# DF20-C-PN-RT-V10
# Adapter
# User Manual

# (Applicable to TIA Portal V16)

**V2.0.2**

**2024.9.29**

Version update record:

| date | Version | describe |
|---|---|---|
| 2023/6/21 | v1.0.0 | Release version |
| 2023/11/23 | v1.0.1 | Added configuration parameter definition of DF20-M-2LC-S-5; 2023-11-23 |
| 2024/4/16 | v1.0.2 | Changed the adapter technical parameters System power output is 5V DC/2A |
| 2024/6/24 | V1.03 | Modify and check the technical parameters of the coupler and extended IO; add DF20-M-4DO-R /DF20-M-8AO-U-4 /DF20-M-8AO-I-5 /DF20-M-2CNT-EL-5 /DF20-M-2CNT-EL-4/DF20-M-2PWM/DF20-M-1COM-232/485/422 to IO; add DF20-M-8AI-U-4 /DF20-M-8AI-I-5 /DF20-M-8AO-U-4 /DF20-M-8AO-I-5 to routine |
| 2024/8/22 | V2.0.0 | Added DF20-M-2CNT-EL-5 /DF20-M-2CNT-EL-4/DF20-M-2PWM/DF20-M-1COM-232/485/422 usage examples, corrected description errors and DF20-M-2RTD-PT/DF20-M-4RTD-PT/DF20-M-8AI-U-4/DF20-M-8AI-I-5 wiring diagram errors |
| 2024/9/13 | V2.0.1 | Added DF20-M-4IOL module; added DF20-M-4IOL usage routines |
| 2024/9/29 | V2.0.2 | Improve the wiring diagram of DF20-M-2CNT-EL-5 and DF20-M-2CNT-EL-4 |

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# 1 Product Overview

- The distributed remote IO system consists of a network adapter module and an expansion IO module.
- The network adapter module is responsible for fieldbus communication and realizes communication connection with the master station controller.

The adapter can select the corresponding bus module according to the communication interface of the controller system. The mainstream industrial communication protocols include EtherCAT, ProfiNET, Profibus-DP, Modbus/TCP, EtherNet/IP, etc.

- The extended IO module is responsible for connecting to the input and output sensors on site. The input IO module collects on-site

Various signals are sent to the adapter through the internal bus. The controller reads and processes the data from the adapter through the field bus, and then writes the output data to the network adapter. The network adapter then writes the output data to the output IO module through the internal bus, thereby realizing the control of the device. The expansion IO module is divided into 9 categories: digital input module, digital output module, digital input and output mixed module,Analog input module, analog output module, temperature input module, pressure sensor input module, pulse counting module, auxiliary module, etc.

- The network adapter and the expansion IO module can be freely combined according to the needs of the site.

In this case, the use of distributed IO modules can achieve lower cost requirements.

- This manual mainly describes the use of ProfiNET series distributed IO.

## 1.1 Product Features

- Occupies fewer nodes, one node has one ProfiNET adapter,The adapter can be expanded to a maximum of 32 IO modules.
- Flexible configuration, multiple types of IO modules can be combined arbitrarily.
- Easy to use, each IO has an independent functional module, which can be directly loaded into the configuration system according to the actual topology structure, making configuration easy.

Easy to get started.

- The extended IO module has rich functions. The IO module includes digital quantity, analog quantity, temperature, pressure, pulse and other types, which can be flexibly combined and expanded.

It can be applied in different occasions. It has strong compatibility, and the communication interface of the adapter complies with the ProfiNET communication standard, and supports mainstream ProfiNET master station PLCs such as Siemens 200, 300, 1200, and 1500.

- Support module parameter configuration.
- Supports error diagnosis, the adapter is marked with an error indicator light, and each module also supports a fault alarm function, making detection and maintenance simple and convenient.

## 1.2 Product Installation and Removal

- When the module is installed, the DIN rail lock at the bottom of the module can be safely and reliably installed on the 35 mm DIN rail. In addition, there is a DIN rail lock on the left side of the adapter.

A manual clip is used to lock the guide rail. When installing the module, you need to align it with the notch, push the module toward the DIN clip in the direction of the arrow, and place the module on the DIN guide rail.

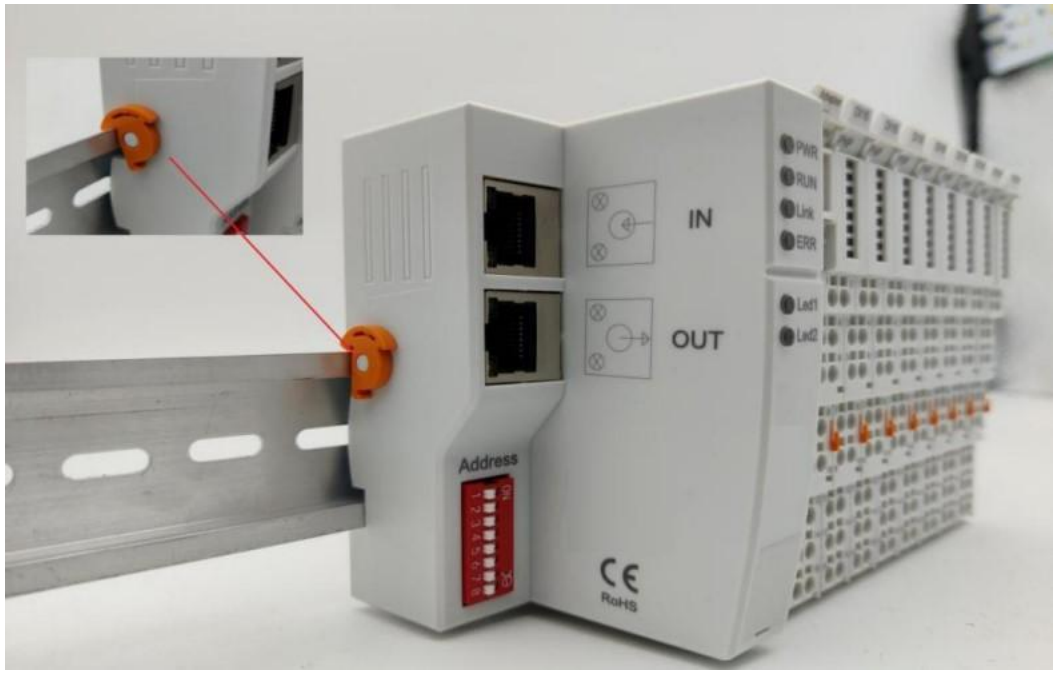



Figure 1-1

- When disassembling a module, first remove all signal cables or power cables from the module, then pull the latch in the direction of the arrow (the yellow part in the figure below).

When removing the adapter module, you also need to open the rail lock counterclockwise.

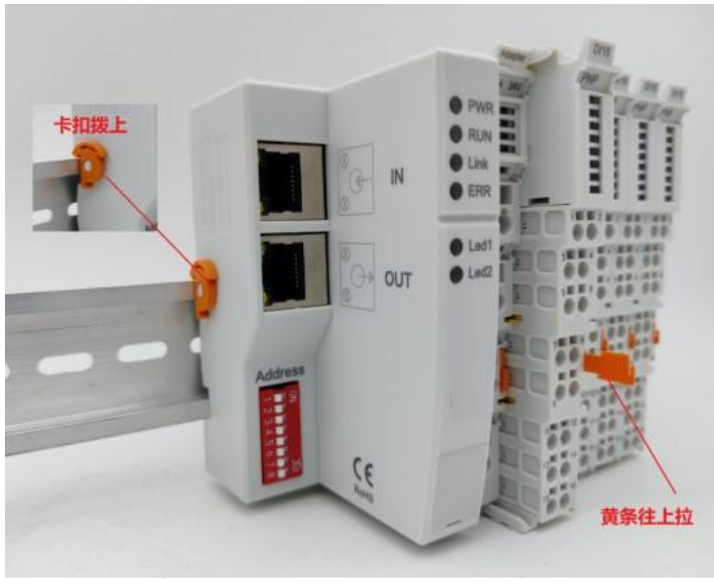



Figure 1-2

## 1.3 Product installation dimensions

- Adapter module installation dimensions: 100mm × 48mm × 69mm
- IO module installation size: 100mm × 12mm × 67mm

## 1.4 Grounding protection

- There is a metal spring on the back of the module for effective grounding with the rail. The metal spring and the grounding PE of the adapter module are

Connected.

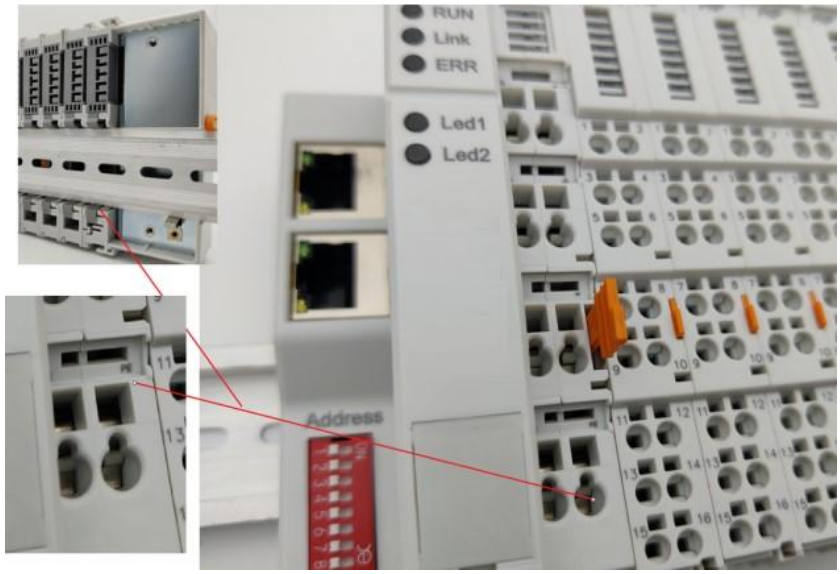



Figure 1-3

# 2 Network adapters

DF20-C-PN-RT-V10The network adapter supports standard Profinet IO Device communication. The adapter has two Profinet bus interfaces, supports MRP media redundancy, and can realize ring network redundancy function..Can be adaptedSiemens200, 300, 1200, 1500 and most other ProfiNET master stations. Small footprint, fast speed, easy wiring and simple configuration.

## 2.1 Adapter Technical Parameters

| adapterTechnical Parameters | | |
|---|---|---|
| Product Model | DF20-C-PN-RT-V10 | |
| Bus protocol | ProfiNET | |
| Number of slaves | According to the master station settings | |
| Data transmission | Category 5 twisted pair | |
| Transmission | 100m(Station distance) | |
| Bus speed | 100Mbps | |
| Bus interface | 2*RJ45 | |
| System Power | Power Input | 24V DC (18~36V) |
| | Power Output | 5V DC/2A |
| Common power | 24V DC (±20%)/8A | |
| Slave Error | support | |
| Vibration Testing | 1g, in accordance with IEC 60068-2-6 | |
| Shock Test | 15g, compliant with IEC 60068-2-27 | |
| Electromagnetic | Compliant with EN 61000-4standard | |
| Protection level | IP20 | |
| Operating | -25～75℃ | |
| Storage temperature | -40°C~+85°C | |
| Relative humidity | 5～95%RH (no condensation) | |
| Dimensions | 100mm × 48mm × 69mm | |
| Pollution degree | Class 2, in accordance with IEC 61131-2 | |
| Corrosion resistance | Compliant with IEC 60068-2-42 and IEC | |
| Operating altitude | 0～2000m | |

## 2.2 Adapter Wiring Diagram

➢ The figure shows the adapter wiring diagram. Users need to connect two groups of isolated 24V Power access system power input port(SYS_24V port and SYS_0V port)Common power input port(Filed_24V port and Filed_0V port), there are two groups of common power input ports, and it is recommended that users connect all of them.In addition, a set of safety ground wires and network communication cables need to be connected.

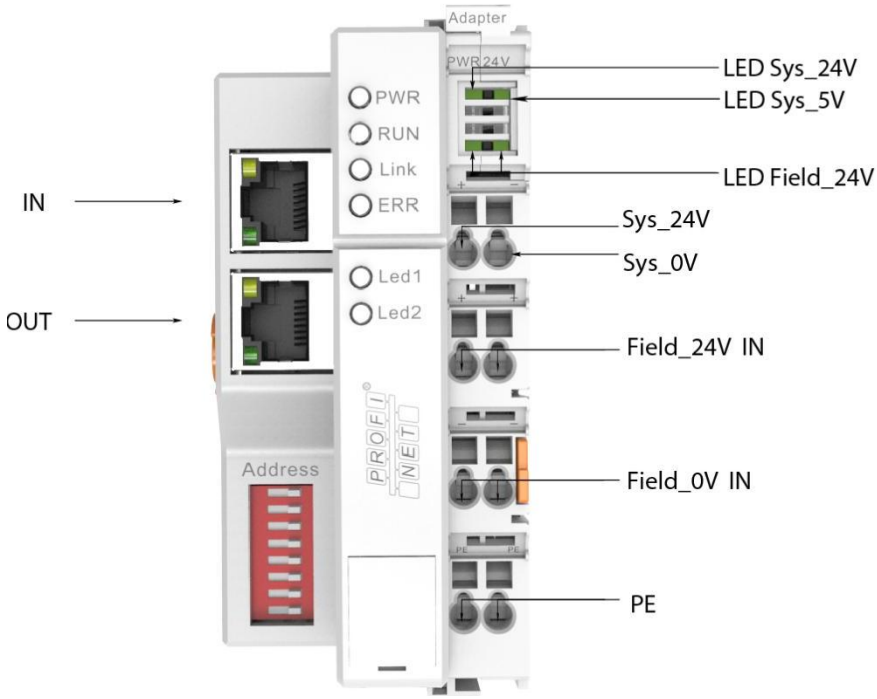



Figure 2-1

## 2.3 Adapter DIP Switch

The adapter dip switch function is not open to the public yet, and users do not need to set it.

## 2.4 Adapter LED Indicator

| serial number | Indicator Lights | illustrate | color | state | meaning |
|---|---|---|---|---|---|
| 1 | PWR | controlpower supply | green | Bright | controlpower supplypowered bynormal |
| | | | | Destroy | controlpower supplyMissed orFault |
| 2 | RUN | Bus Status | green | Bright | Bus configuration successful |
| | | | | Destroy | Bus configuration failed |
| 3 | Link | Module communication | green | Flash | ModulesCommunication is normal |
| | | | | Destroy/oftenBright | ModulesNo communication |
| 4 | ERR | Module failure | red | Bright | ModulesFault (specific fault information can be queried in PLC) |
| | | | | Destroy | ModulesWorknormal |
| 5 | Led1 | Network port 1Linkandstate | greencolor | Bright | networkLinknormal |
| | | | | Flash | Network communication work |
| | | | | Destroy | networkLinkabnormal |
| 6 | Led2 | Network port 2Linkandstate | greencolor | Bright | networkLinknormal |
| | | | | Flash | Network communication work |
| | | | | Destroy | networkLinkabnormal |

# 3 Expansion IO Module

- The expansion IO modules are divided into 9 categories: digital input module, digital output module, digital input and output module,

Mixing module,Analog input module, analog output module, temperature input module, pressure sensor input module, encoder/pulse counting module, auxiliary module, etc. Multiple types of IO modules can be combined arbitrarily.

## 3.1adaptationIO module list

| model | Product Description |
|---|---|
| DF20-M-8DI-N | 8-channel digital input module, NPN |
| DF20-M-8DI-P | 8-channel digital input module, PNP |
| DF20-M-16DI-N | 16-channel digital input module, NPN |
| DF20-M-16DI-P | 16-channel digital input module, PNP |
| DF20-M-32DI-N | 32Channel digital input module, NPN |
| DF20-M-32DI-P | 32Channel digital input module, PNP |
| DF20-M-8DO-N | 8-channel digital output module, NPN |
| DF20-M-8DO-P | 8-channel digital output module, PNP |
| DF20-M-16DO-N | 16-channel digital output module, NPN |
| DF20-M-16DO-P | 16-channel digital output module, PNP |
| DF20-M-32DO-N | 32Channel digital output module, NPN |
| DF20-M-32DO-P | 32Channel digital output module, PNP |
| DF20-M-4DO-R | 4-channel relay output module |
| DF20-M-8DIO-N | 8-channel digital input + 8-channel digital output NPN |
| DF20-M-8DIO-P | 8-channel digital input + 8-channel digital output PNP |
| DF20-M-4AI-U-0 | 4-channel analog input module, -10V~+10V |
| DF20-M-4AI-U-1 | 4-channel analog input module, 0~+10V |
| DF20-M-4AI-I-2 | 4-channel analog input module, 0~20mA |
| DF20-M-4AI-I-3 | 4-channel analog input module, 4~20mA |
| DF20-M-4AI-U-4 | 4-channel analog input voltage type<br>±10V/0~10V/2~10V/±5V/0~5V/1~5V |
| DF20-M-4AI-I-5 | 4-channel analog input current type 0-20ma/4-20mA |
| DF20-M-8AI-U-4 | 8Channel simulationquantityInput voltage type |

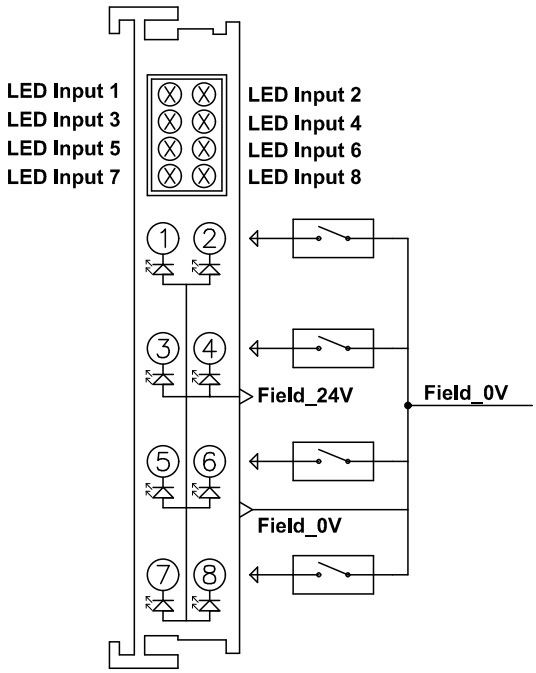
| | |
|---|---|
| | ±10V/0-10V/2-10V/±5V/0-5V/1-5V |
| DF20-M-8AI-I-5 | 8Channel simulationquantityInput current type 0-20ma/4-20mA |
| DF20-M-2LC-S-5 | 2-channel pressure sensor input module |
| DF20-M-2RTD-PT | 2-channel RTD sensor input module |
| DF20-M-4RTD-PT | 4Channel RTD Sensor Input Module |
| DF20-M-4TC-KETJ | 4-channel Thermocouple Sensor Input Module |
| DF20-M-8TC-KETJ | 8Channel Thermocouple Sensor Input Module |
| DF20-M-4AO-U-0 | 4-channel analog output module, -10V~+10V |
| DF20-M-4AO-U-1 | 4-channel analog output module, 0~+10V |
| DF20-M-4AO-I-2 | 4-channel analog output module, 0~20mA |
| DF20-M-4AO-I-3 | 4-channel analog output module, 4~20mA |
| DF20-M-4AO-U-4 | 4-channel analog output voltage type<br>±10V/0-10V/2-10V/±5V/0-5V/1-5V |
| DF20-M-4AO-I-5 | 4-channel analog output current type 0-20ma/4-20mA |
| DF20-M-8AO-U-4 | 8Channel simulationquantityOutput voltage type<br>±10V/0-10V/2-10V/±5V/0-5V/1-5V |
| DF20-M-8AO-I-5 | 8Channel simulationquantityOutput current type 0-20ma/4-20mA |
| DF20-M-1CNT-EL-5 | Single channel encoder counter module, 5V |
| DF20-M-1CNT-EL-4 | Single channel encoder counter module, 24V |
| DF20-M-2CNT-PIL-5 | 2-channel pulse counting module, 5V |
| DF20-M-2CNT-PIL-4 | 2-channel pulse counting module, 24V |
| DF20-M-2CNT-EL-5 | 2-channel encoder/pulse counting module, 5V |
| DF20-M-2CNT-EL-4 | 2-channel encoder/pulse counting module, 24V |
| DF20-M-2PWM | 2-channel pulse output module, 5V |
| DF20-M-1COM-232/485/422 | 1 channelRS485/RS232/RS422Serial communication module |
| DF20-M-4IOL | 4-channel IO-Link communication module |
| DF20-M-DC-UD-5 | Power Module |

# 3.2 DF20-M-8DI-N:8-channel digital input moduleNPN Type

## 3.2.1 Technical parameters

| **Electrical parameters** | |
|---|---|
| Input Channelsnumber | 8 |
| Input signal type | NPN |
| Input rated voltage | 0V DC |
| logic“0Signal voltage | >11VDC |
| logic“1Signal voltage | <5V DC |
| Typical input current | 3mA |
| System side current consumption | 15mA |
| Input filtering | Default 3ms, 0.2-40ms configurable |
| enterimpedance | >7.5kΩ |
| Module failure alarm | support |
| **General parameters** | |
| Isolation withstand voltage | 500V |
| Vibration Testing | 1g, in accordance with IEC 60068-2-6 |
| Shock Test | 15g, compliant with IEC 60068-2-27 |
| Electromagnetic compatibility testing | Compliant with EN 61000-4standard |
| Protection level | IP20 |
| Operating temperature | -25～75℃ |
| Storage temperature | -40℃~+85℃ |
| Relative humidity | 5～95%RH (no condensation) |
| Installation | 35mm rail mounting |
| Dimensions | 100mm × 12mm × 67mm |
| Maximum crimping area of wire | 2.5mm² |
| Maximum crimping area of wire | AWG14 |
| Minimum crimping area of wire | 0.2mm² |
| Minimum crimping area for wire | AWG28 |
| Line length | 8...9mm |

### 3.2.2 Status indicator light and wiring diagram




The status indicator lights are shown in the table below:

| LED Input No | Status and meaning | LED Input No | Status and meaning |
|---|---|---|---|
| LED Input1 | On: Channel 1 input signal is valid | LED Input2 | On: Channel 2 input signal is valid |
| | Off: Channel 1 input signal is invalid | | Off: Channel 2 input signal is invalid |
| LED Input3 | On: Channel 3 input signal is valid | LED Input4 | On: Channel 4 input signal is valid |
| | Off: Channel 3 input signal is invalid | | Off: Channel 4 input signal is invalid |
| LED Input5 | On: Channel 5 input signal is valid | LED Input6 | On: Channel 6 input signal is valid |
| | Off: Channel 5 input signal is invalid | | Off: Channel 6 input signal is invalid |
| LED Input7 | On: Channel 7 input signal is valid | LED Input8 | On: Channel 8 input signal is valid |
| | Off: Channel 7 input signal is invalid | | Off: Channel 8 input signal is invalid |

### 3.2.3 Module process data definition

| Input data: 1 Byte | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Byte 0 | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
| | CH8 | CH7 | CH6 | CH5 | CH4 | CH3 | CH2 | CH1 |

Data description:

CH1~CH8: When the corresponding channel input signal is valid, this position is 1, and when the input is invalid, it is 0.

0: Input signal is invalid

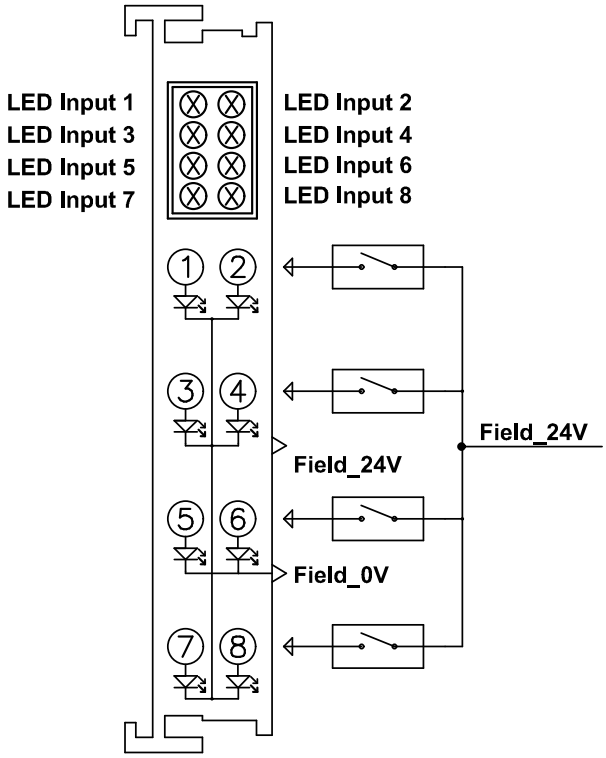
1: Input signal is valid

# 3.3 DF20-M-8DI-P:8-channel digital input modulePNP Type

## 3.3.1 Technical parameters

| **Electrical parameters** | |
|---|---|
| Input Channelsnumber | 8 |
| Input signal type | PNP |
| Input rated voltage | twenty fourV DC |
| logic“0Signal voltage | <5VDC |
| logic“1Signal voltage | >11VDC |
| Typical input current | 3mA |
| System side current consumption | 15mA |
| Input filtering | Default 3ms, 0.2-40ms configurable |
| enterimpedance | >7.5kΩ |
| Module failure alarm | support |
| **General parameters** | |
| Isolation withstand voltage | 500V |
| Vibration Testing | 1g, in accordance with IEC 60068-2-6 |
| Shock Test | 15g, compliant with IEC 60068-2-27 |
| Electromagnetic compatibility testing | Compliant with EN 61000-4standard |
| Protection level | IP20 |
| Operating temperature | -25～75℃ |
| Storage temperature | -40℃~+85℃ |
| Relative humidity | 5～95%RH (no condensation) |
| Installation | 35mm rail mounting |
| Dimensions | 100mm × 12mm × 67mm |
| Maximum crimping area of wire | 2.5mm² |
| Maximum crimping area of wire | AWG14 |
| Minimum crimping area of wire | 0.2mm² |
| Minimum crimping area for wire | AWG28 |
| Line length | 8...9mm |

## 3.3.2 Status indicator light and wiring diagram




The status indicator lights are shown in the table below:

| LED Input No | Status and meaning | LED Input No | Status and meaning |
|---|---|---|---|
| LED Input1 | On: Channel 1 input signal is valid | LED Input2 | On: Channel 2 input signal is valid |
| | Off: Channel 1 input signal is invalid | | Off: Channel 2 input signal is invalid |
| LED Input3 | On: Channel 3 input signal is valid | LED Input4 | On: Channel 4 input signal is valid |
| | Off: Channel 3 input signal is invalid | | Off: Channel 4 input signal is invalid |
| LED Input5 | On: Channel 5 input signal is valid | LED Input6 | On: Channel 6 input signal is valid |
| | Off: Channel 5 input signal is invalid | | Off: Channel 6 input signal is invalid |
| LED Input7 | On: Channel 7 input signal is valid | LED Input8 | On: Channel 8 input signal is valid |
| | Off: Channel 7 input signal is invalid | | Off: Channel 8 input signal is invalid |

## 3.3.3 Module process data definition

| Input data: 1 Byte | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Byte 0 | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
| | CH8 | CH7 | CH6 | CH5 | CH4 | CH3 | CH2 | CH1 |

Data description:

CH1~CH8: When the corresponding channel input signal is valid, this position is 1, and when the input is invalid, it is 0.

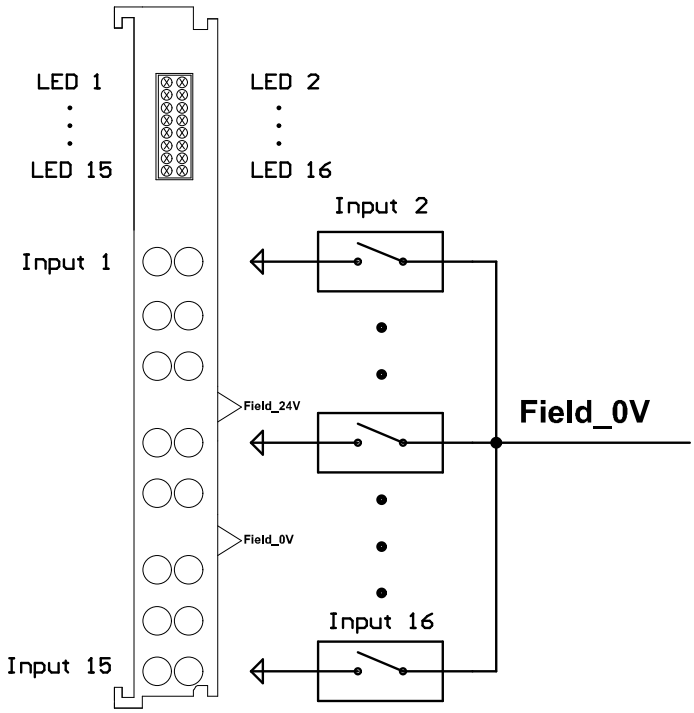
0: Input signal is invalid 1: Input signal is valid

# 3.4 DF20-M-16DI-N:16Channel digital input moduleNPN Type

## 3.4.1 Technical parameters

| **Electrical parameters** | |
|---|---|
| Input Channelsnumber | 16 |
| Input signal type | NPN |
| Input rated voltage | 0V DC |
| logic“0”Signal voltage | >11VDC |
| logic“1”Signal voltage | <5V DC |
| Typical input current | 3mA |
| System side current consumption | 30mA |
| Input filtering | Default 3ms, 0.2-40ms configurable |
| enterimpedance | >7.5kΩ |
| Module failure alarm | support |
| **General parameters** | |
| Isolation withstand voltage | 500V |
| Vibration Testing | 1g, in accordance with IEC 60068-2-6 |
| Shock Test | 15g, compliant with IEC 60068-2-27 |
| Electromagnetic compatibility testing | Compliant with EN 61000-4standard |
| Protection level | IP20 |
| Operating temperature | -25～75℃ |
| Storage temperature | -40℃~+85℃ |
| Relative humidity | 5～95%RH (no condensation) |
| Installation | 35mm rail mounting |
| Dimensions | 100mm × 12mm × 67mm |
| Maximum crimping area of wire | 1.5mm² |
| Maximum crimping area of wire | AWG16 |
| Minimum crimping area of wire | 0.2mm² |
| Minimum crimping area for wire | AWG28 |
| Line length | 8...9mm |

## 3.4.2 Status indicator lights and wiring diagram




The status indicator lights are shown in the table below:

| led No | Status and meaning | led No | Status and meaning |
|---|---|---|---|
| LED1 | On: Channel 1 input signal is valid | LED2 | On: Channel 2 input signal is valid |
| | Off: Channel 1 input signal is invalid | | Off: Channel 2 input signal is invalid |
| LED3 | On: Channel 3 input signal is valid | LED4 | On: Channel 4 input signal is valid |
| | Off: Channel 3 input signal is invalid | | Off: Channel 4 input signal is invalid |
| LED5 | On: Channel 5 input signal is valid | LED6 | On: Channel 6 input signal is valid |
| | Off: Channel 5 input signal is invalid | | Off: Channel 6 input signal is invalid |
| LED7 | On: Channel 7 input signal is valid | LED8 | On: Channel 8 input signal is valid |
| | Off: Channel 7 input signal is invalid | | Off: Channel 8 input signal is invalid |
| LED9 | On: Channel 9 input signal is valid | LED10 | On: Channel 10 input signal is valid |
| | Off: Channel 9 input signal is invalid | | Off: Channel 10 input signal is invalid |

| | | | |
|---|---|---|---|
| LED11 | On: Channel 11 input signal is valid | LED12 | On: Channel 12 input signal is valid |
| | Off: Channel 11 input signal is invalid | | Off: Channel 12 input signal is invalid |
| LED13 | On: Channel 13 input signal is valid | LED14 | On: Channel 14 input signal is valid |
| | Off: Channel 13 input signal is invalid | | Off: Channel 14 input signal is invalid |
| LED15 | On: Channel 15 input signal is valid | LED16 | On: Channel 16 input signal is valid |
| | Off: Channel 15 input signal is invalid | | Off: Channel 16 input signal is invalid |

### 3.4.3 Module process data definition

| Input data: 2 Byte | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Byte 0 | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
| | CH8 | CH7 | CH6 | CH5 | CH4 | CH3 | CH2 | CH1 |
| Byte1 | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
| | CH16 | CH15 | CH14 | CH13 | CH12 | CH11 | CH10 | CH9 |

Data description:

CH1~CH16: When the corresponding channel input signal is valid, this position is 1, and when the input is invalid, it is 0.

