can configure each channelSignal range and signal filtering.

50-M-4AI-UI-6 Parameter S	Setting
SignalRange Setting(CH0):	Disabled
SignalRange Setting(CH1):	Disabled
SignalRange Setting(CH2):	Disabled
SignalRange Setting(CH3):	Disabled
SignalFilter Setting(CH0):	100Hz_10ms
SignalFilter Setting(CH1):	100Hz_10ms
SignalFilter Setting(CH2):	100Hz_10ms
SignalFilter Setting(CH3):	100Hz_10ms

### 5.4 Module process data definition

Input data: 8 Byte



ByteNo.	Word No.	meaning
Byte0-Byte1	Word0	Channel 0 input data
Byte2-Byte3	Word1	aisle1 LoseInput Data
Byte4-Byte5	Word2	aisle2Input Data
Byte6-Byte7	Word3	aisle3Input Data

### Process data definition description:

	Process data description (voltage type)				
Signal range	Voltage value	Decimal data	Hexadecimal data	Scope	Conversion relationship
	>11.76V	32767	0x7FFF	Overflow	
	11.76V	32511	0x7EFF	Upper limit	
	10V	27648	0x6C00		
	5V	13824	0x3600		D = 27648 x U / 10
$\pm 10 V$	0V	0	0x0000	Normal range	U. D. 10/27(4)
	-5V	-13824	0xCA00		U = D x 10 / 27648
	-10V	-27648	0x9400		
	-11.76V	-32511	0x8100	Lower limit	
	<-11.76V	-32768	0x8000	Underflow	
	>11.76V	32767	0x7FFF	Overflow	
	11.76V	32511	0x7EFF	Upper limit	D = 27648 x U / 10
0-10V	10V	27648	0x6C00		U. D. 10/27(40
	5V	13824	0x3600	Normal range	U = D x 10 / 27648
	0V	0	0x0000		
	>11.41V	32767	0x7FFF	Overflow	D = 27648  x (U - 2) / 8
	11.41V	32511	0x7EFF	Upper limit	
2-10V	10V	27648	0x6C00	Normal range	$U = D \ge 8 / 27648 + 2$
	6V	13824	0x3600		



$1-5V$ $5V$ $27648$ $0x6C00$ Normal range $3V$ $13824$ $0x3600$ $U = D \times 4 / 27648 + 1$ $1V$ $0$ $0x0000$ $U = D \times 4 / 27648 + 1$ $0.3V$ $-4864$ $0xED00$ Lower limit $<0.3V$ $-32768$ $0x8000$ Underflow         Process data description (current type)						
10.059 V3.227680.08000Underflow-5.88 V522670.67 FFOverflow5.88 V325110.07 EFFUpper limit5.89 V276480.66000Normal range0 V00.00000Normal range0.5 V-158240.62000Normal range-5.5 W-158240.62000Lower limit-5.5 R8 V-276480.9400Lower limit-5.88 V-325110.88100Lower limit-5.88 V-325110.8100Lower limit-5.88 V-325120.8300Underflow-5.88 V-325110.8100Lower limit-5.88 V-325120.8300Normal range2.5 V138240.86000Normal range2.5 V138240.83000Normal range0.5 V276480.8000Normal range2.5 V138240.83000Normal range0.5 V276480.8000Normal range1.5 V327670.871TO.setlow3.5 N325110.8000Normal range0.5 V276480.80000Normal range3.5 N327670.871TO.setlow1.5 V138240.86000Normal range0.5 N-257480.86000Normal range0.3 V138240.86000Normal range0.3 V-32580.86000Lower limit-1 V00.80000Lower limit0.3 V-327680.86000		2V	0	0x0000		
$ \frac{55.88V}{5.88V} \\ \frac{52.51}{5.88V} \\ \frac{52.51}{5.88V} \\ \frac{52.51}{5.88V} \\ \frac{52.51}{5.88V} \\ \frac{52.51}{5.88V} \\ \frac{52.5V}{2.7648} \\ \frac{51.5V}{5.7V} \\ \frac{51.5V}{-2.7648} \\ \frac{52.5V}{-2.7648} $		0.59 V	-4864	0xED00	Lower limit	
5.88V325110x7EFFUpper limit5V276480x6000 $ABC00$ 2.5V138240x3600 $ABC00$ 0V00x0000 $BBC10$ 2.5V-138240x5CA00 $BBC10$ -5VV-276480x9400 $BBC10$ -5.88V-225110x8100Lower limit-5.88V-225120x8100Lower limit-5.88V-22670x7EFFOver low-5.88V-227680x600 $BBC10$ -5.88V325110x7EFFUpper limit5.88V325110x7EFFUpper limit-5.88V325110x7EFFUpper limit-5.88V325110x7EFFUpper limit-5.88V325110x7EFFUpper limit-5.7V276480x6000 $BBC10$ -5.7V327610x7EFFOverlow-5.7V327610x7EFFUpper limit-5.7V327610x7EFFUpper limit-5.7V327610x7EFFUpper limit-5.7V327610x7EFFUpper limit-5.7V327610x6000 $BBC10$ -5.7V327640x6000 $BBC10$ -5.7V <td></td> <td>&lt;0.59 V</td> <td>-32768</td> <td>0x8000</td> <td>Underflow</td> <td></td>		<0.59 V	-32768	0x8000	Underflow	
\$\begin{aligned} 5\begin{aligned} 5\begin{aligned} 25\begin{aligned} 13824 & 0x600 & 0x000 & 0		>5.88V	32767	0x7FFF	Overflow	
±SV2.5V138240x3600 0x0000Normal range 0x0000D = 27648 x U / 5 200000V00x00000x00<		5.88V	32511	0x7EFF	Upper limit	
$\pm 5V$ $2.5V$ $13824$ $0x5000$ Normal range $0V$ $0$ $0x0000$ Normal range $-2.5V$ $-13824$ $0xCA00$ $U = D \times 5 / 27648$ $-5V$ $-27648$ $0x9400$ Lower limit $-5V$ $-32768$ $0x9400$ Lower limit $-5.88V$ $-32768$ $0x8000$ Lower limit $-5.88V$ $32767$ $0x7FFF$ $0xerlow$ $0.5V$ $5.88V$ $32511$ $0x7EFF$ $0xerlow$ $0.5V$ $5.88V$ $32511$ $0x7EFF$ $0xerlow$ $0.5V$ $2.5V$ $13824$ $0x3600$ $U = D \times 5 / 27648$ $0.5V$ $0.7168$ $0x6C00$ $Normal range$ $U = D \times 5 / 27648$ $1.5V$ $32767$ $0x7EFF$ $0yerlow$ $U = D \times 4 / 27648$ $1.5V$ $32511$ $0x5000$ $U = D \times 4 / 27648$ $1.5V$ $32768$ $0x6C00$ $Normal range$ $0.3V$ $4864$ $0xED00$ Lower limit $0.3V$ $-32768$ $0x800$ Lower limit		5V	27648	0x6C00		
$0V$ $0$ $0x0000$ $0$ $U = D \times 5 / 27648$ $-2.5V$ $-13824$ $0xCA00$ $U = D \times 5 / 27648$ $-5V$ $-27648$ $0x9400$ Lower limit $-5V$ $-32511$ $0x8100$ Lower limit $-5.88V$ $-32768$ $0x8000$ Underflow $-5.88V$ $32767$ $0x7EFF$ $0yerlow$ $-5.88V$ $32511$ $0x7EFF$ $0yerlow$ $-5.88V$ $32511$ $0x7EFF$ $0yerlow$ $0.5V$ $27648$ $0x6C00$ $Nermal range$ $0.5V$ $0.57V$ $327167$ $0x7FFF$ $0yerlow$ $0.5V$ $0.57V$ $327167$ $0x7FFF$ $0yerlow$ $5.7V$ $327167$ $0x7FFF$ $0yerlow$ $0 = 27648 \times (U - 1)/4$ $1.5V$ $2.57V$ $32767$ $0x7FFF$ $0yerlow$ $0 = 27648 \times (U - 1)/4$ $1.5V$ $32768$ $0x6C00$ $Normal range$ $0.3V$ $-4864$ $0xED00$ Lower limit $0.3$		2.5V	13824	0x3600		D = 27648 x U / 5
-2.5V-138240xCA00-5V-276480x9400-5V-327680x8100Lover limit-5.88V-327670x71FFOverflow-5.88V327670x71FFOverflow5.88V325110x7EFFUpper limit5.88V276480x6000 $Merral and and and and and and and and and and$	±5V	$0 \mathrm{V}$	0	0x0000	Normal range	
-5.88V-325110x8100Lower limit<5.88V		-2.5V	-13824	0xCA00		U = D x 5 / 27648
$< -5.88V$ $.32768$ $0.8000$ Underliew $> 55.88V$ $32767$ $0.7FFF$ $Overliow$ $0.5V$ $5.88V$ $32511$ $0.7FFF$ $Upper limit$ $0.5V$ $5.88V$ $32511$ $0.7FFF$ $Upper limit$ $0.5V$ $5.8V$ $27648$ $0.x6000$ $Marrararaa           2.5V 13824 0.x3000 Marraraa U=D \times 5/27648 0.V 0 0.0000 Uu=D \times 5/27648 U=D \times 5/27648 5.7V 32511 0.x7EFF Overliow D=27648 \times (U-1)/4 5.7V 32511 0.x7EFF Overliow D=27648 \times (U-1)/4 5.7V 32511 0.x7EFF Overliow D=27648 \times (U-1)/4 1.5V 2.7648 0.x6C00 Normal range U=D \times 4/27648 \times 1 1.5V 0.3V 1.824 0.x6000 Uue D \times 4/27648 \times 1 0.3V 4.864 0.xED00 Lower limit U=D \times 4/27648 \times 1 0.3V 2.3768 $		-5V	-27648	0x9400		
$\sim$ 5.88V         32767         0x7FFF         Oxerflow         D = 27648 x U/5           0.5V         5.88V         32511         0x7EFF         Upper limit         D = 27648 x U/5           5V         27648         0x6000         Normal range         U = D x 5/27648         U = D x 5/27648           0.5V         13824         0x3600         Normal range         U = D x 5/27648         U = D x 5/27648           0.5V         0.5V         32211         0x7FFF         Oxerflow         D = 27648 x (U - 1)/4           1.5V         32511         0x7EFF         Upper limit         D = 27648 x (U - 1)/4           5.7V         322511         0x7EFF         Upper limit           5.7V         32511         0x7EFF         Upper limit           5.7V         32511         0x7EFF         Upper limit           5.7V         32511         0x7EFF         Upper limit           0.3V         13824         0x3600         Normal range           0.3V         -4864         0xED00         Lower limit           <0.3V		-5.88V	-32511	0x8100	Lower limit	ч.
$0.5 V$ $5.88V$ $32511$ $0.07EFF$ $Upper limit$ $D = 27648 \times U/5$ $5V$ $5V$ $27648$ $0x6C00$ $Marrare Parameter P$		<-5.88V	-32768	0x8000	Underflow	
0.5V $5.88V$ $32511$ $0x7EFF$ $Upper limit$ $0.5V$ $5V$ $27648$ $0x600$ $Normal range$ $U = Dx 5 / 27648$ $2.5V$ $13824$ $0x3600$ $Normal range$ $U = Dx 5 / 27648$ $0V$ $0$ $0x0000$ $U = Dx 5 / 27648$ $U = Dx 5 / 27648$ $0V$ $0$ $0x0000$ $U = Dx 5 / 27648$ $U = Dx 5 / 27648$ $1.5V$ $32767$ $0x7FFF$ $0yer limit$ $D = 27648 x (U - 1) / 4$ $1.5V$ $3V$ $13824$ $0x3600$ $D = 27648 x (U - 1) / 4$ $1.5V$ $3V$ $13824$ $0x3600$ $U = Dx 4 / 27648 + 1$ $0.3V$ $-4864$ $0xED00$ $Lower limit$ $U = Dx 4 / 27648 + 1$ $0.3V$ $-4864$ $0xE000$ $Lower limit$ $U = Dx 4 / 27648 + 1$ $0.3V$ $-4864$ $0x8000$ $Uderflow$ $U = Dx 4 / 27648 + 1$ $0.3V$ $-4864$ $0x8000$ $Uderflow$ $U = Dx 4 / 27648 + 1$ $0.3V$ $-4864$ $0x8000$ $Uderflow$ $D = 27648 x (J - 1) / 4$ $0.3V$ $0.52768$		>5.88V	32767	0x7FFF	Overflow	
5V       27648       0x6C00       Normal range $U = D \times 5 / 27648$ 2.5V       13824       0x3600 $U = D \times 5 / 27648$ 0V       0       0x0000 $U = D \times 5 / 27648$ 10V       0       0x0000 $U = D \times 5 / 27648$ 5.7V       32767       0x7FFF       Overflow         5.7V       32511       0x7EFF       Upper limit         5.7V       32511       0x6C00 $Normal range$ 5.7V       32511       0x3600 $D = 27648 \times (U - 1) / 4$ 1.5V       5.7V       32511       0x6C00 $D = 27648 \times (U - 1) / 4$ 1.5V       3.7V       13824       0x3600 $D = 27648 \times (U - 1) / 4$ 1.5V       0.3V       -4864       0xED00       Lower limit         0.3V       -4864       0xED00       Lower limit         .6.3V       .32768       0x8000       Underflow         Signal range       Current (I)       Decimal data       Hexadecimal data       scope       Conversion relationship         .23.52 mA       32767       0x7FFF       Overflow       D=27648 x 1/20		5.88V	32511	0x7EFF	Upper limit	D = 27648 x U / 5
2.5V       13824       0x3600 $111111111111111111111111111111111111$	0-5V	5V	27648	0x6C00		U. D. 5/07/40
$ \begin{array}{ c c c c c c } & & & & & & & & & & & & & & & & & & &$		2.5V	13824	0x3600	Normal range	$U = D \ge 5 / 2 / 648$
1-5V $5.7V$ $32511$ $0x7EFF$ $Upper limit<D=27648 \times (U-1)/41-5V5V276480x6C00Normal range3V138240x3600U=D \times 4/27648 \times 10^{-1}1V00x0000U=D \times 4/27648 \times 10^{-1}0.3V-48640xED00Lower limit<0.3V-48640xED00Underflow<0.3V-327680x8000UnderflowSignal rangeCurrent (I)Decimal datascopeConversion relationship>23.52 mA327670x7FFF0verflowD=27648 x I/20$		$0 \mathrm{V}$	0	0x0000		
1-5V 27648 0x6C00 Normal range $D = 27648 \times (U-1)/4$ 3V 13824 0x3600 Normal range $U = D \times 4/27648 + 1$ 1V 0 0x0000 Lower limit 0.3V -4864 0xED00 Lower limit < 0.3V -4864 0xED00 Underlow $V = U = D \times 4/27648 + 1$ $V = D \times 4/27648 + 1$ V		>5.7V	32767	0x7FFF	Overflow	
$\begin{array}{ c c c c c } & & & & & & & & & & & & & & & & & & &$		5.7V	32511	0x7EFF	Upper limit	
$3V$ $13824$ $0x3600$ $U = D \times 4 / 27648 + 1$ $1V$ $0$ $0x0000$ $U = D \times 4 / 27648 + 1$ $0.3V$ $-4864$ $0xED00$ Lower limit $<0.3V$ $-32768$ $0x8000$ UnderflowProcess data dataSignal rangeCurrent (I)Decimal dataHexadecimal datascopeConversion relationship>23.52 mA $32767$ $0x7FFF$ $Overflow$		5V	27648	0x6C00		D = 27648 x (U - 1) / 4
IV00x00000.3V-48640xED00Lower limit<0.3V	1-5V	3V	13824	0x3600	Normal range	
<0.3V		1V	0	0x0000		$U = D \times 4 / 2 / 648 + 1$
Process data description (current type)         Signal range       Current (I)       Decimal data       Hexadecimal data       scope       Conversion relationship         >23.52 mA       32767       0x7FFF       Overflow       D = 27648 x I / 20		0.3V	-4864	0xED00	Lower limit	
Signal range     Current (I)     Decimal data     Hexadecimal data     scope     Conversion relationship       >23.52 mA     32767     0x7FFF     Overflow     D=27648 x I / 20		<0.3V	-32768	0x8000	Underflow	
>23.52 mA 32767 $0x7FFF$ Overflow $D = 27648 \times I / 20$	Process data description (current type)					
	Signal range	Current (I)	Decimal data	Hexadecimal data	scope	Conversion relationship
0 - 20 mA		>23.52 mA	32767	0x7FFF	Overflow	D = 27648 x I / 20
23.52 mA 32511 0x7EFF Upper limit $I = D \times 20 / 27648$	0 - 20 MA	23.52 mA	32511	0x7EFF	Upper limit	$I = D \times 20 / 27649$

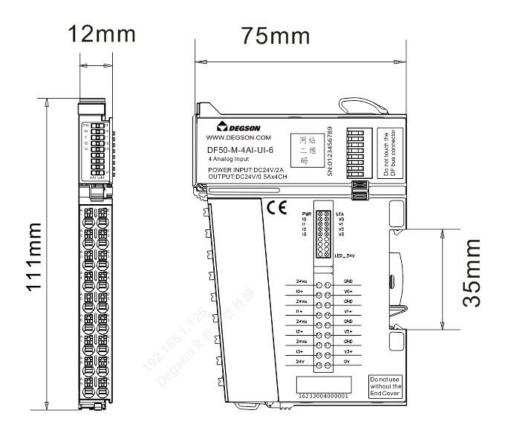


	20 mA	27648	0x6C00		
	10 mA	13824	0x3600	Normal range	
	0 mA	0	0		
	>22.81 mA	32767	0x7FFF	Overflow	
	22.81 mA	32511	0x7EFF	Upper limit	
	20 mA	27648	0x6C00		D = 27648 x (I - 4) / 16
4 – 20 mA	12 mA	13824	0x3600	Normal range	
	4 mA	0	0		I = D x 16 / 27648 + 4
	1.19 mA	-4864	0xED00	Lower limit	
	<1.19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

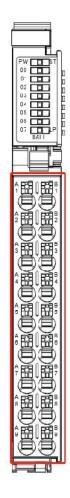


Independent channel anchier configuration	from the interface, and the interface is isolated from the bus.
Independent channel enable configuration Diagnosis reporting function configuration	support
Channel Mode Configuration	support Disable, 0~20mA, 4~20mA
	, , ,
Filter parameter configuration	1000Hz~50Hz configurable
Input Action Display	When the input signal is valid, the input indicator flashes (software controlled)
IO process data size	8 Word
Power parameters	6 Wold
System bus input power rated voltage	5V DC (4.75V DC~ 5.25V DC)
System bus input power rated current	35 DC (4.75 V DC~ 5.25 V DC)
Internal load power input rated voltage	24V DC (20.4V DC~ 28.8V DC)
Internal load power input rated current	24 V DC (20.4 V DC~ 28.8 V DC)
Wiring parameters	2011A
Connection technology: Input	PUSH-IN Terminal Blocks
Wire crimping area	0.2~1.5mm2/26~16AWG
Stripping length	8~10mm <sup>2</sup>
Installation	DIN-35 rail
Material parameters	
color	black
Housing Material	PC plastic, PA66
Conformance mark	CE
Environmental requirements	
Allowable ambient temperature (operating)	-25~60°C
Permissible ambient temperature (storage)	-40~85°C
Protection type	IP20
Pollution degree	2. Comply with IEC 61131-2 standard
Operating altitude	Temperature without derating: $0 \sim 2000$ m
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	10ppm
75% relative humidity	
Permissible SO2 pollutant concentration at 75%	25ppm
relative humidity	



## 6.2 Hardware Interface

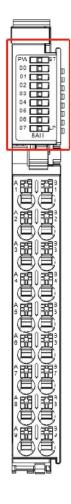
### 6.2.1 WiringTerminal Definition



TerminalsSerial number	Signal	TerminalsSerial number	Signal	illustrate
A1	I0+	B1	I0-	Current input channel 1
A2	I1+	B2	I1-	Current input channel2
A3	I2+	B3	I2-	Current input channel3
A4	I3+	B4	I3-	Current input channel4
A5	I4+	B5	I4-	Current input channel5
A6	I5+	B6	I5-	Current input channel6
A7	I6+	B7	I6-	Current input channel7
A8	I7+	B8	I7-	Current input channel8
A9	/	B9	/	/



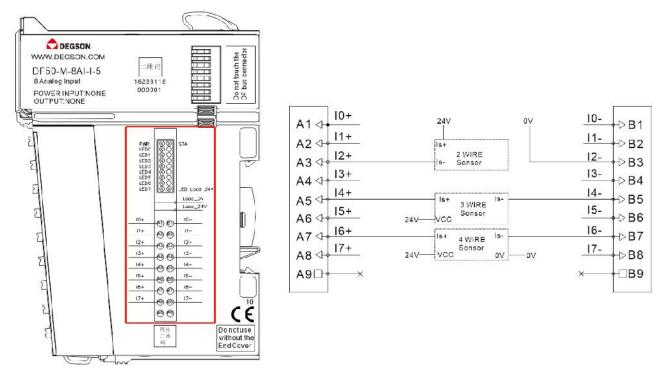
## 6.2.2 LED Indicator definition



Indicator Lights	meaning			
PW	Green:System bus power inputnormal			
Г VV	Green Kill:S	ystem bus power inputabnormal		
	Power-on	Green: Module initialization error		
	stage	Green off: Module initialization is normal		
	On anotion of	Green flash: The internal bus of the module is working normally		
ST	Operational	Green off/green on: The internal bus of the module is working		
	stage	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			
00~07	Green off: In	nput signal is invalid		



#### 6.2.3 Wiring Diagram



### 6.3 Module configuration data definition

As shown in the figure, the user can configure each channelSignal range and signal filtering.

SignalRange Setting(CH0):	Disabled
SignalRange Setting(CH1):	Disabled
SignalRange Setting(CH2):	Disabled
SignalRange Setting(CH3):	Disabled
SignalRange Setting(CH4):	Disabled
SignalRange Setting(CH5):	Disabled
SignalRange Setting(CH6):	Disabled
SignalRange Setting(CH7):	Disabled
SignalFilter Setting(CH0):	100Hz_10ms
SignalFilter Setting(CH1):	100Hz_10ms
SignalFilter Setting(CH2):	100Hz_10ms
SignalFilter Setting(CH3):	100Hz_10ms
SignalFilter Setting(CH4):	100Hz_10ms
SignalFilter Setting(CH5):	100Hz_10ms
SignalFilter Setting(CH6):	100Hz_10ms
SignalFilter Setting(CH7):	100Hz_10ms

#### DF50-M-8AI-I-5 Parameter Setting



# 6.4 Module process data definition

	Input data:16Byte				
ByteNo.	Word No.	meaning			
Byte0-Byte1	Word0	Channel 0 input data			
Byte2-Byte3	Word1	Word1Channel 1 input dataWord2Channel 2 input dataWord3Channel 3 input data			
Byte4-Byte5	Word2				
Byte6-Byte7	Word3				
Byte8-Byte9	Word4	aisle4Input Data			
Byte10-Byte11	Word5	aisle5Input Data			
Byte12-Byte13	Word6	aisle6Input Data			
Byte14-Byte15	Word7	ord7 aisle7Input Data			

Process data definition description:

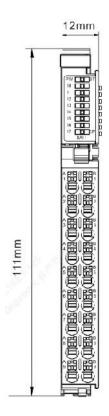
	Process data description (current type)						
Signal range	Signal range Current		Hexadecimal	scope	Conversion relationship		
	>23.52	32767	0x7FFF	Overflow			
$0 \sim 20 \text{ mA}$	23.52 mA	32511	0x7EFF	Upper	D = 27648 x I / 20		
	20 mA	27648	0x6C00	Normal			
	10 mA	13824	0x3600	range	I = D x 20 / 27648		
	0 mA	0	0	8			
	>22.81	32767	0x7FFF	Overflow	D = 27648 x (I – 4) / 16		
$4{\sim}20~mA$	22.81 mA	32511	0x7EFF	Upper			
	20 mA	27648	0x6C00	Normal	I = D x 16 / 27648 + 4		

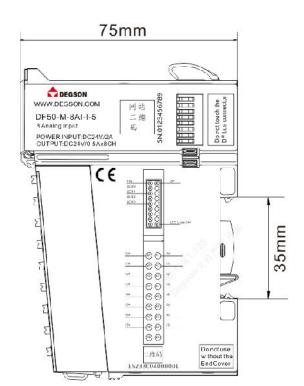


12 mA	13824	0x3600	
4 mA	0	0	
1.19 mA	-4864	0xED00	Lower
<1.19 mA	-32768	0x8000	Underflo

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  $\pm 10V$ ,  $0 \sim 10V$ ,  $2 \sim 10V$ ,  $\pm 5V$ ,  $0 \sim 5V$ ,  $1 \sim 5V$  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		

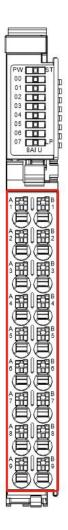


	bus.		
Independent channel enable configuration	support		
Diagnosis reporting function configuration	support		
Channel Mode Configuration	Disable,±10V,0~10V, 2~10V, ±5V, 0~5V, 1~5V		
Filter parameter configuration	1000Hz~50Hz configurable		
Input Action Display	When the input signal is valid, the input indicator flashes		
	(software controlled)		
IO process data size	8Word		
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	0.2~1.5mm2/26~16AWG		
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°C		
Permissible ambient temperature (storage)	-40~85°C		
Protection type	IP20		
Pollution degree	2. Comply with IEC 61131-2 standard		
Operating altitude	Temperature without derating: $0 \sim 2000$ m		
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	10ppm		
75% relative humidity			
Permissible SO2 pollutant concentration at 75%	25ppm		
relative humidity			



### 7.2 Hardware Interface

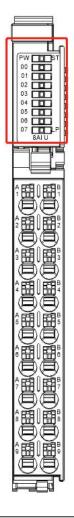
### 7.2.1 WiringTerminal Definition



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	/	/



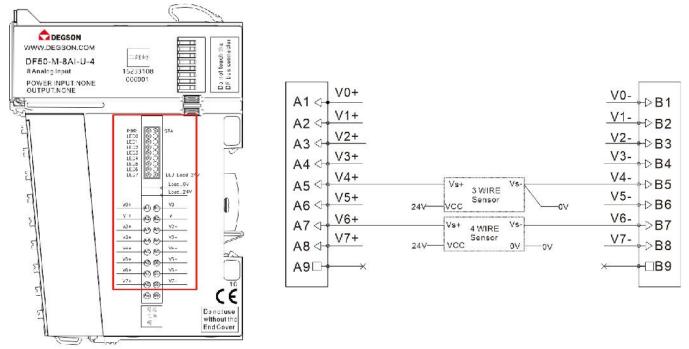
#### 7.2.2 LED indicator definition



Indicator Lights	meaning						
PW	Green:System bus power inputnormal				Green:System bus power inputnormal		
F VV	Green Kill:S	ystem bus power inputabnormal					
	Power-on	Green: Module initialization error					
	stage	Green off: Module initialization is normal					
	Onemational	Green flash: The internal bus of the module is working normally					
ST	Operational	Green off/green on: The internal bus of the module is working					
	stage	abnormally or the internal load power input is abnormal.					
LP	Green: Internal load power input is normal						
Lr	Green off: Internal load power input is abnormal						
00 ~ .07	Green flash: input signal is valid						
00~07	put signal is invalid						



#### 7.2.3 Wiring Diagram



### 7.3 Module configuration data definition

As shown in the figure, the user can configure each channelSignal range and signal filtering.



DF50-M-8AI-U-4 Paramete	er Setting
-------------------------	------------

	5a
SignalRange Setting(CH0):	Disabled
SignalRange Setting(CH1):	Disabled
SignalRange Setting(CH2):	Disabled
SignalRange Setting(CH3):	Disabled
SignalRange Setting(CH4):	Disabled
SignalRange Setting(CH5):	Disabled
SignalRange Setting(CH6):	Disabled
SignalRange Setting(CH7):	Disabled
SignalFilter Setting(CH0):	100Hz_10ms
SignalFilter Setting(CH1):	100Hz_10ms
SignalFilter Setting(CH2):	100Hz_10ms
SignalFilter Setting(CH3):	100Hz_10ms
SignalFilter Setting(CH4):	100Hz_10ms
SignalFilter Setting(CH5):	100Hz_10ms
SignalFilter Setting(CH6):	100Hz_10ms
SignalFilter Setting(CH7):	100Hz_10ms

## 7.4 Module process data definition

	Input data:16Byte				
ByteNo.	Word No.	meaning			
Byte0-Byte1	Word0	Channel 0 input data			
Byte2-Byte3	Word1	Word1 Channel 1 input data			
Byte4-Byte5	Word2	Channel 2 input data			
Byte6-Byte7	Word3	Channel 3 input data			
Byte8-Byte9	Word4	aisle4Input Data			
Byte10-Byte11	Word5	aisle5Input Data			
Byte12-Byte13	Word6	aisle6Input Data			



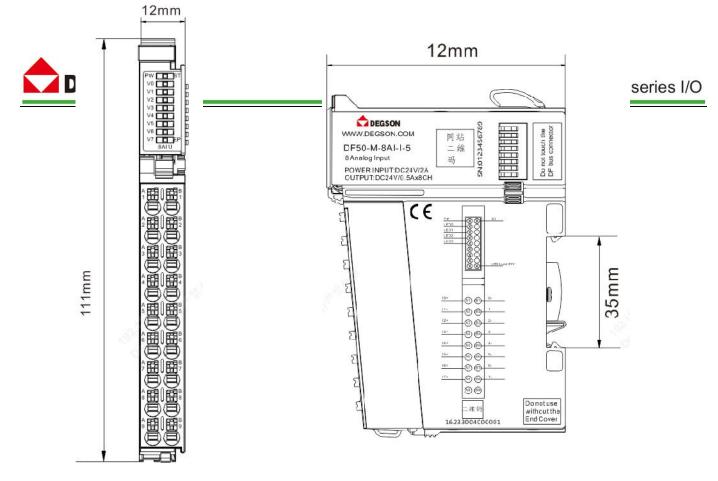
Byte14-Byte15	Word7	aisle7Input Data

### Process data definition description:

Process data description (voltage type)						
Signal range	Voltage value	Decimal data	Hexadecimal data	Scope	Conversion relationship	
	>11.76V	32767	0x7FFF	Overflow		
	11.76V	32511	0x7EFF	Upper limit		
	10V	27648	0x6C00			
	5V	13824	0x3600		D = 27648 x U / 10	
±10V	0V	0	0x0000	Normal range	U = D = 10 / 27649	
	-5V	-13824	0xCA00		U = D x 10 / 27648	
	-10V	-27648	0x9400			
	-11.76V	-32511	0x8100	Lower limit		
	<-11.76V	-32768	0x8000	Underflow		
	>11.76V	32767	0x7FFF	Overflow		
0~10V	11.76V	32511	0x7EFF	Upper limit	D = 27648 x U / 10	
0~10V	10V	27648	0x6C00	Normal ran as	U = D x 10 / 27648	
	5V	13824	0x3600	Normal range	$0 = D \times 10727040$	
	0V	0	0x0000			
	>11.41V	32767	0x7FFF	Overflow		
	11.41V	32511	0x7EFF	Upper limit	D 07(40 (L 0)/0	
	10V	27648	0x6C00	Normal range	D = 27648 x (U - 2) / 8	
2~10V	6V	13824	0x3600	Normai range	U = D x 8 / 27648 + 2	
	2V	0	0x0000		5 <u>5</u> X 67 27040 + 2	
	0.59 V	-4864	0xED00	Lower limit		
	<0.59 V	-32768	0x8000	Underflow		
$\pm 5 V$	>5.88V	32767	0x7FFF	Overflow	D = 27648 x U / 5	
	5.88V	32511	0x7EFF	Upper limit		



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



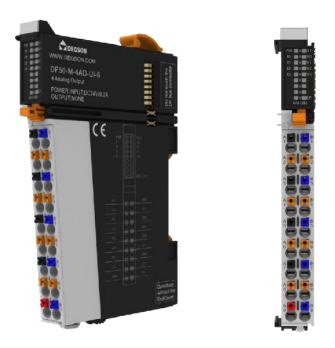
### 7.5 Mechanical Installation

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	$\pm 0.1\%$			
Current output range	0~20mA, 4~20mA			
Current output load	<600Ω			
Current output accuracy	±0.1%			

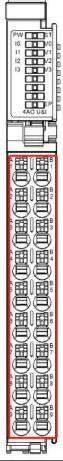


Isolation	The interface channels are not isolated, the power supply is isolated from the interface, and the interface is isolated from the bus.		
Independent channel enable configuration	support		
Diagnosis reporting function configuration	support		
Channel Mode Configuration	Disable, $\pm 10V$ , 0~10V, 2~10V, $\pm 5V$ , 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	0.2~1.5mm2/26~16AWG		
Stripping length	8~10mm		
Installation	DIN-35 rail		
Material parameters			
color	black		
Housing Material	PC plastic, PA66		
Conformance mark	CE		
Environmental requirements			
Allowable ambient temperature (operating)	-25~60°C		
Permissible ambient temperature (storage)	-40~85°C		
Protection type	IP20		
Pollution degree	2. Comply with IEC 61131-2 standard		
Operating altitude	Temperature without derating: $0 \sim 2000$ m		
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

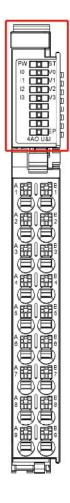
### 8.2.1 WiringTerminal Definition



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	В9	0V	Terminal power input 0V



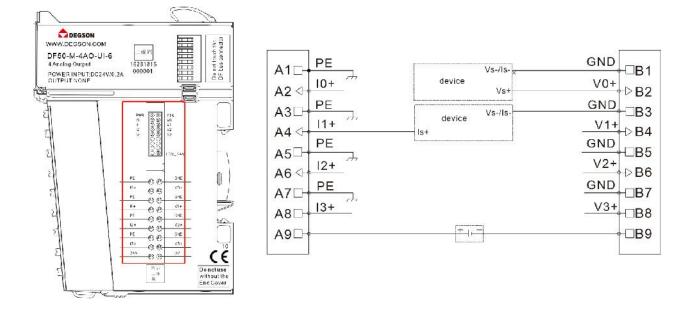
#### 8.2.2 LED indicators definition



Indicator Lights	meaning				
DW	Bits         Green:System bus powerSource Inputnormal           Green Kill:System bus powerSource Inputabnormal				
PW					
	Power-on	Green: Module initialization error			
	stage	Green off: Module initialization is normal			
		Green flash: The internal bus of the module is working normally			
ST	Operational	Green off/green on: The internal bus of the module is working			
	stage	abnormally or the terminal power input is abnormal			
ED	Green: The to	erminal power input is normal			
EP	Green off: Terminal power input abnormality				
	Green flash:	output signal is valid			
I0~I3,V0~V3	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 each channelSignal range.

DF50-M-4AO-UI-6 Parameter	Setting
SignalRange Setting(CH0):	Disabled
SignalRange Setting(CH1):	Disabled
SignalRange Setting(CH2):	Disabled
SignalRange Setting(CH3):	Disabled



# 8.4 Module process data definition

loseoutData: 8 Bytes					
ByteNo.	Word No.	meaning			
Byte0-Byte1	Word0	Channel 0 Inputoutdata			
Byte2-Byte3	Word1	aislelloseoutdata			
Byte4-Byte5	Word2	aisle2loseoutdata			
Byte6-Byte7	Word3	aisle3loseoutdata			

Channel output data description:

Signal range	Voltage value (U)	Decimal data	Hexadecimal data	Scope	Conversion relationship
	0V	>32511	>0x7EFF	Overflow	
	11.76V	32511	0x7EFF	Upper limit	
	10V 27648 0x6C00				
	5V	13824	0x3600	- Normal - range	D 07/40 U/40
±10V	0V	0	0x0000		D = 27648 x U / 10 U = D x 10 / 27648
	-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



	11.76V	32511	0x7EFF	Upper limit	U = D x 10 / 27648
	10V	27648	0x6C00	Normal	
	5V	13824	0x3600	range	
	0V	0	0x0000		
	0V	>32511	>0x7EFF	Overflow	
	11.41V	32511	0x7EFF	Upper limit	
	10V	27648	0x6C00	Normal	D = 27648 + (11 - 2)/8
2~10V	6V	13824	0x3600	Normal	D = 27648 x (U - 2) / 8
	2V	0	0x0000	range	U = D x 8 / 27648 + 2
	0.59 V	-4864	0xED00	Lower limit	
	0 V	<-4864	<ed00< td=""><td>Underflow</td><td></td></ed00<>	Underflow	
	0V	>32511	>7EFF	Overflow	
	5.88V	32511	0x7EFF	Upper limit	
	5V	27648	0x6C00		
	2.5V	13824	0x3600	Normal	D = 27649 = 11/5
±5V	0V	0	0x0000	Normal	$D = 27648 \times U / 5$
	-2.5V	-13824	0xCA00	range	U = D x 5 / 27648
	-5V	-27648	0x9400		
	-5.88V	-32511	0x8100	Lower limit	
	$0\nabla$	<-32511	<0x8100	Underflow	



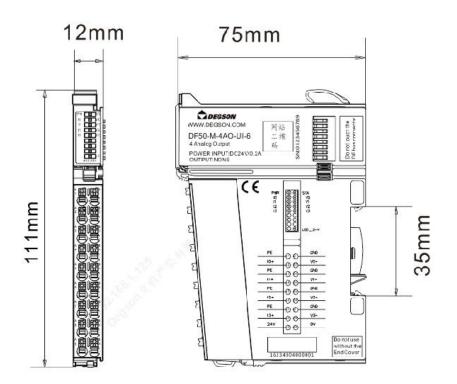
	0V	>32511	>0x7EFF	Overflow	
	5.88V	32511	0x7EFF	Upper limit	D = 27648 x U / 5
0~5V	5V	27648	0x6C00	Normal	$D = 27648 \times 073$ $U = D \times 5/27648$
	2.5V	13824	0x3600	range	$U = D \times 3727048$
	0V	0	0x0000		
1.51/	0V	>22511	> 0+ 7EEE	Ourflow	D = 27648 x (U - 1) / 4
1~5V	00	>32511	>0x7EFF	Overflow	$U = D \ge 4 / 27648 + 1$

Signal range	Current value (I)	Decimal data	Hexadecimal data	Scope	Conversion relationship
	0ma	>32511	>0x7EFF	Overflow	
	23.52ma	32511	0x7EFF	Upper limit	D = 27749 - 1/20
0~20ma	20ma	27648	0x6C00	Normal	D = 27648 xI/ 20 I= D x 20/ 27648
	10ma	13824	0x3600	range	I- D X 20/ 27048
	0ma	0	0x0000		
	0ma	>32511	>0x7EFF	Overflow	
	22.81ma	32511	0x7EFF	Upper limit	
4~20ma	20ma	27648	0x6C00	Normal	D = 27648 x (I-4) / 16
4~20111a	12ma	13824	0x3600		I= D x 16 / 27648 + 4
	4ma	0	0x0000	range	
	1.19ma	-4864	0xED00	Lower limit	

<b>DEG</b>	SON				DF50 series I/O
	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

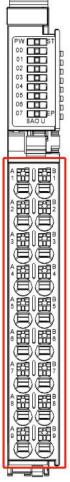


	isolated from the interface, and the interface is isolated from the
	bus.
Independent channel enable configuration	support
Diagnosis reporting function configuration	support
Channel Mode Configuration	Disable,±10V, 0~10V, 2~10V, ±5V, 0~5V, 1~5V
Output status configuration after shutdown	Clear and keep 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	8Word
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	0.2~1.5mm2/26~16AWG
Stripping length	8~10mm
Installation	DIN-35 rail
Material parameters	
color	black
Housing Material	PC plastic, PA66
Conformance mark	CE
Environmental requirements	
Allowable ambient temperature (operating)	-25~60°C
Permissible ambient temperature (storage)	-40~85°C
Protection type	IP20
Pollution degree (5)	2. Comply with IEC 61131-2 standard
Operating altitude	Temperature without derating: $0 \sim 2000$ m
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	10ppm
75% relative humidity	1 obbu
Permissible SO2 pollutant concentration at 75%	25ppm
relative humidity	2. ppm



### 9.2 Hardware Interface

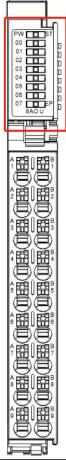
### 9.2.1 WiringTerminal Definition



Terminal number	Signal	Terminal number	Signal	illustrate
Al	V0+	B1	V0-	Voltage output channel0
A2	V1+	B2	V1-	Voltage output channel1
A3	V2+	В3	V2-	Voltage output channel2
A4	V3+	B4	V3-	Voltage output channel3
A5	V4+	В5	V4-	Voltage output channel4
A6	V5+	B6	V5-	Voltage output channel5
A7	V6+	B7	V6-	Voltage output channel6
A8	V7+	B8	V7-	Voltage output channel7
A9	24V	В9	0V	Terminal power input



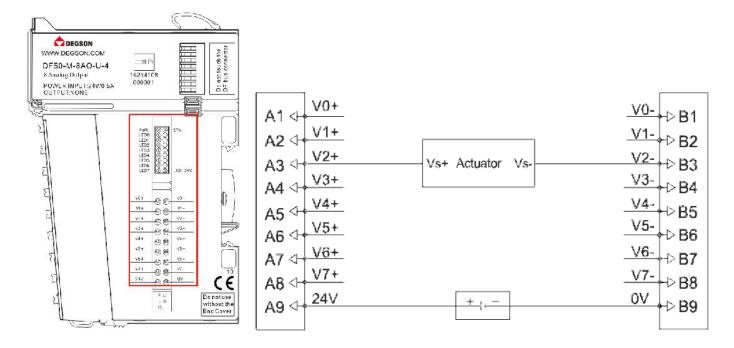
#### 9.2.2 LED indicators definition



Indicator Lights		meaning		
PW	Green:Syster	Green:System bus powerSource Inputnormal		
F VV	Green Kill:S	Green Kill:System bus powerSource Inputabnormal		
	Power-on	Green: Module initialization error		
	stage	Green off: Module initialization is normal		
	Onemational	Green flash: The internal bus of the module is working normally		
ST	Operational	Green off/green on: The internal bus of the module is working		
stage abnormally or the ter		abnormally or the terminal power input is abnormal		
EP	Green: The to	Green: The terminal power input is normal		
Green off: Terminal power input abnormality		erminal power input abnormality		
	Green flash: output signal is valid			
$V0 \sim V7$ 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 each channelSignal range.

DF50-M-8AO-U-4 Parameter	Setting
SignalRange Setting(CH0):	Disabled
SignalRange Setting(CH1):	Disabled
SignalRange Setting(CH2):	Disabled
SignalRange Setting(CH3):	Disabled
SignalRange Setting(CH4):	Disabled
SignalRange Setting(CH5):	Disabled
SignalRange Setting(CH6):	Disabled
SignalRange Setting(CH7):	Disabled

#### 9.4 Module process data definition

loseoutdata:16Byte			
ByteNo.	Word No.	meaning	



Byte0-Byte1	Word0	Channel 0 Inputoutdata	
Byte2-Byte3	Word1	aisle1loseoutdata	
Byte4-Byte5	Word2	aisle2loseoutdata	
Byte6-Byte7	Word3	aisle3loseoutdata	
Byte8-Byte9	Word4	aisle4loseoutdata	
Byte10-Byte11	Word5	aisle5loseoutdata	
Byte12-Byte13	Word6	aisle6loseoutdata	
Byte14-Byte15	Word7	aisle7loseoutdata	

### Channel output data description:

Signal range	Voltage value (U)	Decimal data	Hexadecimal data	Scope	Conversion relationship
	0V	>32511	>0x7EFF	Overflow	
	11.76V	32511	0x7EFF	Upper limit	
	10V	27648	0x6C00		
	5V	13824	0x3600		D 07(40 11/10
±10V	0V	0	0x0000	Normal	D = 27648 x U / 10
	-5V	-13824	0xCA00	range	U = D x 10 / 27648
	-10V	-27648	0x9400		
	-11.76V	-32511	0x8101	Lower limit	
	0V	<-32511	<0x8101	Underflow	
0~10V	0V	>32511	>0x7EFF	Overflow	D = 27648 x U / 10



	11.76V	32511	0x7EFF	Upper limit	U = D x 10 / 27648
	10V	27648	0x6C00	Normal	
	5V	13824	0x3600	range	
	0V	0	0x0000		
	0V	>32511	>0x7EFF	Overflow	
	11.41V	32511	0x7EFF	Upper limit	
	10V	27648	0x6C00	Nameal	D = 27(49 - (11 - 2)/9)
2~10V	6V	13824	0x3600	Normal	$D = 27648 \times (U - 2) / 8$
	2V	0	0x0000	range	U = D x 8 / 27648 + 2
	0.59 V	-4864	0xED00	Lower limit	
	0 V	<-4864	<0xED00	Underflow	
	0V	>32511	>0x7EFF	Overflow	
	5.88V	32511	0x7EFF	Upper limit	
	5V	27648	0x6C00		
	2.5V	13824	0x3600	Normal	D = 27648 x U / 5
±5V	$0 \nabla$	0	0x0000		$U = D \times 5 / 27648$
	-2.5V	-13824	0xCA00	range	$U = D \times 3 / 2 / 040$
	-5V	-27648	0x9400		
	-5.88V	-32511	0x8100	Lower limit	
	0V	<-32511	<0x8101	Underflow	

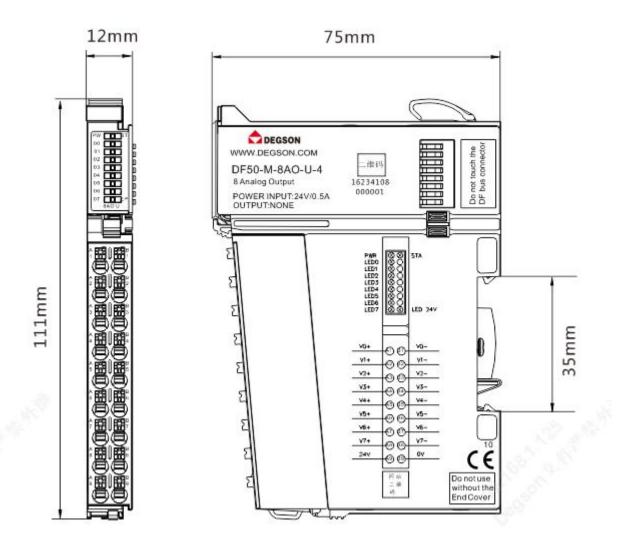


	0V	>32511	>0x7EFF	Overflow	
	5.88V	32511	0x7EFF	Upper limit	D = 27(49 - 11/5)
0~5V	5V	27648	0x6C00	Normal	D = 27648 x U / 5 U = D x 5 / 27648
	2.5V	13824	0x3600	range	$U = D \times 37 / 27048$
	0V	0	0x0000		
	0V	>32511	>0x7EFF	Overflow	
	5.7V	32511	0x7EFF	Upper limit	
	5V	27648	0x6C00		D 27(49 (II 1)/4
1~5V	3V	13824	0x3600	Normal	D = 27648 x (U - 1) / 4 $U = D x 4 / 27648 + 1$
	1V	0	0x0000	range	U = D X 4 / 2 / 648 + 1
	0.3V	-4864	0xED00	Lower limit	
	0V	<-4864	<0xED00	Underflow	



### 9.5 Mechanical Installation

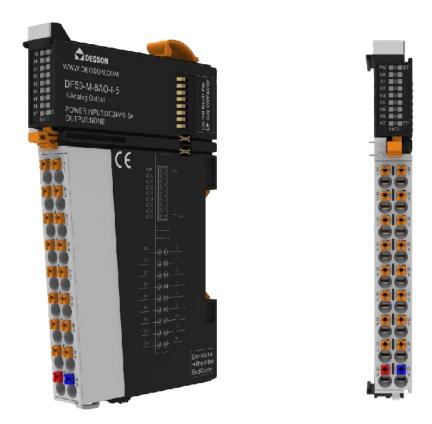
The installation dimensions are shown in the figure below, in mm:





### 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

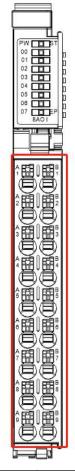


isolated from the interface, and the interface is isolated from the bus.Independent channel enable configurationsupportDiagnosis reporting function configurationDisable.0-20mA, 4-20mAOutput status configuration after shutdownClear and kcep current outputStop ModeIn the fault shutdown mode, no more refreshInput Action DisplayWhen the output signal is valid, the output indicator light flashes (software controlled)IO process data size8 WordPower parametersSystem bus input power rated voltageSystem bus input power rated voltage5V DC (4.75V DC~ 5.25V DC)System bus input power rated voltage24V DC (20.4V DC~ 28.8V DC)Terminal power input rated voltage24V DC (20.4V DC~ 28.8V DC)Terminal power input rated voltage0.2~1.5mm2/26~16AWGWire crimping area0.2~1.5mm2/26~16AWGStripping length8~10mmInstallationDIN-35 railMaterial parametersCEcolorblackHousing MaterialCD placic, PA66Conformance markCEEnvironmental requirementsAllowable ambient temperature (operating)-25~60°CPermissible ambient temperature (operating)-25~60°CPermensible ambient temperature (operating)-25~60°CProtection typeIP20Pollution degree (5)2. Comply with IEC 61131-2 standardOperating allitudeTemperature without derating: 0~2000mRelative humidity (non-condensing)5~95%RHVibration resistanceIg, in accordance with IEC 60068-2-43 sta		
Independent channel enable configuration         support           Diagnosis reporting function 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           Powcer parameters         System bus input power rated voltage           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         33mA           Wire rimping area         0.2~1.5mm2/26~16AWG           Stripping length         8~10mm           Installation         DIN-35 rail           Material parameters		
Diagnosis reporting function configuration         support           Channel Mode 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           Wring parameters         *           Connection technology: Output         PUSH-IN Terminal Blocks           Wire orimping area         0.2~1.5mm2/26~16AWG           Stripping length         8~10mm           Installation         DIN-35 rail           Material parameters         *           color         black           Housing Material         PC plastic, PA66           Conformance mark         CE           Environmental requirements         -25~60°C           Pertestion type         IP20           Pollution degree (5)         2. Comply with IEC 611		
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         5           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           Wire rimping area         0.2~1.5mm2/26~16AWG           Stripping length         8~10mm           Installation         DIN-35 rail           Material parameters         Ce           color         black           Housing Material         PC plastic, PA66           Conformance mark         CE           Environmental requirements         -40~85°C           Protection type         IP20           Pollution degree (5)         2. Comply with IEC 61131-2 standard           Operating altitude         Temperature without derating: 0~2000m           Relative humidity (		
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         Suripping length           Nerreinping area         0.2~1.5mm2/26~16AWG           Stripping length         8~10mm           Installation         DIN-35 rail           Material parameters         CE           color         black           Housing Material         PC plastic, PA66           Conformance mark         CE           Permissible ambient temperature (operating)         -25~60°C           Permetsible ambient temperature (operating)         -25~60°C           Pertection type         IP20           Polution degree (5)         2. Comply with IEC 61131-2		
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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 voltage       24V DC (20.4V DC~ 28.8V DC)         Terminal power input rated voltage       24V DC (20.4V DC~ 28.8V DC)         Terminal power input rated current       33mA         Wiring parameters       7000000000000000000000000000000000000	Input Action Display	
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       0.2 VDC (20.4V DC~ 28.8V DC)         Connection technology: Output       PUSH-IN Terminal Blocks         Wire crimping area       0.2~1.5mm2/26~16AWG         Stripping length       8~10mm         Installation       DIN-35 rail         Material parameters       color         color       black         Housing Material       PC plastic, PA66         Conformance mark       CE         Environmental requirements       -25~60°C         Allowable ambient temperature (operating)       -25~60°C         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       15g, compliant with IEC 60068-2-27         EMC anti-interference level       Compliant with IEC 60068-2-43 standards         Oppm       10ppm		
System bus input power rated voltage $5V DC (4.75V DC \sim 5.25V DC)$ System bus input power rated current $35mA$ Terminal power input rated voltage $24V DC (20.4V DC \sim 28.8V DC)$ Terminal power input rated current $33mA$ Wiring parameters $0.2 \sim 1.5mm2/26 \sim 16AWG$ Connection technology: OutputPUSH-IN Terminal BlocksWire crimping area $0.2 \sim 1.5mm2/26 \sim 16AWG$ Stripping length $8 \sim 10mm$ InstallationDIN-35 railMaterial parameters $color$ colorblackHousing MaterialPC plastic, PA66Conformance markCEEnvironmental requirementsAllowable ambient temperature (operating) $-25 \sim 60^{\circ}C$ Permissible ambient temperature (storage) $40 \sim 85^{\circ}C$ Protection typeIP20Pollution degree (5) $2.$ Comply with IEC 61131-2 standardOperating altitudeTemperature without derating: $0 \sim 2000m$ Relative humidity (non-condensing) $5 \sim 95\% RH$ Vibration resistance15 g, compliant with IEC 60068-2-6Shock resistance15 g, compliant with IEC 60068-2-7EMC anti-interference levelCompliant with IEC 60068-2-43 atandardsPermissible H2S contaminant concentration at $75\%$ relative humidityID0pm		8 Word
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Wiring parametersConnection technology: OutputPUSH-IN Terminal BlocksWire crimping area0.2~1.5mm2/26~16AWGStripping length8~10mmInstallationDIN-35 railMaterial parameterscolorcolorblackHousing MaterialPC plastic, PA66Conformance markCEEnvironmental requirementsAllowable ambient temperature (operating)-25~60°CPermissible ambient temperature (storage)-40~85°CProtection typeIP20Pollution degree (5)2. Comply with IEC 61131-2 standardOperating altitudeTemperature without derating: 0~2000mRelative humidity (non-condensing)5~95%RHVibration resistance15g, compliant with IEC 60068-2-6Shock resistance15g, compliant with IEC 60068-2-43 standardsPermissible H2S contaminant concentration at 75%25ppm		
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Permissible ambient temperature (storage)-40~85°CProtection typeIP20Pollution degree (5)2. Comply with IEC 61131-2 standardOperating altitudeTemperature without derating: 0~2000mRelative humidity (non-condensing)5~95%RHVibration resistance1g, in accordance with IEC 60068-2-6Shock resistance15g, compliant with IEC 60068-2-6Shock resistance15g, compliant with IEC 60068-2-42Corrosion resistanceCompliant with IEC 60068-2-43 standardsPermissible H2S contaminant concentration at 75% relative humidity10ppmPermissible SO2 pollutant concentration at 75%25ppm	Environmental requirements	
Protection typeIP20Pollution degree (5)2. Comply with IEC 61131-2 standardOperating altitudeTemperature without derating: 0~2000mRelative humidity (non-condensing)5~95%RHVibration resistance1g, in accordance with IEC 60068-2-6Shock resistance15g, compliant with IEC 60068-2-7EMC anti-interference levelCompliant with IEC 61000-4Corrosion resistanceCompliant with IEC 60068-2-42 and IEC 60068-2-43 standardsPermissible H2S contaminant concentration at 75% relative humidity10ppmPermissible SO2 pollutant concentration at 75%25ppm		-25~60°C
Pollution degree (5)2. Comply with IEC 61131-2 standardOperating altitudeTemperature without derating: 0~2000mRelative humidity (non-condensing)5~95%RHVibration resistance1g, in accordance with IEC 60068-2-6Shock resistance15g, compliant with IEC 60068-2-7EMC anti-interference levelCompliant with IEC 61000-4Corrosion resistanceCompliant with IEC 60068-2-42 and IEC 60068-2-43 standardsPermissible H2S contaminant concentration at 75% relative humidity10ppmPermissible SO2 pollutant concentration at 75%25ppm	Permissible ambient temperature (storage)	-40~85°C
Operating altitudeTemperature without derating: 0~2000mRelative humidity (non-condensing)5~95%RHVibration resistance1g, in accordance with IEC 60068-2-6Shock resistance15g, compliant with IEC 60068-2-7EMC anti-interference levelCompliant with IEC 61000-4Corrosion resistanceCompliant with IEC 60068-2-42 and IEC 60068-2-43 standardsPermissible H2S contaminant concentration at 75% relative humidity10ppmPermissible SO2 pollutant concentration at 75%25ppm	Protection type	IP20
Relative humidity (non-condensing)5~95%RHVibration resistance1g, in accordance with IEC 60068-2-6Shock resistance15g, compliant with IEC 60068-2-27EMC anti-interference levelCompliant with IEC 61000-4Corrosion resistanceCompliant with IEC 60068-2-42 and IEC 60068-2-43 standardsPermissible H2S contaminant concentration at 75% relative humidity10ppmPermissible SO2 pollutant concentration at 75%25ppm	Pollution degree (5)	2. Comply with IEC 61131-2 standard
Relative humidity (non-condensing)5~95%RHVibration resistance1g, in accordance with IEC 60068-2-6Shock resistance15g, compliant with IEC 60068-2-27EMC anti-interference levelCompliant with IEC 61000-4Corrosion resistanceCompliant with IEC 60068-2-42 and IEC 60068-2-43 standardsPermissible H2S contaminant concentration at 75% relative humidity10ppmPermissible SO2 pollutant concentration at 75%25ppm	Operating altitude	Temperature without derating: $0 \sim 2000$ m
Vibration resistance1g, in accordance with IEC 60068-2-6Shock resistance15g, compliant with IEC 60068-2-27EMC anti-interference levelCompliant with IEC 61000-4Corrosion resistanceCompliant with IEC 60068-2-42 and IEC 60068-2-43 standardsPermissible H2S contaminant concentration at 75% relative humidity10ppmPermissible SO2 pollutant concentration at 75%25ppm	Relative humidity (non-condensing)	
Shock resistance15g, compliant with IEC 60068-2-27EMC anti-interference levelCompliant with IEC 61000-4Corrosion resistanceCompliant with IEC 60068-2-42 and IEC 60068-2-43 standardsPermissible H2S contaminant concentration at 75% relative humidity10ppmPermissible SO2 pollutant concentration at 75%25ppm		1g, in accordance with IEC 60068-2-6
EMC anti-interference levelCompliant with IEC 61000-4Corrosion resistanceCompliant with IEC 60068-2-42 and IEC 60068-2-43 standardsPermissible H2S contaminant concentration at 75% relative humidity10ppmPermissible SO2 pollutant concentration at 75%25ppm		
Corrosion resistanceCompliant with IEC 60068-2-42 and IEC 60068-2-43 standardsPermissible H2S contaminant concentration at 75% relative humidity10ppmPermissible SO2 pollutant concentration at 75%25ppm	EMC anti-interference level	
Permissible H2S contaminant concentration at 75% relative humidity10ppmPermissible SO2 pollutant concentration at 75%25ppm		
75% relative humidity     11       Permissible SO2 pollutant concentration at 75%     25ppm	Permissible H2S contaminant concentration at	
Permissible SO2 pollutant concentration at 75% 25ppm		
		25ppm



### 10.2 Hardware Interface

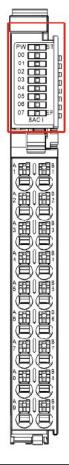
### 10.2.1 WiringTerminal Definition



Terminal number	Signal	Terminal number	Signal	illustrate
A1	I0+	B1	I0-	Current output channel 0
A2	I1+	B2	I1-	Current output channel 1
A3	I2+	B3	I2-	Current output channel 2
A4	I3+	B4	I3-	Current output channel 3
A5	I4+	В5	I4-	Current output channel 4
A6	I5+	B6	I5-	Current output channel 5
A7	I6+	B7	I6-	Current output channel 6
A8	I7+	B8	I7-	Current output channel 7
A9	24V	В9	0V	Terminal power input



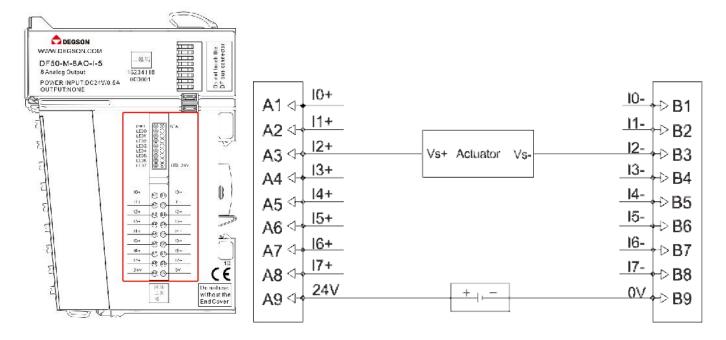
#### 10.2.2 LED Indicator definition



Indicator Lights		meaning
PW	Green:Syster	n bus powerSource Inputnormal
L AA	Green Kill:S	ystem bus powerSource Inputabnormal
	Power-on	Green: Module initialization error
	stage	Green off: Module initialization is normal
	Onomianal	Green flash: The internal bus of the module is working normally
ST	Operational	Green off/green on: The internal bus of the module is working
	stage	abnormally or the terminal power input is abnormal
EP	Green: The to	erminal power input is normal
Er	Green off: Te	erminal power input abnormality
10 - 17	Green flash:	output signal is valid
I0~I7	Green off: O	utput signal is invalid



#### 10.2.3 Wiring Diagram



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

### 10.3 Module Configuration Data Definition

likeAs shown in the figure, users can configure each channelSignal range.

