

QY20 Series IO modules

User Manual



Preface

Thank you for choosing the QY20 series IO module products.

This manual introduces product information, product installation, electrical installation, program debugging, and fault diagnosis. The illustrations are for illustrative purposes only and may differ slightly from the actual product. Due to product upgrades, there may also be slight differences; please refer to the actual product.

Please keep this manual safe for future inspection and maintenance.

If you have any questions, please contact our company or our agents promptly. We are happy to assist you.

● Version Change Log

Change time	Release version	Change Notice
2025-7	V00	The manual was published for the first time.

● Related materials

name	serial number	Synopsis
QY20-ECT Coupler User Manual	QY20000000ECT	It introduces product information, product installation, electrical installation, program debugging, and fault diagnosis.
QY20-PN Coupler User Manual	QY20000000PN	It introduces product information, product installation, electrical installation, program debugging, and fault diagnosis.
QY20-CCT Coupler User Manual	QY20000000CCT	It introduces product information, product installation, electrical installation, program debugging, and fault diagnosis.
QY20 Series IO Module User Manual (This Manual)	QY20000200IO	It introduces product information, product installation, electrical installation, program debugging, and fault diagnosis.

Safety Precautions

● Security Statement

This chapter outlines the safety precautions required for the proper use of 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



危险

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



警告

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



注意

This indicates that failure to operate according to regulations may result in minor physical 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.

Unpacking and inspection



警告

- 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 upon unpacking!
- Please carefully check the packing list. If you find any discrepancies between the packing list and the product name, please do not install!



注意

- Before unpacking, 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



注意

- Please strictly follow the storage and transportation conditions required for the product ; otherwise, there is a risk of product damage.
- Avoid storing and transporting the product in places where it is splashed with water, exposed to direct sunlight, or subjected to strong electric or magnetic fields or intense vibrations.
- 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, sealed containers must be used.
- This product must not be transported together with equipment or items that may affect or damage this product.

Install



危险

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



警告

- 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 while performing installation work, as this may pose 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!

- It is strictly forbidden to loosen the fixing bolts of product parts and components, or the bolts marked in red!

- When this product is installed in a cabinet or terminal device, the cabinet or terminal device must be provided with appropriate fireproof enclosures, electrical protective enclosures, and mechanical protective enclosures, and the protection level should comply with relevant EC 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.



注意

- During installation, please cover the top of the product with a cloth or paper to prevent metal shavings, oil, water, or other foreign objects from entering the product and causing malfunction. After installation, please remove the cover to prevent it from blocking the ventilation holes and affecting heat dissipation, which could lead to abnormal overheating of the product.

- 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.

wiring



危险

- Non-professionals are strictly prohibited from installing, wiring, maintaining, inspecting, or replacing 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; otherwise, there is a risk of electric shock.

- Do not perform wiring work, remove product covers, or touch circuit boards with the power 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.



警告

- 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 in wiring must meet the corresponding requirements for wire diameter and shielding. The shielding layer of shielded cables must be reliably grounded at one end!

- Please tighten the terminal screws according to the tightening torque specified in the manual. Insufficient or excessive tightening torque may cause the connection to overheat, be damaged, or cause a fire hazard.

- 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.



注意

- 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.



危险

- 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!

- It is strictly forbidden to 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!



警告

- 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.

run



危险

- Non-professionals are strictly prohibited from operating the product, as this could result in 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!



警告

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

repair



危险

- Non-professionals are strictly prohibited from installing, wiring, maintaining, inspecting, or replacing 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, repairs, or other operations.



警告

- 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 proper maintenance records.
- Please follow the product's consumable parts replacement instructions for replacement .
- Do not continue to use the damaged machine, as this may cause personal injury or further damage to the product.
- After replacing the equipment, please be sure to check the wiring and reconfigure the parameters.

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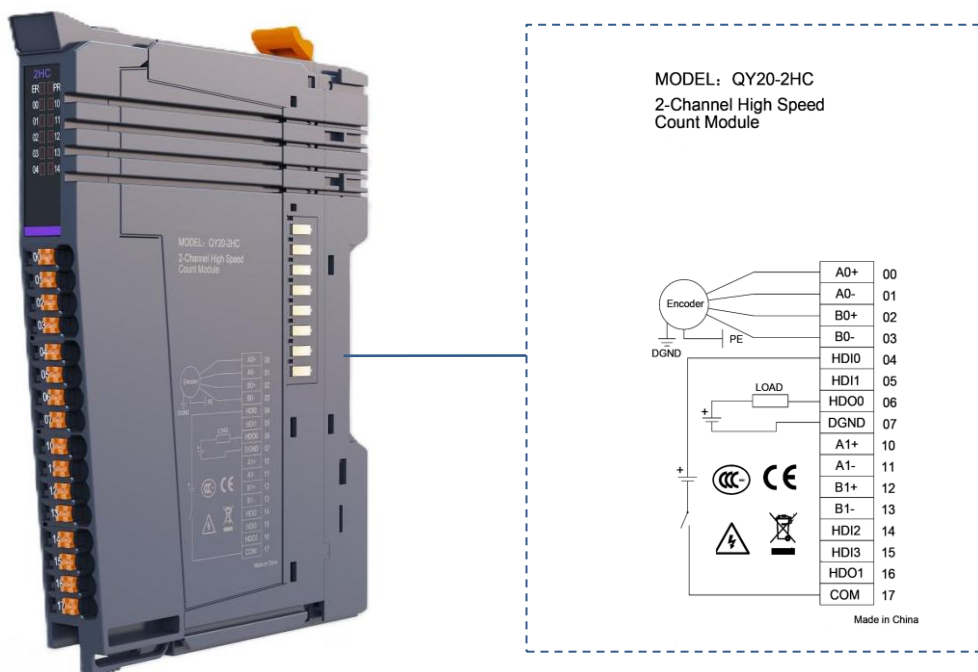
1. Product Information

1.1 Naming Rules and Nameplate Description

- QY20-2HC

QY 20-2 HC
 ① ② ③ ④

①Product Type QY: QY series I/O modules	③ Number of channels 2: Two channels
②Product Series 20:20 Series Blade I/O	④ Type HC: High-speed input counter



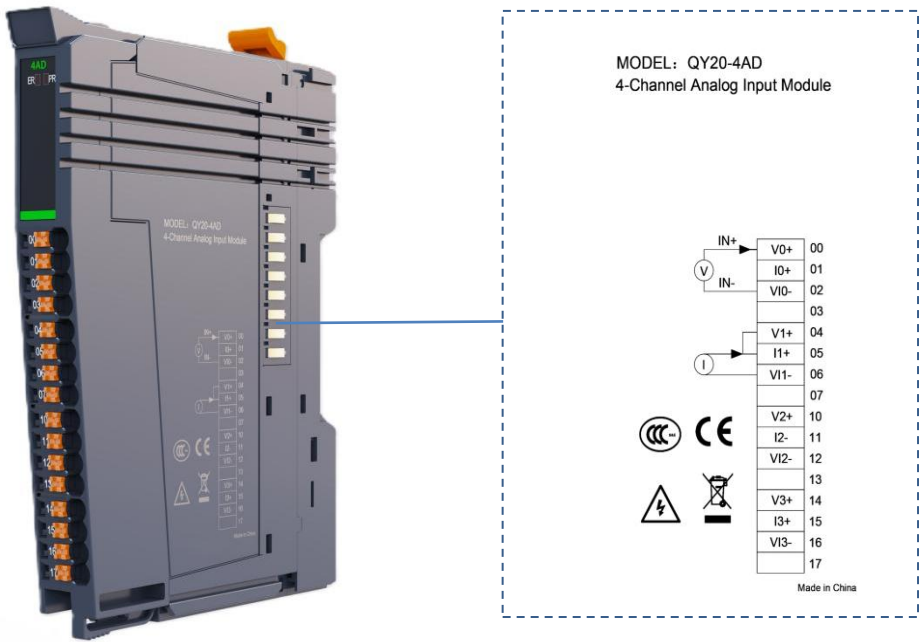
Based on the above naming rules and nameplate instructions , the relevant ordering data for this product is shown in the table below .

model	describe	Whole machine coding	Applicable models
QY20-2HC	2 -channel encoder high-speed counting module	45.02.00 17	ZQ600 Series PLC IO Expansion QY20 Series Coupler IO Expansion

- QY20-4AD

QY 20-4 AD ① ② ③ ④

①Product Type QY: QY series I/O modules	③ Number of channels 4:4 points input
②Product Series 20:20 Series Blade I/O	④ Type AD: Analog Input



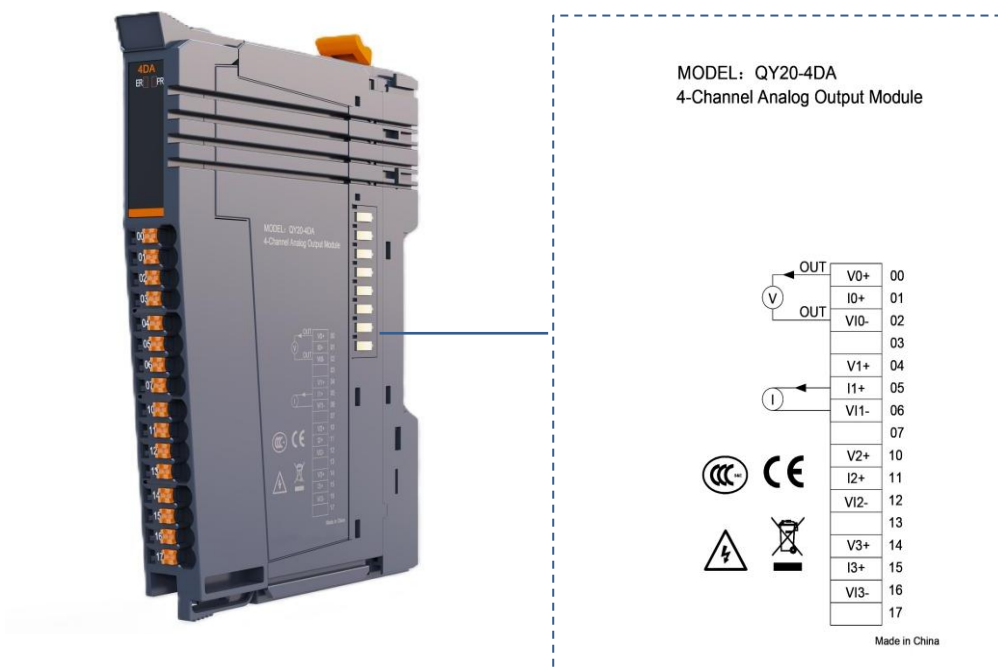
Based on the above naming rules and nameplate instructions , the relevant ordering data for this product is shown in the table below .

model	describe	Whole machine coding	Applicable models
QY20-4AD	4-channel analog input module	45.02.0008	ZQ600 Series PLC IO Expansion QY20 Series Coupler IO Expansion

- QY20-4DA

QY 20-4 DA ① ② ③ ④

①Product Type QY: QY series I/O modules	③ Number of channels 4: 4 channels
②Product Series 20:20 Series Blade I/O	④ Type DA: Analog Output



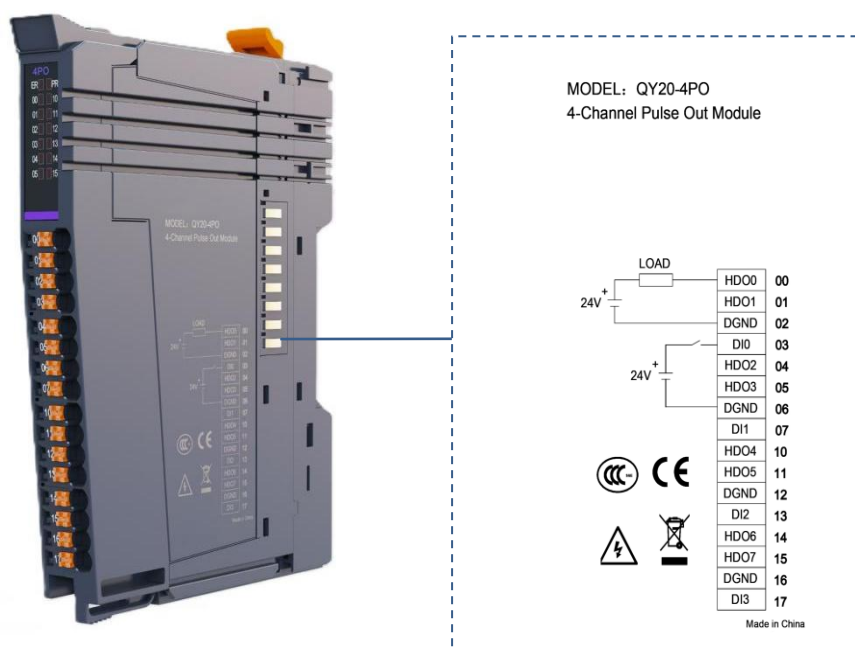
Based on the above naming rules and nameplate instructions , the relevant ordering data for this product is shown in the table below .

model	describe	Whole machine coding	Applicable models
QY20-4DA	4-channel analog output module	45.02.0009	ZQ600 Series PLC IO Expansion QY20 Series Coupler IO Expansion

● QY20-4PO

QY 20-4 PO
 ① ② ③ ④

①Product Type QY: QY series I/O modules	③ Number of channels 4: 4 channels
②Product Series 20:20 Series Blade I/O	④ Type PO: High-speed pulse output



Based on the above naming rules and nameplate instructions , the relevant ordering data for this product is shown in the table below:

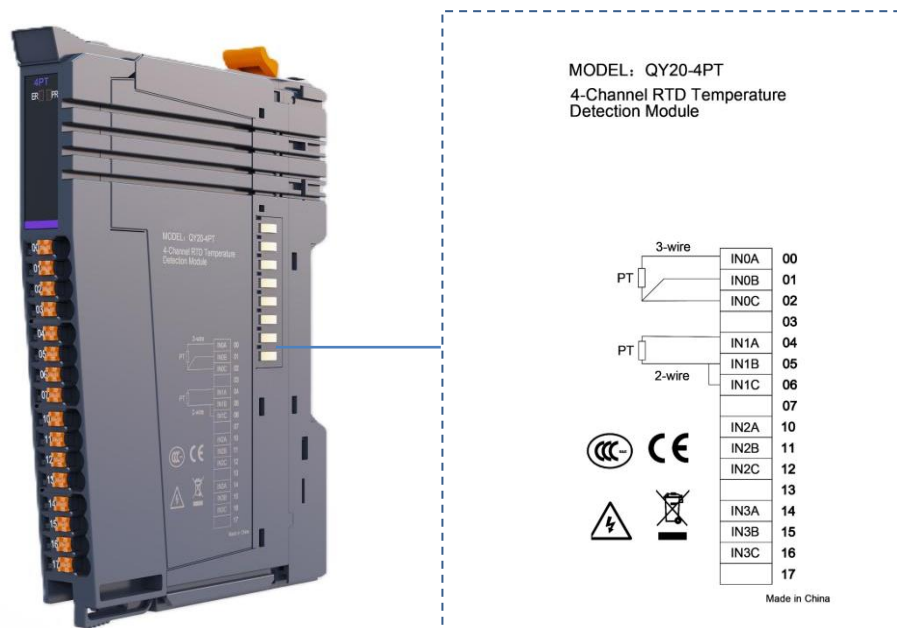
model	describe	Whole machine coding	Applicable models
QY20-4PO	4 -channel pulse output module	45.02.00 18	ZQ600 Series PLC IO Expansion QY20 Series Coupler IO Expansion

● QY20-4PT

QY 20-4 PT

① ② ③ ④

① Product Type QY: QY series I/O modules	③ Number of channels 4: 4 channels
② Product Series 20:20 Series Blade I/O	④ Type PT: Resistance Temperature Detector



Based on the above naming rules and nameplate instructions , the relevant ordering data for this product is shown in the table below .

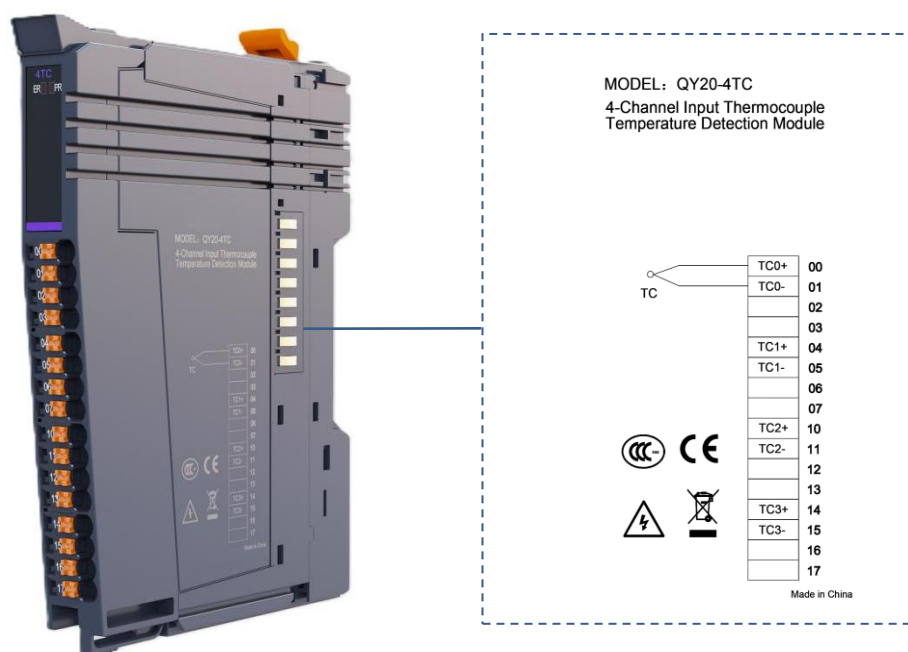
model	describe	Whole machine coding	Applicable models
QY20-4PT	4-channel RTD temperature detection module	45.02.0015	ZQ600 Series PLC IO Expansion QY20 Series Coupler IO Expansion

● QY20-4TC

QY 20-4 TC

① ② ③ ④

①Product Type QY: QY series I/O modules	③ Number of channels 4:4 points input
②Product Series 20:20 Series Blade I/O	④ Type TC: Thermocouple Temperature Acquisition



Based on the above naming rules and nameplate instructions , the relevant ordering data for this product is shown in the table below:

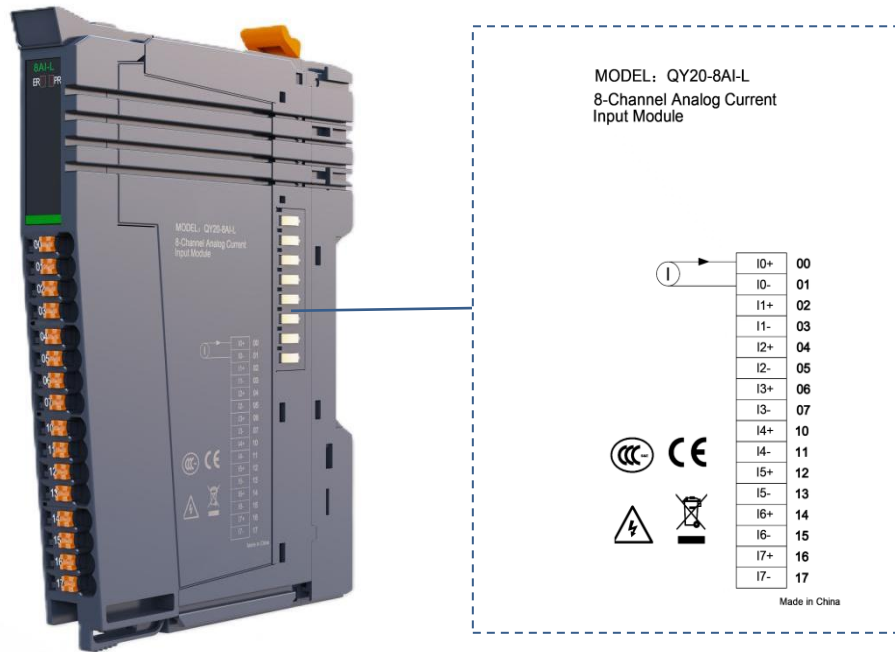
model	describe	Whole machine coding	Applicable models
QY20-4TC	4-channel thermocouple temperature detection module	45.02.0016	ZQ600 Series PLC IO Expansion QY20 Series Coupler IO Expansion

● QY20-8AI-L

QY 20-8 AI-L

① ② ③ ④ ⑤

①Product Type QY: QY series I/O modules	③ Number of channels 8: 8 channels	⑤ Accuracy L: Low precision
②Product Series 20:20 Series Blade I/O	④ Type AI: Current-type analog input	



Based on the above naming rules and nameplate instructions , the relevant ordering data for this product is shown in the table below .

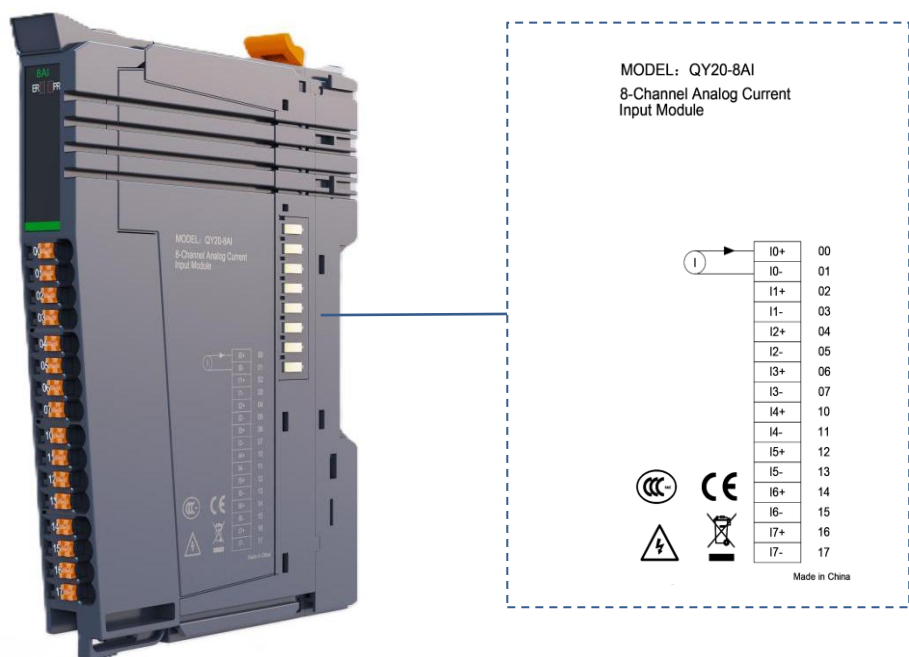
model	describe	Whole machine coding	Applicable models
QY20-8AI -L	8 -channel low-precision current-type analog input module	45.02.0012	ZQ600 Series PLC IO Expansion QY20 Series Coupler IO Expansion

● QY20-8AI

QY 20-8 AI

① ② ③ ④

①Product Type QY: QY series I/O modules	③ Number of channels 8:8 o'clock input
②Product Series 20:20 Series Blade I/O	④ Type AI: Current-type analog input



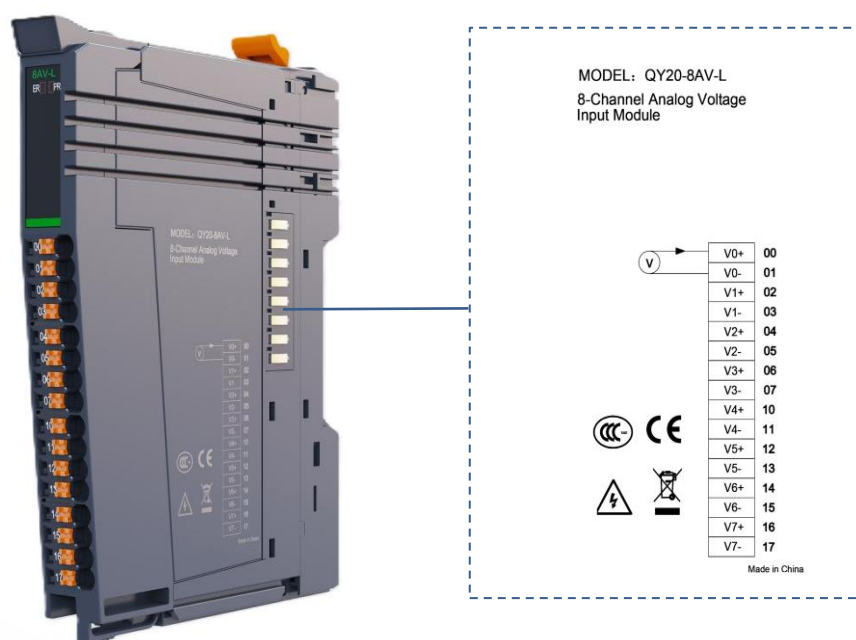
Based on the above naming rules and nameplate instructions , the relevant ordering data for this product is shown in the table below:

model	describe	Whole machine coding	Applicable models
QY20-8AI	8 -channel analog current input module	45.02.0014	ZQ600 Series PLC IO Expansion QY20 Series Coupler IO Expansion

● QY20-8AV-L

QY 20-8 AV-L
 ① ② ③ ④ ⑤

①Product Type QY: QY series I/O modules	③ Number of channels 8:8 o'clock input	⑤ Accuracy L: Low precision
②Product Series 20:20 Series Blade I/O	④ Type AV: Voltage-type analog input	



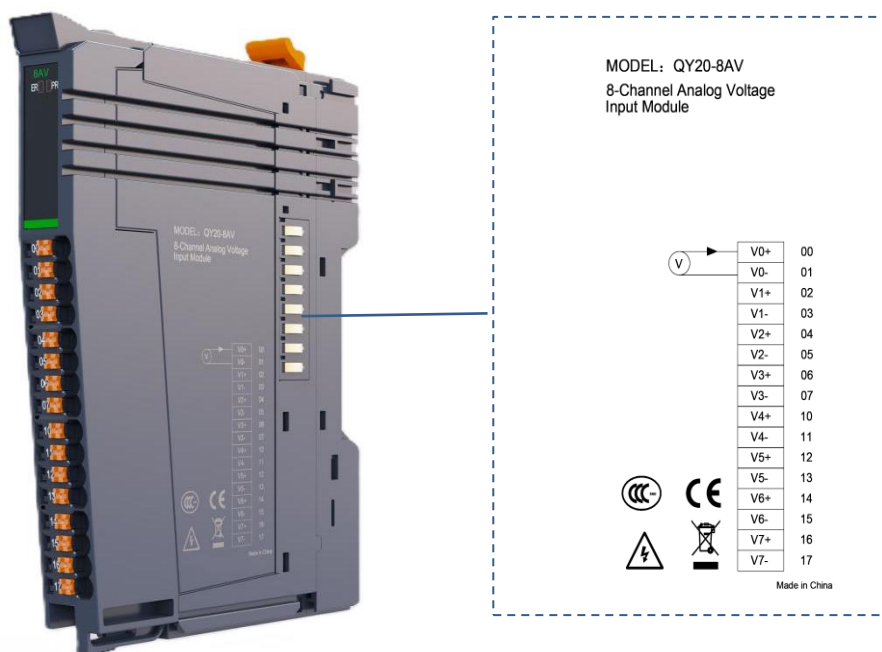
Based on the above naming rules and nameplate instructions , the relevant ordering data for this product is shown in the table below:

model	describe	Whole machine coding	Applicable models
QY20-8AV -L	8 -channel low-precision voltage -type analog input module	45.02.00 21	ZQ600 Series PLC IO Expansion QY20 Series Coupler IO Expansion

● QY20-8AV

QY 20-8 AV
 ① ② ③ ④

①Product Type QY: QY series I/O modules	③ Number of channels 8:8 o'clock input
②Product Series 20:20 Series Blade I/O	④ Type AV: Voltage-type analog input



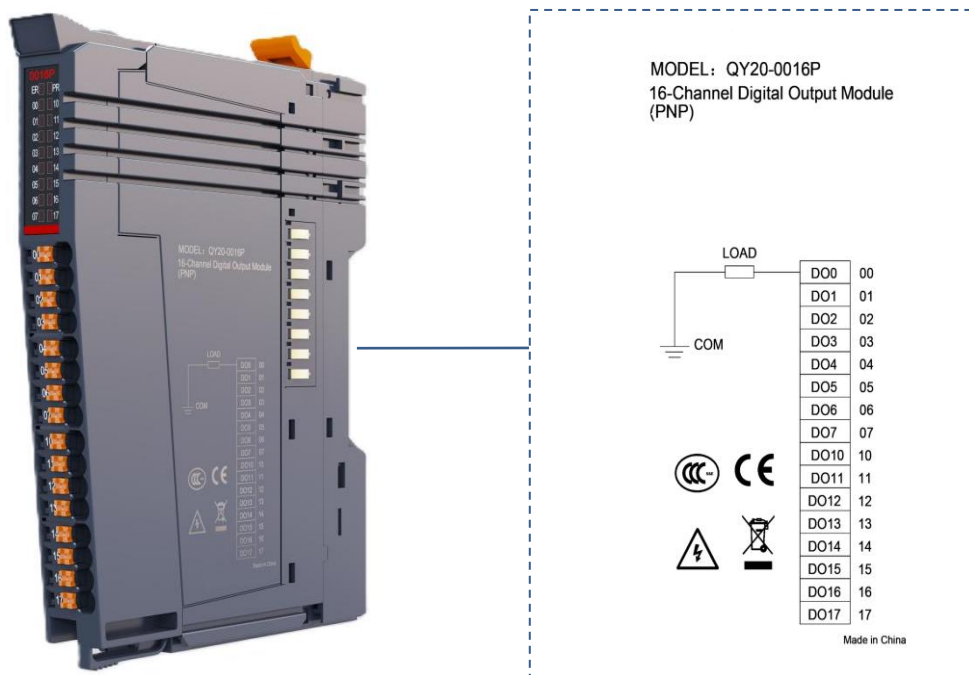
Based on the above naming rules and nameplate instructions , the relevant ordering data for this product is shown in the table below:

model	describe	Whole machine coding	Applicable models
QY20-8AV	8 -channel voltage -type analog input module	45.02.00 11	ZQ600 Series PLC IO Expansion QY20 Series Coupler IO Expansion

● QY20-0016P

QY 20-00 16 P
 ① ② ③ ④ ⑤

①Product Type QY: QY series I/O modules	③IO points 00:00 input	⑤ Type P: PNP type digital input/output N: NPN type digital input/output
②Product Series 20:20 Series Blade I/O	④IO points 16:16 output	



Based on the above naming rules and nameplate instructions , the relevant ordering data for this product is shown in the table below:

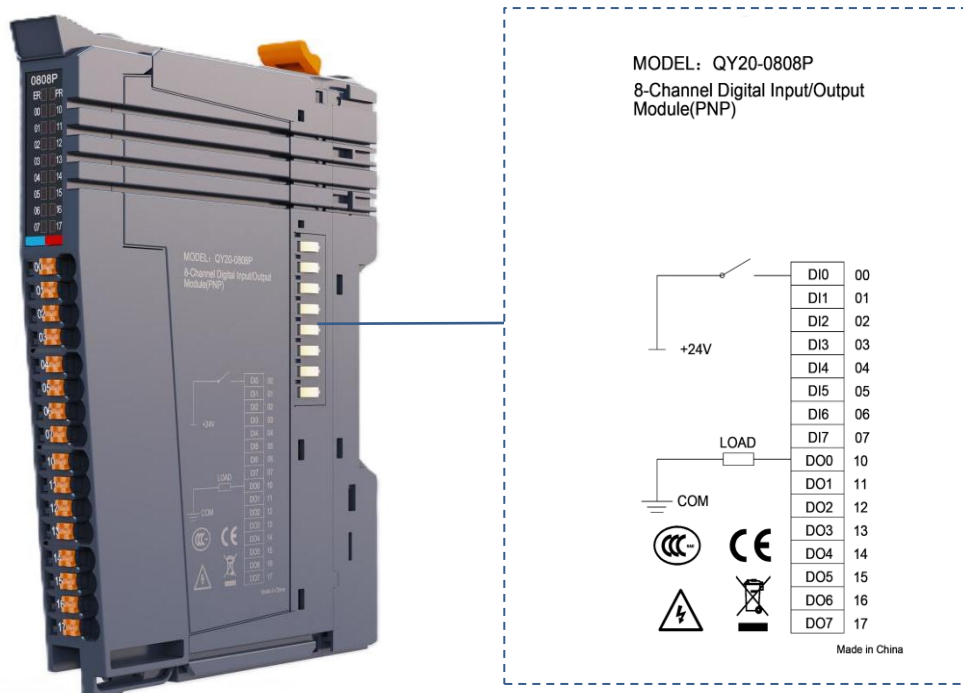
model	describe	Whole machine coding	Applicable models
QY20-0016 P	16-channel digital output module, PNP	45.02.0006	ZQ600 Series PLC IO Expansion QY20 Series Coupler IO Expansion
QY20-0016 N	16-channel digital output module, NPN	45.02.0004	