0: Input signal is invalid

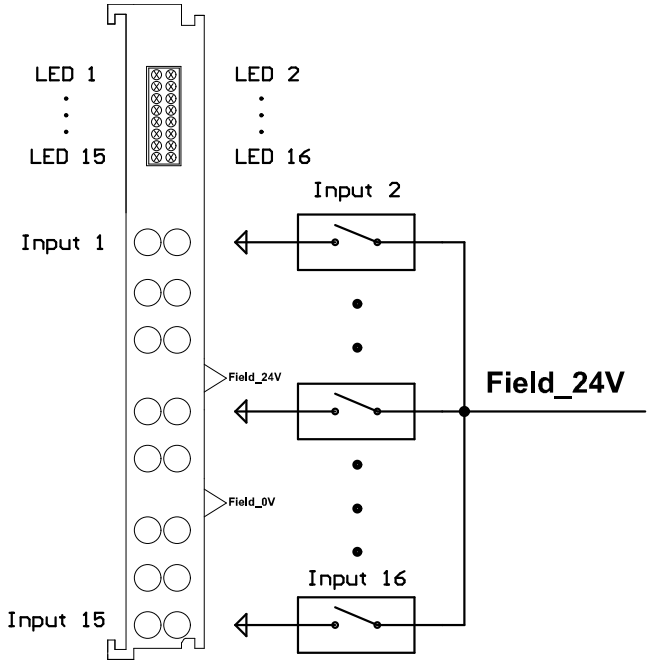
1: Input signal is valid

# 3.5 DF20-M-16DI-P:16Channel digital input modulePNP Type

## 3.5.1 Technical parameters

| **Electrical parameters** | |
|---|---|
| Input Channelsnumber | 16 |
| Input signal type | PNP |
| Input rated voltage | twenty fourV DC |
| logic“0”Signal voltage | <5VDC |
| logic“1”Signal voltage | >11VDC |
| Typical input current | 3mA |
| System side current consumption | 30mA |
| Input filtering | Default 3ms, 0.2-40ms configurable |
| enterimpedance | >7.5kΩ |
| Module failure alarm | support |
| **General parameters** | |
| Isolation withstand voltage | 500V |
| Vibration Testing | 1g, in accordance with IEC 60068-2-6 |
| Shock Test | 15g, compliant with IEC 60068-2-27 |
| Electromagnetic compatibility testing | Compliant with EN 61000-4standard |
| Protection level | IP20 |
| Operating temperature | -25～75℃ |
| Storage temperature | -40℃~+85℃ |
| Relative humidity | 5～95%RH (no condensation) |
| Installation | 35mm rail mounting |
| Dimensions | 100mm × 12mm × 67mm |
| Maximum crimping area of wire | 1.5mm² |
| Maximum crimping area of wire | AWG16 |
| Minimum crimping area of wire | 0.2mm² |
| Minimum crimping area for wire | AWG28 |
| Line length | 8...9mm |

## 3.5.2 Status indicator lights and wiring diagram




The status indicator lights are shown in the table below:

| led No | Status and meaning | led No | Status and meaning |
|---|---|---|---|
| LED1 | On: Channel 1 input signal is valid | LED2 | On: Channel 2 input signal is valid |
| | Off: Channel 1 input signal is invalid | | Off: Channel 2 input signal is invalid |
| LED3 | On: Channel 3 input signal is valid | LED4 | On: Channel 4 input signal is valid |
| | Off: Channel 3 input signal is invalid | | Off: Channel 4 input signal is invalid |
| LED5 | On: Channel 5 input signal is valid | LED6 | On: Channel 6 input signal is valid |
| | Off: Channel 5 input signal is invalid | | Off: Channel 6 input signal is invalid |
| LED7 | On: Channel 7 input signal is valid | LED8 | On: Channel 8 input signal is valid |
| | Off: Channel 7 input signal is invalid | | Off: Channel 8 input signal is invalid |
| LED9 | On: Channel 9 input signal is valid | LED10 | On: Channel 10 input signal is valid |
| | Off: Channel 9 input signal is invalid | | Off: Channel 10 input signal is invalid |
| LED11 | On: Channel 11 input signal is valid | LED12 | On: Channel 12 input signal is |

| | | | |
|---|---|---|---|
| | | | valid |
| | Off: Channel 11 input signal is invalid | | Off: Channel 12 input signal is invalid |
| LED13 | On: Channel 13 input signal is valid | LED14 | On: Channel 14 input signal is valid |
| | Off: Channel 13 input signal is invalid | | Off: Channel 14 input signal is invalid |
| LED15 | On: Channel 15 input signal is valid | LED16 | On: Channel 16 input signal is valid |
| | Off: Channel 15 input signal is invalid | | Off: Channel 16 input signal is invalid |

### 3.5.3 Module process data definition

| Input data: 2 Byte | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Byte 0 | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
| | CH8 | CH7 | CH6 | CH5 | CH4 | CH3 | CH2 | CH1 |
| Byte1 | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
| | CH16 | CH15 | CH14 | CH13 | CH12 | CH11 | CH10 | CH9 |

Data description:

CH1~CH16: When the corresponding channel input signal is valid, this position is 1, and when the input is invalid, it is 0.

0: Input signal is invalid

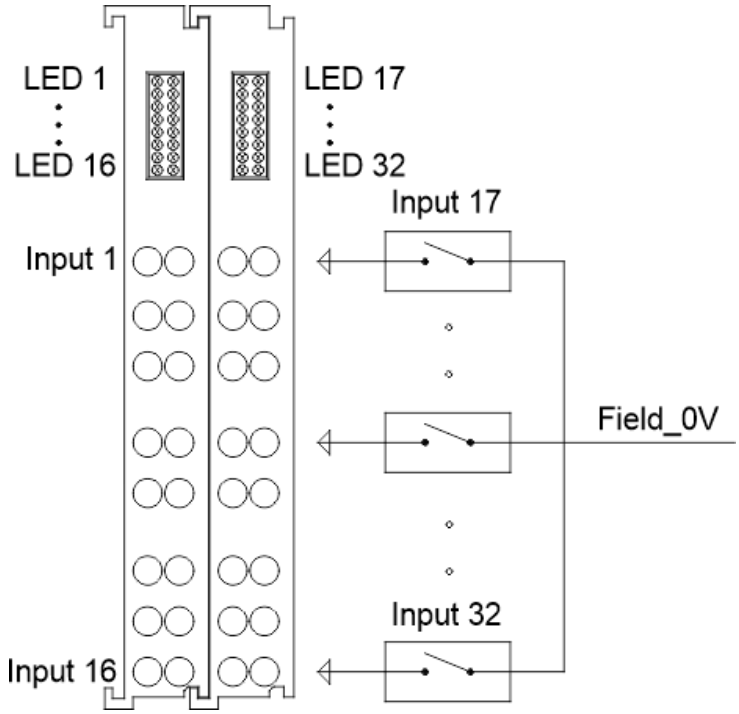
1: Input signal is valid

# 3.6 DF20-M-32DI-N:32Channel digital input moduleNPN Type

## 3.6.1 Technical parameters

| **Electrical parameters** | |
|---|---|
| Input Channelsnumber | 32 |
| Input signal type | NPN |
| Input rated voltage | 0V DC |
| logic“0Signal voltage | >11VDC |
| logic“1Signal voltage | <5V DC |
| Typical input current | 3mA |
| System side current consumption | 65mA |
| Input filtering | Default 3ms, 0.2-40ms configurable |
| enterimpedance | >7.5kΩ |
| Module failure alarm | support |
| **General parameters** | |
| Isolation withstand voltage | 500V |
| Vibration Testing | 1g, in accordance with IEC 60068-2-6 |
| Shock Test | 15g, compliant with IEC 60068-2-27 |
| Electromagnetic compatibility testing | Compliant with EN 61000-4standard |
| Protection level | IP20 |
| Operating temperature | -25～75℃ |
| Storage temperature | -40℃~+85℃ |
| Relative humidity | 5～95%RH (no condensation) |
| Installation | 35mm rail mounting |
| Dimensions | 100mm × 12mm × 67mm |
| Maximum crimping area of wire | 1.5mm² |
| Maximum crimping area of wire | AWG16 |
| Minimum crimping area of wire | 0.2mm² |
| Minimum crimping area for wire | AWG28 |
| Line length | 8...9mm |

## 3.6.2 Status indicator light and wiring diagram




The status indicator lights are shown in the table below:

| led No | Status and meaning | led No | Status and meaning |
|---|---|---|---|
| LED1 | On: Channel 1 input signal is valid | LED2 | On: Channel 2 input signal is valid |
| | Off: Channel 1 input signal is invalid | | Off: Channel 2 input signal is invalid |
| LED3 | On: Channel 3 input signal is valid | LED4 | On: Channel 4 input signal is valid |
| | Off: Channel 3 input signal is invalid | | Off: Channel 4 input signal is invalid |
| LED5 | On: Channel 5 input signal is valid | LED6 | On: Channel 6 input signal is valid |
| | Off: Channel 5 input signal is invalid | | Off: Channel 6 input signal is invalid |
| LED7 | On: Channel 7 input signal is valid | LED8 | On: Channel 8 input signal is valid |
| | Off: Channel 7 input signal is invalid | | Off: Channel 8 input signal is invalid |
| LED9 | On: Channel 9 input signal is valid | LED10 | On: Channel 10 input signal is valid |
| | Off: Channel 9 input signal is invalid | | Off: Channel 10 input signal is invalid |
| LED11 | On: Channel 11 input signal is valid | LED12 | On: Channel 12 input signal is valid |
| | Off: Channel 11 input signal is invalid | | Off: Channel 12 input signal is invalid |
| LED13 | On: Channel 13 input signal is valid | LED14 | On: Channel 14 input signal is valid |
| | Off: Channel 13 input signal is invalid | | Off: Channel 14 input signal is invalid |
| LED15 | On: Channel 15 input signal is valid | LED16 | On: Channel 16 input signal is valid |
| | Off: Channel 15 input signal is invalid | | Off: Channel 16 input signal is invalid |
| LED17 | On: Channel 17 input signal is valid | LED18 | On: Channel 18 input signal is valid |

| | | | |
|---|---|---|---|
| | Off: Channel 17 input signal is invalid | | Off: Channel 18 input signal is invalid |
| LED19 | On: Channel 19 input signal is valid | LED20 | On: Channel 20 input signal is valid |
| | Off: Channel 19 input signal is invalid | | Off: Channel 20 input signal is invalid |
| LED21 | On: Channel 21 input signal is valid | LED22 | On: Channel 22 input signal is valid |
| | Off: Channel 21 input signal is invalid | | Off: Channel 22 input signal is invalid |
| LED23 | On: Channel 23 input signal is valid | LED24 | On: Channel 24 input signal is valid |
| | Off: Channel 23 input signal is invalid | | Off: Channel 24 input signal is invalid |
| LED25 | On: Channel 25 input signal is valid | LED26 | On: Channel 26 input signal is valid |
| | Off: Channel 25 input signal is invalid | | Off: Channel 26 input signal is invalid |
| LED27 | On: Channel 27 input signal is valid | LED28 | On: Channel 28 input signal is valid |
| | Off: Channel 27 input signal is invalid | | Off: Channel 28 input signal is invalid |
| LED29 | On: Channel 29 input signal is valid | LED30 | On: Channel 30 input signal is valid |
| | Off: Channel 29 input signal is invalid | | Off: Channel 30 input signal is invalid |
| LED31 | On: Channel 31 input signal is valid | LED32 | On: Channel 32 input signal is valid |
| | Off: Channel 31 input signal is invalid | | Off: Channel 32 input signal is invalid |

### 3.6.3 Module process data definition

| Input data: 4 Byte | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Byte 0 | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
| | CH8 | CH7 | CH6 | CH5 | CH4 | CH3 | CH2 | CH1 |
| Byte1 | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
| | CH16 | CH15 | CH14 | CH13 | CH12 | CH11 | CH10 | CH9 |
| Byte2 | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
| | CH24 | CH23 | CH22 | CH21 | CH20 | CH19 | CH18 | CH17 |
| Byte3 | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
| | CH32 | CH31 | CH30 | CH29 | CH28 | CH27 | CH26 | CH25 |

Data description:

CH1~CH32: When the corresponding channel input signal is valid, this position is 1, and when the input is invalid, it is 0.

0: Input signal is invalid

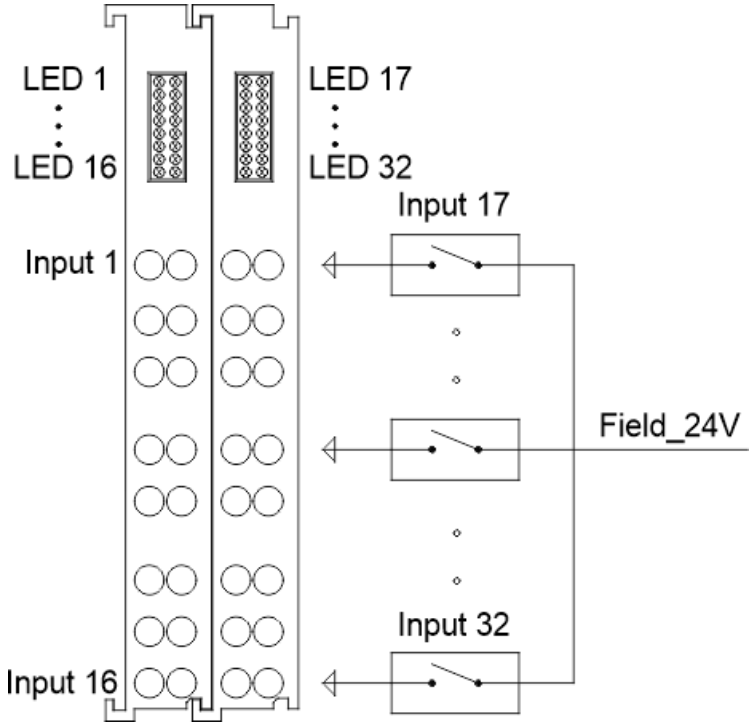
1: Input signal is valid

# 3.7 DF20-M-32DI-P:32Channel digital input modulePNP Type

## 3.7.1 Technical parameters

| **Electrical parameters** | |
|---|---|
| Input Channelsnumber | 32 |
| Input signal type | PNP |
| Input rated voltage | twenty fourV DC |
| logic“0Signal voltage | <5VDC |
| logic“1Signal voltage | >11VDC |
| Typical input current | 3mA |
| System side current consumption | 65mA |
| Input filtering | Default 3ms, 0.2-40ms configurable |
| enterimpedance | >7.5kΩ |
| Module failure alarm | support |
| **General parameters** | |
| Isolation withstand voltage | 500V |
| Vibration Testing | 1g, in accordance with IEC 60068-2-6 |
| Shock Test | 15g, compliant with IEC 60068-2-27 |
| Electromagnetic compatibility testing | Compliant with EN 61000-4standard |
| Protection level | IP20 |
| Operating temperature | -25～75℃ |
| Storage temperature | -40℃~+85℃ |
| Relative humidity | 5～95%RH (no condensation) |
| Installation | 35mm rail mounting |
| Dimensions | 100mm × 12mm × 67mm |
| Maximum crimping area of wire | 1.5mm² |
| Maximum crimping area of wire | AWG16 |
| Minimum crimping area of wire | 0.2mm² |
| Minimum crimping area for wire | AWG28 |
| Line length | 8...9mm |

### 3.7.2 Status indicator light and wiring diagram




The status indicator lights are shown in the table below:

| led No | Status and meaning | led No | Status and meaning |
|---|---|---|---|
| LED1 | On: Channel 1 input signal is valid | LED2 | On: Channel 2 input signal is valid |
| | Off: Channel 1 input signal is invalid | | Off: Channel 2 input signal is invalid |
| LED3 | On: Channel 3 input signal is valid | LED4 | On: Channel 4 input signal is valid |
| | Off: Channel 3 input signal is invalid | | Off: Channel 4 input signal is invalid |
| LED5 | On: Channel 5 input signal is valid | LED6 | On: Channel 6 input signal is valid |
| | Off: Channel 5 input signal is invalid | | Off: Channel 6 input signal is invalid |
| LED7 | On: Channel 7 input signal is valid | LED8 | On: Channel 8 input signal is valid |
| | Off: Channel 7 input signal is invalid | | Off: Channel 8 input signal is invalid |
| LED9 | On: Channel 9 input signal is valid | LED10 | On: Channel 10 input signal is valid |
| | Off: Channel 9 input signal is invalid | | Off: Channel 10 input signal is |

| | | | |
|---|---|---|---|
| | | | invalid |
| LED11 | On: Channel 11 input signal is valid | LED12 | On: Channel 12 input signal is valid |
| | Off: Channel 11 input signal is invalid | | Off: Channel 12 input signal is invalid |
| LED13 | On: Channel 13 input signal is valid | LED14 | On: Channel 14 input signal is valid |
| | Off: Channel 13 input signal is invalid | | Off: Channel 14 input signal is invalid |
| LED15 | On: Channel 15 input signal is valid | LED16 | On: Channel 16 input signal is valid |
| | Off: Channel 15 input signal is invalid | | Off: Channel 16 input signal is invalid |
| LED17 | On: Channel 17 input signal is valid | LED18 | On: Channel 18 input signal is valid |
| | Off: Channel 17 input signal is invalid | | Off: Channel 18 input signal is invalid |
| LED19 | On: Channel 19 input signal is valid | LED20 | On: Channel 20 input signal is valid |
| | Off: Channel 19 input signal is invalid | | Off: Channel 20 input signal is invalid |
| LED21 | On: Channel 21 input signal is valid | LED22 | On: Channel 22 input signal is valid |
| | Off: Channel 21 input signal is invalid | | Off: Channel 22 input signal is invalid |
| LED23 | On: Channel 23 input signal is valid | LED24 | On: Channel 24 input signal is valid |
| | Off: Channel 23 input signal is invalid | | Off: Channel 24 input signal is invalid |
| LED25 | On: Channel 25 input signal is valid | LED26 | On: Channel 26 input signal is valid |

| | | | |
|---|---|---|---|
| | Off: Channel 25 input signal is invalid | | Off: Channel 26 input signal is invalid |
| LED27 | On: Channel 27 input signal is valid | LED28 | On: Channel 28 input signal is valid |
| | Off: Channel 27 input signal is invalid | | Off: Channel 28 input signal is invalid |
| LED29 | On: Channel 29 input signal is valid | LED30 | On: Channel 30 input signal is valid |
| | Off: Channel 29 input signal is invalid | | Off: Channel 30 input signal is invalid |
| LED31 | On: Channel 31 input signal is valid | LED32 | On: Channel 32 input signal is valid |
| | Off: Channel 31 input signal is invalid | | Off: Channel 32 input signal is invalid |

### 3.7.3 Module process data definition

| Input data: 4 Byte | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Byte 0 | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
| | CH8 | CH7 | CH6 | CH5 | CH4 | CH3 | CH2 | CH1 |
| Byte1 | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
| | CH16 | CH15 | CH14 | CH13 | CH12 | CH11 | CH10 | CH9 |
| Byte2 | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
| | CH24 | CH23 | CH22 | CH21 | CH20 | CH19 | CH18 | CH17 |
| Byte3 | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
| | CH32 | CH31 | CH30 | CH29 | CH28 | CH27 | CH26 | CH25 |

Data description:

CH1~CH32: When the corresponding channel input signal is valid, this position is 1, and when the input is invalid, it is 0.

0: Input signal is invalid

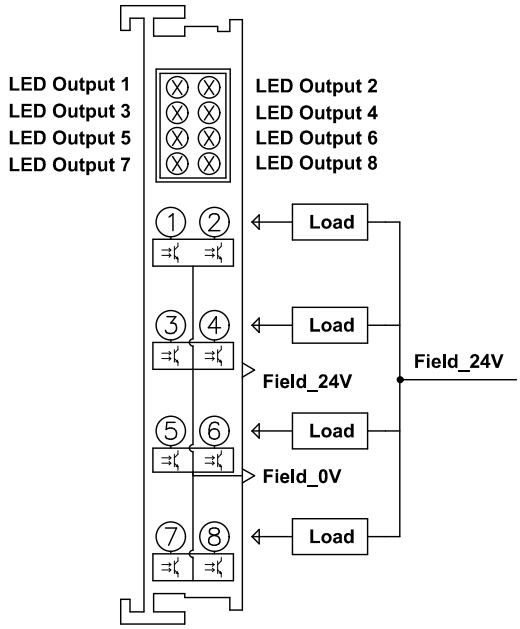
1: Input signal is valid

# 3.8 DF20-M-8DO-N:8-channel digital inputoutModulesNPN Type

## 3.8.1 Technical parameters

| **Electrical parameters** | |
|---|---|
| loseoutaislenumber | 8 |
| loseoutSignal Type | NPN |
| logic“0"SignalVoltage | High impedance |
| logic“1"SignalVoltage | 0V DC |
| Maximum output current | 0.5A/channel, 3A/module |
| System side current consumption | 50mA |
| Maximum short circuit protection | 2A |
| Load Type | Sensibilityload, Resistiveload,lamplоad |
| Reverse voltage protection | support |
| Module failure alarm | support |
| **General parameters** | |
| Isolation withstand voltage | 500V |
| Vibration Testing | 1g, in accordance with IEC 60068-2-6 |
| Shock Test | 15g, compliant with IEC 60068-2-27 |
| Electromagnetic compatibility testing | Compliant with EN 61000-4standard |
| Protection level | IP20 |
| Operating temperature | -25～75℃ |
| Storage temperature | -40℃~+85℃ |
| Relative humidity | 5～95%RH (no condensation) |
| Installation | 35mm rail mounting |
| Dimensions | 100mm × 12mm × 67mm |
| Maximum crimping area of wire | 2.5mm² |
| Maximum crimping area of wire | AWG14 |
| Minimum crimping area of wire | 0.2mm² |
| Minimum crimping area for wire | AWG28 |
| Line length | 8...9mm |

## 3.8.2 Status indicator light and wiring diagram




The status indicator lights are shown in the table below:

| led No | Status and meaning | led No | Status and meaning |
|---|---|---|---|
| LED 1 | On: Channel 1 output is valid | LED 2 | On: Channel 2 output is valid |
| | Off: Channel 1 output is invalid | | Off: Channel 2 output is invalid |
| LED 3 | On: Channel 3 output is valid | LED 4 | On: Channel 4 output is valid |
| | Off: Channel 3 output is invalid | | Off: Channel 4 output is invalid |
| LED 5 | On: Channel 5 output is valid | LED 6 | On: Channel 6 output is valid |
| | Off: Channel 3 output is invalid | | Off: Channel 6 output is invalid |
| LED 7 | On: Channel 7 output is valid | LED 8 | On: Channel 8 output is valid |
| | Off: Channel 7 output is invalid | | Off: Channel 8 output is invalid |

## 3.8.3 Module process data definition

| Output data: 1 Byte | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Byte 0 | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
| | CH8 | CH7 | CH6 | CH5 | CH4 | CH3 | CH2 | CH1 |

Data description:

CH1~CH8: When this position is 1, the corresponding channel output signal is valid, and the outputVoltageWhen it is 0V, the output is invalid.VoltageIt is in high impedance state.

0: Output signal is invalid.

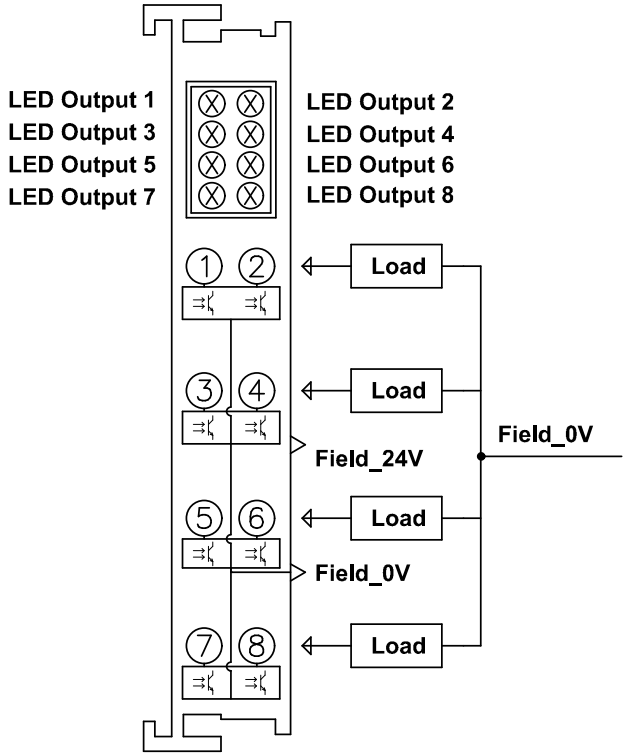
1: Output signal is valid.

# 3.9 DF20-M-8DO-P:8-channel digital inputoutModulesPNP Type

## 3.9.1 Technical parameters

| **Electrical parameters** | |
|---|---|
| loseoutaislenumber | 8 |
| loseoutSignal Type | PNP |
| logic“0"SignalVoltage | High impedance |
| logic“1"SignalVoltage | twenty fourV DC |
| Maximum output current | 0.5A/channel, 3A/module |
| System side current consumption | 50mA |
| Maximum short circuit protection | 2A |
| Load Type | Sensibilityload, Resistiveload,lampload |
| Reverse voltage protection | support |
| Module failure alarm | support |
| **General parameters** | |
| Isolation withstand voltage | 500V |
| Vibration Testing | 1g, in accordance with IEC 60068-2-6 |
| Shock Test | 15g, compliant with IEC 60068-2-27 |
| Electromagnetic compatibility testing | Compliant with EN 61000-4standard |
| Protection level | IP20 |
| Operating temperature | -25～75℃ |
| Storage temperature | -40℃~+85℃ |
| Relative humidity | 5～95%RH (no condensation) |
| Installation | 35mm rail mounting |
| Dimensions | 100mm × 12mm × 67mm |
| Maximum crimping area of wire | 2.5mm² |
| Maximum crimping area of wire | AWG14 |
| Minimum crimping area of wire | 0.2mm² |
| Minimum crimping area for wire | AWG28 |
| Line length | 8...9mm |

## 3.9.2 Status indicator light and wiring diagram




The status indicator lights are shown in the table below:

| LED No | Status and meaning | LED No | Status and meaning |
|---|---|---|---|
| LED 1 | On: Channel 1 output is valid | LED 2 | On: Channel 2 output is valid |
| | Off: Channel 1 output is invalid | | Off: Channel 2 output is invalid |
| LED 3 | On: Channel 3 output is valid | LED 4 | On: Channel 4 output is valid |
| | Off: Channel 3 output is invalid | | Off: Channel 4 output is invalid |
| LED 5 | On: Channel 5 output is valid | LED 6 | On: Channel 6 output is valid |
| | Off: Channel 3 output is invalid | | Off: Channel 6 output is invalid |
| LED 7 | On: Channel 7 output is valid | LED 8 | On: Channel 8 output is valid |
| | Off: Channel 7 output is invalid | | Off: Channel 8 output is invalid |

## 3.9.3 Module process data definition

| Output data: 1 Byte | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Byte 0 | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
| | CH8 | CH7 | CH6 | CH5 | CH4 | CH3 | CH2 | CH1 |

Data description:

CH1~CH8: When this position is 1, the corresponding channel output signal is valid, and the outputVoltagefortwenty fourWhen V is 0, the output is invalid.VoltageIt is in high impedance state.

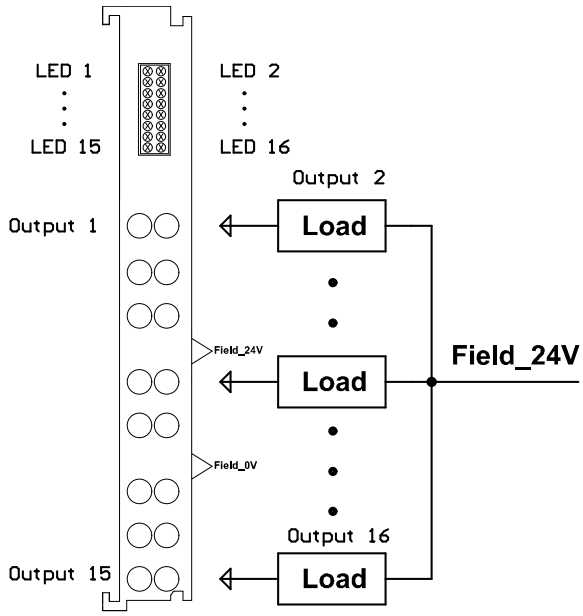
0: Output signal is invalid. 1: Output signal is valid.

# 3.10 DF20-M-16DO-N:16Channel digital inputoutModulesNPN Type

## 3.10.1 Technical parameters

| **Electrical parameters** | |
|---|---|
| loseoutaislenumber | 16 |
| loseoutSignal Type | NPN |
| logic“0”Signal voltage | High impedance |
| logic“1”Signal voltage | 0V DC |
| Maximum output current | 0.5A/channel, 6A/module |
| System side current consumption | 75mA |
| Maximum short circuit protection | 2A |
| Load Type | Sensibilityload, Resistiveload,lamplоad |
| Reverse voltage protection | support |
| Module failure alarm | support |
| **General parameters** | |
| Isolation withstand voltage | 500V |
| Vibration Testing | 1g, in accordance with IEC 60068-2-6 |
| Shock Test | 15g, compliant with IEC 60068-2-27 |
| Electromagnetic compatibility testing | Compliant with EN 61000-4standard |
| Protection level | IP20 |
| Operating temperature | -25～75℃ |
| Storage temperature | -40℃~+85℃ |
| Relative humidity | 5～95%RH (no condensation) |
| Installation | 35mm rail mounting |
| Dimensions | 100mm × 12mm × 67mm |
| Maximum crimping area of wire | 1.5mm² |
| Maximum crimping area of wire | AWG16 |
| Minimum crimping area of wire | 0.2mm² |
| Minimum crimping area for wire | AWG28 |
| Line length | 8...9mm |

## 3.10.2 Status indicator lights and wiring diagram




The status indicator lights are shown in the table below:

| led No | Status and meaning | led No | Status and meaning |
|---|---|---|---|
| LED1 | On: Channel 1 output is valid | LED2 | On: Channel 2 output is valid |
| | Off: Channel 1 output is invalid | | Off: Channel 2 output is invalid |
| LED3 | On: Channel 3 output is valid | LED4 | On: Channel 4 output is valid |
| | Off: Channel 3 output is invalid | | Off: Channel 4 output is invalid |
| LED5 | On: Channel 5 output is valid | LED6 | On: Channel 6 output is valid |
| | Off: Channel 5 output is invalid | | Off: Channel 6 output is invalid |
| LED7 | On: Channel 7 output is valid | LED8 | On: Channel 8 output is valid |
| | Off: Channel 7 output is invalid | | Off: Channel 8 output is invalid |
| LED9 | On: Channel 9 output is valid | LED10 | On: Channel 10 output is valid |
| | Off: Channel 9 output is invalid | | Off: Channel 10 output is invalid |
| LED11 | On: Channel 11 output is valid | LED12 | On: Channel 12 output is valid |
| | Off: Channel 11 output is invalid | | Off: Channel 12 output is invalid |
| LED13 | On: Channel 13 output is valid | LED14 | On: Channel 14 output is valid |
| | Off: Channel 13 output is invalid | | Off: Channel 14 output is invalid |
| LED15 | On: Channel 15 output is valid | LED16 | On: Channel 16 output is valid |
| | Off: Channel 15 output is invalid | | Off: Channel 16 output is invalid |

### 3.10.3 Module process data definition

| Output data: 2 Byte | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Byte 0 | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
| | CH8 | CH7 | CH6 | CH5 | CH4 | CH3 | CH2 | CH1 |
| Byte1 | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
| | CH16 | CH15 | CH14 | CH13 | CH12 | CH11 | CH10 | CH9 |

Data description:

CH1~CH16: When this position is 1, the corresponding channel output signal is valid, and the outputVoltageWhen it is 0V, the output is invalid.VoltageIt is in high impedance state.

0: Output signal is invalid.

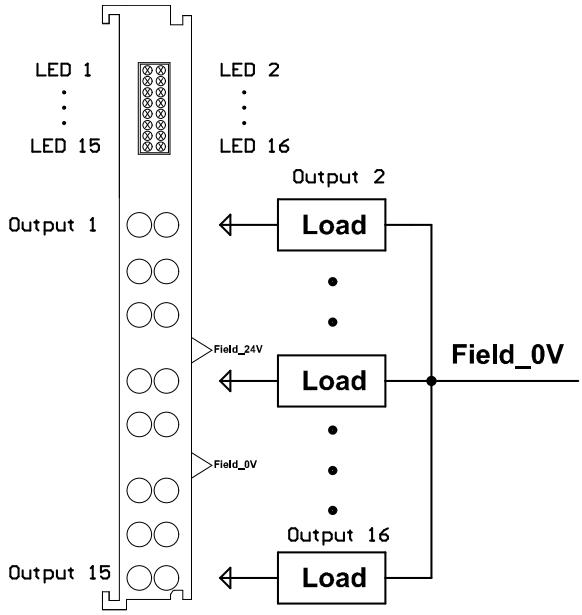
1: Output signal is valid.

# 3.11 DF20-M-16DO-P:16Channel digital inputoutModulesPNP Type

## 3.11.1 Technical parameters

| **Electrical parameters** | |
|---|---|
| loseoutaislenumber | 16 |
| loseoutSignal Type | PNP |
| logic“0”Signal voltage | High impedance |
| logic“1”Signal voltage | twenty fourV DC |
| Maximum output current | 0.5A/channel, 6A/module |
| System side current consumption | 75mA |
| Maximum short circuit protection | 2A |
| Load Type | Sensibilityload, Resistiveload,lampload |
| Reverse voltage protection | support |
| Module failure alarm | support |
| **General parameters** | |
| Isolation withstand voltage | 500V |
| Vibration Testing | 1g, in accordance with IEC 60068-2-6 |
| Shock Test | 15g, compliant with IEC 60068-2-27 |
| Electromagnetic compatibility testing | Compliant with EN 61000-4standard |
| Protection level | IP20 |
| Operating temperature | -25～75℃ |
| Storage temperature | -40℃~+85℃ |
| Relative humidity | 5～95%RH (no condensation) |
| Installation | 35mm rail mounting |
| Dimensions | 100mm × 12mm × 67mm |
| Maximum crimping area of wire | 1.5mm² |
| Maximum crimping area of wire | AWG16 |
| Minimum crimping area of wire | 0.2mm² |
| Minimum crimping area for wire | AWG28 |
| Line length | 8...9mm |

## 3.11.2 Status indicator lights and wiring diagram




The status indicator lights are shown in the table below:

| led No | Status and meaning | led No | Status and meaning |
|---|---|---|---|
| LED1 | On: Channel 1 output is valid | LED2 | On: Channel 2 output is valid |
| | Off: Channel 1 output is invalid | | Off: Channel 2 output is invalid |
| LED3 | On: Channel 3 output is valid | LED4 | On: Channel 4 output is valid |
| | Off: Channel 3 output is invalid | | Off: Channel 4 output is invalid |
| LED5 | On: Channel 5 output is valid | LED6 | On: Channel 6 output is valid |
| | Off: Channel 5 output is invalid | | Off: Channel 6 output is invalid |
| LED7 | On: Channel 7 output is valid | LED8 | On: Channel 8 output is valid |
| | Off: Channel 7 output is invalid | | Off: Channel 8 output is invalid |
| LED9 | On: Channel 9 output is valid | LED10 | On: Channel 10 output is valid |
| | Off: Channel 9 output is invalid | | Off: Channel 10 output is invalid |
| LED11 | On: Channel 11 output is valid | LED12 | On: Channel 12 output is valid |
| | Off: Channel 11 output is invalid | | Off: Channel 12 output is invalid |
| LED13 | On: Channel 13 output is valid | LED14 | On: Channel 14 output is valid |
| | Off: Channel 13 output is invalid | | Off: Channel 14 output is invalid |
| LED15 | On: Channel 15 output is valid | LED16 | On: Channel 16 output is valid |
| | Off: Channel 15 output is invalid | | Off: Channel 16 output is invalid |

### 3.11.3 Module process data definition

| Output data: 2 Byte | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Byte 0 | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
| | CH8 | CH7 | CH6 | CH5 | CH4 | CH3 | CH2 | CH1 |
| Byte1 | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
| | CH16 | CH15 | CH14 | CH13 | CH12 | CH11 | CH10 | CH9 |

Data description:

CH1~CH16: When this position is 1, the corresponding channel output signal is valid, and the outputVoltagefortwenty fourWhen V is 0, the output is invalid.VoltageIt is in high impedance state.

0: Output signal is invalid.

