

RB Series IO Module

User Manual

DECOWELL Industrial Intelligence makes reliable partners



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Preface

■ Profile

Thank you for purchasing DECOWELL RB Series of card-type I/O modules!

RB series card-type I/O modules are distributed expansion modules developed by DECOWELL. This series of modules consists of adapters, I/O modules, power modules, and terminal modules. The adapter can support a variety of communication buses, such as PROFINET, EtherCAT, CC-Link, Modbus TCP, etc. I/O modules can be divided into digital input modules, digital output modules, analog input modules, analog output modules, and functional modules. Users can match them according to actual applications.

Digital input modules and digital output modules are commonly used I/O modules of the RB series.

This manual mainly describes the specifications, features and usage of the module. Please read it carefully before use so that you can use this product more clearly and safely.

Due to continuous product and technical updates and improvements, the content in this document may not fully correspond to the actual product. Please understand. In case of any discrepancies, the actual product shall prevail. Content changes resulting from product upgrades are subject to change without prior notice.

CONTENTS

Preface	2
Safety Precautions	4
1.Product Information	7
1.1 Digital Input Module	7
1.1.1 Product model information	7
1.1.2 Technical specifications	7
1.2 Digital Output Module	10
1.2.1 Product model information	10
1.2.2 Technical specifications	10
1.3 Environmental Specifications	13
1.4 Indicator Light Description	13
2.Mechanical Installation	15
2.1 Installation dimensions	15
2.2 Installation method	15
2.2.1 Inter-module installation	15
2.2.2 Installation on the rail	17
3.Electrical installation	18
3.1 Cable Selection	18
3.2 Terminal Wiring	19
3.2.1 Digital input module wiring diagram	19
3.2.2 Digital output module wiring diagram	22
4.Module configuration information	25
4.1 Module input and output bytes	25
4.2 DO type modules support single channel substitute value configuration	25
4.3 DI type module supports filter configuration	26

Safety Precautions

■ Security Statement

1. Before installing, operating, or maintaining the product, please read and comply with these safety precautions.
2. To ensure personal and equipment safety, follow all safety labels on the product and all safety instructions contained in this manual during installation, operation, and maintenance.
3. The “Note”, “Caution”, “Warning”, and “Danger” statements in this manual do not represent all safety precautions that should be observed; they are supplementary to the overall safety requirements.
4. This product must be used under conditions that meet the specified design requirements. Failure to meet these conditions may result in malfunction. Functional abnormalities or component damage caused by non-compliance are not covered by the product warranty.
5. DECOWELL assumes no legal liability for personal injury, property damage, or other losses caused by improper or unauthorized operation of the product.

■ Security level definition

Note

Indicates additional information or explanations that supplement the operating instructions.

Caution

Indicates a hazardous situation that may result in minor to moderate personal injury or equipment damage if not operated as instructed.

Warning

Indicates a hazardous situation that may result in serious personal injury or death if not operated as instructed.

 Warning — During Control System Design

01. When applying this system, please be sure to design a safety circuit to ensure that the control system can still operate safely when the external power supply fails or the expansion module malfunctions.
02. If the output circuit experiences prolonged overcurrent due to exceeding the rated load current or a load short circuit, the module may smoke or catch fire. External safety devices such as fuses or circuit breakers should be installed.

 Caution — During Control System Design

01. It is essential to install an emergency braking circuit, a protection circuit, an interlock circuit for forward and reverse operation, and upper and lower limit interlock switches to prevent machine damage in the external circuit of the expansion module;
02. To ensure the safe operation of the equipment, please design external protection circuits and safety mechanisms for output signals related to major accidents;
03. When the output units of the expansion module, such as relays and transistors, are damaged, their outputs cannot be controlled to be in the ON or OFF state;

 Caution — During Installation

01. During installation, prevent metal shavings and wire ends from falling into the module's ventilation holes, as this may cause fire, malfunction, or misoperation;
02. After installation, ensure that there are no foreign objects on its ventilation surface, otherwise it may cause poor heat dissipation, resulting in fire, malfunction, or misoperation;
03. During installation, ensure that the module is securely connected to its respective connector and that the module connection hooks are firmly locked. Improper module installation may lead to malfunctions, failures, or detachment.

 Warning — During Installation

01. Only professional maintenance personnel who have received relevant electrical equipment training and possess sufficient electrical knowledge can install this product;

02. When installing or removing modules, all external power supplies to the system must be completely disconnected before proceeding. Failure to disconnect the power supply may result in electric shock, module malfunction, or accidental operation.

03. Do not use the module in the following locations: places with dust, fumes, conductive dust, corrosive gases, or flammable gases; places exposed to high temperatures, condensation, or wind and rain; places subject to vibration or impact. Electric shock, fire, or misoperation may also cause product damage and deterioration.

1.Product Information

1.1 Digital Input Module

1.1.1 Product model information

Model	Specifications	Order
RB-2008	8 digital inputs, input signal is low level NPN Support single-line system	18-02-01
RB-2108	8 digital inputs, input signal is low level PNP Support single-line system	18-02-03
RB-2018	8 digital inputs, input signal is low level NPN Support 2-wire/3-wire sensors	18-02-05
RB-2118	8 digital inputs, input signal is low level PNP Support 2-wire/3-wire sensors	18-02-06
RB-200H	16 digital inputs, input signal is low level NPN	18-02-02
RB-210H	16 digital inputs, input signal is high level PNP	18-02-04

