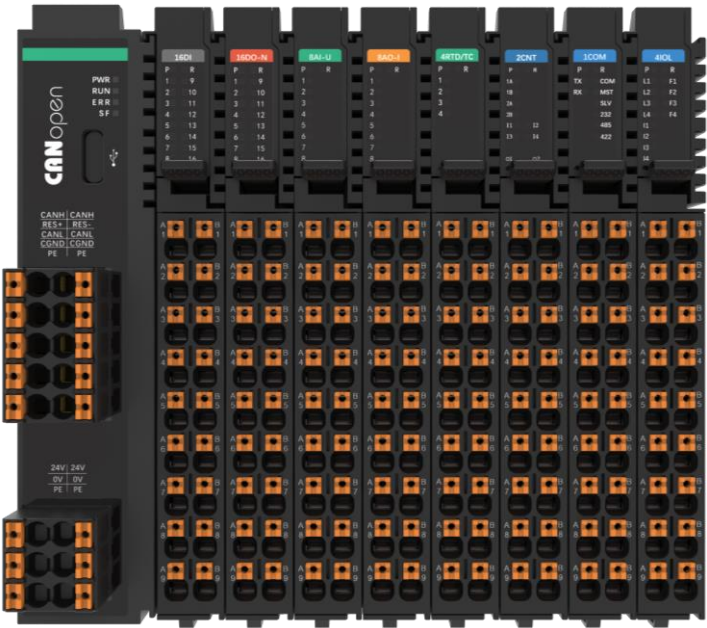


DF30-C-CAN Operation Manual



1 Foreword

■ Brief Introduction

➤ The DF30-C-CAN communication interface module (hereinafter referred to as this module) is used as a CANopen slave to access the CANopen network. In this module, digital and analog quantities can be expanded. Temperature measurement, pulse measurement, communication gateway, Local modules.

This manual introduces the products. Basic information and electrical installation and programming examples. Mechanical installation, etc.

■ Meets standards

Please refer to the table below for relevant certification categories, directives and standards. Whether or not relevant certification qualifications have been obtained shall be based on the product nameplate markings.

Authentication Name	Command Name		Meets standards
CE certification	EMC Directive	2014/30/EU	EN 61131-2
	LVD instructions	2014/35/EU	EN 61010-1 EN 61010-2-201
	RoHS Directive	2011/65/EU Amended by (EU) 2015/863	EN IEC 63000

■ More information

Document Name	Data Encoding	Synopsis
《DF30-C--ECBus Coupler User Manual 《DF30-C--PN-RTBus Coupler User Manual 《DF30-C--CLIBus Coupler User Manual		It introduces product information, mechanical installation, electrical installation, program debugging, fault

		diagnosis, and version matching instructions.
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■ Version Change Log

Revision Date	Release version	Changes
2025-05-20	V1i0i0	The manual was published for the first time.

■ Warranty Statement

Under normal use, if the product malfunctions or is damaged, warranty service will be provided within the warranty period (please refer to the order form for product warranty period details). Repair fees will apply after the warranty period.

During the warranty period, repair fees will be charged for product damage caused by the following situations.

- Damage to the product may result from failure to operate the product according to the instructions in the manual.
- Product damage caused by fire, flood, or abnormal voltage.
- Damage to the product caused by using it for non-normal functions.
- Damage to the product caused by exceeding the product's specified usage range.
- Secondary damage to products caused by force majeure (natural disasters, earthquakes, lightning strikes).

Service fees are calculated according to the manufacturer's unified standards. If there is a contract, the contract shall take precedence.

For detailed warranty information, please refer to the Product Warranty Card.

2 Safety Precautions

■ Security Statement

➤ This chapter outlines the safety precautions required when using this product. Before using this product, please read the instruction manual and fully understand the safety precautions. Failure to comply with the safety precautions may result in death, serious injury, or equipment damage.

➤ The “Danger,” “Warning,” and “Caution” sections in this manual do not represent all the safety precautions that should be followed; they are only supplementary to all safety considerations.

➤ This product should be used in an environment that meets the design specifications; otherwise, it may cause malfunctions. Functional abnormalities or component damage caused by failure to comply with relevant regulations are not covered by the product quality guarantee.

➤ Our company will not bear any legal responsibility for personal safety accidents or property losses caused by failure to comply with the contents of this book or improper operation of the product.

■ Security level definition

Danger : If not operated according to regulations, it may result in death or serious bodily injury.

Warning: This indicates that failure to follow the instructions could result in death or serious bodily injury.

Attention: This indicates that failure to follow the prescribed procedures may lead to...Causes minor bodily injury or equipment damage.

■ Safety Precautions

➤ In the product illustrations in this manual, the product may sometimes be shown with the outer cover or safety cover removed to demonstrate product details. When using this product, please be sure to install the outer cover or safety cover as specified and operate according to the instructions in the user manual.

➤ The product illustrations in this manual are for illustrative purposes only and may differ slightly from the product you order. Please refer to the actual product you order.

➤ Workers must take mechanical safety precautions to protect their personal safety. Please wear necessary protective equipment, such as protective shoes, safety clothing, safety glasses, protective gloves, and sleeves.

Unpacking and inspection

Attention:

- If you find any damage, rust, or signs of use on the product or its accessories upon unpacking, please do not install it!
- Do not install the product if you find water inside, missing parts, or damaged parts when you open the box!
- Please carefully check the packing list. If you find any discrepancies between the packing list and the product name, please do not install!
- Before opening the box, please check whether the outer packaging of the equipment is intact and whether there is any damage, wetness, dampness, deformation, etc.
- Please open the packaging in the correct order, and do not strike it violently!
- When unpacking, please check the surface of the equipment and accessories for any damage, rust, or dents.
- After unpacking, please carefully check the packing list to verify the quantity of equipment and accessories and whether the documents are complete.

Storage and transportation

Attention:

- When moving products, please lift and place them gently, and always pay attention to the objects under your feet to prevent tripping or falling, otherwise there is a risk of injury or product damage!
- When handling the product by hand, please be sure to hold the product casing firmly to prevent product parts from falling, otherwise there is a risk of injury!
- Please strictly follow the storage and transportation conditions required by the product specifications for storage and transportation; otherwise, there is a risk of product damage.
- Avoid storing and transporting in places where water splashes, rain falls, direct sunlight is present, strong electric fields, strong magnetic fields, or strong vibrations are present.
- Avoid storing the product for more than 3 months. If the storage time is too long, please take more

stringent precautions and conduct necessary inspections.

- Please pack the product carefully before transporting it by vehicle. For long-distance transport, a sealed container must be used.
- It is strictly forbidden to transport this product together with equipment or articles that may affect or damage this product.

During installation

Danger :

- Only qualified professionals with electrical training and knowledge are permitted to operate this equipment. Operation by unqualified personnel is strictly prohibited!

Warning:

- Please read the product instruction manual and safety precautions carefully before installation!
- Do not install this product in locations with strong electric fields or strong electromagnetic interference!
- Before installation, ensure that the mechanical strength of the installation location is sufficient to support the weight of the equipment; otherwise, it may lead to mechanical hazards.
- Do not wear loose clothing or jewelry when performing installation work, otherwise there may be a risk of electric shock!
- When installing the product in an enclosed environment (such as a cabinet or chassis), please use a cooling device (such as a cooling fan or air conditioner) to cool it thoroughly to meet the requirements of the installation environment. Otherwise, it may cause the product to overheat or catch fire.
- Modification of this product is strictly prohibited!
- When this product is installed in a cabinet or terminal equipment, the cabinet or terminal equipment must be provided with appropriate fireproof enclosures, electrical protective enclosures, and mechanical protective enclosures, and the protection level should comply with relevant IEC standards and local laws and regulations.
- When installing equipment that is subject to strong electromagnetic interference, such as transformers, please install shielding protection devices to prevent this product from malfunctioning!
- Please install the product on flame-retardant objects such as metal. Do not allow flammable

materials to come into contact with the product or attach flammable materials to the product, otherwise there may be a risk of fire.

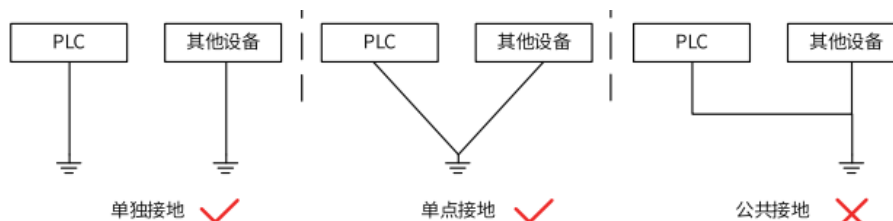
Attention:

- When performing installation, please cover the top of the product with a cloth or paper to prevent metal shavings, oil, water, and other foreign objects from entering the product during drilling, which could cause product malfunction. After the installation is complete, please remove the cover to prevent it from blocking the ventilation holes and affecting heat dissipation, which could cause the product to overheat abnormally.
- Resonance may occur when a machine that operates at a constant speed is subjected to variable speed operation. In this case, installing anti-vibration rubber under the motor frame or using vibration damping functions can effectively reduce resonance.

When wiring

Danger:

- It is strictly forbidden for non-professionals to install, wire, maintain, inspect, or replace parts of the equipment!
- Before wiring, please disconnect the power supply to all devices. After disconnecting the power, residual voltage may remain in the internal capacitors of the devices. Please wait at least the time specified on the warning label on the product before performing any wiring operations. Measure the DC voltage of the main circuit to ensure it is below a safe voltage level; otherwise, there is a risk of electric shock.
- Do not perform wiring operations, remove product covers, or touch circuit boards while the power is off, otherwise there is a risk of electric shock.
- Please ensure that the equipment and products are properly grounded, otherwise there is a risk of electric shock. Grounding should preferably be done by separate grounding or single-point grounding, and common grounding should not be used.



Warning:

- It is strictly forbidden to connect the input power supply to the output terminal of the equipment or product, otherwise it will cause damage to the equipment or even cause a fire.
- When connecting the drive device to the motor, please ensure that the phase sequence of the product and the motor terminals is accurate and consistent to avoid causing the motor to rotate in the opposite direction.
- The cables used for wiring must meet the corresponding requirements for wire diameter and shielding. The shielding layer of shielded cables must be reliably grounded at one end!
- After wiring is complete, please ensure that all cables are connected correctly and that there are no loose screws, washers or exposed cables inside the product, otherwise there may be a risk of electric shock or damage to the product.

Attention:

- Please follow the procedures specified in the electrostatic discharge (ESD) prevention measures and wear an anti-static wrist strap when performing wiring operations to avoid damaging the internal circuitry of the equipment or product.
- When wiring the control circuit, please use a twisted shielded cable and connect the shield to the grounding terminal of the product for grounding. Otherwise, the product may malfunction.

When powered on**Danger :**

- Before powering on, please ensure that the product is properly installed, the wiring is secure, and the motor is ready to restart.
- Before powering on, please ensure that the power supply meets the product requirements to avoid product damage or fire!
- Do not open the product cabinet door or product protective cover, touch any wiring terminals of the product, or disassemble any device or component of the product while it is powered on, otherwise there is a risk of electric shock!

Warning:

- After the wiring and parameter settings are completed, please conduct a trial run of the machine

to confirm that it can operate safely. Otherwise, it may cause personal injury or equipment damage.

- Before powering on, ensure that the product's rated voltage matches the power supply voltage.

Using an incorrect power supply voltage may cause a fire.

- Before powering on, ensure that there are no people around the product, motor, and machinery, otherwise it may result in injury or death.

runtime

Danger :

- It is strictly forbidden for non-professionals to operate the product, otherwise there is a risk of injury or death!
- It is strictly forbidden to touch any terminals of the equipment, disassemble any device or component of the equipment or product while it is running, otherwise there is a risk of electric shock!

Warning:

- Do not touch the equipment casing, fan, or resistors to test the temperature, as this may cause burns!
- During operation, prevent other items or metal objects from falling into the equipment, otherwise it may cause a fire or product damage!