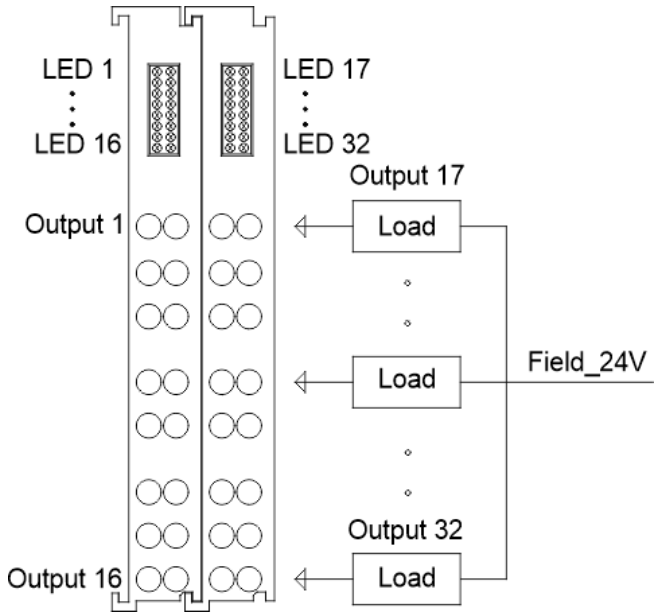
1: Output signal is valid.

# 3.12 DF20-M-32DO-N:32Channel digital inputoutModulesNPN Type

## 3.12.1 Technical parameters

| **Electrical parameters** | |
|---|---|
| loseoutaislenumber | 32 |
| loseoutSignal Type | NPN |
| logic“0”Signal voltage | High impedance |
| logic“1”Signal voltage | 0V DC |
| Maximum output current | 0.5A/channel, 12A/module |
| System side current consumption | 130mA |
| Maximum short circuit protection | 2A |
| Load Type | Sensibilityload, Resistiveload,lamplоad |
| Reverse voltage protection | support |
| Module failure alarm | support |
| **General parameters** | |
| Isolation withstand voltage | 500V |
| Vibration Testing | 1g, in accordance with IEC 60068-2-6 |
| Shock Test | 15g, compliant with IEC 60068-2-27 |
| Electromagnetic compatibility testing | Compliant with EN 61000-4standard |
| Protection level | IP20 |
| Operating temperature | -25～75℃ |
| Storage temperature | -40℃~+85℃ |
| Relative humidity | 5～95%RH (no condensation) |
| Installation | 35mm rail mounting |
| Dimensions | 100mm × 12mm × 67mm |
| Maximum crimping area of wire | 1.5mm² |
| Maximum crimping area of wire | AWG16 |
| Minimum crimping area of wire | 0.2mm² |
| Minimum crimping area for wire | AWG28 |
| Line length | 8...9mm |

## 3.12.2 Status indicator lights and wiring diagram




The status indicator lights are shown in the table below:

| led No | Status and meaning | led No | Status and meaning |
|---|---|---|---|
| LED1 | On: Channel 1 output is valid | LED2 | On: Channel 2 output is valid |
| | Off: Channel 1 output is invalid | | Off: Channel 2 output is invalid |
| LED3 | On: Channel 3 output is valid | LED4 | On: Channel 4 output is valid |
| | Off: Channel 3 output is invalid | | Off: Channel 4 output is invalid |
| LED5 | On: Channel 5 output is valid | LED6 | On: Channel 6 output is valid |
| | Off: Channel 5 output is invalid | | Off: Channel 6 output is invalid |
| LED7 | On: Channel 7 output is valid | LED8 | On: Channel 8 output is valid |
| | Off: Channel 7 output is invalid | | Off: Channel 8 output is invalid |
| LED9 | On: Channel 9 output is valid | LED10 | On: Channel 10 output is valid |
| | Off: Channel 9 output is invalid | | Off: Channel 10 output is invalid |
| LED11 | On: Channel 11 output is valid | LED12 | On: Channel 12 output is valid |
| | Off: Channel 11 output is invalid | | Off: Channel 12 output is invalid |
| LED13 | On: Channel 13 output is valid | LED14 | On: Channel 14 output is valid |
| | Off: Channel 13 output is invalid | | Off: Channel 14 output is invalid |
| LED15 | On: Channel 15 output is valid | LED16 | On: Channel 16 output is valid |
| | Off: Channel 15 output is invalid | | Off: Channel 16 output is invalid |
| LED17 | On: Channel 17 output is valid | LED18 | On: Channel 18 output is valid |

| | | | |
|---|---|---|---|
| | Off: Channel 17 output is invalid | | Off: Channel 18 output is invalid |
| LED19 | On: Channel 19 output is valid | LED20 | On: Channel 20 output is valid |
| | Off: Channel 19 output is invalid | | Off: Channel 20 output is invalid |
| LED21 | On: Channel 21 output is valid | LED22 | On: Channel 22 output is valid |
| | Off: Channel 21 output is invalid | | Off: Channel 22 output is invalid |
| LED23 | On: Channel 23 output is valid | LED24 | On: Channel 24 output is valid |
| | Off: Channel 23 output is invalid | | Off: Channel 24 output is invalid |
| LED25 | On: Channel 25 output is valid | LED26 | On: Channel 26 output is valid |
| | Off: Channel 25 output is invalid | | Off: Channel 26 output is invalid |
| LED27 | On: Channel 27 output is valid | LED28 | On: Channel 28 output is valid |
| | Off: Channel 27 output is invalid | | Off: Channel 28 output is invalid |
| LED29 | On: Channel 29 output is valid | LED30 | On: Channel 30 output is valid |
| | Off: Channel 29 output is invalid | | Off: Channel 30 output is invalid |
| LED31 | On: Channel 31 output is valid | LED32 | On: Channel 32 output is valid |
| | Off: Channel 31 output is invalid | | Off: Channel 32 output is invalid |

### 3.12.3 Module process data definition

| Output data: 4 Byte | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Byte 0 | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
| | CH8 | CH7 | CH6 | CH5 | CH4 | CH3 | CH2 | CH1 |
| Byte1 | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
| | CH16 | CH15 | CH14 | CH13 | CH12 | CH11 | CH10 | CH9 |
| Byte2 | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
| | CH24 | CH23 | CH22 | CH21 | CH20 | CH19 | CH18 | CH17 |
| Byte3 | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
| | CH32 | CH31 | CH30 | CH29 | CH28 | CH27 | CH26 | CH25 |

Data description:

CH1~CH32: When this position is 1, the corresponding channel output signal is valid, and the outputVoltageWhen it is 0V, the output is invalid.VoltageIt is in high impedance state.

0: Output signal is invalid.

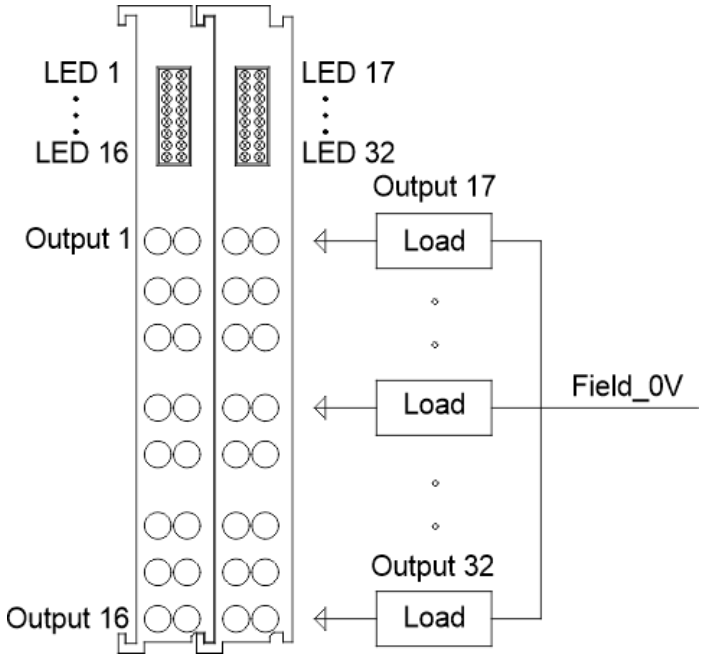
1: Output signal is valid.

# 3.13 DF20-M-32DO-P:32Channel digital inputoutModulesPNP-Type

## 3.13.1 Technical parameters

| **Electrical parameters** | |
|---|---|
| loseoutaislenumber | 32 |
| loseoutSignal Type | PNP |
| logic“0”Signal voltage | High impedance |
| logic“1”Signal voltage | twenty fourV DC |
| Maximum output current | 0.5A/channel, 12A/module |
| System side current consumption | 130mA |
| Maximum short circuit protection | 2A |
| Load Type | Sensibilityload, Resistiveload,lampload |
| Reverse voltage protection | support |
| Module failure alarm | support |
| **General parameters** | |
| Isolation withstand voltage | 500V |
| Vibration Testing | 1g, in accordance with IEC 60068-2-6 |
| Shock Test | 15g, compliant with IEC 60068-2-27 |
| Electromagnetic compatibility testing | Compliant with EN 61000-4standard |
| Protection level | IP20 |
| Operating temperature | -25～75℃ |
| Storage temperature | -40℃~+85℃ |
| Relative humidity | 5～95%RH (no condensation) |
| Installation | 35mm rail mounting |
| Dimensions | 100mm × 12mm × 67mm |
| Maximum crimping area of wire | 1.5mm² |
| Maximum crimping area of wire | AWG16 |
| Minimum crimping area of wire | 0.2mm² |
| Minimum crimping area for wire | AWG28 |
| Line length | 8...9mm |

## 3.13.2 Status indicator lights and wiring diagram




The status indicator lights are shown in the table below:

| led No | Status and meaning | led No | Status and meaning |
|---|---|---|---|
| LED1 | On: Channel 1 output is valid | LED2 | On: Channel 2 output is valid |
| | Off: Channel 1 output is invalid | | Off: Channel 2 output is invalid |
| LED3 | On: Channel 3 output is valid | LED4 | On: Channel 4 output is valid |
| | Off: Channel 3 output is invalid | | Off: Channel 4 output is invalid |
| LED5 | On: Channel 5 output is valid | LED6 | On: Channel 6 output is valid |
| | Off: Channel 5 output is invalid | | Off: Channel 6 output is invalid |
| LED7 | On: Channel 7 output is valid | LED8 | On: Channel 8 output is valid |
| | Off: Channel 7 output is invalid | | Off: Channel 8 output is invalid |
| LED9 | On: Channel 9 output is valid | LED10 | On: Channel 10 output is valid |
| | Off: Channel 9 output is invalid | | Off: Channel 10 output is invalid |
| LED11 | On: Channel 11 output is valid | LED12 | On: Channel 12 output is valid |
| | Off: Channel 11 output is invalid | | Off: Channel 12 output is invalid |
| LED13 | On: Channel 13 output is valid | LED14 | On: Channel 14 output is valid |
| | Off: Channel 13 output is invalid | | Off: Channel 14 output is invalid |
| LED15 | On: Channel 15 output is valid | LED16 | On: Channel 16 output is valid |
| | Off: Channel 15 output is invalid | | Off: Channel 16 output is invalid |
| LED17 | On: Channel 17 output is valid | LED18 | On: Channel 18 output is valid |

| | | | |
|---|---|---|---|
| | Off: Channel 17 output is invalid | | Off: Channel 18 output is invalid |
| LED19 | On: Channel 19 output is valid | LED20 | On: Channel 20 output is valid |
| | Off: Channel 19 output is invalid | | Off: Channel 20 output is invalid |
| LED21 | On: Channel 21 output is valid | LED22 | On: Channel 22 output is valid |
| | Off: Channel 21 output is invalid | | Off: Channel 22 output is invalid |
| LED23 | On: Channel 23 output is valid | LED24 | On: Channel 24 output is valid |
| | Off: Channel 23 output is invalid | | Off: Channel 24 output is invalid |
| LED25 | On: Channel 25 output is valid | LED26 | On: Channel 26 output is valid |
| | Off: Channel 25 output is invalid | | Off: Channel 26 output is invalid |
| LED27 | On: Channel 27 output is valid | LED28 | On: Channel 28 output is valid |
| | Off: Channel 27 output is invalid | | Off: Channel 28 output is invalid |
| LED29 | On: Channel 29 output is valid | LED30 | On: Channel 30 output is valid |
| | Off: Channel 29 output is invalid | | Off: Channel 30 output is invalid |
| LED31 | On: Channel 31 output is valid | LED32 | On: Channel 32 output is valid |
| | Off: Channel 31 output is invalid | | Off: Channel 32 output is invalid |

### 3.13.3 Module process data definition

Data description:

| Output data: 4 Byte | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Byte 0 | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
| | CH8 | CH7 | CH6 | CH5 | CH4 | CH3 | CH2 | CH1 |
| Byte1 | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
| | CH16 | CH15 | CH14 | CH13 | CH12 | CH11 | CH10 | CH9 |
| Byte2 | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
| | CH24 | CH23 | CH22 | CH21 | CH20 | CH19 | CH18 | CH17 |
| Byte3 | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
| | CH32 | CH31 | CH30 | CH29 | CH28 | CH27 | CH26 | CH25 |

CH1~CH32: When this position is 1, the corresponding channel output signal is valid, and the outputVoltagefortwenty fourWhen V is 0, the output is invalid.VoltageIt is in high impedance state.

0: Output signal is invalid.

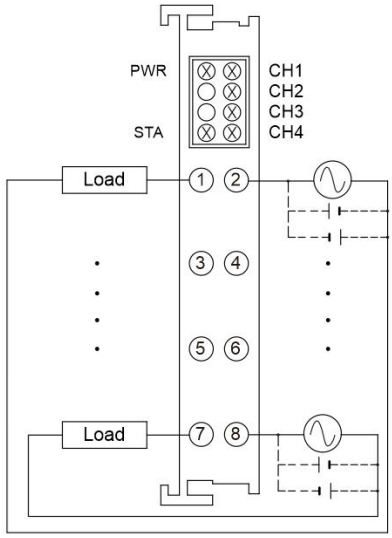
1: Output signal is valid.

# 3.14 DF20-M-4DO-R: 4-channel relay output module

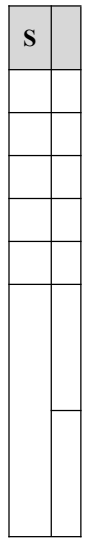
## 3.14.1 Technical parameters

| | |
|---|---|
| **Electrical parameters** | |
| Number of channels | 4 |
| Contact Type | NO contact |
| Maximum output current | 5A/channel, 20A/module |
| System side current consumption | 20mA |
| Maximum switching voltage | 250VAC/30VDC |
| Output Impedance | <200mΩ |
| Action time | ≤15ms |
| Release time | ≤15ms |
| Reverse circuit protection | support |
| Communication error diagnosis | support |
| **General parameters** | |
| Vibration Testing | 1g, in accordance with IEC 60068-2-6 |
| Shock Test | 15g, compliant with IEC 60068-2-27 |
| Electromagnetic compatibility testing | Complies with EN 61000-4 |
| Protection level | IP20 |
| Operating temperature | -25～75℃ |
| storage temperature | -40℃~+85℃ |
| Relative humidity | 5～95%RH (no condensation) |
| Installation | 35mm rail mounting |
| Dimensions | 100mm × 12mm × 67mm |
| Maximum crimping area of wire | 1.5mm² |
| Maximum crimping area of wire | AWG16 |
| Minimum crimping area of wire | 0.2mm² |
| Minimum crimping area for wire | AWG28 |
| Stripping length | 8...9mm |

### 3.14.2 Status indicator lights and wiring diagram




The status indicator lights are shown in the table below:




### 3.14.3 Module process data definition

| Output data: 1 Byte | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Byte 0 | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
| | / | / | / | / | CH4 | CH3 | CH2 | CH1 |

Data description:

CH1~CH4:When this position is set to 1,Corresponding channelOutputThe signal is valid.The channel relay is energized. When the position is 0,Corresponding channelOutputSignalnoneeffect, the relay is disconnected

0: LoseoutInvalid signal

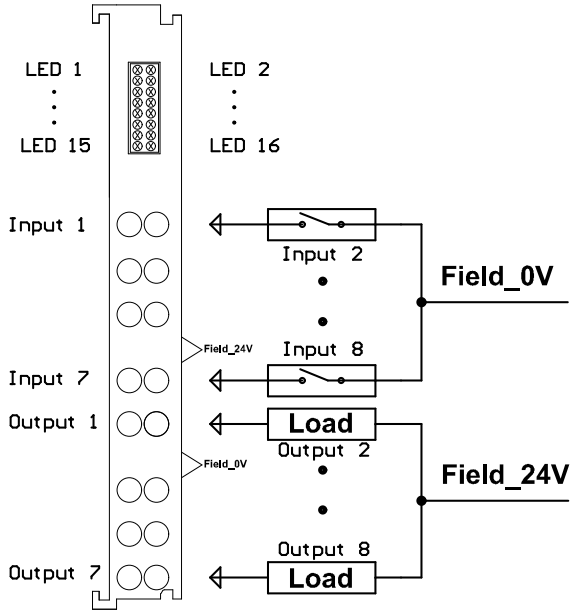
1: LoseoutSignal valid

# 3.15 DF20-M-8DIO-N:8Channel digital input8-channel digital outputModulesNPN Type

## 3.15.1 Technical parameters

| **Electrical parameters** | |
|---|---|
| Input Channelsnumber | 8 |
| loseoutaislenumber | 8 |
| Input signal type | NPN |
| loseoutSignal Type | NPN |
| enterlogic“0”Signal voltage | >11VDC |
| logic“1”Signal voltage | <5V DC |
| Outputlogic“0”Signal voltage | High impedance |
| Outputlogic“1”Signal voltage | 0V |
| System side current consumption | 50mA |
| Input filtering | Default 3ms, 0.2-40ms configurable |
| enterimpedance | >7.5kΩ |
| Module failure alarm | support |
| **General parameters** | |
| Isolation withstand voltage | 500V |
| Vibration Testing | 1g, in accordance with IEC 60068-2-6 |
| Shock Test | 15g, compliant with IEC 60068-2-27 |
| Electromagnetic compatibility testing | Compliant with EN 61000-4standard |
| Protection level | IP20 |
| Operating temperature | -25～75℃ |
| Storage temperature | -40℃~+85℃ |
| Relative humidity | 5～95%RH (no condensation) |
| Installation | 35mm rail mounting |
| Dimensions | 100mm × 12mm × 67mm |
| Maximum crimping area of wire | 1.5mm² |
| Maximum crimping area of wire | AWG16 |
| Minimum crimping area of wire | 0.2mm² |
| Minimum crimping area for wire | AWG28 |
| Line length | 8...9mm |

## 3.15.2 Status indicator lights and wiring diagram




The status indicator lights are shown in the table below:

| led No | Status and meaning | led No | Status and meaning |
|---|---|---|---|
| LED1 | On: Channel 1 input signal is valid | LED2 | On: Channel 2 input signal is valid |
| | Off: Channel 1 input signal is invalid | | Off: Channel 2 input signal is invalid |
| LED3 | On: Channel 3 input signal is valid | LED4 | On: Channel 4 input signal is valid |
| | Off: Channel 3 input signal is invalid | | Off: Channel 4 input signal is invalid |
| LED5 | On: Channel 5 input signal is valid | LED6 | On: Channel 6 input signal is valid |
| | Off: Channel 5 input signal is invalid | | Off: Channel 6 input signal is invalid |
| LED7 | On: Channel 7 input signal is valid | LED8 | On: Channel 8 input signal is valid |
| | Off: Channel 7 input signal is invalid | | Off: Channel 8 input signal is invalid |
| LED9 | On: Channel 9 output signal is valid | LED10 | On: Channel 10 output signal is valid |
| | Off: Channel 9 output signal is invalid | | Off: Channel 10 output signal is invalid |
| LED11 | On: Channel 11 output signal is valid | LED12 | On: Channel 12 output signal is |

| | | | |
|---|---|---|---|
| | | | valid |
| | Off: Channel 11 output signal is invalid | | Off: Channel 12 output signal is invalid |
| LED13 | On: Channel 13 output signal is valid | LED14 | On: Channel 14 output signal is valid |
| | Off: Channel 13 output signal is invalid | | Off: Channel 14 output signal is invalid |
| LED15 | On: Channel 15 output signal is valid | LED16 | On: Channel 16 output signal is valid |
| | Off: Channel 15 output signal is invalid | | Off: Channel 16 output signal is invalid |

### 3.15.3 Module process data definition

| Input data: 1 Byte | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Byte 0 | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
| | CH8 | CH7 | CH6 | CH5 | CH4 | CH3 | CH2 | CH1 |
| Output data: 1 Byte | | | | | | | | |
| Byte1 | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
| | CH16 | CH15 | CH14 | CH13 | CH12 | CH11 | CH10 | CH9 |

Data description:

CH1~CH16： When the corresponding channel inputOutputWhen the signal is valid, this position is 1, inputOutputIf invalid, it is 0.

0: Input signal is invalid

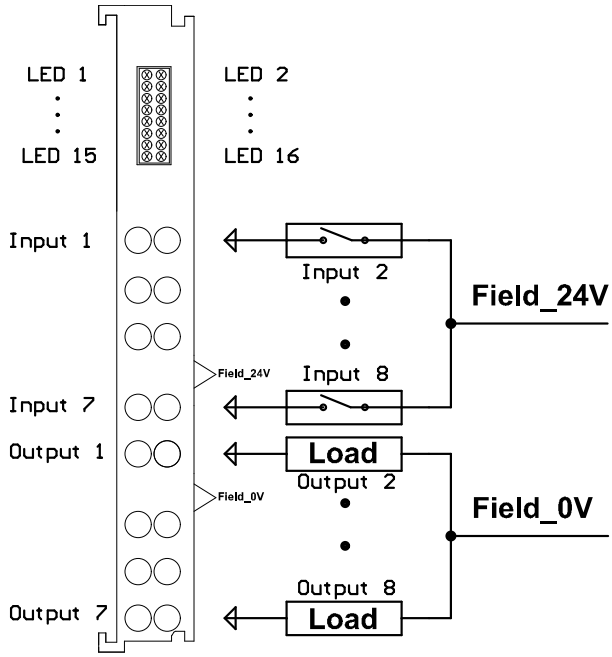
1: Input signal is valid

# 3.16 DF20-M-8DIO-P:8Channel digital input8-channel digital output Modules PNP type

## 3.16.1 Technical parameters

| **Electrical parameters** | |
|---|---|
| Input Channelsnumber | 8 |
| loseoutaislenumber | 8 |
| Input signal type | PNP |
| loseoutSignal Type | PNP |
| enterlogic“0”Signal voltage | <5VDC |
| enterlogic“1”Signal voltage | >11VDC |
| Outputlogic“0”Signal voltage | High impedance |
| Outputlogic“1”Signal voltage | 24V |
| System side current consumption | 50mA |
| Input filtering | Default 3ms, 0.2-40ms configurable |
| enterimpedance | >7.5kΩ |
| Module failure alarm | support |
| **General parameters** | |
| Isolation withstand voltage | 500V |
| Vibration Testing | 1g, in accordance with IEC 60068-2-6 |
| Shock Test | 15g, compliant with IEC 60068-2-27 |
| Electromagnetic compatibility testing | Compliant with EN 61000-4standard |
| Protection level | IP20 |
| Operating temperature | -25～75℃ |
| Storage temperature | -40℃~+85℃ |
| Relative humidity | 5～95%RH (no condensation) |
| Installation | 35mm rail mounting |
| Dimensions | 100mm × 12mm × 67mm |
| Maximum crimping area of wire | 1.5mm² |
| Maximum crimping area of wire | AWG16 |
| Minimum crimping area of wire | 0.2mm² |
| Minimum crimping area for wire | AWG28 |

## 3.16.2 Status indicator lights and wiring diagram




The status indicator lights are shown in the table below:

| led No | Status and meaning | led No | Status and meaning |
|---|---|---|---|
| LED1 | On: Channel 1 input signal is valid | LED2 | On: Channel 2 input signal is valid |
| | Off: Channel 1 input signal is invalid | | Off: Channel 2 input signal is invalid |
| LED3 | On: Channel 3 input signal is valid | LED4 | On: Channel 4 input signal is valid |
| | Off: Channel 3 input signal is invalid | | Off: Channel 4 input signal is invalid |
| LED5 | On: Channel 5 input signal is valid | LED6 | On: Channel 6 input signal is valid |
| | Off: Channel 5 input signal is invalid | | Off: Channel 6 input signal is invalid |
| LED7 | On: Channel 7 input signal is valid | LED8 | On: Channel 8 input signal is valid |
| | Off: Channel 7 input signal is invalid | | Off: Channel 8 input signal is invalid |
| LED9 | On: Channel 9 output signal is | LED10 | On: Channel 10 output signal is |

| | | | |
|---|---|---|---|
| | valid | | valid |
| | Off: Channel 9 output signal is invalid | | Off: Channel 10 output signal is invalid |
| LED11 | On: Channel 11 output signal is valid | LED12 | On: Channel 12 output signal is valid |
| | Off: Channel 11 output signal is invalid | | Off: Channel 12 output signal is invalid |
| LED13 | On: Channel 13 output signal is valid | LED14 | On: Channel 14 output signal is valid |
| | Off: Channel 13 output signal is invalid | | Off: Channel 14 output signal is invalid |
| LED15 | On: Channel 15 output signal is valid | LED16 | On: Channel 16 output signal is valid |
| | Off: Channel 15 output signal is invalid | | Off: Channel 16 output signal is invalid |

### 3.16.3 Module process data definition

| Input data: 1 Byte | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Byte 0 | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
| | CH8 | CH7 | CH6 | CH5 | CH4 | CH3 | CH2 | CH1 |
| Output data: 1 Byte | | | | | | | | |
| Byte1 | Bit7 | Bit6 | Bit5 | Bit4 | Bit3 | Bit2 | Bit1 | Bit0 |
| | CH16 | CH15 | CH14 | CH13 | CH12 | CH11 | CH10 | CH9 |

Data description:

CH1~CH16： When the corresponding channel inputOutputWhen the signal is valid, this position is 1, inputOutputIf invalid, it is 0.

0: Input signal is invalid

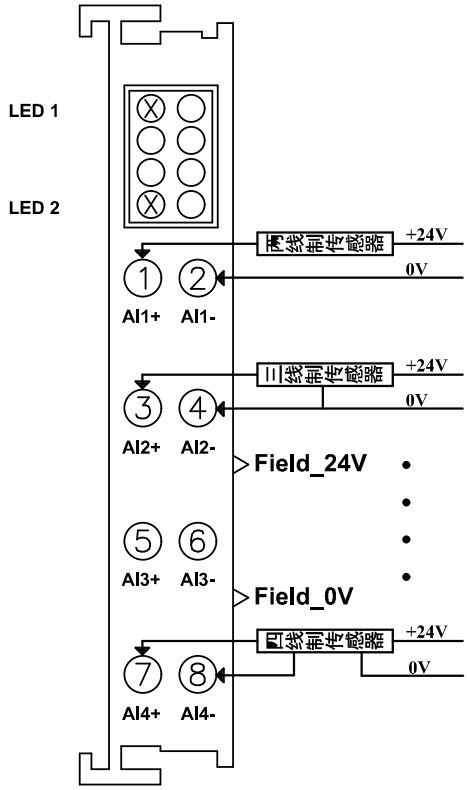
1: Input signal is valid

# 3.17 DF20-M-4AI-U-0:4 channel Voltage inputModules

## 3.17.1 Technical parameters

| **Electrical parameters** | |
|---|---|
| aislenumber | 4 |
| Signalscope | ±10V |
| Signal Type | Differential/Single-ended |
| Connection Type | 2-wire |
| Input Impedance | >500KΩ |
| Resolution/Accuracy | 16bit/0.2% |
| Sampling frequency | 20Hz~300HzConfigurable, default 20Hz |
| System side current consumption | 120mA |
| Reverse circuit protection | support |
| Module failure alarm | support |
| **General parameters** | |
| Vibration Testing | 1g, in accordance with IEC 60068-2-6 |
| Shock Test | 15g, compliant with IEC 60068-2-27 |
| Electromagnetic compatibility testing | Compliant with EN 61000-4standard |
| Protection level | IP20 |
| Operating temperature | -25～75℃ |
| Storage temperature | -40℃~+85℃ |
| Relative humidity | 5～95%RH (no condensation) |
| Installation | 35mm rail mounting |
| Dimensions | 100mm × 12mm × 67mm |
| Maximum crimping area of wire | 2.5mm² |
| Maximum crimping area of wire | AWG14 |
| Minimum crimping area of wire | 0.2mm² |
| Minimum crimping area for wire | AWG28 |
| Line length | 8...9mm |

## 3.17.2 Status indicator lights and wiring diagram




The status indicator lights are shown in the table below:

| LED No | Status and meaning |
|---|---|
| LED1 | On: The module is powered normally |
| | Off: Module power supply is abnormal |
| LED2 | On: Module initialization error |
| | Off: Module initialization is normal |
| | Flashing: The module is working in normal sampling state |

## 3.17.3 Module process data definition

| Input data: 4 words | |
|---|---|
| Word 1 | AD Value CH1: first channel input data |
| Word 2 | AD Value CH2: Second channel input data |
| Word 3 | AD Value CH3: The third channel input data |
| Word 4 | AD Value CH4: The fourth channel input data |

Process Data Definition

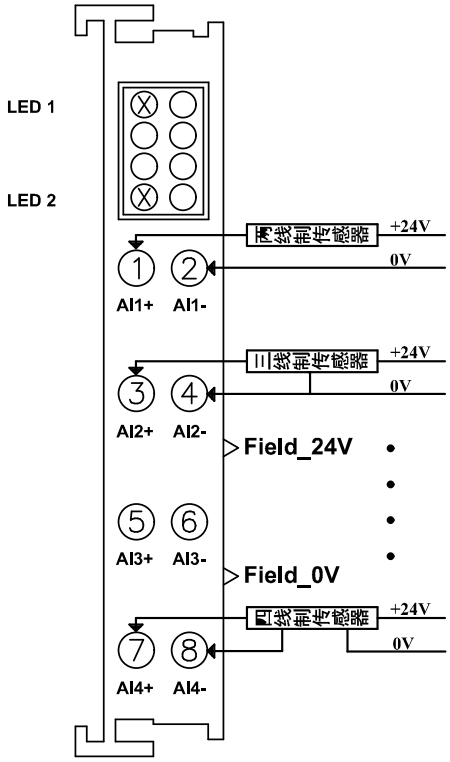
| Signal range | Voltage value | Decimal data | Hexadecimal | scopeillustr | Conversion relationship |
|---|---|---|---|---|---|
| ±10V | 10V | 27648 | 0x6C00 | Normal range | D =27648x U / 10<br>U = D x 10 /27648 |
| | 0V | 0 | 0 | | |
| | -10V | -27648 | 0x9400 | | |

# 3.18 DF20-M-4AI-U-1:4 channel Voltage inputModules

## 3.18.1 Technical Parameters

| **Electrical parameters** | |
|---|---|
| aislenumber | 4 |
| Signalscope | 0~10V |
| Signal Type | Differential/Single-ended |
| Connection Type | 2-wire |
| Input Impedance | >500KΩ |
| Resolution/Accuracy | 16bit/0.2% |
| Sampling frequency | 20Hz~300HzConfigurable, default 20Hz |
| System side current consumption | 120mA |
| Reverse circuit protection | support |
| Module failure alarm | support |
| **General parameters** | |
| Vibration Testing | 1g, in accordance with IEC 60068-2-6 |
| Shock Test | 15g, compliant with IEC 60068-2-27 |
| Electromagnetic compatibility testing | Compliant with EN 61000-4standard |
| Protection level | IP20 |
| Operating temperature | -25～75℃ |
| Storage temperature | -40℃~+85℃ |
| Relative humidity | 5～95%RH (no condensation) |
| Installation | 35mm rail mounting |
| Dimensions | 100mm × 12mm × 67mm |
| Maximum crimping area of wire | 2.5mm² |
| Maximum crimping area of wire | AWG14 |
| Minimum crimping area of wire | 0.2mm² |
| Minimum crimping area for wire | AWG28 |
| Line length | 8...9mm |

## 3.18.2 Status indicator lights and wiring diagram




The status indicator lights are shown in the table below:

| LED No | Status and meaning |
|---|---|
| LED1 | On: The module is powered normally |
| | Off: Module power supply is abnormal |
| LED2 | On: Module initialization error |
| | Off: Module initialization is normal |
| | Flashing: The module is working in normal sampling state |

## 3.18.3 Module process data definition

| Input data: 4 words | |
|---|---|
| Word 1 | AD Value CH1: first channel input data |
| Word 2 | AD Value CH2: Second channel input data |
| Word 3 | AD Value CH3: The third channel input data |
| Word 4 | AD Value CH4: The fourth channel input data |

Process Data Definition

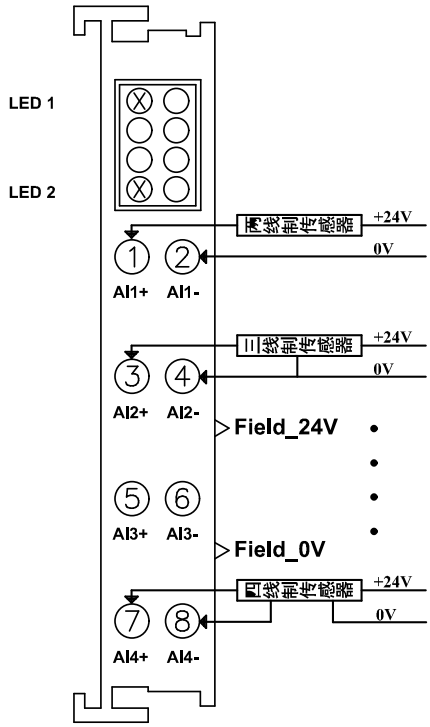
| Signal range | Voltage value | Decimal data | Hexadecimal | scopeillustr | Conversion relationship |
|---|---|---|---|---|---|
| 0~10V | 10V | 27648 | 0x6C00 | Normal range | D =27648x U / 10<br>U = D x 10 /27648 |
| | 5V | 13824 | 0x3600 | | |
| | 0V | 0 | 0 | | |

# 3.19 DF20-M-4AI-I-2:4 channel Current inputModules

## 3.19.1 Technical Parameters

| **Electrical parameters** | |
|---|---|
| aislenumber | 4 |
| Signalscope | 0~20mA |
| Signal Type | Differential/Single-ended |
| Connection Type | 2-wire |
| Input Impedance | 100Ω |
| Resolution/Accuracy | 16bit/0.2% |
| Sampling frequency | 20Hz~300HzConfigurable, default 20Hz |
| System side current consumption | 120mA |
| Reverse circuit protection | support |
| Module failure alarm | support |
| **General parameters** | |
| Vibration Testing | 1g, in accordance with IEC 60068-2-6 |
| Shock Test | 15g, compliant with IEC 60068-2-27 |
| Electromagnetic compatibility testing | Compliant with EN 61000-4standard |
| Protection level | IP20 |
| Operating temperature | -25～75℃ |
| Storage temperature | -40℃~+85℃ |
| Relative humidity | 5～95%RH (no condensation) |
| Installation | 35mm rail mounting |
| Dimensions | 100mm × 12mm × 67mm |
| Maximum crimping area of wire | 2.5mm² |
| Maximum crimping area of wire | AWG14 |
| Minimum crimping area of wire | 0.2mm² |
| Minimum crimping area for wire | AWG28 |
| Line length | 8...9mm |