1.1.2 Technical specifications

●RB-2008/RB-2108 Input module parameters

Basic parameters		
Dimensions	100mm×77mm×12mm	
Protection level	IP20	
Wiring Specification	0.2~1.5mm ²	
Wiring method	Straight-through spring terminal connection	
Technical Parameters		
model	RB-2008	RB-2108
Product Name	Digital Input Modules	
Signal Type	NPN (single-wire)	PNP (single-wire)
Power consumption	Max 18mA	Max 19mA
Number of input channels	8	
Input rated voltage	24VDC (±25%)	24VDC (±25%)
Input logic 1 signal	0~5V	18~30V
Input logic 0 signal	11~30V	0~12V

Input response time OFF to ON	50us	50us
Input response time ON to OFF	100us	100us
Filter parameters	Configurable: 0~10ms, default value: 3ms	
Inrush Current value	0.15k A($\pm 10\%$)	
instantaneous power interruption time	>0.01s	
Isolation withstand voltage	500V	
Isolation method	Optocoupler Isolation	

●RB-2018/RB-2118 Input module parameters

Basic parameters		
Dimensions	100mm×77mm×12mm	
Protection level	IP20	
Wiring Specification	0.2~1.5mm²	
Wiring method	Straight-through spring terminal connection	
Technical Parameters		
model	RB-2018	RB-2118
Product Name	Digital Input Modules	
Signal Type	NPN (2/3 wire)	PNP (2/3 wire)
Power consumption	Max 43mA	Max 18mA
Number of input channels	8	
Input rated voltage	24VDC (±25%)	24VDC (±25%)
Input logic 1 signal	0~5V	18~30V
Input Logic 0 Signal	11~30V	0~12V
Input response time OFF to ON	50us	50us
Input response time ON to OFF	100us	100us
Sensor power supply	24V/150mA(MAX)	24V/150mA(MAX)
Filter parameters	Configurable: 0~10ms, default value: 3ms	
Inrush Current value	0.15k A(± 10%)	
instantaneous power interruption time	>0.01s	

Isolation withstand voltage	500V
Isolation method	Optocoupler Isolation

●RB-200H/RB-210H input module parameters

Basic parameters		
Dimensions	100mm×77mm×12mm	
Protection level	IP20	
Wiring Specification	0.2~1.5mm²	
Wiring method	Straight-through spring terminal connection	
Technical Parameters		
model	RB-200H	RB-210H
Product Name	Digital Input Modules	
Signal Type	NPN (single-wire)	PNP (single-wire)
Power consumption	Max 22mA	Max 22mA
Number of input channels	16	
Input rated voltage	24VDC (±25%)	24VDC (±25%)
Input logic 1 signal	0~5V	18~30V
Input Logic 0 Signal	11~30V	0~12V
Input response time OFF to ON	50us	50us
Input response time ON to OFF	100us	100us
Filter parameters	Configurable: 0~10ms, default value: 3ms	
Inrush Current value	0.15k A(± 10%)	
instantaneous power interruption time	>0.01s	
Isolation withstand voltage	500V	
Isolation method	Optocoupler Isolation	

1.2 Digital Output Module

1.2.1 Product model information

model	Specifications	Order Number
RB-3008	8 digital outputs, output signal is low level (NPN)	18-03-01
RB-3108	8-channel digital output, output signal is high level (PNP)	18-03-03
RB-3018	8 digital outputs, output signal is low level (NPN) Support two-wire system	18-03-05
RB-3118	8-channel digital output, output signal is high level (PNP) Support two-wire system	18-03-06
RB-300H	16 digital outputs, output signal is low level (NPN)	18-03-02
RB-310H	16-channel digital output, output signal is high level (PNP)	18-03-04
RB-3204	4 relay outputs	18-03-07

1.2.2 Technical specifications

●RB-3018/RB-3118 Output module parameters

Basic parameters		
Dimensions	100mm×77mm×12mm	
Protection level	IP20	
Wiring Specification	0.2~1.5mm²	
Wiring method	Straight-through spring terminal connection	
weight	70g	
Technical Parameters		
model	RB-3018	RB-3118
Product Name	Digital output modules	
Signal Type	NPN	PNP
Power consumption	Max 43mA	Max 23mA
Number of output channels	8	
Output voltage type	Low voltage level	High voltage level
Drive Capability	Maximum load current per channel: 0.5A/maximum load current per 8 consecutive channels: 2A	
Output response time OFF to ON	4us	50us

Output response time ON to OFF	36us	50us
Load Type	Resistive load, Inductive load, Lamp load	
Inrush Current value	0.15k A($\pm 10\%$)	
instantaneous power interruption time	>0.01s	
Isolation withstand voltage	500V	
Isolation method	Optocoupler Isolation	

● RB-3204Relay output module parameters

Basic parameters			
Dimensions	100mm×77mm×12mm		
Protection level	IP20		
Wiring Specification	0.2~1.5mm²		
Wiring method	Straight-through spring terminal connection		
weight	70g		
Technical Parameters			
model	RB-3204		
Product Name	Relay output module		
Signal Type	Relay		
Power consumption	Max 36mA		
Number of output channels	4		
Drive Capability	30VDC/5A, 250VAC/5A		
Minimum permissible load	5VDC/1mA		
switching current	3A（Maximum support 5A）		
Electrical Endurance	1×10 ⁵ times（3A 30VDC/250VAC） 5×10 ⁴ times（5A 30VDC/250VAC）		
Load Type	Resistive load	Inductive load	Lamp load

Inrush Current value	0.15k A($\pm 10\%$)
instantaneous power interruption time	>0.01s
Isolation withstand voltage	500V
Isolation method	Optocoupler Isolation