● QY20-0808P

QY 20-08 08 P

① ② ③ ④ ⑤

①Product Type QY: QY series I/O modules	③IO points 08:08 input	⑤ Type P: PNP type digital input/output N: NPN type digital input/output
②Product Series 20:20 Series Blade I/O	④IO points 08:8 output	



Based on the above naming rules and nameplate instructions , the relevant ordering data for this product is shown in the table below:

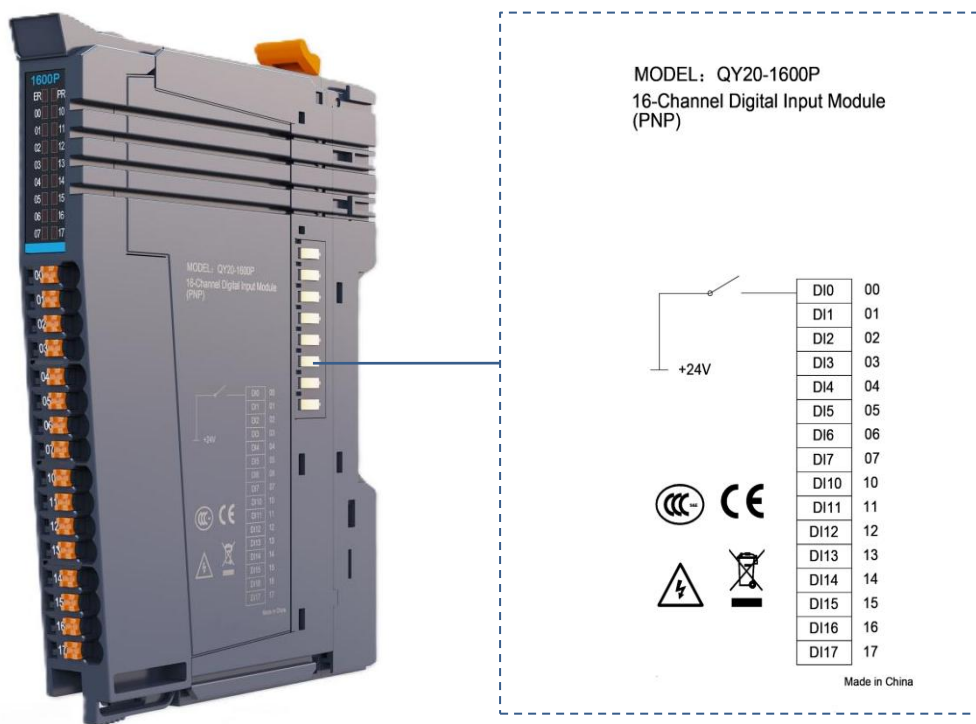
model	describe	Whole machine coding	Applicable models
QY20-0808 P	8 digital inputs + 8 digital outputs , PNP	45.02.0013	ZQ600 Series PLC IO Expansion QY20 Series Coupler IO Expansion
QY20-0808 N	8 digital inputs + 8 digital outputs , NPN	45.02.0019	

● QY20-1600P

QY 20-16 00 P

① ② ③ ④ ⑤

①Product Type QY: QY series I/O modules	③IO points 16:16 input	⑤ Type P: PNP type digital input/output N: NPN type digital input/output
②Product Series 20:20 Series Blade I/O	④IO points 00:00 output	



Based on the above naming rules and nameplate instructions , the relevant ordering data for this product is shown in the table below:

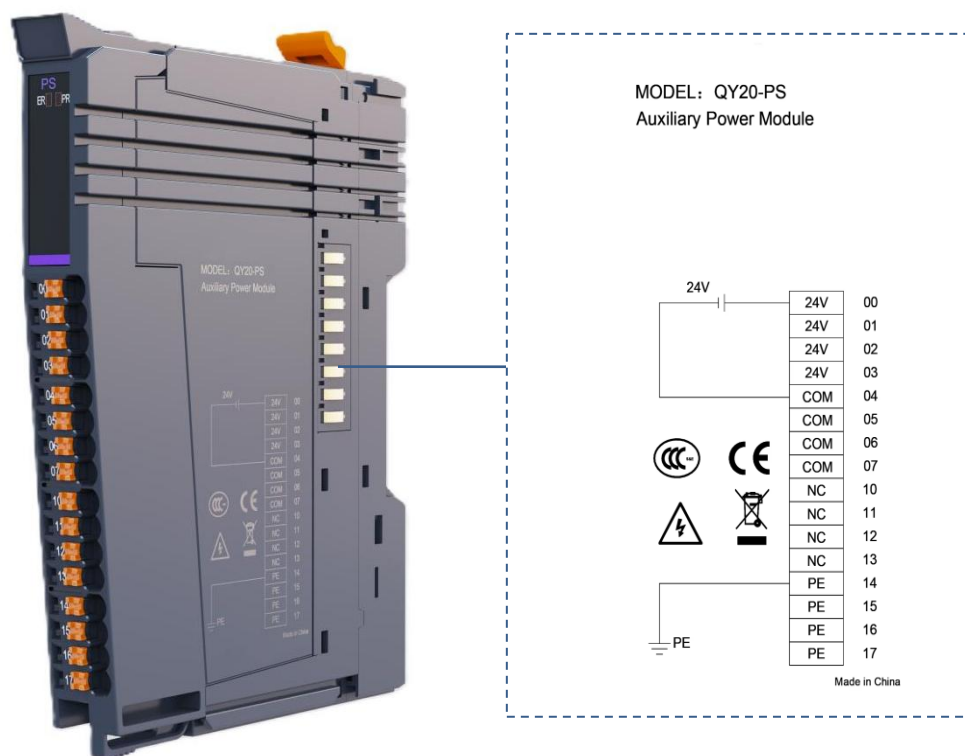
model	describe	Whole machine coding	Applicable models
QY20-1600P	16-channel digital input module, PNP	45.02.0003	ZQ600 Series PLC IO Expansion QY20 Series Coupler IO Expansion
QY20-1600N	16-channel digital input module, NPN	45.02.0005	

● QY20-PS

QY 20-PS

① ② ③

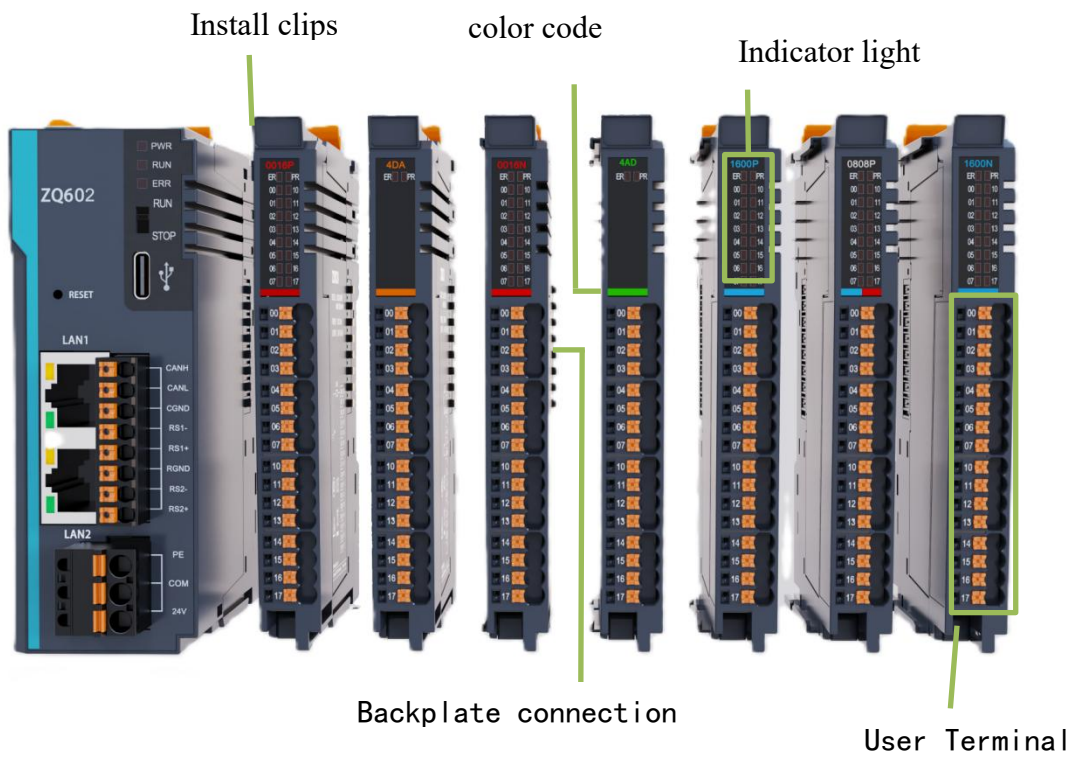
①Product Type QY: QY series I/O modules	③ Type PS: Relay power module
②Product Series 20:20 Series Blade I/O	



Based on the above naming rules and nameplate instructions , the relevant ordering data for this product is shown in the table below:

model	describe	Whole machine coding	Applicable models
QY20- PS	Relay power module	45.02.00 22	ZQ600 Series PLC IO Expansion QY20 Series Coupler IO Expansion

1.2 Component Description



Serial Number	Name	Model	Logo	definition	Component Description	
1	Install clips	All I/O modules			Pressing down indicates the open state, and lifting up indicates the locked state.	
2	indicator lights	QY20-2HC				
			ER	Running status	yellow	Constantly lit: The system is running and has completed initialization and ID allocation . Slow flashing (50ms on, 1s off) : System running, ID initialization and allocation not yet complete. Flashing light (50ms on, 50ms off) : Alarm or stop.
			PR	Power-on state	red	Power indicator light
			00	Channel 1 5V Differential A	Channel 1 differential signal input indication; when the input is in drive mode. The indicator light should be constantly on; otherwise, it should be off.	
			01	Channel 1 5V Differential B		
			02	Channel 1 24V Single-Ended A	Channel 1 single-ended input indicator; when the input is in drive mode. The indicator light should be constantly on; otherwise, it should be off.	
			03	Channel 1 24V Single-Ended B		
			04	Channel 1 DO	Channel 1 digital output indicator: When the output is in drive mode. The output indicator light should be constantly on; otherwise, it should be off.	

			10	Channel 2 5V Differential A	Channel 2 differential signal input indication; when the input is in drive mode. The indicator light should be constantly on; otherwise, it should be off.	
			11	Channel 2 5V Differential B		
			12	Channel 2 24V Single-Ended A	Channel 2 single-ended input indicator: The indicator light is constantly on when the input is in drive mode, and off otherwise.	
			13	Channel 2 24V Single-Ended B		
			14	Channel 2 DO	Channel 2 digital output indicator: When the output is in drive mode, the output indicator light is constantly on; otherwise, it is off.	
		QY20-4AD, QY20-4DA, QY20-4PT, QY20-4TC, QY20-8AI-L, QY20-8AI, QY20-8AV-L, QY20-8AV, QY20-PS	ER	Running status	yellow	Constantly lit: The system is running and address allocation has been completed. Slow flashing (50ms on, 1s off) : System running, address allocation incomplete. Flashing light (50ms on, 50ms off) : Alarm or stop.
			PR	Power-on state	red	Power indicator light

		QY20-4PO	ER	Running status	yellow	Constantly lit: The system is running and has completed initialization and ID allocation . Slow flashing (50ms on, 1s off) : System running, ID initialization and allocation not yet complete. Flashing light (50ms on, 50ms off) : Alarm or stop.
			PR	Power-on state	red	Power indicator light
			00	One direction of the passage		When the output is in drive mode, the output indicator light is always on; otherwise, it is off.
			01	Channel 1 pulse		
			02	Channel 1 DI		When the input is in drive mode, the input indicator light is always on; otherwise, it is off.
			10	Channel Two Direction		When the output is in drive mode, the output indicator light is always on; otherwise, it is off.
			11	Channel Two Pulse		
			12	Channel 2 DI		When the input is in drive mode, the input indicator light is always on; otherwise, it is off.
			03	Three-way passage		When the output is in drive mode, the output indicator light is always on; otherwise, it is off.
			04	Channel Three Pulse		
			05	Channel 3 DI		When the input is in drive mode, the input indicator light is always on; otherwise, it is off.
			13	Four-way passage		

			14	Channel four pulse		When the output is in drive mode, the output indicator light is always on; otherwise, it is off.	
			15	Channel 4 DI		When the input is in drive mode, the input indicator light is always on; otherwise, it is off.	
		QY20-0016, QY20-0808, QY20-1600	Module running indicator light	ER	Running status	yellow	Constantly lit: The system is running and address allocation has been completed. Slow flashing (50ms on, 1s off) : System running, address allocation incomplete. Flashing light (50ms on, 50ms off) : Alarm or stop.
				PR	Power-on state	red	Power indicator light
			IO indicator	00~17	IO signal indication	Each output signal indicates a valid output; the indicator light illuminates when the output is valid , and remains off otherwise.	
				Module type		Blue : Digital input Red : Digital output Green : Analog input Orange : Analog output Purple : Other modules	
3	Color Code	All I/O modules					
4	Backplate connection	All I/O modules				Backplane bus and power line expansion	
5	User Terminal	All I/O modules				For detailed instructions, please refer to " 3.2 Terminal Arrangement ".	

1.3 Technical Specifications

1.3.1 Basic Specifications

model	project	Specification
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All I/O modules	IP Level	IP20
	Dimensions (width × height × depth)	12 mm * 83 mm * 100 mm
	weight	Approximately 60g

1.3.2 Power Supply Specifications

model	project	Specification
QY20-4PO, QY20-2HC	System power supply rated voltage	5V DC
	System power supply rated current	200 mA (typical at 5V)
	Auxiliary power supply rated voltage	24 V DC
	Auxiliary power supply rated current	30 mA (typical at 24 V)
	Module hot-swap function	Not supported
QY20-PS	Bus input power supply rated voltage	24 V DC
	Bus input power supply rated current	55 mA (typical value at 5V)
	Bus output power supply rated voltage	5V DC
	Bus output power supply rated current	2A (typical value at 5V)
	Module hot-swap function	Not supported
QY20-8AV, QY20-4AD, QY20-8AI-L, QY20-8AI, QY20-8AV-L, QY20-8AV	System power supply rated voltage	5V DC
	System power supply rated current	50 mA (typical value at 5V)
	Auxiliary power supply rated voltage	24 V DC
	Auxiliary power supply rated current	30 mA (typical at 24 V)
	Module hot-swap function	Not supported
QY20-4DA, QY20-4PT, QY20-4TC	System power supply rated voltage	5V DC
	System power supply rated current	50 mA (typical value at 5V)
	Auxiliary power supply rated voltage	24 V DC
	Auxiliary power supply rated current	10 mA (typical at 24 V)
	Module hot-swap function	Not supported
QY20-0016	System power supply rated voltage	5V DC
	System power supply rated current	0016P: 100 mA (typical at 5V)
		0016N: 100 mA (typical at 5V)
	Auxiliary power supply rated voltage	24 V DC
	Auxiliary power supply rated current	0016P: none (typical value at 24 V)
		0016N: none (typical value at 24 V)

	Module hot-swap function	Not supported
QY20-0808	System power supply rated voltage	5V DC
	System power supply rated current	0808P: 200 mA (typical at 5V) 0808N: 100 mA (typical at 5V)
	Auxiliary power supply rated voltage	24 V DC
	Auxiliary power supply rated current	0808P: none (typical value at 24 V) 0808N: 100 mA (typical at 24 V)
	Module hot-swap function	Not supported
QY20-1600	System power supply rated voltage	5V DC
	System power supply rated current	1600P: 100 mA (typical at 5V) 1600N: 100 mA (typical at 5V)
	Auxiliary power supply rated voltage	24 V DC
	Auxiliary power supply rated current	1600P: none (typical value at 24 V) 1600N: 200 mA (typical at 24 V)
	Module hot-swap function	Not supported

1.3.3 Input Specifications

model	Input Channel	Rated voltage	signal type	Input type	Input current	Input voltage	Input filtering	resolution	Measurement accuracy	Optical coupling method
QY20-2HC	2 channels	24V		1. 5V differential AB phase 2. 5V differential direction + pulse 3. 5V differential CW/CCW 4. 24V single-ended AB phase 5. 24V single-ended directional + pulse 6. 24V single-ended CW/CCW	7 mA	5 ~ 24 V	0~30ms selectable			
QY20-4AD	4 channels	24V	Voltage /current selectable	Analog input	0~20mA	- 10 ~10V	0~30ms selectable	16-bit	25°C: Full scale * $\pm 0.3\%$ (-	

									10V~10V full scale) - 20~55°C: Full scale * ±0.5% (-10V~10V full scale)	
QY20-8AIL	8 channels	24V	Current	Analog input	0~20mA		0~30ms selectable	12-digit	25°C: Full scale * ±0.5 % (0~20mA full scale) - 20~55°C: Full scale * ±0.1 % (0~20mA full scale)	
QY20-8AI	8 channels	24V	Current	Analog input	0~20mA		0~30ms selectable	16-bit	25°C: Full scale * ±0.3% (0~20mA full scale) - 20~55°C: Full scale * ±0.5% (0~20mA full scale)	
QY20-8AVL	8 channels	24V	Voltage	Analog input		0~10V	0~30ms selectable	12-digit	25°C: Full scale * ±0.5 % (0~10V full scale) - 20~55°C: Full scale*±1 % (0~10V full scale)	
QY20-8AV	8 channels	24V	Voltage	Analog input		-10~10V	0~30ms selectable	16-bit	25°C: Full scale * ±0.3% (-10~10V full scale) - 20~55°C: Full scale * ±0.5%	

									(-10 ~ 10V full scale)	
QY2-0808	8 channels	24V	PNP	Digital input	4mA		3ms			Optical isolation
QY20-1600	16 channels	24V	PNP /NPN	Digital input	4mA		3ms			Optical isolation

1.3.4 Output Specifications

model	project	Specification
QY20-4AD	Output type	Analog output
	Output Channel	4 channels
	Rated voltage	24V
	signal type	Voltage/current selectable
	Output current	0~20mA
	Output voltage	-10~10V
	resolution	16-bit
	Measurement accuracy	25°C: Full scale * $\pm 0.3\%$ (-10V~10V full scale) -20~55°C: Full scale * $\pm 0.5\%$ (-10V~10V full scale)
QY20-0016, QY20-0808	Output type	Digital output
	Output Channel	4 PM [QY20-0016] , 8 PM [QY20-0808]
	Output voltage level	24V DC $\pm 10\%$ (21.6V DC~26.4V DC)
	Output load (resistive load)	0.5A/point, 2A/module
	Output load (inductive load)	7.2W/point, 12W/module
	Output load (lighting load)	5W/point, 18W/module [QY20-0016] 5W/point, 9W/module [QY20-0808]
	signal type	PNP /NPN
	Hardware response time ON/OFF	100 μ s/100 μ s
	Leakage current when OFF	10 μ A
	Switching frequency	Resistive load 100Hz, inductive load 0.5Hz, lamp load 10Hz
	Optical coupling method	Optical isolation
	Output action display	When the output is in drive mode, the output indicator light will illuminate (software controlled).
	Output derating	When operating at 45°C under full load (taking a resistive load as an example: the output current of all output channels simultaneously ON does not exceed 2A), and when operating at 55°C, the load is dated by 50 % (taking a resistive load as an example: the output current of all output channels simultaneously ON does not exceed 1A) [QY20-

		0016] When operating at 45°C under full load (taking a resistive load as an example: 8-channel output current not exceeding 2A), and when operating at 55°C, the load is dated by 50% (taking a resistive load as an example: 8-channel output current not exceeding 1A) [QY20-0808]
	Protection function	Short circuit protection, overcurrent protection

1.3.5 Other Specifications

model	project	Specification	
QY20-4PO	Input type	Analog input	
	Input Channel	4 channels	
	Rated voltage	24V	
	Pulse type	Direction + Pulse, CW/CCW selectable	
	Input filtering	0 ~ 30 ms selectable	
	Output current	<500 mA	
	Output voltage	24V	
QY20-4PT	Input type	RTD input	
	Input Channel	4 channels	
	Rated voltage	24V	
	Resistance temperature detector (RTD) type	PT 100 , PT 500 , PT 1000 , CU 100 , KTY84-130, NTC5K, NTC10K optional	
	Input resistance	10R~180KR	
	Input filtering	0~30ms selectable	
	Sampling period	250ms, 500ms, 1000ms/4 channels selectable	
	resolution	24-bit	
	AD sampling accuracy	25°C: Full scale * $\pm 0.3\%$ (0V-1800MV full scale) -20~55°C: Full scale* $\pm 0.5\%$ (0V-1800MV full scale)	
	Temperature measurement accuracy	PT100	T<300°C: $\pm 1.5^{\circ}\text{C}$ 300°C $\leq$ T $\leq$ 700°C: $\pm 2.5^{\circ}\text{C}$ T>700°C: $\pm 3^{\circ}\text{C}$
		PT500	T<300°C: $\pm 1.5^{\circ}\text{C}$ 300°C $\leq$ T $\leq$ 700°C: $\pm 2.5^{\circ}\text{C}$ T>700°C: $\pm 3^{\circ}\text{C}$
		PT1000	T<300°C: $\pm 1.5^{\circ}\text{C}$ 300°C $\leq$ T $\leq$ 700°C: $\pm 2.5^{\circ}\text{C}$ T>700°C: $\pm 3^{\circ}\text{C}$
		CU100	-50°C $\leq$ T $\leq$ 150°C : $\pm 1.5^{\circ}\text{C}$
		KTY84	0°C $\leq$ T $\leq$ 200°C: $\pm 2^{\circ}\text{C}$
		NTC5K (B=2000)	-30°C $\leq$ T $\leq$ 200°C : $\pm 2^{\circ}\text{C}$
		NTC5K (B=3950)	-15°C $\leq$ T $\leq$ 100°C : $\pm 2^{\circ}\text{C}$
		NTC5K (B=6000)	0°C $\leq$ T $\leq$ 100°C: $\pm 2^{\circ}\text{C}$
		NTC10K (B=2000)	-25°C $\leq$ T $\leq$ 200°C : $\pm 2^{\circ}\text{C}$
		NTC10K (B=3950)	0°C $\leq$ T $\leq$ 150°C: $\pm 2^{\circ}\text{C}$
		NTC10K (B=6000)	6°C $\leq$ T $\leq$ 100°C: $\pm 2^{\circ}\text{C}$
	Wiring method	Third line	

QY20-4TC	Input type	Thermocouple input	
	Input Channel	4 channels	
	Rated voltage	24V	
	thermocouple type	K, J, E, B, N, R, S, T (optional)	
	Input voltage	-110-110MV	
	Input filtering	0~30ms selectable	
	Sampling period	250ms, 500ms, 1000ms/4 channels selectable	
	resolution	24-bit	
	AD sampling accuracy	25°C: *±0.3% (-110MV~110MV full range) + cold junction compensation error -20~55°C: Full scale * ±0.5% (-110MV~110MV full scale) + cold junction compensation error	
	Temperature measurement accuracy	K type	T<300°C: ±1.5°C 300°C≤T≤700°C: ±2.5°C T>700°C: ±3°C
		J-type	T<300°C: ±1.5°C 300°C≤T≤700°C: ±2.5°C T>700°C: ±3°C
		Type E	T<300°C: ±1.5°C 300°C≤T≤700°C: ±2.5°C T>700°C: ±3°C
		Type B	-50°C≤T≤150°C: ±1.5°C
		N-type	0°C≤T≤200°C: ±2°C
		R type	-30°C≤T≤200°C: ±2°C
		S-shaped	-15°C≤T≤100°C: ±2°C
		T-shaped	0°C≤T≤100°C: ±2°C
	Cold junction compensation error	Horizontal and upright installation of adjacent temperature modules	-20°C≤T≤0°C: ≥±3.5°C 0°C≤T≤55°C: ±2.25°C
		Horizontal and upright installation of adjacent non-temperature modules	-20°C≤T≤0°C: ≥±7°C 0°C≤T≤55°C: ±5°C
		Non-horizontal upright installation of adjacent temperature modules	-20°C≤T≤0°C: ≥±6°C 0°C≤T≤55°C: ±4.5°C
		Non-horizontal upright mounting of adjacent non-temperature modules	-20°C≤T≤0°C: ≥±6°C 0°C≤T≤55°C: ±5°C

2. Product Installation

2.1 Installation Environment Requirements

When installing the module onto the guide rail, operability, maintainability, and environmental resistance should be fully considered.

project	Specification
Usage Environment	In environments where there are no corrosive or flammable gases and the conductive dust (dust) is not severe.
altitude	≤2000m
Pollution level	Level 2
immunity	Power supply 2kV (IEC 61000-4-4)
Overvoltage category	I
EMC anti-interference level	Zone B, IEC61131-2
earthquake resistance	According to IEC60068 -2 -6 testing, the amplitude is 3.5mm from 5Hz to 8.4Hz, and the acceleration is 1g from 8.4Hz to 150Hz ; 10 cycles/axial
Impact resistance	According to IEC 60068-2-27 testing, the peak acceleration is 150 m/s ² , the pulse width is 11 ms, and the pulses occur 3 times per direction in six directions (±X/Y/Z), for a total of 18 pulses.
Storage temperature	Storage temperature: -40°C~70°C Relative humidity: <90%RH, no condensation
Operating temperature	Operating temperature: -20°C~55°C Relative humidity: 10%RH~90%RH, no condensation Note: When the operating temperature exceeds the maximum temperature, be sure to install a forced fan or air conditioner in the direction of the heat dissipation vents.

2.2 Installation location requirements

This product is divided into two types based on the installation direction: horizontal (DIN rail horizontal placement) and non-horizontal installation.

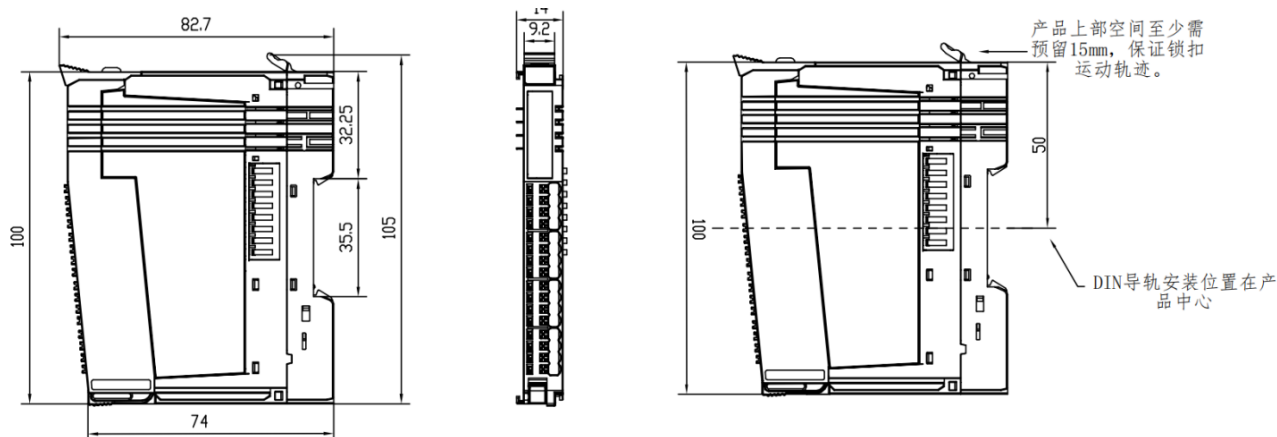
The optimal installation location for this product is horizontal, with minimal clearance around it to ensure ventilation and heat dissipation, and to allow sufficient space for wiring.

If there are high-temperature heat sources (heaters, transformers, large resistors, etc.) around this product, a gap of at least 100mm should be maintained between the product and the high-temperature heat source equipment.

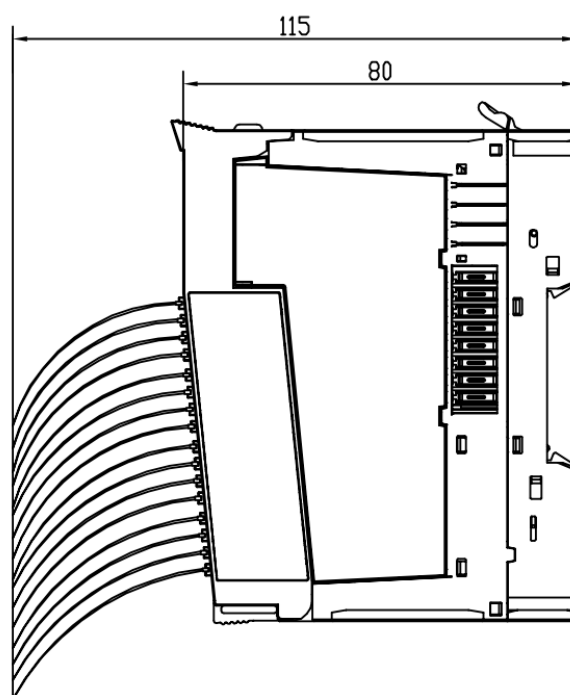
2.3 Installation Dimensions

- Module

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



● Connecting cables

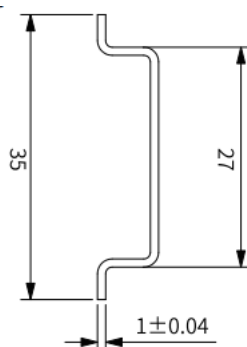


2.4 Installation Precautions

- Please use cable trays or similar means to secure the cables during wiring to prevent the cable weight from putting pressure on the lower guide rail clips . If the lower guide rail clips slide down under the weight of the cables, the product may not be securely fixed to the DIN rail, potentially causing malfunction .
- Before installing or removing the module, ensure that the module is powered off .
- Do not hot-swap modules. Hot-swapping modules poses a risk of overcurrent and overvoltage surges to the module itself, which may damage the module. For communication interface modules or PLC hosts, it may result in restarts, loss or corruption of user data , etc.
- Do not allow the module's casing or terminals to fall or be subjected to impact, as this may damage the module .

2.5 Installation Method

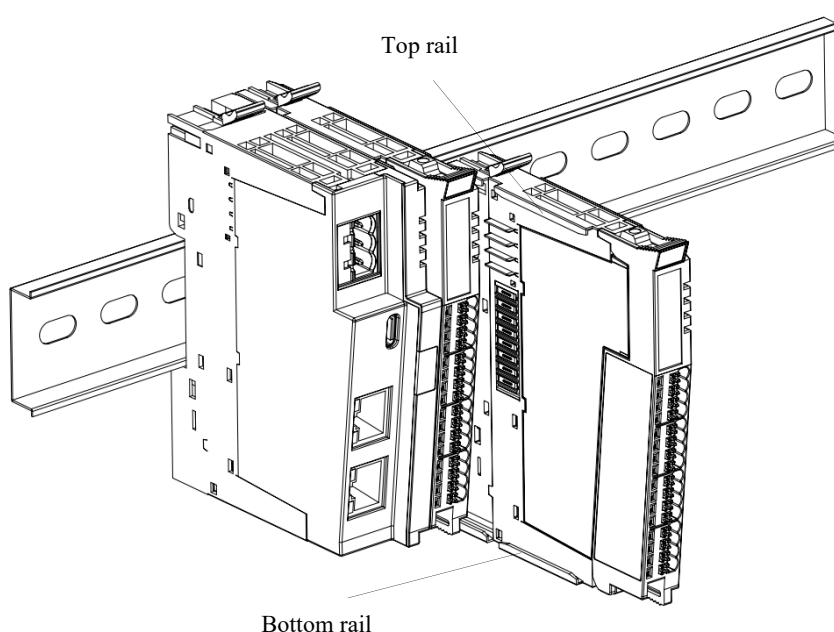
The module is mounted using a DIN rail. The DIN rail must conform to the IEC 60715 standard (35mm wide, 1mm thick). The dimensions are shown in the figure below, in millimeters (mm).



When this product is installed on a DIN rail other than those recommended above (especially if the DIN rail thickness is not 1.0mm), the DIN rail locking mechanism will fail, the product will not be able to be installed properly, and the product will not function properly.