## 3.19.2 Status indicator lights and wiring diagram




The status indicator lights are shown in the table below:

| LED No | Status and meaning |
|---|---|
| LED1 | On: The module is powered normally |
| | Off: Module power supply is abnormal |
| LED2 | On: Module initialization error |
| | Off: Module initialization is normal |
| | Flashing: The module is working in normal sampling state |

## 3.19.3 Module process data definition

| Input data: 4 words | |
|---|---|
| Word 1 | AD Value CH1: first channel input data |
| Word 2 | AD Value CH2: Second channel input data |
| Word 3 | AD Value CH3: The third channel input data |
| Word 4 | AD Value CH4: The fourth channel input data |

Process Data Definition

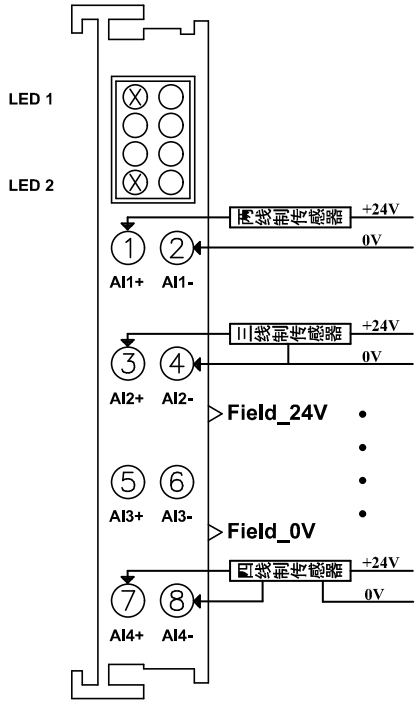
| Signal range | Current value (I) | Decimal data | Hexadecimal data | scope | Conversion relationship |
|---|---|---|---|---|---|
| 0 – 20 mA | 20mA | 27648 | 0x6C00 | Normal range | D =27648x I / 20<br>I = D x 20 /27648 |
| | 10mA | 13824 | 0x3600 | | |
| | 0 | 0 | 0 | | |

# 3.20 DF20-M-4AI-I-3:4 channel Current inputModules

## 3.20.1 Technical Parameters

| **Electrical parameters** | |
|---|---|
| aislenumber | 4 |
| Signalscope | 4~20mA |
| Signal Type | Differential/Single-ended |
| Connection Type | 2-wire |
| Input Impedance | 100Ω |
| Resolution/Accuracy | 16bit/0.2% |
| Sampling frequency | 20Hz~300HzConfigurable, default 20Hz |
| System side current consumption | 120mA |
| Reverse circuit protection | support |
| Module failure alarm | support |
| **General parameters** | |
| Vibration Testing | 1g, in accordance with IEC 60068-2-6 |
| Shock Test | 15g, compliant with IEC 60068-2-27 |
| Electromagnetic compatibility testing | Compliant with EN 61000-4standard |
| Protection level | IP20 |
| Operating temperature | -25～75℃ |
| Storage temperature | -40℃~+85℃ |
| Relative humidity | 5～95%RH (no condensation) |
| Installation | 35mm rail mounting |
| Dimensions | 100mm × 12mm × 67mm |
| Maximum crimping area of wire | 2.5mm² |
| Maximum crimping area of wire | AWG14 |
| Minimum crimping area of wire | 0.2mm² |
| Minimum crimping area for wire | AWG28 |
| Line length | 8...9mm |

## 3.20.2 Status indicator lights and wiring diagram




The status indicator lights are shown in the table below:

| LED No | Status and meaning |
|---|---|
| LED1 | On: The module is powered normally |
| | Off: Module power supply is abnormal |
| LED2 | On: Module initialization error |
| | Off: Module initialization is normal |
| | Flashing: The module is working in normal sampling state |

## 3.20.3 Module process data definition

| Input data: 4 words | |
|---|---|
| Word 1 | AD Value CH1: first channel input data |
| Word 2 | AD Value CH2: Second channel input data |
| Word 3 | AD Value CH3: The third channel input data |
| Word 4 | AD Value CH4: The fourth channel input data |

Process Data Definition

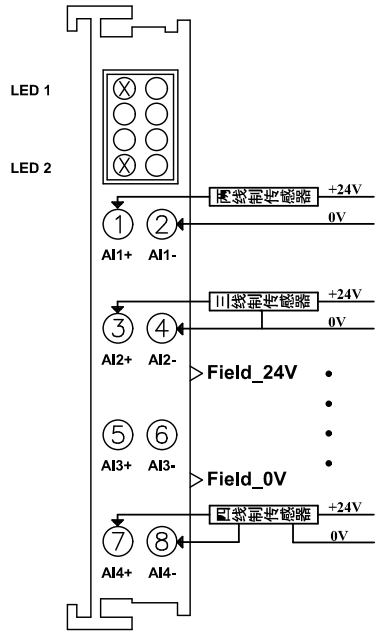
| Signal range | Current value (I) | Decimal data | Hexadecimal data | scope | Conversion relationship |
|---|---|---|---|---|---|
| 4 - 20 mA | 20mA | 27648 | 0x6C00 | Normal range | D =27648x (I – 4) / 16<br>I = D x 16 /27648+ 4 |
| | 12mA | 13824 | 0x3600 | | |
| | 4mA | 0 | 0 | | |

# 3.21 DF20-M-4AI-U-4:4 channel Voltage inputModules

## 3.21.1 Technical Parameters

| **Electrical parameters** | |
|---|---|
| aislenumber | 4 |
| Signalscope | ±10V/0-10V/2-10V/±5V/0-5V/1-5V |
| Signal Type | Differential/Single-ended |
| Connection Type | 2-wire |
| Input Impedance | >500KΩ |
| Resolution/Accuracy | 16bit/0.2% |
| Sampling frequency | 20Hz~300HzConfigurable, default 20Hz |
| System side current consumption | 120mA |
| Reverse circuit protection | support |
| Module failure alarm | support |
| **General parameters** | |
| Vibration Testing | 1g, in accordance with IEC 60068-2-6 |
| Shock Test | 15g, compliant with IEC 60068-2-27 |
| Electromagnetic compatibility testing | Compliant with EN 61000-4standard |
| Protection level | IP20 |
| Operating temperature | -25～75℃ |
| Storage temperature | -40℃~+85℃ |
| Relative humidity | 5～95%RH (no condensation) |
| Installation | 35mm rail mounting |
| Dimensions | 100mm × 12mm × 67mm |
| Maximum crimping area of wire | 2.5mm² |
| Maximum crimping area of wire | AWG14 |
| Minimum crimping area of wire | 0.2mm² |
| Minimum crimping area for wire | AWG28 |
| Line length | 8...9mm |

## 3.21.2 Status indicator lights and wiring diagram




The status indicator lights are shown in the table below:

| LED No | Status and meaning |
|---|---|
| LED1 | On: The module is powered normally |
| | Off: Module power supply is abnormal |
| LED2 | On: Module initialization error |
| | Off: Module initialization is normal |
| | Flashing: The module is working in normal sampling state |

## 3.21.3 Module process data definition

| Input data: 4 words | |
|---|---|
| Word 1 | AD Value CH1: first channel input data |
| Word 2 | AD Value CH2: Second channel input data |
| Word 3 | AD Value CH3: The third channel input data |
| Word 4 | AD Value CH4: The fourth channel input data |

Process Data Definition

| Signal range | Voltage value | Decimal data | Hexadecimal | scopeillustr | Conversion relationship |
|---|---|---|---|---|---|
| ±10V | >11.76V | 32767 | 0x7FFF | Overflow | D = 27648 x U / 10<br>U = D x 10 / 27648 |
| | 11.76V | 32511 | 0x7EFF | Upper limit | |
| | 10V | 27648 | 0x6C00 | Normal range | |
| | 5V | 13824 | 0x3600 | | |
| | 0V | 0 | 0x0000 | | |
| | -5V | -13824 | 0xCA00 | | |
| | -10V | -27648 | 0x9400 | | |
| | -11.76V | -32511 | 0x8100 | Lower limit | |

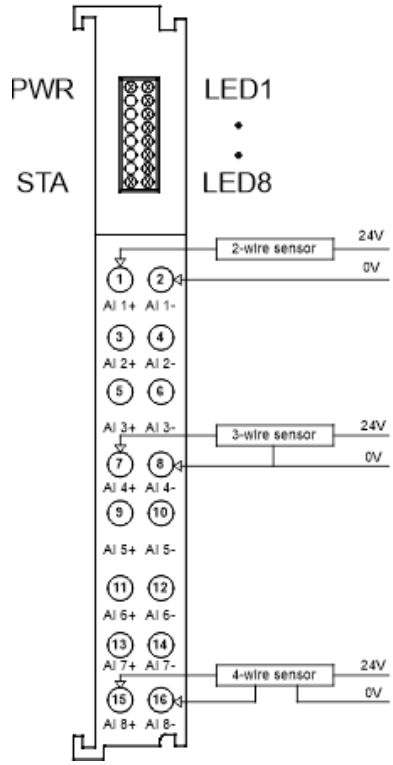
| | | | | | |
|---|---|---|---|---|---|
| 0~10V | <-11.76V | -32768 | 0x8000 | Underflow | D = 27648 x U / 10<br>U = D x 10 / 27648 |
| | >11.76V | 32767 | 0x7FFF | Overflow | |
| | 11.76V | 32511 | 0x7EFF | Upper limit | |
| | 10V | 27648 | 0x6C00 | Normal range | |
| | 5V | 13824 | 0x3600 | | |
| | 0V | 0 | 0x0000 | | |
| 2~10V | >11.41V | 32767 | 0x7FFF | Overflow | D = 27648 x (U – 2) / 8<br>U = D x 8 / 27648 + 2 |
| | 11.41V | 32511 | 0x7EFF | Upper limit | |
| | 10V | 27648 | 0x6C00 | Normal range | |
| | 6V | 13824 | 0x3600 | | |
| | 2V | 0 | 0x0000 | | |
| | 0.59 V | -4864 | 0xED00 | Lower limit | |
| | <0.59 V | -32768 | 0x8000 | Underflow | |
| ±5V | >5.88V | 32767 | 0x7FFF | Overflow | D = 27648 x U / 5<br>U = D x 5 / 27648 |
| | 5.88V | 32511 | 0x7EFF | Upper limit | |
| | 5V | 27648 | 0x6C00 | Normal range | |
| | 2.5V | 13824 | 0x3600 | | |
| | 0V | 0 | 0x0000 | | |
| | -2.5V | -13824 | 0xCA00 | | |
| | -5V | -27648 | 0x9400 | | |
| | -5.88V | -32511 | 0x8100 | Lower limit | |
| | <-5.88V | -32768 | 0x8000 | Underflow | |
| 0~5V | >5.88V | 32767 | 0x7FFF | Overflow | D = 27648 x U / 5<br>U = D x 5 / 27648 |
| | 5.88V | 32511 | 0x7EFF | Upper limit | |
| | 5V | 27648 | 0x6C00 | Normal range | |
| | 2.5V | 13824 | 0x3600 | | |
| | 0V | 0 | 0x0000 | | |
| 1~5V | >5.7V | 32767 | 0x7FFF | Overflow | D = 27648 x (U – 1) / 4<br>U = D x 4 / 27648 + 1 |
| | 5.7V | 32511 | 0x7EFF | Upper limit | |
| | 5V | 27648 | 0x6C00 | Normal range | |
| | 3V | 13824 | 0x3600 | | |
| | 1V | 0 | 0x0000 | | |
| | 0.3V | -4864 | 0xED00 | Lower limit | |
| | <0.3V | -32768 | 0x8000 | Underflow | |

# 3.22 DF20-M-8AI-U-4:8 channel Voltage inputModules

## 3.22.1 Technical Parameters

| **Electrical parameters** | |
|---|---|
| aislenumber | 8 |
| Signalscope | ±10V/0~10V/2~10V/±5V/0~5V/1~5V |
| Signal Type | Differential/Single-ended |
| Connection Type | 2-wire |
| Input Impedance | >500KΩ |
| Resolution/Accuracy | 16bit/0.2% |
| Sampling frequency | 50Hz~1000HzConfigurable, default 100Hz |
| System side current consumption | 20mA |
| Reverse circuit protection | support |
| Module failure alarm | support |
| **General parameters** | |
| Vibration Testing | 1g, in accordance with IEC 60068-2-6 |
| Shock Test | 15g, compliant with IEC 60068-2-27 |
| Electromagnetic compatibility testing | Compliant with EN 61000-4standard |
| Protection level | IP20 |
| Operating temperature | -25～75℃ |
| Storage temperature | -40℃~+85℃ |
| Relative humidity | 5～95%RH (no condensation) |
| Installation | 35mm rail mounting |
| Dimensions | 100mm × 12mm × 67mm |
| Maximum crimping area of wire | 2.5mm² |
| Maximum crimping area of wire | AWG14 |
| Minimum crimping area of wire | 0.2mm² |
| Minimum crimping area for wire | AWG28 |
| Line length | 8...9mm |

## 3.22.2 Status indicator lights and wiring diagram




The status indicator lights are shown in the table below:

| LED No | Status and meaning |
|---|---|
| PWR | On: The module is powered normally |
| | Off: Module power supply is abnormal |
| STA | On: Module initialization error |
| | Off: Module initialization is normal |
| | Flashing: The module is working in normal sampling state |
| LED1 | Off: No signal input to the module |
| | Flashing: The module has signal input |
| LED2 | Off: No signal input to the module |
| | Flashing: The module has signal input |
| LED3 | Off: No signal input to the module |
| | Flashing: The module has signal input |
| LED4 | Off: No signal input to the module |
| | Flashing: The module has signal input |
| LED5 | Off: No signal input to the module |
| | Flashing: The module has signal input |
| LED6 | Off: No signal input to the module |
| | Flashing: The module has signal input |
| LED7 | Off: No signal input to the module |
| | Flashing: The module has signal input |
| LED8 | Off: No signal input to the module |
| | Flashing: The module has signal input |

## 3.22.3 Module process data definition

| Number of inputsaccording to:8Word | |
|---|---|
| Word1 | AD Value CH1: first channel input data |
| Word2 | AD Value CH2: Second channel input data |
| Word3 | AD Value CH3: The third channel input data |
| Word4 | AD Value CH4: The fourth channel input data |
| Word5 | AD Value CH5:fiveChannel input data |
| Word6 | AD Value CH6:sixChannel input data |
| Word7 | AD Value CH7:sevenChannel input data |
| Word8 | AD Value CH8:eightChannel input data |

Process Data Definition

| Signal range | Voltage value | Decimal data | Hexadecimal | scopeillustr | Conversion relationship |
|---|---|---|---|---|---|
| ±10V | >11.76V | 32767 | 0x7FFF | Overflow | D = 27648 x U / 10<br>U = D x 10 / 27648 |
| | 11.76V | 32511 | 0x7EFF | Upper limit | |
| | 10V | 27648 | 0x6C00 | Normal range | |
| | 5V | 13824 | 0x3600 | | |
| | 0V | 0 | 0x0000 | | |
| | -5V | -13824 | 0xCA00 | | |
| | -10V | -27648 | 0x9400 | | |
| | -11.76V | -32511 | 0x8100 | Lower limit | |
| | <-11.76V | -32768 | 0x8000 | Underflow | |
| 0-10V | >11.76V | 32767 | 0x7FFF | Overflow | D = 27648 x U / 10<br>U = D x 10 / 27648 |
| | 11.76V | 32511 | 0x7EFF | Upper limit | |
| | 10V | 27648 | 0x6C00 | Normal range | |
| | 5V | 13824 | 0x3600 | | |
| | 0V | 0 | 0x0000 | | |
| 2-10V | >11.41V | 32767 | 0x7FFF | Overflow | D = 27648 x (U – 2) / 8<br>U = D x 8 / 27648 + 2 |
| | 11.41V | 32511 | 0x7EFF | Upper limit | |
| | 10V | 27648 | 0x6C00 | Normal range | |
| | 6V | 13824 | 0x3600 | | |
| | 2V | 0 | 0x0000 | | |
| | 0.59 V | -4864 | 0xED00 | Lower limit | |
| | <0.59 V | -32768 | 0x8000 | Underflow | |
| ±5V | >5.88V | 32767 | 0x7FFF | Overflow | D = 27648 x U / 5<br>U = D x 5 / 27648 |
| | 5.88V | 32511 | 0x7EFF | Upper limit | |
| | 5V | 27648 | 0x6C00 | Normal range | |
| | 2.5V | 13824 | 0x3600 | | |
| | 0V | 0 | 0x0000 | | |
| | -2.5V | -13824 | 0xCA00 | | |
| | -5V | -27648 | 0x9400 | | |

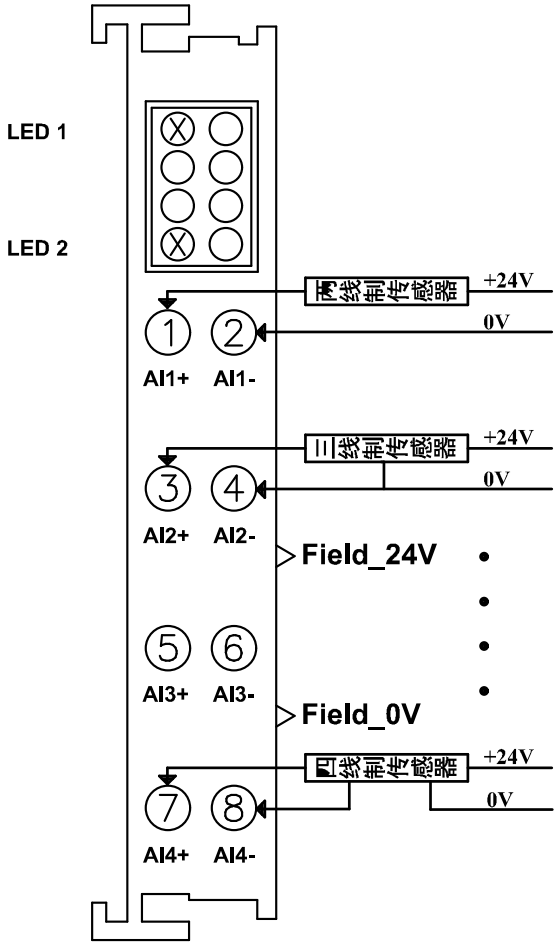
| | | | | | |
|---|---|---|---|---|---|
| 0-5V | -5.88V | -32511 | 0x8100 | Lower limit | D = 27648 x U / 5<br>U = D x 5 / 27648 |
| | <-5.88V | -32768 | 0x8000 | Underflow | |
| | >5.88V | 32767 | 0x7FFF | Overflow | |
| | 5.88V | 32511 | 0x7EFF | Upper limit | |
| | 5V | 27648 | 0x6C00 | Normal range | |
| | 2.5V | 13824 | 0x3600 | | |
| | 0V | 0 | 0x0000 | | |
| 1-5V | >5.7V | 32767 | 0x7FFF | Overflow | D = 27648 x (U – 1) / 4<br>U = D x 4 / 27648 + 1 |
| | 5.7V | 32511 | 0x7EFF | Upper limit | |
| | 5V | 27648 | 0x6C00 | Normal range | |
| | 3V | 13824 | 0x3600 | | |
| | 1V | 0 | 0x0000 | | |
| | 0.3V | -4864 | 0xED00 | Lower limit | |
| | <0.3V | -32768 | 0x8000 | Underflow | |

# 3.23 DF20-M-4AI-I-5:4 channel Current inputModules

## 3.23.1 Technical Parameters

| **Electrical parameters** | |
|---|---|
| aislenumber | 4 |
| Signalscope | 0~20mA/4~20mA |
| Signal Type | Differential/Single-ended |
| Connection Type | 2-wire |
| Input Impedance | 100Ω |
| Resolution/Accuracy | 16bit/0.2% |
| Sampling frequency | 20Hz~300HzConfigurable, default 20Hz |
| System side current consumption | 120mA |
| Reverse circuit protection | support |
| Module failure alarm | support |
| **General parameters** | |
| Vibration Testing | 1g, in accordance with IEC 60068-2-6 |
| Shock Test | 15g, compliant with IEC 60068-2-27 |
| Electromagnetic compatibility testing | Compliant with EN 61000-4standard |
| Protection level | IP20 |
| Operating temperature | -25～75℃ |
| Storage temperature | -40℃~+85℃ |
| Relative humidity | 5～95%RH (no condensation) |
| Installation | 35mm rail mounting |
| Dimensions | 100mm × 12mm × 67mm |
| Maximum crimping area of wire | 2.5mm² |
| Maximum crimping area of wire | AWG14 |
| Minimum crimping area of wire | 0.2mm² |
| Minimum crimping area for wire | AWG28 |
| Line length | 8...9mm |

### 3.23.2 Status indicator lights and wiring diagram




The status indicator lights are shown in the table below:

| LED No | Status and meaning |
|---|---|
| LED1 | On: The module is powered normally |
| | Off: Module power supply is abnormal |
| LED2 | On: Module initialization error |
| | Off: Module initialization is normal |
| | Flashing: The module is working in normal sampling state |

## 3.23.3 Module process data definition

| Input data: 4 words | |
|---|---|
| Word 1 | AD Value CH1: first channel input data |
| Word 2 | AD Value CH2: Second channel input data |
| Word 3 | AD Value CH3: The third channel input data |
| Word 4 | AD Value CH4: The fourth channel input data |

Process Data Definition

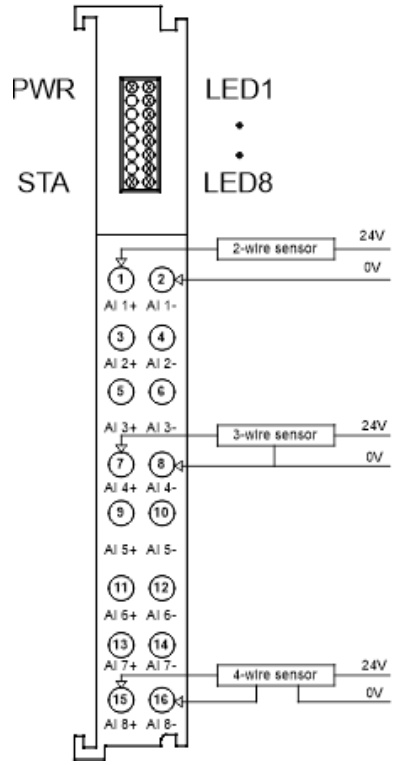
| Signal range | Current value (I) | Decimal data | Hexadecimal data | scope | Conversion relationship |
|---|---|---|---|---|---|
| 0 ~ 20 mA | >23.52 mA | 32767 | 0x7FFF | Overflow | D = 27648 x I / 20<br>I = D x 20 / 27648 |
| | 23.52 mA | 32511 | 0x7EFF | Upper limit | |
| | 20 mA | 27648 | 0x6C00 | Normal range | |
| | 10 mA | 13824 | 0x3600 | | |
| | 0 mA | 0 | 0 | | |
| 4 ~ 20 mA | >22.81 mA | 32767 | 0x7FFF | Overflow | D = 27648 x (I – 4) / 16<br>I = D x 16 / 27648 + 4 |
| | 22.81 mA | 32511 | 0x7EFF | Upper limit | |
| | 20 mA | 27648 | 0x6C00 | Normal range | |
| | 12 mA | 13824 | 0x3600 | | |
| | 4 mA | 0 | 0 | | |
| | 1.19 mA | -4864 | 0xED00 | Lower limit | |
| | <1.19 mA | -32768 | 0x8000 | Underflow | |

# 3.24 DF20-M-8AI-I-5:8 channel CurrententerModules

## 3.24.1 Technical Parameters

| **Electrical parameters** | |
|---|---|
| aislenumber | 8 |
| Signalscope | 0~20mA/4~20mA |
| Signal Type | Differential/Single-ended |
| Connection Type | 2-wire |
| Input Impedance | 100Ω |
| Resolution/Accuracy | 16bit/0.2% |
| Sampling frequency | 50Hz~1000HzConfigurable, default 100Hz |
| System side current consumption | 20mA |
| Reverse circuit protection | support |
| Module failure alarm | support |
| **General parameters** | |
| Vibration Testing | 1g, in accordance with IEC 60068-2-6 |
| Shock Test | 15g, compliant with IEC 60068-2-27 |
| Electromagnetic compatibility testing | Compliant with EN 61000-4standard |
| Protection level | IP20 |
| Operating temperature | -25～75℃ |
| Storage temperature | -40℃~+85℃ |
| Relative humidity | 5～95%RH (no condensation) |
| Installation | 35mm rail mounting |
| Dimensions | 100mm × 12mm × 67mm |
| Maximum crimping area of wire | 2.5mm² |
| Maximum crimping area of wire | AWG14 |
| Minimum crimping area of wire | 0.2mm² |
| Minimum crimping area for wire | AWG28 |
| Line length | 8...9mm |

## 3.24.2 Status indicator lights and wiring diagram




The status indicator lights are shown in the table below:

| LED No | Status and meaning |
|---|---|
| PWR | On: The module is powered normally |
| | Off: Module power supply is abnormal |
| STA | On: Module initialization error |
| | Off: Module initialization is normal |
| | Flashing: The module is working in normal sampling state |
| LED1 | Off: No signal input to the module |
| | Flashing: The module has signal input |
| LED2 | Off: No signal input to the module |
| | Flashing: The module has signal input |
| LED3 | Off: No signal input to the module |
| | Flashing: The module has signal input |
| LED4 | Off: No signal input to the module |
| | Flashing: The module has signal input |
| LED5 | Off: No signal input to the module |
| | Flashing: The module has signal input |
| LED6 | Off: No signal input to the module |
| | Flashing: The module has signal input |
| LED7 | Off: No signal input to the module |
| | Flashing: The module has signal input |
| LED8 | Off: No signal input to the module |
| | Flashing: The module has signal input |

## 3.24.3 Module process data definition

| Input data:8Word | |
|---|---|
| Word 1 | AD Value CH1: first channel input data |
| Word2 | AD Value CH2: Second channel input data |
| Word3 | AD Value CH3: The third channel input data |
| Word4 | AD Value CH4: The fourth channel input data |
| Word5 | AD Value CH5:fiveChannel input data |
| Word6 | AD Value CH6:sixChannel input data |
| Word7 | AD Value CH7:sevenChannel input data |
| Word8 | AD Value CH8:eightChannel input data |

Process Data Definition

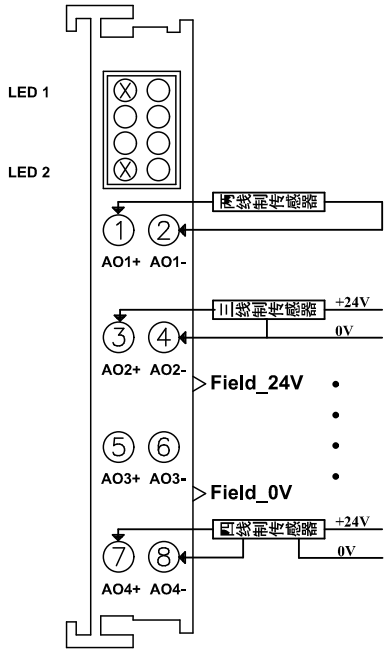
| Signal range | Current value (I) | Decimal data | Hexadecimal data | scope | Conversion relationship |
|---|---|---|---|---|---|
| 0 ~ 20 mA | >23.52 mA | 32767 | 0x7FFF | Overflow | D = 27648 x I / 20<br>I = D x 20 / 27648 |
| | 23.52 mA | 32511 | 0x7EFF | Upper limit | |
| | 20 mA | 27648 | 0x6C00 | Normal range | |
| | 10 mA | 13824 | 0x3600 | | |
| | 0 mA | 0 | 0 | | |
| 4 ~ 20 mA | >22.81 mA | 32767 | 0x7FFF | Overflow | D = 27648 x (I – 4) / 16<br>I = D x 16 / 27648 + 4 |
| | 22.81 mA | 32511 | 0x7EFF | Upper limit | |
| | 20 mA | 27648 | 0x6C00 | Normal range | |
| | 12 mA | 13824 | 0x3600 | | |
| | 4 mA | 0 | 0 | | |
| | 1.19 mA | -4864 | 0xED00 | Lower limit | |
| | <1.19 mA | -32768 | 0x8000 | Underflow | |

# 3.25 DF20-M-4AO-U-0:4 channel Voltage outputModules

## 3.25.1 Technical Parameters

| **Electrical parameters** | |
|---|---|
| aislenumber | 4 |
| Signalscope | ±10V |
| Signal Type | Differential/Single-ended |
| Connection Type | 2-wire |
| Load Capacity | >1KΩ |
| Resolution/Accuracy | 16bit/0.1% |
| Load Type | Resistive load/capacitive load |
| System side current consumption | 500mA |
| Reverse circuit protection | support |
| Module failure alarm | support |
| **General parameters** | |
| Vibration Testing | 1g, in accordance with IEC 60068-2-6 |
| Shock Test | 15g, compliant with IEC 60068-2-27 |
| Electromagnetic compatibility testing | Compliant with EN 61000-4standard |
| Protection level | IP20 |
| Operating temperature | -25～75℃ |
| Storage temperature | -40℃~+85℃ |
| Relative humidity | 5～95%RH (no condensation) |
| Installation | 35mm rail mounting |
| Dimensions | 100mm × 12mm × 67mm |
| Maximum crimping area of wire | 2.5mm² |
| Maximum crimping area of wire | AWG14 |
| Minimum crimping area of wire | 0.2mm² |
| Minimum crimping area for wire | AWG28 |
| Line length | 8...9mm |

## 3.25.2 Status indicator lights and wiring diagram




The status indicator lights are shown in the table below:

| LED No | Status and meaning |
|---|---|
| LED1 | On: The module is powered normally |
| | Off: Module power supply is abnormal |
| LED2 | On: Module initialization error |
| | Off: Module initialization is normal |
| | Flashing: The module is working in normal output state |

## 3.25.3 Module process data definition

| loseoutData: 4 Words | |
|---|---|
| Word 1 | Set Value CH1: The first channel inputoutdata |
| Word 2 | Set Value CH2: The second channel inputoutdata |
| Word 3 | Set Value CH3: The third channel inputoutdata |
| Word 4 | Set Value CH4: The fourth channel inputoutdata |

Process data definition description:

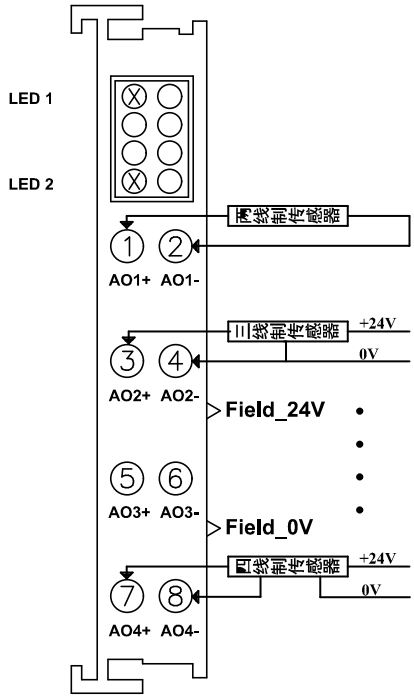
| Signal range | Voltage value | Decimal data | Hexadecimal | scopeillustr | Conversion relationship |
|---|---|---|---|---|---|
| ±10V | 10V | 27648 | 0x6C00 | Normal range | D =27648x U / 10<br>U = D x 10 /27648 |
| | 0V | 0 | 0 | | |
| | -10V | -27648 | 0x9400 | | |

# 3.26 DF20-M-4AO-U-1:4 channel Voltage outputModules

## 3.26.1 Technical Parameters

| **Electrical parameters** | |
|---|---|
| aislenumber | 4 |
| Signalscope | 0~10V |
| Signal Type | Differential/Single-ended |
| Connection Type | 2-wire |
| Load Capacity | >1KΩ |
| Resolution/Accuracy | 16bit/0.1% |
| Load Type | Resistive load/capacitive load |
| System side current consumption | 500mA |
| Reverse circuit protection | support |
| Module failure alarm | support |
| **General parameters** | |
| Vibration Testing | 1g, in accordance with IEC 60068-2-6 |
| Shock Test | 15g, compliant with IEC 60068-2-27 |
| Electromagnetic compatibility testing | Compliant with EN 61000-4standard |
| Protection level | IP20 |
| Operating temperature | -25～75℃ |
| Storage temperature | -40℃~+85℃ |
| Relative humidity | 5～95%RH (no condensation) |
| Installation | 35mm rail mounting |
| Dimensions | 100mm × 12mm × 67mm |
| Maximum crimping area of wire | 2.5mm² |
| Maximum crimping area of wire | AWG14 |
| Minimum crimping area of wire | 0.2mm² |
| Minimum crimping area for wire | AWG28 |
| Line length | 8...9mm |

## 3.26.2 Status indicator lights and wiring diagram




The status indicator lights are shown in the table below:

| LED No | Status and meaning |
|---|---|
| LED1 | On: The module is powered normally |
| | Off: Module power supply is abnormal |
| LED2 | On: Module initialization error |
| | Off: Module initialization is normal |
| | Flashing: The module is working in normal output state |

## 3.26.3 Module process data definition

| loseoutData: 4 Words | |
|---|---|
| Word 1 | Set Value CH1: The first channel inputoutdata |
| Word 2 | Set Value CH2: The second channel inputoutdata |
| Word 3 | Set Value CH3: The third channel inputoutdata |
| Word 4 | Set Value CH4: The fourth channel inputoutdata |

Process data definition description:

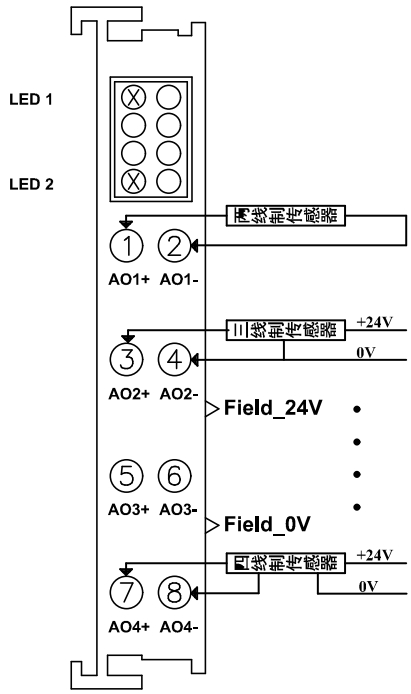
| Signal range | Voltage value (U) | Decimal data | Hexadecimal data | scopeillustrate | Conversion relationship |
|---|---|---|---|---|---|
| 0~10V | 10V | 27648 | 0x6C00 | Normal range | D =27648x U / 10<br>U = D x 10 /27648 |
| | 5V | 13824 | 0x3600 | | |
| | 0V | 0 | 0 | | |