● RB-300H/RB-310H Output Module Parameters

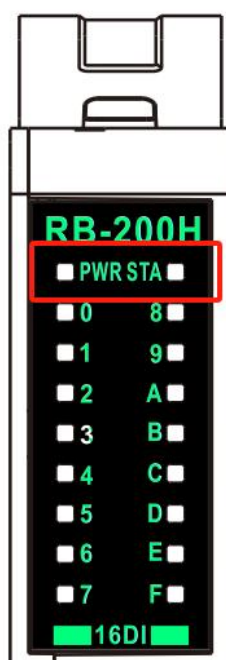
Basic parameters				
Dimensions	100mm×77mm×12mm			
Protection level	IP20			
Wiring Specification	0.2~1.5mm²			
Wiring method	Straight-through spring terminal connection			
weight	70g			
Technical Parameters				
model	RB-300H	RB-310H	RB-3008	RB-3108
Product Name	Digital output modules			
Signal Type	NPN	PNP	NPN	PNP
Power consumption	Max 79mA	Max 33mA	Max 44mA	Max 15mA
Number of output channels	16		8	
Output voltage type	Low voltage level	High voltage level	Low voltage level	High voltage level
Drive Capability	Maximum load current per channel: 0.5A/maximum load current per 8 consecutive channels: 2A			
Output response time OFF to ON	4us	50us	4us	50us
Output response time ON to OFF	36us	50us	36us	50us
Load Type	Resistive load, Inductive load, Lamp load			
Inrush Current value	0.15k A(±10%)			
instantaneous power interruption time	>0.01s			

Isolation withstand voltage	500V
Isolation method	Optocoupler Isolation

1.3 Environmental Specifications

Environmental parameters	
Operating temperature	-25~60℃
Operating humidity	95% non-condensing
atmosphere	≥795 hPa (altitude ≤ 2000 m) as per IEC 61131-2
Storage temperature	-40~85℃
Overvoltage category	I

1.4 Indicator Light Description



Led	State	Describe
STA	Red light flashes quickly (5HZ)	Module self-test abnormality (internal fault)
	Red light is on	The module has not established communication with the adapter, and configuration information loading failed.

	Green light is always on	The module works fine
	Red light flashes slowly (1HZ)	Module hardware abnormality
PWR	Green light is always on	Internal power supply is normal (5V System side)
	Green light off	No power supply/abnormal power supply (5V System side)
0~F	Green light is always on	With signal input/output
	Green light off	No signal input/output

2. Mechanical Installation

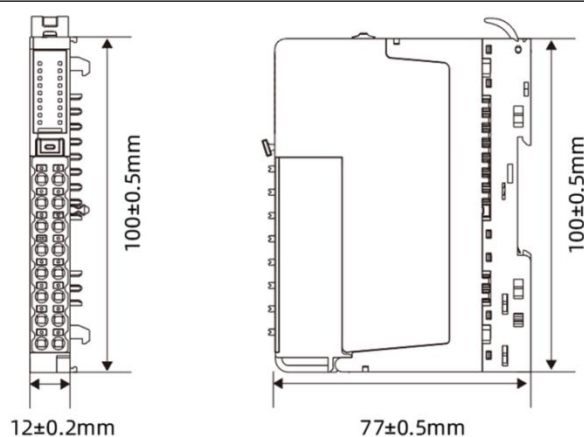
2.1 Installation dimensions

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



Notice

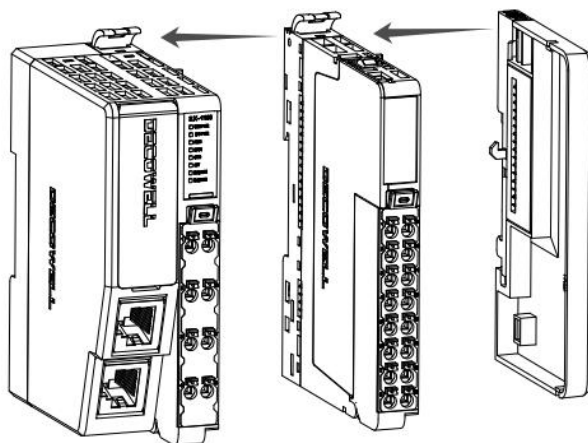
- The dimensions in the figure below are for the temperature module.



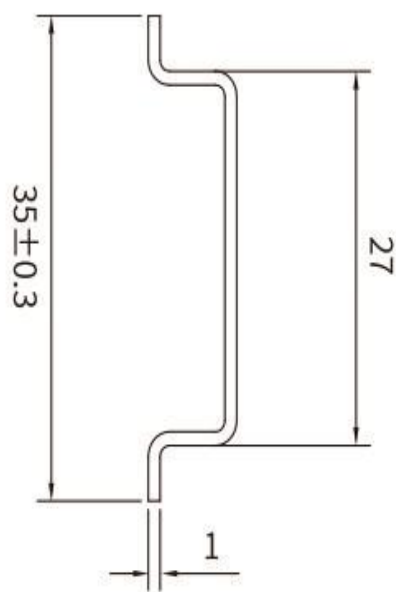
2.2 Installation method

2.2.1 Inter-module installation

Before installation, push the lock and release lever on the top of the module backward. After all the module levers are open, insert the modules horizontally. After installation, push the lever back to its original position.



The module is installed on a DIN rail. The DIN rail must comply with the IEC 60715 standard (35 mm wide and 1 mm thick). The dimensions are as follows:



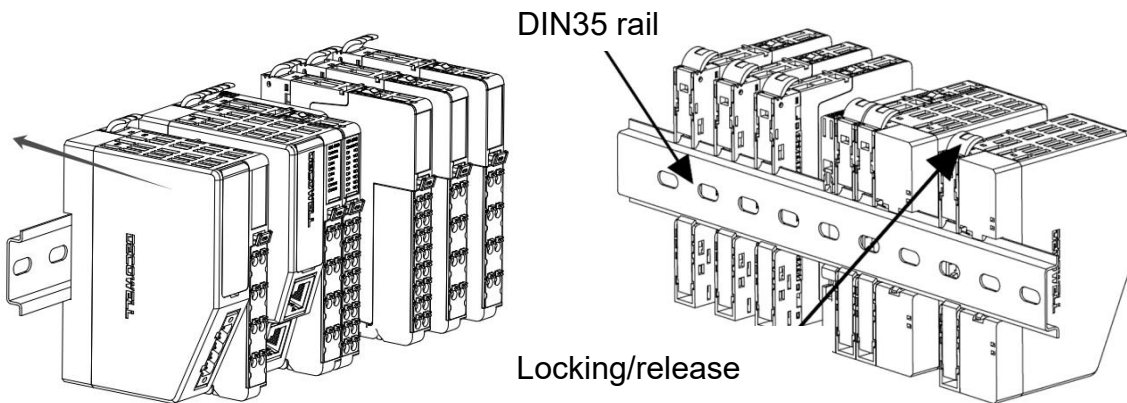
Note: When the module is installed on a DIN35 rail other than the one recommended above, the DIN rail lock may not lock properly. Before installing the module, open the lock lever on the top of the module before proceeding to the next step of installation.

**Notice**

- **When** this product is installed on a DIN rail other than the one recommended above (especially when the thickness of the DIN rail is $\leq 1.0\text{mm}$), the DIN rail lock will fail and the product will not be installed properly, causing the product to not work properly.

2.2.2 Installation on the rail

During installation, align the module with the DIN35 rail and press the module in the direction indicated by the arrow, as shown in the figure below.

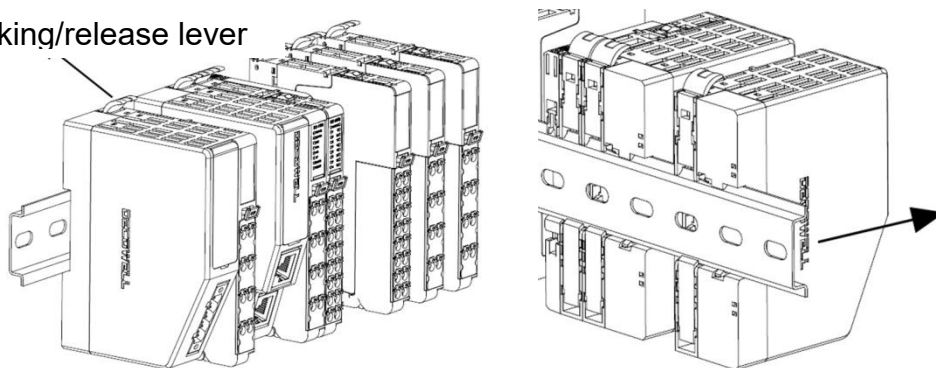


Note: After installing the module, press the lock-release lever downward by hand to secure the module onto the guide rail, ensuring it is properly installed.

Disassembly:

Push the lock lever upwards by hand, and then pull the module away from the DIN35 rail.

lifting the locking/release lever



3. Electrical installation

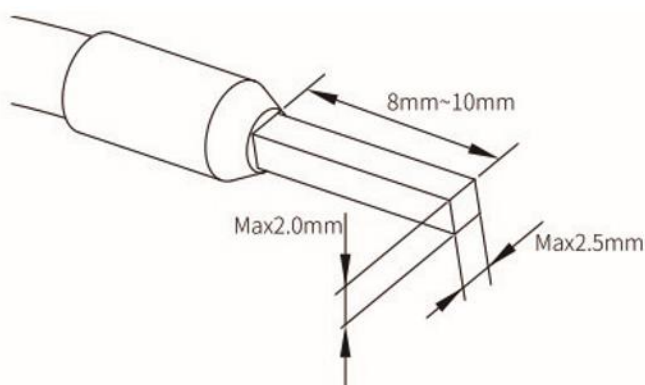
3.1 Cable Selection

Signal related cables. The wire lug diameters in the following table are for reference only and can be reasonably calculated and adjusted based on actual use.

Name	Compatible Wire Gauge		KST	
	Standard (mm ²)	AWG	Model	Crimping Tool
Ferrule Type	0.25	24	E0208	KST2000L
	0.5	20	E0510	
	0.75	18	E7510	
	1.0	18	E1010	
	1.5	16	E1510	

Stripping length: 8–10 mm

The shape and size requirements of the riveted terminals are shown in the figure below.



3.2 Terminal Wiring

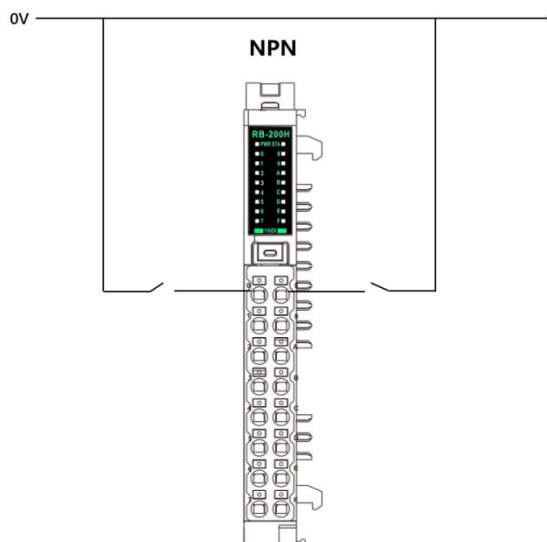
Notice

- The RB series adapter power supply is divided into system power and I/O power. To avoid interference with the system, it is recommended to take two sets of power lines from the same 24VDC power supply module and connect them separately to the adapter's system power and I/O power.
- To ensure the normal operation of the module, please check whether the I/O side power on the adapter is properly connected before use.