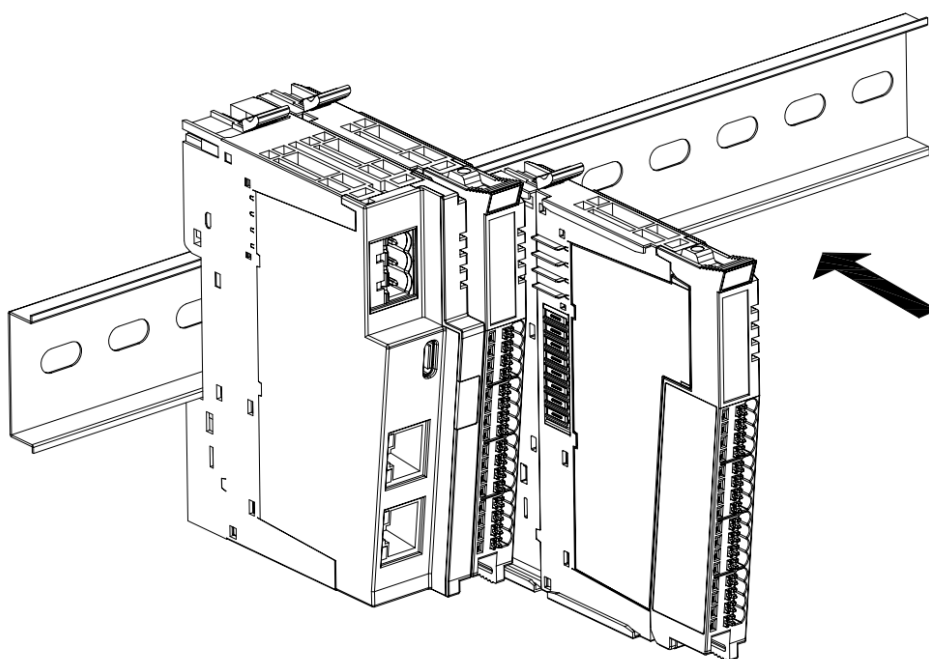
- Installation between modules

The IO modules are assembled by sliding them together using the top and bottom rails, as shown in the figure below.

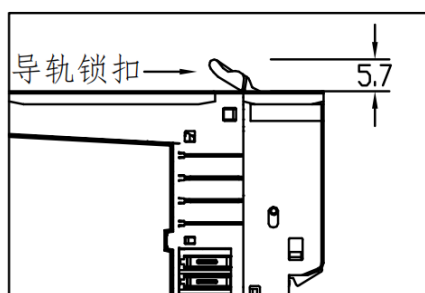


- Module mounted on guide rail

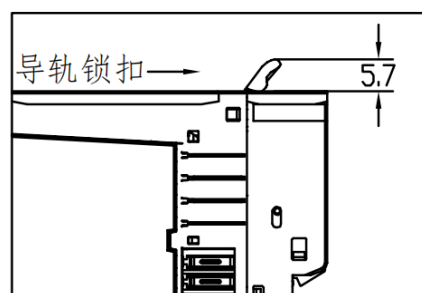
1. During installation, align the module with the DIN rail and press the module in the direction of the arrow .



2. After installation, move the latch in the opposite direction of the arrow to lock it in place. Confirm that the DIN rail latch of the module is locked. The locked and unlocked states of the rail latch are shown in the figure below.



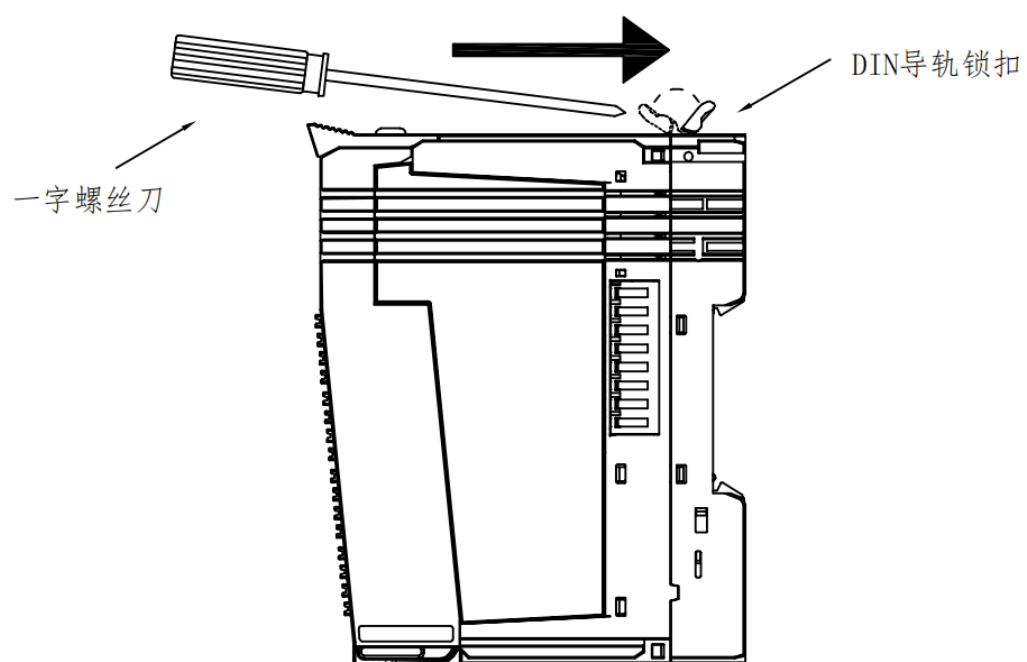
锁定状态



解锁状态

● Disassembly

Use a flathead screwdriver or similar tool to pry open the rail latch in the direction of the arrow and pull the module straight forward , as shown in the picture below .



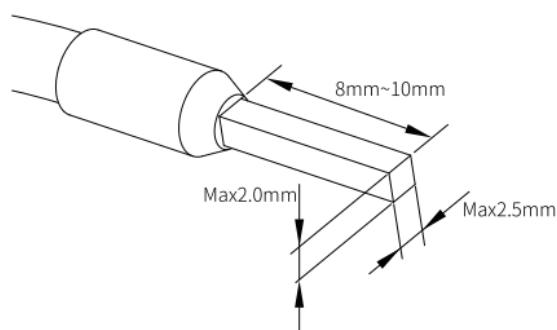
3. Electrical installation

3.1 Cable Selection

The wire diameter in the table below is for reference only. It can be calculated and adjusted according to actual use .

Supporting material name	Compatible wire diameter	
	National Standard/mm ²	American Standard/AWG
tubular wire lug	0.3	twenty two
	0.5	20
	0.75	18
	1.0	18
	1.5	16

If using other tubular lugs, crimp them onto the stranded wire, with the shape and size requirements shown in the diagram below.



3.2 Terminal Arrangement

	QY20-2HC			
	model	terminal	definition	illustrate
	QY20-2HC	00	A0+	- When the 5V differential AB phase is used, it indicates the positive and negative terminals of signal A differential. 5V differential direction + pulse indicates the direction port 5V differential CW/CCW indicates channel 1
		01	A0-	
		02	B0+	
		03	B0-	- When the 5V differential AB phase is used, it indicates the positive and negative terminals of signal B differential. 5V differential direction + pulse indicates pulse port 5V differential CW/CCW indicates channel 2
		04	HDI0	
		05	HDI1	
		06	HDO0	Normal DO or comparison output
		07	DGND	land
		10	A1+	- When the 5V differential AB phase is used, it indicates the positive and negative terminals of signal A differential. 5V differential direction + pulse indicates the direction port 5V differential CW/CCW indicates channel 1
		11	A1-	
		12	B1+	
		13	B1-	- When the 5V differential AB phase is used, it indicates the positive and negative terminals of signal B differential. 5V differential direction + pulse indicates pulse port 5V differential CW/CCW indicates channel 2
		14	HDI2	
		15	HDI3	
		16	HDO1	Normal DO or comparison output
			COM	Public terminal
	QY20-4AD	00	V0+	Channel 1 voltage input positive terminal
		01	I0+	Channel 1 current input positive terminal
		02	VI0-	Channel 1 Voltage/Current Input Negative
		03	-	-
		04	V1+	Channel 2 voltage input positive terminal
		05	I1+	Channel 2 current input positive terminal
		06	VI1-	Channel 2 voltage/current input negative terminal
		07	-	-
		10	V2+	Channel three voltage input positive
		11	I2+	Channel three current input positive terminal
		12	VI2-	Channel 3 voltage/current input negative terminal
		13	-	-

		14	V3+	Channel 4 voltage input positive terminal
		15	I3+	Channel 4 Current Input Positive
		16	VI3-	Channel 4 voltage/current input negative terminal
		17	-	-
	QY20-4DA	00	V0+	Channel 1 voltage output positive terminal
		01	I0+	Channel 1 current output positive terminal
		02	VI0-	Channel 1 voltage/current output negative terminal
		03	-	-
		04	V1+	Channel 2 voltage output positive terminal
		05	I1+	Channel 2 current output positive terminal
		06	VI1-	Channel 2 voltage/current output negative terminal
		07	-	-
		10	V2+	Channel three voltage output positive terminal
		11	I2+	Channel three current output positive terminal
		12	VI2-	Channel three voltage/current output negative terminal
		13	-	-
		14	V3+	Channel 4 voltage output positive terminal
		15	I3+	Channel 4 Current Output Positive
		16	VI3-	Channel 4 voltage/current output negative terminal
		17	-	-
	QY20-4PO	00	HDO0	One direction of the passage
		01	HDO1	Channel 1 pulse
		02	DGND	One passage
		03	DI0	Channel 1 DI
		04	HDO2	Channel Two Direction
		05	HDO3	Channel Two Pulse
		06	DGND	two locations along the passage
		07	DI1	Channel 2 DI
		10	HDO4	Three-way passage
		11	HDO5	Channel Three Pulse
		12	DGND	Tongdao Three Places
		13	DI2	Channel 3 DI
		14	HDO6	Four-way passage
		15	HDO7	Channel four pulse
		16	DGND	Tongdao Sidi
		17	DI3	Channel 4 DI

	QY20-4PT	00	IN0A	Channel 1 RTD A terminal
		01	IN0B	Channel 1 RTD B terminal
		02	IN0C	Channel 1 RTD C terminal
		03	-	-
		04	IN1A	Channel 2 RTD A terminal
		05	IN1B	Channel 2 RTD B terminal
		06	IN1C	Channel 2 RTD C terminal
		07	-	-
		10	IN2A	Channel 3 RTD A-line terminal
		11	IN2B	Channel 3 RTD B terminal
		12	IN2C	Channel three-resistance circuit C-line terminal
		13	-	-
		14	IN3A	Channel 4 RTD A terminal
		15	IN3B	Channel 4 RTD B terminal
		16	IN3C	Channel 4 RTD C-line terminal
		17	-	-
	QY20-4TC	00	TC0+	Channel 1 thermocouple positive end
		01	TC0-	Channel 1 thermocouple negative end
		02	-	-
		03	-	-
		04	TC1+	Channel 2 thermocouple positive end
		05	TC1-	Channel 2 thermocouple negative end
		06	-	-
		07	-	-
		10	TC2+	Channel three thermocouple positive end
		11	TC2-	Channel three thermocouple negative end
		12	-	-
		13	-	-
		14	TC3+	Channel 4 thermocouple positive end
		15	TC3-	Channel 4 thermocouple negative end
		16	-	-
		17	-	-
	QY20-8AI-L	00	I0+	Channel 1 current input positive terminal
		01	I0-	Channel 1 current input negative terminal
		02	I1+	Channel 2 current input positive terminal
		03	I1-	Channel 2 current input negative terminal

		04	I2+	Channel 3 current input positive terminal
		05	I2-	Channel 3 current input negative terminal
		06	I3+	Channel 4 Current Input Positive
		07	I3-	Channel 4 Current Input Negative
		10	I4+	Channel 5 Current Input Positive
		11	I4-	Channel 5 current input negative terminal
		12	I5+	Channel 6 Current Input Positive
		13	I5-	Channel 6 Current Input Negative Terminal
		14	I6+	Channel 7 Current Input Positive
		15	I6-	Channel 7 Current Input Negative Terminal
		16	i7+	Channel 8 Current Input Positive
		17	I7-	Channel 8 Current Input Negative
	QY20-8AI	00	I0+	Channel 1 current input positive terminal
		01	I0-	Channel 1 current input negative terminal
		02	I1+	Channel 2 current input positive terminal
		03	I1-	Channel 2 current input negative terminal
		04	I2+	Channel 3 current input positive terminal
		05	I2-	Channel 3 current input negative terminal
		06	I3+	Channel 4 Current Input Positive
		07	I3-	Channel 4 Current Input Negative
		10	I4+	Channel 5 Current Input Positive
		11	I4-	Channel 5 current input negative terminal
		12	I5+	Channel 6 Current Input Positive
		13	I5-	Channel 6 Current Input Negative Terminal
		14	I6+	Channel 7 Current Input Positive
		15	I6-	Channel 7 Current Input Negative Terminal
		16	i7+	Channel 8 Current Input Positive
		17	I7-	Channel 8 Current Input Negative
	QY20-8AV-L	00	V0+	Channel 1 voltage input positive terminal
		01	V0-	Channel 1 voltage input negative terminal
		02	V1+	Channel 2 voltage input positive terminal
		03	V1-	Channel 2 voltage input negative terminal
		04	V2+	Channel 3 voltage input positive
		05	V2-	Channel 3 voltage input negative terminal
		06	V3+	Channel 4 voltage input positive terminal
		07	V3-	Channel 4 voltage input negative terminal

		10	V4+	Channel 5 voltage input positive terminal
		11	V4-	Channel 5 voltage input negative terminal
		12	V5+	Channel 6 voltage input positive terminal
		13	V5-	Channel 6 voltage input negative terminal
		14	V6+	Channel 7 voltage input positive terminal
		15	V6-	Channel 7 voltage input negative terminal
		16	V7+	Channel 8 voltage input positive terminal
		17	V7-	Channel 8 voltage input negative terminal
	QY20-8AV	00	V0+	Channel 1 voltage input positive terminal
		01	V0-	Channel 1 voltage input negative terminal
		02	V1+	Channel 2 voltage input positive terminal
		03	V1-	Channel 2 voltage input negative terminal
		04	V2+	Channel 3 voltage input positive
		05	V2-	Channel 3 voltage input negative terminal
		06	V3+	Channel 4 voltage input positive terminal
		07	V3-	Channel 4 voltage input negative terminal
		10	V4+	Channel 5 voltage input positive terminal
		11	V4-	Channel 5 voltage input negative terminal
		12	V5+	Channel 6 voltage input positive terminal
		13	V5-	Channel 6 voltage input negative terminal
		14	V6+	Channel 7 voltage input positive terminal
		15	V6-	Channel 7 voltage input negative terminal
		16	V7+	Channel 8 voltage input positive terminal
		17	V7-	Channel 8 voltage input negative terminal
	QY20-0016	00	DO0	Channel 1 Digital Output
		01	DO1	Channel 2 Digital Output
		02	DO2	Channel 3 digital output
		03	DO3	Channel 4 Digital Output
		04	DO4	Channel 5 Digital Output
		05	DO5	Channel 6 Digital Output
		06	DO6	Channel 7 Digital Output
		07	DO7	Channel 8 digital output
		10	DO8	Channel 9 Digital Output
		11	DO9	Channel 10 Digital Output
		12	DO10	Channel 11 Digital Output
		13	DO11	Channel 12 Digital Output

		14	DO12	Channel 13 Digital Output
		15	DO13	Channel 14 Digital Output
		16	DO14	Channel 15 Digital Output
		17	DO15	Channel 16 Digital Output
	QY20-0808	00	DI0	Channel 1 Digital Input
		01	DI1	Channel 2 Digital Input
		02	DI2	Channel 3 Digital Input
		03	DI3	Channel 4 Digital Input
		04	DI4	Channel 5 Digital Input
		05	DI5	Channel 6 Digital Input
		06	DI6	Channel 7 Digital Input
		07	DI7	Channel 8 digital input
		10	DO0	Channel 1 Digital Output
		11	DO1	Channel 2 Digital Output
		12	DO2	Channel 3 digital output
		13	DO3	Channel 4 Digital Output
		14	DO4	Channel 5 Digital Output
		15	DO5	Channel 6 Digital Output
		16	DO6	Channel 7 Digital Output
		17	DO7	Channel 8 digital output
	QY20-1600	00	DI0	Channel 1 Digital Input
		01	DI1	Channel 2 Digital Input
		02	DI2	Channel 3 Digital Input
		03	DI3	Channel 4 Digital Input
		04	DI4	Channel 5 Digital Input
		05	DI5	Channel 6 Digital Input
		06	DI6	Channel 7 Digital Input
		07	DI7	Channel 8 digital input
		10	DI8	Channel 9 Digital Input
		11	DI9	Channel 10 Digital Input
		12	DI10	Channel 11 Digital Input
		13	DI11	Channel 12 Digital Input
		14	DI12	Channel 13 Digital Input
		15	DI13	Channel 14 Digital Input
		16	DI14	Channel 15 Digital Input
		17	DI15	Channel 16 Digital Input

	QY20-PS	00	24V	24V DC power supply positive terminal
		01	24V	24V DC power supply positive terminal
		02	24V	24V DC power supply positive terminal
		03	24V	24V DC power supply positive terminal
		04	COM	Public terminal
		05	COM	Public terminal
		06	COM	Public terminal
		07	COM	Public terminal
		10	NC	Unconnected end
		11	NC	Unconnected end
		12	NC	Unconnected end
		13	NC	Unconnected end
		14	PE	Protective grounding
		15	PE	Protective grounding
		16	PE	Protective grounding
		17	PE	Protective grounding

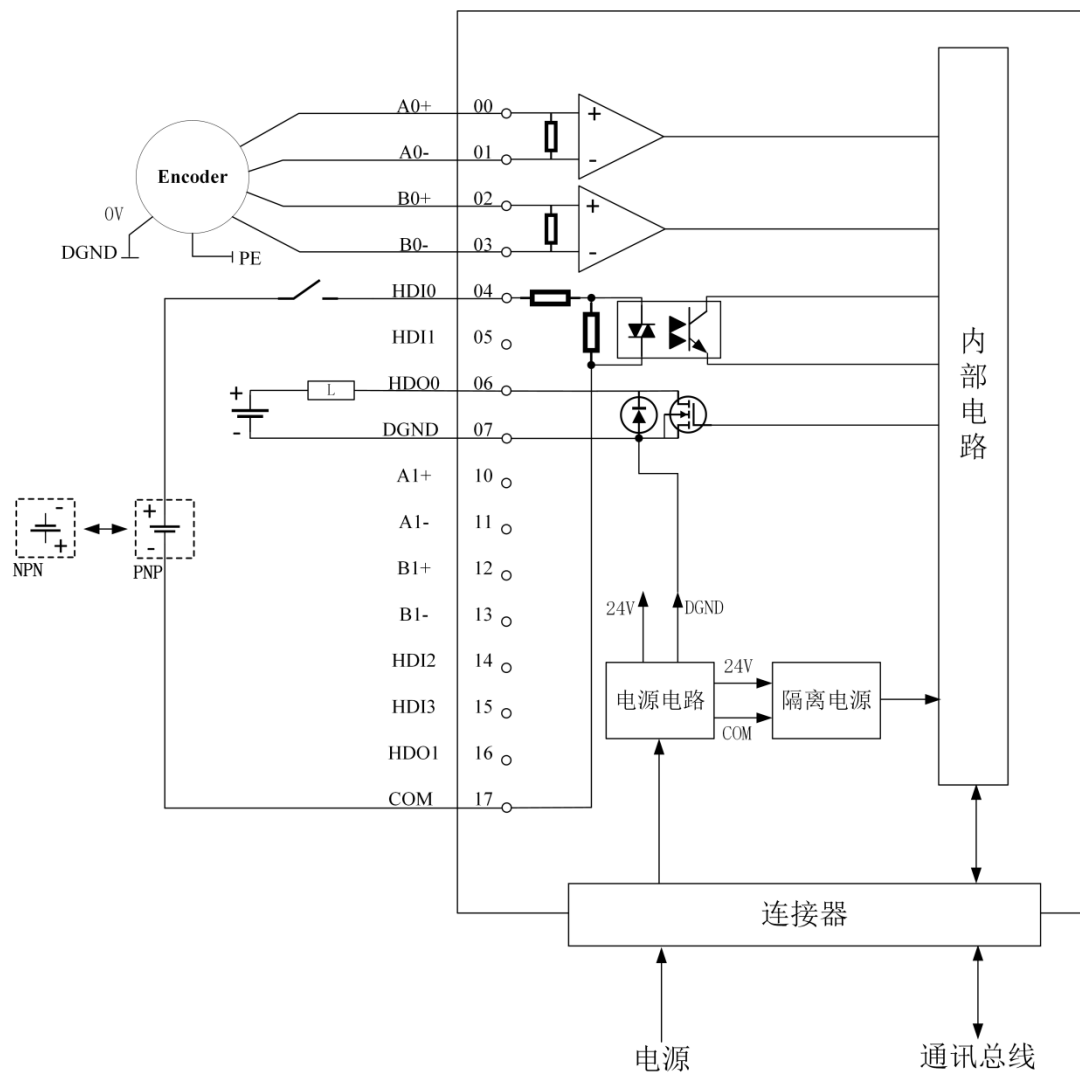
Remark:

If a 5V differential signal input is selected, the corresponding DI terminal can be configured as a standard DI, probe, or hardware preset.

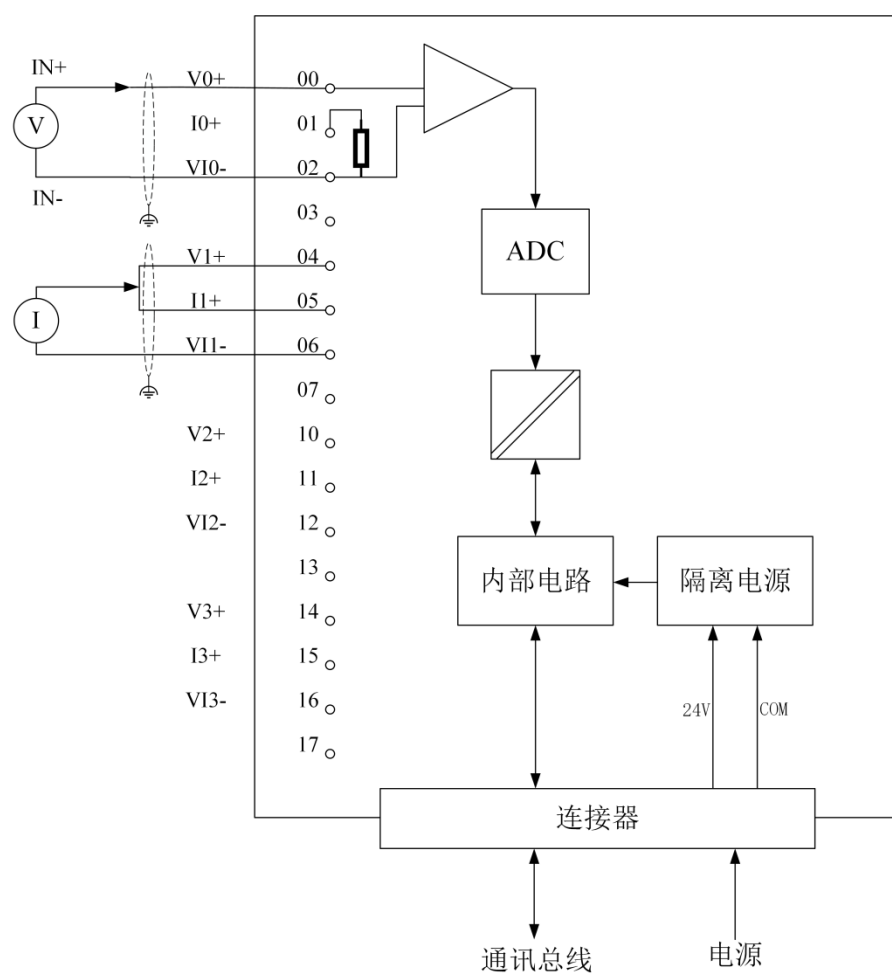
If a 24V single-ended input is selected, the DI terminal will be used as a 24V pulse single-ended input, and the probe or hardware preset functions cannot be implemented.

3.3 Terminal wiring

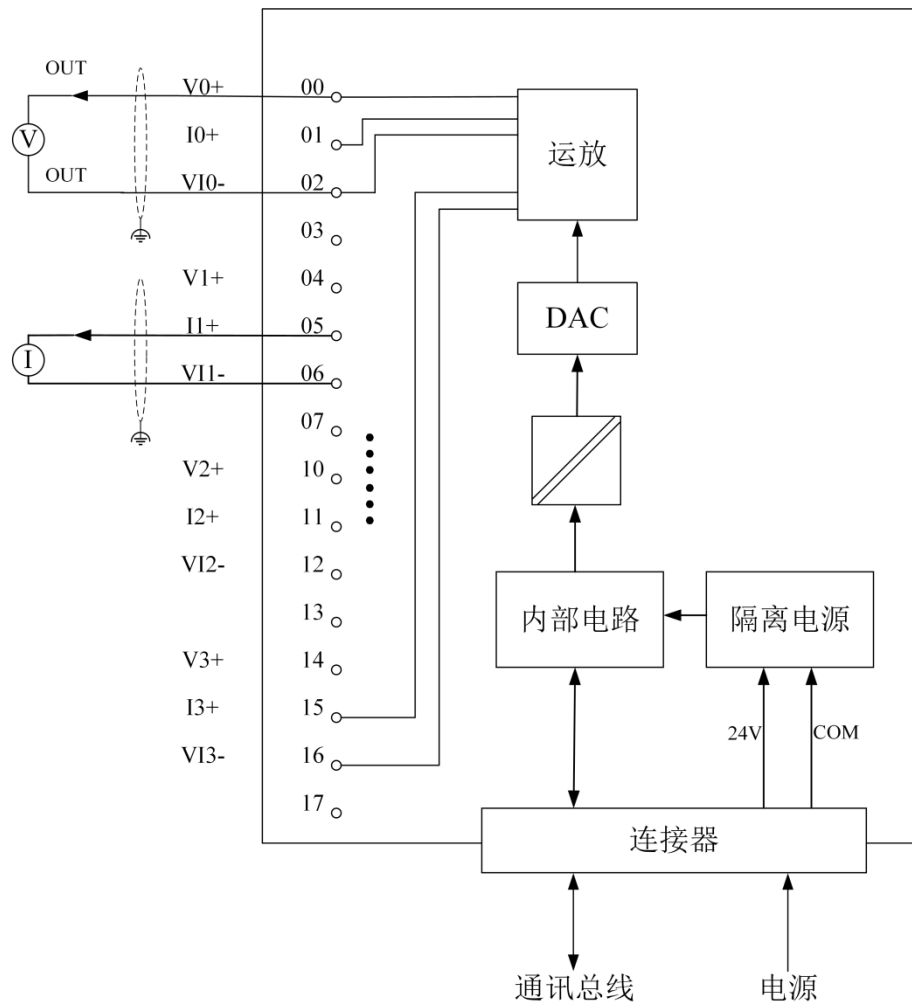
● QY20-2HC



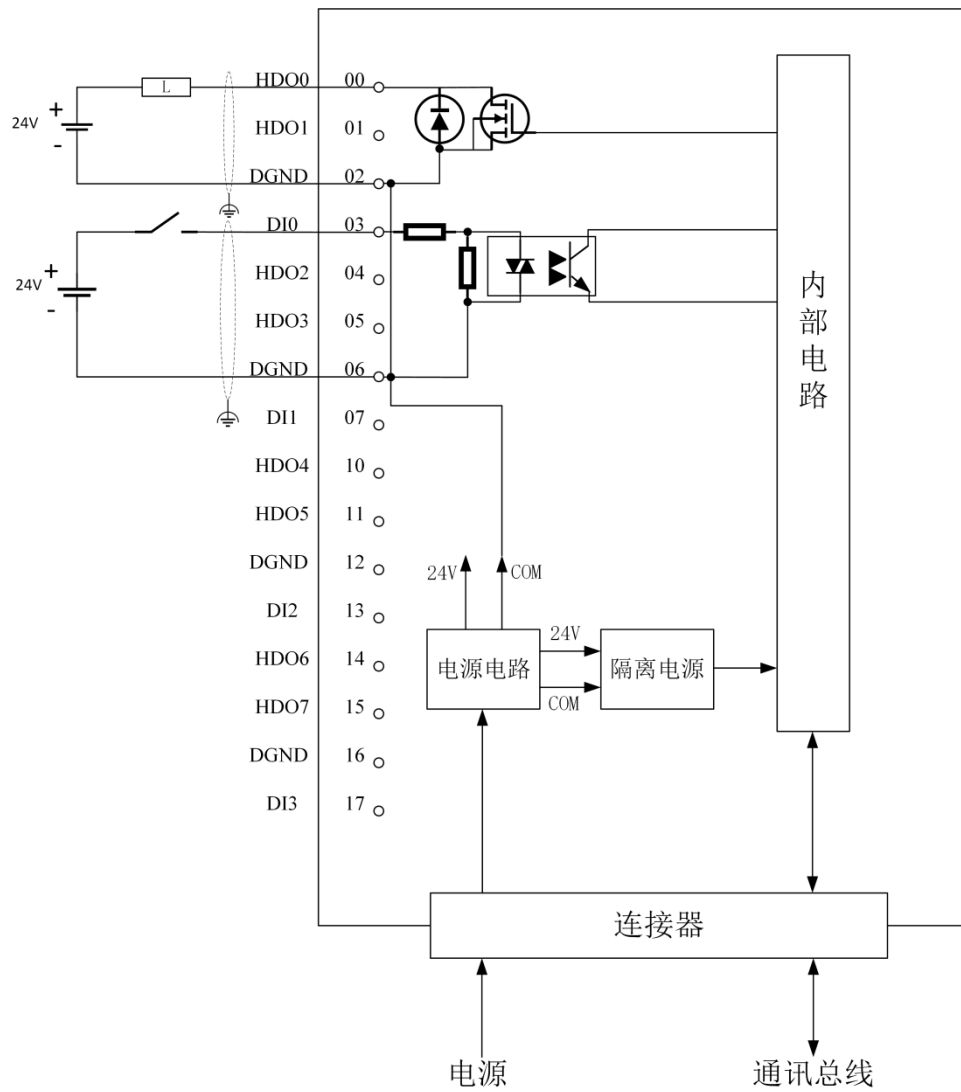
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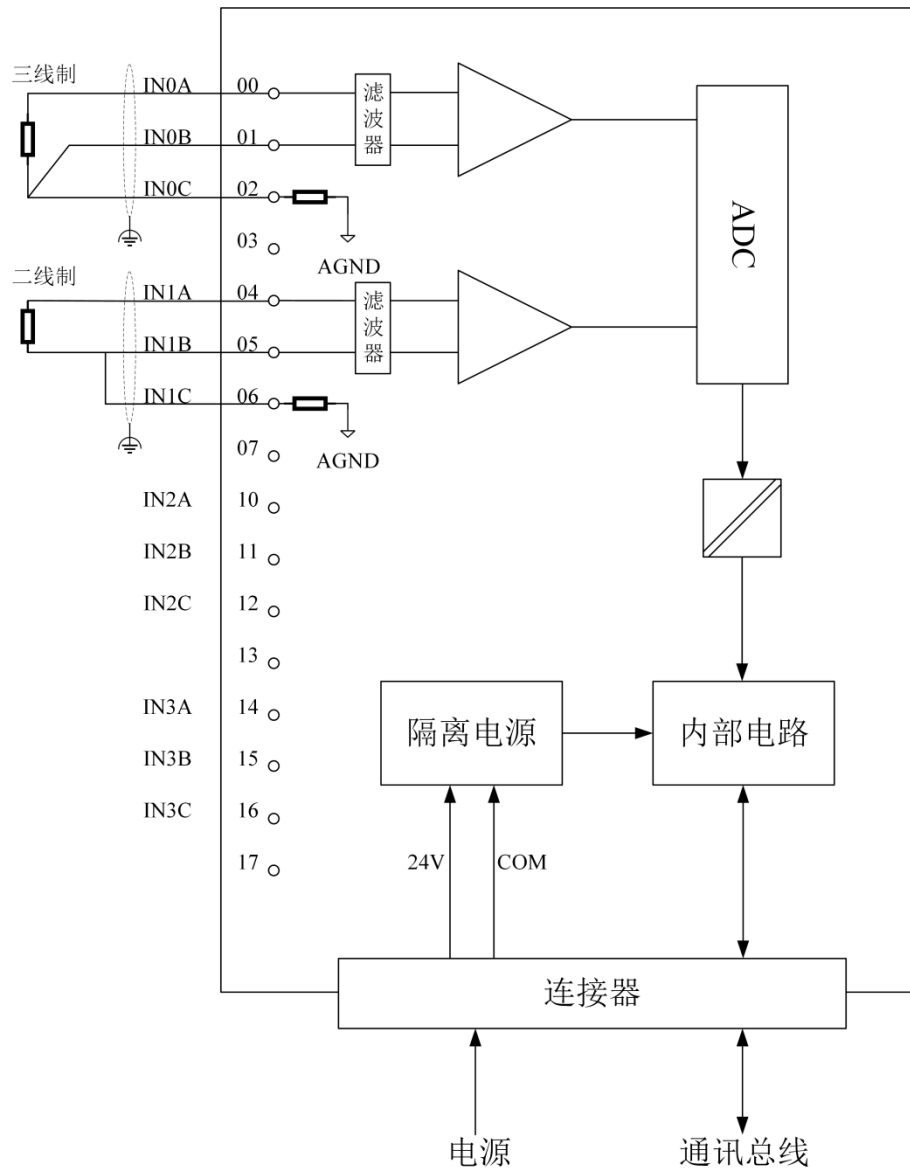
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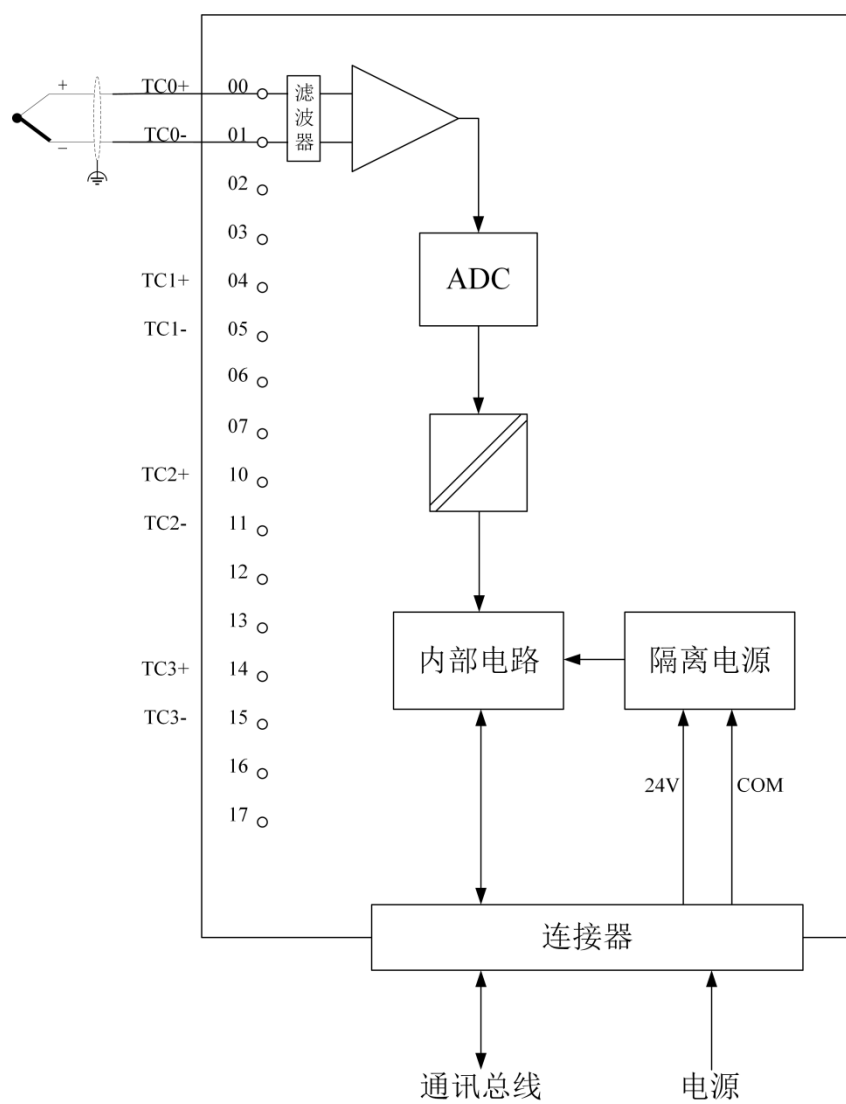
● QY20-4PO