# 3.27 DF20-M-4AO-I-2:4 channel Current outputModules

## 3.27.1 Technical Parameters

| **Electrical parameters** | |
|---|---|
| aislenumber | 4 |
| Signalscope | 0~20mA |
| Signal Type | Differential/Single-ended |
| Connection Type | 2-wire |
| Load Capacity | <500Ω |
| Resolution/Accuracy | 16bit/0.1% |
| Load Type | Resistive load/capacitive load |
| System side current consumption | 600mA |
| Reverse circuit protection | support |
| Module failure alarm | support |
| **General parameters** | |
| Vibration Testing | 1g, in accordance with IEC 60068-2-6 |
| Shock Test | 15g, compliant with IEC 60068-2-27 |
| Electromagnetic compatibility testing | Compliant with EN 61000-4standard |
| Protection level | IP20 |
| Operating temperature | -25～75℃ |
| Storage temperature | -40℃~+85℃ |
| Relative humidity | 5～95%RH (no condensation) |
| Installation | 35mm rail mounting |
| Dimensions | 100mm × 12mm × 67mm |
| Maximum crimping area of wire | 2.5mm² |
| Maximum crimping area of wire | AWG14 |
| Minimum crimping area of wire | 0.2mm² |
| Minimum crimping area for wire | AWG28 |
| Line length | 8...9mm |

## 3.27.2 Status indicator lights and wiring diagram




The status indicator lights are shown in the table below:

| LED No | Status and meaning |
|---|---|
| LED1 | On: The module is powered normally |
| | Off: Module power supply is abnormal |
| LED2 | On: Module initialization error |
| | Off: Module initialization is normal |
| | Flashing: The module is working in normal output state |

## 3.27.3 Module process data definition

| loseoutData: 4 Words | |
|---|---|
| Word 1 | Set Value CH1: The first channel inputoutdata |
| Word 2 | Set Value CH2: The second channel inputoutdata |
| Word 3 | Set Value CH3: The third channel inputoutdata |
| Word 4 | Set Value CH4: The fourth channel inputoutdata |

Process Data Definition

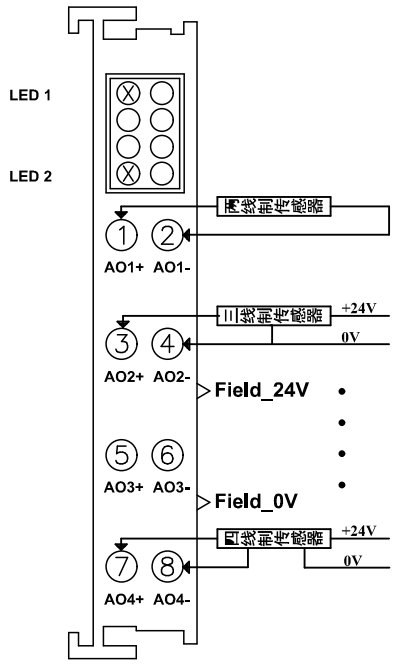
| Signal range | Decimal data | Hexadecimal data | Current value (I) | scope | Conversion relationship |
|---|---|---|---|---|---|
| 0 ~ 20 mA | 27648 | 0x6C00 | 20mA | Normal range | D =27648x I / 20<br>I = D x 20 /27648 |
| | 13824 | 0x3600 | 10mA | | |
| | 0 | 0 | 0 | | |

# 3.28 DF20-M-4AO-I-3:4 channel Current outputModules

## 3.28.1 Technical Parameters

| **Electrical parameters** | |
|---|---|
| aislenumber | 4 |
| Signalscope | 4~20mA |
| Signal Type | Differential/Single-ended |
| Connection Type | 2-wire |
| Load Capacity | <500Ω |
| Resolution/Accuracy | 16bit/0.1% |
| Load Type | Resistive load/capacitive load |
| System side current consumption | 600mA |
| Reverse circuit protection | support |
| Module failure alarm | support |
| **General parameters** | |
| Vibration Testing | 1g, in accordance with IEC 60068-2-6 |
| Shock Test | 15g, compliant with IEC 60068-2-27 |
| Electromagnetic compatibility testing | Compliant with EN 61000-4standard |
| Protection level | IP20 |
| Operating temperature | -25～75℃ |
| Storage temperature | -40℃~+85℃ |
| Relative humidity | 5～95%RH (no condensation) |
| Installation | 35mm rail mounting |
| Dimensions | 100mm × 12mm × 67mm |
| Maximum crimping area of wire | 2.5mm² |
| Maximum crimping area of wire | AWG14 |
| Minimum crimping area of wire | 0.2mm² |
| Minimum crimping area for wire | AWG28 |
| Line length | 8...9mm |

## 3.28.2 Status indicator lights and wiring diagram




The status indicator lights are shown in the table below:

| LED No | Status and meaning |
|---|---|
| LED1 | On: The module is powered normally |
| | Off: Module power supply is abnormal |
| LED2 | On: Module initialization error |
| | Off: Module initialization is normal |
| | Flashing: The module is working in normal output state |

## 3.28.3 Module process data definition

| loseoutData: 4 Words | |
|---|---|
| Word 1 | Set Value CH1: The first channel inputoutdata |
| Word 2 | Set Value CH2: The second channel inputoutdata |
| Word 3 | Set Value CH3: The third channel inputoutdata |
| Word 4 | Set Value CH4: The fourth channel inputoutdata |

Process Data Definition

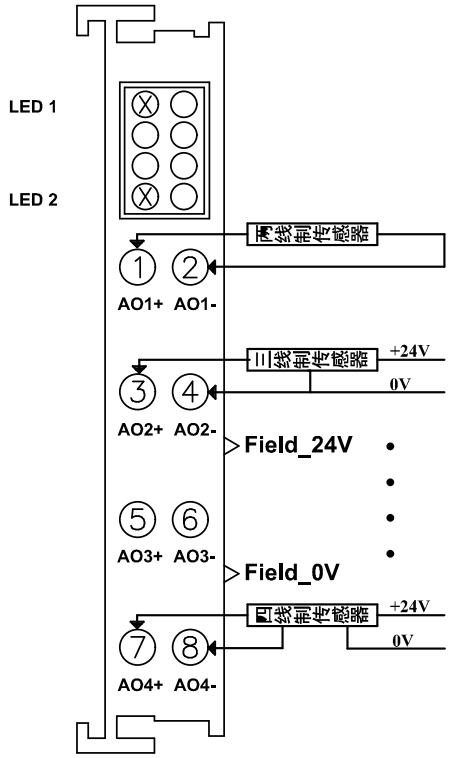
| Signal range | Decimal data | Hexadecimal data | Current value (I) | scope | Conversion relationship |
|---|---|---|---|---|---|
| 4～20 mA | 27648 | 0x6C00 | 20mA | Normal range | D =27648x (I – 4) / 16<br>I = D x 16 /27648+ 4 |
| | 13824 | 0x3600 | 12mA | | |
| | 0 | 0 | 4mA | | |

# 3.29 DF20-M-4AO-U-4:4 channel Voltage outputModules

## 3.29.1 Technical Parameters

| **Electrical parameters** | |
|---|---|
| aislenumber | 4 |
| Signalscope | ±10V/0~10V/2~10V/±5V/0~5V/1~5V |
| Signal Type | Differential/Single-ended |
| Connection Type | 2-wire |
| Load Capacity | >1KΩ |
| Resolution/Accuracy | 16bit/0.1% |
| Load Type | Resistive load/capacitive load |
| System side current consumption | 500mA |
| Reverse circuit protection | support |
| Module failure alarm | support |
| **General parameters** | |
| Vibration Testing | 1g, in accordance with IEC 60068-2-6 |
| Shock Test | 15g, compliant with IEC 60068-2-27 |
| Electromagnetic compatibility testing | Compliant with EN 61000-4standard |
| Protection level | IP20 |
| Operating temperature | -25～75℃ |
| Storage temperature | -40℃~+85℃ |
| Relative humidity | 5～95%RH (no condensation) |
| Installation | 35mm rail mounting |
| Dimensions | 100mm × 12mm × 67mm |
| Maximum crimping area of wire | 2.5mm² |
| Maximum crimping area of wire | AWG14 |
| Minimum crimping area of wire | 0.2mm² |
| Minimum crimping area for wire | AWG28 |
| Line length | 8...9mm |

## 3.29.2 Status indicator lights and wiring diagram




The status indicator lights are shown in the table below:

| LED No | Status and meaning |
|---|---|
| LED1 | On: The module is powered normally |
| | Off: Module power supply is abnormal |
| LED2 | On: Module initialization error |
| | Off: Module initialization is normal |
| | Flashing: The module is working in normal output state |

## 3.29.3 Module process data definition

| loseoutData: 4 Words | |
|---|---|
| Word 1 | Set Value CH1: The first channel inputoutdata |
| Word 2 | Set Value CH2: The second channel inputoutdata |
| Word 3 | Set Value CH3: The third channel inputoutdata |
| Word 4 | Set Value CH4: The fourth channel inputoutdata |

## Process Data Definition

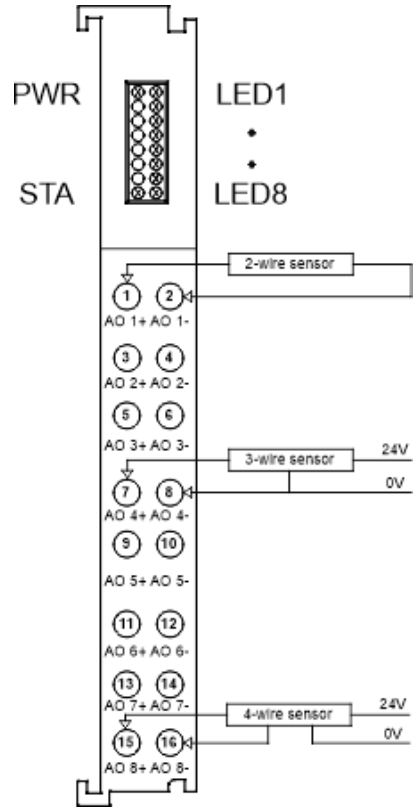
| Signal range | Decimal data | Hexadecimal data | Voltage value (U) | scopeillustrate | Conversion relationship |
|---|---|---|---|---|---|
| ±10V | >32511 | >0x7EFF | 0V | Overflow | D = 27648 x U / 10<br>U = D x 10 / 27648 |
| | 32511 | 0x7EFF | 11.76V | Upper limit | |
| | 27648 | 0x6C00 | 10V | Normal range | |
| | 13824 | 0x3600 | 5V | | |
| | 0 | 0x0000 | 0V | | |
| | -13824 | 0xCA00 | -5V | | |
| | -27648 | 0x9400 | -10V | | |
| | -32511 | 0x8100 | -11.76V | Lower limit | |
| | <-32511 | <0x8100 | 0V | Underflow | |
| 0~10V | >32511 | >0x7EFF | 0V | Overflow | D = 27648 x U / 10<br>U = D x 10 / 27648 |
| | 32511 | 0x7EFF | 11.76V | Upper limit | |
| | 27648 | 0x6C00 | 10V | Normal range | |
| | 13824 | 0x3600 | 5V | | |
| | 0 | 0x0000 | 0V | | |
| 2~10V | >32511 | >0x7EFF | 0V | Overflow | D = 27648 x (U – 2) / 8<br>U = D x 8 / 27648 + 2 |
| | 32511 | 0x7EFF | 11.41V | Upper limit | |
| | 27648 | 0x6C00 | 10V | Normal range | |
| | 13824 | 0x3600 | 6V | | |
| | 0 | 0x0000 | 2V | | |
| | -4864 | 0xED00 | 0.59 V | Lower limit | |
| | <-4864 | <0xED00 | 0V | Underflow | |
| ±5V | >32511 | >0x7EFF | 0V | Overflow | D = 27648 x U / 5<br>U = D x 5 / 27648 |
| | 32511 | 0x7EFF | 5.88V | Upper limit | |
| | 27648 | 0x6C00 | 5V | Normal range | |
| | 13824 | 0x3600 | 2.5V | | |
| | 0 | 0x0000 | 0V | | |
| | -13824 | 0xCA00 | -2.5V | | |
| | -27648 | 0x9400 | -5V | | |
| | -32511 | 0x8100 | -5.88V | Lower limit | |
| | <-32511 | <0x8100 | 0V | Underflow | |
| 0~5V | >32511 | >0x7EFF | 0V | Overflow | D = 27648 x U / 5<br>U = D x 5 / 27648 |
| | 32511 | 0x7EFF | 5.88V | Upper limit | |
| | 27648 | 0x6C00 | 5V | Normal range | |
| | 13824 | 0x3600 | 2.5V | | |
| | 0 | 0x0000 | 0V | | |
| 1~5V | >32511 | >0x7EFF | 0V | Overflow | D = 27648 x (U – 1) / 4<br>U = D x 4 / 27648 + 1 |
| | 32511 | 0x7EFF | 5.7V | Upper limit | |
| | 27648 | 0x6C00 | 5V | Normal range | |
| | 13824 | 0x3600 | 3V | | |
| | 0 | 0x0000 | 1V | | |
| | -4864 | 0xED00 | 0.3V | Lower limit | |
| | <-4864 | <0xED00 | 0V | Underflow | |

# 3.30 DF20-M-8AO-U-4:8 channel Voltage outputModules

## 3.30.1 Technical Parameters

| **Electrical parameters** | |
|---|---|
| aislenumber | 8 |
| Signalscope | ±10V/0~10V/2~10V/±5V/0~5V/1~5V |
| Signal Type | Differential/Single-ended |
| Connection Type | 2-wire |
| Load Capacity | >1KΩ |
| Resolution/Accuracy | 16bit/0.1% |
| Load Type | Resistive load/capacitive load |
| System side current consumption | 35mA |
| Reverse circuit protection | support |
| Module failure alarm | support |
| **General parameters** | |
| Vibration Testing | 1g, in accordance with IEC 60068-2-6 |
| Shock Test | 15g, compliant with IEC 60068-2-27 |
| Electromagnetic compatibility testing | Compliant with EN 61000-4standard |
| Protection level | IP20 |
| Operating temperature | -25～75℃ |
| Storage temperature | -40℃~+85℃ |
| Relative humidity | 5～95%RH (no condensation) |
| Installation | 35mm rail mounting |
| Dimensions | 100mm × 12mm × 67mm |
| Maximum crimping area of wire | 2.5mm² |
| Maximum crimping area of wire | AWG14 |
| Minimum crimping area of wire | 0.2mm² |
| Minimum crimping area for wire | AWG28 |
| Line length | 8...9mm |

## 3.30.2 Status indicator lights and wiring diagram




The status indicator lights are shown in the table below:

| LED No | Status and meaning |
|---|---|
| PWR | On: The module is powered normally |
| | Off: Module power supply is abnormal |
| STA | On: Module initialization error |
| | Off: Module initialization is normal |
| | Flashing: The module is working in normal sampling state |
| LED1 | Off: No signal from the moduleOutput |
| | Flashing: The module has a signalOutput |
| LED2 | Off: No signal from the moduleOutput |
| | Flashing: The module has a signalOutput |
| LED3 | Off: No signal from the moduleOutput |
| | Flashing: The module has a signalOutput |
| LED4 | Off: No signal from the moduleOutput |
| | Flashing: The module has a signalOutput |
| LED5 | Off: No signal from the moduleOutput |
| | Flashing: The module has a signalOutput |
| LED6 | Off: No signal from the moduleOutput |
| | Flashing: The module has a signalOutput |
| LED7 | Off: No signal from the moduleOutput |
| | Flashing: The module has a signalOutput |
| LED8 | Off: No signal from the moduleOutput |

| | |
|---|---|
| | Flashing: The module has a signalOutput |

## 3.30.3 Module process data definition

| loseoutdata:8Word | |
|---|---|
| Word 1 | Set Value CH1: The first channel inputoutdata |
| Word 2 | Set Value CH2: The second channel inputoutdata |
| Word 3 | Set Value CH3: The third channel inputoutdata |
| Word 4 | Set Value CH4: The fourth channel inputoutdata |
| Word5 | Set Value CH5:fiveChannel Inputoutdata |
| Word6 | Set Value CH6:sixChannel Inputoutdata |
| Word7 | Set Value CH7:sevenChannel Inputoutdata |
| Word8 | Set Value CH8:eightChannel Inputoutdata |

Process Data Definition

| Signal range | Decimal data | Hexadecimal | Voltage value | scopeillustr | Conversion relationship |
|---|---|---|---|---|---|
| ±10V | >32511 | >0x7EFF | 0V | Overflow | D = 27648 x U / 10<br>U = D x 10 / 27648 |
| | 32511 | 0x7EFF | 11.76V | Upper limit | |
| | 27648 | 0x6C00 | 10V | Normal range | |
| | 13824 | 0x3600 | 5V | | |
| | 0 | 0x0000 | 0V | | |
| | -13824 | 0xCA00 | -5V | | |
| | -27648 | 0x9400 | -10V | | |
| | -32511 | 0x8100 | -11.76V | Lower limit | |
| | <-32511 | <0x8100 | 0V | Underflow | |
| 0~10V | >32511 | >0x7EFF | 0V | Overflow | D = 27648 x U / 10<br>U = D x 10 / 27648 |
| | 32511 | 0x7EFF | 11.76V | Upper limit | |
| | 27648 | 0x6C00 | 10V | Normal range | |
| | 13824 | 0x3600 | 5V | | |
| | 0 | 0x0000 | 0V | | |
| 2~10V | >32511 | >0x7EFF | 0V | Overflow | D = 27648 x (U – 2) / 8<br>U = D x 8 / 27648 + 2 |
| | 32511 | 0x7EFF | 11.41V | Upper limit | |
| | 27648 | 0x6C00 | 10V | Normal range | |
| | 13824 | 0x3600 | 6V | | |
| | 0 | 0x0000 | 2V | | |
| | -4864 | 0xED00 | 0.59 V | Lower limit | |
| | <-4864 | <0xED00 | 0V | Underflow | |
| ±5V | >32511 | >0x7EFF | 0V | Overflow | D = 27648 x U / 5<br>U = D x 5 / 27648 |
| | 32511 | 0x7EFF | 5.88V | Upper limit | |
| | 27648 | 0x6C00 | 5V | Normal range | |
| | 13824 | 0x3600 | 2.5V | | |
| | 0 | 0x0000 | 0V | | |
| | -13824 | 0xCA00 | -2.5V | | |

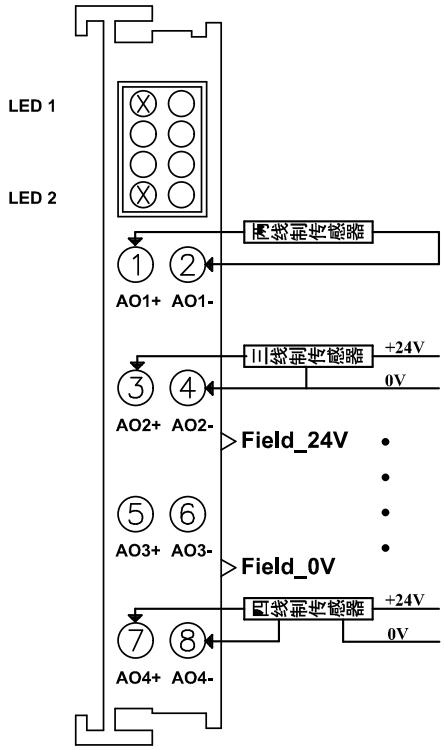
| | | | | | |
|---|---|---|---|---|---|
| 0~5V | -27648 | 0x9400 | -5V | | D = 27648 x U / 5<br>U = D x 5 / 27648 |
| | -32511 | 0x8100 | -5.88V | Lower limit | |
| | <-32511 | <0x8100 | 0V | Underflow | |
| | >32511 | >0x7EFF | 0V | Overflow | |
| | 32511 | 0x7EFF | 5.88V | Upper limit | |
| | 27648 | 0x6C00 | 5V | Normal range | |
| | 13824 | 0x3600 | 2.5V | | |
| | 0 | 0x0000 | 0V | | |
| 1~5V | >32511 | >0x7EFF | 0V | Overflow | D = 27648 x (U – 1) / 4<br>U = D x 4 / 27648 + 1 |
| | 32511 | 0x7EFF | 5.7V | Upper limit | |
| | 27648 | 0x6C00 | 5V | Normal range | |
| | 13824 | 0x3600 | 3V | | |
| | 0 | 0x0000 | 1V | | |
| | -4864 | 0xED00 | 0.3V | Lower limit | |
| | <-4864 | <0xED00 | 0V | Underflow | |

# 3.31 DF20-M-4AO-I-5:4 channel Current outputModules

## 3.31.1 Technical Parameters

| **Electrical parameters** | |
|---|---|
| aislenumber | 4 |
| Signalscope | 0~20mA/4~20mA |
| Signal Type | Differential/Single-ended |
| Connection Type | 2-wire |
| Load Capacity | <500Ω |
| Resolution/Accuracy | 16bit/0.1% |
| Load Type | Resistive load/capacitive load |
| System side current consumption | 600mA |
| Reverse circuit protection | support |
| Module failure alarm | support |
| **General parameters** | |
| Vibration Testing | 1g, in accordance with IEC 60068-2-6 |
| Shock Test | 15g, compliant with IEC 60068-2-27 |
| Electromagnetic compatibility testing | Compliant with EN 61000-4standard |
| Protection level | IP20 |
| Operating temperature | -25～75℃ |
| Storage temperature | -40℃~+85℃ |
| Relative humidity | 5～95%RH (no condensation) |
| Installation | 35mm rail mounting |
| Dimensions | 100mm × 12mm × 67mm |
| Maximum crimping area of wire | 2.5mm² |
| Maximum crimping area of wire | AWG14 |
| Minimum crimping area of wire | 0.2mm² |
| Minimum crimping area for wire | AWG28 |
| Line length | 8...9mm |

## 3.31.2 Status indicator lights and wiring diagram




The status indicator lights are shown in the table below:

| LED No | Status and meaning |
|---|---|
| LED1 | On: The module is powered normally |
| | Off: Module power supply is abnormal |
| LED2 | On: Module initialization error |
| | Off: Module initialization is normal |
| | Flashing: The module is working in normal output state |

## 3.31.3 Module process data definition

| loseoutData: 4 Words | |
|---|---|
| Word 1 | Set Value CH1: The first channel inputoutdata |
| Word 2 | Set Value CH2: The second channel inputoutdata |
| Word 3 | Set Value CH3: The third channel inputoutdata |
| Word 4 | Set Value CH4: The fourth channel inputoutdata |

Process Data Definition

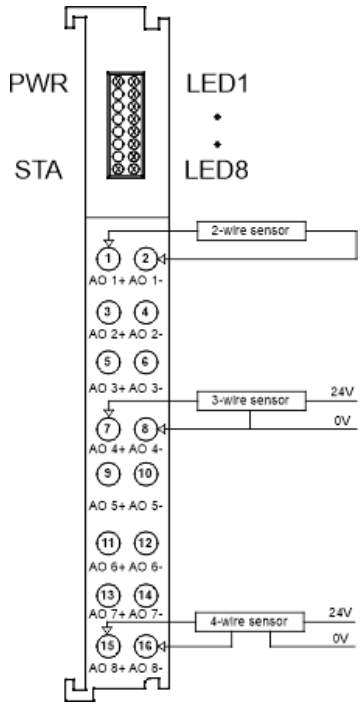
| Signal range | Decimal data | Hexadecimal data | Current value (I) | scope | Conversion relationship |
|---|---|---|---|---|---|
| 0 ~ 20 mA | >32511 | >0x7EFF | 0mA | Overflow | D = 27648 x I / 20<br>I = D x 20 / 27648 |
| | 32511 | 0x7EFF | 23.52 mA | Upper limit | |
| | 27648 | 0x6C00 | 20 mA | Normal range | |
| | 13824 | 0x3600 | 10 mA | | |
| | 0 | 0 | 0 mA | | |
| 4 ~20 mA | >32511 | >0x7EFF | 0mA | Overflow | D = 27648 x (I – 4) / 16<br>I = D x 16 / 27648 + 4 |
| | 32511 | 0x7EFF | 22.81 mA | Upper limit | |
| | 27648 | 0x6C00 | 20 mA | Normal range | |
| | 13824 | 0x3600 | 12 mA | | |
| | 0 | 0 | 4 mA | | |
| | -4864 | 0xED00 | 1.19 mA | Lower limit | |
| | <-4864 | <0xED00 | 0mA | Underflow | |

# 3.32 DF20-M-8AO-I-5:8 channel Current outputModules

## 3.32.1 Technical Parameters

| **Electrical parameters** | |
|---|---|
| aislenumber | 8 |
| Signalscope | 0~20mA/4~20mA |
| Signal Type | Differential/Single-ended |
| Connection Type | 2-wire |
| Load Capacity | <500Ω |
| Resolution/Accuracy | 16bit/0.1% |
| Load Type | Resistive load/capacitive load |
| System side current consumption | 35mA |
| Reverse circuit protection | support |
| Module failure alarm | support |
| **General parameters** | |
| Vibration Testing | 1g, in accordance with IEC 60068-2-6 |
| Shock Test | 15g, compliant with IEC 60068-2-27 |
| Electromagnetic compatibility testing | Compliant with EN 61000-4standard |
| Protection level | IP20 |
| Operating temperature | -25～75℃ |
| Storage temperature | -40℃~+85℃ |
| Relative humidity | 5～95%RH (no condensation) |
| Installation | 35mm rail mounting |
| Dimensions | 100mm × 12mm × 67mm |
| Maximum crimping area of wire | 2.5mm² |
| Maximum crimping area of wire | AWG14 |
| Minimum crimping area of wire | 0.2mm² |
| Minimum crimping area for wire | AWG28 |
| Line length | 8...9mm |

## 3.32.2 Status indicator lights and wiring diagram




The status indicator lights are shown in the table below:

| LED No | Status and meaning |
|---|---|
| PWR | On: The module is powered normally |
| | Off: Module power supply is abnormal |
| STA | On: Module initialization error |
| | Off: Module initialization is normal |
| | Flashing: The module is working in normal sampling state |
| LED1 | Off: The module has no output signal |
| | Flashing: module output signal |
| LED2 | Off: The module has no output signal |
| | Flashing: module output signal |
| LED3 | Off: The module has no output signal |
| | Flashing: module output signal |
| LED4 | Off: The module has no output signal |
| | Flashing: module output signal |
| LED5 | Off: The module has no output signal |
| | Flashing: module output signal |
| LED6 | Off: The module has no output signal |
| | Flashing: module output signal |
| LED7 | Off: The module has no output signal |
| | Flashing: module output signal |
| LED8 | Off: The module has no output signal |
| | Flashing: module output signal |

## 3.32.3 Module process data definition

| loseoutdata:8Word | |
|---|---|
| Word 1 | Set Value CH1: The first channel inputoutdata |
| Word 2 | Set Value CH2: The second channel inputoutdata |
| Word 3 | Set Value CH3: The third channel inputoutdata |
| Word 4 | Set Value CH4: The fourth channel inputoutdata |
| Word5 | Set Value CH5:fiveChannel Inputoutdata |
| Word6 | Set Value CH6:sixChannel Inputoutdata |
| Word7 | Set Value CH7:sevenChannel Inputoutdata |
| Word8 | Set Value CH8:eightChannel Inputoutdata |

Process Data Definition

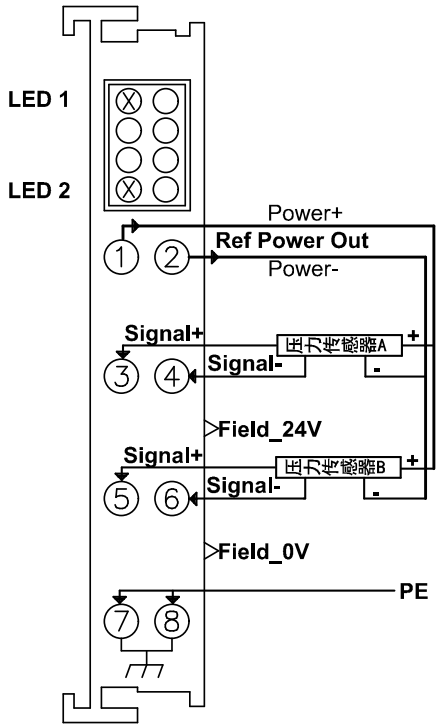
| Signal range | Decimal data | Hexadecimal data | Current value (I) | scope | Conversion relationship |
|---|---|---|---|---|---|
| 0 ~ 20 mA | >32511 | >0x7EFF | 0mA | Overflow | D = 27648 x I / 20<br>I = D x 20 / 27648 |
| | 32511 | 0x7EFF | 23.52 mA | Upper limit | |
| | 27648 | 0x6C00 | 20 mA | Normal range | |
| | 13824 | 0x3600 | 10 mA | | |
| | 0 | 0 | 0 mA | | |
| 4 ~20 mA | >32511 | >0x7EFF | 0mA | Overflow | D = 27648 x (I – 4) / 16<br>I = D x 16 / 27648 + 4 |
| | 32511 | 0x7EFF | 22.81 mA | Upper limit | |
| | 27648 | 0x6C00 | 20 mA | Normal range | |
| | 13824 | 0x3600 | 12 mA | | |
| | 0 | 0 | 4 mA | | |
| | -4864 | 0xED00 | 1.19 mA | Lower limit | |
| | <-4864 | <0xED00 | 0mA | Underflow | |

# 3.33 DF20-M-2LC-S-5:2 channel Pressure sensor inputModules

## 3.33.1 Technical Parameters

| **Electrical parameters** | |
|---|---|
| aislenumber | 2 |
| Signalscope | 0~10mv |
| Signal Type | Differential/Single-ended |
| Connection Type | 3-wire/4-wire |
| Excitation power output | 5V DC |
| Resolution/Accuracy | 16bit/0.2% |
| Sampling frequency | 20Hz~300HzConfigurable |
| System side current consumption | 210mA |
| Reverse circuit protection | support |
| Module failure alarm | support |
| **General parameters** | |
| Vibration Testing | 1g, in accordance with IEC 60068-2-6 |
| Shock Test | 15g, compliant with IEC 60068-2-27 |
| Electromagnetic compatibility testing | Compliant with EN 61000-4standard |
| Protection level | IP20 |
| Operating temperature | -25～75℃ |
| Storage temperature | -40℃~+85℃ |
| Relative humidity | 5～95%RH (no condensation) |
| Installation | 35mm rail mounting |
| Dimensions | 100mm × 12mm × 67mm |
| Maximum crimping area of wire | 2.5mm² |
| Maximum crimping area of wire | AWG14 |
| Minimum crimping area of wire | 0.2mm² |
| Minimum crimping area for wire | AWG28 |
| Line length | 8...9mm |

### 3.33.2 Status indicator light and wiring diagram




The status indicator lights are shown in the table below:

| LED No | Status and meaning |
|---|---|
| LED1 | On: The module is powered normally |
| | Off: Module power supply is abnormal |
| LED2 | On: Module initialization error |
| | Off: Module initialization is normal |
| | Flashing: The module is working in normal input state |

### 3.28.3 Module process data definition

| Input data:2Word | |
|---|---|
| Word2 | LC Value CH1: First channel input data |
| Word3 | LC Value CH2: Second channel input data |

Definition of various sensor process data

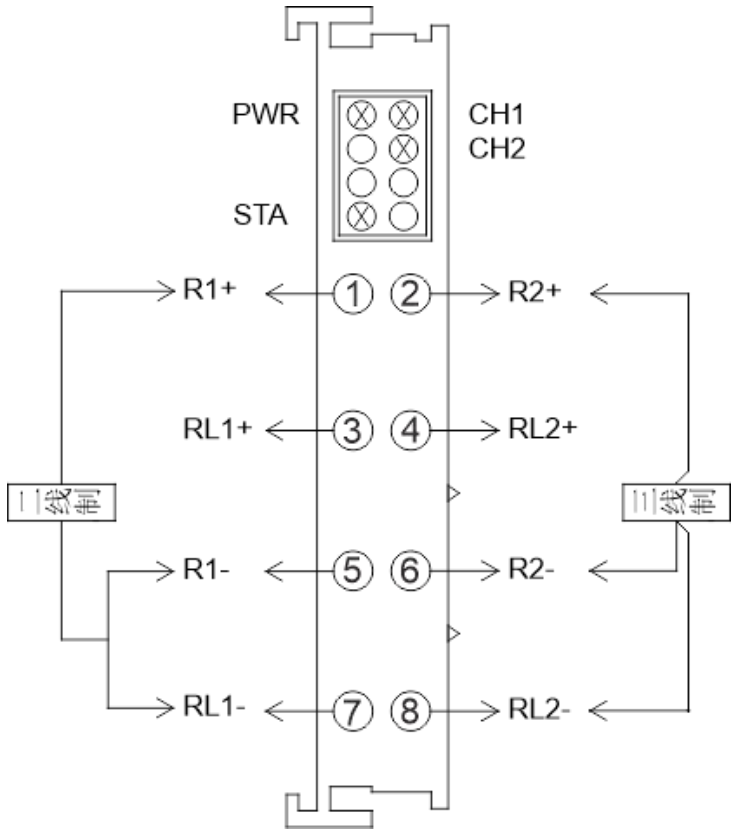
| Signal range | Weighing | Decimal data | Hexadecimal data | Voltage value（U） |
|---|---|---|---|---|
| 0~5KG(0~10mv) Pressure Sensors | 5 | 27648 | 0x7FFF | 10 mV |
| | 2.5 | 13824 | 0x3FFF | 5mV |
| | 0 | 0 | 0x0000 | 0 mV |