3.2.1 Digital input module wiring diagram

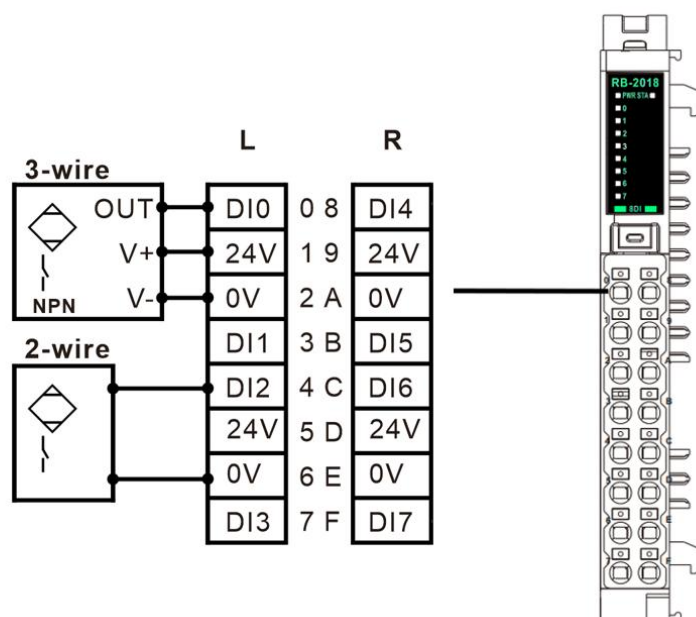
Notice

- RB-200H/RB-2008 are NPN type modules with a input signal of 0V.



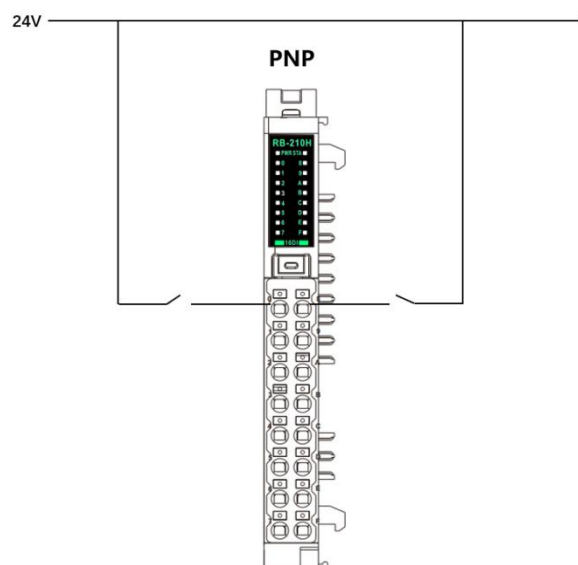
Notice

- RB-2018 is NPN type modules, supporting 2/3-wire sensors.

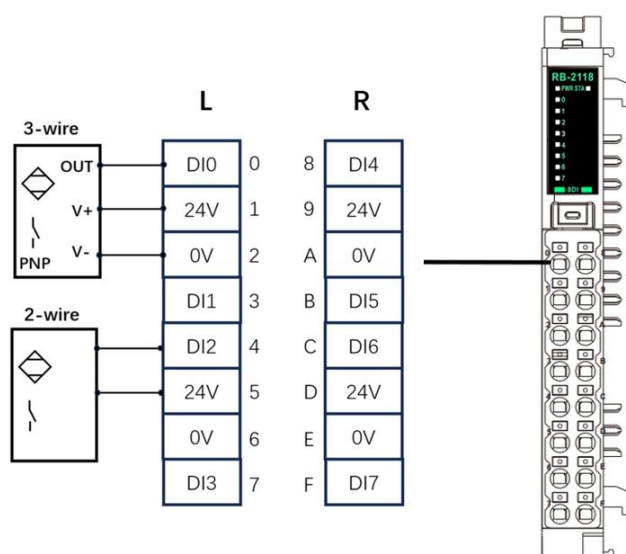


**Notice**

- RB-210H/2108 are PNP type modules with an input signal of 24V.