During maintenance

Danger :

- It is strictly forbidden for non-professionals to install, wire, maintain, inspect, or replace parts of the equipment!
- Never perform equipment maintenance while the device is powered on, as this could result in electric shock!
- After disconnecting the power to all devices, please wait at least the time specified on the warning label on the product before performing any maintenance or other operations.
- When using the PM motor, even if the product's power is off, an induced voltage will be generated on the motor terminals during motor rotation. Do not touch the motor terminals, as this may result in an electric shock risk.

Warning:

- Please conduct daily and periodic inspections and maintenance of equipment and products in accordance with equipment maintenance and upkeep requirements, and keep maintenance records.

During maintenance

Danger :

- It is strictly forbidden for non-professionals to install, wire, maintain, inspect, or replace parts of the equipment!
- It is strictly forbidden to perform equipment maintenance while the power is on, otherwise there is a risk of electric shock!
- After disconnecting the power to all devices, please wait at least the time specified on the warning label on the product before performing any equipment inspections, maintenance, or other operations.

Warning:

- Please report the equipment for repair in accordance with the product warranty agreement.
- When a fuse blows, a circuit breaker trips, or an ELCB trips, please wait at least the time specified on the warning label on the product before turning on the power or operating the machine. Otherwise, it may result in personal injury or equipment damage.
- When equipment malfunctions or is damaged, it is essential that professional personnel troubleshoot and repair the equipment and products in accordance with the maintenance guidelines, and keep maintenance records.
- Please replace the parts according to the product's consumable parts replacement instructions.
- Do not continue to use a damaged machine, as this may cause personal injury or further damage to the product.
- After replacing the equipment, please be sure to check the equipment wiring and re-set the parameters.

When scrapped

Warning:

- Please scrap equipment and products in accordance with relevant national regulations and standards to avoid property damage or personal injury!

- Discarded equipment and products should be disposed of and recycled in accordance with industrial waste disposal standards to avoid environmental pollution.

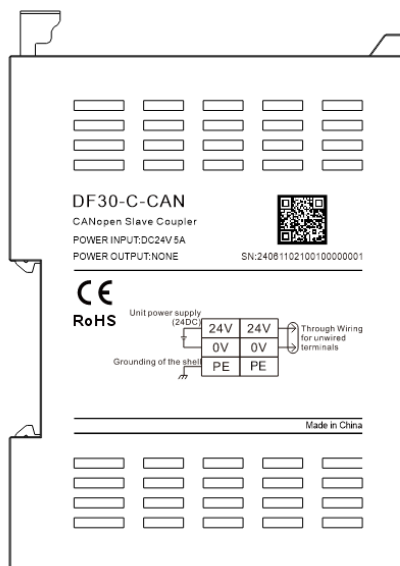
■ Safety signs

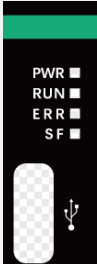
To ensure safe operation, please always adhere to the safety labels affixed to the equipment and do not damage or remove them. The safety labels are explained below:

Safety signs	Content Description
	Please read the safety manual and instructions for use carefully before using the product, otherwise there may be a risk of personal injury or product damage!

3 Product Information

3.1 Component Description



indicator lights				
	LED No	Status and meaning	LED No	Status and meaning
	PWR	Green light indicates normal system power supply.	RUN	Green indicator: Running status
				Green flash: Configuration status (pre-operation)
		Green light off: System power failure		Green Extinction: Not Connected
	SF	redBright:The equipment is in forced operation mode (ForBootLoad mode)		
		Red Flash: IOModulehavemistake(Backplane timeout, configuration error, power supply failure, etc.)		
		Red ExtinctionIOModule is normal		
	ERR	Red flash:Couplerhavemistake(No valid card, configuration failure, hot-swap failure, etc.)		

		Red Extinction:Couplernormal
Terminal blocks		
Interface Name	Function definition	
PORT	CAN interface	
24V power supply	Module power input terminals	
Type-C interface	Port for single-board software upgrade	
DIP switch		
		
Function definition	Switch to ONEffective, for eachThese represent 1, 2, 4, 8, 16, 32, 64, and 128 respectively. Used to set the slave address and baud rate	
Factory ID	1	
Factory baud rate	500Kbps	
Set slave address	With the DIP switch in position 8 (ON), the slave ID number can be set using the DIP switch values from position 1 to position 7.	
Set baud rate	With the DIP switch in position 8 (OFF), the baud rate can be set using DIP switch positions 1 through 3.	

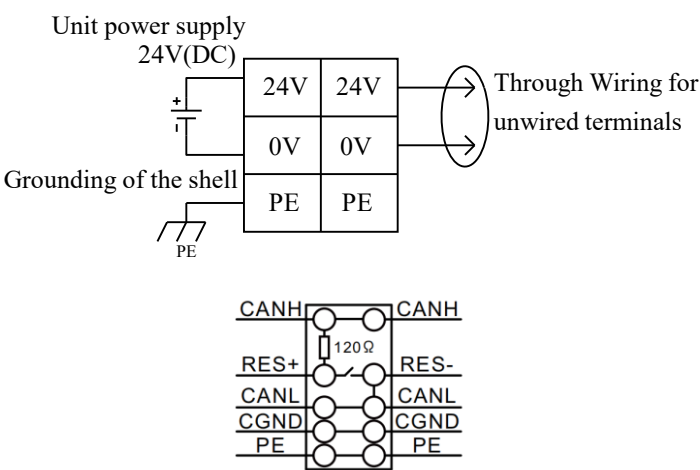
3.2 Specifications

Structural parameters	
Dimensions (width x height x depth)	24mm x 104mm x 80mm
weight	103.4g
Power parameters	
Terminal input power supply rated voltage	24V DC (20.4V DC~ 28.8V DC)
Terminal input power supply rated current	5A (typical value at 24V DC)
U _{sys} backplane output power rated voltage	5V DC (4.75V DC~5.25V DC)
U _{sys} backplane output power rated current	2A (typical value at 5V)
U _{in} backplane output power rated voltage	24V DC (20.4V DC~28.8V DC)
U _{in} backplane output power rated current	4A (typical value at 24V)
Functional parameters	
Specifications	1 CAN interface
Connection method	Terminal blocks
Communication Protocol	CANOpen
Communication rate	Supports 10, 20, 50, 100, 125, 250, 500, and 1000K.bpsconfigurable
Bus address settings	DIP switch settings, maximum number of slave stations supported: 127
Transmission distance	The maximum range is 1000 meters, but the actual range depends on the baud rate and cable impedance.
Alarm function	Standard and Enhanced Diagnostics

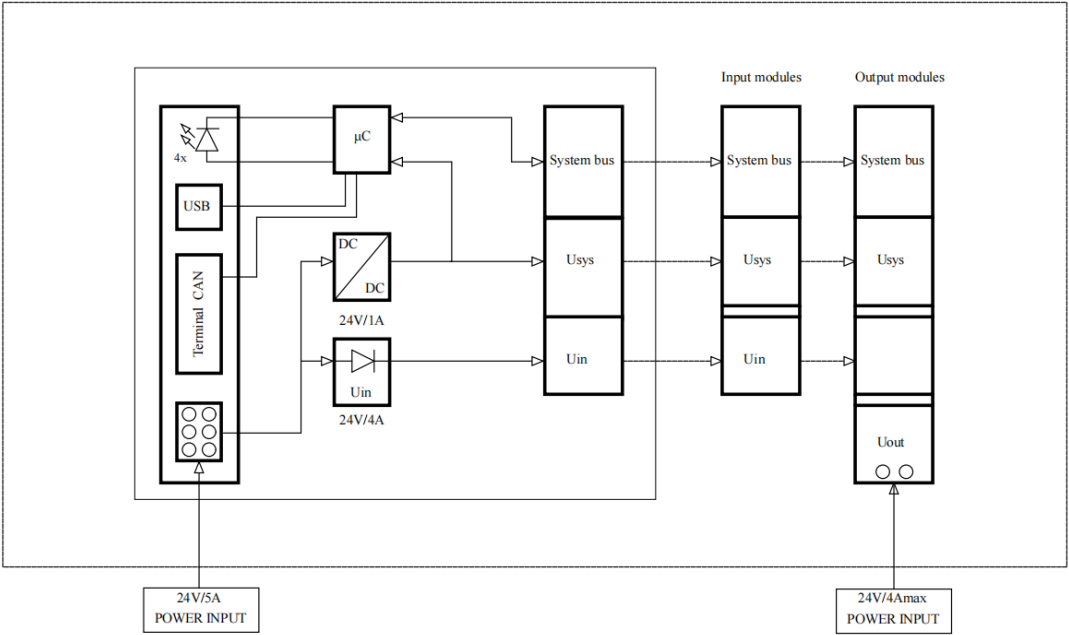
Isolation methods	Electrical isolation from site
transmission medium	Category 5 twisted pair cable
Software parameters	
Maximum number of I/O modules	Supports 16
Input PDO data volume	maximum128byte
Output PDO data volume	maximum128byte
Wiring parameters	
Connection technology: Communication/Fieldbus	CAN 2.0
Connectivity technology	PUSH-IN type terminal block
Connection type	System/Field Power Supply/Input
crimping area of the wire	0.34~1.5mm ²
Stripping length	10mm
Installation method	DIN-35 type guide rail
Material parameters	
color	Pantone 419C
Shell material	PC plastic
Environmental requirements	
Permissible ambient temperature (during operation)	-20~55°C
Permissible ambient temperature (for storage)	-40~85°C
Protection type	IP20
Pollution level	2. Complies with IEC 61131-2 standard
Working altitude	0~2000m
Relative humidity (non-condensing)	5-95%RH

Vibration resistance	1g, conforming to IEC 60068-2-6 standard
Impact resistance	15g, conforming to IEC 60068-2-27 standard
EMC anti-interference level	Zone B, IEC61131-2
Corrosion resistance	Compliant with IEC 60068-2-42 and IEC 60068-2-43 standards

3.3 wiringprinciplepicture



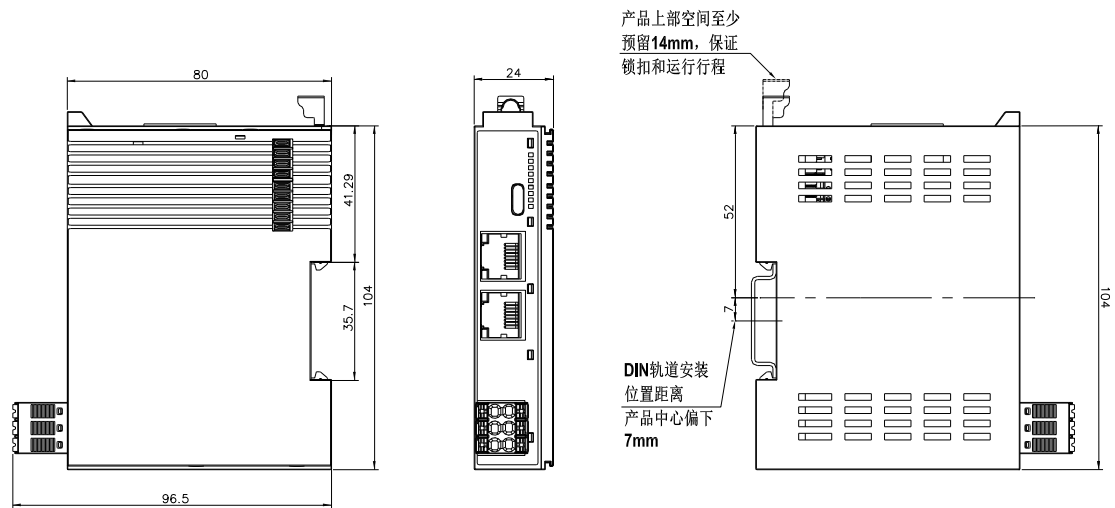
3.4 systemblock diagram



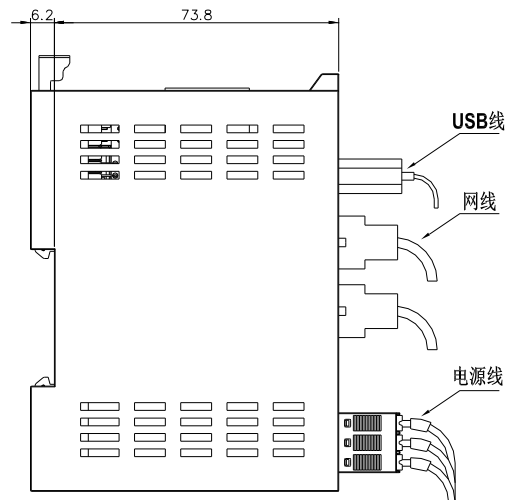
4 Installation and disassembly

4.1 Installation dimensions

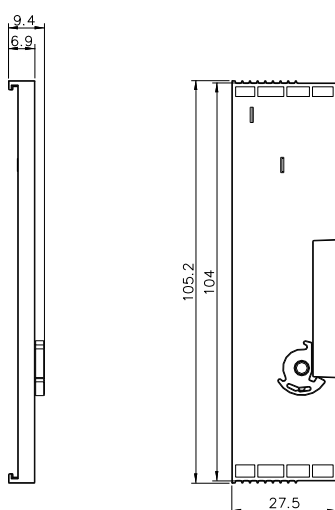
- The installation dimensions are shown in the figure below, in millimeters (mm).