# 3.34 DF20-M-2RTD-PT: 2 channel Thermal resistor sensor inputModules

## 3.34.1 Technical parameters

| **Electrical parameters** | |
|---|---|
| aislenumber | 2 |
| Connection Type | 2-wire/3-wire |
| temperatureResolution(Temperatur | Temperature value:0.1℃/each digit |
| Resistance value conversion formula (measurement resistance value) | Ractual = D/27648*R amount<br>in:Ris the current resistance value;R amountis the rated range value of the resistance. |
| Sampling frequency | Configurable |
| Sensor Type | PT100, PT200, PT500, PT1000, Ni100, Ni120, Ni200, Ni500, Ni1000, Cu10, Cu50, Cu53, Cu100, KTY84-130, KTY84-150, KTY84-151, 40 Ohm, 80 Ohm, 150 Ohm, 300 Ohm, 500 Ohm, 1000 Ohm, 2000 Ohm, 4000 Ohm, KTY83-110, KTY83-120, KTY83-121, KTY83-122, KTY83-150, KTY83-151, NTC-5K, NTC-10K |
| Disconnection detection | support |
| System side current consumption | 70mA |
| Reverse circuit protection | support |
| Module failure alarm | support |
| **General parameters** | |
| Vibration Testing | 1g, in accordance with IEC 60068-2-6 |
| Shock Test | 15g, compliant with IEC 60068-2-27 |
| Electromagnetic compatibility | Compliant with EN 61000-4standard |
| Protection level | IP20 |
| Operating temperature | -25～75℃ |
| Storage temperature | -40℃~+85℃ |
| Relative humidity | 5～95%RH (no condensation) |
| Installation | 35mm rail mounting |
| Dimensions | 100mm × 12mm × 67mm |
| Maximum crimping area of | 2.5mm² |
| Maximum crimping area of | AWG14 |
| Minimum crimping area of | 0.2mm² |
| Minimum crimping area for wire | AWG28 |
| Line length | 8...9mm |

## 3.34.2 Status indicator light and wiring diagram




The status indicator lights are shown in the table below:

| LED No | Status and meaning |
|---|---|
| LED1 | On: The module is powered normally |
| | Off: Module power supply is abnormal |
| LED2 | Power-on stage:Always on when powered on;<br>Turns off after the internal bus is initialized.. |
| | Operational stage: Flashes when the module is running normally;<br>When the module is running abnormally, it is always on or off |
| CH1 | First channel indicator |

| | |
|---|---|
| CH2 | Second channel indicator |

## 3.34.3 Module process data definition

| Input data:2Word | |
|---|---|
| Word 1 | RTD Input CH1: First channel input data |
| Word 2 | RTD Input CH2: Second channel input data |

Definition of various sensor process data

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

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

| PT500 | | | |
|---|---|---|---|
| temperature | Decimal | hexadecimal | Scope |
| >850 | 32767 | 0x7FFF | Overflow |
| 850 | 8500 | 0x2134 | Normal range |
| -200 | -2000 | 0xF830 | |
| <-200 | -32767 | 0x8001 | Underflow |

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

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

| Ni100 | | | |
|---|---|---|---|
| temperature | Decimal | hexadecimal | Scope |
| >250 | 32767 | 0x7FFF | Overflow |
| 250 | 2500 | 0x09C4 | Normal range |
| -60 | -600 | 0xFDA8 | |
| <-60 | -32767 | 0x8001 | Underflow |
| Sensor not connected | -32768 | 0x8000 | Disconnection detection |

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

| NI200 |
|---|

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

| Ni500 | | | |
|---|---|---|---|
| temperature | Decimal | hexadecimal | Scope |
| >250 | 32767 | 0x7FFF | Overflow |
| 250 | 2500 | 0x09C4 | Normal range |
| -60 | -600 | 0xFDA8 | |
| <-60 | -32767 | 0x8001 | Underflow |
| Sensor not connected | -32768 | 0x8000 | Disconnection detection |

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

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

| | | | |
|---|---|---|---|
| <-59 | -32767 | 0x8001 | Underflow |
| Sensor not connected | -32768 | 0x8000 | Disconnection detection |

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

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

| Cu100 | | | |
|---|---|---|---|
| temperature | Decimal | hexadecimal | Scope |
| >159 | 32767 | 0x7FFF | Overflow |
| 159 | 1590 | 0x0636 | Normal range |
| -59 | -590 | 0xFDB2 | |
| <-59 | -32767 | 0x8001 | Underflow |
| Sensor not connected | -32768 | 0x8000 | Disconnection detection |

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

| KTY84_150 | | | |
|---|---|---|---|
| temperature | Decimal | hexadecimal | Scope |
| >280 | 32767 | 0x7FFF | Overflow |
| 280 | 2800 | 0x0AF0 | Normal range |
| -40 | -400 | 0xFE70 | |
| <-40 | -32767 | 0x8001 | Underflow |
| Sensor not connected | -32768 | 0x8000 | Disconnection detection |

| KTY84_151 | | | |
|---|---|---|---|
| temperature | Decimal | hexadecimal | Scope |
| >280 | 32767 | 0x7FFF | Overflow |
| 280 | 2800 | 0x0AF0 | Normal range |
| -40 | -400 | 0xFE70 | |
| <-40 | -32767 | 0x8001 | Underflow |
| Sensor not connected | -32768 | 0x8000 | Disconnection detection |

| 0-40ohm type | | | |
|---|---|---|---|
| Ohm value | Decimal | hexadecimal | Scope |
| >319.25ohm | -32768 | 0x8000 | Beyond the limit |
| >47.03ohm | 32767 | 0x7FFF | Upper limit |
| 47.03ohm | 32511 | 0x7EFF | Overflow |

| | | | |
|---|---|---|---|
| 40ohm | 27648 | 0x6C00 | Normal range |
| 0ohm | 0 | 0x0000 | |
| Sensor not connected | -32768 | 0x8000 | Disconnection detection |

| 0-80ohm type | | | |
|---|---|---|---|
| Ohm value | Decimal | hexadecimal | Scope |
| >319.25ohm | -32768 | 0x8000 | Beyond the limit |
| >94.07ohm | 32767 | 0x7FFF | Upper limit |
| 94.07ohm | 32511 | 0x7EFF | Overflow |
| 80ohm | 27648 | 0x6C00 | Normal range |
| 0ohm | 0 | 0x0000 | |
| Sensor not connected | -32768 | 0x8000 | Disconnection detection |

| 0-150ohm type | | | |
|---|---|---|---|
| Ohm value | Decimal | hexadecimal | Scope |
| >319.25ohm | -32768 | 0x8000 | Beyond the limit |
| >176.38ohm | 32767 | 0x7FFF | Upper limit |
| 176.38ohm | 32511 | 0x7EFF | Overflow |
| 150ohm | 27648 | 0x6C00 | Normal range |
| 0ohm | 0 | 0x0000 | |
| Sensor not connected | -32768 | 0x8000 | Disconnection detection |

| 0-300ohm type | | | |
|---|---|---|---|
| Ohm value | Decimal | hexadecimal | Scope |
| >638.5ohm | -32768 | 0x8000 | Beyond the limit |
| >352.77ohm | 32767 | 0x7FFF | Upper limit |
| 352.77ohm | 32511 | 0x7EFF | Overflow |
| 300ohm | 27648 | 0x6C00 | Normal range |
| 0ohm | 0 | 0x0000 | |
| Sensor not | -32768 | 0x8000 | Disconnection |

| | | | |
|---|---|---|---|
| connected | | | detection |

| 0-500ohm type | | | |
|---|---|---|---|
| Ohm value | Decimal | hexadecimal | Scope |
| >638.5ohm | -32768 | 0x8000 | Beyond the limit |
| >587.94ohm | 32767 | 0x7FFF | Upper limit |
| 587.94ohm | 32511 | 0x7EFF | Overflow |
| 500ohm | 27648 | 0x6C00 | Normal range |
| 0ohm | 0 | 0x0000 | |
| Sensor not connected | -32768 | 0x8000 | Disconnection detection |

| 0-1000ohm type | | | |
|---|---|---|---|
| Ohm value | Decimal | hexadecimal | Scope |
| >1277ohm | -32768 | 0x8000 | Beyond the limit |
| >1175.89ohm | 32767 | 0x7FFF | Upper limit |
| 1175.89ohm | 32511 | 0x7EFF | Overflow |
| 1000ohm | 27648 | 0x6C00 | Normal range |
| 0ohm | 0 | 0x0000 | |
| Sensor not connected | -32768 | 0x8000 | Disconnection detection |

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

| 0-4000ohm type | | | |
|---|---|---|---|
| Ohm value | Decimal | hexadecimal | Scope |
| >5108ohm | -32768 | 0x8000 | Beyond the limit |
| >4703.56ohm | 32767 | 0x7FFF | Upper limit |
| 4703.56ohm | 32511 | 0x7EFF | Overflow |
| 4000ohm | 27648 | 0x6C00 | Normal range |
| 0ohm | 0 | 0 | |
| Sensor not connected | -32768 | 0x8000 | Disconnection detection |

| KTY83-110 | | | |
|---|---|---|---|
| temperature | Decimal | hexadecimal | Scope |
| >175 | 32767 | 0x7FFF | Overflow |
| 175 | 1750 | 0x06D6 | Normal range |
| -55 | -550 | 0xFDDA | |
| <-55 | -32767 | 0x8001 | Underflow |
| Sensor not connected | -32768 | 0x8000 | Disconnection detection |

| KTY83-120 | | | |
|---|---|---|---|
| temperature | Decimal | hexadecimal | Scope |
| >175 | 32767 | 0x7FFF | Overflow |
| 175 | 1750 | 0x06D6 | Normal range |
| -55 | -550 | 0xFDDA | |
| <-55 | -32767 | 0x8001 | Underflow |
| Sensor not connected | -32768 | 0x8000 | Disconnection detection |

| KTY83-121 | | | |
|---|---|---|---|
| temperature | Decimal | hexadecimal | Scope |
| >175 | 32767 | 0x7FFF | Overflow |
| 175 | 1750 | 0x06D6 | Normal range |
| -55 | -550 | 0xFDDA | |
| <-55 | -32767 | 0x8001 | Underflow |
| Sensor not connected | -32768 | 0x8000 | Disconnection detection |

| KTY83-122 | | | |
|---|---|---|---|
| temperature | Decimal | hexadecimal | Scope |
| >175 | 32767 | 0x7FFF | Overflow |
| 175 | 1750 | 0x06D6 | Normal range |
| -55 | -550 | 0xFDDA | |

| | | | |
|---|---|---|---|
| <-55 | -32767 | 0x8001 | Underflow |
| Sensor not connected | -32768 | 0x8000 | Disconnection detection |

| KTY83-150 | | | |
|---|---|---|---|
| temperature | Decimal | hexadecimal | Scope |
| >175 | 32767 | 0x7FFF | Overflow |
| 175 | 1750 | 0x06D6 | Normal range |
| -55 | -550 | 0xFDDA | |
| <-55 | -32767 | 0x8001 | Underflow |
| Sensor not connected | -32768 | 0x8000 | Disconnection detection |

| KTY83-151 | | | |
|---|---|---|---|
| temperature | Decimal | hexadecimal | Scope |
| >175 | 32767 | 0x7FFF | Overflow |
| 175 | 1750 | 0x06D6 | Normal range |
| -55 | -550 | 0xFDDA | |
| <-55 | -32767 | 0x8001 | Underflow |
| Sensor not connected | -32768 | 0x8000 | Disconnection detection |

| NTC-5K | | | |
|---|---|---|---|
| temperature | Decimal | hexadecimal | Scope |
| >90 | 32767 | 0x7FFF | Overflow |
| 90 | 900 | 0x0384 | Normal range |
| -30 | -300 | 0xFED4 | |
| <-30 | -32767 | 0x8001 | Underflow |
| Sensor not connected | -32768 | 0x8000 | Disconnection detection |

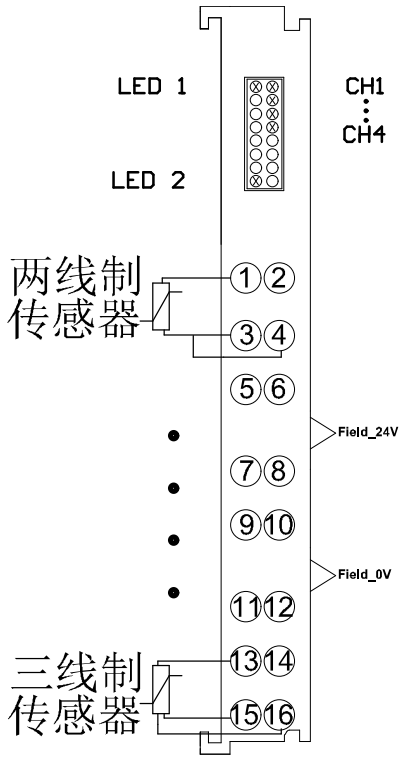
| NTC-10K | | | |
|---|---|---|---|
| temperature | Decimal | hexadecimal | Scope |
| >150 | 32767 | 0x7FFF | Overflow |
| 150 | 1500 | 0x05DC | Normal range |
| 25 | 250 | 0x00FA | |
| <25 | -32767 | 0x8001 | Underflow |
| Sensor not connected | -32768 | 0x8000 | Disconnection detection |

# 3.35 DF20-M-4RTD-PT: 4 channel Thermal resistor sensor inputModules

## 3.35.1 Technical parameters

| **Electrical parameters** | |
|---|---|
| aislenumber | 4 |
| Connection Type | 2-wire/3-wire |
| temperatureResolution(Temperatur | Temperature value:0.1℃/each digit |
| Resistance value conversion formula (measurement resistance value) | Ractual = D/27648*R amount<br>in:Ris the current resistance value;R amountis the rated range value of the resistance. |
| Sampling frequency | Configurable |
| Sensor Type | PT100, PT200, PT500, PT1000, Ni100, Ni120, Ni200, Ni500, Ni1000, Cu10, Cu50, Cu53, Cu100, KTY84-130, KTY84-150, KTY84-151, 40 Ohm, 80 Ohm, 150 Ohm, 300 Ohm, 500 Ohm, 1000 Ohm, 2000 Ohm, 4000 Ohm, KTY83-110, KTY83-120, KTY83-121, KTY83-122, KTY83-150, KTY83-151, NTC-5K, NTC-10K |
| Disconnection detection | support |
| System side current consumption | 70mA |
| Reverse circuit protection | support |
| Module failure alarm | support |
| **General parameters** | |
| Vibration Testing | 1g, in accordance with IEC 60068-2-6 |
| Shock Test | 15g, compliant with IEC 60068-2-27 |
| Electromagnetic compatibility | Compliant with EN 61000-4standard |
| Protection level | IP20 |
| Operating temperature | -25～75℃ |
| Storage temperature | -40℃~+85℃ |
| Relative humidity | 5～95%RH (no condensation) |
| Installation | 35mm rail mounting |
| Dimensions | 100mm × 12mm × 67mm |
| Maximum crimping area of | 2.5mm² |
| Maximum crimping area of | AWG14 |
| Minimum crimping area of | 0.2mm² |
| Minimum crimping area for wire | AWG28 |
| Line length | 8...9mm |

## 3.35.2 Status indicator light and wiring diagram




The status indicator lights are shown in the table below:

| LED No | Status and meaning |
|---|---|
| PWR | On: The module is powered normally |
| | Off: Module power supply is abnormal |
| L/A | Power-on stage:Always on when powered on;<br>Turns off after the internal bus is initialized.. |
| | Operational stage: Flashes when the module is running normally;<br>When the module is running abnormally, it is always on or off |
| CH1 | First channel indicator |
| CH2 | Second channel indicator |
| CH3 | The third channel indicator |
| CH4 | The fourth channel indicator |

## 3.35.3 Module process data definition

| Input data:4Word | |
|---|---|
| Word 1 | RTD Input CH1: First channel input data |
| Word 2 | RTD Input CH2: Second channel input data |

| | |
|---|---|
| Word3 | RTD Input CH3:threeChannel input data |
| Word4 | RTD Input CH4:FourChannel input data |

Definition of various sensor process data

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

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

| PT500 | | | |
|---|---|---|---|
| temperature | Decimal | hexadecimal | Scope |
| >850 | 32767 | 0x7FFF | Overflow |
| 850 | 8500 | 0x2134 | Normal range |
| -200 | -2000 | 0xF830 | |
| <-200 | -32767 | 0x8001 | Underflow |
| Sensor not connected | -32768 | 0x8000 | Disconnection detection |

| PT1000 |
|---|

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

| Ni100 | | | |
|---|---|---|---|
| temperature | Decimal | hexadecimal | Scope |
| >250 | 32767 | 0x7FFF | Overflow |
| 250 | 2500 | 0x09C4 | Normal range |
| -60 | -600 | 0xFDA8 | |
| <-60 | -32767 | 0x8001 | Underflow |
| Sensor not connected | -32768 | 0x8000 | Disconnection detection |

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

| NI200 | | | |
|---|---|---|---|
| temperature | Decimal | hexadecimal | Scope |
| >250 | 32767 | 0x7FFF | Overflow |
| 250 | 2500 | 0x09C4 | Normal range |
| -60 | -600 | 0xFDA8 | |

| | | | |
|---|---|---|---|
| <-60 | -32767 | 0x8001 | Underflow |
| Sensor not connected | -32768 | 0x8000 | Disconnection detection |

| Ni500 | | | |
|---|---|---|---|
| temperature | Decimal | hexadecimal | Scope |
| >250 | 32767 | 0x7FFF | Overflow |
| 250 | 2500 | 0x09C4 | Normal range |
| -60 | -600 | 0xFDA8 | |
| <-60 | -32767 | 0x8001 | Underflow |
| Sensor not connected | -32768 | 0x8000 | Disconnection detection |

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

| Cu10 type | | | |
|---|---|---|---|
| temperature | Decimal | hexadecimal | Scope |
| >159 | 32767 | 0x7FFF | Overflow |
| 159 | 1590 | 0x0636 | Normal range |
| -59 | -590 | 0xFDB2 | |
| <-59 | -32767 | 0x8001 | Underflow |
| Sensor not connected | -32768 | 0x8000 | Disconnection detection |

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

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

| Cu100 | | | |
|---|---|---|---|
| temperature | Decimal | hexadecimal | Scope |
| >159 | 32767 | 0x7FFF | Overflow |
| 159 | 1590 | 0x0636 | Normal range |
| -59 | -590 | 0xFDB2 | |
| <-59 | -32767 | 0x8001 | Underflow |
| Sensor not connected | -32768 | 0x8000 | Disconnection detection |

| KTY84_130 | | | |
|---|---|---|---|
| temperature | Decimal | hexadecimal | Scope |
| >280 | 32767 | 0x7FFF | Overflow |
| 280 | 2800 | 0x0AF0 | Normal range |

| | | | |
|---|---|---|---|
| -40 | -400 | 0xFE70 | |
| <-40 | -32767 | 0x8001 | Underflow |
| Sensor not connected | -32768 | 0x8000 | Disconnection detection |

| KTY84_150 | | | |
|---|---|---|---|
| temperature | Decimal | hexadecimal | Scope |
| >280 | 32767 | 0x7FFF | Overflow |
| 280 | 2800 | 0x0AF0 | Normal range |
| -40 | -400 | 0xFE70 | |
| <-40 | -32767 | 0x8001 | Underflow |
| Sensor not connected | -32768 | 0x8000 | Disconnection detection |

| KTY84_151 | | | |
|---|---|---|---|
| temperature | Decimal | hexadecimal | Scope |
| >280 | 32767 | 0x7FFF | Overflow |
| 280 | 2800 | 0x0AF0 | Normal range |
| -40 | -400 | 0xFE70 | |
| <-40 | -32767 | 0x8001 | Underflow |
| Sensor not connected | -32768 | 0x8000 | Disconnection detection |

| 0-40ohm type | | | |
|---|---|---|---|
| Ohm value | Decimal | hexadecimal | Scope |
| >319.25ohm | -32768 | 0x8000 | Beyond the limit |
| >47.03ohm | 32767 | 0x7FFF | Upper limit |

| | | | |
|---|---|---|---|
| 47.03ohm | 32511 | 0x7EFF | Overflow |
| 40ohm | 27648 | 0x6C00 | Normal range |
| 0ohm | 0 | 0x0000 | |
| Sensor not connected | -32768 | 0x8000 | Disconnection detection |

| 0-80ohm type | | | |
|---|---|---|---|
| Ohm value | Decimal | hexadecimal | Scope |
| >319.25ohm | -32768 | 0x8000 | Beyond the limit |
| >94.07ohm | 32767 | 0x7FFF | Upper limit |
| 94.07ohm | 32511 | 0x7EFF | Overflow |
| 80ohm | 27648 | 0x6C00 | Normal range |
| 0ohm | 0 | 0x0000 | |
| Sensor not connected | -32768 | 0x8000 | Disconnection detection |

| 0-150ohm type | | | |
|---|---|---|---|
| Ohm value | Decimal | hexadecimal | Scope |
| >319.25ohm | -32768 | 0x8000 | Beyond the limit |
| >176.38ohm | 32767 | 0x7FFF | Upper limit |
| 176.38ohm | 32511 | 0x7EFF | Overflow |
| 150ohm | 27648 | 0x6C00 | Normal range |
| 0ohm | 0 | 0x0000 | |
| Sensor not connected | -32768 | 0x8000 | Disconnection detection |

| 0-300ohm type | | | |
|---|---|---|---|
| Ohm value | Decimal | hexadecimal | Scope |
| >638.5ohm | -32768 | 0x8000 | Beyond the limit |
| >352.77ohm | 32767 | 0x7FFF | Upper limit |
| 352.77ohm | 32511 | 0x7EFF | Overflow |
| 300ohm | 27648 | 0x6C00 | Normal range |
| 0ohm | 0 | 0x0000 | |

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

| 0-500ohm type | | | |
|---|---|---|---|
| Ohm value | Decimal | hexadecimal | Scope |
| >638.5ohm | -32768 | 0x8000 | Beyond the limit |
| >587.94ohm | 32767 | 0x7FFF | Upper limit |
| 587.94ohm | 32511 | 0x7EFF | Overflow |
| 500ohm | 27648 | 0x6C00 | Normal range |
| 0ohm | 0 | 0x0000 | |
| Sensor not connected | -32768 | 0x8000 | Disconnection detection |

| 0-1000ohm type | | | |
|---|---|---|---|
| Ohm value | Decimal | hexadecimal | Scope |
| >1277ohm | -32768 | 0x8000 | Beyond the limit |
| >1175.89ohm | 32767 | 0x7FFF | Upper limit |
| 1175.89ohm | 32511 | 0x7EFF | Overflow |
| 1000ohm | 27648 | 0x6C00 | Normal range |
| 0ohm | 0 | 0x0000 | |
| Sensor not connected | -32768 | 0x8000 | Disconnection detection |

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

| | | | |
|---|---|---|---|
| connected | | | detection |

| 0-4000ohm type | | | |
|---|---|---|---|
| Ohm value | Decimal | hexadecimal | Scope |
| >5108ohm | -32768 | 0x8000 | Beyond the limit |
| >4703.56ohm | 32767 | 0x7FFF | Upper limit |
| 4703.56ohm | 32511 | 0x7EFF | Overflow |
| 4000ohm | 27648 | 0x6C00 | Normal range |
| 0ohm | 0 | 0 | |
| Sensor not connected | -32768 | 0x8000 | Disconnection detection |

| KTY83-110 | | | |
|---|---|---|---|
| temperature | Decimal | hexadecimal | Scope |
| >175 | 32767 | 0x7FFF | Overflow |
| 175 | 1750 | 0x06D6 | Normal range |
| -55 | -550 | 0xFDDA | |
| <-55 | -32767 | 0x8001 | Underflow |
| Sensor not connected | -32768 | 0x8000 | Disconnection detection |

| KTY83-120 | | | |
|---|---|---|---|
| temperature | Decimal | hexadecimal | Scope |
| >175 | 32767 | 0x7FFF | Overflow |
| 175 | 1750 | 0x06D6 | Normal range |
| -55 | -550 | 0xFDDA | |
| <-55 | -32767 | 0x8001 | Underflow |
| Sensor not connected | -32768 | 0x8000 | Disconnection detection |

| KTY83-121 | | | |
|---|---|---|---|
| temperature | Decimal | hexadecimal | Scope |
| >175 | 32767 | 0x7FFF | Overflow |
| 175 | 1750 | 0x06D6 | Normal range |
| -55 | -550 | 0xFDDA | |
| <-55 | -32767 | 0x8001 | Underflow |
| Sensor not connected | -32768 | 0x8000 | Disconnection detection |

| KTY83-122 | | | |
|---|---|---|---|
| temperature | Decimal | hexadecimal | Scope |
| >175 | 32767 | 0x7FFF | Overflow |

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

| KTY83-150 | | | |
|---|---|---|---|
| temperature | Decimal | hexadecimal | Scope |
| >175 | 32767 | 0x7FFF | Overflow |
| 175 | 1750 | 0x06D6 | Normal range |
| -55 | -550 | 0xFDDA | |
| <-55 | -32767 | 0x8001 | Underflow |
| Sensor not connected | -32768 | 0x8000 | Disconnection detection |

| KTY83-151 | | | |
|---|---|---|---|
| temperature | Decimal | hexadecimal | Scope |
| >175 | 32767 | 0x7FFF | Overflow |
| 175 | 1750 | 0x06D6 | Normal range |
| -55 | -550 | 0xFDDA | |
| <-55 | -32767 | 0x8001 | Underflow |
| Sensor not connected | -32768 | 0x8000 | Disconnection detection |

| NTC-5K | | | |
|---|---|---|---|
| temperature | Decimal | hexadecimal | Scope |
| >90 | 32767 | 0x7FFF | Overflow |
| 90 | 900 | 0x0384 | Normal range |
| -30 | -300 | 0xFED4 | |
| <-30 | -32767 | 0x8001 | Underflow |
| Sensor not connected | -32768 | 0x8000 | Disconnection detection |

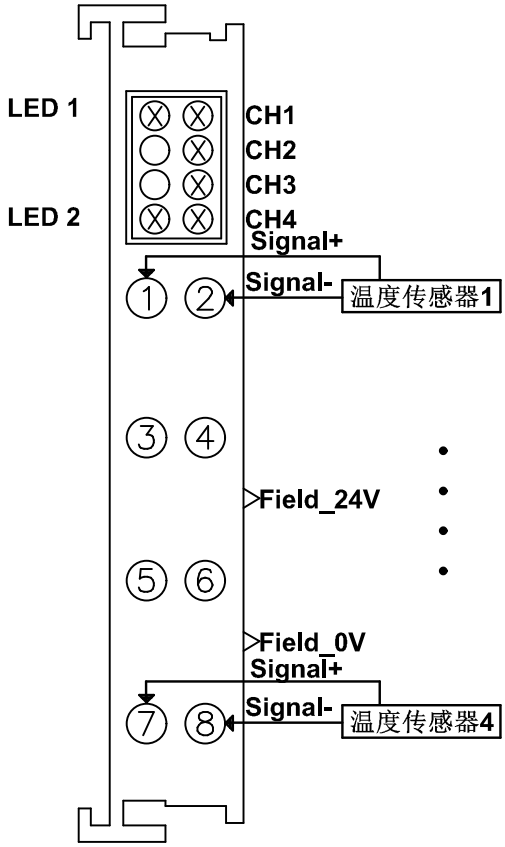
| NTC-10K | | | |
|---|---|---|---|
| temperature | Decimal | hexadecimal | Scope |
| >150 | 32767 | 0x7FFF | Overflow |
| 150 | 1500 | 0x05DC | Normal range |
| 25 | 250 | 0x00FA | |
| <25 | -32767 | 0x8001 | Underflow |
| Sensor not connected | -32768 | 0x8000 | Disconnection detection |

# 3.36 DF20-M-4TC-KETJ: 4 channel Thermocouple sensor inputModules

## 3.36.1 Technical parameters

| **Electrical parameters** | |
|---|---|
| aislenumber | 4 |
| Connection Type | 2-wire |
| temperatureResolution(Temperature | Temperature value:0.1℃/each digit |
| Voltage conversion formula (measure mV voltage value) | $V_{Real = D}/32767*V_{Forehead}$ in:$V_{Reality}$is the current voltage value; $V_{Forehead}$is the rated |
| Sampling frequency | Configurable, default 4Hz |
| Sensor type/signal range | K, E, T, J, B, S, R, N, C, L, 15.625mV, 31.25mV, 62.5mV, 125mV, 250mV, 500mV, 1000mV, 2000mV |
| Disconnection detection | support |
| System side current consumption | 70mA |
| Reverse circuit protection | support |
| Module failure alarm | support |
| **General parameters** | |
| Vibration Testing | 1g, in accordance with IEC 60068-2-6 |
| Shock Test | 15g, compliant with IEC 60068-2-27 |
| Electromagnetic compatibility | Compliant with EN 61000-4standard |
| Protection level | IP20 |
| Operating temperature | -25～75℃ |
| Storage temperature | -40°C~+85°C |
| Relative humidity | 5～95%RH (no condensation) |
| Installation | 35mm rail mounting |
| Dimensions | 100mm × 12mm × 67mm |
| Maximum crimping area of | 2.5mm² |
| Maximum crimping area of | AWG14 |
| Minimum crimping area of | 0.2mm² |
| Minimum crimping area for wire | AWG28 |
| Line length | 8...9mm |

## 3.36.2 Status indicator light and wiring diagram




The status indicator lights are shown in the table below:

| LED No | Status and meaning |
|---|---|
| PWR | On: The module is powered normally |
| | Off: Module power supply is abnormal |
| L/A | Power-on stage:Always on when powered on;<br>Turns off after the internal bus is initialized.. |
| | Operational stage: Flashes when the module is running normally;<br>When the module is running abnormally, it is always on or off |
| CH1 | First channel indicator |
| CH2 | Second channel indicator |
| CH3 | The third channel indicator |
| CH4 | The fourth channel indicator |

## 3.36.3 Module process data definition

| Input data:4Word | |
|---|---|
| Word 1 | TC Value CH1: First channel input data |
| Word 2 | TC Value CH2: Second channel input data |

| | |
|---|---|
| Word3 | TC Value CH3:threeChannel input data |
| Word4 | TC Value CH4:FourChannel input data |
| loseoutdata:4Word | |
| Word 1 | Offset Value CH1: First channel dataOffset |
| Word 2 | Offset Value CH2: Second channel dataOffset |
| Word3 | Offset Value CH3:threeChannel dataOffset |
| Word4 | Offset Value CH4:FourChannel dataOffset |

Process Data Definition

| K-Type | | | |
|---|---|---|---|
| temperature | Decimal | hexadecimal | Scope |
| >1370 | 32767 | 7FFF | Overflow |
| 1370 | 13700 | 3584 | Normal range |
| -270 | -2700 | F574 | |
| <-270 | -32767 | 8001 | Underflow |
| Sensor not connected | -32768 | 8000 | Disconnection detection |

| Type E | | | |
|---|---|---|---|
| temperature | Decimal | hexadecimal | Scope |
| >1000 | 32767 | 7FFF | Overflow |
| 1000 | 10000 | 2710 | Normal range |
| -270 | -2700 | F574 | |
| <-270 | -32767 | 8001 | Underflow |
| Sensor not connected | -32768 | 8000 | Disconnection detection |

| T-Type | | | |
|---|---|---|---|
| temperature | Decimal | hexadecimal | Scope |
| >400 | 32767 | 7FFF | Overflow |
| 400 | 4000 | FA0 | Normal range |
| -270 | -2700 | F574 | |
| <-270 | -32767 | 8001 | Underflow |
| Sensor not | -32768 | 8000 | Disconnection |

| | | | |
|---|---|---|---|
| connected | | | detection |

| J-Type | | | |
|---|---|---|---|
| temperature | Decimal | hexadecimal | Scope |
| >1200 | 32767 | 7FFF | Overflow |
| 1200 | 12000 | 2EE0 | Normal range |
| -210 | -2100 | F7CC | |
| <-210 | -32767 | 8001 | Underflow |
| Sensor not connected | -32768 | 8000 | Disconnection detection |

| Type B | | | |
|---|---|---|---|
| temperature | Decimal | hexadecimal | Scope |
| >1820 | 32767 | 7FFF | Overflow |
| 1820 | 18200 | 4718 | Normal range |
| 50 | 500 | 1F4 | |
| <50 | -32767 | 8001 | Underflow |
| Sensor not connected | -32768 | 8000 | Disconnection detection |

| S-Type | | | |
|---|---|---|---|
| temperature | Decimal | hexadecimal | Scope |
| >1760 | 32767 | 7FFF | Overflow |
| 1760 | 17600 | 44C0 | Normal range |
| -50 | -500 | FE0C | |
| <-50 | -32767 | 8001 | Underflow |
| Sensor not connected | -32768 | 8000 | Disconnection detection |

| R-Type | | | |
|---|---|---|---|
| temperature | Decimal | hexadecimal | Scope |

| | | | |
|---|---|---|---|
| >1770 | 32767 | 7FFF | Overflow |
| 1770 | 17700 | 4524 | Normal range |
| -50 | -500 | FE0C | |
| <-50 | -32767 | 8001 | Underflow |
| Sensor not connected | -32768 | 8000 | Disconnection detection |

| N-type | | | |
|---|---|---|---|
| temperature | Decimal | hexadecimal | Scope |
| >1300 | 32767 | 7FFF | Overflow |
| 1300 | 13000 | 32C8 | Normal range |
| -270 | -2700 | F574 | |
| <-270 | -32767 | 8001 | Underflow |
| Sensor not connected | -32768 | 8000 | Disconnection detection |

| Type C | | | |
|---|---|---|---|
| temperature | Decimal | hexadecimal | Scope |
| >2320 | 32767 | 7FFF | Overflow |
| 2320 | 23200 | 5AA0 | Normal range |
| 0 | 0 | 0 | |
| <0 | -32767 | 8001 | Underflow |
| Sensor not connected | -32768 | 8000 | Disconnection detection |

| L-type | | | |
|---|---|---|---|
| temperature | Decimal | hexadecimal | Scope |
| >900 | 32767 | 7FFF | Overflow |
| 900 | 9000 | 2328 | Normal range |
| -200 | -2000 | F830 | |
| <-200 | -32767 | 8001 | Underflow |

| | | | |
|---|---|---|---|
| Sensor not connected | -32768 | 8000 | Disconnection detection |

| ±15.625mV | | | |
|---|---|---|---|
| mv value | Decimal | hexadecimal | Scope |
| 15.625mV | 32767 | 7FFF | Normal range |
| -15.625mV | -32767 | 8001 | |
| Sensor not connected | -32768 | 8000 | Disconnection detection |

| ±62.5mV | | | |
|---|---|---|---|
| mv value | Decimal | hexadecimal | Scope |
| 62.5mV | 32767 | 7FFF | Normal range |
| -62.5mV | -32767 | 8001 | |
| Sensor not connected | -32768 | 8000 | Disconnection detection |

| ±125mV | | | |
|---|---|---|---|
| mv value | Decimal | hexadecimal | Scope |
| 125mV | 32767 | 7FFF | Normal range |
| -125mV | -32767 | 8001 | |
| Sensor not connected | -32768 | 8000 | Disconnection detection |

| ±250mV | | | |
|---|---|---|---|
| mv value | Decimal | hexadecimal | Scope |
| 250mV | 32767 | 7FFF | Normal range |
| -250mV | -32767 | 8001 | |
| Sensor not connected | -32768 | 8000 | Disconnection detection |

| ±500mV | | | |
|---|---|---|---|
| mv value | Decimal | hexadecimal | Scope |
| 500mV | 32767 | 7FFF | Normal range |
| -500mV | -32767 | 8001 | |
| Sensor not connected | -32768 | 8000 | Disconnection detection |