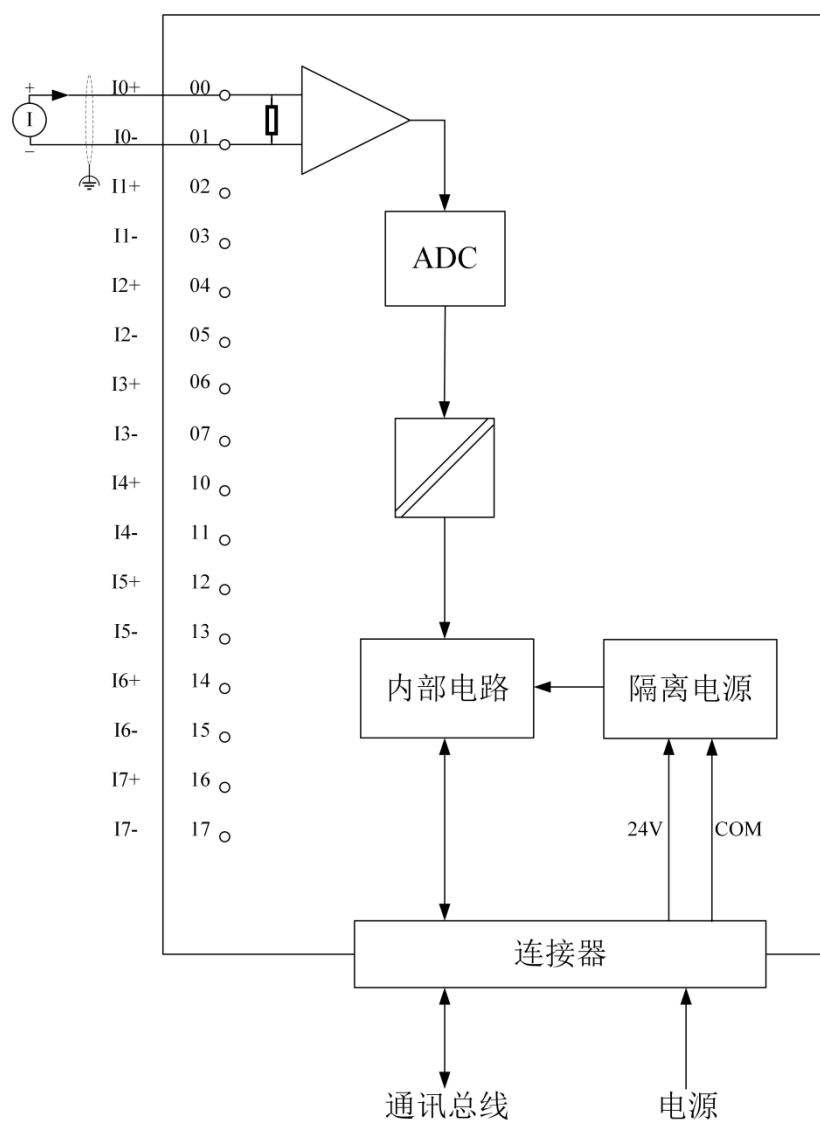
- QY20-4PT



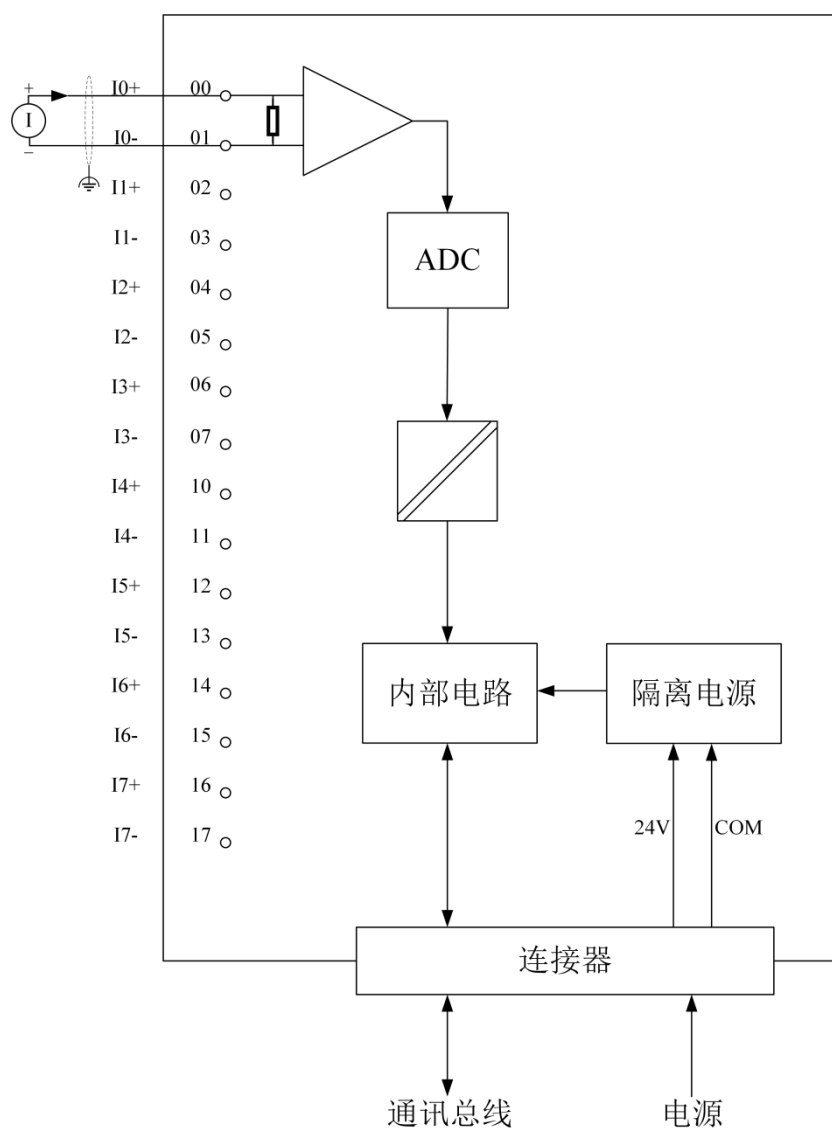
● QY20-4TC



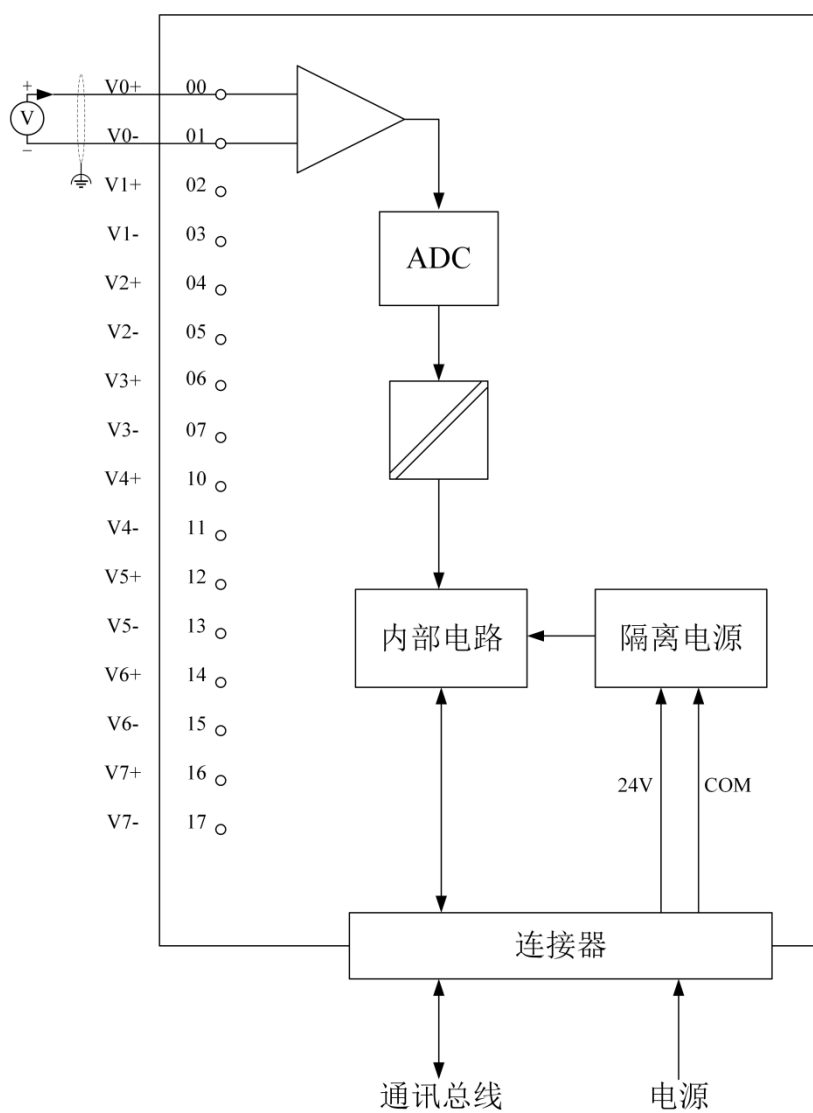
● QY20-8AI-L



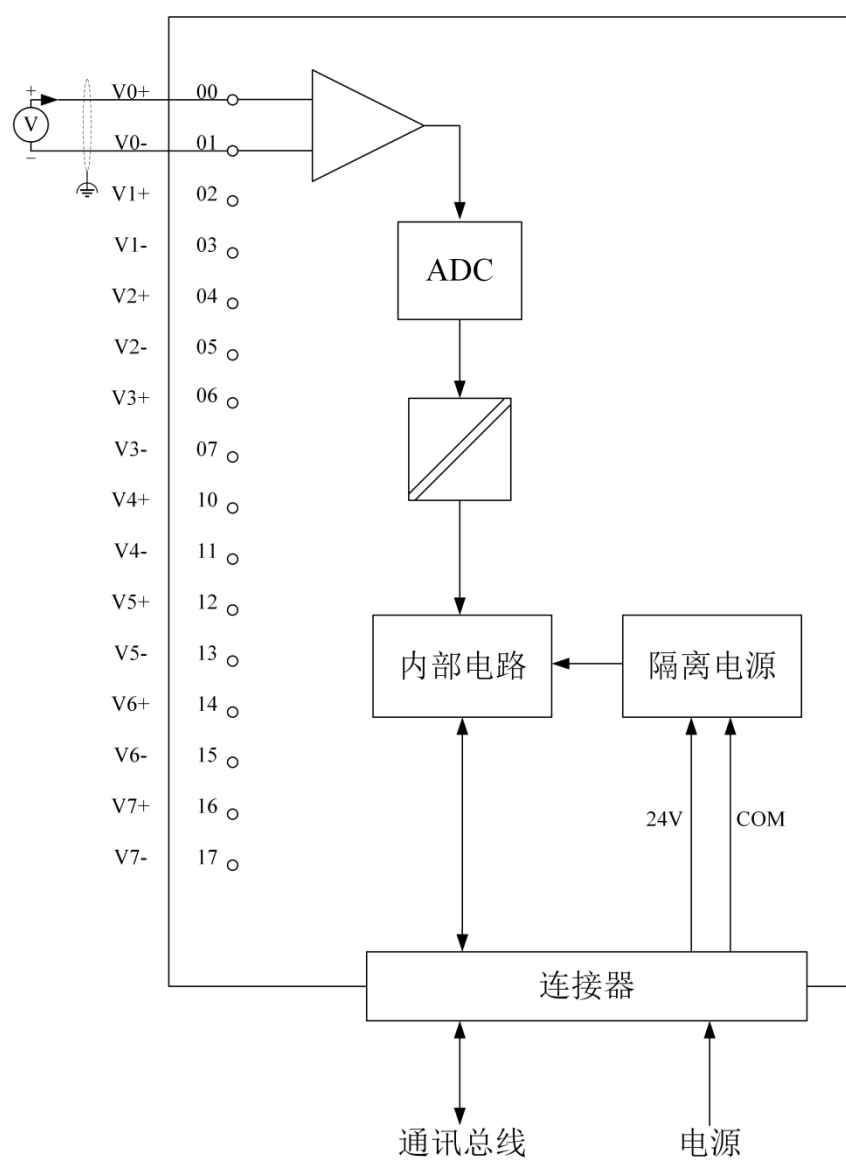
● QY20-8AI



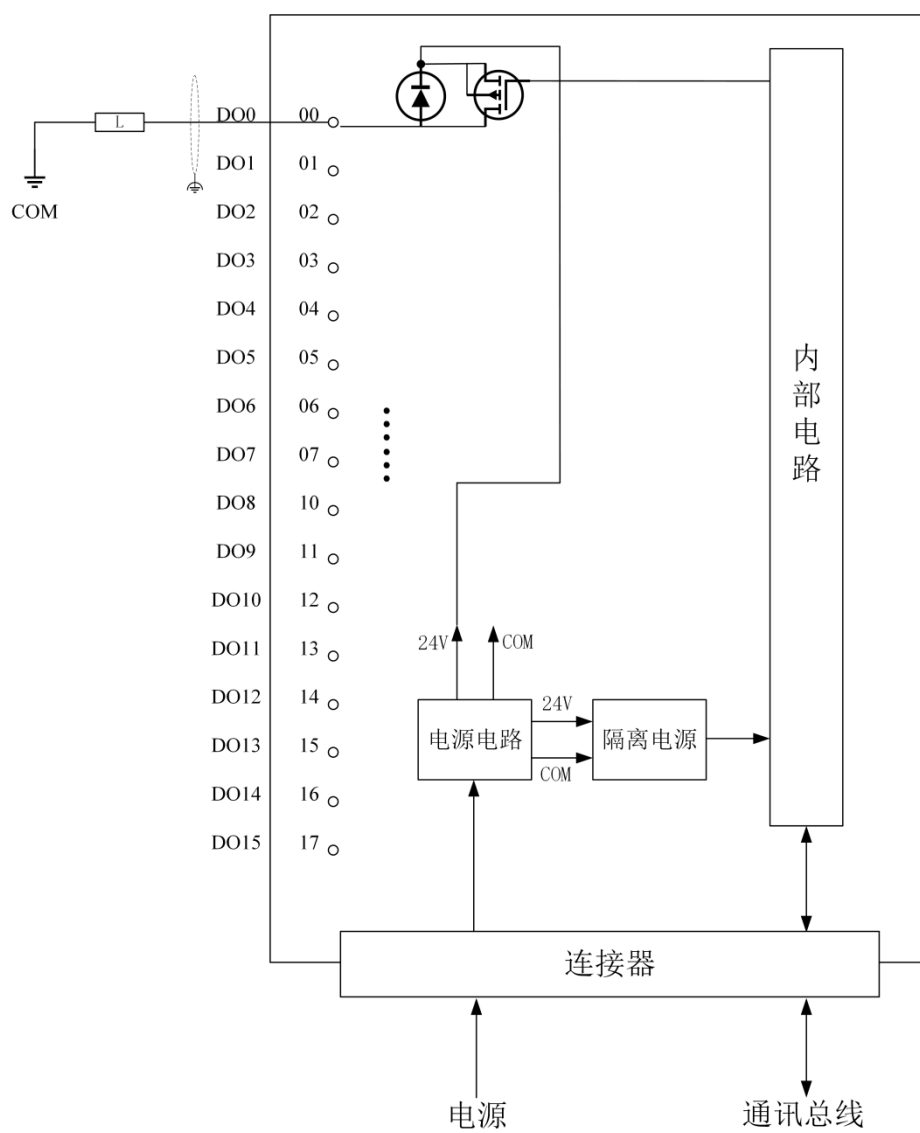
● QY20-8AV-L



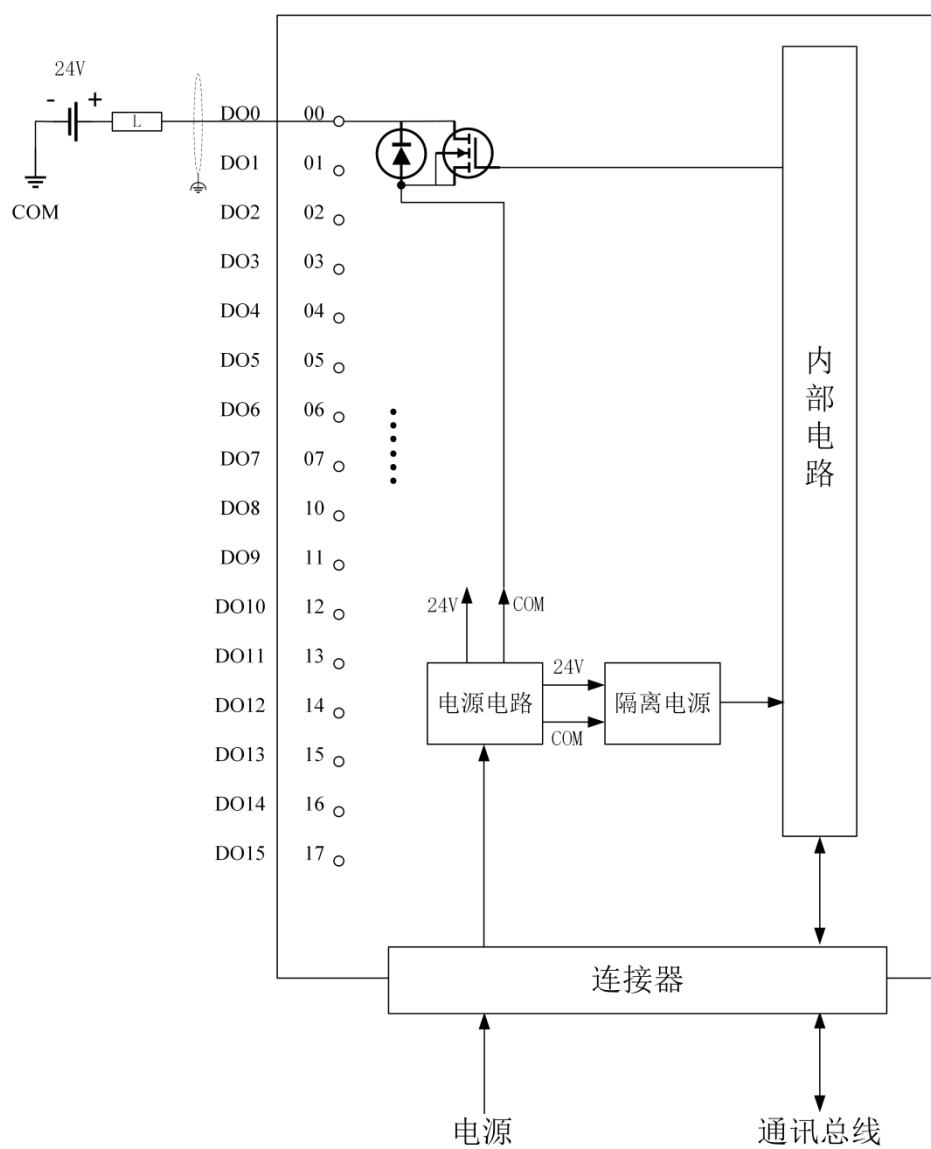
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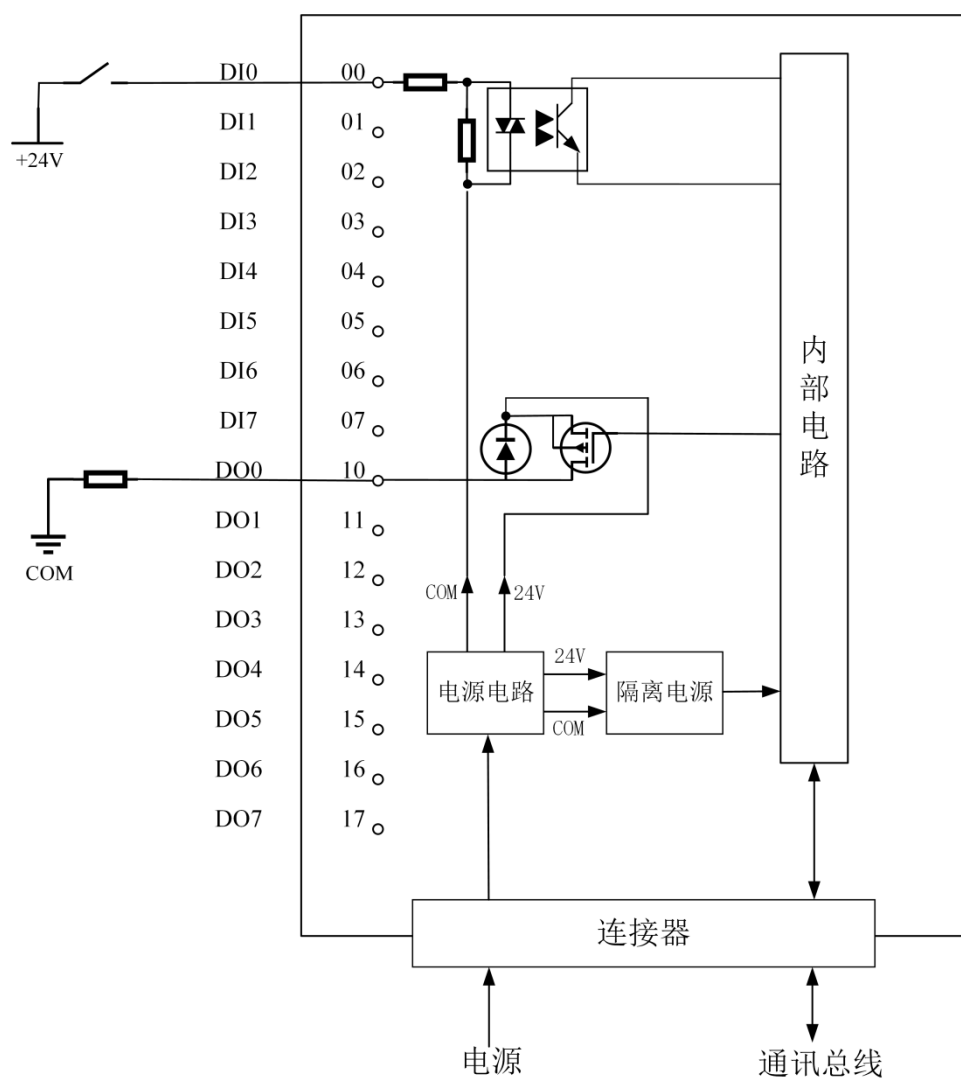
● QY20-0016P



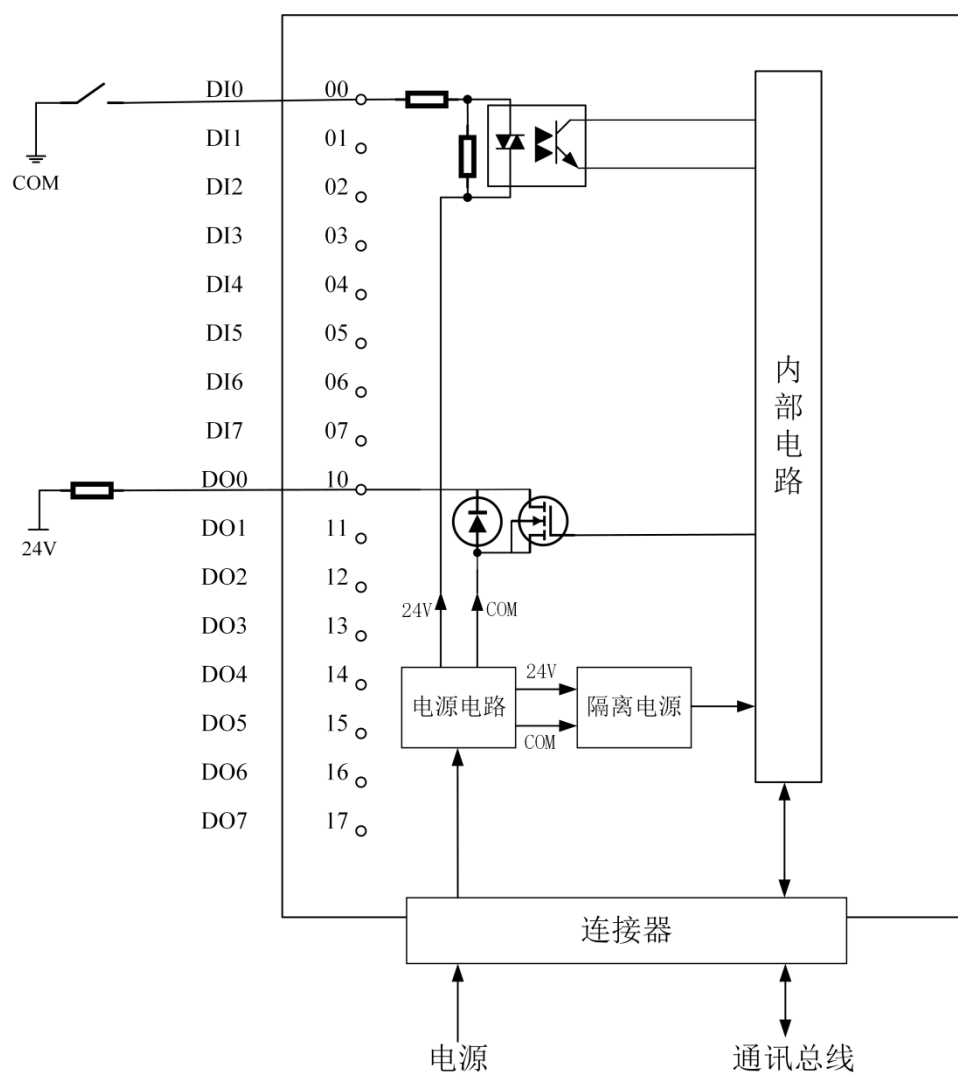
● QY20-0016N



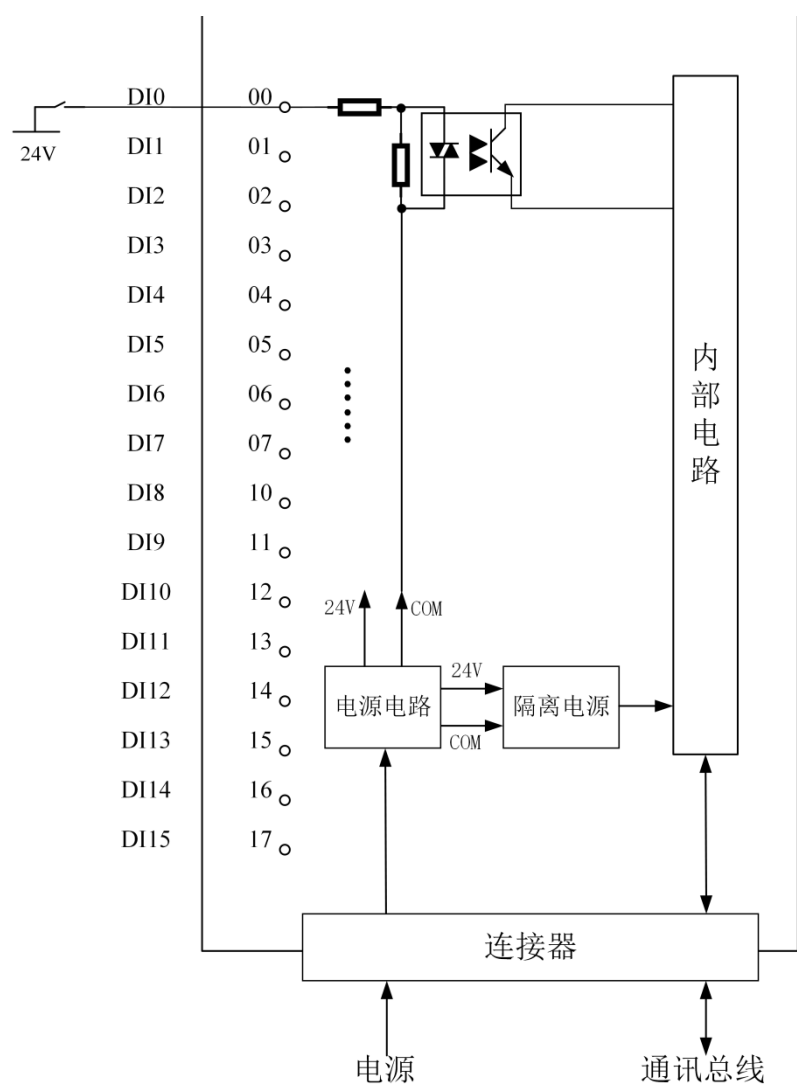
● QY20-0808P



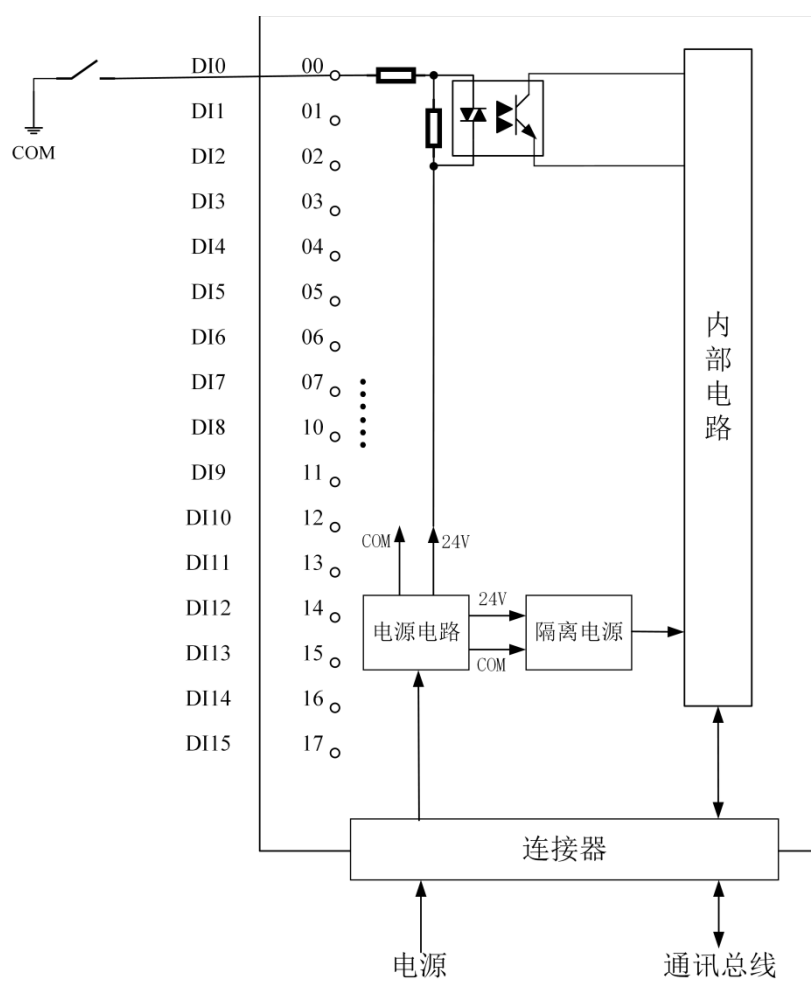
● QY20-0808N



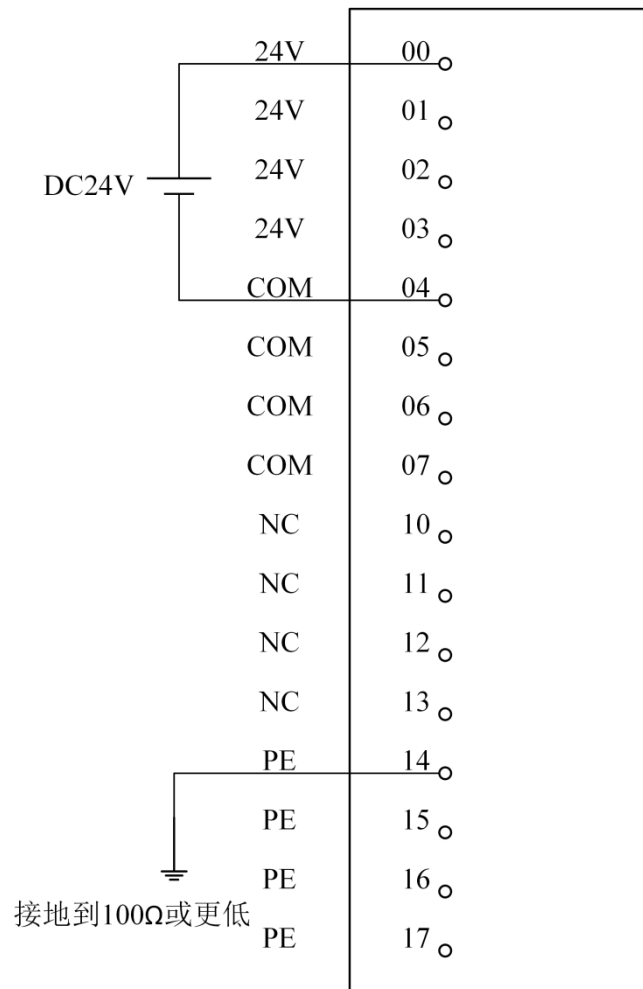
● QY20-1600P



● QY20-1600N



● QY20-PS



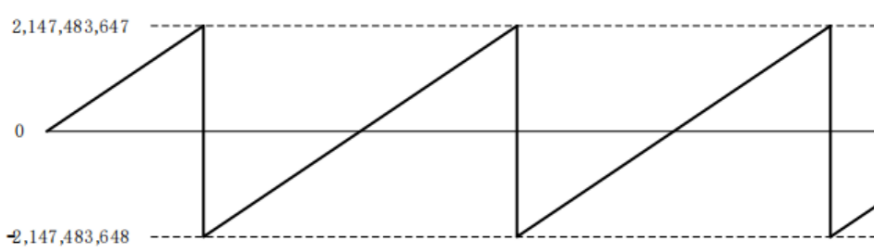
4. Functional Description

■ QY20-2HC

4.1 Counting function

The counting function can accurately detect and quantify externally input pulse signals, capturing the rising and falling edges of the pulse signal and accumulating the count by incrementing or decrementing. It supports 5V differential and 24V single-ended pulse signals. The counting can be started and stopped via software commands, and the count value can be set to the "preset position value" in the downlink parameters through hardware pins and software commands. The maximum counting range can be set to -2147483648 to 2147483647. When overflowing, the circular count jumps, the linear count is maintained or stopped, and the function supports probe, hardware setting, and comparison output functions. It also has built-in hardware filtering and anti-jitter processing, making it suitable for metering scenarios of physical quantities such as speed, flow rate, and displacement.

The counting parameters include seven items: counting mode, counting direction, filtering, counting range, initial counting value, pulse mode, and counting preset mode.

name		illustrate
Counting mode /direction	Ring counting	Assuming the initial value is set to 0, the maximum value is set to 2147483647, and the minimum value is set to -2147483648, then as the count value increases, once it reaches the maximum value, any further increase will result in the count reaching the minimum value. 
	Linear counting	Assuming the initial value is set to 0, the maximum value to 1000, and the minimum value to -1000, as the count increases, once it reaches the maximum value, further increases will cause the displayed count to remain unchanged, while the internal hardware count continues. If the count is reversed, it will only begin to decrease normally once the internal count returns to the set range. If a linear counter is set to stop when it exceeds the limit, the counter will automatically stop when it reaches the maximum value. To restart it, you need to write 0 to the counter enable setting and then write 1 to it.

	Counting direction	When the encoder rotates in the forward direction, the count value increases when the counting direction is positive, and decreases when the counting direction is negative.
Counting Filter		Encoder counting filtering can be configured; see parameter configuration section 5.1 for details . Filter Level
Counting upper limit, lower limit, and initial value settings		The upper and lower limits and initial value of the encoder count can be set.
AB phase counting		Incremental encoder counting, with selectable frequency multiplication (1, 2, or 4 times).
Direction + Pulse Count		If the direction port is 1, then the pulse port increments the count value by 1 for each pulse received. If the direction port is 0, then the pulse port count value is decremented by 1 for each pulse received.
CW/CCW Count		When a pulse arrives in phase A, the count increments by 1; when a pulse arrives in phase B, the count decrements by 1.
Preset counting method	Software preset	The count value can be set to the "preset position value" in the downlink parameters via the "count preset" in the downlink data control word.
	Hardware preset	In 5V differential counting mode, after setting the DI to a rising/falling edge preset, triggering the DI will set the count value to the "preset position value" in the

		downlink parameters.
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4.2 DI Function

- Ordinary DI

A standard DI (Digital Input) is an interface on the module used to receive external digital signals. It is primarily used to detect digital information such as the on/off status of external devices or pulse signals, for example, detecting whether a button is pressed or a limit switch is triggered. In a pulse counting module, a standard DI can serve as an input channel for external trigger signals, participating in control logic such as counting start/stop and resetting, providing basic digital signal input support for interaction between the module and external devices.

- Probe

In pulse counting modules, a probe typically refers to a function or component used to accurately detect specific states of pulse signals. It can monitor key characteristics of pulse signals in real time, such as edges (rising edge, falling edge) and level changes, helping the module to more accurately capture and identify pulse signals. Through the probe function, the module can more reliably determine the validity of pulses, reduce counting errors caused by signal interference and other factors, and ensure counting accuracy, especially in high-frequency pulse or complex signal environments.

- Hardware presets

Hardware presets refer to preset functions implemented through the module's hardware circuitry or dedicated hardware pins. In pulse counting modules, they are mainly used for count reset operations, offering fast response times to meet the demands of scenarios with high real-time requirements and ensuring rapid reset of the counting state.

Function	illustrate
DI	When the DIX port function is selected as a normal DI in the startup parameters, it can be used as a normal DI with a filtering time of 0-30ms.
probe	In the startup parameters, the DIX port function selection allows the port to be used as a probe when the probe's rising/falling edge is selected. Upon triggering, the current count value is recorded. For details on the filtering time, please refer to parameter configuration in section 5.1 . Filter Level
Preset Filter	When the DIX port function in the startup parameters is selected with rising/falling edge preset, the port can be used as a hardware setter. After triggering, the count value is set to the "preset position value" in the downlink parameters.

4.3 DO Function

- Ordinary DO

A standard DO (Digital Output) is an interface through which a module outputs digital signals to external devices. It is primarily used to control the on/off states of these devices, and the output signal is typically a high or low level. For example, a standard DO can be used to

control relay activation/deactivation, indicator light activation/deactivation, and external actuator start/stop.

- Compare outputs

The comparison output is a function within the pulse counting module that compares the count value with a preset value. Internally, the module compares the real-time count value with the preset value, triggering a specific output signal when the count value reaches or exceeds the preset value. This function can be used to implement automatic control logic. For example, in metering scenarios, when the accumulated pulse count reaches a preset flow threshold, the comparison output controls the valve to close; in motion control, when the count reaches a preset position, it triggers external equipment to decelerate or stop. The comparison output responds quickly, enabling precise real-time control based on the count data, thus improving the system's automation level.

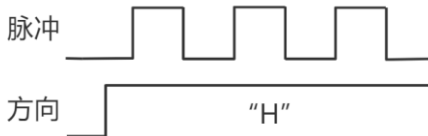
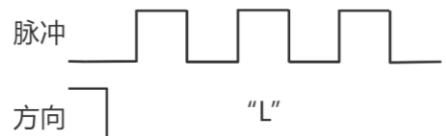
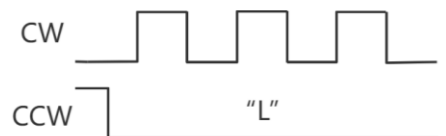
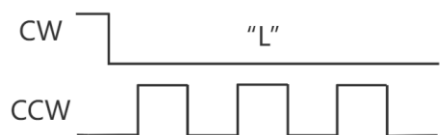
Function	illustrate
DO	When the DO function in the startup parameters is set to normal DO, the port can be used as a normal DO. If the "DO stop mode" in the startup parameters is set to clear, set, or hold, then after stopping, the DO will be set to 0, set to 1, or held respectively.
Compare output	In the startup parameters, the DO function is selected as compare output, the compare output time is set to 100 (ms), and the port is used for compare output. When the count value of the next parameter equals the compare output value, the DO port outputs, and then shuts down after 100ms.

■ QY20-4PO

4.4 Pulse Output Function

four-channel high-speed pulse output module provides multi-channel pulse control functions, supporting single-pulse (pulse + direction) and dual-pulse (CW/CCW) modes, with each of the four channels individually configurable. Each channel output is equipped with a standard DI input point, offering rich pulse functions including trapezoidal acceleration/deceleration and braking. It supports absolute position, relative position, and speed modes, enabling motion merging and dynamic adjustment of speed, position, and acceleration/deceleration time. The module can also be configured to trigger pulse output actions in case of network anomalies to ensure safety. The module is small, easy to install, and compact, occupying minimal space. It uses DIN 35 mm standard rail mounting and spring-loaded terminals for convenient and quick wiring. The innovative channel indicator lights are conveniently located near the channels for easy identification and maintenance.

name	illustrate
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Pulse output mode	Pulse + Direction	Forward	
		Reversal	
	CW/CCW	Forward	
		Reversal	
Safe Mode		Continue operation: When the module stops or disconnects, if it is currently running in position mode, it will wait for position mode to complete; if it is currently running in speed mode, it will decelerate and stop. Deceleration and Stop: When the module stops or disconnects, it will decelerate and stop regardless of the current operation mode. Braking and stopping: When the module stops or disconnects, it will brake and stop regardless of the current operation mode.	
Braking time		Once the braking command is triggered, the device will enter the braking phase and will come to a stop within the set time, regardless of the speed.	
Startup speed		The initial velocity of the trapezoidal acceleration/deceleration curve	
Scale (subdivision)		Set the units for speed and position according to your needs. If the external motor rotates one revolution every 360 pulses, the scale can be set to 360. In this case, if the pulse target position is set to 1, then 1*360 pulses will actually be sent.	
Input point filtering time		Input DI filtering time	
Pulse direction		Taking pulse + direction as an example, if the pulse direction is set to positive, then when the relative position is set to 100, the direction port outputs high and the pulse port outputs 100 pulses; if the pulse direction is set to negative, then when the relative position is set to 100, the direction port outputs low and the pulse port outputs 100 pulses.	
Motion merging	Single merge mode	Location mode	During the movement, if the position/velocity needs to be changed, the "Start Sending" parameter in the downlink must be set from 0 to 1 for each movement merge, and the movement must continue with the movement parameters set to 1.
		Speed Mode	If you need to change position/speed during movement, you can directly change it.
	Continuous Merging Mode	If the position/speed needs to be changed during the movement, the speed/position of the downlink parameters can be directly modified when the downlink parameter "Start Sending" is 1.	
	Turn off	During the movement, position/speed cannot be changed; a new instruction can only	

	merge mode	be given after the previous one has ended.
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5. Usage

5.1 Parameter Configuration

Taking channel 0 as an example, the configuration parameters are shown in the table below. **Note:**
Parameters can only be modified when the channel is not started.

Model	Parameter Name		Description	Default Value
QY20-2HC	Pulse Mode	Counter mode	0: 5V AB 1: 5V direction+pulse 2: 5V CW/CCW 3: 24V AB 4: 24V direction+pulse 5: 24V CW/CCW	0
	Filter Level	Filtering levels	Levels 0-15 0: Filters out pulses above 72MHz 1: Filters out pulses above 36MHz 2: Filters out pulses above 18MHz 3: Filters out pulses above 9MHz 4: Filters out pulses above 6MHz 5: Filters out pulses above 4.5MHz 6: Filters out pulses above 3MHz 7: Filters out pulses above 2.25MHz 8: Filters out pulses above 1.5MHz 9: Filters out pulses above 1.125MHz 10: Filters out pulses above 0.9MHz 11: Filters out pulses above 0.75MHz 12: Filters out pulses above 562.5kHz 13: Filters out pulses above 450kHz 14: Filters out pulses above 375kHz 15: Filters out pulses above 281.25kHz	7
	Count Multiple	Frequency multiplication factor	0: single frequency, 1: double frequency, 2: quadruple frequency	0
	Count Range Min	Counter lower limit	≥ -2147483648	-2147483648
	Count Range Max	Counter upper limit	≤ 2147483647	2147483647
	Count Direction	Counting direction	0: Circular count reversed 1: Circular count forward 2: Linear count reversed 3: Linear count forward	1
	Preset Value Mode	Preset mode	0: Software preset 1: Hardware preset	0
	Count Initial Value	Counter initial value		0
	Input CH0	DI0 input mode	0: Normal DI	0

	Mode		1: Probe rising edge 2: Probe falling edge 3: Preset rising edge 4: Preset falling edge	
	Input Mode CH1	DI1 Input mode	0: Normal DI 1: Probe rising edge 2: Probe falling edge 3: Preset rising edge 4: Preset falling edge	0
	Input Filter Time CH0	Digital input filtering	0~30ms	4
	Output Mode CH0	Digital output mode	0: DO 1: Compare output	0
	Compare Output Time(ms)	Compare output time	5~5000ms	10
	Speed Acquisition Time	Speed acquisition time (encoder change rate is acquired every t ms)	5~5000ms	10
	Output Stop Mode CH0	Digital output stop mode	0: Clear 1: Set 2: Hold	0
	Auto-stop When Linear Count Exceeds Limit	Automatic stop counting when linear counting exceeds the limit.	0: Off 1: On	0
QY20-4AD	Transform Mode	Conversion Mode	Used to set the analog input conversion type, there are 7 types in total. 0: -10~10V 1: 0~10V 2: -5~5V 3: 0~5V 4: 1~5V 5: 0~20mA 6: 4~20mA	0
	Digital Output Range	Digital Output Range	Used to set the reading range of analog inputs, there are three types: 0: -20000~20000 1: -27648~27648 2: -32000~32000	0
	Filter Parameter	Filtering parameters	Used to set analog input filtering, unit: ms 0~30ms	4
	Overflow Detect	Over-limit detection	Used to set whether to enable over-limit detection. 0: false 1: true	0
	Disconnected Detect	Disconnection detection	Used to configure whether to enable disconnection detection (only effective when the conversion mode is set to -1~5V or 4~20mA). 0: false	0

			1: true	
QY20-4DA	Transform Mode	Conversion Mode	Used to set the analog output conversion type, there are 7 types in total. 0: -10~10V 1: 0~10V 2: -5~5V 3: 0~5V 4: 1~5V 5: 0~20mA 6: 4~20mA	0
	Digital Output Range	Digital Output Range	Used to set the range of analog output readings, there are three types: 0: -20000~20000 1: -27648~27648 2: -32000~32000	0
	Communication Stop Output Mode	Output Status After Stop	This parameter is used to set the analog output status after the module stops. 0: Channel Clear (通道清零): When stopped, all channels x are closed. 1: Channel Hold (通道保持): When stopped, channel x retains the output state it had before stopping. 2: Channel Preset (通道预设): When stopped, channel x outputs the CHx Out Preset Value.	0
	Output Preset Value	Output Preset Value	used to set the output status of each channel after the module stops when "Stop Output Status" is configured as "Channel Preset".	0
QY20-4PO	Pulse Out Mode	Pulse Output Mode	0: Pulse + Direction 1: Double Pulse (CW/CCW)	0
	STOP Mode	Safety Mode	This setting determines the handling when the stop module disconnects: 0: Continue running 1: Decelerate and stop 2: Brake to stop	0
	Brake Time(ms)	Braking Time	20~5000ms	200
	Startup Speed(Hz)	Starting Speed	Used to set the starting point velocity of the trapezoidal acceleration curve. 0~200000hz	1
	Scale(N Pulses correspond to 1 Turn)	Scale (n pulses correspond to 1 revolution)	1~65535	1
	Input Filter Time(ms)	Input Point Filtering Time	0~30ms	4
	Pulse	Direction Logic	0: Reverse rotation 1: Forward rotation	1

	Direction			
	Movement Merge Mode	Motion Merging Configuration	Used to change speed/position during movement: 0: Execute changes real-time position/speed 1: Enable changes real-time position/speed 2: Disallows position/ speed changes until stopped	0
QY20-4PT	Enable	Channel Enable	used to configure whether the channel is enabled. Other parameter settings will only take effect after the channel is enabled. 0: false 1: true	1
	Sampling Time	Sampling Period	Used to configure the sampling time of the channel. 0: 250ms 1: 500ms 2: 1000ms	0
	Transform mode	Sensor Type	Sensor types used for configuring channels 0: PT100 1: PT500 2: PT1000 3: CU100 4: KTY84 5: NTC5K 6: NTC10K	0
	Filter Time(s)	Filtering Parameters	Used to set analog input filtering, unit: seconds (s) 0~30s	5
	Transform Type	Temperature Unit	Used to set temperature units 0: Celsius degree 摄氏度 (°C) 1: Fahrenheit degree 华氏度 (°F)	0
	Temperature Bias	Temperature Offset Value	Used to set the temperature offset value 0.1°C -2048~2047, that is, the temperature offset range is : -204.8°C~+204.7°C	0
	NTC Material Constant B	NTC material constant B value	The material constant B used to set the NTC resistance temperature detector (RTD) is only valid when the sensor type is set to NTC5K or NTC10K.	3470
	Overflow Detect	out-of-limit detection	Used to set whether to enable over-limit detection. 0: false 1: true	0
	Input UpLimit	upper temperature limit	Used to set the upper limit of temperature measurement, in units of 0.1°C. Only effective when over-limit detection is enabled (please refer to the datasheet of the sensor type you are using for settings).	8500(850.0°C)

	Input DownLimit	lower temperature limit	Used to set the lower limit of temperature measurement, in units of 0.1°C. Only effective when over-limit detection is enabled (please refer to the datasheet of the sensor type you are using for settings).	-2000(-200.0°C)
	Disconnected Detect	Sensor disconnection detection	Used to set whether to enable sensor disconnection detection. 0: false 1: true	0
QY20-4TC	Enable	Channel enable	Used to configure whether the channel is enabled. Other parameter settings will only take effect after the channel is enabled. 0: false 1: true	1
	Sampling Time	Sampling period	Used to configure the channel sampling period 0: 250ms 1: 500ms 2: 1000ms	0
	Transform mode	Sensor type	Used to configure sensor type 0: K type 1: J type 2: E type 3: B type 4: N type 5: R type 6: S type 7: T type	0
	Filter Time(s)	Filtering parameters	Used to set analog input filtering, unit: seconds (s) 0~30s	5
	Transform Type	Temperature unit	Used to set temperature unit 0: Celsius degree 摄氏度 (°C) 1: Fahrenheit degree 华氏度 (°F)	0
	Temperature Bias	Temperature offset value	Used to set the temperature offset value, in units of 0.1°C. -2048~2047, That is, the temperature offset range is -204.8°C~ +204.7°C	0
	Overflow Detect	Over-limit detection	Used to set whether to enable over-limit detection. 0: false 1: true	0
	Input UpLimit	Upper temperature limit	Used to set the upper limit of temperature measurement, in units of 0.1°C. Only effective when over-limit detection is enabled (please refer to the datasheet of the sensor type you are using for settings).	8500(850.0°C)
	Input DownLimit	Lower temperature limit	Used to set the lower limit of temperature measurement, in units of 0.1°C. Only effective when over-limit	-2000(-200.0°C)

			detection is enabled (please refer to the datasheet of the sensor type you are using for settings).	
	Disconnected Detect	Sensor disconnection detection	Used to set whether sensor disconnection detection is enabled. 0: false 1: true	0
QY20-8AI-L	Transform Mode	Conversion Mode	Used to set the analog input conversion type, there are two types in total. 5: 0~20mA 6: 4~20mA	5
	Digital Output Range	Digital Output Range	Used to set the reading range of analog inputs, there are three types: 0: -20000~20000 1: -27648~27648 2: -32000~32000	0
	Filter Parameter	Filtering Parameters	Used to set analog input filtering, unit is ms. 0~30ms	4
	Overflow Detect	Over-Limit Detection	Used to set whether to enable over-limit detection. 0: false 1: true	0
	Disconnected Detect	Disconnection Detection	Used to configure whether disconnection detection is enabled. (Only effective when the conversion mode is set to 4~20mA) 0: false 1: true	0
QY20-8AI	Transform Mode	Conversion Mode	Used to set the analog input conversion type, there are two types in total. 0: 0~20mA 1: 4~20mA	0
	Digital Output Range	Digital Output Range	Used to set the reading range of analog inputs, there are three types: 0: -20000~20000 1: -27648~27648 2: -32000~32000	0
	Filter Parameter	Filtering Parameters	Used to set analog input filtering, unit: ms 0~30ms	4
	Overflow Detect	Over-Limit Detection	Used to set whether to enable over-limit detection. 0: false 1: true	0
	Disconnected Detect	Disconnection Detection	Used to configure whether disconnection detection is enabled. (Only effective when the conversion mode is set to 4~20mA) 0: false 1: true	0
QY20-8AV-L	Transform Mode	Conversion Mode	Used to set the analog input conversion type, there are three types in total.	1

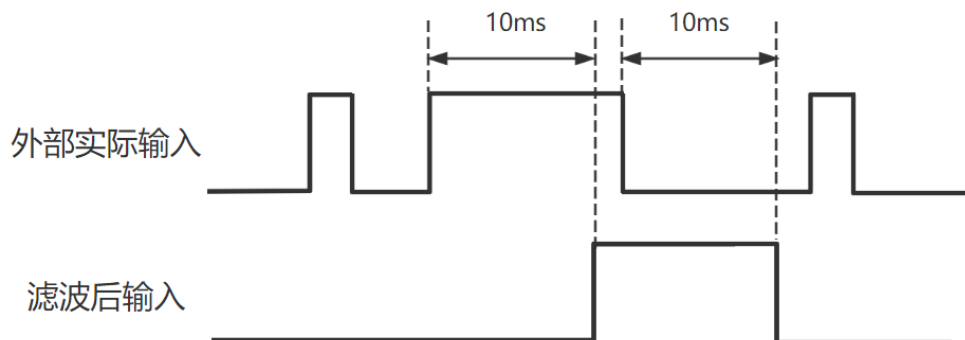
			1: 0~10V 3: 0~5V 4: 1~5V	
	Digital Output Range	Digital Output Range	Used to set the reading range of analog inputs, there are three types: 0: -20000~20000 1: -27648~27648 2: -32000~32000	0
	Filter Parameter	Filtering Parameters	Used to set analog input filtering, unit:ms 0~30ms	4
	Overflow Detect	Over-Limit Detection	Used to set whether to enable over-limit detection. 0: false 1: true	0
	Disconnected Detect	Disconnection Detection	Used to configure whether to enable disconnection detection (only effective when the conversion mode is set to -1~5V). 0: false 1: true	0
QY20-8AV	Transform Mode	Conversion Mode	Used to set the analog input conversion type, there are 5 types in total. 0: -10~10V 1: 0~10V 2: -5~5V 3: 0~5V 4: 1~5V	0
	Digital Output Range	Digital Output Range	Used to set the reading range of analog inputs, there are three types: 0: -20000~20000 1: -27648~27648 2: -32000~32000	0
	Filter Parameter	Filtering Parameters	Used to set analog input filtering, unit:ms 0~30ms	4
	Overflow Detect	Over-Limit Detection	Used to set whether to enable over-limit detection. 0: false 1: true	0
	Disconnected Detect	Disconnection Detection	Used to configure whether to enable disconnection detection (only effective when the conversion mode is set to -1~5V). 0: false 1: true	0
QY20-0016	Communication Stop Output Mode	Output mode after stop/disconnection	Configuration for the output status of DO when the module stops 0: Channel Clear—When stopped, all channels x are turned off 1: Channel Hold—When stopped, channels x maintain the output status before stopping or disconnection	0

			2: Channel Preset—When stopped, channels x are set to the status of CHx Out Preset Value 3: Select Preset—When stopped, channels x are set according to CHx Set Preset Bits and CHx Out Preset Value	
	Set Preset Bits	Bit-by-bit setting value	This parameter configures which output channels (DOs) will use to output preset values when the module stops. Each channel's output mode is bit-matched, with one bit representing one channel. If a channel is set to TRUE, it outputs according to the preset value; if set to FALSE, the channel's output retains the state it was in before stopping. This parameter is valid when the output state is set to the selected preset after stopping/disconnection.	
	Output Preset Value	Output preset value	One bit represents one channel; when a channel is set to TRUE, its output state is 1; when set to FALSE, its output state is 0. This parameter is valid when the output state is the channel preset or channel selection preset after a stop/disconnection.	
QY20-0808	Filter Time(ms)	Filtering time	Used to set digital input filtering, unit:ms 0~30ms	4
	Communication Stop Output Mode	Output mode after stop/disconnection	Used to configure the output state of DO when the module stops: 0: Channel Clear: All channels x are turned off when the module stops. 1: Channel Hold: Channel x retains its output state before stopping or network disconnection when the module stops. 2: Channel Preset: Channel x is set to the CHx Out Preset Value when the module stops. 3: Select Preset: When the module stops, channel x is set according to the CHx Set Preset Bits and CHx Out Preset Value.	0
	Set Preset Bits	Bit-by-bit setting value	This parameter configures which output channels (DOs) will use to output preset values when the module stops. Each channel's output mode is bit-matched, with one bit representing one channel. If a channel is set to TRUE, it outputs according to the preset value; if set to FALSE, the channel's output retains the state it was in before stopping. This parameter is valid when the output state is set to the	

			selected preset after stopping/disconnection.	
	Output Preset Value	Output preset value	One bit represents one channel; when a channel is set to TRUE, its output state is 1; when set to FALSE, its output state is 0. This parameter is valid when the output state is the channel preset or channel selection preset after a stop/disconnection.	
QY20-1600	Filter Time(ms)	Filtering time (ms)	Used to set the filtering of digital input, unit:ms, 0 means no filtering 0~30ms	4

Note:

The QY20-1600's filtering time is set to 10ms. If the external input transitions from low to high for 10ms, the filtered input will be high; if the external input transitions from high to low for 10ms, the filtered input will be low; otherwise, it will remain high. The effect is shown in the image below.



5.2 Data

5.2.1 Uplink Data

model	Parameter name		Parameter definition
QY20-2HC	Counter Status	Counter status	Bit0: DI0 input signal Bit1: DI1 input signal Bit2: DI0 latch complete Bit3: DI1 latch complete Bit4: DO status
	Count Value	Count value	The current count value of the corresponding encoder
	Velocity	Counting speed	Pulse velocity of the encoder input channel
	Latch Value1	Latch value 1	After the probe is triggered, the latched encoder latch value is 1.
	Latch Value2	Latch value 2	After the probe is triggered, the latched encoder latch value is 2.
	Errorcode	Error code	By position 0x01: Range setting error (maximum value is less than minimum value) 0x02: Comparison output value setting exceeded limit 0x04: Hardware zeroing is configured, but DI mode is not set to zeroing, or DI mode is set to zeroing, but the zeroing mode is not set to hardware zeroing. 0x08: Phase AB missing 0x10: Linear count greater than maximum limit value 0x20: Linear count less than minimum limit value 0x40: Linear counter exceeds limit and stops
QY20-4PO	Pulse Output Status	Pulse output status	Bit0: Actual output direction of the pulse ·0: Forward rotation; 1: Reverse rotation Bit1: No pulse output Bit2: Pulse state accelerating Bit3: Pulse state at constant speed Bit4: Pulse state deceleration Bit5: Location mode running status · 0: Not in position mode 1: In position mode Bit6: Speed Mode Operating Status 0: Not in speed mode 1: In speed mode Bit7: Status reached 0: Position/velocity not reached; 1: Position/velocity reached. Bit8: DI state
	Error Code	Alarm Code	By position 0x0001: Startup speed > Running speed 0x0002: Running speed * subdivisions > 200k 0x0004: Running steps * subdivisions > 2147483647 or < -2147483648 0x0008: Startup speed * subdivisions > 200k 0x0010: Acceleration time > 5000ms 0x0020: Deceleration time > 5000ms 0x0040: Speed is 0 alarm
	Current Position	Current location	The offset pulse number relative to zero, i.e., the command position (coordinates). If the coordinates are cleared when there is no pulse output in the channel, this value will be set to 0.

model	Parameter name		Parameter definition
QY20-2HC	Counter Status	Counter status	Bit0: DI0 input signal Bit1: DI1 input signal Bit2: DI0 latch complete Bit3: DI1 latch complete Bit4: DO status
	Count Value	Count value	The current count value of the corresponding encoder
	Velocity	Counting speed	Pulse velocity of the encoder input channel
	Latch Value1	Latch value 1	After the probe is triggered, the latched encoder latch value is 1.
	Latch Value2	Latch value 2	After the probe is triggered, the latched encoder latch value is 2.
	Errorcode	Error code	By position 0x01: Range setting error (maximum value is less than minimum value) 0x02: Comparison output value setting exceeded limit 0x04: Hardware zeroing is configured, but DI mode is not set to zeroing, or DI mode is set to zeroing, but the zeroing mode is not set to hardware zeroing. 0x08: Phase AB missing 0x10: Linear count greater than maximum limit value 0x20: Linear count less than minimum limit value 0x40: Linear counter exceeds limit and stops
	Current Velocity	Current speed	Current channel actual operating speed

Data Explanation:

● QY20-2HC

① DI0 and DI1 input signals

Each encoder is equipped with 2 DI channels, which can be used as ordinary DI channels, probes, and hardware setters to indicate the presence or absence of the corresponding input signal.

② DI0 and DI1 latch completion flags

When DI is used as a probe, after the probe input channel completes one latch, the flag bit will toggle from 0 to 1 or from 1 to 0.

For example: The latch completion flag for encoder 1 probe input channel 1 is 0. After one latch, the flag bit changes to 1. After another latch, the flag bit changes to 0.