DF50-M-8AO-I-5 Parameter S	etting
SignalRange Setting(CH0):	Disabled
SignalRange Setting(CH1):	Disabled
SignalRange Setting(CH2):	Disabled
SignalRange Setting(CH3):	Disabled
SignalRange Setting(CH4):	Disabled
SignalRange Setting(CH5):	Disabled
SignalRange Setting(CH6):	Disabled
SignalRange Setting(CH7):	Disabled



# 10.4 Module process data definition

	loseoutdata:16By	rte
ByteNo.	Word No.	meaning
Byte0-Byte1	Word0	Channel 0 Inputoutdata
Byte2-Byte3	Word1	aislelloseoutdata
Byte4-Byte5	Word2	aisle2loseoutdata
Byte6-Byte7	Word3	aisle3loseoutdata
Byte8-Byte9	Word4	aisle4loseoutdata
Byte10-Byte11	Word5	aisle5loseoutdata
Byte12-Byte13	Word6	aisle6loseoutdata
Byte14-Byte15	Word7	aisle7loseoutdata

### Channel output data description:

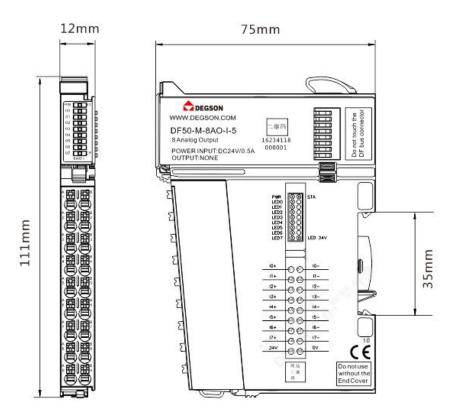
Signal range	Current value (I)	Decimal data	Hexadecimal data	Scope	Conversion relationship
0~20ma	0ma	>32511	>0x7EFF	Overflow	
	23.52ma	32511	0x7EFF	Upper limit	D = 27648 xI/ 20 I= D x 20/ 27648
	20ma	27648	0x6C00	Normal	
	10ma	13824	0x3600	range	
	0ma	0	0x0000		
	0ma	>32511	>0x7EFF	Overflow	D = 27648 x (I-4) / 16
4~20ma	22.81ma	32511	0x7EFF	Upper limit	I= D x 16 / 27648 + 4



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.







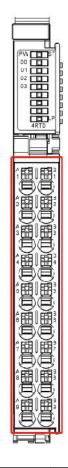
## 11.1 Specifications

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°C/bit
Accuracy	$\pm 0.3\%$
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	0.2~1.5mm2/26~16AWG
Stripping length	8~10mm
Installation	DIN-35 rail
Material parameters	
color	black
Housing Material	PC plastic, PA66
Conformance mark	CE
Environmental requirements	
Allowable ambient temperature (operating)	-25~60°C
Permissible ambient temperature (storage)	-40~85°C
Protection type	IP20
Pollution degree	2. Comply with IEC 61131-2 standard
Operating altitude	Temperature without derating: 0~2000m
Relative humidity (non-condensing)	5~95%RH
Vibration resistance	1g, in accordance with IEC 60068-2-6
Shock resistance	15g, compliant with IEC 60068-2-27
EMC anti-interference level	Compliant with IEC 61000-4
Corrosion resistance	Compliant with IEC 60068-2-42 and IEC 60068-2-43 standards
Permissible H2S contaminant concentration at 75% relative humidity	10ppm
Permissible SO2 pollutant concentration at 75% relative humidity	25ppm



## 11.2 Hardware Interface

## 11.2.1 WiringTerminal Definition



Terminal number	Signal	Terminal number	Signal	illustrate	
A1	RTD0+	B1	RTD0-		
A2	Sense0+	B2	Sense0-	The first channel signal input	
A3	RTD1+	В3	RTD1-	Second shares he is a linear	
A4	Sense1+	B4	Sense1-	Second channel signal input	
A5	RTD2+	В5	RTD2-		
A6	Sense2+	B6	Sense2-	The third channel signal input	
A7	RTD3+	B7	RTD3-	The fourth channel signal	
A8	Sense3+	B8	Sense3-	input	
A9	/	В9	/	Reserved for hanging	



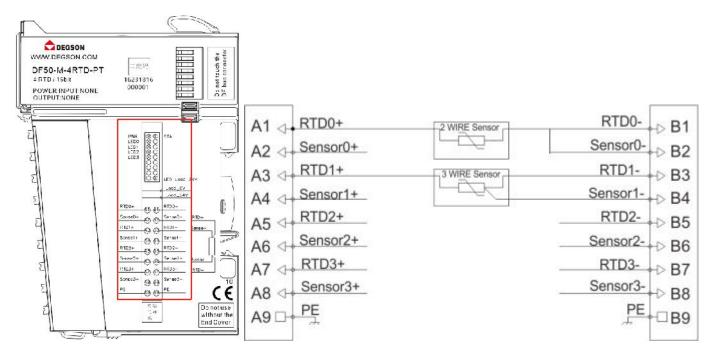
## 11.2.2 LED Indicator definition



Indicator Lights	meaning			
PW	Green:System bus powerSource Inputnormal		Green:System bus powerSource Inputnormal	
L AA	Green Kill:S	ystem bus powerSource Inputabnormal		
	Power-on	Green: Module initialization error		
	stage	Green off: Module initialization is normal		
	Onemational	Green flash: The internal bus of the module is working normally		
ST	Operational	Green off/green on: The internal bus of the module is working		
	stage	abnormally orInternal LoadPower input abnormality		
LD	Green:Internal load power inputnormal			
LP	Green off:Internal load power inputabnormal			
00~02	Green flash: input signal is valid			
00~03	Green off: In	Green off: Input signal is invalid		



#### 11.2.3 Wiring Diagram



#### 11.3 Module Configuration Data Definition

likeAs shown in the figure, users can configure each channelSignal type.

DF50-M-4RTD-PT Parameter S	setting
RTD Type Setting:	PT100 -200850 degree C
SignalFilter Setting:	5Hz_200ms

## 11.4 Module process data definition

loseenterdata:8Byte			
ByteNo.	Word No.	meaning	
Byte0-Byte1	Word0	Channel 0 Inputenterdata	
Byte2-Byte3	Word1	aislelloseenterdata	
Byte4-Byte5	Word2	aisle2loseenterdata	
Byte6-Byte7	Word3	aisle3loseenterdata	

Channel output data description:



PT100			
temperature	Decimal	hexadecimal	Scope
>850	32767	0x7FFF	Overflow
850	8500	0x2134	Nemelane
-200	-2000	0xF830	Normal range
<-200	-32767	0x8001	Underflow
Sensor not	227(9	0, 9000	
connected	-32768	0x8000	Disconnection detection

PT200			
temperature	Decimal	hexadecimal	Scope
>850	32767	0x7FFF	Overflow
850	8500	0x2134	Normal range
-200	-2000	0xF830	Normal range
<-200	-32767	0x8001	Underflow
Sensor not connected	227(9	08000	Disconnection
Sensor not connected	-32768	0x8000	detection

	PT:	500	
temperature	Decimal	hexadecimal	Scope



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

PT1000			
temperature	Decimal	hexadecimal	Scope
>850	32767	0x7FFF	Overflow
850	8500	0x2134	Newsteiner
-200	-2000	0xF830	Normal range
<-200	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection detection

Ni100			
temperature	Decimal	hexadecimal	Scope
>250	32767	0x7FFF	Overflow
250	2500	0x09C4	
-60	-600	0xFDA8	Normal range
<-60	-32767	0x8001	Underflow



Sensor not connected -32	768 0x8000	Disconnection detection
--------------------------	------------	-------------------------

Ni120			
temperature	Decimal	hexadecimal	Scope
>309	32767	0x7FFF	Overflow
309	3090	0x0C12	Normalizzazia
-79	-790	0xFCEA	Normal range
<-79	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection detection

NI200			
temperature	Decimal	hexadecimal	Scope
>250	32767	0x7FFF	Overflow
250	2500	0x09C4	
-60	-600	0xFDA8	Normal range
<-60	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection detection

Ni500				
temperature	temperature Decimal hexadecimal Scope			



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

Ni1000			
temperature	Decimal	hexadecimal	Scope
>250	32767	0x7FFF	Overflow
250	2500	0x09C4	Nemelane
-60	-600	0xFDA8	Normal range
<-60	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection detection

Cu10 type			
temperature	Decimal	hexadecimal	Scope
>159	32767	0x7FFF	Overflow
159	1590	0x0636	
-59	-590	0xFDB2	Normal range
<-59	-32767	0x8001	Underflow



Sensor not connected -32768	0x8000	Disconnection detection
-----------------------------	--------	-------------------------

Cu50			
temperature	Decimal	hexadecimal	Scope
>159	32767	0x7FFF	Overflow
159	1590	0x0636	Nemelane
-59	-590	0xFDB2	Normal range
<-59	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection detection

Cu53			
temperature	Decimal	hexadecimal	Scope
>150	32767	0x7FFF	Overflow
150	1500	0x05DC	
-50	-500	0xFE0C	Normal range
<-50	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection detection

Cu100				
temperature	temperature Decimal hexadecimal Scope			



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

KTY84_130			
temperature	Decimal	hexadecimal	Scope
>280	32767	0x7FFF	Overflow
280	2800	0x0AF0	Nerreleaner
-40	-400	0xFE70	Normal range
<-40	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection detection

KTY84_150			
temperature	Decimal	hexadecimal	Scope
>280	32767	0x7FFF	Overflow
280	2800	0x0AF0	Nemelane
-40	-400	0xFE70	Normal range
<-40	-32767	0x8001	Underflow



Sensor not connected	-32768	0x8000	Disconnection detection
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KTY84_151			
temperature	Decimal	hexadecimal	Scope
>280	32767	0x7FFF	Overflow
280	2800	0x0AF0	Normalizzazi
-40	-400	0xFE70	Normal range
<-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	
0ohm	0	0x0000	Normal range
Sensor not connected	-32768	0x8000	Disconnection detection

0-800hm 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	
0ohm	0	0x0000	Normal range
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	
0ohm	0	0x0000	Normal range
Sensor not connected	-32768	0x8000	Disconnection detection
	0-300oh	m 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	
0ohm	0	0x0000	Normal range
Sensor not connected	-32768	0x8000	Disconnection detection

0-1000ohm type			
Ohm value	Decimal	hexadecimal	Scope
>1277ohm	-32768	0x8000	Beyond the limit
>1175.890hm	32767	0x7FFF	Upper limit
1175.89ohm	32511	0x7EFF	Overflow
1000ohm	27648	0x6C00	Normal range



0ohm	0	0x0000	
Sensor not connected	-32768	0x8000	Disconnection detection

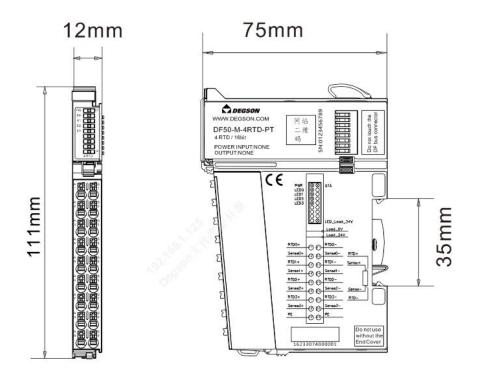
0-2000ohm type			
Ohm value	Decimal	hexadecimal	Scope
>2554ohm	-32768	0x8000	Beyond the limit
>2351.78ohm	32767	0x7FFF	Upper limit
2351.78ohm	32511	0x7EFF	Overflow
2000ohm	27648	0x6C00	
0ohm	0	0x0000	Normal range
Sensor not connected	-32768	0x8000	Disconnection detection

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	Newselment
0ohm	0	0	Normal range
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



DEGOON	DI 30 senes	
Sensor Type	K, E, T, J, B, S, R, N, L and millivolt voltage sensors	
Resolution/Display sensitivity	16bit, 0.1°C/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	0.2~1.5mm2/26~16AWG	
Stripping length	8~10mm	
Installation	DIN-35 rail	
Material parameters		
color	black	
Housing Material	PC plastic, PA66	
Conformance mark	CE	
Environmental requirements		
Allowable ambient temperature (operating)	-25~60°C	
Permissible ambient temperature (storage)	-40~85°C	
Protection type	IP20	
Pollution degree	2. Comply with IEC 61131-2 standard	
Operating altitude	Temperature without derating: $0 \sim 2000$ m	
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

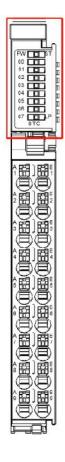
#### 12.2.1 WiringTerminal Definition



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



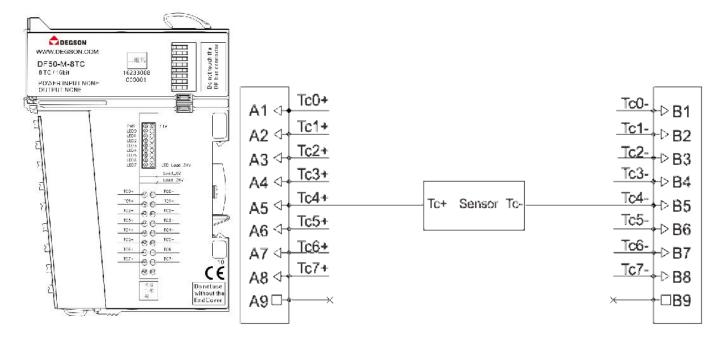
#### 12.2.2 LED Indicator definition



Indicator Lights	meaning		
PW	Green:System bus powerSource Inputnormal		
PW	Green Kill:S	ystem bus powerSource Inputabnormal	
	Power-on	Green: Module initialization error	
	stage	Green off: Module initialization is normal	
	Onomitional	Green flash: The internal bus of the module is working normally	
ST	Operational	Green off/green on: The internal bus of the module is working	
	stage	abnormally orInternal LoadPower input abnormality	
LP	Green:Internal load power inputnormal		
Lr	Green off:Internal load power inputabnormal		
00~.07	Green flash: input signal is valid		
00~07	Green off: Input signal is invalid		



#### 12.2.3 Wiring Diagram



### 12.3 Module Configuration Data Definition

likeAs shown in the figure, users can configure each channelSignal type.

DF50-M-8TC-KETJ Parameter	Setting
TC Type Setting:	ТС Туре К
SignalFilter Setting:	225ms

#### 12.4 Module process data definition

loseenterdata:16Byte			
ByteNo.	ByteNo. Word No. meaning		
Byte0-Byte1	Word0	Channel 0 Inputenterdata	
Byte2-Byte3	Word1	aislelloseenterdata	
Byte4-Byte5	Word2	aisle2loseenterdata	
Byte6-Byte7	Word3	aisle3loseenterdata	
Byte8-Byte9	Word4	aisle4loseenterdata	



Byte10-Byte11	Word5	aisle5loseenterdata
Byte12-Byte13	Word6	aisle6loseenterdata
Byte14-Byte15	Word7	aisle7loseenterdata

	loseoutdata:16Byte			
ByteNo.	Word No.	meaning		
Byte0-Byte1	Word0	Channel 0compensatedata		
Byte2-Byte3	Word1	aisle1 Compensationdata		
Byte4-Byte5	Word2	aisle2 Compensationdata		
Byte6-Byte7	Word3	aisle3. Compensationdata		
Byte8-Byte9	Word4	aisle4 Compensationdata		
Byte10-Byte11	Word5	aisle5. Compensationdata		
Byte12-Byte13	Word6	aisle6 Compensationdata		
Byte14-Byte15	Word7	aisle7. Compensationdata		

### Channel output data description:

К-Туре				
temperature	Decimal	hexadecimal	Scope	
>1370	32767	0x7FFF	Overflow	
1370	13700	0x3584		
-270	-2700	0xF574	- Normal range	



<-270	-32767	0x8001	Underflow
Sensor not	-32768	0x8000	Disconnection detection
connected	-52708	0,2000	Disconnection detection

Type E			
temperature	Decimal	hexadecimal	Scope
>1000	32767	0x7FFF	Overflow
1000	10000	0x2710	
-270	-2700	0xF574	Normal range
<-270	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection detection

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



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

Type B			
temperature	Decimal	hexadecimal	Scope
>1830	32767	0x7FFF	Overflow
1830	18300	0x477C	Normalizzazia
50	500	0x01F4	Normal range
<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	Normaliana
-60	-600	0xFDA8	Normal range
<-60	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection detection

Ni500			
temperature	Decimal	hexadecimal	Scope
>1770	32767	0x7FFF	Overflow
1770	17700	0x4524	
-50	-500	0xFE0C	Normal range
<-50	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection detection



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

L-type			
temperature	Decimal	hexadecimal	Scope
>900	32767	0x7FFF	Overflow
900	9000	0x2328	Nemelane
-200	-2000	0xF830	Normal range
<-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	Normalizzazia
-15.625mV	-32767	0x8001	Normal range
Sensor not connected	-32768	0x8000	Disconnection detection

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

±62.5mV			
Signal	Decimal	hexadecimal	Scope
62.5mV	32767	0x7FFF	Newslaws
-62.5mV	-32767	0x8001	Normal range



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

$\pm 500 \mathrm{mV}$			
Signal	Decimal	hexadecimal	Scope
500mV	32767	0x7FFF	Normalianas
-500mV	-32767	0x8001	Normal range
Sensor not connected	-32768	0x8000	Disconnection detection

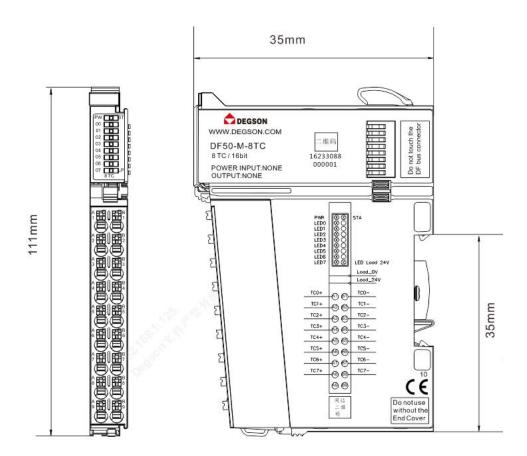
$\pm 1000 { m mV}$			
Signal	Decimal	hexadecimal	Scope
1000mV	32767	0x7FFF	Newsland
-1000mV	-32767	0x8001	Normal range
Sensor not connected	-32768	0x8000	Disconnection detection



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

### 12.5 Mechanical Installation

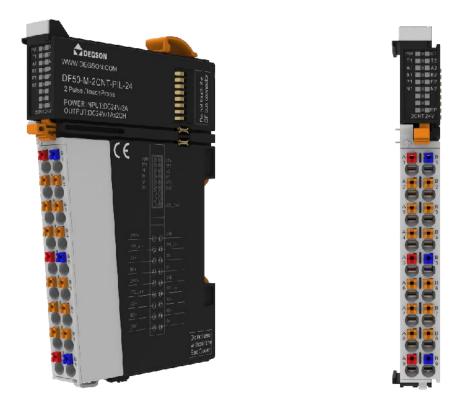
InstallSize letterinterestAs shown in the figure below, the unit is (mm)  $\,:\,$ 





## 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	1MHZ	
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	

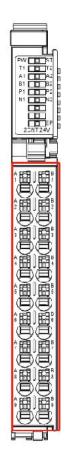


Count latch/reset function	Support, configurable
Filter function	Support, configurable
Counting range	-2147483648~2147483647
Accuracy	±1 pulse
Isolation method	Photoelectric isolation from the field layer
Error diagnosis	support
	When the input is in driving state, the indicator light is on
Input Action Display	(software control)
IO process data size	Output: 10 Byte; Input: 18 Byte
•	Supports 3 IO mapping modes: bit-based access, byte-based
IO data mapping	access, and word-based access
Power parameters	
System bus input power rated voltage	5V DC (4.75V DC~ 5.25V DC)
System bus input power rated current	115mA
Terminal power input rated voltage	24V DC (20.4V DC~ 28.8V DC)
Terminal power input rated current	2A
Terminal power output rated voltage	24V DC (20.4V DC~ 28.8V DC)
Terminal power output rated current	1A
Wiring parameters	
Connection technology:	PUSH-IN Terminal Blocks
Wire crimping area	0.2~1.5mm2/26~16AWG
Stripping length	8~10mm
Installation	DIN-35 rail
Material parameters	
color	black
Housing Material	PC plastic, PA66
Conformance mark	CE
Environmental requirements	
Allowable ambient temperature (operating)	-25~60°C
Permissible ambient temperature (storage)	-40~85°C
Protection type	IP20
Pollution degree	2. Comply with IEC 61131-2 standard
Operating altitude	Temperature without derating: $0 \sim 2000$ m
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	10,000
75% relative humidity	10ppm
Permissible SO2 pollutant concentration at 75% relative humidity	25ppm



## 13.2 Hardware Interface

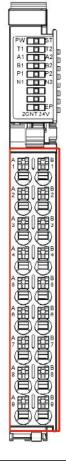
## 13.2.1 WiringTerminal Definition



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+	В3	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	В5	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	В9	0V	Terminal power input



#### 13.2.2 LED Indicator definition

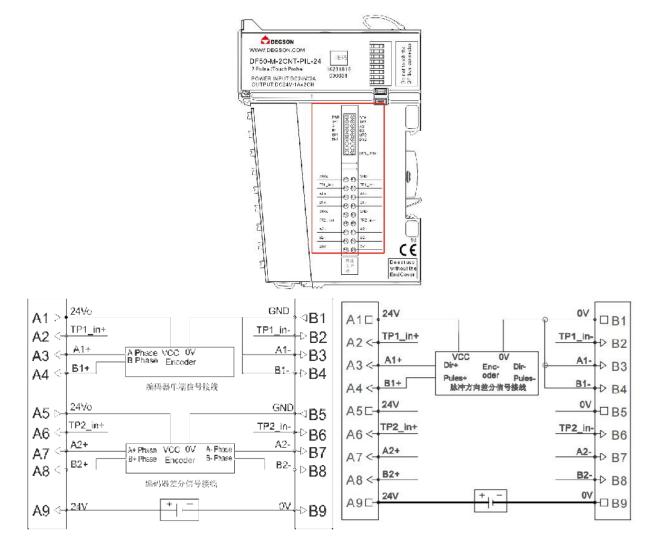


Indicator Lights	meaning	
PW	Green:System bus powerSource Inputnormal	
PW	Green Kill:S	ystem bus powerSource Inputabnormal
	Power-on	Green: Module initialization error
	stage	Green off: Module initialization is normal
		Green flash: The internal bus of the module is working
ST	Operational	normally.
	stage Green off/green on: The internal bus of the module is work	
		abnormally or the terminal power input is abnormal
T1/T2	Green: DI input signal is valid	
T1/T2	Green off: DI input signal is invalid	
A1/A2	Green: Input signal is valid	
A1/A2	Green off: Input signal is invalid	
D1/D2	Green: Input signal is valid	
B1/B2	Green off: Input signal is invalid	
P1/P2	Green: Encoder is rotating forward	



		Green off: Encoder is stationary or reversed
		Green: Encoder reverse
	N1/N2	Green off: Encoder is stationary or rotating forward
Green: The terminal power input is normal		Green: The terminal power input is normal
	EP	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

likeAs shown in the figure, users canAs neededConfigure each channelSignal type.

CH0 Configuration	
CH0 Configuration	
Signal mode:	Rotary transducer quadruple
DI Signal Function:	Disabled
Filter time Signal A:	100KHz
Filter time Signal B:	100KHz
Encoder Count Direction:	Position Direaction of Phase A
Countermode Setting:	Line Counter
Comparison Function:	Disabled
Behavious on field bus error:	Continue counting
Upper limit:	2147483647
Lower limit:	-2147483648
CH1 Configuration CH1 Configuration	
Signal mode:	Rotary transducer quadruple
DI Signal Function:	Disabled
Filter time Signal A:	100KHz
Filter time Signal B:	100KHz
Encoder Count Direction:	Position Direaction of Phase A
Countermode Setting:	Line Counter
Comparison Function:	Disabled
Behavious on field bus error:	Continue counting
Upper limit:	2147483647
Lower limit:	-2147483648



## 13.4 Module process data definition

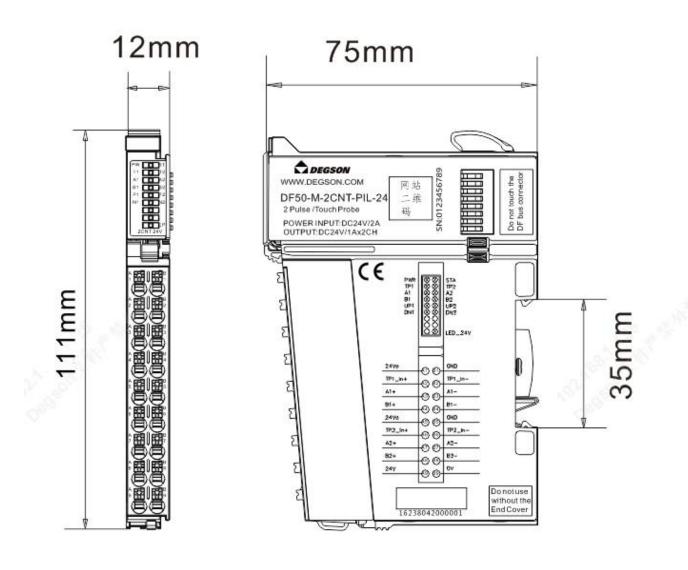
Output data meaning				
The first channel output data				
Byte0	bit7~bit1	reserve		
	bit0	0: Channel 1 stops counting and the original count is reset to zero; 1: Channel 1 starts		
Byte1~Byte4		Channel 1 pulse comparison value output, range:-2147483648~2147483647		
Second channel output data				
Byte5	bit7~bit1	reserve		
	bit0	0: Channel 2 stops counting and the original count is cleared; 1: Channel 2 starts		
Byte6~Byte9		Channel 2 pulse comparison value output, range:-2147483648~2147483647		

Input data meaning			
First channel input data			
Byte0	bit7~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	
	bit1	0: No electronic probe/1st channel count reset signal 1: Electronic probe/channel count	
	bit0	0: Channel 1 counting stop state, the original count is cleared; 1: Channel 1 counting state	
Byte1~Byte4		Channel 1 pulse input value, range:-2147483648~2147483647	
Byte5~Byte8		Channel 1 pulse input latch value, range:-2147483648~2147483647	
Second channel input data			
Byte9	bit7~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	
	bit1	0: No electronic probe/channel 2 count reset signal 1: Electronic probe/channel count reset	
	bit0	0: Channel2Counting stop state, the original count is cleared; 1: Channel2Counting status	
Byte10~Byte13		aisle2Pulse input value, range:-2147483648~2147483647	
Byte14~Byte17		aisle2Pulse input latch value, range:-2147483648~2147483647	



## 13.5 Mechanical Installation

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





## 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	1MHZ
Input signal voltage	5V DC

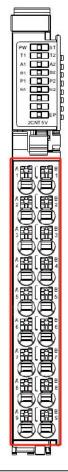


~	
Connection Type	2-wire/4-wire
Quadrature encoder frequency multiplication	x1/x2/x4
Counting Mode	Linear counter form, ring counter form
Count latch/reset function	Support, configurable
Filter function	Support, configurable
Counting range	-2147483648~2147483647
Accuracy	±1 pulse
Isolation method	Photoelectric isolation from the field layer
Error diagnosis	support
Input Action Display	When the input is in driving state, the indicator light is on
	(software control)
IO process data size	Output: 10 Byte; Input: 18 Byte
IO data mapping	Supports 3 IO mapping modes: bit-based access, byte-based
	access, and word-based access
Power parameters	
System bus input power rated voltage	5V DC (4.75V DC~ 5.25V DC)
System bus input power rated current	115mA
Terminal power input rated voltage	24V DC (20.4V DC~ 28.8V DC)
Terminal power input rated current	2A
Terminal power output rated voltage	24V DC (20.4V DC~ 28.8V DC)
Terminal power output rated current	1A
Wiring parameters	
Connection technology:	PUSH-IN Terminal Blocks
Wire crimping area	0.2~1.5mm2/26~16AWG
Stripping length	8~10mm
Installation	DIN-35 rail
Material parameters	
color	black
Housing Material	PC plastic, PA66
Conformance mark	CE
Environmental requirements	
Allowable ambient temperature (operating)	-25~60°C
Permissible ambient temperature (storage)	-40~85°C
Protection type	IP20
Pollution degree	2. Comply with IEC 61131-2 standard
Operating altitude	Temperature without derating: $0 \sim 2000$ m
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	10ppm
75% relative humidity	.11
Permissible SO2 pollutant concentration at 75%	25ppm
relative humidity	
• • • • • • • • • • • • • • • • • • •	



## 14.2 Hardware Interface

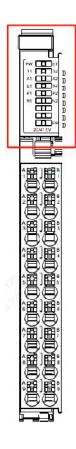
#### 14.2.1 Terminal Block Definition



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	В5	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	В9	0V	Terminal power input



### 14.2.2 LED indicator definition

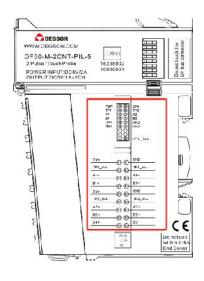


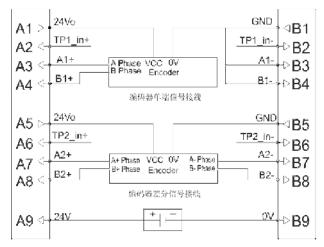
Indicator Lights	meaning		
PW	Green:System bus powerSource Inputnormal		
P W	Green Kill:System bus powerSource Inputabnormal		
	Power-on	Green: Module initialization error	
	stage	Green off: Module initialization is normal	
		Green flash: The internal bus of the module is working	
ST	Operational	normally.	
	stage	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		
A1/A2	Green off: Input signal is invalid		
B1/B2	Green: Input signal is valid		



	Green off: Input signal is invalid	
D1/D2		Green: Encoder is rotating forward
	P1/P2	Green off: Encoder is stationary or reversed
	N11/N12	Green: Encoder reverse
	N1/N2	Green off: Encoder is stationary or rotating forward
		Green: The terminal power input is normal
	EP	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

likeAs shown in the figure, users canAs neededConfigure each channelSignal type.

CH0 Configuration	
CH0 Configuration	
Signal mode:	Rotary transducer quadruple
DI Signal Function:	Disabled
Filter time Signal A:	100KHz
Filter time Signal B:	100KHz
Encoder Count Direction:	Position Direaction of Phase A
Countermode Setting:	Line Counter
Comparison Function:	Disabled
Behavious on field bus error:	Continue counting
Upper limit:	2147483647
Lower limit:	-2147483648
CH1 Configuration CH1 Configuration	
Signal mode:	Rotary transducer quadruple
DI Signal Function:	Disabled
Filter time Signal A:	100KHz
Filter time Signal B:	100KHz
Encoder Count Direction:	Position Direaction of Phase A
Countermode Setting:	Line Counter
Comparison Function:	Disabled
Behavious on field bus error:	Continue counting
Upper limit:	2147483647
Lower limit:	-2147483648



# 14.4 Module process data definition

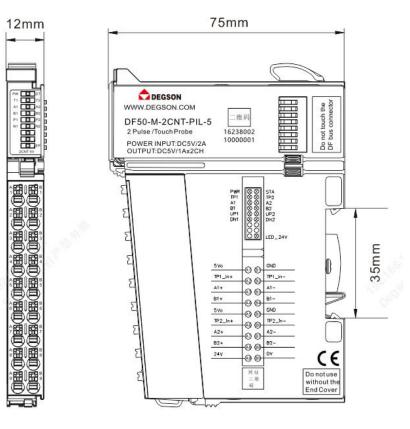
Output data meaning			
The first ch	annel output	data	
Byte0	bit7~bit1	reserve	
	bit0	0: Channel 1 stops counting and the original count is reset to zero; 1: Channel 1 starts	
Byte1~Byte4		Channel 1 pulse comparison value output, range:-2147483648~2147483647	
Second cha	Second channel output data		
Byte5 bit7~bit1 reserve		reserve	
Bytes	bit0	0: Channel 2 stops counting and the original count is cleared; 1: Channel 2 starts	
Byte6~Byte9 Channel 2 pulse comparison value output, range:-2147483648~2147		Channel 2 pulse comparison value output, range:-2147483648~2147483647	

Input data meaning					
First cha	First channel input data				
	bit7~bit5	reserve			
	bit3~bit4	0: Channel 1 stops; 1: Channel 1 counts up; 2: Channel 1 counts down			
Byte0	bit2	0: Channel 1 count value is less than the comparison value; 1: Channel 1 count value is			
	bit1	0: No electronic probe/1st channel count reset signal 1: Electronic probe/channel count			
	bit0	0: Channel 1 counting stop state, the original count is cleared; 1: Channel 1 counting state			
Byte1~I	Byte1~Byte4 Channel 1 pulse input value, range:-2147483648~2147483647				
Byte5~Byte8 Channel 1 pulse input latch value, range:-2147483648~2147483647		Channel 1 pulse input latch value, range:-2147483648~2147483647			
Second	channel inp	ut data			
	bit7~bit5	Reserved seat			
	bit3~bit4	0: Channel 2 stops; 1: Channel 2 counts up; 2: Channel 2 counts down			
Byte9	bit2	0: Channel 2 count value is less than the comparison value; 1: Channel 2 count value is			
	bit1	0: No electronic probe/channel 2 count reset signal 1: Electronic probe/channel count reset			
	bit0	0: Channel2Counting stop state, the original count is cleared; 1: Channel2Counting status			
Byte10~Byte13 aisle2Pulse input value, range:-21474		aisle2Pulse input value, range:-2147483648~2147483647			
Byte14~Byte17 aisle2Pulse input latch value, range:-2147483648~2147483647					



## 14.5 Mechanical Installation

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

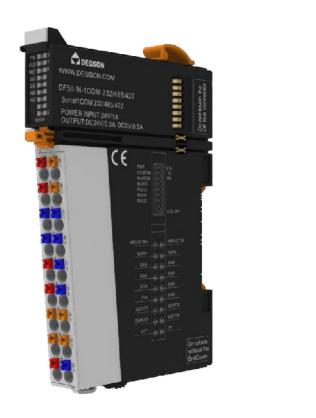




# 15 serial communication module (DF50-M-1COM-232/485/422)

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

instruments.





### **15.1 Specifications**

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

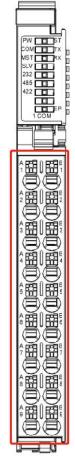


System bus input power rated current	55mA
Terminal power input rated voltage	24V DC (20.4V DC~ 28.8V DC)
Terminal power input rated current	730mA
Terminal 24V power output rated voltage	24V DC (20.4V DC~ 28.8V DC)
Terminal 24V power output rated current	500mA/each power output channel
Terminal 5V power output rated voltage	5V DC (4.75V DC~ 5.25V DC)
Terminal 5V power supply output rated current	500mA/each power output channel
Wiring parameters	
Connection technology	PUSH-IN Terminal Blocks
Wire crimping area	0.2~1.5mm2/26~16AWG
Stripping length	8~10mm
Installation	DIN-35 rail
Material parameters	
color	Light Gray
Housing Material	PC plastic, PA66
Conformance mark	CE
Environmental requirements	
Allowable ambient temperature (operating)	-25~60°C
Permissible ambient temperature (storage)	-40~85°C
Protection type	IP20
Pollution degree	2. Comply with IEC 61131-2 standard
Operating altitude	Temperature without derating: $0 \sim 2000$ m
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	10ppm
75% relative humidity	
Permissible SO2 pollutant concentration at 75%	25ppm
relative humidity	
Firmware Upgrade	support



## 15.2 Hardware Interface

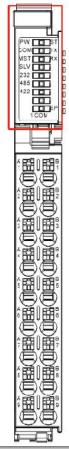
### 15.2.1 WiringTerminal Definition



Terminal number	Signal	Terminal number	Signal	illustrate
A1	485/422 TA+	B1	485/422 TB-	RS422/RS485
A2	422 R+	B2	422 R-	RS422
A3	GND	В3	GND	Power Ground
A4	GND	B4	GND	Power Ground
A5	24Vo	В5	GND	Terminal 24V power output
A6	5Vo	B6	GND	Terminal 5V power output
A7	232CTS	В7	232RTS	RS232
A8	232RXD	B8	232TXD	RS232
A9	24V	В9	0V	Terminal power input



### 15.2.2 LED Indicator definition



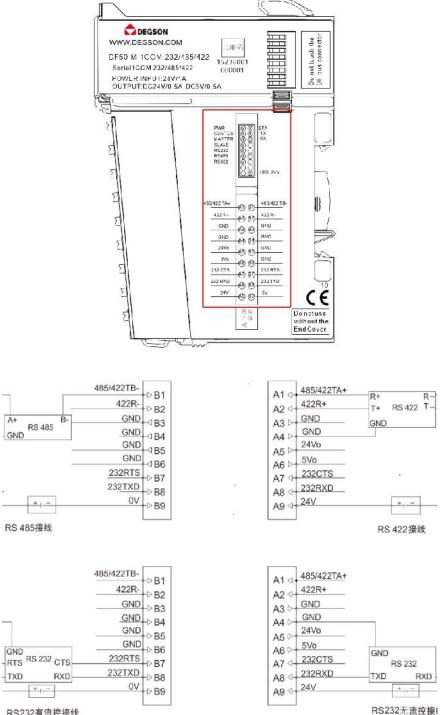
Indicator Lights	meaning		
PW	Green:System bus power inputnormal		
L M	Green Kill:System bus power inputabnormal		
	Power-on	Green: Module initialization abnormality,	
	stage:	Green off: Module initialization is normal	
		Green flash: The internal bus of the module is	
CT.	Operation	working normally	
ST	phase:	Green off/Green on: The internal bus of the module is	
		working abnormally or the terminal power input is	
		abnormal.	
	Green: The n	nodule is working in free transparent transmission	
СОМ	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		



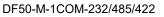
CLV	Green: The module is working in ModBus slave mode	
SLV	Green off: The module is not working in ModBus slave mode	
222	Green: Enable 232 communication interface	
232	Green off: 232 communication interface disabled	
405	Green: Enable 485 communication interface	
485	Green off: 485 communication interface disabled	
422	Green: Enable the 422 communication interface	
422	Green off: 422 communication interface disabled	
TV	Green flash: The module is sending data	
TX	Green off: The module does not receive data	
DV	Green flash: The module is receiving data	
RX	Green off: The module does not receive data	
ED	Green: The terminal power input is normal	
EP	Green off: Terminal power input abnormality	



#### 15.2.3 Wiring Diagram









### 15.3 Module Configuration Data Definition

As shown in the figure, the module communication parameters can be configured.

Module Config Parameters	
OperationMode:	Free Protocol
Interface:	RS485
Parity:	None
DataBits:	8bits
StopBit:	1Bit
Baudrate(bps):	115200bps
IntervalTime(ms):	0
ModbusSlaveAddr:	1

### 15.4 Module process data definition

Free transparent transmission mode process data structure:

F: Control Status Module subslot data structure is as follows:

Output Data			
Byte offset	name	length	meaning
Byte:0-1	CtrlWord	2byte	Control Word
Byte:2	TxDataLEN	1byte	Send data length
Byte:3	TxDataCNT	1byte	Send data sequence number
Input Data			
Byte Sequence Number	name	length	meaning
Byte:0-1	StateWord	2byte	Status word
Byte:2	RxDataLEN	1byte	Receive data length
Byte:3	RxDataCNT	1byte	Receive data sequence number
Byte:4-11	/	8byte	reserve

inCtrlWord and State form a control state machine. CtrlWord contains the following commands:

Command Value	Command Name	meaning
16#00A1	CONFIGUREPORT	Configuration command (no
		operation required for PN bus)
16#00C1	WRITECUSTOM	Free mode write dataOrder
16#00C2	READCUSTOM	Free mode read dataOrder

Note: CouplerEach time the power is turned on again, the configuration will be automatically



sentCONFIGUREPORTThe command configures the serial port module. After success, the serial port

module entersREADCUSTOMStatus and feedbackStateWordThe status is 16#0003.

StateWord contains the following states:

Normal state value	Status Name	meaning
16#0000	OP_SUCCESS	Configuration or write
		operation successful
16#0001	DATA_FULL	dataUpdated,Readable
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

Different input and output data can be obtained according to the different sub-slots added later.

F: Free-Port Input 0064 Bytes is input data, a total of 64 Bytes;

F: Free-Port Output 0064 Bytes is the output data, a total of 64Bytes;

Modbus RTU Slave mode process data structure:

S: Modbus Status Input (1 Word) is the diagnostic information of the slave station. The PLC program

can clearly understand the current slave station status by monitoring the diagnostic information. The

diagnostic information includes the following:

Normal state value	Status Name	meaning
16#0000	OP_SUCCESS	Configuration or write
		operation successful
16#0001	DATA_FULL	dataUpdated,Readable
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

Different input and output data can be obtained according to the different sub-slots added later. Modbus RTU Master mode process data structure:

M: Error Code Input (28 CH) contains 28 word data, corresponding to the diagnostic information of

28 slave slots. The PLC program can clearly understand the current slave status by monitoring the

diagnostic information. The diagnostic information includes the following:

Normal state value	Status Name	meaning
16#0000	OP_SUCCESS	Configuration or write
		operation successful
16#0001	DATA_FULL	dataUpdated,Readable
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

Different input and output data can be obtained according to the different sub-slots added later.

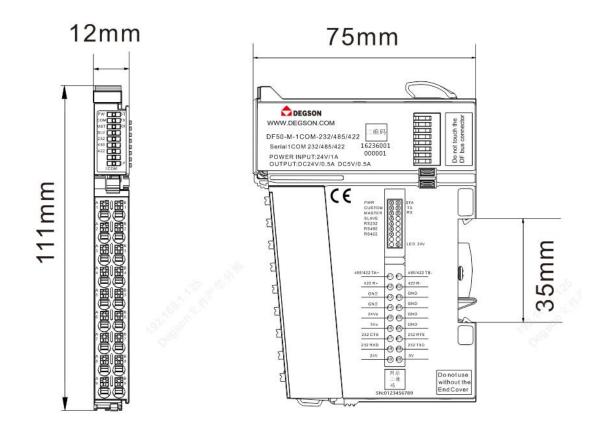
M: Read 16 Words 4xxxxContains 16 words of data.

M: Write 02 Words 4xxxxContains 2 word data.



## 15.5 Mechanical Installation

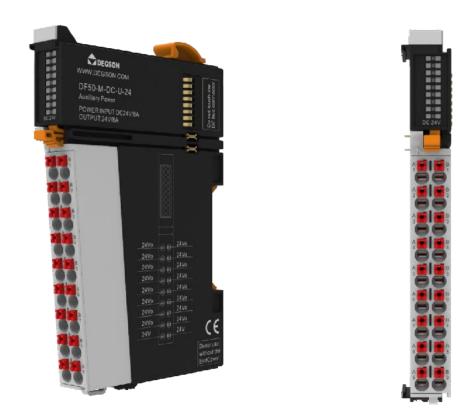
The installation dimension information is shown in the figure below, the unit is (mm)





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

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



# 16.1 Specifications

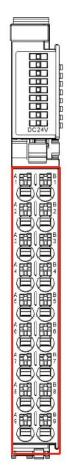
Technical Information		
Product Description	Voltage distribution module, 16 channels, 24V	
Number of channels	16	
Operating voltage	24VDC (-15%~+20%) through power jumper contacts	
Provide on-site voltage	24VDC (-15%~+20%)	
Provides the maximum current on site	8A	
Number of input power jumper contacts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



Housing Material	PC plastic, PA66
Conformance mark	CE
Environmental requirements	
Allowable ambient temperature (operating)	-25~60°C
Permissible ambient temperature (storage)	-40~85°C
Protection type	IP20
Pollution degree	2. Comply with IEC 61131-2 standard
Operating altitude	Temperature without derating: $0 \sim 2000$ m
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	10ppm
75% relative humidity	
Permissible SO2 pollutant concentration at 75%	25ppm
relative humidity	

## 16.2 Hardware Interface

### 16.2.1 WiringTerminal Definition

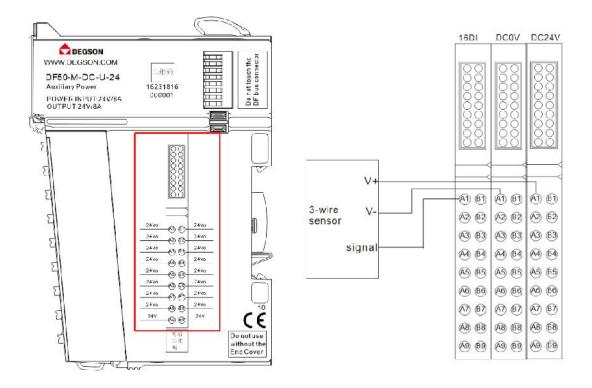


Termina	l number	Signal	illustrate
A1	B1	On-site power supply 24VDC	Provides 16 channels of 24VDC rated voltage



A2	B2		for external loads
A3	B3		
A4	B4		
A5	В5		
A6	B6		
A7	B7		
A8	B8		
A9	В9	External voltage input 24VDC	External 24VDC voltage input jumper contacts

#### 16.2.2 Wiring Diagram

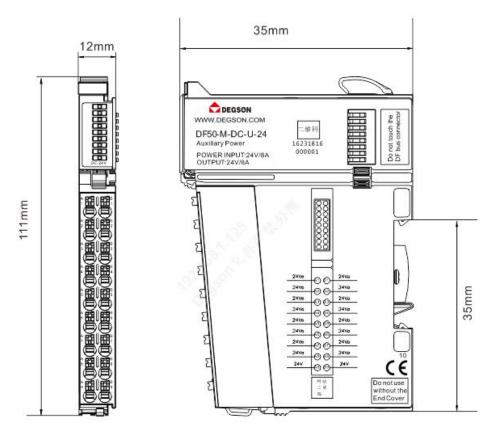


Note: Each of the 16 channels can provide a 24VDC rated voltage to the external load. A9/B9 provides 24VDC externally.



# 16.3 Mechanical Installation

InstallSize letterinterestAs shown in the figure below, the unit is (mm):





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

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





## 17.1 Specifications

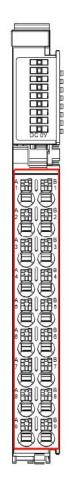
Technical Information		
Product Description	Voltage distribution module, 16 channels, 0V	
Number of channels	16	
Operating voltage	0VDC (-15% to +20%) through power jumper contacts	
Provide on-site voltage	0VDC (-15%~+20%)	
Provides the maximum current on site	8A	
Number of input power jumper contacts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



Allowable ambient temperature (operating)	-25~60°C
Permissible ambient temperature (storage)	-40~85°C
Protection type	IP20
Pollution degree	2. Comply with IEC 61131-2 standard
Operating altitude	Temperature without derating: $0 \sim 2000$ m
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	10ppm
75% relative humidity	
Permissible SO2 pollutant concentration at 75%	25ppm
relative humidity	

### 17.2 Hardware Interface

17.2.1 WiringTerminal Definition

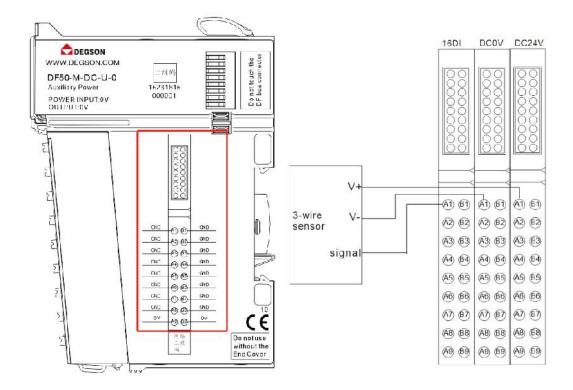


Termina	l number	Signal	illustrate
A1	B1	On-site power supply 0VDC	Provides 16 channels of 0VDC rated voltage for



A2	B2		external loads
A3	B3		
A4	B4		
A5	В5		
A6	B6		
A7	B7		
A8	B8		
A9	В9	External voltage input 0VDC	External 0VDC voltage input jumper contacts

#### 17.2.2 Wiring Diagram



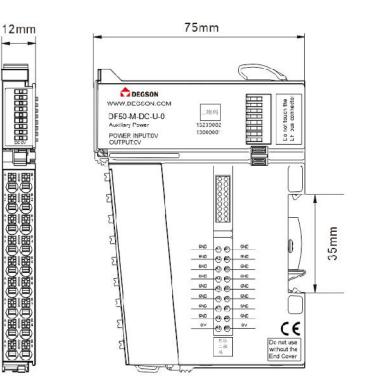
Remark:Each of the 16 channels can provide a 0VDC rated voltage to an external load. A9/B9 provides

0VDC externally.



## 17.3 Mechanical Installation

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





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

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





### 18.1 Specifications

productinformation		
Product Name	DF50-M-4IOL	
Product Description	IO-Link communication module	
Technical Information		
ordinaryDigital quantityportenterparameter		
Number of channels	4-wire	
Signal Type	IEC 61131-2: Type 1 PNP	
Input voltage range, "0" signal	-0.3 V DC 8 V DC	
Input voltage range, "1" signal	12.9 V DC 24.3 V DC	
IO-LINK port input parameters		
IO-LINK Mode		
Number of ports	4	
Connection	Push-in connection	
Connecting the system	3 lines\5 lines	
Port Type	Category A	
Connect the cables	3-wire or 5-wire unshielded standard cable	
Digital input mode		
Input Description	IO-Link port in digital input (DI) mode	
Input quantity	Max 4	
Input Type	IEC 61131-2 :Type 1 PNP	
Connection	Push-in connection	
Connecting the system	3 lines	
Rated input voltage	24 V DC	
Input voltage range, "0" signal	-0.3 V DC 8 V DC	
Input voltage range, "1" signal	12.9 V DC 24.3 V DC	

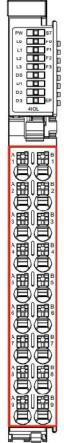


Digital output mode	
Output Description	IO-Link port in digital output (DO) mode
Number of outputs	Max 4
Output Type	IEC 61131-2 :Type 0.5 PNP
Connection	Push-in connection
Connecting the system	2, 3 lines
Rated output voltage	24 V DC
Rated current per channel	500 mA
Power parameters	
Operating voltage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



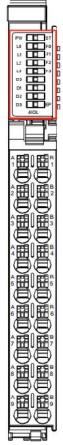
### 18.2 Hardware Interface

18.2.1 WiringTerminal Definition



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



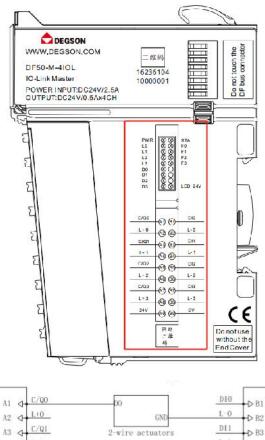


Indicator Lights		meaning		
PW	On: Internal bus po	On: Internal bus power supplynormal		
PW	Off: Internal bus po	ower supply abnormalityoften		
		Green: Module initialization		
	Dower on stage	error		
	Power-on stage:	Green off: Module initialization		
ST		is normal		
51		Green flash: The internal bus of		
	Operation phases	the module is working normally		
	Operation phase:	Green off: The internal bus of the		
		module is working abnormally		
	Green: The corresp	onding channel IO-LINK is		
	communicating nor	communicating normally		
L0~L3	Green flash: No IO	Green flash: No IO-LINK slave is connected to the		
L0~L3	corresponding chan	corresponding channel		
	Green off: The corr	Green off: The corresponding channel is not configured		
	as IO-LINK mode	as IO-LINK mode		
	Red: The correspon	Red: The corresponding channel reports an error		
F0~F3	Red off: No error re	Red off: No error reported on the corresponding		
	channel	channel		
D0~D3	Green: DI input val	Green: DI input valid signal		
D0~D3	Green off: DI has n	Green off: DI has no valid input signal		
	On: The external in	On: The external interface of the module is powered		
EP	normally			
EP	Off: The power sup	Off: The power supply of the module's external		
	interface is abnorm	al.		



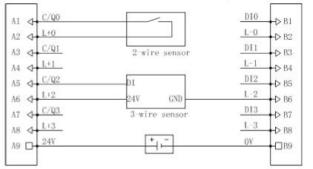
Note: When the C/Q port is used as DI input, no indicator light will be displayed.





2 C/Q1	0 ditp	DII
$\begin{array}{c c} 3 & 4 & \frac{1}{\sqrt{2}} \\ 4 & 4 & \frac{1}{\sqrt{2}} \end{array}$	2-wire actuators	
5 4 C/Q2	po.	D12
6 4 L+2		L-2
7 d C/Q3	3-wire actuators	DI3
3 4 L+3		L-3
9 D 24V	+ -	01

#### C/Q为D0时接线



C/Q为DI时接线

1 d C/Q0	C/Q	D10 → B
2 4 L+0	24V GND	L-0 B
3 d C/Q1	ClassA接线	DI1 B
4 4 L+1	24V OV	<u>I.−1</u> ⇒ B
5 d C/Q2	C/0 24V 0V	D12 B
6 d L+2	24V GND	1-2 D B
7 d C/Q3	ClassB接线	D13 B
8 d L+3		L-3 → B
9.40	+	OV B
.9 - 247		

### C/Q为I0-Link模式接线图



## 18.3 Module Configuration Data Definition

likeAs shown in the figure, users canAs neededConfigurationThe working mode of each PORT, the specific meaning is detailed in the table below.

Module Config Parameters	
Operating Mode:	IO-LINK
Cycle Mode:	FreeRuning
Cycle Time:	3.2ms
Validation Mode:	Disable
Parameter Server:	Disable
VendoriD:	0
DeviceID:	0
SDU 0	
ISDU 0	
1300 0	
ISDU U	0
	0
ISDU Index:	
ISDU Index: ISDU SubIndex:	0
ISDU Index: ISDU Subindex: ISDU Length:	0
ISDU Index: ISDU SubIndex: ISDU Length: ISDU data0:	0
ISDU Index: ISDU Subindex: ISDU Length: ISDU data0: ISDU data1:	0 0 0 0
ISDU Index: ISDU Subindex: ISDU Length: ISDU data0: ISDU data1: ISDU data2:	0 0 0 0 0
ISDU Index: ISDU Subindex: ISDU Length: ISDU data0: ISDU data1: ISDU data2: ISDU data3:	0 0 0 0 0 0
ISDU Index: ISDU Subindex: ISDU Length: ISDU data0: ISDU data1: ISDU data2: ISDU data3: ISDU data4:	0 0 0 0 0 0 0

:

SDU 4	
ISDU 4	
ISDU Index:	0
ISDU SubIndex:	0
ISDU Length:	0
ISDU data0:	0
ISDU data1:	0
ISDU data2:	0
ISDU data3:	0
ISDU data4:	0
ISDU data5:	0
ISDU data6:	0
ISDU data7:	0

Configuration items	Configuration parameters	default value	
Operating Mode	0:disable 1:IO-LINK	1	
Working Mode	2:DI 4:DO		
Cycle Mode	0:Free Running 1:Fixed Time	0	
Cycle Mode	2:Message sync (not supported yet)	0	
Cycle Time	3.2ms~132.8ms (This parameter is		
Cycle time	only effective when Cycle Mode is	3.2ms	
	Fixed Time)		
Validation Mode	0:disable 1:compatible	0	

DEGSON

Verification Mode	2:identical (not supported yet)		
Parameter Server	0:disable 1:BackUp/Restore	0	
Parameter Service	2:Restore	0	
VendorID		0	
Vendor ID	Vendor ID (unsigned 16 bits)	0	
DeviceID	Device ID (unsigned 32-bit) binary	0	
Device ID		0	
	ISDU Index	0~65535	
	ISDU Subindex	0~255	
	ISDU Length	0~8	
	ISDU data 0	0~255	
	ISDU data 1	0~255	
ISDU Parameter 0	ISDU data 2	0~255	
	ISDU data 3	0~255	
	ISDU data 4	0~255	
	ISDU data 5	0~255	
	ISDU data 6	0~255	
	ISDU data 7	0~255	
	ISDU Index	0~65535	
	ISDU Subindex	0~255	
	ISDU Length	0~8	
	ISDU data 0	0~255	
	ISDU data 1	0~255	
ISDU Parameter 1	ISDU data 2	0~255	
	ISDU data 3	0~255	
	ISDU data 4	0~255	
	ISDU data 5	0~255	
	ISDU data 6	0~255	
	ISDU data 7	0~255	
	ISDU Index	0~65535	
	ISDU Subindex	0~255	
	ISDU Length	0~8	
	ISDU data 0	0~255	
	ISDU data 1	0~255	
ISDU Parameter 2	ISDU data 2	0~255	
	ISDU data 3	0~255	
	ISDU data 4	0~255	
	ISDU data 5	0~255	
	ISDU data 6	0~255	
	ISDU data 7	0~255	
	ISDU Index	0~65535	
	ISDU Subindex	0~255	
	ISDU Length	0~8	
	ISDU data 0	0~255	
ISDU Parameter 3	ISDU data 1	0~255	
	ISDU data 2	0~255	
	ISDU data 3	0~255	
	ISDU data 4	0~255	
	ISDU data 5	0~255	



	ISDU data 6	0~255
	ISDU data 7	0~255
ISDU Parameter 4	ISDU Index	0~65535
	ISDU Subindex	0~255
	ISDU Length	0~8
	ISDU data 0	0~255
	ISDU data 1	0~255
	ISDU data 2	0~255
	ISDU data 3	0~255
	ISDU data 4	0~255
	ISDU data 5	0~255
	ISDU data 6	0~255
	ISDU data 7	0~255

## 18.4 Module Process Data Definition

### 18.4.1 "IO-LINK State" process data

Input Data					
	Bit 7	Bit 6	Bit 5	Bit 4~Bit 0	
Byte0~Byte1	The mos	he most recent event code of port 0. For details, see the port event code table.			
		0: Normal working	0: Slave disconnected		
		state 1: Error working	1: Slave connection status		
Byte2	reserve	state	(Real-time flag of port 0	reserve	
		(Port 0 device error	device communication		
		real-time flag)	status)		
Byte3~Byte4	The mos	The most recent event code of port 1. For details, see the port event code table.			
		0: Normal working	0: Slave disconnected		
		state 1: Error working	1: Slave connection status		
Byte5	reserve	state	(Real-time flag of port 1	reserve	
		(Port 1 device error	device communication		
		real-time flag)	status)		
Byte6~Byte7	The mos	The most recent event code of port 2. For details, see the port event code table.			
Byte8 re	reserve	0: Normal working	0: Slave disconnected		
		state 1: Error working	1: Slave connection status		
		state	(Real-time flag of port 2	reserve	
		(Port 2 device error	device communication		
		real-time flag)	status)		
Byte9~Byte10	The most recent event code of port 3. For details, see the port event code table.				



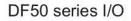
Byte11	res	serve	0: Normal working state 1: Error working state (Port 3 device error real-time flag)	0: Slave disconnected 1: Slave connection status (Real-time flag of port 3 device communication status)	reserve	
	Output Data					
Byte 0	Byte 0 Port 0 operation commands, see the port operation code table for details				s	
Byte 1	Port 1 operation command, for details, see the port operation code table					
Byte 2	Port 2 operation commands, see the port operation code table for details					
Byte 3	Port 3 operation commands, see the port operation code table for details					

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

#### Port event code:

#### Port operation code:

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



DEGSON

reserve

#### 18.4.2Port0~Port3\_subslot process data

Input data (1 byte fixed data + N bytes of data exchanged with slaves)						
	Bit 7~Bit 3	Bit 2		Bit 1		Bit 0
Byte 0 (fixed data)	*******	Valid	bit	C/Q DI N	lote	DI
	reserve	Note 1		2		DI
Byte 1Byte N	Process data of IO-Link decisions					
Output data (1 byte fixed data + N bytes and slave station interactive data)						
	Bit 7~Bit 3Bit 2Bit 1Bit 0				Bit 0	
Byte 0 (fixed data)	reserve	Valid	bit	C/Q	DO	reserve
		Note 1		Note 3		
Byte 1Byte N	Process data of IO-Link decisions					

Note 1: Valid bit indicates data validity. Whether the data is valid is determined by whether this bit is true. Note 2: When the channel is configured in IO-link mode, this bit is invalid;

When the channel is configured in DI mode, this bit indicates the peripheral input status.

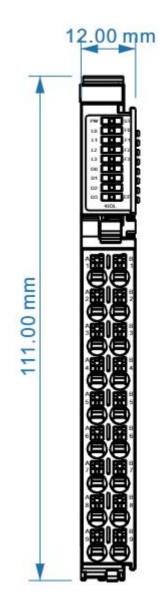
Note 3: When the channel is configured in IO-link mode, this bit is invalid;

When the channel is configured as DO mode, this bit is used to control the module channel output.



# 18.5 Mechanical Installation

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



▼75.0	00 mm		-	
		$\bigcirc$		
DEGSON WWW.DEGSON.COM DF50-M-4IOL IO-Link Master POWER INPUT:DC24V/2.5A OUTPUT:DC24V/0.5Ax4CH	二维祀 16236104 10000001		Do not touch the DF bus connector	
	PWR 19 11 12 13 10 10 10 20 21 20 20 21 20 20 21 20 20 21 20 20 20 20 20 20 20 20 20 20 20 20 20	STA F0 F1 F2 F3 LED 24V		E
ย		L-0 DH L-1		35.00 mm
	L+2 00 Cr03 00 L+3 00 24V 00 Fi &	L-2 DIS L-3 OV	Do notuse	
1	- 19 49		without the End Cover	



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

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





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

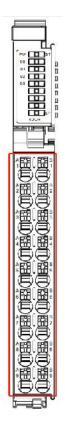


IO M .	
IO Mapping	Support bit-mapped mode
Fault shutdown output status mode	Clear to zero, keep current value
In stop mode	In the fault shutdown mode, no more refresh
Power parameters	
System bus input power rated voltage	5V DC (4.75V DC~ 5.25V DC)
System bus input power rated current	30mA
Terminal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



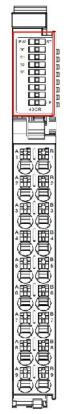
#### 19.2 Hardware Interface

19.2.1 Terminal Block Definition



Terminal number	Signal	Terminal number	Signal	illustrate
A1	CH1 contact 1	B1	CH1 contact 1	CH1 relay interface 1
A2	CH1 contact 2	B2	CH1 contact 2	CH1 relay interface 2
A3	CH2 contact 1	В3	CH2 contact 1	CH2 relay interface 1
A4	CH2 contact 2	B4	CH2 contact 2	CH2 relay interface 2
A5	CH3 contact 1	В5	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	В9	0V	Terminal power input

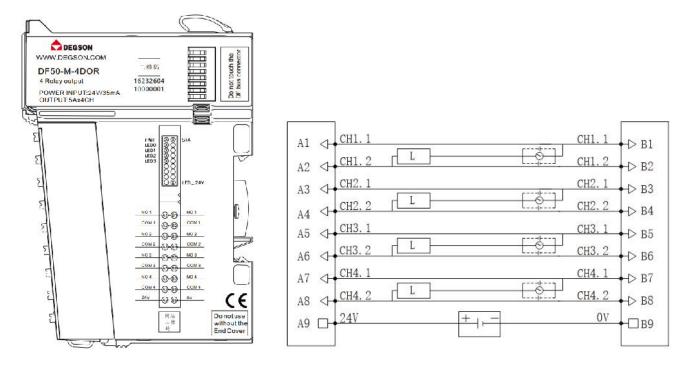




Indicator Lights	meaning			
DW	Green:System bus power inputnormal			
PW	Green Kill:S	ystem bus power inputabnormal		
	Power-on	Green: Module initialization error		
	stage	Green off: Module initialization is normal		
ST	Operational stage	Green flash: The internal bus of the module is working normally		
		Green off/green on: The internal bus of the module is working		
		abnormally or the terminal power input is abnormal		
LD	Green: 24V r	nodule power supply is normal		
LP	Green off: 24V module power supply is abnormal			
00 02	Green: Relay closed			
00~03	Green off: re	lay disconnected		



#### 19.2.3 Wiring Diagram



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

#### 19.3 Process Data Definition

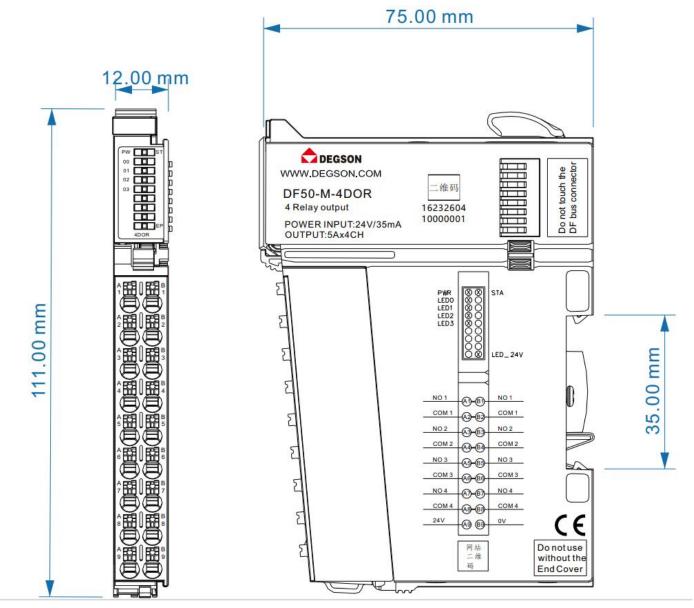
DF50-M-4DOR ModulesProcess data definition

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



# 19.4 Mechanical Installation

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





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

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





Technical Information	
Product Description	Digital output modules,4Output,PNP, 24VDC
Number of channels	4
Signal Type	PNP
"OFF" signal voltage	High impedance
"ON" signal voltage	twenty fourV DC
Data size	1Byte
Connection Type	1-wire
Reverse circuit protection	Yes
Overcurrent protection	Yes
Short circuit protection	Yes
Isolation method	Photoelectric isolation from the field layer
Error diagnosis	Yes
Switching frequency (resistive)	100Hz
Switching frequency (lamp)	10Hz
Switching frequency (inductive)	0.2Hz
Response time of protection circuit	< 100µs
Maximum output current per channel	2A
Leakage Current	Maximum value:0.18uA
Hardware response time	100us/100us
Output Impedance	<200mΩ
Output delay	OFF to ON:Max.100us, ON to OFF:Max.150us
Protection function	Over temperature shutdown: typical value 135°C
	Overcurrent protection:4A. Typical value2A
	Support short circuit protection
Load Type	Inductive (7.2W/point, 24W/module), Resistive (0.5A/point,
	4A/module), Light (5W/point, 18W/module)

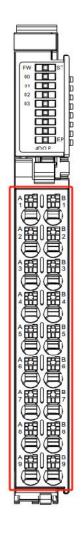


Output action display	When the output is in driving state, the indicator light is on.
Input derating	When working at 55°C, the rating is reduced by 50% (the output
	current of ON at the same time does not exceed 2A), or the rating
	is reduced by 10°C when all output points are ON
IO Mapping	Support bit-mapped mode
Fault shutdown output status mode	Clear to zero, keep current value
In stop mode	In the fault shutdown mode, no more refresh
Power parameters	
System bus input power rated voltage	5V DC (4.75V DC~ 5.25V DC)
System bus input power rated current	100mA
Terminal power input rated voltage	24V DC (20.4V DC~ 28.8V DC)
Terminal power input rated current	8A
Wiring parameters	
Connection technology: Output	PUSH-IN Terminal Blocks
Wire crimping area	0.2~1.5mm2/26~16AWG
Stripping length	8~10mm
Installation	DIN-35 rail
Material parameters	
color	black
Housing Material	PC plastic, PA66
Conformance mark	CE
Environmental requirements	
Allowable ambient temperature (operating)	-25~60°C
Permissible ambient temperature (storage)	-40~85°C
Protection type	IP20
Pollution degree	2. Comply with IEC 61131-2 standard
Operating altitude	Temperature without derating: $0 \sim 2000$ m
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	10ppm
75% relative humidity	
Permissible SO2 pollutant concentration at 75%	25ppm
relative humidity	



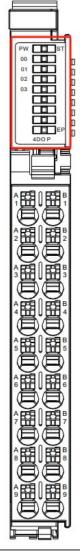
#### 20.2 Hardware Interface

20.2.1 wiring Terminal Definition



Terminal number	Signal	Terminal number	Signal	illustrate
A1	DO 1	B1	DO 1	DO1 signal output
A2	GND	B2	GND	DOI Signal Salpat
A3	DO 2	B3	DO 2	DO2 signal output
A4	GND	B4	GND	D 02 signal output
A5	DO 3	В5	DO 3	DO3 signal output
A6	GND	B6	GND	D 05 signal output
A7	DO 4	B7	DO 4	DO4 signal output
A8	GND	B8	GND	Do i signal output
A9	24V	B9	0V	Terminal power input

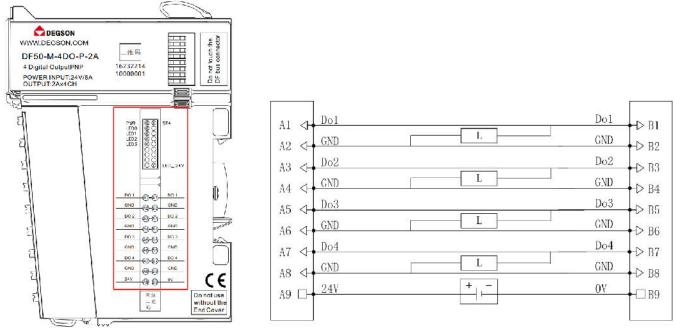




Indicator Lights	meaning				
PW	Green:Syster	n bus power inputnormal			
P W	Green Kill:System bus power inputabnormal				
	Power-on	Green: Module initialization error			
	stage	Green off: Module initialization is normal			
ST	Operational stage	Green flash: The internal bus of the module is working normally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



#### 20.2.3 Wiring Diagram



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

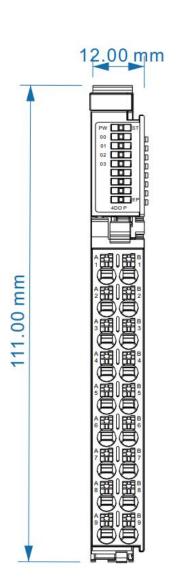
#### 20.4 Process Data Definition

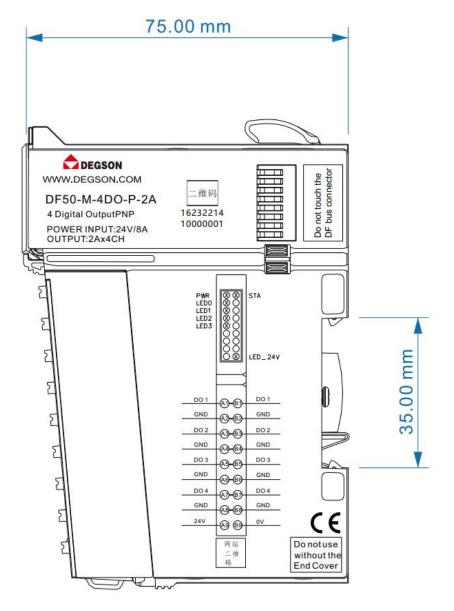
	Output Data									
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0		
Byte 0	Reserved	Reserved	Reserved	Reserved	DO 3	DO 2	DO 1	DO 0		
	Input Data									
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0		
Byte 1	Reserved	Reserved	Reserved	Reserved	Overcurrent3	Overcurrent2	Overcurrent1	Overcurrent0		



# 20.5 Mechanical Installation

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







- 21 32-channel digital output/24VDC/NPN (DF50-M-32DO-N)
- > 32Channel digital output,NPN LowThe level is valid.
- > Each output channel has an LED indicator.
- > The field layer and the system layer are isolated by photocouplers.
- > Protection grade IP20.



Technical Information	
Product Description	Digital output modules,32Output,NPN, 24VDC
Number of channels	32
Signal Type	NPN
"OFF" signal voltage	High impedance
"ON" signal voltage	0V DC
Data size	4Byte
Connection Type	1-wire
Reverse circuit protection	Yes
Overcurrent protection	Yes
Short circuit protection	Yes
Isolation method	Photoelectric isolation from the field layer
Error diagnosis	Yes
Switching frequency (resistive)	100Hz
Switching frequency (lamp)	10Hz
Switching frequency (inductive)	0.2Hz
Response time of protection circuit	< 100µs
Maximum output current per channel	500 mA
Leakage Current	Maximum value: 10uA
Hardware response time	100us/100us
Output Impedance	<200mΩ
Output delay	OFF to ON:Max.100us, ON to OFF:Max.150us
	Over temperature shutdown: typical value 135°C
Protection function	Overcurrent protection: 1.1A. Typical value 0.5A
	Support short circuit protection

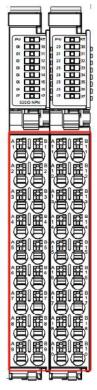


Load Type	0.5A/point,8A/Module
Output action display	When the output is in driving state, the indicator light is on.
	When working at 55°C, the rating is reduced by 50% (the output
Input derating	current of ON at the same time does not exceed 2A), or the rating
	is reduced by 10°C when all output points are ON
IO Mapping	Support bit-by-bit or word-by-word mapping
Fault shutdown output status mode	Clear, keep current value or output according to preset value
In stop mode	In the fault shutdown mode, no more refresh
Power parameters	
System bus input power rated voltage	5V DC (4.75V DC~ 5.25V DC)
System bus input power rated current	200mA
Terminal power input rated voltage	24V DC (20.4V DC~ 28.8V DC)
Terminal power input rated current	8A
Wiring parameters	
Connection technology: Output	PUSH-IN Terminal Blocks
Wire crimping area	0.2~1.5mm2/26~16AWG
Stripping length	8~10mm
Installation	DIN-35 rail
Material parameters	
color	black
Housing Material	PC plastic, PA66
Conformance mark	CE
Environmental requirements	
Allowable ambient temperature (operating)	-25~60°C
Permissible ambient temperature (storage)	-40~85°C
Protection type	IP20
Pollution degree	2. Comply with IEC 61131-2 standard
Operating altitude	Temperature without derating: $0 \sim 2000$ m
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	10ppm
75% relative humidity	
Permissible SO2 pollutant concentration at 75%	25ppm
relative humidity	



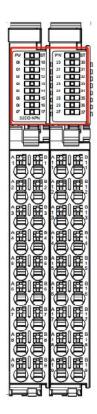
#### 21.2 Hardware Interface

21.2.1 Terminal Block Definition



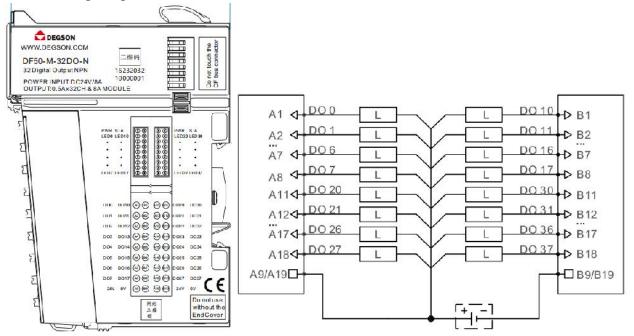
Terminal number	Signal	Terminal number	Signal	Terminal number	Signal	Terminal number	Signal	illustrate
A1	DO0	B1	DO10	C1	DO 20	D1	DO 30	
A2	DO1	B2	DO11	C2	DO 21	D2	DO 31	
A3	DO2	В3	DO12	C3	DO 22	D3	DO 32	
A4	DO3	B4	DO13	C4	DO 23	D4	DO 33	DOSignal
A5	DO4	В5	DO14	C5	DO 24	D5	DO 34	inputout
A6	DO5	B6	DO15	C6	DO 25	D6	DO 35	
A7	DO6	B7	DO16	С7	DO 26	D7	DO 36	
A8	DO7	B8	DO17	C8	DO 27	D8	DO 37	
A9	24V	В9	0V	С9	24V	D9	0V	Terminal power





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

#### 21.2.3 Wiring Diagram





# 21.3 Process Data Definition

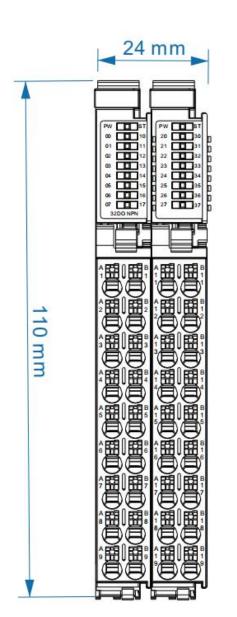
# DF50-M-32DO-NModulesProcess data definition

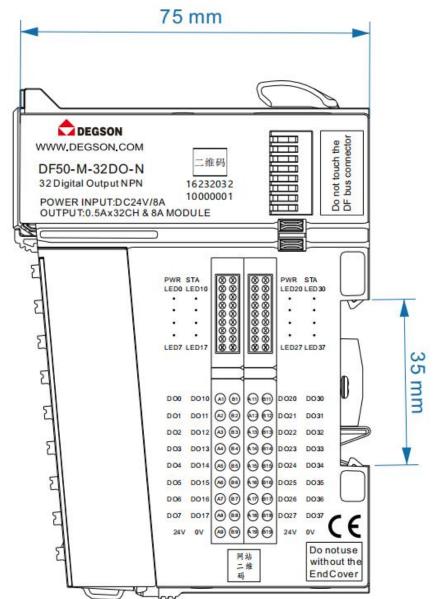
	Output Data										
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0			
Byte 0	DO 7	DO 6	DO 5	DO 4	DO 3	DO 2	DO 1	DO 0			
Byte 1	DO 17	DO16	DO 15	DO 14	DO 13	DO 12	DO 11	DO 10			
Byte 2	DO 27	DO 26	DO 25	DO 24	DO 23	DO 22	DO 21	DO 20			
Byte 3	DO 37	DO 36	DO 35	DO 34	DO 33	DO 32	DO 31	DO 30			



# 21.4 Mechanical Installation

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







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

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



Technical Information	
Product Description	Digital output modules,32Output,PNP, 24VDC
Number of channels	32
Signal Type	PNP
"OFF" signal voltage	High impedance
"ON" signal voltage	twenty fourV DC
Data size	4Byte
Connection Type	1-wire
Reverse circuit protection	Yes
Overcurrent protection	Yes
Short circuit protection	Yes
Isolation method	Photoelectric isolation from the field layer
Error diagnosis	Yes
Switching frequency (resistive)	100Hz
Switching frequency (lamp)	10Hz
Switching frequency (inductive)	0.2Hz
Response time of protection circuit	< 100µs
Maximum output current per channel	500 mA
Leakage Current	Maximum value: 10uA
Hardware response time	100us/100us
Output Impedance	<200mΩ
Output delay	OFF to ON:Max.100us, ON to OFF:Max.150us
	Over temperature shutdown: typical value 135°C
Protection function	Overcurrent protection: 1.1A. Typical value 0.5A
	Support short circuit protection

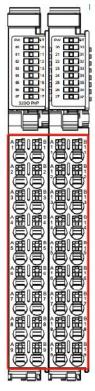


Load Type	0.5A/point,8A/Module
Output action display	When the output is in driving state, the indicator light is on.
	When working at 55°C, the rating is reduced by 50% (the output
Input derating	current of ON at the same time does not exceed 2A), or the rating
	is reduced by 10°C when all output points are ON
IO Mapping	Support bit-by-bit or word-by-word mapping
Fault shutdown output status mode	Clear, keep current value or output according to preset value
In stop mode	In the fault shutdown mode, no more refresh
Power parameters	
System bus input power rated voltage	5V DC (4.75V DC~ 5.25V DC)
System bus input power rated current	200mA
Terminal power input rated voltage	24V DC (20.4V DC~ 28.8V DC)
Terminal power input rated current	8A
Wiring parameters	
Connection technology: Output	PUSH-IN Terminal Blocks
Wire crimping area	0.2~1.5mm2/26~16AWG
Stripping length	8~10mm
Installation	DIN-35 rail
Material parameters	
color	black
Housing Material	PC plastic, PA66
Conformance mark	CE
Environmental requirements	
Allowable ambient temperature (operating)	-25~60°C
Permissible ambient temperature (storage)	-40~85°C
Protection type	IP20
Pollution degree	2. Comply with IEC 61131-2 standard
Operating altitude	Temperature without derating: $0 \sim 2000$ m
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	10ppm
75% relative humidity	
Permissible SO2 pollutant concentration at 75%	25ppm
relative humidity	



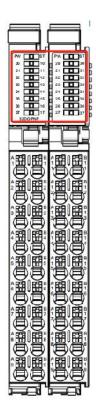
#### 22.2 Hardware Interface

22.2.1 Terminal Block Definition



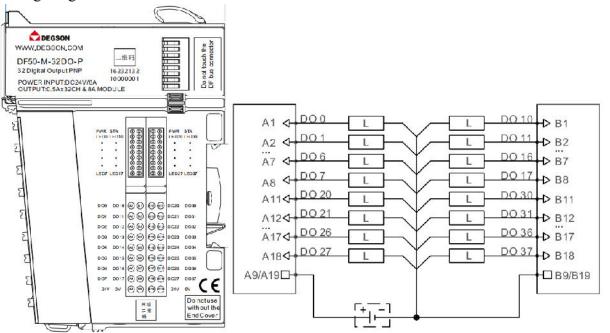
Terminal number	Signal	Terminal number	Signal	Terminal number	Signal	Terminal number	Signal	illustrate
A1	DO0	B1	DO10	C1	DO 20	D1	DO 30	
A2	DO1	B2	DO11	C2	DO 21	D2	DO 31	
A3	DO2	В3	DO12	C3	DO 22	D3	DO 32	
A4	DO3	B4	DO13	C4	DO 23	D4	DO 33	DOSignal
A5	DO4	В5	DO14	C5	DO 24	D5	DO 34	inputout
A6	DO5	B6	DO15	C6	DO 25	D6	DO 35	
A7	DO6	В7	DO16	С7	DO 26	D7	DO 36	
A8	DO7	B8	DO17	C8	DO 27	D8	DO 37	
A9	24V	В9	0V	С9	24V	D9	0V	Terminal power





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

22.2.3 Wiring Diagram



# 22.3 Module Process Data Definition

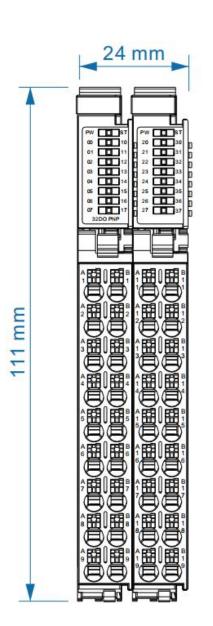
#### DF50-M-32DO-PModulesProcess data definition

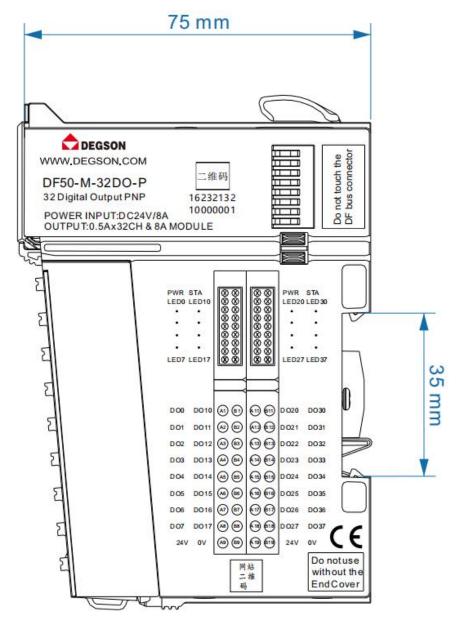
Output Data									
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	
Byte 0	DO 7	DO 6	DO 5	DO 4	DO 3	DO 2	DO 1	DO 0	
Byte 1	DO 17	DO16	DO 15	DO 14	DO 13	DO 12	DO 11	DO 10	
Byte 2	DO 27	DO 26	DO 25	DO 24	DO 23	DO 22	DO 21	DO 20	
Byte 3	DO 37	DO 36	DO 35	DO 34	DO 33	DO 32	DO 31	DO 30	



# 22.4 Mechanical Installation

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



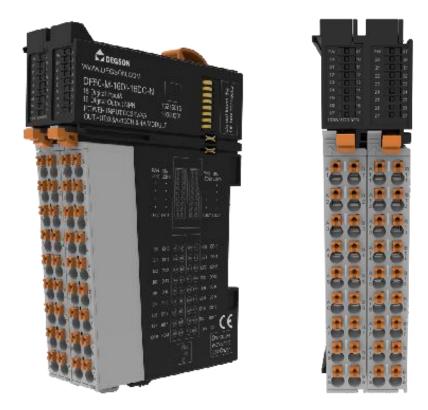




# 23 16-channel digital input & 16-channel digital output / 24VDC / NPN

# (DF50-M-16DI-16DO-N)

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



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



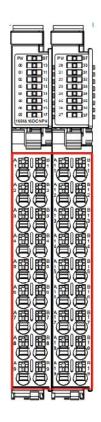
Connection Type		1-wire, Type 1/Type 3, according to IEC 61131-2				
Reverse circuit protec	tion	Yes				
Isolation method		Photoelectric isolation from the field layer				
Error diagnosis		Yes				
Filter time		0~40ms configurable				
Input Impedance		>7.5kΩ				
Input Action Display		When the input is in driving state, the input indicator light is on.				
IO Mapping		Support bit-by-bit or word-by-word mapping				
Output channel param	eters					
"OFF" signal voltage		High impedance				
"ON" signal voltage		0V DC				
Data size		2 Byte				
Connection Type		1-wire				
Reverse circuit protec	tion	Yes				
Overcurrent protection		Yes				
Short circuit protection		Yes				
	11					
Isolation method		Photoelectric isolation from the field layer				
Error diagnosis	·····	Yes				
Switching frequency (		100Hz				
Switching frequency (		10Hz				
Switching frequency (		0.2Hz				
Response time of prot		<100µs				
Maximum output curr	ent per channel	500 mA				
Leakage Current		Maximum value: 10uA				
Hardware response tir	ne	100us/100us				
Output Impedance		<200mΩ				
Output delay		OFF to ON:Max.100us, ON to OFF:Max.150us				
		Over temperature shutdown: typical value 135°C				
Protection function		Overcurrent protection: 1.1A. Typical value 0.5A				
		Support short circuit protection				
Load Type		Inductive (7.2W/point, 24W/module), Resistive (0.5A/point,				
Load Type		4A/module), Light (5W/point, 18W/module)				
Output action display		When the output is in driving state, the indicator light is on.				
		When working at 55°C, the rating is reduced by 50% (the output				
Input derating		current of ON at the same time does not exceed 2A), or the rating				
		is reduced by 10°C when all output points are ON				
IO Mapping		Support bit-by-bit or word-by-word mapping				
Fault shutdown output	t 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 pow	er rated voltage	5V DC (4.75V DC~ 5.25V DC)				
System bus input pow		145mA				
Input	NPN signal type	24V				
ChannelsTerminal						
power supply						
(common terminal)	PNP signal type	0V				
input voltage						
Wiring parameters						
Connection technolog	v. Innut	PUSH-IN Terminal Blocks				
Wire crimping area		0.2~1.5mm2/26~16AWG				
Stripping length		8~10mm <sup>2</sup>				
Installation		DIN-35 rail				
Material parameters						
color		black				
Housing Material		PC plastic, PA66				
Conformance mark		CE				
Environmental require	ements					



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

# 23.2 Hardware Interface

#### 23.2.1Terminal Block Definition



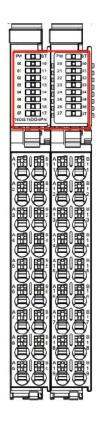
Terminal number	Signal	Terminal number	Signal	Terminal number	Signal	Terminal number	Signal	illustrate
A1	DI 0	B1	DI 10	C1	DO 20	D1	DO 30	DI signal input:
A2	DI 1	B2	DI 11	C2	DO 21	D2	DO 31	A1~B9
A3	DI 2	В3	DI 12	C3	DO 22	D3	DO 32	DO signal



DF50 series I/O

A4	DI 3	B4	DI 13	C4	DO 23	D4	DO 33	output: C1~D9
A5	DI 4	В5	DI 14	C5	DO 24	D5	DO 34	
A6	DI 5	B6	DI 15	C6	DO 25	D6	DO 35	
A7	DI 6	B7	DI 16	C7	DO 26	D7	DO 36	
A8	DI 7	B8	DI 17	C8	DO 27	D8	DO 37	
A9	COM	В9	COM	С9	24V	D9	0V	Public

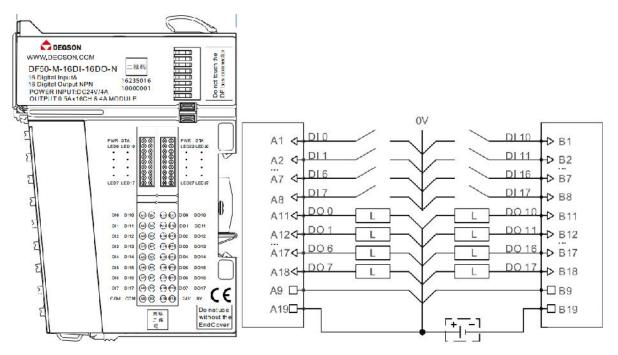
23.2.2 LED indicator definition



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

As shown in the figure, users canunifiedConfigurationSignal filtering of the module.

DF50-M-16DI-16DO-N	Parameter Setting
--------------------	-------------------

SignalFilter Setting: 20ms

# 23.4 Module Process Data Definition

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

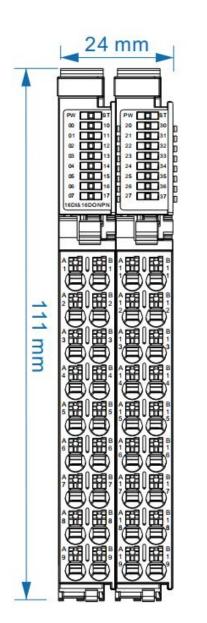
Input Data								
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	DI 7	DI 6	DI 5	DI 4	DI 3	DI 2	DI 1	DI 0
Byte 1	DI 17	DI 16	DI 15	DI 14	DI 13	DI 12	DI 11	DI 10

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



# 23.5 Mechanical Installation

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



DEGSON     WWW.DEGSON.COM     DF50-M-16DI-16DO-N     16 Digital Input& 16235016     16 Digital Output NPN 16235016     16 Digital Output NPN 10000001     POWER INPUT:D C24V/4A     OUTPUT:0.5Ax16CH & 4A MODULE     PWR STA     LED0 LED10     PWR STA     LED20 LED30	-	75 mm		
WWW.DEGSON.COM DF50-M-16DI-16DO-N 16 Digital Input& 16 Digital Output NPN POWER INPUT:DC24V/4A OUTPUT:0.5Ax16CH & 4A MODULE				*
PWR STA LED0 LED10	WWW.DEGSON.COM DF50-M-16DI-16 16 Digital Input& 16 Digital Output NPN POWER INPUT:DC24	DO-N 二维码 16235016 10000001		DF bus connector
2 2 2 2 2 2 2 2 2 2 2 2 2 2	ย ย ย	LED0 LED10 000 000 000 000 000 000 000 000 000 0		
E E E E E E E E E E E E E E	ย ย	DI1 DI11 (2) (5) DI2 DI12 (3) (5) DI3 DI13 (4) (5) DI4 DI14 (6) (5)	(1)         (1)         (1)         (1)         (1)           (1)         (1)         (1)         (1)         (1)           (1)         (1)         (1)         (1)         (1)           (1)         (1)         (1)         (1)         (1)           (1)         (1)         (1)         (1)         (1)           (1)         (1)         (1)         (1)         (1)           (1)         (1)         (1)         (1)         (1)	35 m
DI5 DI15     細部     19     19     1005     D015       DI6 DI16     回     117     回     100     1005     D016       DI7 DI17     回     1017     1017     007     D017     CCC       COM COM     回     101     117     117     117     117     117       COM COM     回     101     117     117     117     117     117       COM COM     回     101     117     117     117     117     117     117       COM COM     Image: State Sta	Σ	DI6 DI18 (2) (9) DI7 DI17 (2) (9) COM COM (2) (9) =	(可) (可) DOS DO18 (可) (可) DO7 DO17 (可) (可) 24V 0V 参 業	tuse ut the



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

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



Technical Information			
Product Description		Digital inputOutputModules,16enter+16 output,PNP, 24VDC	
Number of channels		16enter+16 output	
Signal Type		PNP	
Input channel parameter	ers		
Signal range	"ON" signal voltage	Voltage difference > 11VDC (voltage difference with common	
		input)	
	"OFF" signal voltage	Voltage difference <5VDC (voltage difference with common input)	
Hardware response time		200us/200us	
Data size		4Byte	
Connection Type		1-wire, Type 1/Type 3, according to IEC 61131-2	
Reverse circuit protection		Yes	
Isolation method		Photoelectric isolation from the field layer	
Error diagnosis		Yes	
Filter time		0~40ms configurable	



Input Impedance		>7.5kΩ
Input Action Display		When the input is in driving state, the input indicator light is on.
IO Mapping		Support bit-by-bit or word-by-word mapping
Output channel parame	eters	
"OFF" signal voltage		High impedance
"ON" signal voltage		twenty fourV DC
Data size		2 Byte
Connection Type		1-wire
Reverse circuit protection		Yes
Overcurrent protection		Yes
Short circuit protection		Yes
Isolation method		Photoelectric isolation from the field layer
Error diagnosis		Yes
Switching frequency (resistive)		100Hz
Switching frequency (lamp)		10Hz
Switching frequency (inductive)		0.2Hz
Response time of protection circuit		< 100µs
Maximum output current per channel		500 mA
Leakage Current		Maximum value: 10uA
Hardware response time		100us/100us
Output Impedance		<200mΩ
Output delay		OFF to ON:Max.100us, ON to OFF:Max.150us
		Over temperature shutdown: typical value 135°C
Protection function		Overcurrent protection: 1.1A. Typical value 0.5A
		Support short circuit protection
		Inductive (7.2W/point, 24W/module), Resistive (0.5A/point,
Load Type		4A/module), Light (5W/point, 18W/module)
Output action display		When the output is in driving state, the indicator light is on.
		When working at 55°C, the rating is reduced by 50% (the output
Input derating		current of ON at the same time does not exceed 2A), or the rating is
		reduced by 10°C when all output points are ON
IO Mapping		Support bit-by-bit or word-by-word mapping
Fault shutdown output status mode		Clear, keep current value or output according to preset value
In stop mode		In the fault shutdown mode, no more refresh
Power parameters		
System bus input power rated voltage		5V DC (4.75V DC~ 5.25V DC)
System bus input powe		145mA
Input	NPN signal type	24V
ChannelsTerminal		
power supply	PNP signal type	0V
(common terminal)		
input voltage		
Wiring parameters	-	
Connection technology: Input		PUSH-IN Terminal Blocks
Wire crimping area		0.2~1.5mm2/26~16AWG
Stripping length		$8 \sim 10 \text{mm}^2$
Installation		DIN-35 rail
Material parameters		
color		black
Housing Material		PC plastic, PA66
Conformance mark		CE
Environmental requirements		·
Allowable ambient temperature (operating)		-25~60°C
Permissible ambient temperature (sporadilg)		-40~85°C
Protection type		IP20
		2. Comply with IEC 61131-2 standard
Pollution degree		2. Compty with the 01151-2 standard
Pollution degree		Temperature without dorating: 00,2000m
Operating altitude	1	Temperature without derating: $0 \sim 2000$ m
Operating altitude Relative humidity (nor	n-condensing)	5~95%RH
Operating altitude	n-condensing)	

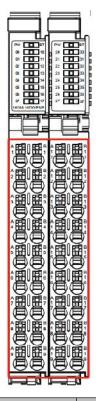


## DF50 series I/O

EMC anti-interference level	Compliant with IEC 61000-4
Corrosion resistance	Compliant with IEC 60068-2-42 and IEC 60068-2-43 standards
Permissible H2S contaminant concentration at 75% relative humidity	10ppm
Permissible SO2 pollutant concentration at 75% relative humidity	25ppm

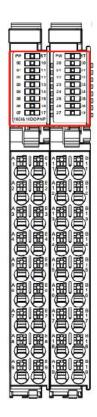
## 24.2 Hardware Interface

#### 24.2.1 Terminal Block Definition



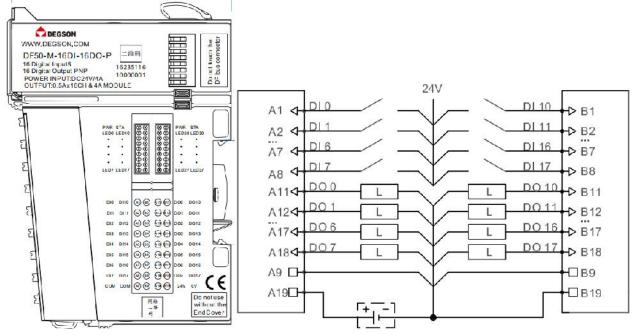
Terminal number	Signal	Terminal number	Signal	Terminal number	Signal	Terminal number	Signal	illustrate
Al	DI 0	B1	DI 10	C1	DO 20	D1	DO 30	
A2	DI 1	B2	DI 11	C2	DO 21	D2	DO 31	
A3	DI 2	В3	DI 12	C3	DO 22	D3	DO 32	DI signal input:
A4	DI 3	B4	DI 13	C4	DO 23	D4	DO 33	A1~B9
A5	DI 4	В5	DI 14	C5	DO 24	D5	DO 34	DO signal
A6	DI 5	B6	DI 15	C6	DO 25	D6	DO 35	output: C1~D9
A7	DI 6	B7	DI 16	C7	DO 26	D7	DO 36	
A8	DI 7	B8	DI 17	C8	DO 27	D8	DO 37	
A9	СОМ	В9	COM	С9	24V	D9	0V	Public





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

24.2.3 Wiring Diagram



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



PNP.



# 24.3 Module Configuration Data Definition

As shown in the figure, users canunifiedConfigurationSignal filtering of the module.

DF50-M-16DI-	16DO	P Para	meter Setting	J
			-	

SignalFilter Setting: 20ms

# 24.4 Module Process Data Definition

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

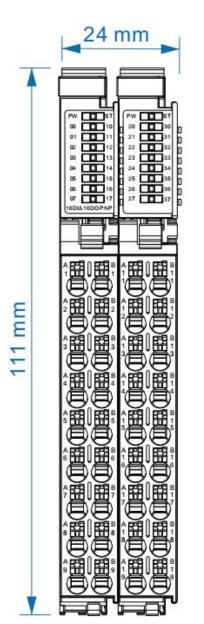
Input Data										
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0		
Byte 0	DI 7	DI 6	DI 5	DI 4	DI 3	DI 2	DI 1	DI 0		
Byte 1	DI 17	DI 16	DI 15	DI 14	DI 13	DI 12	DI 11	DI 10		

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

DEGSON

# 24.5 Mechanical Installation

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



	75 mm	1		
~		6	B	
DEGSON WWW.DEGSON.C DF50-M-16DI- 16 Digital Input& 16 Digital Output P POWER INPUT:DC OUTPUT:0.5Ax160	16DO-P NP 162351 224V/4A 100000	16	Do not touch the	DF bus connector
2 2 2	PWR STA LED0 LED10 · · · · LED7 LED17	888 888 888 888 888 888 888 888 888 88	PWR STA LED20 LED 30	
ย ย ย	DI1 DI11		D 00 D0 10 D 01 D0 11 D 02 D0 12 D 03 D0 13	35 mm
E E	DI5 D115 (4) DI6 D116 (4)		D 04 D 014 D 05 D 015 D 08 D 016 D 07 D 017 24V 0V	Ē
E		网站 二维 码	Do not without End Co	the



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

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







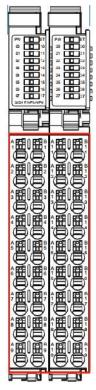
# 25.1 Specifications

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



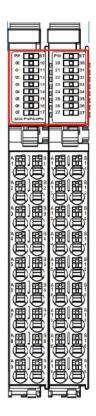
## 25.2 Hardware Interface

25.2.1 Terminal Block Definition



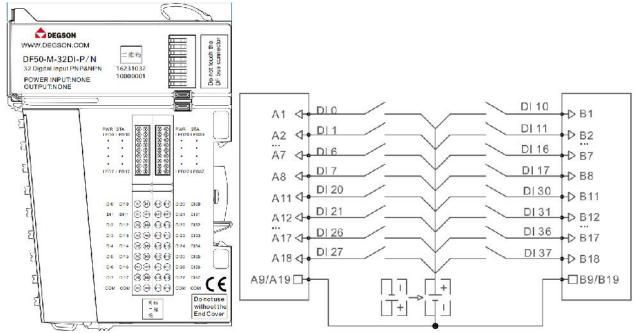
Terminal number	Signal	Terminal number	Signal	Terminal number	Signal	Terminal number	Signal	illustrate
A1	DI 0	B1	DI 10	C1	DI20	D1	DI30	
A2	DI 1	B2	DI 11	C2	DI21	D2	DI31	
A3	DI 2	В3	DI 12	C3	DI22	D3	DI32	
A4	DI 3	B4	DI 13	C4	DI23	D4	DI33	
A5	DI 4	В5	DI 14	C5	DI24	D5	DI34	DI signal input
A6	DI 5	B6	DI 15	C6	DI25	D6	DI35	
A7	DI 6	В7	DI 16	C7	DI26	D7	DI36	
A8	DI 7	B8	DI 17	C8	DI27	D8	DI37	
A9	СОМ	В9	СОМ	С9	СОМ	D9	СОМ	Public





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

#### 25.2.3 Wiring Diagram





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

# 25.3 Module Configuration Data Definition

As shown in the figure, users canunifiedConfigurationSignal filtering of the module.

#### DF50-M-32DI-P/N Parameter Setting

SignalFilter Setting: 20ms

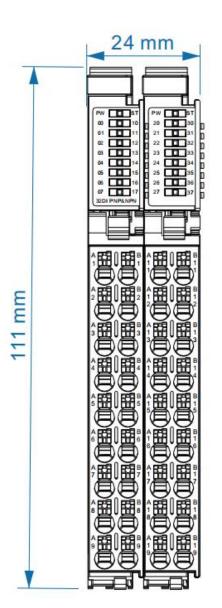
# 25.4 Module Process Data Definition

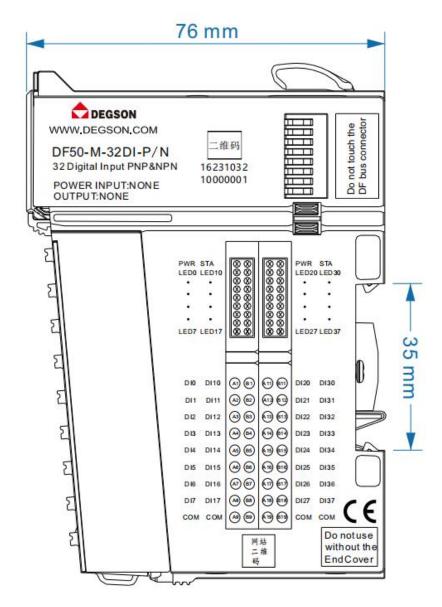
	Input Data											
Bit No	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0				
Byte 0	DI 7	DI 6	DI 5	DI 4	DI 3	DI 2	DI 1	DI 0				
Byte 1	DI 17	DI 16	DI 15	DI 14	DI 13	DI 12	DI 11	DI 10				
Byte 2	DI 27	DI 26	DI 25	DI 24	DI 23	DI 22	DI 21	DI 20				
Byte 3	DI 37	DI 36	DI 35	DI 34	DI 33	DI 32	DI 31	DI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



# 25.5 Mechanical Installation

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







# **4. Software Configuration Description**

1. TIA Portal V16 configuration process

This chapterspecialDon't use SiemensTIA Portal V16 As configuration software adapterDF50-C-PN-RTThe use of is introduced.

The PLC model used in this section is 6ES7212-1AE40-0XB0.

# 1.1. Project Creation

#### 1.1.1. New Construction

➢ As shown in Figure 4-1-1, open the TIA Portal V16 software, then select "Create New Project" from the menu bar to create a new project:

Start			Create new project		
Devices &	2. A	Open existing project	Project name: Path:	Project1 C:lUsersizy;WorkIDocumentsi/Jutomation	
		🥚 Create new project	Version:		-
PLC programming	-	Migrate project	Author: Comment:	zyyWork	~
Motion & technology	-	Close project			~
Visualization					Create

Figure 4-1-1

As shown in Figure 4-1-2, create a project and open the project view:

Start Intervention Start	Open existing project     Create new project     Migrate project     Close project	First steps Project: "Project" was opened successfully. I Star:	Yease select the next step:
Mation & 🚓 technology 🏹 Visualization 💋 Online & 🛩	Welcome Tour	Pet/ces 8 6     PLC programming	Configure a device Write PLC program
Diagnostics	🥚 First steps	Molion & 🚓	Configure technology objects
	<ul> <li>Installed software</li> <li>Help</li> </ul>		Configure an HMI screen
	🚯 User interface language	Project view	Open the project view

## 1.1.2. Add GSD file

>

Add GSD file as shown in Figure 4-1-3 and 4-1-4:

Figure 4-1-2



Project Edit View Insert Online	Options	Tools N	Mindow	Help	
🛉 🎦 🔚 Save project 🛛 📕 🐰 🗐	🍟 Settin	gs			
Project tree	Suppo	ort package	es		
Devices	Manage general station description files (GSD)				
	Start /	Automation	n License	Manager	
	🐮 Show	reference t	text		
▼ ] Project1	🛄 Globa	l <mark>librarie</mark> s			
Add new device					
Devices & networks					

Figure 4-1-3

Manage general station description	n files			×
Installed GSDs GSDs in the	project			
Source path: D: D	F50\GSDML-\	/2.42-DF50-C-PN-R1	F-20240418	
Content of imported path				STEP1
File	Version	Language	Status	Info
GSDML-V2.42-DF50-C-PN-RT-2024	V2.42	English, Chi	Already installed	PROFINETIO Devi
STEP2				
<		III	STEP	3
			Delete	tall Cancel

Figure 4-1-4

1.1.3. Adding controllers and adapters

Add a controller as shown in Figure 4-1-5:



-	Project tree			
	Devices	Add new device		×
	Ť	Device name:		
Start	Project1     Add new device     Devices & networks     Cross-device functions     Corss-device functions     Common data     Documentation settings     Card Reader/USB memory	Device name: PLC_2 Controllers HMI PC systems	<ul> <li>Controllers</li> <li>SIMATIC 57-1200</li> <li>CPU</li> <li>CPU 1211C AC/DC/RIy</li> <li>CPU 1211C DC/DC/DC</li> <li>CPU 1211C DC/DC/RIy</li> <li>CPU 1212C AC/DC/RIy</li> <li>CPU 1212C DC/DC/DC</li> <li>6657 212-1AE31-0X80</li> <li>6557 212-1AE31-0X80</li> <li>CPU 1212C DC/DC/RIy</li> <li>CPU 1212C DC/DC/RIy</li> <li>CPU 1214C AC/DC/RIy</li> <li>CPU 1214C AC/DC/RIy</li> <li>CPU 1214C DC/DC/RIy</li> <li>CPU 1214C DC/DC/RIy</li> <li>CPU 1214C DC/DC/RIy</li> <li>CPU 1214C DC/DC/RIy</li> <li>CPU 1215C DC/DC/RIy</li> <li>CPU 1215C DC/DC/RIy</li> <li>CPU 1215C DC/DC/RIy</li> </ul>	Device:       Image: CPU 1212C DC/DC/DC         CPU 1212C DC/DC/DC         Article no.:       6ES7 212-1AE40-0XB0         Version:       V4.4         Description:         Work memory 75 KB; 24VDC power supply with D18 x 24VDC SINK/SOURCE, DQ6 x 24VDC and Al2 on board; 4 high-speed counters (expandable with digital signal board) and 4 pulse outputs on board; signal board expands on-board I/O; up to 3 communication modules for serial communication; up to 2 signal modules for I/O
	Details view		CUUTERSEARCH CONTRACTOR CONTRACT	expansion; PROFINETIO controller, I-device, transport protocol TCP/IP, secure Open User Communication, 57 communication, Web server, OPC UA: Server DA
		Open device view		OK Cancel

# Figure 4-1-5

<sup>A</sup> Add new device        STEP1        STALUDistation        Station	Project tree 🛛 🗍 🌗	Project1 > Devices & networks				_ 🖬 🖬 🗙	Hardware cat	
Catalog     Catalog     Catalog     Catalog     STEP1     Project1     Project1     Project1     Project2     STEP1     PLC_1     CPU 1212C DC/DC/DC     Pilcr     Pilcr     CPU 1212C DC/DC/DC     Pilcr     Pilcr     CPU 1212C DC/DC/DC     Pilcr     Pilcr     Pilcr     CPU 1212C DC/DC/DC     Pilcr     Pi	Devices		F Topology	view 👗 Netwo	ork view	/ice view	Options	
<ul> <li>Project1</li> <li>Add new devce STEP1</li> <li>Device Snetworks</li> <li>PlC_1 (CPU 1212C DO/DO/DC)</li> <li>PlC_1 (CPU 1212C DO/DO/DC)</li> <li>PlC 1 CPU 1212C DO/DO/DC</li> <li>PlC 1 CPU 1212C DO/DC/DC</li> <li>PlC 1</li></ul>	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Network	Re Ne	twork overview	Connections			5
Add new dev ce     STEP1     Add new dev ce     STEP1     PLC_1     CPU 1212C DC/DC/DC/     PLC_1     CPU 1212C DC/DC/DC/     PLC_1     CPU 1212C DC/DC/DC/     PLC_1     CPU 1212C DC/DC/DC/     PlLC_1     CPU 1212C DC/DC/DC/     PlLC_1     CPU 1212C DC/DC/DC/     Prosectings     Common data     Documentation settings     Common data     Documentation settings     Common data     Qercise common data     CPU 1212C     Qercise common data     CPU 1212C     Qercise common data     CPU 1212C     Qercise common data     Qercise c			^ ·	Device	Туре	W 2A los s	✓ Catalog	
Add new device STEP1   Device: & networks   Implic_1 (CPU 1212C DC/DC/DC)						Ostation	Search>	ini ten
Image: Second	Devices & networks      Devices & networks      Ungrouped devices      Security settings      Cross-device functions      Grownen data      Documentation settings      Languages & resources      Xersion control interface      Online access			▶ PLC 1	CPU 12	12C DC/DC/DC	Gontroller     HMI     PC system     Drives & s     Metwork c     Detecting     Distribute     Power sup     Field devi     Other field     Mddito	s s tarters omponents & Monitoring d I/O uplyand distribu res d devices nal Ethernet de
Image: Second			~	1			- 🗖 PROFIN	ETIO
General (a) Cross references       Compile <ul> <li></li></ul>				AL		>	🕨 🕨 🕅 Driv	es
General 3     Cross references     Compile <ul> <li>Image: Image: Image:</li></ul>			S Propert	les 🗓 Info 🤨	Diagnostics			
C A G Show all messages C C C C C C C C C C C C C C C C C C C		General (1) Cross references	Compile					eway
		Show all mersage:					Contraction of the second s	
			0.00					
	t Details view	! Path	Description			Go to	Second Second Second Second	DF20-C-PN

Figure 4-1-6

- 1.1.4. Establish connections and add IO expansion modules:
- Assign a network interface to the adapter (as shown in Figures 4-1-7 and 4-1-8):







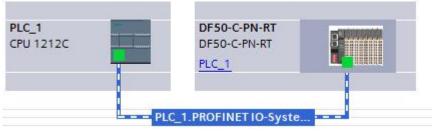


Figure 4-1-8

➤ Double-click the adapter. In the hardware catalog tab on the right, as shown in Figure 4-1-9, add modules in the device tree according to the modules inserted behind the adapter. The topology of this example is DF50-C-PN-RT, DF50-M-16DO-P, and DF50-M-16DI-P/N. The default configuration of DF50-C-PN-RT is SystemDiagnostic and AdapterDigitalInput modules, which are used to display the error information of the IO modules in the topology and the 8-channel DI input signal of the adapter.

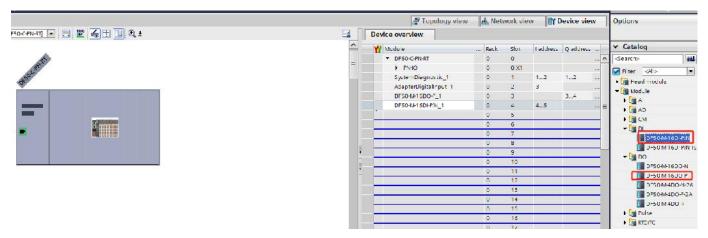


Figure 4-1-9

#### 1.1.5. Assigning a Device Name

Assign device names as shown in Figures 4-1-10 and 4-1-11. Open the Assign PROFINET Device Name column, click Update List, select the scanned device, and click Assign Name. Ensure that the Status column displays a blue check mark and the text OK is displayed.



# DF50 series I/O

		📉 🕹 Kelations 💘 👈 🔳 🖽 🛄 🔍 🕇
<ul> <li>Project1</li> <li>Add new device</li> <li>Devices &amp; networks</li> <li>Devices &amp; networks</li> <li>PLC_1 [CPU 1212C DC/DC/DC]</li> <li>Ungrouped devices</li> <li>Security settings</li> <li>Cross-device functions</li> </ul>	PLC_1 CPU 1212C PLC_1 PLC_1 PLC_1	T Device configuration Change device Write IO-Device name to Micro Memory Card Start device tool
🕨 🙀 Common data		X Cut Ctrl+X
Documentation settings		Copy Ctrl+C
🕨 🐻 Languages & resources		Tel Paste Ctrl+V
Version control interface		X Delete Del
🔚 Online access		Rename F2
ing Card Reader/USB memory		Assign to new DP master / IO controller Disconnect from DP master system / IO system Ighlight DP master system / IO system
		🚆 Go to topology view
	STEF	Compile Download to device S Go online Ctrl+K G Online Ctrl+M Ctrl+M Ctrl+D Ctrl+D Ctrl+D

Figure 4-1-10

Assign PROFINE⊤ device	e name.					>
		Configured PRO	FINET de	vice		
		PROFINET devic	e name:	df50-c-pn-rt		•
			/ice type:	DF50-C-PN-RT		
		Online access				
		Type of the PG/PC i	nterface:	L PN/IE		
		PG/PC i	nterface:	Realtek Gam	ing 2.5GbE Family Con	troller 💌 💎 🖸
		Device filter				
		🛃 Only show	devices of	the same type		
		Only show	devices wit	th bad parameter	settings	
		Only show	devices wit	thout names		
	Accorcible doui	ices in the network:				
	IP address	MAC address	Device	PROFINET devi	ce name Status	
	192.168.0.2	16-14-02-10-52-D3	PNIO	df50-c-pn-rt	🥝 ок	
<b>L</b> 🗖			S	TEP2		
Fissi LED						
	<			Ш		
-					Update list	Assign name
					STEP1	
					UT LIVI	STEP3
Orline status information	1:					
Search completed	d. 1 of 2 devices we	ere found.				
<			111			>
						4
						Close

Figure 4-1-11



#### 1.1.6. Download to device

> After the module configuration is completed, download the configuration to the PLC as shown in

Figure 4-1-12. Make sure that the computer network segment is consistent with the PLC network segment.

	Configured acco Device	ess nodes of *PLC_1* Device type	Slot	Interface type	Address	Subne	
	PLC_1	CPU 1212C DC/D		PN/IE	192,168.0.1	PN/IE	
					1-1-1-1		-
		Type of the PG/PC inte	rface:	PN/IE			•
		PG/PC inte	rface:	Realtek Gamin	g 2.5GbE Family Con	troller	-
		Connection to interface/su	bnet:	Direct at slot '1	(1'		- 💎
		1st gat	eway:				- 0
	PLC_1	CPU 1212C DC/D			.168.0.1	PLC_1	1
10	Device PLC_1 -	Device type CPU 1212C DC/D		192	Iress 2.168.0.1 ess address	Target de PLC_1 —	
<b>r</b>		STE	P2				
📄 Flash LED						ST	EP1
						<u>S</u> ta	rt search
				r	Display only error	messages	
)nline status informat	tion:					messages	
		with address 192.168.0.1.		Ļ		messages	
<ul> <li>Connection estab</li> <li>Scan completed.</li> </ul>	lished to the device 1 compatible device	with address 192.168.0.1. s of 3 accessible devices fou	ind.	Ļ			
Connection estab Scan completed.	lished to the device 1 compatible device information	s of 3 accessible devices for	ind.	ţ			[
<ul> <li>Connection estab</li> <li>Scan completed.</li> </ul>	lished to the device 1 compatible device information	s of 3 accessible devices for	ind.		STEP		

Figure 4-1-12

#### 1.1.7. Running PLC

As shown in Figure 4-1-13, click Start PLC to run the PLC in RUN state and switch to online mode.
All states in the project tree list are green, indicating that the configuration is normal.



Project tree	Project1 > Devices & ne	tworks	
Devices		불 Торо	ology view 🖁 🖁 Network view
- 111	Network L Connection	is 🔭 📴 🗍	Network overview Cor
	4 IO system: PLC_1.PROFIL	P.072	Pevice
Project1			S7-1200 station_1
💕 Add new device			✓ ▶ PLC 1
devices & networks	 PLC_1 CPU 1212C	DF50-C	GSD device 1
PLC_1 [CPU 1212C DC/DC/DC]			DF50-C-PN-RT
🕨 🖳 Ungrouped devices		PLC_1	
🕨 📷 Security settings			
Cross-device functions		PLC 1.PROFINE	
🕨 🙀 Common data		-LC_T.FROTINE	
Documentation settings			
· P= · ·			

Figure 4-1-13

#### 1.1.8. Debugging and testing

As shown in Figure 4-1-14, adding a new monitoring table can monitor the data received by the IO

module or force the modification of output data, which is convenient for us to debug.

Project tree		Project	1 ) PLC_1 [CF	U 1212C DC/DC/D	C] • Watch and for	rce tables 🔸 Wa	tch table_1		
Devices									
		🚽 🛃	1 <sup>22</sup>	9 7 7 7 00 00	h 1				
		i	Name	Address	Display format	Monitor value	Modify value	3	Comment
🕶 🛅 Project1	<b>2</b> • ^	1							
🚔 Add new device		2							
Devices & networks		З							
PLC_1 [CPU 1212C DC/DC/DC]		4							
The vice configuration		5							
🞖 Online & diagnostics		6							
🕨 📴 Program blocks	•	7							
🕨 🚂 Technology objects		8							
External source files	≡	9							
🕨 🚂 PLC tags	•	10							
E PLC data types		11							
<ul> <li>Watch and force tables</li> </ul>		12							
Add new watch table STE	D1	13							
Force table		14							
Watch table_1 STEP2		15							
Online backups		16							
🕨 📴 Traces		17							
OPC UA communication		18							
Device proxy data		19							
Program info		20							
PLC alarm text lists		21							
Local modules		22							
Distributed I/O		23							
Ungrouped devices		24							
🕨 📴 Security settings		25							
Cross-device functions		26						1999	

Figure 4-1-14Monitoring table

Double-click the adapter in the device and network view, and a window as shown in Figure 4-1-15 will appear. The system automatically assigns the I address (input address) and Q address (output address) to the IO module.



Module 🛛	 Rack	Slot	I address	Q address
▼ DF50-C-PN-RT	0	0		
PN-IO	0	0 X1		
SystemDiagnostic_1	0	1	12	12
AdapterDigitalInput_1	0	2	3	
DF50-M-16DO-P_1	0	3		34
DF50-M-16DI-P/N_1	0	4	45	
	0	5	_	

Figure 4-1-15Device Address

As shown in Figure 4-1-16, filling the module address into the monitoring table can monitor and modify the data.

iojaa \$⁄ ≥⁄		91 90 97 1 1	C]  Watch and for				
1	Name	Address	Display format	Monitor value	Modify value	9	Comment
		%IW1	Hex	16#0000			SystemDiagnostic_1
		%QW1	Hex	16#0000			SystemDiagnostic_1
		%IB3	Hex	16#00			AdapterDigitalInput_1
		%QW3	Hex	16#FFFF	16#FFFF		DF50-M-16DO-P_1
		%IW4	Hex	16#0000			DF50-M-16DI-P/N_1

Figure 4-1-16



#### 1.2. Adapter usage examples

Please refer to the wiring diagram of the adapter<u>Chapter 2 Section 2.2</u>The example uses the DF50-C-PN-RT + DF50-M-16DO-P + DF50-M-16DO-N + DF50-M-16DI-P/N + DF50-M-16DI-P/N-TS topology. After adding the modules in sequence, the topology shown in Figure 4-1-17 is obtained: SystemDiagnostic\_1 is the diagnostic module, AdapterDigitalInput\_1 is the adapter 8-channel digital input display, and the other modules are the various IO module cards we inserted.

4	Module	 Rack	Slot	I address	Q address
	▼ DF50-C-PN-RT	0	0		
	PN-IO	0	0 X1		
	SystemDiagnostic_1	0	1	12	12
	AdapterDigitalInput_1	0	2	3	
	DF50-M-16DO-P_1	0	3		34
	DF50-M-16DO-N_1	0	4		56
	DF50-M-16DI-P/N_1	0	5	45	
	DF50-M-16DI-P/N-TS_1	0	6	639	7

Figure 4-1-17

#### 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 fault code table 1 for details				
	(	Output data: 2 Byte				
Byte No.	illustrate	Remark				
Byte 0	No action required	/				
Byte 1		/				

> The meanings of the fault codes are shown in the following table.

Fault Codes	Fault Description	Troubleshooting
0xE1	Module power supply abnormality	Check the power cord connection
0xE2	Analog module calibration failure	Contact Supplier
0xE3	Module internal initialization exception	Contact Supplier
0xE4	Overcurrent signal detected	Check peripherals

T11 410



0xE8 Serial port module communication abnormality Check signal line wiring

As shown in Figures 4-1-18 and 4-1-19, the monitoring value of the diagnostic module is "16#01E1". "01" indicates that the first IO card has a fault, and "E1" indicates that the external power supply of the module is abnormal (see Table 4.1.2 for the meaning of other fault codes). If the monitoring value is 16#02E1, it means that the second IO card has an abnormal module external power supply fault, and so on.

Address	Display format	Monitor value	Modify value	9	Comment
%IW1	Hex	16#01E1			SystemDiagnostic_1
%QW1	Hex	16#0000	1		SystemDiagnostic_1
%IB3	Hex	16#00			AdapterDigitalInput_1
		Figure 4	-1-18		
Address	Display format	Figure 4 Monitor value	-1-18 Modify value	4	Comment
	Display format Hex			9	Comment SystemDiagnostic_1
Address %IW1 %QW1		Monitor value		9	



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 07	DI 06	DI 05	DI 04	DI 03	DI 02	DI 01	DI 00		

➤ As shown in the figure below, the filter parameters of the adapter's 8-channel digital input can be modified in the module properties window.

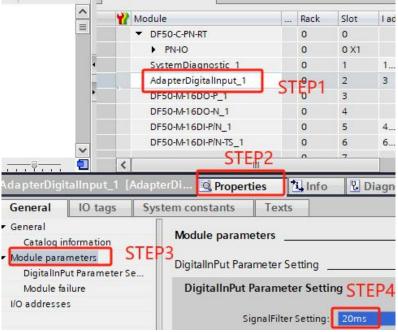


Figure 4-1-20



1.2.3. Bus Error Adapter Status Setting

➤ As shown in the figure below, you can set the behavior of the adapter when a bus error occurs. You can set it to clear the output value or keep the last value. The default is to clear the output value.

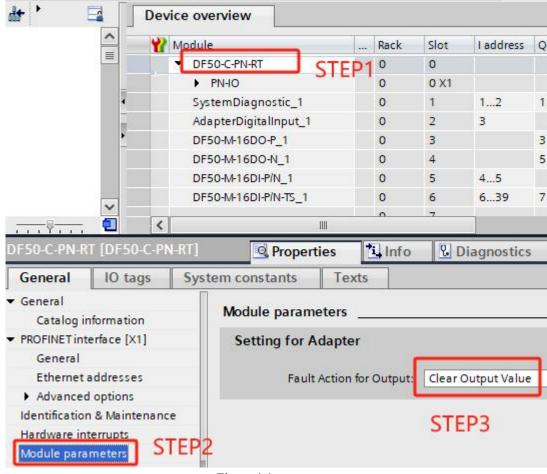
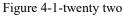


Figure 4-1-twenty one

1.2.4. Get module software version

> Get the adapter version information as shown in the figure below. Write "0x100" in the SystemDiagnostic\_1 input address to get the adapter software version information. "0x1200" means the software version is V12.

Address	Display format	Monitor value	Modify value	9	Comment
%IW1	Hex	16#1200			SystemDiagnostic_1
%QW1	Hex	16#0100	16#0100	M 🧎	SystemDiagnostic_1
%IB3	Hex	16#00			AdapterDigitalInput_1



SystemDiagnostic\_1 input address to get the software version information of the first module after the adapter. "0x1100" means the software version is V11.



Address	Display format	Monitor value	Modify value	9	Comment
%IW1	Hex	16#1100			SystemDiagnostic_1
%QW1	Hex	16#0101	16#0101	M 🔺	SystemDiagnostic_1
%IB3	Hex	16#00			AdapterDigitalInput_1

Figure 4-1-twenty three



## 1.3. Digital module usage routine

This example uses the DF50-C-PN-RT + 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-4DO-R topology. After adding the modules, it is shown in the figure below.

DF50-C-PN-RT	0	0		
PN-IO	0	0 X1		
SystemDiagnostic_1	0	1	12	12
AdapterDigitalInput_1	0	2	3	
DF50-M-16DO-P_1	0	3		34
DF50-M-16DO-N_1	0	4		56
DF50-M-16DI-P/N_1	0	5	45	
DF50-M-16DI-P/N-TS_1	0	6	639	7
DF50-M-4DO-P-2A_1	0	7	40	8
DF50-M-4DO-R_1	0	8		9
DF50-M-32DO-P_1	0	9		1013
DF50-M-32DO-N_1	0	10		1417
DF50-M-32DI-P/N_1	0	11	4144	
DF50-M-16DI-16DO-P_1	0	12	4546	1819
DF50-M-16DI-16DO-N_1	0	13	4748	2021

Figure 4-1-twenty four

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

Please refer to the module wiring diagram<u>Chapter 3, Section 3.2</u>The output status of the module when a PN bus error occurs can be set in the adapter. For setting methods, please refer to<u>Chapter 4, Section</u> 1.2.3.

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

Comment	9	Modify value	Monitor value	Display format	Address
DF50-M-16DO-P_1		16#FFFF	16#FFFF	Hex	%QW3
			16#FFFF Figure 4-1	Hex	%QW3

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

> Please refer to the module wiring diagram<u>Chapter 3 Section 4.2</u>The output status of the module when

a PN bus error occurs can be set in the adapter. For setting methods, please refer to Chapter 4, Section

<u>1.2.3</u>.

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

Address	Display format	Monitor value	Modify value	9	Comment
%QW5	Hex	16#FFFF	16#FFFF	🗹 🛕	DF50-M-16DO-N_1





#### 1.3.3. DF50-M-32DO-P digital output module

> Please refer to the module wiring diagram<u>Chapter 3, Section 22.2</u>The output status of the module

when a PN bus error occurs can be set in the adapter. For setting methods, please refer to Chapter 4,

Section 1.2.3.

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

Address	Display format	Monitor value	Modify value	9	Comment
%QD10	Hex	16#FFFF_FFFF	16#FFFF_FFFF	M 📐	DF50-M-32DO-P_1
		Figure 4-	-1-27		

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

> Please refer to the module wiring diagram<u>Chapter 3, Section 21.2</u>The output status of the module when a PN bus error occurs can be set in the adapter. For setting methods, please refer to<u>Chapter 4,</u> Section 1.2.3.

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

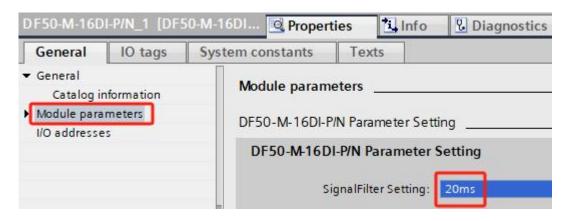
Address	Display format	Monitor value	Modify value	9	Comment
%QD14	Hex	16#FFFF_FFFF	16#FFFF_FFFF	M 👗	DF50-M-32DO-N_1
		E: 4	1.00		

```
Figure 4-1-28
```

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

> Please refer to the module wiring diagram<u>Chapter 3 Section 1.2</u>.

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





> The input data of each channel can be viewed as shown in the figure below.





Address	Display format	Monitor value	Modify value	9	Comment
					DF50-M-16DI-P/N_1
%I4.0	Bool	TRUE			CHO
%I4. <mark>1</mark>	Bool	FALSE			CH1
%14.2	Bool	FALSE			CH2
%14.3	Bool	FALSE			CH3
%14.4	Bool	FALSE			CH4
%14.5	Bool	FALSE			CH5
%14.6	Bool	FALSE			CH6
% <mark>14</mark> .7	Bool	FALSE			CH7
%15.0	Bool	FALSE			CH8
%15.1	Bool	FALSE			CH9
%15.2	Bool	FALSE			CH10
%15.3	Bool	FALSE			CH11
%15.4	Bool	FALSE			CH12
%15.5	Bool	FALSE			CH13
%15.6	Bool	FALSE			CH14
%15.7	Bool	FALSE			CH15

Figure 4-1-30



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

> Please refer to the module wiring diagram<u>Chapter 3 Section 25.2</u>.

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

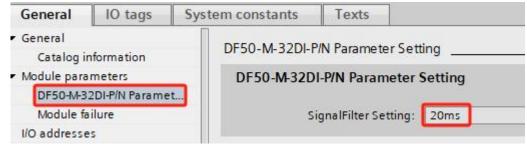


Figure 4-1-31

> The input data of each channel can be viewed as shown in the figure below.

Name	Address	Display format	Monitor value	Modify value	9	Comment
	%141.0	Bool	TRUE			DF50-M-32DI-P/N_1
	%141.1	Bool	FALSE			
	%141.2	Bool	FALSE			A
	%141.3	Bool	FALSE			
	%141.4	Bool	FALSE			
	%141.5	Bool	FALSE			
	%141.6	Bool	FALSE			
	%141.7	Bool	FALSE			
	%142.0	Bool	FALSE			
	%142.1	Bool	FALSE			
	%142.2	Bool	FALSE			
	%142.3	Bool	FALSE			
	%142.4	Bool	FALSE			
	%142.5	Bool	FALSE			
	%142.6	Bool	FALSE			
	%142.7	Bool	FALSE			
	%143.0	Bool	FALSE			
	%143.1	Bool	FALSE			
	%143.2	Bool	FALSE			
	%143.3	Bool	FALSE			
	%143.4	Bool	FALSE			
	%143.5	Bool	FALSE			
	%143.6	Bool	FALSE			
	%143.7	Bool	FALSE			
	%144.0	Bool	FALSE			
	% 44.1	Bool	FALSE			
	%144.2	Bool	FALSE			
	%144.3	Bool	FALSE			
	%144.4	Bool	FALSE			
	%144.5	Bool	FALSE			
	%144.6	Bool	FALSE			
	%144.7	Bool	FALSE			

Figure 4-1-32



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

> Please refer to the module wiring diagram<u>Chapter 3, Section 24.2</u>.

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

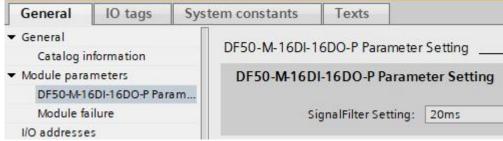


Figure 4-1-33

As shown in the figure below, you can view the input data and output data of each channel.

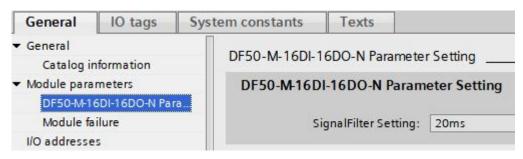
Address	Display format	Monitor value	Modify value	9	Comment
%145.0	Bool	TRUE			DF50-M-16DI-16DO-P_1
%145.1	Bool	FALSE			
%145.2	Bool	FALSE			
%145.3	Bool	FALSE			
%145.4	Bool	FALSE			
%145.5	Bool	FALSE			
%145.6	Bool	FALSE			
%145.7	Bool	FALSE			
%146.0	Bool	FALSE			
%I46.1	Bool	FALSE			
%146.2	Bool	FALSE			
%146.3	Bool	FALSE			
%146.4	Bool	FALSE			
% 46.5	Bool	FALSE			
%146.6	Bool	FALSE			
%146.7	Bool	FALSE			
%QW18	Hex	16#FFFF	16#FFFF		4

Figure 4-1-34

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

> Please refer to the module wiring diagram<u>Chapter 3, Section 23.2</u>.

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





Address	Display format	Monitor value	Modify value	9	Comment
%147.0	Bool	TRUE			DF50-M-16DI-16DO-N_1
%147.1	Bool	FALSE			
%147.2	Bool	FALSE			
%147.3	Bool	FALSE			
%147.4	Bool	FALSE			
%147.5	Bool	FALSE			
% 47.6	Bool	FALSE			
%147.7	Bool	FALSE			
%I48.0	Bool	FALSE			
% 48.1	Bool	FALSE			
%148.2	Bool	FALSE			
%148.3	Bool	FALSE			
%148.4	Bool	FALSE			
%148.5	Bool	FALSE			
% <mark> 48.6</mark>	Bool	FALSE			
%I48.7	Bool	FALSE			
%QW20	Hex	16#FFFF	16#FFFF		1

Figure 4-1-35 As shown in the figure below, you can view the input data and output data of each channel.

Figure 4-1-36

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

> Please refer to the module wiring diagram<u>Chapter 3 Section 2.2</u>.

➤ As shown in the figure below, you can set the counting mode of channels CH00~CH07, 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.

DF50-M-16D	I-P/N-TS_1 [	DF50-M-1	Ropert	ties 🔁	Info	Diagnostics
General	IO tags	System c	onstants	Texts	7	
<ul> <li>General</li> <li>Catalog ir</li> <li>Module para</li> <li>I/O addresse</li> </ul>	and operation of the second seco		dule param 50-M-16DI-P		nting Cl	nannel Parameter Setti
		D		I-P/N-TS C		Channel Parameter
				ount Mode(		Rising edge count
			C	ount Mode(	CH02):	Rising edge count
		-	C	ount Mode(	CH03):	Rising edge count
			C	ount Mode(	CH04):	Rising edge count
			C	ount Mode(	CH05):	Rising edge count
			C	ount Mode(	CH06):	Rising edge count
			C	ount Mode(	CH07):	Rising edge count

Figure 4-1-37



▶ As shown in the figure below, for input channels CH10~CH17, can be modifiedInput filter parameters,

the default is 20ms.

General IC	tags	Sys	stem constants	Texts		
✓ General Catalog inform				ount Mode(CH07)		
Module paramete	rs				nting Channel Parameter	-
			Setting	SignalFilte g(CH10-CH17)_ms	20	

Figure 4-1-38

➢ For process data definition, please refer to <u>Chapter 3 Section 2.4</u>, fill in the data we need into the monitoring table, as shown in the figure below.

Address	Display format	Monitor value	Modify value	9	Comment
					DF50-M-16DI-P/N_1
%I6.0	Bool	FALSE			CH0
% 6.1	Bool	FALSE			CH1
%I6.2	Bool	FALSE			CH2
%16.3	Bool	FALSE			СНЗ
%16.4	Bool	FALSE			CH4
%16.5	Bool	FALSE			CH5
%16.6	Bool	FALSE			CH6
%16.7	Bool	FALSE			CH7
%17.0	Bool	FALSE			CH8
%17.1	Bool	FALSE			CH9
%17.2	Bool	FALSE			CH10
%17.3	Bool	FALSE			CH11
%17.4	Bool	FALSE			CH12
%17.5	Bool	FALSE			CH13
%17.6	Bool	FALSE			CH14
%17.7	Bool	FALSE	1		CH15
%ID8	Hex	16#0000_0000			CH0 Count
%ID12	Hex	16#0000_0000			CH1 Count
%ID16	Hex	16#0000_0000	1		CH2 Count
%ID20	Hex	16#0000_0000			CH3 Count
%ID24	Hex	16#0000_0000			CH4 Count
%ID28	Hex	16#0000_0000			CH5 Count
%ID32	Hex	16#0000_0000			CH6 Count
%ID36	Hex	16#0000_0000			CH7 Count
%QB7	Hex	16#00			Count Clear

Figure 4-1-39



A1 for IO module(CH00),A2(CH01),A3(CH02)The ports input valid signals 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.

Address	Display format	Monitor value	Modify value	9	Comment
					DF50-M-16DI-P/N_1
%16.0	Bool	FALSE			CHO
%16.1	Bool	FALSE			CH1
%16.2	Bool	TRUE			CH2
%16.3	Bool	FALSE			CH3
%16.4	Bool	FALSE			CH4
%16.5	Bool	FALSE			CH5
%16.6	Bool	FALSE			CH6
%16.7	Bool	FALSE			CH7
%17.0	Bool	FALSE			CH8
%17.1	Bool	FALSE			CH9
%17.2	Bool	FALSE			CH10
%17.3	Bool	FALSE			CH11
%17.4	Bool	FALSE			CH12
%17.5	Bool	FALSE			CH13
%I7.6	Bool	FALSE			CH14
%17.7	Bool	FALSE			CH15
%ID8	Hex	16#0000_0001			CH0 Count
%ID12	Hex	16#0000_0002			CH1 Count
%ID16	Hex	16#0000_0005			CH2 Count
		A MARKING A PROPERTY OF		()	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1

Figure 4-1-40

> Clear the count value of CH02 as shown in the figure below.

%ID8	Hex	16#0000_0001		CH0 Count
%ID12	Hex	16#0000_0002		CH1 Count
%ID16	Hex	16#0000_0000		CH2 Count
%ID20	Hex	16#0000_0000		CH3 Count
%ID24	Hex	16#0000_0000		CH4 Count
%ID28	Hex	16#0000_0000		CH5 Count
%ID32	Hex	16#0000_0000		CH6 Count
%ID36	Hex	16#0000_0000		CH7 Count
%QB7	Bin	2#0000_0100	2#0000_0100	Count Clear

Figure 4-1-41

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

> Please refer to the module wiring diagram<u>Chapter 3, Section 20.2</u>The output status of the module

when a PN bus error occurs can be set in the adapter. For setting methods, please refer to Chapter 4,

#### Section 1.2.3.

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

Address	Display format	Monitor value	Modify value	9	Comment
					DF50-M-4DO-P-2A
%IB40	Bin	2#0000 0000			Overcurrent
%QB8	Bin	2#0000_1111	2#0000_1111	I 🗹 🥼	Output

#### Figure 4-1-42

➤ As shown in the figure below, the first channel output is enabled. When the module channel outputs 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 displays the "16#01E4" error, indicating that the first module detects an overcurrent signal. For the meaning of the diagnostic fault code, please refer to <u>Chapter 2 Section 1.3</u>.

				DF50-M-4DO-P-2A
%IB40	Bin	2#0000_0001		Overcurrent
%QB8	Bin	2#0000_0001	2#0000_0001	Output
%IW1	Hex	16#01E4		SystemDiagnostic_1
		Figure 4-	1-43	

1.3.11. DF50-M-4DOR relay output module

> Please refer to the module wiring diagram<u>Chapter 3, Section 19.2</u>The output status of the module when a PN bus error occurs can be set in the adapter. For setting methods, please refer to<u>Chapter 4,</u> Section 1.2.3.

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







1.4. Analog module usage routine

This example uses the topology of DF50-C-PN-RT + 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 structure is as shown in the figure below.

1	Module	 Rack	Slot	I address	Q addres
	▼ DF50-C-PN-RT	0	0		
	PN-IO	0	0 X1		
	SystemDiagnostic_1	0	1	12	12
	AdapterDigitalInput_1	0	2	3	
	DF50-M-8AO-U-4_1	0	3		6479
	DF50-M-8AO-I-5_1	0	4		8095
	DF50-M-4AO-UI-6_1	0	5		96103
	DF50-M-8AI-U-4_1	0	6	6883	
	DF50-M-8AI-I-5_1	0	7	8499	
	DF50-M-4AI-UI-6_1	0	8	100107	



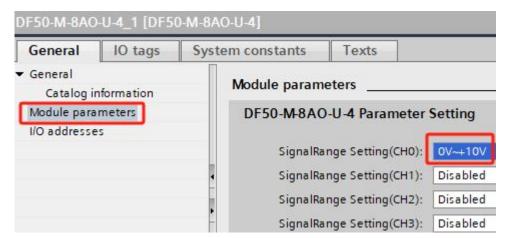
1.4.1. DF50-M-8AO-U-4 voltage output module

> Please refer to the module wiring diagram<u>Chapter 3 Section 9.2</u>The output status of the module when

a PN bus error occurs can be set in the adapter. For setting methods, please refer to Chapter 4, Section

<u>1.2.3</u>.

As shown in the figure below, you can set the module output voltage range, the default is Disabled. Set CH0 to  $0\sim10$ V.





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 Chapter 3 Section 9.4.



Address	Display format	Monitor value	Modify value	9	Comment
%QW64	DEC+/-	27648	27648	🗹 🔺	DF50-M-8AO-U-4_1

Figure 4-1-47

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

> Please refer to the module wiring diagram<u>Chapter 3 Section 10.2</u>The output status of the module when

a PN bus error occurs can be set in the adapter. For setting methods, please refer to Chapter 4, Section

<u>1.2.3</u>.

➢ As shown in the figure below, you can set the module output current range, the default is Disabled. Set CH0 to 0~20ma.

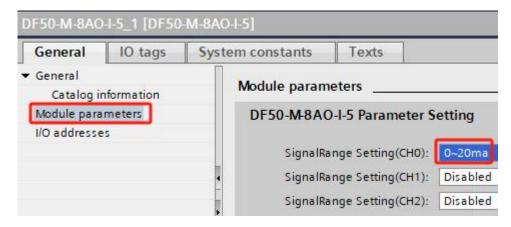


Figure 4-1-48

➤ 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<u>Chapter 3 Section 10.4</u>.

Address	Display format	Monitor value	Modify value	9	Comment
%QW80	DEC+/-	27648	27648		DF50-M-8AO-I-4_1
		Figure 4-1	-49		

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

> Please refer to the module wiring diagram<u>Chapter 3, Section 8.2</u>The output status of the module when

a PN bus error occurs can be set in the adapter. For setting methods, please refer to <u>Chapter 4</u>, <u>Section</u> <u>1.2.3</u>.

As shown in the figure below, you can set the module output voltage or current range, the default is Disabled. Set CH0 to  $0\sim10V$  and CH1 to  $0\sim20$ ma.



DF50-M-4AO	-UI-6_1 [DF5	50-M-4AO-UI-6]		
General	IO tags	System constants		
<ul> <li>General</li> <li>Catalog in</li> </ul>	nformation	Module param	eters	
Module para I/O addresse	COST CONTRACTOR CONTRACTOR	DF50-M-4AC	)-U <mark>I-6</mark> Parame	ter Setting
		SignalRa	nge Setting(CH	0): 0V~+10V
		∢ SignalRa	nge Setting(CH	1): 0~20ma
		SignalRa	nge Setting(CH	2): Disabled
		SignalRa	nge Setting(CH	3): Disabled



➤ As shown in the figure below, write the value "27648" to the module CH0 and CH1. Through the multimeter measurement, it can be seen that the output voltage of CH0 is 10V and the output current of CH1 is 20ma. The conversion relationship is shown in <u>Chapter 3, Section 8.4</u>.

Address	Display format	Monitor value	Modify value	9	Comment
					DF50-M-4AO-UI-6_1
%QW96	DEC+/-	27648	27648	🗹 🔺	CHO
%QW98	DEC+/-	27648	27648	🗹 🔺	CH1
%QW100	DEC+/-	0			CH2
%QW102	DEC+/-	0			СНЗ

Figure 4-1-51

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

> Please refer to the module wiring diagram<u>Chapter 3, Section 7.2</u>As shown in the figure below, you can set the module acquisition voltage range, the default is Disabled. Set CH0 to  $0\sim10$ V.

General	IO tags	System constants		Texts		
General Catalog information			Module param	eters		
Module parameters I/O addresses			DF50-M-8AI-U-4 Parameter Setting			
no addresse			SignalRa	nge Setting(CH	0): 0V~+10	
			SignalRa	nge Setting(CH	I): Disabled	
			SignalRa	nge Setting(CH	2): Disable	

Figure 4-1-52

➤ As shown in the figure below, you can set the signal filter for each channel, the default is 100Hz\_10ms.



General	IO tags	System constants	Texts		
General		Signal	SignalRange Setting(CH4):		
Catalog information		Signal	SignalRange Setting(CH5):		
Module parameters I/O addresses		Signal	Range Setting(CH6):	Disabled	
no addresse	-5	Signal	Range Setting(CH7):	Disabled	
		, Signa	lFilter Setting(CH0)	100Hz_10m	
		Signa	lFilter Setting(CH1):	100Hz_10m	
		▶ Signa	lFilter Setting(CH2):	100Hz_10m	
		Signa	lFilter Setting(CH3):	100Hz_10m	
		Signa	Filter Setting(CH4):	100Hz_10m	

Figure 4-1-53

After 5V voltage is applied to CH0, the value shown in the figure below is obtained. Through conversion, it is known that the collected voltage is 5.001V. The conversion relationship is shown in <u>Chapter 3, Section 7.4</u>.

Address	Display format	Monitor value	Modify value	4	Comment
					DF50-M-8AI-U-4_1
%IW68	DEC+/-	13828			CHO
%IW70	DEC+/-	0			CH1
%IW72	DEC+/-	0			CH2
%IW74	DEC+/-	0			СНЗ
%IW76	DEC+/-	0			CH4
%IW78	DEC+/-	0			CH5
%IW80	DEC+/-	0			CH6
%IW82	DEC+/-	0			CH7



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

> Please refer to the module wiring diagram<u>Chapter 3 Section 6.2</u>As shown in the figure below, you can set the module current collection range, the default is Disabled. Set CH0 to  $0\sim20$ ma.

DF50-M-8AI-	I-5_1 [DF50-	M-8AI-I	-5]			
General	IO tags	System constants Texts				
✓ General Catalog i	nformation		Module param	eters		
Module para	Module parameters		DF50-M-8AI-I-5 Parameter Setting			
			SignalRa	ange Setting(CH	0): 0~20ma	
		•	SignalRa	ange Setting(CH	1): Disabled	
			SignalRa	nge Setting(CH	2): Disabled	

Figure 4-1-55



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

#### 100Hz\_10ms.

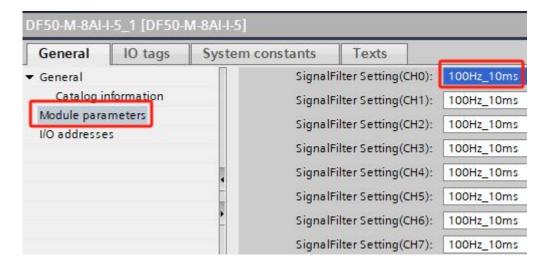


Figure 4-1-56

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 10.006ma. The conversion relationship is shown in Chapter 3, Section 6.4.

Address	Display format	Monitor value	Modify value	9	Comment
					DF50-M-8AI-I-5_1
%IW84	DEC+/-	13833			CH0
%IW86	DEC+/-	0			CH1
%IW88	DEC+/-	0			CH2
%IW90	DEC+/-	0			СНЗ
%IW92	DEC+/-	0			CH4
%IW94	DEC+/-	0			CH5
%IW96	DEC+/-	0			CH6
%IW98	DEC+/-	0			CH7



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

> Please refer to the module wiring diagram<u>Chapter 3 Section 5.2</u>As shown in the figure below, you can set the module to collect voltage or current range, the default is Disabled. Set CH0 to  $0\sim10V$  and CH1 to  $0\sim20$ ma.



DF50-M-4AI-	UI-6_1 [DF5(	)-M-4AI-UI-6]		
General	IO tags	System constants	Texts	
✓ General Catalog in	nformation	Module para	meters	
Module para 1/O addresse	2000 CONTRACTOR CONTRACTOR	DF50-M-44	I-UI-6 Paramete	er Setting
		Signal	Range Setting(CH0	): 0V~+10V
		- Signal	Range Setting(CH1	): 0~20ma
		Signal	Range Setting(CH2	): Disabled
		- Signal	Range Setting(CH3	): Disabled



As shown in the figure below, you can set the signal filter for each channel, the default is 100Hz\_10ms.

DF50-M-4AI-	UI-6_1 [DF5(	)-M-4AI-UI-6]				
General	IO tags	System constants	Texts	1		
✓ General		Signall	SignalFilter Setting(CH0):			
	Catalog information		SignalFilter Setting(CH1):			
Module parameters		Signall	SignalFilter Setting(CH2):			
no addresse		Signall	Filter Setting(	CH3):	100Hz_10ms	

Figure 4-1-59



After passing 5V voltage to CH0 and 10ma current to CH1, the values shown in the figure below are obtained. Through conversion, it is known that the voltage collected by CH0 is 5.009V and the current collected by CH1 is 10.002ma. The conversion relationship is shown in <u>Chapter 3, Section 5.4</u>.

Address	Display format	Monitor value	Modify value	9	Comment	
					DF50-M-4AI-UI-6_1	
%IW100	DEC+/-	13849			CHO	
%IW102	DEC+/-	13827			CH1	
%IW104	DEC+/-	0			CH2	
%IW106	DEC+/-	0			СНЗ	

Figure 4-1-60



1.5. Routine use of thermal resistance sensor data acquisition module

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

Dev	ice overview				
*	Module	 Rack	Slot	I address	Q address
	<ul> <li>DF50-C-PN-RT</li> </ul>	0	0		
	PN-IO	0	0 X1		
	SystemDiagnostic_1	0	1	12	12
	AdapterDigitalInput_1	0	2	3	
	DF50-M-4RTD-PT_1	0	3	6875	



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

Please refer to the module wiring diagram<u>Chapter 3 Section 11.2</u>As shown in the figure below, you can modify the sensor type collected by the module, the default is PT100.

DF50-M-4RT	D-PT_1 (DF5	0-M-4RTD-PT]		
General	IO tags	System constants	Texts	
<ul> <li>✓ General</li> <li>Catalog in</li> <li>Module para</li> <li>I/O addresse</li> </ul>	and a second		eters D-PT Paramete RTD Type Settin ignalFilter Settin	g: PT100 -200850 degree C

Figure 4-1-62

> The filter settings of this module can be adjusted as shown in the figure below, the default is

5Hz\_200ms.

DF50-M-4RT	D-PT_1 [DF5	0-M-4RT	D-PT]		
General	IO tags	Syste	m constants	Texts	
Module para			Module param DF50-M-4RT	eters D-PT Paramete RTD Type Settir	
			S	ignalFilter Settin	ng: 5Hz_200ms

Figure 4-1-63



> After connecting the sensor to module CH0, the following data is obtained. "225" means the collected

# temperature is 22.5℃.

Address	Display format	Monitor value	Modify value	9	Comment
					DF50-M-4RTD-PT_1
%IW68	DEC	225			CHO
%IW70	DEC	32768			CH1
%IW72	DEC	32768			CH2
%IW74	DEC	32768			СНЗ





1.6. Thermocouple temperature data acquisition module usage routine

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

Device overview									
Wodule		Rack	Slot	I address	Q addres				
DF50-C-PN-RT		0	0						
► PN-IO		0	0 X1						
SystemDiagnostic_1		0	1	12	12				
AdapterDigitalInput_1		0	2	3					
DF50-M-8TC_1		0	3	6883	6479				



#### 1.6.1. DF50-M-8TC Thermocouple Measurement Module

Please refer to the module wiring diagram<u>Chapter 3, Section 12.2</u>As shown in the figure below, you can modify the sensor type collected by this module. The default is K-type sensor.

General	IO tags	Sys	tem constants	Texts		
	nformation		Module param	rameters		
Module para I/O addresse			DF50-M-8TC-KETJ Parameter Sett			
				TC Type Setting:	ТС Туре	
			s	ignalFilter Setting:	225ms	



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

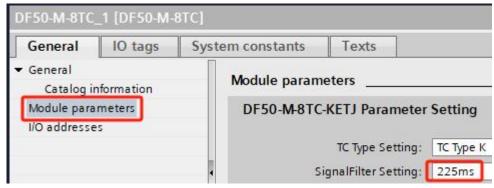


Figure 4-1-67



> DF50-M-8TC process data definition please refer to <u>Chapter 3, Section 12.4</u> After connecting the

sensor to CH0, as shown in the figure below, "253" means 25.3°C, and no compensation value is given at this time.

%IW68	DEC	253	СНО
%IW70	DEC	32768	CH1
%IW72	DEC	32768	CH2
QU DA/7.4	DEC	20769	

Figure 4-1-68

> When we write 50 into the compensation value of CH0, we can see that the collected value becomes "309", which means  $30.9^{\circ}$ C.



Figure 4-1-69



- 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 a 5V encoder signal, and the DF50-M-2CNT-PIL-24 is connected to a 24V encoder signal. This document uses the DF50-M-2CNT-PIL-24 module as an example. For wiring methods, please refer to<u>Chapter 3, Section 13.2</u>.
- 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.
- Add the DF50-M-2CNT-PIL-24 module as shown below.

Device overview									
*	Module		Rack	Slot	l address	Q addres			
	DF50-C-PN-RT		0	0					
	PN-IO		0	0 X1					
	SystemDiagnostic_1		0	1	12	12			
	AdapterDigitalInput_1		0	2	3				
	DF50-M-2CNT-PIL-24_1		0	3	421	312			



The output status of the module can be set in the adapter. For setting methods, please refer to <u>Chapter 4</u>, Section 1.2.3.

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, Default 4x), DI signal function, filter time signal A, filter time signal B, encoder calculation direction, counter mode setting, comparison function, fieldbus error behavior, count upper limit, count lower limit.



DF50-M-2CNT-PIL-24_1 [D	F50-M-2CNT-PIL-24]					
General IO tags	System constants	ystem constants Texts				
General     Catalog information     Module parameters     I/O addresses     General     CH0 Configuration						
	CH0 Config	uration				
		Signal mode:	Rotary transducer quadruple			
		DI Signal Function:	Disabled			
		Filter time Signal A:	100KHz			
		Filter time Signal B:	100KHz			
	Enco	der Count Direction:	Position Direaction of Phase A			
	Co	untermode Setting:	Line Counter			
	Co	mparison Function:	Disabled			
	Behaviou	us on field bus error:	Continue counting			
		Upper limit:	2147483647			
		Lower limit:	-2147483648			

Figure 4-1-71

As shown in the figure below, fill the address of module CH0 into the monitoring table. For the meaning of process data, please refer to <u>Section 1.7.1 of this chapter</u>.

Address	Display format	Monitor value	Modify value	9	Comment
					DF50-M-2CNT-PIL-24_1
%IB4	Hex	16#00			state
%ID5	Hex	16#0000_0000			pulse
%ID9	Hex	16#0000_0000			Latching pulses
%QB3	Hex	16#00			command
%QD4	Hex	16#0000_0000			set comparison

Figure 4-1-72



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.

Address	Display format	Monitor value	Modify value	9	Comment
			_		DF50-M-2CNT-PIL-24_1
%IB4	Bin	2#0000_0001			state
%ID5	DEC	2061			pulse
%ID9	DEC	0			Latching pulses
%QB3	Bin	2#0000_0001	2#0000_0001		command
%QD4	DEC	0			set comparison

Figure 4-1-73



- 1.7.1. Module process data description
- The ProfiNET bus adapter will allocate corresponding input and output addresses according to the different modules connected to it; the table shows the meaning, data length and data type of the input and output data.

Output Data	Number of bytes	Data Types
Channel 1 command output data	1	Uint8
Channel 1 pulse comparison value	4	int32
output		
Channel 2 command output data	1	Uint8
Channel 2 pulse comparison value	4	int32
output		
Input Data	Number of bytes	Data Types
Channel 1 Status Input Data	1	Uint8
Channel 1 Status Input Data Channel 1 Pulse Number	1 4	Uint8 int32
-	1 4 4	
Channel 1 Pulse Number		int32
Channel 1 Pulse Number Channel 1 Latch pulse number	4	int32 int32

Table 4.1 4 Module	data length and type
Table 4.1.4 Module	data length and type

	Table 4.1.5Output data meaning				
	Output data meaning				
	0 bytes				
bit7~bit1	reserve				
bit0	0: Channel 1 stops counting and the original count is reset to zero; 1:				
	Channel 1 starts counting				
1~4 bytes	Channel 1 pulse comparison value output, signed 32-bit data				
	5 bytes				
bit7~bit1	reserve				
bit0	0: Channel 2 stops counting and the original count is cleared; 1: Channel				
	2 starts counting				
6~9 bytes	Channel 2 pulse comparison value output, signed 32-bit data				
L	Table 4.1.6Input data meaning				
	Input data meaning				

	1 2				
	0 bytes				
bit7~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		
1~4 bytes	Channel 1 pulse input value, signed 32-bit data		
5~8 bytes	Channel 1 pulse input latch value, signed 32-bit data		
	9 bytes		
bit7~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		
10~13 bytes	Channel 1 pulse input value, signed 32-bit data		
14~17 bytes	Channel 1 pulse input latch value, signed 32-bit data		

### 1.7.2. DI Signal Function Configuration

As shown in the figure below, you can configure the DI signal function. The default setting is Disabled. The following functions are available: rising edge capture, falling edge capture, both rising and falling edge capture, rising edge reset, falling edge reset, and both rising and falling edge reset.Rising edge capture (Rising edge capture) and rising edge reset (Rising edge reset)Function.