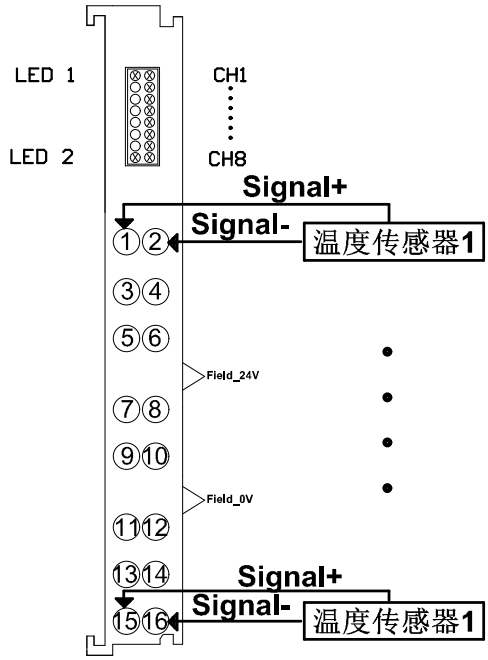
| ±1000mV | | | |
|---|---|---|---|
| mv value | Decimal | hexadecimal | Scope |
| 1V | 32767 | 7FFF | Normal range |
| -1V | -32767 | 8001 | |
| Sensor not connected | -32768 | 8000 | Disconnection detection |
| ±2000mV | | | |
| mv value | Decimal | hexadecimal | Scope |
| 2V | 32767 | 7FFF | Normal range |
| -2V | -32767 | 8001 | |
| Sensor not connected | -32768 | 8000 | Disconnection detection |

# 3.37 DF20-M-8TC-KETJ: 8 channel Thermocouple sensor inputModules

## 3.37.1 Technical parameters

| **Electrical parameters** | |
|---|---|
| aislenumber | 8 |
| Connection Type | 2-wire |
| temperatureResolution(Temperature | Temperature value:0.1℃/each digit |
| Voltage conversion formula (measure mV voltage value) | $V_{Real = D}/32767*V_{Forehead}$ in:$V_{Reality}$is the current voltage value; $V_{Forehead}$is the rated range value of the sensor. |
| Filter time | Configurable, default 1800ms |
| Sensor type/signal range | K, E, T, J, B, S, R, N, C, L, 15.625mV, 31.25mV, 62.5mV, 125mV, 250mV, 500mV, 1000mV, 2000mV |
| Disconnection detection | support |
| System side current consumption | 80mA |
| Reverse circuit protection | support |
| Module failure alarm | support |
| **General parameters** | |
| Vibration Testing | 1g, in accordance with IEC 60068-2-6 |
| Shock Test | 15g, compliant with IEC 60068-2-27 |
| Electromagnetic compatibility | Compliant with EN 61000-4standard |
| Protection level | IP20 |
| Operating temperature | -25～75℃ |
| Storage temperature | -40°C~+85°C |
| Relative humidity | 5～95%RH (no condensation) |
| Installation | 35mm rail mounting |
| Dimensions | 100mm × 12mm × 67mm |
| Maximum crimping area of | 2.5mm² |
| Maximum crimping area of | AWG14 |
| Minimum crimping area of | 0.2mm² |
| Minimum crimping area for wire | AWG28 |
| Line length | 8...9mm |

## 3.37.2 Status indicator light and wiring diagram




The status indicator lights are shown in the table below:

| LED No | Status and meaning |
|---|---|
| LED1 | On: The module is powered normally |
| | Off: Module power supply is abnormal |
| LED2 | Power-on stage:Always on when powered on;<br>Turns off after the internal bus is initialized.. |
| | Operational stage: Flashes when the module is running normally;<br>When the module is running abnormally, it is always on or off |
| CH1 | First channel indicator |
| CH2 | Second channel indicator |
| CH3 | The third channel indicator |
| CH4 | The fourth channel indicator |
| CH5 | The fifth channel indicator |
| CH6 | The sixth channel indicator |
| CH7 | Channel 7 indicator light |
| CH8 | The eighth channel indicator |

## 3.37.3 Module process data definition

| Input data:8Word | |
|---|---|
| Word 1 | TC Value CH1: First channel input data |
| Word 2 | TC Value CH2: Second channel input data |
| Word3 | TC Value CH3:threeChannel input data |
| Word4 | TC Value CH4:FourChannel input data |
| Word5 | TC Value CH5:fiveChannel input data |
| Word6 | TC Value CH6:sixChannel input data |
| Word7 | TC Value CH7:sevenChannel input data |
| Word8 | TC Value CH8:eightChannel input data |
| loseoutdata:8Word | |
| Word 1 | Offset Value CH1: First channel dataOffset |
| Word 2 | Offset Value CH2: Second channel dataOffset |
| Word3 | Offset Value CH3:threeChannel dataOffset |
| Word4 | Offset Value CH4:FourChannel dataOffset |
| Word5 | Offset Value CH5:fiveChannel dataOffset |
| Word6 | Offset Value CH6:sixChannel dataOffset |
| Word7 | Offset Value CH7:sevenChannel dataOffset |
| Word8 | Offset Value CH8:eightChannel dataOffset |

Process Data Definition

| K-Type | | | |
|---|---|---|---|
| temperature | Decimal | hexadecimal | Scope |
| >1370 | 32767 | 7FFF | Overflow |
| 1370 | 13700 | 3584 | Normal range |
| -270 | -2700 | F574 | |
| <-270 | -32767 | 8001 | Underflow |
| Sensor not connected | -32768 | 8000 | Disconnection detection |

| Type E | | | |
|---|---|---|---|
| temperature | Decimal | hexadecimal | Scope |

| | | | |
|---|---|---|---|
| >1000 | 32767 | 7FFF | Overflow |
| 1000 | 10000 | 2710 | Normal range |
| -270 | -2700 | F574 | |
| <-270 | -32767 | 8001 | Underflow |
| Sensor not connected | -32768 | 8000 | Disconnection detection |

| T-Type | | | |
|---|---|---|---|
| temperature | Decimal | hexadecimal | Scope |
| >400 | 32767 | 7FFF | Overflow |
| 400 | 4000 | FA0 | Normal range |
| -270 | -2700 | F574 | |
| <-270 | -32767 | 8001 | Underflow |
| Sensor not connected | -32768 | 8000 | Disconnection detection |

| J-Type | | | |
|---|---|---|---|
| temperature | Decimal | hexadecimal | Scope |
| >1200 | 32767 | 7FFF | Overflow |
| 1200 | 12000 | 2EE0 | Normal range |
| -210 | -2100 | F7CC | |
| <-210 | -32767 | 8001 | Underflow |
| Sensor not connected | -32768 | 8000 | Disconnection detection |

| Type B | | | |
|---|---|---|---|
| temperature | Decimal | hexadecimal | Scope |
| >1820 | 32767 | 7FFF | Overflow |
| 1820 | 18200 | 4718 | Normal range |
| 50 | 500 | 1F4 | |
| <50 | -32767 | 8001 | Underflow |

| | | | |
|---|---|---|---|
| Sensor not connected | -32768 | 8000 | Disconnection detection |

| S-Type | | | |
|---|---|---|---|
| temperature | Decimal | hexadecimal | Scope |
| >1760 | 32767 | 7FFF | Overflow |
| 1760 | 17600 | 44C0 | Normal range |
| -50 | -500 | FE0C | |
| <-50 | -32767 | 8001 | Underflow |
| Sensor not connected | -32768 | 8000 | Disconnection detection |

| R-Type | | | |
|---|---|---|---|
| temperature | Decimal | hexadecimal | Scope |
| >1770 | 32767 | 7FFF | Overflow |
| 1770 | 17700 | 4524 | Normal range |
| -50 | -500 | FE0C | |
| <-50 | -32767 | 8001 | Underflow |
| Sensor not connected | -32768 | 8000 | Disconnection detection |

| N-type | | | |
|---|---|---|---|
| temperature | Decimal | hexadecimal | Scope |
| >1300 | 32767 | 7FFF | Overflow |
| 1300 | 13000 | 32C8 | Normal range |
| -270 | -2700 | F574 | |
| <-270 | -32767 | 8001 | Underflow |
| Sensor not connected | -32768 | 8000 | Disconnection detection |

| Type C |
|---|

| temperature | Decimal | hexadecimal | Scope |
|---|---|---|---|
| >2320 | 32767 | 7FFF | Overflow |
| 2320 | 23200 | 5AA0 | Normal range |
| 0 | 0 | 0 | |
| <0 | -32767 | 8001 | Underflow |
| Sensor not connected | -32768 | 8000 | Disconnection detection |

| L-type | | | |
|---|---|---|---|
| temperature | Decimal | hexadecimal | Scope |
| >900 | 32767 | 7FFF | Overflow |
| 900 | 9000 | 2328 | Normal range |
| -200 | -2000 | F830 | |
| <-200 | -32767 | 8001 | Underflow |
| Sensor not connected | -32768 | 8000 | Disconnection detection |

| ±15.625mV | | | |
|---|---|---|---|
| mv value | Decimal | hexadecimal | Scope |
| 15.625mV | 32767 | 7FFF | Normal range |
| -15.625mV | -32767 | 8001 | |
| Sensor not connected | -32768 | 8000 | Disconnection detection |

| ±62.5mV | | | |
|---|---|---|---|
| mv value | Decimal | hexadecimal | Scope |
| 62.5mV | 32767 | 7FFF | Normal range |
| -62.5mV | -32767 | 8001 | |
| Sensor not connected | -32768 | 8000 | Disconnection detection |

| ±125mV | | | |
|---|---|---|---|
| mv value | Decimal | hexadecimal | Scope |
| 125mV | 32767 | 7FFF | Normal range |
| -125mV | -32767 | 8001 | |
| Sensor not connected | -32768 | 8000 | Disconnection detection |

| ±250mV | | | |
|---|---|---|---|
| mv value | Decimal | hexadecimal | Scope |
| 250mV | 32767 | 7FFF | Normal range |
| -250mV | -32767 | 8001 | |
| Sensor not connected | -32768 | 8000 | Disconnection detection |

| ±500mV | | | |
|---|---|---|---|
| mv value | Decimal | hexadecimal | Scope |
| 500mV | 32767 | 7FFF | Normal range |
| -500mV | -32767 | 8001 | |
| Sensor not connected | -32768 | 8000 | Disconnection detection |

| ±1000mV | | | |
|---|---|---|---|
| mv value | Decimal | hexadecimal | Scope |
| 1V | 32767 | 7FFF | Normal range |
| -1V | -32767 | 8001 | |
| Sensor not connected | -32768 | 8000 | Disconnection detection |

| ±2000mV | | | |
|---|---|---|---|
| mv value | Decimal | hexadecimal | Scope |

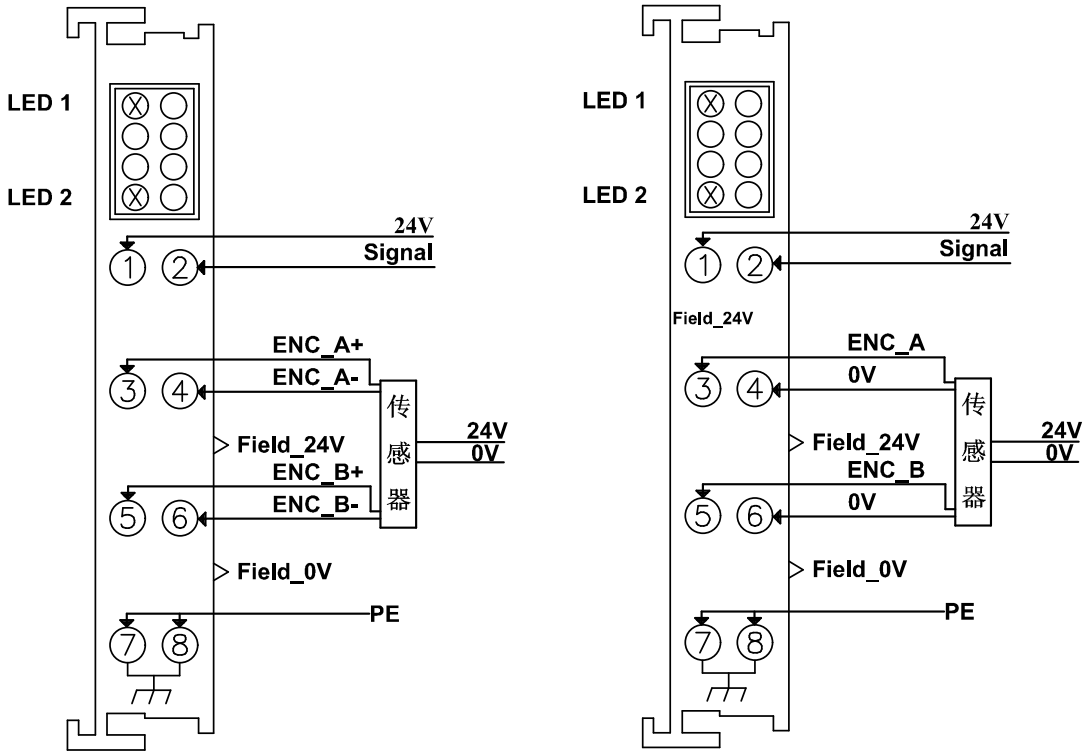
| | | | |
|---|---|---|---|
| 2V | 32767 | 7FFF | Normal range |
| -2V | -32767 | 8001 | |
| Sensor not connected | -32768 | 8000 | Disconnection detection |

# 3.38 DF20-M-1CNT-EL-5:1 channel Encoder inputModules5V signal

## 3.38.1 Technical parameters

| | | |
|---|---|---|
| **Electrical parameters** | | |
| Input Channels | 1 incremental encoder input | |
| | 1 electronic probe input | |
| Input signal voltage | Encoder signal | 5V |
| | Electron probe signal | 24V |
| **Encoder input parameters** | | |
| Signal Type | A+A-/B+B- differential signal or A/B signal | |
| Connection Type | 2-wire/4-wire | |
| Counting range | –2147483648~2147483647 | |
| Signal frequency multiplication | 4x | |
| mostMaximum input frequency | 1MHz | |
| Resolution/Accuracy | 32bit/±1 pulse | |
| Input Impedance | >500KΩ | |
| System side current consumption | 30mA | |
| Module failure alarm | support | |
| **General parameters** | | |
| Vibration Testing | 1g, in accordance with IEC 60068-2-6 | |
| Shock Test | 15g, compliant with IEC 60068-2-27 | |
| Electromagnetic compatibility | Compliant with EN 61000-4standard | |
| Protection level | IP20 | |
| Operating temperature | -25～75℃ | |
| Storage temperature | -40°C~+85°C | |
| Relative humidity | 5～95%RH (no condensation) | |
| Installation | 35mm rail mounting | |
| Dimensions | 100mm × 12mm × 67mm | |
| Maximum crimping area of | 2.5mm² | |
| Maximum crimping area of | AWG14 | |
| Minimum crimping area of | 0.2mm² | |
| Minimum crimping area for wire | AWG28 | |
| Line length | 8...9mm | |

## 3.38.2 Status indicator light and wiring diagram




The status indicator lights are shown in the table below:

| LED No | Status and meaning |
|---|---|
| LED1 | On: The module is powered normally |
| | Off: Module power supply is abnormal |
| LED2 | Power-on stage:Always on when powered on;<br>Turns off after the internal bus is initialized.. |
| | Operational stage: Flashes when the module is running normally;<br>When the module is running abnormally, it is always on or off |

## 3.38.3 Module process data definition

| Input data: 5 words | |
|---|---|
| Word 1 | ENC State: module status word |
| Word 2~Word 3 | Actual Position: Encoder current position (number of pulses) |
| Word 4~Word 5 | TouchProbe Position: Electronic probe latch value |

| | |
|---|---|
| | (number of pulses) |
| Output data: 1 Word | |
| Word 1 | Command: module command output word |

DF20-M-1CNT-EL-5Module state machine description:

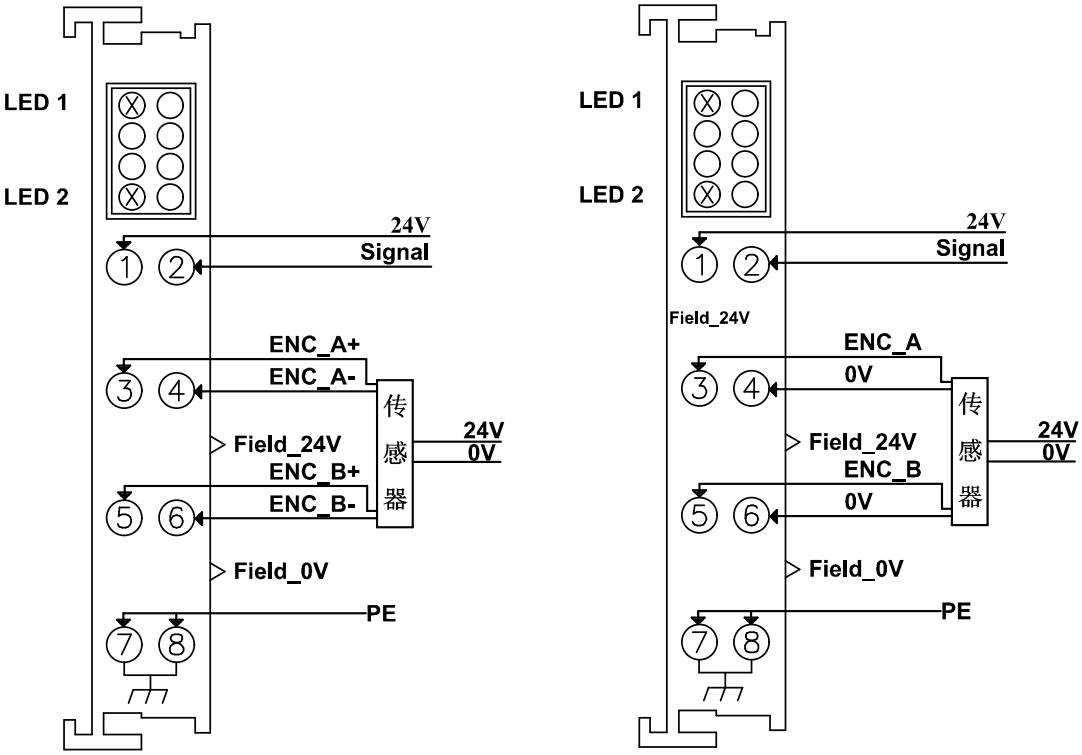
| Control command | meaning | ModulesStatus word | meaning |
|---|---|---|---|
| 0x012B | Enter counting state | 0x010B | Counting status |
| 0x012C | Clear current count | 0x010C | Clear Status |
| | | 0x0109 | Idle state |
| | | 0x010E | Error Status |

# 3.39 DF20-M-1CNT-EL-4:1 channel Encoder inputModules24V signal

## 3.39.1 Technical parameters

| | | |
|---|---|---|
| **Electrical parameters** | | |
| Input Channels | 1 incremental encoder input | |
| | 1 electronic probe input | |
| Input signal voltage | Encoder signal | 24V |
| | Electron probe signal | 24V |
| **Encoder input parameters** | | |
| Signal Type | A+A-/B+B- differential signal or A/B signal | |
| Connection Type | 2-wire/4-wire | |
| Counting range | –2147483648~2147483647 | |
| Signal frequency multiplication | 4x | |
| mostMaximum input frequency | 1MHz | |
| Resolution/Accuracy | 32bit/±1 pulse | |
| Input Impedance | >500KΩ | |
| System side current consumption | 30mA | |
| Module failure alarm | support | |
| **General parameters** | | |
| Vibration Testing | 1g, in accordance with IEC 60068-2-6 | |
| Shock Test | 15g, compliant with IEC 60068-2-27 | |
| Electromagnetic compatibility | Compliant with EN 61000-4standard | |
| Protection level | IP20 | |
| Operating temperature | -25～75℃ | |
| Storage temperature | -40°C~+85°C | |
| Relative humidity | 5～95%RH (no condensation) | |
| Installation | 35mm rail mounting | |
| Dimensions | 100mm × 12mm × 67mm | |
| Maximum crimping area of | 2.5mm² | |
| Maximum crimping area of | AWG14 | |
| Minimum crimping area of | 0.2mm² | |
| Minimum crimping area for wire | AWG28 | |
| Line length | 8...9mm | |

## 3.39.2 Status indicator light and wiring diagram




The status indicator lights are shown in the table below:

| LED No | Status and meaning |
|---|---|
| LED1 | On: The module is powered normally |
| | Off: Module power supply is abnormal |
| LED2 | Power-on stage:Always on when powered on;<br>Turns off after the internal bus is initialized.. |
| | Operational stage: Flashes when the module is running normally;<br>When the module is running abnormally, it is always on or off |

## 3.39.3 Module process data definition

| Input data: 5 words | |
|---|---|
| Word 1 | ENC State: module status word |
| Word 2~Word 3 | Actual Position: Encoder current position (number of pulses) |
| Word 4~Word 5 | TouchProbe Position: Electronic probe latch value |

| | |
|---|---|
| | (number of pulses) |
| Output data: 1 Word | |
| Word 1 | Command: module command output word |

DF20-M-1CNT-EL-4Module state machine description:

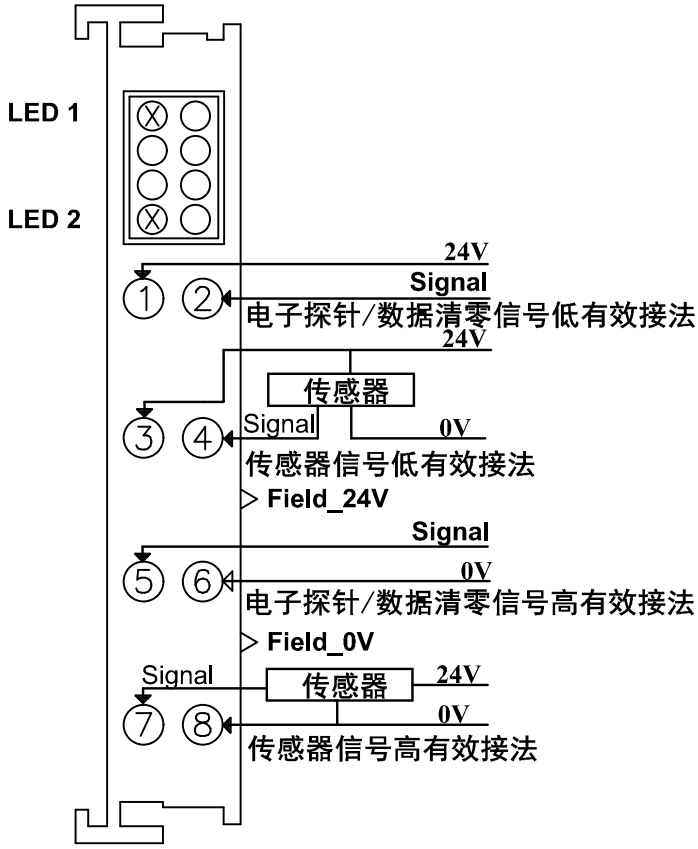
| Control command | meaning | ModulesStatus word | meaning |
|---|---|---|---|
| 0x012B | Enter counting state | 0x010B | Counting status |
| 0x012C | Clear current count | 0x010C | Clear Status |
| | | 0x0109 | Idle state |
| | | 0x010E | Error Status |

# 3.40 DF20-M-2CNT-PIL-5:2 channel Pulse inputModules5V signal

## 3.40.1 Technical parameters

| | | |
|---|---|---|
| **Electrical parameters** | | |
| Input Channels | 2 pulse inputs | |
| | 2 electronic probe inputs | |
| Input signal voltage | Pulse signal | 5V |
| | Electron probe signal | 24V |
| **Encoder input parameters** | | |
| Signal Type | Differential signal or single-ended signal | |
| Connection Type | 2-wire | |
| Counting range | 0~4294967295 | |
| mostMaximum input frequency | 500KHz | |
| Resolution/Accuracy | 32bit/±1 pulse | |
| Input Impedance | >500KΩ | |
| System side current consumption | 30mA | |
| Module failure alarm | support | |
| **General parameters** | | |
| Vibration Testing | 1g, in accordance with IEC 60068-2-6 | |
| Shock Test | 15g, compliant with IEC 60068-2-27 | |
| Electromagnetic compatibility | Compliant with EN 61000-4standard | |
| Protection level | IP20 | |
| Operating temperature | -25～75℃ | |
| Storage temperature | -40℃~+85℃ | |
| Relative humidity | 5～95%RH (no condensation) | |
| Installation | 35mm rail mounting | |
| Dimensions | 100mm × 12mm × 67mm | |
| Maximum crimping area of | 2.5mm² | |
| Maximum crimping area of | AWG14 | |
| Minimum crimping area of | 0.2mm² | |
| Minimum crimping area for wire | AWG28 | |
| Line length | 8...9mm | |

## 3.40.2 Status indicator light and wiring diagram




The status indicator lights are shown in the table below:

| LED No | Status and meaning |
|---|---|
| PWR | On: The module is powered normally |
| | Off: Module power supply is abnormal |
| L/A | Power-on stage:Always on when powered on;<br>Turns off after the internal bus is initialized.. |
| | Operational stage: Flashes when the module is running normally;<br>When the module is running abnormally, it is always on or off |

## 3.40.3 Module process data definition

| Output data meaning | |
|---|---|
| 0byte | |
| bit7~bit3 | Reserved seat |
| bit2 | 0: Disable channel 1 comparison value; 1: Enable channel 1 comparison value |
| bit1 | 0: Enable the electronic probe function of channel 1; 1: Enable the external signal trigger count clear function of channel 1 |
| bit0 | 0: Channel 1 stops counting and the original count is reset to zero; 1: Channel 1 starts counting |
| 1~4byte | Channel 1 pulse comparison value output, unsigned 32-bit data |
| 5byte | |
| bit7~bit3 | Reserved seat |
| bit2 | 0: Disable channel 2 comparison value; 1: Enable channel 2 comparison value |
| bit1 | 0: Enable channel 2 electronic probe function; 1: Enable channel 2 external signal trigger count clear function |
| bit0 | 0: Channel 2 stops counting and the original count is reset to zero; 1: Channel 2 starts counting |
| 6~9byte | Channel 2 pulse comparison value output, unsigned 32-bit data |

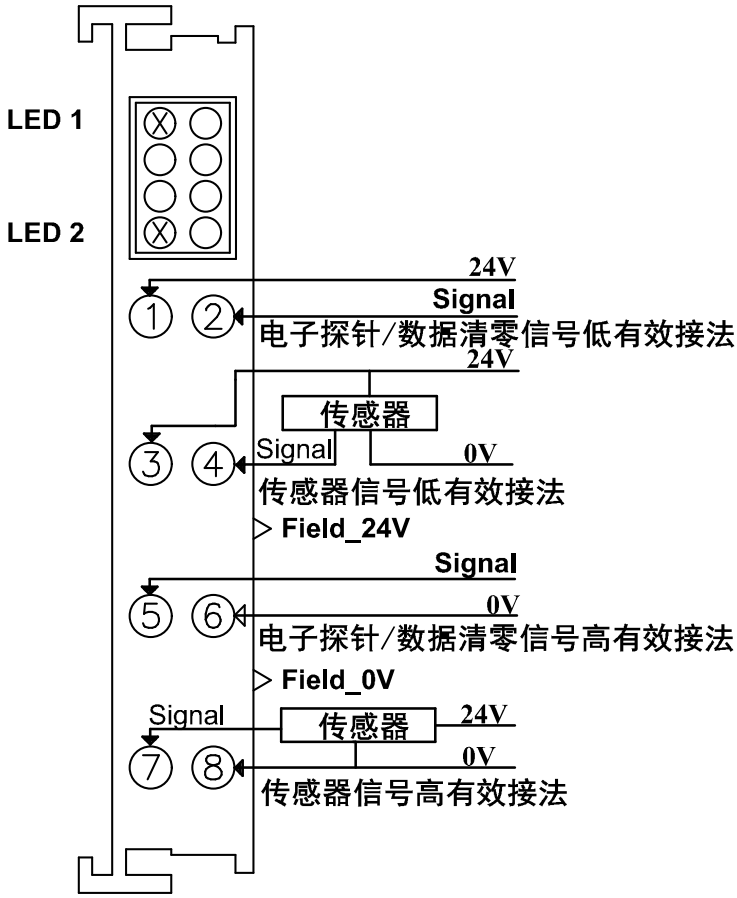
| Input data meaning | |
|---|---|
| 0byte | |
| bit7~bit3 | Reserved seat |
| bit2 | 0: Channel 1 count value is less than the comparison value; 1: Channel 1 count value is greater than the comparison value. |
| bit1 | 0: No electronic probe/first channel count reset signal; 1: Electronic probe/first channel count reset signal |
| bit0 | 0: Channel 1 counting stop state, the original count is cleared; 1: Channel 1 counting state |
| 1~4byte | Channel 1 pulse input value, unsigned 32-bit data |
| 5~8byte | Channel 1 pulse input latch value, unsigned 32-bit data |
| 9byte | |
| bit7~bit3 | Reserved seat |
| bit2 | 0: Channel 2 count value is less than the comparison value; 1: Channel 2 count value is greater than the comparison value. |
| bit1 | 0: No electronic probe/count clear signal for the 2nd channel; 1: Electronic probe/count clear signal for the 2nd channel |
| bit0 | 0: Channel 2 counting stop state, the original count is cleared; 1: Channel 2 counting state |
| 10~13byte | Channel 2 pulse input value, unsigned 32-bit data |
| 14~17byte | Channel 2 pulse input latch value, unsigned 32-bit data |

# 3.41 DF20-M-2CNT-PIL-4:2 channel Pulse inputModules24V signal

## 3.41.1 Technical parameters

| | | |
|---|---|---|
| **Electrical parameters** | | |
| Input Channels | 2 pulse inputs | |
| | 2 electronic probe inputs | |
| Input signal voltage | Pulse signal | 24V |
| | Electron probe signal | 24V |
| **Encoder input parameters** | | |
| Signal Type | Differential signal or single-ended signal | |
| Connection Type | 2-wire | |
| Counting range | 0~4294967295 | |
| mostMaximum input frequency | 500KHz | |
| Resolution/Accuracy | 32bit/±1 pulse | |
| Input Impedance | >500KΩ | |
| System side current consumption | 30mA | |
| Module failure alarm | support | |
| **General parameters** | | |
| Vibration Testing | 1g, in accordance with IEC 60068-2-6 | |
| Shock Test | 15g, compliant with IEC 60068-2-27 | |
| Electromagnetic compatibility | Compliant with EN 61000-4standard | |
| Protection level | IP20 | |
| Operating temperature | -25～75℃ | |
| Storage temperature | -40℃~+85℃ | |
| Relative humidity | 5～95%RH (no condensation) | |
| Installation | 35mm rail mounting | |
| Dimensions | 100mm × 12mm × 67mm | |
| Maximum crimping area of | 2.5mm² | |
| Maximum crimping area of | AWG14 | |
| Minimum crimping area of | 0.2mm² | |
| Minimum crimping area for wire | AWG28 | |
| Line length | 8...9mm | |

### 3.41.2 Status indicator light and wiring diagram




The status indicator lights are shown in the table below:

| LED No | Status and meaning |
|---|---|
| PWR | On: The module is powered normally |
| | Off: Module power supply is abnormal |
| L/A | Power-on stage:Always on when powered on;<br>Turns off after the internal bus is initialized.. |
| | Operational stage: Flashes when the module is running normally;<br>When the module is running abnormally, it is always on or off |

### 3.41.3 Module process data definition

| Output data meaning | |
|---|---|
| 0byte | |
| bit7~bit3 | Reserved seat |
| bit2 | 0: Disable channel 1 comparison value; 1: Enable channel 1 comparison value |
| bit1 | 0: Enable the electronic probe function of channel 1; 1: Enable the external signal trigger count clear function of channel 1 |
| bit0 | 0: Channel 1 stops counting and the original count is reset to zero; 1: Channel 1 starts counting |
| 1~4byte | Channel 1 pulse comparison value output, unsigned 32-bit data |
| 5byte | |
| bit7~bit3 | Reserved seat |
| bit2 | 0: Disable channel 2 comparison value; 1: Enable channel 2 comparison value |
| bit1 | 0: Enable channel 2 electronic probe function; 1: Enable channel 2 external signal trigger count clear function |
| bit0 | 0: Channel 2 stops counting and the original count is reset to zero; 1: Channel 2 starts counting |
| 6~9byte | Channel 2 pulse comparison value output, unsigned 32-bit data |