**Notice**

- RB-2118 is PNP type module, supports 2/3-wire sensors, input signal is 24V

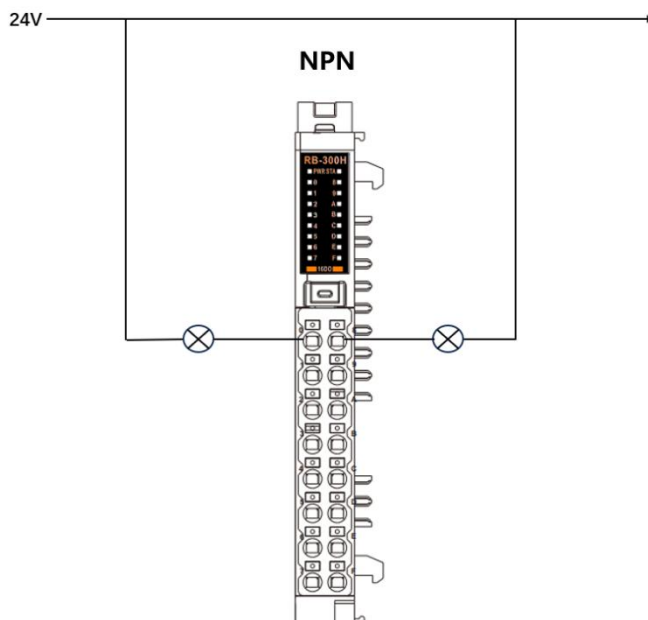


3.2.2 Digital output module wiring diagram



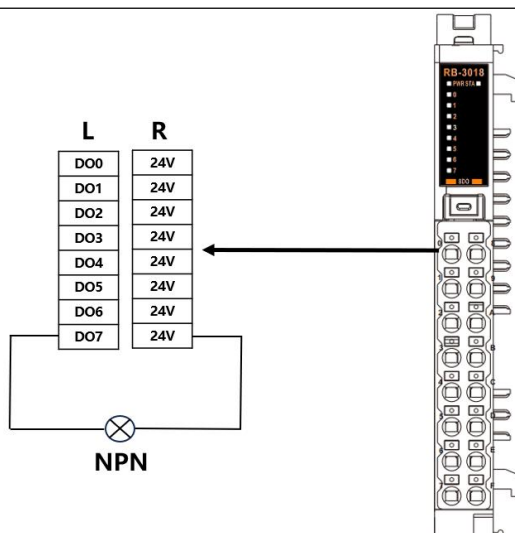
Notice

- RB-300H and RB-3008 are NPN type modules with an output signal of 0V.



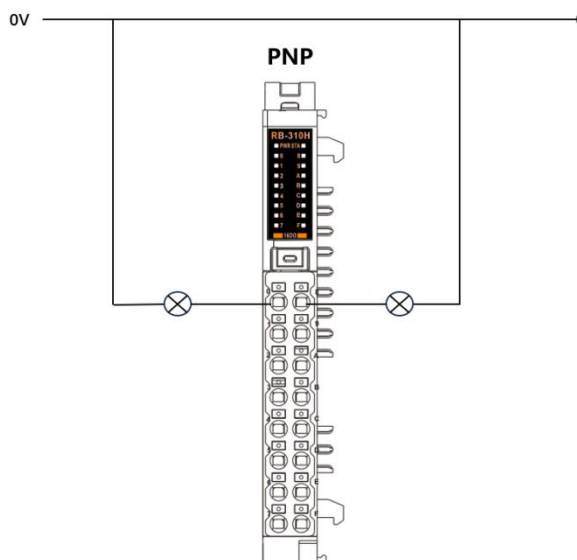
Notice

- RB-3018 is NPN type module, output signal is 0V; The terminal interface provides a built-in 24V, allowing the load to be directly connected between the DO channel and the 24V terminal.

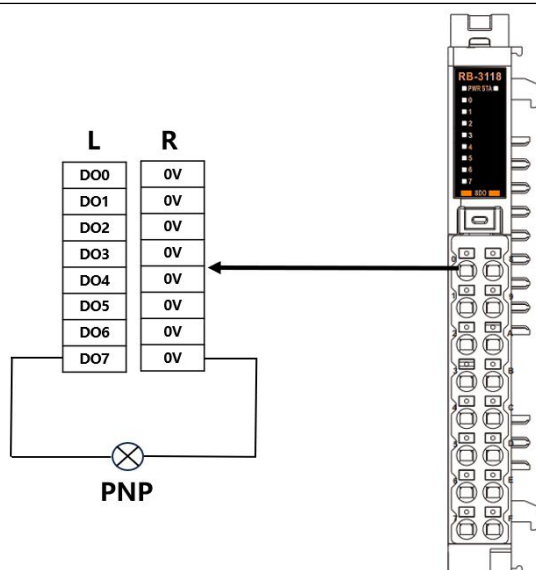


 Notice

- RB-310H and RB-3108 are PNP type modules with an output signal of 24V.

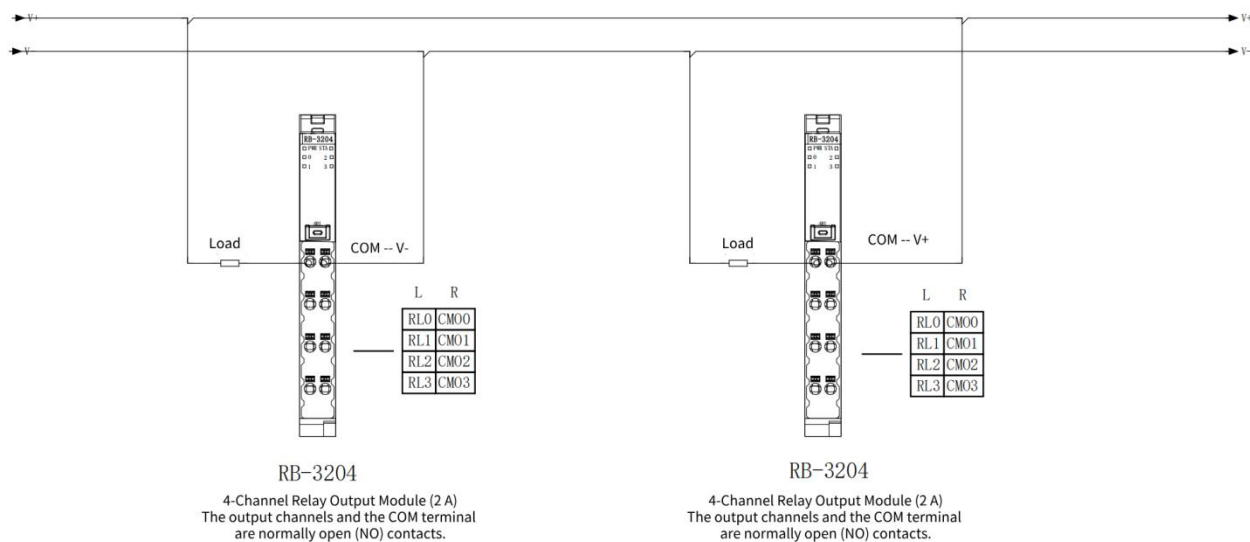

 Notice

- The RB-3018 is an NPN type module with an output signal of 0V. The terminal interface provides a built-in 24V, allowing the load to be directly connected between the DO channel and the 24V terminal.



**Notice**

- RB-3204 is relay output, the right channel is COM.



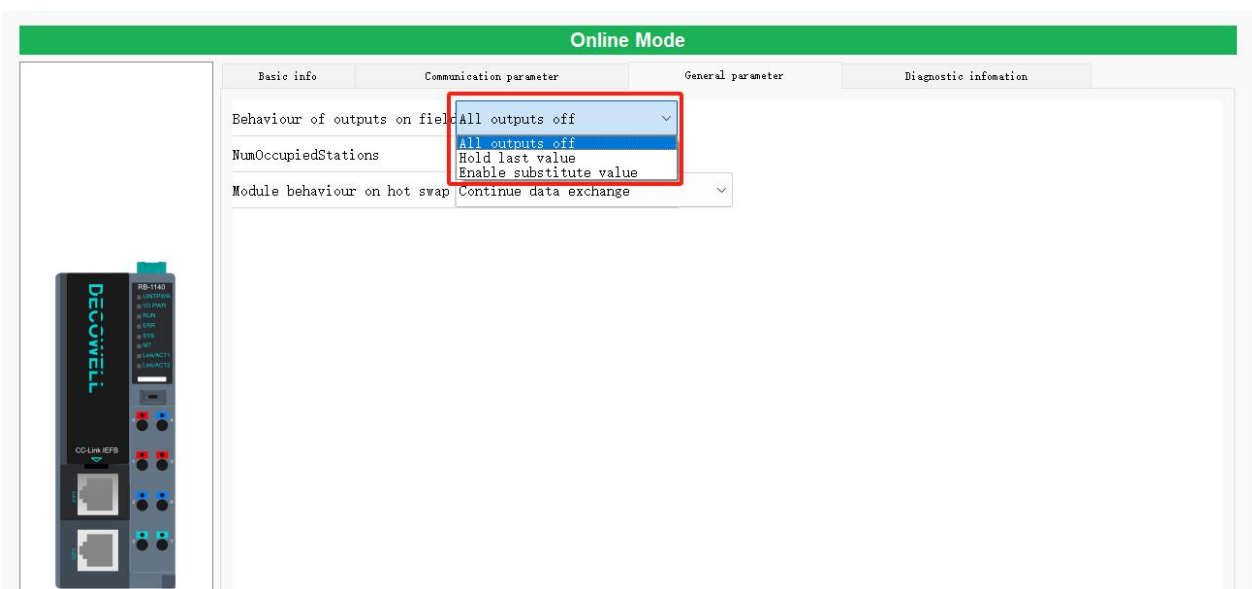
NOTE: The COM terminals of the relay module are not interconnected.

4. Module configuration information

4.1 Module input and output bytes

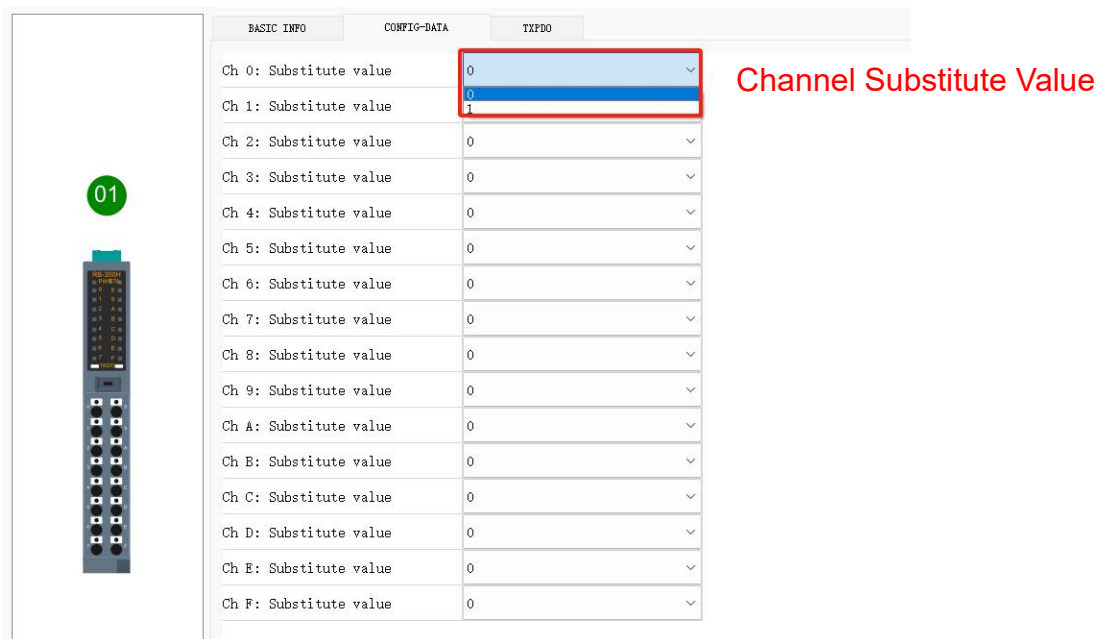
Module Type	Number of input bytes	Output Bytes
8DI	1	—
16DI	2	—
8DO	—	1
16DO	—	2

4.2 DO type modules support single channel substitute value configuration



value	describe
All outputs off(default value)	Output module status data
Hold last value	Keep last value
Enable substitute value	Start Alternative Value

Note: Whether to enable the replacement value is set in the adapter

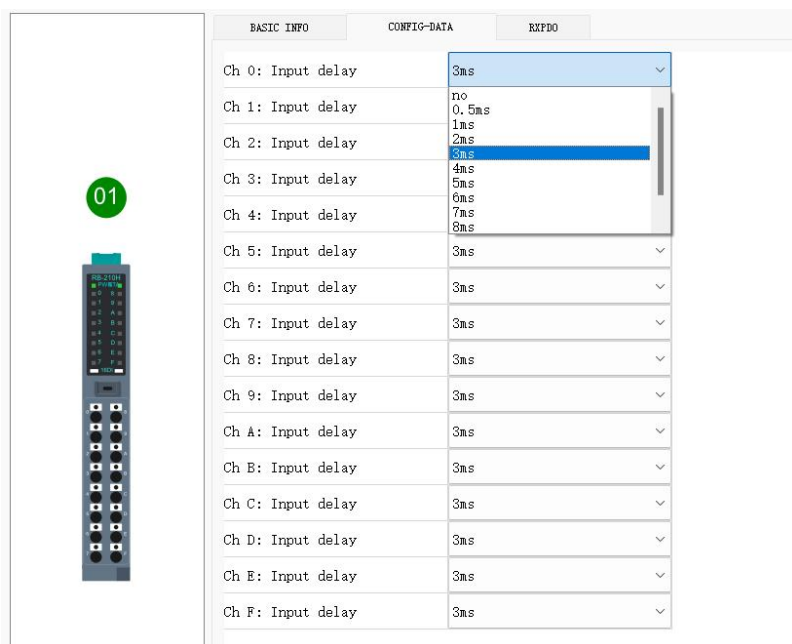


	BASIC INFO	CONFIG-DATA	TXPDO
Ch 0: Substitute value		0	
Ch 1: Substitute value		1	
Ch 2: Substitute value		0	
Ch 3: Substitute value		0	
Ch 4: Substitute value		0	
Ch 5: Substitute value		0	
Ch 6: Substitute value		0	
Ch 7: Substitute value		0	
Ch 8: Substitute value		0	
Ch 9: Substitute value		0	
Ch A: Substitute value		0	
Ch B: Substitute value		0	
Ch C: Substitute value		0	
Ch D: Substitute value		0	
Ch E: Substitute value		0	
Ch F: Substitute value		0	

Channel Substitute Value

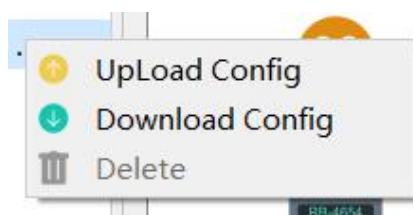
4.3 DI type module supports filter configuration

Configuration range: 0~10ms, default 3ms.



	BASIC INFO	CONFIG-DATA	RXPDO
Ch 0: Input delay		3ms	
Ch 1: Input delay		no	
Ch 2: Input delay		0.5ms	
Ch 3: Input delay		1ms	
Ch 4: Input delay		2ms	
Ch 5: Input delay		3ms	
Ch 6: Input delay		4ms	
Ch 7: Input delay		5ms	
Ch 8: Input delay		6ms	
Ch 9: Input delay		7ms	
Ch A: Input delay		8ms	
Ch B: Input delay		3ms	
Ch C: Input delay		3ms	
Ch D: Input delay		3ms	
Ch E: Input delay		3ms	
Ch F: Input delay		3ms	

Note: After completing the above modifications, you need to right-click the module, click Download Configuration, and then power off and restart to take effect



5. Appendix

5.1 Usage Requirements for Relay Output Modules

Relay output modules are suitable for low-frequency, status-type control applications.

Through potential-free contacts, they realize ON/OFF control of external loads, providing good electrical isolation and strong voltage adaptability.

5.1.1 Recommended Application Scenarios:

- ① Equipment start/stop / mode switching
- ② Alarm signal output
- ③ Indicator lights and buzzer control
- ④ Driving interposing relays or contactor coils
- ⑤ Signal isolation control between different voltage systems

Typical characteristics:

- ① Low switching frequency
- ② Control logic mainly based on “status”
- ③ No requirement for high speed or precise timing

5.1.2 Application Scope Limitations

To ensure long-term stable operation, relay output modules are **not suitable** for the following applications:

- ① **High-frequency or pulse control** (running lights, flashing outputs, PWM/pulse signals, high-frequency jog control)

Note: Relays use mechanical contacts and are not suitable for frequent energizing and de-energizing.

② **Precise synchronization or high-speed timing control** (multi-channel millisecond-level synchronous outputs, strict timing interlock control)

Note: Due to physical differences in relay operate/release times, synchronous accuracy cannot be guaranteed.

③ **Direct driving of high-power or highly inductive loads** (motors, heaters, brake coils, high-power solenoid valves)

Recommendation: Such loads should be controlled via contactors or interposing relays.

5.1.3 Recommended Usage Method

To improve system reliability and maintainability, the following typical structure is recommended:

PLC Relay DO



External relay module / Contactor



Field load

Advantages:

- ① Effectively protects PLC output points
- ② Relay wear and replacement do not affect the PLC module
- ③ Adapts to changes in field loads
- ④ Reduces on-site maintenance costs

5.1.4 Selection and Usage Recommendations

Application Requirement	Recommended Solution
Low-frequency status control	Relay DO
Inductive load	Relay DO + external relay
High-frequency / pulse	Transistor DO
High reliability / easy maintenance	External relay module
Safety control	Dedicated safety module



Service Hotline

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