- Connecting cables

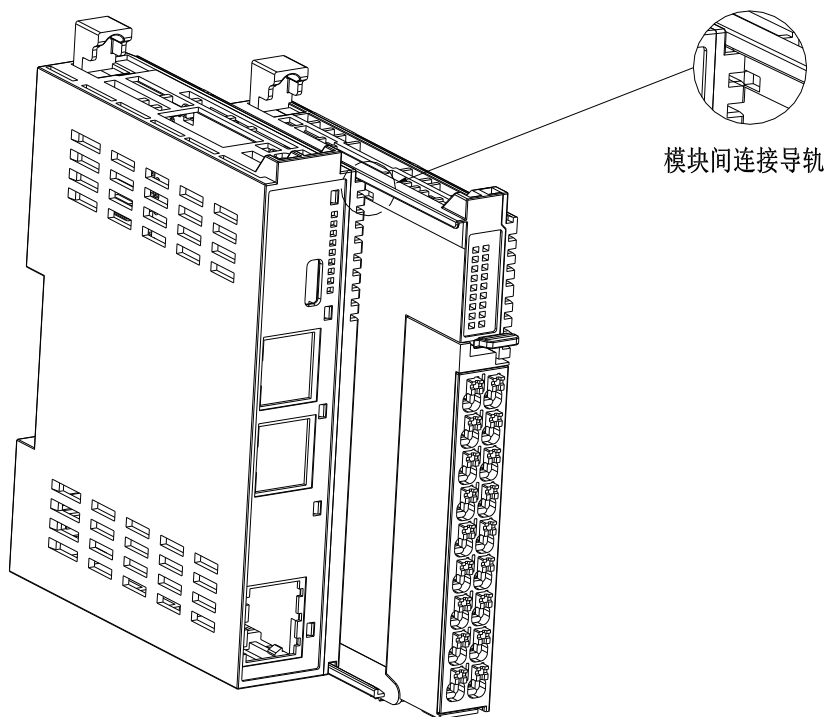


- Tail cover

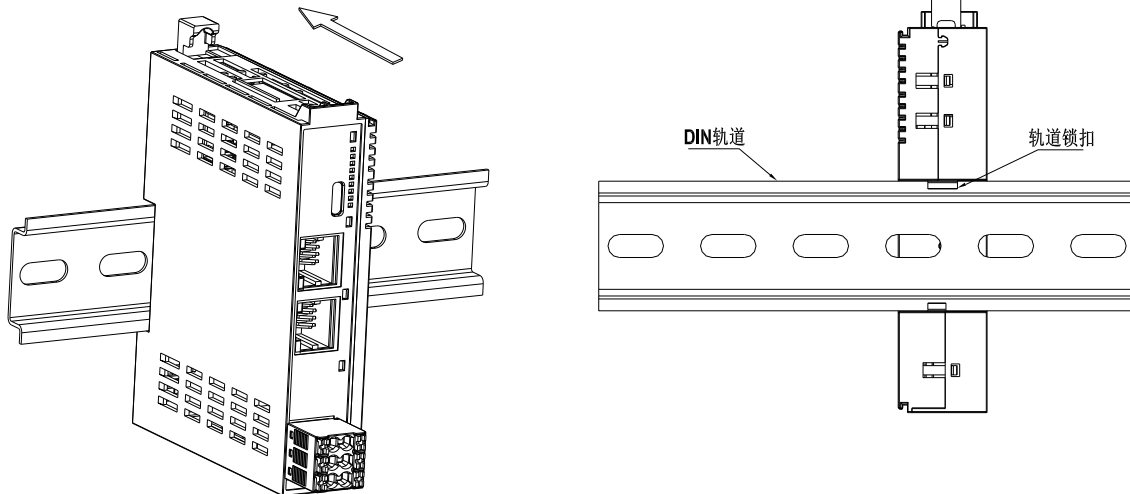


4.2 Installation Guide

- The modules are slidably installed using the top and bottom guide rails of the modules, as shown in the figure below.



- During installation, align the module with the DIN rail and press the module in the direction shown by the arrow. After installation, there will be a clear clicking sound, as shown in the picture below.



➤ Confirm that the DIN rail latch of the module is in the locked state. The locked and unlocked states of the rail latch are shown in the figure below.



If the DIN rail latch is at the bottom, it is in the locked state.

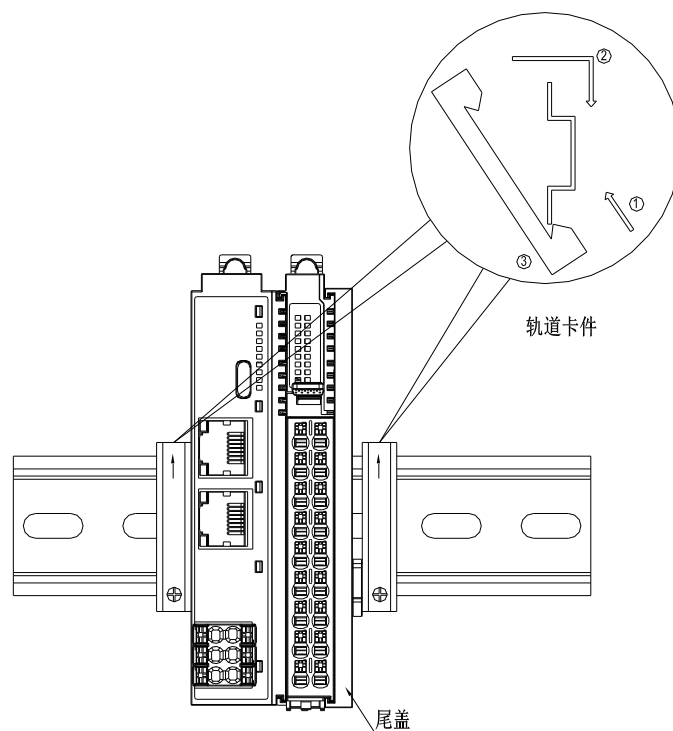
If the DIN rail latch is on top, it is in the unlocked state.

When in the unlocked state, press down on the DIN rail latch to lock it.

➤ The tail cap needs to be installed on the last module to prevent the metal pins from being exposed, and a DIN rail clip should be installed at both ends of the main unit or module to prevent the module from sliding left and right, as shown in the figure below.

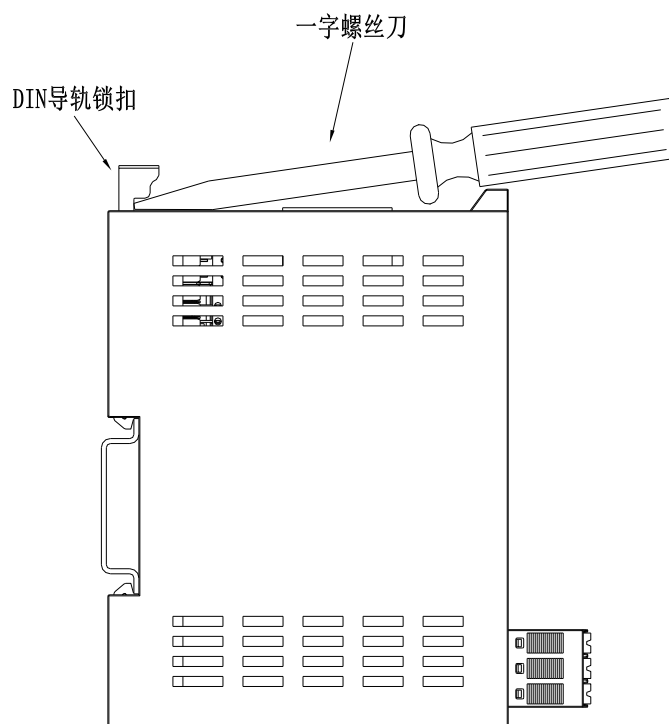
➤ When installing the guide rail clip, hook the bottom of the guide rail clip onto the bottom of the guide rail, then rotate the guide rail clip to make the guide rail clip...

➤ The upper end hooks onto the upper end of the guide rail, and finally the screws are tightened to lock the guide rail clip.



4.3 Disassembly method

- Use a flathead screwdriver or similar tool to pry up the rail latch, then pull the module away from the DIN rail. After that, press down on the top of the latch.



4.4 Precautions

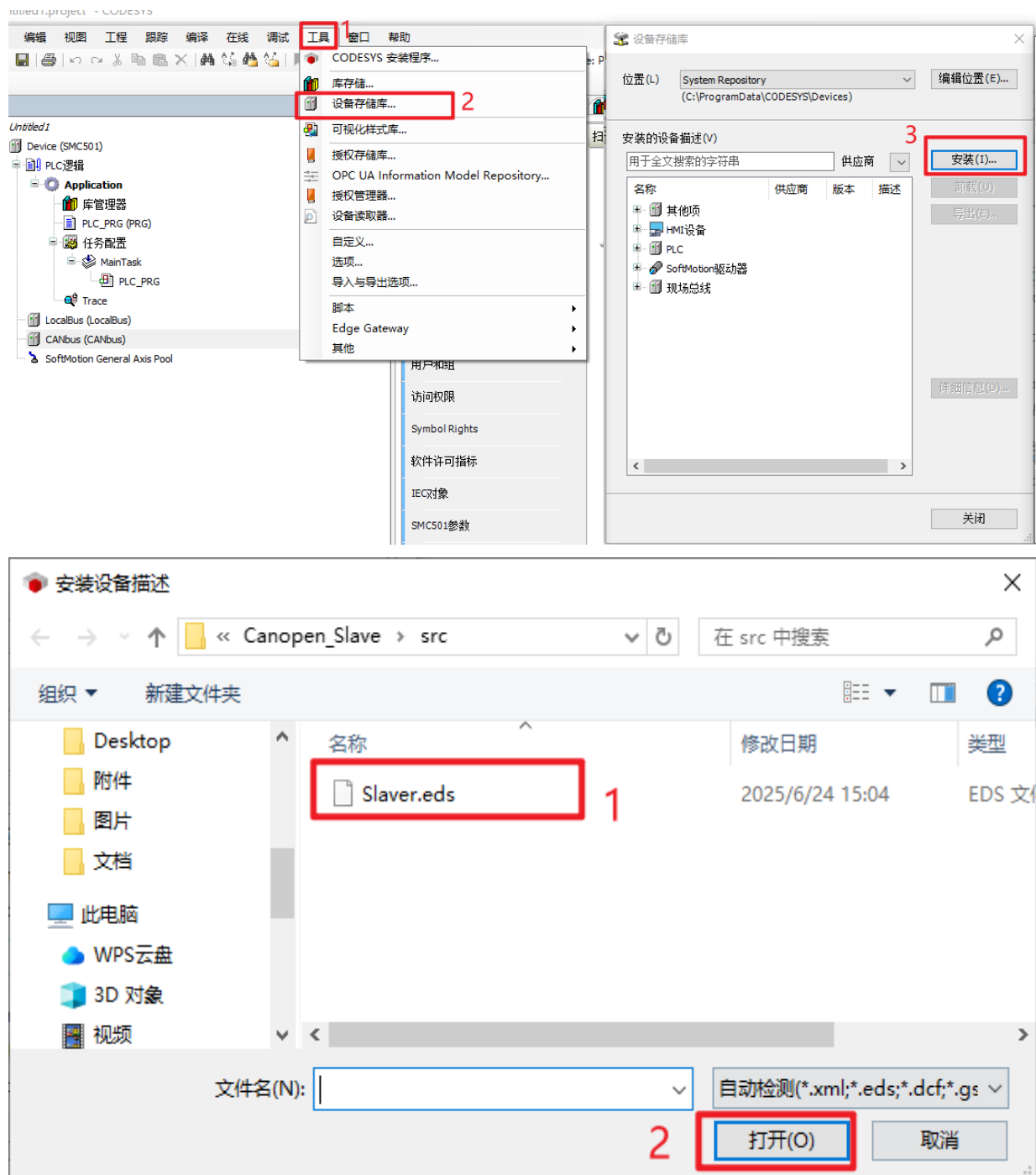
- Before installing or removing the module, ensure that the module is powered off.
- If you encounter a module that is difficult to install, do not use brute force to install it, as this may damage the current module or other modules. The module should be removed from the guide rail and checked for any abnormalities (such as foreign objects blocking the circuit). Only after confirming that there are no problems should you attempt to plug or unplug it.
- When this product is installed on a non-standard DIN rail (DIN rail thickness is 1.0mm), the DIN rail locking mechanism will fail, the product will not be able to be installed properly, and thus the product will not work properly.

5 Configuration Example

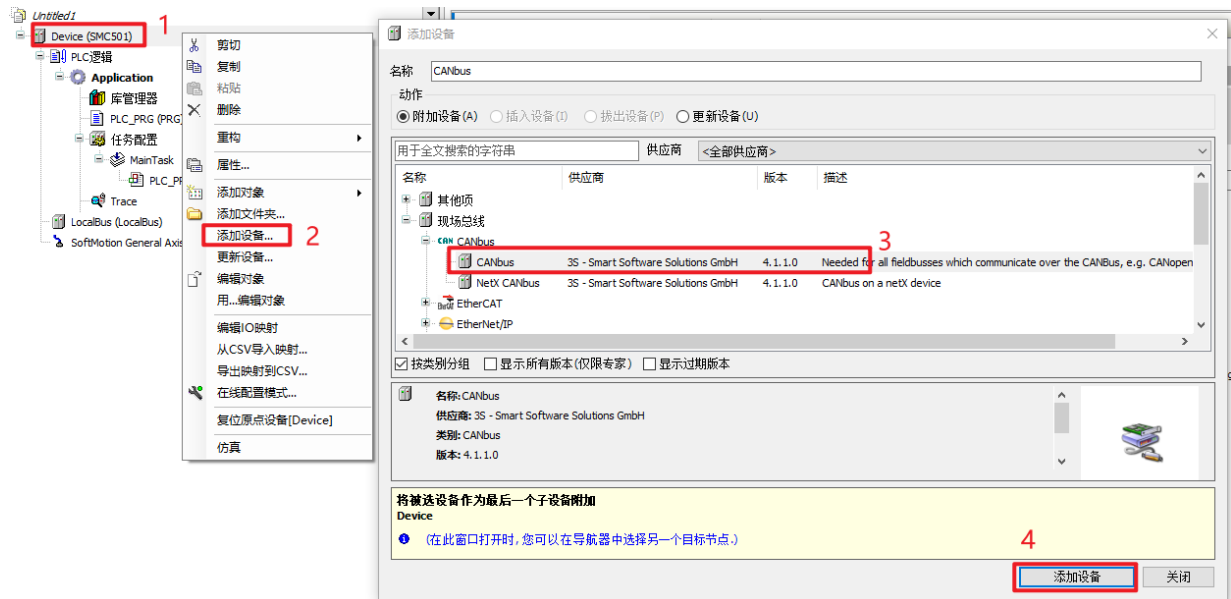
5.1 CODESYS V3.5.19 Software Example

Example with The DFC301 controller serves as the CANopen master station.,DF30-C-CAN as a CANopen slave station,DF30-M-16DI + DF30-M-16DO + DF30-M-8AI-I + DF30-M-8AO-IAs a remote I/O module.

■ Import EDS file

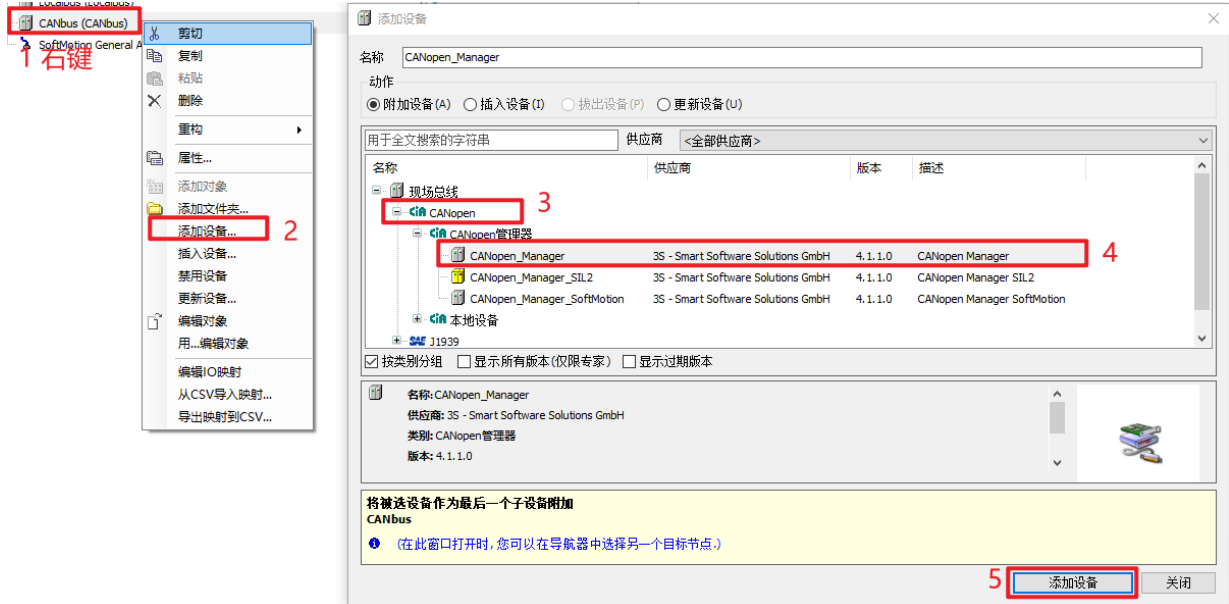


■ Add CANbus using DFC301 controller



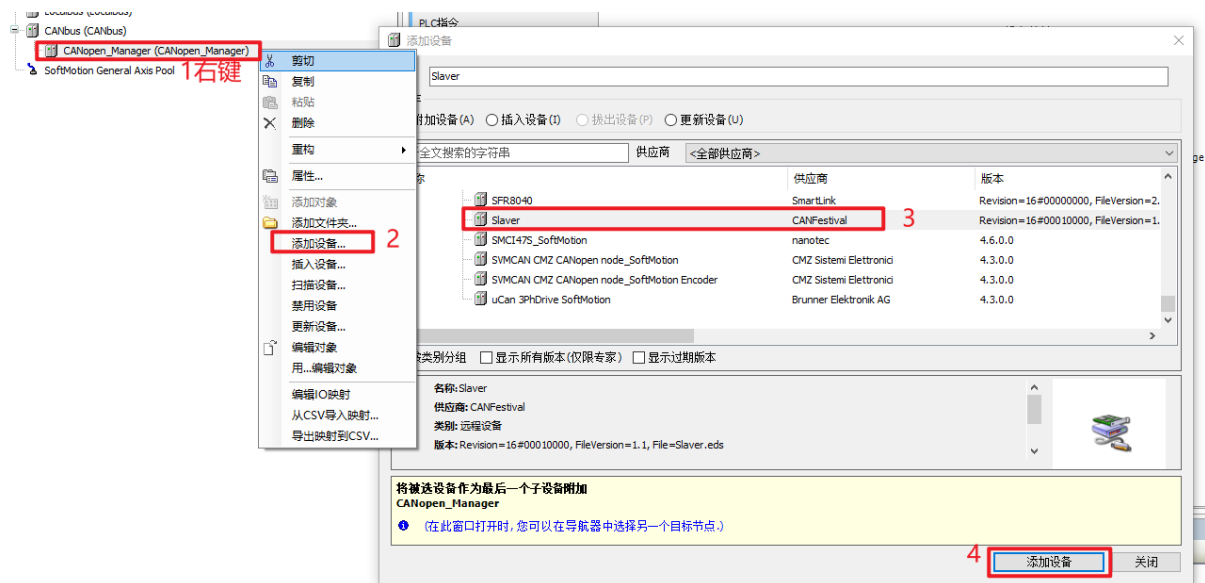
■ Add CANopen_Manager slave

Select CANbus with your mouse, then right-click and select Add Device. turn up CANopen-Manager. Double-click to add.



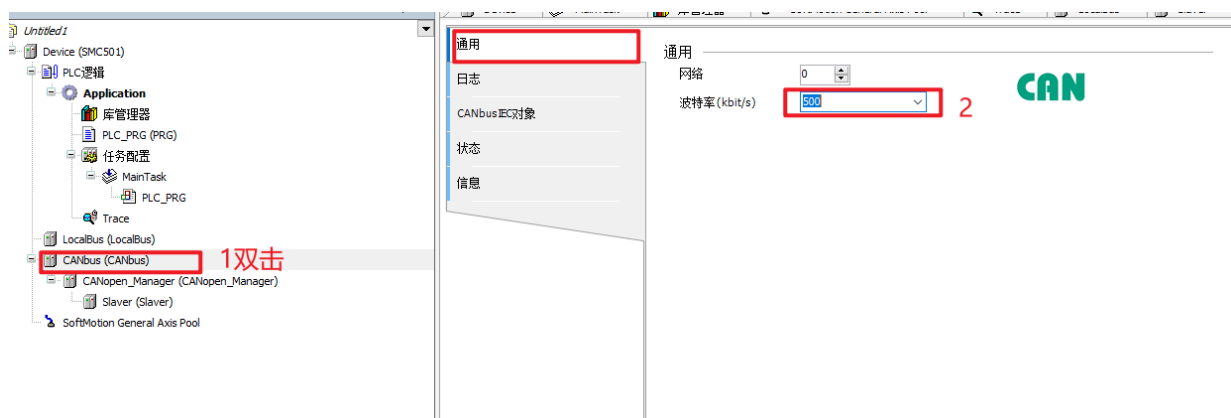
■ Add the devices that need to be connected

Select CANopen-Manager with your mouse, then right-click and select Add Device. turn up Imported EDS from device files, Double-click to add.



■ Enter CANbus settings to match the baud rate of the slave station.

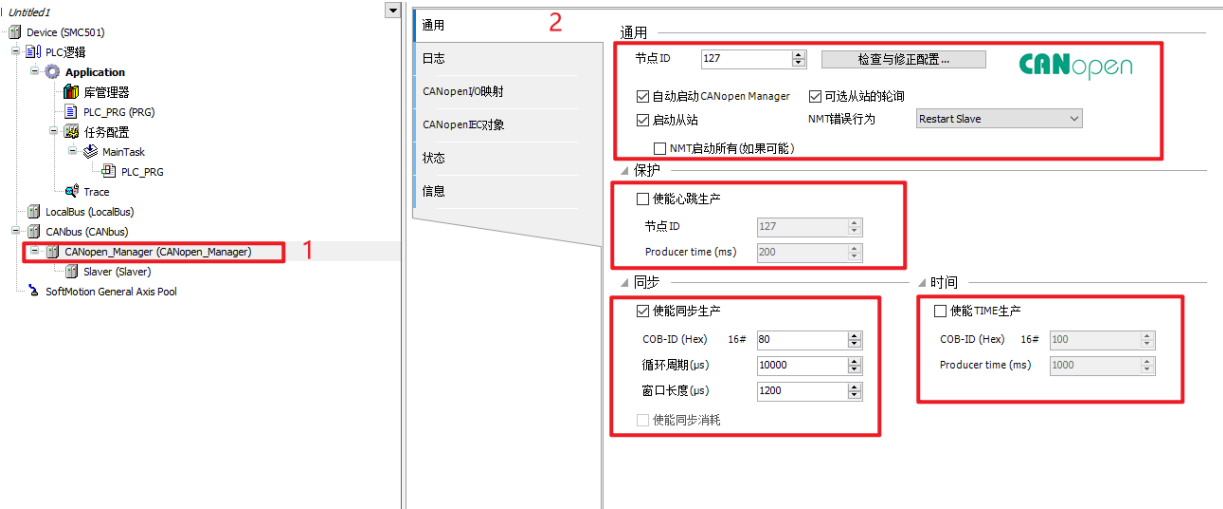
Double-click the CANbus icon, and set the baud rate corresponding to the slave hardware settings. Refer to the steps for setting the slave baud rate. [ID and baud rate settings](#) Typically, the speed is set to 500Kbps at the factory.



■ Enter CANopen-Manager to configure master station parameters

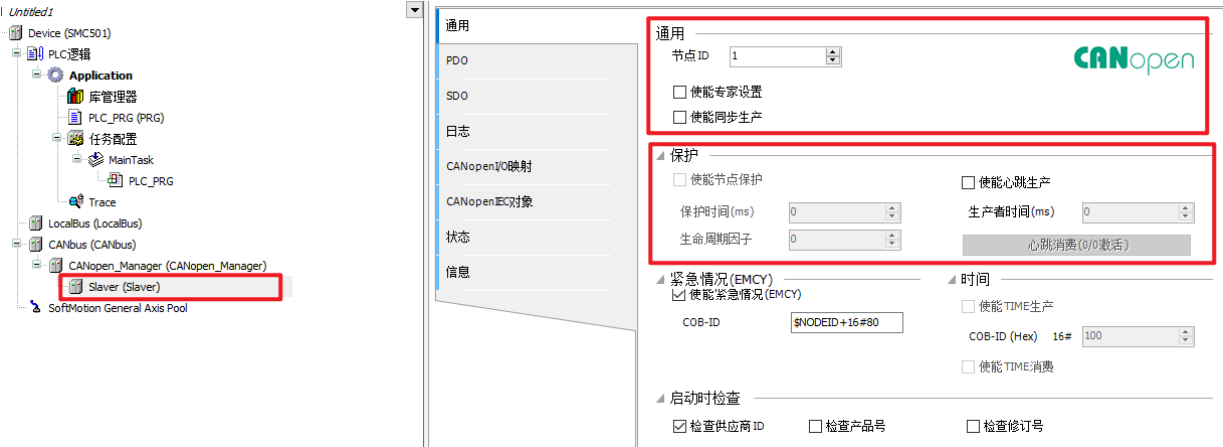
The master station parameters can be configured as follows. The master station will be enabled for synchronization. At a baud rate of 500Kbps, the time to transmit one standard CAN frame is approximately $108 \text{ bits} \times 2 \mu\text{s/bit} = 216 \mu\text{s}$. Considering that CAN has padding bits, the actual number of bits will increase, so we add redundancy to 250us. Add the corresponding number of PDOs according to the topology. Here, we assume that 3 TPDOs and 3 RPDOs have been added. In addition, the number of messages to be transmitted for one synchronization frame is 7 frames. The actual minimum synchronization period setting for the master station is: $0.25 \times (6+1) = 1.75 \text{ms}$. The master station synchronization period setting must be greater than the actual data

transmission time. Here, we set the synchronization period to 10ms.



- Enter the slave we added, set the node ID that matches the slave, and add your own PDO.

The slave station parameters can be configured as follows. If the master station has enabled synchronization, the slave station needs to disable synchronization. The node ID setting should match the ID set in the DF30-C-CAN hardware settings. Here, the node ID of the coupler has been set to 1 in advance.



通用	收到PDO(从站=>主站)	传输PDO(从站=>主站)																																																																																																																																																																		
PDO	<table> <tr> <th>名称</th><th>对象</th><th>Bit length</th></tr> <tr> <td>☒ 16#1400: Receive PDO 1 Parameter</td><td>16#201 (\$NODEID+16#200)</td><td>16</td></tr> <tr> <td>Write Outputs 0x1 to 0x10</td><td>16#6300sub01</td><td>16</td></tr> <tr> <td>☒ 16#1401: Receive PDO 2 Parameter</td><td>16#301 (\$NODEID+16#300)</td><td>64</td></tr> <tr> <td>Analogue Output 1</td><td>16#6411sub01</td><td>16</td></tr> <tr> <td>Analogue Output 2</td><td>16#6411sub02</td><td>16</td></tr> <tr> <td>Analogue Output 3</td><td>16#6411sub03</td><td>16</td></tr> <tr> <td>Analogue Output 4</td><td>16#6411sub04</td><td>16</td></tr> <tr> <td>☒ 16#1402: Receive PDO 3 Parameter</td><td>16#401 (\$NODEID+16#400)</td><td>64</td></tr> <tr> <td>Analogue Output 5</td><td>16#6411sub05</td><td>16</td></tr> <tr> <td>Analogue Output 6</td><td>16#6411sub06</td><td>16</td></tr> <tr> <td>Analogue Output 7</td><td>16#6411sub07</td><td>16</td></tr> <tr> <td>Analogue Output 8</td><td>16#6411sub08</td><td>16</td></tr> <tr> <td>☐ 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■ After logging in, downloading, and running the program, the connection is as shown in the image below.

You can see that the adapter's RUN light is constantly on, and the software...The icons are all green.If no error message is displayed, it means that the connection has been successfully established.

设备

Untitled1

Device [连接的] (SMC501)

PLC逻辑

Application [运行]

库管理器

PLC_PRG (PRG)

任务配置

MainTask

PLC_PRG

Trace

LocalBus (LocalBus)

CANbus (CANbus)

CANopen_Manager (CANopen_Manager)

Slaver (Slaver)

SoftMotion General Axis Pool

通用

PDO

SDO

日志

CANopen I/O映射

CANopen IEC对象

状态

信息

查找

过滤器 显示所有

变量	映射	通道	地址	类型	当前值
Write Outputs 0x1 to 0x10			%QW0	UINT	16#0000
Analogue Output 1			%QW1	INT	16#0000
Analogue Output 2			%QW2	INT	16#0000
Analogue Output 3			%QW3	INT	16#0000
Analogue Output 4			%QW4	INT	16#0000
Analogue Output 5			%QW5	INT	16#0000
Analogue Output 6			%QW6	INT	16#0000
Analogue Output 7			%QW7	INT	16#0000
Analogue Output 8			%QW8	INT	16#0000
Module_Count			%IB0	USINT	16#04
Apater_Status_Error_Code			%IW1	UINT	16#0000
Read Inputs 0x1 to 0x10			%IW2	UINT	16#4000
Analogue Input 1			%IW3	INT	16#8000
Analogue Input 2			%IW4	INT	16#8000
Analogue Input 3			%IW5	INT	16#8000
Analogue Input 4			%IW6	INT	16#8000
Analogue Input 5			%IW7	INT	16#8000
Analogue Input 6			%IW8	INT	16#8000
Analogue Input 7			%IW9	INT	16#8000
Analogue Input 8			%IW10	INT	16#8000

■ Node ID and baud rate settings for DF30-C-CAN

The slave station's address and baud rate can be set via the DIP switch on the side of the coupler. The DIP switch is set to ID setting mode at the factory, with the node ID set to 1 and the baud rate set to 500Kbps.

➤ Baud rate settings:

When the coupler is powered off, turning the DIP switch to position 8 (OFF) will activate the baud rate setting mode. The first three DIP switches can be combined to set different baud rates. After setting the baud rate, power on the coupler again. The coupler's factory baud rate is set to 500Kbps. If no further node settings are required, the coupler's node ID will default to 1.

Baud Rate Comparison Table1

The first 3 positions of the DIP switch	baud rate
000	1000Kbps
001 (Default)	500Kbps
010	250Kbps
011	125Kbps
100	100Kbps
101	50Kbps
110	20Kbps
111	10Kbps

➤ Node ID settings:

With the coupler powered off, turn the DIP switch to position 8 ON to set the node ID. The first 7 digits of the DIP switch can be combined to set different node ID values (1~127). After completing the DIP setting, power on the coupler again. The coupler will be set to 1 by default, and the node ID will be set to 1. If you do not continue to set the baud rate, the baud rate of the coupler will be 500Kbps by default.

➤ Setup steps:

Note: You must first set the baud rate and power cycle the device before setting the node ID. Finally, set the operating mode to ID setting mode. Otherwise, the node ID will always be 1 in baud rate setting mode.

■ Parameter configuration

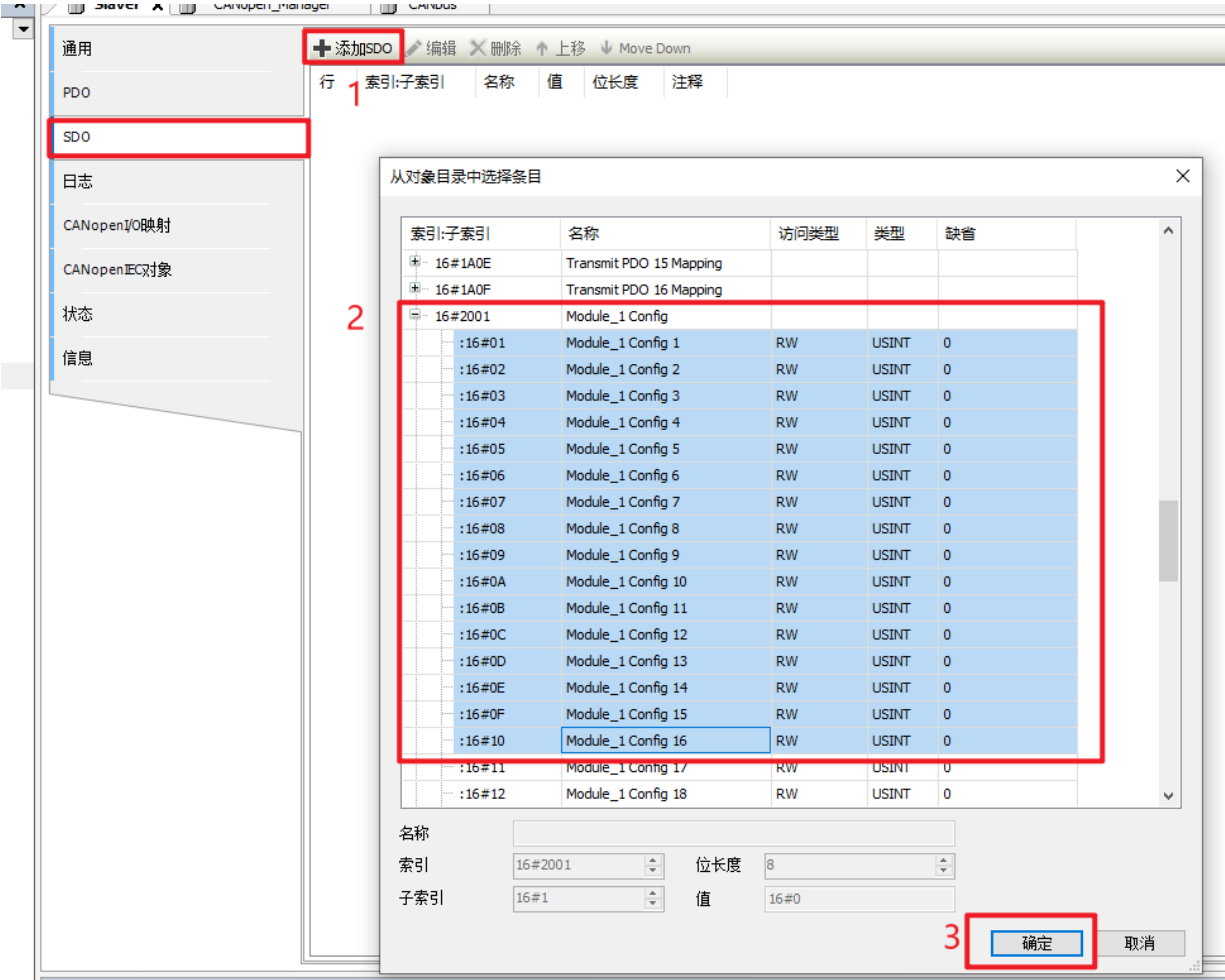
Upon power-on, all I/O module configurations of the DF30-C-CAN will revert to their default settings. I/O module configurations can be changed by adding SDOs (Sub-DOs). For SDO index and sub-index definitions, please refer to [link/reference].[SDO definition](#)The SDO sub-index is of type uint8_t, and when configuring uint16_t parameters, the low byte first, high byte last principle is