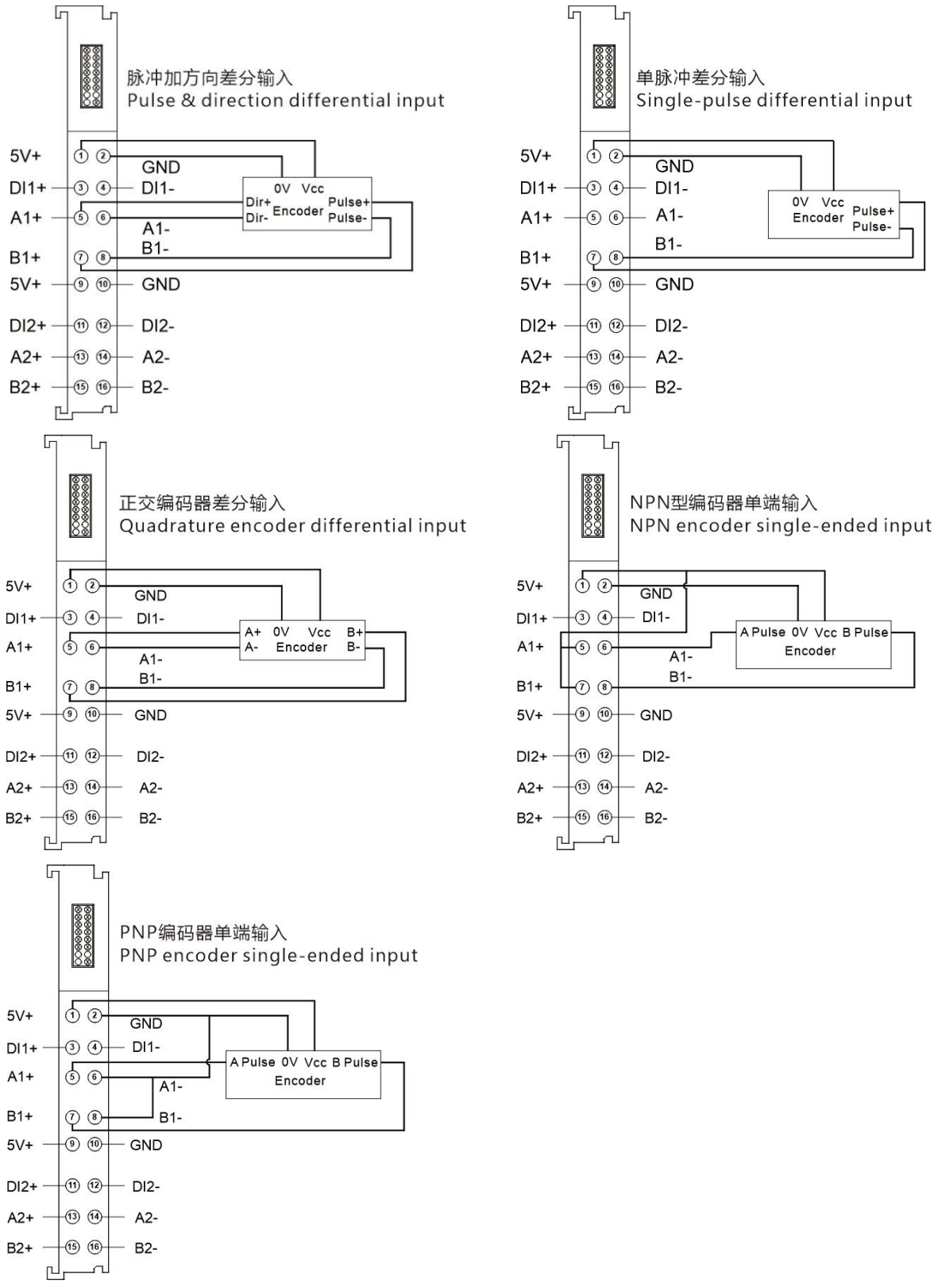
| Input data meaning | |
|---|---|
| 0byte | |
| bit7~bit3 | Reserved seat |
| bit2 | 0: Channel 1 count value is less than the comparison value; 1: Channel 1 count value is greater than the comparison value. |
| bit1 | 0: No electronic probe/first channel count reset signal; 1: Electronic probe/first channel count reset signal |
| bit0 | 0: Channel 1 counting stop state, the original count is cleared; 1: Channel 1 counting state |
| 1~4byte | Channel 1 pulse input value, unsigned 32-bit data |
| 5~8byte | Channel 1 pulse input latch value, unsigned 32-bit data |
| 9byte | |
| bit7~bit3 | Reserved seat |
| bit2 | 0: Channel 2 count value is less than the comparison value; 1: Channel 2 count value is greater than the comparison value. |
| bit1 | 0: No electronic probe/count clear signal for the 2nd channel; 1: Electronic probe/count clear signal for the 2nd channel |
| bit0 | 0: Channel 2 counting stop state, the original count is cleared; 1: Channel 2 counting state |
| 10~13byte | Channel 2 pulse input value, unsigned 32-bit data |
| 14~17byte | Channel 2 pulse input latch value, unsigned 32-bit data |

# 3.42DF20-M-2CNT-EL-5: 2-channel encoder input module 5V signal

## 3.42.1 Technical parameters

| **Electrical parameters** | |
|---|---|
| Bus input power rated voltage | DC5V |
| Bus input power rated current | 65mA |
| Terminal output rated voltage | DC5V |
| Terminal output rated current | 500mA |
| Input connection type | 2-wire / 4-wire |
| Number of input channels | 2 |
| Input signal type | AB quadrature/pulse+direction |
| Input signal voltage | 5V |
| DI channel input signal type | Single-ended/differential |
| DI channel input voltage | DC24V |
| Maximum input frequency | 1MHz |
| Orthogonal coded signal | 4x/2x/1x, configurable |
| Accuracy | ±1 pulse |
| Hardware filtering | Support, configurable |
| Channel Configuration | support |
| Error diagnosis | support |
| Counting Mode | Linear counter form, ring counter form, configurable |
| Count latch/reset function | Support, configurable |
| Counting range | –2147483648~2147483647 |
| **General parameters** | |
| Isolation withstand voltage | 500V |
| Vibration Testing | 1g, in accordance with IEC 60068-2-6 |
| Shock Test | 15g, compliant with IEC 60068-2-27 |
| Electromagnetic compatibility testing | Complies with EN 61000-4 |
| Protection level | IP20 |
| Operating temperature | -25~75℃ |
| Storage temperature | -40°C~+85°C |
| Relative humidity | 5~95%RH (non-condensing) |
| Installation | 35mm rail mounting |
| Dimensions | 100mm × 12mm × 67mm |
| Maximum crimping area of wire | 2.5mm² |
| Maximum crimping area of wire (AWG) | AWG14 |
| Minimum crimping area of wire | 0.2mm² |
| Minimum crimping area for | AWG28 |
| Line length | 8...9mm |

## 3.42.2 Status indicator light and wiring diagram




The status indicator lights are shown in the table below:

| name | Status description |
|---|---|
| PWR power indicator | On: Internal bus power supply is normal Off: Internal bus power supply is abnormal |

| | |
|---|---|
| STA status indicator | Power-on stage: Green: Module initialization abnormality |
| | Power-on stage: Green off: Module initialization is normal |
| | Running stage: Green flash: The internal bus of the module is working normally |
| | Running stage: Green off: The internal bus of the module is working abnormally |
| TP1/TP2 trigger signal indicator | On: Input signal is valid Off: Input signal is invalid |
| A1/A2 encoder signal indicator | On: Input signal is valid Off: Input signal is invalid |
| B1/B2 encoder signal indicator | On: Input signal is valid Off: Input signal is invalid |
| UP1/UP2 indicator | On: Encoder is rotating forward Off: Encoder is stationary or rotating reverse |
| DN1/DN2 indicator light | On: Encoder is rotating in the reverse direction Off: Encoder is stationary or rotating in the forward direction |
| FP 5V indicator | On: The module power is normal Off: The module power is abnormal |

## 3.42.3 Module process data definition

| Output data: 5 words | | |
|---|---|---|
| The first channel output data | | |
| PulseCtrl CH1 | bit3~bit7 | reserve |
| | bit2 | 0: Close the channel1Position comparison function; 1: Enable channel1Location Comparison |
| | bit1 | 0:Openaisle1Electronic probe function; 1: Enable channel1Count clear signal |
| | bit0 | 0: Channel1Stop counting, the original count is reset to zero; 1: Channel1Start counting |
| PulseCompare CH1 | | Channel 1Pulse comparison value,scope:–2147483648~2147483647 |
| Second channel output data | | |
| PulseCtrl CH2 | bit3~bit7 | reserve |
| | bit2 | 0: Close the channel2Position comparison function; 1: Enable channel2Location Comparison |
| | bit1 | 0:Openaisle2Electronic probe function; 1: Enable channel2Count clear signal |
| | bit0 | 0: Channel2Stop counting, the original count is reset to zero; 1: Channel2Start counting |
| PulseCompare CH2 | | Channel 2 pulse comparison value, range: –2147483648~2147483647 |
| Input data: 9 words | | |
| First channel input data | | |
| PulseState CH1 | bit3~Bit7 | reserve |
| | bit2 | 0: Channel 1 count value is less than the comparison value; 1: |

| | | |
|---|---|---|
| | | Channel 1 count value is greater than or equal to the comparison value. |
| | bit1 | 0: No electronic probe/1 channel count reset signal; 1: Electronic probe/1 channel count reset signal |
| | bit0 | 0: Channel 1 counting stop state, the original count is cleared; 1: Channel 1 counting state |
| PulseCount CH1 | | Channel 1 pulse input value, range:–2147483648~2147483647 |
| LatchCount CH1 | | Channel 1 pulse input latch value, range:–2147483648~2147483647 |
| Second channel input data | | |
| PulseState CH2 | bit3~bit7 | reserve |
| | bit2 | 0: Channel 2 count value is less than the comparison value; 1: Channel 2 count value is greater than or equal to the comparison value. |
| | bit1 | 0: No electronic probe/channel 2 count reset signal; 1: Electronic probe/channel 2 count reset signal |
| | bit0 | 0: Channel 2 counting stop state, the original count is cleared; 1: Channel 2 counting state |
| PulseCount CH2 | | aisle2Pulse input value, range:–2147483648~2147483647 |
| LatchCount CH2 | | aisle2Pulse input latch value, range:–2147483648~2147483647 |

## 3.42.4 Configuration parameter definition

| Configuration items | Parameter meaning |
|---|---|
| Signal Mode (input signal type) | 0:Rotary transducer quadruple(Orthogonal coding 4 times frequency)<br>1:Rotary transducer double(Orthogonal coding 2 times frequency)<br>2:Rotary transducer single(Orthogonal coding 1x frequency)<br>3:Pulse and Directions(Pulse plus direction)<br>4: CW/CCW is not supported yet |
| Filter time(Input pulse signal filtering configuration) | 3:4MHZ 4:1.5MHZ 5:1MHZ 6:800KHZ 7:600KHZ 8:420KHZ 9:315KHZ 10:250KHZ 11:200KHZ 12:160KHZ 13:120KHZ 14:100KHZ 15:75KHZ |
| Directional Logic(Signal input direction logic) | 0:Positive Logic(Positive logic) 1:Negative Logic(Negative logic)<br>Positive logic: Orthogonal encoding input, phase A leads phase B by 90 degrees for forward rotation, pulse plus direction input, direction input high effective signal for forward rotation.<br>Negative logic: Orthogonal encoding input, B phase leads A phase by 90 degrees for forward rotation, pulse plus direction input, direction input low effective signal or floating for forward rotation. |
| Counter Mode(Count type) | 0: Line Counter (Linear Count)<br>1: Ring Counter |
| Upper limit(Ring count upper limit) | -2147483648~ 2147483647 |

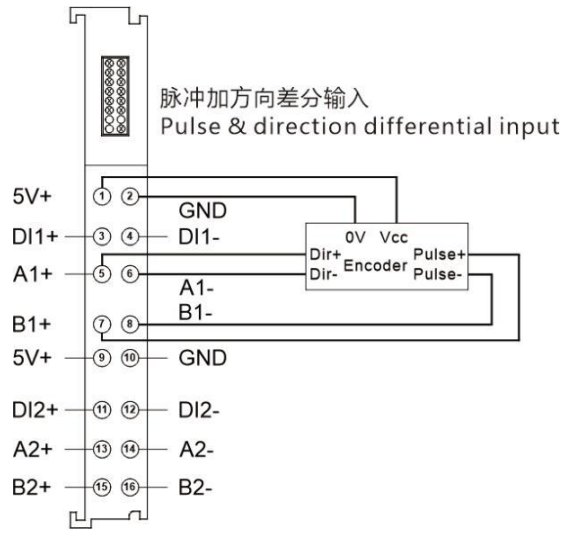
| | |
|---|---|
| Lower limit(Ring count lower limit) | -2147483648~ 2147483647<br>For example, if the upper and lower limits are set to 5 and -5 respectively in loop mode, the upward count is -5, -4, -3, -2, -1, 0, 1, 2, 3, 4, -5, -4.... The downward count is -5, 4, 3, 2, 1, 0, -1, -2, -3, -4, -5, 4.... |

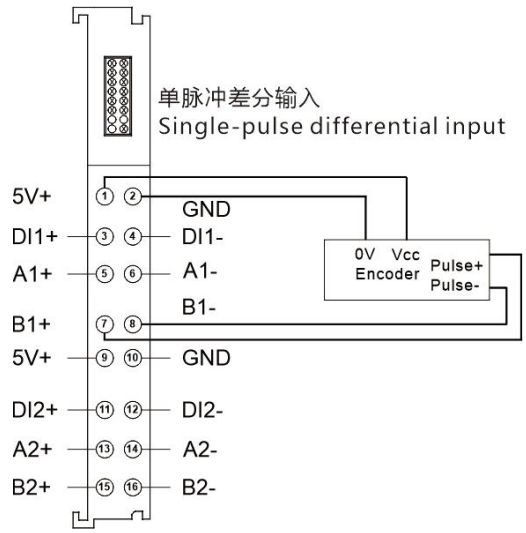
# 3.43DF20-M-2CNT-EL-4: 2-channel encoder input module 24V signal

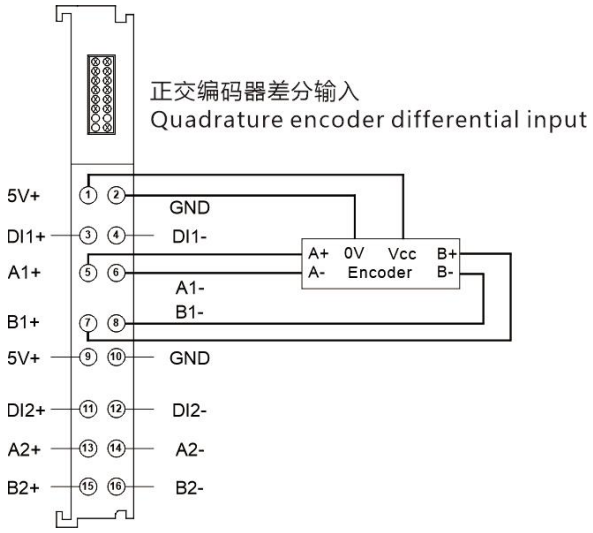
## 3.43.1 Technical parameters

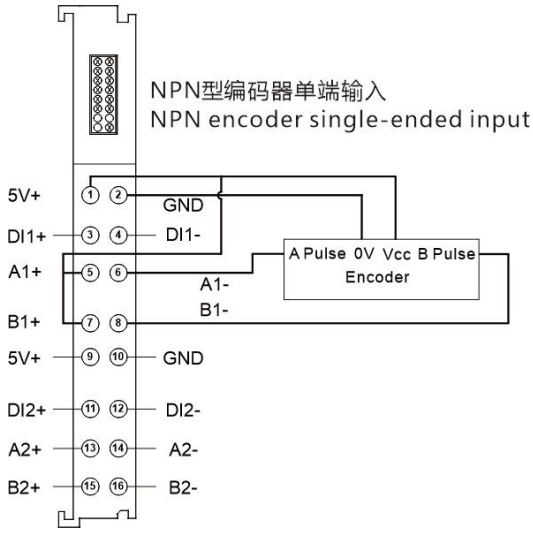
| **Electrical parameters** | |
|---|---|
| Bus input power rated voltage | DC5V |
| Bus input power rated current | 65mA |
| Terminal output rated voltage | DC24V |
| Terminal output rated current | 500mA |
| Input connection type | 2-wire / 4-wire |
| Number of input channels | 2 |
| Input signal type | AB quadrature/pulse+direction |
| Input signal voltage | 24V |
| DI channel input signal type | Single-ended/differential |
| DI channel input voltage | DC24V |
| Maximum input frequency | 1MHz |
| Orthogonal coded signal frequency multiplication | 4x/2x/1x, configurable |
| Accuracy | ±1 pulse |
| Hardware filtering | Support, configurable |
| Channel Configuration | support |
| Error diagnosis | support |
| Counting Mode | Linear counter form, ring counter form, configurable |
| Count latch/reset function | Support, configurable |
| Counting range | –2147483648~2147483647 |
| **General parameters** | |
| Isolation withstand voltage | 500V |
| Vibration Testing | 1g, in accordance with IEC 60068-2-6 |
| Shock Test | 15g, compliant with IEC 60068-2-27 |
| Electromagnetic compatibility testing | Complies with EN 61000-4 |
| Protection level | IP20 |
| Operating temperature | -25～75℃ |
| Storage temperature | -40°C~+85°C |
| Relative humidity | 5～95%RH (no condensation) |
| Installation | 35mm rail mounting |
| Dimensions | 100mm × 12mm × 67mm |
| Maximum crimping area of wire | 2.5mm² |
| Maximum crimping area of wire (AWG) | AWG14 |
| Minimum crimping area of wire | 0.2mm² |
| Minimum crimping area for wire (AWG) | AWG28 |
| Line length | 8...9mm |

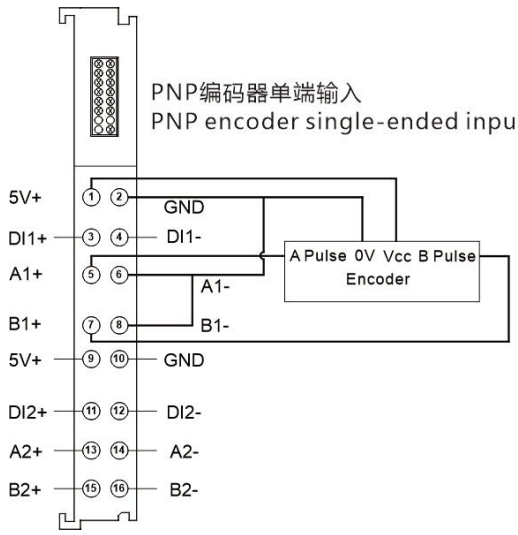
## 3.43.2 Status indicator light and wiring diagram



The status indicator lights are shown in the table below:

| name | Status description |
|---|---|
| PWR power indicator | On: Internal bus power supply is normal Off: Internal bus power supply is abnormal |
| STA status indicator | Power-on stage: Green: Module initialization abnormality |
| | Power-on stage: Green off: Module initialization is normal |
| | Running stage: Green flash: The internal bus of the module is working normally |
| | Running stage: Green off: The internal bus of the module is working abnormally |
| TP1/TP2 trigger signal indicator | On: Input signal is valid Off: Input signal is invalid |
| A1/A2 encoder signal indicator | On: Input signal is valid Off: Input signal is invalid |
| B1/B2 encoder signal indicator | On: Input signal is valid Off: Input signal is invalid |
| UP1/UP2 indicator | On: Encoder is rotating forward Off: Encoder is stationary or rotating reverse |
| DN1/DN2 indicator light | On: Encoder is rotating in the reverse direction Off: Encoder is stationary or rotating in the forward direction |
| FP 24V indicator light | On: The module power is normal Off: The module power is abnormal |

## 3.43.3 Module process data definition

| Output data: 5 words | | |
|---|---|---|
| The first channel output data | | |
| PulseCtrl CH1 | bit3~bit7 | reserve |
| | bit2 | 0: Disable the position comparison function of channel 1; 1: Enable the position comparison function of channel 1 |
| | bit1 | 0: Enable the electronic probe function of channel 1; 1: Enable the count clear signal of channel 1 |
| | bit0 | 0: Channel 1 stops counting and the original count is reset to zero; 1: Channel 1 starts counting |
| PulseCompare CH1 | | Channel 1 pulse comparison value, range:–2147483648~2147483647 |
| Second channel output data | | |
| PulseCtrl CH2 | bit3~bit7 | reserve |
| | bit2 | 0: Disable the position comparison function of channel 2; 1: Enable the position comparison function of channel 2 |
| | bit1 | 0: Enable the electronic probe function of channel 2; 1: Enable the count clear signal of channel 2 |
| | bit0 | 0: Channel 2 stops counting and the original count is cleared; 1: Channel 2 starts counting |

| | | |
|---|---|---|
| PulseCompare CH2 | | Channel 2 pulse comparison value, range: –2147483648~2147483647 |
| Input data: 9 words | | |
| First channel input data | | |
| PulseState CH1 | bit3~bit7 | reserve |
| | bit2 | 0: Channel 1 count value is less than the comparison value; 1: Channel 1 count value is greater than or equal to the comparison value. |
| | bit1 | 0: No electronic probe/1 channel count reset signal; 1: Electronic probe/1 channel count reset signal |
| | bit0 | 0: Channel 1 counting stop state, the original count is cleared; 1: Channel 1 counting state |
| PulseCount CH1 | | Channel 1 pulse input value, range:–2147483648~2147483647 |
| LatchCount CH1 | | Channel 1 pulse input latch value, range:–2147483648~2147483647 |
| Second channel input data | | |
| PulseState CH2 | bit3~bit7 | reserve |
| | bit2 | 0: Channel 2 count value is less than the comparison value; 1: Channel 2 count value is greater than or equal to the comparison value. |
| | bit1 | 0: No electronic probe/channel 2 count reset signal; 1: Electronic probe/channel 2 count reset signal |
| | bit0 | 0: Channel 2 counting stop state, the original count is cleared; 1: Channel 2 counting state |
| PulseCount CH2 | | Channel 2 pulse input value, range:–2147483648~2147483647 |
| LatchCount CH2 | | Channel 2 pulse input latch value, range:–2147483648~2147483647 |

## 3.43.4 Configuration parameter definition

| Configuration items | Parameter meaning |
|---|---|
| Signal Mode (input signal type) | 0:Rotary transducer quadruple(Orthogonal coding 4 times frequency)<br>1:Rotary transducer double(Orthogonal coding 2 times frequency)<br>2:Rotary transducer single(Orthogonal coding 1x frequency)<br>3:Pulse and Directions(Pulse plus direction)<br>4: CW/CCW is not supported yet |
| Filter time(Input pulse signal filtering configuration) | 3:4MHZ 4:1.5MHZ 5:1MHZ 6:800KHZ 7:600KHZ 8:420KHZ 9:315KHZ 10:250KHZ 11:200KHZ 12:160KHZ 13:120KHZ 14:100KHZ 15:75KHZ |
| Directional Logic(Signal input direction logic) | 0:Positive Logic(Positive logic) 1:Negative Logic(Negative logic)<br>Positive logic: Orthogonal encoding input, phase A leads phase B by 90 degrees for forward rotation, pulse plus direction input, direction input high effective signal for forward rotation.<br>Negative logic: Orthogonal encoding input, B phase leads A phase by 90 degrees for forward rotation, pulse plus direction |

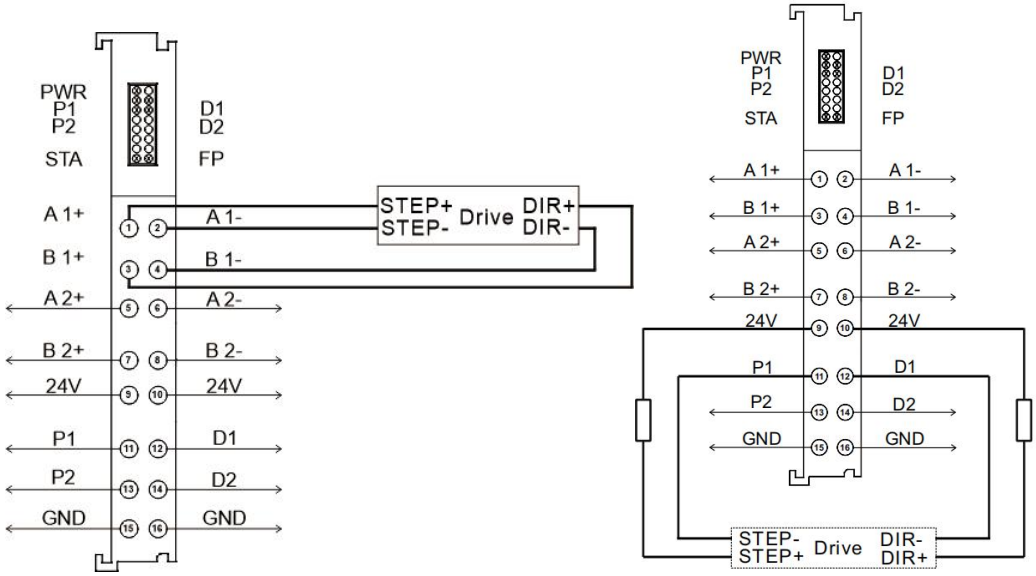
| | |
|---|---|
| | input, direction input low effective signal or floating for forward rotation. |
| Counter Mode(Count type) | 0: Line Counter (Linear Count)<br>1: Ring Counter |
| Upper limit(Ring count upper limit) | -2147483648~ 2147483647 |
| Lower limit(Ring count lower limit) | -2147483648~ 2147483647<br>For example, if the upper and lower limits are set to 5 and -5 respectively in loop mode, the upward count is -5, -4, -3, -2, -1, 0, 1, 2, 3, 4, -5, -4.... The downward count is -5, 4, 3, 2, 1, 0, -1, -2, -3, -4, -5, 4.... |

# 3.44DF20-M-2PWM: 2-channel pulse output module 24V signal

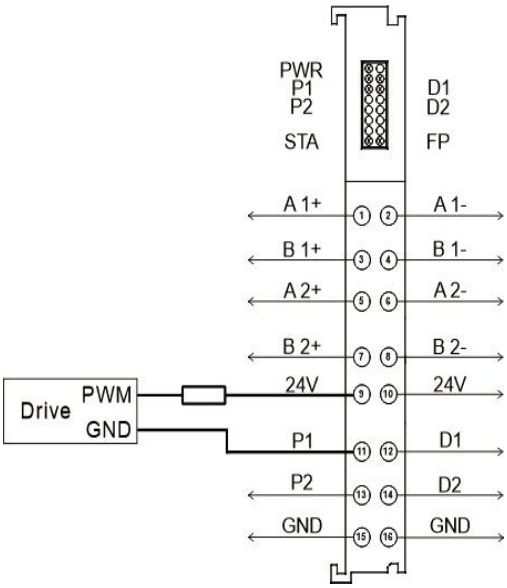
## 3.44.1 Technical parameters

| | |
|---|---|
| **Electrical parameters** | |
| Bus input power rated | DC5V |
| Bus input power rated | 40mA |
| Terminal output rated | DC24V |
| Terminal output rated | 500mA |
| Output connection type | 2-wire / 4-wire |
| Number of output channels | 2 |
| Output signal type | Pulse+direction/PWM, configurable |
| Output signal voltage | DC5V |
| Differential signal output | 800HZ~4MHZ |
| Open drain signal output | 800HZ~500KHZ |
| PWM signal output | 20HZ~12KHZ |
| Open drain output | 30mA |
| Open-drain output maximum pull-up voltage | 28V |
| Accuracy | ±1 pulse |
| **General parameters** | |
| Vibration Testing | 1g, in accordance with IEC 60068-2-6 |
| Shock Test | 15g, compliant with IEC 60068-2-27 |
| Electromagnetic | Compliant with EN 61000-4standard |
| Protection level | IP20 |
| Operating temperature | -25～75℃ |
| Storage temperature | -40℃~+85℃ |
| Relative humidity | 5～95%RH (no condensation) |
| Installation | 35mm rail mounting |
| Dimensions | 100mm × 12mm × 67mm |
| Maximum crimping area of | 2.5mm² |
| Maximum crimping area of | AWG14 |
| Minimum crimping area of | 0.2mm² |
| Minimum crimping area for | AWG28 |
| Line length | 8...9mm |

## 3.44.2 Status indicator light and wiring diagram




Pulse plus direction differential output Pulse plus direction open drain output




PWM open-drain output

The status indicator lights are shown in the table below:

| LED No | Status and meaning |
|---|---|
| PWR | On: The module is powered normally |
| | Off: Module power supply is abnormal |
| STA | Power-on stage: Green: initialization abnormality;<br>Green off: Initialization is normal |
| | Running stage: Green flashing: the internal bus is working normally<br>Green off: Internal bus working abnormally |
| P1~P2 | Green flash: Pulse/PWM signal output |
| | Green off: No signal output |
| D1~D2 | Green: Output forward direction signal |
| | Green off: Output reverse direction signal or stop |
| FP | Green: Power input is normal |
| | Green off: Power input abnormality |

## 3.44.3 Module process data definition

| RXPD0 | | | |
|---|---|---|---|
| Name | Type | Size | meaning |
| Stop bit CH1 | BOOL | 0.1 | 1: Channel 1 emergency stop |
| | | | 0: Channel 1 does not stop suddenly |
| Jog Enable bit CH1 | BOOL | 0.1 | 0->1: Channel 1 starts jog motion |
| | | | 1->0: Channel 1 stops jog motion |
| Jog Direction bit CH1 | BOOL | 0.1 | 0: Channel 1 jog direction forward |
| | | | 1: Channel 1 jog direction reverse |
| Position Enable bit CH1 | BOOL | 0.1 | 0->1: Channel 1 starts positioning motion |
| | | | 1->0: Channel 1 stops positioning motion |
| Position Clear bit CH1 | BOOL | 0.1 | 1: Clear the current position of channel 1 |
| | | | 0: Channel 1 position counts normally |
| Target Duty Cycle CH1 | UINT | 2.0 | Channel 1 duty cycle setting, 1/1000 resolution. |
| Target Position or frequency CH1 | DINT | 4.0 | Channel 1 pulse plus direction positioning mode target position setting, or PWM mode frequency setting. |
| Stop bit CH2 | BOOL | 0.1 | 1: Channel 2 emergency stop |
| | | | 0: Channel 2 does not stop suddenly |
| Jog Enable bit CH2 | BOOL | 0.1 | 0->1: Channel 2 starts jog motion |

| | | | |
|---|---|---|---|
| | | | 1->0: Channel 2 stops jog motion |
| Jog Direction bit CH2 | BOOL | 0.1 | 0: Channel 2 jog direction forward |
| | | | 1: Channel 2 jog direction reverse |
| Position Enable bit CH2 | BOOL | 0.1 | 0->1: Channel 2 starts positioning motion |
| | | | 1->0: Channel 2 stops positioning motion |
| Position Clear bit CH2 | BOOL | 0.1 | 1: Clear the current position of channel 2 |
| | | | 0: Channel 2 position counts normally |
| Target Duty Cycle CH2 | UINT | 2.0 | Channel 2 duty cycle setting, 1/1000 resolution. |
| Target Position or frequency CH2 | DINT | 4.0 | Channel 2 pulse plus direction positioning mode target position setting, or PWM mode frequency setting. |
| TXPD0 | | | |
| Name | Type | Size | meaning |
| Pulse Fault bit CH1 | BOOL | 0.1 | 0: Channel 1 is normal |
| | | | 1: Channel 1 fault |
| CtrlWord Fault bit CH1 | BOOL | 0.1 | 0: Channel 1 process data is normal |
| | | | 1: Channel 1 process data is abnormal |
| Positioning Complete bit CH1 | BOOL | 0.1 | 0: Channel 1 is in signal output state |
| | | | 1: Channel 1 has no signal output status |
| Config Fault bit CH1 | BOOL | 0.1 | 0: Channel 1 configuration data is normal |
| | | | 1: Channel 1 configuration data is abnormal |
| ActualPosition CH1 | DINT | 4.0 | Actual position or number of PWM outputs of channel 1. |
| Pulse Fault bit CH2 | BOOL | 0.1 | 0: Channel 2 is normal |
| | | | 1: Channel 2 fault |
| CtrlWord Fault bit CH2 | BOOL | 0.1 | 0: Channel 2 process data is normal |
| | | | 1: Channel 2 process data is abnormal |
| Positioning Complete bit CH2 | BOOL | 0.1 | 0: Channel 2 is in signal output state |
| | | | 1: Channel 2 has no signal output status |
| Config Fault bit CH2 | BOOL | 0.1 | 0: Channel 2 configuration data is normal |
| | | | 1: Channel 2 configuration data is abnormal |
| ActualPosition CH2 | DINT | 4.0 | Actual position or number of PWM outputs of channel 2. |

## 3.44.4 Configuration parameter definition

| index | Sub-index | name | Size | Value range | default value | meaning |
|---|---|---|---|---|---|---|
| 16#40A0 | 1 | Pulse Mode CH1 | 2.0 | See DTA41A0: Table | 0 | Channel 1 signal type. |
| | 2 | Motion Mode CH1 | 2.0 | See DTB41A0: Table | 0 | Channel 1 pulse control mode. |
| | 3 | Ramp Mode CH1 | 2.0 | See DTC41A0: Table | 0 | Channel 1 pulse ramp enable. |
| | 4 | Direction Mode CH1 | 2.0 | See DTD41A0: Table | 0 | Channel 1 direction logic. |

| | | | | | | |
|---|---|---|---|---|---|---|
| | 5 | Signal Type CH1 | 2.0 | See DTE41A0: Table | 0 | Channel 1 pulse output mode. |
| | 6 | Duty Cycle CH1 | 2.0 | See DTF41A0: Table | 0 | Channel 1 PWM signal duty cycle enable. |
| | 7 | PWM Freq Range CH1 | 2.0 | See DTA41B0: Table | 3 | Channel 1 PWM frequency range. |
| | 8 | Startup Freq CH1 | 4.0 | 800~4000000 | 1000 | Channel 1 pulse output starting frequency, unit: HZ. |
| | 9 | Target Freq CH1 | 4.0 | 800~4000000 | 10000 | Channel 1 pulse output target frequency, unit: HZ. |
| | 10 | Ramp Up Time CH1 | 2.0 | 10~4096 | 100 | Channel 1 pulse output ramp-up time, in ms. |
| | 11 | Ramp Dn Time CH1 | 2.0 | 10~4096 | 100 | Channel 1 pulse output downslope time, in ms. |
| | 12 | Pulse Mode CH2 | 2.0 | See DTA41A0: Table | 0 | Channel 2 signal type. |
| | 13 | Motion Mode CH2 | 2.0 | See DTB41A0: Table | 0 | Channel 2 pulse control mode. |
| | 14 | Ramp Mode CH2 | 2.0 | See DTC41A0: Table | 0 | Channel 2 pulse ramp enable. |
| | 15 | Direction Mode CH2 | 2.0 | See DTD41A0: Table | 0 | Channel 2 direction |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | | logic. |
| | 16 | Signal Type CH2 | 2.0 | See DTE41A0: Table | 0 | Channel 2 pulse output mode. |
| | 17 | Duty Cycle CH2 | 2.0 | See DTF41A0: Table | 0 | Channel 2 PWM signal duty cycle enable. |
| | 18 | PWM Freq Range CH2 | 2.0 | See DTA41B0: Table | 3 | Channel 1 PWM frequency range. |
| | 19 | Startup Freq CH2 | 4.0 | 800~4000000 | 1000 | Channel 2 pulse output starting frequency, unit: HZ. |
| | 20 | Target Freq CH2 | 4.0 | 800~4000000 | 10000 | Channel 2 pulse output target frequency, unit: HZ. |
| | twenty one | Ramp Up Time CH2 | 2.0 | 10~4096 | 100 | Channel 2 pulse output ramp-up time, in ms. |
| | twenty two | Ramp Dn Time CH2 | 2.0 | 10~4096 | 100 | Channel 2 pulse output downslope time, in ms. |
| Note: If the module is inserted in the first card slot after the coupler, the SDO index is 16#40A0. If it is inserted in the second card slot, the SDO index is 16#40A1 and the index offset is 16#01. | | | | | | |

Table DTA41A0:

| Sub-index object data | name | meaning |
|---|---|---|
| 0 | Pulse/Dir | Pulse plus direction |

| | | |
|---|---|---|
| 1 | CW/CCW (Not Supported) | Not supported yet |
| 2 | A/B (Not Supported) | Not supported yet |
| 3 | PWM | PWM |

Table DTB41A0:

| Sub-index object data | name | meaning |
|---|---|---|
| 0 | Jog | Jog control |
| 1 | RelativePosition | Relative position control |
| 2 | AbsolutePosition | Absolute position control |

Table DTC41A0:

| