DF50-C-MD-TCP Adapter

User's Manual
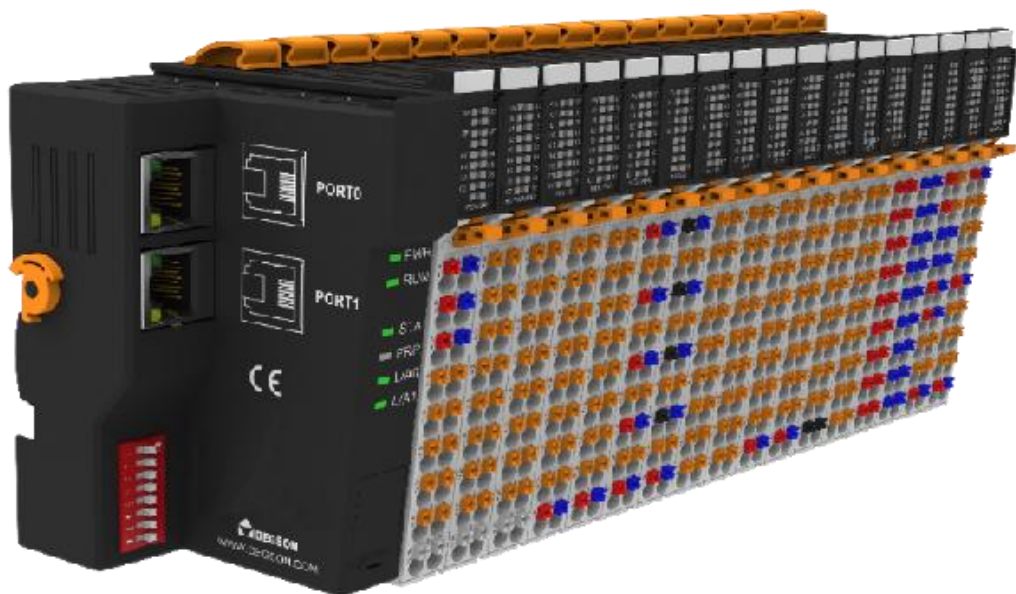
Versions of records

Date	Version	Description
18/10/2024	v1.0.2	New DF50-M-32DI-P/N、DF50-M-4DOR、DF50-M-4DO-P-2A、DF50-M-32DO-N、DF50-M-32DO-P、DF50-M-16DI-16DO-N、DF50-M-16DI-16DO-P added.
17/4/2024	v1.0.1	New TIA Portal V16 configuration process has been added to the software configuration description; new Chapter 5 address description has been added; new Chapter 6 address layout example has been added;
22/3/2024	v1.0.0	The version of this release.

Catalog

Preamble

Scope of application of this document

This document applies to the DF50 Series Remote IO System

Content Introduction

This manual introduces the technical specifications, installation, and commissioning about DF50 series remote I/O modules.

The main elements include：

➢ System Overview: It mainly introduces the product ordering information of DF50 series remote I/O modules as well as the product composition, system architecture, and product transportation and storage environment;

➢ Product Description: Introduces the technical parameters of DF50 series remote I/O modules;

➢ Installation and Removal Guide: Introduces the installation and removal of DF50 series remote I/O modules, etc;

➢ Mechanical and Electrical Diagrams: DF50 Remote IO Module Dimensional and Electrical Wiring Diagrams;

➢ User's Guide: Introduces the communication between DF50 series remote I/O modules and each mainstream PLC through examples.

Caveat

➢ This document describes in detail how to use the DF50 Series Remote I/O Module and is read in the context of people with some engineering experience. DEGSON is not responsible for any consequences arising from the use of this material.

➢ Before attempting to use the equipment, read the precautions related to the equipment carefully and be sure to observe the installation and commissioning safety precautions and operating procedures. The hazards and extent of damage that may result from incorrect use of the equipment are indicated by the symbols below.

DANGER

Imminent risk to life!

Notes with the signal word Danger warnyou of situations which will result in seriousnjury or death if you do not follow the instructions given in this manual.

WARNING

Possible danger to life!

Notes with the signal word " Warning " warnyou of situations which may result in seriousinjury or death if you do not follow the instructions given in this manua

ATTENTION

Material damageNotes

With the signal word " Attention " warn you of hazardswhich may result in material damage

Applicable objects

➢ This manual provides information on the installation and commissioning of the DF50 Series Remote I/O Modules and is designed for engineers, installers, maintenance personnel and electricians with a general knowledge of automation.。

Recycling and disposal

➢ To ensure that your old equipment is recycled and disposed of in an environmentally friendly manner, contact a certified e-waste processor.

Ⅰ、Installation and disassembly

1 Installation Methods

➢ The DIN rail lock on the bottom of the module can be mounted safely and securely on a 35 mm DIN rail. To mount the module, align the notch, push the module against the DIN rail and place the module on the DIN rail.

➢ When mounting the adapter, there is a manual snap above and to the left for locking the rail.
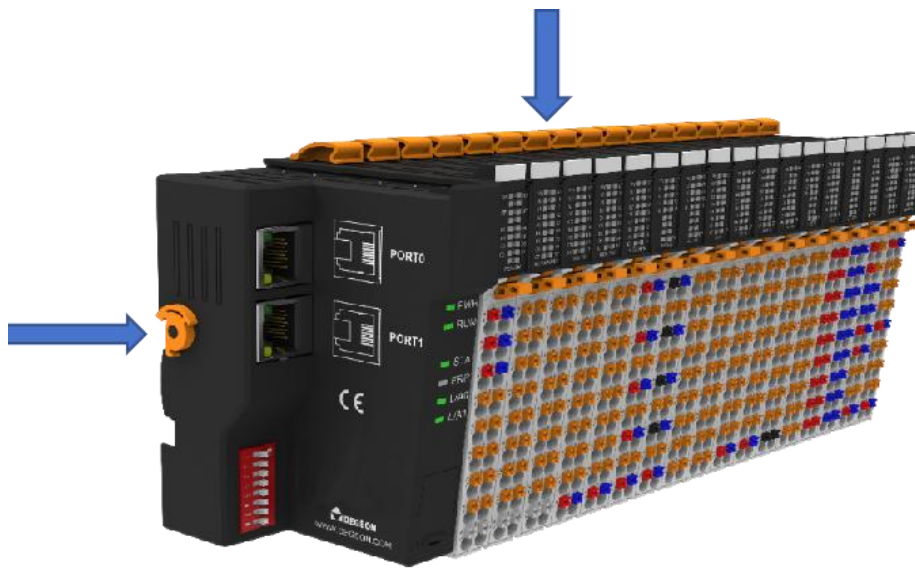
2 Grounding protection

➢ On the back of the module there is a metal splinter for effective grounding with the rail, the metal splinter is connected to the inside of the ground PE of the adapter module.
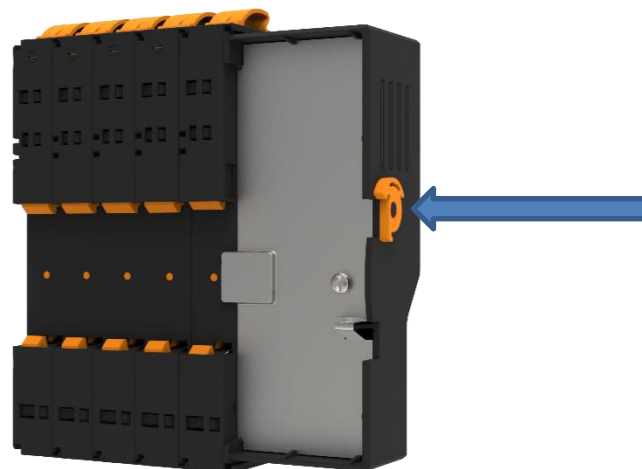
3 Disassembly Methods

3.1 Module disassembly

➤ You should first remove all signal or power cables from the module, then press the snap pins (at the upper arrow) and also open the rail locks clockwise (at the left arrow) when removing the adapter module.

3.2 Terminal Disassembly

➤ Terminals are individually removable by pushing down on the clips.
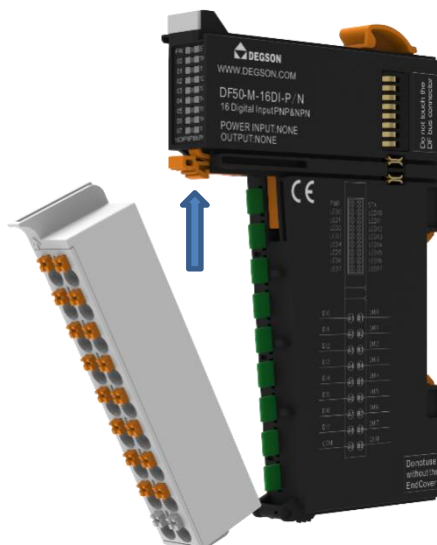
3.3 Cold pressed terminals

➤ It is recommended to use cables with cores less than 1.5 mm². The parameters of the cold pressed terminals are referenced as follows.
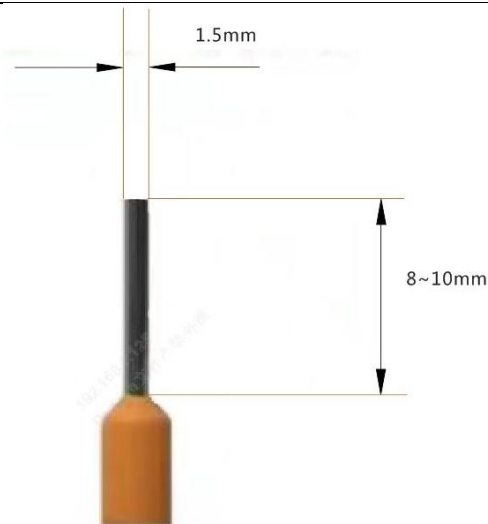
➢ The terminal buttons are recommended to be pressed down with a 0.4*2.5 screwdriver.

4 Caveat

➢ If you encounter a situation where a module is difficult to install, do not use brute force to install it, so as not to damage the current module or other modules; you should remove the module from the rail, check whether there is any abnormality in the module (e.g., blockage by foreign objects, etc.), and then plug and unplug it after confirming that there is no problem.

Ⅱ、Fieldbus Adapters

Fieldbus systems	Description	Model
Modbus	ModbusTCP bus, 2 RJ45, expandable by 32 modules, 24VDC	DF50-C-MD-TCP

1 ModbusTCP Fieldbus Adapters (DF50-C-MD-TCP)

➢ Extended IO module is feature-rich, IO module contains digital, analog, temperature, pulse and other types, flexible combination of expansion, can be applied to different occasions. Strong compatibility, the communication interface of the adapter meets the MODBUS/TCP communication standard and supports various mainstream MODBUS/TCP master stations.

➢ It is also equipped with a dual-port switch that makes it easy to create a wire fabric without using any other network components.

➢ Support web interface module parameter configuration.

➢ Supports error diagnosis, adapters are labeled with error indicators, and each module also supports fault alarms, making testing and maintenance simple and convenient.

1.1 Specification parameters

Technical Information	
Specification parameters	ModbusTCP bus, 2 RJ45, expandable by 32 modules, 24VDC
Product Description	ModbusTCP
Connection Methods	2 X RJ45 with integrated switch functionality
Transmission rate	10/100Mbps，full duplex (networking)
Transmission distance	100 meters
Number of expandable modules	32
Address mapping	Supporting.
Bus Address Setting	ModbusTCP specification
Transmission medium	Category 5 twisted pair
Isolation method	Electrically isolated from the field
Alarm function	Diagnostic alarms, process alarms

Minimum cycle time	1ms
Connection Methods	PUSH-IN type terminal block
Internal system electrical terminal rated voltage input	24V DC（20.4V DC～28.8V DC）
Rated current input to internal system electrical terminals	0.75A（Typical value at 24V）
Internal system electrical rated voltage output	5VDC
Internal system electrical rated current output	2A
Rated voltage input for internal load terminals	24V DC（20.4V DC～28.8V DC）
Rated current input for internal load electrical terminals	0.75A（Typical value at 24V）
Internal load electrical rated voltage output	24V DC（20.4V DC～28.8V DC）
Internal load current rated output	0.75A（Typical value at 24V）

DI parameters	
Number of channels	8
Signal Type	NPN & PNP
signal range	"ON" signal voltage	Differential pressure >11VDC (Differential pressure to common terminal input)
	"OFF" signal voltage	Differential pressure <5VDC (Differential pressure to common terminal input)
Data Size	1 Byte
Connection Type	1-wire, Type 1/Type 3, referenced to IEC 61131-2
Filter time	Configurable
Input Impedance	>7.5kΩ
Input Action Display	Input indicator is on when input is driving state
IO Mapping	Supports per-bit access

Wiring parameters	
Connection technology: communication / fieldbus	ModbusTCP IO: 2 x RJ45
Connection technology	PUSH-IN Type Terminal Block
Connection type	System/site power supply/input
Crimp area of the conductor	0.14～1.5mm2/26～16AWG
Stripped wire length	8～10mm
Mounting method	DIN-35 rail

Material Parameters	
Color Black	Color Black
Housing material PC plastic, PA66	Housing material PC plastic, PA66
Conformance Mark CE	Conformance Mark CE

Environmental Requirements	
Permissible ambient temperature (operating)	-25～60℃
Permissible ambient temperature (storage)	-40～85℃
Type of protection	IP20
Pollution level	2, in accordance with IEC 61131-2 standard
Operating Altitude	Temperature without derating: 0～2000m
Relative humidity (non-condensing)	5～95%RH
Vibration Resistance	1g according to IEC 60068-2-6
Shock Resistance	15g according to IEC 60068-2-27
EMC Anti-Interference Rating	Complies with IEC 61000-4
Corrosion resistance	Complies with IEC 60068-2-42 and IEC 60068-2-43
Permissible H2S pollutant concentration at 75 % relative humidity	10ppm
Permissible SO2 pollutant concentration at 75 % relative humidity	25ppm

1.2 Hardware interfaces

1.2.1 Terminal Block Definition

Terminal No.	Signal Terminal No.	Terminal Serial Number	Signal	Clarification
A1	Sys-24V	B1	Sys-0V	System power
A2	Field-24V	B2	Field-0V	Load power supply
A3	Field-24V	B3	Field-0V	
A4	PE	B4	PE	Safely
A5	DI0	B5	DI4	DI signal input
A6	DI1	B6	DI5	
A7	DI2	B7	DI6	
A8	DI3	B8	DI7	
A9	COM	B9	COM	Public end

Note: It is recommended to use two mutually isolated 24V power supplies to provide 2 separate power supplies for the adapter to achieve optimal anti-interference performance.

1.2.2 LED Indicator Definition
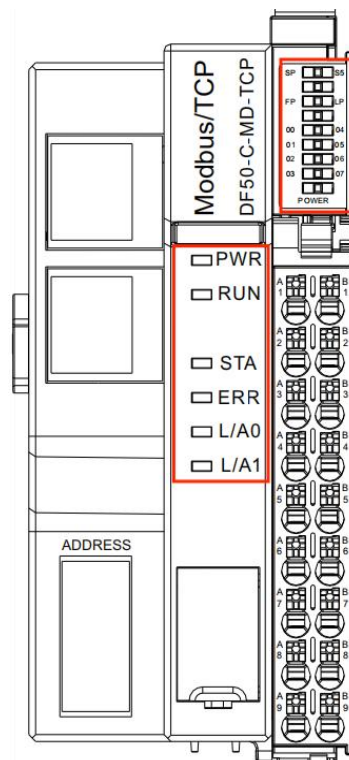
Indicator light	Statuses	Implications
PWR	Green light	Normal power supply operation
	Green off	Power supply runs abnormally
RUN	Green Bright	Coupler operation normal
	Green Out	Abnormal coupler operation
STA	Green flash	Module operation normal
	Green out	Module operation abnormal
ERR	Red Bright	Abnormal communication between coupler and module
	Red out	Communication between coupler and module is normal
L/A0	Green Bright	Successful connection on port 1
	Green flash	Network port 1 has data communication
L/A1	Green Bright	Successful connection on port 2
	Green flash	Network port 2 has data communication
FP	Green light always on	Load power input is normal
	Green light off	Load power input abnormal
LP	Green light always on	Load power output is normal
	Green light off	Load power output abnormal
SP	Green light on	System power input normal
	Green light off	System power input abnormal
S5	Green light on	System power output normal
	Green light off	System power output abnormal

1.2.3 RJ45 interface
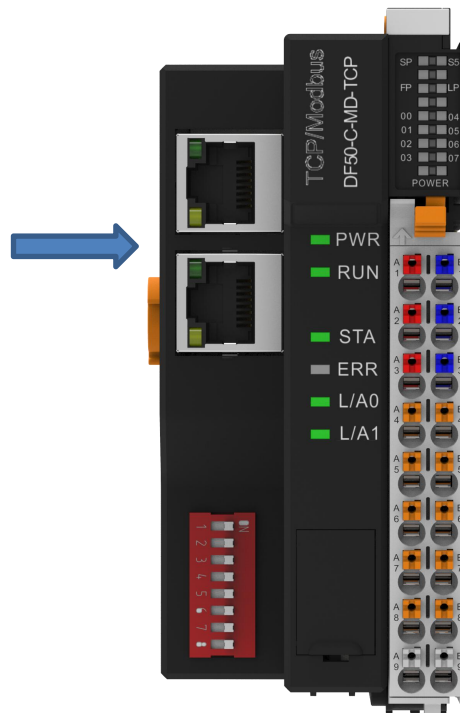
➢ The is used to establish communication with the host computer. The dual RJ45 ports make it easy to create a wire structure without using any other network components.

1.2.4 DIP switches and network settings
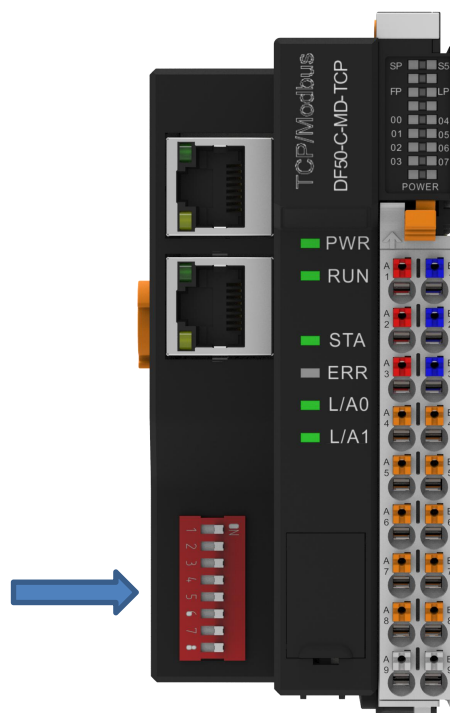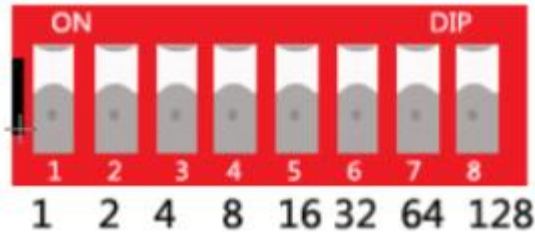
> As shown in the figure, ModbusTCP adapter module with a set of dip switches, dip switches have a total of 8 bits, bit 1, bit 2, bit 3, bit 4, bit 5, bit 6, bit 7, bit 8, each bit represents a numerical value, pushed to the ON position in turn represents 1, 2, 4, 8, 16, 32, 64, 128, dialed to the ON position represented by the value of the sum of the address code is the machine.

> Address 11 is: 1(Bit 1)+2(Bit 2)+8(Bit 4)=11, address 30 is: 2(Bit 2)+4(Bit 3)+8(Bit 4)+16(Bit 5)=30; the dial code all the way down represents 0.

> The dipswitch can be used to set the last byte of the IP address of the adapter module, i.e., segment D of IP land A:B:C:D. The ABC segment of the IP address can be configured via a web page.

> In particular, when the dip switch is dialed to 0 or 255, the ABCD segments of the adapter IP address all use the information configured by the web page, and when the dip switch is dialed to 254, the adapter IP address is fixed to 192.168.1.254. Therefore, when the IP address is lost, forgotten, or in other abnormal situations, the dip switch can be dialed to 254, and the IP address can be configured using the Therefore, when the IP address is lost or forgotten or other abnormalities occur, you can set the dip switch to 254 and use the 192.168.1.254 address to enter the web configuration to reconfigure the network information of the adapter.

> will be shipped with the dip switch set to 0 and the IP address configured as 192.168.1.254

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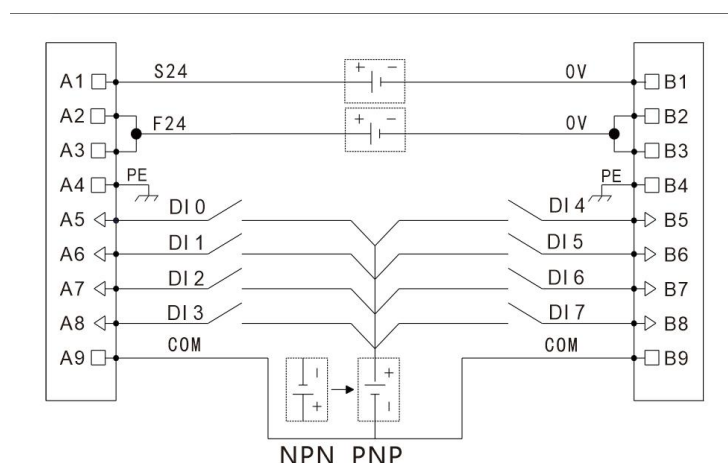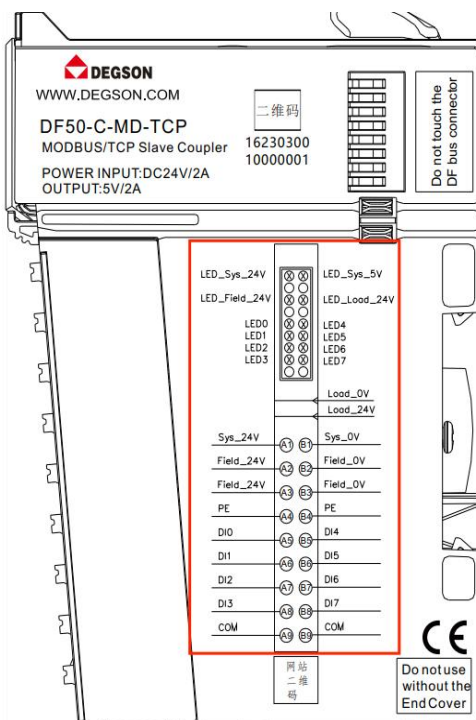
Note: COM is the common terminal, external 24V to realize NPN. external 0V to realize PNP.

1.2.6 Configure the interface
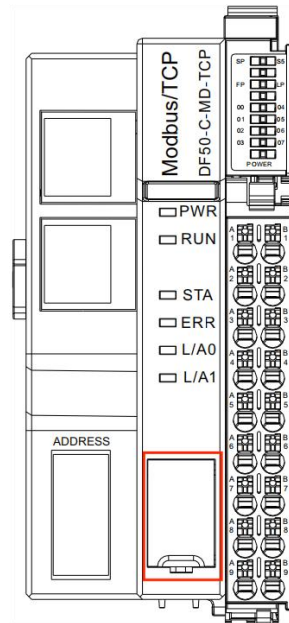
> Setting configuration interface, flip cover can be lifted up and open, easy to upgrade the firmware of the adapter.

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

1.3 Register allocation rules

1.3.1 Adapter comes with I/O input module Adaptor_IO register block

➢ The adapter has 8 channels of PNP/NPN digital inputs occupying 1 hold register and 8 discrete input status registers.

➢ Holding Register Block Data Structure Definition:

HoldReg	Byte	Format	Bit	Description	
0	IB0	Word	IX0.0	Adaptor_DI0	Adaptor_IO_HoldRegBlock Size:1
			IX0.1	Adaptor_DI1	
			IX0.2	Adaptor_DI2	
			IX0.3	Adaptor_DI3	
			IX0.4	Adaptor_DI4	
			IX0.5	Adaptor_DI5	
			IX0.6	Adaptor_DI6	
			IX0.7	Adaptor_DI7	
	IB1		IX1.0	Reserve 0x00	
			IX1.1		
			IX1.2		
			IX1.3		
			IX1.4		
			IX1.5		
			IX1.6		
			IX1.7		

➢ Discrete Input Status Register Block Data Structure Definition:

DiscReg	Byte	Format	Bit	Description	
0	IB0	Bit	IX0.0	Adaptor_DI0	Adaptor_IO_DiscRegBlock Size:8
1		Bit	IX0.1	Adaptor_DI1	
2		Bit	IX0.2	Adaptor_DI2	
3		Bit	IX0.3	Adaptor_DI3	
4		Bit	IX0.4	Adaptor_DI4	
5		Bit	IX0.5	Adaptor_DI5	
6		Bit	IX0.6	Adaptor_DI6	
7		Bit	IX0.7	Adaptor_DI7	

1.3.2 System Diagnostic Information Sys_DiagInfo Register Block

➢ System diagnostic information, occupying 101 holding registers, mainly includes disconnected output attributes, module error information, module type and firmware version information, module status information, Modbus configuration long connection time, and so on.

➢ Holding register block data structure definition:

HoldReg	Byte	Format	Description	
0	IB0	Word	Reserve 0x0000	Sys_DiagInfo_HoldRegBlock Size:101
	IB1			
1	IB2	Word	Hold	
	IB3			
2	IB4	Word	ModuleError	
	IB5			
3	IB6	Word	No.1 Module Info	
	IB7			
4	IB8	Word	No.2 Module Info	
	IB9			

	... ...		
34	IB68	Word	No.32 Module Info
	IB69		
35	IB70	Word	No.1 Module State
	IB71		
36	IB72	Word	No.2 Module State
	IB73		
	... ...		
66	IB132	Word	No.32 Module State
	IB133		
67	IB134	Word	Modbus Connect Time[16..31]
	IB135		
68	IB136	Word	Modbus Connect Time[0..15]
	IB137		
69	IB138	Word	No.1 Modbus Polling Time
	IB139		
	... ...		
100	IB200	Word	No.32 Modbus Polling Time
	IB201		

➢ Hold Disconnected Output Attribute (1:Hold Output 0:Clear Output)

➢ ModuleError 16-bit module error information (high 8-bit 1: error 0: no error low 8-bit module serial number, such as the first module internal bus communication error, error code is 0x0101, the second module communication error, error code is 0x0102, and so on)

➢ Module Info 16-bit module info (high 8-bit module type value, low 8-bit firmware version)

➢ Module State 16-bit module state (high 8-bit module serial number, low 8-bit error code)

➢ Modbus Connect Time 32-bit count value (Modbus Connect Time[0..15] low 16-bit Modbus Connect Time[16..31] high 16-bit duration of the current ModbusTCP connection from the time of establishment, zeroed for disconnection, and recounted for restoration of connection). (the connection is cleared when disconnected and recounted when it is resumed).

➢ Modbus Polling Time records the time period between the master sending and the module returning data, No.1 Modbus Polling Time is the response time of module 1, and so on.

1.4 Mechanical Installation

1.4.1 Mounting Dimensions

➢ Installation dimensional information is shown below, dimensions in (mm)：
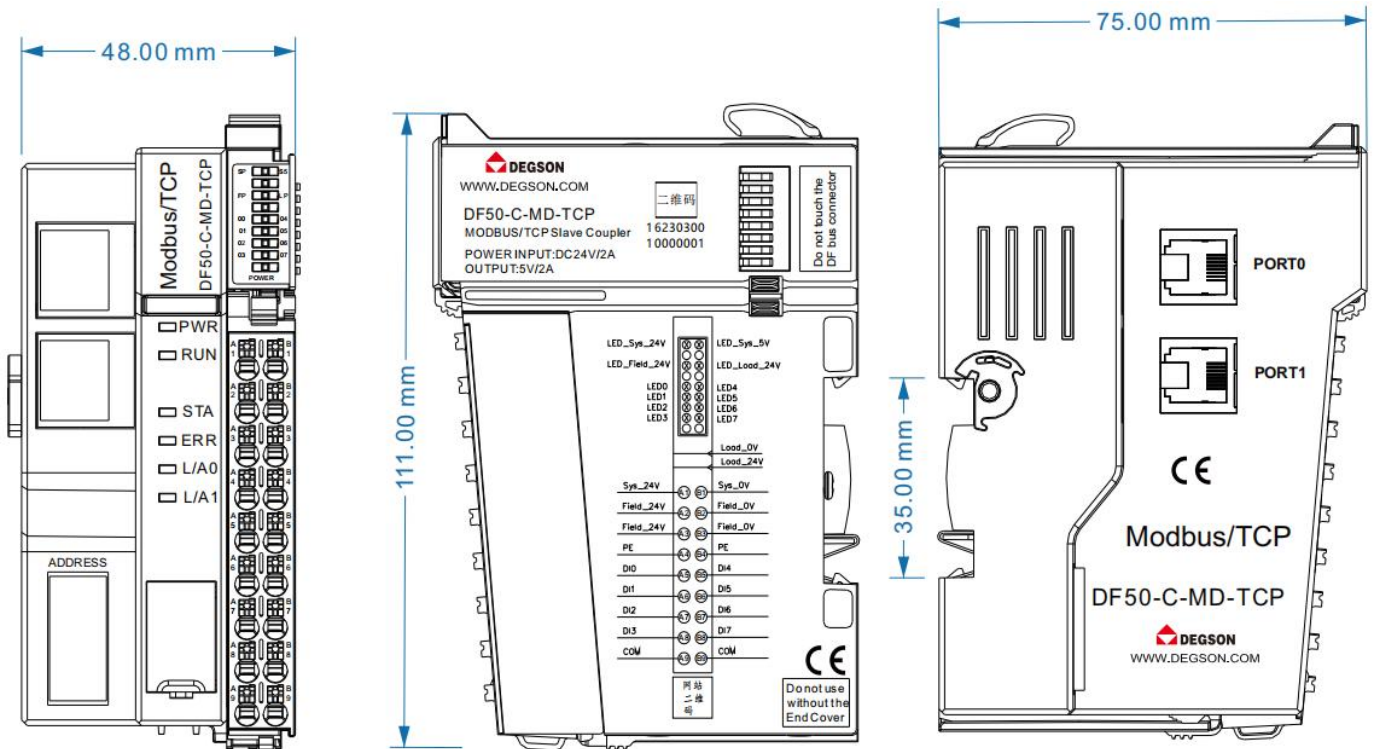
Ⅲ、 Expansion I/O Modules

Function	Description	Model
Digital Modules	Digital Inputs with Counter, 16 Inputs, PNP/NPN	DF50-M-16DI-P/N
Digital Modules	Digital Inputs with Counter, 16 Inputs, PNP/NPN	DF50-M-16DI-P/N-TS
Digital Modules	Digital Outputs, 16 Outputs, PNP	DF50-M-16DO-P
Digital Modules	Digital Outputs, 16 Outputs, NPN	DF50-M-16DO-N
Analog Modules	Analog Input, 4-Channel, Voltage-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-Channel, Current Type	DF50-M-8AI-I-5
Analog Modules	Analog Output, 4-Channel, Voltage-Current Type	DF50-M-4AO-UI-6
Analog Modules	Analog Output, 8-Channel, Voltage	DF50-M-8AO-U-4
Analog Modules	Analog Output, 8-Channel, Current	DF50-M-8AO-I-5
Temperature Modules	Thermocouple Measurement, 4 Channels	DF50-M-4RTD-PT
Temperature Modules	Thermocouple Measurement, 8 Channels	DF50-M-8TC
Pulse Counting Modules	24VDC Encoder Input/Pulse Output, 2 Channels	DF50-M-2CNT-PIL-24
Pulse Counting Modules	5VDC Encoder Input/Pulse Output, 2 Channels	DF50-M-2CNT-PIL-5
Voltage Distribution Modules	24VDC Voltage Distribution, 16 Channels	DF50-M-DC-U-24
Voltage Distribution Module	0VDC Voltage Distribution, 16 Channels	DF50-M-DC-U-0
Digital Modules	Digital Inputs, 32 Inputs, PNP/NPN	DF50-M-32DI-P/N
Digital Modules	Relay Module, 4 Channels	DF50-M-4DOR
Digital Modules	Digital Outputs, 4 Outputs, PNP, 2A per Channel	DF50-M-4DO-P-2A
Digital Modules	Digital Outputs, 32 Outputs, NPN	DF50-M-32DO-N
Digital Modules	Digital Output, 32 Outputs, PNP	DF50-M-32DO-P
Digital Modules	Digital Inputs and Outputs, 16 Inputs and 16 Outputs, NPN	DF50-M-16DI-16DO-N
Digital Modules	Digital Inputs and Outputs, 16 Inputs and 16 Outputs, PNP	DF50-M-16DI-16DO-P

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

➢ This digital input module receives control signals from field devices (e.g., sensors, etc.).

➢ 16-channel digital inputs, PNP & NPN valid, common terminal conversion.

➢ Each input module is equipped with an anti-interference filter.

➢ LED indicators for each input module.

➢ Isolation between field level and system level via opto-coupler.

➢ Protection class IP20.

1.1 Specification parameters

Technical Information		
Product Description		Digital Input Module, 16-Input, NPN & PNP, 24VDC
Number of Channels		16
Signal Type		NPN & PNP
Signal ranges	"ON" signal voltage	Differential pressure >11VDC (Differential pressure to common terminal input)
	"OFF"signal voltage	Differential pressure <5VDC (Differential pressure to common terminal input)
Hardware Response Time		200us/200us
Data Size		2 Byte
Connection Type		1-wire, Type 1/Type 3, refer to IEC 61131-2
Reverse Circuit Protection		Yes
Isolation Method		Optically isolated from the field layer
Error Diagnostics		Yes
Filter Time		0-40ms configurable
Input Impedance		>7.5kΩ
Input Action Display		Input indicator is on when the input is driven.
IO Mapping		Supports per-bit or per-word mapping
Power Supply Parameters		
System bus input power supply rated voltage		5V DC （4.75V DC~ 5.25V DC）
System bus input power supply rated current		45mA
Terminal power (common) input rated voltage	NPN Signal Type	24V
	PNP Signal Type	0V
Wiring parameters		
Connection technology: input		PUSH-IN type terminal block
Area of crimped wire		0.2~1.5mm²/26~16AWG
Stripped wire length		8~10mm²
Mounting method		DIN-35 rail
Material Parameters		
Color		Black
Shell Material		PC Plastic, PA66
Consistency mark		CE
Environmental Requirements		
Permissible ambient temperature (operating)		-25~60℃
Permissible ambient temperature (storage)		-40~85℃
Type of protection		IP20
Pollution level		2, in accordance with IEC 61131-2 standard
Operating Altitude		Temperature without derating: 0~2000m
Relative humidity (non-condensing)		5~95%RH
Vibration resistance		1g according to IEC 60068-2-6

Shock Resistance	15g according to IEC 60068-2-27
EMC Anti-Interference Rating	Complies with IEC 61000-4
Corrosion resistance	Complies with IEC 60068-2-42 and IEC 60068-2-43
Permissible H2S pollutant concentration at 75 % relative humidity	10ppm
Permissible SO2 pollutant concentration at 75 % relative humidity	25ppm

1.2 Hardware interfaces

1.2.1 Terminal Block Definition

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

1.2.2 LED Indicator Definition

Indicator light	Meaning		
PW	Green on:System bus power input normal		
	Green off:System bus power input abnormal		
ST	Power-up phase	Green on: module initialization abnormal	
		Green off: module initialization normal	
	Operation phase	Green flash: module internal bus works normally	
		Green off: module internal bus works abnormally	
00～07,10～17	Green on:Input signal is valid		
	Green off:Input signal is invalid		

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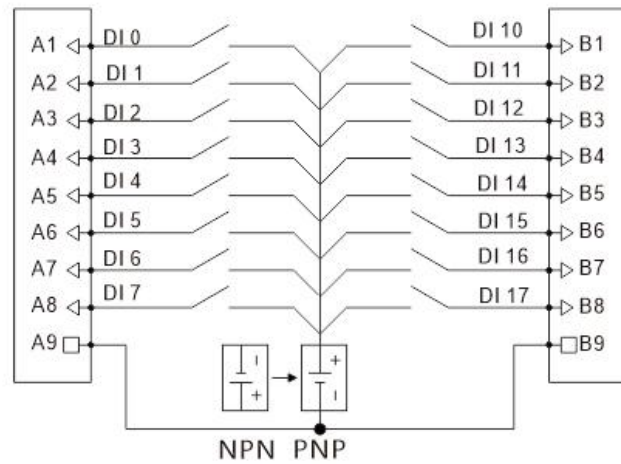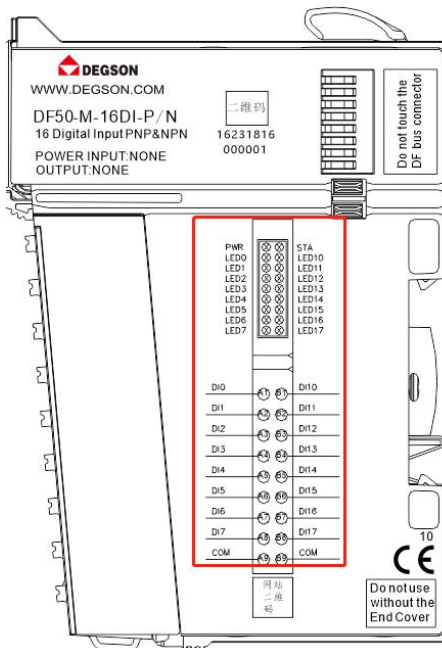
Note: COM is the common terminal, external 24V to realize NPN. external 0V to realize PNP.

1.3 Register allocation rules

A 16-channel PNP/NPN digital input module occupying 1 read-hold register and 16 discrete input status registers.

Register Type	Register PLC Address Interval	Register Modbus Protocol Address Interval	Function code	Read/Write Status
Discrete Input Status	10001~11032	0000H~0407H	02H	Read-only
Holding Register	43073~44048	0C00H~0FCFH	03H	Readable

Read Holding Register Block Data Structure Definition:

ReadHoldReg	Byte	Format	Bit	Description	
0	IB0	Word	IX0.0	DI0	DI16_MOD_ReadHoldRegBlock Size:1
			IX0.1	DI1	
			IX0.2	DI2	
			IX0.3	DI3	
			IX0.4	DI4	
			IX0.5	DI5	
			IX0.6	DI6	
			IX0.7	DI7	
	IB1		IX1.0	DI8	
			IX1.1	DI9	
			IX1.2	DI10	
			IX1.3	DI11	
			IX1.4	DI12	
			IX1.5	DI13	
			IX1.6	DI14	
			IX1.7	DI15	

Read discrete input status register block data structure definition:

ReadDiscReg	Byte	Format	Bit	Description	
0	IB0	Bit	IX0.0	DI0	DI16_MOD_ReadDiscRegBlock Size:16
1		Bit	IX0.1	DI1	
2		Bit	IX0.2	DI2	
3		Bit	IX0.3	DI3	
4		Bit	IX0.4	DI4	
5		Bit	IX0.5	DI5	
6		Bit	IX0.6	DI6	
7		Bit	IX0.7	DI7	
8	IB1	Bit	IX1.0	DI8	
9		Bit	IX1.1	DI9	
10		Bit	IX1.2	DI10	
11		Bit	IX1.3	DI11	
12		Bit	IX1.4	DI12	
13		Bit	IX1.5	DI13	
14		Bit	IX1.6	DI14	
15		Bit	IX1.7	DI15	

1.4 Mechanical Installation

Installation dimensional information is shown below, dimensions in (mm)：

2 16-Channel Digital Input with Counter/24VDC/PNP&NPN (DF50-M-16DI-P/N-TS)

➢ This digital input module receives control signals from field devices (e.g., sensors, etc.).

➢ 16-channel digital input with low-speed counting, PNP & NPN valid, common terminal conversion.

➢ Each input module has an anti-interference filter.

➢ Each input module with LED indicators

➢ Isolation between field level and system level via opto-coupler.

➢ Protection class IP20.

2.1 Specification parameters

Technical Information		
Product Description		Digital input counter module, 16 inputs, of which 8 channels have counting function.NPN & PNP，24VDC
Number of Channels		16
Signal Type		NPN & PNP
Signal ranges	"ON" signal voltage	Differential pressure >11VDC (Differential pressure to common terminal input)
	"OFF" signal voltage	Differential pressure <5VDC (Differential pressure to common terminal input)
Counting Function Channel，Channel parameter information	Counting Modes	Rising edge counting, falling edge counting, dual edge counting, configurable
	Counting Range	0~4294967296
	Maximum input frequency of counting channel	1KHz
	Count value clear function	Support.
Hardware response time		200us/200us
Filtering time for input channels without counting function		0~255ms configurable
Data Size		Input 34 Byte; Output 1 Byte
Connection Type		1-wire, Type 1/Type 3, refer to IEC 61131-2
Reverse Circuit Protection		Yes
Isolation Method		Optically isolated from the field layer
Error Diagnostics		Yes
Input Impedance		>7.5kΩ
Input Action Display		Input indicator is on when the input is driven.
IO Mapping		Supports per-bit or per-word mapping
Power supply parameters		
System bus input power supply rated voltage		5V DC （4.75V DC~ 5.25V DC）
System bus input power supply rated current		45mA
Terminal power (common) input rated voltage	NPN Signal Type	24V
	PNP Signal Type	0V
Wiring parameters		
Connection technology: input		PUSH-IN type terminal block
Area of crimped wire		0.2～1.5mm²/26～16AWG
Stripped wire length		8～10mm²
Mounting method		DIN-35 rail
Material Parameters		

Color	Black
Shell Material	PC Plastic, PA66
Conformance Mark	CE
Environmental Requirements	
Permissible ambient temperature (operating)	-25～60℃
Permissible ambient temperature (storage)	-40～85℃
Type of protection	IP20
Pollution level	2, in accordance with IEC 61131-2 standard
Operating Altitude	Temperature without derating: 0～2000m
Relative humidity (non-condensing)	5～95%RH
Vibration Resistance	1g according to IEC 60068-2-6
Shock Resistance	15g according to IEC 60068-2-27
EMC Anti-Interference Rating	Complies with IEC 61000-4
Corrosion resistance	Complies with IEC 60068-2-42 and IEC 60068-2-43
Permissible H2S pollutant concentration at 75 % relative humidity	10ppm
Permissible SO2 pollutant concentration at 75 % relative humidity	25ppm

2.2 Hardware interfaces

2.2.1 Terminal Block Definition

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

2.2.2 LED Indicator Definition

Indicator light	Meaning	
PW	Green on:System bus power input normal	
PW	Green off: System bus power input abnormal	
ST	Power-up phase	Green on: module initialization abnormal
ST	Power-up phase	Green off: module initialization normal
ST	Operation phase	Green flash: module internal bus works normally
ST	Operation phase	Green off: module internal bus works abnormally
00～07,10～17	Green on:Input signal is valid	
00～07,10～17	Green off:Input signal is invalid	

2.2.3 Wiring diagram
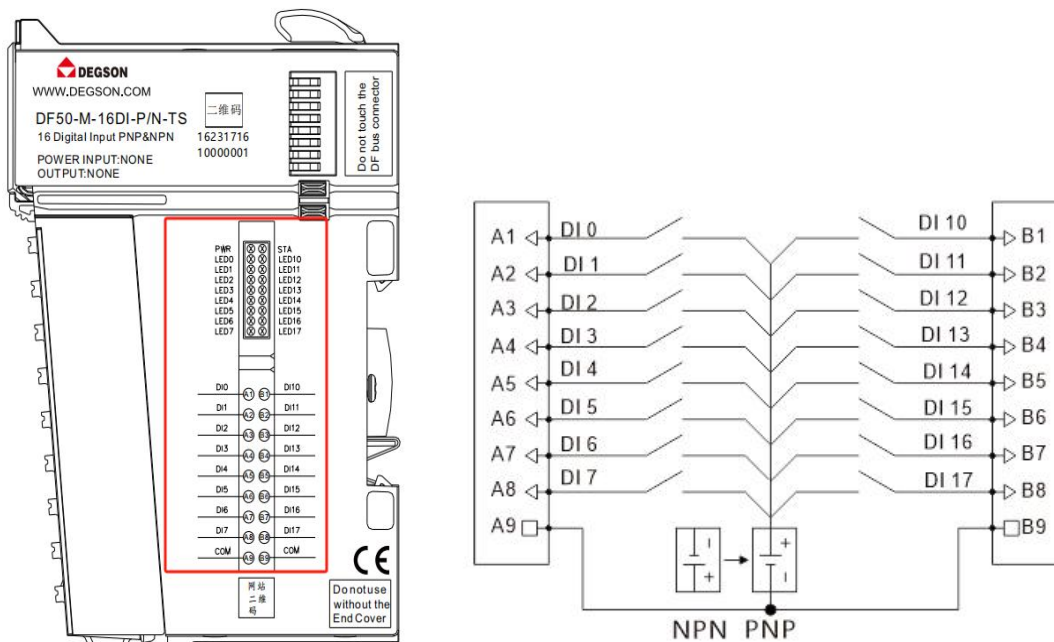
Remarks: COM is the common terminal, external 24V realizes NPN, external 0V realizes PNP.

2.3 Register allocation rules

The 16-channel PNP/NPN digital input with 8-channel low-speed counter module occupies 17 read-hold registers, 1 write-hold register, and 17 input registers.

Register Type	Register PLC Address Interval	Register Modbus Protocol Address Interval	Function code	Read/Write Status
Input Register	30001~31024	0000H~03FFH	04H	Read-only
Holding Register	43073~44048	0C00H~0FCFH	03H	Readable
Holding Register	40001~41024	0000H~03FFH	06H	Writable

Read Holding Register Block Data Structure Definition:

ReadHoldReg	Byte	Format	Bit	Description	
0	IB0	Word	IX0.0	DI0	DI16TS_MOD_ReadHoldRegBlock Size:17
			IX0.1	DI1	
			IX0.2	DI2	
			IX0.3	DI3	
			IX0.4	DI4	
			IX0.5	DI5	
			IX0.6	DI6	
			IX0.7	DI7	
	IB1		IX1.0	DI8	
			IX1.1	DI9	
			IX1.2	DI10	
			IX1.3	DI11	
			IX1.4	DI12	
			IX1.5	DI13	
			IX1.6	DI14	
			IX1.7	DI15	
1	IB2	Word	CNT Value[16..31] Ch0		

	IB3			
2	IB4	Word	CNT Value[0..15] Ch0	
	IB5			
3	IB6	Word	CNT Value[16..31] Ch1	
	IB7			
4	IB8	Word	CNT Value[0..15] Ch1	
	IB9			
... ...				
15	IB30	Word	CNT Value[16..31] Ch7	
	IB31			
16	IB32	Word	CNT Value[0..15] Ch7	
	IB33			

Note: CNT Value 32-bit count value (CNT Value[0..15] low 16 bits CNT Value[16..31] high 16 bits)

Write Holding Register Block Data Structure Definition:

WriteHoldReg	Byte	Format	Bit	Description	
0	QB0	Word	QX0.0	CNT Clear Ch0	DI16TS_MOD_WriteHoldRegBlock Size:1
			QX0.1	CNT Clear Ch1	
			QX0.2	CNT Clear Ch2	
			QX0.3	CNT Clear Ch3	
			QX0.4	CNT Clear Ch4	
			QX0.5	CNT Clear Ch5	
			QX0.6	CNT Clear Ch6	
			QX0.7	CNT Clear Ch7	
	QB1		QX1.0	Reserve	
			QX1.1	Reserve	
			QX1.2	Reserve	
			QX1.3	Reserve	
			QX1.4	Reserve	
			QX1.5	Reserve	
			QX1.6	Reserve	
			QX1.7	Reserve	

Note: CNT Clear (1: count value clear 0 0: count value not clear 0)

Read input register block data structure definition:

ReadInputReg	Byte	Format	Bit	Description	
0	IB0	Word	IX0.0	DI0	DI16TS_MOD_ReadInputRegBlock Size:17
			IX0.1	DI1	
			IX0.2	DI2	
			IX0.3	DI3	
			IX0.4	DI4	
			IX0.5	DI5	
			IX0.6	DI6	
			IX0.7	DI7	
	IB1		IX1.0	DI8	
			IX1.1	DI9	
			IX1.2	DI10	
			IX1.3	DI11	
			IX1.4	DI12	
			IX1.5	DI13	
			IX1.6	DI14	
			IX1.7	DI15	
1	IB2	Word	CNT Value[16..31] Ch0		

	IB3			
2	IB4	Word	CNT Value[0..15] Ch0	
	IB5			
3	IB6	Word	CNT Value[16..31] Ch1	
	IB7			
4	IB8	Word	CNT Value[0..15] Ch1	
	IB9			
... ...				
15	IB30	Word	CNT Value[16..31] Ch7	
	IB31			
16	IB32	Word	CNT Value[0..15] Ch7	
	IB33			

Note: CNT Value 32-bit count value (CNT Value[0..15] low 16 bits CNT Value[16..31] high 16 bits)

2.4 Mechanical Installation

Installation dimensional information is shown below, dimensions in (mm)：

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

➢ 16-channel digital output with PNP active high.

➢ Each output channel has an LED indicator.

➢ Isolation between field level and system level by opto-coupler.

➢ Protection class IP20.
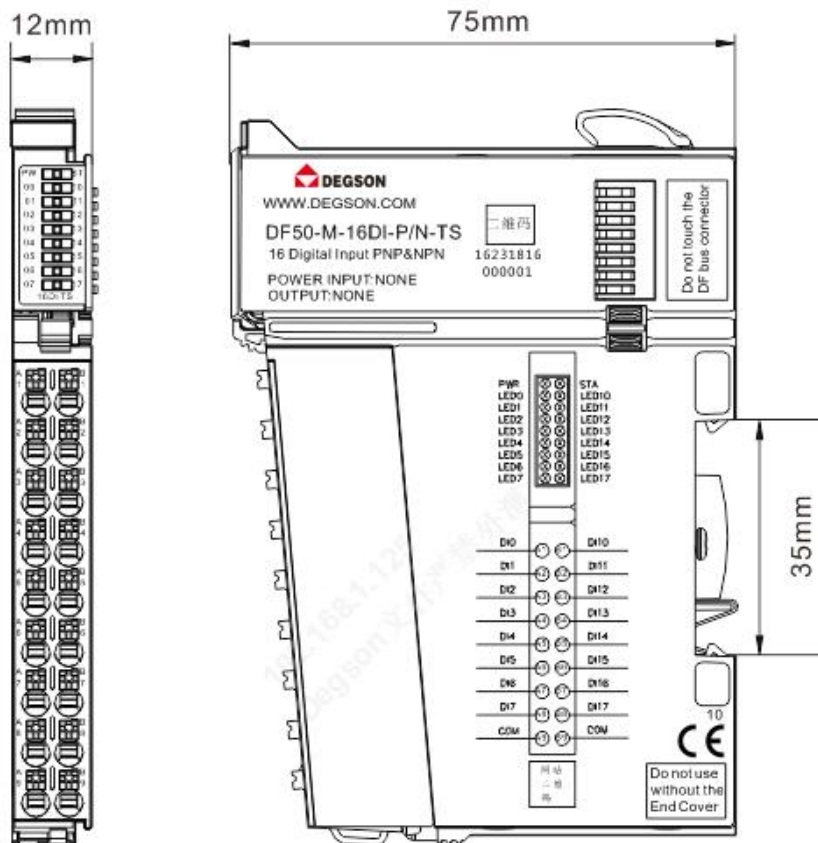
3.1 Specification parameters

Technical Information	
Product Description	Digital output module, 16 outputs. PNP，24VDC
Number of Channels	16
Signal type	PNP
"OFF signal voltage	High resistance state
"ON" Signal Voltage	24V DC
Data size	2 Byte
Connection type	1-Wire
Reverse circuit protection	Yes
Overcurrent protection	Yes
Short circuit protection	Yes
Isolation method	Optically isolated 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: 10uA
Hardware response time	100us/100us
Output impedance	<200mΩ
Output delay time	OFF to ON :Max.100us ， ON to OFF :Max.150us
Protection Function	Over-temperature shutdown: 135°C typical
Load Type	Over-current protection: 1.1A, 0.5A typical
Output Action Display	Support short circuit protection
Input Derating	Inductive (7.2W/point, 24W/module), Resistive (0.5A/point, 4A/module), Lamp (5W/point, 18W/module)
IO Mapping	Indicator light when output is driving state
Fail-Stop Output Status Mode	50% derating when operating at 55°C (output current not exceeding 2A while ON), or 10°C when output points are fully ON
In Shutdown Mode	Supports bitwise or wordwise mapping
Power supply parameters	
System bus input power supply rated voltage	5V DC （4.75V DC~ 5.25V DC）
System bus input power supply rated current	100mA
Rated voltage of terminal power input	24V DC (20.4V DC~ 28.8V DC)
Rated current of terminal power input	8A
Wiring parameters	
Connection technology: outputs	PUSH-IN type terminal block
Crimp area of conductors	0.2～1.5mm^2/26～16AWG
Stripped wire length	8～10mm
Installation method	DIN-35 rail
Material parameters	
Color	Black
Housing Material	PC Plastic, PA66
Consistency Mark	CE
Environmental Requirements	
Permissible ambient temperature (operating)	-25～60°C
Permissible ambient temperature (storage)	-40～85°C
Type of protection	IP20

Pollution level	2, in accordance with IEC 61131-2 standard
Operating Altitude	Temperature without derating: 0～2000m
Relative humidity (non-condensing)	5～95%RH
Vibration Resistance	1g according to IEC 60068-2-6
Shock Resistance	15g according to IEC 60068-2-27
EMC Anti-Interference Rating	Complies with IEC 61000-4
Corrosion resistance	Complies with IEC 60068-2-42 and IEC 60068-2-43
Permissible H2S pollutant concentration at 75 % relative humidity	10ppm
Permissible SO2 pollutant concentration at 75 % relative humidity	25ppm

3.2 Hardware interfaces

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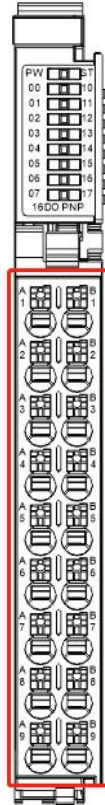
Terminal Serial Number	Signal	Terminal Serial Number	Signa	Clarification
A1	DO 00	B1	DO 10	DO signal output
A2	DO 01	B2	DO 11	
A3	DO 02	B3	DO 12	
A4	DO 03	B4	DO 13	
A5	DO 04	B5	DO 14	
A6	DO 05	B6	DO 15	
A7	DO 06	B7	DO 16	
A8	DO 07	B8	DO 17	
A9	24V	B9	0V	Terminal power input

3.2.2 LED Indicator Definition

Indicator light	Meaning		
PW	Green on:System bus power input normal		
	Green off: System bus power input abnormal		
ST	Power-up phase	Green on: module initialization abnormal	
		Green off: module initialization normal	
	Operation phase	Green flash: module internal bus works normally	
		Green off/green on: module internal bus works abnormally or terminal power input is abnormal	
00～07,10～17	Green on:Output signal is valid		
	Green off:Output signal is invalid		

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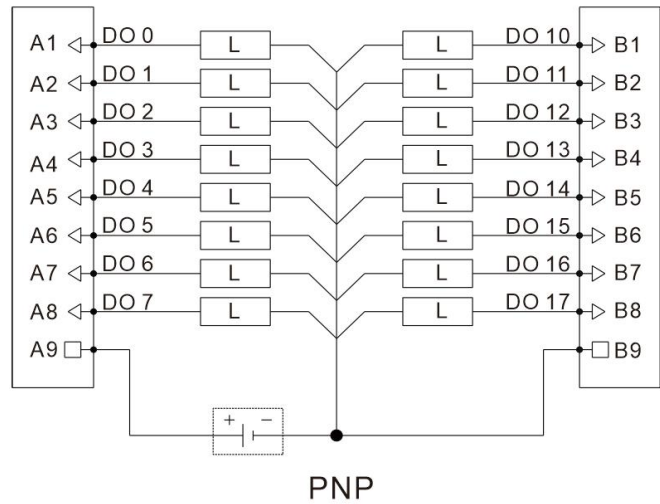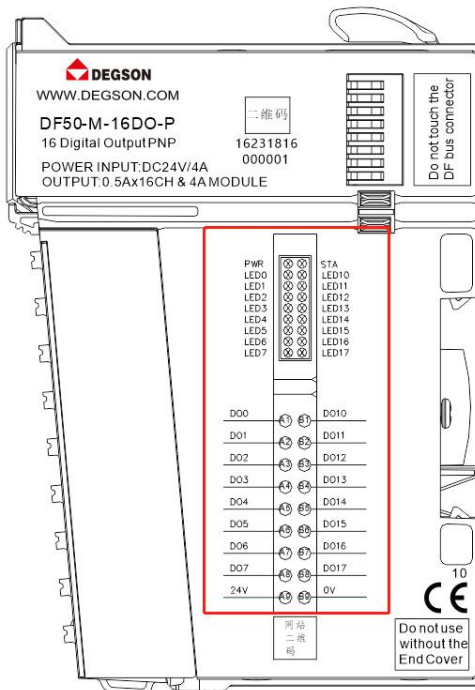
Note: A9, B9 24V power supply is provided externally.