DF50-M-2CNT-PIL-24_1 [[	OF50-M-2CNT-PIL-24]		
General IO tags	System constants	Texts	
<ul> <li>General</li> <li>Catalog information</li> <li>Module parameters</li> <li>I/O addresses</li> </ul>	Module parar CH0 Configura CH0 Config	ation	
		Signal mode	e: Rotary transducer quadruple
		DI Signal Function	n: Disabled
	- Encod	Filter time Signal / Filter time Signal I der Count Direction untermode Setting	Bilateral edge capture Rising edge reset Risling edge reset Bilateral edge reset

Figure 4-1-74DI data configuration



### ▶ DI rising edge capture: As shown in the figure below, the pulse number is "5440".

Address	Display format	Monitor value	Modify value	5	Comment
					DF50-M-2CNT-PIL-24_1
%IB4	Bin	2#0000_0001			state
%ID5	DEC	5440			pulse
%ID9	DEC	0			Latching pulses
%QB3	Bin	2#0000_0001	2#0000_0001		command
%QD4	DEC	0			set comparison

Figure 4-1-75DI rising edge capture

➢ 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 latch pulses becomes "5440".

Address	Display format	Monitor value	Modify value	9	Comment
					DF50-M-2CNT-PIL-24_1
%IB4	Bin	2#0000_0011			state
%ID5	DEC	5440			pulse
%ID9	DEC	5440			Latching pulses
%QB3	Bin	2#0000_0001	2#0000_0001		command
%QD4	DEC	0			set comparison

Figure 4-1-76DI rising edge capture trigger

> DI rising edge reset: As shown in the figure below, the pulse number is "2995".

Address	Display format	Monitor value	Modify value	9	Comment
					DF50-M-2CNT-PIL-24_
%IB4	Bin	2#0000 0001			state
%ID5	DEC	2995			pulse
%ID9	DEC	0			Latching pulses
%QB3	Bin	2#0000_0001	2#0000_0001		🔔 command
%QD4	DEC	0			set comparison

Figure 4-1-77DI 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".

Modify value 9 Comment Address Display format Monitor value DF50-M-2CNT-PIL-24\_1 2#0000\_0011 %IB4 Bin state DEC 0 pulse %ID5 0 Latching pulses %ID9 DEC %QB3 Bin 2#0000\_0001 2#0000\_0001 command **A**. %QD4 DEC 0 set comparison

Figure 4-1-78DI rising edge reset trigger

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- 1.7.3. Compare function configurations (Comparison Function)
- > Turn on the comparison function as shown below

DF50-M-2CNT-PIL-24_1 [[	)F50-M-2CNT-PIL-24]	
General IO tags	System constants Tex	ds
▼ General	Module parameters	*
Catalog information Module parameters	CH0 Configuration	
I/O addresses	CH0 Configuration	
	Sig	gnal mode: Rotary transducer quadruple
	DI Signa	I Function: Rising edge reset
	Filter tim	e Signal A: 100KHz
	Filter tim	e Signal B: 100KHz
	• Encoder Coun	t Direction: Position Direaction of Phase A
	Countermo	de Setting: Line Counter
	Compariso	n Function: Enable
	Behavious on field	d bus error: Disabled Enable
	L	Jpper limit: 2147483647
	L	ower limit: -2147483648

Figure 4-1-79Comparison function enable

As shown in the figure below, the pulse comparison value is set to 10000. When the pulse number is "1735", the third bit of the status input data is "0".

Address	Display format	Monitor value	Modify value	9	Comment
			_		DF50-M-2CNT-PIL-24_1
%IB4	Bin	2#0000_0001			state
%ID5	DEC	1735			pulse
%ID9	DEC	0			Latching pulses
%QB3	Bin	2#0000_0001	2#0000_0001		command
%QD4	DEC	10000	10000	M /	set comparison

Figure 4-1-80Comparison count



As shown in the figure below, when the pulse number is "10945", it exceeds the set value 10000, and the third bit of the status input data becomes "1".

Address	Display format	Monitor value	Modify value	9		Comment
						DF50-M-2CNT-PIL-24_1
%IB4	Bin	2#0000_0101				state
%ID5	DEC	10945				pulse
%ID9	DEC	0				Latching pulses
%QB3	Bin	2#0000_0001	2#0000_0001		Â	command
%QD4	DEC	10000	10000		A	set comparison

Figure 4-1-81Comparison count

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

 $\blacktriangleright$  As shown in the figure below, change the signal mode to pulse plus direction mode. For the wiring method, please refer to <u>Chapter 3</u>, <u>Section 13.2.3</u> When this mode is used, the A+ and A- ports input high and low levels to indicate the direction, and the B+ and B- ports input valid levels to accumulate count values.

DF50-M-2CN	IT-PIL-24_1 [I	DF50-M	1-2CNT-PIL-24]		
General	IO tags	Syst	em constants	Texts	
✓ General Catalog i	nformation		Module param	eters	
<ul> <li>Module para</li> <li>I/O addresse</li> </ul>	meters		CH0 Configurat	ion	
no addresse			CH0 Configu	ration	
				Signal mode:	Pulse and Directions
			i	DI Signal Function:	Rotary transducer single Rotary transducer double
		4	F	ilter time Signal A:	Rotary transducer quadruple Pulse and Directions
			F	ilter time Signal B:	CW/CCW

Figure 4-1-82

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

Address	Display format	Monitor value	Modify value	9	Comment
			-		DF50-M-2CNT-PIL-24_1
%IB4	Bin	2#0000_0001			state
%ID5	DEC+/-	0			pulse
%ID9	DEC+/-	0			Latching pulses
%QB3	Bin	2#0000_0001	2#0000_0001		command
%QD4	DEC	0	_		set comparison

Figure 4-1-83



> 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".

Address	Display format	Monitor value	Modify value	9	Comment
			_		DF50-M-2CNT-PIL-24_1
%IB4	Bin	2#0001_0001			state
%ID5	DEC+/-	-7507			pulse
%ID9	DEC+/-	0			Latching pulses
%QB3	Bin	2#0000_0001	2#0000_0001		command
%QD4	DEC	0			set comparison



➤ 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".

Address	Display format	Monitor value	Modify value	9	Comment
					DF50-M-2CNT-PIL-24_1
%IB4	Bin	2#0000_1001			state
%ID5	DEC+/-	2516			pulse
%ID9	DEC+/-	0			Latching pulses
%QB3	Bin	2#0000_0001	2#0000_0001	M 🔺	command
%QD4	DEC	0			set comparison

Figure 4-1-85



1.8. Serial port module usage routine

➤ This example uses the DF50-C-PN-RT + DF50-1COM-232-485-422 topology.

DF50-1COM-232-485-422 supports three modes: free transparent transmission, slave mode, and Modbus RTU master mode. The mode switching is achieved by adding different sub-slots and setting the mode in the Modbus interface Module. <u>Section 15.2</u> The wiring diagram is connected to the card, simulating the communication device and the DF50-1COM-232-485-422 module communication. After adding the module, it is shown as follows.

Dev	ice overview				
*	Module	 Rack	Slot	I address	Q addres
	▼ DF50-C-PN-RT	0	0		
	▶ PNHO	0	0 X1		
	SystemDiagnostic_1	0	1	12	12
	AdapterDigitalInput_1	0	2	3	
	▼ DF50-M-1COM-232/485/42	0	3		
	Modbus Interface Module	0	31		
		0	3 CMD		



> The parameters of Modbus interface Module are shown in the figure below. The default mode is Free Protocol.

Modbus Inte	rface Modul	le [Moc	lbus Interface M	lodule]	
General	IO tags	Syst	em constants	Texts	
✓ General Catalog in	nformation		Module param	eters	
Module para	meters		Module Conf	ig Parameters	
				OperationMode:	Free Protocol
-				Interface:	RS485
				Parity:	None
				DataBits:	8bits
				StopBit:	1Bit
-		•		Baudrate(bps):	115200bps
				IntervalTime(ms):	0
			,	ModbusSlaveAddr:	1

Figure 4-1-87



As shown in the figure below, the number starting with F indicates free transparent transmission mode, the number starting with M indicates Modbus RTU master mode, and the number starting with S indicates Modbus RTU slave mode.

👻 🚺 Submod	ules
- DF50	M-1COM-232/485/422 Submodule
🕨 🚺 Et	Control&Status Modules
🕨 🚺 E:	O Data Modules
🕨 🚺 M:	Diagnostic Modules
🕨 🚺 M:	Read Coils (0xxxx)
🕨 🚺 M:	Read Discrete Inputs (1xxx)
🕨 🚺 M:	Read Holding Registers (4xxxx)
🕨 🚺 M:	Read Input Registers (3xxxx)
🕨 🚺 M:	Write Coils (0xxx)
🕨 🚺 M:	Write Holding Registers (4xxx)
🕨 🚺 S:	Diagnostic Modules
🕨 🚺 S:	Read Coils (0xxxx)
🕨 🚺 S:	Read Holding Registers (4xxxx)
🕨 🕨 🚺 S:	Write Coils (0xxxx)
🕨 🚺 S:	Write Discrete Inputs (1xxx)
🕨 🊺 S:	Write Holding Registers (4xxx)
• 🚺 S:	Write Input Registers (3xxx)

Figure 4-1-88



- 1.8.1. Modbus RTU Master Mode Usage Example
- > Set the module mode to Modbus RTU Master mode, as shown below.

					endire uniber		~	-
			-	DF50-N	H1COM-232/485	42	0	3
		~		Mod	lbus Interface M	odule	0	3 1
< III > <del>.</del>			<		111	_		
Modbus Interfa	ice Modu	le [Mo	dbus Inte	rfac	<b>Q</b> Properties	*i.,	Info	况 Dia
General	IO tags	Syst	em consta	ints	Texts	18		
✓ General Catalog infor	mation		Module	param	eters			
Module parame	ters		Modul	e Confi	ig Parameters			
					OperationMod	e: Mo	dbus RTL	J Master
					Interfac	e: RS4	85	

Figure 4-1-89

Add the diagnostic module M: Error Code Input (28 CH) to the second subslot, which contains the diagnostic information of the subsequent 28 subslots at most, and each subslot occupies 2 bytes of diagnostic information. See Table 4.1.7 for its meaning.

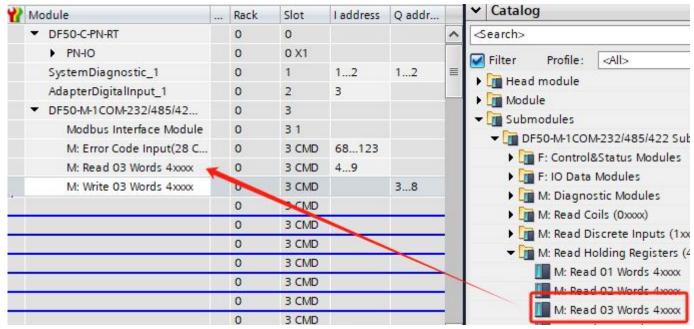
🐈 Module		Rack	Slot	I address	Q addr		✓ Catalog
▼ DF50-C-PN-RT		0	0			~	<search></search>
PN-IO		0	0 X1				Filter Profile: <all></all>
SystemDiagnostic_1		0	1	12	12	=	Inter Prome.     August      August
AdapterDigitalInput_1		0	2	3			Module
<ul> <li>DF50-M-1COM-232/485/42</li> </ul>		0	3				✓ Im Submodules
Modbus Interface Module		0	31				<ul> <li>DF50-M-1COM-232/485/422 Subm</li> </ul>
M: Error Code Input(28 C	~	0	3 CMD	68123			F: Control&Status Modules
		0	3 CMD				F: IO Data Modules
		0	3 CMD	-		1	
		0	3 CMD			_	M: Diagnostic Modules     M: Control Output (28 CH)
		0	3 CMD				
		0	3 CMD				M: Error Code Input(28 CH)
		0	3 CMD				M: Status Input (28 CH)

	Figure 4-1-90 Table 4.1.7	
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

From the 6 function codes starting with M, select the required ones and add them to the third sub-slot. If you need to read and write more data, you can add different sub-slot types continuously, up to 28 sub-slots, plus the first interface sub-slot and diagnostic sub-slot, a total of 30 sub-slots. As shown in Figures 4-1-79 and 4-1-80, add M: Read 03 Words 4xxxx and M: Write 03 Words 4xxxx.



#### Figure 4-1-91



Module	Rack	Slot	I address	Q addr		✓ Catalog
<ul> <li>DF50-C-PN-RT</li> </ul>	0	0			^	<search></search>
▶ PN-IO	0	0 X1				Filter Profile: <all></all>
SystemDiagnostic_1	0	1	12	12	=	Head module
AdapterDigitalInput_1	0	2	3			Module
▼ DF50-M-1COM-232/485/42	0	3				Submodules
Modbus Interface Module	0	31				<ul> <li>DF50-M-1COM-232/485/422 Submo</li> </ul>
M: Error Code Input(28 C	0	3 CMD	68123			F: Control&Status Modules
M: Read 03 Words 4xxxx	0	3 CMD	49			F: IO Data Modules
M: Write 03 Words 4xxx	0	3 CMD		38		The Data Modules      M: Diagnostic Modules
	0	3 CMD				M: Read Coils (0xxxx)
	0	3 CMD				M: Read Discrete Inputs (1xxx)
	0	SCMD				M: Read Holding Registers (4xxx)
	0	3 CMD	<b>N</b>			M: Read Input Registers (3xxx)
	0	3 CMD				M: Write Coils (0xxxx)
	0	3 CMD				✓ → M: Write Holding Registers (4xxx)
	0	3 CMD				M: Write 01 Words 4xxxx
<	0	3.CMD		>		M: Write 02 Words 4xxxx
						M: Write 03 Words 4xxxx
Reperties	Info	🞖 Diagr	nostics	18	M	M: Write 04 Words 4xxxx

Figure 4-1-92

➢ As shown in the figure below, click M: Read 03 Words 4xxxx to enter the property interface to configure the slave device information. The meaning is shown in Table 4.1.8.

M: Read 03 Words 4xxxx	[M: Read 03 Words 4x	oxxx]
General IO tags	System constants	Texts
<ul> <li>General</li> <li>Catalog information</li> <li>Module parameters</li> <li>I/O addresses</li> </ul>	Module param Module Config Module Conf	
	Respo	Slave ID:1Fuction Code:03 Read Holding Registers (4x)Start Address:0Data Length:3Poll Time(ms):500Event Trigger:Poll Modeemse Timeout(ms):1000Poll Delay(ms):0Lost Action:Hold Data

Figure 4-1-93 Table 4-1-8

SlaveID	Slave node address
Function Code	
Function Code	Function code



Start Address	Register start address
Data Length	Number of registers or coils
Poll Time	The period of polling this slave
Event Trigger	Poll: Polling mode
Trigger mode selection	Trigger: Trigger mode
Response TimeOut	Slave station response timeout
Poll Delay	Polling interval between slaves
Lost Action	Hold: Keep the last value
Slave loss handling	Clear: Clear
Input data processing when module	Input value cleared
fails	Keep the last value

As shown in the figure below, change the register starting address of M: Write 03 Words 4xxxx to 4000.

M: Write 03 Words 4x	xxx [M: V	Vrite 03 Words 4	xxxx]	
General IO tag	s Syst	em constants	Texts	
<ul> <li>General</li> <li>Catalog information</li> </ul>		Module param	eters	
Module parameters I/O addresses		Module Conf	ig Parameters	
			Slave ID:	1
			Fuction Code:	16 Write Multiple Registers (4x)
			Start Address:	0
			Data Length:	3
			Poll Time(ms):	500
	4		Event Trigger:	Poll Mode
		Respo	onse Timeout(ms):	1000
	-		Poll Delay(ms):	0
			Lost Action:	Hold Data

Figure 4-1-94

- > The meanings of the two sub-slots added now are as follows:
- ➢ M: Read 03 Words 4xxxx contains 3 word data. According to the configuration information, the data represents the register value of the slave with node address 1 and address 0-2.
- ➤ M: Write 03 Words 4xxxx contains 3 words of data. According to the configuration information, the data will be written to the slave with node address 1 and registers with addresses 4000-4002.



Download the configuration to the device. Fill in the information we need into the monitoring table for

## monitoring as shown below.

Address	Display format	Monitor value	Modify value	9	Comment
					DF50-M-1COM-232/485/422_1
%IW68	Hex				Diagnostics module(read 03 words)
%IW70	Hex				Diagnostics module(write 03 words)
%IW4	Hex				M: Read 03 Words 4xxxx
%IW6	Hex				M: Read 03 Words 4xxxx
%IW8	Hex				M: Read 03 Words 4xxxx
%QW3	Hex				M: Write 03 Words 4xxxx
%QW6	Hex				M: Write 03 Words 4xxxx
%QW8	Hex				M: Write 03 Words 4xxx

Figure 4-1-95

➢ Use Modbus Slave software to create two slave stations to communicate with the module, as shown in the figure below, with the starting addresses being 0 and 4000 respectively.

ID = 1: F = 03 Alias	
Alias	0.000
Allas	04000
0	0x0000
1	0x0000
2	0x0000
	1

Figure 4-1-96



> After changing the data format to HEX and writing "11, 22, 33" into registers 0-2 of the first slave, the

TIA Portal monitoring table will be displayed as shown below.

%IW4	Hex	16#0011			
%IW6	Hex	16#0022			
%IW8	Hex	16#0033			
				_	
%QW3	Hex	16#0000			
%QW5	Hex	16#0000			
%QW7	Hex	16#0000			
	e <u>E</u> dit <u>C</u> onnection	and the second se	<u> </u>		
	1 😅 🖬 🎒   🗂   🚝 9 Mbslave1	and the second se	Mbsla	ave2	
	) 🖨 🖬 🎒 🗂 📜	and the second se	<u> </u>	ave2	
	1 😅 🖬 🎒   🗂   🚝 9 Mbslave1	and the second se	Mbsla	ave2	04000
	) 🗃 🖬 🚭   🗂   ⊑ 9 Mbslave1 0 = 1: F = 03	i a   <b>? №</b>	Mbsla	ave2 = 03	04000 0x0000
	0 🗃 🖬 🚭   🗂   与 9 Mbslave1 0 = 1: F = 03 Alias	₽ <u></u> <u> </u> <u></u>	ID = 1: F	ave2 = 03	

Figure 4-1-97

➢ After writing "44, 55, 66" to subslot 4 in the TIA Portal monitoring table, the second slave is displayed as shown in the figure below.

%QW3	Hex	16#0044	16#0044					
Contraction of the second		a subscription of the second second						
%QW5	Hex	16#0055	16#0055					
%QW7	Hex	16#0066	16#0066					
	Image: Modbus Slave - Mbslave2         File       Edit       Connection       Setup       Display       View       Window       Help         Image: Im							
	📴 Mbslave1		Mbslave2					
	ID = 1: F = 03	ID	= 1: F = 03					
	Alias	00000	Alias	04000				
	Alias	000000 0x0011	JJJJ	04000 0x0044				
			JJJJ					

Figure 4-1-98



- 1.8.1. FreeRUN free transparent transmission mode usage example
- > In the Modbus Interface Module, set the mode to Free Protocol mode, as shown in the figure below.

Modbus Inte	erface Modu	le [	Section 24 Properties	L Info	2 D	iagnostics
General	IO tags	Syst	em constants	Texts		
✓ General Catalog i	n formation		Module para	meters		
Module para	meters		Module Cor	nfig <mark>Para</mark> me	ters	
				Operation	Mode:	Free Protocol
		-		Inte	erface:	RS485
		-			Parity:	None

Figure 4-1-99

Add the F: Control status Module module to the second subslot. See Table 4.1.9 for its data structure.

Device overview						
Y Module		Rack	Slot	l a		✓ Catalog
▼ DF50-C-PN-RT		0	0		^	
PN-IO		0	0 X1			Filter Profile: <all></all>
SystemDiagnostic_1		0	1	1		Head module
AdapterDigitalInput_1		0	2	3		and the second se
<ul> <li>DF50-M-1COM-232/485/42</li> </ul>		0	3			Module
Modbus Interface Module		0	3 1			▼ 🖸 Submodules
F: Control Status Module	-	0	3 CMD	4		DF50-M-1COM-232/485/422 Sub     Sub      DF50-M-1COM-232/485/422 Sub
	100	0	3 CMD	-	_	F: Control Status Module
		0	3 CMD			
		0	3 CMD			F: IO Data Modules

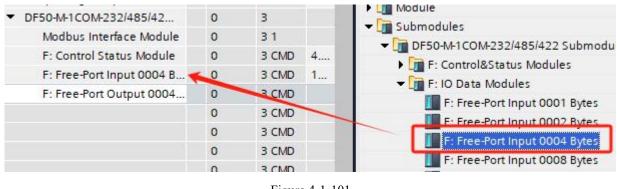
Figure 4-1-100 Table 4.1.9						
	Output	t Data				
Byte offset	name	length	meaning			
Byte:0-1	CtrlWord	2byte	Control Word			
Byte:2	TxDataLEN	1byte	Send data length			
Byte:3	TxDataCNT	1byte	Send data sequence			
			number			
	Input	Data				
Byte Sequence	name	length	meaning			
Number						
Byte:0-1	StateWord	2byte	Status word			
Byte:2	RxDataLEN	1byte	Receive data length			
Byte:3	RxDataCNT	1byte	Receive data sequence			



			number	
Byte:4-11	/	8byte	reserve	

From F: IO Data Modules, select the ones you need and add them to the third sub-slot. As shown in

Figures 4-1-89 and 4-1-90, add F: Free-Port Input 0004 Bytes and F: Free-Port Output 0004 Bytes.





▼ DF50-M-1COM-232/485/42	0	3		
Modbus Interface Module	0	31		F: Free-Port Input 0016 Bytes
F: Control Status Module	0	3 CMD	4	F: Free-Port Input 0032 Bytes
F: Free-Port Input 0004 B	0	3 CMD	1	F: Free-Port Input 0064 Bytes
F: Free-Port Output 0004	0	3 CMD		F: Free-Port Input 0128 Bytes
	0	3 CMD		F: Free-Port Output 0001 Bytes
	0	3 CMD		
	0	3 CMD		F: Free-Port Output 0004 Bytes

Figure 4-1-102

- > The meanings of the two sub-slots added now are as follows:
- ➢ F: Free-Port Input 0004 Bytes contains 4 bytes of input data.
- ▶ F: Free-Port Output 0004 Bytes contains 4 bytes of output data.



> Download the configuration to the device and fill in the required data into the monitoring table as

#### shown below.

%IW4	Hex	state
%IB6	Hex	length of the data
%IB7	Hex	Serial number
%QW3	Hex	command
%QB5	Hex	length of the data
%QB6	Hex	Serial number
%IB16	Hex	Receive data
%IB17	Hex	Receive data
%IB18	Hex	Receive data
%IB19	Hex	Receive data
%QB64	Hex	Send data
%QB65	Hex	Send data
%QB66	Hex	Send data
%QB67	Hex	Send data

#### Figure 4-1-103

Receive data test: The module will automatically enter the receive mode after being configured in free-running mode, or write16#00C2 actively switches to receiving mode. After connecting using the serial port assistant, send "11, 22, 33, 44" in HEX mode. As shown in the figure below, the data sent by the serial port assistant can be received in the receiving data of the TIA Portal monitoring table.

			DF50-M-1COM-23
%IW4	Hex	16#0003	state
%IB6	Hex	16#04	length of the dat
%IB7	Hex	16#01	Serial number
%QW3	Hex	16#0000	command
%QB5	Hex	16#00	length of the dat
%QB6	Hex	16#00	Serial number
%IB16	Hex	16#11	Receive data
%IB17	Hex	16#22	Receive data
%IB18	Hex	16#33	Receive data
%IB19	Hex	16#44	Receive data
		2 B	11 22 3
%QB64	Hex	16#00	Send data
Noner	11	1000	

Figure 4-1-104The meaning of the status word is shown in the following table.

Table 4.1.10						
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

> The control word commands are shown in the following table.

	Table 4.1.11	
Command Value	Command Name	meaning
16#00C1	WRITECUSTOM	Free mode write data command
16#00C2	READCUSTOM	Free mode read data command

Send data test: set the control word to 16#00C1, set the send data length to 4 bytes, set the send sequence number to 1, assign values to Byte1-4 of the send data respectively, and then perform the write action together. The received 4Byte data can be read using the serial port assistant, as shown in the figure below: (To send again, just loop and accumulate the send sequence number)



					DF50-M-1COM-2	32/485/422
%IW4	Hex	16#0000			state	
%IB6	Hex	16#04			length of the da	ta
%IB7	Hex	16#01			Serial number	
						A
%QW3	Hex	16#00C1	16#00C1		command	
%QB5	Hex	16#04	16#04		length of the da	
%QB6	Hex	16#01	16#01		Serial number	55 66 77 8
%IB16	Hex	16#11			Receive data	
%IB17	Hex	16#22			Receive data	
%IB18	Hex	16#33			Receive data	
%IB19	Hex	16#44		9	Receive data	
%QB64	Hex	16#55	16#55		Send data	
%QB65	Hex	16#66	16#66	-	Send data	
%QB66	Hex	16#77	16#77		Send data	
%QB67	Hex	▼ 16#88	16#88		Send data	

Figure 4-1-105First send

%IW4	Hex	16#0000			state	
%IB6	Hex	16#04			length of the dat	a
%IB7	Hex	16#01			Serial number	
						A
%QW3	Hex	16#00C1	16#00C1		command	22.0 <b>-</b> 0
%QB5	Hex	16#04	16#04		length of the da	
%QB6	Hex	16#02	16#02		Serial number	55 66 77 88 55 66 77 88
						· · · · · · · · · · · · · · · · · · ·
%IB16	Hex	16#11			Receive data	
%IB17	Hex	16#22			Receive data	
%IB18	Hex	16#33			Receive data	
%IB19	Hex	16#44			Receive data	
%QB64	Hex	16#55	16#55	Å	Send data	
%QB65	Hex	16#66	16#66	A	Send data	
%QB66	Hex	16#77	16#77		Send data	
%QB67	Hex	16#88	16#88	A	Send data	

Figure 4-1-106Second send

➢ If you need to receive data, you need to set the control word to 16#00C2 after sending the data before you can receive the data.



1.8.2. Modbus RTU Slave mode usage routine

➢ In the Modbus Interface Module, set the mode to Modbus RTU slave mode. The default value of SlaveAddr is "1" and can be modified as shown in the figure below.

Modbus Inte	erface Modul	le [Mod	bus Interface N	lodule]	
General	IO tags	System constants		Texts	
<ul> <li>General</li> <li>Catalog i</li> </ul>	nformation		Module param	eters	
Module para			Module Cont		
				OperationMod	e: Modbus RTU Slave
		-		Interfac	e: RS485
		_		Parit	ty: None
		P.		DataBit	s: 8bits
				StopB	it: 1Bit
				Baudrate(bps	;): 115200bps
				IntervalTime(ms	;): 0
				ModbusSlaveAdd	lr: 🚺

Figure 4-1-107

Add the S: Modbus Status Input (1 Word) module to the second subslot. See Table 4.1.12 for its data structure.

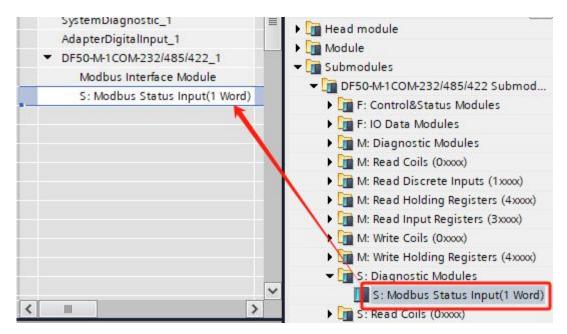


Figure 4-1-108



Table 4.1.12							
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					

From the 6 types starting with S, select the desired type and add it to the third subslot. If you need to read and write more data, you can add different subslot types continuously, up to 28 subslots, plus the first interface subslot and diagnostic subslot, a total of 30 subslots. Right-click the properties of the third subslot to configure the protocol information, and the register first address can be set for both reading and writing. Add S: Read 0002 Words 4xxxx and S: Write 0002 Words 4xxxx as shown in Figures 4-1-97 and 4-1-98.

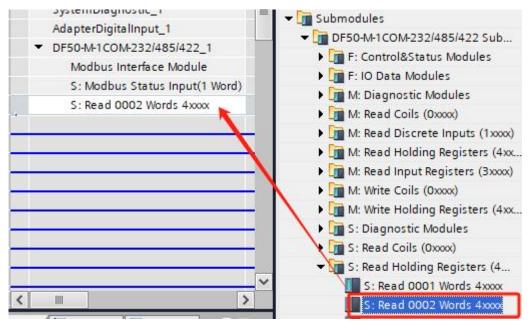
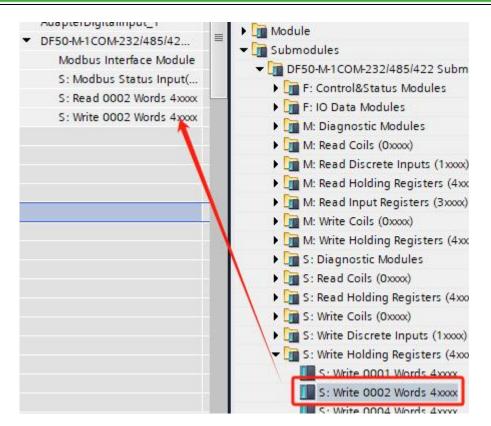


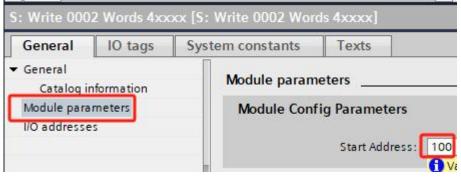
Figure 4-1-109







➢ As shown in the figure below, click S: Write 0002 Words 4xxxx to enter the property interface and change the starting address to 100.





> The meanings of the two sub-slots added now are as follows:

S: Read 0002 Words 4xxxx contains 2 word data. According to the configuration information, the data represents the register value at address 0-1.

S: Write 0002 Words 4xxxx contains 2 words of data. According to the configuration information, the data will be written to the register at address 100-101.



> Download the configuration to the device. Fill in the information we need into the monitoring table for

monitoring as shown below.

%IW6         Hex         16#0000         S: Read 0002 Words 4xxxx           %QW64         Hex         16#0000         S: Write 0002 Words 4xxxx					DF50-M-1COM-232/485/422
%IW4         Hex         16#0000         S: Read 0002 Words 4xxxx           %IW6         Hex         16#0000         S: Read 0002 Words 4xxxx           %QW64         Hex         16#0000         S: Write 0002 Words 4xxxx	%IW68	Hex	16#0000		state
%QW64 Hex 16#0000 S: Write 0002 Words 4xxxx	%IW4	Hex	16#0000		S: Read 0002 Words 4xxx
%QW64 Hex 16#0000 S: Write 0002 Words 4xxxx	%IW6	Hex	16#0000	(1000)	S: Read 0002 Words 4xxxx
%QW66 Hex 16#0000 S: Write 0002 Words 4xxxx	%QW64	Hex	16#0000		S: Write 0002 Words 4xxxx
	%QW66	Hex	16#0000		S: Write 0002 Words 4xxxx



➤ Use Modbus Poll software to create two new master stations to communicate with the module, as shown in the figure below, with the starting addresses being 0 and 100 respectively.

💬 Mbpoll	1		Mbpoll2				
Tx = 888: Err = 0: ID = 1: F = 03: SR =			Tx = 782: Err = 0: ID = 1: F = 03: SR				
	Alias	00000		Alias	00100		
0		0x0000	0		0x0000		
1		0x0000	1		0x0000		

Figure 4-1-113

After changing the data format to HEX and writing "11, 22" into the 0th-1st register in the first master station, the TIA Portal monitoring table will be displayed as shown in the figure below.

			DF50-M-1	Les mope		
%IW68	Hex	16#0000	state	Tx = 979	9: Err = 0: ID = 1	: F = 03: SR =
0/114/4	Use	1/20011	C. Prod C			
%IW4	Hex	16#0011	S: Read		Alias	00000
%IW6	Hex	16#0022	S:Read	0		0x0011
%QW64	Hex	16#0000	S: Write	1		0x0022
%QW66	Hex	16#0000	S: Write	2	1.2	0x0000



After writing "33, 44" to subslot 4 in the TIA Portal monitoring table, the second master station is displayed as shown in the figure below.

%IW1	Hex	16#0000		Mbpoli1			Mbpoll2 کی		
%QW1	Hex	16#0000		Tx = 1046: Err = 0: ID = 1: F = 03: SR		Tx = 940: Err = 0: ID = 1: F = 03: SR			
%IB3	Hex	16#00						and a set of the set o	
%IW68	Hex	16#0000		Alias	00000		Alias	00100	
/614/00	TIEX	10#0000		0	0x0011	0		0x0033	
%IW4	Hex	16#0011		1	0x0022	1		0x0044	
%IW6	Hex	16#0022	-	2	0x0000	2		0	
%QW64	Hex	16#0033	16#0033	3	0	3		0	
%QW66	Hex	16#0044	16#0044	4	0	4		0	



Figure 4-1-115



# 1.9. IO-LINK module usage routine

This example uses the DF50-C-PN-RT + DF50-M-4IOL topology. For wiring methods, please refer to <u>Chapter 3, Section 18.2</u>, After adding the module, it will look like the following figure.

🐈 Module	 Rack	Slot	I address	Q address
▼ DF50-C-PN-RT	0	0		
► PN-IO	0	0 X1		
SystemDiagnostic_1	0	1	12	12
AdapterDigitalInput_1	0	2	3	
▼ DF50-M-4IOL_1	0	3		
IO-link State	0	3 1	617	58
IOL_I/O_02/02_byte	0	3 PORTO	2123	911
IOL_I_00_byte	0	3 PORT1	20	
IOL_O_00_byte	0	3 PORT2		64
	0	3 PORT3		



> The submodules that can be added to PORT0~PORT3 are as follows.



Figure 4-1-117

Table 4.1.13



DF50 series I/O

IOL_I/O_01/01_byte	Input 1 byte Output 1 byte	IOL_I_00_byte	Enter 0 bytes for DI mode	IOL_O_00_byte	Output 0 bytes, used in DO mode
IOL_I/O_02/02_byte	Input 2 bytes Output 2 bytes	IOL_I_01_byte	Input 1 byte	IOL_O_01_byte	Output 1 byte
IOL_I/O_04/02_byte	Input 4 bytes Output 2 bytes	IOL_I_02_byte	Input 2 bytes	IOL_O_02_byte	Output 2 bytes
IOL_I/O_04/04_byte	Input 4 bytes Output 4 bytes	IOL_I_04_byte	Input 4 bytes	IOL_O_04_byte	Output 4 bytes
IOL_I/O_06/06_byte	Input 6 bytes Output 6 bytes	IOL_I_06_byte	Input 6 bytes	IOL_O_06_byte	Output 6 bytes
IOL_I/O_08/08_byte	Input 8 bytes Output 8 bytes	IOL_I_08_byte	Input 8 bytes	IOL_O_08_byte	Output 8 bytes
IOL_I/O_16/16_byte	Input 16 bytes Output 16 bytes	IOL_I_12_byte	Input 12 bytes	IOL_O_12_byte	Output 12 bytes
IOL_I/O_24/24_byte	Input 24 bytes Output 24 bytes	IOL_I_16_byte	Input 16 bytes	IOL_O_16_byte	Output 16 bytes
IOL_I/O_32/32_byte	Input 32 bytes Output 32 bytes	IOL_I_twenty four_byte	Input 24 bytes	IOL_O_twenty four_byte	Output 24 bytes
		IOL_I_32_byte	Input 32 bytes	IOL_O_32_byte	Output 32 bytes

### 1.9.1. IO-LINK State information

➤ After adding the DF50-M-4IOL module, there is a default slot "IO-LINK State" to display the status information of each port of the module. Fill in the IO-LINK State address into the monitoring table as shown below. For the specific meaning of State, please refer to <u>Chapter 3</u>, <u>Section 18.4.2</u>.

Address	Display format	Monitor value	Modify value	9	Comment
%IW6	Hex	16#0000			Port0 Event code
%18.5	Bool	TRUE			Port0 Working status
%18.6	Bool	FALSE			Port0 Communication status
%IW9	Hex	16#1800			Port1 Event code
%111.5	Bool	FALSE			Port1 Working status
%111.6	Bool				Port1 Communication status
%IW12	Hex	16#1800			Port2 Event code
%114.5	Bool	FALSE			Port2 Working status
%114.6	Bool	TRUE			Port2 Communication status
%IW1 5	Hex	16#0000			Port3 Event code
%117.5	Bool	FALSE			Port3 Working status
%117.6	Bool	FALSE			Port3 Communication status
%QB5	Hex	16#00			Porto Command
%QB6	Hex	16#00			Port1 Command
%QB7	Hex	16#00			Port2 Command
%QB8	Hex	16#00			Port3 Command

Figure 4-1-118



PORT0 is connected to an IO-link slave, the event code is displayed as "16#0", the working status is "TRUE" indicating that it is in normal working state, and the communication status is "FALSE" indicating that it is in slave connection state.

> PORT1 and PORT2 are not connected to the device, and the event code is displayed as "16#1800".

According to the port event code, the IO-LINK slave is offline. The working status is "FALSE", indicating that it is in an incorrect working state, and the communication status is "TRUE", indicating that the slave is disconnected.

- > PORT3 is the monitoring information when it is not configured.
- > As shown in the figure below, writing "0x01" in Port1 Command can clear the event code of Port1.

Address	Display format	Monitor value	Modify value	9	Comment
%IW6	Hex	16#0000			Port0 Event code
%18.5	Bool	TRUE			Port0 Working status
%18.6	Bool	FALSE			Port0 Communication status
%IW9	Hex	16#0000	]	ă	Port1 Event code
%111.5	Bool	FALSE			Port1 Working status
%111.6	Bool				Port1 Communication status
%IW12	Hex	16#1800			Port2 Event code
%I14 <mark>.</mark> 5	Bool	FALSE			Port2 Working status
%I14.6	Bool	TRUE			Port2 Communication status
%IW15	Hex	16#0000			Port3 Event code
%I17.5	Bool	FALSE			Port3 Working status
%17.6	Bool	FALSE			Port3 Communication status
%QB5	Hex	16#00	<u> </u>		Port0 Command
%QB6	Hex	16#01	16#01		1 Port1 Command
%QB7	Hex	16#00			Port2 Command
%QB8	Hex	16#00			Port3 Command

Figure 4-1-119



## 1.9.2. IO-LINK Mode

➢ As shown in the figure below, configure PORT0 to IO-link mode. The default mode is IO-link mode. For other configurable information, please refer to<u>Chapter 3</u>, Section 18.3ISDU is configured according to the instructions of the IO-Link slave you are using. The IO-Link slave used in this tutorial does not have a configurable ISDU. Note that you must re-download the configuration after the configuration is complete.

	0	3		
IO-link State	0	31	617	58
IOL_1/0_02/02_byt	e O	3 PORTO	2123	911
IOL_I_00_byte	0	3 PORT1	20	
IOL_O_00_byte	STEP1 °	3 PORT2		64
	0	3 PORT3		
	0	4		
	0	5		
	0	6		
~	0	7		
2 🔍	STEP2			
IOL_I/O_02/02_byte [IOL_I/O_02/0	<b>Properties</b>	<u>I</u> Info	P. Di	agnostics
				ugnosties
General IO tags System co		Texts		ugnostics
General IO tags System co	onstants 1	Texts		ugnosaes
General IO tags System co General Moo		Texts		ugnostics
General IO tags System co General Moo Catalog information	onstants 1	rs		ugnostics
General IO tags System co General Mod Catalog information Module parameters NO addresses	onstants 1 Jule parameter	rs	STEP	
General IO tags System co General Mod Catalog information Module parameters NO addresses	onstants 1 dule parameter dule Config Para odule Config P	rs	STEP	4
General IO tags System co General Mod Catalog information Module parameters NO addresses	onstants 1 dule parameter dule Config Para odule Config P	rexts rs ameters arameters	STEP	4
General IO tags System co General Mod Catalog information Module parameters NO addresses	onstants 1 dule parameter dule Config Para odule Config P	rexts rs ameters arameters erating Mode:	STEP 10-LINK	4
General IO tags System co General Mod Catalog information Module parameters NO addresses	onstants 1 dule parameter dule Config Para odule Config P Op	rexts rs ameters Parameters erating Mode: Cycle Mode:	STEP 10-LINK FreeRur	4 J

Figure 4-1-120



Fill in the Port0 address in the monitoring table. For its meaning, please refer to Chapter 3, Section

### <u>18.4.2</u>.

Address	Display format	Monitor value	Modify value	4	Comment
%121.0	Bool	FALSE			DI
%121.1	Bool	FALSE			C/Q D
%121.2	Bool	TRUE			Valid bit
%IB22	Hex	16#08			Process data
%IB23	Hex	<mark>16#00</mark>			Process data
%Q9.1	Bool	FALSE			C/Q D
%Q9.2	Bool	FALSE			Valid bit
%QB10	Hex	16#00			Process data
%QB11	Hex	16#00			Process data

### Figure 4-1-121

Data reception: As shown in the figure below, if the Valid bit is "TRUE", it means the received data is valid, and the Process data is the received data. The data received this time is "16#08". In this mode, the DI and C/Q DI bits are invalid.

Address	Display format	Monitor value	Modify value	3	Comment
%I21.0	Bool	FALSE			DI
%121.1	Bool	FALSE			C/Q DI
%I21.2	Bool	TRUE			Valid bit
%IB22	Hex	16#08			Process data
%IB23	Hex	16#00	1		Process data
%Q9.1	Bool	FALSE			C/Q DO
%Q9.2	Bool	FALSE			Valid bit
%QB10	Hex	16#00			Process data
%QB11	Hex	16#00			Process data



Data sending:Setting the Valid bit to "TRUE" or "FALSE" indicates whether the sent data is valid. The Process data is the sent data, and this time "16#0F" is sent. In this mode, the C/Q DO bit is invalid.

Address	Display format	Monitor value	Modify value	9	Comment
%121.0	Bool	FALSE			DI
%121.1	Bool	FALSE			C/Q DI
%I21.2	Bool	TRUE			Valid bit
%IB22	Hex	16#08			Process data
%IB23	Hex	16#00			Process data
%Q9.1	Bool	FALSE			C/Q DO
%Q9.2	Bool	FALSE			Valid bit
%QB10	Hex	16#0F	16#0F	🗹 🔺	Process data
%QB11	Hex	16#00			Process data

Figure 4-1-123



# 1.9.3. DI/DO mode

As shown in the figure below, configure Port1 to DI mode and Port2 to DO mode. The default mode is IO-link. Note that you need to re-download the configuration after the configuration is completed.

1.00				1 1750			
	▼ DF50-N	1-410L_1	(	) 3			
•	10-1	ink State	(	) 3	1 6	517	58
	IOL	_1/O_02/02_byte	(	3	PORTO 2	2123	911
<u> -</u>	IOL	I_00_byte	(	) 3	PORTI 2	20	
	The second	0.00 http	TED1	) 3	PORT2		64
			STEP1	3	PORT3		
			(	9 4			
			(	) 5			
			(	) 6			
~			(	) 7			
	<		STEP2				
	yte [IOL_I_00_		Q Properti	es 📩	Info	C Dia	agnost
General	IO tags	System cor	nstants	Texts			
General     Catalog     Module pa     I/O address			<mark>ile parame</mark> ile Config F		5		
		Mo	dule Confi	g <mark>P</mark> arame	ters	ST	EP4
				Operating	Mode:	DI	
		-		Cycle	Mode:	FreeRun	ing
		•			-		

Figure 4-1-124Configured as DI



Module paran I/O addresses			Module Confi		ameters ting Mode:	STEP	4
General Catalog inf	formation	Mo	dule parame	eters	<u>2</u>		
General	IO tags	System o	onstants	Tex	ts		
L_O_00_byt	e [IOL_O_00	_byte]	S Propert	ies	<u>i</u> Info	🖁 🕹 Di	agno
. 1	<		STI	EP2		1	
~			(	0	7		
			1	D	6		
				D	5		
	S	rep1	(	b	4		
				0	3 PORTS		
		O_00_byte		0	3 PORT2		64
•		00 byte		0	3 PORTI	20	
_	IOL	1/0_02/02_b	vte (	D	3 PORTO	2123	9
4	IO-lii	nk State		D	31	617	5
	▼ DF50-M	410L_1	1	0	3		

Figure 4-1-125Configured as DO

Fill in the Port1 and Port2 addresses in the monitoring table. For their meanings, please refer to <u>Chapter 3, Section 18.4.2</u> For wiring method, please refer to <u>Chapter 3, Section 18.2.2</u>.

Address	Display format	Monitor value	Modify value	9	Comment
%120.0	Bool	FALSE			Port1 DI
%120.1	Bool	FALSE			Port1 C/Q DI
%Q64.1	Bool	FALSE			Port2 C/Q DO



> Input valid signals to Port1 DI and Port1 C/Q DI. As shown in the figure below, you can see that the corresponding address becomes "TURE".

Address	Display format	Monitor value	Modify value	9	Comment
%120.0	Bool	TRUE			Port1 DI
<mark>%I20.1</mark>	Bool [				Port1 C/Q DI
%Q64.1	Bool	FALSE			Port2 C/Q DO



 $\blacktriangleright$  As shown in the figure below, write "TRUE" to Port2 C/Q DO, and use a multimeter to measure the voltage of C/Q2 port, and you can measure the voltage to be 24V.



Address	Display format	Monitor value	Modify value	9	Comment
%120.0	Bool	FALSE			Port1 DI
%I20.1	Bool	FALSE			Port1 C/Q DI
%Q64.1	Bool	TRUE	TRUE		Port2 C/Q DO





- 2. STEP 7-MicroWIN SMART software configuration process
- > This chapter specifically introduces the use of the adapter DF50-C-PN-RT using Siemens STEP

7-MicroWIN SMART as the configuration software.

> The PLC model used in this section is 6ES7 288-1ST20-0AA0.

# 2.1. Project Creation

### 2.1.1. Add GSD file

> As shown in Figure 4-2-1 and Figure 4-2-2, find the GSD file on the computer and add the GSD file.

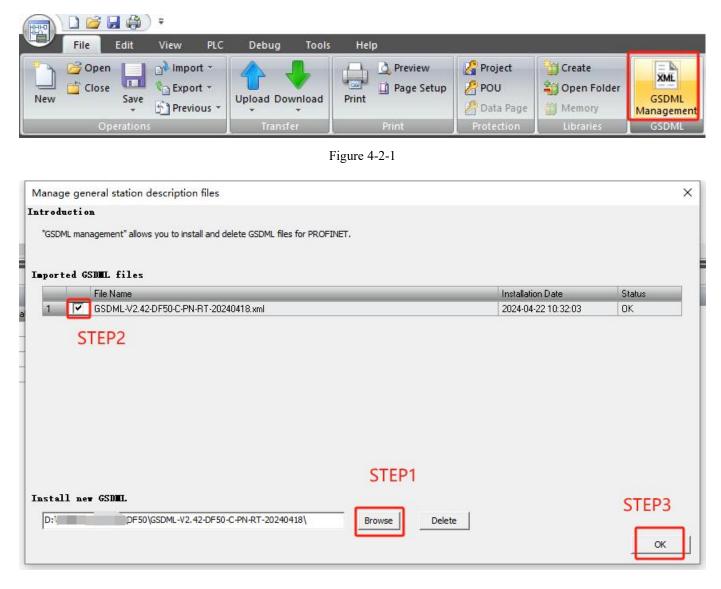


Figure 4-2-2



## 2.1.2. Adding a Controller

➢ As shown in Figure 4-2-3, double-click CPU ST20, select the CPU model and version number you are

#### using, and click OK.

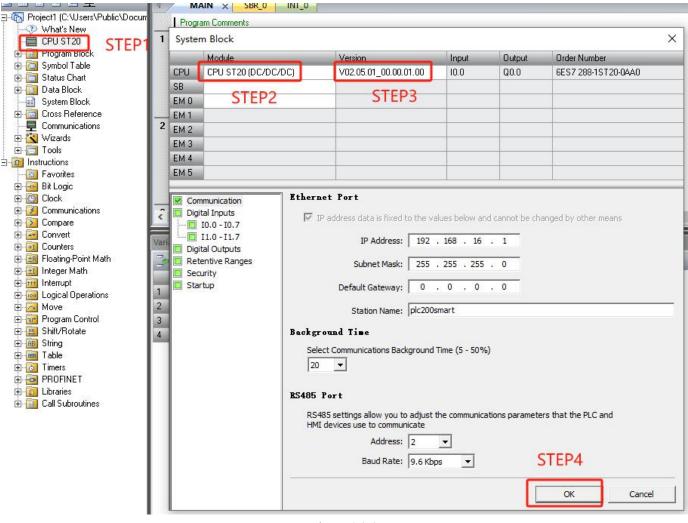


Figure 4-2-3

### 2.1.3. Adapter Configuration

➢ As shown in Figure 4-2-4, correctly select the network card connected to the adapter and find the DF50-C-PN-RT adapter. STEP4 You can modify the name of the adapter by yourself. Please remember the name, which will be used during configuration.



⊡			
	Find PROFINET Devices		×
🗄 📉 Wizards			
E-E Tools	Communication Interface	Press the "Edit" button to (	change the device name of the selected
Motion Control Panel	Realtek Gaming 2.5GbE Family Controller.TCPIP.Auto.1		hts" button to continuously flash device
		LEDs to visually locate a co	nnected device.
	PROFINET Device	MAC Address	
Find PROFINET Devices	E PNIO	STEP2 16:14:02:10:64:7F	Flash Lights
Certificate Management	192.168.0.2 (df50-c-pn-rt)		
Instructions		IP Address	
Favorites STEP		192,168,0,2	
🗄 뒢 Bit Logic		•	
⊞ 🐻 Clock		Subnet Mask	
🗄 📝 Communications		255,255,255,0	
E Compare		1200 1200 1200 1 0	
🗄 🚾 Convert		Default Gateway	
🗄 📶 Counters			
🗄 🛅 Floating-Point Math		192.168.0.2	
🗄 🔣 Integer Math			CII characters 'a' - 'z', '0' - '9', '.' and '-'
🗄 🔟 Interrupt			iber, '.' , '-', or 'port-n(n=09)', should
🗄 🚾 Logical Operations		not end with '.' or '-' )	
🗄 🔂 Move		df50-c-pn-rt	Edit
🗄 🚾 Program Control		Constant ICCO	
🗄 🧱 Shift/Rotate		Convert name: df50-c-pn-	STEP4
🗄 🔞 String			SIEP4
🗄 🧰 Table	Find Devices CTED2		
⊞- <u>o</u> Timers	Find Devices STEP3		
🗄 🧰 PROFINET			
🗄 🔟 Libraries			Close
🗄 🛅 Call Subroutines			

Figure 4-2-4

➢ As shown in Figure 4-2-5, double-click PROFINET, check the controller of STEP2, fill in the PLC IP

address in the blank, and click Next.

Symool Jabe         Status Chart         Status Chart         System Block         System Block         System Block         System Block         Cross Reference         Communications         Notion         High Opeed Counter         PD         PD </th <th>PROFINET Configuration Wizard</th> <th>Introduction         This wizard allows you to configure a PRDFINET network the project, which can be downloaded to the PLC together         <b>JLE Bole</b>         Select a role for the PLC.         I Device         Parameter assignment of PROFIMET interface by         <b>Jthernet Port</b>         Subnet Mask:         Subnet Mask:         Default Gateway:         0       0         Station Name:         plc200smart</th> <th></th>	PROFINET Configuration Wizard	Introduction         This wizard allows you to configure a PRDFINET network the project, which can be downloaded to the PLC together <b>JLE Bole</b> Select a role for the PLC.         I Device         Parameter assignment of PROFIMET interface by <b>Jthernet Port</b> Subnet Mask:         Subnet Mask:         Default Gateway:         0       0         Station Name:         plc200smart	
⊉⊶@ Lbranes ⊕-@ Cell Subroutines		STEP4	
		< Previous Next >	Generate Cancel
		Figure 4-2-5	

> Drag and add DF50-C-PN-RT adapter as shown in Figure 4-2-6



# DF50 series I/O

PROFINET Configuration Wizard						Х
PROFINET network	The device table You can add devic Device table	lists all devices es from the device		200sment 2.168.16.1 pafigured for thi right.	5 PBOFINET network.	Cataloc
	Devce Number         I           1         2           3         4           5         6           7         8            Add           Deete		Cevce Name	IP Setting Generate	IP Address	Artide no.: 30050002548 Version: GSDML-V2.42-DF5C-C-PN-RT-20240413.xml Description: GSDML-V2.42-DF5O-C-PN-RT-20240413.xml PROFINET IO Device Adapter

Figure 4-2-6

➢ As shown in Figure 4-2-7, change the device name to the device name set in Figure 4-2-4.STEP4, and select a fixed IP for IP settings. Click Next

PROFINET Configuration Wizard			6755			×
PROFINET network  PC Controler(CPU 5T20_plc200smart)  PC Controler(CPU 5T20_plc200smart)  PC CPU CPN4NIVU.1df0/c-gn4  PS SystemDiagnostic(1)  AdapterDigitalInput(2)  Completion	d50-cpnt(DF50	le lists all devices		200smet 2.168.16.1 onfigured for thi right.	s <b>PBOFINET</b> network.	Cataloc ⊡-PLC S7-200 SMART □-CFU SR20 □-CFU SR30 □-CFU SR40 □-CFU SR60 □-CFU ST40 □-CFU ST40 □-CFU ST40 □-CFU ST60 ⊡-PROFINET-10 □-1/0 □-DECSCN □-RenoteD0 □-DF50-C-PN-RTV0.1
	Dev ce Number	Type	Device Name	IP Setting	IP Address	
	1 2 3 4 5 6 7	DF50-C-PN-RTV0.1	df50-c-pn-rt	Fixed		Article no.: 30050002548           Version:           GSDML-V2.42-DF5C-C-PN-RT-20240418.xml
	Add Dee	te _				Description: SSDML-V2.42-DF50-C-PN-RT-20240418.xml PROFINET IO Device Adapter
	< Frevious	vext >		Generate	Cancel	Ý

Figure 4-2-7



> Drag and add the required cards as shown in Figure 4-2-8. You can modify the starting address of

## each card on this page.

twork (CPU 3T20_plc200smart) [] C-PN-R IV0. 1-df50-c-pn-rt	Li ck	the 🖍	dd" button to add a modu	le for this device.			DF50-C-PN-RTV0.1
F5C-C-PN-RT(0)	È.	Index	Module Name	Submodule Name	Slot_Subslot	PNI Sta 🔿	⊡. • Module
ystemDiagnostic(1) 1		0	DF50 C PN RT		0		IA
dapterDigitalInput(2)			1	PN-IU	U 32768/X1J		
letion 3				Port 0 - B.145	0.32769×1		
4				Port 1 - RJ45	0 32770%1		
5		1	SystemDiagnostic		1	123	CF50-M-16CI-F/N
G		2	AdapterDigital nput		2	100	CF50-M-16CI-F/N-TS
7					3		⊒-DO ⊡ Pulse
8			1		4		± RTD/TC
9					5		Submodule
13					6		<ul> <li>STREEP AND AND AND AND AND AND AND AND AND AND</li></ul>
11					7		
12			1		8		
13			-		9		
14					10		
15					11		
15					12		
17					13		
13			1		14		
13					15		
23					16		
21					17		
22					18		
			Ť.		19	~	
22	Add	 	Delete Update Time (ms)	4.00 V Data Hold	18	×	

Figure 4-2-8

➢ As shown in Figure 4-2-9, click other cards under the adapter to modify their configuration information separately. Click Next.



PROFINET Configuration Wizard		×
>FINET network           Controler(CPU 3T20_plc200sma*t)           Dr5uC-PN-RT(N)           DF5C-C-PN-RT(0)           SystemDiagnostic(1)           AdapterDigitalTroub(2)	This page allows you to configure each submodule of the selected module.           DF50-M-8AO-U-4	
DF5C-M-IGOT-P.N(4) DF5C-M-IGOT-P.N(4) DF5C-M-IGOT-P.N(4) Completion	RSN Path C:\Leare\Public\Cocurrente\Sicmenes\STEP 7 Micro\v/IN SMART\GSCML \GSDNL V2.42 DF50 C PN RT 2024C418.+ml	
	JF50-M-8A0-U-4 Parameter	
	SignalRange Setting(CHD)   Disabled	
	SignalRange Setting(CH1)	
	SignalRange Setting(CH2) Disabled 🗨	
	SignalKange Setting(UH3) Disabled 💌	
	Signal Mange Setting(UM4) Disabled 💌	
	Signal.Range Setting(UH5) Disabled 💌	
	Signal Mange Setting(UM6) Disabled 💌	
	SignalMange Setting(UR1) Disabled 💌	
		~
< >	< Frev/lous Next > Generate Cancel	

Figure 4-2-9

▶ As shown in Figure 4-2-10, on the completion page, you can see all the input and output addresses.

# Finally, click Generate.

VET network htroler(CPU 3T20_plc200smart) DF50-C-PN-RT(0) DF5C-C-PN-RT(0) SystemDiagnostic(1)					plc200smart 192.168.16.1				
AdapterDigitalTrput(2)     Dr5C-M-10D0+(0)     Dr5C-M-10D1+N(4)     Dr5C-M-8AO-U-4(5)     Completion	ď50-c-	-prit(DF50C-PN-F							
	Ad	ldress overviev							
	-	Device Number		Device Name	Children and Chi	Sict_Subsid	О Туре	Address From	Address To
	1	1	0	∃fE0 o pn rt	DF50C PN RT	J_1			
	ALC: NO.	1	U	df5U-c-pn-rt	PN-IU	J_32768	-		
	3	1	n	HfEO-c-pn-rt	Port 0 - BJ45	1_32769	-	-	-
	4	1	0	df50-c-pn-rt	Port 1 - RJ45	J_3277C	-		-
	5	1	0	df50-c-pn-rt	3ystemDiagnostic	11	nput	128	129
	G	1	0	df50-c-pn-rt	SystemDiagnostic	1_1	Dutput	120	129
	7	1	0	df50-c-pn-rt	AdapterDigtalInput	2_1	nput	130	130
	8	1	0	dfEO-c-pn-rt	DF50-M-16D0-P	3_1	Dutput	130	131
	9	1	0	df50-c-pn-rt	DF50-M-16DI-P/N	4_1	nput	131	132
	10	1	0	df50-c-pn-rt	DF50-M-8A0-U-4	5_1	Dutput	132	147

Figure 4-2-10



### 2.1.4. Download to PLC

➢ As shown in Figure 4-2-11, correctly select the network card connected to the PLC and download the configuration to the PLC. Then run the PLC.

🚰   👚 Upload 👻 🐥 Download 🕶 👫 Insert 🕘 🛱 Delete 🤟	★ ★ ▲   ⊇   ≗ ‰ ☆   ⊄ - →
MAIN X SBR_0 INT_0 STEP1	
Communications	×
Communication Interface         Realtek Gaming 2.5GbE Family Controller.TCPIP.Auto.1         Eound-CDUe         Interface         Interface         STEP3	Press the "Edit" button to change the IP data and station name of the selected CPU. Press the "Flash Lights" button to continuously flash CPU LEDs to visually locate a connected CPU. MAC Address E0:DC:A0:D6:8D:DD Flash Lights IP Address 192 . 168 . 16 . 1 Edit Subnet Mask 255 . 255 . 255 . 0 Default Gateway 0 . 0 . 0 . 0 Station Name (ASCII characters a-z, 0-9, - and .) plc200smart STEP5
	OK Cancel

Figure 4-2-11

### 2.1.5. Debugging and testing

➢ As shown in Figure 4-2-12, enter the status chart and fill in the input and output addresses of each module to monitor or write data. Click the continuous monitoring button in STEP3 to monitor the data in the address in real time.



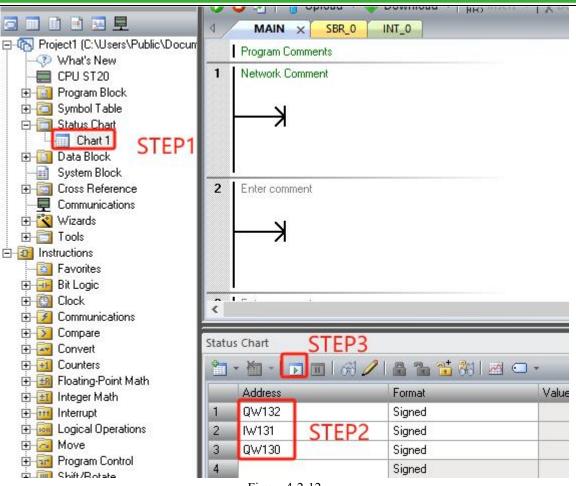


Figure 4-2-12



## 2.2. Adapter usage examples

Please refer to the wiring diagram of the adapter<u>Chapter 2 Section 2.2</u>The example uses the DF50-C-PN-RT + DF50-M-16DO-P + DF50-M-16DO-N + DF50-M-16DI-P/N + DF50-M-16DI-P/N-TS topology. After adding the modules in sequence, the topology shown in Figure 4-2-13 is obtained: SystemDiagnostic is the diagnostic module, AdapterDigitalInput is the adapter 8-channel digital input display, and the other modules are the various IO module cards we inserted.

Device Name	Module	Slot_Subslot	IO Type	Address From	Address To
df50-c-pn-rt	DF50-C-PN-RT	0_1		-	
df50-c-pn-rt	PN-10	0_32768			
df50-c-pn-rt	Port 0 - RJ45	0_32769	-		-
df50-c-pn-rt	Port 1 - RJ45	0_32770			
df50-c-pn-rt	SystemDiagnostic	1_1	Input	128	129
df50-c-pn-rt	SystemDiagnostic	1_1	Output	128	129
df50-c-pn-rt	AdapterDigitalInput	2_1	Input	130	130
df50-c-pn-rt	DF50-M-16D0-P	3_1	Output	130	131
df50-c-pn-rt	DF50-M-16D0-N	4_1	Output	132	133
df50-c-pn-rt	DF50-M-16DI-P/N	5_1	Input	131	132
df50-c-pn-rt	DF50-M-16DI-P/N-TS	6_1	Input	133	166
df50-c-pn-rt	DF50-M-16DI-P/N-TS	6_1	Output	134	134

#### Figure 4-2-13

### 2.2.1. SystemDiagnostic: Diagnostic module

> The process data is shown in the following table.

		Table 4.2.1			
	Input data: 2 Byte				
Byte No.	illustrate	Remark			
D ( 0	Location of the faulty	0x01 represents the first IO module, 0x02 represents the second			
Byte 0	module	module, and so on.			
Byte 1	Fault Codes	See fault code table 4.2.2 for details			
	(	Dutput data: 2 Byte			
Byte No.	illustrate	Remark			
Byte 0	No action required	/			
Byte 1		/			

> The meanings of the fault codes are shown in the following table.

Table 4.2.2							
Fault Codes	Fault Description	Troubleshooting					



0xE1	Module power supply abnormality	Check the power cord connection
0xE2	Analog module calibration failure	Contact Supplier
0xE3	Module internal initialization exception	Contact Supplier
0xE4	Overcurrent signal detected	Check peripherals
0xE8	Serial port module communication abnormality	Check signal line wiring

As shown in Figures 4-2-14 and 4-2-15, the monitoring value of the diagnostic module is "16#01E1". "01" indicates that the first IO card has a fault, and "E1" indicates that the external power supply of the module is abnormal (see Table 4.2.2 for other fault code meanings); if the monitoring value is 16#02E1, it means that the second IO card has an abnormal module external power supply fault, and so on. Clear the fault data after powering on and off again.

Address	Format	Value
IW128	Hexadecimal	16#01E1
QW128	Unsigned	0
IB130	Unsigned	0

Address	Format	Value
IW128	Hexadecimal	16#02E1
QW128	Unsigned	0
IB130	Unsigned	0

Figure 4-2-15

- 2.2.2. AdapterDigitalInput: Adapter 8-channel digital input display
- > The process data is shown in the following table.

Table 4.2.3									
	Input data: 1 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	

➢ As shown in the figure below, select AdapterDigitalInput in the configuration wizard to modify the filter parameters of the adapter's 8-channel digital input.





Figure 4-2-16

## 2.2.3. Bus Error Adapter Status Setting

As shown in the figure below, you can set the behavior of the adapter when a bus error occurs in the  $\triangleright$ configuration wizard. You can set it to clear the output value or keep the last value. The default is to clear the output value.

<ul> <li>DE50-C-PN-RTV0.1-df50-c-p</li> <li>DF50-C-PN-RT(0)</li> <li>SystemDiagnostic(1)</li> <li>AdapterDigitalInput(2)</li> <li>DF50-M-16DO-P(3)</li> </ul>	DF50-C-PN-RT PN-IO Port 0 - RJ45	Port 1 - RJ45	
DF50-M-16DO-N(4)	Setting for Adapter		-
DF50-M-16DI-P/N(5)		Fault Action for Output	
Completion			





2.2.4. Get module software version

> Get the adapter version information as shown in the figure below. Write "0x100" in the

SystemDiagnostic output address to get the adapter software version information. "0x1200" means the software version is V12.

Address	Format	Value
IW128	Hexadecimal	16#1200
QW128	Hexadecimal	16#0100
IB130	Unsigned	0



SystemDiagnostic output address to get the software version information of the first module after the adapter. "0x1100" means the software version is V11.

Address	Format	Value
IW128	Hexadecimal	16#1100
QW128	Hexadecimal	16#0101
IB130	Unsigned	0

Figure 4-2-19



# 2.3. Digital module usage routine

This example uses the DF50-C-PN-RT + DF50-M-16DO-P + DF50-M-16DO-N + DF50-M-16DI-P/N

+ DF50-M-16DI-P/N-TS topology. After adding the modules, it will look like the following figure.

df50-c-pn-rt	SystemDiagnostic	1_1	Input	128	129
df50-c-pn-rt	SystemDiagnostic	1_1	Output	128	129
df50-c-pn-rt	AdapterDigitalInput	2_1	Input	130	130
df50-c-pn-rt	DF50-M-16D0-P	3_1	Output	130	131
df50-c-pn-rt	DF50-M-16D0-N	4_1	Output	132	133
df50-c-pn-rt	DF50-M-16DI-P/N	5_1	Input	131	132
df50-c-pn-rt	DF50-M-16DI-P/N-TS	6_1	Input	133	166
df50-c-pn-rt	DF50-M-16DI-P/N-TS	6_1	Output	134	134
df50-c-pn-rt	DF50-M-4D0-P-2A	7_1	Input	167	167
df50-c-pn-rt	DF50-M-4D0-P-2A	7_1	Output	135	135
df50-c-pn-rt	DF50-M-4DO-R	8_1	Output	136	136



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

> Please refer to the module wiring diagram<u>Chapter 3, Section 3.2</u>The output status of the module when a PN bus error occurs can be set in the adapter. For setting methods, please refer to<u>Chapter 4, Section</u> 2.2.3.

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

Address	Format	Value
IW128	Hexadecimal	16#0000
QW128	Hexadecimal	16#0000
IB130	Unsigned	0
	Signed	
QW130	Unsigned	65535
	And the second sec	

Figure 4-2-twenty one

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

Please refer to the module wiring diagram<u>Chapter 3 Section 4.2</u> The output status of the module when a PN bus error occurs can be set in the adapter. For setting methods, please refer to<u>Chapter 4, Section</u>

<u>2.2.3</u>.

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



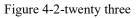
Address	Format	Value
IW128	Hexadecimal	16#0000
QW128	Hexadecimal	16#0000
IB130	Unsigned	0
	Signed	
QW132	Unsigned	65535
	and the state of the second	

Figure 4-2-twenty two

- 2.3.3. DF50-M-16DI-P/N digital input module
- > Please refer to the module wiring diagram<u>Chapter 3 Section 1.2</u>.
- > This module can set input filtering, which can be set in the configuration wizard, as shown in the

figure below. The default setting is 20ms.

DF50-M-16DI-P/N(5)	Latalog	
DF50-M-16DI-P/N-TS(6) DF50-M-4DO-P-2A(7) DF50-M-4DO-R(8)	Short Designation	DF50-M-16DI-P
Completion	Description	Diagital Input 16
	Article Number	30050002551
	Firmware version	1.0
	GSD Path	C:\Users\Public \GSDML-V2.42
	DF50-M-16DI-P/N Parameter	
	Setting SignalFilter Setting	20ms 🔻



> The input data of each channel can be viewed as shown in the figure below.

Address	Format	Value	
IW128	Hexadecimal	16#0000	
QW128	Hexadecimal	16#0000	
IB130	Unsigned	0	
	Signed		
IW131	Unsigned	256	

Figure 4-2-twenty four



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

> Please refer to the module wiring diagram<u>Chapter 3 Section 2.2</u>.

➤ As shown in the figure below, you can set the counting mode of channel 00 to channel 07, which can be set to rising edge counting, falling edge counting, and both rising and falling edges counting. The default is rising edge counting.

DF50-C-PN-RT(0)	DF50-M-16DI-P/N-TS			
AdapterDigitalInput(2)     DF50-M-16DO-P(3)     DF50-M-16DO-N(4)	DF50-H-16DI-P/H-TS Counting Channel Parameter Setting(CH00-CH07)			_
DF50-M-16DI-P/N(5) DF50-M-16DI-P/N-TS(6)		Count Mode(CHOO)	Rising edge count	Ţ
DF50-M-4DO-R(8) Completion		Count Mode(CHO1)	Rising edge count	•
		Count Mode(CHO2)	Rising edge count	•

Figure 4-2-25

➢ As shown in the figure below, for input channels CH10∼CH17, can be modifiedInput filter parameters, the default is 20ms.

SystemDiagnostic(1)	DF50-M-16DI-P/N-TS
AdapterDigitalInput(2)	·
DF50-M-16DO-P(3)	DF50-H-16DI-P/H-TS Non
DF50-M-16DO-N(4)	Counting Channel Parameter
DF50-M-16DI-P/N(5)	Setting(CH10-CH17)
DF50-M-16DI-P/N-TS(6)	SignalFilter Setting(CH10-CH17)_ms 20
DF50-19-400-P-2A(7)	
DF50-M-4DO-R(8)	
Completion	



➢ For process data definition, please refer to <u>Chapter 3 Section 2.4</u>, fill in the data we need into the monitoring table, as shown in the figure below.

IW133	Unsigned	0
	Signed	
ID135	Unsigned	0
ID139	Unsigned	0
	Signed	
QW134	Unsigned	0



➤ Input a valid signal to the A1 (CH0) port of the IO module, and you can see that the DI input bit of the corresponding channel becomes "1", and the count value of the corresponding channel increases by 1.



IW133	Unsigned	256	
	Signed	and the second second	
ID135	Unsigned	101	
ID139	Unsigned	0	
	Signed		
QW134	Unsigned	0	

Figure 4-2-28

➢ Writing "1" to the clear bit of the corresponding channel can clear the count value of the corresponding channel. As shown in the figure below, the count value of A1 (CH0) is cleared.

Unsigned	0
Signed	_
Unsigned	0
Unsigned	10
Signed	
Unsigned	256
	Signed Unsigned Unsigned Signed

Figure 4-2-29

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

> Please refer to the module wiring diagram<u>Chapter 3</u>, Section 20.2 The output status of the module when a PN bus error occurs can be set in the adapter. For setting methods, please refer to<u>Chapter 4</u>, Section 1.2.3.

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

Address	Format	Value
IW128	Hexadecimal	16#0000
	Signed	
QB135	Binary	2#0000_1111
IB167	Binary	2#0000_0000

Figure 4-2-30

As shown in the figure below, the first channel output is enabled. When the module channel is overcurrent, the first channel bit in Overcurrent becomes "1", and the system status information shows a "16#01E4" error (the first module detects an overcurrent signal), and the first channel of the module stops outputting.

IW128	Hexadecimal	16#01E4
0	Signed	
QB135	Binary	2#0000_0001
IB167	Binary	2#0000_0001

Figure 4-2-31



2.3.6. DF50-M-4DOR relay output module

> Please refer to the module wiring diagram<u>Chapter 3, Section 19.2</u>The output status of the module

when a PN bus error occurs can be set in the adapter. For setting methods, please refer to Chapter 4,

Section 1.2.3.

Each channel relay can be closed as shown in the figure below.

QB136	Binary	2#0000_1111

Figure 4-2-32



# 2.4. Analog module usage routine

This example uses the topology of DF50-C-PN-RT + 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 structure is as shown in the figure below.

df50-c-pn-rt	SystemDiagnostic	1_1	Input	128	129
df50-c-pn-rt	SystemDiagnostic	1_1	Output	128	129
df50-c-pn-rt	AdapterDigitalInput	2_1	Input	130	130
df50-c-pn-rt	DF50-M-8A0-U-4	3_1	Output	130	145
df50-c-pn-rt	DF50-M-8A0-1-5	4_1	Output	146	161
df50-c-pn-rt	DF50-M-4A0-UI-6	5_1	Output	162	169
df50-c-pn-rt	DF50-M-8AI-U-4	6_1	Input	131	146
df50-c-pn-rt	DF50-M-8AI-I-5	7_1	Input	147	162
df50-c-pn-rt	DF50-M-4AI-UI-6	8_1	Input	163	170



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

Please refer to the module wiring diagram<u>Chapter 3 Section 9.2</u>The output status of the module when

a PN bus error occurs can be set in the adapter. For setting methods, please refer to Chapter 4, Section

<u>2.2.3</u>.

> As shown in the figure below, you can set the module output voltage range, the default is Disabled. Set CH0 to  $0\sim10$ V.

SystemDiagnostic(1)	DF50-M-8AO-U-4
AdapterDigitalInput(2) DF50-M-8AO-U-4(3) DF50-M-8AO-I-5(4) DF50-M-4AO-UI-6(5)	DF50-H-8A0-U-4 Parameter Setting SignalRange Setting(CHO)
DF50-M-8AI-U-4(6) DF50-M-8AI-I-5(7) DF50-M-4AI-UI-6(8)	SignalRange Setting(CH1) Disabled -10V~+10V 0V~+10V
Completion	SignalRange Setting(CH2) V~+5V V~+5V 1V~+5V
	SignalRange Setting(CH3) Disabled 💌

Figure 4-2-34

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 is 10V. The conversion relationship is shown in <u>Chapter 3 Section 9.4</u>.

Address	Format	Value
QW130	Signed	+27648

Figure 4-2-35



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

> Please refer to the module wiring diagramChapter 3 Section 10.2 The output status of the module when

a PN bus error occurs can be set in the adapter. For setting methods, please refer to Chapter 4, Section

### <u>2.2.3</u>.

➢ As shown in the figure below, you can set the module output current range, the default is Disabled. Set CH0 to 0~20ma.

SystemDiagnostic(1)	DF50-M-8AO-I-5	
AdapterDigitalInput(2)	DF50-H-8A0-I-5 Parameter	
DE50-M-8AO-U-4(3)	Setting	
DF50-M-8AO-I-5(4)		2
DF50-M-4AO-UI-6(5)	SignalRange Setting(CHO)	
DF50-M-8AI-U-4(6)	Disabled	I
DF50-M-8AI-I-5(7)	SignalRange Setting(CH1) 0~20ma	1
DF50-M-4AI-UI-6(8)	4~20ma	1
Completion		

Figure 4-2-36

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 current is 20ma. The conversion relationship is shown in <u>Chapter 3 Section 10.4</u>.

Format	Value	New Val
Signed	+27648	+27648

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

> Please refer to the module wiring diagram<u>Chapter 3, Section 8.2</u>The output status of the module when a PN bus error occurs can be set in the adapter. For setting methods, please refer to<u>Chapter 4, Section</u> 2.2.3.

As shown in the figure below, you can set the module output voltage or current range, the default is Disabled. Set CH0 to  $0\sim10V$  and CH1 to  $0\sim20ma$ .

SystemDiagnostic(1)	DF50-M-4AO-UI-6
AdapterDigitalInput(2)     DF50-M-8AO-U-4(3)     DF50-M-8AO-I-5(4)	DF50-M-4A0-VI-6 Parameter Setting
DF50-M-4AO-UI-6(5)	SignalRange Setting(CHO) 0/~+10/ 💌
DF50-M-8AI-I-5(7) DF50-M-4AI-UI-6(8) Completion	SignalRange Setting(CH1) 0~20ma 💌

Figure 4-2-38



➤ As shown in the figure below, write the value "27648" to the module CH0 and CH1. Through the multimeter measurement, it can be seen that the output voltage of CH0 is 10V and the output current of CH1 is 20ma. The conversion relationship is shown in <u>Chapter 3, Section 8.4</u>.

Address	Format	Value	New Valu
QW162	Signed	+27648	+27648
QW164	Signed	+27648	+27648



### 2.4.4. DF50-M-8AI-U-4 Voltage Input Module

> Please refer to the module wiring diagram<u>Chapter 3, Section 7.2</u>As shown in the figure below, you can set the module acquisition voltage range, the default is Disabled. Set CH0 to  $0\sim10$ V.

DF50-C-PN-RT(0)	DF50-M-8AI-U-4		
AdapterDigitalInput(2)     DF50-M-8AO-U-4(3)     DF50-M-8AO-I-5(4)	DF50-W-8AI-U-4 Parameter Setting	· · · · · · · · · · · · · · · · · · ·	
DE50-M-440-LIT-6(5)		SignalRange Setting(CHD)	Disabled 💌
DF50-M-8AI-U-4(6)     DF50-M-8AI-I-5(7)     DF50-M-4AI-UI-6(8)		SignalRange Setting(CH1)	Disabled -10V~+10V 0V~+10V
Completion		SignalRange Setting(CH2)	2V~+10V -5V~+5V 0V~+5V 1V~+5V
		SignalRange Setting(CH3)	Disabled 💌

Figure 4-2-40

As shown in the figure below, you can set the signal filter for each channel, the default is 100Hz\_10ms.

SignalFilter Setting(CHO)	100Hz_10ms 💌
SignalFilter Setting(CH1)	100Hz_10ms 💌
SignalFilter Setting(CH2)	100Hz_10ms
SignalFilter Setting(CH3)	100Hz_10ms
SignalFilter Setting(CH4)	100Hz_10ms
SignalFilter Setting(CH5)	100Hz_10ms
SignalFilter Setting(CH6)	100Hz_10ms
SignalFilter Setting(CH7)	100Hz_10ms 💌

Figure 4-2-41





After 5V voltage is applied to CH0, the value shown in the figure below is obtained. Through conversion, it is known that the collected voltage is 5.001V. The conversion relationship is shown in <u>Chapter 3, Section 7.4</u>.

0./121 Cignod (12020	IWIJI	Figure 4-2-42	+13023
	IW131	Signed	+13829

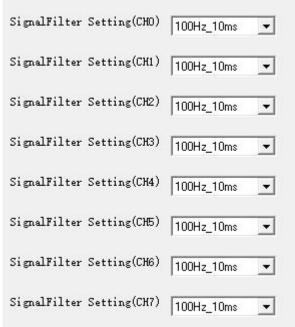
2.4.5. DF50-M-8AI-I-5 Current Input Module

> Please refer to the module wiring diagram<u>Chapter 3 Section 6.2</u>As shown in the figure below, you can set the module current collection range, the default is Disabled. Set CH0 to  $0\sim20$ ma.

SystemDiagnostic(1)	DF50-M-8AI-I-5			
<ul> <li>AdapterDigitalInput(2)</li> <li>DF50-M-8AO-U-4(3)</li> </ul>	DF50-M-8AI	-I-5 Parameter Setting		
DF50-M-8AO-I-5(4) DF50-M-4AO-UI-6(5) DF50-M-8AI-U-4(6)		2	SignalRange Setting(CHO)	Disabled 💌
DF50-M-8AI-U-4(6) DF50-M-8AI-I-5(7) DF50-M-4AI-UI-6(8)		\$	SignalRange Setting(CH1)	Disabled 0~20ma 4~20ma



➤ As shown in the figure below, you can set the signal filter for each channel, the default is 100Hz\_10ms.





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 10.004ma. The conversion relationship is shown in Chapter 3, Section 6.4.



地址	格式	当前值
IW147	有符号	+13830

```
Figure 4-2-45
```

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

> Please refer to the module wiring diagram<u>Chapter 3 Section 5.2</u>As shown in the figure below, you can set the module to collect voltage or current range, the default is Disabled. Set CH0 to  $0\sim10V$  and CH1 to  $0\sim20$ ma.

SystemDiagnostic(1)	DF50-M-4AI-UI-6		
AdapterDigitalInput(2) DF50-M-8AO-U-4(3) DF50-M-8AO-I-5(4)	DF50-H-4AI-VI-6 Parameter		
DF50-M-4AO-UI-6(5)	SignalRange Setting(CHO)	0V~+10V	•
DE50-M-8AI-I-5(7) DE50-M-4AI-UI-6(8) Completion	SignalRange Setting(CH1)	0~20ma	·
sompte don	SignalRange Setting(CH2)	Disabled	-

Figure 4-2-46

As shown in the figure below, you can set the signal filter for each channel, the default is 100Hz\_10ms.

SignalFilter Setting(CHO)	100Hz_10ms 💌
SignalFilter Setting(CH1)	100Hz_10ms 💌
SignalFilter Setting(CH2)	100Hz_10ms 💌
SignalFilter Setting(CH3)	100Hz_10ms 💌



After passing 5V voltage to CH0 and 10ma current to CH1, the values shown in the figure below are obtained. Through conversion, it is known that the voltage collected by CH0 is 5.009V and the current collected by CH1 is 10ma. The conversion relationship is shown in <u>Chapter 3, Section 5.4</u>.

Address	Format	Value
IW163	Signed	+13850
IW165	Signed	+13824

Figure 4-2-48



2.5. Routine use of thermal resistance sensor data acquisition module

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

df50-c-pn-rt	SystemDiagnostic	1_1	Input	128	129
df50-c-pn-rt	SystemDiagnostic	1_1	Output	128	129
df50-c-pn-rt	AdapterDigitalInput	2_1	Input	130	130
df50-c-pn-rt	DF50-M-4RTD-PT	3_1	Input	131	138

Figure 4-2-49

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

Please refer to the module wiring diagram<u>Chapter 3 Section 11.2</u>As shown in the figure below, you can modify the sensor type collected by the module, the default is PT100.

AdapterDigitalToput(2)     DF50-M-4RTD-PT(3)     Completion	DF50- <b>H</b> -4RTD-	PT Parameter Setting			
Completion			RTD Type Setting	PT100 -200850 degree C	•
			SignalFilter Setting	PT100 -200850 degree C PT200 -200850 degree C PT500 -200850 degree C	î
				PT1000 -200850 degree C Ni100 -60250 degree C Ni120 -80260 degree C Ni200 -60250 degree C	~

Figure 4-2-50

 $\succ$  The filter settings of this module can be adjusted as shown in the figure below, the default is

5Hz\_200ms.

SignalFilter Setting	5Hz_200ms
	1.25Hz_800ms 2.5Hz_400ms
	5Hz_200ms
	7.5Hz_133ms

Figure 4-2-51

After connecting the sensor to module CH0, the following data is obtained. "204" means the collected temperature is  $20.4^{\circ}$ C.

Address	Format	Value
IW131	Signed	+204

Figure 4-2-52



2.6. Thermocouple temperature data acquisition module usage routine

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

df50-c-pn-rt	SystemDiagnostic	1_1	Input	128	129
df50-c-pn-rt	SystemDiagnostic	1_1	Output	128	129
df50-c-pn-rt	AdapterDigitalInput	2_1	Input	130	130
df50-c-pn-rt	DF50-M-8TC	3_1	Input	131	146
df50-c-pn-rt	DF50-M-8TC	3_1	Output	130	145

Figure 4-2-53

2.6.1. DF50-M-8TC Thermocouple Measurement Module

Please refer to the module wiring diagram<u>Chapter 3, Section 12.2</u>As shown in the figure below, you can modify the sensor type collected by this module. The default is K-type sensor.

SystemDiagnostic(1)	DF50-M-8TC		
AdapterDigitalInput(2)     DF50-M-8TC(3)     Completion	DF50-M-8TC-KETJ Parameter		
	TC Type Setting	ТС Туре К	-1
	SignalFilter Setting	TC Type K TC Type E TC Type T	^
		TC Type J TC Type B	
		TC Type S TC Type R	~



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

SignalFilter Setting	225ms	+
	LECOMO	1.1.1

Figure 4-2-55

➢ DF50-M-8TC process data definition please refer to<u>Chapter 3, Section 12.4</u>After connecting the sensor to CH0, as shown in the figure below, "1003" means 100.3℃, and no compensation value is given at this time.

Address	Format	Value
IW131	Signed	+1003
QW130	Signed	+0

Figure 4-2-56



➤ When we write 500 into the compensation value of CH0, we can see that the collected value becomes "1508", which means 150.8°C.

Format	Value	New Va
Signed	+1508	
Signed	+500	+500
	Signed	Signed +1508



- 2.7. Encoder data acquisition module usage routine
- The encoder pulse counting module has two types: DF50-M-2CNT-PIL-24 and DF50-M-2CNT-PIL-5. The wiring and usage of the two modules are the same. The difference is that the DF50-M-2CNT-PIL-5 is connected to a 5V encoder signal, and the DF50-M-2CNT-PIL-24 is connected to a 24V encoder signal. This document uses the DF50-M-2CNT-PIL-24 module as an example. For wiring methods, please refer to <u>Chapter 3, Section 13.2</u>.
- 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.
- Add the DF50-M-2CNT-PIL-24 module as shown below.

df50-c-pn-rt	SystemDiagnostic	1_1	Input	128	129
df50-c-pn-rt	SystemDiagnostic	1_1	Output	128	129
df50-c-pn-rt	AdapterDigitalInput	2_1	Input	130	130
df50-c-pn-rt	DF50-M-2CNT-PIL-24	3_1	Input	131	148
df50-c-pn-rt	DF50-M-2CNT-PIL-24	3_1	Output	130	139

Figure 4-2-58

- The output status of the module can be set in the adapter. For setting methods, please refer to <u>Chapter 4</u>, <u>Section 2.2.3</u>.
- 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, Default 4x), DI signal function, filter time signal A, filter time signal B, encoder calculation direction, counter mode setting, comparison function, fieldbus error behavior, count upper limit, count lower limit.



DF50-M-2CNT-PIL-24(3)	CHO Configuration	
Completion	Signal mode	Rotary transducer quadruple
	DI Signal Function	Disabled
	Filter time Signal A	100KHz 💌
	Filter time Signal B	100KHz 💌
	Encoder Count Direction	Position Direaction of Phase A
	Countermode Setting	Line Counter 🗨
	Comparison Function	Disabled 💌
	Behavious on field bus error	Continue counting
	Vpper limit	2147483647
	Lower limit	-2147483648



As shown in the figure below, fill the address of module CH0 into the monitoring table. For the meaning of process data, please refer to <u>Section 2.7.1 of this chapter</u>.

Address	Format	Value
IB131	Binary	2#0000_0000
ID132	Signed	+0
ID136	Signed	+0
	Signed	
QB130	Binary	2#0000_0000
QD131	Signed	+0

Figure 4-2-60

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.

Address	Format	Value	New Value
IB131	Binary	2#0000_0001	
ID132	Signed	+6511	
ID136	Signed	+0	
	Signed		
QB130	Binary	2#0000_0001	2#0000_0001
QD131	Signed	+0	

Figure 4-2-61



# 2.7.1. Module process data description

The ProfiNET bus adapter will allocate corresponding input and output addresses according to the different modules connected to it; the table shows the meaning, data length and data type of the input and output data.

Output Data	Number of bytes	Data Types	
Channel 1 command output data	1	Uint8	
Channel 1 pulse comparison value	4	int32	
output			
Channel 2 command output data	1	Uint8	
Channel 2 pulse comparison value	4	int32	
output			
Input Data	Number of bytes	Data Types	
Channel 1 Status Input Data	1	Uint8	
Channel 1 Status Input Data Channel 1 Pulse Number	1 4	Uint8 int32	
-	1 4 4		
Channel 1 Pulse Number		int32	
Channel 1 Pulse Number Channel 1 Latch pulse number	4	int32 int32	

Table 4.2	4 Madula	data	longth	and type	
Table $4.2$	.4 Module	data	length	and type	

L	Table 4.2.5Output data meaning		
	Output data meaning		
	0 bytes		
bit7~bit1	reserve		
bit0	0: Channel 1 stops counting and the original count is reset to zero; 1:		
	Channel 1 starts counting		
1~4 bytes	Channel 1 pulse comparison value output, signed 32-bit data		
	5 bytes		
bit7~bit1	reserve		
bit0	0: Channel 2 stops counting and the original count is cleared; 1: Channel		
	2 starts counting		
6~9 bytes	Channel 2 pulse comparison value output, signed 32-bit data		
	Table 4.2.6Input data meaning		
	Input data meaning		

	0 bytes
bit7~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
1~4 bytes	Channel 1 pulse input value, signed 32-bit data
5~8 bytes	Channel 1 pulse input latch value, signed 32-bit data
	9 bytes
bit7~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
10~13 bytes	Channel 1 pulse input value, signed 32-bit data
14~17 bytes	Channel 1 pulse input latch value, signed 32-bit data

## 2.7.2. DI Signal Function Configuration

As shown in the figure below, you can configure the DI signal function. The default setting is Disabled. The following functions are available: rising edge capture, falling edge capture, both rising and falling edge capture, rising edge reset, falling edge reset, and both rising and falling edge reset.Rising edge capture (Rising edge capture) and rising edge reset (Rising edge reset)Function.

CHO Configuration _		
	Signal mode	Rotary transducer quadruple
	DI Signal Function	Disabled 💽
	Filter time Signal A	Disabled Rising edge capture Falling edge capture
	Filter time Signal B	Bilateral edge capture Rising edge reset Falling edge reset Bilateral edge reset



> DI rising edge capture: As shown in the figure below, the number of pulses is "3052".



Address	Format	Value
IB131	Binary	2#0000_0001
ID132	Signed	+3052
ID136	Signed	+0
	Signed	
QB130	Binary	2#0000_0001
QD131	Signed	+0

Figure 4-2-63

➤ 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 latch pulses becomes "3052".

Address	Format	Value
IB131	Binary	2#0000_0011
ID132	Signed	+3052
ID136	Signed	+3052
	Signed	
QB130	Binary	2#0000_0001
QD131	Signed	+0

Figure 4-2-64

> DI rising edge reset: As shown in the figure below, the pulse number is "3789".

Address	Format	Value
IB131	Binary	2#0000_0001
ID132	Signed	+3789
ID136	Signed	+0
	Signed	
QB130	Binary	2#0000_0001
QD131	Signed	+0

Figure 4-2-65

➤ 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".

Address	Format	Value
IB131	Binary	2#0000_0011
ID132	Signed	+0
ID136	Signed	+0
	Signed	
QB130	Binary	2#0000_0001
QD131	Signed	+0

Figure 4-2-66



- 2.7.3. Compare function configurations (Comparison Function)
- > Turn on the comparison function as shown in the figure below.

сно (	Configuration	2	
		Signal mode	Rotary transducer quadruple
		DI Signal Function	Disabled
		Filter time Signal A	100KHz 💌
		Filter time Signal B	100KHz 💌
		Encoder Count Direction	Position Direaction of Phase A
		Countermode Setting	Line Counter 💌
		Comparison Function	Enable 🔻
	Behav	vious on field bus error	Disabled Enable Continue counting

As shown in the figure below, the pulse comparison value is set to 10000. When the pulse number is "5142", the third bit of the status input data is "0".

Address	Format	Value
IB131	Binary	2#0000_0001
ID132	Signed	+5142
ID136	Signed	+0
	Signed	
QB130	Binary	2#0000_0001
QD131	Signed	+10000

Figure 4-2-68

➤ As shown in the figure below, when the pulse number is "10940", it exceeds the set value 10000, and the third bit of the status input data becomes "1".

Address	Format	Value
IB131	Binary	2#0000_0101
ID132	Signed	+10940
ID136	Signed	+0
	Signed	
QB130	Binary	2#0000_0001
QD131	Signed	+10000

Figure 4-2-69

Figure 4-2-67

2.7.4. 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 <u>Chapter 3</u>, <u>Section 13.2.3</u> When this mode is used, the A+ and A- ports input high and low levels to indicate the direction, and the B+ and B- ports input valid levels to accumulate count values.

CHO Configuration			
	Signal mode	Pulse and Directions	•
	DI Signal Function	Rotary transducer single Rotary transducer double Rotary transducer quadruple Pulse and Directions	
	Filter time Signal A	CW/CCW	



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

Address	Format	Value
IB131	Binary	2#0000_0001
ID132	Signed	+0
ID136	Signed	+0
	Signed	
QB130	Binary	2#0000_000*
QD131	Signed	+0

Figure 4-2-71

> 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".

Address	Format	Value
IB131	Binary	2#0001_0001
ID132	Signed	-1147
ID136	Signed	+0
	Signed	
QB130	Binary	2#0000_0001
QD131	Signed	+0

Figure 4-2-72

➤ 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".



# DF50 series I/O

Address	Format	Value
IB131	Binary	2#0000_1001
ID132	Signed	+826
ID136	Signed	+0
	Signed	
QB130	Binary	2#0000_0001
QD131	Signed	+0

Figure 4-2-73



## 2.8. Serial port module usage routine

➤ This example uses the DF50-C-PN-RT + DF50-1COM-232-485-422 topology.

DF50-1COM-232-485-422 supports three modes: free transparent transmission, slave mode, and Modbus RTU master mode. The mode switching is achieved by adding different sub-slots and setting in the Modbus interface Module sub-module.<u>Section 15.2</u>The wiring diagram is connected to the card, simulating the communication device and the DF50-1COM-232-485-422 module communication. After adding the module, it is shown as follows.

df50-c-pn-rt	SystemDiagnostic	1_1	Input	128	129
df50-c-pn-rt	SystemDiagnostic	1_1	Output	128	129
df50-c-pn-rt	AdapterDigitalInput	2_1	Input	130	130
df50-c-pn-rt	DF50-M-1C0M-232/	3_1			



> The parameters of Modbus interface Module are shown in the figure below. The default mode is Free Protocol.

<ul> <li>SystemDiagnostic(1)</li> <li>AdapterDigitalInput(2)</li> </ul>	Modbus Interface Module		
DF50-M-1COM-232/485/422(3 Completion	Todule Config Parameters	OperationMode	Free Protocol
		Interface	RS485
		Parity	None 💌
		DataBits	8bits 💌
		StopBit	1Bit 💌
		Baudrate(bps)	115200bps 💌
		IntervalTime(ms)	0
		ModbusSlaveAddr	1



➤ As shown in the figure below, the number starting with F indicates free transparent transmission mode, the number starting with M indicates Modbus RTU master mode, and the number starting with S indicates Modbus RTU slave mode.



DF.	50-l	M-1COM-232/485/422 Submodule
Đ	F:	Control&Status Modules
Đ	F:	IO Data Modules
Đ	M:	Diagnostic Modules
Đ	M:	Read Coils (0xxxx)
Đ	M:	Read Discrete Inputs (1xxxx)
Đ	M:	Read Input Registers (3xxxx)
Đ	M:	Read Holding Registers (4xxxx)
Đ	M:	Write Coils (0xxxx)
Đ	M:	Write Holding Registers (4xxxx)
Đ	S:	Read Coils (0xxxx)
Đ	S:	Read Holding Registers (4xxxx)
Đ	s:	Write Coils (0xxxx)
Đ	s:	Write Discrete Inputs (1xxxx)
Đ	s:	Write Input Registers (3xxxx)
Đ	S:	Write Holding Registers (4xxxx)
÷	S:	Diagnostic Modules
	_	

Figure 4-2-76

- 2.8.1. Modbus RTU Master Mode Usage Example
- Set the module mode to Modbus RTU Master mode, as shown below.

OperationMode	Modbus RTU Master 📃 💌
Interface	Free Protocol Modbus RTU Master Modbus RTU Slave
Parity	None 💌
DataBits	8bits 💌
StopBit	1Bit 💌
Baudrate(bps)	115200bps 💌
IntervalTime(ms)	0
ModbusSlaveAddr	1



Add the diagnostic module M: Error Code Input (28 CH) to the second subslot, which contains the diagnostic information of the subsequent 28 subslots at most, and each subslot occupies 2 bytes of diagnostic information. See Table 4.2.7 for its meaning.



# DF50 series I/O

	In End odd inpate only	0 2(0110)	101	HIM: Read Discrete Inputs (IXXX)
	M: Error Code Input(28 CH)	3 2(CMD)	131	H: Read Discrete Inputs (1xxxx)
DF50-M-1COM-232/485/422		3		
AdapterDigitalInput		2	130	M: Error Code Input(28 CH) M: Status Input (28 CH)
SystemDiagnostic		1	128	
	Port 1 - RJ45	0 32770		M: Diagnostic Modules
	Port 0 - RJ45	0 32769		
	PN-IO	0 32768		
DISCONTRACT		0		DF50-M-1COM-232/485/422 Submodu

## Figure 4-2-78

	Table 4.2.7	
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

From the 6 function codes starting with M, select the required one and add it to the third sub-slot. If you need to read and write more data, you can add different sub-slot types continuously, up to 28 sub-slots, plus the first interface sub-slot and diagnostic sub-slot, a total of 30 sub-slots. As shown in Figures 4-2-76 and 4-2-77, add M: Read 03 Words 4xxxx and M: Write 03 Words 4xxxx.

	Port 1 - RJ45	0 32770		- M: Read 15 Words 4xxxx
SystemDiagnostic		1	128	M: Read 16 Words 4xxxx
AdapterDigitalInput		2	130	M: Read 01 Words 4xxxx
DF50-M-1COM-232/485/422		3		M: Read 02 Words 4xxxx M: Read 03 Words 4xxxx
	M: Error Code Input(28 CH)	3 2(CMD)	131	M: Read 04 Words 4xxxx
	M: Read 03 Words 4xxxx 🗧	3 3(CMD)	187	
		3 4(CMD)		M: Read 06 Words 4xxxx





# DF50 series I/O

SystemDiagnostic		1	128	M: Write 14 Words 4xxxx
AdapterDigitalInput		2	130	M: Write 15 Words 4xxxx M: Write 16 Words 4xxxx
DF50-M-1C0M-232/485/422		3		M: Write 10 Words 4xxxx
	M: Error Code Input(28 CH)	3 2(CMD)	131	
	M: Read 03 Words 4xxxx	3 3(CMD)	187	M: Write 03 Words 4xxxx
	M: Write 03 Words 4xxxx 🛛 🗲	3 4(CMD)		M: Write 04 Words 4xxxx
		3.5(CMD)		M: Write 05 Words 4xxxx

Figure 4-2-80

➢ As shown in the figure below, click M: Read 03 Words 4xxxx submodule to configure slave device

information. See Table 4.2.8 for its meaning.

SystemDiagnostic(1)	Modbus Interface Module M: Error C	code Input(28 CH) M: Read 03 W	ords 4xxxx M: Write 03 Words 4xxxx
AdapterDigitalInput(2) DF50-M-1COM-232/485/422(3)	Module Config Parameter	rs	
ompletion		Slave ID	1
		Fuction Code	03 Read Holding Registers (4x)
		Start Address	0
		Data Length	3
		Poll Time(ms)	500
		Event Trigger	Poll Mode
		Response Timeout(ms)	1000
		Poll Delay(ms)	0
		Lost Action	Hold Data 💌

Figure 4-2-81

	Table 4.2.8
SlaveID	Slave node address
Function Code	Function code
Start Address	Register start address
Data Length	Number of registers or coils
Poll Time	The period of polling this slave
Event Trigger	Poll: Polling mode
Trigger mode selection	Trigger: Trigger mode
Response TimeOut	Slave station response timeout
Poll Delay	Polling interval between slaves
Lost Action	Hold: Keep the last value
Slave loss handling	Clear: Clear



Input data processing when module	Input value cleared
fails	Keep the last value

As shown in the figure below, change the register starting address of M: Write 03 Words 4xxxx to 4000.

Slave ID	1
Fuction Code	16 Write Multiple Registers (4x)
Start Address	4000

Figure 4-2-82

> The final address overview is as follows:

df50-c-pn-rt	SystemDiagnostic	1_1	Input	128	129
df50-c-pn-rt	SystemDiagnostic	1_1	Output	128	129
df50-c-pn-rt	AdapterDigitalInput	2_1	Input	130	130
df50-c-pn-rt	DF50-M-1C0M-232/	3_1			
df50-c-pn-rt	M: Error Code Input(2	3_2	Input	131	186
df50-c-pn-rt	M: Read 03 Words 4	3_3	Input	187	192
df50-c-pn-rt	M: Write 03 Words 4	3_4	Output	130	135

Figure 4-2-83

> The meanings of the two sub-slots added now are as follows:

➤ M: Read 03 Words 4xxxx contains 3 word data. According to the configuration information, the data represents the register value of the slave with node address 1 and address 0-2.

➢ M: Write 03 Words 4xxxx contains 3 words of data. According to the configuration information, the data will be written to the slave with node address 1 and registers with addresses 4000-4002.

> Download the configuration to the device. Fill in the information we need into the monitoring table for monitoring as shown below.

Address	Format	Value
IW187	Hexadecimal	16#0000
IW189	Hexadecimal	16#0000
IW191	Hexadecimal	16#0000
-	Signed	
QW130	Hexadecimal	16#0000
QW132	Hexadecimal	16#0000
QW134	Hexadecimal	16#0000

Figure 4-2-84



> Use Modbus Slave software to create two slave stations to communicate with the module, as shown in

the figure below, with the starting addresses being 0 and 4000 respectively.

📴 Mbslave1		💬 Mbslave2	
ID = 1: F = 03		ID = 1: F = 03	
Alias	00000	Alias	04000
0	0x0000	0	0x0000
1	0x0000	1	0x0000
2	0x0000	2	0x0000

Figure 4-2-85

 $\blacktriangleright$  After changing the data format to HEX and writing "11, 22, 33" into registers 0-2 in the first slave, the monitoring table is displayed as shown in the figure below.

Address	Format	Value	Mbslave1	
IW187	Hexadecimal	16#0011	ID = 1: F = 03	
IW189	Hexadecimal	16#0022		
IW191	Hexadecimal	16#0033	Alias	00000
		1000 M	0	0x0011
QW130	Hexadecimal	16#0000		
QW132	Hexadecimal	16#0000	1	0x0022
QW134	Hexadecimal	16#0000	2	0x003
	Signed			

Figure 4-2-86

➢ After writing "44, 55, 66" to subslot 4 in the monitoring table, the second slave is displayed as shown below.

Address	Format	Value	💬 Mbslave2	
		and the second second	ID = 1: F = 03	
IW187	Hexadecimal	16#0011		
IW189	Hexadecimal	16#0022		
IW191	Hexadecimal	16#0033	Alias	04000
	Signed		0	0x0044
QW130	Hexadecimal	16#0044		
QW132	Hexadecimal	16#0055	1	0x0055
QW134	Hexadecimal	16#0066	2	0x0066

Figure 4-2-87



- 2.8.2. FreeRUN free transparent transmission mode usage example
- > In the Modbus Interface Module, set the mode to Free Protocol mode, as shown in the figure below.

SystemDiagnostic(1)	Modbus Interface Module		
DF50-M-1COM-232/485/	] Iodule Config Parameters		
Completion		OperationMode	Free Protocol
		Interface	RS485 -



## Add the F: Control status Module module to the second subslot. See Table 4.2.9 for its data structure.

DEDU-C-EIN-EI		U		DF50-M-1COM-232/485/422 Submodule
	PN-10	0 32768		F: Centrel & table Modules
	Port 0 - RJ45	0 32769		F: Control Status Module
	Port 1 - RJ45	0 32770		+ F: IO Data Modules
SystemDiagnostic		1	128	
AdapterDigitalInput		2	130	⊕ M: Read Coils (0xxxx)
DF50-M-1COM-232/485/422		3		
	F: Control Status Module 🥓	3 2(CMD)	131	• M: Read Holding Registers (4xxxx)

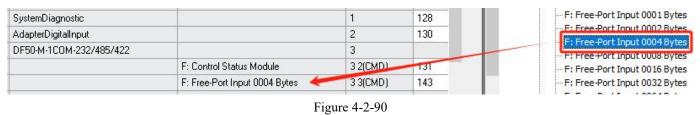
Figure 4-2-89

Table 4.2.9						
Output Data						
Byte offset	name	length	meaning			
Byte:0-1	CtrlWord	2byte	Control Word			
Byte:2	TxDataLEN	1byte	Send data length			
Byte:3	TxDataCNT	1byte	Send data sequence			
			number			
	Input Data					
Byte Sequence	name	length	meaning			
Number						
Byte:0-1	StateWord	2byte	Status word			
Byte:2	RxDataLEN	1byte	Receive data length			
Byte:3	RxDataCNT	1byte	Receive data sequence			
			number			
Byte:4-11	/	8byte	reserve			



From F: IO Data Modules, select the ones you need and add them to the third sub-slot. As shown in

Figures 4-2-87 and 4-2-88, add F: Free-Port Input 0004 Bytes and F: Free-Port Output 0004 Bytes.





SystemDiagnostic		1	128	- F: Free-Port Input 0064 Bytes
AdapterDigitalInput		2	130	F: Free-Port Input 0128 Bytes
DF50-M-1COM-232/485/422		3		F: Free-Port Output 0001 Bytes     F: Free-Port Output 0002 Bytes
	F: Control Status Module	3 2(CMD)	131	F: Free-Port Output 0004 Bytes
	F: Free-Port Input 0004 Bytes	3 3(CMD)	143	F: Free-Port Output 0008 Bytes
	F: Free-Port Output 0004 Bytes 🛹	34(CMD)		- F: Free-Port Output 0016 Bytes
		2.5(CMD)		F: Free-Port Output 0032 Bytes



- > The meanings of the two sub-slots added now are as follows:
- ➤ F: Free-Port Input 0004 Bytes contains 4 bytes of input data.
- > F: Free-Port Output 0004 Bytes contains 4 bytes of output data.
- > Download the configuration to the device and fill in the required data into the monitoring table as shown below.

Address	Format
IW131	Unsigned
IB133	Unsigned
IB134	Unsigned
QW130	Unsigned
QB132	Unsigned
QB133	Unsigned
	Signed
W143	Hexadecimal
IW145	Hexadecimal
	Signed
QW134	Hexadecimal
QW136	Hexadecimal

#### Figure 4-2-92

Receive data test: The module will automatically enter the receive mode after being configured in free-running mode, or write16#00C2 actively switches to receiving mode. After connecting using the serial port assistant, send "11, 22, 33, 44" in HEX mode. As shown in the following figure, the data sent by the serial port assistant can be received in the receiving data of the monitoring table.



Address	Format	Value	
IW131	Hexadecimal	16#0003	
IB133	Unsigned	4	
IB134	Unsigned	2	
QW130	Unsigned	0	
QB132	Unsigned	0	
QB133	Unsigned	0	1
	Signed	2	11 22 33 44
IW143	Hexadecimal	16#1122	
IW145	Hexadecimal	16#3344	
	Signed		
QW134	Hexadecimal	16#0000	
QW136	Hexadecimal	16#0000	



### > The meaning of the status word is shown in the following table.

	Table 4.2.10	
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

### > The control word commands are shown in the following table.

	Table 4.2.11	
Command Value	Command Name	meaning
16#00C1	WRITECUSTOM	Free mode write data command
16#00C2	READCUSTOM	Free mode read data command

Send data test: set the control word to 16#00C1, set the send data length to 4 bytes, set the send
 sequence number to 1, assign values
 to Byte1-4 of the send data respectively, and then perform the



write action together. The received 4Byte data can be read using the serial port assistant, as shown in the

figure below: (To send again, just loop and accumulate the send sequence number)

Address	Format	Value	*
IW131	Hexadecimal	16#0000	
IB133	Unsigned	4	1
IB134	Unsigned	2	11 11 22 22
QW130	Hexadecimal	16#00C1	
QB132	Unsigned	4	
QB133	Unsigned	1	
	Signed		
IW143	Hexadecimal	16#1122	
IW145	Hexadecimal	16#3344	
	Signed		
QW134	Hexadecimal	16#1111	
QW136	Hexadecimal	16#2222	

Figure 4-2-94First send

Address	Format	Value
IW131	Hexadecimal	16#0000
IB133	Unsigned	4
IB134	Unsigned	2
QW130	Hexadecimal	16#00C1
QB132	Unsigned	4
QB133	Unsigned	2
	Signed	
IW143	Hexadecimal	16#1122
IW145	Hexadecimal	16#3344
	Signed	
QW134	Hexadecimal	16#3333
QW136	Hexadecimal	16#4444

Figure 4-2-95Second send

If you need to receive data, you need to set the control word to 16#00C2 after sending the data before you can receive the data.



2.8.3. Modbus RTU Slave mode usage routine

➢ In the Modbus Interface Module, set the mode to Modbus RTU slave mode. The default value of SlaveAddr is "1" and can be modified as shown in the figure below.

SystemDiagnostic(1)	Modbus Interface Module		
AdapterDigitalInput(2)     DF50-M-1COM-232/485/ Completion	Todule Config Parameters _		
		OperationMode	Modbus RTU Slave
		Interface	RS485
		Parity	None 💌
		DataBits	8bits 💌
		StopBit	1Bit 💌
		Baudrate(bps)	115200bps 💌
		IntervalTime(ms)	0
		ModbusSlaveAddr	1

Figure 4-2-96

Add the S: Modbus Status Input (1 Word) module to the second subslot. See Table 4.2.12 for its data structure.

SystemDiagnostic		1	128	M: Read Discrete Inputs (1xxxx)
AdapterDigitalInput		2	130	M: Read Input Registers (3xxxx)
DF50-M-1COM-232/485/422		3		• M: Write Coils (0xxxx)
	S: Modbus Status Input(1 Word) 🥣	3 2(CMD)	131	⊕ M: Write Holding Registers (4xxxx)
		2.3(CMD)		
		3 4(CMD)		: S: Read Holding Registers (4xxxx)
		3 5(CMD)		
		3 6(CMD)		S: Write Discrete Inputs (1xxxx)     S: Write Input Registers (3xxxx)
		37(CMD)		· S: Write Holding Registers (4xxxx)
		3 8(CMD)		E- S: Diagnostic Modules
		3 9(CMD)		S: Modbus Status Input(1 Word)



	Table 4.2.12	
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

From the 6 types starting with S, select the one you need and add it to the third subslot. If you need to  $\triangleright$ read and write more data, you can add different subslot types continuously, up to 28 subslots, plus the first interface subslot and diagnostic subslot, a total of 30 subslots. Enter the submodule configuration page to configure the protocol information, and set the register first address for both reading and writing. Add S: Read 0002 Words 4xxxx and S: Write 0002 Words 4xxxx as shown in Figures 4-2-95 and 4-2-96.

SystemDiagnostic		1	128	M: Write Coils (0xxxx)
AdapterDigitalInput		2	130	⊞·M: Write Holding Registers (4xxxx
DF50-M-1COM-232/485/422		3		⊡ S: Read Coils (0xxxx) ⊡ S: Read Holding Registers (4xxxx)
	S: Modbus Status Input(1 Word)	3 2(CMD)	131	S: Read 0001 Words 4xxxx
	S: Read 0002 Words 4xxxx 🛛 🗲	O O(CMD)	133	S: Read 0002 Words 4xxxx
	2	2.4(CMD)	200	S: Read 0004 Words 4xxxx



SystemDiagnostic		1	128	E S: Read Coils (0xxxx)
AdapterDigitalInput		2	130	
DF50-M-1C0M-232/485/422		3		
	S: Modbus Status Input(1 Word)	3 2(CMD)	131	
	S: Read 0002 Words 4xxxx	3 3(CMD)	133	S: Write Holding Registers (4xxx)
	S: Write 0002 Words 4xxxx 🔶	2 4(CMD)		S: Write 0001 Words 4xxxx
		3 5(CMD)		-S: Write 0002 Words 4xxxx

Figure 4-2-99

 $\geq$ As shown in the figure below, click S: Write 0002 Words 4xxxx to enter the property interface and change the starting address to 100.

SystemDiagnostic(1)     AdapterDigitalInput(2)	Modbus Interface Module S: Modbus Status Input(1 Word) S: Read 0002 Words 4xxxx S: Write 0002 Words 4xxxx
	Todule Config Parameters
	Start Address 100



The meanings of the two sub-slots added now are as follows:  $\geq$ 



S: Read 0002 Words 4xxxx contains 2 word data. According to the configuration information, the data represents the register value at address 0-1.

S: Write 0002 Words 4xxxx contains 2 words of data. According to the configuration information, the data will be written to the register at address 100-101.

> Download the configuration to the device. Fill in the information we need into the monitoring table for monitoring as shown below.

Address	Format
IW133	Hexadecimal
IW135	Hexadecimal
	Signed
QW130	Hexadecimal
QW132	Hexadecimal



➤ Use Modbus Poll software to create two new master stations to communicate with the module, as shown in the figure below, with the starting addresses being 0 and 100 respectively.

Los more and		💬 Mbpoll2 Tx = 78: Err = 0: ID =	1: F = 03: SR =
Alias	00000	Alias	00100
0	0x0000	0	0x0000
1	0x0000	1	0x0000



➤ After changing the data format to HEX and writing "11, 22" into the 0th-1st register in the first master station, the monitoring table is displayed as shown in the figure below.

Address	Format	Value	IX - 137. LII - 0. ID -	1.1 - 10.01
IW133	Hexadecimal	16#0011		
IW135	Hexadecimal	16#0022	Alias	00000
	Signed		0	0x0011
QW130	Hexadecimal	16#0000		000 0.000 0.000
QW132	Hexadecimal	16#0000	1	0x002



➢ After writing "33, 44" to subslot 4 in the monitoring table, the second master station is displayed as shown below.



Address	Format	Value	New Valu	📅 Mbpoll2	
IW133	Hexadecimal	16#0011		Tx = 200: Err = 0: ID = 1	: F = 03: SR =
IW135	Hexadecimal	16#0022		allena merekaniska kakronaka ra	
	Signed				00400
QW130	Hexadecimal	16#0033	16#0033	Alias	00100
QW132	Hexadecimal	16#0044	16#0044	0	0x0033
	Signed			1	0x0044
	or 1			1000	CIPATION CONTRACTOR

Figure 4-2-104



# 2.9. IO-LINK module usage routine

> This example uses the DF50-C-PN-RT + DF50-M-4IOL topology. For wiring methods, please refer

to<u>Chapter 3, Section 18.2</u>, After adding the module, it will look like the following figure.

df50-c-pn-rt	SystemDiagnostic	1_1	Input	128	129
df50-c-pn-rt	SystemDiagnostic	1_1	Output	128	129
df50-c-pn-rt	AdapterDigitalInput	2_1	Input	130	130
df50-c-pn-rt	DF50-M-4IOL	3_1	Input	131	142
df50-c-pn-rt	DF50-M-4IOL	3_1	Output	130	133
df50-c-pn-rt	IOL_1/0_02/02_byte	3_2	Input	143	145
df50-c-pn-rt	IOL_1/0_02/02_byte	3_2	Output	134	136
df50-c-pn-rt	IOL_I_00_byte	3_3	Input	146	146
df50-c-pn-rt	IOL_O_00_byte	3_4	Output	137	137

Figure 4-2-105

> The submodules that can be added to PORT0~PORT3 are as follows.

- Submodule	
E-DF50-M-4IOL SUBMODULE	
IOL_I/O_01/01_byte	
IOL_I/O_02/02_byte	IOL_I_12_byte
IOL_I/O_04/02_byte	IOL_I_16_byte
IOL_I/O_04/04_byte	IOL_I_24_byte
IOL I/O 06/06 byte	IOL_I_32_byte
IOL I/O 08/08 byte	IOL_O_00_byte
IOL_I/O_16/16_byte	IOL_O_01_byte
IOL_I/O_24/24_byte	IOL_O_02_byte
IOL I/O 32/32 byte	-IOL_O_04_byte
IOL I 00 byte	-IOL_O_06_byte
IOL I 01 byte	-IOL_O_08_byte
IOL I 02 byte	-IOL_O_12_byte
IOL_I_04 byte	IOL_O_16_byte
IOL I 06 byte	IOL_O_24_byte
IOL_I_08_byte	IOL_O_32_byte

Figure 4-2-106

		Table 4.	2.13		
IOL_I/O_01/01_byte	Input 1 byte	IOL_I_00_byte	Enter 0 bytes for	IOL_O_00_byte	Output 0 bytes,
	Output 1 byte		DI mode		used in DO mode
IOL_I/O_02/02_byte	Input 2 bytes	IOL_I_01_byte	Input 1 byte	IOL_O_01_byte	Output 1 byte
	Output 2 bytes				
IOL_I/O_04/02_byte	Input 4 bytes	IOL_I_02_byte	Input 2 bytes	IOL_O_02_byte	Output 2 bytes
	Output 2 bytes				
IOL_I/O_04/04_byte	Input 4 bytes	IOL_I_04_byte	Input 4 bytes	IOL_O_04_byte	Output 4 bytes
	Output 4 bytes				
IOL I/O 06/06 byte	Input 6 bytes	IOL I 06 byte	Input 6 bytes	IOL O 06 byte	Output 6 bytes
	Output 6 bytes				
IOL I/O 08/08 byte	Input 8 bytes	IOL I 08 byte	Input 8 bytes	IOL O 08 byte	Output 8 bytes
	Output 8 bytes				
IOL_I/O_16/16_byte	Input 16 bytes	IOL_I_12_byte	Input 12 bytes	IOL_O_12_byte	Output 12 bytes
	Output 16 bytes				
IOL I/O 24/24 byte	Input 24 bytes	IOL I 16 byte	Input 16 bytes	IOL O 16 byte	Output 16 bytes
	Output 24 bytes				
IOL_I/O_32/32_byte	Input 32 bytes	IOL_I_twenty	Input 24 bytes	IOL_O_twenty	Output 24 bytes
	Output 32 bytes	four_byte		four_byte	_
		IOL_I_32_byte	Input 32 bytes	IOL_O_32_byte	Output 32 bytes



## 2.9.1. IO-LINK State information

➤ After adding the DF50-M-4IOL module, there is a default slot "IO-LINK State" to display the status information of each port of the module. Fill in the IO-LINK State address into the monitoring table as shown below. For the specific meaning of State, please refer to <u>Chapter 3</u>, <u>Section 18.4.2</u>.

	Address	Format	Value
1	IW131	Hexadecimal	16#0000
2	1133.5	Bit	2#1
3	1133.6	Bit	2#0
4		Signed	
5	IW134	Hexadecimal	16#1800
6	1136.5	Bit	2#0
7	1136.6	Bit	2#1
8		Signed	
9	IW137	Hexadecimal	16#1800
10	1139.5	Bit	2#0
11	1139.6	Bit	2#1
12		Signed	
13	IW140	Hexadecimal	16#0000
14	1142.5	Bit	2#0
15	1142.6	Bit	2#0
16		Signed	
17	QB130	Hexadecimal	16#00
18	QB131	Hexadecimal	16#00
19	QB132	Hexadecimal	16#00
20	QB133	Hexadecimal	16#00

### Figure 4-2-107

PORT0 is connected to an IO-link slave, the event code is displayed as "16#0", the working status is "TRUE" indicating that it is in normal working state, and the communication status is "FALSE" indicating that it is in slave connection state.

> PORT1 and PORT2 are not connected to the device, and the event code is displayed as "16#1800".

According to the port event code, the IO-LINK slave is offline. The working status is "FALSE", indicating that it is in an incorrect working state, and the communication status is "TRUE", indicating that the slave is disconnected.

- > PORT3 is the monitoring information when it is not configured.
- > As shown in the figure below, writing "0x01" in Port1 Command can clear the event code of Port1.



2	Address	Format	Value
1	IW131	Hexadecimal	16#0000
2	1133.5	Bit	2#1
3	1133.6	Bit	2#0
4		Signed	
5	IW134	Hexadecimal	16#0000
6	1136.5	Bit	2#0
7	1136.6	Bit	2#1
8		Signed	
9	IW137	Hexadecimal	16#1800
10	1139.5	Bit	2#0
11	1139.6	Bit	2#1
12		Signed	
13	IW140	Hexadecimal	16#0000
14	1142.5	Bit	2#0
15	1142.6	Bit	2#0
16		Signed	
17	QB130	Hexadecimal	16#00
18	QB131	Hexadecimal	16#01
19	QB132	Hexadecimal	16#00
20	QB133	Hexadecimal	16#00

Figure 4-2-108

## 2.9.2. IO-LINK Mode

➤ As shown in the figure below, configure PORT0 to IO-link mode. The default mode is IO-link mode. For other configurable information, please refer to<u>Chapter 3</u>, <u>Section 18.3</u>ISDU is configured according to the instructions of the IO-Link slave you are using. The IO-Link slave used in this tutorial does not have a configurable ISDU. Note that you must re-download the configuration after the configuration is complete.

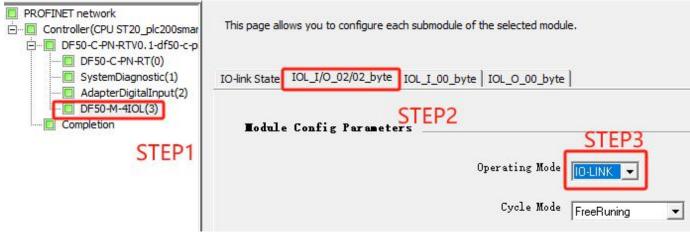


Figure 4-2-109



Fill in the Port0 address in the monitoring table. For its meaning, please refer to <u>Chapter 3, Section</u>

<u>18.4.2</u>.

	Address	Format
23	1143.0	Bit
24	1143.1	Bit
25	1143.2	Bit
26	IB144	Hexadecima
27	IB145	Hexadecima
28		Signed
29	Q134.1	Bit
30	Q134.2	Bit
31	QB135	Hexadecima
32	QB136	Hexadecimal

Figure 4-2-110

Data reception: As shown in the figure below, if the Valid bit is "TRUE", it means the received data is valid, and the Process data is the received data. The data received this time is "16#08". In this mode, the DI and C/Q DI bits are invalid.

Address	Format	Value
1143.0	Bit	2#0
1143.1	Bit	2#0
1143.2	Bit	2#1
IB144	Hexadecimal	16#08
IB145	Hexadecimal	16#00
	Signed	
Q134.1	Bit	2#0
Q134.2	Bit	2#0
QB135	Hexadecimal	16#00
QB136	Hexadecimal	16#00

Figure 4-2-111

> Data sending: Setting the Valid bit to "TRUE" or "FALSE" indicates whether the sent data is valid.

The Process data is the sent data, and this time "16#0F" is sent. In this mode, the C/Q DO bit is invalid.

Address	Format	Value
1143.0	Bit	2#0
1143.1	Bit	2#0
1143.2	Bit	2#1
IB144	Hexadecimal	16#08
IB145	Hexadecimal	16#00
(	Signed	
Q134.1	Bit	2#0
Q134.2	Bit	2#0
QB135	Hexadecimal	16#0F
QB136	Hexadecimal	16#00

Figure 4-2-112



# 2.9.3. DI/DO mode

> As shown in the figure below, configure Port1 to DI mode and Port2 to DO mode. The default mode is

IO-link. Note that you need to re-download the configuration after the configuration is completed.

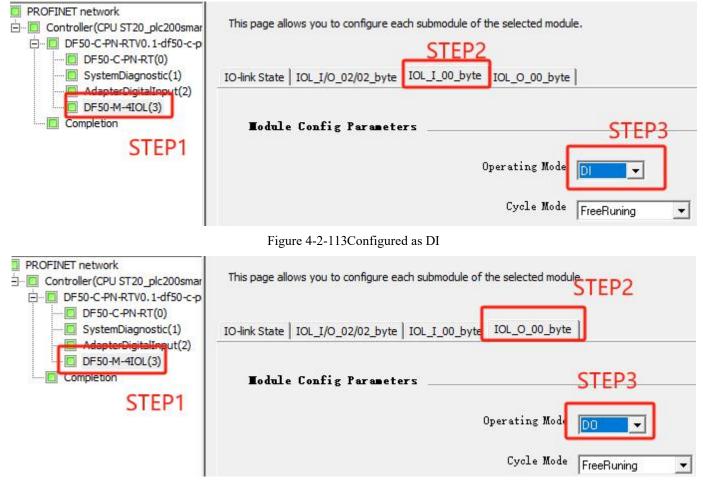


Figure 4-2-114Configured as DO

Fill in the Port1 and Port2 addresses in the monitoring table. For their meanings, please refer

to<u>Chapter 3, Section 18.4.2</u>For wiring method, please refer to<u>Chapter 3, Section 18.2.2</u>.

1146.0	Bit
1146.1	Bit
	Signed
Q137.1	Bit



➤ Input valid signals to Port1 DI and Port1 C/Q DI. As shown in the figure below, you can see that the corresponding address becomes "TURE".

1146.0	Bit	2#1
1146.1	Bit	2#1
	Signed	
Q137.1	Bit	2#0

Figure 4-2-116



As shown in the figure below, write "TRUE" to Port2 C/Q DO, and use a multimeter to measure the voltage of C/Q2 port, and you can measure the voltage to be 24V.

1146.0	Bit	2#0
1146.1	Bit	2#0
	Signed	
Q137.1	Bit	2#1

Figure	4-2-117
1 15 41 6	1 2 11/



- 3. SIMATIC Manager software configuration process
- This chapter specifically introduces the use of the adapter DF50-C-PN-RT using Siemens' SIMATIC Manager as the configuration software.
- The PLC model used in this section is 6ES7 315-2EH14-0AB0.

# 3.1. Project Creation

- 3.1.1. New Construction
- > The software interface is shown below. Click Next.

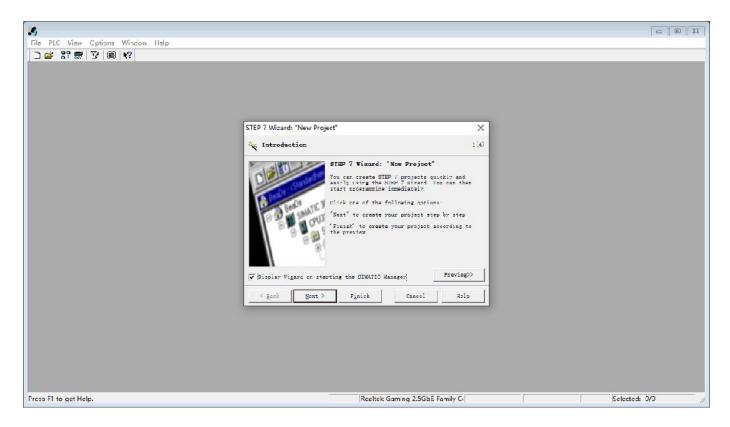


Figure 4-3-1



Select the CPU model you are using and click Finish.

STEP 7 Wizard: "Nev	v Project"			×
which CPU are	you using	in your	project?	2 (4)
СР <u>Ш</u> :		14 C-2 DP 14 C-2 PtP	Order No 6ES7 314-6CG03-0 6ES7 314-6BG03-0 6ES7 315-1AF03-0	DAB0
	CPU3 CPU3	15-2 DP 15-2 PN/DP 16-2 DP	6ES7 315-2AH14-( 6ES7 315-2EH14-( 6ES7 316-2AG00-( 6ES7 317-2AJ10-(	DABO DABO DABO
<u>C</u> PU name:	CPU31	5-2 PN/DP(1	)	
MPI <u>a</u> ddress:	2	- instruc	work memory; 0.0 ctions; PROFINET munication (loada	connection;
S7_Pro10	r	Block Name		
	PN/DP(1) gram(1)	0B1	Cycle Executi	
K Back	ext >	F <u>i</u> nish	Cancel	Help

Figure 4-3-2

> The creation completion interface is shown in the figure below.

SIMATIC Manager - S7_Pro10	
File Edit Insert PLC View Options Window Help	
🗅 😂 🔐 🚿 🕹 🛍 😰 🐾 🖭 🔂 🏦 🔁 😳 🖓 🗰 💼 🔁	
ST_Pro10 C:\Program Files (x86)\Siemens\Step7\s7proj\S7_Pro10  ST_Fro10  GTU315-2 PX/DP(1)  ST Program(1)  Blooks  Dlooks	

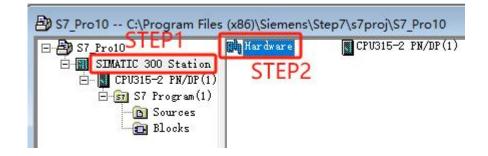






# 3.1.2. Add GSD file

> Double-click Hardware, as shown in the following figure.



- Figure 4-3-4
- Click Install GSD file, as shown below.

🙀 HW Config - [SIMATIC 300 Station (Co	nfiguration) S7_Pro10]
Station Edit Insert PLC View C	Pptions Window Help
D 🗲 🔐 🖩 🖏   🚭   🛍 💼   🔬	Customize Ctrl+Alt+E
(0) VR	Specify Module Configure Network
1 2 CPV315-2 PH/DP(1) X1 MPI/DP	Symbol Table Ctrl+Alt+T Report System Error
X2         FN-10           X2         P1         Port 1           X2         P2         Port 2	Edit Catalog Profile Update Catalog
3	Install HW Updates
	Install GSD File
	Find in Service & Support
	Create GSD file for I-Device

Figure 4-3-5

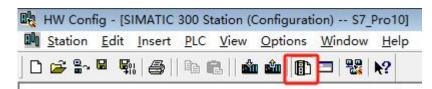


> As shown in the figure below, find the GSD file directory in the computer and add it.

tall GSD Files			
stall GSD Files:	from the directory	•	STEP1
: DF50\GSI	DML-V2.42-DF50-C-PN-RT-2023112	2	<u>B</u> rowse
File	Release	Version	and the second se
GSDML-V2.42-DF50-C-PN-RT-	20231122.xml 11/22/2023 12:0	0:00 AM V2.42	English, Chinese
	STEP2		
STEP3			
STEP3			
	· Log   Select <u>A</u> ll	Deselect All	
	Log Select <u>A</u> ll	Deselect All	
	· Log Select <u>A</u> ll	Deselect All	
	· LogSelect <u>A</u> ll	Deselect All	Help

Figure 4-3-6

Click the Catalog button to open the device catalog.





> DF50-C-PN-RT can be added to the catalog as shown in the figure below.

		므고
<u>F</u> ind:		M† Mi
<u>P</u> rofil	Standard	•
	ROFIBUS DP	
- 📅 PI	ROFIBUS-PA	
E TR PI	ROFINET IO	
	Additional Field Devices	
	DF50-C-PN-RT	
÷.	Gateway	
÷.	) HMI	
<u>.</u>	] I/O	
<u>.</u>	] Ident Systems	
± 🙆	Network Components	
÷.	Sensors	
÷.	Switching devices	



Figure 4-3-8

# 3.1.3. Adding an Adapter

➢ As shown in the figure below, double-click PN-IO, enter the General page, and click Properties...

	General Addresse	s PROFINET Synchronization Time-of-Day Synchronization
CPU315-2 PH/DP(1) MPI/DP PN-IO	Short description:	PN-IO
Port 1 Port 2	<u>D</u> evice name:	PN-IO
	✓ Support device	replacement without exchangeable medium
	✓ Support device Interface	e replacement without exchangeable medium
VR		e replacement without exchangeable medium Ethernet
UR Module Order	Interface	
	-Interface Type:	Ethernet

Figure 4-3-9



Add a new subnet as shown in Figures 4-3-10 and 4-3-11. Then click OK.

Properties - Ethernet interface PN-IO (R0/S2.2)		×
General Parameters	If a subnet is selected, the next available addresses are suggested.	
<u>I</u> P address: 192.168.0.1 Su <u>b</u> net mask: 255.255.255.0	Gateway © <u>D</u> o not use router © <u>U</u> se router <u>A</u> ddress:	
Subnet: not networked	<u>New</u> P <u>r</u> operties De <u>l</u> ete	
ок	Cancel Help	

Figure 4-3-10



perties - New subi	net Industrial Ethernet		
ieneral			
<u>N</u> ame:	Ethernet(1)		
<u>S</u> 7 subnet ID:	0048 - 0005		
Project path:	S7_Pro10		
Storage location of the project:	C:\Program Files (x86)\Siemen	s\Step7\s7proj\S7_Pro10	
uthor:			
Date created:	02/20/2024 02:12:07 PM		
ast modified:	02/20/2024 02:12:07 PM		
Comment:			^
			Ŷ
ок		Cancel	Help

Figure 4-3-11

> After adding the subnet, the result is as shown in the following figure.

1		~	
2	CPU315-2 PM/DP(1)		
X1	MPI/DP		
X2	PN-IO		
X2 P1	Port 1		Ethernet(1). INDITALI TO System (100)
X2	Port 2		

Figure 4-3-12



Select the Ethernet you just added.

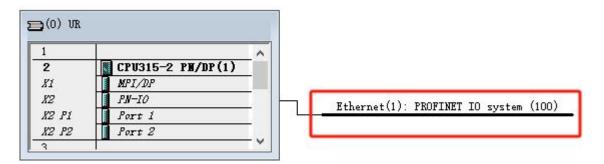


Figure 4-3-13

Double-click DF50-C-PN-RT in the catalog.



Figure 4-3-14

> After adding, you will get the following interface.

1		^	
2	CPV315-2 PM/DP(1)		
81	MPI/DP		
82	PN-IO		Ethernet(1): PROFINET IO system (100
K2 P1	Port 1		Etherhet(1). TROFINET TO System (TOO
K2 P2	Port 2		85 C
3		- <b>v</b>	
		12	1) DF50-C-

	(1) DF50-C-PN-RT						
ot	Module	Order number	I Add	Q address	Diagnostic Address	Comment	Access
,	₩ DISO-C-FI-RT	30050002548			2042*		Pall
I I	PN-10		·		2041*		Pull
PO	Port 0 - RJ45	8	·		2040*	1	Pull
1 P1	Port 1 - RJ45	8	S		2039*		Pull
	SystemDiegnostic	******	12	01			Pull
	AdepterDigitelInput	******	0				Pull

Figure 4-3-15



# 3.1.4. Assigning a Device Name

➤ As shown in the figure below, double-click the adapter to modify the device name of the adapter. Here, three zeros are added.

	Ethernet(1): PROFINET IC	- Jystem (100)
Г	🚠 (1) DF50-C-	
L		
L		

Figure 4-3-16



General	Identification	Shared Access
Short D	escription:	DF50-C-PN-RT
		PROFINET IO Device Adapter
Order 1	no./ firmware:	30050002548 / V0.1
Family:		RemotelO
<u>D</u> evice	name:	DF50-C-PN-RT000

Figure 4-3-17

➢ As shown in the figure below, you can verify the device name (Verify Device Name) and assign the device name (Assign Device Name).



I <u>S</u> tation <u>E</u> dit Insert ]	<u>PLC</u> <u>V</u> iew <u>Options</u> <u>W</u> indow <u>H</u> e Download Upload	lp Ctrl+L	
(0) UR 1 2 CPU315			
X1 MPI/DP X2 PN-10 X2 P1 Port 1 X2 P2 Port 2 3	Faulty Modules Module Information Operating Mode Clear/Reset Set Time of Day Monitor/Modify	Ctrl+D Ctrl+I	m (100)
	Update Firmware Save Device Name to Memory (	Card	
🖕 🐋 (1) DF50-C-PN		>	Edit Ethernet Node
Slot <b>M</b> odule 0 <b>DP50-C-PS</b> -	PROFIBUS Save Service Data	>	Verify Device Name Assign Device Name.
X1   PN-IO X1 PO   Port 0 - RJ4	5 Save Security Events		040*

Figure 4-3-18

Click Verify Device Name to get the page shown in the figure below. The red cross indicates that the device name we set does not match the actual device name and needs to be re-assigned. You can directly click Assign Name... in the figure or open Assign Device Name in Figure 4-3-18.

_			
Status	IP address	MAC address	
×	( <del></del>		Ássign Name
	Status X	Status IP address	Status IP address MAC address

Figure 4-3-19

➢ As shown in the figure below, select the device in STEP2 and click STEP3 to specify the name. If multiple devices are configured, you can select them in STEP1.

ssign device	e name		STEP1		
<u>D</u> evice	DF50-C-PN-RT000		•	De <u>v</u> ice	RemoteIO
Ava <u>i</u> lable	STEP	2			STEP3
IP oddross	NAC address	Dovice type	Dovico nomo		Assign name
192.168.0.	2 16-14-02-10-64-7F	RemoteIO	df50-c-pn-r	t	Node flashing t



#### Figure 4-3-20

▶ Verify again that the device name shows a green check.

erify Device Name			
Available			
Device name	Status	IP address	MAC address
DF50-C-PN-RT000		192, 168, 0, 2	16-14-02-10.

Figure 4-3-twenty one

3.1.5. Adding IO expansion modules

> After selecting the device, double-click the card you need in the directory on the right or drag it to the sub-slot behind. The software will automatically assign an address to it, and you can also double-click the sub-slot to modify it.

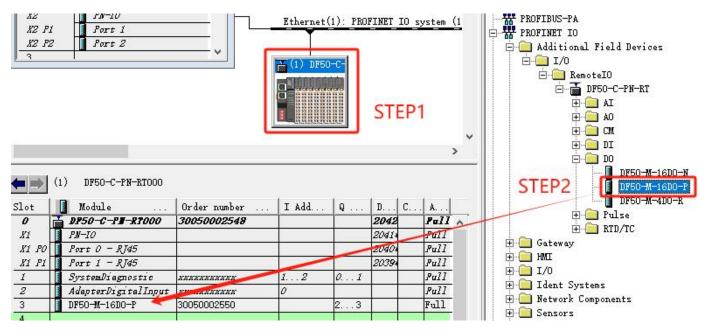


Figure 4-3-twenty two



## 3.1.6. Download to PLC

> Click Download in the PLC tab as shown below.

Station Edit Insert	PLC	View Options	<u>Window H</u> elp		
🗅 🚘 🏪 🖩 🖏 🎒	ſ	Download		Ctrl+L	
()		Upload			
<b>A</b> (0) <b>V</b> R		Download Modu	le Identification		
1	Upload Module Identification to PG				

Click the button as shown below.

	none of estamo	2 🕂	lot: Target Station:
	none of estamo	6 Local	······
	nonr of retown	and the second s	
	leans or gareway	$m{c}$ Can be reached by m	arget Station.
		on to target station:	Enter connecti
tion name Modul	Module type	MAC address	IP address
MATIC 3 CPU 3	CPU 315-2	00-0E-8C-CD-B4	192.168.0.1
>			<
			ccessible Nodes
MATIC 3	CPU 315-2		192.168.0.1 < Accessible Nodes

Figure 4-3-twenty four



After selecting the device, click OK in sequence to complete the download.

CPU315-2 PN/DP(1	on address is the progr )?			
<u>l</u> ack:	0			
<u>S</u> lot:	2			
Carget Station:	€ Local C Can be reached by n	neans of gateway		
and the second	on to target station:		0.1	
IP address	MAC address	The second s	Station name	Concernment of
192.168.0.1	00-0E-8C-CD-B4	CPU 315-2	SIMATIC 3	CPU 3
٢				>
nust be e.g. by	Upda connected to an enterpr appropriately protecto use of firewalls and no information about indu	rise network or ed against unau etwork segmentar	thorized access tion.	e intern

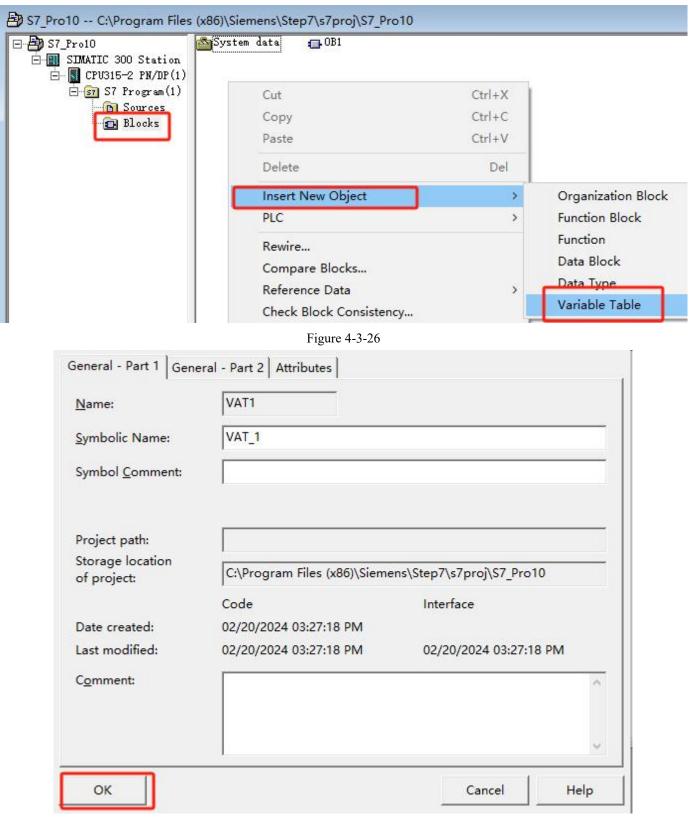
Figure 4-3-25

➢ Finally, you need to turn the switch on the PLC to RUN. If there is no red light error on the PLC and the RUN light on the DF50 adapter is always on, the configuration is complete.



#### 3.1.7. Debugging and testing

➤ As shown in the figure below, click Blocks, right-click in the blank space on the right, and add a variable table.







> Double-click the variable table just added to get the following interface.

ystem data	🕞 OB1	VAT_1			
Var - VAT_1					
<u>T</u> able <u>E</u> dit	nsert P <u>L</u> C V	ariable <u>V</u> iev	v <u>O</u> ptions <u>V</u>	<u>V</u> in <mark>d</mark> ow <u>H</u> elp	
	<b>.</b> 5 <b>.</b> 4		× 55 5	<u> </u>	Mar w Mar Mar
👪 VAT_1 S	7_Pro10\SIMAT	IC 300 Statio	n\CPU315-2 PN	N/DP(1)\S7 Progra	m(1)
Addres	s Symbol Dis	play format	Status value	Modify value	

Figure 4-3-28

Add an address in the orange box to monitor and modify its data. Click STEP1 and STEP2 in turn to monitor the data in the address in real time. After filling in the data in Modify value, click STEP3 to write the data.

Var - VAT_1		STE	EP1			
<u>T</u> able <u>E</u> dit <u>I</u> nse	rt P <u>L</u> C V <u>a</u> riabl	le <u>V</u> iew <u>O</u> ption	ns <u>W</u> indow	Help STEP	2	STEP3
	<i>a</i> x <b>b c</b>	n a X P	a 2 <b>∖</b> ?		©∦ 66° 4≯	60°1 447 ////
🕌 .VAT_1 @S7	Pro10\SIMATIC	300 Station\CPU3	15-2 PN/DP(	1)\S7 Program	(1) ONLINE	•
		y format Status				
Address	Symbol Display	y format Status	value Modi	fy value		
Address 1 QW 2	Symbol Display HEX		#0000	fy value		

Figure 4-3-29



#### 3.2. Adapter usage examples

Please refer to the wiring diagram of the adapter<u>Chapter 2 Section 2.2</u>The example uses the DF50-C-PN-RT + DF50-M-16DO-P + DF50-M-16DO-N + DF50-M-16DI-P/N + DF50-M-16DI-P/N-TS topology. After adding the modules in sequence, the topology shown in Figure 4-3-30 is obtained: SystemDiagnostic is the diagnostic module, AdapterDigitalInput is the adapter 8-channel digital input display, and the other modules are the various IO module cards we inserted.

Module	Order number	I Add	Q address
DISO-C-PI-RT000	30050002548		
PN-IO			
] Port 0 - RJ45			
Port 1 - RJ45			
SystemDiagnostic	XXXXXXXXXXXX	12	01
AdepterDigitelInput	XXXXXXXXXXX	0	
DF50-M-16D0-P	30050002550		23
DF50-M-16D0-N	30050002552		45
DF50-M-16DI-P/N	30050002551	3 4	
DF50-M-16DI-P/N-TS	30050002671	570	67

Figure 4-3-30

#### 3.2.1. SystemDiagnostic: Diagnostic module

> The process data is shown in the following table.

		Input data: 2 Byte		
Byte No.	illustrate	Remark		
Byte 0 Location of the fault module		0x01 represents the first IO module, 0x02 represents the sec module, and so on.		
Byte 1	Fault Codes	See fault code table 4.3.2 for details		
	(	Dutput data: 2 Byte		
Byte No.	illustrate	Remark		
Byte 0	No action required	/		
Byte 1		/		

> The meanings of the fault codes are shown in the following table.

	Table 4.3.2						
Fault Codes	Fault Description	Troubleshooting					
0xE1	Module power supply abnormality	Check the power cord connection					
0xE2	Analog module calibration failure	Contact Supplier					
0xE3	Module internal initialization exception	Contact Supplier					
0xE4	Overcurrent signal detected	Check peripherals					



0xE8 Serial port module communication abnormality Check signal line wiring

As shown in Figures 4-3-31 and 4-3-32, the monitoring value of the diagnostic module is "16#01E1". "01" indicates that the first IO card has a fault, and "E1" indicates that the external power supply of the module is abnormal (see Table 4.3.2 for other fault code meanings); if the monitoring value is 16#02E1, it means that the second IO card has an abnormal module external power supply fault, and so on. Clear the fault data after powering on and off again.

-	Address	Symbol	Display format	Status value	Modify value
	//SystemD	iagnost:	ic		
	IW 1		HEX	W#16#01E1	
~	Address	Symbol	Display format	Status value	Modify value
	//SystemI	)iagnost	ic		
		//SystemD IW 1 Address	//SystemDiagnost: IW 1 Address Symbol	//SystemDiagnostic IW 1 HEX Figure 4-3-31	//SystemDiagnostic IW 1 HEX W#16#01E1 Figure 4-3-31

Figure 4-3-32

## 3.2.2. AdapterDigitalInput: Adapter 8-channel digital input display

> The process data is shown in the following table.

	Table 4.3.3       Input data: 1 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

➢ As shown in the figure below, double-click the AdapterDigitalInput module to modify the filter parameters of the adapter's 8-channel digital input.

<b>←</b> ⇒	(1) DF50-C-PN-RT		Properties - AdapterDigitalInput - (R-/S2)			
Slot	Module	.   Order numb	General Addresses Parameters STEP2	2		
0	🚡 DI50-C-II-RI	300500025				
Xi	PN-IO			Value		
X1 P0	Port 0 - RJ45		🖃 🔄 Parameters			
X1 P1	Bort 1 - RJ45 STF	P1	DigitalInPut Parameter Setting			
1	SystemDisenostic	*******		1.00		
2	AdapterDigitalInput	******	└≝ SignalFilter Setting	20ms		
3	DF50-M-16D0-P	30050002550		16ms	STEP3	^
4	DF50-M-16D0-N	30050002552		17ms 18ms	SIEFS	
5	DF50-M-16DI-P/N	30050002551		19ms		
6	DF50-M-16DI-P/N-TS	30050002671		20ms		
7	2001)			25ms		and the second second
8				30ms		
9				35ms 40ms		~
10				140112		





-

#### 3.2.3. Bus Error Adapter Status Setting

➤ As shown in the figure below, you can set the behavior of the adapter when a bus error occurs. You can set it to clear the output value or keep the last value. The default is to clear the output value.

(1) DF50-C-PN-RT	Properties - DF50-C-PN-RT (R-/S0)	
STEP1	General Addresses Parameters STEP	22
<b>DP50-C-PI-RT</b> PII-IO		Value
Port 0 - RJ45	🖃 🔄 Parameters	STEP3
Port 1 - RJ45	Setting for Adapter	
SystemDiegnostic	- ── Fault Action for Output	Clear Output Value
AdepterDigitelInput	-II OFFSET	Clear Output Value
	TO OFFSET	Hold Output Value



#### 3.2.4. Get module software version

 $\blacktriangleright$  Get the adapter version information as shown in the figure below. Write "0x100" in the

SystemDiagnostic input address to get the adapter software version information. "0x1200" means the software version is V12.

1	Address	Symbol	Display format	Status value	Modify value
	//System	Diagnost:	ic		
	IW 1		HEX	W#16#1200	
	QW (	)	HEX	W#16#0100	W#16#0100



Set the subsequent IO module version information as shown in the figure below. Write "0x101" in the SystemDiagnostic input address to get the software version information of the first module after the adapter. "0x1100" means the software version is V11.

Addr	ess Syn	nbol Display for	mat Status value	Modify value
//Sy:	stemDiag	nostic		
I₩	1	HEX	W#16#1100	
QW	0	HEX	W#16#0101	₩#16#0101

#### Figure 4-3-36



## 3.3. Digital module usage routine

This example uses the DF50-C-PN-RT + DF50-M-16DO-P + DF50-M-16DO-N + DF50-M-16DI-P/N

+ DF50-M-16DI-P/N-TS topology. After adding the modules, it will look like the following figure.

₩ D#50-C-P#-R1	30050002548		
PN-IO	8	2	2
Port 0 - RJ45			2
Port 1 - RJ45	- C	8	2
SystemDiagnostic	******	1 2	01
AdepterDigitelInput	*****	0	0
DF50-M-16D0-P	30050002550		23
DF50-M-16D0-N	30050002552		45
DF50-M-16DI-P/N	30050002551	3 4	8
DF50-M-16DI-P/N-TS	30050002671	5 38	6
DF50-M-4D0-P-2A	30050002839	39	7
DF50-M-4D0-R	30050002838	2	8

Figure 4-3-37

## 3.3.1. DF50-M-16DO-P digital output module

Please refer to the module wiring diagram<u>Chapter 3, Section 3.2</u>The output status of the module when a PN bus error occurs can be set in the adapter. For setting methods, please refer to<u>Chapter 4, Section</u> 3.2.3.

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

Addres	s Symbol	Display format	Status value	Modify value
//DF50	)-M-16D0-P			0
Q₩	2	HEX	W#16#FFFF	W#16#FFFF



## 3.3.2. DF50-M-16DO-N digital output module

Please refer to the module wiring diagram<u>Chapter 3 Section 4.2</u>The output status of the module when a PN bus error occurs can be set in the adapter. For setting methods, please refer to<u>Chapter 4, Section</u>

#### <u>3.2.3</u>.

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

1	Address	Symbol	Display format	Status value	Modify value
	//DF50-N	I-16D0-N			
	Q₩ 4		HEX	W#16#FFFF	W#16#FFFF



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

Please refer to the module wiring diagram<u>Chapter 3 Section 1.2</u>.

This module can set input filtering. Double-click the module to set it, as shown in the figure below.
The default value is 20ms.



	101 00 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	5005000253		8
	PN-IO		Properties - DF50-M-16DI-P/N - (R-/S5)	
	Port 0 - RJ45			
	Port 1 - RJ45		General Addresses Parameters STEP2	
	SystemDiegnostic	******		
	AdepterDigitelInput	*****		Value
	DF50-M-16D0-P	30050002550		value
	DF50-M-16D0-N	30050002552	Parameters STEP	<u>}</u>
	DF50-M-16DI-P/N	30050002551	□ 🔄 DF50-M-16DI-P/N Parameter Setting	
	DF50-M-16D1-P/N-TS	30050002671	_≝ SignalFilter Setting	20ms
_	STEP1		-	16ms 17ms 18ms



> The input data of each channel can be viewed as shown in the figure below.

Address	Symbol	Display format	Status value	Modify value
//DF50-	M-16DI-P,	/N	а — — — — — — — — — — — — — — — — — — —	
IΨ	3	HEX	W#16#0080	1



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

> Please refer to the module wiring diagram<u>Chapter 3 Section 2.2</u>.

As shown in the figure below, you can set the counting mode of channel 0 to channel 7. You can set it

to rising edge counting, falling edge counting, and both rising and falling edges counting. The default is rising edge counting.

Module <b>DP50-C-PJ-R1</b>	General Addresses Parameters STEP2	
PN-10 Port 0 - RJ45		Value
Port 1 - RJ45	Parameters	STEP3
SystemDiagnostic .	DF50-M-16DI-P/N-TS Counting Channe	
AdepterDigitelInput	Count Mode(CH00)	Rising edge count
DF50-M-16D0-P	–(≝) Count Mode(CH01)	Rising edge count
DF50-M-16D0-N	-III Count Mode(CH02)	Rising edge count
DEED-M-16DT-P/N		
DF50-M-16DI-P/N-TS		Rising edge count
	-E Count Mode(CH04)	Rising edge count
STEP1	–≝ Count Mode(CH05)	Rising edge count
	–≝ Count Mode(CH06)	Rising edge count
	└ Count Mode(CH07)	Rising edge count
	DF50-M-16DI-P/N-TS Non Counting Ch	
	└ SignalFilter Setting(CH10-CH17)_ms	20

Figure 4-3-42

➤ As shown in the figure below, the filter parameters of channels 10 to 17 can be modified individually, and the default is 20ms.



	KISIN	ig eage count
└ Count Mode(CH07)	Risin	ig edge count
DF50-M-16DI-P/N-TS Non Counting Ch		
└॔≝ SignalFilter Setting(CH10-CH17)_ms	20	



> For process data definition, please refer to <u>Chapter 3 Section 2.4</u>, fill in the data we need into the

monitoring table, as shown in the figure below.

1	Address	Symbol	Display format	Status value
	//DF50-M-	-16DI-P/1	N-TS	
	//A1 (CHO)			
	IW 5		HEX	₩#16#0000
	//A1 (CHO)	Count		
	ID 7		HEX	DW#16#00000000
	//Count C	Clear		
	QW 6		HEX	W#16#0000



➤ Input a valid signal to the A1 (CH0) port of the IO module, and you can see that the DI input bit of the corresponding channel becomes "1", and the count value of the corresponding channel increases by 1.

Address	Symbol	Display format	Status value	Modify value
//DF50-	M-16DI-P/	N-TS		
//A1 (CH	10)			7
IW	5	HEX	₩#16#0100	
ID	7	HEX	DW#16#00000013	
//A1 (CH	IO)COUNT			
QB	6	HEX	B#16#00	B#16#00



➢ Writing "1" to the clear bit of the corresponding channel can clear the count value of the corresponding channel. As shown in the figure below, the count value of A1 (CH0) is cleared.

Addre	ss S	ymbol	Display format	Status value	Modify value
//DF5	0-M-161	DI-P/I	I-TS		
//A1(	CHO)				
IW	5		HEX	₩#16#0000	
ID	7		HEX	DW#16#00000000	1
//A1 (	CH0) COI	JNT			
QB	6		BIN	2#0000_0001	2#0000_0001



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

> Please refer to the module wiring diagram<u>Chapter 3, Section 20.2</u>The output status of the module when a PN bus error occurs can be set in the adapter. For setting methods, please refer to<u>Chapter 4,</u> Section 1.2.3.

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



Addr	ess	Symbol	Display format	Status value	Modify value
//DF	50-M-	4D0-P-2.	A		
//0v	ercur	rent			
IB	39		BIN	2#0000_0000	
//0u	tput				
QB	7		BIN	2#0000_1111	2#0000_1111



As shown in the figure below, the first channel output is enabled. When the module channel is overcurrent, the first channel bit in Overcurrent becomes "1", and the system status information shows a "16#01E4" error (the first module detects an overcurrent signal), and the first channel of the module stops outputting.

Address	Symbol	Display format	Status value	Modify value
//DF50-	M-4D0-P-2	A		
//Overc	urrent			
IB 3	9	BIN	2#0000_0001	
//Outpu	t			
QB	7	BIN	2#0000_0001	2#0000_0001
//Syste	mDiagnost	ic		
,, 5,500	me ragnos o	HEX	W#16#01E4	

Figure 4-3-48

#### 3.3.6. DF50-M-4DOR relay output module

> Please refer to the module wiring diagram<u>Chapter 3, Section 19.2</u>The output status of the module when a PN bus error occurs can be set in the adapter. For setting methods, please refer to<u>Chapter 4,</u> Section 1.2.3.

Each channel relay can be closed as shown in the figure below.

//DF	50- <b>M-4</b> DO-	-R		
QB	8	BIN	2#0000_1111	2#0000_1111

Figure 4-3-49



## 3.4. Analog module usage routine

➤ This example uses the topology of DF50-C-PN-RT + 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 structure is as shown in the figure below.

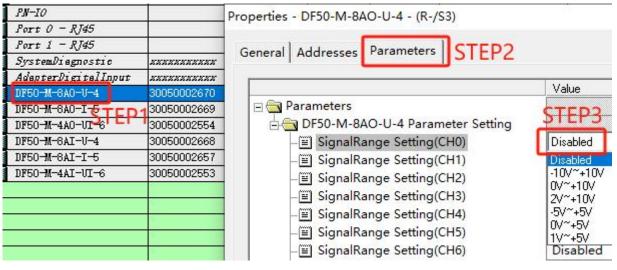
Module	Order number	I Add	Q address
🚡 DP50-C-PS-RT	30050002548		
PN-IO	2	1	3
Port 0 - RJ45	2.	1	3
🛛 Port 1 - RJ45	2		3
SystemDiagnostic	******	12	01
AdapterDigitalInput	*****	0	3
DF50-M-8A0-V-4	30050002670		256271
DF50-M-8A0-I-5	30050002669		272287
DF50-M-4A0-VI-6	30050002554		288295
DF50-M-8AI-U-4	30050002668	256271	3
DF50-M-8AI-I-5	30050002657	272287	3
DF50-M-4AI-VI-6	30050002553	288295	3



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

Please refer to the module wiring diagram<u>Chapter 3 Section 9.2</u>The output status of the module when a PN bus error occurs can be set in the adapter. For setting methods, please refer to<u>Chapter 4, Section</u> 3.2.3.

> As shown in the figure below, you can set the module output voltage range, the default is Disabled. Set CH0 to  $0\sim10$ V.





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 is 10V. The conversion relationship is shown in <u>Chapter 3 Section 9.4</u>.



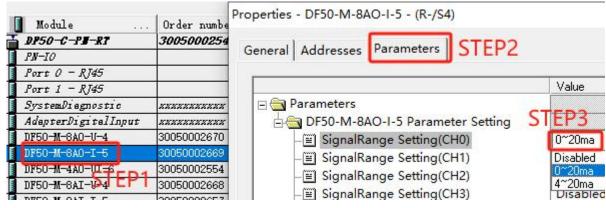
Add	ress i	Symbol	Display format	Status value	Modify value
//DF	750-M-8A	10-U-4			
//CH	łO		•		
QW	256		DEC	27648	27648

Figure 4-3-52

#### 3.4.2. DF50-M-8AO-I-5 Current Output Module

Please refer to the module wiring diagram<u>Chapter 3 Section 10.2</u>The output status of the module when a PN bus error occurs can be set in the adapter. For setting methods, please refer to<u>Chapter 4, Section</u> 3.2.3.

As shown in the figure below, you can set the module output current range, the default is Disabled. Set CH0 to 0~20ma.





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 current is 20ma. The conversion relationship is shown in <u>Chapter 3 Section 10.4</u>.

Address	Symbol	Display format	Status value	Modify value
//DF50-M	-8A0-I-5		· · · · ·	
//CH0				



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

> Please refer to the module wiring diagram<u>Chapter 3, Section 8.2</u>The output status of the module when a PN bus error occurs can be set in the adapter. For setting methods, please refer to<u>Chapter 4, Section</u> 3.2.3.

As shown in the figure below, you can set the module output voltage or current range, the default is Disabled. Set CH0 to  $0\sim10V$  and CH1 to  $0\sim20$ ma.



<b></b> D₽50-C-₽∎-R1	3005000254	Properties - DF50-M-4AO-UI-6 - (R-/S5)	
PN-IO			
Port 0 - RJ45		General Addresses Parameters STEP2	
🛛 Port 1 - RJ45		General Addresses Fordineters 51 ET 2	
SystemDiegnostic	*****		
AdepterDigitelInput	*****		Value
DF50-M-8A0-U-4	30050002670	🖃 🔄 Parameters 💦 🤆	TEP3
DF50-M-8A0-I-5	30050002669	E Image: End DF50-M-4AO-UI-6 Parameter Setting →	LFJ
DF50-M-4A0-VI-6	30050002554	– I SignalRange Setting(CH0)	0V~+10V
DISU-M-GAL-U-4-FD1	30050002668	– SignalRange Setting(CH1)	0~20ma
DF50-M-8AI-I-I-I CPI	30050002657	-(≝) SignalRange Setting(CH2)	Disabled
DF50-M-4AI-VI-6	30050002553	_ I SignalRange Setting(CH3)	-10V~+10V
			-0V~+10V
			2V~+10V -5V~+5V
			0V~+5V
			1V~+5V
			0~20ma
			4~20ma

Figure 4-3-55

As shown in the figure below, write the value "27648" to the module CH0 and CH1. Through the multimeter measurement, it can be seen that the output voltage of CH0 is 10V and the output current of CH1 is 20ma. The conversion relationship is shown in <u>Chapter 3, Section 8.4</u>.

-	Address	Symbol	Display format	Status value	Modify value
	//DF50-M-	-4AO-UI-	6		
	//CH0				
	QW 288		DEC	27648	27648
	//CH1	<u></u>			
	QW 290		DEC	27648	27648



## 3.4.4. DF50-M-8AI-U-4 Voltage Input Module

> Please refer to the module wiring diagram<u>Chapter 3, Section 7.2</u>As shown in the figure below, you can set the module acquisition voltage range, the default is Disabled. Set CH0 to  $0\sim10$ V.

Module	Order number		
DP50-C-P#-R7	30050002548	General Addresses Parameters STEP2	
PN-IO			
Port 0 - RJ45			Value
Port 1 - RJ45		🖃 🚔 Parameters	T GIOG
SystemDiegnostic	******		TEP3
AdepterDigitelInput	******	E DF50-M-8AI-U-4 Parameter Setting →	
DF50-M-8A0-V-4	30050002670	—	Disabled
DF50-M-8A0-I-5	30050002669	– SignalRange Setting(CH1)	Disabled
DF50-M-4A0-UI-6	30050002554	–≝ SignalRange Setting(CH2)	-10V~+10
DF50-M-8AI-V-4	30050002668	- I SignalRange Setting(CH3)	0V~+10V 2V~+10V
UF50-M-BAL-I-OTED	30050002657	_ SignalRange Setting(CH4)	-5V~+5V
DF50-M-4AI-UI-6	30050002553	– iii) SignalRange Setting(CH5)	0V~+5V
		_	1V~+5V Disabler





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

100Hz\_10ms.

-E signalitarige setting(Crirr)	Disableu
-	100Hz_10ms
–≝ SignalFilter Setting(CH1)	1000Hz_1ms
–≝) SignalFilter Setting(CH2)	500Hz_2ms 250Hz 4ms
–≝ SignalFilter Setting(CH3)	125Hz 8ms
–≝ SignalFilter Setting(CH4)	100Hz_10ms
–≝ SignalFilter Setting(CH5)	50Hz_20ms
–≝ SignalFilter Setting(CH6)	100Hz_10ms
–≝) SignalFilter Setting(CH7)	100Hz_10ms



After 5V voltage is applied to CH0, the value shown in the figure below is obtained. Through conversion, it is known that the collected voltage is 4.997V. The conversion relationship is shown in <u>Chapter 3, Section 7.4</u>.

Add	ress	Symbol	Display format	Status	value
//DF	750-M-	8AI-U-4		- Lo	
//CF					

Figure 4-3-59

## 3.4.5. DF50-M-8AI-I-5 Current Input Module

> Please refer to the module wiring diagram<u>Chapter 3 Section 6.2</u>As shown in the figure below, you can

set the module current collection range, the default is Disabled. Set CH0 to 0~20ma.

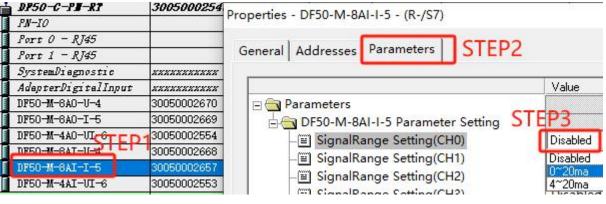


Figure 4-3-60

As shown in the figure below, you can set the signal filter for each channel, the default is 100Hz\_10ms.



—≡ SignalRange Setting(CH/)	Disabled
─	100Hz_10ms
─	1000Hz_1ms
– <mark>∭ Sig</mark> nalFilter Setting(CH2)	500Hz_2ms 250Hz 4ms
—	125Hz 8ms
—	100Hz 10ms
—	50Hz_20ms
─	100Hz_10ms
☐ SignalFilter Setting(CH7)	100Hz_10ms

Figure 4-3-61

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 10.008ma. The conversion relationship is shown in Chapter 3, Section 6.4.

Addr	ess	Symbol	Display format	Status value
//DF	50-M-	8AI-I-5		
//cu	0			
// CH	.0			

Figure 4-3-62

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

> Please refer to the module wiring diagram<u>Chapter 3 Section 5.2</u>As shown in the figure below, you can set the module to collect voltage or current range, the default is Disabled. Set CH0 to  $0\sim10V$  and CH1 to  $0\sim20$ ma.

Module	Urder numb	Properties - DF50-M-4AI-UI-6 - (R-/S8)	
₩ D\$50-C-\$\$ <b>\$</b> -R\$	300500025		
PN-IO		General Addresses Parameters STEP2	
Port 0 - RJ45		General Addresses Parameters STEP2	
Port 1 - RJ45			
SystemDiegnostic	*******		Value
AdepterDigitelInput	********	🖃 🔄 Parameters 🔍 🤇	STEP3
DF50-M-8A0-V-4	30050002670	🔄 🔄 DF50-M-4AI-UI-6 Parameter Setting	
DF50-M-8A0-I-5	30050002669	- ────────────────────────────────────	0V~+10V
DF50-M-4A0-VI-6	30050002554	- I SignalRange Setting(CH1)	Disabled
DF50-M-8AI-V-4	30050002668	- SignalRange Setting(CH2)	Disabled
DF50-M-8AI-I-5	30050002657		-10V~+10V
DF50-M-4AI-VI-6	30050002553		0V~+10V
CTED1		–≝ SignalFilter Setting(CH0)	2V~+10V
STEPT		—────────────────────────────────────	-5V~+5V
		—I SignalFilter Setting(CH2)	0V~+5V 1V~+5V
		- ☐ SignalFilter Setting(CH3)	0~20ma
			4~20ma



➤ As shown in the figure below, you can set the signal filter for each channel, the default is 100Hz\_10ms.



- SignalFilter Setting(CH0)	100Hz_10ms
–≝ SignalFilter Setting(CH1) –≝ SignalFilter Setting(CH2) –≝ SignalFilter Setting(CH3)	1000Hz_1ms 500Hz_2ms 250Hz_4ms 125Hz_8ms
	100Hz 10ms 50Hz_20ms

#### Figure 4-3-64

After passing 5V voltage to CH0 and 10ma current to CH1, the values shown in the figure below are obtained. Through conversion, it is known that the voltage collected by CH0 is 5.005V and the current collected by CH1 is 10.002ma. The conversion relationship is shown in <u>Chapter 3, Section 5.4</u>.

Address	Symbol	Display format	Status value
//DF50-3	-4AI-UI-	6	
//CH0			( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( )
IW 288	}	DEC	13839
//CH1			
IW 290	)	DEC	13828

Figure 4-3-65



3.5. Routine use of thermal resistance sensor data acquisition module

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

Module	Order number	I Add	Q address
T DP50-C-PH-RT	30050002548		
PN-10	2	8	2
🛿 Port 0 - RJ45	2.	8	2
🛿 Port 1 - RJ45		8	2
SystemDiegnostic	******	12	01
AdepterDigitelInput	******	0	2
DF50-M-4RTD-PT	30050002555	256263	8



#### 3.5.1. DF50-M-4RTD-PT Thermal Resistance Measurement Module

Please refer to the module wiring diagram<u>Chapter 3 Section 11.2</u>As shown in the figure below, you can modify the sensor type collected by the module, the default is PT100.

(1) DF50-C-PN-RT	_	Properties - DF50-M-4RTD-PT - (R-/S3) General Addresses Parameters STEP	2
Module		🛛 🖂 🖂 Parameters	
<b>DP50-C-PJ-RT</b> PN-I0	3005000254	DF50-M-4RTD-PT Parameter Setting	STEP3
Port 0 - RJ45		- I RTD Type Setting	PT100 -200850 degree C
Port 1 - RJ45		_≝ SignalFilter Setting	PT100 -200850 degree C
SystemDiegnostic	******		PT1000 -200850 degree C
AdenterDieitelInput	******		PT200 -200850 degree C PT500 -200850 degree C
DF50-M-4RTD-PT STEP1	30050002555		Ni120 -80260 degree C Ni100 -60250 degree C Ni200 -60250 degree C Ni500 -60250 degree C Ni1000 -60250 degree C



The filter settings of this module can be adjusted as shown in the figure below, the default is 5Hz\_200ms.

- RTD Type Setting	PT100 -20085
–≝ SignalFilter Setting	5Hz_200ms
	1.25Hz_800ms 2.5Hz_400ms
	5Hz 200ms 7.5Hz_133ms





After connecting the sensor to module CH0, the following data is obtained. "246" means the collected

temperature is 24.6℃.

Add	ress	Symbol	Display format	Status value
//DF	750-M-	4RTD-PT		
1101	IU			
//CE	10			

Figure 4-3-69

3.6. Thermocouple temperature data acquisition module usage routine

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

Module	Order number	I Add	Q address
🖬 DP50-C-PJ-RT	30050002548		
PN-10			
Port 0 - RJ45			
Port 1 - RJ45			
SystemDiegnostic	*****	12	01
AdepterDigitelInput	*****	0	
DF50-M-8TC	30050002754	256271	256271

Figure 4-3-70

3.6.1. DF50-M-8TC Thermocouple Measurement Module

Please refer to the module wiring diagram<u>Chapter 3, Section 12.2</u>As shown in the figure below, you can modify the sensor type collected by this module. The default is K-type sensor.

		Properties - DF50-M-8TC - (R-/S3)	
(1) DF50-C-PN-RT	-	General Addresses Parameters STEP2	
	Order number 10050002541	Parameters	Value
PN-10 Port 0 - RJ45		DF50-M-8TC-KETJ Parameter Setting	ТС Туре К
Port 1 - RJ45	*****	_≝ SignalFilter Setting	TC Type K TC Type E
AdepterDigitelInput z	0050002754		TC Type T TC Type J
STEP1			TC Type B TC Type S TC Type R TC Type N
			ТС Туре С

Figure 4-3-71

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



- TC Type Setting	TC Type K
_	225ms
	7200ms 3600ms 1800ms 900ms 450ms
	225ms 122.5ms
	61.25ms



➢ DF50-M-8TC process data definition please refer to<u>Chapter 3, Section 12.4</u>After connecting the sensor to CH0, as shown in the figure below, "1050" means 105.0°C, and no compensation value is given at this time.

Address	Symbol	Display format	Status value	Modify value
//DF50-1	I-8TC		-53 	
//CH0				
IW 256	8	DEC	1050	
//CHO Co	ompensate			
QW 256	}	DEC	0	



> When we write 500 into the compensation value of CH0, we can see that the collected value becomes "1549", which means  $154.9^{\circ}$ C.

Address	Symbol	Display format	Status value	Modify value
//DF50-M	-8TC			
//CH0				
IW 256		DEC	1549	
//CHO Con	npensate			
QW 256		DEC	500	500

Figure 4-3-74



- 3.7. Encoder data acquisition module usage routine
- The encoder pulse counting module has two types: DF50-M-2CNT-PIL-24 and DF50-M-2CNT-PIL-5. The wiring and usage of the two modules are the same. The difference is that the DF50-M-2CNT-PIL-5 is connected to a 5V encoder signal, and the DF50-M-2CNT-PIL-24 is connected to a 24V encoder signal. This document uses the DF50-M-2CNT-PIL-24 module as an example. For wiring methods, please refer to<u>Chapter 3, Section 13.2</u>.
- 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.
- Add the DF50-M-2CNT-PIL-24 module as shown below.

Module	Order number	I Add	Q address
🖬 DF50-C-F#-RT	30050002548		1
FN-10			
🚦 Port 0 - RJ45			
■ Port 1 - RJ45			
SystemDiegnostic	*****	12	01
AdepterDigitelInput	*****	0	
DF50-M-2CNT-PIL-24	30050002556	320	2 11

Figure 4-3-75

The output status of the module can be set in the adapter. For setting methods, please refer to <u>Chapter 4</u>, Section 3.2.3.

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, Default 4x), DI signal function, filter time signal A, filter time signal B, encoder calculation direction, counter mode setting, comparison function, fieldbus error behavior, count upper limit, count lower limit.

Properties - DF50-M-2CNT-PIL-24 - (R-/S3)

		STEP3
	In Calence comments	Value
) DF50-C-PN-RT	🖃 📾 Parameters	
	🗄 🔄 CH0 Configuration	
Module .	–≝ Signal mode	Rotary transducer quadruple
DF50-C-PH-RT	– DI Signal Function	Disabled
PN-10 Port 0 - RJ45	- Filter time Signal A	100KHz
Port 1 - RJ45	- Filter time Signal B	100KHz
SystemDiegnostic	- Encoder Count Direction	Position Direaction of Phase A
AdapterDigitalInput	- Countermode Setting	Line Counter
DF50-M-2CNT-PIL-24	- Comparison Function	Disabled
STEP1	– Behavious on field bus error	Continue counting
STEPT		2147483647
	Lower limit	-2147483648



Figure 4-3-76

As shown in the figure below, fill in the module address into the monitoring table. For the meaning of the process data, please refer to <u>Section 3.7.1 of this chapter</u>.

1	Address	Symbol	Display format	Status value
	//DF50-M-	-2CNT-PI	L-24	
	//CH1 Sta	ate		
	IB 3		BIN	
	//CH1 Pul	lses		
	ID 4		DEC	
	//CH1 Lat	ching p	ulses	
	ID 8		DEC	
	//CH1 Cor	ntrol		
	QB 2		BIN	
	//CH1 Com	nparison	Value	
	QD 3		DEC	



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.

Address	Symbol	Display format	Status value	Modify value
//DF50-W	-2CNT-PI	L-24	<del>n.</del> 	
//CH1 St	ate			
IB 3		BIN	2#0000_1001	
//CH1 Pu	lses			
ID 4		DEC	L#11107	
//CH1 La	tching p	ulses		
ID 8		DEC	L#0	
//CH1 Co	ntrol			
QB 2		BIN	2#0000_0001	2#0000_0001
//CH1 Co	mparison	Value		
QD 3		DEC	L#0	



- 3.7.1. Module process data description
- The ProfiNET bus adapter will allocate corresponding input and output addresses according to the different modules connected to it; the table shows the meaning, data length and data type of the input and output data.

	atta tengun and type	
Output Data	Number of bytes	Data Types
Channel 1 command output data	1	Uint8
Channel 1 pulse comparison value	4	int32
output		

Table 4.3.4Module data length and type



Channel 2 command output data	1	Uint8
Channel 2 pulse comparison value	4	int32
output		
Input Data	Number of bytes	Data Types
Channel 1 Status Input Data	1	Uint8
Channel 1 Pulse Number	4	int32
Channel 1 Latch pulse number	4	int32
Channel 2 status input data	1	Uint8
Channel 2 Pulse Number	4	int32
Channel 2 Latch pulse number	4	int32

## Table 4.3.5Output data meaning

Output data meaning				
	0 bytes			
bit7~bit1	reserve			
bit0	0: Channel 1 stops counting and the original count is reset to zero; 1:			
	Channel 1 starts counting			
1~4 bytes	-4 bytes Channel 1 pulse comparison value output, signed 32-bit data			
	5 bytes			
bit7~bit1	reserve			
bit0	0: Channel 2 stops counting and the original count is cleared; 1: Channel			
	2 starts counting			
6~9 bytes	Channel 2 pulse comparison value output, signed 32-bit data			

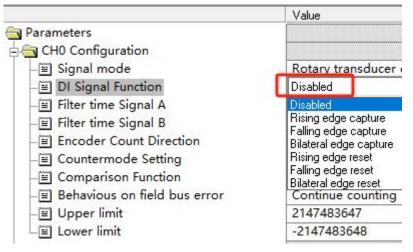
#### Table 4.3.6Input data meaning Input data meaning

input data incaning				
	0 bytes			
bit7~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			
1~4 bytes	Channel 1 pulse input value, signed 32-bit data			
5~8 bytes	Channel 1 pulse input latch value, signed 32-bit data			
	9 bytes			
bit7~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	
10~13 bytes	Channel 1 pulse input value, signed 32-bit data	
14~17 bytes	Channel 1 pulse input latch value, signed 32-bit data	

- 3.7.2. DI Signal Function Configuration
- As shown in the figure below, you can configure the DI signal function. The default setting is Disabled. The following functions are available: rising edge capture, falling edge capture, both rising and falling edge capture, rising edge reset, falling edge reset, and both rising and falling edge reset.Rising edge capture (Rising edge capture) and rising edge reset (Rising edge reset)Function.





> DI rising edge capture: As shown in the figure below, the number of pulses is "2632".

Address	Symbol Display for	rmat Status value	Modify value
//DF50-M-2	CNT-PIL-24		30
//CH1 Stat	e	12	
IB 3	BIN	2#0000_000	1
//CH1 Puls	es		
ID 4	DEC	L#2632	
//CH1 Latc	hing pulses		
ID 8	DEC	L#0	
//CH1 Cont	rol		
QB 2	BIN	2#0000_000	1 2#0000_0001
//CH1 Comp	arison Value		
QD 3	DEC	L#0	

Figure 4-3-80



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 latch pulses changes to "2632".

Address	Symbol	Display format	Status value	Modify value
//DF50-M-	-2CNT-PII	-24		
//CH1 Sta	ate			<u></u>
IB 3		BIN	2#0000_0011	
//CH1 Pul	lses			
ID 4		DEC	L#2632	
//CH1 Lat	ching p	lses		
ID 8		DEC	L#2632	
			-	
//CH1 Cor	ntrol			
QB 2		BIN	2#0000_0001	2#0000_0001
//CH1 Com	nparison	Value		
QD 3		DEC	L#0	

Figure 4-3-81

> DI rising edge reset: As shown in the figure below, the pulse number is "2851".

Address	Symbol	Display format	Status value	Modify value
//DF50-M-	2CNT-PII	24	•	
//CH1 Sta	nte			
IB 3		BIN	2#0000_0001	
//CH1 Pul	.ses			
ID 4		DEC	L#2851	
//CH1 Lat	ching pu	ilses		0
ID 8		DEC	L#0	
//CH1 Cor	ntrol			
QB 2		BIN	2#0000_0001	2#0000_0001
//CH1 Com	parison	Value		
QD 3		DEC	L#0	8

Figure 4-3-82

➤ 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".



# DF50 series I/O

Address	Symbol	Display format	Status value	Modify value
//DF50-M-	-2CNT-PI	L-24		<
//CH1 Sta	ate			
IB 3		BIN	2#0000_0011	
//CH1 Pul	lses			
ID 4		DEC	L#0	
//CH1 Lat	tching p	ulses		
ID 8		DEC	L#0	
//CH1 Con	ntrol			
QB 2		BIN	2#0000_0001	2#0000_0001
//CH1 Cor	nparison	Value		
QD 3		DEC	L#0	

Figure 4-3-83



- 3.7.3. Compare function configurations (Comparison Function)
- > Turn on the comparison function as shown in the figure below.

	Value
🔄 📥 Parameters	
🖶 🔄 CH0 Configuration	
–≝ Signal mode	Rotary transduc
- DI Signal Function	Rising edge res
– 🗐 Filter time Signal A	100KHz
– <mark>) Filter time Signal B</mark>	100KHz
– Encoder Count Direction	Position Direact
–	Line Counter
- Comparison Function	Enable
— Behavious on field bus error	Disabled
–≝ Upper limit	Enable
Lower limit	-2147483648



As shown in the figure below, the pulse comparison value is set to 10000. When the pulse number is "4077", the third bit of the status input data is "0".

-	Address	Symbol	Display format	Status value	Modify value
	//CH1 Sta	ate			·
	IB 3		BIN	2#0000 0001	
	//CH1 Pul	lses	kanananananananananananananan		
	ID 4		DEC	L#4077	
	//CH1 Lat	tching p	ulses		
	ID 8		DEC	L#0	
	//CH1 Cor	ntrol	·······		
	QB 2		BIN	2#0000_0001	2#0000_0001
	//CH1 Con	nparison	Value	( <u></u>	
	QD 3		DEC	L#10000	L#10000

Figure 4-3-85

 $\blacktriangleright$  As shown in the figure below, when the pulse number is "11825", it exceeds the set value 10000, and the third bit of the status input data becomes "1".

Address	Symbol	Display format	Status value	Modify value
//CH1 Sta	te	LL		
IB 3		BIN	2#0000_0101	
//CH1 Pul	ses			
ID 4		DEC	L#11825	
//CH1 Lat	ching p	ulses		
ID 8		DEC	L#0	
Ś				
//CH1 Con	trol			
QB 2		BIN	2#0000_0001	2#0000_0001
//CH1 Com	parison	Value		
QD 3		DEC	L#10000	L#10000



#### Figure 4-3-86

3.7.4. 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 <u>Chapter 3</u>, <u>Section 13.2.3</u> When this mode is used, the A+ and A- ports input high and low levels to indicate the direction, and the B+ and B- ports input valid levels to accumulate count values.

	Value
Parameters	
–≝ Signal mode	Pulse and Directions
<ul> <li>-</li></ul>	Rotary transducer single Rotary transducer double Rotary transducer quadruple Pulse and Directions CW/CCW
– Countermode Setting	Line Counter
– 🗐 Comparison Function	Disabled
–	Continue counting
–≝ Upper limit	2147483647
Lower limit	-2147483648



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

Address	Symbol	Display format	Status value	Modify value
//CH1 St	ate			-
IB 3		BIN	2#0000_0001	
//CH1 Pu	lses			
ID 4		DEC	L#0	
//CH1 La	tching p	ulses		
ID 8		DEC	L#0	
//CH1 Com	ntrol			
QB 2		BIN	2#0000_0001	2#0000_0001
//CH1 Com	mparison	Value		
QD 3		DEC	L#0	

Figure 4-3-88



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".

Address	Symbol	Display format	Status value	Modify value
//CH1 Sta	ate			
IB 3		BIN	2#0001_0001	1
//CH1 Pul	lses			
ID 4		DEC	L#-742	
//CH1 Lat	ching p	ulses		
ID 8		DEC	L#0	
//CH1 Cor	ntrol			
QB 2		BIN	2#0000_0001	2#0000_0001
//CH1 Con	nparison	Value		
QD 3		DEC	L#0	

Figure 4-3-89

➤ 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".

Address	Symbol	Display format	Status value	Modify value
//CH1 St	ate			
IB 3		BIN	2#0000_1001	
//CH1 Pu	lses			
ID 4		DEC	L#818	
//CH1 La	tching p	ulses		
ID 8		DEC	L#0	
//CH1 Co	ntrol			
QB 2		BIN	2#0000_0001	2#0000_0001
//CH1 Co	mparison	Value		
QD 3		DEC	L#0	

Figure 4-3-90



## 3.8. Serial port module usage routine

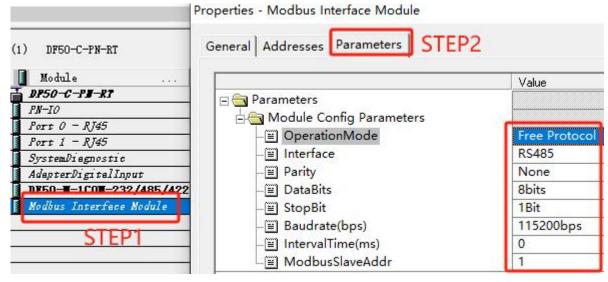
➤ This example uses the DF50-C-PN-RT + DF50-1COM-232-485-422 topology.

DF50-1COM-232-485-422 supports three modes: free transparent transmission, slave mode, and Modbus RTU master mode. The mode switching is achieved by adding different sub-slots and setting in the Modbus interface Module sub-module. Section 15.2 The wiring diagram is connected to the card, simulating the communication device and the DF50-1COM-232-485-422 module communication. After adding the module, it is shown as follows.

🚺 Module	Order number	I Add	Q address
₩ DF50-C-FF-RT	30050002548		
PN-IO			
<b>Fort</b> 0 - RJ45			
Port 1 - RJ45			
SystemDiegnostic	******	12	01
AdepterDigitelInput	******	0	
DF50-1-1C01-232/485/422	30050003656		
Modbus Interface Module			

Figure 4-3-91

> The parameters of Modbus interface Module are shown in the figure below. The default mode is Free Protocol.





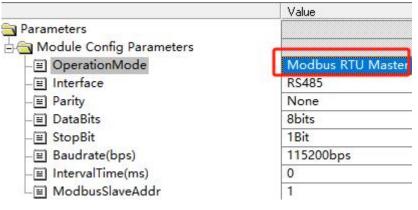
➤ As shown in the figure below, the number starting with F indicates free transparent transmission mode, the number starting with M indicates Modbus RTU master mode, and the number starting with S indicates Modbus RTU slave mode.



	OM-232/485/422						
🗄 - 🧰 🗖 DF50 - N	🗄 🛄 <b>DF50-M</b> -1COM-232/485/422 Submodule						
🕂 🧰 F:	Control&Status Modules						
🕂 🧰 F:	IO Data Modules						
🕀 🧰 M:	Diagnostic Modules						
🕀 🧰 M:	Read Coils (Охххх)						
🕂 🧰 M:	Read Discrete Inputs (1xxxx)						
🗄 🧰 M.:	Read Holding Registers (4xxxx)						
🕂 🧰 M:	Read Input Registers (3xxxx)						
🗄 🧰 M.:	Write Coils (Oxxxx)						
🗄 🧰 M.:	Write Holding Registers (4xxxx)						
🗄 🧰 S:	Diagnostic Modules						
🗄 🧰 S:	Read Coils (Охххх)						
🗄 🧰 S:	Read Holding Registers (4xxxx)						
🗄 🧰 S:	Write Coils (Oxxxx)						
🗄 🧰 S:	Write Discrete Inputs (1xxxx)						
🕀 🧰 S:	Write Holding Registers (4xxxx)						
🗄 🧰 S:	Write Input Registers (3xxxx)						
	A 100 ALL 101 DIA						

Figure 4-3-93

- 3.8.1. Modbus RTU Master Mode Usage Example
- Set the module mode to Modbus RTU Master mode, as shown below.





Add the diagnostic module M: Error Code Input (28 CH) to the second subslot, which contains the diagnostic information of the subsequent 28 subslots at most, and each subslot occupies 2Bytes of diagnostic information. See Table 4.3.7 for its meaning.

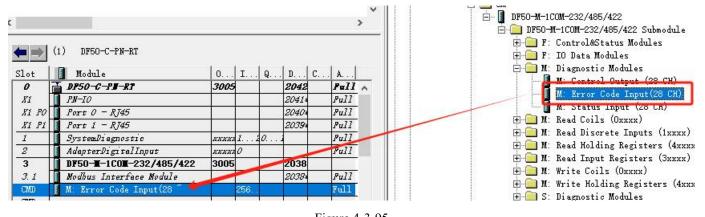
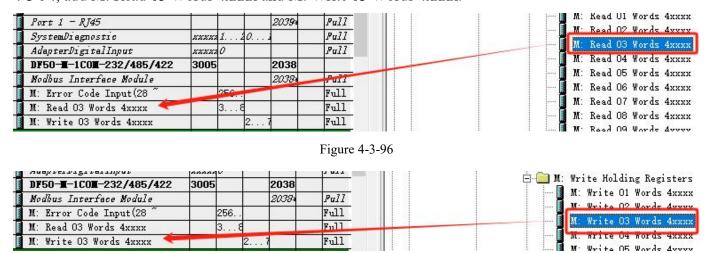


Figure 4-3-95 Table 4.3.7



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

From the 6 function codes starting with M, select the required one and add it to the third sub-slot. If you need to read and write more data, you can add different sub-slot types continuously, up to 28, plus the first interface sub-slot and diagnostic sub-slot, a total of 30 sub-slots. As shown in Figures 4-3-93 and 4-3-94, add M: Read 03 Words 4xxxx and M: Write 03 Words 4xxxx.





➢ As shown in the figure below, click M: Read 03 Words 4xxxx submodule to configure slave device information. See Table 4.3.8 for its meaning.



DF50-C-PN-RT G	eneral Addresses Parameters ST	EP2	
Module			
PN-IO		Value	
Port 0 - RJ45	Parameters		
Port 1 - RJ45	A Module Config Parameters		1
SystemDiegnostic	Slave ID	1	
AdapterDigitalInput	– III) Fuction Code	02 Read He	ding Registers (4)
DF50-1-1C01-232/485/422		US Read HO	uning registers (4)
Modhus Interface Module	– Start Address	0	and a the store of the
M: Error Code Input(28 ~	– <u>)</u> Data Length	3	STEP3
M: Read O3 Words 4xxxx 📉 📉 🛛 🗧	P1 – 🗉 Poll Time(ms)	500	
M: Write O3 Words 4xxxx	–≝ Event Trigger	Poll Mode	
	—	1000	
	– Poll Delay(ms)	0	
	Lost Action	Hold Data	

#### Figure 4-3-98

e e						
Table 4.3.8						
SlaveID	Slave node address					
Function Code	Function code					
Start Address	Register start address					
Data Length	Number of registers or coils					
Poll Time	The period of polling this slave					
Event Trigger	Poll: Polling mode					
Trigger mode selection	Trigger: Trigger mode					
Response TimeOut	Slave station response timeout					
Poll Delay	Polling interval between slaves					
Lost Action	Hold: Keep the last value					
Slave loss handling	Clear: Clear					
Input data processing when module	Input value cleared					
fails	Keep the last value					



As shown in the figure below, change the register starting address of M: Write 03 Words 4xxxx to 4000.

#### Properties - M: Write 03 Words 4xxxx

General Addresses Parameters	
	Value
🖃 🔄 Parameters	
🗄 🔄 Module Config Parameters	
- ≝ Slave ID	1
- E Fuction Code	16 Write Mul
- Start Address	4000
–≝ Data Length	3
	500

#### Figure 4-3-99

> The final address overview is as follows:

DF50-1-1C01-232/485/422	30050003656		
Modbus Interface Module			
M: Error Code Input(28 ~		256311	
M: Read 03 Words 4xxxx		38	
M: Write O3 Words 4xxxx			27



> The meanings of the two sub-slots added now are as follows:

➤ M: Read 03 Words 4xxxx contains 3 word data. According to the configuration information, the data represents the register value of the slave with node address 1 and address 0-2.

➤ M: Write 03 Words 4xxxx contains 3 words of data. According to the configuration information, the data will be written to the slave with node address 1 and registers with addresses 4000-4002.

Download the configuration to the device. Fill in the information we need into the monitoring table for monitoring as shown below.

1	Addre	SS	Symbol	Display for
	//DF5	0-M-	1COM-23	2/485/422
	//Rea	d 03	Words	
	IΨ	3		HEX
	IΨ	5		HEX
	IΨ	7		HEX
	//Wri	te O	3 Words	
	QW	2		HEX
	QW	4		HEX
	QW	6		HEX

#### Figure 4-3-101

➤ Use Modbus Slave software to create two slave stations to communicate with the module, as shown in the figure below, with the starting addresses being 0 and 4000 respectively.



📴 Mbslave1		🗒 Mbslave2			
ID = 1: F = 03	ID = 1: F = 03				
Alias	00000		Alias	04000	
0	0	0		0	
1	0	1	1.1	0	



➤ After changing the data format to HEX and writing "11, 22, 33" into registers 0-2 in the first slave, the monitoring table is displayed as shown in the figure below.

	1	//DF	//DF50-M-1COM-232/485/422				
00000	2	//Re:	ad O3 Wo	rds	<b></b>		
0x0011	3	I₩	3	HEX	W#16#0011		
0x0022	4	IW	5	HEX	¥#16#0022		
0.0000	5	IW	7	HEX	W#16#0033		
UMDU33	-	1 / /		·····			



➢ After writing "44, 55, 66" to subslot 4 in the monitoring table, the second slave is displayed as shown below.

04000	1	//DF5	50-M-1CO	M-232/485/422		
04000	2	//Rea	ad 03 Wo:			
0x0044	3	IΨ	3	HEX	W#16#0011	
0x0055	4	IW	5	HEX	W#16#0022	
0x0066	5	IW	7	HEX	W#16#0033	
0	6	//₩ri	te 03 W	ords	<b></b>	
	7	QW	2	HEX	W#16#0044	₩#16#0044
0	8	QW	4	HEX	W#16#0055	¥#16#0055
0	9	QW	6	HEX	W#16#0066	₩#16#0066



- 3.8.2. FreeRUN free transparent transmission mode usage example
- > In the Modbus Interface Module, set the mode to Free Protocol mode, as shown in the figure below.

Properties - Modbus Interface Module

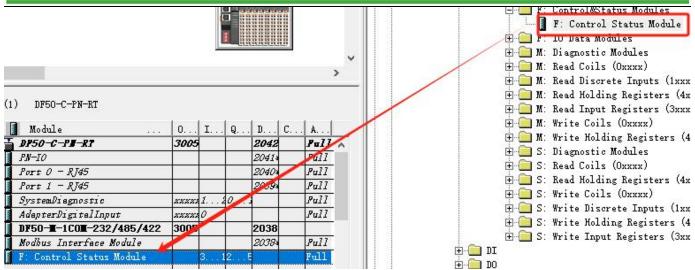
Seneral Addresses Parameters	
	Value
□ ➡ Parameters □ ➡ ➡ Module Config Parameters	
-	Free Protocol
– ≝ Interface	R\$485



Add the F: Control status Module module to the second subslot. See Table 4.3.9 for its data structure.



#### DF50 series I/O

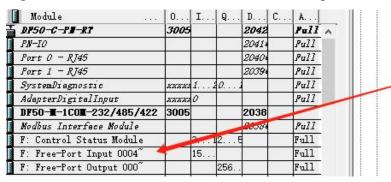


#### Figure 4-3-106

	Table	4.3.9						
Output Data								
Byte offset	name	length	meaning					
Byte:0-1	CtrlWord	2byte	Control Word					
Byte:2	TxDataLEN	1byte	Send data length					
Byte:3	TxDataCNT	1byte	Send data sequence					
			number					
	Input Data							
Byte Sequence	name	length	meaning					
Number								
Byte:0-1	StateWord	2byte	Status word					
Byte:2	RxDataLEN	1byte	Receive data length					
Byte:3	RxDataCNT	1byte	Receive data sequence					
			number					
Byte:4-11	/	8byte	reserve					

From F: IO Data Modules, select the ones you need and add them to the third sub-slot. As shown in

Figures 4-3-104 and 4-3-105, add F: Free-Port Input 0004 Bytes and F: Free-Port Output 0004 Bytes.



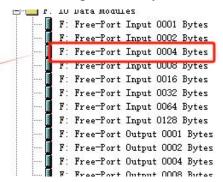
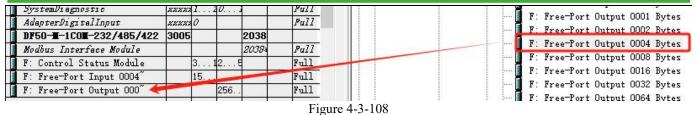


Figure 4-3-107



### DF50 series I/O



- > The meanings of the two sub-slots added now are as follows:
- ▶ F: Free-Port Input 0004 Bytes contains 4 bytes of input data.
- ➤ F: Free-Port Output 0004 Bytes contains 4 bytes of output data.

> Download the configuration to the device and fill in the required data into the monitoring table as shown below.

Add	Address Syn		Display format	St
//DF	750-M-	1COM-23	2/485/422	
//F:	Free	-Port I	nput 0004 Bytes	5
IΨ	15		HEX	
IΨ	17		HEX	
//F:	Free	-Port O	utput 0004 Byte	s
QW	256	~~~~~	HEX	
Q₩	258		HEX	
//Ct	rlWor	d v TxDat	t <mark>aLEN、</mark> TxDataCN	Т
Q₩	2		HEX	
QB	4		HEX	
QB	5		HEX	
//St	:ate\o	rd v RxD:	ataLEN、RxDataC	NT
IW	3		HEX	
IB	5		HEX	
IB	6		HEX	

Figure 4-3-109

Receive data test: The module will automatically enter the receive mode after being configured in free-running mode, or write16#00C2 actively switches to receiving mode. After connecting using the serial port assistant, send "11, 22, 33, 44" in HEX mode. As shown in the following figure, the data sent by the serial port assistant can be received in the receiving data of the monitoring table.



Addres	5 8	Symbol	Display format	Status value		
//DF50	)-M-10	OM-23	2/485/422			
//F: F	Free-P	ort I	nput 0004 Bytes	3		
IW	15		HEX	W#16#1122		
IW	17		HEX	¥#16#3344		
//F: F	Free-P	ort O	utput 0004 Byte	es		
QW 2	256		HEX	W#16#0000		
QW 2	258		HEX	W#16#0000		
//Ctr]	LWord	TxDat	taLEN、TxDataCN	IT		
QW	2		HEX	W#16#0000		
QB	4		HEX	B#16#00		
QB	5		HEX	B#16#00		
//Stat	teWord	l v RxDa	ataLEN、RxDataC	INT	11 22 33 44	4
IW	3		HEX	W#16#0003	11 22 33 44	±
IB	5		HEX	B#16#04		
IB	6		HEX	B#16#01		

Figure 4-3-110

The meaning of the status word is shown in the following table.  $\triangleright$ 

	Table 4.3.10	
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

The control word commands are shown in the following table.  $\triangleright$ 

	Table 4.3.11	
Command Value	Command Name	meaning
16#00C1	WRITECUSTOM	Free mode write data command
16#00C2	READCUSTOM	Free mode read data command



Send data test: set the control word to 16#00C1, set the send data length to 4 bytes, set the send sequence number to 1, assign values to Byte1-4 of the send data respectively, and then perform the write action together. The received 4Byte data can be read using the serial port assistant, as shown in the figure below: (To send again, just loop and accumulate the send sequence number)

-	Address	Symbol	Display format	Status value	Modify value	A
	//DF50-M-	-1COM-23	2/485/422			
	//F: Fre	e-Port I	nput 0004 Byte:	5		
	IW 15		ΗĒΧ	W#16#1122		55 66 77 88
	IW 17		ΗĒΧ	W#16#3344		
	//F: Fre	e-Port O	utput 0004 Byt	95	2	
	QW 256		ΗEX	W#16#5566	W#16#5566	
	QW 258		ΗEX	W#16#7788	₩ <b>#</b> 16 <b>#</b> 7788	
	//CtrlWo	rd v TxDa	taLEN、TxDataCN	IT		
	QW 2		ΗEX	W#16#00C1	W#16#00C1	
	QB 4		ΗEX	B#16#04	B#16#04	
	QB 5		ΗEX	B#16#01	B#16#01	
	//StateW	ord . RxD	ataLEN v RxDataC	INT		
	IW 3		ΗEX	W#16#0000		
	IB 5		ΗEX	B#16#04		
	IB 6		HEX	B#16#01		

Figure 4-3-111First send

4	Address	Symbol	Display format	Status value	Modify value	A
1,	/DF50-M-	1COM-23	2/485/422			5.07
1	/F: Free	-Port I	nput 0004 Byte:	5		
I	₩ 15		HEX	₩#16#1122		55 66 77 88 55 66 77 88
I	₩ 17	-	HEX	₩#16#3344		
1,	/F: Free	-Port O	utput 0004 Byte			
Q1	₩ 256		HEX	₩#16#5566	W#16#5566	
Q1	₩ 258		ΗEX	₩#16#7788	W#16#7788	
1,	/CtrlWor	d v TxDa	taLEN , TxDataCN	IT		
Q	₩ 2		HEX	₩#16#00C1	W#16#00C1	
Q	B 4		HEX	B#16#04	B#16#04	
Q	B 5		HEX	B#16#02	B#16#02	
1,	/StateWo	rd NRxD	ataLEN 🛛 RxDataC	NT		
I	₩ 3		ΗEX	₩#16#0000		
I	B 5		ΉΕΧ	B#16#04		d
I	B 6		HEX	B#16#01		

Figure 4-3-112Second send

> If you need to receive data, you need to set the control word to 16#00C2 after sending the data before you can receive the data.



3.8.3. Modbus RTU Slave mode usage routine

➢ In the Modbus Interface Module, set the mode to Modbus RTU slave mode. The default value of SlaveAddr is "1" and can be modified as shown in the figure below.

	Value
🖃 🔄 Parameters	
🗄 🔄 Module Config Parameters	
- OperationMode	Modbus RTU Slave
– <mark>∭</mark> Interface	RS485
– <mark>∭</mark> Parity	None
– <mark>∭</mark> DataBits	8bits
– StopBit	1Bit
– <mark>∭</mark> Baudrate(bps)	115200bps
– IntervalTime(ms)	0
_≝ ModbusSlaveAddr	



Add the S: Modbus Status Input (1 Word) module to the second subslot. See Table 4.3.12 for its data structure.

SystemDiegnostic	XXXXX	1	20		Pull	⊞ 🛄 M: Write Coils (Oxxxx)
AdepterDigitelInput	22222	0			Pull	🕀 🔄 M: Write Holding Registers (4x;
DF50-1-1C01-232/485/422	3005	ĺ.		2038		
Modhus Interface Module				2038	Pull	S: Modbus Status Input(1 Wo
S: Modbus Status Input(~ <		Z56.			Full	E C P WILL P (UXXXX)
12.70 C		· · · ·				⊕ — S: Read Holding Registers (4xx:

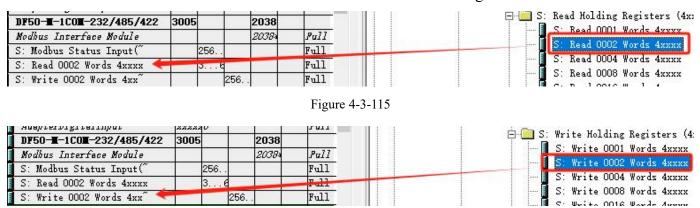
Figure 4-3-114

	-	
	Table 4.3.12	
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	

➢ From the 6 types starting with S, select the one you need and add it to the third subslot. If you need to read and write more data, you can add different subslot types continuously, up to 28 subslots, plus the first interface subslot and diagnostic subslot, a total of 30 subslots. Enter the submodule configuration page to configure the protocol information, and set the register first address for both reading and writing. Add S: Read 0002 Words 4xxxx and S: Write 0002 Words 4xxxx as shown in Figures 4-3-112 and 4-3-113.





➢ As shown in the figure below, click S: Write 0002 Words 4xxxx to enter the property interface and change the starting address to 100.

	Properties - S: Write 0002 Words 4xx~	
_	General Addresses Parameters STEP	2
(1) DF50-C-PN-RT		Value
Module	🖃 🔄 Parameters	
	🗄 🔄 Module Config Parameters	
PN-10	LE Start Address	100
Port 0 - RJ45		السل
] Port 1 - RJ45		
SystemDiegnostic	5	
AdepterDigitelInput		
DF50-1-1C01-232/485/422		
Modhus Interface Module	3	
S: Modbus Status Input(~		
S: Read 0002 Words 4xxxx	STEP1	
S: Write 0002 Words 4xx	SILFI	

Figure 4-3-117

> The meanings of the two sub-slots added now are as follows:

S: Read 0002 Words 4xxxx contains 2 word data. According to the configuration information, the data represents the register value at address 0-1.

S: Write 0002 Words 4xxxx contains 2 words of data. According to the configuration information, the data will be written to the register at address 100-101.



> Download the configuration to the device. Fill in the information we need into the monitoring table for monitoring as shown below.

Address St		Symbol	Display format
//DF	750-M-	1COM-23	2/485/422
//S:	Read	0002 W	ords
IΨ	3		HEX
IΨ	5		HEX
//S:	Writ	e 0002	Words
Q₩	256		HEX
QW	258		HEX



➤ Use Modbus Poll software to create two new master stations to communicate with the module, as shown in the figure below, with the starting addresses being 0 and 100 respectively.

勞 Mbpoll1 Tx = 53: Err = 0: ID = 1: F = 03: SR =			Mbpoll2     Tx = 14: Err = 0: I	D = 1: F = 03: SR =
	Alias	00000	Alia	
0		0	0	0
1		0	1	0



➤ After changing the data format to HEX and writing "11, 22" into the 0th-1st register in the first master station, the monitoring table is displayed as shown in the figure below.

		Address	Symbol	Display format	Status value
00000	1	//DF50-M-	1COM-232	2/485/422	
0x0011	2	//S: Read	1 0002 Wa	ords 👝	
0x0022	3	IW 3		HEX	₩#16#0011
	4	IW 5		HEX	W#16#0022
	5	//S: Writ	e 0002 ł	Yords 🕒	
0	6	QW 256		HEX	W#16#0000
0	7	QW 258		HEX	₩#16#0000

Figure 4-3-120

➤ After writing "33, 44" to subslot 4 in the monitoring table, the second master station is displayed as shown below.

			Address	Symbol	Display format	Status value	Modify value
s	00100	1	//DF50-M-	-1COM-23	2/485/422		9. 
	0x0033	2	//S: Rea	d 0002 W	ords		
	0x0044	3	IW 3		HEX	₩#16#0011	
	0	4	IW 5		HEX	₩#16#0022	
-		5	//S: Writ	te 0002	Words	r	1
	0	6	QW 256		HEX	₩#16#0033	W#16#0033
	0	7	QW 258		HEX	₩#16#0044	W#16#0044
						and the second se	



Figure 4-3-121

### 3.9. IO-LINK module usage routine

This example uses the DF50-C-PN-RT + DF50-M-4IOL topology. For wiring methods, please refer

to Chapter 3, Section 18.2, After adding the module, it will look like the following figure.

SystemDiegnostic	******	12	01
AdepterDigitelInput	******	0	
DF50-I-4IOL	30050002841		
10-link State		3 14	25
IOL_I/0_02/02_byte		1517	256258
IOL_I_OO_byte		18	
IOL_O_OO_byte			259



> The submodules that can be added to PORT0~PORT3 are as follows.

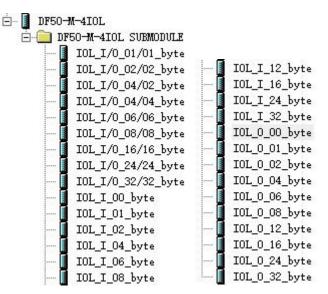


Figure 4-3-123

		Table 4.	.3.13		
IOL_I/O_01/01_byte	Input 1 byte	IOL_I_00_byte	Enter 0 bytes for	IOL_O_00_byte	Output 0 bytes,
	Output 1 byte		DI mode		used in DO mode
IOL_I/O_02/02_byte	Input 2 bytes	IOL_I_01_byte	Input 1 byte	IOL_O_01_byte	Output 1 byte
	Output 2 bytes				
IOL_I/O_04/02_byte	Input 4 bytes	IOL_I_02_byte	Input 2 bytes	IOL_O_02_byte	Output 2 bytes
	Output 2 bytes				
IOL I/O 04/04 byte	Input 4 bytes	IOL I 04 byte	Input 4 bytes	IOL O 04 byte	Output 4 bytes
	Output 4 bytes				
IOL_I/O_06/06_byte	Input 6 bytes	IOL_I_06_byte	Input 6 bytes	IOL_O_06_byte	Output 6 bytes
	Output 6 bytes				
IOL_I/O_08/08_byte	Input 8 bytes	IOL_I_08_byte	Input 8 bytes	IOL_O_08_byte	Output 8 bytes
	Output 8 bytes				
IOL I/O 16/16 byte	Input 16 bytes	IOL I 12 byte	Input 12 bytes	IOL O 12 byte	Output 12 bytes
	Output 16 bytes				
IOL I/O 24/24 byte	Input 24 bytes	IOL I 16 byte	Input 16 bytes	IOL O 16 byte	Output 16 bytes
	Output 24 bytes				
IOL I/O 32/32 byte	Input 32 bytes	IOL I twenty	Input 24 bytes	IOL_O_twenty	Output 24 bytes
	Output 32 bytes	four_byte		four_byte	
		IOL_I_32_byte	Input 32 bytes	IOL_O_32_byte	Output 32 bytes



3.9.1. IO-LINK State information

➤ After adding the DF50-M-4IOL module, there is a default slot "IO-LINK State" to display the status information of each port of the module. Fill in the IO-LINK State address into the monitoring table as shown below. For the specific meaning of State, please refer to <u>Chapter 3, Section 18.4.2</u>.

-	Addre	55	Symbol	Display format	Status value	Modify value
		0-M-4I				
- martine	//Por	tO Eve	nt code	PortO Working	status;PortO	Communication status
······	IW	3		HEX	₩#16#0000	
······	I	5.5		BOOL	🚺 true	
······	I	5.6		BOOL	false	
and the second	//Por	t1 Eve	nt code	Port1 Working		Communication status
	IΨ	6		HEX	₩#16#1800	
and the second	I	8.5		BOOL	false	
	I	8.6		BOOL	📘 true	
Number of Street, or S	//Por	t2 Eve	nt code	Port2 Working	status;Port2	Communication status
	IΨ	9		HEX	₩#16#1800	
······	I	11.5		BOOL	false	
	I	11.6		BOOL	📘 true	
	//Por	t3 Eve	nt code	Port3 Working	status;Port3	Communication status
······	IΨ	12		HEX	₩#16#0000	
	I	14.5		BOOL	false	
	I	14.6		BOOL	false	
	//Por	tO com	mand			
	QB	2		HEX	B#16#00	
	//Por	tl com	mand			
	QB	3		HEX	B#16#00	
	//Por	t2 com	mand			
	QB	4		HEX	B#16#00	
······	//Por	t3 com	mand			
	QB	5		HEX	B#16#00	

#### Figure 4-3-124

PORT0 is connected to an IO-link slave, the event code is displayed as "16#0", the working status is "TRUE" indicating that it is in normal working state, and the communication status is "FALSE" indicating that it is in slave connection state.

> PORT1 and PORT2 are not connected to the device, and the event code is displayed as "16#1800".

According to the port event code, the IO-LINK slave is offline. The working status is "FALSE", indicating that it is in an incorrect working state, and the communication status is "TRUE", indicating that the slave is disconnected.

> PORT3 is the monitoring information when it is not configured.

As shown in the figure below, writing "0x01" in Port1 Command can clear the event code of Port1.

# DEGSON

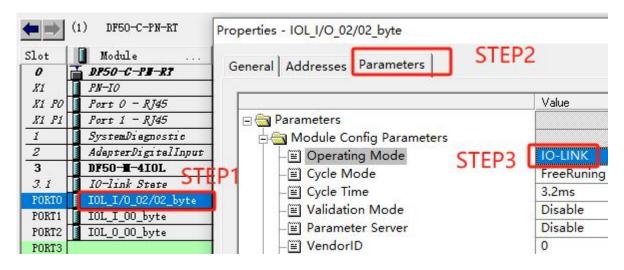
Addr	dress Symbol Display format Sta		Status value	Modify value	
//DF	50-M-41	OL			
//Po	rt0 Eve	nt code	;PortO Working	status;PortO	Communication status
IW	3		HEX	₩#16#0000	
I	5.5		BOOL	🚺 true	
I	5.6		BOOL	false	
//Po	rt1 Eve	nt code	Port1 Working	status;Port1	Communication status
IW	6		HEX	W#16#0000	
I	8.5		BOOL	false	
I	8.6		BOOL	📘 true	
//Po	rt2 Eve	nt code	;Port2 Working	status;Port2	Communication status
IΨ	9		HEX	W#16#1800	
I	11.5		BOOL	false	
I	11.6		BOOL	📘 true	
//Po	rt3 Eve	nt code	;Port3 Working	status;Port3	Communication status
I₩	12		HEX	W#16#0000	
I	14.5		BOOL	false	
I	14.6		BOOL	false	
//Po	rt0 com	mand	<u>.</u>		
QB	2		HEX	B#16#00	
//Po	rt1 com	mand	<u>.</u>		
QB	3		HEX	B#16#01	B#16#01
//Po	rt2 com	mand	<u>.</u>		
QB	4		HEX	B#16#00	
//Po	rt3 com	mand	L		
QB	5		HEX	B#16#00	

Figure 4-3-125



### 3.9.2. IO-LINK Mode

As shown in the figure below, configure PORT0 to IO-link mode. The default mode is IO-link mode. For other configurable information, please refer to<u>Chapter 3, Section 18.3</u>ISDU is configured according to the instructions of the IO-Link slave you are using. The IO-Link slave used in this tutorial does not have a configurable ISDU. Note that you must re-download the configuration after the configuration is complete.





Fill in the Port0 address in the monitoring table. For its meaning, please refer to <u>Chapter 3, Section</u> 18.4.2.

Add	ress	Symbol	Display format	Status value
//D:	I:C/Q DI	;Valid	bit;Process dat	ta;Process data
I	15.0		BOOL	
I	15.1		BOOL	
I	15.2		BOOL	
IB	16		ΗEX	
IB	17		HEX	
//C/	/Q DO;Va	lid bit	Process data;	Process data
Q	256.1		BOOL	
Q	256.2		BOOL	
QB	257		HEX	••••••••••••••••••••••••••••••••••••
QB	258		HEX	



Data reception: As shown in the figure below, if the Valid bit is "TRUE", it means the received data is valid, and the Process data is the received data. The data received this time is "16#08". In this mode, the DI and C/Q DI bits are invalid.



Add	ress	Symbol	Display format	Status value
//D:	I;C/Q DI	;Valid	bit;Process da	ta;Process data
I	15.0		BOOL	false
I	15.1		BOOL	false
I	15.2		BOOL	true 🛛
IB	16		HEX	B#16#08
IB	17		HEX	B#16#00
//C,	(Q DO;Va	lid bit	;Process data;	Process data
Q	256.1		BOOL	false
Q	256.2		BOOL	false
QB	257		HEX	B#16#00
QB	258		HEX	B#16#00

Figure 4-3-128

Data sending:Setting the Valid bit to "TRUE" or "FALSE" indicates whether the sent data is valid. The Process data is the sent data, and this time "16#0F" is sent. In this mode, the C/Q DO bit is invalid.

Add	ress	Symbol	Display format	Status value	Modify value
//D3	I:C/Q DI	;Valid	bit;Process da	ta;Process dat	a
I	15.0		BOOL	false	
I	15.1		BOOL	false	
I	15.2		BOOL	👖 true	
IB	16		HEX	B#16#08	
IB	17		HEX	B#16#00	
//C/	(Q DO;Va	lid bit	;Process data;I	Process data	
Q	256.1		BOOL	false	
Q	256.2		BOOL	false	
QB	257		HEX	B#16#0F	B#16#0F
QB	258		HEX	B#16#00	

Figure 4-3-129



## 3.9.3. DI/DO mode

As shown in the figure below, configure Port1 to DI mode and Port2 to DO mode. The default mode is IO-link. Note that you need to re-download the configuration after the configuration is completed.

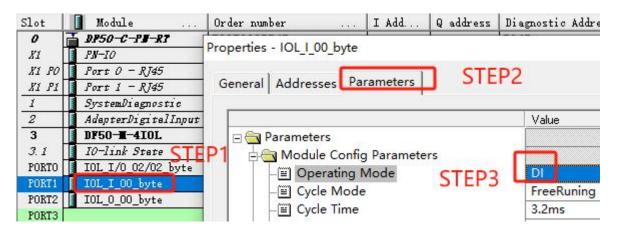


Figure 4-3-130Configured as DI

Slot	Module	Order number		I Add	Q address	Diagnostic Addre
0	₩ DISO-C-PI-RT	Properties - IOL O (	00 byte			
XI	PN-IO		- /			
X1 PO		General Address	er Par	ameters	STEP	0
_ X1 P1	Port 1 - RJ45	Ceneral Address	es <u></u>		SIEP	2
1	SystemDiegnostic					Ture
2 3	AdepterDigitelInput		-12)			Value
3	DF50-I-4IOL	📃 🖃 🔄 Parameter				
3.1	IO-link State	📄 🔤 🔂 Module	e Config	Paramete	rs	
PORTO	IOL_I/0_02/02-17ED	1 – 🗐 Ope	rating N	1ode	STEP3	DO
PORT1	IOL I OO byte	- 🗐 Cycle	Mode		STEL	FreeRuning
PORT2	IOL_0_00_byte	- 🗐 Cycle				3.2ms

- Figure 4-3-131Configured as DO
- Fill in the Port1 and Port2 addresses in the monitoring table. For their meanings, please refer

to<u>Chapter 3, Section 18.4.2</u>For wiring method, please refer to<u>Chapter 3, Section 18.2.2</u>.

Add	lress S	ymbol Display for	mat Status value
//P	ort1 D1;Po	rt1 C/Q DI	
I	18.0	BOOL	false
Ι	18.1	BOOL	false
//P	ort2 C/Q D	) )	
Q	259.1	BOOL	false



➤ Input valid signals to Port1 DI and Port1 C/Q DI. As shown in the figure below, you can see that the corresponding address becomes "TURE".



Address		Symbol Display for	mat Status value
//P	ort1 D1;Pc	rt1 C/Q DI	
I	18.0	BOOL	🚺 true
I	18.1	BOOL	🚺 true
//P	ort2 C/Q I	0	
Q	259.1	BOOL	false

Figure 4-3-133

➢ As shown in the figure below, write "TRUE" to Port2 C/Q DO, and use a multimeter to measure the voltage of C/Q2 port, and you can measure the voltage to be 24V.

Address	Symbol	Display format	Status value	Modify value
//Port1	D1;Port1 C	/Q DI		
I 1	8.0	BOOL	false	
I 1	8.1	BOOL	false	
//Port2	C/Q DO			
Q 25	9.1	BOOL	<b>t</b> rue	true