③ Encoder latch value

When DI is used as a probe, by inputting a signal that meets the set conditions into the probe input channel, the current count value of the corresponding encoder can be quickly latched.

Therefore, the range of the latched value is the same as the count value, which is -2147483648 ~ 2147483647

● **QY20-4PO**

① Pulse actual output direction

Indicates the actual direction of the current pulse transmission

② No pulse output, pulse acceleration, pulse constant speed, and pulse deceleration – these four states indicate the current pulse transmission status.

③ Position mode in operation, speed mode in operation; these two states indicate the current pulse transmission mode.

④ State reached

◆ In speed mode, this parameter is set to 1 when the current speed reaches the set speed. When the channel starts moving again, this position will be reset to 0.

◆ In position mode, this parameter is set to 1 when the current position reaches the set position. When the channel starts moving again, it will reset the position to 0.

⑤ Input point status

Indicates the actual input status of the current channel input port.

5.2.2 Downlink Data

model	Parameter name		Parameter definition
QY20-2HC	Count Control	Counting control	Bit0: Encoder counting enable Bit1: Probe 1 latch enable Bit2: Probe 2 latch enable Bit3: Comparison output enable Bit4: Count preset Bit5: Probe 1 latch mode (0 single, 1 repeat) Bit6: Probe 2 latch mode (0 single, 1 repeat) Bit7: Compare output mode (0 single, 1 repeat) Bit 8: Compare output direction (0 for incrementing comparison, 1 for decrementing comparison) Bit9: Compare output levels (0 high, 1 low) Bit10: Normal DO output
	Compare Output Set Value	Compare Output Set Value	After the comparison output function is enabled, the module compares the current count value with the set value. When the comparison direction and the comparison set value are both consistent, the corresponding comparison output channel will output a pulse with adjustable time.
	Position Preset Value	Position preset value	After the Bit4 counter preset is triggered, the current position is set to this data.

QY20-4PO	Pulse Control	Pulse control	Bit0: Channel Mode ·0: Position mode 1: Speed mode Bit1: Position Pattern ·0: Absolute position; 1: Relative position Bit2: Initiate transmission (edge control) Bit3: Stop sending Bit4: Brake Enable Bit5: Set position Bit6: Clear flag • Edge 0 → 1 control, clearing the two flags: homing complete and position reached.
	Set Acceleration	Set acceleration	Set acceleration
	Set Deceleration	Set deceleration	Set deceleration
	Set Velocity	Set speed	In position mode, the absolute value is used; in speed mode, the direction of speed is indicated.
	Set Position	Set location	Set location

Data Explanation:

● QY20-2HC

① Encoder counting enable

Setting the encoder count enable to 0 enables start/stop counting, while setting it to 1 enables it.

② Probe latch enable

Setting the encoder input latch channel enable flag to 1 enables/disables the probe function for latching; setting it to 0 disables the latching function.

③ Compare output enable

Setting the encoder compare output enable to 0 enables/disables the compare output function, while setting it to 1 enables it.

④ Compare output modes

The encoder's comparator output channel trigger mode can be set to: 0 (single trigger), 1 (repeated trigger).

- ◆ Single Trigger: After the compare output function is enabled, a pulse output is triggered when the count value meets the condition. After that, no more comparisons are made. To trigger the compare output again, the compare output function must be re-enabled.
- ◆ Repeated Trigger: After the comparison output function is enabled, a pulse output is triggered once the count value meets the condition. The next comparison will then begin immediately. However, the pulse output will not restart for a specified period during the

comparison output time until the count value changes . After the previous comparison output ends, if the comparison output condition is met again, a pulse output will be triggered again. If the comparison output time is set relatively long, say 2 seconds, and the upper and lower limits of the count are set relatively small, if the comparison pulse is triggered again within 2 seconds, then the 2-second timer will be refreshed.

⑤ Compare output direction

The encoder's comparator output channel's comparator direction is set to 1 for incrementing comparison (count value from smallest to largest) and 0 for decrementing comparison (count value from largest to smallest).

⑥ Compare output levels

When the comparator output channel function is not enabled or triggered, it can be used as a normal digital output channel. Digital channel output (NPN type output): Setting it to "0" outputs a high level of 24V, setting it to "1" outputs a low level of 0V.

When the compare output is triggered, the level of this pin will toggle. Therefore, the active/no level corresponding to the compare output can be set by first setting this bit and then enabling the compare output.

⑦ Normal DO output

Digital output channel (NPN type output): Setting it to "0" outputs a high level of 24V, setting it to "1" outputs a low level of 0V.

● QY20-4PO

① The two parameters, mode configuration and position mode configuration, determine the mode of movement.

When mode configuration = 0 and position mode = 1, the movement is in absolute position.

When mode configuration = 0 and position mode = 0, movement is relative to position.

When mode configuration=1, it moves in speed mode.

◆ Absolute position: The number of steps indicates the distance traveled from the current coordinates to the set coordinate position.

For example: if the current position is 600 steps and the running step count is 800, it means running to the 800th step position, which is 200 steps in the positive direction.

In this mode, you can modify the speed and position during the uniform acceleration and deceleration process in a trapezoidal pattern. Note that setting the speed to 0 is not allowed in this mode.

For example: If the current position is 10,000 steps, and the initial launch is in absolute position mode with a target position of 20,000 steps, and during operation the 20,000 steps

are changed to 50,000 steps, then the program will directly run to the position at 50,000 steps. The same logic applies to changing the speed.

◆ **Relative position:** The number of steps indicates how many steps to run directly.

For example, a run count of -500 means running 500 steps in the opposite direction. In this mode, you can modify the speed and position during the constant speed process of trapezoidal acceleration and deceleration. Note that setting the speed to 0 is not allowed in this mode.

For example: If the current position is 10,000 steps, and the initial launch is in relative position mode with a target position of 20,000 steps, and when it reaches 15,000 steps, the 20,000 steps are changed to 50,000 steps, then it will directly run to the position of $15,000 + 50,000 = 65,000$ steps. The modification speed works similarly.

◆ **Speed Mode:** The channel will accelerate to the operating speed according to the set acceleration curve and continue to run continuously. The operating speed can be changed during the constant speed process of trapezoidal acceleration and deceleration.

For example, when starting in speed mode, if the acceleration time is set to 100ms, the deceleration time is set to 100ms, and the speed is set to 100, the channel will run according to the set speed and acceleration/deceleration times. During the constant speed process, if the speed is changed to 200, it will take 100ms to increase the speed from the current speed of 100 to 200. The deceleration will follow the same principle.

② Start sending

Setting this parameter to 1 initiates the sending of pulses according to the given pulse parameters. Execute 0→1 edge-triggered.

③ Stop sending

To stop the movement, set this parameter to 1. Execute 0→1 edge-triggered.

④ Brake enable

The braking command has the highest priority in the entire system, taking effect immediately at all times, and is controlled by a voltage level. Therefore, if the braking command is 1, not only must the current movement be immediately stopped, but the start of the next movement is also prohibited. In other words, for the device to move, the braking command must be 0.

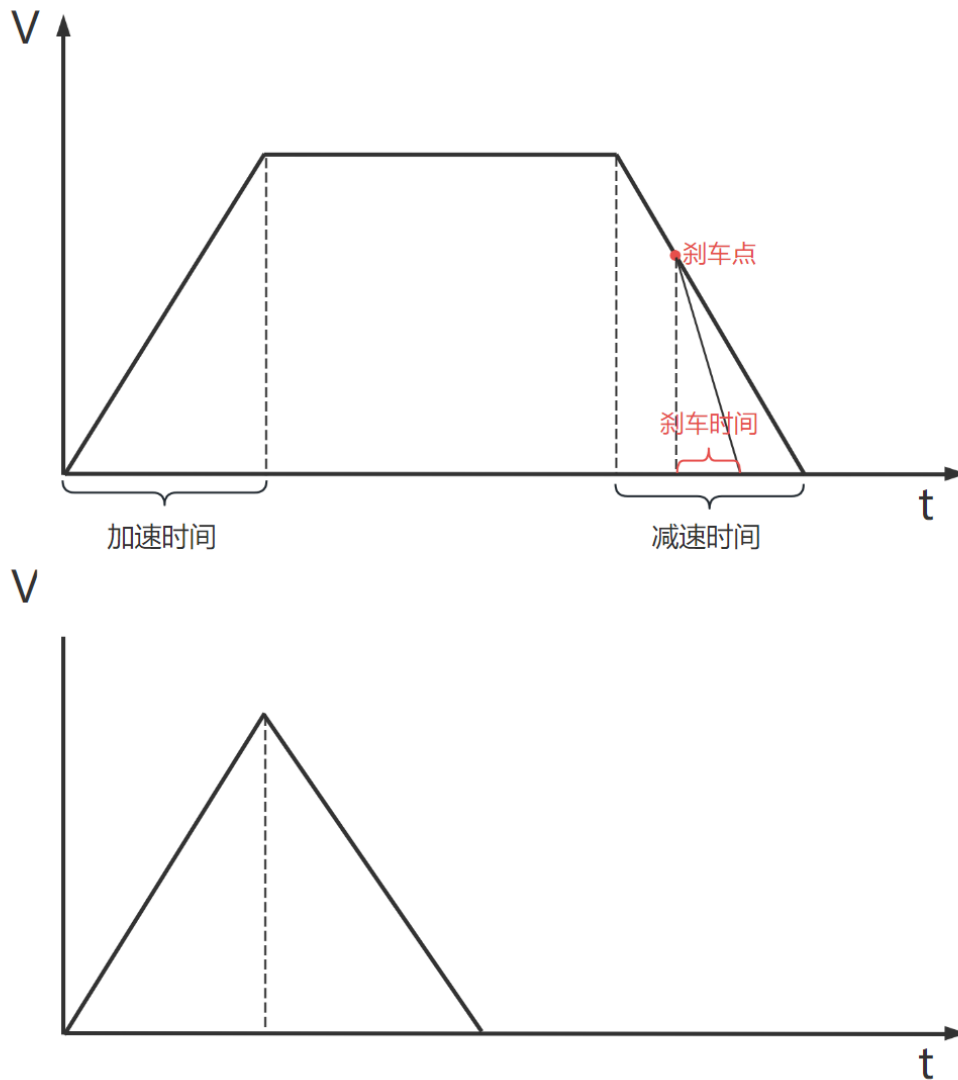
When the brakes are applied, the motor no longer decelerates at the set deceleration rate, but instead decelerates immediately until it comes to a stop at a faster rate (determined by the braking time).

⑤ Set acceleration

starts at the starting speed and increases its speed at the set acceleration until it reaches the target speed.

⑥ Set deceleration

The motor starts at the target speed and decreases in speed at a set deceleration rate.



⑦ Set speed

- ◆ In position mode, the actual running speed is the absolute value of the set speed, and the direction follows the difference between the set position and the current position.
- ◆ In speed mode, the actual running speed is the absolute value of the set speed, and the direction follows the sign of the speed.

⑧ Set location

During the stop process, if it is necessary to set the current position, setting this parameter to 1 will set the current position to the "set position" in the downline parameters. Execute 0→1 edge-triggered.

⑨ Clear flag

In speed mode, when the speed reaches the set value, or in position mode, when the position reaches the set value, the position arrival status in the uplink parameters will be set to 1. This position arrival status can be cleared using the "Clear Flag" parameter.

5.2.3 Process Data

● QY20-4AD

For a module with slot n (n = 0 ~ 31), index 16# 1A02 + 16# 10 * n:

index	16# 1A02+16#10*n: 4AD 16Bit-Input		
Sub-index	name	Data types	default value
01	AD CH0	INT	16#6xx2:16#01
02	AD CH1	INT	16#6xx2:16#02
03	AD CH2	INT	16#6xx2:16#03
04	AD CH3	INT	16#6xx2:16#04

Example 1: CH0 range setting -10~10V, reading range setting -32000~32000.

If the current reading of AD CH0 is 16000, then the actual voltage read is as follows:

$$V_{in} = (16000 / 32000) * 10 = 0.5 * 10 = 5V$$

Example 2: CH0 range setting is 1~5V, and reading range setting is -20000~20000.

If the current reading of AD CH0 is 12000, then the actual voltage read is as follows:

$$V_{in} = (12000 / 20000) * (5 - 1) + 1 = 0.6 * 4 + 1 = 3.4V$$

● QY20-4DA

For a module with slot n (n = 0 ~ 31), index 16# 1602 + 16# 10 * n:

index	16# 1602+16#10*n: 4DA16Bit-Output		
Sub-index	name	Data types	default value
01	DA CH0	INT	16#7xx2:16#01
02	DA CH1	INT	16#7xx2:16#02
03	DA CH2	INT	16#7xx2:16#03
04	DA CH3	INT	16#7xx2:16#04

Example 1: CH0 range setting -10~10V, reading range setting -32000~32000.

If DA CH0 is now set to 16000, the actual output voltage will be as follows:

$$V_{out} = (16000 / 32000) * 10 = 0.5 * 10 = 5V$$

Example 2: CH0 range setting is 1~5V, and reading range setting is -20000~20000.

If DA CH0 is now set to 12000, the actual output voltage will be as follows:

$$V_{out} = (12000 / 20000) * (5 - 1) + 1 = 0.6 * 4 + 1 = 3.4V$$

● QY20-4PT

For a module with slot n (n = 0 ~ 31), index 16# 1A03 + 16# 10 * n:

index	16# 1A03+16#10*n: 4PT 32Bit-Input		
Sub-index	name	Data types	default value
01	PT CH0	REAL	16#6xx3:16#01
02	PT CH1	REAL	16#6xx3:16#02
03	PT CH2	REAL	16#6xx3:16#03
04	PT CH3	REAL	16#6xx3:16#04

- QY20-4TC

For a module with slot n (n = 0 ~ 31), index 16# 1A03 + 16# 10 * n:

index	16# 1A03+16#10*n: 4TC 32Bit-Input		
Sub-index	name	Data types	default value
01	TC CH0	REAL	16#6xx3:16#01
02	TC CH1	REAL	16#6xx3:16#02
03	TC CH2	REAL	16#6xx3:16#03
04	TC CH3	REAL	16#6xx3:16#04

- QY20-8AI-L

For a module with slot n (n = 0 ~ 31), index 16# 1A02 + 16# 10 * n:

index	16# 1A02+16#10*n: 8AI-L 16Bit-Input		
Sub-index	name	Data types	default value
01	AD CH0	INT	16#6xx2:16#01
02	AD CH1	INT	16#6xx2:16#02
03	AD CH2	INT	16#6xx2:16#03
04	AD CH3	INT	16#6xx2:16#04
05	AD CH4	INT	16#6xx2:16#05
06	AD CH5	INT	16#6xx2:16#06
07	AD CH6	INT	16#6xx2:16#07
08	AD CH7	INT	16#6xx2:16#08

Example 1: CH0 range setting is 0~20mA, and reading range setting is -32000~32000.

If the current reading of AD CH0 is 16000, then the actual voltage read is as follows:

$$I_{in} = (16000 / 32000) * 20 = 0.5 * 20 = 10\text{ma}$$

Example 2: CH0 range setting is 4~20mA, and reading range setting is -20000~20000.

If the current reading of AD CH0 is 12000, then the actual voltage read is as follows:

$$V_{in} = (12000 / 20000) * (20 - 4) + 4 = 0.6 * 16 + 4 = 13.6\text{ma}$$

- QY20-8AI

For a module with slot n (n = 0 ~ 31), index 16# 1A02 + 16# 10 * n:

index	16# 1A02+16#10*n: 8AI 16Bit-Input		
Sub-index	name	Data types	default value
01	AD CH0	INT	16#6xx2:16#01
02	AD CH1	INT	16#6xx2:16#02
03	AD CH2	INT	16#6xx2:16#03
04	AD CH3	INT	16#6xx2:16#04
05	AD CH4	INT	16#6xx2:16#05
06	AD CH5	INT	16#6xx2:16#06
07	AD CH6	INT	16#6xx2:16#07
08	AD CH7	INT	16#6xx2:16#08

Example 1: CH0 range setting is 0~20mA, and reading range setting is -32000~32000.

If the current reading of AD CH0 is 16000, then the actual voltage read is as follows:

$$I_{in} = (16000 / 32000) * 20 = 0.5 * 20 = 10\text{ma}$$

Example 2: CH0 range setting is 4~20mA, and reading range setting is -20000~20000.

If the current reading of AD CH0 is 12000, then the actual voltage read is as follows:

$$V_{in} = (12000 / 20000) * (20 - 4) + 4 = 0.6 * 16 + 4 = 13.6\text{ma}$$

- QY20-8AV-L

For a module with slot n (n = 0 ~ 31), index 16# 1A02 + 16# 10 * n:

index	16# 1A02+16#10*n: 8AV-L 16Bit-Input		
Sub-index	name	Data types	default value
01	AD CH0	INT	16#6xx2:16#01
02	AD CH1	INT	16#6xx2:16#02
03	AD CH2	INT	16#6xx2:16#03
04	AD CH3	INT	16#6xx2:16#04
05	AD CH4	INT	16#6xx2:16#05
06	AD CH5	INT	16#6xx2:16#06
07	AD CH6	INT	16#6xx2:16#07
08	AD CH7	INT	16#6xx2:16#08

Example 1: CH0 range setting is 0~10V, and reading range setting is -32000~32000.

If the current reading of AD CH0 is 16000, then the actual voltage read is as follows:

$$V_{in} = (16000 / 32000) * 10 = 0.5 * 10 = 5V$$

Example 2: CH0 range setting is 1~5V, and reading range setting is -20000~20000.

If the current reading of AD CH0 is 12000, then the actual voltage read is as follows:

$$V_{in} = (12000 / 20000) * (5 - 1) + 1 = 0.6 * 4 + 1 = 3.4V$$

- QY20-8AV

For a module with slot n (n = 0 ~ 31), index 16# 1A02 + 16# 10 * n:

index	16# 1A02+16#10*n: 8AV 16Bit-Input		
Sub-index	name	Data types	default value
01	AD CH0	INT	16#6xx2:16#01
02	AD CH1	INT	16#6xx2:16#02
03	AD CH2	INT	16#6xx2:16#03
04	AD CH3	INT	16#6xx2:16#04
05	AD CH4	INT	16#6xx2:16#05
06	AD CH5	INT	16#6xx2:16#06
07	AD CH6	INT	16#6xx2:16#07
08	AD CH7	INT	16#6xx2:16#08

Example 1: CH0 range setting -10~10V, reading range setting -32000~32000.

If the current reading of AD CH0 is 16000, then the actual voltage read is as follows:

$$V_{in} = (16000 / 32000) * 10 = 0.5 * 10 = 5V$$

Example 2: CH0 range setting is 1~5V, and reading range setting is -20000~20000.

If the current reading of AD CH0 is 12000, then the actual voltage read is as follows:

$$V_{in} = (12000 / 20000) * (5 - 1) + 1 = 0.6 * 4 + 1 = 3.4V$$

- QY20-0016

For a module with slot n (n = 0 ~ 31), index 16# 1600 + 16# 10 * n:

index	16# 1600+16#10*n: 0016 Bit-Input		
Sub-index	name	Data types	default value
01	DO bit0	BOOL	16#7xx0:16#01
02	DO bit1	BOOL	16#7xx0:16#02
03	...	...	...
09	DO bit8	BOOL	16#7xx0:16#09

0A	DO bit9	BOOL	16#7xx0:16#0A
0B	...	...	...
0F	DO bit14	BOOL	16#7xx0:16#0F
10	DO bit15	BOOL	16#7xx0:16#10

For a module with slot n (n = 0 ~ 31), index 16# 1601 + 16# 10 * n:

index	16# 1601+16#10*n: 0016 8Bit-Input		
Sub-index	name	Data types	default value
01	DO CH0-8bit	USINT	16#7xx1:16#01
02	DO CH1-8bit	USINT	16#7xx1:16#02

For a module with slot n (n = 0 ~ 31), index 16# 1602 + 16# 10 * n:

index	16# 1602+16#10*n: 0016 16Bit-Input		
Sub-index	name	Data types	default value
01	DO CH0-16bit	UINT	16#7xx2:16#01

● QY20-0808

For a module with slot n (n = 0 ~ 31), index 16# 1A00 + 16# 10 * n:

index	16# 1A00+16#10*n: 0808 Bit-Input		
Sub-index	name	Data types	default value
01	DI bit0	BOOL	16#6xx0:16#01
02	DI bit1	BOOL	16#6xx0:16#02
03	...	...	...
08	DI bit7	BOOL	16#6xx0:16#08

For a module with slot n (n = 0 ~ 31), index 16# 1A01 + 16# 10 * n:

index	16# 1A01+16#10*n: 0808 8Bit-Input		
Sub-index	name	Data types	default value
01	DI CH0-8bit	USINT	16#6xx1:16#01

For a module with slot n (n = 0 ~ 31), index 16# 1600 + 16# 10 * n:

index	16# 1600+16#10*n: 0808 Bit-Input		
Sub-index	name	Data types	default value
01	DO bit0	BOOL	16#7xx0:16#01
02	DO bit1	BOOL	16#7xx0:16#02
03	...	...	...
08	DO bit7	BOOL	16#7xx0:16#08

For a module with slot n (n = 0 ~ 31), index 16# 1601 + 16# 10 * n:

index	16# 1601+16#10*n: 0808 8Bit-Input		
Sub-index	name	Data types	default value
01	DO CH0-8bit	USINT	16#7xx1:16#01

● QY20-1600

For a module with slot n (n = 0 ~ 31), index 16# 1A00 + 16# 10 * n:

index	16# 1A00+16#10*n: 1600 Bit-Input		
Sub-index	name	Data types	default value
01	DI bit0	BOOL	16#6xx0:16#01
02	DI bit1	BOOL	16#6xx0:16#02
03	...	...	...
09	DI bit8	BOOL	16#6xx0:16#09
0A	DI bit9	BOOL	16#6xx0:16#0A
0B	...	...	...

0F	DI bit14	BOOL	16#6xx0:16#0F
10	DI bit15	BOOL	16#6xx0:16#10

For a module with slot n (n = 0 ~ 31), index 16# 1A01 + 16# 10 * n:

index	16# 1A01+16#10*n: 1600 8Bit-Input		
Sub-index	name	Data types	default value
01	DI CH0-8bit	USINT	16#6xx1:16#01
02	DI CH1-8bit	USINT	16#6xx1:16#02

For a module with slot n (n = 0 ~ 31), index 16# 1A02 + 16# 10 * n:

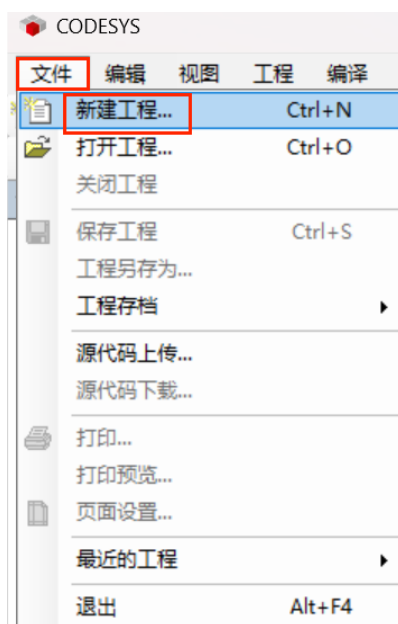
index	16# 1A02+16#10*n: 1600 16Bit-Input		
Sub-index	name	Data types	default value
01	DI CH0-16bit	UINT	16#6xx2:16#01

5.3 Program Debugging

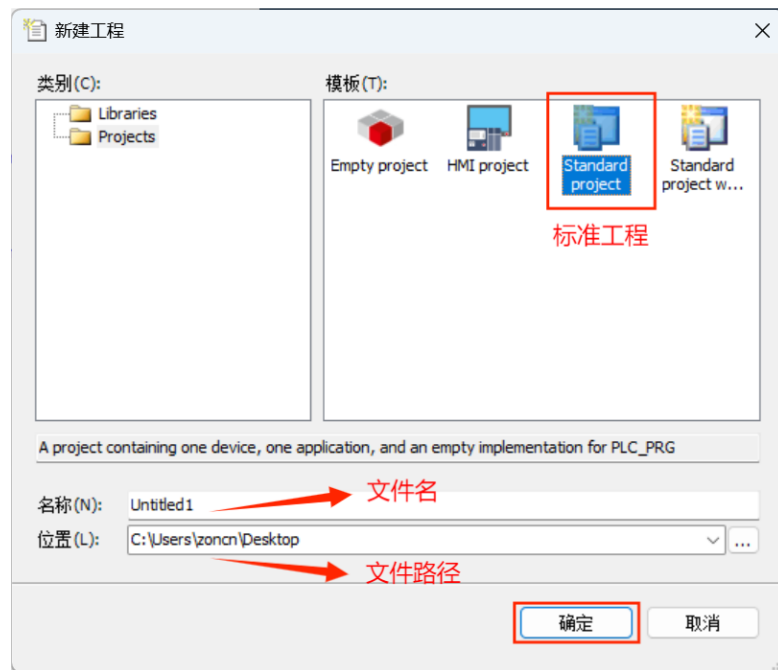
5.3.1 CODESYS Environment

1. New construction project

- a. Launch Codesys, and select " New Project " from the " File " menu to create a new project .



- b. In the New Project dialog box template area, select Standard Project, enter a name and local path for the project file, and click "OK" to open the wizard dialog box.

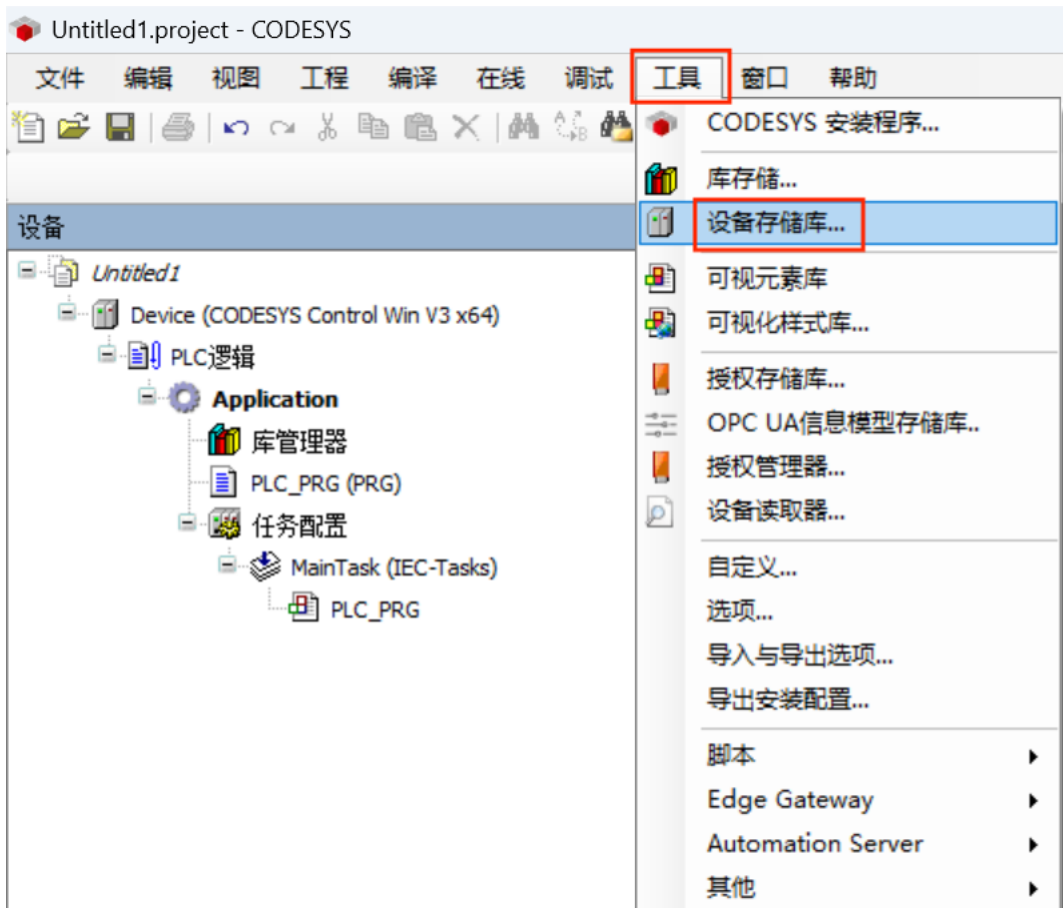


a. Select " CODESYS Control Win V3 x64 (CODESYS) " for the device and "Structured Text (ST)" for the PLC_PRG programming language. Click " OK " to save the configuration .

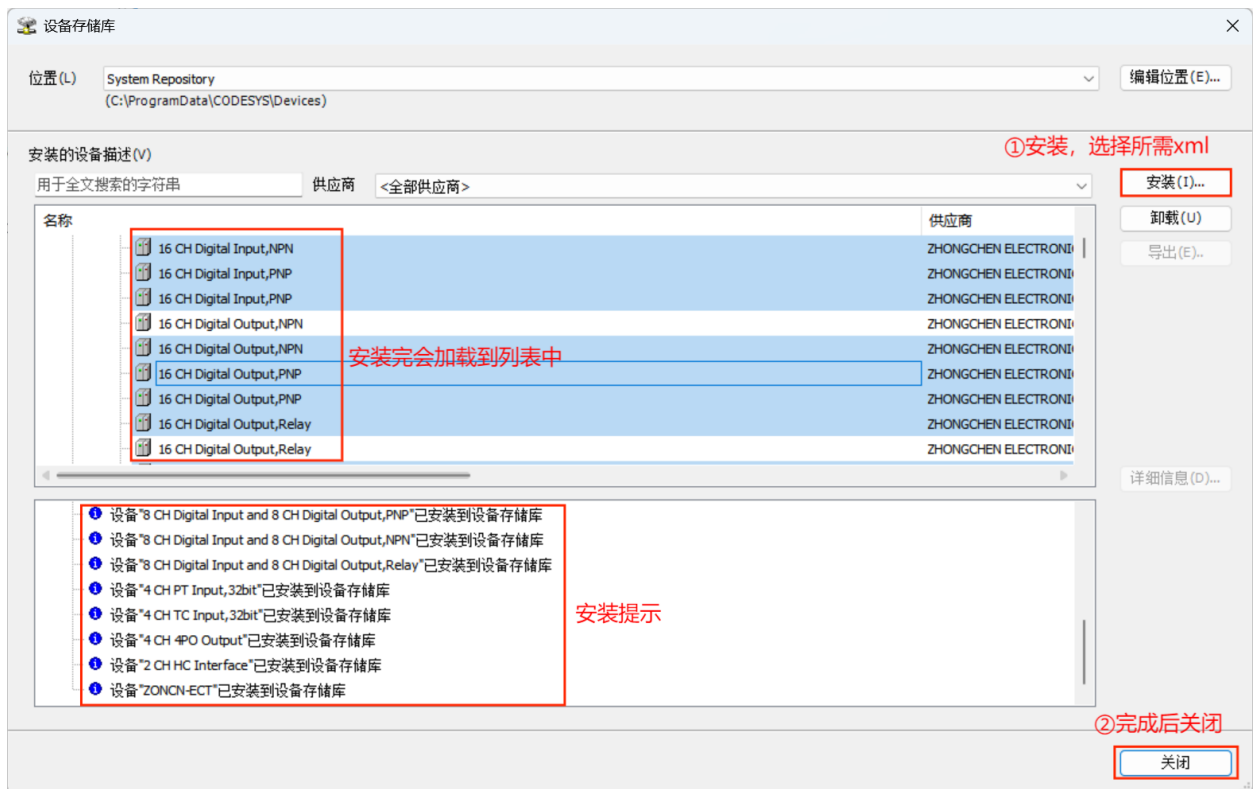


2. Install XML

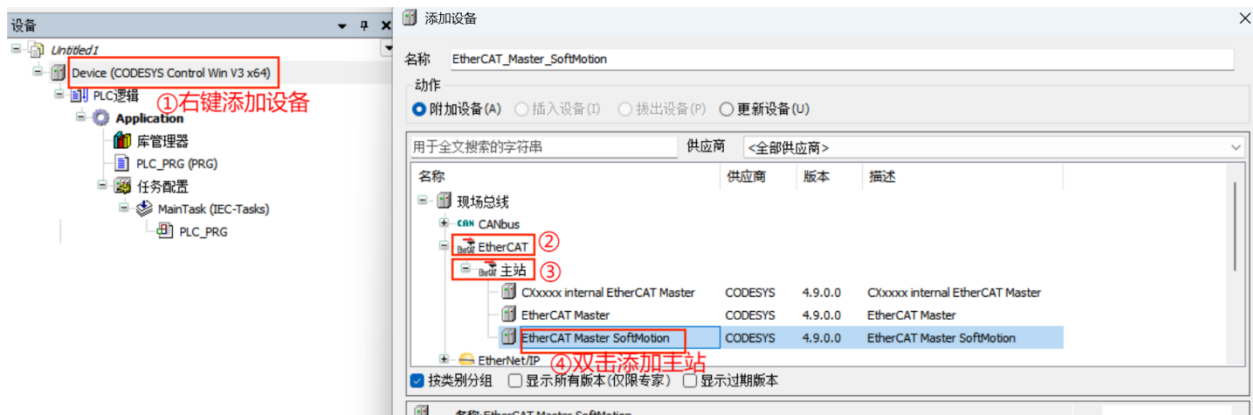
a. Click " Tools" in the menu bar and select "Device Repository" .



b. Click "Install", locate the device description file path, and install the file .



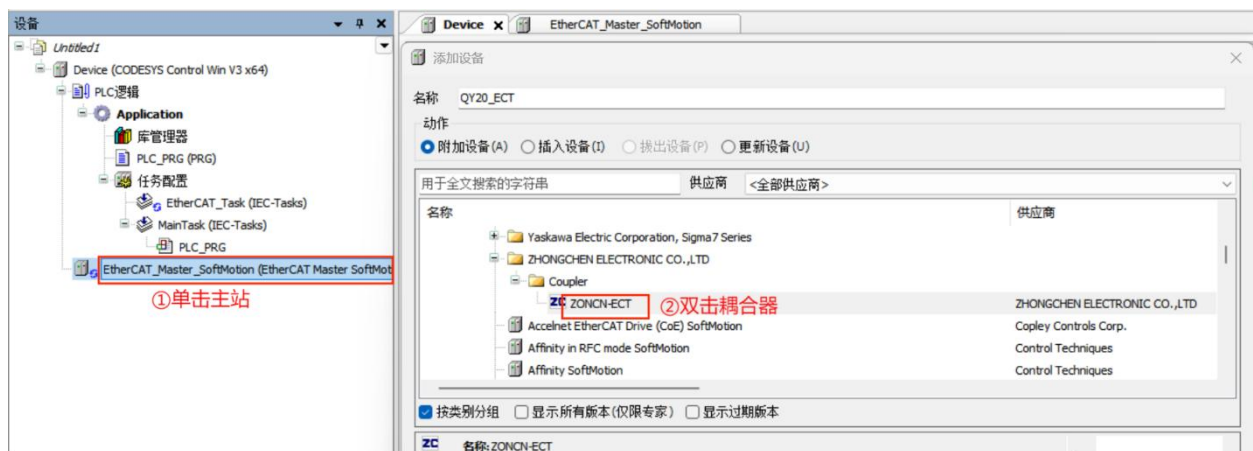
3. Right-click "Device (CODESYS Control Win V3 x64)" in the device view , select Add Device , find EtherCAT → Master Station → EtherCAT Master SoftMotion in the pop-up window , and double-click to add the master station.



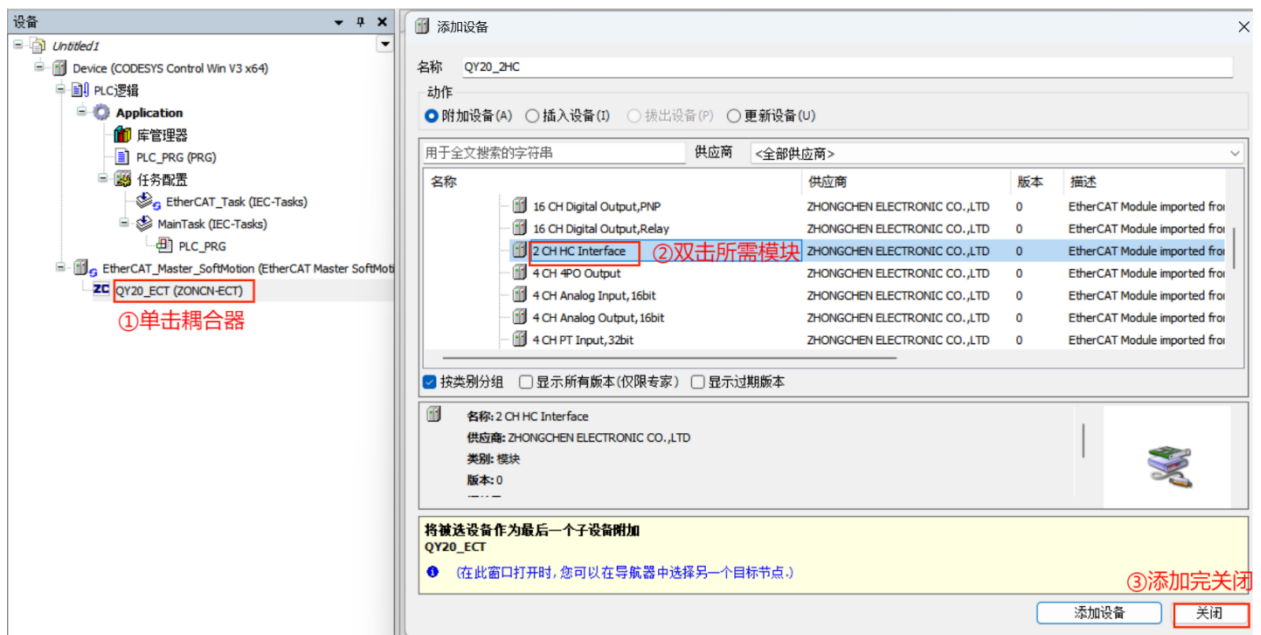
4. Adding devices

✧ Manual mode

a. In the "Device" navigation tree on the left, click the newly added master station "EtherCAT_Master_SoftMotion". In the Add Device window , find EtherCAT → Slave Station → NIETZ ELECTRIC CO.,LTD → Coupler , double-click to add a NIETZ-ECT coupler .

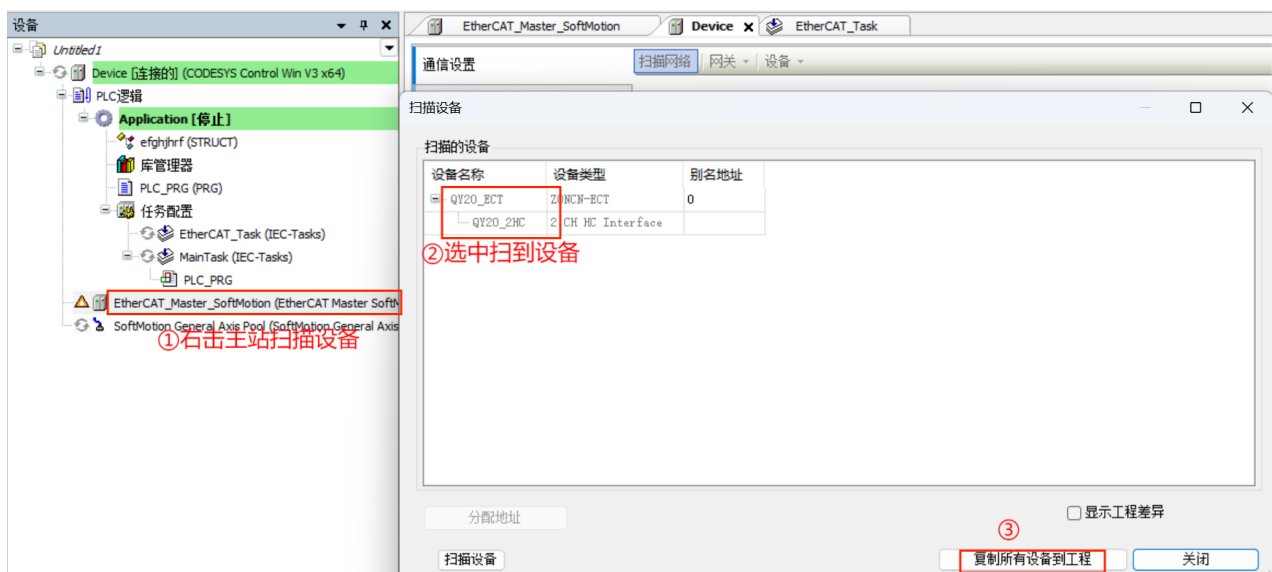


b. Click on the QY20-ECT (NIETZ-ECT) added in the Device View. In the Add Device window, select the module you want to debug from the supported modules, such as the " 2 CH HC Interface " module, and double-click to complete the addition of the extended module , then close the window.

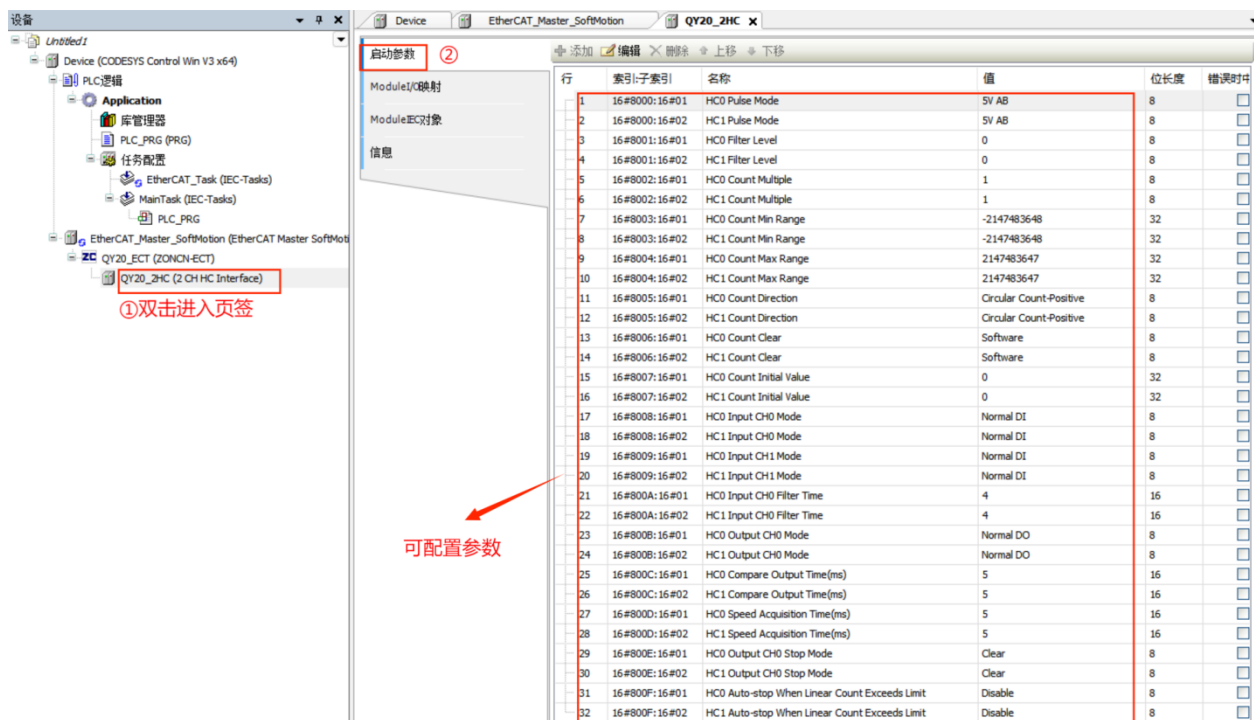


✧ Scanning method

a. After correctly configuring the master station and connecting it to the coupler via a network cable, you can right-click the master station and select "Scan Network" to automatically scan for couplers and modules .



5. In the "Device" navigation tree on the left, double-click the module you want to debug, for example: "QY20_2HC " , to enter the QY20_2HC tab, and in the QY20_2HC interface, click to select "Startup Parameters" to set the configuration parameters .



6. Operating equipment

a. If the project settings are correct, click the  compile button in the toolbar at the top of the interface to compile .



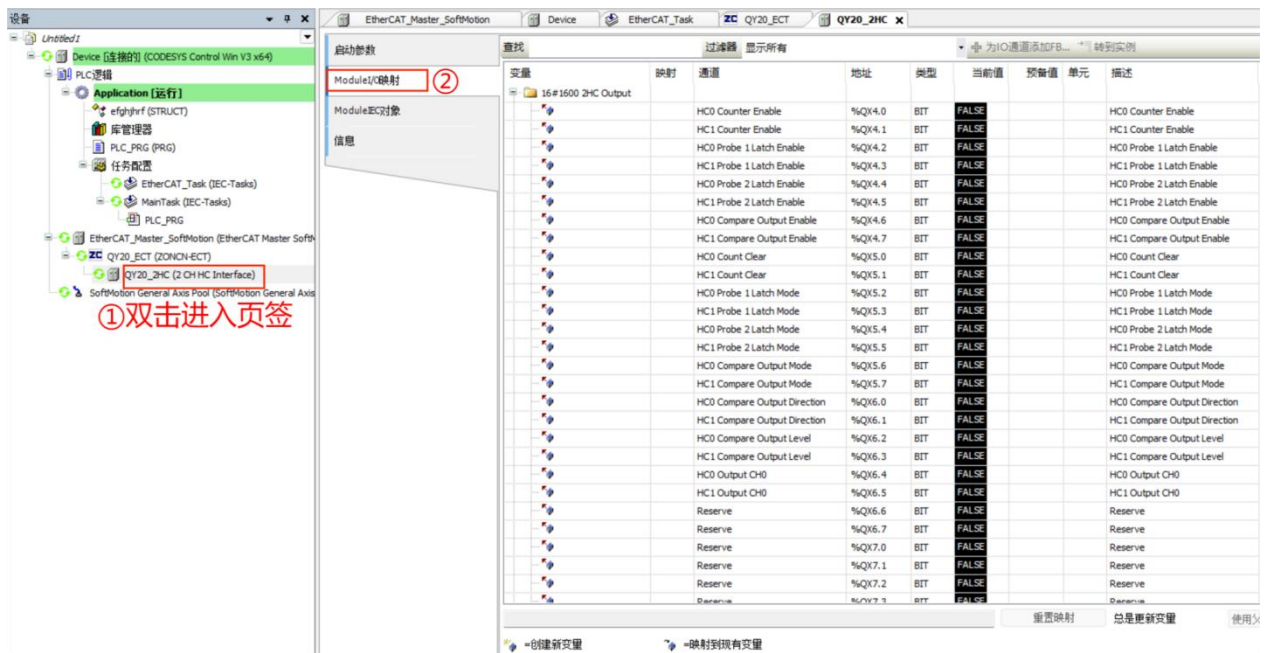
b. After successful compilation, click  the login button in the toolbar at the top of the interface to log in and download the project .



c. After logging in and successfully downloading, click "  Run Project" in the toolbar at the top of the interface .



d. " Device " navigation tree on the left , for example, "QY20_2 HC " to enter its tab. In the QY20_2 HC interface, select "Module I/O Mapping" and adjust the parameters according to the process data definition .



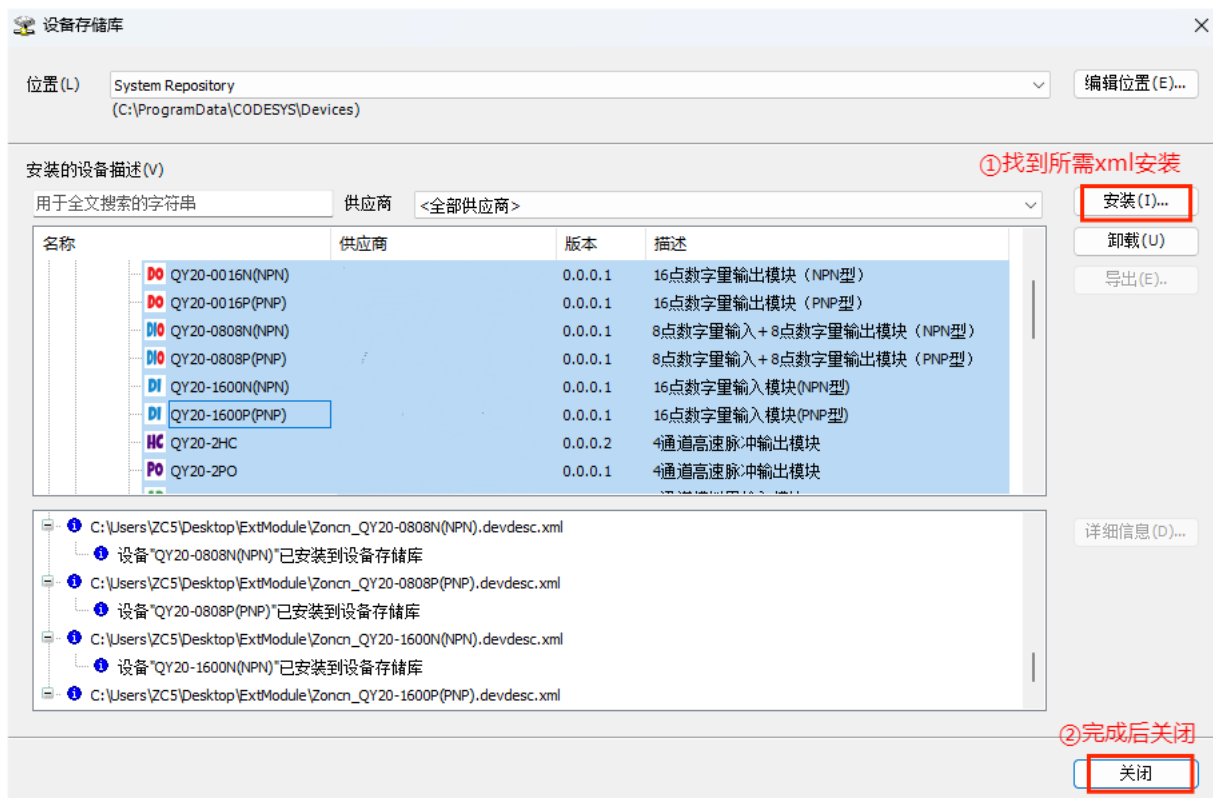
5.3.2 ZQ600 Series PLC Environment

1. Install XML

a. Launch Codesys , click "Tools" in the menu bar, and select "Device Repository".

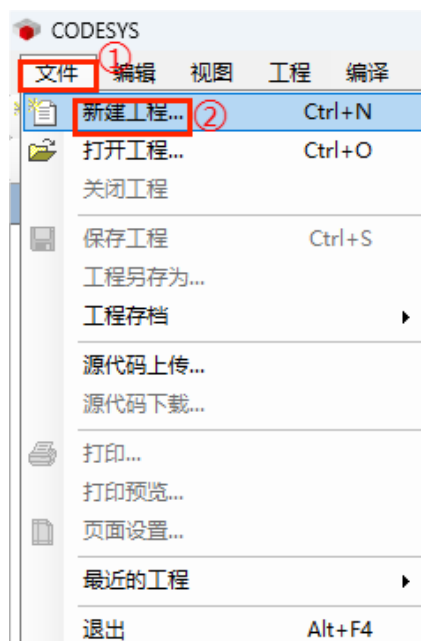


b. Click "Install", locate the device description file path, and install the file.

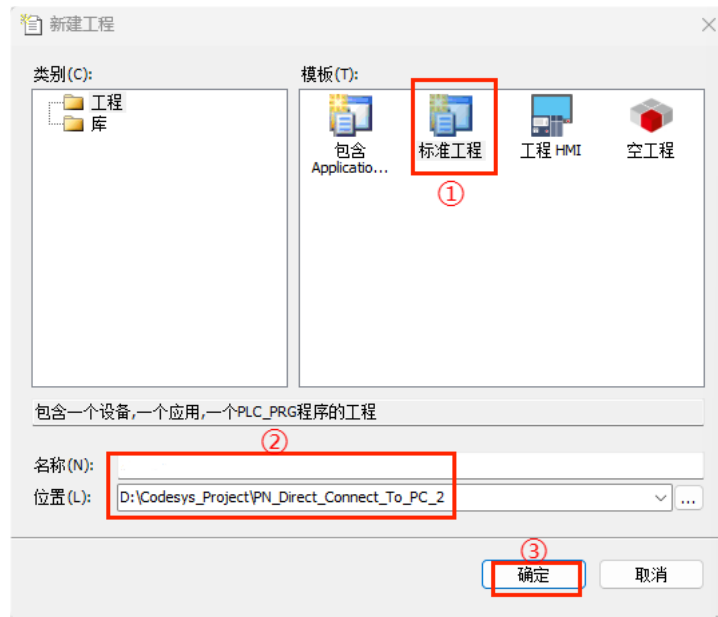


2. New construction projects

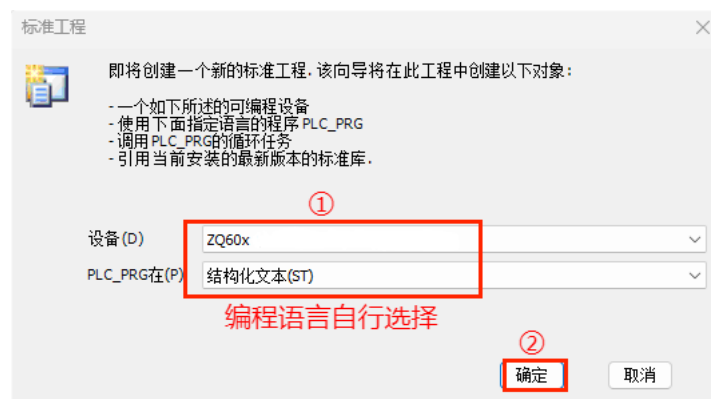
A. Select the " New Project " command from the " File " menu to create a new project .



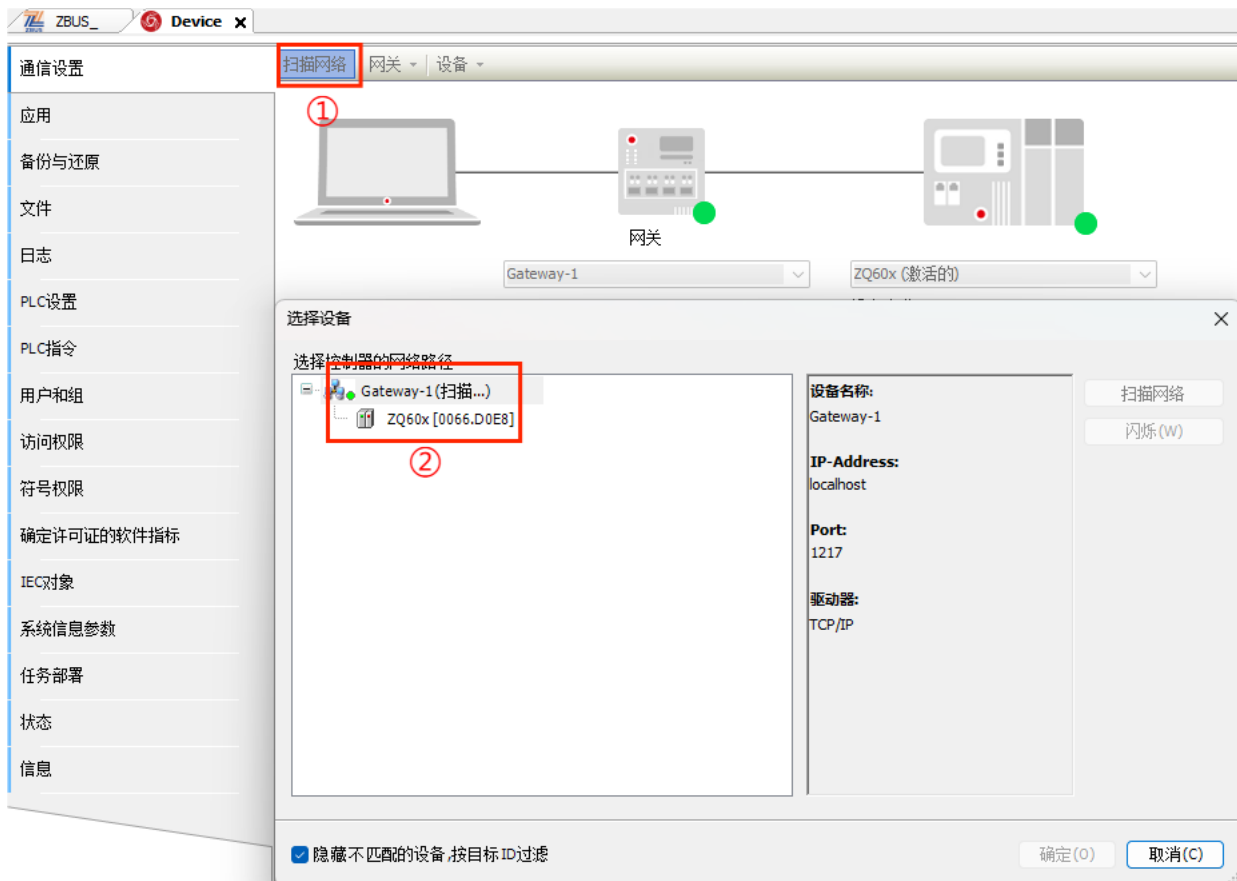
B. In the New Project dialog box template area, select Standard Project, enter a name and local path for the project file, and click "OK" to open the wizard dialog box.



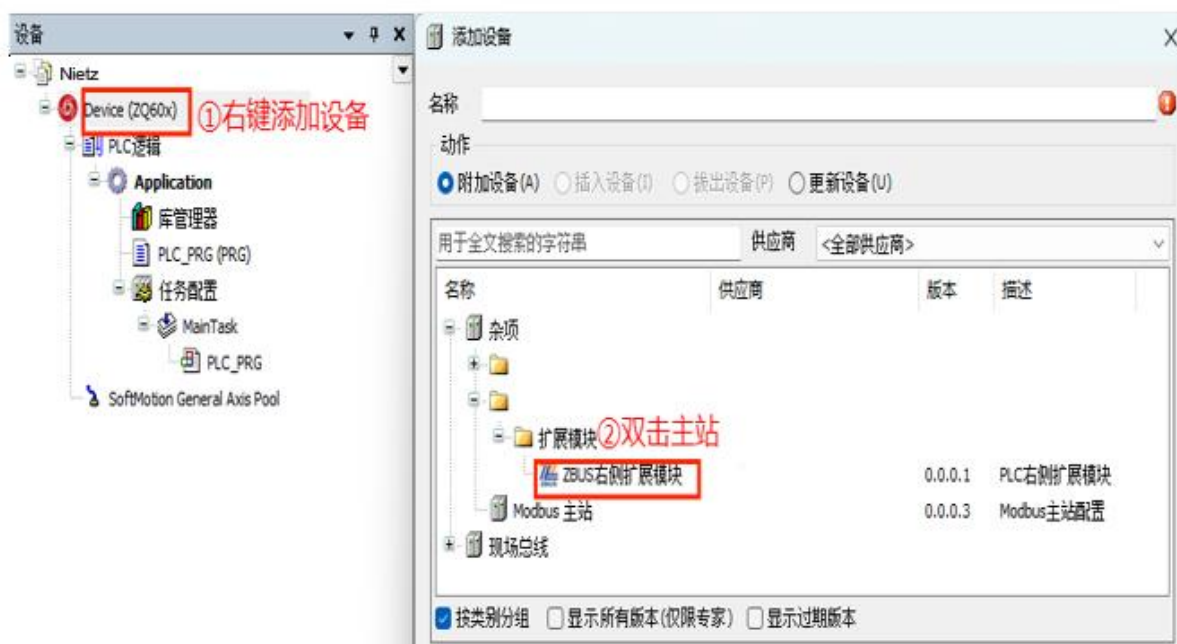
C. "ZQ60x" for the device and " Structured Text (ST)" for the PLC_PRG programming language . Click "OK" to save the configuration.



D. After ensuring that the computer and PLC (LAN2: 192.168.7.232) are on the same network segment, double-click the Device (ZQ60x) in the device view, select Scan Network in the pop-up window, double-click the scanned ZX60x or click to select and click OK to successfully connect to the PLC.



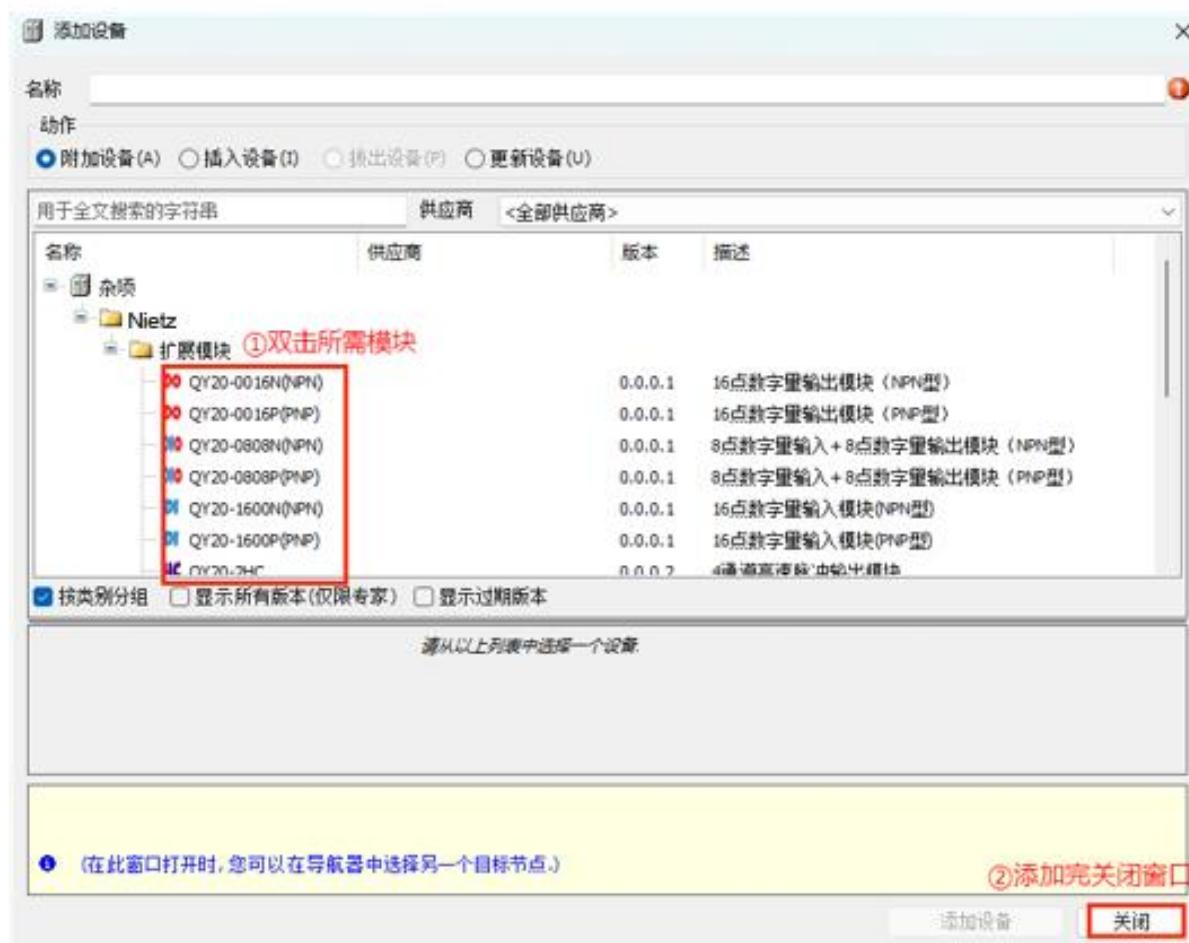
E. "Device (ZQ60x)" in the device view , select Add Device , and find Miscellaneous in the pop-up window → →Extended Modules→ZBUS Extended Modules on the right, double-click to add a main station.



3. Add extension modules

✧ Manual mode

a. Right-click ZBUS (the ZBUS right-side extension module) in the device view to add a device . Locate the required module and double-click to add it. Please ensure that the software configuration matches the actual configuration; otherwise, communication will not be possible.



✧ Scanning method

a. After correctly configuring the main station, you can right-click ZBUS (ZBUS right-side extension module) → Scan Network to automatically scan for extension modules.



4. By double-clicking an added module, you can view the corresponding configuration parameters and process data in the required module parameters and mappings, such as QY20-2HC parameters and QY20-2HC I/O mappings.

QY20-2HC参数

QY20-2HC I/O映射

QY20-2HC IEC对象

状态

信息

参数	类型	值	默认值	单元	描述
产品信息					
固件版本	STRING				
硬件版本	STRING				
产品SN码	STRING				
配置参数					
2HC_CH【0】配置					
计数器模式	Enumeration of BYTE	5V AB相	5V AB相		
滤波等级	BYTE(0..0)	7	7		
倍频系数	Enumeration of BYTE	2倍频	2倍频		
计数器下限	DINT	-2147483648	-2147483648		
计数器上限	DINT	2147483647	2147483647		
计数方向	Enumeration of BYTE	环形计数...	环形计数...		
预设值模式	Enumeration of BYTE	软件预设	软件预设		
计数器初始值	DINT	0	0		
DI0输入模式	Enumeration of BYTE	普通输入	普通输入		
DI1输入模式	Enumeration of BYTE	普通输入	普通输入		
数字量输入滤波	BYTE(0..30)	0	0	ms	
数字量输出模式	Enumeration of BYTE	普通输出	普通输出	ms	
比较输出时间	WORD(5..5000)	5	5	ms	
速度采集时间	WORD(5..1000)	5	5	ms	
数字量输出停止模式	Enumeration of BYTE	输出清零	输出清零	ms	当DO模式配置为【普通输出】时配置生效
超限时自动停止计数	Enumeration of BYTE	关闭	关闭	ms	仅计数方向设置为【线性】类型时生效
2HC_CH【1】配置					
计数器模式	Enumeration of BYTE	5V AB相	5V AB相		
滤波等级	BYTE(0..0)	7	7		
倍频系数	Enumeration of BYTE	2倍频	2倍频		
计数器下限	DINT	-2147483648	-2147483648		
计数器上限	DINT	2147483647	2147483647		



5. Operating equipment

a. If the project settings are correct, click  the compile button in the toolbar at the top of the interface to compile.



b. After successful compilation, click  the login button in the toolbar at the top of the interface to log in and download the project .



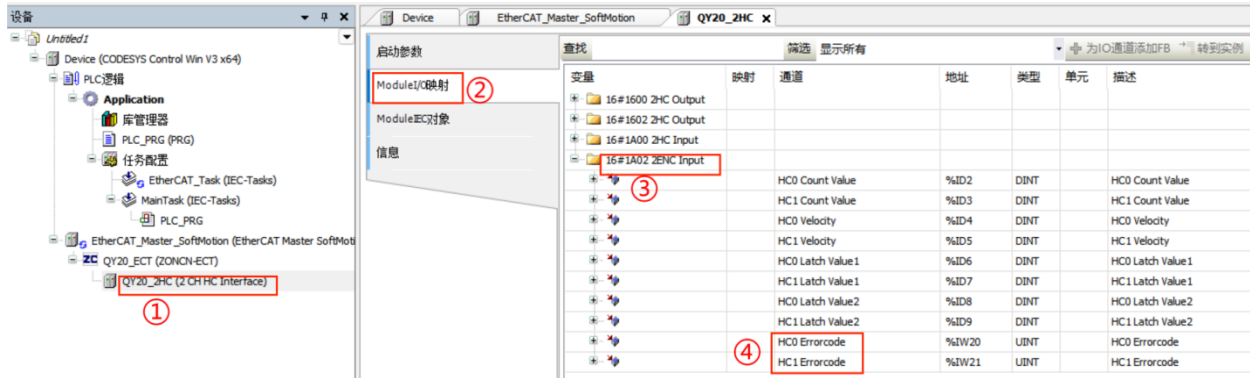
c. After logging in and successfully downloading, click "  Run Project" in the toolbar at the top of the interface .



6. Fault Diagnosis

● QY20-HC

When the module's ERR indicator light flashes , it indicates a module malfunction. At this time, the module will report a fault code, which can be obtained through the HCx Errorcode option in the " Module I/O " interface .



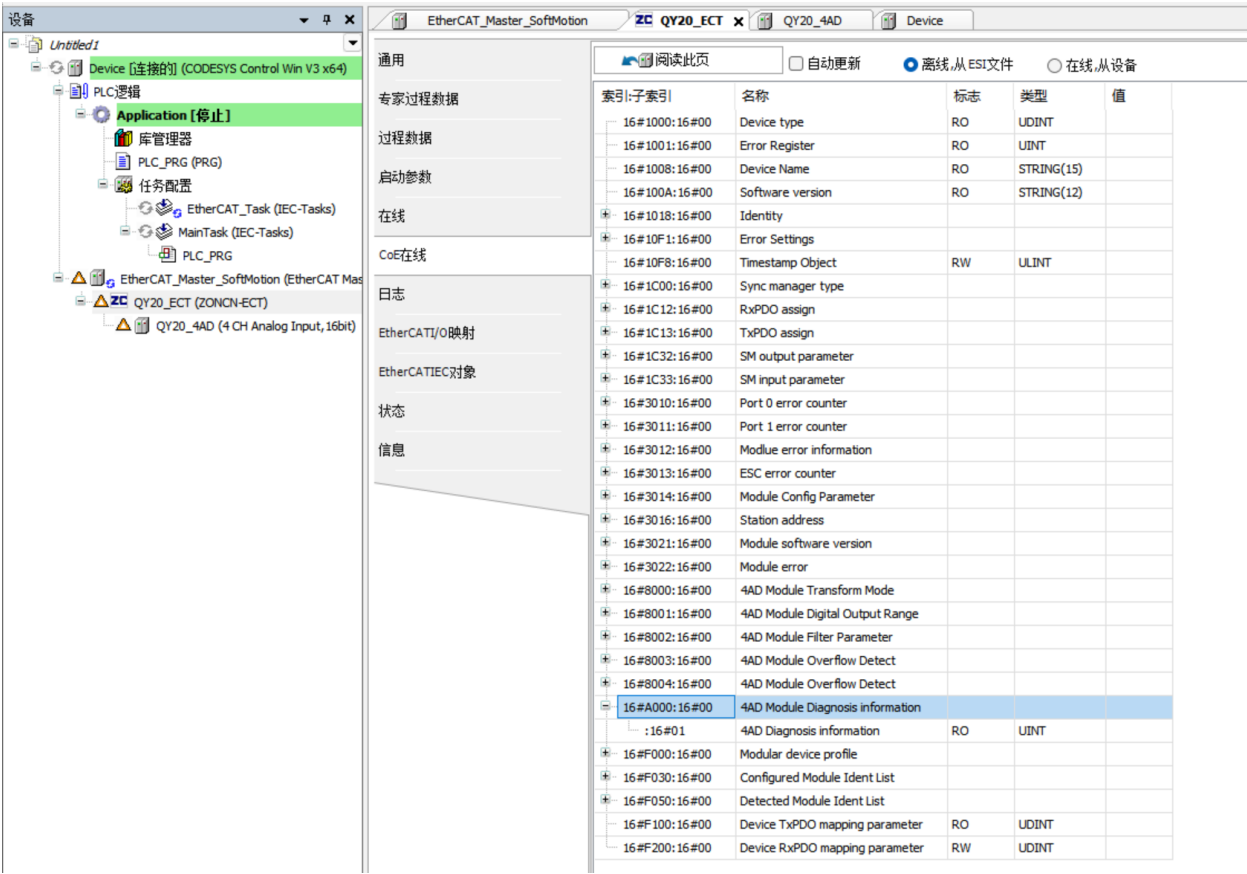
The details are shown in the table below.

Fault codes	Actual content	Solution
0x0001	The range is set incorrectly (the maximum value is less than the minimum value).	Adjust the range parameter to ensure that the maximum value is greater than the minimum value.
0x0002	The comparison output value setting exceeded the limit.	Modify the comparison output value to within the specified range.
0x0004	Hardware zeroing is configured, but DI mode is not set to zeroing, or DI mode is set to zeroing, but the zeroing mode is not set to hardware zeroing.	Unify hardware zeroing and DI mode settings. If hardware zeroing is set, the DI mode will be changed to zeroing, or vice versa.
0x0008	AB phase loss	• Check if the encoder's AB phase wiring is loose, disconnected, or broken. • Confirm if the encoder itself is damaged (replace the encoder for testing) . • Check for short circuits or poor connections in the wiring; repair and reconnect.
0x0010	Linear count greater than maximum limit value	Confirm the maximum limit value, check if the counting signal source (sensor, encoder) is abnormal, and reset the count if necessary.
0x0020	Linear count less than minimum limit value	Confirm the minimum limit value, check if the counting signal source is falsely triggered, and restore or adjust the counting to the normal range.
0x0040	Linear count over-limit stop	Check whether the error is exceeding the upper or lower limit (refer to 0x0010/0x0020). After fixing it, write 0 followed by 1 to enable the Bit0 encoder counter; this should restore the counting function to normal operation. If, after restarting, the counting continues to exceed the limit, an alarm will sound again.

● QY20-4AD

When the module's ERR indicator light flashes , it indicates a module malfunction. At this time, the module will report a fault code, which can be obtained from the diagnostic data object

dictionary value in the "CoE Online" interface after logging in . The "CoE Online" interface is shown in the following figure.

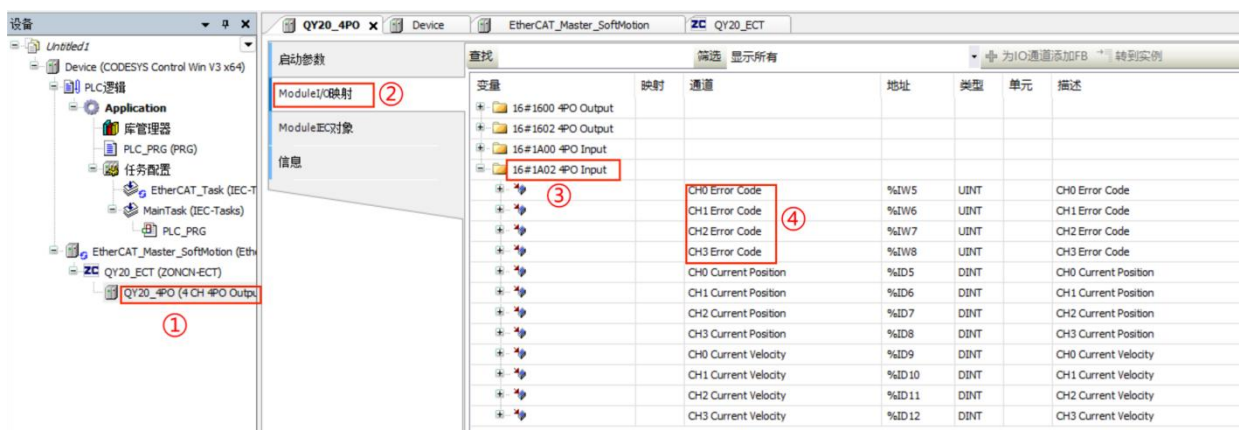


■ Module fault codes

Fault code (n represents the channel)	Actual content	Solution
0x03n2	Count exceeded the limit	Check if external input exceeds limits
0x03n3	Count exceeds lower limit	Check if external input exceeds limits

● QY20-4PO

When the module's ERR indicator light flashes , it indicates a module malfunction. The module will then report a fault code, which can be obtained through the CHx Error Code section of the " Module I/O " interface .



The details are shown in the table below.

Fault codes	Actual content	Solution
0x0001	Startup speed > Running speed	Adjust parameter settings to ensure that the startup speed is less than or equal to the running speed.
0x0002	Running speed exceeded limit (running speed * subdivision > 200k)	Reduce the running speed or decrease the subdivision parameter so that the product of the two is $\leq 200k$.
0x0004	The number of steps exceeded the limit (number of steps * subdivision > 2147483647 or < -2147483648).	Adjust the number of running steps or the subdivision parameter so that their product is within the range of [-2147483648, 2147483647].
0x0008	Startup speed exceeded limit (startup speed * subdivision > 200k)	Reduce the startup speed or decrease the microstepping parameter so that the product of the two is $\leq 200k$.
0x0010	Acceleration time exceeded limit (acceleration time > 5000ms)	Shorten acceleration time
0x0020	Deceleration time exceeded limit (deceleration time > 5000ms)	shorten deceleration time
0x0040	The speed is 0 when the "start movement" command is given.	Check the speed parameter configuration to ensure that the running speed has been set to a valid non-zero value before the "Start Movement" command is issued.

● QY20-4PT

When the module's ERR indicator light flashes , it indicates a module malfunction. At this time, the module will report a fault code, which can be obtained from the diagnostic data object dictionary value in the "CoE Online" interface after logging in . The "CoE Online" interface is shown in the following figure.

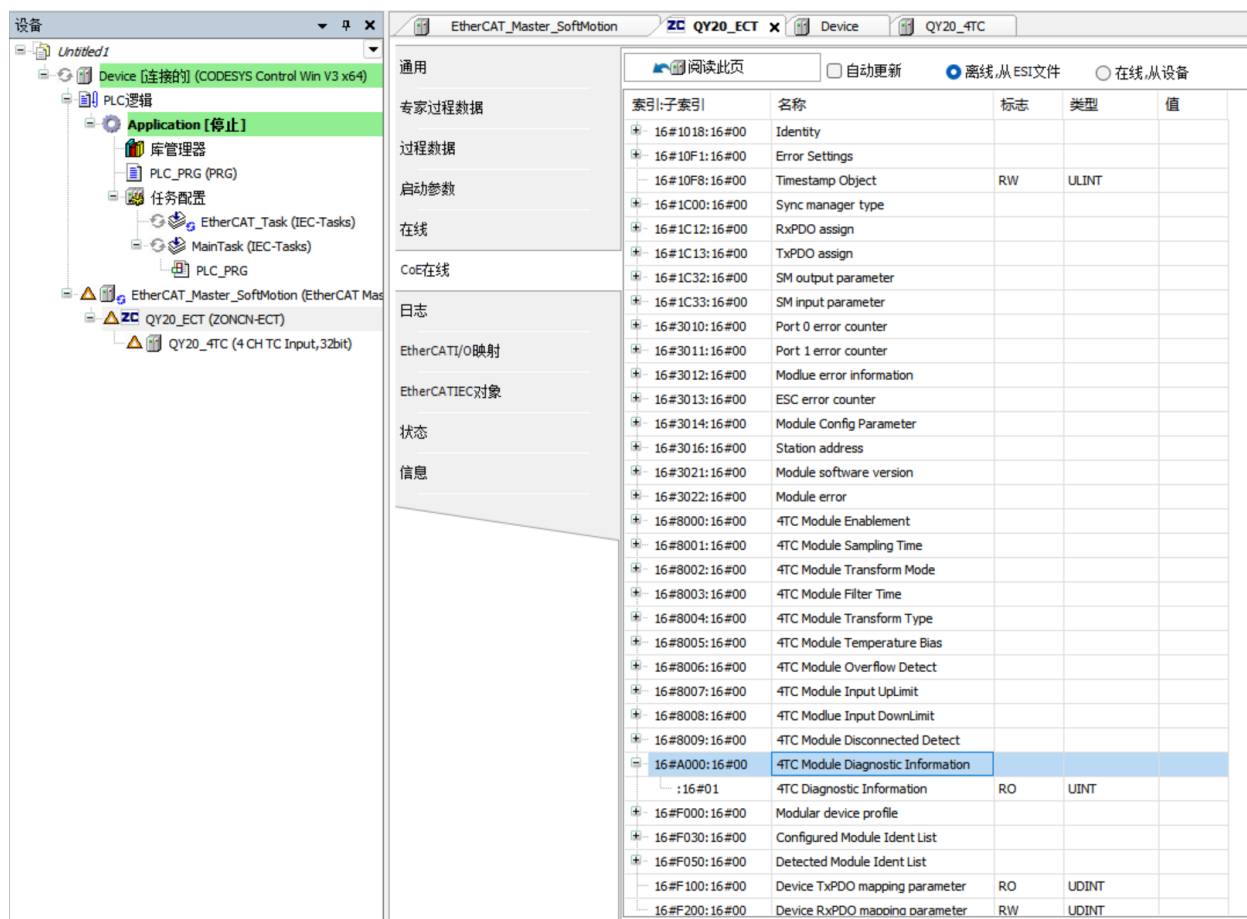
索引:子索引	名称	标志	类型	值
16#10F8:16#00	Timestamp Object	RW	ULINT	
16#1C00:16#00	Sync manager type			
16#1C12:16#00	RxPDO assign			
16#1C13:16#00	TxPDO assign			
16#1C32:16#00	SM output parameter			
16#1C33:16#00	SM input parameter			
16#3010:16#00	Port 0 error counter			
16#3011:16#00	Port 1 error counter			
16#3012:16#00	Module error information			
16#3013:16#00	ESC error counter			
16#3014:16#00	Module Config Parameter			
16#3016:16#00	Station address			
16#3021:16#00	Module software version			
16#3022:16#00	Module error			
16#8000:16#00	4PT Module Enablement			
16#8001:16#00	4PT Module Sampling Time			
16#8002:16#00	4PT Module Transform Mode			
16#8003:16#00	4PT Module Filter Time			
16#8004:16#00	4PT Module Transform Type			
16#8005:16#00	4PT Module Temperature Bias			
16#8006:16#00	4PT Module NTC Material Constant B			
16#8007:16#00	4PT Module Overflow Detect			
16#8008:16#00	4PT Module Input UpLimit			
16#8009:16#00	4PT Module Input DownLimit			
16#800A:16#00	4PT Module Disconnected Detect			
16#A000:16#00	4PT Module Diagnostic Information			
16#01	4PT Diagnostic Information	RO	UINT	0x05n2
16#F000:16#00	Modular device profile			
16#F030:16#00	Configured Module Ident List			
16#F050:16#00	Detected Module Ident List			
16#F100:16#00	Device TxPDO mapping parameter	RO	UDINT	
16#F200:16#00	Device RxPDO mapping parameter	RW	UDINT	

Module fault codes

Fault code (n represents the channel)	Actual content	Solution
0x05n2	The count is greater than the maximum limit.	Check if external input exceeds limits
0x05n3	The count is less than the minimum limit.	Check if external input exceeds limits

QY20-4TC

When the module's ERR indicator light flashes , it indicates a module malfunction. At this time, the module will report a fault code, which can be obtained from the diagnostic data object dictionary value in the "CoE Online" interface after logging in . The "CoE Online" interface is shown in the following figure.



■ Module fault codes

Fault code (n represents the channel)	Actual content	Solution
0x06n2	The count is greater than the maximum limit.	Check if external input exceeds limits
0x06n3	The count is less than the minimum limit.	Check if external input exceeds limits

● QY20-8AI-L

When the module's ERR indicator light flashes , it indicates a module malfunction. At this time, the module will report a fault code, which can be obtained from the diagnostic data object dictionary value in the "CoE Online" interface after logging in . The "CoE Online" interface is shown in the following figure.

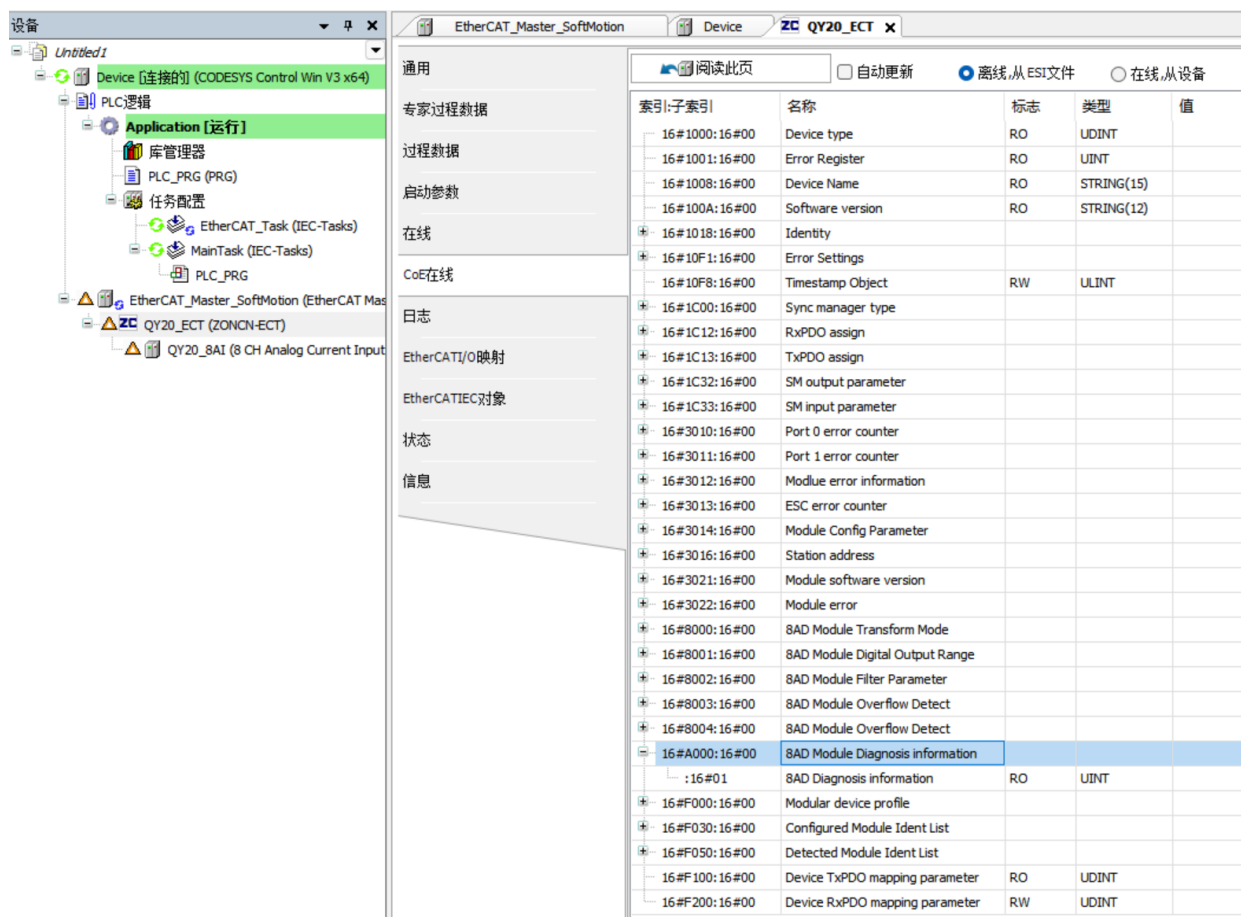
索引/子索引	名称	标志	类型	值
16#1000:16#00	Device type	RO	UDINT	
16#1001:16#00	Error Register	RO	UINT	
16#1008:16#00	Device Name	RO	STRING(15)	
16#100A:16#00	Software version	RO	STRING(12)	
16#1018:16#00	Identity			
16#10F1:16#00	Error Settings			
16#10F8:16#00	Timestamp Object	RW	ULINT	
16#1C00:16#00	Sync manager type			
16#1C12:16#00	RxPDO assign			
16#1C13:16#00	TxPDO assign			
16#1C32:16#00	SM output parameter			
16#1C33:16#00	SM input parameter			
16#3010:16#00	Port 0 error counter			
16#3011:16#00	Port 1 error counter			
16#3012:16#00	Module error information			
16#3013:16#00	ESC error counter			
16#3014:16#00	Module Config Parameter			
16#3016:16#00	Station address			
16#3021:16#00	Module software version			
16#3022:16#00	Module error			
16#8000:16#00	8AD Module Transform Mode			
16#8001:16#00	8AD Module Digital Output Range			
16#8002:16#00	8AD Module Filter Parameter			
16#8003:16#00	8AD Module Overflow Detect			
16#8004:16#00	8AD Module Overflow Detect			
16#A000:16#00	8AD Module Diagnosis information			
16#A001:16#01	8AD Diagnosis information	RO	UINT	
16#F000:16#00	Modular device profile			
16#F030:16#00	Configured Module Ident List			
16#F050:16#00	Detected Module Ident List			
16#F100:16#00	Device TxPDO mapping parameter	RO	UDINT	
16#F200:16#00	Device RxPDO mapping parameter	RW	UDINT	

■ Module fault codes

Fault code (n represents the channel)	Actual content	Solution
0x03n2	The count is greater than the maximum limit.	Check if external input exceeds limits
0x03n3	The count is less than the minimum limit.	Check if external input exceeds limits

● QY20-8AI

When the module's ERR indicator light flashes , it indicates a module malfunction. At this time, the module will report a fault code, which can be obtained from the diagnostic data object dictionary value in the "CoE Online" interface after logging in . The "CoE Online" interface is shown in the following figure.

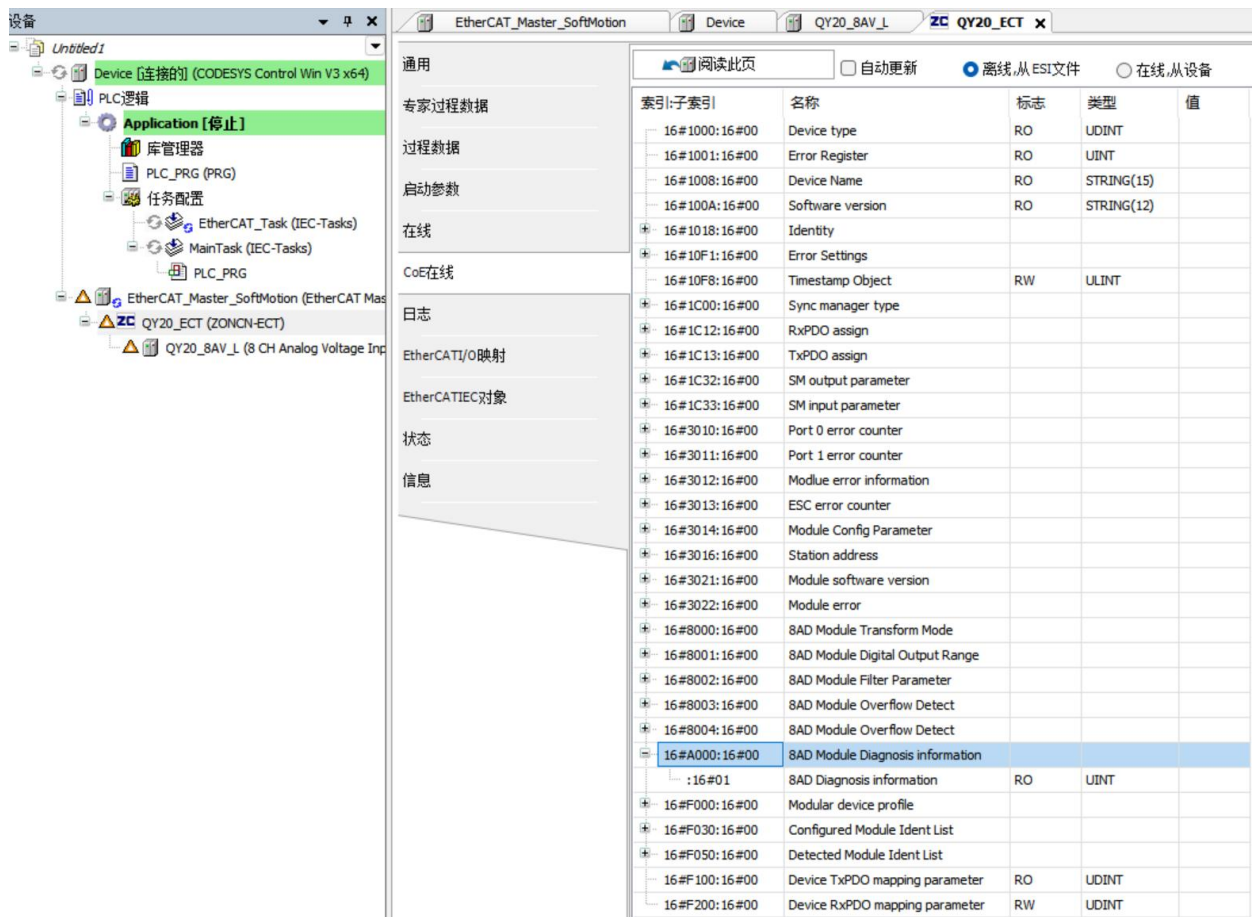


■ Module fault codes

Fault code (n represents the channel)	Actual content	Solution
0x03n2	The count is greater than the maximum limit.	Check if external input exceeds limits
0x03n3	The count is less than the minimum limit.	Check if external input exceeds limits

● QY20-8AV-L

When the module's ERR indicator light flashes , it indicates a module malfunction. At this time, the module will report a fault code, which can be obtained from the diagnostic data object dictionary value in the "CoE Online" interface after logging in . The "CoE Online" interface is shown in the following figure.



■ Module fault codes

Fault code (n represents the channel)	Actual content	Solution
0x03n2	The count is greater than the maximum limit.	Check if external input exceeds limits
0x03n3	The count is less than the minimum limit.	Check if external input exceeds limits

● QY20-8AV

When the module's ERR indicator light flashes , it indicates a module malfunction. At this time, the module will report a fault code, which can be obtained from the diagnostic data object dictionary value in the "CoE Online" interface after logging in . The "CoE Online" interface is shown in the following figure.

索引/子索引	名称	标志	类型	值
16#1000:16#00	Device type	RO	UDINT	
16#1001:16#00	Error Register	RO	UINT	
16#1008:16#00	Device Name	RO	STRING(15)	
16#100A:16#00	Software version	RO	STRING(12)	
16#1018:16#00	Identity			
16#10F1:16#00	Error Settings			
16#10F8:16#00	Timestamp Object	RW	ULINT	
16#1C00:16#00	Sync manager type			
16#1C12:16#00	RxPDO assign			
16#1C13:16#00	TxPDO assign			
16#1C32:16#00	SM output parameter			
16#1C33:16#00	SM input parameter			
16#3010:16#00	Port 0 error counter			
16#3011:16#00	Port 1 error counter			
16#3012:16#00	Module error information			
16#3013:16#00	ESC error counter			
16#3014:16#00	Module Config Parameter			
16#3016:16#00	Station address			
16#3021:16#00	Module software version			
16#3022:16#00	Module error			
16#8000:16#00	8AD Module Transform Mode			
16#8001:16#00	8AD Module Digital Output Range			
16#8002:16#00	8AD Module Filter Parameter			
16#8003:16#00	8AD Module Overflow Detect			
16#8004:16#00	8AD Module Overflow Detect			
16#A000:16#00	8AD Module Diagnosis information			
16#A001:16#01	8AD Diagnosis information	RO	UINT	
16#F000:16#00	Modular device profile			
16#F030:16#00	Configured Module Ident List			
16#F050:16#00	Detected Module Ident List			
16#F100:16#00	Device TxPDO mapping parameter	RO	UDINT	
16#F200:16#00	Device RxPDO mapping parameter	RW	UDINT	

■ Module fault codes

Fault code (n represents the channel)	Actual content	Solution
0x03n2	The count is greater than the maximum limit.	Check if external input exceeds limits
0x03n3	The count is less than the minimum limit.	Check if external input exceeds limits

Appendix

Related Product Model Ordering Index

coding	Product Model	describe
CPU : ZQ600 series PLC		
45.02.0023	ZQ601	Medium-sized PLC main control module
45.02.0002	ZQ602	Medium-sized PLC main control module
QY20 series coupler modules		
45.02.0001	QY20-ECT	EtherCAT bus coupler
45.02.0007	QY20-PN	PROFINET bus coupler
45.02.0020	QY20-CCCT	CC- Link IE TSN bus coupler
QY20 series IO modules		
45.02.0006	QY20-0016P	16-channel digital output module, PNP
45.02.0004	QY20-0016N	16-channel digital output module, NPN
45.02.0003	QY20-1600P	16-channel digital input module, PNP
45.02.0005	QY20-1600N	16-channel digital input module, NPN
45.02.0013	QY20-0808P	8 digital inputs + 8 digital outputs, PNP
45.02.0019	QY20-0808N	8 digital inputs + 8 digital outputs, NPN
45.02.0008	QY20-4AD	4-channel analog input module (16-bit), $\pm 10V/0\sim 10V/\pm 5V/0\sim 5V/1\sim 5V/0\sim 20mA/4\sim 20mA$
45.02.0009	QY20-4DA	4-channel analog output module (16-bit), $\pm 10V/0\sim 10V/\pm 5V/0\sim 5V/1\sim 5V/0\sim 20mA/4\sim 20mA$
45.02.0014	QY20-8AI	8-channel analog input module, current type (16-bit), $0\sim 20mA/4\sim 20mA$
45.02.0011	QY20-8AV	8-channel analog input module, voltage type (16-bit), $\pm 10V/0\sim 10V/\pm 5V/0\sim 5V/1\sim 5V$
45.02.0012	QY20-8AI-L	8-channel analog input module, current type (12-bit), $0\sim 20mA/4\sim 20mA$
45.02.0021	QY20-8AV-L	8-channel analog input module, voltage type (12-bit), $0\sim 10V/0\sim 5V/1\sim 5V$
45.02.0015	QY20 -4PT	4-channel RTD temperature detection module, PT100, PT500, PT1000, CU100 , KTY84, NTC5K, NTC10K
45.02.0016	QY2 0-4TC	4-channel thermocouple temperature detection module, B, E, N, J, K, R, S, T
45.02.0017	QY20-2HC	2-channel encoder high-speed counting module, 5V differential or 24V single-ended
45.02.0018	QY20-4PO	4-channel pulse output module, 24V NPN type
45.02.0022	QY20-PS	Relay power module, 5V 2A