3.3 Register allocation rules

A 16-channel PNP digital output module occupying 1 write-hold register and 16 coil registers.

Register Type	Register PLC Address Interval	Register Modbus Protocol Address Interval	Function code	Read and Write Status
Coil	00001~01024	0000H~03FFH	05H\0FH	Write-only
Holding Register	41025~42048	0400H~07FFH	06H\10H	Writable

Write Holding Register Block Data Structure Definition:

WriteHold Reg	Byte	Format	Bit	Description	
0	QB0	Word	QX0.0	DO0	DO16P_MOD_WriteHoldRegBlock Size:1
			QX0.1	DO1	
			QX0.2	DO2	
			QX0.3	DO3	
			QX0.4	DO4	
			QX0.5	DO5	
			QX0.6	DO6	
			QX0.7	DO7	
	QB1		QX1.0	DO8	
			QX1.1	DO9	
			QX1.2	DO10	
			QX1.3	DO11	
			QX1.4	DO12	
			QX1.5	DO13	
			QX1.6	DO14	
			QX1.7	DO15	

Write coil status register block data structure definition:

WriteCoilReg	Byte	Format	Bit	Description	
0	QB0	Bit	QX0.0	DO0	DO16P_MOD_WriteCoilRegBlock Size:16
1		Bit	QX0.1	DO1	
2		Bit	QX0.2	DO2	
3		Bit	QX0.3	DO3	
4		Bit	QX0.4	DO4	
5		Bit	QX0.5	DO5	
6		Bit	QX0.6	DO6	
7		Bit	QX0.7	DO7	
8	QB1	Bit	QX1.0	DO8	
9		Bit	QX1.1	DO9	
10		Bit	QX1.2	DO10	
11		Bit	QX1.3	DO11	
12		Bit	QX1.4	DO12	
13		Bit	QX1.5	DO13	
14		Bit	QX1.6	DO14	
15		Bit	QX1.7	DO15	

3.4 Mechanical Installation

Installation dimensional information is shown below, dimensions in (mm)：

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

➢ 16-channel digital output with NPN active low.

➢ Each output channel has an LED indicator.

➢ Isolation between field level and system level by opto-coupler.

➢ Protection class IP20.
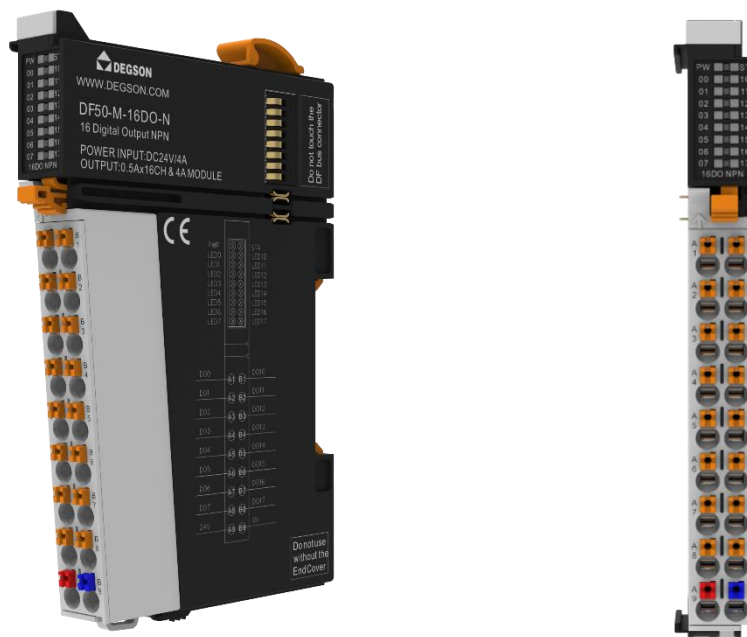
4.1 Specification parameters

Technical Information	
Product Description	Digital Output Module, 16 Outputs, NPN, 24VDC
Number of Channels	16
Signal type	NPN
"OFF signal voltage	High resistance state
"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	Optically isolated 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: 10uA
Hardware Response Time	100us/100us
Output Impedance	<200mΩ

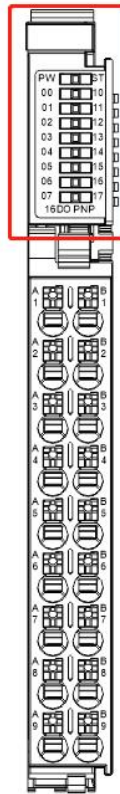|	
Output delay	OFF to ON :Max.100us , ON to OFF :Max.150us
Protection Function	Over-temperature shutdown: 135°C typical
Load type	Over-current protection: 1.1A, 0.5A typical
Output action display	Support short circuit protection
Input derating	Inductive (7.2W/point, 24W/module), Resistive (0.5A/point, 4A/module), Lamp (5W/point, 18W/module)
IO Mapping	Indicator light when output is driving state
Fail-Stop Output Status Mode	50% derating when operating at 55°C (output current not exceeding 2A while ON), or 10°C when output points are fully ON
Fail-Shutdown Mode	Supports bitwise or wordwise mapping
Power Supply Parameters	
System bus input power supply voltage rating	5V DC （4.75V DC~ 5.25V DC）
System bus input power supply rated current	100mA
Rated voltage of terminal power input	24V DC (20.4V DC~ 28.8V DC)
Rated current of terminal power input	8A
Wiring parameters	
Connection technology: outputs	PUSH-IN type terminal block
Crimp area of conductors	0.2~1.5mm²/26~16AWG
Stripped wire length	8~10mm
Installation method	DIN-35 rail
Material parameters	
Color	Black
Housing Material	PC Plastic, PA66
Conformance Mark	CE
Environmental Requirements	
Permissible ambient temperature (operating)	-25~60°C
Permissible ambient temperature (storage)	-40~85°C
Type of protection	IP20
Pollution level	2, in accordance with IEC 61131-2 standard
Operating Altitude	Temperature without derating: 0~2000m
Relative humidity (non-condensing)	5~95%RH
Vibration Resistance	1g according to IEC 60068-2-6
Shock Resistance	15g according to IEC 60068-2-27
EMC Anti-Interference Rating	Complies with IEC 61000-4
Corrosion resistance	Complies with IEC 60068-2-42 and IEC 60068-2-43
Permissible H2S pollutant concentration at 75 % relative humidity	10ppm
Permissible SO2 pollutant concentration at 75 % relative humidity	25ppm

## 4.2 Hardware interfaces

4.2.1 Terminal Block Definition

Terminal Serial Number	Signal	Terminal Serial Number	Signa	Clarification
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	B5	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	B9	0V	Terminal power input

4.2.2 LED Indicator Definition

Indicator light	Meaning		
PW	Green on:System bus power input normal		
	Green off: System bus power input abnormal		
ST	Power-up phase	Green on: module initialization abnormal	
		Green off: module initialization normal	
	Operation phase	Green flash: module internal bus works normally	
		Green off/green on: module internal bus works abnormally or terminal power input is abnormal	
00～07,10～17	Green on:Output signal is valid		
	Green off:Output signal is invalid		

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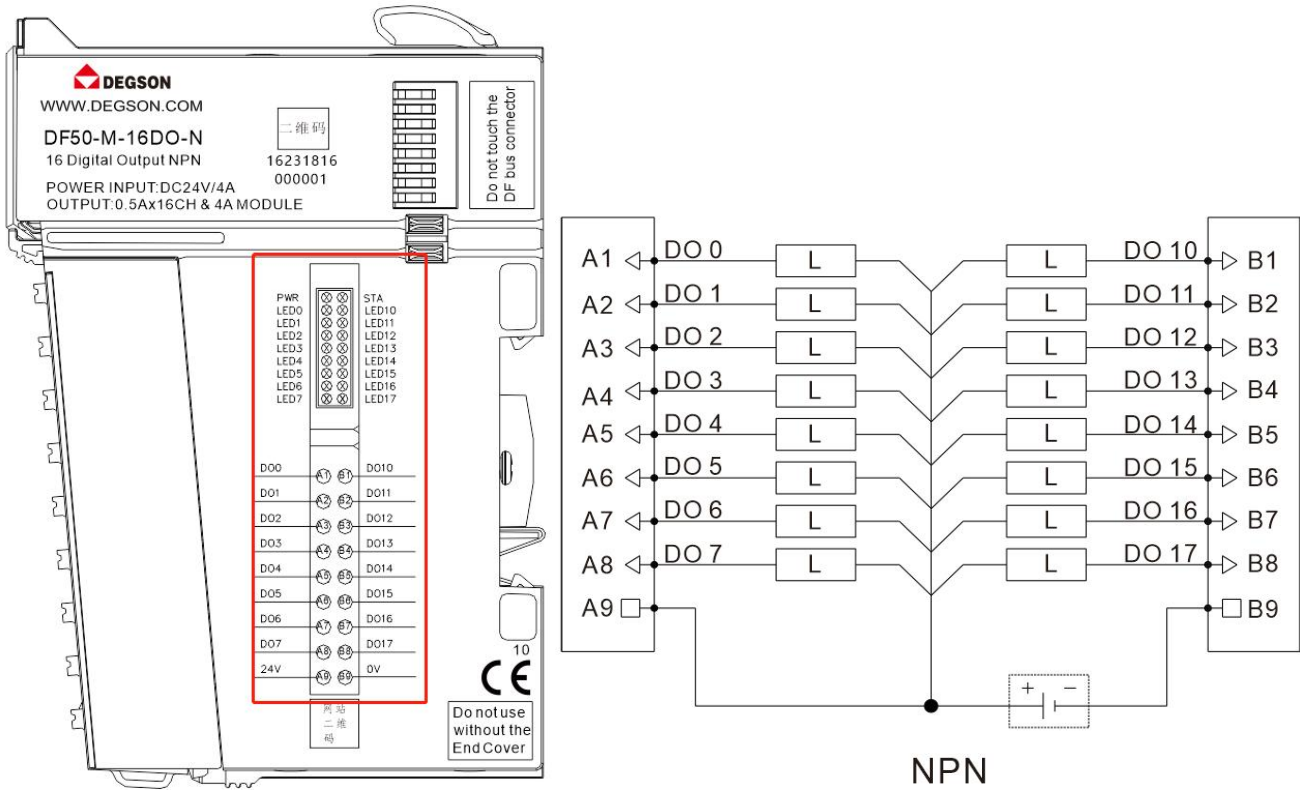
Note: A9, B9 24V power supply is provided externally.

4.3 Register allocation rules

The 16-channel NPN digital output module occupies 1 write-hold register and 16 coil registers.

Register Type	Register PLC Address Interval	Register Modbus Protocol Address Interval	Function code	Read and Write Status
Coil	00001~01024	0000H~03FFH	05H\0FH	Write-only
Holding Register	41025~42048	0400H~07FFH	06H\10H	Writable

Write Holding Register Block Data Structure Definition:

WriteHold Reg	Byte	Format	Bit	Description	
0	QB0	Word	QX0.0	DO0	DO16N_MOD_WriteHoldRegBlock Size:1
			QX0.1	DO1	
			QX0.2	DO2	
			QX0.3	DO3	
			QX0.4	DO4	
			QX0.5	DO5	
			QX0.6	DO6	
			QX0.7	DO7	
	QB1		QX1.0	DO8	
			QX1.1	DO9	
			QX1.2	DO10	
			QX1.3	DO11	
			QX1.4	DO12	
			QX1.5	DO13	
			QX1.6	DO14	
			QX1.7	DO15	

Write coil status register block data structure definition:

WriteCoilReg	Byte	Format	Bit	Description	
0	QB0	Bit	QX0.0	DO0	DO16N_MOD_WriteCoilRegBlock Size:16
1		Bit	QX0.1	DO1	
2		Bit	QX0.2	DO2	
3		Bit	QX0.3	DO3	
4		Bit	QX0.4	DO4	
5		Bit	QX0.5	DO5	
6		Bit	QX0.6	DO6	
7		Bit	QX0.7	DO7	
8	QB1	Bit	QX1.0	DO8	
9		Bit	QX1.1	DO9	
10		Bit	QX1.2	DO10	
11		Bit	QX1.3	DO11	
12		Bit	QX1.4	DO12	
13		Bit	QX1.5	DO13	
14		Bit	QX1.6	DO14	
15		Bit	QX1.7	DO15	

4.4 Mechanical Installation

Installation dimensional information is shown below, dimensions in (mm)：

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

➢ This analog input module receives voltage and current standard signals.

➢ 4-channel analog input, voltage type, current type.

➢ Two LEDs indicate normal module operation and normal communication.

➢ Magnetic isolation between field and system level.

➢ Transmission in 16-bit resolution.

➢ Protection class IP20。

5.1 Specification parameters

Technical Information	
Product Description	Analog Input Module, 4 Inputs, Voltage & Current Type
Number of Channels	4
Signal Type	Voltage/current, single-ended signals
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 Limits	±15V
Voltage input diagnostics	2~10V, 1~5V support broken wire detection
Current Measurement Range	0~20mA、4~20mA

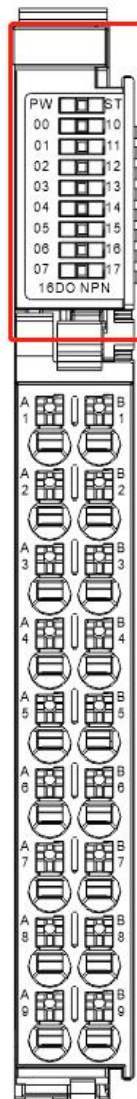|	
Current collection impedance	100Ω
Current input accuracy (full temperature range)	0.2%
Current Input Limit	Instantaneous 30mA, average 24mA
Current Input Diagnostics	4~20mA support disconnection detection
Isolated or not	No isolation between interface channels, power supply and interface isolation, interface and bus isolation
Independent channel enable configuration	Support
Diagnostic report 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	Input indicator flashes when input signal is valid (software controlled)
IO process data size	4 Word
Power supply parameters	
System bus input power supply rated voltage	5V DC （4.75V DC~ 5.25V DC）
System bus input power supply rated current	35mA
Rated voltage of terminal power input	24V DC (20.4V DC~ 28.8V DC)
Terminal power input rated current	30mA
Terminal power supply output rated voltage	24V DC (20.4V DC~ 28.8V DC)
Terminal power supply output rated current	0.5A/per power output channel
Wiring parameters	
Connection technology: input	PUSH-IN type terminal block
Crimped area of conductor	0.2~1.5mm^2/26~16AWG
Stripped wire length	8~10mm²
Installation method	DIN-35 rail
Material parameters	
Color	Black
Housing Material	PC Plastic, PA66
Conformance Mark	CE
Environmental Requirements	
Permissible ambient temperature (operating)	-25~60°C
Permissible ambient temperature (storage)	-40~85°C
Type of protection	IP20
Pollution level	2, in accordance with IEC 61131-2 standard
Operating Altitude	Temperature without derating: 0~2000m
Relative humidity (non-condensing)	5~95%RH
Vibration Resistance	1g according to IEC 60068-2-6
Shock Resistance	15g according to IEC 60068-2-27
EMC Anti-Interference Rating	Complies with IEC 61000-4
Corrosion resistance	Complies with IEC 60068-2-42 and IEC 60068-2-43
Permissible H2S pollutant concentration at 75 % relative humidity	10ppm
Permissible SO2 pollutant concentration at 75 % relative humidity	25ppm

5.2 Hardware interfaces

5.2.1 Terminal Block Definition
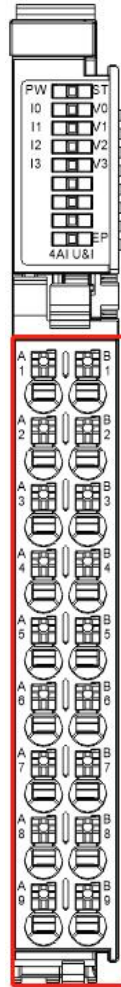
Terminal Serial Number	Signal	Terminal Serial Number	Signa	Clarification
A1	24Vo	B1	GND	Terminal Power Output
A2	I0+	B2	V0+	Current/Voltage Input Channel
A3	24Vo	B3	GND	Terminal power output
A4	I1+	B4	V1+	Current/Voltage Input Channel
A5	24Vo	B5	GND	Terminal power output
A6	I2+	B6	V2+	Current/voltage input channel
A7	24Vo	B7	GND	Terminal power output
A8	I3+	B8	V3+	Current/voltage input channel
A9	24V	B9	0V	Terminal power input

5.2.2 LED Indicator Definition

Indicator light	Meaning		
PW	Green on:System bus power input normal		
	Green off: System bus power input abnormal		
ST	Power-up phase	Green on: module initialization abnormal	
		Green off: module initialization normal	
	Operation phase	Green flash: module internal bus works normally	
		Green off/green on: module internal bus works abnormally or terminal power input is abnormal	
EP	Green on: Normal terminal power input		
	Green off: abnormal terminal power input		
I0～I3,V0～V3	Green flash: input signal is valid		
	Green off:Input signal is invalid		

5.2.3 Wiring diagram
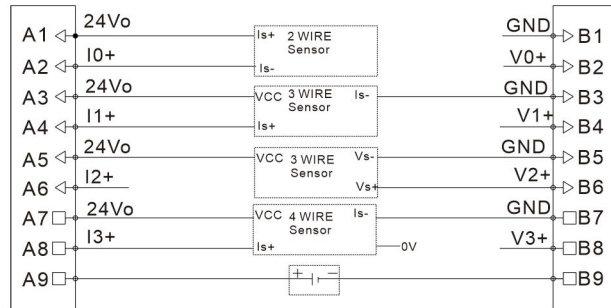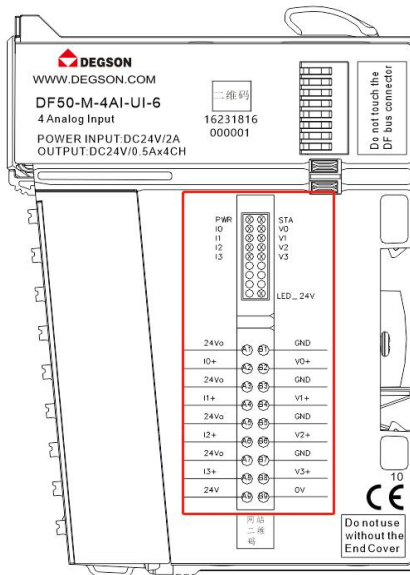
Note: A9, B9 24V power supply is externally supplied.

5.3 Register allocation rules

4-channel voltage type/current type analog input module occupying 4 read-hold registers, 4 input registers.

Register Type	Register PLC Address Interval	Register Modbus Protocol Address Interval	Function code	Read and Write Status
Coil	30001~31024	0000H~03FFH	04H	Write-only
Holding Register	42049~43072	0800H~0BFFH	03H	Writable

Read input register block data structure definition:

ReadInputReg	Byte	Format	Description	
0	IB0	Word	AI_UI_0	AI4UI_MOD_ReadInputRegBlock Size:4
0	IB1	Word	AI_UI_0	
1	IB2	Word	AI_UI_1	
1	IB3	Word	AI_UI_1	
2	IB4	Word	AI_UI_2	
2	IB5	Word	AI_UI_2	
3	IB6	Word	AI_UI_3	
3	IB7	Word	AI_UI_3	

Read Holding Register Block Data Structure Definition:

ReadHoldReg	Byte	Format	Description	
0	IB0	Word	AI_UI_0	AI4UI_MOD_ReadHoldRegBlock Size:4
0	IB1	Word	AI_UI_0	
1	IB2	Word	AI_UI_1	
1	IB3	Word	AI_UI_1	
2	IB4	Word	AI_UI_2	
2	IB5	Word	AI_UI_2	
3	IB6	Word	AI_UI_3	
3	IB7	Word	AI_UI_3	

Data Description:

Signal range	Voltage value (U)	Decimal data	Hexadecimal data	Scope note	Conversion relation
±10V	>11.76V	32767	0x7FFF	overflow	$D = 27648 \times U / 10$ $U = D \times 10 / 27648$
	11.76V	32511	0x7EFF	upper value	
	10V	27648	0x6C00	Regular range	
	5V	13824	0x3600		
	0V	0	0x0000		
	-5V	-13824	0xCA00		
	-10V	-27648	0x9400		
	-11.76V	-32511	0x8100	lower value	
	<-11.76V	-32768	0x8000	underflow	
0~10V	>11.76V	32767	0x7FFF	overflow	$D = 27648 \times U / 10$ $U = D \times 10 / 27648$
	11.76V	32511	0x7EFF	upper value	
	10V	27648	0x6C00	Regular range	
	5V	13824	0x3600		
	0V	0	0x0000		
2~10V	>11.41V	32767	0x7FFF	overflow	$D = 27648 \times (U - 2) / 8$ $U = D \times 8 / 27648 + 2$
	11.41V	32511	0x7EFF	upper value	
	10V	27648	0x6C00	Regular range	

Range	Value	Decimal	Hex	Status	Formula
	6V	13824	0x3600		
	2V	0	0x0000		
	0.59 V	-4864	0xED00	lower value	
	<0.59 V	-32768	0x8000	underflow	
±5V	>5.88V	32767	0x7FFF	overflow	D = 27648 x U / 5 U = D x 5 / 27648
	5.88V	32511	0x7EFF	upper value	
	5V	27648	0x6C00	Regular range	
	2.5V	13824	0x3600		
	0V	0	0x0000		
	-2.5V	-13824	0xCA00		
	-5V	-27648	0x9400		
	-5.88V	-32511	0x8100	lower value	
	<-5.88V	-32768	0x8000	underflow	
0~5V	>5.88V	32767	0x7FFF	overflow	D = 27648 x U / 5 U = D x 5 / 27648
	5.88V	32511	0x7EFF	upper value	
	5V	27648	0x6C00	Regular range	
	2.5V	13824	0x3600		
	0V	0	0x0000		
1~5V	>5.7V	32767	0x7FFF	overflow	D = 27648 x (U – 1) / 4 U = D x 4 / 27648 + 1
	5.7V	32511	0x7EFF	upper value	
	5V	27648	0x6C00	Regular range	
	3V	13824	0x3600		
	1V	0	0x0000		
	0.3V	-4864	0xED00	lower value	
	<0.3V	-32768	0x8000	underflow	
0~20ma	>23.52ma	32767	0x7FFF	overflow	D = 27648 x I / 20 I = D x 20/ 27648
	23.52ma	32511	0x7EFF	upper value	
	20ma	27648	0x6C00	Regular range	
	10ma	13824	0x3600		
	0ma	0	0x0000		
4~20ma	>22.81ma	32767	0x7FFF	overflow	D = 27648 x (I – 4) / 16 I = D x 16 / 27648 + 4
	22.81ma	32511	0x7EFF	upper value	
	20ma	27648	0x6C00	Regular range	
	12ma	13824	0x3600		
	4ma	0	0x0000		
	1.19ma	-4864	0xED00	lower value	
	<1.19ma	-32768	0x8000	underflow	

5.4 Mechanical Installation

Installation dimensional information is shown below, dimensions in (mm)：
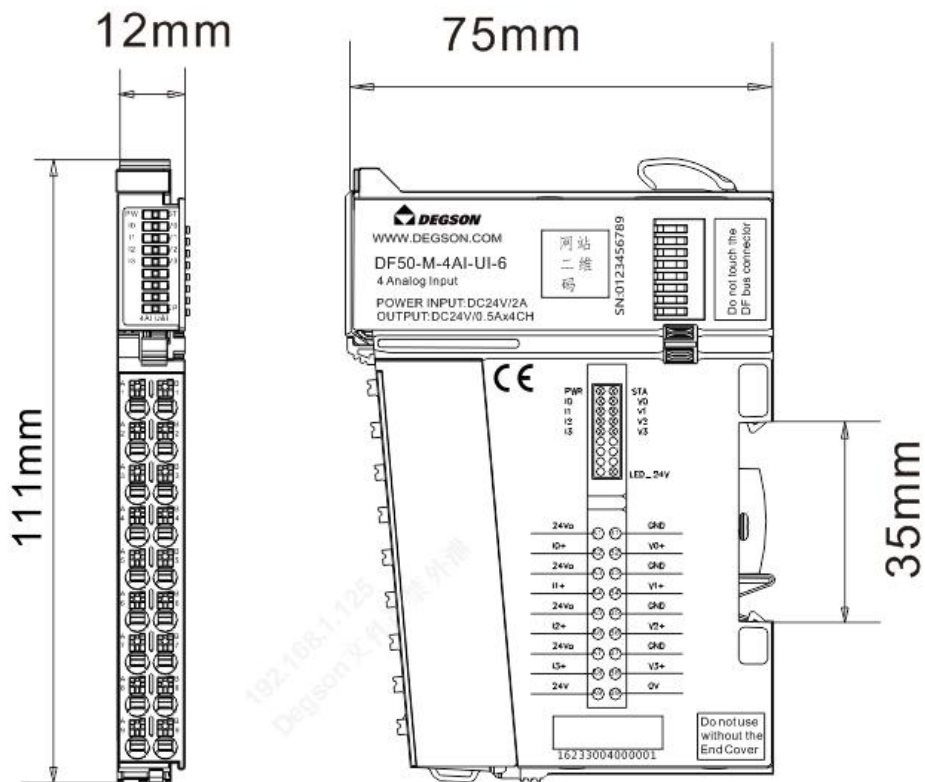
6 8-Channel Analog Input/Current Type (DF50-M-8AI-I-5)

➢ This analog input module can receive 0~20mA, 4~20mA standard signals.

➢ 8-channel analog input, current type.

➢ Two LEDs indicate normal module operation and normal communication respectively.

➢ Magnetic isolation between field level and system level.

➢ Transmission in 16-bit resolution.

➢ Protection class IP20.
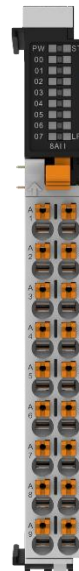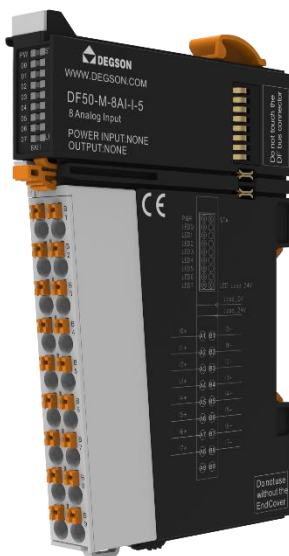
6.1 Specification

Technical Information	
Product Description	Analog Input Module, 8-Input, Current Type
Number of Channels	8
Signal Type	Current, Single-Ended Inputs
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 support disconnection detection
Isolated or not	No isolation between interface channels, power supply and interface isolation, interface and bus isolation
Independent channel enable configuration	Support
Diagnostic report function configuration	Supported
Channel mode configuration	Disable,0~20mA,4~20mA
Filter parameter configuration	1000Hz~50Hz configurable
Input action display	When the input signal is valid, the input indicator flashes (software control)
IO process data size	8 Word
Power supply parameters	
System bus input power supply rated voltage	5V DC (4.75V DC~5.25V DC)
System bus input power supply current rating	35mA
Internal load power input rated voltage	24V DC (20.4V DC~ 28.8V DC)
Internal load power supply input current rating	20mA
Wiring parameters	
Connection technology: inputs	PUSH-IN type terminal block
Crimped area of conductor	0.2~1.5mm2/26~16AWG
Stripped wire length	8~10mm²
Mounting method	DIN-35 rail
Material parameters	
Color	Black color
Housing Material	PC plastic, PA66
Conformance Mark	CE
Environmental Requirements	
Permissible ambient temperature (operating)	-25~60℃
Permissible ambient temperature (storage)	-40~85℃
Type of protection	IP20
Pollution level	2，Conforms to IEC 61131-2 standard
Operating Altitude	Temperature without derating: 0~2000m
Relative humidity (non-condensing)	5~95%RH
Vibration Resistance	1g, according to IEC 60068-2-6 standard
Shock Resistance	15g, according to IEC 60068-2-27 standard
EMC Anti-Interference Rating	Conforms to IEC 61000-4
Corrosion resistance	Conforms to IEC 60068-2-42 and IEC 60068-2-43
Permissible H2S pollutant concentration at 75 % relative humidity	10ppm
Permissible SO2 pollutant concentration at 75 % relative humidity	25ppm

## 6.2 Hardware Interface

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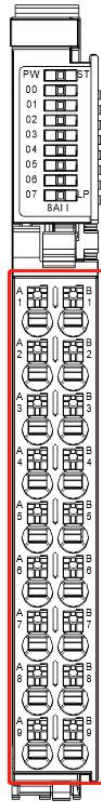
Terminal Number	Signal	Terminal Number	Signal	Description
A1	I0+	B1	I0-	Current input channel 1
A2	I1+	B2	I1-	Current input channel 2
A3	I2+	B3	I2-	Current input channel 3
A4	I3+	B4	I3-	Current input channel 4
A5	I4+	B5	I4-	Current input channel 5
A6	I5+	B6	I5-	Current input channel 6
A7	I6+	B7	I6-	Current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

6.2.2 LED Indicator Definition

Indicator	Meaning		
PW	Green on:System bus power input normal		
	Green off:System bus power input abnormal		
ST	Power-on stage	Green on: module initialization abnormal	
		Green off: module initialization is normal	
	Running phase	Green flash: module internal bus works normally	
		Green off/green on: module internal bus works abnormally or internal load power input is abnormal	
LP	Green on: Internal load power input normal		
	Green off: Internal load power input abnormal		
00～07	Green flash: input signal is valid		
	Green off: Input signal is invalid		

6.2.3 Wiring Diagram

6.3 Register Assignment Rules

8-channel current type analog input module occupying 8 holding registers, 8 input registers.

Register Type	Register PLC Address Interval	Register Modbus Protocol Address Interval	Function Code	Read/Write Status
Input Registers	30001~31024	0000H~03FFH	04H	Read Only
Holding Register	42049~43072	0800H~0BFFH	03H	Read

Read input register block data structure definition:

ReadInputReg	Byte	Format	Description	
0	IB0	Word	AI_I_0	
	IB1			
1	IB2	Word	AI_I_1	
	IB3			
2	IB4	Word	AI_I_2	
	IB5			
3	IB6	Word	AI_I_3	AI8I_MOD_ReadInputRegBlock Size:8
	IB7			
4	IB8	Word	AI_I_4	
	IB9			
5	IB10	Word	AI_I_5	
	IB11			
6	IB12	Word	AI_I_6	
	IB13			
7	IB14	Word	AI_I_7	
	IB15			

Read Holding Register Block Data Structure Definition:

ReadHoldReg	Byte	Format	Description	
0	IB0	Word	AI_I_0	
	IB1			
1	IB2	Word	AI_I_1	
	IB3			
2	IB4	Word	AI_I_2	
	IB5			
3	IB6	Word	AI_I_3	AI8I_MOD_ReadHoldRegBlock Size:8
	IB7			
4	IB8	Word	AI_I_4	
	IB9			
5	IB10	Word	AI_I_5	
	IB11			
6	IB12	Word	AI_I_6	
	IB13			
7	IB14	Word	AI_I_7	
	IB15			

Data Description：

Analog Input Data(Channel 1~8)：The analog signal input value of the corresponding channel.

Signal range	Voltage Value（U）	Decimal Data	Hexadecimal Data	Scope statement	Conversion Relation
0~20ma	>23.52ma	32767	0x7FFF	overflow	D = 27648 x I / 20
	23.52ma	32511	0x7EFF	Upper limit	I = D x 20/ 27648

			value	
20ma	27648	0x6C00	Normal range	
10ma	13824	0x3600		
0ma	0	0x0000	Overflow Upper limit value	
4~20ma	>22.81ma	32767	0x7FFF	Normal range	$D = 27648 \times (I - 4) / 16$ $I = D \times 16 / 27648 + 4$
	22.81ma	32511	0x7EFF	Lower limit value	
	20ma	27648	0x6C00	Lower overflow	
	12ma	13824	0x3600		
	4ma	0	0x0000	Upper limit value	
	1.19ma	-4864	0xED00	Normal range	
	<1.19ma	-32768	0x8000	Overflow	

6.4 Mechanical Installation

Installation dimensional information is shown in the following figure, unit as（mm）：
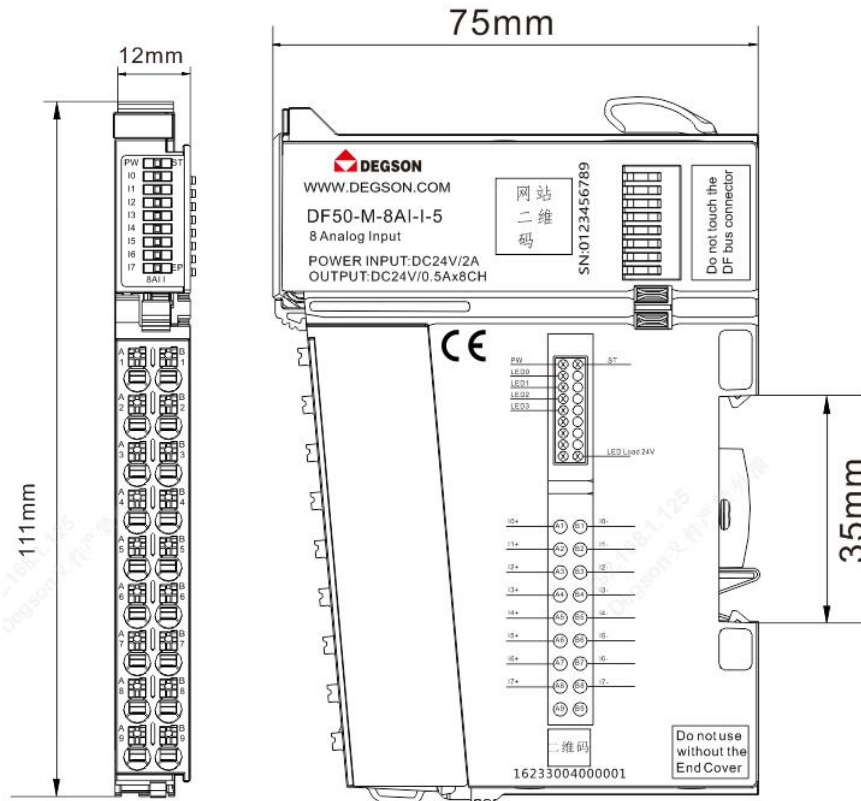
7 8-channel analogue input/voltage type (DF50-M-8AI-U-4)

➢ This analogue input module can receive ±10V, 0~10V, 2~10V, ±5V, 0~5V, 1~5V standard signals.

➢ 8-channel analogue input, voltage type.

➢ Two LEDs indicate that the module is running normally and the communication is normal.

➢ Magnetic isolation between field and system layers.

➢ Transmission in 16-bit resolution.

➢ Protection level of IP20.
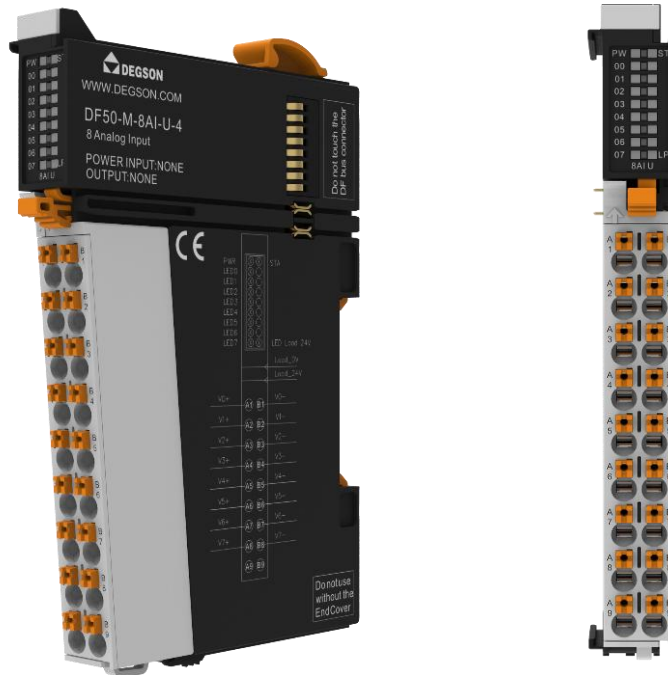
7.1 Specification

Technical Information	
Product Description	Analogue input module, 8 inputs, voltage type
Number of channels	8
Signal Type	Voltage, Single-Ended Input
Resolution (of a Photo)	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
Isolated or not	No isolation between interface channels, power supply and interface isolated, interface and bus isolated
Independent Channel Enablement Configuration	Support
Diagnostic 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 Motion Display	Input indicator flashes when the input signal is active (software controlled)
IO Procedure Data Size	8 Word
Power Supply Parameters	
System Bus Input Power Supply Voltage Rating	5V DC （4.75V DC~ 5.25V DC）
System Bus Input Power Supply Current Rating	33mA
Internal Load Power Supply Input Rated Voltage	24V DC (20.4V DC~ 28.8V DC)
Internal Load Power supply input current rating	42mA
Wiring Parameters	
Connection Technology: Inputs/Outputs	PUSH-IN terminals
Crimped Area of Conductor	0.2～1.5mm²/26～16AWG
Stripped Wire Length	8～10mm/0.31～0.35inches
Installation	DIN-35 Rail
Material Parameters	
Color	Block
Shell Material	PC plastic，PA66
Conformance Marker	CE
Environmental Requirements	
Allowable Ambient Temperature (Operating)	-25～60℃
Permissible ambient temperature (storage)	-40～85℃
Protection Type	IP20
Contamination Level	2, in accordance with IEC 61131-2 standard
Working Altitude	No temperature derating：0～2000m
Mounting Positions	Arbitrarily
Relative humidity (non-condensing)	5～95%RH
Vibration Resistance	1g，Conforms to IEC 60068-2-6 standard
Impact Resistance	15g，Conforms to IEC 60068-2-27 standard.
EMC Anti-Interference Level	Conforms to IEC 61000-4
Corrosion Resistance	Conforms to IEC 60068-2-42 and IEC 60068-2-43 standards
Permissible H2S Pollutant Concentration at 75 % Relative Humidity	10ppm
Allowable SO2 pollutant concentration at 75 % relative humidity	25ppm

DEGSON

7.2 hardware interface

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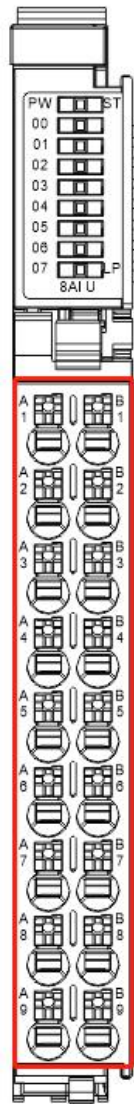
Terminal Number	Signal	Terminal Number	Signal	Description
A1	V0+	B1	V0-	Voltage input channel 0
A2	V1+	B2	V1-	Voltage input channel 1
A3	V2+	B3	V2-	Voltage input channel 2
A4	V3+	B4	V3-	Voltage input channel 3
A5	V4+	B5	V4-	Voltage input channel 4
A6	V5+	B6	V5-	Voltage input channel 5
A7	V6+	B7	V6-	Voltage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

7.2.2 LED Indicator Definition
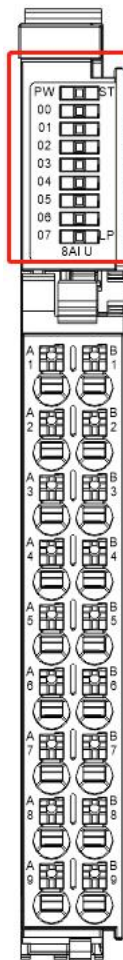
Indicator	Description		
PW	Green light on: System bus power input normal		
	Green light off: System bus power input abnormal		
ST	power-up phase	Green light on：Module initialisation abnormal	
		Green light off：Module initialisation normal	
	operational phase	Green light flashing：Module internal bus works fine	
		Green light off / on：Abnormal operation of the module's internal bus or abnormal input of internal load power supply	
LP	Green light on：Abnormal operation of the module's internal bus or abnormal input of internal load power supply		
	Green light off：Internal load power supply input abnormal		
00～07	Green light flashing: Input signal is valid		
	Green light off: Input signal is invalid		

7.2.3 Wiring Diagram
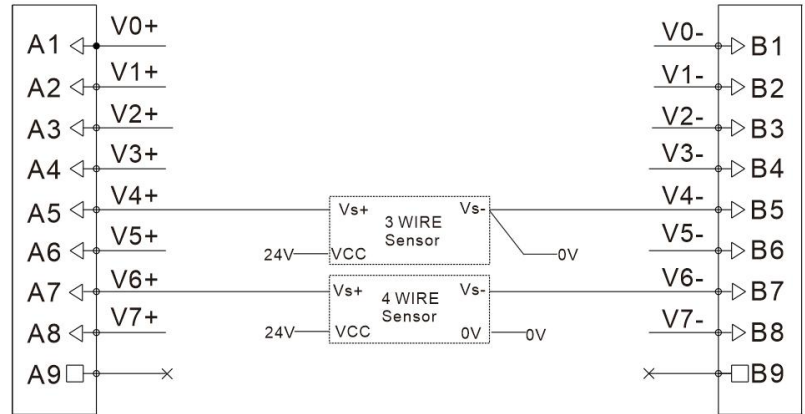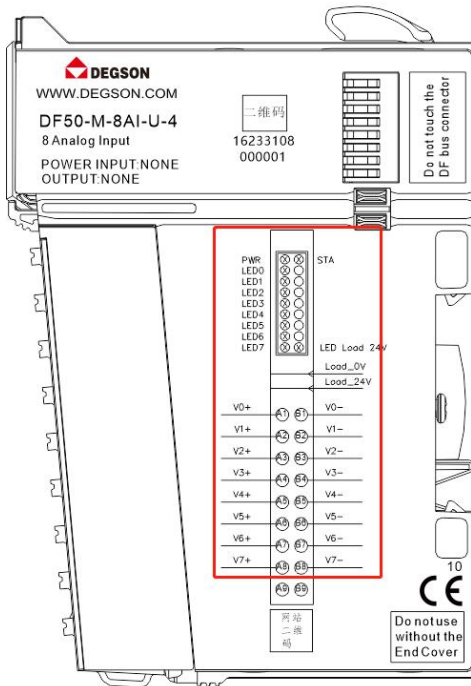
7.3 Register Assignment Rules

8-channel voltage-type analogue input module, occupying 8 read-hold registers, 8 input registers.

Register Type	Register PLC Address Interval	Register Modbus Protocol Address Interval	Function Code	Read/Write Status
Input Register	30001~31024	0000H~03FFH	04H	Read Only
Holding register	42049~43072	0800H~0BFFH	03H	Write Only

Read Input Register Block Data Structure Definition:

ReadInputReg	Byte	Format	Description	
0	IB0	Word	AI_U_0	
	IB1			
1	IB2	Word	AI_U_1	
	IB3			
2	IB4	Word	AI_U_2	
	IB5			
3	IB6	Word	AI_U_3	AI8U_MOD_ReadInputRegBlock Size:8
	IB7			
4	IB8	Word	AI_U_4	
	IB9			
5	IB10	Word	AI_U_5	
	IB11			
6	IB12	Word	AI_U_6	
	IB13			
7	IB14	Word	AI_U_7	
	IB15			

Read Holding Register Block Data Structure Definition:

ReadHoldReg	Byte	Format	Description	
0	IB0	Word	AI_U_0	
	IB1			
1	IB2	Word	AI_U_1	
	IB3			
2	IB4	Word	AI_U_2	
	IB5			
3	IB6	Word	AI_U_3	AI8U_MOD_ReadHoldRegBlock Size:8
	IB7			
4	IB8	Word	AI_U_4	
	IB9			
5	IB10	Word	AI_U_5	
	IB11			
6	IB12	Word	AI_U_6	
	IB13			
7	IB14	Word	AI_U_7	
	IB15			

Data description

Analog Input Data(Channel 1~8)：The analogue signal input value of the corresponding channel.

Signal range	Voltage Value（U）	Decimal Data	Hexadecimal Data	Scope statement	Conversion Relation
±10V	>11.76V	32767	0x7FFF	Overflow	D = 27648 x U / 10 U = D x 10 / 27648
	11.76V	32511	0x7EFF	Upper Value	
	10V	27648	0x6C00	Normal Range	
	5V	13824	0x3600		
	0V	0	0x0000		
	-5V	-13824	0xCA00		
	-10V	-27648	0x9400		
	-11.76V	-32511	0x8100	Lower Value	
	<-11.76V	-32768	0x8000	Underflow	
0~10V	>11.76V	32767	0x7FFF	Overflow	D = 27648 x U / 10 U = D x 10 / 27648
	11.76V	32511	0x7EFF	Upper Value	
	10V	27648	0x6C00	Normal Range	
	5V	13824	0x3600		
	0V	0	0x0000		
2~10V	>11.41V	32767	0x7FFF	Overflow	D = 27648 x (U – 2) / 8 U = D x 8 / 27648 + 2
	11.41V	32511	0x7EFF	Upper Value	
	10V	27648	0x6C00	Normal Range	
	6V	13824	0x3600		
	2V	0	0x0000		
	0.59 V	-4864	0xED00	Lower Value	
	<0.59 V	-32768	0x8000	Underflow	
±5V	>5.88V	32767	0x7FFF	Overflow	D = 27648 x U / 5 U = D x 5 / 27648
	5.88V	32511	0x7EFF	Upper Value	
	5V	27648	0x6C00	Normal Range	
	2.5V	13824	0x3600		
	0V	0	0x0000		
	-2.5V	-13824	0xCA00		
	-5V	-27648	0x9400		
	-5.88V	-32511	0x8100	Lower Value	
	<-5.88V	-32768	0x8000	Underflow	
0~5V	>5.88V	32767	0x7FFF	Overflow	D = 27648 x U / 5 U = D x 5 / 27648
	5.88V	32511	0x7EFF	Upper Value	
	5V	27648	0x6C00	Normal Range	
	2.5V	13824	0x3600		
	0V	0	0x0000		
1~5V	>5.7V	32767	0x7FFF	Overflow	D = 27648 x (U – 1) / 4 U = D x 4 / 27648 + 1
	5.7V	32511	0x7EFF	Upper Value	
	5V	27648	0x6C00	Normal Range	
	3V	13824	0x3600		
	1V	0	0x0000		
	0.3V	-4864	0xED00	Lower Value	
	<0.3V	-32768	0x8000	Underflow	

7.4 Mechanical Installation

Installation size information is shown below，Unit in（mm）：

8 4-Channel Analogue Output/Voltage Type/Current Type (DF50-M-4AO-UI-6)

➢ This analogue output module outputs voltage and current standard signals.

➢ 4-channel analogue output, voltage type, current type.

➢ Two LEDs indicate normal module operation and normal communication respectively.

➢ Magnetic isolation between field and system level.

➢ Transmission in 16-bit resolution.

➢ Protection Level of IP20
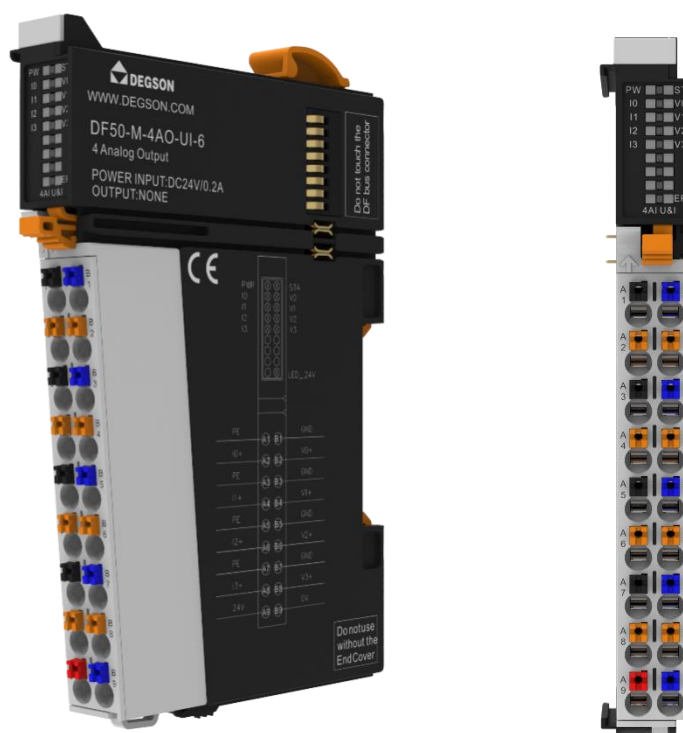
8.1 Specification

Technical Information	
Product Description	Analogue output module, 4 outputs, voltage & current type
Number of Channels	4
Signal Type	Voltage/current, single-ended signals
Resolution	16 Bit
Voltage Output Range	±10V、0~10V、2~10V、±5V、0~5V、1~5V
Voltage Output Load	>1KΩ
Voltage Output Accuracy	±0.1%
Current Output Range	0~20mA、4~20mA
Current Output Load	<600Ω
Current Output Accuracy	±0.1%
Isolated or not	No isolation between interface channels, power supply and interface isolation, interface and bus isolation
Independent channel enable configuration	Support

Diagnostic report function configuration	Disable,±10V, 0~10V, 2~10V, ±5V
Channel mode configuration	Disable,±10V,0~10V,2~10V,±5V,0~5V,1~5V,0~20mA,4~20mA
Output state configuration after stopping	Zero, keep current value
Stop mode	Press the fault shutdown state mode, no longer refreshing
Input action display	Input indicator flashes when output signal is valid (software control)
IO process data size	4 Word
Power supply parameters	
System bus input power supply voltage rating	5V DC （4.75V DC~ 5.25V DC）
System bus input power supply 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 type terminal block
Crimp area of the conductor	0.2~1.5mm2/26~16AWG
Stripping length	8~10mm
Installation method	DIN-35 rail
Material Parameters	
Colour	Black
Shell material	PC plastic，PA66
Consistency mark	CE
Environmental Requirements	
Permissible ambient temperature (during operation)	-25~60℃
Permissible ambient temperature (storage)	-40~85℃
Type of protection	IP20
Pollution level	2，Conforms to IEC 61131-2 standard
Operating Altitude	Temperature without derating: 0~2000m
Relative humidity (non-condensing)	5~95%RH
Vibration Resistance	1g, according to IEC 60068-2-6 standard
Shock Resistance	15g, according to IEC 60068-2-27 standard
EMC Anti-Interference Rating	Conforms to IEC 61000-4
Corrosion resistance	Conforms to IEC 60068-2-42 and IEC 60068-2-43
Permissible H2S pollutant concentration at 75 % relative humidity	10ppm
Permissible SO2 pollutant concentration at 75 % relative humidity	25ppm

8.2 Hardware Interfaces

8.2.1 Terminal Block Definition
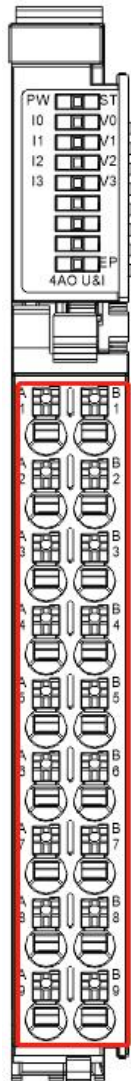
Terminal Number	Signal	Description	Terminal Number	Signal	Description
A1	PE	Safe Ground	B1	GND	Negative of voltage/current
A2	I0+	Current output channel 0	B2	V0+	Voltage output channel 0
A3	PE	Safe ground	B3	GND	Negative of voltage/current
A4	I1+	Current output channel 1	B4	V1+	Voltage output channel 1
A5	PE	Safe ground	B5	GND	Negative of voltage/current
A6	I2+	Current output channel 2	B6	V2+	Voltage output channel 2
A7	PE	Safe	B7	GND	Negative pole of voltage/current
A8	I3+	Current output channel 3	B8	V3+	Voltage output channel 3
A9	24V	Terminal power input 24V	B9	0V	Terminal power input 0V

8.2.2 LED Indicator Definition

Indicator	Meaning	
PW	Green on:System bus power input normal	
	Green off:System bus power input abnormal	
ST	Power-on stage	Green on: module initialisation abnormal
		Green off: module initialisation is normal
	Running phase	Green flash: module internal bus works normally
		Green off/green on: module internal bus work abnormally or terminal
EP	Green on: terminal power input normal	
	Green off: abnormal terminal power input	
I0～I3,V0～V3	Green flash: output signal is valid	
	Green off: Invalid output signal	

8.2.3 Wiring Diagram
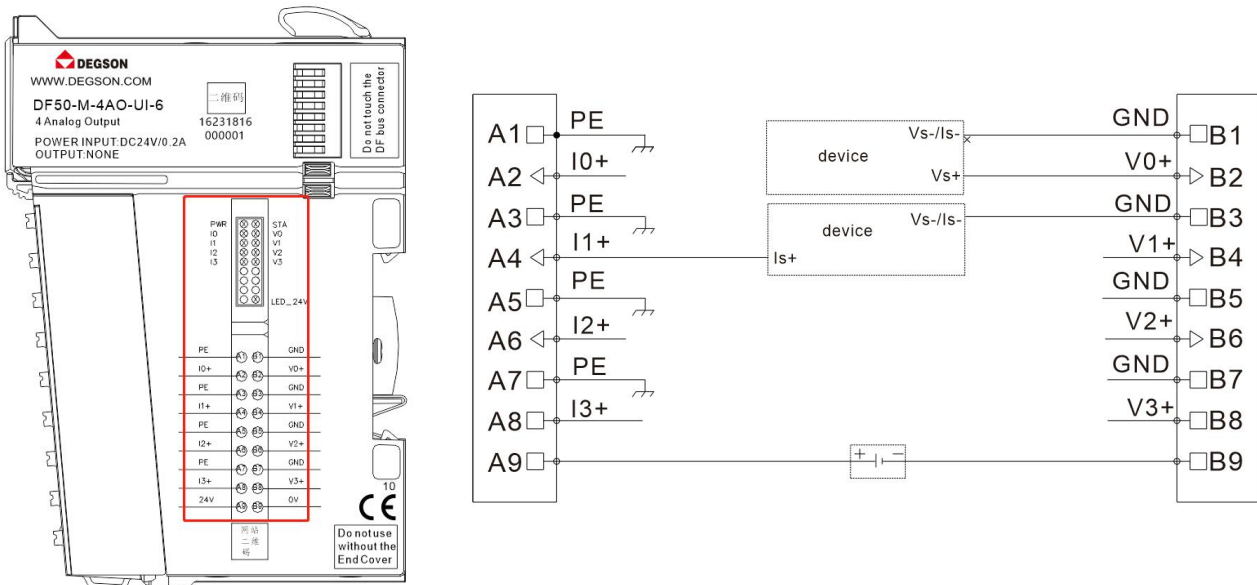
Note: A9 and B9 are external power input connectors.

8.3 Register Assignment Rules

4-channel voltage-type/current-type analogue output module occupying 4 write-hold registers.

Register Type	Register PLC Address Interval	Register Modbus Protocol Address Interval	Function Code	Read/Write Status
Holding Register	40001~41024	0000H~03FFH	06H	Write

Write Holding Register Block Data Structure Definition:

WriteHoldReg	Byte	Format	Description	
0	IB0	Word	AO_UI_0	
0	IB1	Word	AO_UI_0	
1	IB2	Word	AO_UI_1	AO4UI_MOD_WriteHoldRegBlock Size:4
1	IB3	Word	AO_UI_1	
2	IB4	Word	AO_UI_2	
2	IB5	Word	AO_UI_2	
3	IB6	Word	AO_UI_3	
3	IB7	Word	AO_UI_3	

Data Description:

Signal range	Voltage Value (U)	Decimal Data	Hexadecimal Data	Scope statement	Conversion Relation
±10V	0V	>32511	>0x7EFF	overflow	$D = 27648 \times U / 10$ $U = D \times 10 / 27648$
	11.76V	32511	0x7EFF	Upper limit value	
	10V	27648	0x6C00	Normal range	
	5V	13824	0x3600		
	0V	0	0x0000	Lower limit value	
	-5V	-13824	0xCA00	overflow	
	-10V	-27648	0x9400	Upper limit value	
	-11.76V	-32511	0x8101	Normal range	
	0V	<-32511	<0x8101	Lower limit value	
0-10V	0V	>32511	>0x7EFF	overflow	$D = 27648 \times U / 10$ $U = D \times 10 / 27648$
	11.76V	32511	0x7EFF	Upper limit value	
	10V	27648	0x6C00	Normal range	
	5V	13824	0x3600		
	0V	0	0x0000		
2-10V	0V	>32511	>0x7EFF	overflow	$D = 27648 \times (U - 2) / 8$ $U = D \times 8 / 27648 + 2$
	11.41V	32511	0x7EFF	Upper limit value	
	10V	27648	0x6C00	Normal range	
	6V	13824	0x3600		
	2V	0	0x0000	Lower limit value	
	0.59 V	-4864	0xED00	overflow	
	0 V	<-4864	<ED00	Upper limit	

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

8.4 Mechanical Installation

Installation dimensional information is shown in the following figure, unit as（mm）：
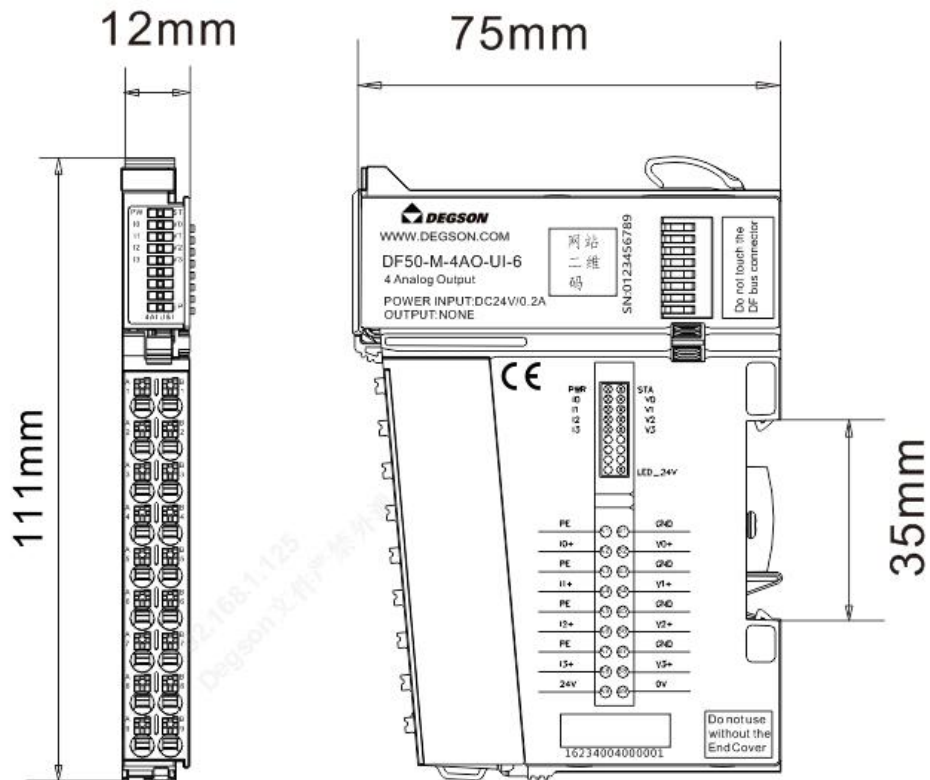
9 8-channel analogue output/voltage type (DF50-M-8AO-U-4)

➢ This analogue output module outputs a voltage standard signal.

➢ 8-channel analogue output, voltage type.

➢ Two LEDs indicate normal module operation and normal communication.

➢ Magnetic isolation between field and system layers.

➢ Transmission in 16-bit resolution.

➢ Protection level of IP20
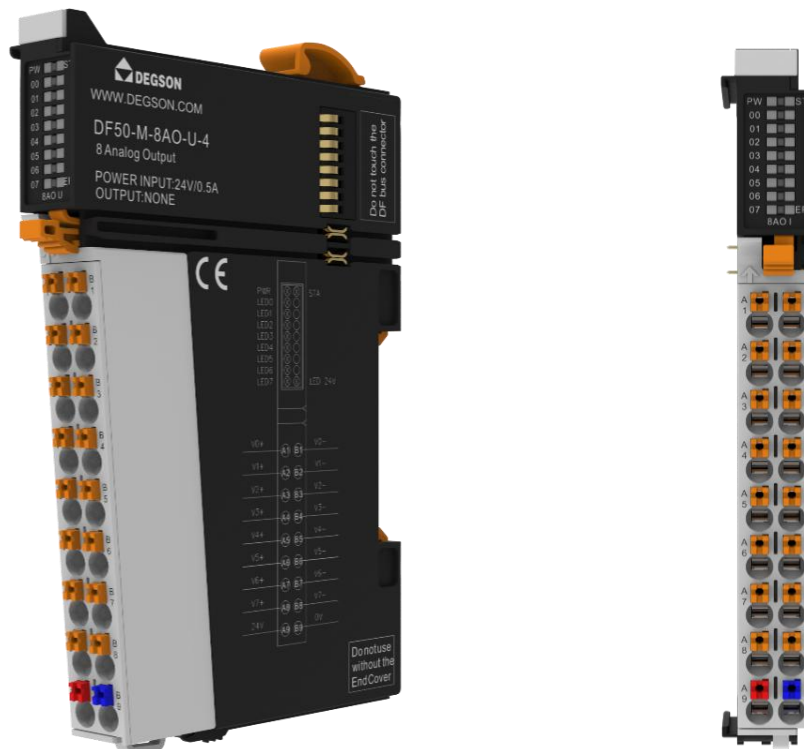
9.1 Specification

Technical Information	
Product Description	Analogue output module, 8 outputs, voltage type
Number of Channels	8
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	±0.1%
Current Output Range	No isolation between interface channels, power supply and interface isolation, interface and bus isolation
Current Output Load	Support
Current Output Accuracy	Support
Isolated or not	Disable, ±10V, 0~10V, 2~10V, ±5V, 0~5V, 1~5V
Independent channel enable configuration	Zero, keep current output

Diagnostic report function configuration	Press fault shutdown state mode, no longer refreshed
Channel mode configuration	Input indicator flashes when output signal is valid (software control)
Output state configuration after stopping	8 Word
Stop mode	
Input action display	5V DC （4.75V DC~ 5.25V DC）
IO process data size	35mA
Power supply parameters	24V DC (20.4V DC~ 28.8V DC)
System bus input power supply voltage rating	90mA
System bus input power supply rated current	
Terminal power input rated voltage	PUSH-IN terminal
Terminal power input rated current	0.2~1.5mm²/26~16AWG
Wiring parameters	8~10mm
Connection technology	DIN-35 rail
Crimp area of the conductor	
Stripping length	Black
Installation method	PC Plastic，PA66
Material Parameters	CE
Colour	
Shell material	-25~60℃
Consistency mark	-40~85℃
Environmental Requirements	IP20
Permissible ambient temperature (during operation)	2, in accordance with IEC 61131-2 standard
Permissible ambient temperature (storage)	Temperature without derating：0~2000m
Type of protection	5~95%RH
Pollution level	1g, according to IEC 60068-2-6 standard
Operating Altitude	15g, according to IEC 60068-2-27 standard
Relative humidity (non-condensing)	Conforms to IEC 61000-4
Vibration Resistance	Conforms to IEC 60068-2-42 and IEC 60068-2-43
Shock Resistance	10ppm
EMC Anti-Interference Rating	25ppm

9.2 Hardware Interface

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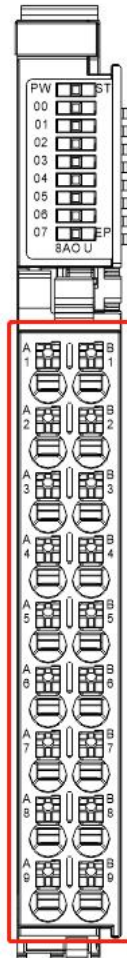
Terminal	Signal	Terminal	Signal	Description
A1	V0+	B1	V0-	Voltage output channel 0
A2	V1+	B2	V1-	Voltage output channel 1
A3	V2+	B3	V2-	Voltage output channel 2
A4	V3+	B4	V3-	Voltage output channel 3
A5	V4+	B5	V4-	Voltage output channel 4
A6	V5+	B6	V5-	Voltage output channel 5
A7	V6+	B7	V6-	Voltage output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

9.2.2 LED Indicator Definition

Indicator	Description		
PW	Green on:System bus power input normal		
	Green off:System bus power input abnormal		
ST	Power-on stage	Green on: module initialisation abnormal	
		Green off: module initialisation is normal	
	Running phase	Green flash: module internal bus work normal	
		Green off/green on: module internal bus work abnormally or terminal power input abnormally	
EP	Green on: terminal power input normal		
	Green off: abnormal terminal power input		
V0~V7	Green flash: output signal is valid		
	Green off: Invalid output signal		

9.2.3 Wiring Diagram
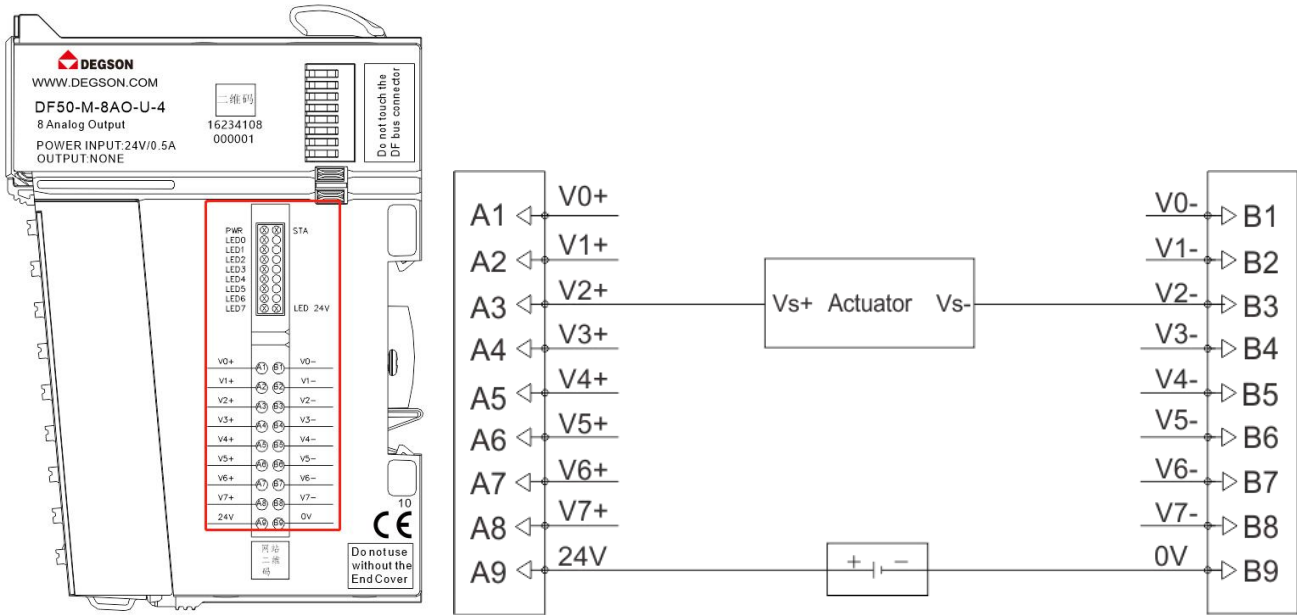
Note: A9, B9 24V power supply is externally supplied.

9.3 Register Assignment Rules

8-channel voltage type analogue output module occupying 8 write-hold registers.

Register Type	Register PLC Address Interval	Register Modbus Protocol Address Interval	Function Code	Read/Write Status
holding register	40001~41024	0000H~03FFH	06H	write

Write Holding Register Block Data Structure Definition:

WriteHoldReg	Byte	Format	Description	
0	IB0	Word	AO_U_0	
	IB1			
1	IB2	Word	AO_U_1	
	IB3			
2	IB4	Word	AO_U_2	
	IB5			
3	IB6	Word	AO_U_3	AO8U_MOD_WriteHoldRegBlock Size:8
	IB7			
4	IB8	Word	AO_U_4	
	IB9			
5	IB10	Word	AO_U_5	
	IB11			
6	IB12	Word	AO_U_6	
	IB13			
7	IB14	Word	AO_U_7	
	IB15			

Data description:

Signal range	Voltage Value (U)	Decimal Data	Hexadecimal Data	Scope statement	Conversion Relation
±10V	0V	>32511	>0x7EFF	overflow	$D = 27648 \times U / 10$ $U = D \times 10 / 27648$
	11.76V	32511	0x7EFF	Upper limit value	
	10V	27648	0x6C00	Normal range	
	5V	13824	0x3600		
	0V	0	0x0000	Lower limit value overflow	
	-5V	-13824	0xCA00		
	-10V	-27648	0x9400	Upper limit value	
	-11.76V	-32511	0x8101	Normal range	
	0V	<-32511	<0x8101	Lower limit value	
0-10V	0V	>32511	>0x7EFF	overflow	$D = 27648 \times U / 10$ $U = D \times 10 / 27648$
	11.76V	32511	0x7EFF	Upper limit value	
	10V	27648	0x6C00	Normal range	
	5V	13824	0x3600		
	0V	0	0x0000		
2-10V	0V	>32511	>0x7EFF	overflow	$D = 27648 \times (U - 2) / 8$ $U = D \times 8 / 27648 + 2$
	11.41V	32511	0x7EFF	Upper limit value	
	10V	27648	0x6C00	Normal	

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

9.4 Mechanical Installation

Installation dimensional information is shown in the following figure, unit as（mm）：
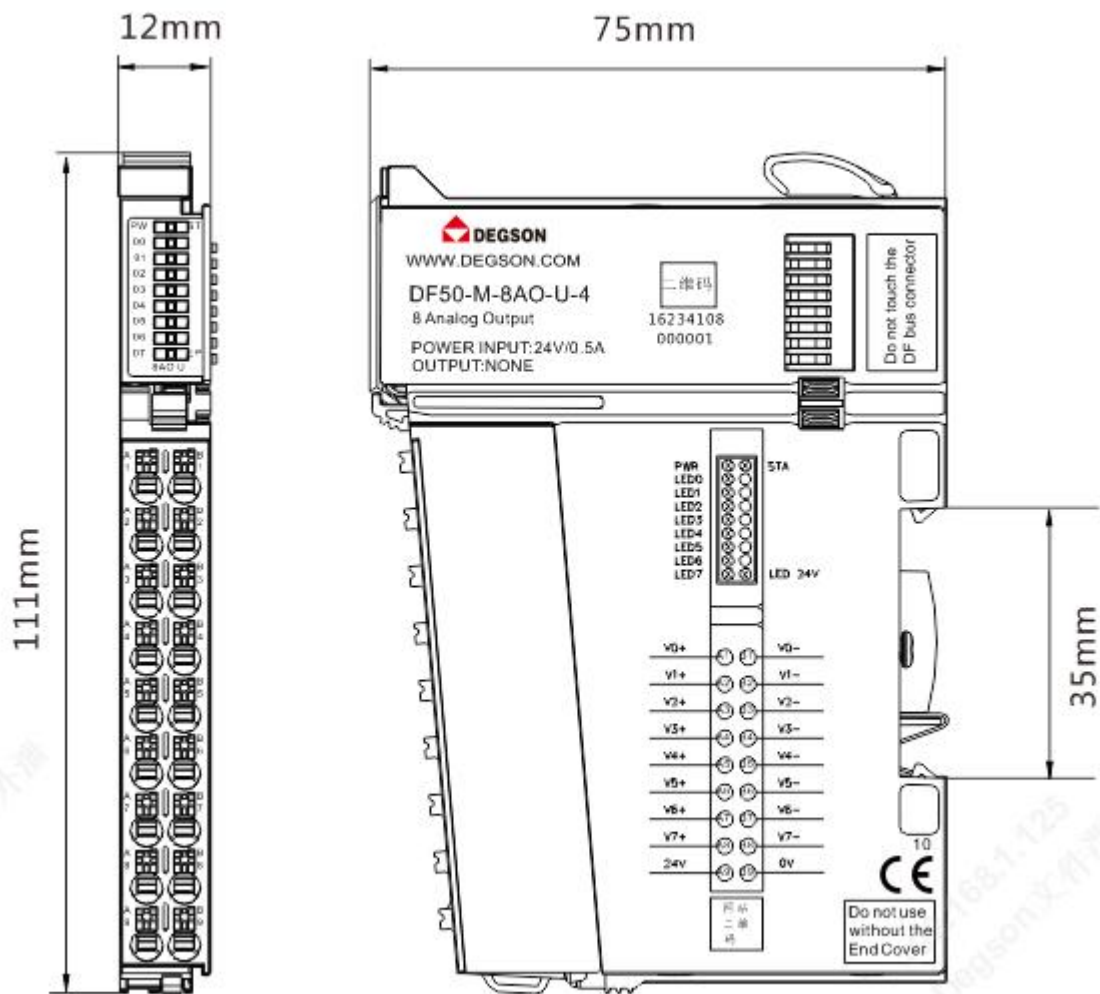
10 8-channel analog output/current type (DF50-M-8AO-I-5)

➢ This analogue output module outputs a current standard signal.

➢ 8-channel analogue output, current type.

➢ Two LEDs indicate normal module operation and normal communication.

➢ Magnetic isolation between field and system layers.

➢ Transmission in 16-bit resolution.

➢ Protection level of IP20
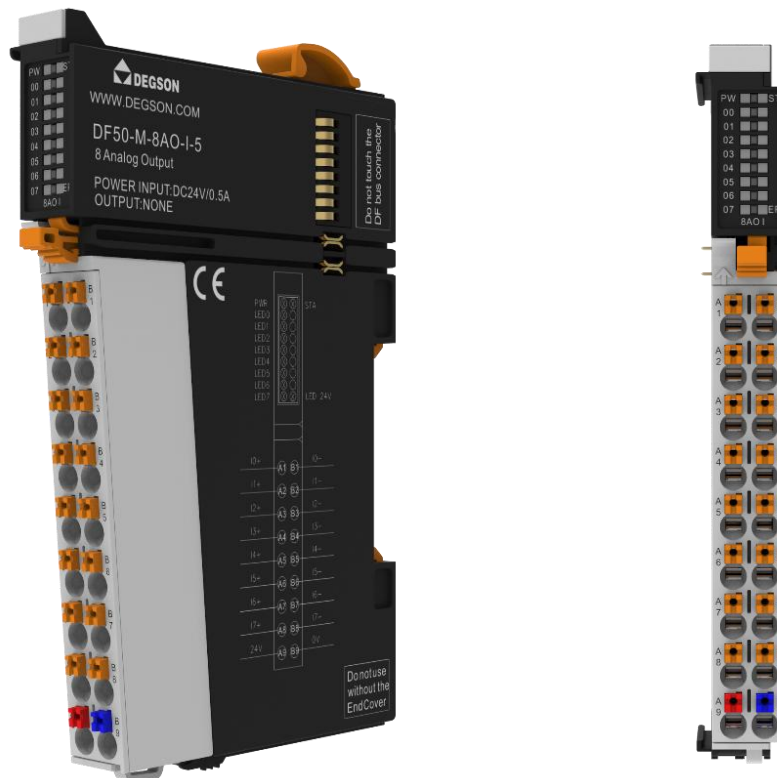
10.1 Specification

Technical Information	
Product Description	Analogue output module, 8 outputs, current type
Number of Channels	8
Signal Type	Current, Single-Ended Output
Resolution	16 Bit
Voltage Output Range	0~20mA, 4~20mA
Voltage Output Load	<600Ω
Voltage Output Accuracy	±0.1%
Current Output Range	No isolation between interface channels, power supply and interface isolation, interface and bus isolation
Current Output Load	Support
Current Output Accuracy	Supported
Isolated or not	Disable, 0-20mA, 4-20mA
Independent channel enable configuration	Zero, hold current output
Diagnostic report function configuration	No more refreshing according to the fault shutdown state mode
Channel mode configuration	Input indicator flashes when output signal is valid (software controlled)
Output state configuration after stopping	8 Word
Stop mode	
Input action display	5V DC （4.75V DC~ 5.25V DC）
IO process data size	35mA
Power supply parameters	24V DC (20.4V DC~ 28.8V DC)
System bus input power supply voltage rating	33mA
System bus input power supply rated current	
Terminal power input rated voltage	PUSH-IN Terminal
Terminal power input rated current	0.2~1.5mm^2/26~16AWG
Wiring parameters	8~10mm
Connection technology	DIN-35 Rail
Crimp area of the conductor	
Stripping length	Black
Installation method	PC plastic，PA66
Material Parameters	CE
Colour	
Shell material	-25~60℃
Consistency mark	-40~85℃
Environmental Requirements	IP20
Permissible ambient temperature (during operation)	2, in accordance with IEC 61131-2 standard
Permissible ambient temperature (storage)	Temperature without derating：0~2000m
Type of protection	5~95%RH
Pollution level	1g, according to IEC 60068-2-6 standard
Operating Altitude	15g, according to IEC 60068-2-27 standard
Relative humidity (non-condensing)	Conforms to IEC 61000-4
Vibration Resistance	Conforms to IEC 60068-2-42 and IEC 60068-2-43
Shock Resistance	10ppm
EMC Anti-Interference Rating	25ppm

10.2 Hardware Interface

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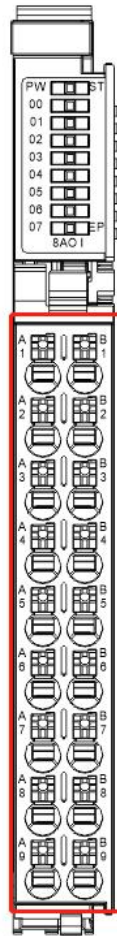
Terminal Number	Signal	Terminal Number	Signal	Description
A1	V0+	B1	V0-	Current output channel 0
A2	V1+	B2	V1-	Current output channel 1
A3	V2+	B3	V2-	Current output channel 2
A4	V3+	B4	V3-	Current output channel 3
A5	V4+	B5	V4-	Current output channel 4
A6	V5+	B6	V5-	Current output channel 5
A7	V6+	B7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

10.2.2 LED Indicator Definition

Indicator	Description		
PW	Green on:System bus power input normal		
	Green off:System bus power input abnormal		
ST	Power-on stage	Green on: module initialisation abnormal	
		Green off: module initialisation is normal	
	Running phase	Green flash: module internal bus work normal	
		Green off/green on: module internal bus work abnormally or terminal power input abnormally	
EP	Green on: terminal power input normal		
	Green off: abnormal terminal power input		
I0～I7	Green flash: output signal is valid		
	Green off: Invalid output signal		

10.2.3 Wiring Diagram
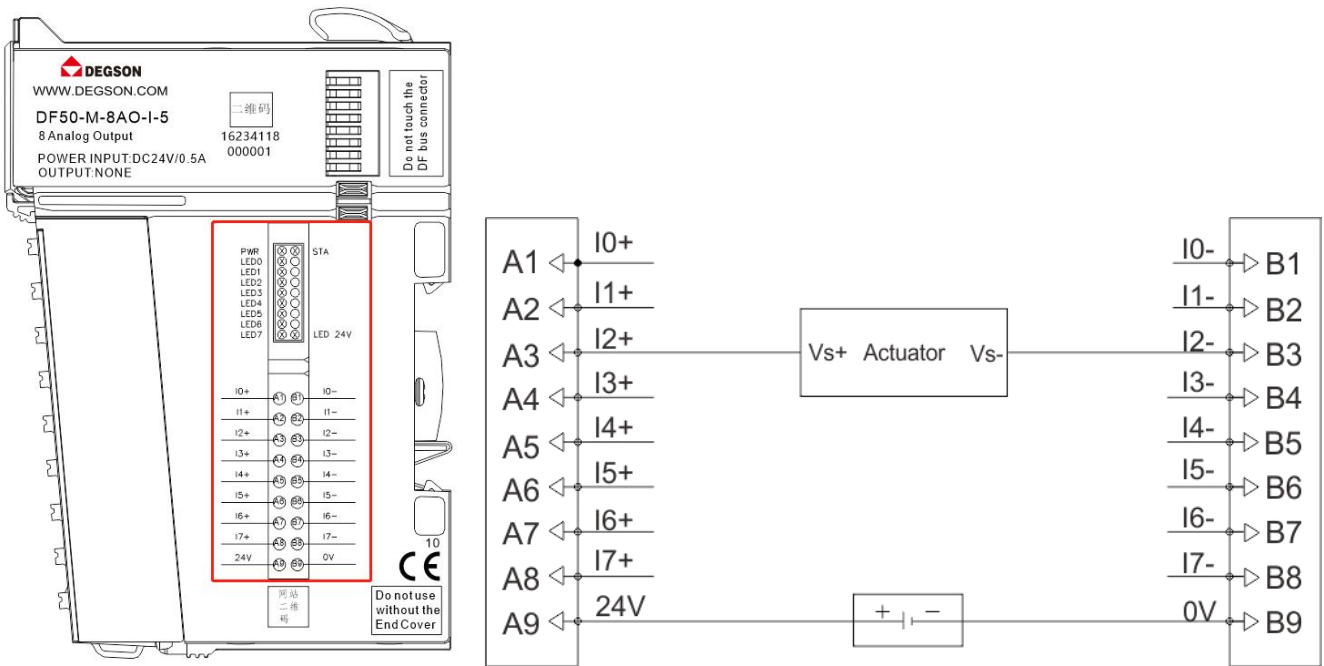
Note: A9, B9 24V power supply is externally supplied.

10.3 Register Assignment Rules

8-channel current-type analogue output module occupying 8 write-hold registers.

Register Type	Register PLC Address Interval	Register Modbus Protocol Address Interval	Function Code	Read/Write Status
Hold registers	40001~41024	0000H~03FFH	06H	Writable

Write Holding Register Block Data Structure Definition:

WriteHoldReg	Byte	Format	Description	
0	IB0	Word	AO_I_0	
	IB1			
1	IB2	Word	AO_I_1	
	IB3			
2	IB4	Word	AO_I_2	
	IB5			
3	IB6	Word	AO_I_3	AO8I_MOD_WriteHoldRegBlock Size:8
	IB7			
4	IB8	Word	AO_I_4	
	IB9			
5	IB10	Word	AO_I_5	
	IB11			
6	IB12	Word	AO_I_6	
	IB13			
7	IB14	Word	AO_I_7	
	IB15			

Data Description：

Signal range	Voltage Value （U）	Decimal Data	Hexadecimal Data	Scope statement	Conversion Relation
0~20ma	0ma	>32511	>0x7EFF	overflow	D = 27648 x I / 20 I = D x 20/ 27648
	23.52ma	32511	0x7EFF	Upper limit value	
	20ma	27648	0x6C00	Normal range	
	10ma	13824	0x3600		
	0ma	0	0x0000		
4~20ma	0ma	>32511	>0x7EFF	overflow	D = 27648 x (I – 4) / 16 I = D x 16 / 27648 + 4
	22.81ma	32511	0x7EFF	Upper limit value	
	20ma	27648	0x6C00	Normal range	
	12ma	13824	0x3600		
	4ma	0	0x0000	Lower limit value	
	1.19ma	-4864	0xED00	overflow	
	0ma	<-4864	<-0xED00	Upper limit value	

10.4 Mechanical Installation

Installation dimensional information is shown in the following figure. Unit as（mm）：
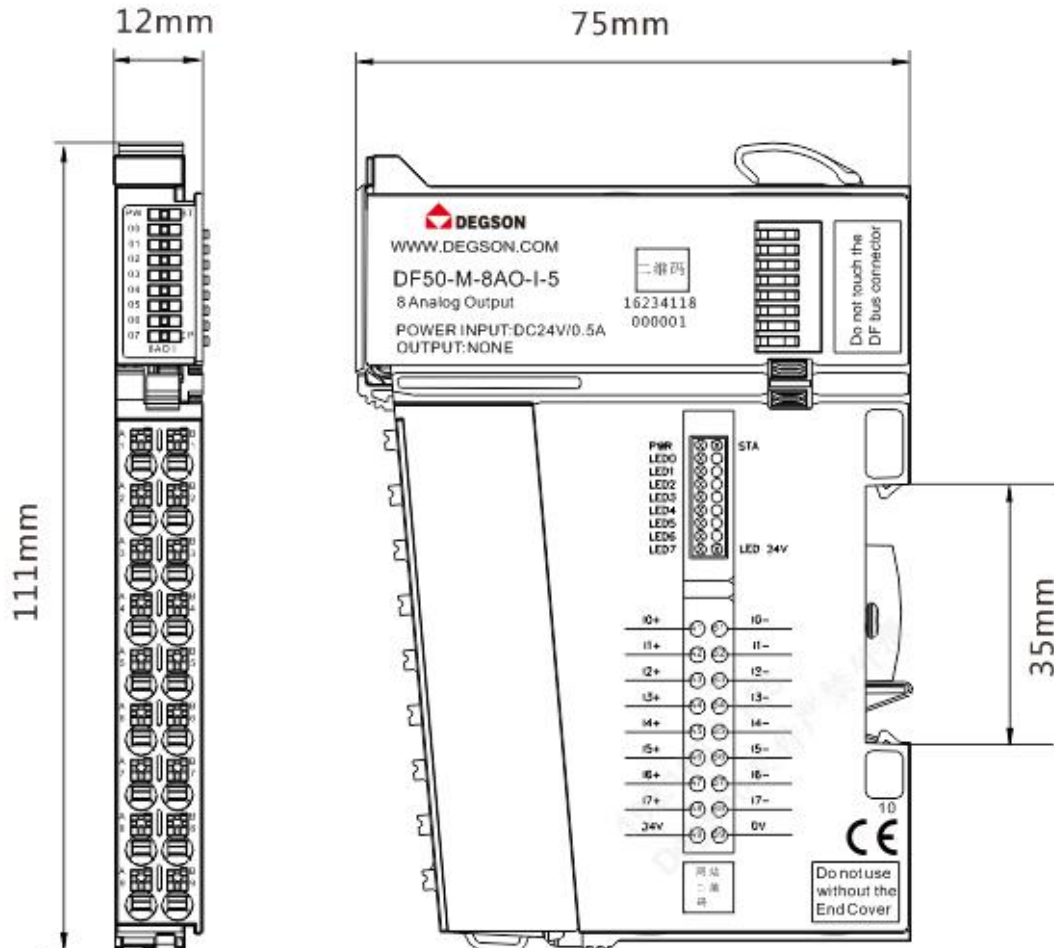
11 4-channel RTD measurement (DF50-M-4RTD-PT)

➢ This module uses 4-channel RTD measurement and supports 13 types of conventional RTDs.

➢ Supports 4-channel sensors.

➢ Supports 2-wire, 3-wire and 4-wire sensors.

➢ Two LEDs indicate normal module operation and normal communication respectively.

➢ Each channel is equipped with an LED indicator.

➢ Magnetic isolation between field and system layers.

➢ Transmitted in 16 resolution.

➢ Protection level of IP20。
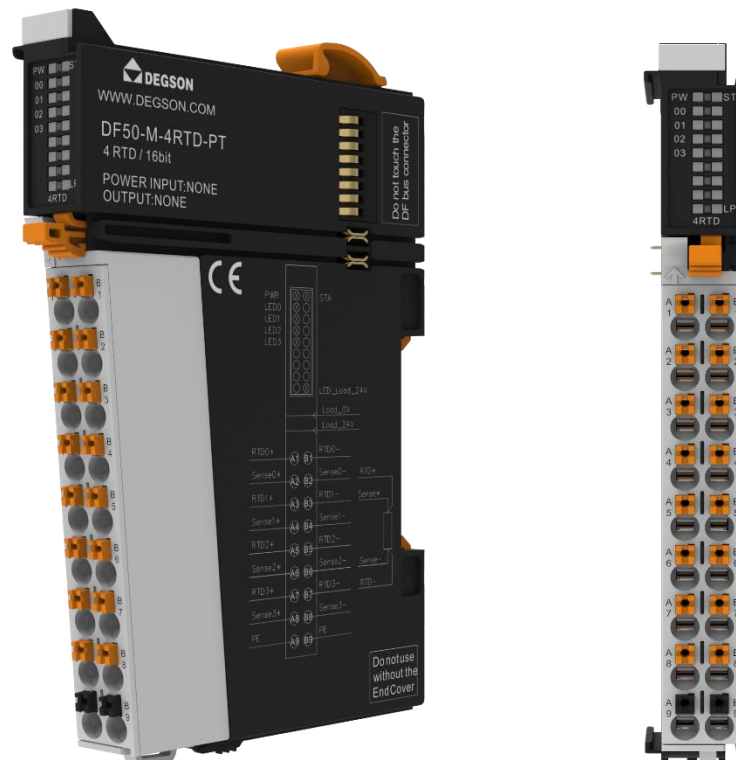
11.1 Specification

Technical Information	
Product Description	Resistance Temperature (RTD) Measurement Module, 16-bit Resolution, 4 Channels
Number of Channels	4
Signal Type	pt100, pt200, pt500, pt1000, ni100, ni120, ni 200,
Resolution	Ni500, Ni1000, Cu10,Cu50,Cu53,Cu100KTY83-110,
Voltage Output Range	kty83-120,kty83-121,kty83-122,kty83-150,kty83-151.
Voltage Output Load	ntc-5k,ntc-20k,kty84-130,kty84-150,kty84-151.
Voltage Output Accuracy	40 Ω, 80 Ω, 150 Ω,300 Ω, 500 Ω, 1 kΩ, 2 kΩ, 4 kΩ
Current Output Range	16bit, 0.1℃/bit
Current Output Load	±0.3%
Current Output Accuracy	2-wire/3-wire
Isolated or not	Interface channel isolation, interface and bus isolation
Independent channel enable configuration	Exceed upper limit alarm, exceed lower limit alarm, disconnection alarm, overflow error
Diagnostic report function configuration	4 Word
Channel mode configuration	
Output state configuration after stopping	5V DC （4.75V DC~ 5.25V DC）
Stop mode	30mA
Input action display	24V DC (20.4V DC~ 28.8V DC)
IO process data size	10mA
Power supply parameters	
System bus input power supply voltage rating	PUSH-IN terminal
System bus input power supply rated current	0.2~1.5mm²/26~16AWG
Terminal power input rated voltage	8~10mm
Terminal power input rated current	DIN-35 Rail
Wiring parameters	
Connection technology	Black
Crimp area of the conductor	PC plastic，PA66
Stripping length	CE
Installation method	
Material Parameters	-25~60℃
Colour	-40~85℃
Shell material	IP20
Consistency mark	2, in accordance with IEC 61131-2 standard
Environmental Requirements	Temperature without derating：0~2000m
Permissible ambient temperature (during operation)	5~95%RH
Permissible ambient temperature (storage)	1g, according to IEC 60068-2-6 standard
Type of protection	15g, according to IEC 60068-2-27 standard
Pollution level	Conforms to IEC 61000-4
Operating Altitude	Conforms to IEC 60068-2-42 and IEC 60068-2-43
Relative humidity (non-condensing)	10ppm
Vibration Resistance	25ppm

11.2 Hardware Interface

11.2.1 Terminal Block Definition
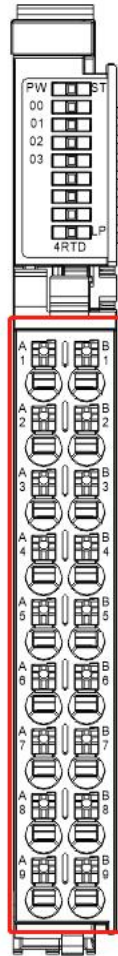
Terminal Number	Signal	Terminal Number	Signal	Description
A1	RTD0+	B1	RTD0-	First channel signal input
A2	Sense0+	B2	Sense0-	
A3	RTD1+	B3	RTD1-	Second channel signal input
A4	Sense1+	B4	Sense1-	
A5	RTD2+	B5	RTD2-	Third channel signal input
A6	Sense2+	B6	Sense2-	
A7	RTD3+	B7	RTD3-	Fourth channel signal input
A8	Sense3+	B8	Sense3-	
A9	/	B9	/	Reserve Overhang

11.2.2 LED Indicator Definition
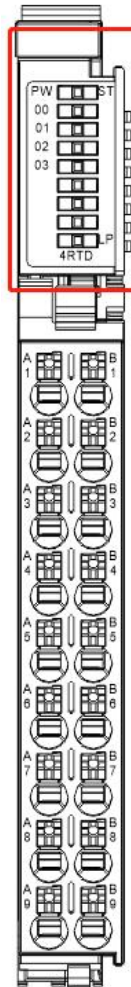
Indicator Light	Description	
PW	Green on:System bus power input normal	
	Green off:System bus power input abnormal	
ST	Power-on stage	Green on: module initialisation abnormal
		Green off: module initialisation is normal
	Running phase	Green flash: module internal bus work normally
		Green off/green on: module internal bus works abnormally or internal load power input is abnormal
LP	Green on: Internal load power input normal	
	Green off: internal load power input abnormal	
00～03	Green flash: input signal is valid	
	Green off:Invalid input signal	
	Green on:Signal overrun	

11.2.3 Wiring Diagram
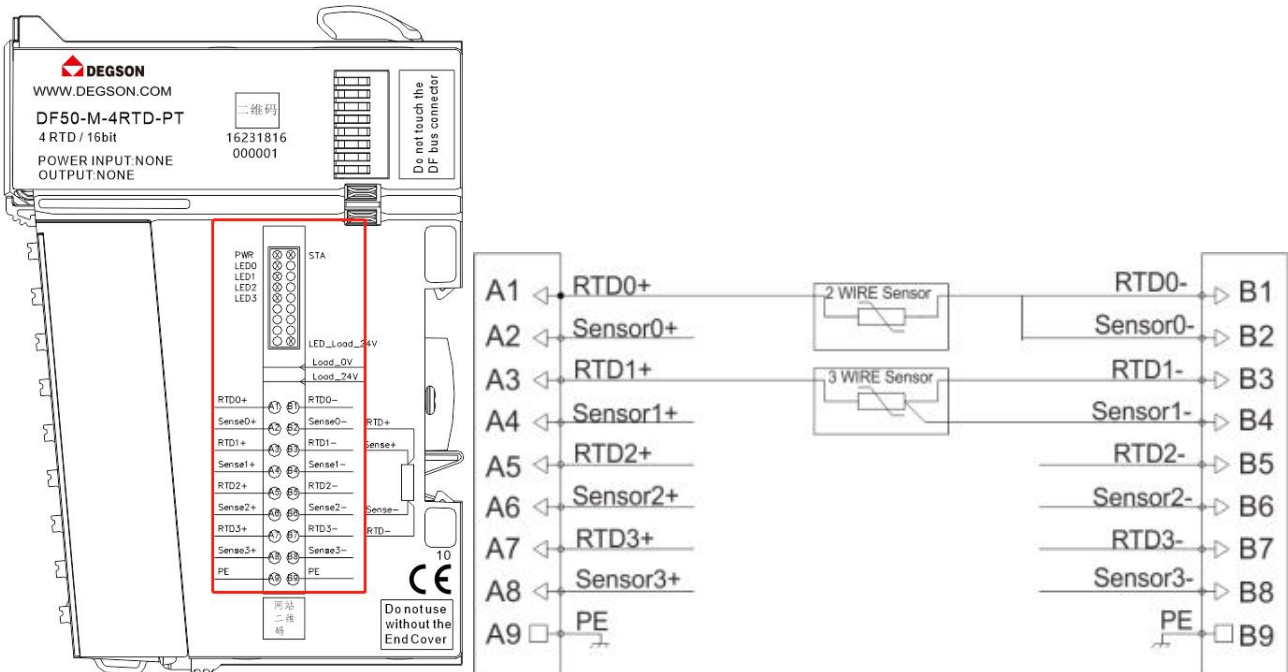
Note：

RTD sensor excitation power +, signal + is usually two red wires, do not distinguish between functions, can be mixed;

Excitation power supply-, signal- Usually two blue wires, or 1 blue and 1 black, do not distinguish between functions, can be mixed;

11.3 Register allocation rules

A 4-channel RTD measurement module occupying 4 holding registers, 4 input registers.

Register Type	Register PLC Address Interval	Register Modbus Protocol Address Interval	Function Code	Read/Write Status
Input Registers	30001~31024	0000H~03FFH	04H	Read Only
Holding Register	42049~43072	0800H~0BFFH	03H	Read

Read input register block data structure definition:

ReadInputReg	Byte	Format	Description	
0	IB0	Word	RTD0	AI4RTD_MOD_ReadInputRegBlock Size:4
0	IB1	Word	RTD0	
1	IB2	Word	RTD1	
1	IB3	Word	RTD1	
2	IB4	Word	RTD2	
2	IB5	Word	RTD2	
3	IB6	Word	RTD4	
3	IB7	Word	RTD4	

Holding register block data structure definition:

ReadHoldReg	Byte	Format	Description	
0	IB0	Word	RTD0	AI4RTD_MOD_ReadHoldRegBlock Size:4
0	IB1	Word	RTD0	
1	IB2	Word	RTD1	
1	IB3	Word	RTD1	
2	IB4	Word	RTD2	
2	IB5	Word	RTD2	
3	IB6	Word	RTD4	
3	IB7	Word	RTD4	

Data Description:

Analog Input Data(Channel 1~4)：The analog signal input value of the corresponding channel

PT100 Type			
Temperature	Decimal System	Hexadecimal	Scope statement
>850	32767	0x7FFF	Overflow
850	8500	0x2134	Normal range
-200	-2000	0xF830	Normal range
<-200	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection Detection

PT200 Type			
Temperature	Decimal System	Hexadecimal	Scope statement
>850	32767	0x7FFF	Overflow
850	8500	0x2134	Normal range
-200	-2000	0xF830	Normal range
<-200	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection Detection

PT500 Type			
Temperature	Decimal System	Hexadecimal	Scope statement
>850	32767	0x7FFF	Overflow

850	8500	0x2134	Normal range
-200	-2000	0xF830	
<-200	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection Detection

PT1000 Type			
Temperature	Decimal System	Hexadecimal	Scope statement
>850	32767	0x7FFF	Overflow
850	8500	0x2134	Normal range
-200	-2000	0xF830	
<-200	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection Detection

Ni100 Type			
Temperature	Decimal System	Hexadecimal	Scope statement
>250	32767	0x7FFF	Overflow
250	2500	0x09C4	Normal range
-60	-600	0xFDA8	
<-60	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection Detection

Ni120 Type			
Temperature	Decimal System	Hexadecimal	Scope statement
>309	32767	0x7FFF	Overflow
309	3090	0x0C12	Normal range
-79	-790	0xFCEA	
<-79	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection Detection

NI200 Type			
Temperature	Decimal System	Hexadecimal	Scope statement
>250	32767	0x7FFF	Overflow
250	2500	0x09C4	Normal range
-60	-600	0xFDA8	
<-60	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection Detection

Ni500 Type			
Temperature	Decimal System	Hexadecimal	Scope statement
>250	32767	0x7FFF	Overflow
250	2500	0x09C4	Normal range
-60	-600	0xFDA8	
<-60	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection Detection

Ni1000 Type			
Temperature	Decimal System	Hexadecimal	Scope statement
>250	32767	0x7FFF	Overflow
250	2500	0x09C4	Normal range
-60	-600	0xFDA8	
<-60	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection Detection

Cu10 Type			
Temperature	Decimal System	Hexadecimal	Scope statement
>159	32767	0x7FFF	Overflow
159	1590	0x0636	Normal range

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

Cu50 Type			
Temperature	Decimal System	Hexadecimal	Scope statement
>159	32767	0x7FFF	Overflow
159	1590	0x0636	Normal range
-59	-590	0xFDB2	
<-59	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection Detection

Cu53 Type			
Temperature	Decimal System	Hexadecimal	Scope statement
>150	32767	0x7FFF	Overflow
150	1500	0x05DC	Normal range
-50	-500	0xFE0C	
<-50	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection Detection

Cu100 Type			
Temperature	Decimal System	Hexadecimal	Scope statement
>159	32767	0x7FFF	Overflow
159	1590	0x0636	Normal range
-59	-590	0xFDB2	
<-59	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection Detection

KTY84_130 Type			
Temperature	Decimal System	Hexadecimal	Scope statement
>280	32767	0x7FFF	Overflow
280	2800	0x0AF0	Normal range
-40	-400	0xFE70	
<-40	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection Detection

KTY84_150 Type			
Temperature	Decimal System	Hexadecimal	Scope statement
>280	32767	0x7FFF	Overflow
280	2800	0x0AF0	Normal range
-40	-400	0xFE70	
<-40	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection Detection

KTY84_151 Type			
Temperature	Decimal System	Hexadecimal	Scope statement
>280	32767	0x7FFF	Overflow
280	2800	0x0AF0	Normal range
-40	-400	0xFE70	
<-40	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection Detection

0-40ohm Type			
ohm	Decimal System	Hexadecimal	Scope statement
>319.25ohm	-32768	0x8000	Super Upper Limit

>47.03ohm	32767	0x7FFF	Upper limit
47.03ohm	32511	0x7EFF	Overflow
40ohm	27648	0x6C00	Normal range
0ohm	0	0x0000	
Sensor not connected	-32768	0x8000	Disconnect Detection

0-80ohm Type			
ohm	Decimal System	Hexadecimal	Scope statement
>319.25ohm	-32768	0x8000	Super Upper Limit
>94.07ohm	32767	0x7FFF	Upper limit
94.07ohm	32511	0x7EFF	Overflow
80ohm	27648	0x6C00	Normal range
0ohm	0	0x0000	
Sensor not connected	-32768	0x8000	Disconnect Detection

0-150ohm Type			
ohm	Decimal System	Hexadecimal	Scope statement
>319.25ohm	-32768	0x8000	Super Upper Limit
>176.38ohm	32767	0x7FFF	Upper limit
176.38ohm	32511	0x7EFF	Overflow
150ohm	27648	0x6C00	Normal range
0ohm	0	0x0000	
Sensor not connected	-32768	0x8000	Disconnect Detection

0-300ohm Type			
ohm	Decimal System	Hexadecimal	Scope statement
>638.5ohm	-32768	0x8000	Super Upper 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	Disconnect Detection

0-500ohm Type			
ohm	Decimal System	Hexadecimal	Scope statement
>638.5ohm	-32768	0x8000	Super Upper Limit
>587.94ohm	32767	0x7FFF	Upper limit
587.94ohm	32511	0x7EFF	Overflow
500ohm	27648	0x6C00	Normal range
0ohm	0	0x0000	
Sensor not connected	-32768	0x8000	Disconnect Detection

0-1000ohm Type			
ohm	Decimal System	Hexadecimal	Scope statement
>1277ohm	-32768	0x8000	Super Upper Limit
>1175.89ohm	32767	0x7FFF	Upper limit
1175.89ohm	32511	0x7EFF	Overflow
1000ohm	27648	0x6C00	Normal range
0ohm	0	0x0000	
Sensor not connected	-32768	0x8000	Disconnect Detection

0-2000ohm Type			
ohm	Decimal System	Hexadecimal	Scope statement
>2554ohm	-32768	0x8000	Super Upper Limit
>2351.78ohm	32767	0x7FFF	Upper limit
2351.78ohm	32511	0x7EFF	Overflow
2000ohm	27648	0x6C00	Normal range
0ohm	0	0x0000	

Sensor not connected	-32768	0x8000	Disconnect Detection

0-4000ohm Type			
ohm	Decimal System	Hexadecimal	Scope statement
>5108ohm	-32768	0x8000	Super Upper Limit
>4703.56ohm	32767	0x7FFF	Upper limit
4703.56ohm	32511	0x7EFF	Overflow
4000ohm	27648	0x6C00	Normal range
0ohm	0	0	
Sensor not connected	-32768	0x8000	Disconnect Detection

KTY83-110 Type			
Temperature	Decimal System	Hexadecimal	Scope statement
>175	32767	0x7FFF	Overflow
175	1750	0x06D6	Normal range
-55	-550	0xFDDA	
<-55	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection Detection

KTY83-120 Type			
Temperature	Decimal System	Hexadecimal	Scope statement
>175	32767	0x7FFF	Overflow
175	1750	0x06D6	Normal range
-55	-550	0xFDDA	
<-55	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection Detection

KTY83-121 Type			
Temperature	Decimal System	Hexadecimal	Scope statement
>175	32767	0x7FFF	Overflow
175	1750	0x06D6	Normal range
-55	-550	0xFDDA	
<-55	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection Detection

KTY83-122 Type			
Temperature	Decimal System	Hexadecimal	Scope statement
>175	32767	0x7FFF	Overflow
175	1750	0x06D6	Normal range
-55	-550	0xFDDA	
<-55	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection Detection

KTY83-150 Type			
Temperature	Decimal System	Hexadecimal	Scope statement
>175	32767	0x7FFF	Overflow
175	1750	0x06D6	Normal range
-55	-550	0xFDDA	
<-55	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection Detection

KTY83-151 Type			
Temperature	Decimal System	Hexadecimal	Scope statement
>175	32767	0x7FFF	Overflow

175	1750	0x06D6	Normal range
-55	-550	0xFDDA	
<-55	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection Detection

NTC-5K Type			
Temperature	Decimal System	Hexadecimal	Scope statement
>90	32767	0x7FFF	Overflow
90	900	0x0384	Normal range
-30	-300	0xFED4	
<-30	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection Detection

NTC-10K Type			
Temperature	Decimal System	Hexadecimal	Scope statement
>150	32767	0x7FFF	Overflow
150	1500	0x05DC	Normal range
25	250	0x00FA	
<25	-32767	0x8001	Underflow
Sensor not connected	-32768	0x8000	Disconnection Detection

11.4 Mechanical Installation

Installation size information is shown below，unit as（mm）：
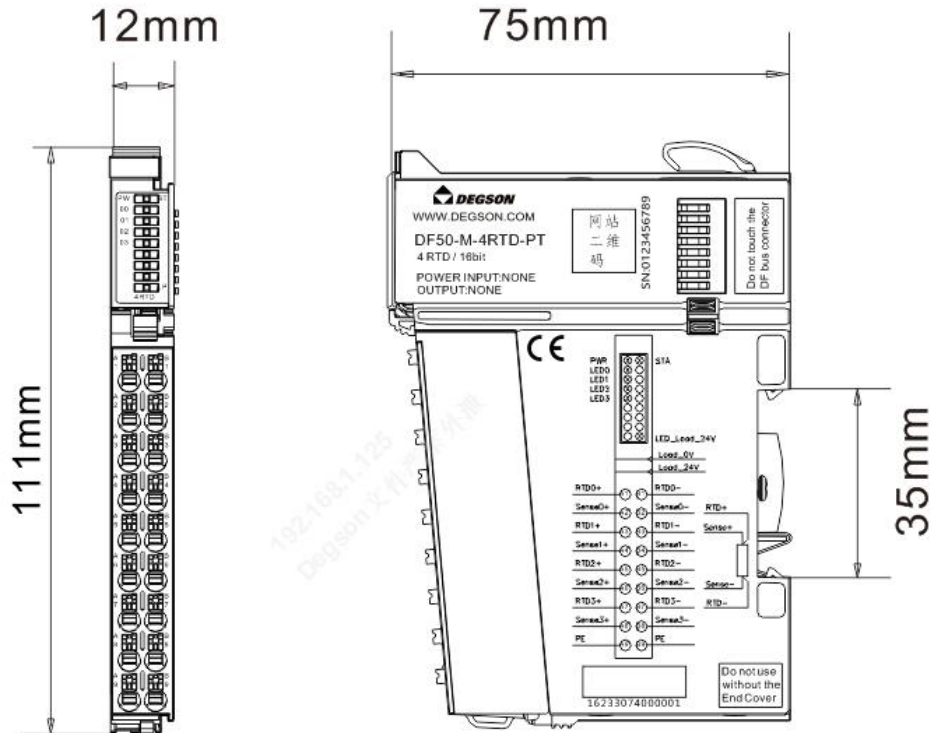
12 8-channel thermocouple measurement (DF50-M-8TC)

➢ This module uses 8-channel thermocouple measurement and supports K/E/T/J/B/S/R/N/L and millivolt voltage sensors.

➢ supports eight-channel sensors.

➢ Supports 2-wire sensors.

➢ This module reserves eight cold-side compensation output channels to compensate for cold-side temperature differences.

➢ Each channel is equipped with an LED indicator.

➢ Two LEDs indicate normal module operation and normal communication.

➢ Each channel is equipped with an LED indicator.

➢ Magnetic isolation between field and system layers.

➢ Transmitted in 16 resolution.
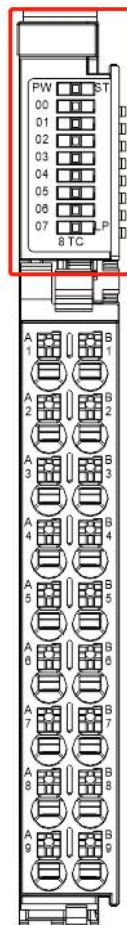
➢ Protection level of IP20。

12.1 Specification

Technical Information	
Product Description	Thermocouple Measurement Module, 16-bit Resolution, 8 Channels
Number of Channels	8
Signal Type	K, E, T, J, B, S, R, N, L and millivolt sensors
Resolution	16bit, 0.1°C/bit
Voltage Output Range	Two-wire
Voltage Output Load	±0.3 per cent
Voltage Output Accuracy	Interface channel isolation, interface and bus isolation
Current Output Range	Over the upper limit alarm, over the lower limit alarm, broken line alarm, overflow error
Current Output Load	Support
Current Output Accuracy	50Hz	60Hz
Isolated or not	61.25ms~7200ms configurable.
Independent channel enable configuration	Input indicator flashes when input signal is valid (software controlled)
Diagnostic report function configuration	8 Word
Channel mode configuration	
Output state configuration after stopping	5V DC （4.75V DC~ 5.25V DC）
Stop mode	35mA
Input action display	24V DC (20.4V DC~ 28.8V DC)
IO process data size	10mA
Power supply parameters	
System bus input power supply voltage rating	PUSH-IN terminal
System bus input power supply rated current	0.2～1.5mm²/26～16AWG
Terminal power input rated voltage	8～10mm
Terminal power input rated current	DIN-35 rail
Wiring parameters	
Connection technology	Black
Crimp area of the conductor	PC plastic，PA66
Stripping length	CE
Installation method	
Material Parameters	-25～60°C
Colour	-40～85°C
Shell material	IP20
Consistency mark	2，Conforms to IEC 61131-2 standard
Environmental Requirements	Temperature without derating：0～2000m
Permissible ambient temperature (during operation)	5～95%RH
Permissible ambient temperature (storage)	1g, according to IEC 60068-2-6 standard
Type of protection	15g, according to IEC 60068-2-27 standard
Pollution level	Conforms to IEC 61000-4
Operating Altitude	Conforms to IEC 60068-2-42 and IEC 60068-2-43
Relative humidity (non-condensing)	10ppm
Vibration Resistance	25ppm

12.2 Hardware Interface

12.2.1 Terminal Block Definition
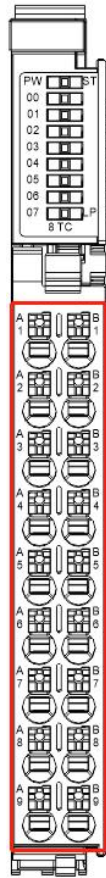
Terminal Number	Signal	Terminal Number	Signal	Description
A1	TC0+	B1	TC0-	Signal input channel 0
A2	TC1+	B2	TC1-	Signal input channel 1
A3	TC2+	B3	TC2-	Signal input channel 2
A4	TC3+	B4	TC3-	Signal Input Channel 3
A5	TC4+	B5	TC4-	Signal Input Channel 4
A6	TC5+	B6	TC5-	Signal Input Channel 5
A7	TC6+	B7	TC6-	Signal Input Channel 6
A8	TC7+	B8	TC7-	Signal Input Channel 7
A9	/	B9	/	Reserve Overhang

12.2.2 LED Indicator Definition

Indicator	Meaning	
PW	Green on:System bus power input normal	
	Green off:System bus power input abnormal	
ST	Power-on stage	Green on: module initialisation abnormal
		Green off: module initialisation is normal
	Running phase	Green flash: module internal bus works normally
		Green off/green on: module internal bus works abnormally or internal load power input is abnormal
LP	Green on: Internal load power input normal	
	Green off: internal load power input abnormal	
00～07	Green flash: input signal is valid	
	Green off:Invalid input signal	
	Green on:Signal overrun	

12.2.3 Wiring Diagram
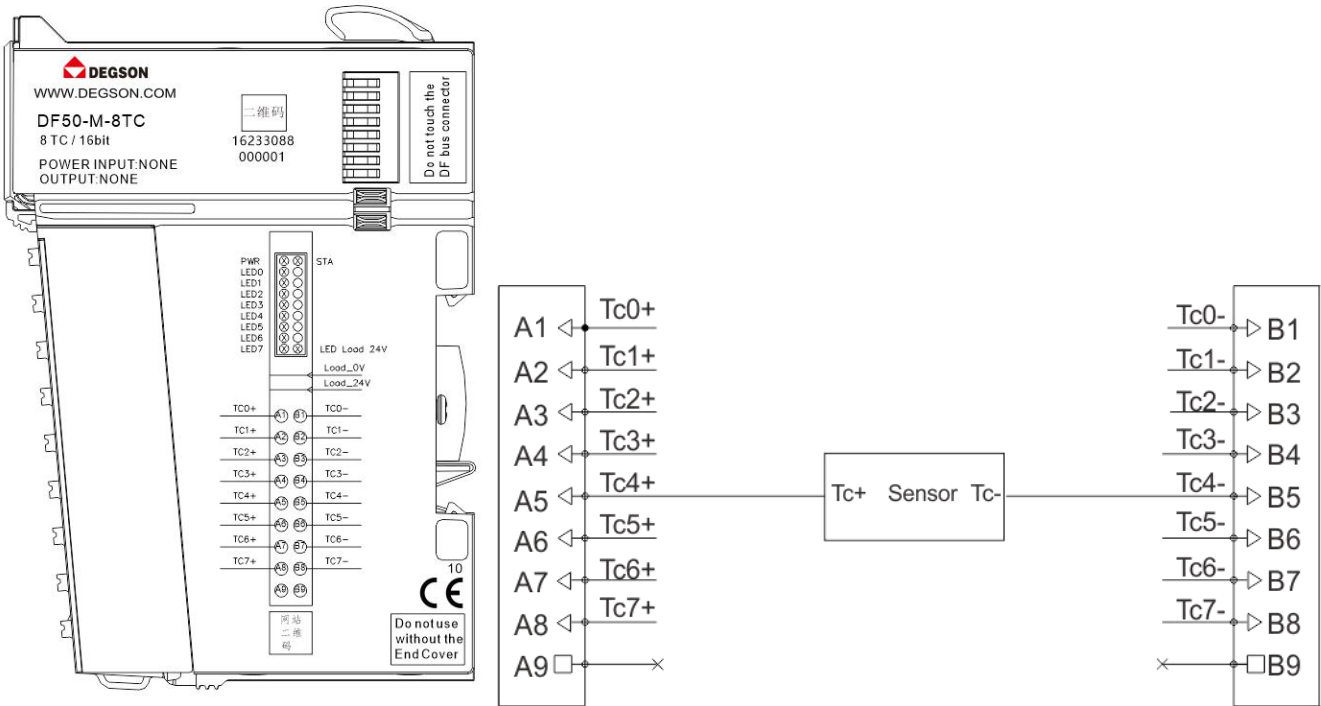
12.3 Register Assignment Rules

An 8-channel thermocouple measurement module occupying 8 holding registers, 8 input registers.

Register Type	Register PLC Address Interval	Register Modbus Protocol Address Interval	Function Code	Read/Write Status
Input Registers	30001~31024	0000H~03FFH	04H	Read Only
Holding Register	42049~43072	0800H~0BFFH	03H	Read

Read input register block data structure definition：

ReadInputReg	Byte	Format	Description	
0	IB0	Word	TC0	
0	IB1	Word	TC0	
1	IB2	Word	TC1	
1	IB3	Word	TC1	
2	IB4	Word	TC2	
2	IB5	Word	TC2	
3	IB6	Word	TC3	AI8TC_MOD_ReadInputRegBlock Size:8
3	IB7	Word	TC3	
4	IB8	Word	TC4	
4	IB9	Word	TC4	
5	IB10	Word	TC5	
5	IB11	Word	TC5	
6	IB12	Word	TC6	
6	IB13	Word	TC6	
7	IB14	Word	TC7	
7	IB15	Word	TC7	

Read input register block data structure definition:

ReadHoldReg	Byte	Format	Description	
0	IB0	Word	TC0	
0	IB1	Word	TC0	
1	IB2	Word	TC1	
1	IB3	Word	TC1	
2	IB4	Word	TC2	
2	IB5	Word	TC2	
3	IB6	Word	TC3	AI8TC_MOD_ReadHoldRegBlock Size:8
3	IB7	Word	TC3	
4	IB8	Word	TC4	
4	IB9	Word	TC4	
5	IB10	Word	TC5	
5	IB11	Word	TC5	
6	IB12	Word	TC6	
6	IB13	Word	TC6	
7	IB14	Word	TC7	
7	IB15	Word	TC7	

Data Description：

Analog Input Data(Channel 1~8)：The analogue signal input value of the corresponding channel.

K Type			
Temperature	decimal	hexadecimal	Range Statement
>1370	32767	0x7FFF	Overflow
1370	13700	0x3584	Normal range

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

E Type			
Temperature	decimal	hexadecimal	Range Statement
>1000	32767	0x7FFF	Overflow
1000	10000	0x2710	Normal range
-270	-2700	0xF574	Underflow
<-270	-32767	0x8001	Disconnection Detection
Sensor not connected	-32768	0x8000	Overflow

T Type			
Temperature	decimal	hexadecimal	Range Statement
>400	32767	0x7FFF	Overflow
400	4000	0x0FA0	Normal range
-270	-2700	0xF574	Underflow
<-270	-32767	0x8001	Disconnection Detection
Sensor not connected	-32768	0x8000	Overflow

J Type			
Temperature	decimal	hexadecimal	Range Statement
>1200	32767	0x7FFF	Overflow
1200	12000	0x2EE0	Normal range
-210	-2100	0xF7CC	Underflow
<-210	-32767	0x8001	Disconnection Detection
Sensor not connected	-32768	0x8000	Overflow

B Type			
Temperature	decimal	hexadecimal	Range Statement
>1830	32767	0x7FFF	Overflow
1830	18300	0x477C	Normal range
50	500	0x01F4	Underflow
<50	-32767	0x8001	Disconnection Detection
Sensor not connected	-32768	0x8000	Overflow

S Type			
Temperature	decimal	hexadecimal	Range Statement
>1760	32767	0x7FFF	Overflow
1760	17600	0x44C0	Normal range
-50	-500	0xFE0C	Underflow
<-50	-32767	0x8001	Disconnection Detection
Sensor not connected	-32768	0x8000	Overflow

R Type			
Temperature	decimal	hexadecimal	Range Statement
>250	32767	0x7FFF	Overflow
250	2500	0x09C4	Normal range
-60	-600	0xFDA8	Underflow
<-60	-32767	0x8001	Disconnection Detection
Sensor not connected	-32768	0x8000	Overflow

Ni500 Type			
Temperature	decimal	hexadecimal	Range Statement
>1770	32767	0x7FFF	Overflow
1770	17700	0x4524	Normal range

-50	-500	0xFE0C	Underflow
<-50	-32767	0x8001	Disconnection Detection
Sensor not connected	-32768	0x8000	Overflow

C Type			
Temperature	decimal	hexadecimal	Range Statement
>2320	32767	0x7FFF	Overflow
2320	23200	0x5AA0	Normal range
0	0	0	Underflow
<0	-32767	0x8001	Disconnection Detection
Sensor not connected	-32768	0x8000	Overflow

L Type			
Temperature	decimal	hexadecimal	Range Statement
>900	32767	0x7FFF	Overflow
900	9000	0x2328	Normal range
-200	-2000	0xF830	Underflow
<-200	-32767	0x8001	Disconnection Detection
Sensor not connected	-32768	0x8000	Overflow

N Type			
Temperature	decimal	hexadecimal	Range Statement
>1300	32767	0x7FFF	Overflow
1300	13000	0x32C8	Normal range
-270	-2700	0xF574	Underflow
<-270	-32767	0x8001	Disconnection Detection
Sensor not connected	-32768	0x8000	Overflow

±15.625mV			
Signal	decimal	hexadecimal	Range Statement
15.625mV	32767	0x7FFF	Normal range
-15.625mV	-32767	0x8001	
Sensor not connected	-32768	0x8000	Disconnection Detection

±31.25mV			
Signal	decimal	hexadecimal	Range Statement
31.25mV	32767	0x7FFF	Normal range
-31.25mV	-32767	0x8001	
Sensor not connected	-32768	0x8000	Disconnection Detection

±62.5mV			
Signal	decimal	hexadecimal	Range Statement
62.5mV	32767	0x7FFF	Normal range
-62.5mV	-32767	0x8001	
Sensor not connected	-32768	0x8000	Disconnection Detection

±125mV			
Signal	decimal	hexadecimal	Range Statement
125mV	32767	0x7FFF	Normal range
-125mV	-32767	0x8001	
Sensor not connected	-32768	0x8000	Disconnection Detection

±500mV			
Signal	decimal	hexadecimal	Range Statement
500mV	32767	0x7FFF	Normal range
-500mV	-32767	0x8001	
Sensor not connected	-32768	0x8000	Disconnection Detection

±1000mV			
Signal	decimal	hexadecimal	Range Statement
1000mV	32767	0x7FFF	Normal range
-1000mV	-32767	0x8001	
Sensor not connected	-32768	0x8000	Disconnection Detection

±2000mV			
Signal	decimal	hexadecimal	Range Statement
2000mV	32767	0x7FFF	Normal range
-2000mV	-32767	0x8001	
Sensor not connected	-32768	0x8000	Disconnection Detection

12.4 Mechanical Installation

Installation size information is shown below，unit as（mm）：
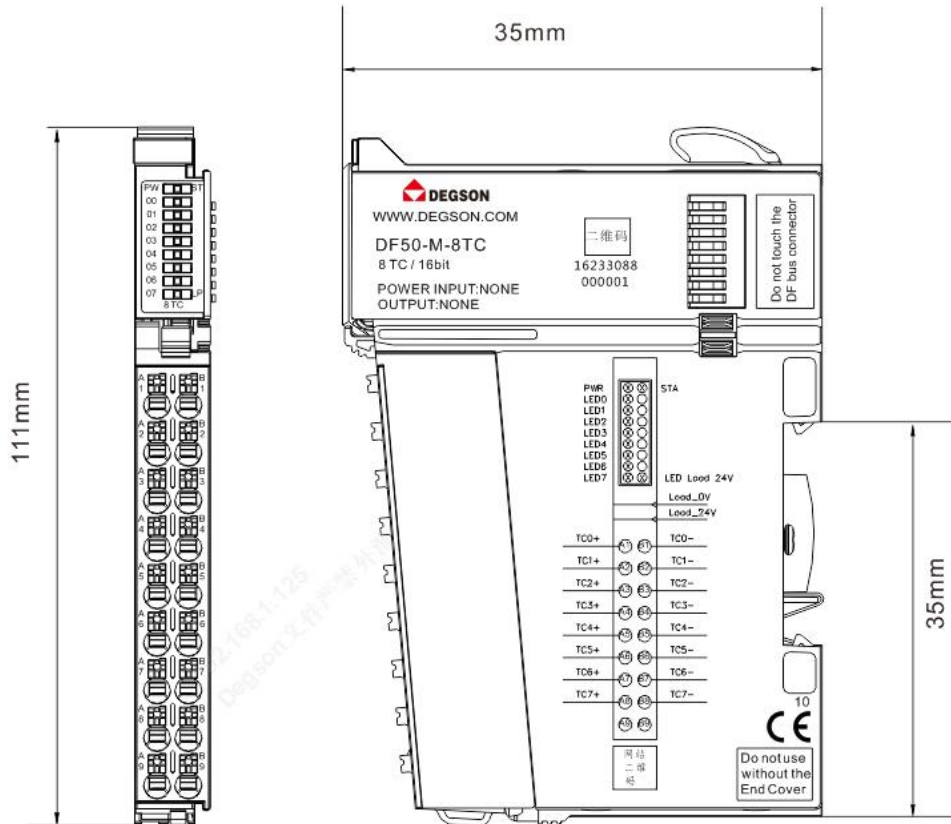
13 2-Channel Encoder Pulse Counting /24VDC (DF50-M-2CNT-PIL-24)

➢ This encoder pulse counting module uses 2 channels of pulse counting.The input signal voltage is 24 VDC.

➢ Each input module is equipped with an anti-interference filter.

➢ Two LEDs indicate normal module operation and normal communication.

➢ Magnetic isolation between field and system layers.

➢ Protection class IP20.

13.1 Specification

| Technical Information	
Product Description	High Speed Counter Module, 2 Channels
Number of Channels	2
Signal Type	Incremental Encoder AB / Pulse + Direction Signal
Resolution	1MHZ
Voltage Output Range	24V DC
Voltage Output Load	2-wire / 4-wire
Voltage Output Accuracy	x1/x2/x4
Current Output Range	Linear counter format, ring counter format
Current Output Load	Supported, Configurable
Current Output Accuracy	Support, Configurable
Isolated or not	-2147483648~2147483647
Independent channel enable configuration	±1 pulse
Diagnostic report function configuration	Optically isolated from field layers
Channel mode configuration	Supported
Output state configuration after stopping	Indicator on when input is drive state (software controlled)
Stop mode	Output: 10 Byte; Input: 18 Byte
Input action display	Supports per-bit access, per-byte access, per-word access, 3 IO mapping methods
IO process data size	
Power supply parameters	5V DC （4.75V DC~ 5.25V DC）
System bus input power supply voltage rating	115mA
System bus input power supply rated current	24V DC (20.4V DC~ 28.8V DC)
Terminal power input rated voltage	2A
Terminal power input rated current	24V DC (20.4V DC~ 28.8V DC)
Wiring parameters	1A
Connection technology	
Crimp area of the conductor	PUSH-IN type terminal block
Stripping length	0.2~1.5mm2/26~16AWG
Installation method	8~10mm
Material Parameters	DIN-35 type rail
Colour	
Shell material	Black
Consistency mark	PC Plastic, PA66
Environmental Requirements	CE
Permissible ambient temperature (during operation)	
Permissible ambient temperature (storage)	-25~60℃
Type of protection	-40~85℃
Pollution level	IP20
Operating Altitude	2，Conforms to IEC 61131-2 standard
Relative humidity (non-condensing)	Temperature without derating：0~2000m
Vibration Resistance	5~95%RH
Shock Resistance	1g, according to IEC 60068-2-6 standard
EMC Anti-Interference Rating	15g, according to IEC 60068-2-27 standard
Corrosion resistance	Conforms to IEC 61000-4
Permissible H2S pollutant concentration at 75 % relative humidity	Conforms to IEC 60068-2-42 and IEC 60068-2-43
Permissible SO2 pollutant concentration at 75 % relative humidity	10ppm
Technical Information	25ppm

13.2 Hardware interfaces

13.2.1 Terminal Block Definition
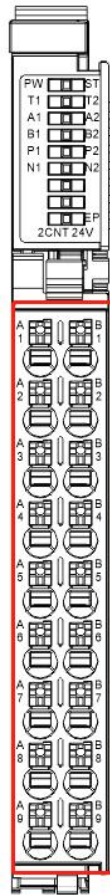
Terminal Number	Signal	Terminal Number	Signal	Description
A1	24Vo	B1	GND	Terminal power output
A2	TP1_in+	B2	TP1_in-	DI signal input
A3	A1+	B3	A1-	Quadrature coding mode A phase signal input/ Pulse plus direction mode direction signal input
A4	B1+	B4	B1-	Quadrature coding mode B phase signal input/ Pulse plus direction mode pulse signal input
A5	24Vo	B5	GND	Terminal power output
A6	TP2_in+	B6	TP2_in-	DI signal input
A7	A2+	B7	A2-	Quadrature coding mode A phase signal input/ Pulse plus direction mode direction signal input
A8	B2+	B8	B2-	Quadrature coding mode B phase signal input/ Pulse plus direction mode pulse signal input
A9	24Vin	B9	0V	Terminal power input

13.2.2 LED Indicator Definition

Indicator	meaning	
PW	Green light on: System bus power input normal	
	Green light off: System bus power input abnormal	
ST	power-up phase	Green light on: module initialization exception
		Green light off: Module initialization is normal
	operational phase	Green light is flashing: the internal bus of the module is working normally.
		Green light off/green light on: abnormal operation of the internal bus or abnormal power input to the terminals.
T1/T2	Green light on: DI input signal is valid	
	Green light off: DI input signal is invalid	
A1/A2	Green light on: Input signal valid	
	Green light off: Input signal is invalid	
B1/B2	Green light on: Input signal valid	
	Green light off: Input signal is invalid	
P1/P2	Green light on: Encoder positive	
	Green light out: encoder stationary or reversed	
N1/N2	Green light on: Encoder reversed	
	Green light out: encoder stationary or positive rotation	
EP	Green light lighting: terminal power input is normal	
	Green light off: Abnormal terminal power input	

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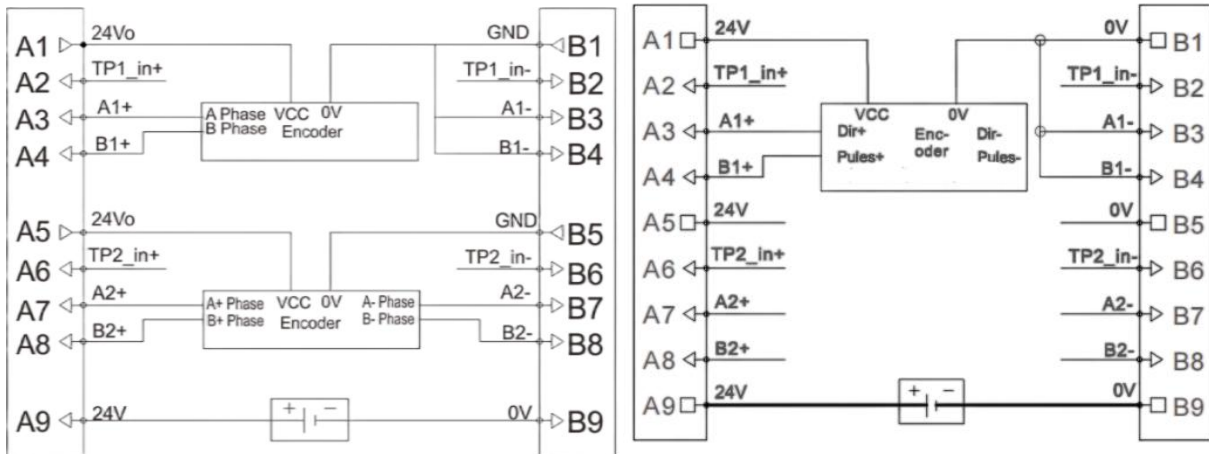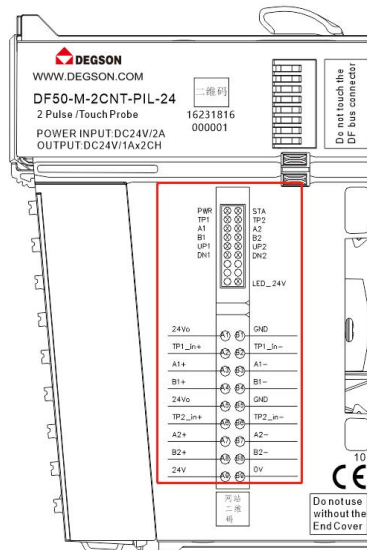
Note: A9, B9 24V power supply is provided externally.

13.3 Register allocation rules

A 2-channel encoder pulse counting module occupying 10 read-hold registers, 10 input registers, and 6 write-hold registers.

Register Type	Register PLC Address Interval	Register Modbus Protocol Address Interval	function code	read-write state
input register	30001~31024	0000H~03FFH	04H	read-only
holding register	42049~43072	0800H~0BFFH	03H	readable
holding register	40001~41024	0000H~03FFH	06H	writable

Write Holding Register Block Data Structure Definition:

WriteHold Reg	Byte	Format	Bit	Description	
0	QB0	Word	QX0.0	CNT Ctl Ch0	
			QX0.1	Reserve b'0000000	
			QX0.2		
			QX0.3		
			QX0.4		
			QX0.5		
			QX0.6		
			QX0.7		
	QB1		QX1.0	Reserve 0x00	
			QX1.1		
			QX1.2		
			QX1.3		
			QX1.4		
			QX1.5		
			QX1.6		
			QX1.7		
1	QB2	Word	Comp Value[16..31] Ch0		
	QB3				
2	QB4	Word	Comp Value[0..15] Ch0		CNT24_MOD_WriteHoldRegBlock Size:6
	QB5				
3	QB6	Word	QX0.0	CNT Ctl Ch1	
			QX0.1	Reserve b'0000000	
			QX0.2		
			QX0.3		
			QX0.4		
			QX0.5		
			QX0.6		
			QX0.7		
	QB7		QX1.0	Reserve 0x00	
			QX1.1		
			QX1.2		
			QX1.3		
			QX1.4		
			QX1.5		
			QX1.6		
			QX1.7		
4	QB8	Word	Comp Value[16..31] Ch1		

	QB9				
5	QB10	Word		Comp Value[0..15] Ch1	
	QB11				

Read Input Register Block Data Structure Definition：

ReadInput Reg	Byte	Format	Bit	Description	
0	IB0	Word	IX0.0	CNT State Ch0	CNT24_MOD_ReadInputRegBlock Size:10
			IX0.1	Clear Signal Ch0	
			IX0.2	Comp Flag Ch0	
			IX0.3	CNT Dir Ch0	
			IX0.4		
			IX0.5	Reserve b'000	
			IX0.6		
			IX0.7		
	IB1		IX1.0	Reserve 0x00	
			IX1.1		
			IX1.2		
			IX1.3		
			IX1.4		
			IX1.5		
			IX1.6		
			IX1.7		
1	IB2 / IB3	Word		CNT Value[16..31] Ch0	
2	IB4 / IB5	Word		CNT Value[0..15] Ch0	
3	IB6 / IB7	Word		Latch Value[16..31] Ch0	
4	IB8 / IB9	Word		Latch Value[0..15] Ch0	
5	IB10	Word	IX0.0	CNT State Ch1	
			IX0.1	Clear Signal Ch1	
			IX0.2	Comp Flag Ch1	
			IX0.3	CNT Dir Ch1	
			IX0.4		
			IX0.5	Reserve b'000	
			IX0.6		
			IX0.7		
	IB11		IX1.0	Reserve 0x00	
			IX1.1		
			IX1.2		
			IX1.3		
			IX1.4		
			IX1.5		
			IX1.6		
			IX1.7		
6	IB12 / IB13	Word		CNT Value[16..31] Ch1	
7	IB14 / IB15	Word		CNT Value[0..15] Ch1	
8	IB16 / IB17	Word		Latch Value[16..31] Ch1	
9	IB18 / IB19	Word		Latch Value[0..15] Ch1	

Read Holding Register Block Data Structure Definition：

ReadHold Reg	Byte	Format	Bit	Description	
0	QB0	Word	QX0.0	CNT Ctl Ch0	CNT24_MOD_ReadHoldRegBlock Size:6
			QX0.1	Reserve b'0000000	
			QX0.2		
			QX0.3		
			QX0.4		
			QX0.5		
			QX0.6		
			QX0.7		
	QB1		QX1.0	Reserve 0x00	
			QX1.1		
			QX1.2		
			QX1.3		
			QX1.4		
			QX1.5		
			QX1.6		
			QX1.7		
1	QB2	Word		Comp Value[16..31] Ch0	
	QB3				
2	QB4	Word		Comp Value[0..15] Ch0	
	QB5				
3	QB6	Word	QX0.0	CNT Ctl Ch1	
			QX0.1	Reserve b'0000000	
			QX0.2		
			QX0.3		
			QX0.4		
			QX0.5		
			QX0.6		
			QX0.7		
	QB7		QX1.0	Reserve 0x00	
			QX1.1		
			QX1.2		
			QX1.3		
			QX1.4		
			QX1.5		
			QX1.6		
			QX1.7		
4	QB8	Word		Comp Value[16..31] Ch1	
	QB9				
5	QB10	Word		Comp Value[0..15] Ch1	
	QB11				

Notes:

CNT Ctl (1: start counting 0: stop counting)

Comp Value 32-bit comparison value (Comp Value [0..15] low 16-bit Comp Value[16..31] high 16-bit)

CNT State Counting state (1: counting in progress 0: counting stopped)

Clear Signal Electronic probe/counting clear signal (1: Yes 0: No)

Comp Flag Comparison match flag (1: count value is greater than the comparison value 0: count value is less than the comparison value)

CNT Dir Counting direction (2: count down 1: count up 0: count stop)

CNT Value 32 Bitmeter value (CNT Value [0..15] lower 16 bits CNT Value[16..31] upper 16 bits)

Latch Value 32-bit latch value (LatchValue [0..15] low 16 bits Latch Value[16..31] high 16 bits)

13.4 Mechanical Installation

Installation dimension information is shown below in（mm）：

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

➢ This encoder pulse counting module utilizes 2-channel pulse counting. Input signal voltage 5VDC。

➢ Each input module has an anti-interference filter。

➢ Two LEDs indicate that the module is running normally and the communication is normal.。

➢ Magnetic isolation between field and system layers。

➢ Protection class IP20。

14.1 Specification

Technical Information	
Product Description	High Speed Counter 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 doubling	x1/x2/x4
counting mode	Linear counter form, Ring counter form
Counting latch/reset function	Support, configurable
filtering function	Support, configurable
Counting range	–2147483648~2147483647
accurate	±1 pulse
Isolation method	Optically isolated from the field layer
incorrect diagnosis	support
Input Motion Display	Indicator lights when input is driven (software controlled)
IO process data size	Output: 10 Byte; Input: 18 Byte
IO data mapping	Supports per-bit access, per-byte access, per-word access, 3 IO mapping methods
Power supply parameters	
System bus input power supply voltage rating	5V DC　（4.75V DC~ 5.25V DC）
System bus input power supply current rating	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 type terminal block
Crimped area of conductor	0.2~1.5mm^2/26~16AWG
Stripped Wire Length	8~10mm
Installation	DIN-35 rail
Material parameters	
colors	black
Housing Material	PC plastic, PA66
consistency mark	CE
Environmental requirements	
Permissible ambient temperature (during operation)	-25~60℃
Permissible ambient temperature (storage)	-40~85℃
Type of protection	IP20
contamination level	2, conforms to IEC 61131-2 standard
Working altitude	Temperature without drop：0~2000m
Relative humidity (non-condensing)	5~95%RH
anti-vibration	1g in accordance with IEC 60068-2-6
anti-impact	15g according to IEC 60068-2-27
EMC anti-interference grade	Conforms to IEC 61000-4
corrosion resistance	IEC 60068-2-42 and IEC 60068-2-43 compliant
Permissible H2S pollutant concentration at 75 % relative humidity	10ppm
Allowable SO2 pollutant concentration at 75 % relative humidity	25ppm

14.2 Hardware interfaces

## 14.2.1 Terminal Block Definition

Terminal Serial Number	signal	Terminal Serial Number	signal	clarification
A1	24Vo	B1	GND	Terminal Power Output
A2	TP1_in+	B2	TP1_in-	DI signal input
A3	A1+	B3	A1-	Quadrature coding mode A-phase signal input/ Pulse plus direction mode direction signal input
A4	B1+	B4	B1-	Quadrature coding mode B-phase signal input/ Pulse plus direction mode pulse signal input
A5	24Vo	B5	GND	Terminal Power Output
A6	TP2_in+	B6	TP2_in-	DI signal input
A7	A2+	B7	A2-	Quadrature coding mode A-phase signal input/ Pulse plus direction mode direction signal input
A8	B2+	B8	B2-	Quadrature coding mode B-phase signal input/ Pulse plus direction mode pulse signal input
A9	24Vin	B9	0V	Terminal power input

14.2.2 LED Indicator Definition
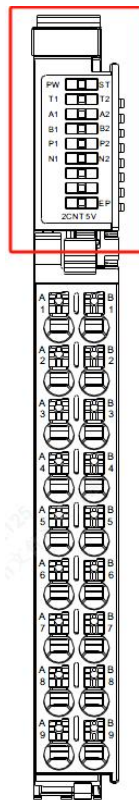
indicator light	hidden meaning		
PW	Green light: System bus power input normal		
	Green off:System bus power input abnormal		
ST	power-up phase	Green light on: module initialization exception	
		Green light off: module initialization is normal	
	operational phase	Green flash: the internal bus of the module is working normally.	
		Green off/green on: Abnormal operation of internal bus or abnormal power input to terminal	
T1/T2	Green on: DI input signal is valid		
	Green off: DI input signal is invalid		
A1/A2	Green on: Input signal valid		
	Green off: Input signal is invalid		
B1/B2	Green on: Input signal valid		
	Green off: Input signal is invalid		
P1/P2	Green on: Encoder positive		
	Green out: encoder stationary or reversed		
N1/N2	Green on: Encoder reversed		
	Green out: encoder stationary or positive rotation		
EP	Green light: terminal power input is normal		
	Green off: Abnormal terminal power input		

14.2.3 wiring diagram
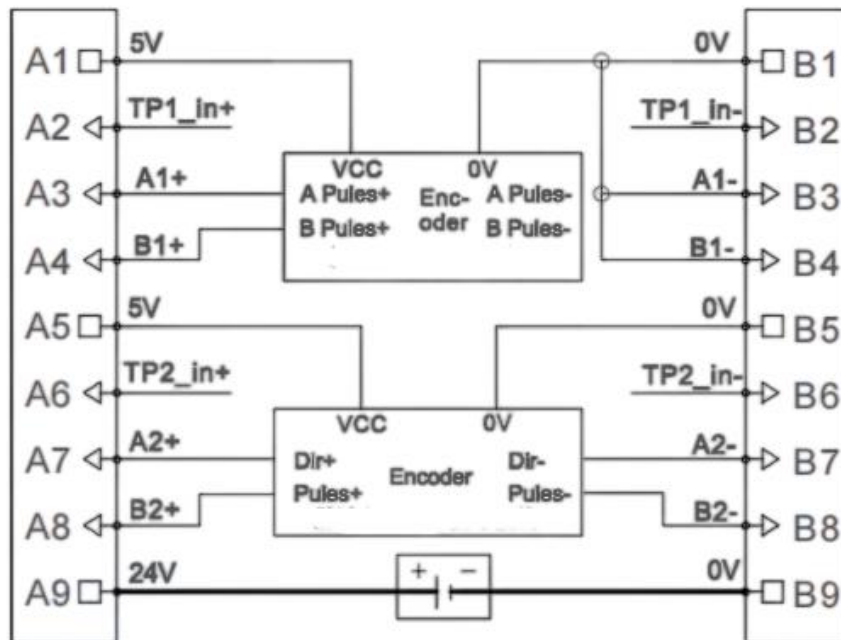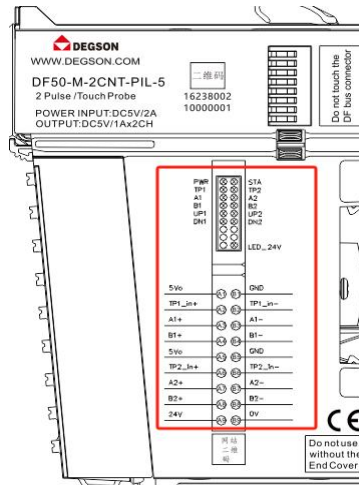
Note: A9, B9 24V power supply is externally supplied

14.3 Register allocation rules

A 2-channel encoder pulse counting module occupying 10 read-hold registers, 10 input registers, and 6 write-hold registers.

Register Type	Register PLC Address Interval	Register Modbus Protocol Address Interval	function code	read-write state
input register	30001~31024	0000H~03FFH	04H	read-only (computing)
holding register	42049~43072	0800H~0BFFH	03H	readable
holding register	40001~41024	0000H~03FFH	06H	writable

Write Holding Register Block Data Structure Definition：

WriteHold Reg	Byte	Format	Bit	Description	
0	QB0	Word	QX0.0	CNT Ctl Ch0	CNT24_MOD_WriteHoldRegBlock Size:6
			QX0.1	Reserve b'0000000	
			QX0.2		
			QX0.3		
			QX0.4		
			QX0.5		
			QX0.6		
			QX0.7		
	QB1		QX1.0	Reserve 0x00	
			QX1.1		
			QX1.2		
			QX1.3		
			QX1.4		
			QX1.5		
			QX1.6		
			QX1.7		
1	QB2	Word		Comp Value[16..31] Ch0	
	QB3				
2	QB4	Word		Comp Value[0..15] Ch0	
	QB5				
3	QB6	Word	QX0.0	CNT Ctl Ch1	
			QX0.1	Reserve b'0000000	
			QX0.2		
			QX0.3		
			QX0.4		
			QX0.5		
			QX0.6		
			QX0.7		
	QB7		QX1.0	Reserve 0x00	
			QX1.1		
			QX1.2		
			QX1.3		
			QX1.4		
			QX1.5		
			QX1.6		
			QX1.7		

	QB8	Word	Comp Value[16..31] Ch1	
4	QB9			
	QB10			
5	QB11	Word	Comp Value[0..15] Ch1	
	IB19			

Read Input Register Block Data Structure Definition：

ReadInput Reg	Byte	Format	Bit	Description	
0	IB0	Word	IX0.0	CNT State Ch0	CNT24_MOD_ReadInputRegBlock Size:10
			IX0.1	Clear Signal Ch0	
			IX0.2	Comp Flag Ch0	
			IX0.3	CNT Dir Ch0	
			IX0.4		
			IX0.5	Reserve b'000	
			IX0.6		
			IX0.7		
	IB1		IX1.0	Reserve 0x00	
			IX1.1		
			IX1.2		
			IX1.3		
			IX1.4		
			IX1.5		
			IX1.6		
			IX1.7		
1	IB2	Word		CNT Value[16..31] Ch0	
	IB3				
2	IB4	Word		CNT Value[0..15] Ch0	
	IB5				
3	IB6	Word		Latch Value[16..31] Ch0	
	IB7				
4	IB8	Word		Latch Value[0..15] Ch0	
	IB9				
5	IB10	Word	IX0.0	CNT State Ch1	
			IX0.1	Clear Signal Ch1	
			IX0.2	Comp Flag Ch1	
			IX0.3	CNT Dir Ch1	
			IX0.4		
			IX0.5	Reserve b'000	
			IX0.6		
			IX0.7		
	IB11		IX1.0	Reserve 0x00	
			IX1.1		
			IX1.2		
			IX1.3		
			IX1.4		
			IX1.5		
			IX1.6		
			IX1.7		
6	IB12	Word		CNT Value[16..31] Ch1	
	IB13				
7	IB14	Word		CNT Value[0..15] Ch1	
	IB15				
8	IB16	Word		Latch Value[16..31] Ch1	
	IB17				
9	IB18	Word		Latch Value[0..15] Ch1	
	IB19				

Read Holding Register Block Data Structure Definition：

ReadHold Reg	Byte	Format	Bit	Description	
0	IB0	Word	IX0.0	CNT State Ch0	
			IX0.1	Clear Signal Ch0	
			IX0.2	Comp Flag Ch0	
			IX0.3	CNT Dir Ch0	
			IX0.4		
			IX0.5	Reserve b'000	
			IX0.6		
			IX0.7		
	IB1		IX1.0	Reserve 0x00	
			IX1.1		
			IX1.2		
			IX1.3		
			IX1.4		
			IX1.5		
			IX1.6		
			IX1.7		
1	IB2	Word		CNT Value[16..31] Ch0	CNT24_MOD_ReadHoldRegBlock Size:10
	IB3				
2	IB4	Word		CNT Value[0..15] Ch0	
	IB5				
3	IB6	Word		Latch Value[16..31] Ch0	
	IB7				
4	IB8	Word		Latch Value[0..15] Ch0	
	IB9				
5	IB10	Word	IX0.0	CNT State Ch1	
			IX0.1	Clear Signal Ch1	
			IX0.2	Comp Flag Ch1	
			IX0.3	CNT Dir Ch1	
			IX0.4		
			IX0.5	Reserve b'000	
			IX0.6		
			IX0.7		
	IB11		IX1.0	Reserve 0x00	
			IX1.1		
			IX1.2		
			IX1.3		
			IX1.4		
			IX1.5		
			IX1.6		
			IX1.7		
6	IB12	Word		CNT Value[16..31] Ch1	
	IB13				
7	IB14	Word		CNT Value[0..15] Ch1	
	IB15				
8	IB16	Word		Latch Value[16..31] Ch1	
	IB17				
9	IB18	Word		Latch Value[0..15] Ch1	
	IB19				

Notes:

CNT Ctl (1: start counting 0: stop counting)

Comp Value 32-bit comparison value (Comp Value[0..15] lower 16 bits Comp Value[16..31] higher 16 bits)

CNT State Counting state (1: counting in progress 0: counting stopped)

Clear Signal Electronic probe/count list signal (1: Yes 0: No)

Comp Flag Compare Match Flag (1: count value is greater than compare value 0: count value is less than compare value)

CNT Dir Counting direction (2:count down 1:count up 0:count stop)

CNT Value 32-bit count value (CNT Value[0..15] low 16-bit CNT Value[16..31] high 16-bit)

Latch Value 32-bit latch value (LatchValue[0..15] low 16-bit Latch Value[16..31] high 16-bit)

14.4 Mechanical Installation

Installation size information is shown below in (mm):
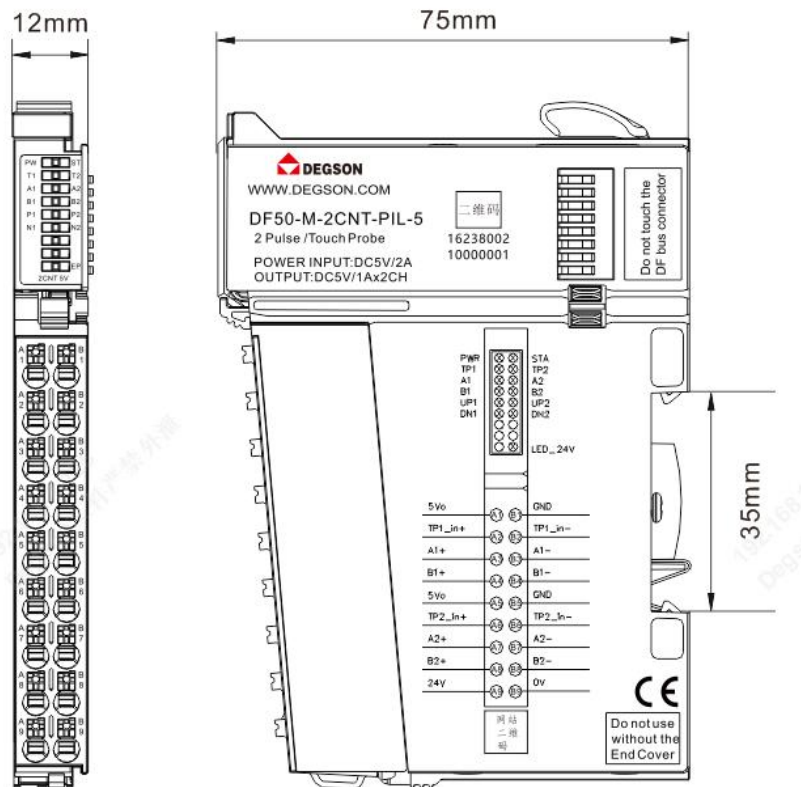
15 16-channel/24VDC/voltage distribution (DF50-M-DC-U-24)

➢ Independent of the fieldbus application and connection type.

➢ Provides 16 channels of 24VDC rating for external field。

➢ Protection class IP20
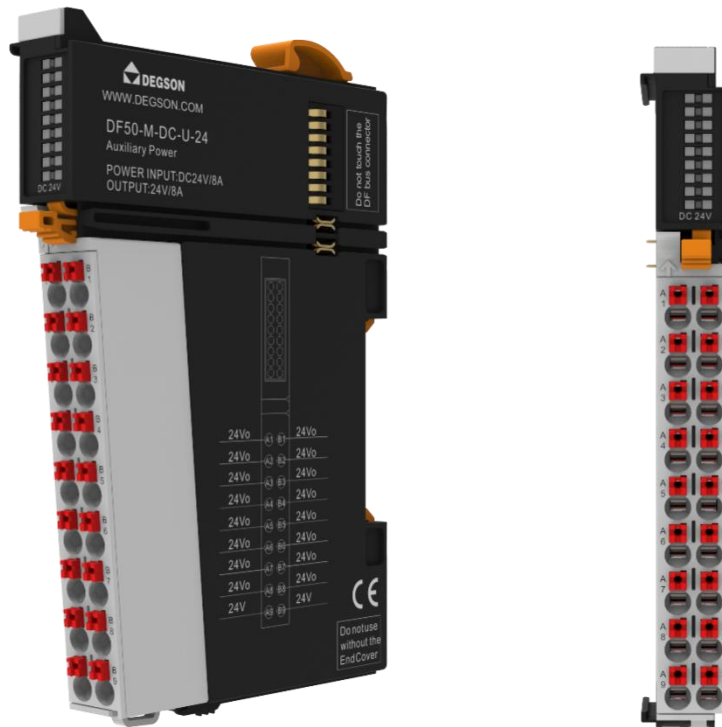
15.1 Specification

| Technical Information	
Product Description	Voltage Distribution Module, 16 Channel, 24V
Number of channels	16
operating voltage	24VDC（-15%～+20%）Through power across contacts
Provides field voltage	24VDC（-15%～+20%）
Provides maximum current in the field	8A
Number of input power across contacts	2
Number of external power crossover contacts	2
Wiring parameters	
Crimped area of conductor	0.2～1.5mm²/26～16AWG
Stripped Wire Length	8～10mm
Installation	DIN-35 rail
Material parameters	
color	black
Housing Material	PC plastic, PA66
consistency mark	CE
Environmental requirements	
Permissible ambient temperature (during operation)	-25～60℃
Permissible ambient temperature (storage)	-40～85℃
Type of protection	IP20
contamination level	2, conforms to IEC 61131-2 standard
Working altitude	Temperature without drop：0～2000m
Relative humidity (non-condensing)	5～95%RH
anti-vibration	1g in accordance with IEC 60068-2-6
anti-impact	15g according to IEC 60068-2-27
EMC anti-interference grade	Conforms to IEC 61000-4
corrosion resistance	Conforms to IEC 60068-2-42 and IEC 60068-2-43 standards
Permissible H2S pollutant concentration at 75 % relative humidity	10ppm
Allowable SO2 pollutant concentration at 75 % relative humidity	25ppm

15.2 hardware interface

15.2.1 Terminal Block Definition
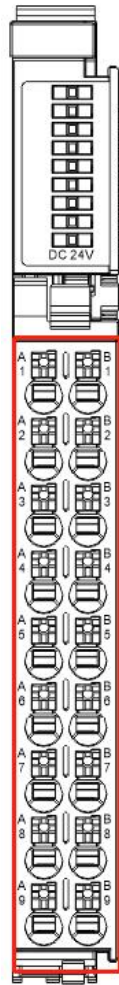
Terminal Serial Number		code	clarification
A1	B1	Field power supply 24VDC	Provides 16 channels of 24VDC rating for external loads
A2	B2		
A3	B3		
A4	B4		
A5	B5		
A6	B6		
A7	B7		
A8	B8		
A9	B9	External voltage input 24VDC	External 24VDC voltage input across contacts

15.2.2 wiring diagram
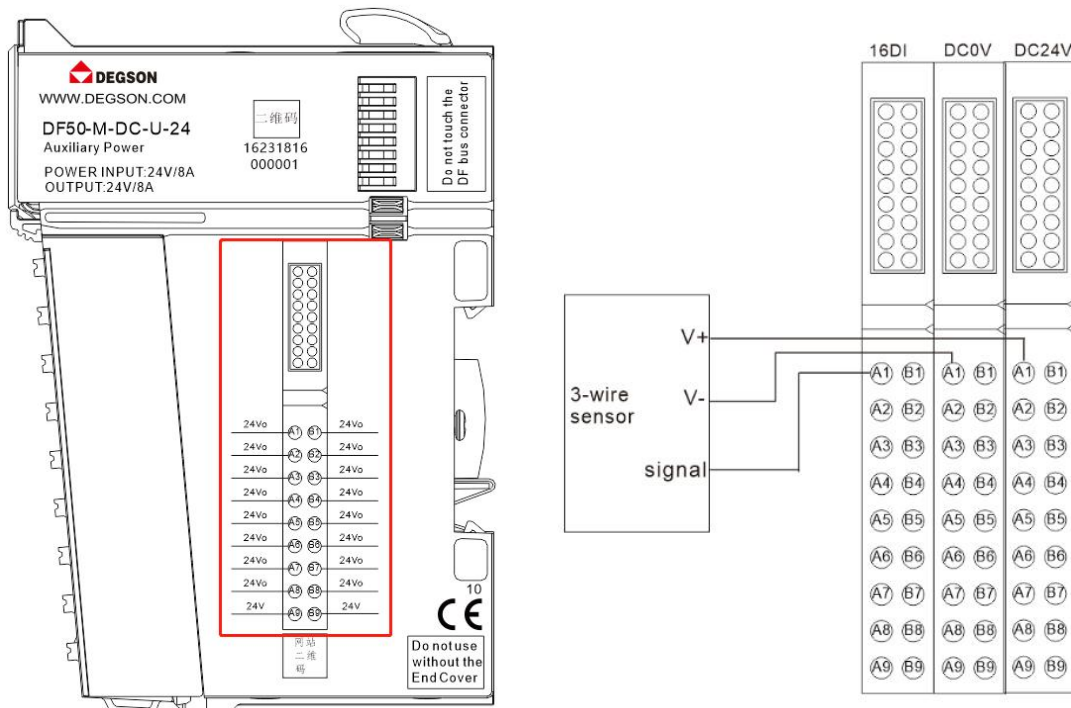
Note: Each of the 16 channels is rated to provide 24VDC to external loads. a9/b9 provides 24VDC to the outside.

15.3 Mechanical Installation

Installation size information is shown below in (mm)：
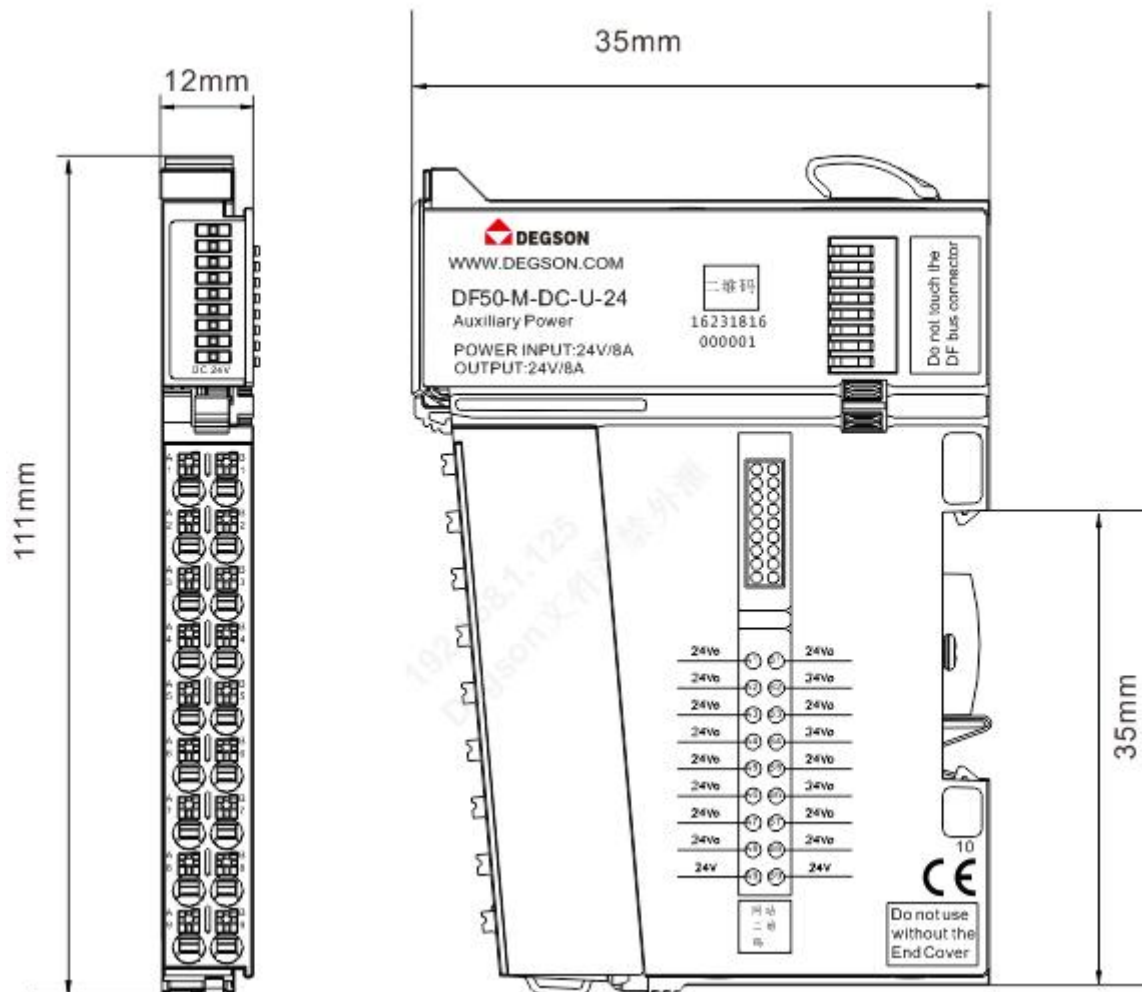
16 16 channels/0VDC/voltage distribution (DF50-M-DC-U-0)

➢ Fieldbus-independent applications and connection types

➢ Provides 16 channels of 0VDC rating for external field

➢ Protection class IP20

16.1 Specification

| Technical Information	
Product Description	Voltage Distribution Module, 16 Channels, 0V
Number of channels	16
operating voltage	0VDC (-15% to +20%) via power across contacts
Provides field voltage	0VDC（-15%～+20%）
Provides maximum current in the field	8A
Number of input power across contacts	2
Number of external power crossover contacts	2
Wiring parameters	
Crimped area of conductor	0.2～1.5mm^2/26～16AWG
Stripped Wire Length	8～10mm
Installation	DIN-35 rail
Material parameters	
color	ferrous
Housing Material	PC plastic, PA66
consistency mark	CE
Environmental requirements	
Permissible ambient temperature (during operation)	-25～60℃
Permissible ambient temperature (storage)	-40～85℃
Type of protection	IP20
contamination level	2, conforms to IEC 61131-2 standard
Working altitude	Temperature without drop：0～2000m
Relative humidity (non-condensing)	5～95%RH
anti-vibration	1g in accordance with IEC 60068-2-6
impact resistance	15g according to IEC 60068-2-27
EMC anti-interference grade	Conforms to IEC 61000-4
corrosion resistance	Conforms to IEC 60068-2-42 and IEC 60068-2-43 standards
Permissible H2S pollutant concentration at 75 % relative humidity	10ppm
Allowable SO2 pollutant concentration at 75 % relative humidity	25ppm

16.2 Hardware interface

16.2.1 Terminal Block Definition
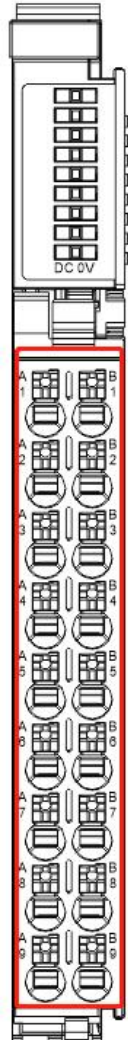
Terminal Serial Number		code	clarification
A1	B1	Field power supply 0VDC	Provides 16 channels of 0VDC rating for external loads
A2	B2		
A3	B3		
A4	B4		
A5	B5		
A6	B6		
A7	B7		
A8	B8		
A9	B9	External voltage input 0VDC	External 0VDC voltage input across contacts

16.2.2 wiring diagram
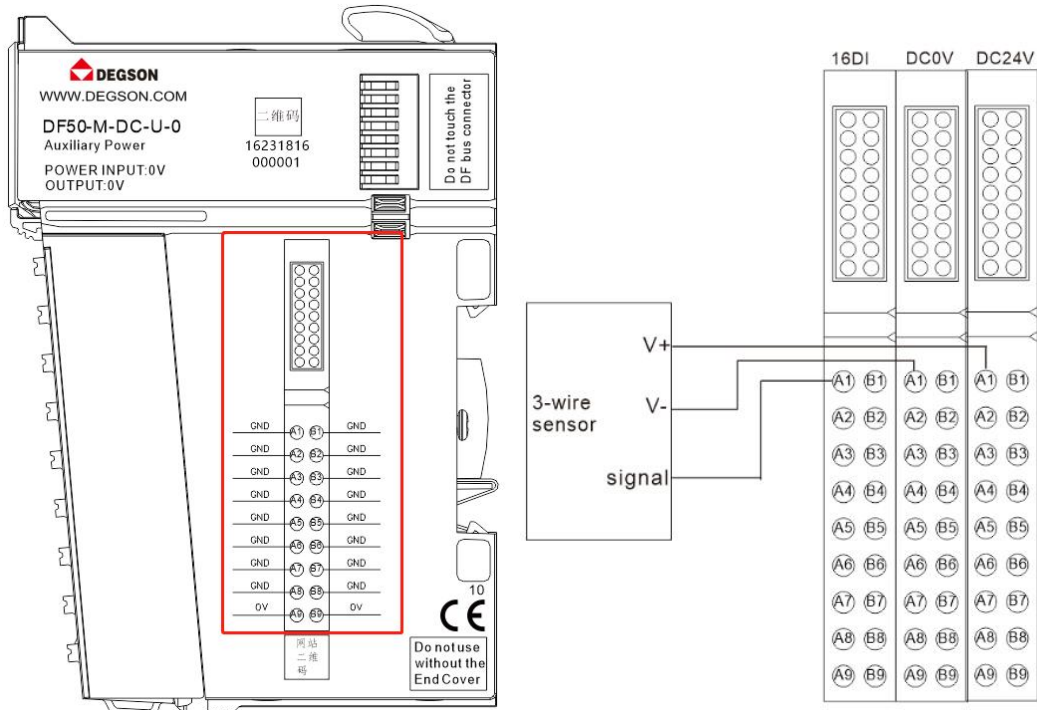
Note: Each of the 16 channels can provide 0VDC rating for external loads. a9/b9 provide 0VDC externally.

16.3 Mechanical Installation

Installation size information is shown below in (mm)：

17 32-Channel Digital Input/24VDC/PNP&NPN(DF50-M-32DI-P/N)

➢ This digital input module receives control signals from field devices (e.g. sensors, etc.).

➢ 32-channel digital inputs, PNP & NPN valid, common terminal conversion

➢ Each input module has an anti-interference filter。

➢ Each input module with LED indicators。

➢ Isolation between field and system layers via optocoupler。

➢ Protection class IP20。

17.1 Specification

Technical Information		
Product Description		Digital Input Module, 32-Input, NPN & PNP, 24VDC
Number of channels		32
Signal Type		NPN & PNP
signal range	"ON" signal voltage	Differential pressure > 11VDC (differential pressure to common terminal input)
	"OFF" signal voltage	Differential pressure <5VDC (differential pressure from common terminal input)
Hardware response time		200us/200us
data size		4 Byte
Connection type		1-wire, Type 1/Type 3, refer to IEC 61131-2
Reverse Circuit Protection		Yes
Isolation method		Optically isolated from the field layer
incorrect diagnosis		Yes
filtering time		0-40ms configurable
Input Impedance		>7.5kΩ
Input Motion Display		When the input is driven, the input indicator lights up
IO mapping		Supports per-bit or per-word mapping
Power supply parameters		
System bus input power supply voltage rating		5V DC （4.75V DC～ 5.25V DC）
System bus input power supply current rating		90mA
Terminal power (common) input rated voltage	NPN Signal Type	24V
	PNP Signal Type	0V
Wiring parameters		
Connection technology: Inputs		PUSH-IN type terminal block
Area of crimping of conductors		0.2～1.5mm²/26～16AWG
Stripped Wire Length		8～10mm²
Installation		DIN-35 rail
Material parameters		
color		black
Housing Material		PC plastic, PA66
consistency mark		CE
Environmental requirements		
Permissible ambient temperature (during operation)		-25～60℃
Permissible ambient temperature (storage)		-40～85℃
Type of protection		IP20
contamination level		2，Conforms to IEC 61131-2
Working altitude		Temperature without drop：0～2000m
Relative humidity (non-condensing)		5 to 95%RH
anti-vibration		1g in accordance with IEC 60068-2-6
impact resistance		15g according to IEC 60068-2-27
EMC anti-interference grade		Conforms to IEC 61000-4
corrosion resistance		Conforms to IEC 60068-2-42 and IEC 60068-2-43 standards
Permissible H2S pollutant concentration at 75 % relative humidity		10ppm
Permissible SO2 pollutant concentration at 75 % relative humidity		25ppm

17.2 Hardware interfaces

17.2.1 Terminal Block Definition
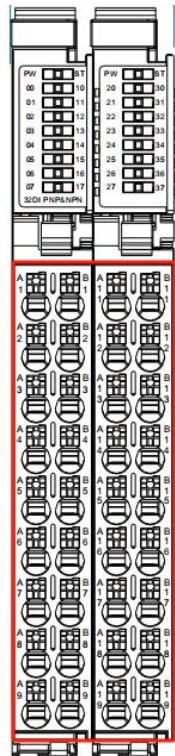
Terminal Serial Number	code	Terminal Serial Number	code	Terminal Serial Number	code	Terminal Serial Number	code	clarification
A1	DI 0	B1	DI 10	C1	DI 20	D1	DI 30	DI signal input
A2	DI 1	B2	DI 11	C2	DI 21	D2	DI 31	
A3	DI 2	B3	DI 12	C3	DI 22	D3	DI 32	
A4	DI 3	B4	DI 13	C4	DI 23	D4	DI 33	
A5	DI 4	B5	DI 14	C5	DI 24	D5	DI 34	
A6	DI 5	B6	DI 15	C6	DI 25	D6	DI 35	
A7	DI 6	B7	DI 16	C7	DI 26	D7	DI 36	
A8	DI 7	B8	DI 17	C8	DI 27	D8	DI 37	
A9	COM	B9	COM	C9	COM	D9	COM	public side

17.2.2 LED Indicator Definition
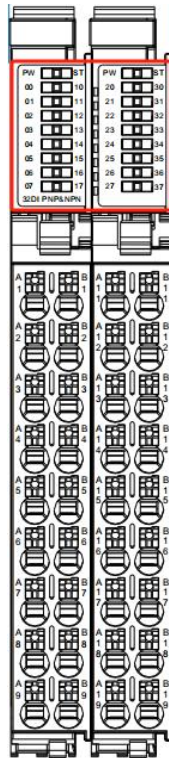
indicator light	hidden meaning	
PW	Green:System bus power input normal	
	Green off:System bus power input abnormal	
ST	power-up phase	Green: Module initialization exception
		Green off: Module initialization is normal
	operational phase	Green flash: the internal bus of the module is working normally
		Green off: abnormal operation of the internal bus of the module
00~07,10~17 20~27,30~37	Green on:Input signal valid	
	Green off:Input signal is invalid	

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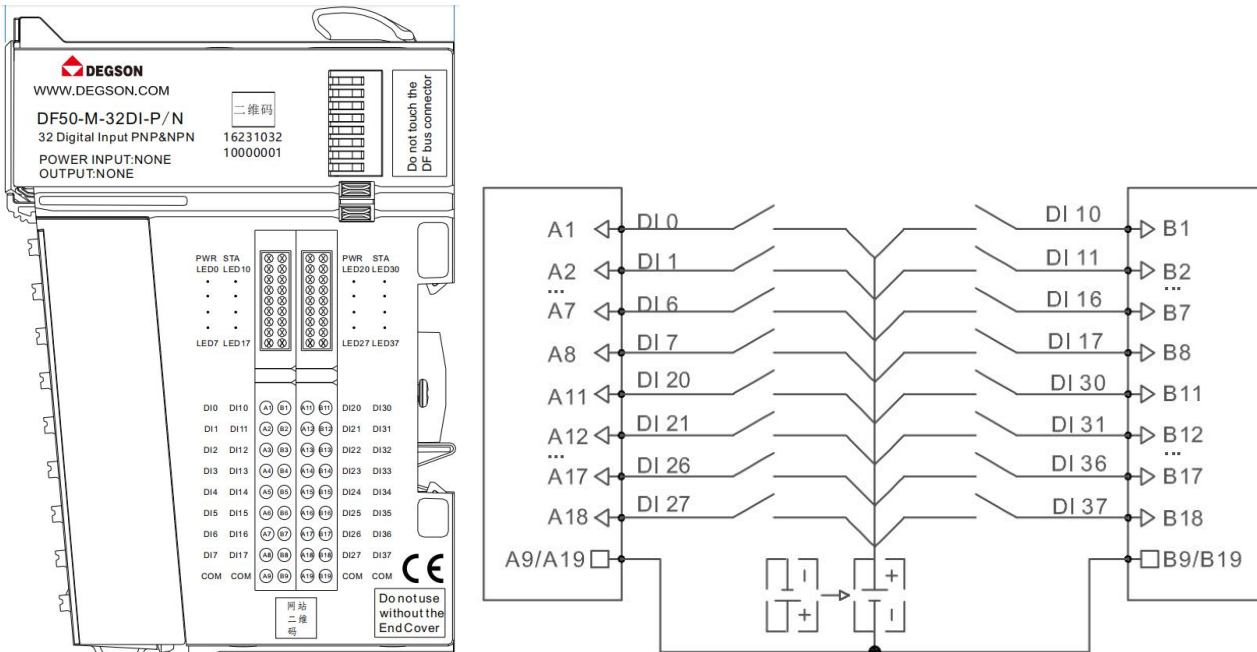
Note: COM is the common terminal, external 24V to realize NPN. external 0V to realize PNP.

17.3 Register allocation rules

A 32-channel PNP/NPN digital input module occupying 2 read-hold registers and 32 discrete input status registers.

Register Type	Register PLC address range	Register Modbus Protocol Address Interval	function code	Read/Write Status
Discrete Input Status	10001~11032	0000H~0407H	02H	Read-only
Holding Register	43073~44048	0C00H~0FCFH	03H	Readable

Read Holding Register Block Data Structure Definition：

ReadHoldReg	Byte	Format	Bit	Description	
0	IB0	Word	IX0.0	DI0	
			IX0.1	DI1	
			IX0.2	DI2	
			IX0.3	DI3	
			IX0.4	DI4	
			IX0.5	DI5	
			IX0.6	DI6	
			IX0.7	DI7	
	IB1		IX1.0	DI8	
			IX1.1	DI9	
			IX1.2	DI10	
			IX1.3	DI11	
			IX1.4	DI12	
			IX1.5	DI13	DI32_MOD_ReadHoldRegBlock Size:2
			IX1.6	DI14	
			IX1.7	DI15	
1	IB0	Word	IX0.0	DI16	
			IX0.1	DI17	
			IX0.2	DI18	
			IX0.3	DI19	
			IX0.4	DI20	
			IX0.5	DI21	
			IX0.6	DI22	
			IX0.7	DI23	
	IB1		IX1.0	DI24	
			IX1.1	DI25	
			IX1.2	DI26	
			IX1.3	DI27	
			IX1.4	DI28	
			IX1.5	DI29	
			IX1.6	DI30	
			IX1.7	DI31	

Read Discrete Input Status Register Block Data Structure Definition：

ReadDiscReg	Byte	Format	Bit	Description	
0	IB0	Bit	IX0.0	DI0	
1		Bit	IX0.1	DI1	DI32_MOD_ReadDiscRegBlock Size:32
2		Bit	IX0.2	DI2	
3		Bit	IX0.3	DI3	
4		Bit	IX0.4	DI4	

5		Bit	IX0.5	DI5	
6		Bit	IX0.6	DI6	
7		Bit	IX0.7	DI7	
8		Bit	IX1.0	DI8	
9		Bit	IX1.1	DI9	
10		Bit	IX1.2	DI10	
11	IB1	Bit	IX1.3	DI11	
12		Bit	IX1.4	DI12	
13		Bit	IX1.5	DI13	
14		Bit	IX1.6	DI14	
15		Bit	IX1.7	DI15	
16		Bit	IX2.0	DI16	
17		Bit	IX2.1	DI17	
18		Bit	IX2.2	DI18	
19	IB2	Bit	IX2.3	DI19	
20		Bit	IX2.4	DI20	
21		Bit	IX2.5	DI21	
22		Bit	IX2.6	DI22	
23		Bit	IX2.7	DI23	
24		Bit	IX3.0	DI24	
25		Bit	IX3.1	DI25	
26		Bit	IX3.2	DI26	
27	IB3	Bit	IX3.3	DI27	
28		Bit	IX3.4	DI28	
29		Bit	IX3.5	DI29	
30		Bit	IX3.6	DI30	
31		Bit	IX3.7	DI31	

17.4 Mechanical Installation

Installation size information is shown below in (mm)：
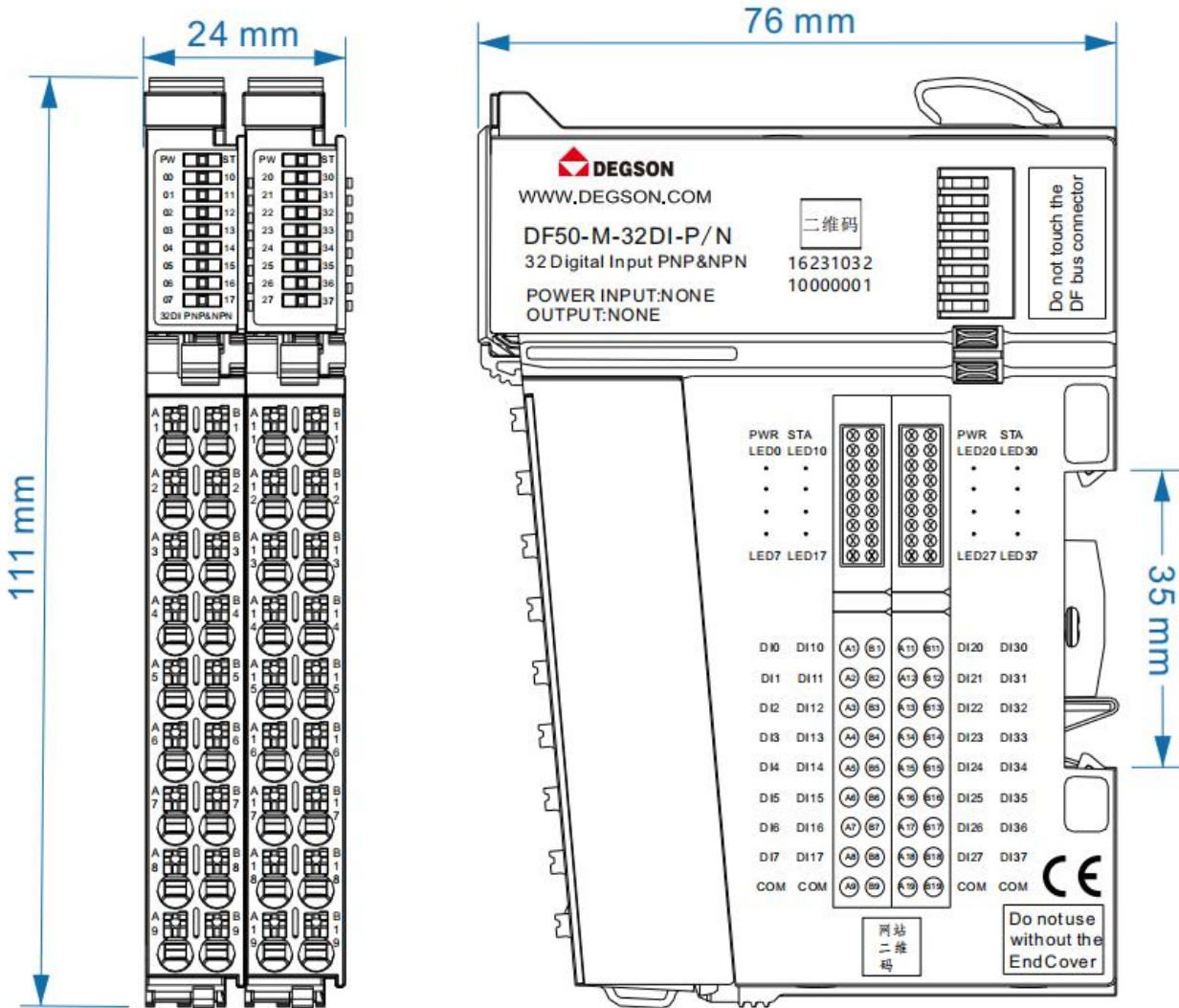
18 4 Channel Relay Output (DF50-M-4DOR)

➢ 4-channel digital output。

➢ LED indicators for each output channel。

➢ Isolation between field and system layers via optocoupler。

➢ Protection class IP20。

18.1 Specification

Technical Information	
Product Description	Relay Output Module, 4 Outputs
Number of channels	4
Contact type	N.O. Contacts
Maximum Output Current	Single-channel output maximum current: 5A
	Maximum module output current: 20A
Maximum switching voltage	250VAC/30VDC
Reverse Circuit Protection	Yes
short circuit protection	Yes
Isolation method	Optically isolated from the field layer
Module Error Diagnosis	Yes
switching frequency	30Hz
Response time of the 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: 125°C typical

Load type	Resistance (5A/point, 20A/module)
Output Action Display	Indicator on when output is driven
IO Mapping	Supports per-bit mapping method
Fail-Stop Output Status Mode	Zero, hold current value
Shutdown Mode	No more refreshing by fault shutdown status mode
Power supply parameters	
System bus input power supply rated voltage	5V DC （4.75V DC~ 5.25V DC）
System bus input power supply rated current	30mA
Rated voltage of terminal power input	24V DC (20.4V DC~ 28.8V DC)
Rated current of terminal power input	50mA
Wiring parameters	
Connection technology: outputs	PUSH-IN Type Terminal Block
Crimp area of conductors	0.2~1.5mm2/26~16AWG
Stripped wire length	8~10mm
Installation method	DIN-35 type rail
Material Parameters	
Color	black
Shell Material	PC plastic, PA66
Conformance Mark	CE
Environmental Requirements	
Permissible ambient temperature (operating)	-25~60°C
Permissible ambient temperature (storage)	-40~85°C
Type of protection	IP20
Pollution level	2，Conforms to IEC 61131-2 standard
Operating Altitude	0~2000m
Relative humidity (non-condensing)	5~95%RH
Vibration Resistance	1g, according to IEC 60068-2-6 standard
Shock Resistance	15g, according to IEC 60068-2-27
EMC Anti-Interference Rating	Conforms to IEC 61000-4
Corrosion resistance	Conforms to IEC 60068-2-42 and IEC 60068-2-43
Permissible H2S pollutant concentration at 75 % relative humidity	10ppm
Permissible SO2 pollutant concentration at 75 % relative humidity	25ppm

18.2 Hardware interfaces

18.2.1 Terminal Block Definition
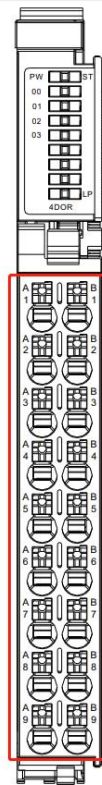
Terminal Serial Number	code	Terminal Serial Number	code	clarification
A1	CH1 contact 1	B1	CH1 contact 1	CH1 Relay Interface 1
A2	CH1 contact 2	B2	CH1 contact 2	CH1 Relay Interface 2
A3	CH2 contact 1	B3	CH2 contact 1	CH2 Relay Interface 1
A4	CH2 contact 2	B4	CH2 contact 2	CH2 Relay Interface 2
A5	CH3 contact 1	B5	CH3 contact 1	CH3 Relay Interface 1
A6	CH3 contact 2	B6	CH3 contact 2	CH3 Relay Interface 2
A7	CH4 contact 1	B7	CH4 contact 1	CH4 Relay Interface 1
A8	CH4 contact 2	B8	CH4 contact 2	CH4 Relay Interface 2
A9	24V	B9	0V	Terminal Power Input

18.2.2 LED Indicator Definition

indicator light	Meaning		
PW	Green on:System bus power input normal		
	Green off:System bus power input abnormal		
ST	Power-up phase	Green on: module initialization abnormal	
		Green off: module initialization normal	
	Operation phase	Green flash: the internal bus of the module works normally	
		Green off/green on: abnormal operation of the module internal bus or abnormal power input to the terminals	
LP	Green on:24V module power supply normal		
	Green off:24V module power supply abnormal		
00~03	Green on:Relay closed		
	Green off:Relay disconnected		

18.2.3 wiring diagram
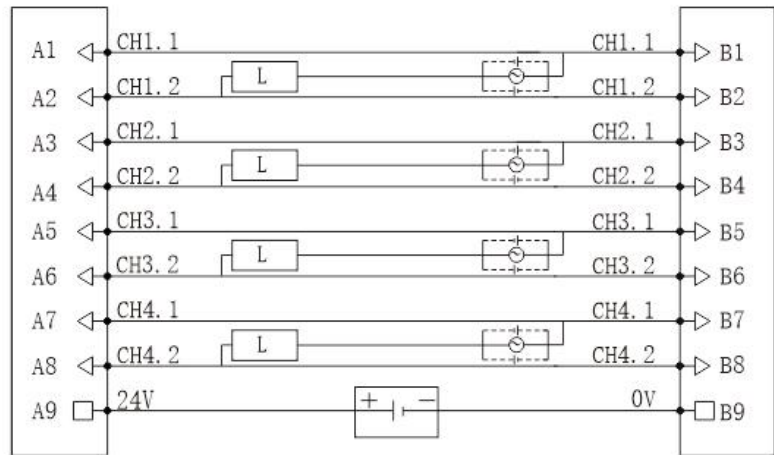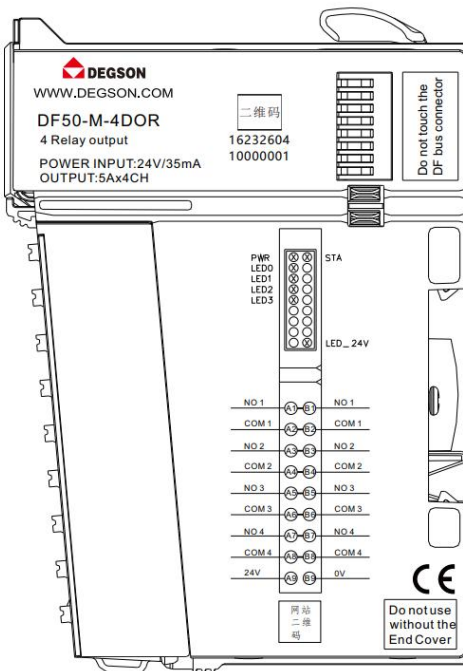
Note: A9, B9 24V power supply is externally supplied.

18.3 Register allocation rules

4-channel relay control output module occupying 1 write-hold register and 8 coil registers.

Register Type	Register PLC address range	Register Modbus protocol address range	Function Code	Read and Write Status
Coil	00001~01024	0000H~03FFH	05H\0FH	Write-only
Holding Register	41025~42048	0400H~07FFH	06H\10H	Writable

Write Holding Register Block Data Structure Definition：

WriteHoldReg	Byte	Format	Bit	Description	
0	QB0	1Word	QX0.0	DO0	DO4R_MOD_WriteHoldRegBlock Size:1
			QX0.1	DO1	
			QX0.2	DO2	
			QX0.3	DO3	
			QX0.4	\	
			QX0.5	\	
			QX0.6	\	
			QX0.7	\	
	QB1		QX1.0	\	
			QX1.1	\	
			QX1.2	\	
			QX1.3	\	
			QX1.4	\	
			QX1.5	\	
			QX1.6	\	
			QX1.7	\	

Write Coil Status Register Block Data Structure Definition：

WriteCoilReg	Byte	Format	Bit	Description	
0	QB0	Bit	QX0.0	DO0	DO4R_MOD_WriteCoilRegBlock Size:8
1		Bit	QX0.1	DO1	
2		Bit	QX0.2	DO2	
3		Bit	QX0.3	DO3	
4		Bit	QX0.4	Reserve：0	
5		Bit	QX0.5	Reserve：0	
6		Bit	QX0.6	Reserve：0	
7		Bit	QX0.7	Reserve：0	

18.4 Mechanical Installation

Installation size information is shown below in (mm)：

19 4 Channel Digital Output/24VDC/2A/PNP(DF50-M-4DO-P-2A)

➢ 4-channel digital output, PNP high active。

➢ LED indicators for each output channel。

➢ Isolation between field and system layers via optocoupler。

➢ Protection class IP20。
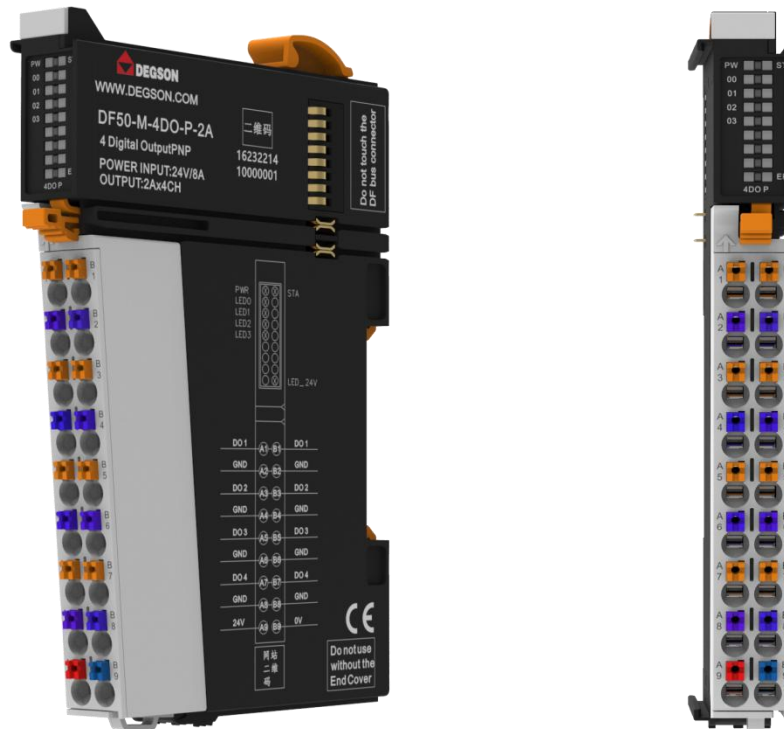
19.1 Specification

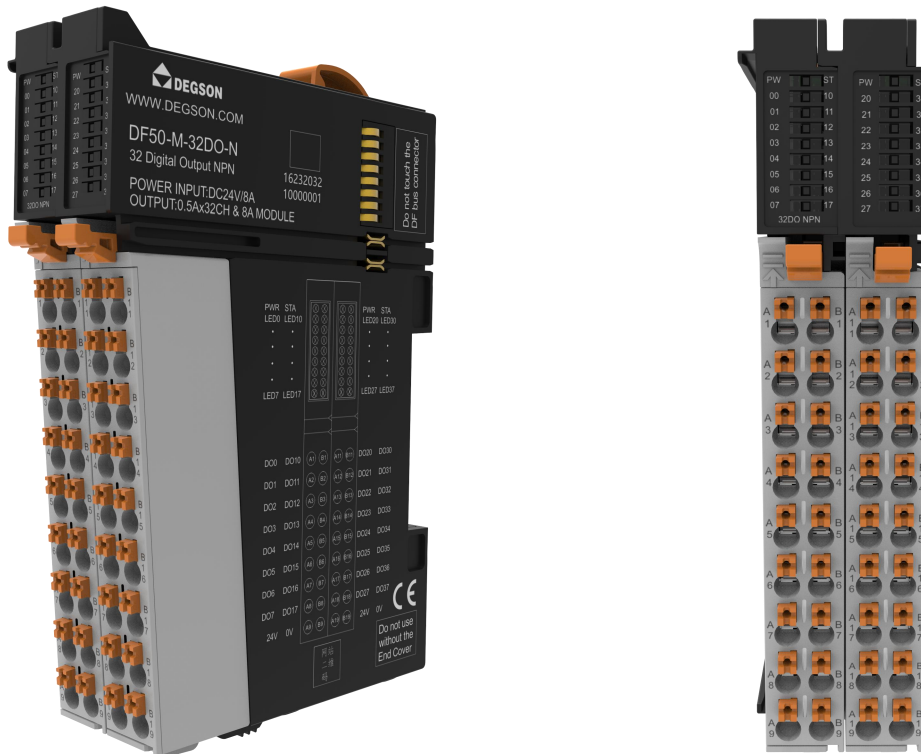| Technical Information	
Product Description	Digital Output Module, 4 Outputs, PNP, 24VDC
Number of Channels	4
Signal type	PNP
"OFF signal voltage	High Resistance
"ON" Signal Voltage	24V DC
Data size	1 Byte
Connection type	1-Wire
Reverse circuit protection	Yes
Overcurrent protection	Yes
Short circuit protection	Yes
Isolation method	Optically isolated from field layers
Error diagnosis	Yes
Switching frequency (resistive)	100Hz
Switching Frequency (Lamp)	10Hz
Switching frequency (inductive)	0.2Hz
Protection circuit response time	< 100μs
Maximum output current per channel	2A
Leakage Current	Maximum: 0.18uA
Hardware response time	100us/100us
Output Impedance	<200mΩ
Output delay time	OFF to ON :Max.100us , ON to OFF :Max.150us
Protection Function	Over-temperature shutdown: Typical 135°C
Load Type	Over-current protection: 4A, 2A typical
Output Action Display	Support short circuit protection
Input Derating	Inductive (7.2W/point, 24W/module), Resistive (0.5A/point, 4A/module), Lamp (5W/point, 18W/module)
IO Mapping	Indicator light when output is driving state
Fail-Stop Output Status Mode	50% derating when operating at 55°C (output current not exceeding 2A while ON), or 10°C when output points are fully ON
In Shutdown Mode	Supports per-bit mapping method
Power supply parameters	
System bus input power supply rated voltage	5V DC （4.75V DC～5.25V DC）
System bus input power supply rated current	100mA
Rated voltage of terminal power input	24V DC (20.4V DC～28.8V DC)
Terminal power input rated current	8A
Wiring parameters	
Connection technology: outputs	PUSH-IN Type Terminal Block
Crimp area of the conductor	0.2～1.5mm2/26～16AWG
Stripped wire length	8～10mm
Mounting method	DIN-35 type rail
Material Parameters	
Color	Black
Shell Material	PC Plastic, PA66
Conformance Mark	CE
Environmental Requirements	
Permissible ambient temperature (operating)	-25～60°C
Permissible ambient temperature (storage)	-40～85°C
Type of protection	IP20
Pollution level	2，Conforms to IEC 61131-2 standard
Operating Altitude	Temperature without derating: 0～2000m
Relative humidity (non-condensing)	5～95%RH
Vibration Resistance	1g, according to IEC 60068-2-6 standard
Shock Resistance	15g, according to IEC 60068-2-27 standard

EMC Anti-Interference Rating	Conforms to IEC 61000-4
Corrosion resistance	Conforms to IEC 60068-2-42 and IEC 60068-2-43
Permissible H2S pollutant concentration at 75 % relative humidity	10ppm
Permissible SO2 pollutant concentration at 75 % relative humidity	25ppm

19.2 hardware interface

19.2.1 Terminal Block Definition
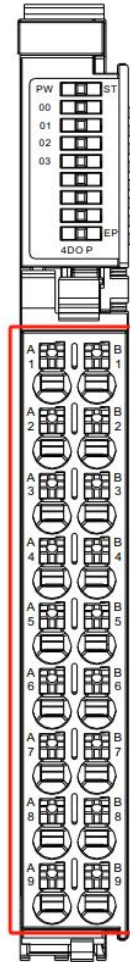
Terminal Serial Number	signal	Terminal Serial Number	signal	clarification
A1	DO 0	B1	DO 0	DO1 signal output
A2	GND	B2	GND	
A3	DO 1	B3	DO 1	DO2 signal output
A4	GND	B4	GND	
A5	DO 2	B5	DO 2	DO3 signal output
A6	GND	B6	GND	
A7	DO 3	B7	DO 3	DO4 signal output
A8	GND	B8	GND	
A9	24V	B9	0V	Terminal power input

19.2.2 LED Indicator Definition

indicator light	Meaning		
PW	Green on:System bus power input normal		
	Green off:System bus power input abnormal		
ST	Power-up phase	Green on: module initialization abnormal	
		Green off: module initialization normal	
	Running phase	Green flash: module internal bus works normally	
		Green off/green on: module internal bus work abnormality or terminal power input abnormality	
EP	Green on:24V module power supply normal		
	Green off:Abnormal power supply of 24V module		
00～03	Green on:Output signal is valid		
	Green off:Invalid output signal		

19.2.3 wiring diagram
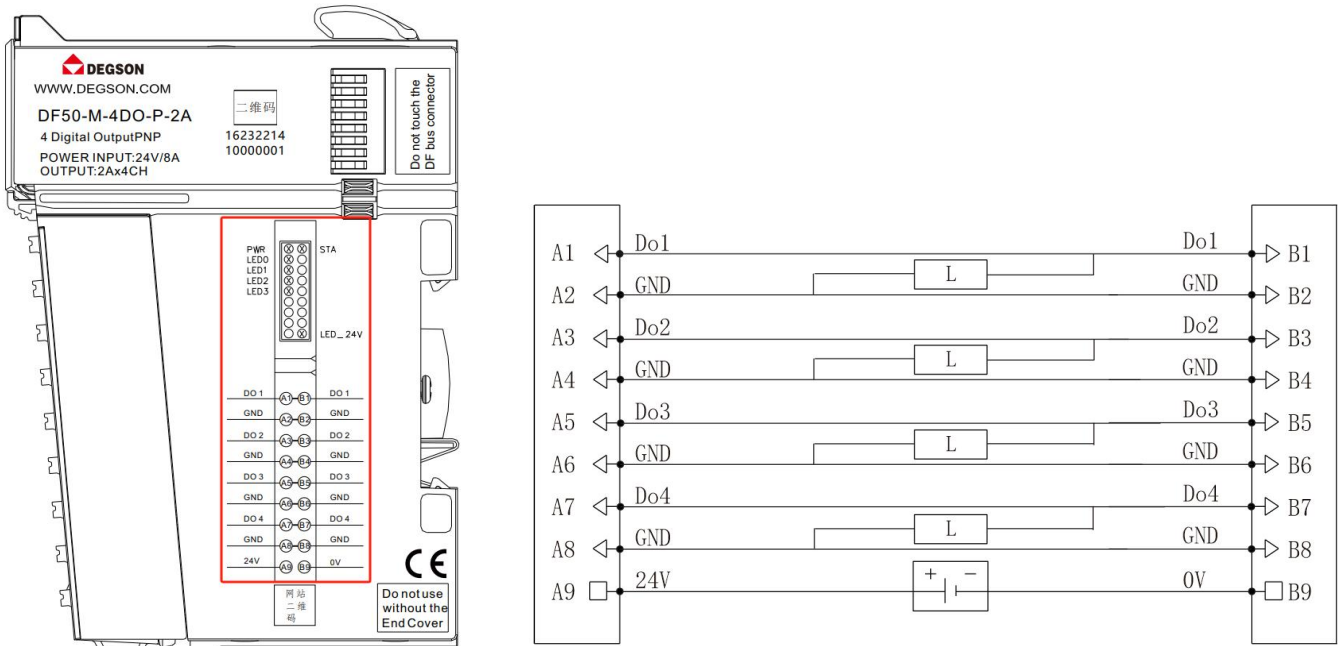
Note: A9, B9 24V power supply is externally supplied.

19.3 Register allocation rules

4-channel digital PNP output module occupying 1 read-hold register, 1 write-hold register, 8 coil registers, 8 discrete input registers。

Register Type	Register PLC address range	Register Modbus protocol address range	function code	Read/Write Status
Discrete Input Status	00001~01032	0000H~0407H	02H	Read-only
Holding Register	43073~44048	0C00H~0FCFH	03H	Readable
Holding Register	40001~41024	0000H~03FFH	06H	Writable
Coil	00001~01024	0000H~03FFH	05H	Write-only

Write Holding Register Block Data Structure Definition:

WriteHold Reg	Byte	Format	Bit	Description	
0	QB0	1Word	QX0.0	DO0	DO4P_MOD_WriteHoldRegBlock Size:1
			QX0.1	DO1	
			QX0.2	DO2	
			QX0.3	DO3	
			QX0.4	\	
			QX0.5	\	
			QX0.6	\	
			QX0.7	\	
	QB1		QX1.0	\	
			QX1.1	\	
			QX1.2	\	
			QX1.3	\	
			QX1.4	\	
			QX1.5	\	
			QX1.6	\	
			QX1.7	\	

Write Coil Status Register Block Data Structure Definition：

WriteCoilReg	Byte	Format	Bit	Description	
0	QB0	Bit	QX0.0	DO0	DO4P_MOD_WriteCoilRegBlock Size:8
1		Bit	QX0.1	DO1	
2		Bit	QX0.2	DO2	
3		Bit	QX0.3	DO3	
4		Bit	QX0.4	Reserve：0	
5		Bit	QX0.5	Reserve：0	
6		Bit	QX0.6	Reserve：0	
7		Bit	QX0.7	Reserve：0	

Read Discrete Input Status Register Block Data Structure Definition：

ReadDiscReg	Byte	Format	Bit	Description	
0	IB0	Bit	IX0.0	Overcurrent0	DO4P_MOD_ReadDiscRegBlock Size:8
1		Bit	IX0.1	Overcurrent1	
2		Bit	IX0.2	Overcurrent2	
3		Bit	IX0.3	Overcurrent3	
4		Bit	IX0.4	Reserve：0	
5		Bit	IX0.5	Reserve：0	
6		Bit	IX0.6	Reserve：0	

7		Bit	IX0.7	Reserve：0	

Read Holding Register Block Data Structure Definition：

ReadHold Reg	Byte	Format	Bit	Description	
0	QB0	1Word	QX0.0	Overcurrent0	DO4P_MOD_ReadHoldRegBlock Size:1
			QX0.1	Overcurrent1	
			QX0.2	Overcurrent2	
			QX0.3	Overcurrent3	
			QX0.4	\	
			QX0.5	\	
			QX0.6	\	
			QX0.7	\	
	QB1		QX1.0	\	
			QX1.1	\	
			QX1.2	\	
			QX1.3	\	
			QX1.4	\	
			QX1.5	\	
			QX1.6	\	
			QX1.7	\	

19.4 Mechanical Installation

Installation dimensional information is shown below in （mm）：
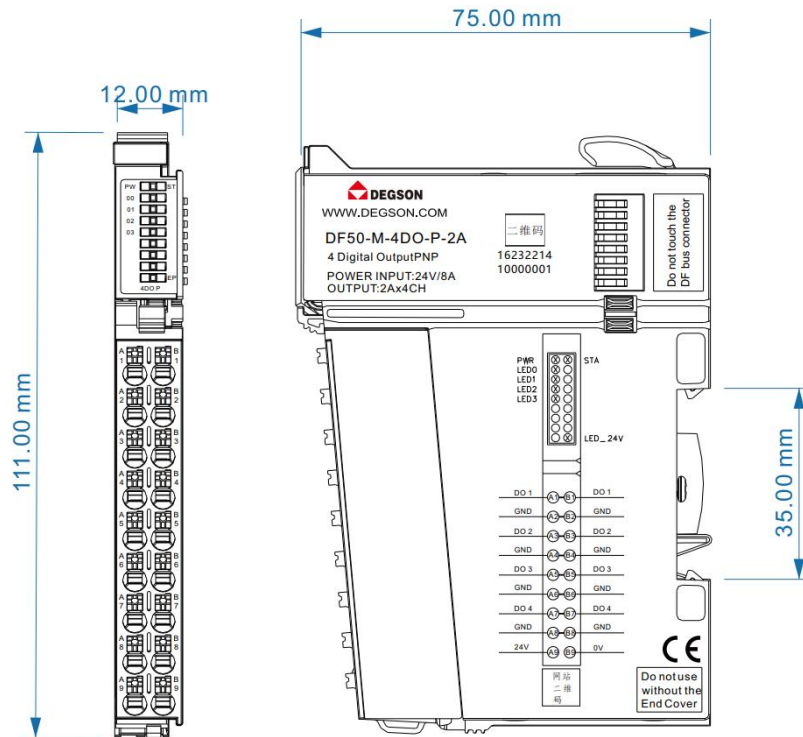
20 32-channel digital output/24VDC/NPN(DF50-M-32DO-N)

➢ 32-channel digital output with NPN active low.

➢ LED indicators for each output channel。

➢ The field and system layers are isolated from each other by means of an optocoupler.

➢ Protection class IP20。

20.1 Specification

Technical Information	
Product Description	Digital Output Module, 32 Outputs, NPN, 24VDC
Number of Channels	32
Signal type	NPN
"OFF signal voltage	High Resistance
"ON" Signal Voltage	0V DC
Data size	4 Byte
Connection type	1-Wire
Reverse circuit protection	Yes
Overcurrent protection	Yes
Short circuit protection	Yes
Isolation method	Optically isolated from field layers
Error diagnosis	Yes
Switching Frequency (Resistive)	100Hz

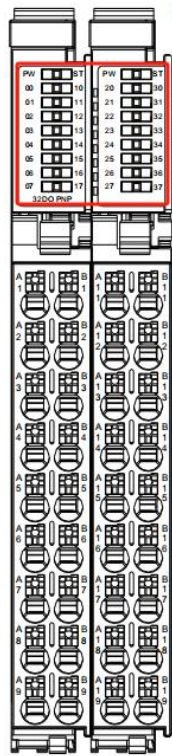|	
Switching Frequency (Lamp)	10Hz
Switching frequency (inductive)	0.2Hz
Response time of protection circuit	< 100μs
Maximum output current per channel	500 mA
Leakage current	Maximum: 10uA
Hardware response time	100us/100us
Output impedance	<200mΩ
Output delay time	OFF to ON :Max.100us , ON to OFF :Max.150us
Protection Function	Over-temperature shutdown: Typ. 135°C
Load Type	Over-current protection: 1.1A, Typical 0.5A
Output Action Display	Support short circuit protection
Input Derating	0.5A/point, 8A/module
IO Mapping	Indicator on when output is driving
Fail-Stop Output Status Mode	50% derating at 55°C operation (output current not exceeding 2A while ON), or 10°C derating when output point is fully ON
In Shutdown Mode	Supports bitwise or wordwise mapping
Power supply parameters	
System bus input power supply rated voltage	5V DC （4.75V DC~ 5.25V DC）
System bus input power supply rated current	200mA
Rated voltage of terminal power input	24V DC (20.4V DC~ 28.8V DC)
Rated current of terminal power input	8A
Wiring parameters	
Connection technology: outputs	PUSH-IN Type Terminal Block
Crimp area of conductors	0.2~1.5mm2/26~16AWG
Stripped wire length	8~10mm
Installation method	DIN-35 rail
Material parameters	
Color	Black color
Housing Material	PC plastic, PA66
Conformance Mark	CE
Environmental Requirements	
Permissible ambient temperature (operating)	-25~60°C
Permissible ambient temperature (storage)	-40~85°C
Type of protection	IP20
Pollution level	2，Conforms to IEC 61131-2 standard
Operating Altitude	Temperature without derating: 0~2000m
Relative humidity (non-condensing)	5~95%RH
Vibration Resistance	1g, according to IEC 60068-2-6 standard
Shock Resistance	15g, according to IEC 60068-2-27 standard
EMC Anti-Interference Rating	Conforms to IEC 61000-4
Corrosion resistance	Conforms to IEC 60068-2-42 and IEC 60068-2-43
Permissible H2S pollutant concentration at 75 % relative humidity	10ppm
Permissible SO2 pollutant concentration at 75 % relative humidity	25ppm

20.2 Hardware interfaces

20.2.1 Terminal Block Definition

Terminal Serial Number	signal	Terminal Serial Number	signal	Terminal Serial Number	signal	Terminal Serial Number	signal	clarification
A1	DO 0	B1	DO 10	C1	DO 20	D1	DO 30	DO signal output
A2	DO 1	B2	DO 11	C2	DO 21	D2	DO 31	
A3	DO 2	B3	DO 12	C3	DO 22	D3	DO 32	
A4	DO 3	B4	DO 13	C4	DO 23	D4	DO 33	
A5	DO 4	B5	DO 14	C5	DO 24	D5	DO 34	
A6	DO 5	B6	DO 15	C6	DO 25	D6	DO 35	
A7	DO 6	B7	DO 16	C7	DO 26	D7	DO 36	
A8	DO 7	B8	DO 17	C8	DO 27	D8	DO 37	
A9	24V	B9	0V	C9	24V	D9	0V	Terminal power input

20.2.2 LED Indicator Definition

Indicator light	Meaning		
PW	Green on:System bus power input normal		
	Green off:System bus power input abnormal		
ST	Power-up phase	Green on: module initialization abnormal	
		Green off: module initialization normal	
	Running phase	Green flash: module internal bus works normally	
		Green off/green on: module internal bus work abnormally or terminal power input abnormally	
00～07,10～17 20～27,30～37	Green on:Output signal is valid		
	Green off:Output signal is invalid		

20.2.3 wiring diagram
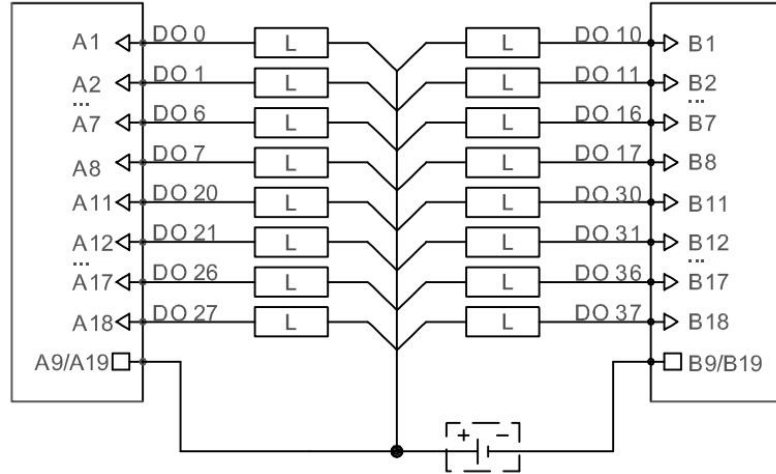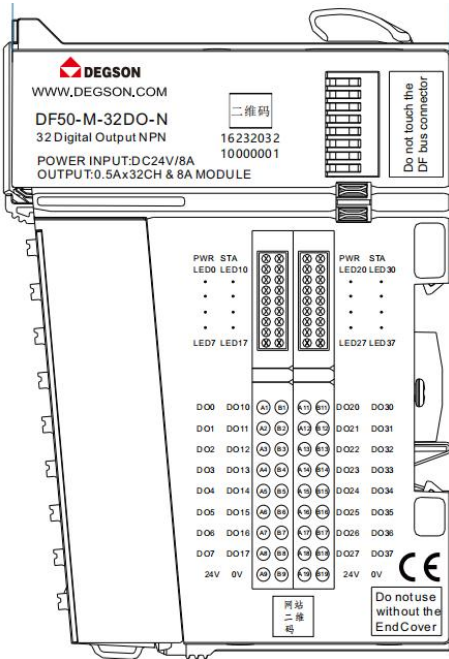
20.3 Register allocation rules

The 32-channel NPN digital output module occupies 2 write-hold registers and 32 coil registers.

Register Type	Register PLC address range	Register Modbus protocol address range	Function Code	Read and Write Status
Coil	00001~01024	0000H~03FFH	05H\0FH	Write-only
Holding Register	41025~42048	0400H~07FFH	06H\10H	Writable

Write Holding Register Block Data Structure Definition：

WriteHoldReg	Byte	Format	Bit	Description	
0	QB0	Word	QX0.0	DO0	DO32N_MOD_WriteHoldRegBlock Size:2
			QX0.1	DO1	
			QX0.2	DO2	
			QX0.3	DO3	
			QX0.4	DO4	
			QX0.5	DO5	
			QX0.6	DO6	
			QX0.7	DO7	
	QB1		QX1.0	DO8	
			QX1.1	DO9	
			QX1.2	DO10	
			QX1.3	DO11	
			QX1.4	DO12	
			QX1.5	DO13	
			QX1.6	DO14	
			QX1.7	DO15	
1	QB0		QX0.0	DO16	
			QX0.1	DO17	
			QX0.2	DO18	
			QX0.3	DO19	
			QX0.4	DO20	
			QX0.5	DO21	
			QX0.6	DO22	
			QX0.7	DO23	
	QB1		QX1.0	DO24	
			QX1.1	DO25	
			QX1.2	DO26	
			QX1.3	DO27	
			QX1.4	DO28	
			QX1.5	DO29	
			QX1.6	DO30	
			QX1.7	DO31	

Write Coil Register Block Data Structure Definition：

WriteCoilReg	Byte	Format	Bit	Description	
0	QB0	Bit	QX0.0	DO0	DO32N_MOD_WriteCoilRegBlock Size:32
1		Bit	QX0.1	DO1	
2		Bit	QX0.2	DO2	
3		Bit	QX0.3	DO3	
4		Bit	QX0.4	DO4	
5		Bit	QX0.5	DO5	
6		Bit	QX0.6	DO6	
7		Bit	QX0.7	DO7	

8		Bit	QX1.0	DO8	
9		Bit	QX1.1	DO9	
10		Bit	QX1.2	DO10	
11		Bit	QX1.3	DO11	
12	QB1	Bit	QX1.4	DO12	
13		Bit	QX1.5	DO13	
14		Bit	QX1.6	DO14	
15		Bit	QX1.7	DO15	
16		Bit	QX2.0	DO16	
17		Bit	QX2.1	DO17	
18		Bit	QX2.2	DO18	
19		Bit	QX2.3	DO19	
20	QB2	Bit	QX2.4	DO20	
21		Bit	QX2.5	DO21	
22		Bit	QX2.6	DO22	
23		Bit	QX2.7	DO23	
24		Bit	QX3.0	DO24	
25		Bit	QX3.1	DO25	
26		Bit	QX3.2	DO26	
27		Bit	QX3.3	DO27	
28	QB3	Bit	QX3.4	DO28	
29		Bit	QX3.5	DO29	
30		Bit	QX3.6	DO30	
31		Bit	QX3.7	DO31	

20.4 Mechanical Installation

Installation size information is shown below in (mm)：

21 32-channel digital output/24VDC/PNP (DF50-M-32DO-P)

➢ 32-channel digital output with PNP active high.。

➢ LED indicators for each output channel。

➢ Isolation between field and system layers via optocoupler。

➢ Protection class IP20。
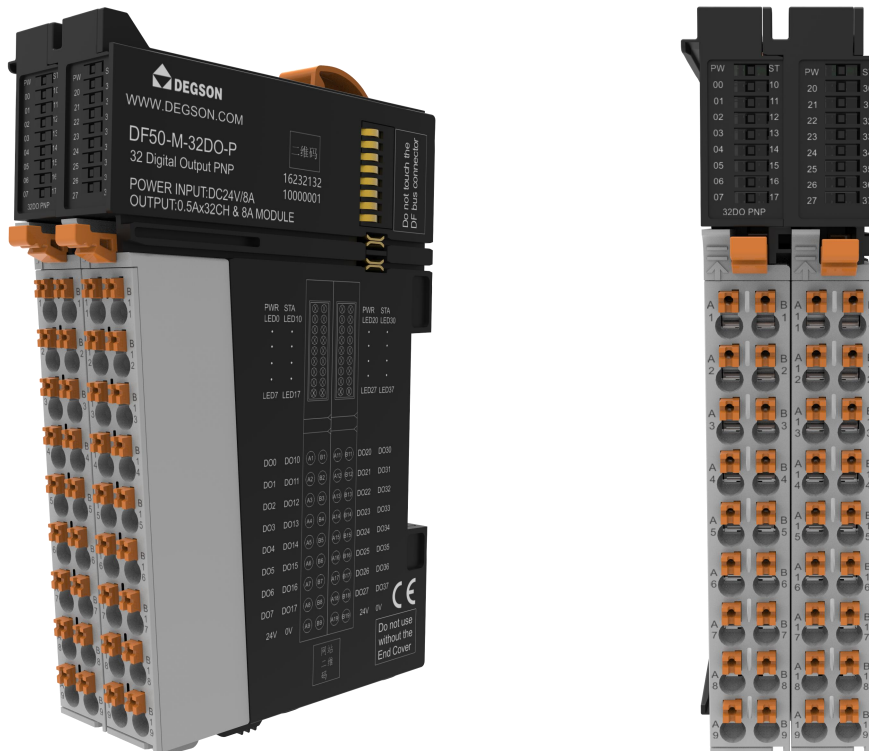
21.1 Specification

Technical Information	
Product Description	Digital Output Module, 32 Outputs, PNP, 24VDC
Number of Channels	32
Signal type	PNP
"OFF signal voltage	High Resistance
"ON" Signal Voltage	24V DC
Data size	4 Byte
Connection type	1-Wire
Reverse circuit protection	Yes
Overcurrent protection	Yes
Short circuit protection	Yes
Isolation method	Optically isolated from field layers
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: 10uA
Hardware response time	100us/100us
Output impedance	<200mΩ
Output delay time	OFF to ON :Max.100us , ON to OFF :Max.150us
Protection Function	Over-temperature shutdown: Typ. 135°C
Load Type	Over-current protection: 1.1A, Typical 0.5A
Output Action Display	Support short circuit protection
Input Derating	0.5A/point, 8A/module
IO Mapping	Indicator on when output is driving
Fail-Stop Output Status Mode	50% derating at 55°C operation (output current not exceeding 2A while ON), or 10°C derating when output point is fully ON
In Shutdown Mode	Supports bitwise or wordwise mapping
Power supply parameters	
System bus input power supply rated voltage	5V DC （4.75V DC~ 5.25V DC）
System bus input power supply rated current	200mA
Rated voltage of terminal power input	24V DC (20.4V DC~ 28.8V DC)
Rated current of terminal power input	8A
Wiring parameters	
Connection technology: outputs	PUSH-IN Type Terminal Block
Crimp area of conductors	0.2~1.5mm2/26~16AWG
Stripped wire length	8~10mm
Installation method	DIN-35 rail
Material parameters	
Color	Black color
Housing Material	PC plastic, PA66
Conformance Mark	CE
Environmental Requirements	
Permissible ambient temperature (operating)	-25~60°C
Permissible ambient temperature (storage)	-40~85°C
Type of protection	IP20
Pollution level	2，Conforms to IEC 61131-2 standard
Operating Altitude	Temperature without derating: 0~2000m
Relative humidity (non-condensing)	5~95%RH
Vibration Resistance	1g, according to IEC 60068-2-6 standard
Shock Resistance	15g, according to IEC 60068-2-27 standard
EMC Anti-Interference Rating	Conforms to IEC 61000-4
Corrosion resistance	Conforms to IEC 60068-2-42 and IEC 60068-2-43
Permissible H2S pollutant concentration at 75 % relative humidity	10ppm
Permissible SO2 pollutant concentration at 75 % relative humidity	25ppm

21.2 Hardware interfaces

21.2.1 Terminal Block Definition

Terminal Serial Number	signal	Terminal Serial Number	signal	Terminal Serial Number	signal	Terminal Serial Number	signal	clarification
A1	DO 0	B1	DO 10	C1	DO 20	D1	DO 30	DO signal output
A2	DO 1	B2	DO 11	C2	DO 21	D2	DO 31	
A3	DO 2	B3	DO 12	C3	DO 22	D3	DO 32	
A4	DO 3	B4	DO 13	C4	DO 23	D4	DO 33	
A5	DO 4	B5	DO 14	C5	DO 24	D5	DO 34	
A6	DO 5	B6	DO 15	C6	DO 25	D6	DO 35	
A7	DO 6	B7	DO 16	C7	DO 26	D7	DO 36	
A8	DO 7	B8	DO 17	C8	DO 27	D8	DO 37	
A9	24V	B9	0V	C9	24V	D9	0V	Terminal power input

21.2.2 LED Indicator Definition

indicator light	Meaning		
PW	Green on:System bus power input normal		
	Green off:System bus power input abnormal		
ST	Power-up phase	Green on: module initialization abnormal	
		Green off: module initialization normal	
	Running phase	Green flash: module internal bus works normally	
		Green off/green on: module internal bus work abnormally or terminal power input abnormally	
00～07,10～17 20～27,30～37	Green light: output signal is valid		
	Green off:Output signal is invalid		

21.2.3 Wiring Diagram
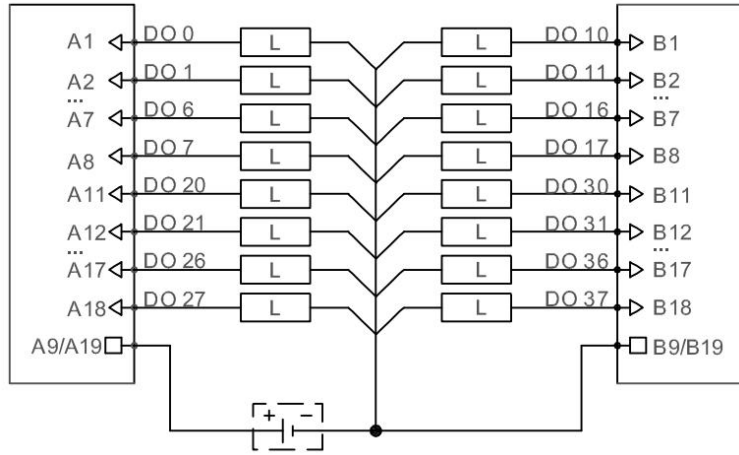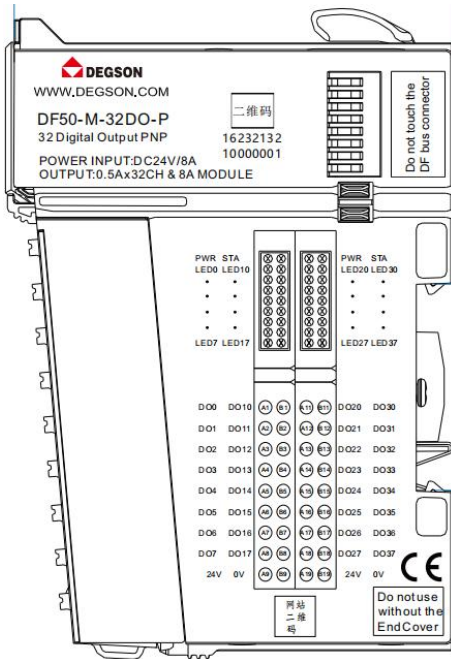
21.3 Register Assignment Rules

32 PNP digital output module for channels, occupying 2 hold registers and 32 coil registers

Register Type	Register PLC Address Interval	Register Modbus Protocol Address Interval	Function Code	Read/Write Status
Transformers	00001~01024	0000H~03FFH	05H\0FH	Write Only
Holding register	41025~42048	0400H~07FFH	06H\10H	Writable

Write Holding Register Block Data Structure Definition：

WriteHoldReg	Byte	Format	Bit	Description	
0	QB0	Word	QX0.0	DO0	DO32P_MOD_WriteHoldRegBlock Size:2
			QX0.1	DO1	
			QX0.2	DO2	
			QX0.3	DO3	
			QX0.4	DO4	
			QX0.5	DO5	
			QX0.6	DO6	
			QX0.7	DO7	
	QB1		QX1.0	DO8	
			QX1.1	DO9	
			QX1.2	DO10	
			QX1.3	DO11	
			QX1.4	DO12	
			QX1.5	DO13	
			QX1.6	DO14	
			QX1.7	DO15	
1	QB0		QX0.0	DO16	
			QX0.1	DO17	
			QX0.2	DO18	
			QX0.3	DO19	
			QX0.4	DO20	
			QX0.5	DO21	
			QX0.6	DO22	
			QX0.7	DO23	
	QB1		QX1.0	DO24	
			QX1.1	DO25	
			QX1.2	DO26	
			QX1.3	DO27	
			QX1.4	DO28	
			QX1.5	DO29	
			QX1.6	DO30	
			QX1.7	DO31	

Write Coil Register Block Data Structure Definition：

WriteCoilReg	Byte	Format	Bit	Description	
0	QB0	Bit	QX0.0	DO0	DO32P_MOD_WriteCoilRegBlock Size:32
1		Bit	QX0.1	DO1	
2		Bit	QX0.2	DO2	
3		Bit	QX0.3	DO3	
4		Bit	QX0.4	DO4	
5		Bit	QX0.5	DO5	
6		Bit	QX0.6	DO6	
7		Bit	QX0.7	DO7	

8	QB1	Bit	QX1.0	DO8	
9		Bit	QX1.1	DO9	
10		Bit	QX1.2	DO10	
11		Bit	QX1.3	DO11	
12		Bit	QX1.4	DO12	
13		Bit	QX1.5	DO13	
14		Bit	QX1.6	DO14	
15		Bit	QX1.7	DO15	
16	QB2	Bit	QX2.0	DO16	
17		Bit	QX2.1	DO17	
18		Bit	QX2.2	DO18	
19		Bit	QX2.3	DO19	
20		Bit	QX2.4	DO20	
21		Bit	QX2.5	DO21	
22		Bit	QX2.6	DO22	
23		Bit	QX2.7	DO23	
24	QB3	Bit	QX3.0	DO24	
25		Bit	QX3.1	DO25	
26		Bit	QX3.2	DO26	
27		Bit	QX3.3	DO27	
28		Bit	QX3.4	DO28	
29		Bit	QX3.5	DO29	
30		Bit	QX3.6	DO30	
31		Bit	QX3.7	DO31	

21.4 Mechanical Installation

Installation dimensional information is shown below in（mm）：
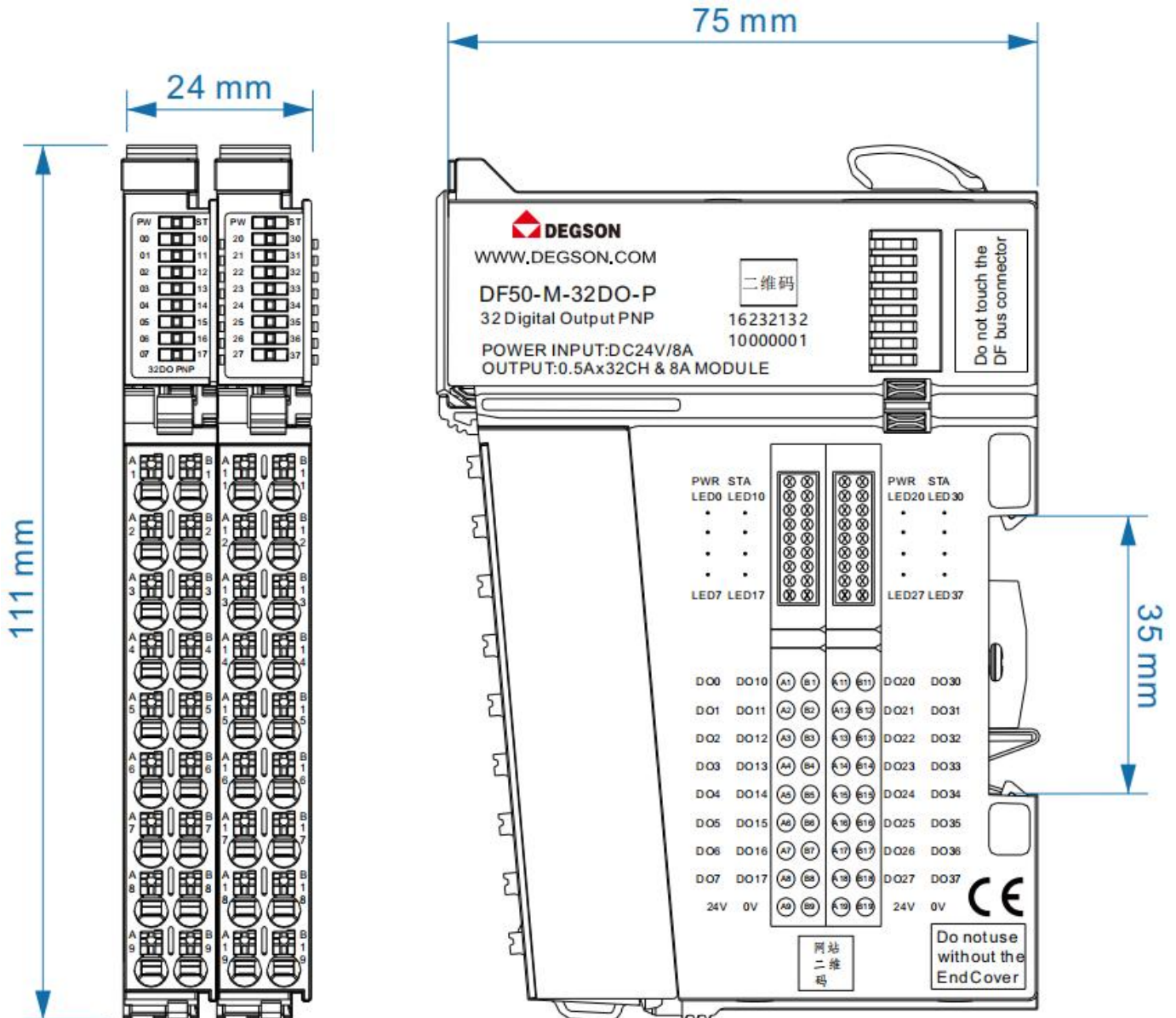
22 16-channel digital input & 16-channel digital output/24VDC/NPN (DF50-M-16DI-16DO-N)

➢ This digital module supports 16 channels of inputs and 16 channels of outputs with NPN active low.

➢ Each input module comes with an anti-interference filter.

➢ Each input and output module is equipped with LED indicators.

➢ The field and system layers are isolated from each other by means of opto-couplers.

➢ Protection class IP20.
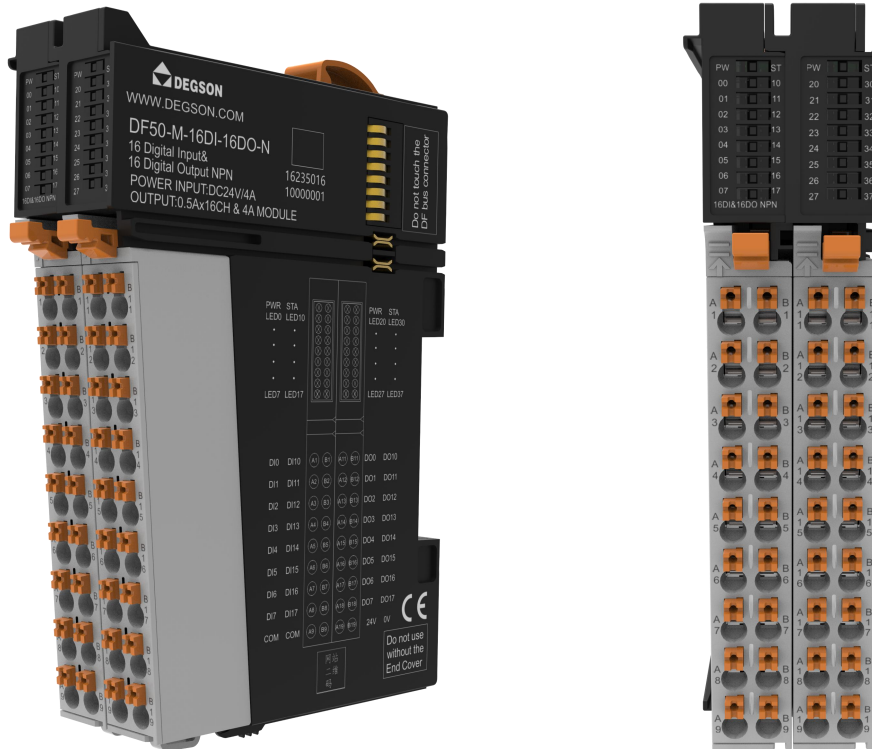
22.1 Specification

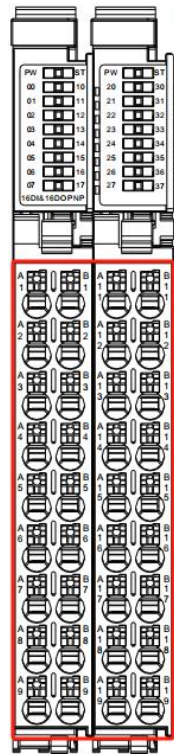| Technical Information		
Product Description		Digital input/output module, 16 inputs + 16 outputs，NPN ，24VDC
Number of Channels		16 inputs + 16 outputs
Signal Type		NPN
Input Channel Parameters		
Signal Ranges	"ON" Voltage	Dropout voltage＞11VDC（Differential pressure to common input）
	"OFF" Voltage	Dropout voltage＜5VDC（Differential pressure to common input）
Hardware Response Time		200us/200us
Data Size		4 Byte
Connection Type		1-wire， Type 1/Type 3 ， refer to IEC 61131-2
Reverse Circuit Protection		Yes
Isolation Method		Optically isolated from field layers
Error Diagnostics		Yes
Filter Time		0~40ms Configurable
Input Impedance		>7.5kΩ
Input Action Display		Input indicator is on when the input is driven.
IO Mapping		Supports per-bit or per-word mapping
Output Channel Parameters		
"OFF" Signal voltage		High resistance state
"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		Optically isolated 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		Max：10uA
Hardware response time		100us/100us
Output impedance		<200mΩ
Output delay time		OFF to ON :Max.100us ， ON to OFF :Max.150us
Protection Function		Over-temperature shutdown: 135°C typical Over-current protection: 1.1A, 0.5A typical Support short circuit protection
Load Type		Inductive (7.2W/point, 24W/module), Resistive (0.5A/point, 4A/module), Lamp (5W/point, 18W/module)
Output Action Display		Indicator light when output is driving state
Input Derating		50% derating when operating at 55°C (output current not exceeding 2A while ON), or 10°C when output points are fully ON
IO Mapping		Supports mapping by bit or word
Fail-Stop Output Status Mode		Zero, hold current value or output according to preset value.
In Shutdown Mode		Press Fail-Stop status mode, no more refreshing
Power supply parameters		
System bus input power supply voltage rating		5V DC （4.75V DC~ 5.25V DC）
System bus input power supply current rating		145mA

| Input Channel Terminal Power (Common) Input Voltage | NPN Signal Type | 24V |
| | PNP Signal Type | 0V |

Wiring parameters	
Connection technology: Inputs	PUSH-IN connector
Area of crimped wire	0.2～1.5mm²/26～16AWG
Stripped wire length	8～10mm²
Mounting method	DIN-35 Din-Rail

Material Parameter	
Color	Black
Housing Material	PC，PA66
Consistency Mark	CE

Environmental Requirements	
Allowable ambient temperature (operating)	-25～60℃
Permissible ambient temperature (storage)	-40～85℃
Type of protection	IP20
Pollution level	2，meet IEC 61131-2
Operating Altitude	Temperature without derating：0～2000m
Relative humidity (non-condensing)	5～95%RH
Vibration Resistance	1g，meet IEC 60068-2-6
Shock Resistance	15g，meet IEC 60068-2-27
EMC Anti-Interference Rating	meet IEC 61000-4
Corrosion resistance	meet IEC 60068-2-42 和 IEC 60068-2-43
Permissible H2S pollutant concentration at 75 % relative humidity	10ppm
Permissible SO2 pollutant concentration at 75 % relative humidity	25ppm

22.2 Hardware Interfaces

22.2.1 Terminal Block Definition
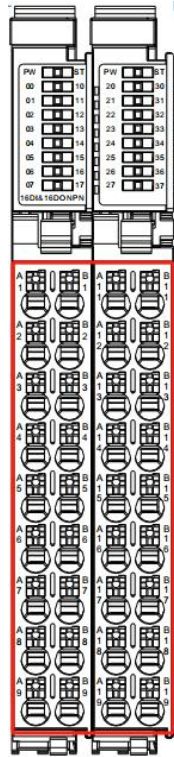
Terminal Serial Number	Signal	Terminal Serial Number	Signal	Terminal Serial Number	Signal	Terminal Serial Number	Signal	Information
A1	DI 0	B1	DI 10	C1	DO 20	D1	DO 30	DI Signal Input：A1~B9 DO Signal Output：C1~D9
A2	DI 1	B2	DI 11	C2	DO 21	D2	DO 31	
A3	DI 2	B3	DI 12	C3	DO 22	D3	DO 32	
A4	DI 3	B4	DI 13	C4	DO 23	D4	DO 33	
A5	DI 4	B5	DI 14	C5	DO 24	D5	DO 34	
A6	DI 5	B6	DI 15	C6	DO 25	D6	DO 35	
A7	DI 6	B7	DI 16	C7	DO 26	D7	DO 36	
A8	DI 7	B8	DI 17	C8	DO 27	D8	DO 37	
A9	COM	B9	COM	C9	24V	D9	0V	Public Terminal

22.2.2 LED Indicator Definition

Indicator	Connotation	
PW	Green on:System bus power input normal	
	Green off: System bus power input abnormal	
ST	Power-up Phase	Green on: module initialization abnormal
		Green off: module initialization normal
	Operational Phase	Green flash: module internal bus works normally
		Green off: module internal bus works abnormally
00～07,10～17	Green on:Input signal is valid	
	Green off:Input signal is invalid	
20～27,30～37	Green on:Output signal is valid	
	Green off:Invalid output signal	

22.2.3 Wiring Diagram
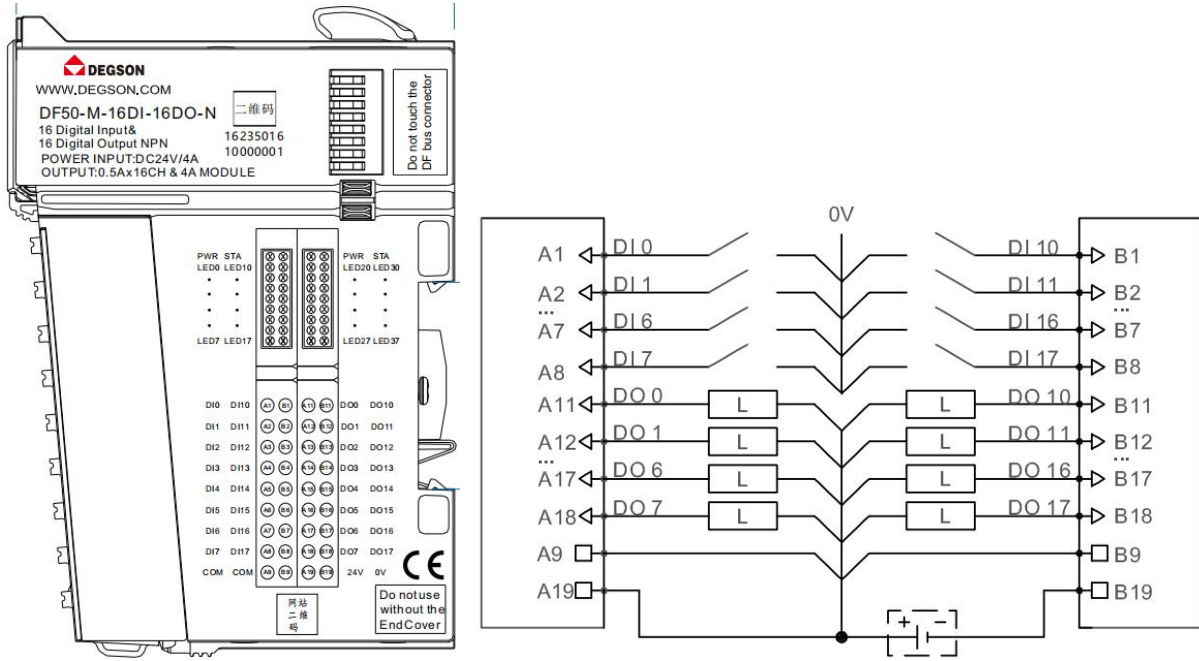
Remarks: COM is the common terminal, external 24V realizes NPN, external 0V realizes PNP.

22.3 Register Assignment Rules

16-channel NPN digital output and output hybrid module occupying 1 read-hold register, 1 write-hold register, 16 discrete input status registers, 16 coil status registers.

Register Type	Register PLC Address Interval	Register Modbus Protocol Address Interval	Function Code	Read/Write Status
Discrete Input Status	00001~01032	0000H~0407H	02H	Read-only
Holding Register	43073~44048	0C00H~0FCFH	03H	Readable
Holding Register	40001~41024	0000H~03FFH	06H	Writable
Coil	00001~01024	0000H~03FFH	05H	Write-only

Read Holding Register Block Data Structure Definition：

ReadHoldReg	Byte	Format	Bit	Description	
0	IB0	1Word	IX0.0	DI0	DIO16N_MOD_ReadHoldRegBlock Size:1
			IX0.1	DI1	
			IX0.2	DI2	
			IX0.3	DI3	
			IX0.4	DI4	
			IX0.5	DI5	
			IX0.6	DI6	
			IX0.7	DI7	
	IB1		IX1.0	DI8	
			IX1.1	DI9	
			IX1.2	DI10	
			IX1.3	DI11	
			IX1.4	DI12	
			IX1.5	DI13	
			IX1.6	DI14	
			IX1.7	DI15	

Write Holding Register Block Data Structure Definition：

WriteHoldReg	Byte	Format	Bit	Description	
1	QB0	1Word	QX0.0	DO0	DIO16N_MOD_WriteHoldRegBlock Size:1
			QX0.1	DO1	
			QX0.2	DO2	
			QX0.3	DO3	
			QX0.4	DO4	
			QX0.5	DO5	
			QX0.6	DO6	
			QX0.7	DO7	
	QB1		QX1.0	DO8	
			QX1.1	DO9	
			QX1.2	DO10	
			QX1.3	DO11	
			QX1.4	DO12	
			QX1.5	DO13	
			QX1.6	DO14	
			QX1.7	DO15	

Read Discrete Input Status Register Block Data Structure Definition：

ReadDiscReg	Byte	Format	Bit	Description	
0		Bit	IX0.0	DI0	
1		Bit	IX0.1	DI1	
2		Bit	IX0.2	DI2	
3	IB0	Bit	IX0.3	DI3	
4		Bit	IX0.4	DI4	
5		Bit	IX0.5	DI5	
6		Bit	IX0.6	DI6	DIO16N_MOD_ReadDiscRegBlock Size:16
7		Bit	IX0.7	DI7	
8		Bit	IX1.0	DI8	
9		Bit	IX1.1	DI9	
10		Bit	IX1.2	DI10	
11	IB1	Bit	IX1.3	DI11	
12		Bit	IX1.4	DI12	
13		Bit	IX1.5	DI13	
14		Bit	IX1.6	DI14	
15		Bit	IX1.7	DI15	

Write Coil Register Block Data Structure Definition：

WriteCoilReg	Byte	Format	Bit	Description	
0		Bit	QX0.0	DO0	
1		Bit	QX0.1	DO1	
2		Bit	QX0.2	DO2	
3	QB0	Bit	QX0.3	DO3	
4		Bit	QX0.4	DO4	
5		Bit	QX0.5	DO5	
6		Bit	QX0.6	DO6	DIO16N_MOD_WriteCoilRegBlock Size:16
7		Bit	QX0.7	DO7	
8		Bit	QX1.0	DO8	
9		Bit	QX1.1	DO9	
10		Bit	QX1.2	DO10	
11	QB1	Bit	QX1.3	DO11	
12		Bit	QX1.4	DO12	
13		Bit	QX1.5	DO13	
14		Bit	QX1.6	DO14	
15		Bit	QX1.7	DO15	

22.4 Mechanical Installation

Installation dimensional information is shown below in（mm）：
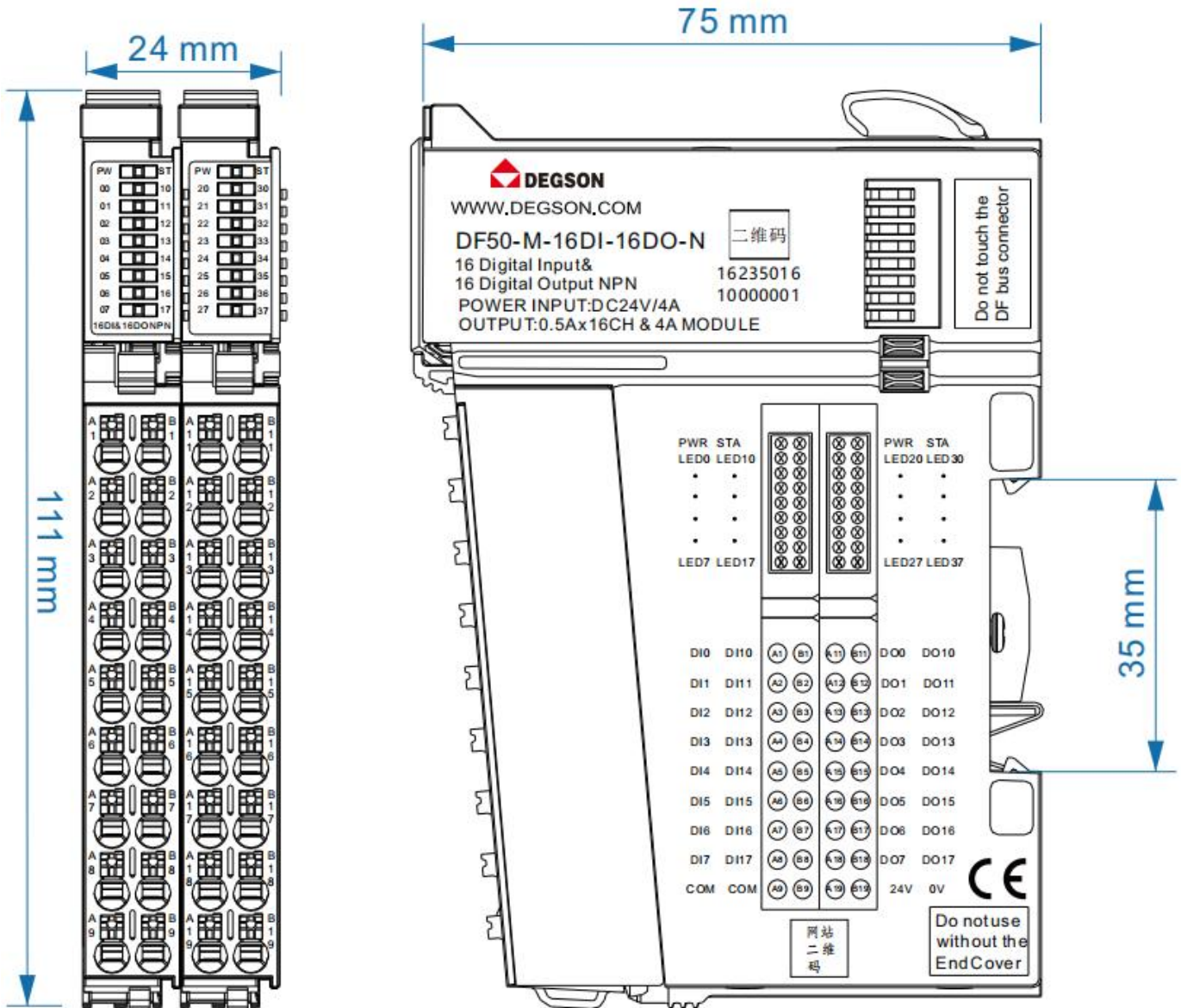
23 16-channel digital inputs & 16-channel digital outputs/24VDC/PNP (DF50-M-16DI-16DO-P)

➢ This digital module supports 16 channels of inputs and 16 channels of outputs with PNP active high.

➢ Each input module is equipped with anti-interference filter.

➢ Each input and output module is equipped with LED indicators.

➢ The field and system layers are isolated by means of opto-couplers.

➢ Protection class IP20.
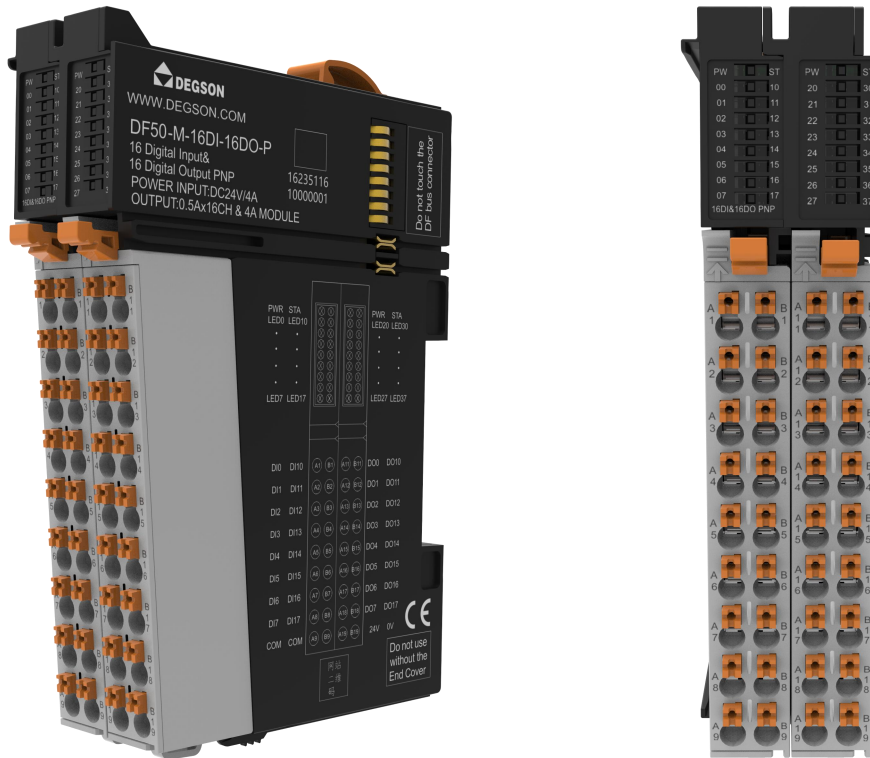
23.1 Specification

Technical Information		
Product Description		Digital Input/Output Module, 16 Inputs + 16 Outputs, PNP, 24VDC
Number of Channels		16 inputs + 16 outputs
Signal Type		PNP
Input Channel Parameters		
Signal Ranges	"ON" Voltage	Dropout voltage＞11VDC（Differential pressure to common input）
	"OFF" Voltage	Dropout voltage＜5VDC（Differential pressure to common input）
Hardware Response Time		200us/200us
Data Size		4 Byte
Connection Type		1-Wire， Type 1/Type 3 ， Refer to IEC 61131-2
Reverse Circuit Protection		Yes
Isolation Method		Optically isolated from the field layer
Error Diagnostics		Yes
Filter Time		0~40ms Configurable
Input Impedance		>7.5kΩ
Input Action Display		Input indicator is on when the input is driven.
IO Mapping		Supports per-bit or per-word mapping
Output Channel Parameters		
"OFF" Signal voltage		High Resistance State
"ON" Signal voltage		24V DC
Data size		2 Byte
Connection type		1-Wire
Reverse circuit protection		Yes
Overcurrent protection		Yes
Short circuit protection		Yes
Isolation method		Optically isolated 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		Max：10uA
Hardware response time		100us/100us
Output impedance		<200mΩ
Output delay time		OFF to ON :Max.100us ， ON to OFF :Max.150us
Protection Function		Over-temperature shutdown: 135°C typical Over-current protection: 1.1A, 0.5A typical Support short circuit protection
Load Type		Inductive (7.2W/point, 24W/module), Resistive (0.5A/point, 4A/module), Lamp (5W/point, 18W/module)
Output Action Display		Indicator light when output is driving state
Input Derating		50% derating when operating at 55°C (output current not exceeding 2A while ON), or 10°C when output points are fully ON
IO Mapping		Supports bitwise or wordwise mapping
Fail-Stop Output Status Mode		Zero, hold current value or output according to preset value.
In Shutdown Mode		Failure shutdown mode, no more refreshing
Power supply parameters		
System bus input power supply voltage rating		5V DC （4.75V DC~ 5.25V DC）
System bus input power supply current rating		145mA
Input Channel	NPN Signal Type	24V

Terminal Power (Common) Input Voltage	PNP Signal Type	0V
Wiring parameters		
Connection technology: Inputs	PUSH-IN connector	
Area of crimped wire	0.2～1.5mm²/26～16AWG	
Stripped wire length	8～10mm²	
Mounting method	DIN-35 Din-Rail Connector	
Material Parameter		
Color	Black	
Housing Material	PC，PA66	
Consistency Mark	CE	
Environmental Requirements		
Allowable ambient temperature (operating)	-25～60℃	
Permissible ambient temperature (storage)	-40～85℃	
Type of protection	IP20	
Pollution level	2，meet IEC 61131-2	
Operating Altitude	Temperature without derating：0～2000m	
Relative humidity (non-condensing)	5～95%RH	
Vibration Resistance	1g，meet IEC 60068-2-6	
Shock Resistance	15g，meet IEC 60068-2-27	
EMC Anti-Interference Rating	Meet IEC 61000-4	
Corrosion resistance	Meet IEC 60068-2-42 and IEC 60068-2-43	
Permissible H2S pollutant concentration at 75 % relative humidity	10ppm	
Permissible SO2 pollutant concentration at 75 % relative humidity	25ppm	

23.2 Hardware Interfaces

23.2.1 Terminal Block Definition

Terminal Number	Signal	Terminal Number	Signal	Terminal Number	Signal	Terminal Number	Signal	Information
A1	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	B3	DI 12	C3	DO 22	D3	DO 32	DI Signal Input：A1~B9 DO Signal Output：C1~D9
A4	DI 3	B4	DI 13	C4	DO 23	D4	DO 33	
A5	DI 4	B5	DI 14	C5	DO 24	D5	DO 34	
A6	DI 5	B6	DI 15	C6	DO 25	D6	DO 35	
A7	DI 6	B7	DI 16	C7	DO 26	D7	DO 36	
A8	DI 7	B8	DI 17	C8	DO 27	D8	DO 37	
A9	COM	B9	COM	C9	24V	D9	0V	Public Side

23.2.2 LED Indicator Definition

Indicator	Connotation	
PW	Green on:System bus power input normal	
	Green off: System bus power input abnormal	
ST	Power-up Phase	Green on: module initialization abnormal
		Green off: module initialization normal
	Operational Phase	Green flash: module internal bus works normally
		Green off: module internal bus works abnormally
00～07,10～17	Green on:Input signal is valid	
	Green off:Input signal is invalid	
20～27,30～37	Green on:Output signal is valid	
	Green off:Invalid output signal	

23.2.3 Wiring Diagram
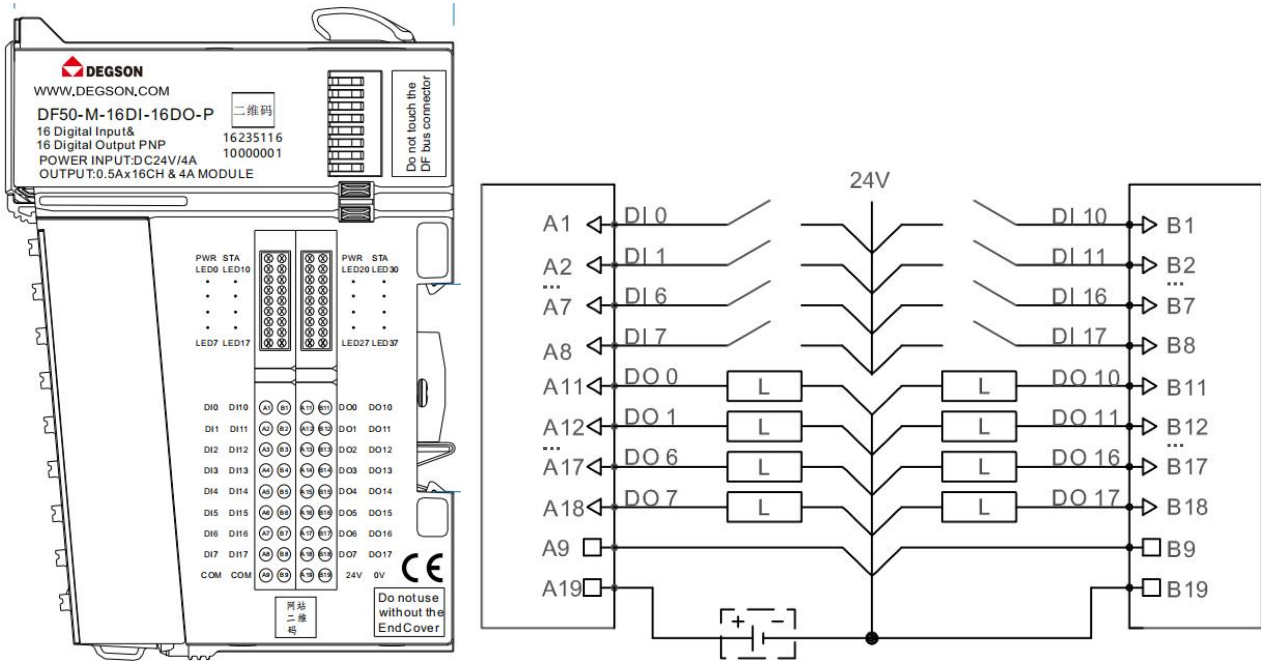
Remarks: COM is the common terminal, external 24V realizes NPN, external 0V realizes PNP.

23.3 Register Assignment Rules

16-channel NPN digital output and output hybrid module occupying 1 read-hold register, 1 write-hold register, 16 discrete input status registers, 16 coil status registers.

Register Type	Register PLC Address Interval	Register Modbus Protocol Address Interval	Function Code	Read/Write Status
Discrete Input Status	00001~01032	0000H~0407H	02H	Read-only
Holding Register	43073~44048	0C00H~0FCFH	03H	Readable
Holding Register	40001~41024	0000H~03FFH	06H	Writable
Coil	00001~01024	0000H~03FFH	05H	Write-only

Read Holding Register Block Data Structure Definition：

ReadHoldReg	Byte	Format	Bit	Description	
0	IB0	1Word	IX0.0	DI0	DIO16P_MOD_ReadHoldRegBlock Size:1
			IX0.1	DI1	
			IX0.2	DI2	
			IX0.3	DI3	
			IX0.4	DI4	
			IX0.5	DI5	
			IX0.6	DI6	
			IX0.7	DI7	
	IB1		IX1.0	DI8	
			IX1.1	DI9	
			IX1.2	DI10	
			IX1.3	DI11	
			IX1.4	DI12	
			IX1.5	DI13	
			IX1.6	DI14	
			IX1.7	DI15	

Write Holding Register Block Data Structure Definition：

WriteHoldReg	Byte	Format	Bit	Description	
1	QB0	1Word	QX0.0	DO0	DIO16P_MOD_WriteHoldRegBlock Size:1
			QX0.1	DO1	
			QX0.2	DO2	
			QX0.3	DO3	
			QX0.4	DO4	
			QX0.5	DO5	
			QX0.6	DO6	
			QX0.7	DO7	
	QB1		QX1.0	DO8	
			QX1.1	DO9	
			QX1.2	DO10	
			QX1.3	DO11	
			QX1.4	DO12	
			QX1.5	DO13	
			QX1.6	DO14	
			QX1.7	DO15	

Discrete Input Status Register Block Data Structure Definition：

ReadDiscReg	Byte	Format	Bit	Description	
0	IB0	Bit	IX0.0	DI0	DIO16P_MOD_ReadDiscRegBlock Size:16
1		Bit	IX0.1	DI1	
2		Bit	IX0.2	DI2	
3		Bit	IX0.3	DI3	
4		Bit	IX0.4	DI4	
5		Bit	IX0.5	DI5	
6		Bit	IX0.6	DI6	
7		Bit	IX0.7	DI7	
8	IB1	Bit	IX1.0	DI8	
9		Bit	IX1.1	DI9	
10		Bit	IX1.2	DI10	
11		Bit	IX1.3	DI11	
12		Bit	IX1.4	DI12	
13		Bit	IX1.5	DI13	
14		Bit	IX1.6	DI14	
15		Bit	IX1.7	DI15	

Write Coil Register Block Data Structure Definition：

WriteCoilReg	Byte	Format	Bit	Description	
0	QB0	Bit	QX0.0	DO0	DIO16P_MOD_WriteCoilRegBlock Size:16
1		Bit	QX0.1	DO1	
2		Bit	QX0.2	DO2	
3		Bit	QX0.3	DO3	
4		Bit	QX0.4	DO4	
5		Bit	QX0.5	DO5	
6		Bit	QX0.6	DO6	
7		Bit	QX0.7	DO7	
8	QB1	Bit	QX1.0	DO8	
9		Bit	QX1.1	DO9	
10		Bit	QX1.2	DO10	
11		Bit	QX1.3	DO11	
12		Bit	QX1.4	DO12	
13		Bit	QX1.5	DO13	
14		Bit	QX1.6	DO14	
15		Bit	QX1.7	DO15	

23.4 Mechanical Installation

Installation dimensional information is shown below in （mm）：
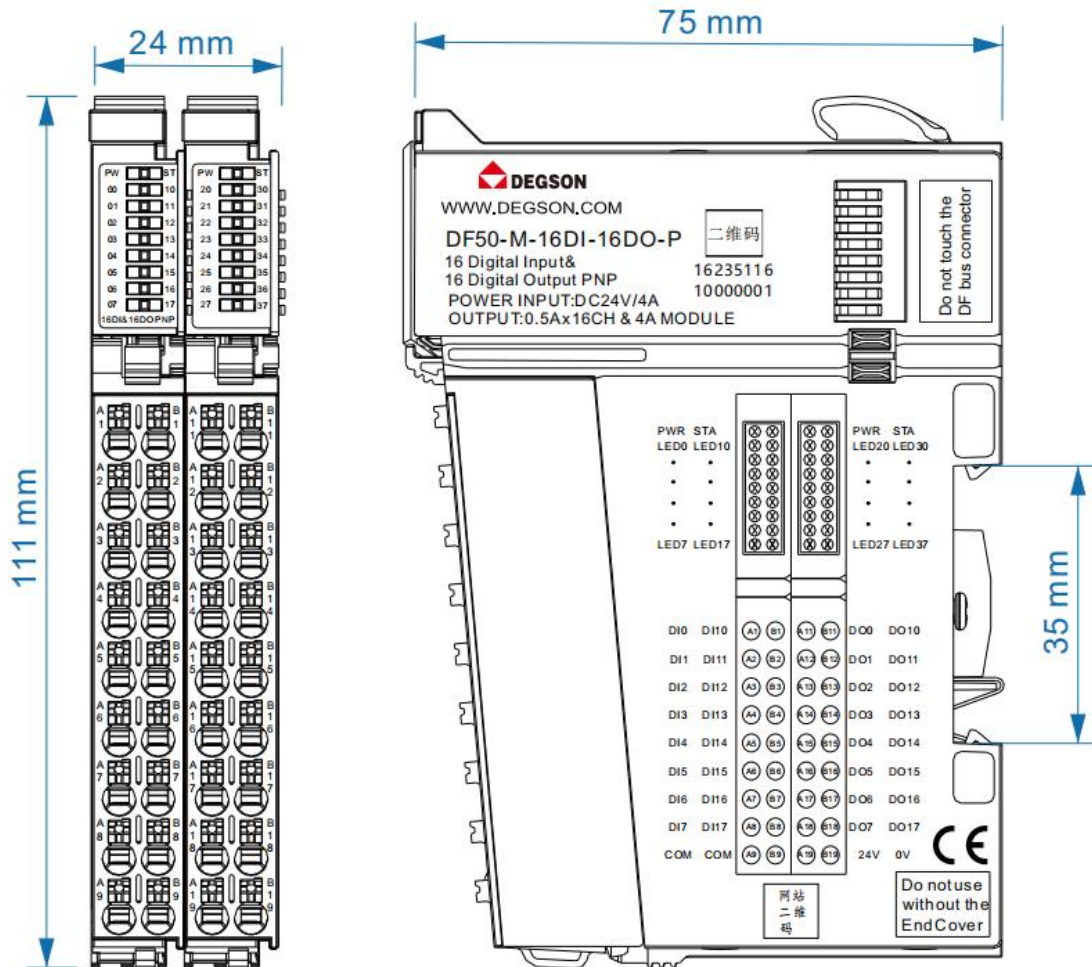
IV、 Web page configuration

➢ ModbusTCP adapter web page configuration can be fast, convenient, quick ModbusTCP remote IO application system in the application configuration, with network, adapter, I/O module information maintenance module.

➢ The Modbus configuration has a higher priority than the web page configuration, and the Mosbus configuration must be stopped before using the web page to manage the configuration of the ModbusTCP adapter, e.g., disconnecting from the Modbus Poll software or closing the Modbus Poll software is considered to be stopping the operation of the Modbus configuration.

1 Web Interface Introduction

➢ Enter the IP address of the ModbusTCP adapter in the address bar of your browser to enter the first page of the configuration web page, e.g., the IP address of the ModbusTCP adapter is 192.168.1.254.

➢ In the home page, some information is displayed with the management and configuration portals of each I/O module, as shown in the following figure.

➢ In Zone 1, you can observe and set network information, including MAC address (read-only), IP address (read/write), subnet mask (read/write), gateway (read/write), and configure disconnected output attributes (clear output or keep output). Before modifying the information in this zone, please dial the dip switch to 0. Modifying the information in this zone will trigger the reset of the adapter, and it will automatically jump to the new web page after waiting for a certain period of time. After waiting for a certain period of time, it will automatically jump to the new web page. (The premise is that the network information of the newly configured adapter and the current configuration PC are in the same network segment, if not in the same network segment, you need to reset the network segment of the configuration PC)

➢ Coupler information can be observed in zone 2, including the coupler name and firmware version (read only)

➢ In Zone 3, you can observe the configuration order of the I/O modules and the management configuration portal for each I/O module, which supports a total of 32 modules.

Network Info

MAC Address: 02:14:62:7E:24:29	IP Address: 192.168.1.254	Subnet mask: 255.255.255.0	
GateWay: 192.168.1.1	Output on Fieldbus Error: Hold last value	Save&Restart	

Tips: Please set the dial-switch to 0 before submitting!   1

Coupler Info

Modbus/TCP Coupler   Firmware Version: 0.2   2

I/O Module Info

3

No.1 DI16_MOD	No.2 CNT24_MOD	No.3 CNT24_MOD	No.4 AI4RTD_MOD
No.5 AI8I_MOD	No.6 AO4UI_MOD	No.7 DI16TS_MOD	No.8 DO16P_MOD
No.9 DO16P_MOD	No.10 DO16P_MOD	No.11 AO8I_MOD	No.12 DO16N_MOD
No.13 DO16P_MOD	No.14 AO8U_MOD	No.15 AO8I_MOD	No.16 AO4UI_MOD
No.17 AO8U_MOD	No.18 AI4UI_MOD	No.19 AI4UI_MOD	No.20 AI4UI_MOD
No.21 AI4RTD_MOD	No.22 AI8I_MOD	No.23 AI8U_MOD	No.24 AI8U_MOD
No.25 AI8I_MOD	No.26 AI8I_MOD	No.27 DI16_MOD	No.28 DI16_MOD
No.29 AI8TC_MOD	No.30 NONE_MOD	No.31 NONE_MOD	No.32 NONE_MOD

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> According to the actual order of module application, the module name will be displayed in the box of No.1~No.32 in order, and the blue block button is the configuration entrance of the card in that position, and the following table lists the supported modules.

Module Name	Platform Display Name	Configuration Entrance
16-Channel Digital Input Module	DI16_MOD	DI16_MOD
24VDC/PNP&NPN	DO16P_MOD	DO16P_MOD
16-Channel Digital Output Module	DO16N_MOD	DO16N_MOD
24VDC/PNP	DI16TS_MOD	DI16TS_MOD
16-Channel Digital Output Module	AI4UI_MOD	AI4UI_MOD
24VDC/NPN	AI8I_MOD	AI8I_MOD
16-Channel Digital Input with Counter Module	AI8U_MOD	AI8U_MOD
24VDC/PNP&NPN	AO4UI_MOD	AO4UI_MOD
4-Channel Analog Input Module	AO8I_MOD	AO8I_MOD
Voltage/Current	AO8U_MOD	AO8U_MOD
8-Channel Analog Input Module	AI4RTD_MOD	AI4RTD_MOD
Current type	AI8TC_MOD	AI8TC_MOD
8-Channel Analog Input Module	CNT24_MOD	CNT24_MOD

Voltage	CNT5_MOD	CNT5_MOD
4-channel analog output module	DI32_MOD	DI32_MOD
Voltage/current type	DO4R_MOD	DO4R_MOD
8-channel analog output module	DO4P_MOD	DO4P_MOD
Current type	DO32N_MOD	DO32N_MOD
8-channel analog output module	DO32P_MOD	DO32P_MOD
Voltage type	DIO16N_MOD	DIO16N_MOD
4-channel RTD measurement module	DIO16P_MOD	DIO16P_MOD

➢ If the number of modules used in an application is less than 32, then the remaining unused positions are displayed as NONE_MOD, if you click the NONE_MOD to enter, the interface is displayed as shown in the following figure, click the HomePage back to home page.

Not insert valid module

HomePage

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➢ If one or some modules used in an application are unsupported modules (not listed in the supported modules list), then the display will be ERROR_MOD, and if you click ERROR_MOD to enter, the interface is displayed as shown in the following figure, click to HomePage back to home page.

This module is not supported

HomePage

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➢ If the module application sequence is changed, the entire I/O system needs to be re-powered and reset.。

2 Adapter IP Address Web Configuration

➢ When shipped from the factory, the dip switch will be set to 0, the IP address is configured as 192.168.1.254, make sure that the power cord and the network cable are all properly connected, configure the PC network configuration as shown in the following figure, and the adapter belongs to the same 192.168.1.xxx network segment.
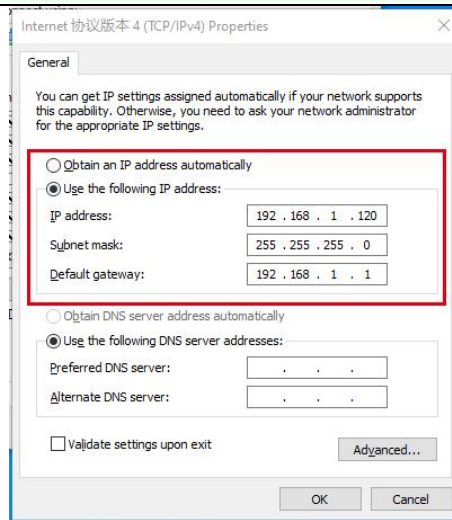
> Power up the adapter and type in the browser address bar192.168.1.254。
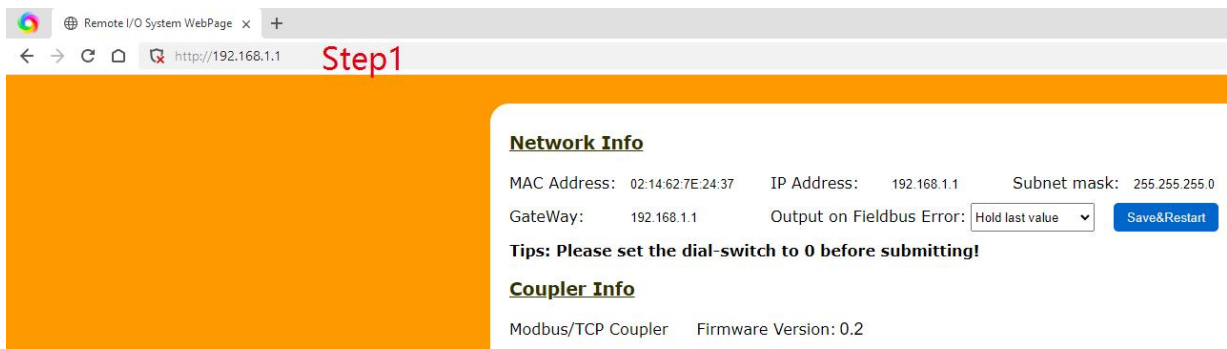
> Only modify the last byte of the IP, do not modify the network segment, as shown in the figure below, change the IP address to "192.168.1.10", click on "Save&Restart", the pop-up dialog box will prompt to dial the dip switch to 0! After clicking "Save&Restart", the pop-up dialog box will prompt you to set the dip switch to 0, continue to click the OK button, wait for 10S, and then the configuration web page will automatically jump to reconnect.
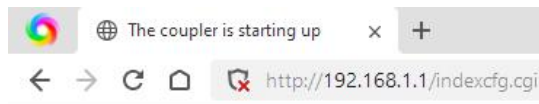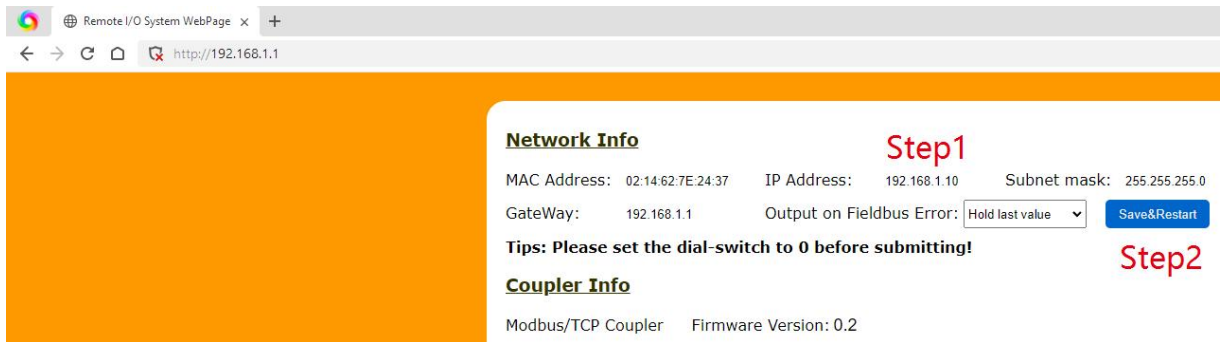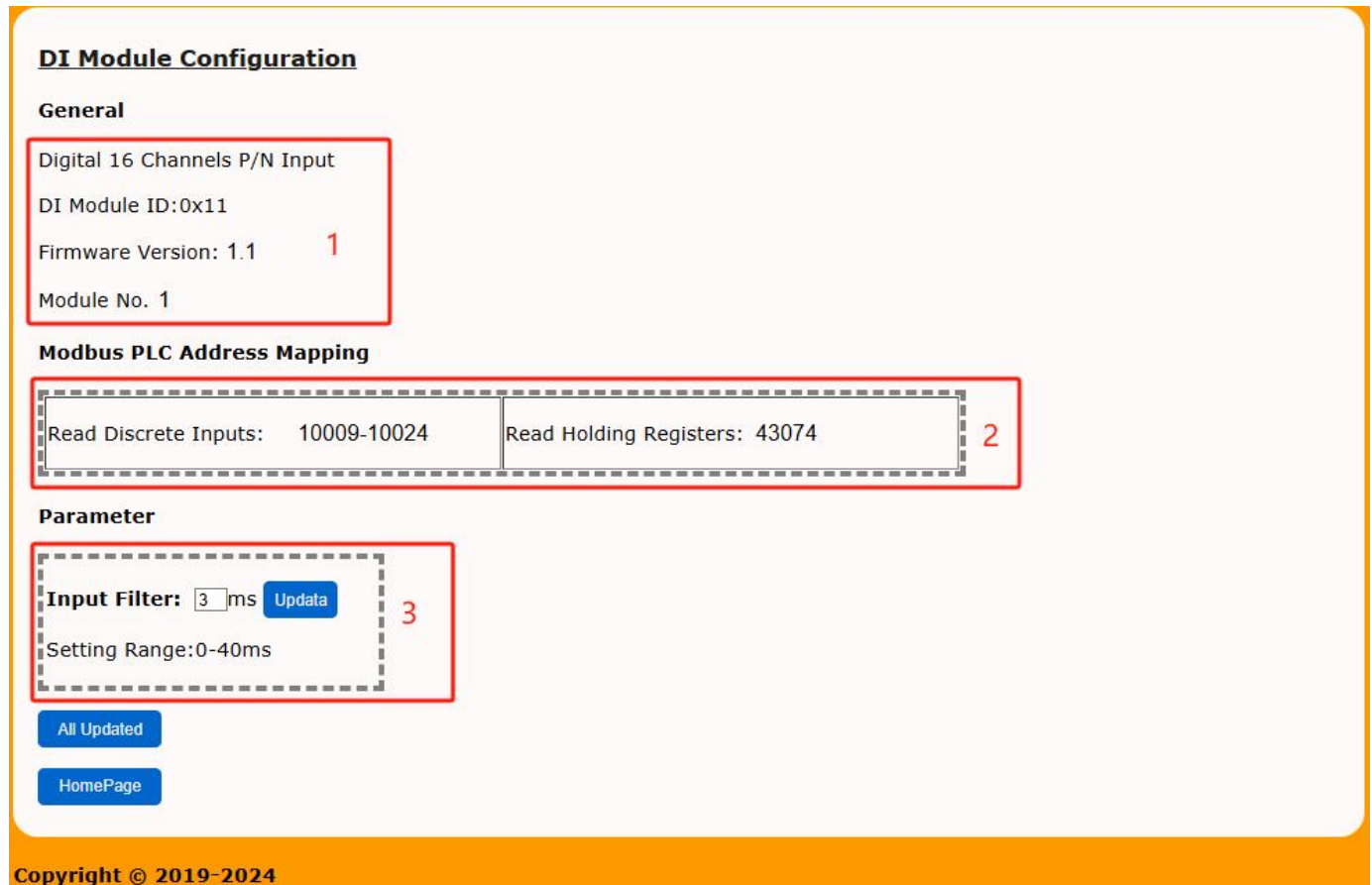
> Change the adapter network parameters to IP address: 10.0.1.10, subnet mask: 255.255.255.0, and default gateway: 10.0.1.1. As shown in the following figure.

Network Info

MAC Address: 02:14:62:7E:24:37   IP Address: 10.0.1.10   Subnet mask: 255.255.255.0

GateWay: 10.0.1.1 **Step2** Output on Fieldbus Error: [Hold last value ▼]   [Save&Restart]

Tips: Please set the dial-switch to 0 before submitting!   **Step3**

Coupler Info

Modbus/TCP Coupler   Firmware Version: 0.2

➢ After modifying and clicking Save to reboot, the configuration PC and the adapter cannot automatically jump to reconnect because the network segments of the configuration PC and the adapter are not the same.

➢ Set the configuration PC and the adapter to the same network segment, for example, the IP address is 10.0.1.201, the adapter is re-powered, and then re-open the browser, enter the IP address 10.0.1.10 of the adapter you just configured, and the connection is successful.

➢ For details of the relationship between the dipswitch and the network settings, see subsection 1.2.4 in Chapter II.

3 16Channel Digital PNP & NPN Input Module Configuration

➢ Click [DI16_MOD] You can enter the running parameters configuration of this type of module, as shown in the following figure.

DI Module Configuration

General

Digital 16 Channels P/N Input

DI Module ID:0x11

Firmware Version: 1.1   **1**

Module No. 1

Modbus PLC Address Mapping

Read Discrete Inputs: 10009-10024   Read Holding Registers: 43074   **2**
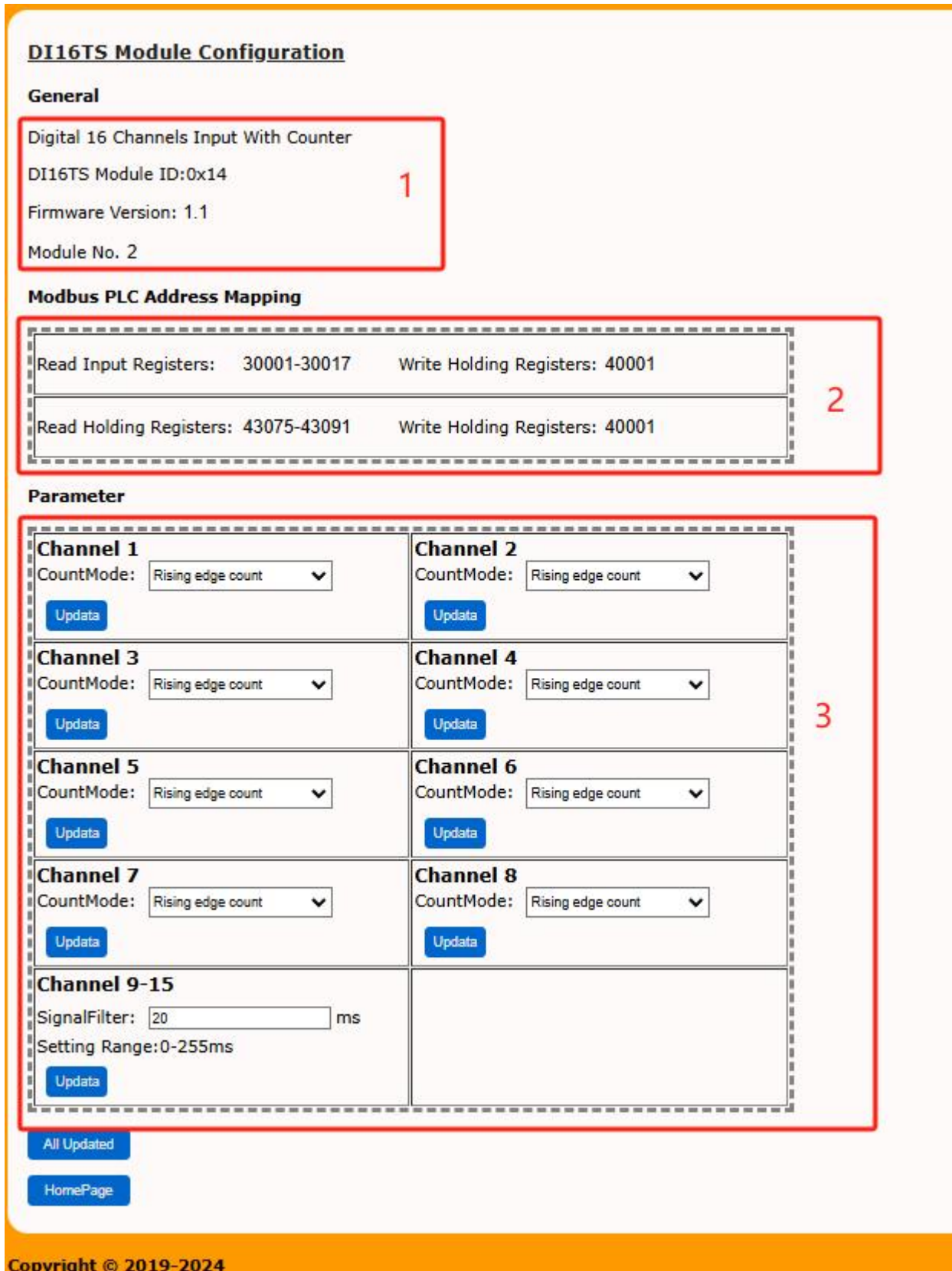
Parameter

Input Filter: [3] ms [Updata]   **3**

Setting Range:0-40ms

[All Updated]

[HomePage]

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➢ The module name, module ID, firmware version and serial number of the module in the application are shown in area 1.

➢ In area 2 shows the module address mapping area.

➢ In area 3 the filtering parameters of the module can be set, the setting range is 0-40ms.

➢ Click [Updata] or [All Updated] to place a command to update the parameters, and click [HomePage] to return to the home page.

4 16 Channel Digital PNP & NPN with Counter Input Module Configuration

➢ Click [DI16TS_MOD] You can enter the running parameters configuration of this type of module, as shown in the following figure.
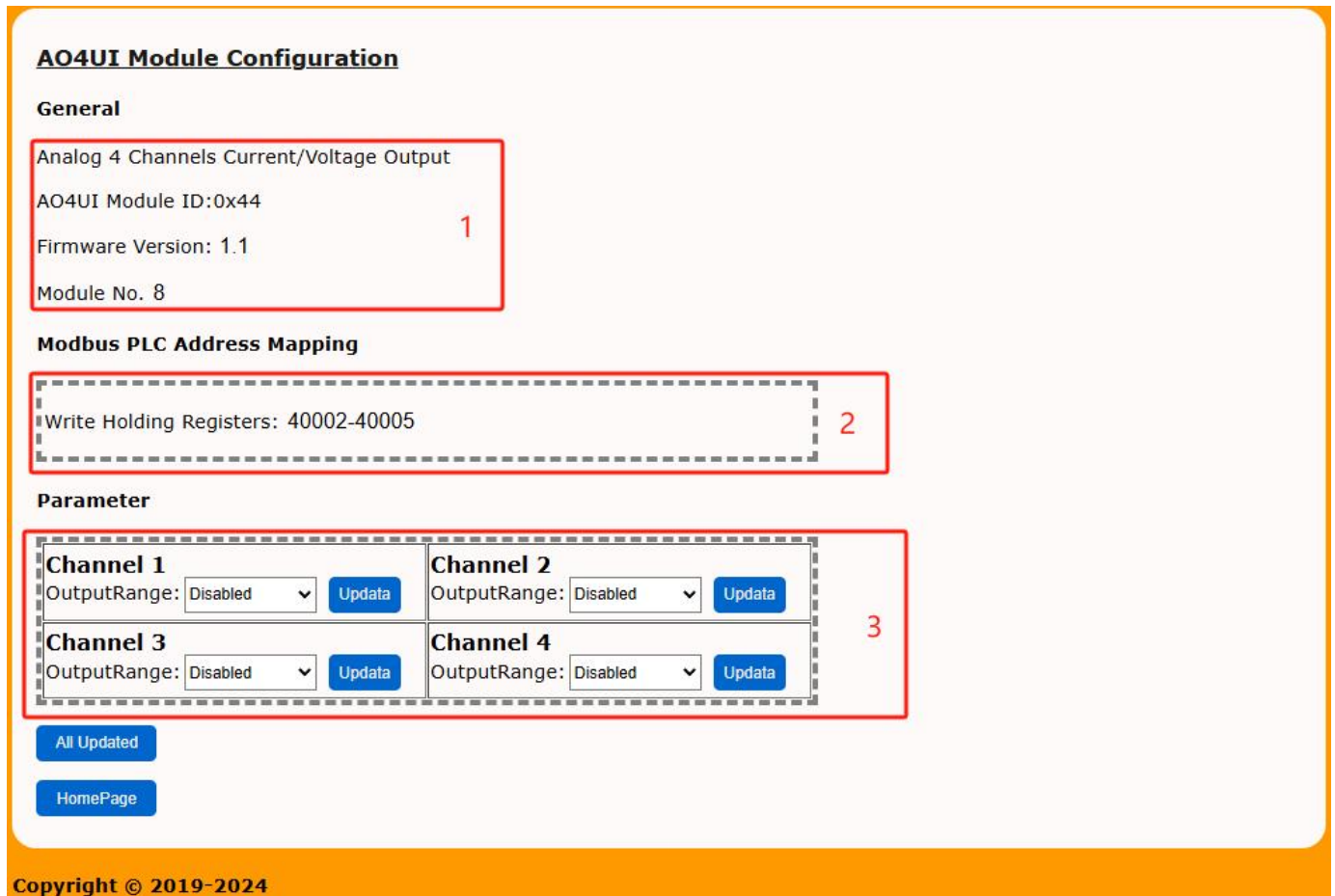

➢ The module name, module ID, firmware version and serial number of the module in the application are shown in area 1.

- ➢ In area 2 shows the module address mapping area.

- ➢ In area 3, you can set the operation parameters of module channel 1 to channel 16, channel 1~channel 8 can be configured with counting mode (counting on rising edge, counting on falling edge and counting on double edge), and channel 9~channel 15 can be configured with filtering parameter (the setting range is 0-255ms).

- ➢ Click Updata or All Updated o send the command to update the parameters, and click HomePage to return to the homepage.

5 16 Channel Digital PNP Output Module Configuration

➢ Click **DO16P_MOD** You can access the configuration of the operating parameters of this type of module, as shown in the following figure.

DO Module do not need to configure

General

Digital 16 Channels Output ModuleID

DO Module ID: 0x23

Firmware Version: 1.1   1

Module No. 3

Modbus PLC Address Mapping

Write Coils Outputs: 00001-00016 | Write Holding Registers: 41025   2
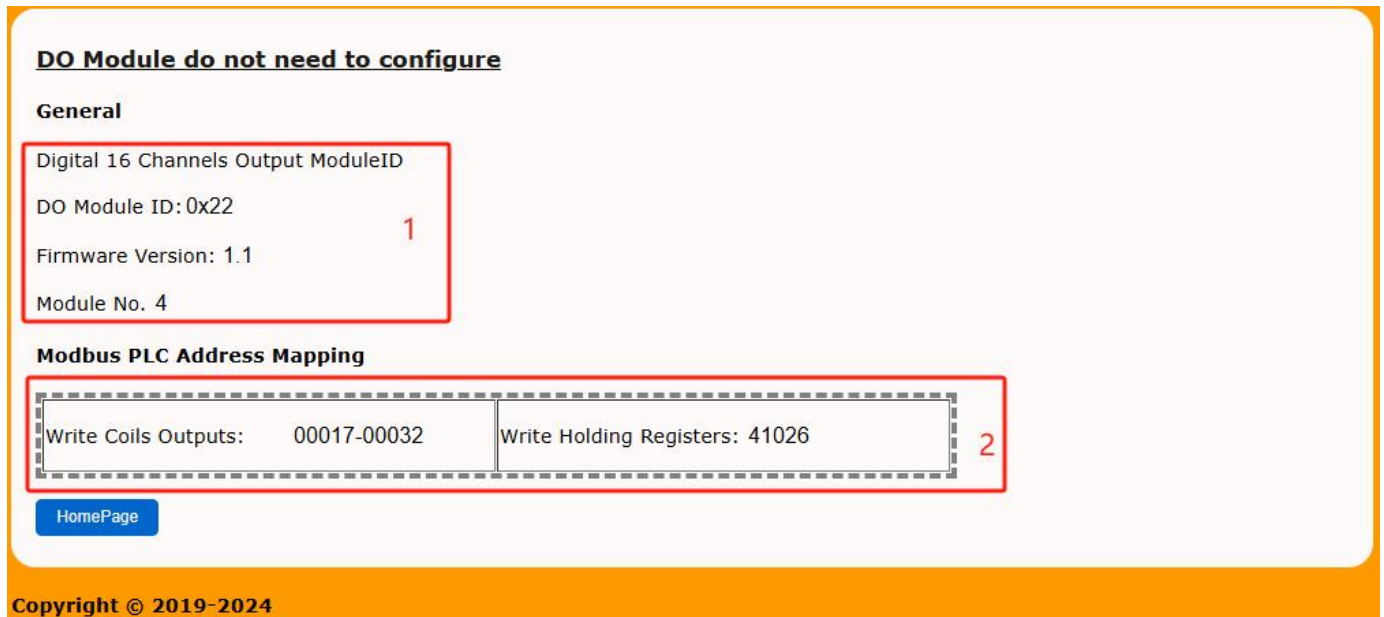
HomePage

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➢ The module name, module ID, firmware version and serial number of the module in the application are shown in area 1.

➢ The module address mapping area is shown in Area 2.

➢ Click **HomePage** to return to main page.

6 16 Channel Digital NPN Output Module Configuration

➢ Click DO16N_MOD You can access the configuration of the operating parameters of this type of module, as shown in the following figure.

DO Module do not need to configure

General

Digital 16 Channels Output ModuleID

DO Module ID: 0x22

Firmware Version: 1.1

Module No. 4

1

Modbus PLC Address Mapping

Write Coils Outputs: 00017-00032   Write Holding Registers: 41026
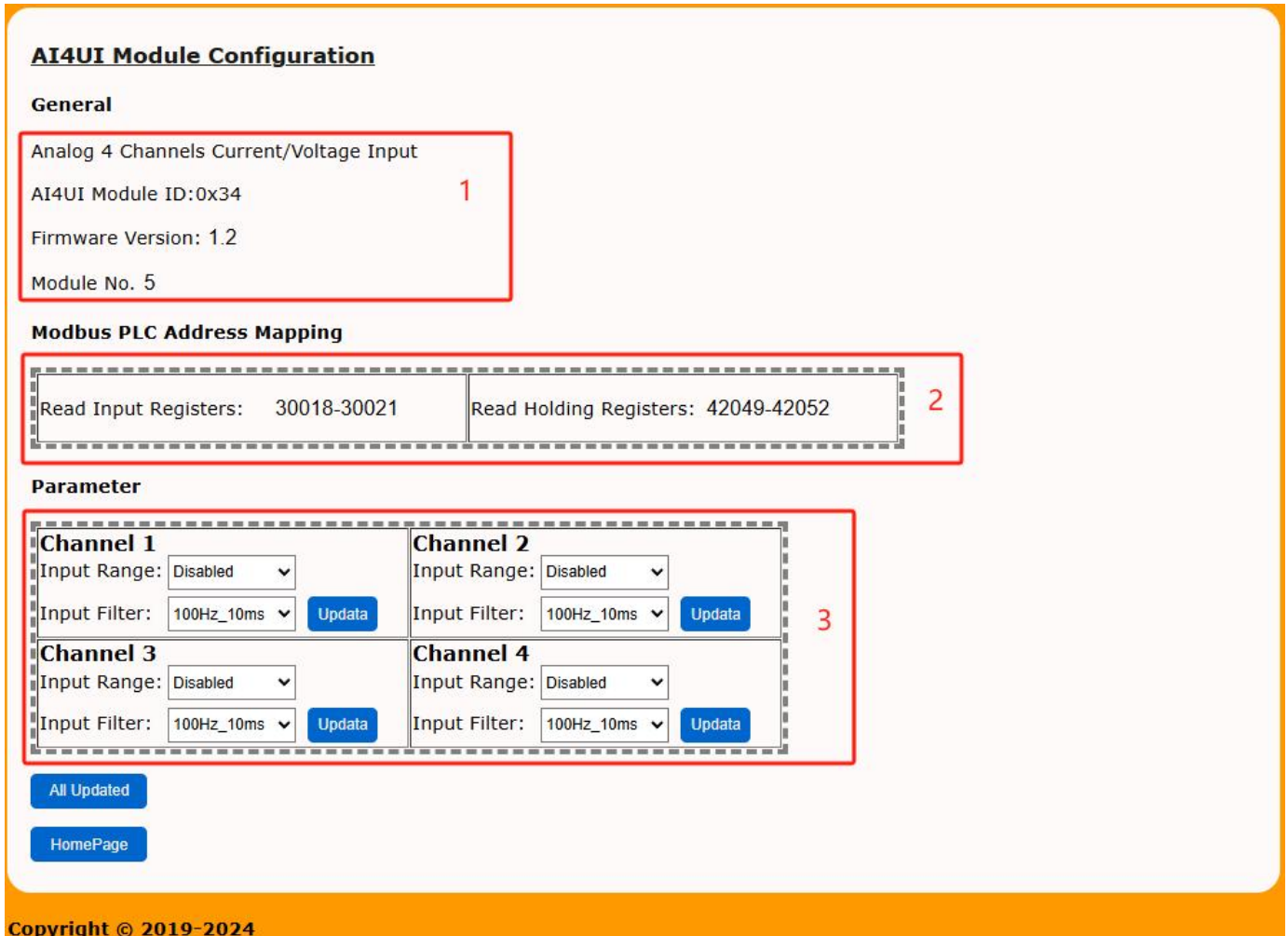
2

HomePage

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➢ The module name, module ID, firmware version and serial number of the module in the application are shown in area 1.

➢ In zone 2 the module address mapping area is shown.

➢ Click HomePage to return to the home page.

7 4 Channel Analog Voltage Type/Current Type Input Module Configuration

➢ Click [AI4UI_MOD] You can enter the running parameters configuration of this type of module, as shown in the following figure.

➢ The module name, module ID, firmware version and serial number of the module in the application are shown in area 1.

➢ In area 2 the module address mapping area is shown.

➢ In area 3, the operating parameters of module channels 1 to 4 can be set, and each channel can be independently configured with input ranges (Disabled、-10V~+10V、0V~+10V、+2V~+10V、-5V~+5V、0V~+5V、+1V~+5V、0-20mA and 4-20mA)and filtering parameters(1KHz_1ms、500Hz_2ms、250Hz_4ms、125Hz_8ms、100Hz_10ms and 50Hz_20ms)。

➢ Click [Updata] or [All Updated] to place a command to update the parameters, and click [HomePage] to return to the home page.

8 8Channel Analog Current Input Module Configuration

➢ Click [AI8I_MOD] You can enter the running parameters configuration of this type of module, as shown in the following figure.

➢ The module name, module ID, firmware version and serial number of the module in the application are shown in area 1.

➢ In area 2 the module address mapping area is shown.

➢ In area 3 the operating parameters of module channels 1 to 8 can be set, each channel can be independently configured with input ranges independently for each channel.(Disabled、0-20mA and 4-20mA) and filtering parameters(1KHz_1ms、500Hz_2ms、250Hz_4ms、125Hz_8ms、100Hz_10ms and 50Hz_20ms)。

➢ Click [Updata] or [All Updated] to place a command to update the parameters, and click [HomePage] to return to the home page.

9 8 Channel Analog Voltage Input Module Configuration

➢ Click **AI8U_MOD** You can access the configuration of the operating parameters of this type of module, as shown in the following figure.

➢ The module name, module ID, firmware version and serial number of the module in the application are shown in area 1.

➢ In area 2 the module address mapping area is shown.

➢ In area 3 the operating parameters of module channels 1 to 8 can be set, each channel can be independently configured with input ranges independently for each channel.(Disabled、0-20mA and 4-20mA) and filtering parameters(1KHz_1ms、500Hz_2ms、250Hz_4ms、125Hz_8ms、100Hz_10ms and 50Hz_20ms)。

➢ Click **Updata** or **All Updated** to place a command to update the parameters, and click **HomePage** to return to the home page.

10 4 Channel Analog Voltage Type/Current Type Output Module Configuration

➢ Click AO4UI_MOD You can access the configuration of the operating parameters of this type of module, as shown in the following figure.

AO4UI Module Configuration

General

Analog 4 Channels Current/Voltage Output

AO4UI Module ID:0x44

Firmware Version: 1.1

Module No. 8

1

Modbus PLC Address Mapping

Write Holding Registers: 40002-40005

2

Parameter
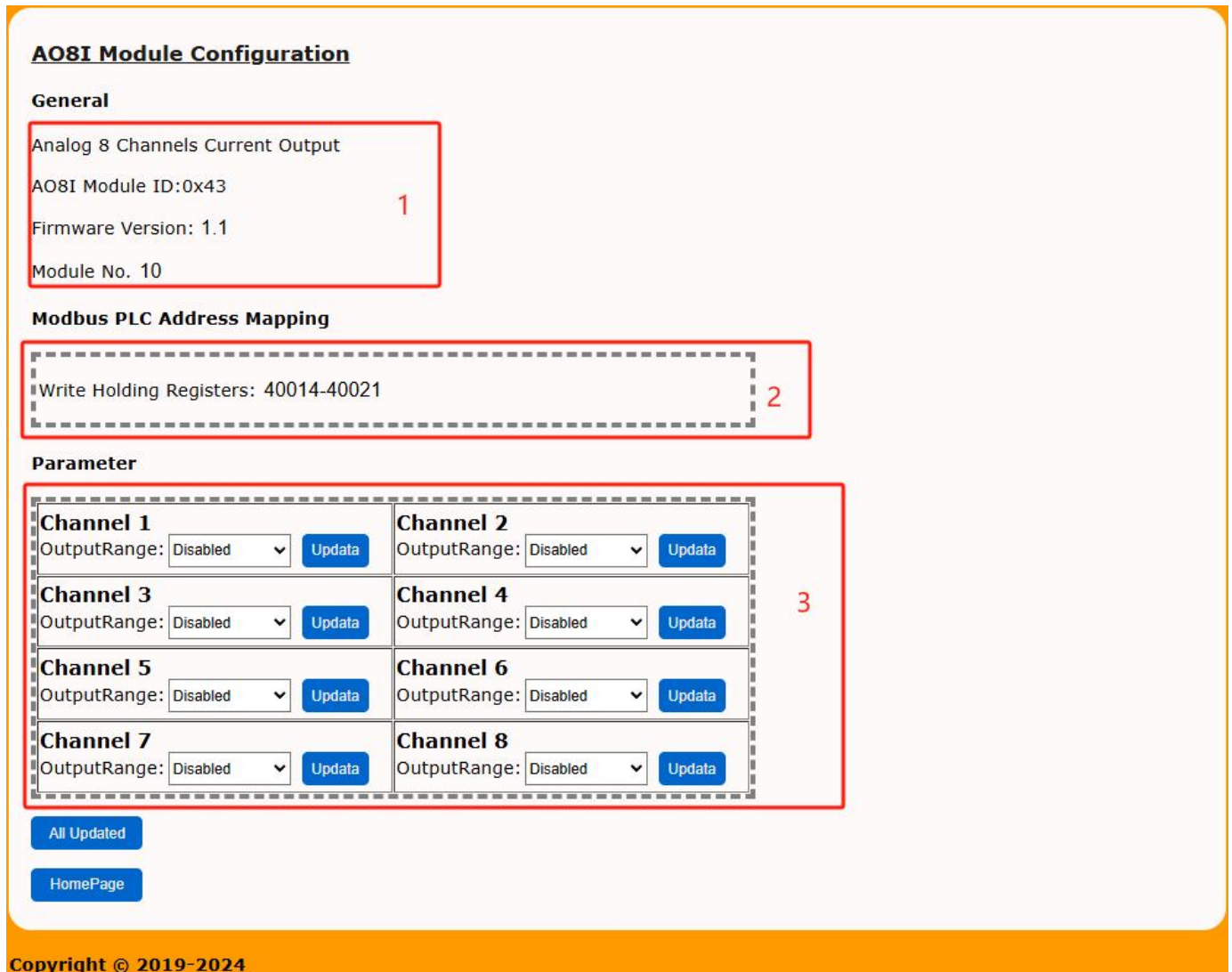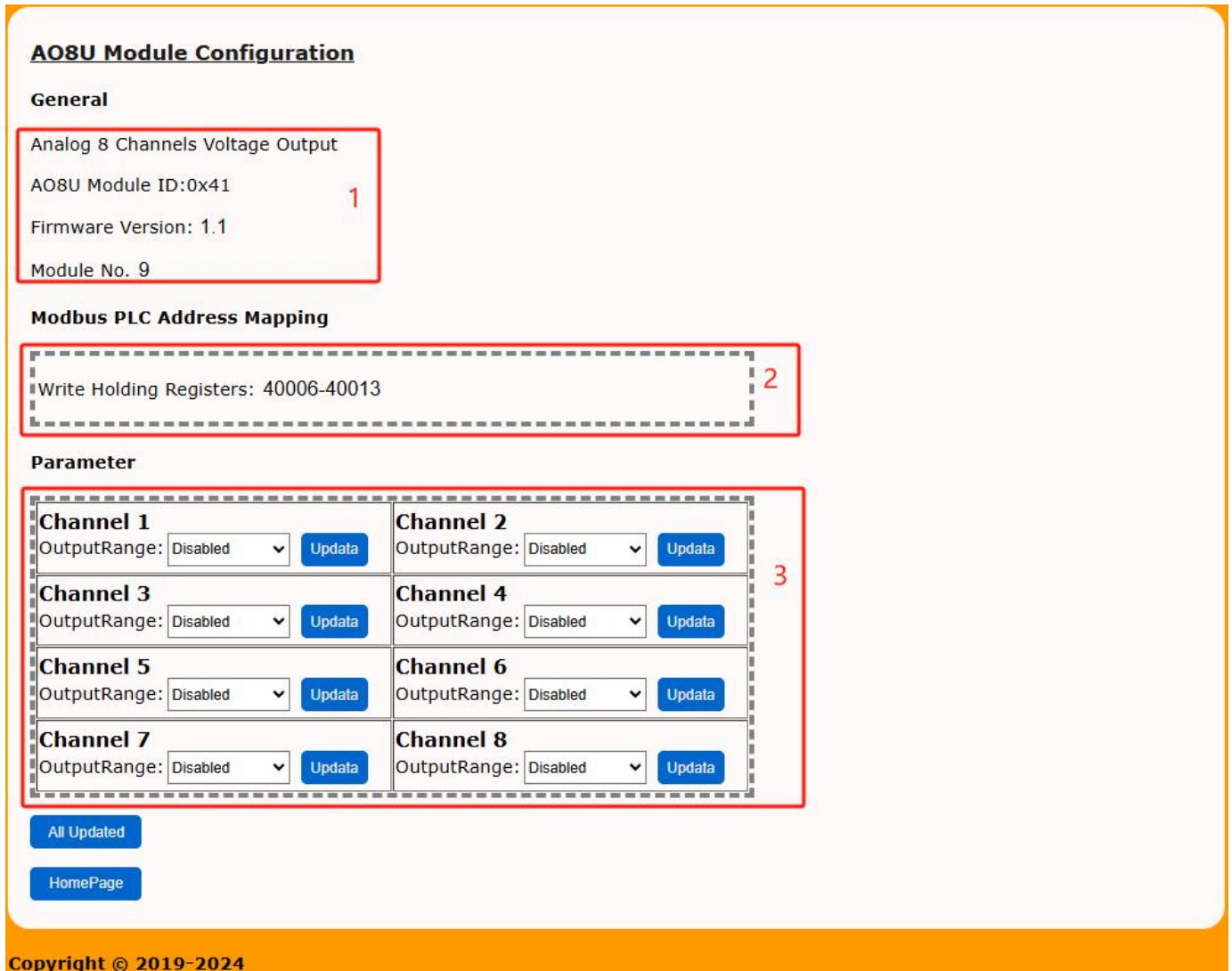
Channel 1
OutputRange: Disabled   Updata

Channel 2
OutputRange: Disabled   Updata

Channel 3
OutputRange: Disabled   Updata

Channel 4
OutputRange: Disabled   Updata
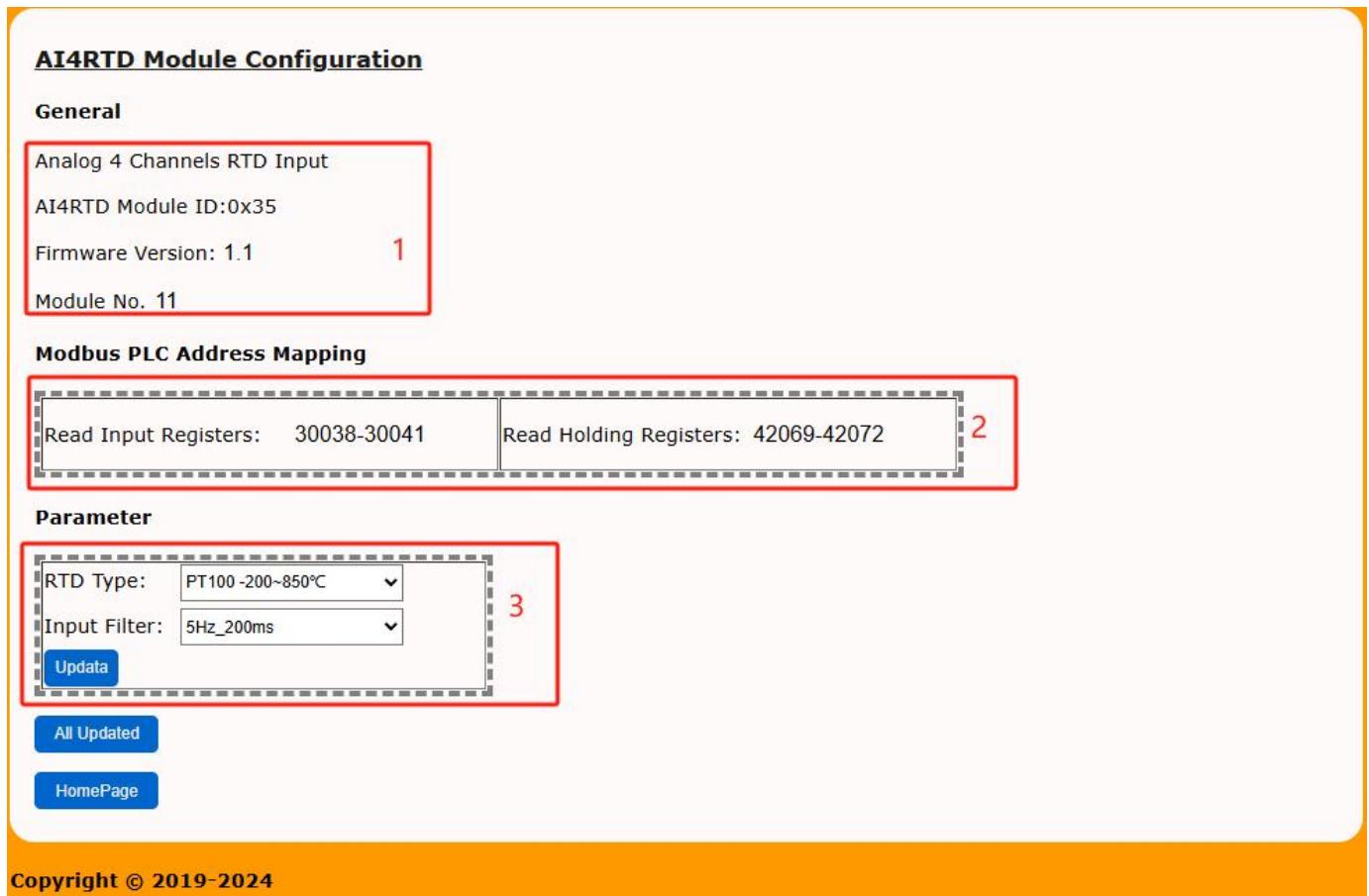
3

All Updated

HomePage

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➢ The module name, module ID, firmware version and serial number of the module in the application are shown in area 1.

➢ In area 2 the module address mapping area is shown.

➢ In Zone 3, you can set the operating parameters of module channels 1 to 4. Each channel can be independently configured with output ranges (Disabled, -10V~+10V, 0V~+10V, +2V~+10V, -5V~+5V, 0V~+5V, +1V~+5V, 0-20mA and 4-20mA).

➢ Click Updata or All Updated to place a command to update the parameters, and click HomePage to return to the home page.

11 8Channel Analog Current Type Output Module Configuration

➢ Click [AO8I_MOD] You can access the configuration of the operating parameters of this type of module, as shown in the following figure.

➢ The module name, module ID, firmware version and serial number of the module in the application are shown in area 1.

➢ In area 2 the module address mapping area is shown.

➢ The operating parameters for module channels 1 through 8 can be set in zone 3, and each channel can be independently configured for output ranges (Disabled, 0-20mA, and 4-20mA).

➢ Click [Updata] or [All Updated] to place a command to update the parameters, and click [HomePage] to return to the home page.

12 8Channel Analog Voltage Type Output Module Configuration

➢ Click [AO8U_MOD] You can access the configuration of the operating parameters of this type of module, as shown in the following figure.

➢ The module name, module ID, firmware version and serial number of the module in the application are shown in area 1.

➢ In area 2 the module address mapping area is shown.

➢ The operating parameters of module channels 1 to 8 can be set in Zone 3, and each channel can be independently configured with output ranges (Disabled, -10V~+10V, 0V~+10V, +2V~+10V, -5V~+5V, 0V~+5V and +1V~+5V).

➢ Click [Updata] or [All Updated] to place a command to update the parameters, and click [HomePage] to return to the home page.

13 4Channel RTD Measurement Module Configuration

➢ Click AI4RTD_MOD You can access the configuration of the operating parameters of this type of module, as shown in the following figure.

AI4RTD Module Configuration

General

Analog 4 Channels RTD Input
AI4RTD Module ID:0x35
Firmware Version: 1.1   1
Module No. 11

Modbus PLC Address Mapping

Read Input Registers: 30038-30041 | Read Holding Registers: 42069-42072   2

Parameter
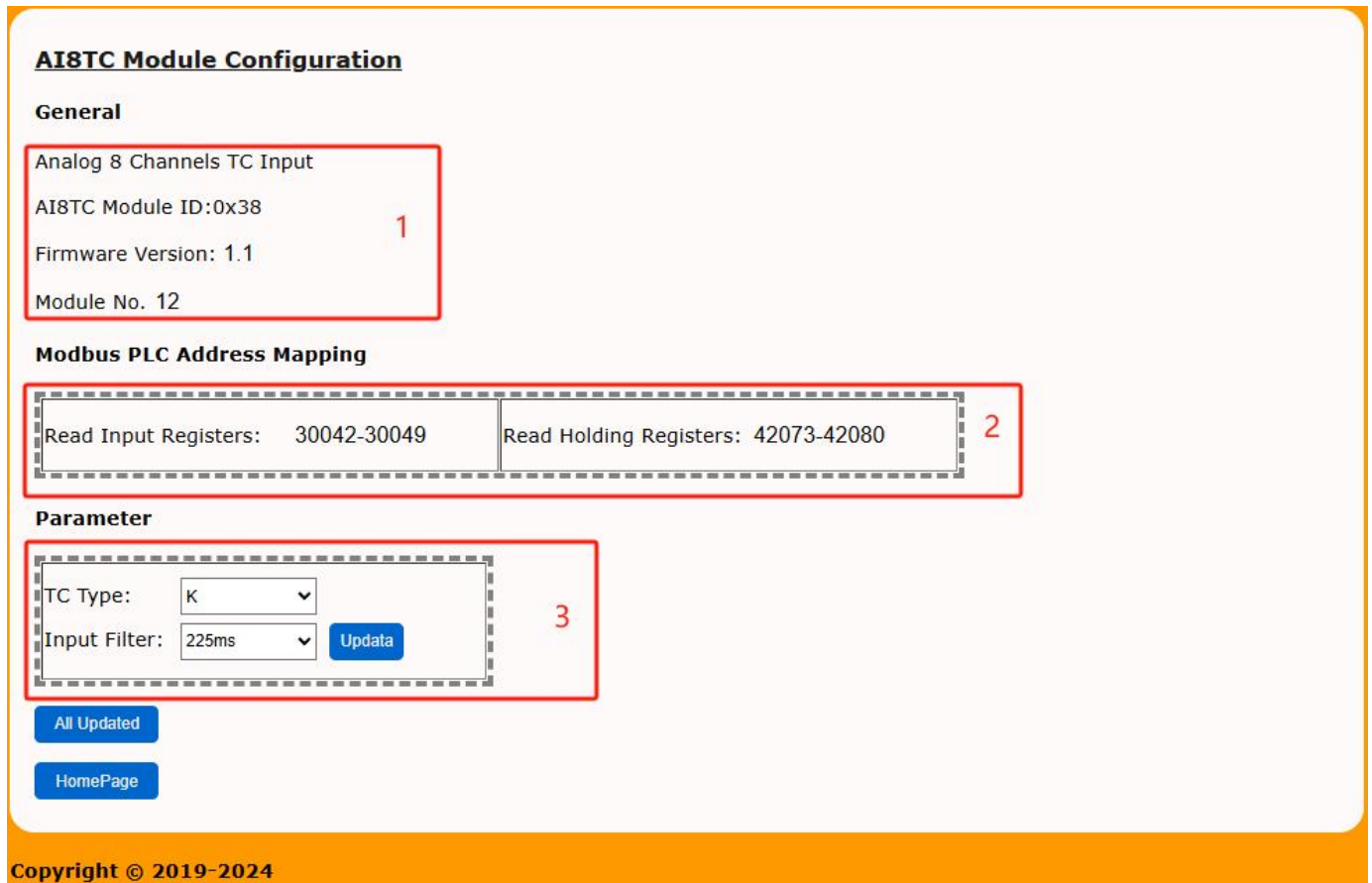
RTD Type: PT100 -200~850℃
Input Filter: 5Hz_200ms   3
Updata

All Updated

HomePage

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➢ The module name, module ID, firmware version and serial number of the module in the application are shown in area 1.

➢ In area 2 the module address mapping area is shown.

➢ The operating parameters of module channels 1 to 4 can be set in zone 3. All channels are simultaneously configured with RTD type (PT100 -200~850℃.... ...NTC-10K 25~150℃) and filter parameters (1.25Hz_800ms, 2.5Hz_400ms, 5Hz_200ms and 7.5Hz_133ms).

➢ Click Updata or All Updated to place a command to update the parameters, and click HomePage to return to the home page.

14 8Channel Thermocouple Measurement Module Configuration

➢ Click `AI8TC_MOD` You can access the configuration of the operating parameters of this type of module, as shown in the following figure.

AI8TC Module Configuration

General

Analog 8 Channels TC Input

AI8TC Module ID:0x38

Firmware Version: 1.1

Module No. 12

1

Modbus PLC Address Mapping

Read Input Registers: 30042-30049 | Read Holding Registers: 42073-42080   **2**

Parameter

TC Type: K

Input Filter: 225ms   Updata   **3**

All Updated

HomePage

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➢ The module name, module ID, firmware version and serial number of the module in the application are shown in area 1.

➢ In area 2 the module address mapping area is shown.

➢ The operating parameters of the module channels 1 to 8 can be set in zone 3. All channels are simultaneously configured with RTD type (K... ±2000mV) and filter parameters (7200ms, 3600ms, 1800ms, 900ms, 450ms, 225ms, 122.5ms, and 61.25ms).

➢ Click `Updata` or `All Updated` to place a command to update the parameters, and click `HomePage` to return to the home page.

15 2 Channel Encoder Pulse Counting 24VDC Module Configuration

➢ Click CNT24_MOD You can access the configuration of the operating parameters of this type of module, as shown in the following figure.

CNT Module Configuration

General

Digital 2 Channels Counter ModuleID

CNT Module ID: 0x81

Firmware Version: 1.1   **1**

Module No. 13

Modbus PLC Address Mapping

Read Input Registers: 30050-30059   Write Holding Registers: 40022-40027

Read Holding Registers: 42081-42090   Write Holding Registers: 40022-40027   **2**

Parameter

Channel 1
SignalMode:	Rotary transducer quadruple ∨
DI Function:	Disabled ∨
A Phase Filter:	100KHz ∨
B Phase Filter:	100KHz ∨
Dir Logic:	Positive logic ∨
CountMode:	Line Counter ∨
CompFunction:	Disabled ∨
BusErrState:	Continue counting ∨
UpperLimit:	2147483647
LowerLimit:	-2147483648

Updata

Channel 2   **3**
SignalMode:	Rotary transducer quadruple ∨
DI Function:	Disabled ∨
A Phase Filter:	100KHz ∨
B Phase Filter:	100KHz ∨
Dir Logic:	Positive logic ∨
CountMode:	Line Counter ∨
CompFunction:	Disabled ∨
BusErrState:	Continue counting ∨
UpperLimit:	2147483647
LowerLimit:	-2147483648

Updata

All Updated

HomePage

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➢ The module name, module ID, firmware version and serial number of the module in the application are shown in area 1.

➢ In area 2 the module address mapping area is shown.

➢ In zone 3 you can set the operating parameters for module channels 1 to 2, each channel can be configured independently with the parameters shown in the table below.

➢ Click Updata or All Updated to place a command to update the parameters, and click HomePage to return to the home page.

Configuration Item	Parameter Meaning	Note
Signal mode Input signal mode	0:Rotary transducer single(quadrature encoded 1 octave) 1:Rotary transducer double(quadrature encoded 2 octave) 2:Rotary transducer quadurpe((quadrature encoded 4 octave) 3:Pulse and Directions(Pulse plus direction) 4：CW/CCW(Not supported yet)	
DI Signal	0:Disable	

Function DI signal function	1:Rising edge capture (Rising Edge Signal Latching) 2:Falling edge capture (Falling Edge Signal Latch) 3:Bilateral edge capture (Bilateral Latch along the Signal) 4:Rising edge reset (Rising Edge Signal Reset) 5:Falling edge reset (Falling Edge Signal Reset) 6:Bilateral edge reset (Bilateral Reset along the Signal)	
Filter time Signal A Phase A Signal filtering configuration	0:4MHZ 1:1.5MHZ 2:1MHZ 3:800KHZ 4:600KHZ 5:420KHZ 6:315KHZ 7:250KHZ 8:200KHZ 9:160KHZ 10:120KHZ 11:100KHZ 12:75KHZ	Note 1
Filter time Signal B Phase B Signal filtering configuration	0:4MHZ 1:1.5MHZ 2:1MHZ 3:800KHZ 4:600KHZ 5:420KHZ 6:315KHZ 7:250KHZ 8:200KHZ 9:160KHZ 10:120KHZ 11:100KHZ 12:75KHZ	Note 1
Encoder Count Direction Signal input Directional logic	0:Positon Direction A(Positive logic) 1:Positon Direction B(Negative Logic)	Note 2
SignalFilter Setting Counting method	0:Line Counter(Linear Count) 1:Ring Counter (Ring Count)	
Comparision Function Location comparison Function enabled	0:Disable 1:Enable	
Behavious on field bus error Bus anomalies Counting actions	0:Continue counting(Continue Counting) 1:Hold last value(Keep Current Count) 2:Clear last value（Stop counting and count zero)	
Upper limit Ring counting Upper limit	-2147483648~ 2147483647	Note 3
Lower limit Ring counting Lower limit value	-2147483648~ 2147483647	

- ➢ Note 1: This configuration item is invalid when the signal is pulse plus direction.

- ➢ Note 2: Positive logic: Quadrature coding input, A-phase overruns B-phase by 90 degrees for positive rotation, pulse plus direction input, direction input with high valid signal for positive rotation. Negative logic: Quadrature coded input, phase B exceeds phase A by 90 degrees for positive rotation, pulse plus direction input, direction input with low valid signal or empty for positive rotation.

- ➢ Note 3: For example, if the upper and lower limit values are set to 5 and -5 respectively in cyclic mode, then the upward count is -5, -4, -3, -2, -1, 0, 1, 2, 3, 4, -5, -4 ..... The downward count is -5, 4, 3, 2, 1, 0, -1, -2, -3, -4, -5, 4 .....

16 2Channel Encoder Pulse Counting 5VDC Module Configuration

➢ Click **CNT5_MOD** You can access the configuration of the operating parameters of this type of module, as shown in the following figure.

➢ The module name, module ID, firmware version and serial number of the module in the application are shown in area 1.

➢ In area 2 the module address mapping area is shown.

➢ In zone 3 you can set the operating parameters for module channels 1 to 2, each channel can be configured independently with the parameters shown in the table below.

➢ Click **Updata** or **All Updated** to place a command to update the parameters, and click **HomePage** to return to the home page.

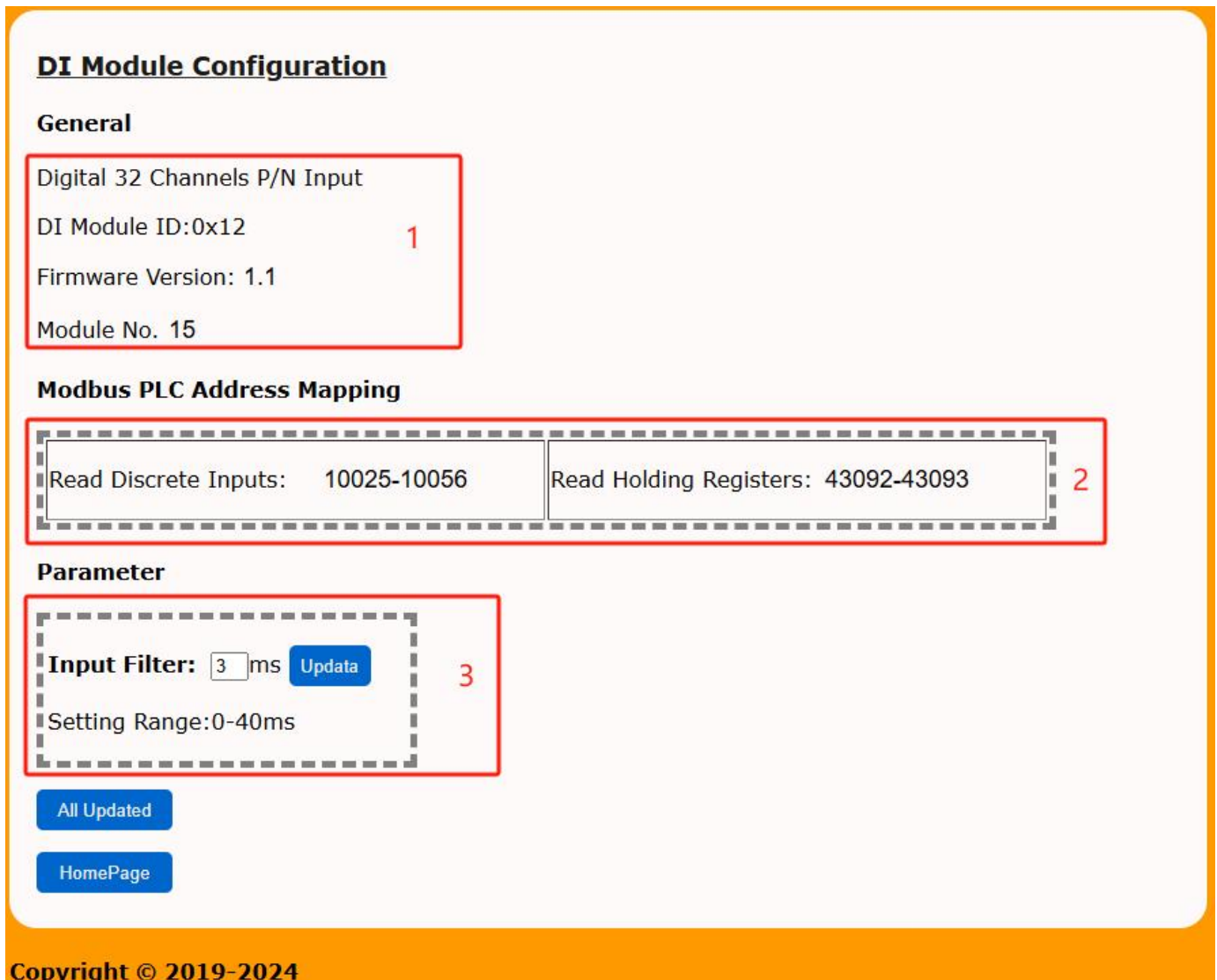| Configuration Item	Parameter Meaning	Note
Signal mode Input signal mode	0:Rotary transducer single(quadrature encoded 1 octave) 1:Rotary transducer double(quadrature encoded 2 octave) 2:Rotary transducer quadurpe(quadrature encoded 4 octave) 3:Pulse and Directions(Pulse plus direction) 4：CW/CCW(Not supported yet)	
DI Signal	0:Disable	

Function DI signal function	1:Rising edge capture(Rising Edge Signal Latching) 2:Falling edge capture(Falling Edge Signal Latch) 3:Bilateral edge capture(Bilateral Latch along the Signal) 4:Rising edge reset(Rising Edge Signal Reset) 5:Falling edge reset(Falling Edge Signal Reset) 6:Bilateral edge reset（Reset along the signal bilaterally）	
Filter time Signal A Phase A Signal filtering configuration	0:4MHZ 1:1.5MHZ 2:1MHZ 3:800KHZ 4:600KHZ 5:420KHZ 6:315KHZ 7:250KHZ 8:200KHZ 9:160KHZ 10:120KHZ 11:100KHZ 12:75KHZ	Note 1
Filter time Signal B Phase B Signal filtering configuration	0:4MHZ 1:1.5MHZ 2:1MHZ 3:800KHZ 4:600KHZ 5:420KHZ 6:315KHZ 7:250KHZ 8:200KHZ 9:160KHZ 10:120KHZ 11:100KHZ 12:75KHZ	Note 1
Encoder Count Direction Signal input Directional logic	0:Positon Direction A(Positive logic) 1:Positon Direction B(Negative Logic)	Note 2
SignalFilter Setting Counting method	0:Line Counter(Linear Count) 1:Ring Counter (Ring Count)	
Comparision Function Location comparison Function enabled	0:Disable 1:Enable	
Behavious on field bus error Bus anomalies Counting actions	0:Continue counting(Continue Counting) 1:Hold last value(Keep Current Count) 2:Clear last value(Stop counting and count to zero)	
Upper limit Ring counting Upper limit	-2147483648~ 2147483647	注 3
Lower limit Ring counting Lower limit value	-2147483648~ 2147483647	

➢ Note 1: This configuration item is invalid when the signal is pulse plus direction.

➢ Note 2: Positive logic: Quadrature coding input, phase A exceeds phase B by 90 degrees for positive rotation, pulse plus direction input, direction input with high valid signal for positive rotation. Negative logic: Quadrature coding input, phase B exceeds phase A by 90 degrees for positive rotation, pulse plus direction input, direction input with low valid signal or empty for positive rotation.

➢ Note 3: For example, if the upper and lower limit values are set to 5 and -5 respectively in cyclic mode, then the upward count is -5, -4, -3, -2, -1, 0, 1, 2, 3, 4, -5, -4 ..... The downward count is -5, 4, 3, 2, 1, 0, -1, -2, -3, -4, -5, 4 .....

17 32 Channel Digital PNP & NPN Input Module Configuration

➢ Click DI32_MOD You can access the configuration of the operating parameters of this type of

module, as shown in the following figure.
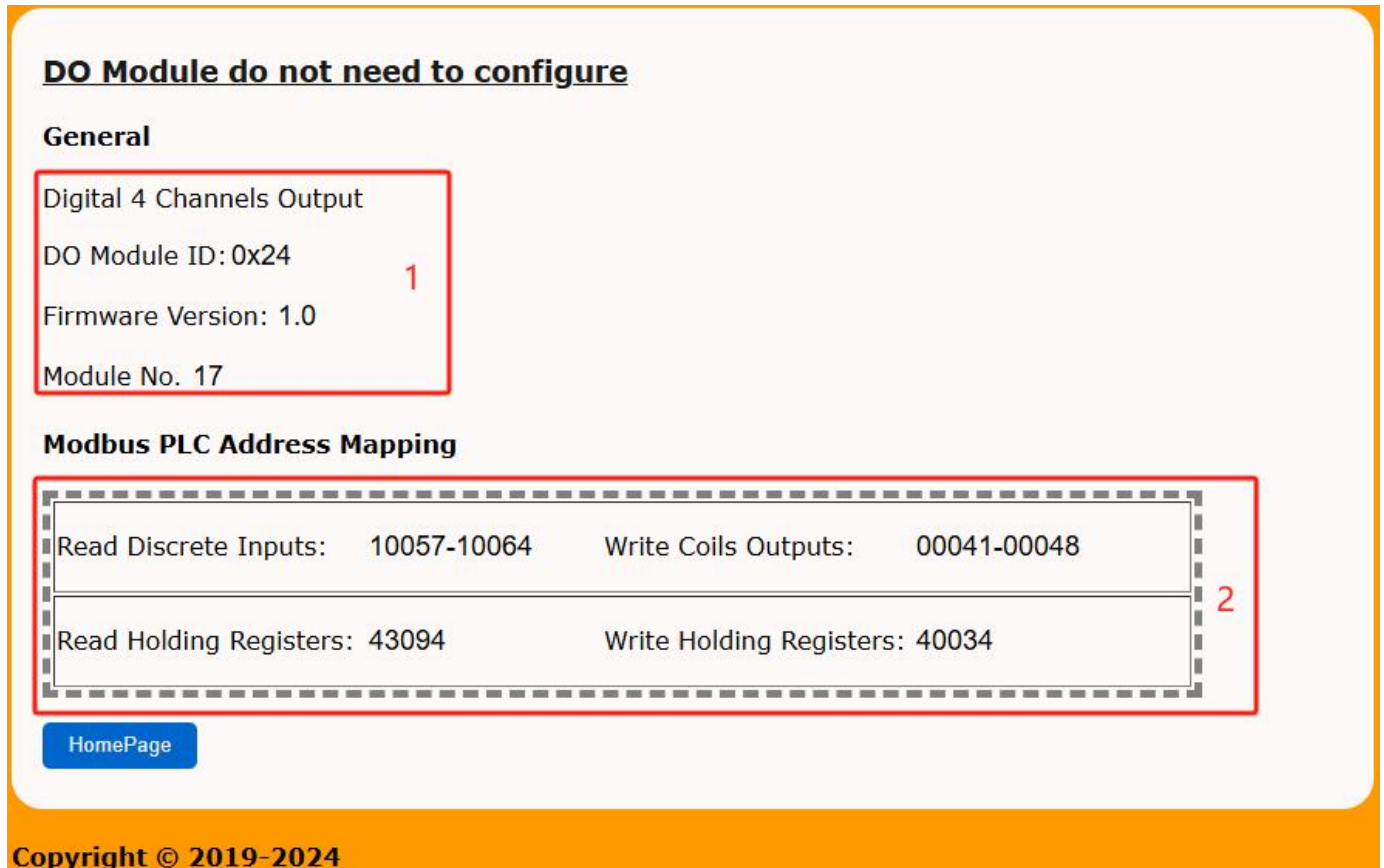

- ➢ The module name, module ID, firmware version and serial number of the module in the application are shown in area 1.
- ➢ In area 2 the module address mapping area is shown.
- ➢ The filtering parameters of the module can be set in zone 3 with a setting range of 0-40ms.
- ➢ Click Updata or All Updated to place a command to update the parameters, and click HomePage to return to the home page.

18 4 Channel Relay Output Module Configuration

➤ The module has no configurable runtime parameters, and clicking on one of the DO4R_MOD Once entered, it is shown below.

DO Module do not need to configure

General

Digital 4 Channels Output

DO Module ID: 0x20

Firmware Version: 1.0   1

Module No. 4

Modbus PLC Address Mapping

Write Coils Outputs: 00033-00040   Write Holding Registers: 41027   2
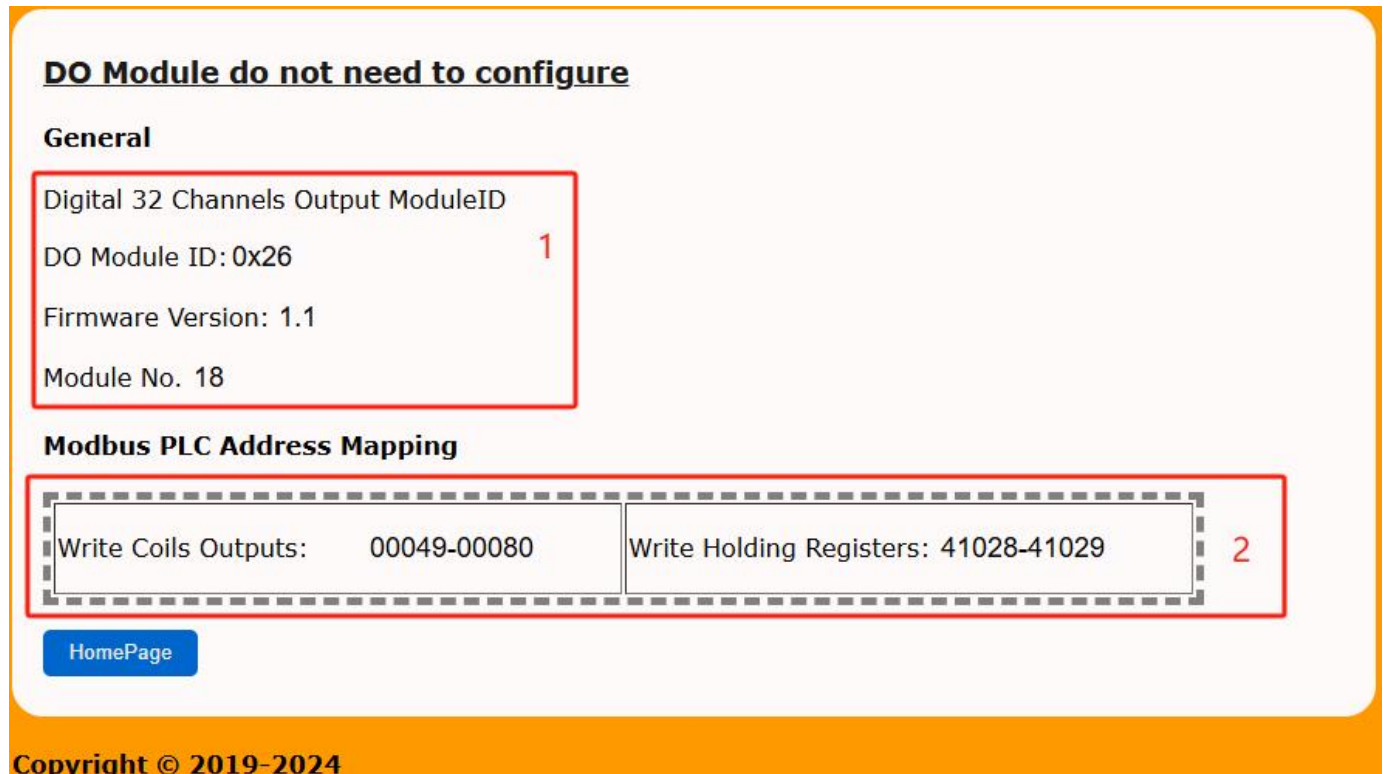
HomePage

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➤ The module name, module ID, firmware version and serial number of the module in the application are shown in area 1.

➤ In area 2 the module address mapping area is shown.

➤ Click HomePage to return to the home page.

19 4 Channel Digital PNP/2A Output Module Configuration

➢ The module has no configurable runtime parameters, and clicking on one of the DO4P_MOD Once entered, it is shown below.

➢ The module name, module ID, firmware version and serial number of the module in the application are shown in area 1.

➢ In area 2 the module address mapping area is shown.

➢ Click HomePage to return to the home page.

20 32 Channel Digital NPN Output Module Configuration

➢ The module has no configurable runtime parameters, and clicking on one of the **DO32N_MOD** Once entered, it is shown below.

DO Module do not need to configure

General

Digital 32 Channels Output ModuleID

DO Module ID: 0x26   1

Firmware Version: 1.1

Module No. 18

Modbus PLC Address Mapping

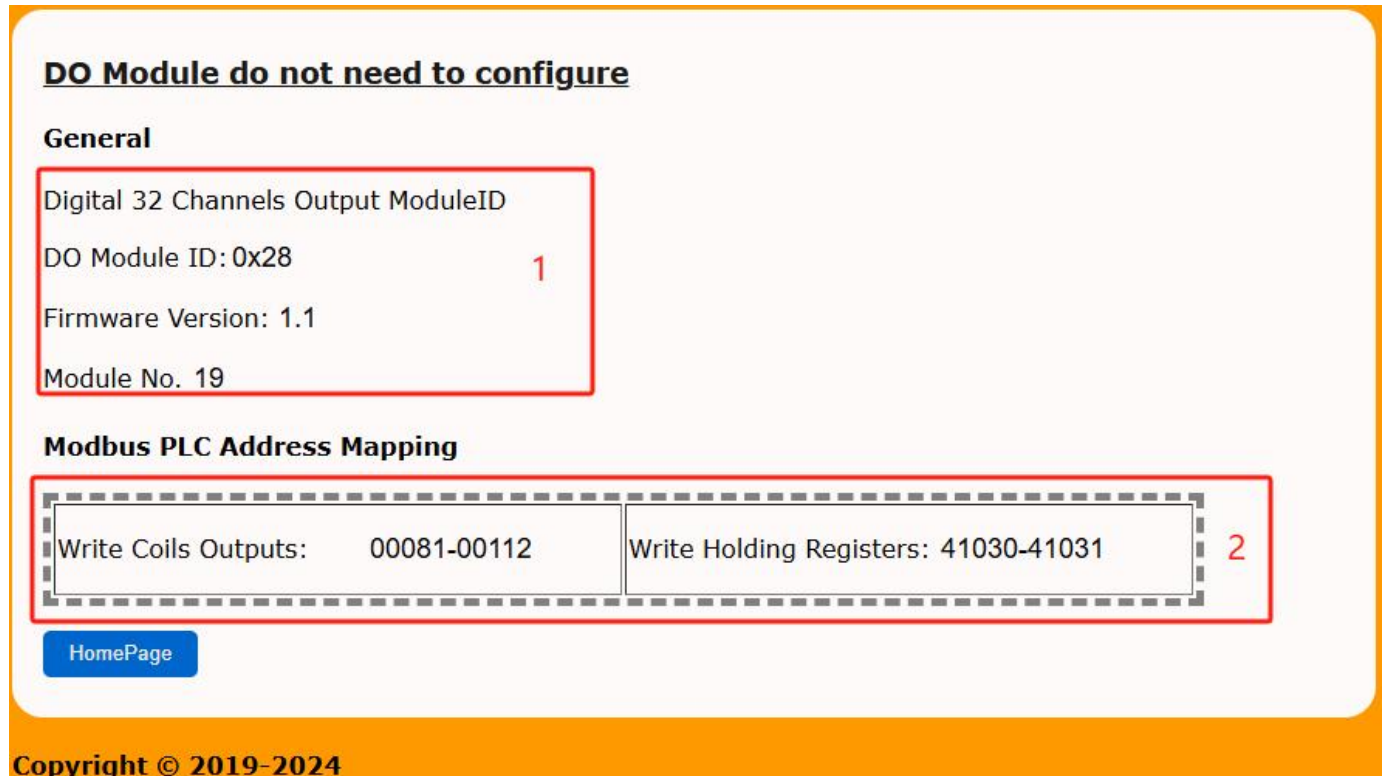| Write Coils Outputs: 00049-00080 | Write Holding Registers: 41028-41029 | 2 |

HomePage

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➢ The module name, module ID, firmware version and serial number of the module in the application are shown in area 1.

➢ In area 2 the module address mapping area is shown.

➢ Click HomePage to return to the home page.

21 32 Channel Digital PNP Output Module Configuration

➢ The module has no configurable runtime parameters, and clicking on one of the DO32P_MOD Once entered, it is shown below.

DO Module do not need to configure

General

Digital 32 Channels Output ModuleID

DO Module ID: 0x28

Firmware Version: 1.1   1

Module No. 19

Modbus PLC Address Mapping

Write Coils Outputs: 00081-00112   Write Holding Registers: 41030-41031   2

HomePage

➢ The module name, module ID, firmware version and serial number of the module in the application are shown in area 1.

➢ In area 2 the module address mapping area is shown.

➢ Click HomePage to return to the home page.

22 16 Channel Input 16 Channel Output Digital NPN Module Configuration

➢ Click **DIO16N_MOD** You can enter the running parameters configuration of this type of module, as shown in the following figure.

DIO Module Configuration

General

Digital 16 Channels Input&Output ModuleID

DIO Module ID: 0x54

Firmware Version: 1.1

Module No. 20

1

Modbus PLC Address Mapping

Read Discrete Inputs: 10065-10080   Write Coils Outputs: 00113-00128

Read Holding Registers: 43095   Write Holding Registers: 40035

2

Parameter

Input Filter: 3 ms [Updata]

Setting Range:0-40ms

3

[All Updated]

[HomePage]

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➢ The module name, module ID, firmware version and serial number of the module in the application are shown in area 1.

➢ In area 2 the module address mapping area is shown.

➢ The filtering parameters of the module can be set in zone 3 with a setting range of 0-40ms.

➢ Click [Updata] or [All Updated] to place a command to update the parameters, and click [HomePage] to return to the home page.

23 16 Channel Input 16 Channel Output Digital PNP Module Configuration

➢ Click DIO16P_MOD You can enter the running parameters configuration of this type of module, as shown in the following figure.

DIO Module Configuration

General

Digital 16 Channels Input&Output ModuleID

DIO Module ID: 0x56

Firmware Version: 1.1

Module No. 21

1

Modbus PLC Address Mapping

Read Discrete Inputs: 10081-10096   Write Coils Outputs: 00129-00144

Read Holding Registers: 43096   Write Holding Registers: 40036

2

Parameter

Input Filter: [3] ms [Updata]

Setting Range:0-40ms

3

[All Updated]

[HomePage]

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➢ The module name, module ID, firmware version and serial number of the module in the application are shown in area 1.

➢ In area 2 the module address mapping area is shown.

➢ The filtering parameters of the module can be set in zone 3 with a setting range of 0-40ms.

➢ Click [Updata] or [All Updated] to place a command to update the parameters, and click [HomePage] to return to the home page.

V、 Address Layout Example

1 Address Layout Description

➢ The easiest way for users to confirm the corresponding register address and meaning of a module is to check the register address of each module through the webpage, and then match the registers with the "Data Structure Definition" under "Register Allocation Rules" in Chapter 3 to confirm the meaning of the corresponding registers of the module. Then you can confirm the meaning of the corresponding registers of the module.

➢ The Modbus address mapping table varies according to the combination of IO modules. There are two ways to map the address of IO modules mounted on the back of the DF50-C-MD-TCP.

➢ One way is that DI is mapped to zone 1 (10001~11032), DO is mapped to zone 0 (00001~01024), AI is mapped to zone 3 (30001~31024), and AO is mapped to zone 4 (40001~41024), as shown in the following table.

Model	Data Description	Function Code	Register Address	Register Length	Read/Write Attributes
DF50-C-MD-TCP	8-channel input data	02	10001~11032	8	Read-Only
DF50-M-16DI-P/N	16 channels of input data	02	10001~11032	16	Read-Only
DF50-M-16DI-P/N-TS	Input Data	04	30001~31024	17	Read Only
	Output Data	03/06/16	40001~41024	1	Read-Write
DF50-M-16DO-P	16-channel output data	05/15	00001~01024	16	Read-Write
DF50-M-16DO-N	16 channels of output data	05/15	00001~01024	16	Read-Write
DF50-M-4AI-UI-6	4-channel input data	04	30001~31024	4	Read Only
DF50-M-8AI-U-4	8-channel input data	04	30001~31024	8	Read Only
DF50-M-8AI-I-5	8-channel input data	04	30001~31024	8	Read Only
DF50-M-4AO-UI-6	4-channel output data	03/06/16	40001~41024	4	Read-Write
DF50-M-8AO-U-4	8-channel output data	03/06/16	40001~41024	8	Read-Write
DF50-M-8AO-I-5	8-channel output data	03/06/16	40001~41024	8	Read-Write
DF50-M-4RTD-PT	4-channel input data	04	30001~31024	4	Read Only
DF50-M-8TC	4-channel input data	04	30001~31024	8	Read Only
DF50-M-2CNT-PIL-24	Input Data	04	30001~31024	10	Read Only
	Output Data	03/06/16	40001~41024	6	Read/Write
DF50-M-2CNT-PIL-5	Input Data	04	30001~31024	10	Read Only
	Output data	03/06/16	40001~41024	6	Read-Write
DF50-M-32DI-P/N	32-channel input data	02	10001~11032	32	Read Only
DF50-M-4DOR	4-channel output data	05/15	00001~01024	4	Read-Write
DF50-M-4DO-P-2A	4-channel input data	02	10001~11032	8	Read Only
	Output data	05/15	00001~01024	8	Read-Write
DF50-M-32DO-N	32-channel output data	05/15	00001~01024	32	Read And Write
DF50-M-32DO-P	32-channel output data	05/15	00001~01024	32	Read-Write
DF50-M-16DI-16DO-N	16 channels of input data	02	10001~11032	16	Read Only
	16-channel output data	05/15	00001~01024	16	Read/Write
DF50-M-16DI-16DO-P	16-channel input data	02	10001~11032	16	Read Only
	16-channel output data	05/15	00001~01024	16	Read/Write
Diagnostic data	Input Data	04	31025~31125	101	Read-Only

DF50-C-MD-TCP + DF50-M-16DI-P/N + DF50-M-4AI-UI-6 + DF50-M-8AI-I-5 + DF50-M-8AI-U-4 + DF50-M-4RTD-PT + DF50-M-8TC + DF50-M-2CNT-PIL-24 + DF50-M- 2CNT-PIL-5 + DF50-M-4DOR + DF50-M-16DO-P + DF50-M-16DO-N + DF50-M-4AO-UI-6 + DF50-M-8AO-I-5 + DF50-M-8AO-U-4 topology as an example, the Modbus register address of each module is shown in the table, and the address of each module can be viewed on the web page. The addresses of each module can also be viewed on the web page.

Module	ID	Register Address	Register Type	Register Length	Read/ Write Attribute	Function Code	Data Description
DF50-C-MD-TCP	/	10001-10008	Discrete Volume Registers	8	Read-Only	02	Channel 1~Channel 8 Input Data
DF50-M-16DI-P/ N	0x11	10009~10024	Discrete Volume Register	16	Read-Only	02	Channel 1~Channel 16 Input Data
DF50-M-4AI-UI-6	0x34	30001~30004	Input Register	4	Read-Only	04	Channel 1~Channel 4 Input Data
DF50-M-8AI-I-5	0x33	30005~30012	Input Register	8	Read-Only	04	Channel 1~Channel 8 Input Data
DF50-M-8AI-U-4	0x41	30013~30020	Input Register	8	Read-Only	04	Channel 1~Channel 8 Input Data
DF50-M-4RTD-PT	0x35	30021~30024	Input Register	4	Read-Only	04	Channel 1~Channel 4 Input Data
DF50-M-8TC	0x38	30025~30032	Input Register	8	Read Only	04	Channel 1~Channel 8 Input Data
DF50-M-2CNT-PIL-24	0x81	40001	Holding Register	6	Read-Write	03/06/16	Channel 1 output control word
		40002					Channel 1 output comparison value high 16 bits
		40003					Channel 1 output compare value low 16 bits
		40004					Channel 2 output control word
		40005					Channel 2 output comparison value high 16 bits
		40006					Channel 2 output compare value low 16 bits
		30033	Input Register	10	Read-Only	04	Channel 1 input status word
		30034					Channel 1 input count value high 16 bits
		30035					Channel 1 input count value low 16 bits
		30036					Channel 1 input latch value high 16 bits
		30037					Channel 1 input latch value low 16 bits
		30038					Channel 2 input status word
		30039					Channel 2 input count value high 16 bits
		30040					Channel 2 input count value low 16 bits
		30041					Channel 2 input latch value high 16 bits
		30042					Channel 2 input latch value low 16 bits
DF50-M-2CNT-PI	0x80	40007	Holding	6	Read-Write	03/06/16	Channel 1 output control word

L-5		40008	Register				Channel 1 output comparison value high 16 bits
		40009					Channel 1 output compare value low 16 bits
		40010					Channel 2 Output Control Word
		40011					Channel 2 output compare value high 16 bits
		40012					Channel 2 output compare value low 16 bits
		30043	Input Registers	10	Read Only	04	Channel 1 input status word
		30044					Channel 1 input count value high 16 bits
		30045					Channel 1 input count value low 16 bits
		30046					Channel 1 input latch value high 16 bits
		30047					Channel 1 input latch value low 16 bits
		30048					Channel 2 input status word
		30049					Channel 2 input count value high 16 bits
		30050					Channel 2 input count value low 16 bits
		30051					Channel 2 input latch value high 16 bits
		30052					Channel 2 input latch value low 16 bits
DF50-M-4DOR	0x20	00001-00008	Coil Register	8	Read-Write	05/15	Channel 1~Channel 4 output data
DF50-M-16DO-P	0x23	00009-00024	Coil register	16	Read And Write	05/15	Channel 1~Channel 16 output data
DF50-M-16DO-N	0x22	00025-00040	Coil register	16	Read And Write	05/15	Channel 1~Channel 16 output data
DF50-M-4AO-UI-6	0x44	40013~40016	Holding Register	4	Read And Write	03/06/16	Channel 1~Channel 4 output data
DF50-M-8AO-I-5	0x43	40017~40024	Holding Register	8	Read And Write	03/06/16	Channel 1~Channel 8 output data
DF50-M-8AO-U-4	0x41	40025~40032	Holding Register	8	Read And Write	03/06/16	Channel 1~Channel 8 Output Data
System Diagnostic Information (101 registers)	/	31025	Input registers	1	Read Only	04	Reserved
		31026		1			Disconnected Output Attributes
		31027		1			Module Error Message
		31028~31059		32			Module type and firmware version information
		31060~31091		32			Module status information
		31092~31093		2			Configuration connection time
		31094-31125		32			Module response time

➤ In the other way, DI, DO, AI, AO, and special module addresses are mapped to zone 4, with DI mapped to 43073~44048, DO mapped to 41025~42048, AI mapped to 42049~43072, AO mapped to 40001~41024, and the special module mapped to 44049~45120 as shown in the table below.

Model	Data Description	Function Code	Register Address	Register Length	Read/Write Attributes
DF50-C-MD-TCP	8-channel input data	03	43073~44048	1	Read-Only
DF50-M-16DI-P/N	16 channels of input data	03	43073~44048	1	Read-Only
DF50-M-16DI-P/N-TS	Input Data	03	43073~44048	17	Read Only
	Output Data	03/06/16	40001~41024	1	Read-Write
DF50-M-16DO-P	16-channel output data	03/06/16	41025~42048	1	Read-Write
DF50-M-16DO-N	16 channels of output data	03/06/16	41025~42048	1	Read-Write
DF50-M-4AI-UI-6	4-channel input data	03	42049~43072	4	Read Only
DF50-M-8AI-U-4	8-channel input data	03	42049~43072	8	Read Only
DF50-M-8AI-I-5	8-channel input data	03	42049~43072	8	Read Only
DF50-M-4AO-UI-6	4-channel output data	03/06/16	40001~41024	4	Read-Write
DF50-M-8AO-U-4	8-channel output data	03/06/16	40001~41024	8	Read-Write
DF50-M-8AO-I-5	8-channel output data	03/06/16	40001~41024	8	Read-Write
DF50-M-4RTD-PT	4-channel input data	03	42049~43072	4	Read Only
DF50-M-8TC	4-channel input data	03	42049~43072	8	Read Only
DF50-M-2CNT-PIL-24	Input Data	03	42049~43072	10	Read Only
	Output Data	03/06/16	40001~41024	6	Read/Write
DF50-M-2CNT-PIL-5	Input Data	03	42049~43072	10	Read Only
	Output data	03/06/16	40001~41024	6	Read-Write
DF50-M-32DI-P/N	32-channel input data	03	43073~44048	2	Read Only
DF50-M-4DOR	4-channel output data	03/06/16	41025~42048	1	Read-Write
DF50-M-4DO-P-2A	4-channel input data	03	43073~44048	1	Read Only
	Output data	03/06/16	40001~41024	1	Read-Write
DF50-M-32DO-N	32-channel output data	03/06/16	41025~42048	2	Read And Write
DF50-M-32DO-P	32-channel output data	03/06/16	41025~42048	2	Read-Write
DF50-M-16DI-16DO-N	16 channels of input data	03	43073~44048	1	Read Only
	16-channel output data	03/06/16	40001~41024	1	Read/Write
DF50-M-16DI-16DO-P	16-channel input data	03	43073~44048	1	Read Only
	16-channel output data	03/06/16	40001~41024	1	Read/Write
Diagnostic data	Input Data	03	31025~31125	101	Read-Only

➢ DF50-C-MD-TCP + DF50-M-16DI-P/N + DF50-M-4AI-UI-6 + DF50-M-8AI-I-5 + DF50-M-8AI-U-4 + DF50-M-4RTD-PT + DF50-M-8TC + DF50-M-2CNT-PIL-24 + DF50-M-2CNT-PIL-5 + DF50-M-4DOR + DF50-M-16DO-P + DF50-M-16DO-N + DF50-M-4AO-UI-6 +

DF50-M-8AO-I-5 + DF50-M-8AO-U-4 topology as an example, the Modbus register address of each module is shown in the table.The address of each module can also be viewed via the web page..

Module	ID	Register Address	Register Type	Register Length	Read/Write Attribute	Function Code	Data Description
DF50-C-MD-TCP	/	43073	Holding Registers	1	Read-Only	03	Channel 1~Channel 8 Input Data
DF50-M-16DI-P/N	0x11	43074	Holding Registers	1	Read-Only	03	Channel 1~Channel 16 Input Data
DF50-M-4AI-UI-6	0x34	42049~42052	Holding Registers	4	Read-Only	03	Channel 1~Channel 4 Input Data
DF50-M-8AI-I-5	0x33	42053~42060	Holding Registers	8	Read-Only	03	Channel 1~Channel 8 Input Data
DF50-M-8AI-U-4	0x41	42061~42068	Holding Registers	8	Read-Only	03	Channel 1~Channel 8 Input Data
DF50-M-4RTD-PT	0x35	42069~42072	Holding Registers	4	Read-Only	03	Channel 1~Channel 4 Input Data
DF50-M-8TC	0x38	42073~42080	Holding Registers	8	Read Only	03	Channel 1~Channel 8 Input Data
DF50-M-2CNT-PIL-24	0x81	40001	Holding Registers	6	Read-Write	03/06/16	Channel 1 output control word
		40002					Channel 1 output comparison value high 16 bits
		40003					Channel 1 output compare value low 16 bits
		40004					Channel 2 output control word
		40005					Channel 2 output comparison value high 16 bits
		40006					Channel 2 output compare value low 16 bits
		42081	Holding Registers	10	Read-Only	03	Channel 1 input status word
		42082					Channel 1 input count value high 16 bits
		42083					Channel 1 input count value low 16 bits
		42084					Channel 1 input latch value high 16 bits
		42085					Channel 1 input latch value low 16 bits
		42086					Channel 2 input status word
		42087					Channel 2 input count value high 16 bits
		42088					Channel 2 input count value low 16 bits
		42089					Channel 2 input latch value high 16 bits
		42090					Channel 2 input latch value low 16 bits
DF50-M-2CNT-PIL-5	0x80	40007	Holding Registers	6	Read-Write	03/06/16	Channel 1 output control word
		40008					Channel 1 output comparison value high 16 bits
		40009					Channel 1 output compare value low 16 bits
		40010					Channel 2 Output Control Word
		40011					Channel 2 output compare value high 16 bits
		40012					Channel 2 output compare value low 16 bits

		42091	Holding Registers		Read Only		Channel 1 input status word
		42092					Channel 1 input count value high 16 bits
		42093					Channel 1 input count value low 16 bits
		42094					Channel 1 input latch value high 16 bits
		42095					Channel 1 input latch value low 16 bits
		42096		10		03	Channel 2 input status word
		42097					Channel 2 input count value high 16 bits
		42098					Channel 2 input count value low 16 bits
		42099					Channel 2 input latch value high 16 bits
		42100					Channel 2 input latch value low 16 bits
DF50-M-4DOR	0x20	41025	Holding Registers	1	Read-Write	03/06/16	Channel 1~Channel 4 output data
DF50-M-16DO-P	0x23	41026	Holding Registers	1	Read And Write	03/06/16	Channel 1~Channel 16 output data
DF50-M-16DO-N	0x22	41027	Holding Registers	1	Read And Write	03/06/16	Channel 1~Channel 16 output data
DF50-M-4AO-UI-6	0x44	40013~40016	Holding Registers	4	Read And Write	03/06/16	Channel 1~Channel 4 output data
DF50-M-8AO-I-5	0x43	40017~40024	Holding Registers	8	Read And Write	03/06/16	Channel 1~Channel 8 output data
DF50-M-8AO-U-4	0x41	40025~40032	Holding Registers	8	Read And Write	03/06/16	Channel 1~Channel 8 Output Data
System Diagnostic Information (101 registers)	/	44049	Input registers	1	Read Only	03	Reserved
		44050		1			Disconnected Output Attributes
		44051		1			Module Error Message
		44052~44083		32			Module type and firmware version information
		44084~44115		32			Module status information
		44116~44117		2			Configuration connection time
		44118~44149		32			Module response time

VI、 Software Configuration Description

1 CODESYS Configuration Process

This chapter introduces the use of the DF50-C-MD-TCP adapter using CODESYS V3.5 SP18 Patch 3 as the configuration software.

1.1. Project Creation

1.1.1. New Construction

➢ As shown in the figure below, create a new project, enter the project name and then create the project.
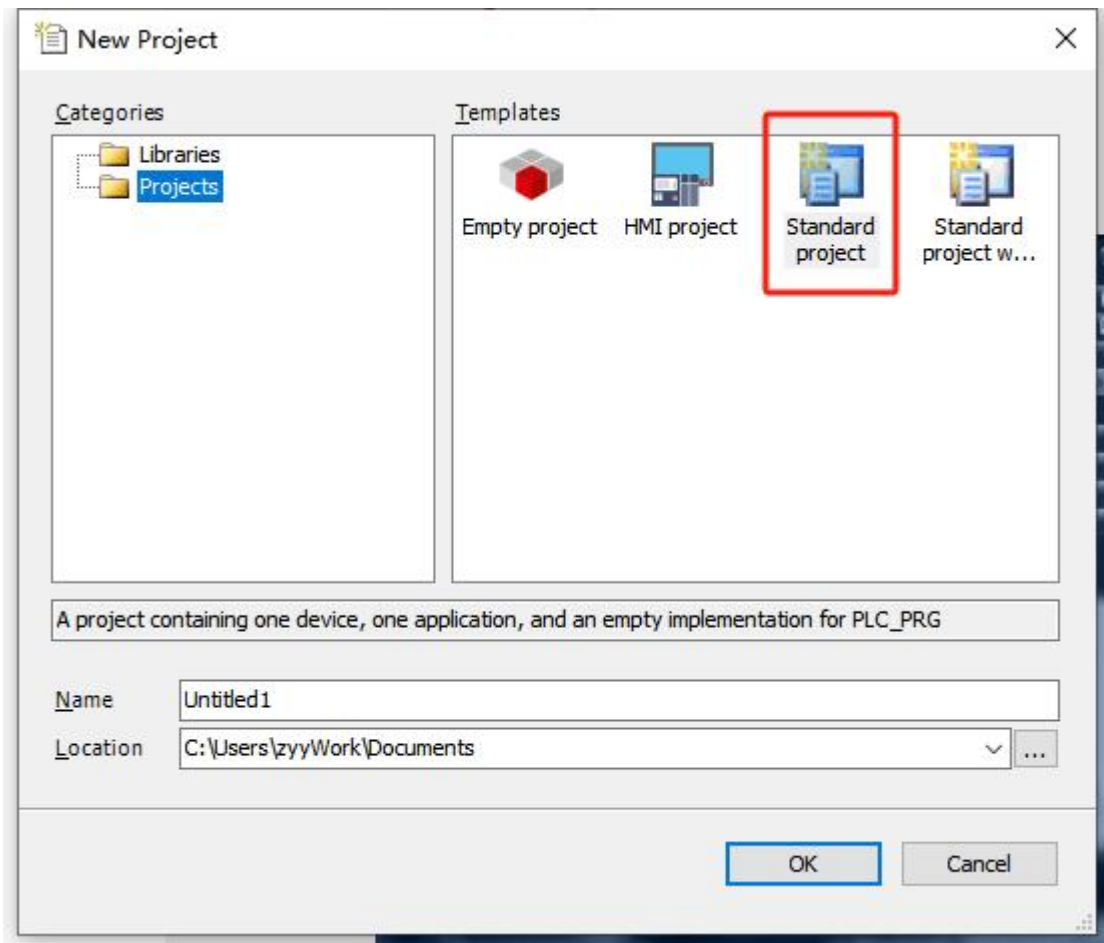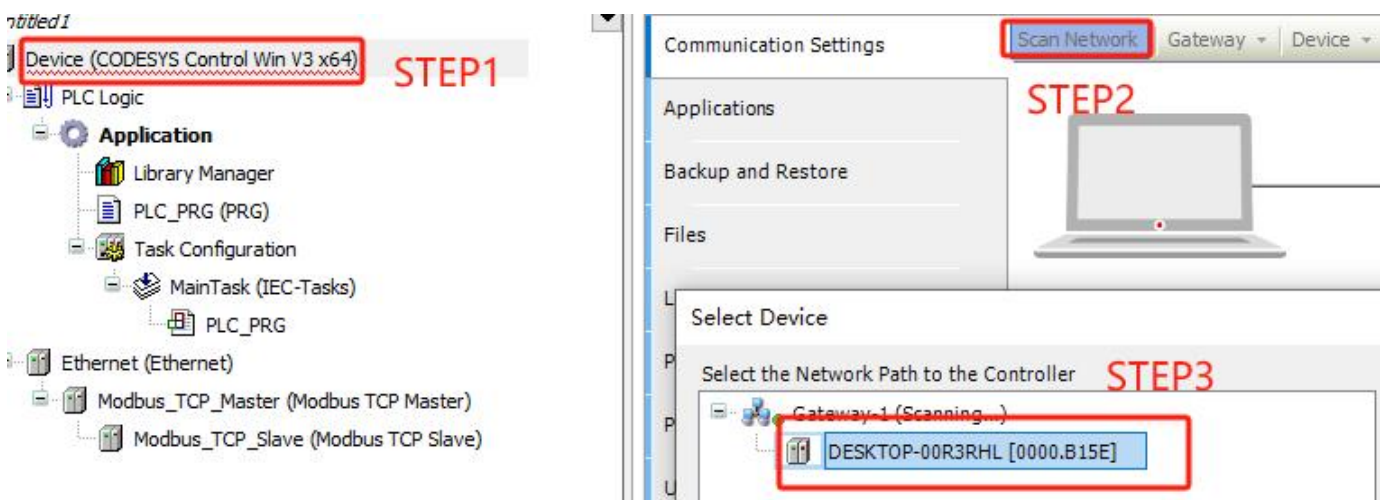

6-1- 1

1.1.2. Adding Controllers
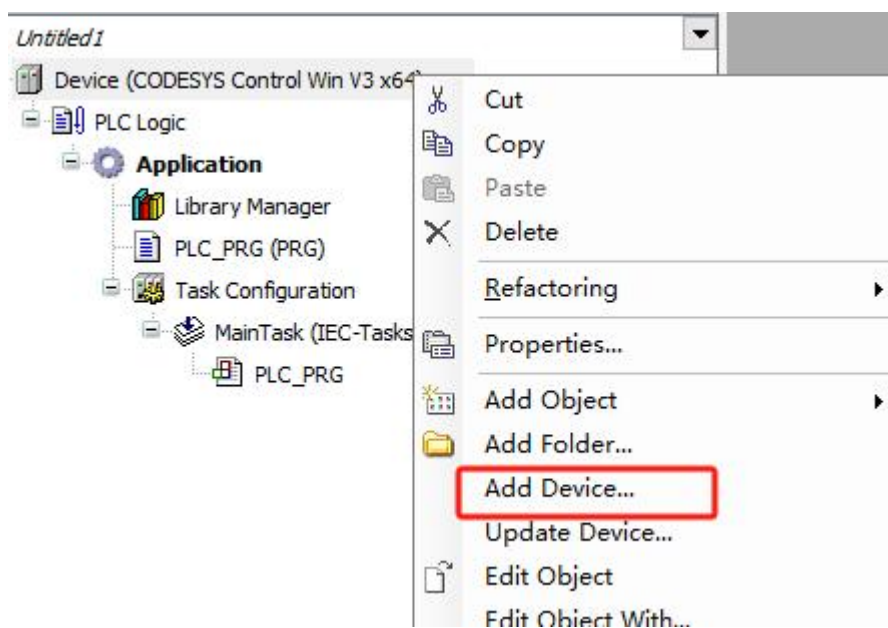
➢ Select the controller you are using and add.
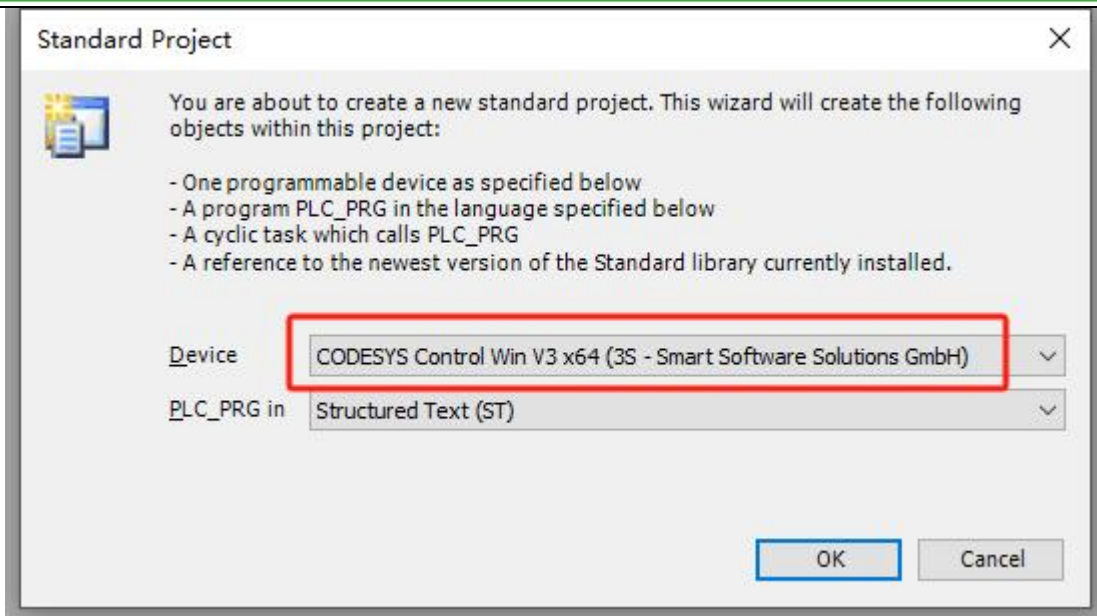
6-1- 2

➢ As shown in the figure below, find the controller you are using and double click to connect it.

6-1- 3

1.1.3. Connection Adapter

➢ Right-click on the item and select Add Device.

6-1- 4

➢ After selecting all providers, find Ethernet and double-click Add.

6-1- 5

➢ Right-click Ethernet and click Add Device.
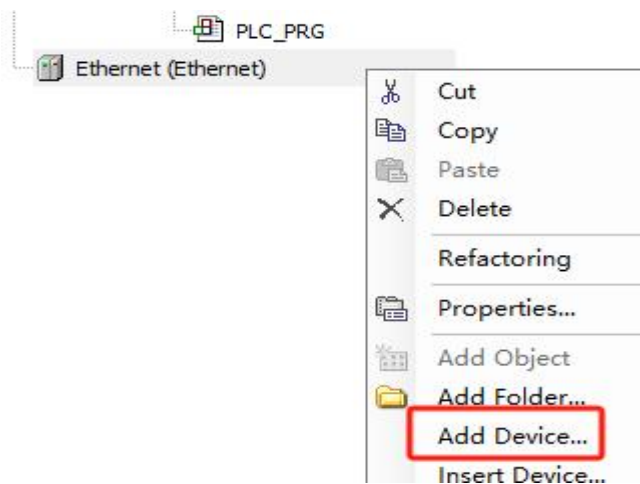
6-1- 6

➢ Find Modbus TCP Master and double-click to add it.

6-1- 7

➢ Right-click Modbus TCP Master and click Add Device.
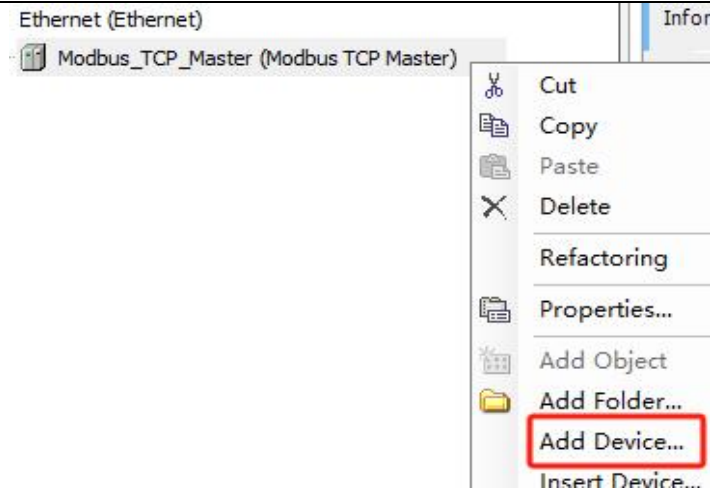
6-1- 8

➢ Double-click to add the Modbus TCP Slave.

6-1- 9

➢ Double-click on Ethernet to select the NIC to which the controller is connected.
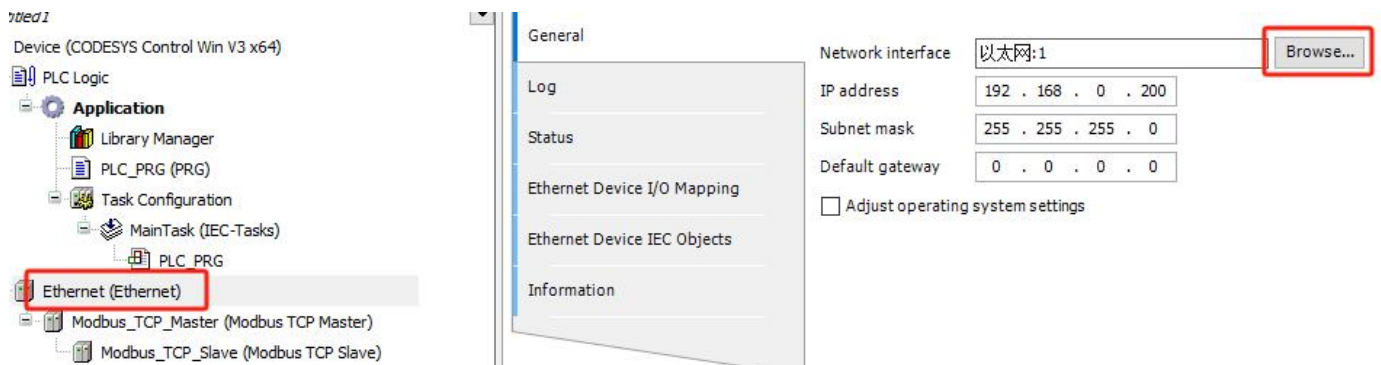
6-1- 10

➢ Double click Modbus_TCP_Slave to set the Modbus slave IP to the adapter IP. note that the adapter IP needs to be in the same network segment as the controller IP, here 192.168.0.2 has been set in advance.Please refer to Chapter 4, subsection 2 for adapter IP modification method.
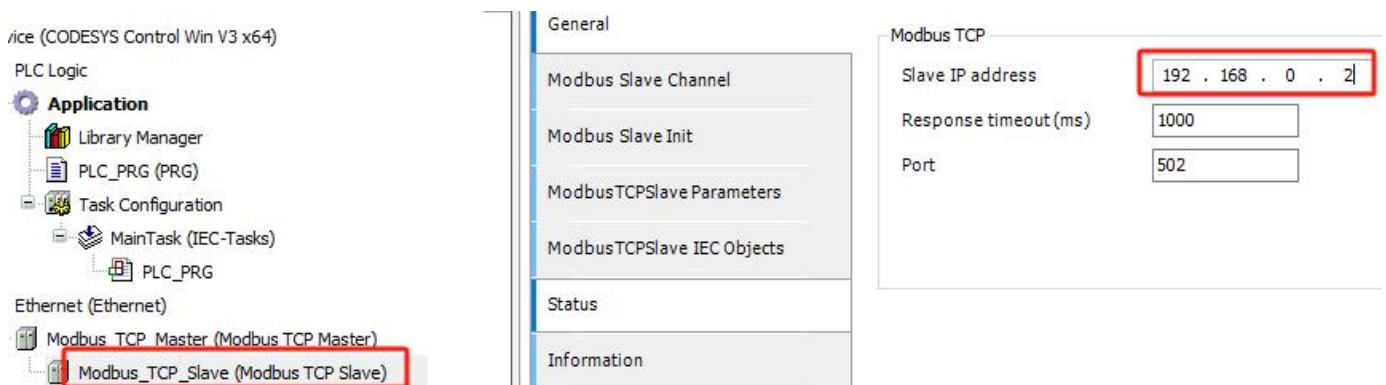
6-1- 11

Click Login and download the configuration to the controller, and click Start when the download is complete. You can see that the RUN light of the adapter is always on, and the software does not report

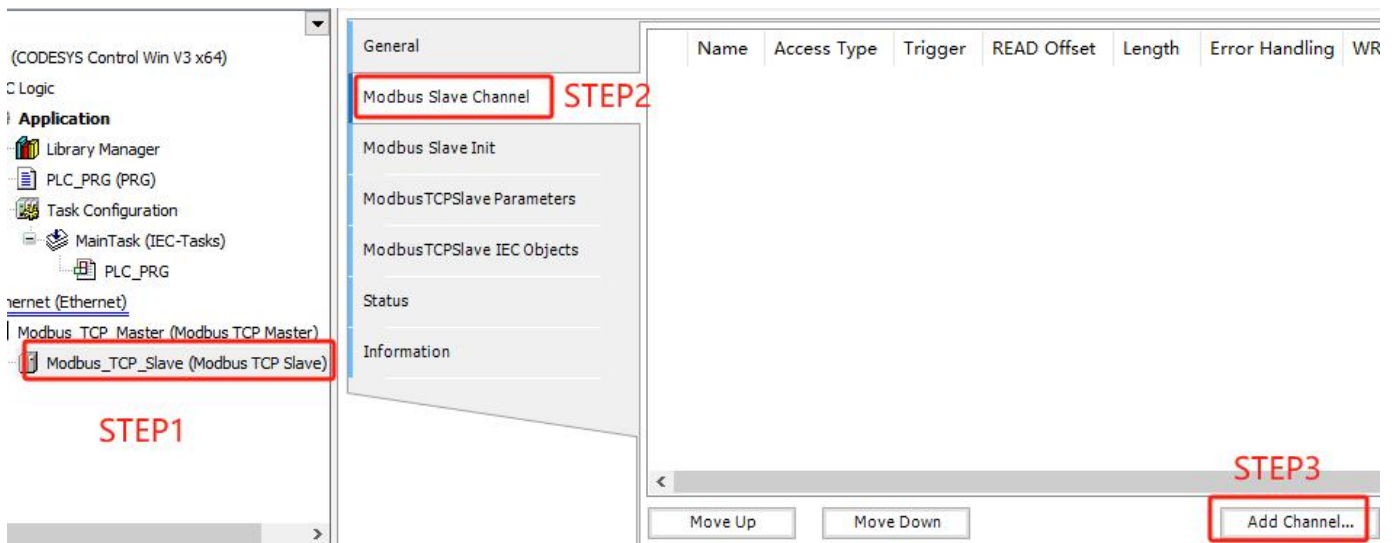errors, indicating that the connection has been successfully established.
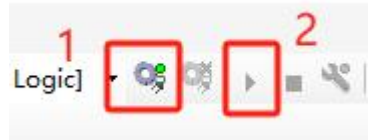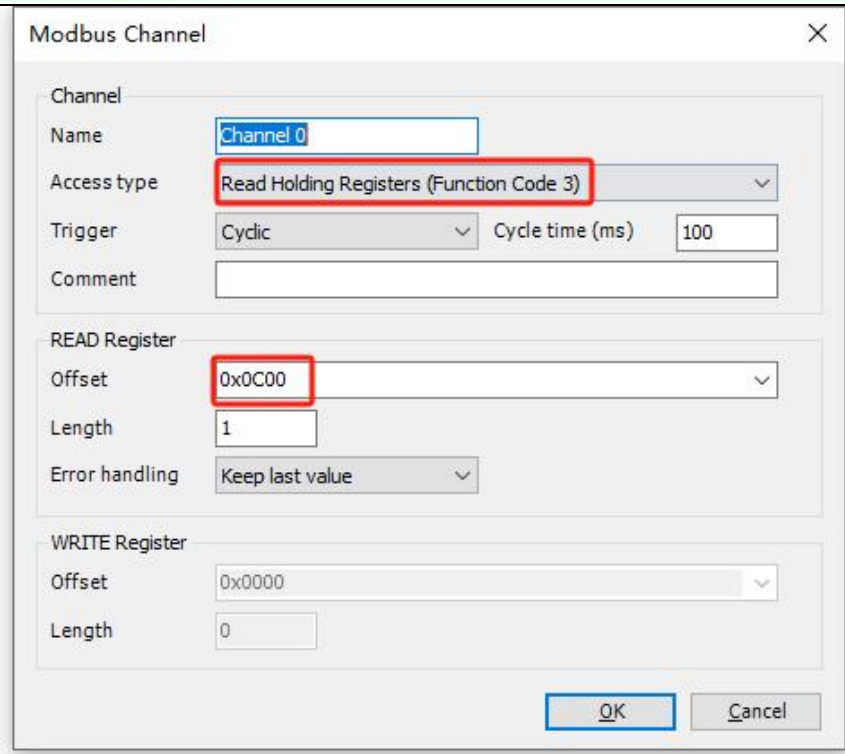

6-1- 12
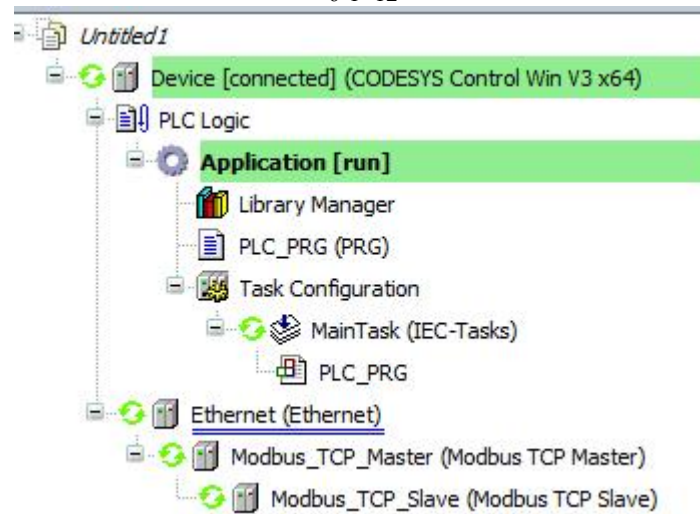
6-1- 13

1.1.4. Modbus Slave Channel Additions

➢ Enter the Slave Channel Configuration screen and click Add Channel.
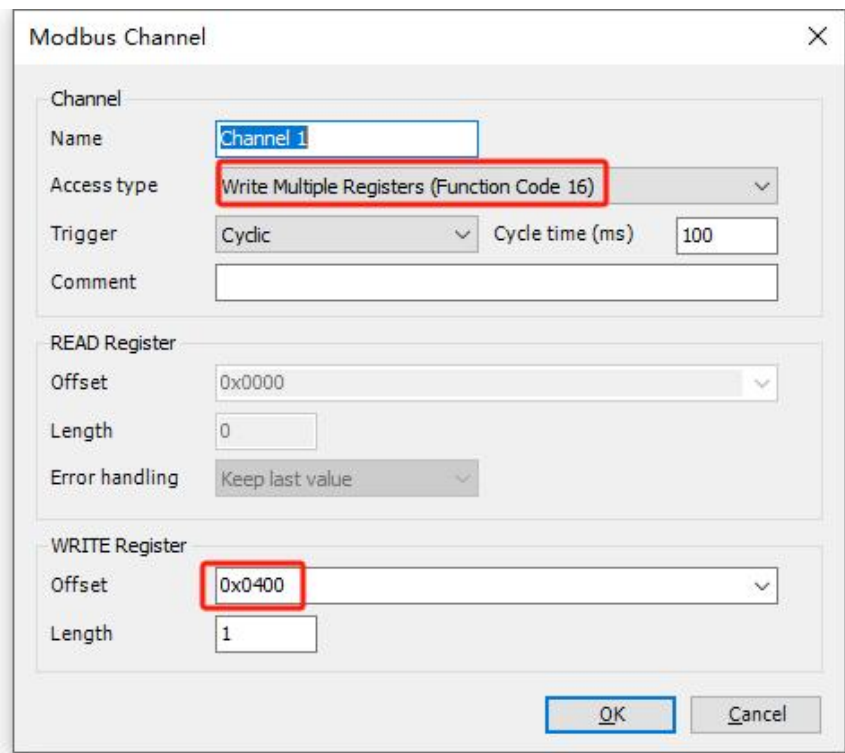

6-1- 14

➢ The demo connected hardware is DF50-C-MD-TCP + DF50-M-16DO-P + DF50-M-16DI-P/N, add the first channel as shown below. The first channel is the 8 DI signals that come with the adapter, add offset 3072, which takes up 8bit, and reserve 8bit for a total of 1word.

6-1- 15

➢ Add the second output channel as shown below, add offset 1024. accounts for 16bit, total 1word.

6-1- 16

➢ Add a third input channel as shown below, adding offset 3073. occupies 16bit, total 1word.

6-1- 17

➢ Enter the I/O mapping interface and change the Always Update variable to Enable 1.

6-1- 18

➢ After adding all channels, you need to re-download to the controller.

1.1.5. Data read/write

➢ As shown in the figure below, you can enter the I/O mapping interface to monitor and modify the data in each channel.

General	Find		Filter Show all				▾ ┿ Add FB for IO Channel... ⁺ᵀ Go ┊
Modbus Slave Channel	Variable	Mapping	Channel	Address	Type	Current Value	Prepared Value
	⊟ ✦		Channel 0	%IW0	ARRAY [0..0] OF WORD	Only subeleme...	
Modbus Slave Init	⊞ ✦		Channel 0[0]	%IW0	WORD	0	
ModbusTCPSlave Parameters	⊟ ✦		Channel 1	%QW0	ARRAY [0..0] OF WORD	Only subeleme...	
	⊞ ✦		Channel 1[0]	%QW0	WORD	0	
ModbusTCPSlave I/O Mapping	⊟ ✦		Channel 2	%IW1	ARRAY [0..0] OF WORD	Only subeleme...	
ModbusTCPSlave IEC Objects	⊞ ✦		Channel 2[0]	%IW1	WORD	0	

6-1- 19

➢ As shown in the figure below, write "65535" to enable all channel outputs of the DF50-M-16DO-P module.

⊟ ✦		Channel 1	%QW0	ARRAY [0..0] OF WORD	Only subeleme...	
⊟ ✦		Channel 1[0]	%QW0	WORD	65535	65535
✦		Bit0	%QX0.0	BOOL	TRUE	
✦		Bit1	%QX0.1	BOOL	TRUE	
✦		Bit2	%QX0.2	BOOL	TRUE	
✦		Bit3	%QX0.3	BOOL	TRUE	
✦		Bit4	%QX0.4	BOOL	TRUE	
✦		Bit5	%QX0.5	BOOL	TRUE	
✦		Bit6	%QX0.6	BOOL	TRUE	
✦		Bit7	%QX0.7	BOOL	TRUE	
✦		Bit8	%QX1.0	BOOL	TRUE	
✦		Bit9	%QX1.1	BOOL	TRUE	
✦		Bit10	%QX1.2	BOOL	TRUE	
✦		Bit11	%QX1.3	BOOL	TRUE	
✦		Bit12	%QX1.4	BOOL	TRUE	
✦		Bit13	%QX1.5	BOOL	TRUE	
✦		Bit14	%QX1.6	BOOL	TRUE	
✦		Bit15	%QX1.7	BOOL	TRUE	

6-1- 20

➢ Input valid signals on the first channel of DF50-C-MD-TCP adapter DI input and the first channel of DF50-M-16DI-P/N, you can see the software interface as shown below.

Channel	Address	Type	Current Value	Prepare
Channel 0	%IW0	ARRAY [0..0] OF WORD	Only subeleme...	
Channel 0[0]	%IW0	WORD	1	
Channel 1	%QW0	ARRAY [0..0] OF WORD	Only subeleme...	
Channel 1[0]	%QW0	WORD	65535	65535
Channel 2	%IW1	ARRAY [0..0] OF WORD	Only subeleme...	
Channel 2[0]	%IW1	WORD	1	

6-1- 21