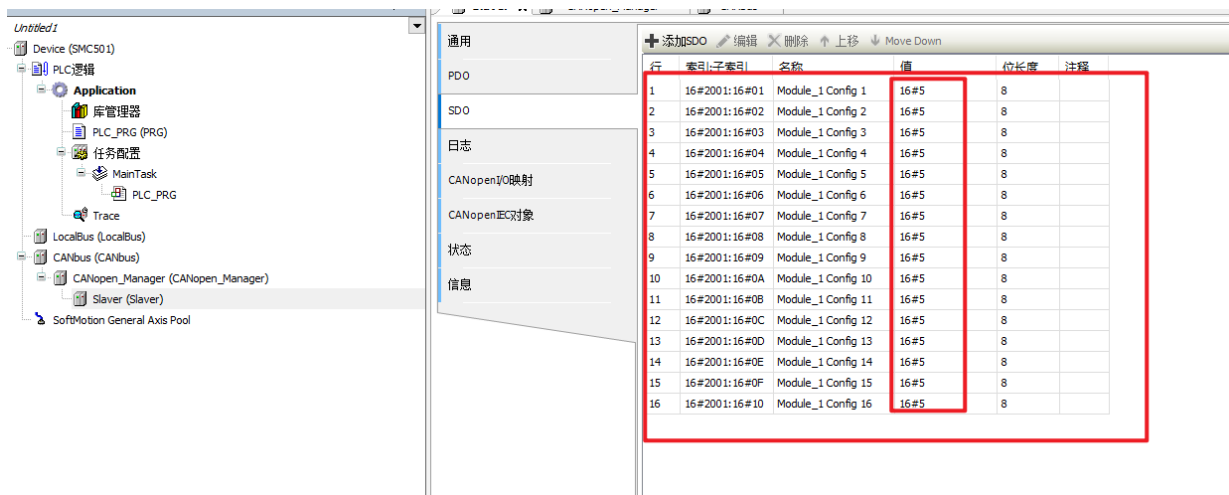
followed.

Taking the topology of DF30-C-CAN + DF30-M-16DI + DF30-M-16DO-P + DF30-M-8AI-I + DF30-M-8AO-I as an example:

➤ Configure DF30-M-16DI module

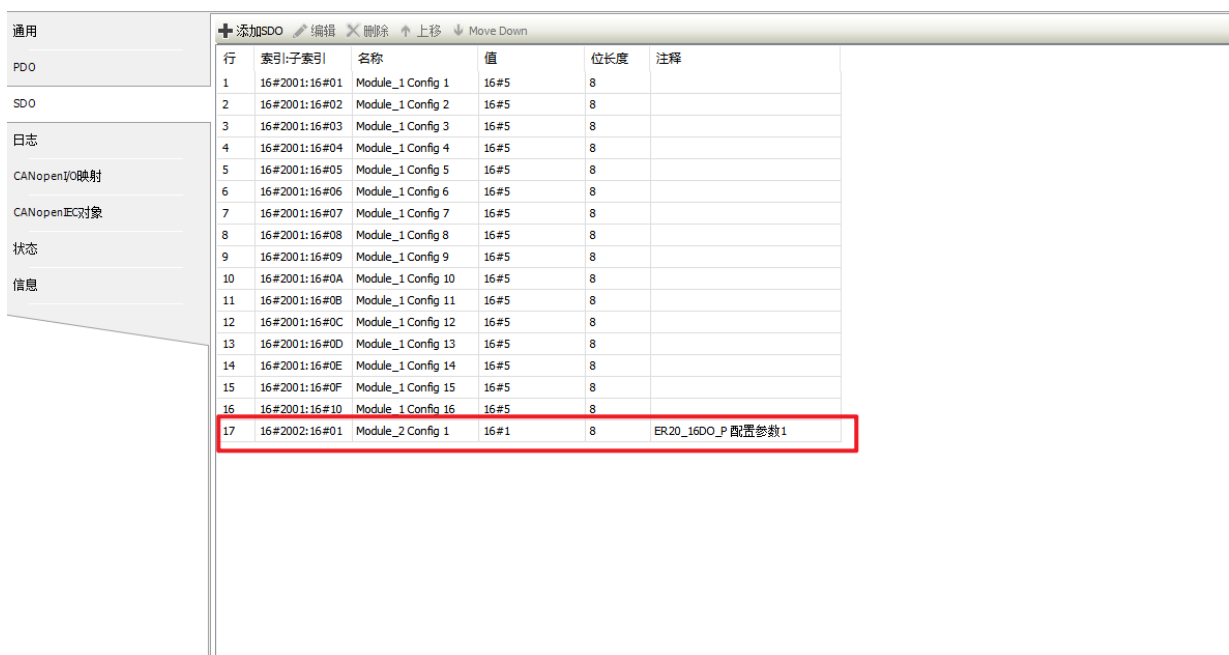
The configuration parameters for DF30-M-16DI can be found in the module's user manual. This module is the first module in the topology and supports individual configuration of 16 bytes of filter parameters, corresponding to SDO index 0x2001 and sub-indexes 0x01~0x10. Each sub-index corresponds to one byte of filter configuration. The default filter value for DF30-M-16DI is 3. If you want to change it to another value, for example, if you want to configure the filter for all channels of DF30-M-16DI to 5, then add all 16 channel sub-indexes and write 5 into the added sub-indexes.





➤ Configure DF30-M-16DO-P module

The configuration parameters for the DF30-M-16DO-P module can be found in the module's user manual. This module is the second module in the topology. The DF30-M-16DO-P module supports 5 bytes of parameter configuration, corresponding to SDO index 0x2002 and sub-indexes 0x01~0x5. Each sub-index corresponds to one byte of configuration. For example, if we want to change the output mode of the DF30-M-16DO-P module to off output mode, we add SDO index 0x2002 and sub-index 0x01. An enumeration value of 0 represents the default configuration output mode as automatic retry, and an enumeration value of 1 represents off output mode. We write 1 to index 0x2002 and sub-index 0x01, thus configuring the output mode to off output. If other configurations are not changed, there is no need to add SDO; the module will use the default configuration.



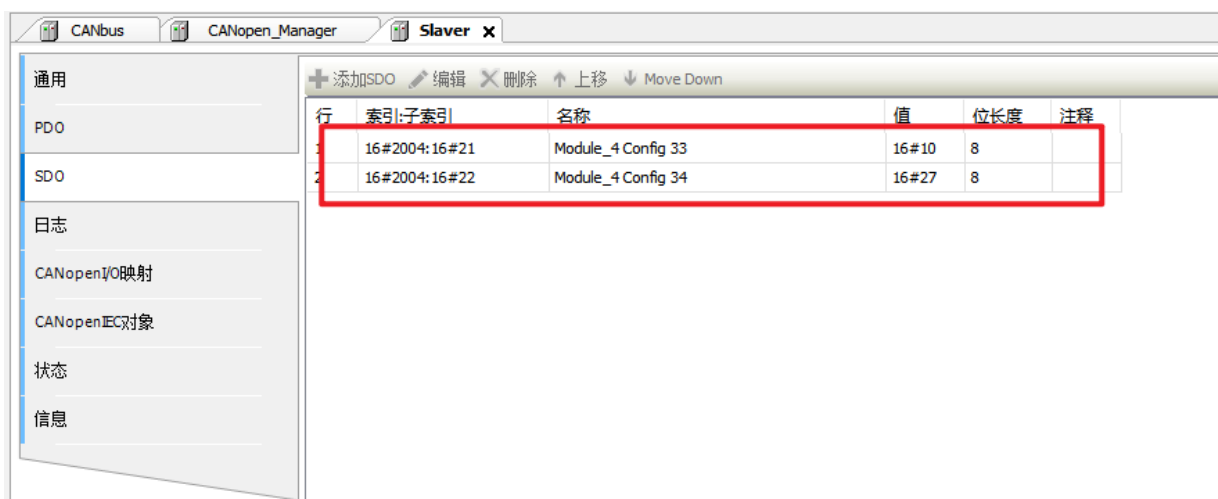
➤ Configure DF30-M-8AI-I module

The configuration parameters for the DF30-M-8AI-I module can be found in the module's user manual. This module is the third module in the topology. The DF30-M-8AI-I module supports 43 bytes of parameter configuration, corresponding to index 0x2003 and sub-indexes 0x01~0x2B. Each sub-index corresponds to one byte of configuration. For example, if we want to change the measurement range of channel 8 of the DF30-M-8AI-I module to 0~20mA, we add an SDO index 0x2003 and a sub-index 0x24. The enumeration value 3 is the default configuration of 4~20mA, and the enumeration value 2 is 0~20mA. We write 2 into index 0x2003 and sub-index 0x24, which configures the measurement range of channel 8 to 0~20mA. If other configurations are not changed, there is no need to add an SDO; the module will use the default configuration.

通用	+ 添加SDO 编辑 删除 上移 下移 Move Down					
PDO	行	索引 子索引	名称	值	位长度	注释
SDO	1	16#2001:16#01	Module_1 Config 1	16#5	8	
日志	2	16#2001:16#02	Module_1 Config 2	16#5	8	
CANopenI/O映射	3	16#2001:16#03	Module_1 Config 3	16#5	8	
CANopenEC对象	4	16#2001:16#04	Module_1 Config 4	16#5	8	
状态	5	16#2001:16#05	Module_1 Config 5	16#5	8	
信息	6	16#2001:16#06	Module_1 Config 6	16#5	8	
	7	16#2001:16#07	Module_1 Config 7	16#5	8	
	8	16#2001:16#08	Module_1 Config 8	16#5	8	
	9	16#2001:16#09	Module_1 Config 9	16#5	8	
	10	16#2001:16#0A	Module_1 Config 10	16#5	8	
	11	16#2001:16#0B	Module_1 Config 11	16#5	8	
	12	16#2001:16#0C	Module_1 Config 12	16#5	8	
	13	16#2001:16#0D	Module_1 Config 13	16#5	8	
	14	16#2001:16#0E	Module_1 Config 14	16#5	8	
	15	16#2001:16#0F	Module_1 Config 15	16#5	8	
	16	16#2001:16#10	Module_1 Config 16	16#5	8	
	17	16#2002:16#01	Module_2 Config 1	16#1	8	ER20_16DO_P 输出模式配置
	18	16#2003:16#24	Module_3 Config 36	16#2	8	ER20_8AI_I通道8测量范围配置

➤ Configure DF30-M-8AO-I module

For the configuration parameters of DF30-M-8AO-I, please refer to the user manual of this module. This module is the 4th module in the topology. The DF30-M-8AO-I module supports 34 bytes of parameter configuration, corresponding to index 0x2004 and sub-indexes 0x01~0x22. Each sub-index corresponds to one byte of configuration. For example, if we want to set the output preset value of channel 8 of the DF30-M-8AO-I module to 10000 (0x2710), and the output preset value is a parameter of type uint16_t, we need to add SDO index 0x2004 and sub-indexes 0x21 and 0x22. We write 0x10 to index 0x2004 sub-index 0x21, that is, we write 0x27 to index 0x2004 sub-index 0x22. If other configurations are not changed, there is no need to add SDO, and the module uses the default configuration.

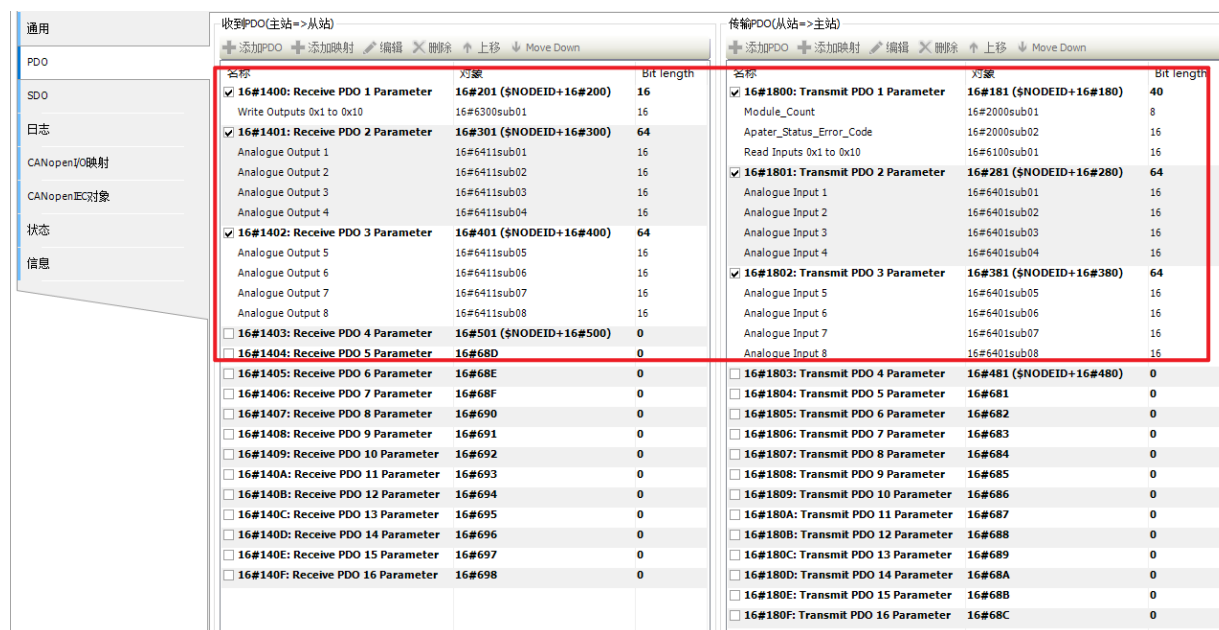


After modifying the configuration data, click the login icon at the top of the interface. After successfully logging in, click the start icon at the top of the interface.

■ Process data

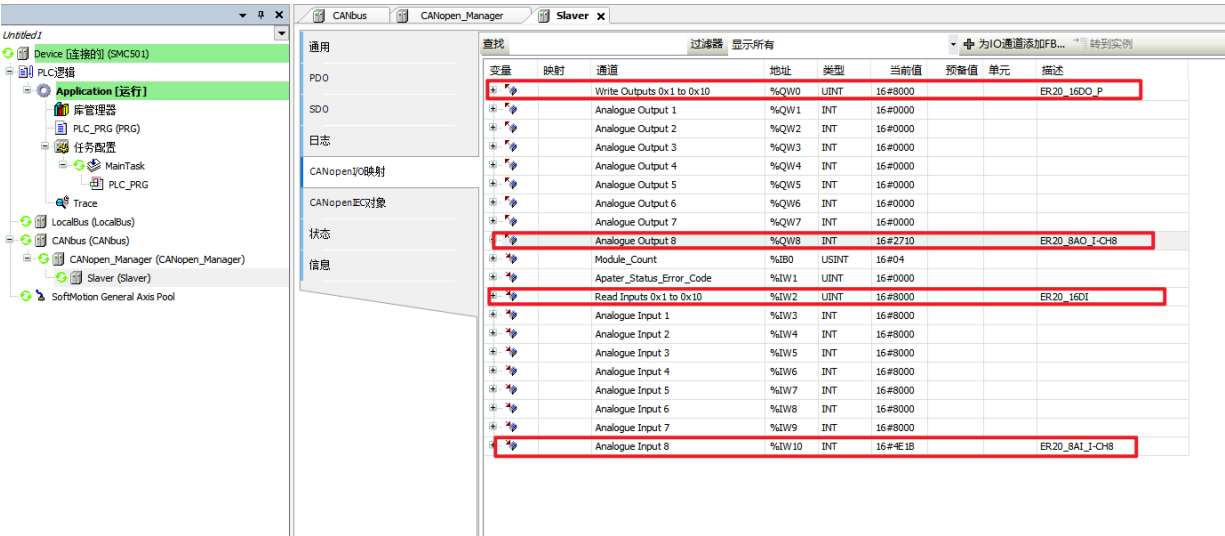
Reference to the mapping relationship between PDO and IO module process data [PDO and IO module process data mapping](#);

Adding a PDO to the topology of DF30-C-CAN + DF30-M-16DI + DF30-M-16DO-P + DF30-M-8AI-I + DF30-M-8AO-I:



The effective voltage of channel 16 of the DF30-M-16DI module is displayed as 0x8000; the mapping value of DF30-M-16DO-P is written as 0x8000, and the measured output of channel 16 is 24V; the 8th channel of the DF30-M-8AI-I module is configured for 0~20mA measurement, and the input of channel 8 is 20mA, with the mapping value displayed as 0x4E1B, corresponding to code

value 19995; the 8th channel of the DF30-M-8AO-I module is configured for 4~20mA measurement, and the mapping value of channel 8 is written as 0x2710(10000), with the measured current being 11.989mA.



■ Firmware version query

Index address (HEX)	Sub-index address (HEX)	Bit length	meaning
0x2000	0x03	16bit	Coupler version number
	0x04	8bit	Module firmware version query control word 0: Disable 1~16: Module serial numbers to be queried
	0x05	16bit	Module firmware version number

Taking the topology of DF30-C-CAN + DF30-M-16DI + DF30-M-16DO-P + DF30-M-8AI-I + DF30-M-8AO-I as an example:

Add sub-indexes 0x03 and 0x05 to TPDO, and sub-index 0x04 to RPDO. The coupler firmware version number is 16#0101, indicating version number V1.0.1. The topology serial number of DF30-M-16DO-P is 2. Write 2 to Module_Version_EN. You can query that the radix value of DF30-M-16DO-P is 16#0201, indicating version number V2.0.1.



变量	映射	通道	地址	类型	当前值
Write Outputs 0x1...			%QW0	UINT	16#0000
Module_Version_EN			%QB2	USINT	16#02
Analogue Output 1			%QW2	INT	16#0000
Analogue Output 2			%QW3	INT	16#0000
Analogue Output 3			%QW4	INT	16#0000
Analogue Output 4			%QW5	INT	16#0000
Analogue Output 5			%QW6	INT	16#0000
Analogue Output 6			%QW7	INT	16#0000
Analogue Output 7			%QW8	INT	16#0000
Analogue Output 8			%QW9	INT	16#0000
Apater_Status_Err...			%IW0	UINT	16#0000
Apater_Version			%IW1	UINT	16#0101
Module_Version			%IW2	UINT	16#0201
Read Inputs 0x1 to...			%IW3	UINT	16#4000
Analogue Input 1			%IW4	INT	16#8000
Analogue Input 2			%IW5	INT	16#8000
Analogue Input 3			%IW6	INT	16#8000
Analogue Input 4			%IW7	INT	16#8000
Analogue Input 5			%IW8	INT	16#8000
Analogue Input 6			%IW9	INT	16#8000
Analogue Input 7			%IW10	INT	16#8000
Analogue Input 8			%IW11	INT	16#8000

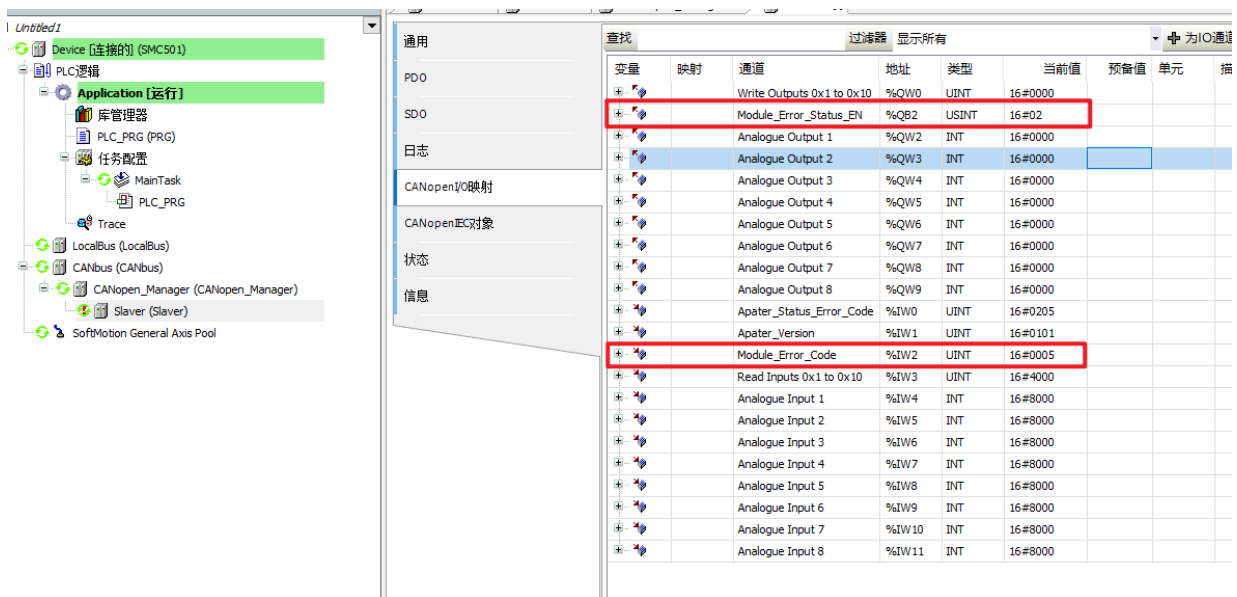
■ Module Diagnostics

Index address (HEX)	Sub-index address (HEX)	Bit length	meaning
0x2000	0x01	8bit	Number of valid I/O modules mounted
	0x02	16bit	bit0~bit3: Error code Bits 4-7: 0 indicates an error in the module itself, and 1-8 indicate an error in the channel. Bits 8-13: 0 indicates the coupler, 1-32 indicates a module error. Bits 14-15: Reserved
	0x06	8bit	Module fault code query control word 0: Disable 1~16: Module serial numbers to be queried
	0x07	16bit	Module fault codes (If the high 8 bits = 0, then the low 8 bits = module fault code: see reference)Fault Code Description) (If the high 8 bits = 1~8, then the low 8 bits = channel fault code: see reference)Fault Code Description)

Taking the topology of DF30-C-CAN + DF30-M-16DI + DF30-M-16DO-P + DF30-M-8AI-I + DF30-M-8AO-I as an example:

➤ Method 1 for querying module fault codes

Add sub-index 0x07 to TPDO and sub-index 0x06 to RPDO. Set the topology serial number of DF30-M-16DO-P to 2 and write 2 to Module_Error_Status_EN. You can then query the fault codes of DF30-M-16DO-P. For example, fault code 0x0005 indicates a fault in the DF30-M-16DO-P module itself, and 5 indicates a power supply abnormality.



变量	映射	通道	地址	类型	当前值	预置值	单元	描
*		Write Outputs 0x1 to 0x10	%QW0	UINT	16#0000			
*		Module_Error_Status_EN	%QB2	USINT	16#02			
*		Analogue Output 1	%QW2	INT	16#0000			
*		Analogue Output 2	%QW3	INT	16#0000			
*		Analogue Output 3	%QW4	INT	16#0000			
*		Analogue Output 4	%QW5	INT	16#0000			
*		Analogue Output 5	%QW6	INT	16#0000			
*		Analogue Output 6	%QW7	INT	16#0000			
*		Analogue Output 7	%QW8	INT	16#0000			
*		Analogue Output 8	%QW9	INT	16#0000			
*		Aptater_Status_Error_Code	%IW0	UINT	16#0205			
*		Aptater_Version	%IW1	UINT	16#0101			
*		Module_Error_Code	%IW2	UINT	16#0005			
*		Read Inputs 0x1 to 0x10	%IW3	UINT	16#4000			
*		Analogue Input 1	%IW4	INT	16#8000			
*		Analogue Input 2	%IW5	INT	16#8000			
*		Analogue Input 3	%IW6	INT	16#8000			
*		Analogue Input 4	%IW7	INT	16#8000			
*		Analogue Input 5	%IW8	INT	16#8000			
*		Analogue Input 6	%IW9	INT	16#8000			
*		Analogue Input 7	%IW10	INT	16#8000			
*		Analogue Input 8	%IW11	INT	16#8000			

➤ Method 2 for querying module fault codes

Add index 0x2000 and subindex 0x02 to the TPDO. 0x0205 indicates an error in the second module. The second module is connected to a DF30-M-16DO-P, and the error code is 5. (Refer to...) [Fault Code Description](#) 5 indicates a power supply abnormality, specifically a power supply abnormality for DF30-M-16DO-P. After a fault is triggered, the configuration icon will display a fault message. If you do not want to add a PDO, you can check the fault code in the log. The system will return to normal after the fault is cleared.

变量	映射	通道	地址	类型	当前值	预备值	单元	描述
Write Outputs 0x1 to 0x10			%QW0	UINT	16#8000			ER20_16DO_P
Analogue Output 1			%QW1	INT	16#0000			
Analogue Output 2			%QW2	INT	16#0000			
Analogue Output 3			%QW3	INT	16#0000			
Analogue Output 4			%QW4	INT	16#0000			
Analogue Output 5			%QW5	INT	16#0000			
Analogue Output 6			%QW6	INT	16#0000			
Analogue Output 7			%QW7	INT	16#0000			
Analogue Output 8			%QW8	INT	16#2710			ER20_8AO_I-CH8
Module_Count			%IB0	USINT	16#04			
Aapter_Status_Error_Code			%IW1	UINT	16#0205			
Read Inputs 0x1 to 0x10			%IW2	UINT	16#8000			ER20_16DI
Analogue Input 1			%IW3	INT	16#8000			
Analogue Input 2			%IW4	INT	16#8000			
Analogue Input 3			%IW5	INT	16#8000			
Analogue Input 4			%IW6	INT	16#8000			
Analogue Input 5			%IW7	INT	16#8000			
Analogue Input 6			%IW8	INT	16#8000			
Analogue Input 7			%IW9	INT	16#8000			
Analogue Input 8			%IW10	INT	16#8000			ER20_8AI_I-CH8

➤ When a fault occurs:

➤ After clearing the fault:

Note: Method 2Index 0x2000 and subindex 0x02 will only display the highest priority errors. Coupler fault priority > module fault priority, and the priority of the module with the smaller serial number > the priority of the module with the larger serial number. If you want to query the fault code of a specific module, please use method 1.

6 Appendix

6.1 SDO definition

Index address (HEX)	Sub-index address (HEX)	describe	illustrate	Data types
0x1000		Device Type	See Cia301	
0x1001		Error Register	See Cia301	
0x1005		COB ID SYNC	See Cia301	
0x1006		Communication Cycle Period	See Cia301	
0x1008		Manufacturer Device Name	See Cia301	
0x100A		Manufacturer Software Version	See Cia301	
0x1014		COB ID EMCY	See Cia301	
0x1015		Inhibit Time Emergency	See Cia301	
0x1017		Producer Heartbeat Time	See Cia301	
0x1018		Identity Object	See Cia301	
0x1200		Server SDO Parameter	See Cia301	
0x1400-0x140F		Receive PDO Parameter	RPDO parameters	
0x1A00-0x1A0F		Transmit PDO Parameter	TPDO parameters	
0x2000		Diagnose_Info	Diagnostic information	
	0x0	Number of entries	Number of parameters	8bit
	0x1	Module_Count	Number of effective I/O modules (Read-only)	8bit
	0x2	Apater_Status_Error_Code	Status error code	16bit

			(Read-only)	
	0x3	Apater_Version	Coupler version (Read-only)	16bit
	0x4	Module_Version_EN	Module firmware version query control word 0: Disable 1~16: Module serial numbers to be queried	8bit
	0x5	Module_Version	Module firmware version number (Read-only)	16bit
	0x6	Module_Error_Status_EN	Module fault code query control word 0: Disable 1~16: Module serial number needs to be retrieved.	8bit
	0x7	Module_Error_Code	Module fault codes (Read-only)	16bit
0x2001		Module_1 Config	IO Module 1 Configuration	
	0x0	Num of configures	Number of configuration parameters for IO module 1	8bit
	0x1	Module_1 Config1	IO Module 1 Configuration	8bit

			Parameter 1	
	0x2	Module_1 Config2	IO Module 1 Configuration Parameters 2	8bit
	0x3	Module_1 Config3	IO Module 1 Configuration Parameters 3	8bit
	...	...	...	
	0x32	Module_1 Config50	IO module 1 configuration parameters 50	8bit
0x2002		Module_2Config	IO Module 2 Configuration	
	0x0	Num of configures	Number of configuration parameters for IO module 2	8bit
	0x1	Module_2Config1	IO Module 2 Configuration Parameter 1	8bit
	0x2	Module_2Config2	IO Module 2 Configuration Parameters 2	8bit
	0x3	Module_2Config3	IO Module 2 Configuration Parameters 3	8bit
	...	...	...	
	0x32	Module_2Config50	IO Module 2 Configuration	8bit

			Parameters 50	
...	...	...	...	
0x2010		Module_16Config	IO module 16 configuration	
	0x0	Num of configures	Number of configuration parameters for IO module 16	8bit
	0x1	Module_16Config1	IO module 16 configuration parameters 1	8bit
	0x2	Module_32Config2	IO module 16 configuration parameters 2	8bit
	0x3	Module_16Config3	IO module 16 configuration parameters 3	8bit
	...	...	...	
	0x32	Module_16Config50	IO module 16 configuration parameters 50	8bit

Note: The definitions of I/O modules may differ depending on the module configuration. Please refer to the manual for each I/O module for details. After powering off the coupler, all I/O modules will use the default configuration.

➤ Apter_Status

Reading sub-index 0x1 of object dictionary 0x2000 retrieves the number of currently active I/O modules. Reading sub-index 0x2 of object dictionary 0x2000 retrieves the current system status fault code. See the documentation for specific value descriptions. [Fault Code Description](#).

➤ IO module configuration

The object dictionary 0x2001~0x2010 is used to set the configuration parameters of the IO

module. Each object corresponds to the configuration of one IO module, and each sub-index corresponds to 1 byte of parameter configuration. Each object supports a maximum of 50 bytes of parameter configuration; a maximum of 16 IO modules can be configured.

6.2 PDO and IO module process data mapping

The DF30-M-CAN adapter supports the DS401 device specification protocol, 16 TPDOs and 16 RPDOs.

The process data of the IO module will be mapped to objects 0x6100, 0x6120, 0x6200, 0x6300, 0x6320, 0x6401, and 0x6411 respectively, according to the attributes of different module types.

IO module types	Index address (HEX)	Sub-index address (HEX)	describe	Data types
16-channel digital Input module (DF30-M-16DI)	0x6100	0x01	The first 16-channel digital quantity Input module	16bit
		0x02	The second 16-channel digital quantity Input module	16bit
		...		
		0x10	The 16th 16-channel digital quantity Input module	16bit
32-channel digital input Input module (DF30-M-32DI)	0x6120	0x01	The first 32-channel digital quantity Input module	32bit
		0x02	The second 32-channel digital quantity Input module	32bit
		...		

		0x10	The 16th 32-channel digital quantity Input module	32bit
8-channel digital Output module (DF30-M-8DOR)	0x6200	0x01	The first 8-channel digital quantity Output module	8bit
		0x02	The second 8-channel digital quantity Output module	8bit
		...		
		0x10	The 16th 8-channel digital quantity Output module	8bit
16-channel digital Output module (DF30-M-16DO_P) (DF30-M-16DO_N)	0x6300	0x01	The first 16-channel digital quantity Output module	16bit
		0x02	The second 16-channel digital quantity Output module	16bit
		...		
		0x10	The 16th 16-channel digital quantity Output module	16bit
32-channel digital input Output module (DF30-M-32DO_P) (DF30-M-32DO_N)	0x6320	0x01	The first 32-channel digital quantity Output module	32bit
		0x02	The second 32-channel digital quantity Output module	32bit

		...		
		0x10	The 16th 32-channel digital quantity Output module	32bit
Analog input module (DF30-M-8AI_I) (DF30-M-8AI_U) (DF30-M-4AI_UI) (DF30-M-8AI_TC) (DF30-M-4RTD_TC)	0x6401	0x01	The first analog quantity Input module channel 1	16bit
		0x02	The first analog quantity Input module channel 2	16bit
		...		
		0x40	The nth analog quantity Output module channel n	16bit
Analog output module (DF30-M-8AO_I) (DF30-M-8AO_U) (DF30-M-4AO_UI)	0x6411	0x01	The first analog quantity Output module channel 1	16bit
		0x02	The first analog quantity Output module channel 1	16bit
		...		
		0x40	The nth analog quantity Output module channel n	16bit

6.3 Fault Code Description

Fault location	Fault Name	Fault Codes	Solution/Cause
Coupler	The protocol stack did not scan the module.	1	Check if the module is inserted firmly and if the clips are fastened securely.

	Module quantity exceeded	2	Check the number of backplane modules
	The configured IO module does not match the actual card being scanned.	3	Check whether the configuration module model and sequence are consistent with the actual modules.
	Configuration list not downloaded	4	
	Hot-swap failed, module model incorrect.	5	Check if the signals of the newly plugged-in/unplugged module are consistent with the original signals.
Module	Backplane bus timeout	1	Check if the module is installed correctly.
	Flash read failure	3	Reconnect the power or contact the supplier.
	Configuration parameter error	4	Check if the configuration parameters are reasonable.
	Power supply failure	5	Check power supply
	ADC anomaly	6	Reconnect the power or contact the supplier.
	DAC error	7	Reconnect the power or contact the supplier.
aisle	Overcurrent	1	Check if the load is too high.
	Overheating	2	Check external wiring and whether the load is too high.
	Short circuit	3	Check the external wiring of the channel
	Open circuit/disconnection	4	Check the external wiring of the channel

	overflow	5	Check if the external input signal is normal.
	overflow	6	Check if the external input signal is normal.
	Exceeding the limit	7	Check if the external input signal is normal.
	Below the lower limit	8	Check if the external input signal is normal.
	Sensor type error	9	Check if the connected sensors and configuration items match.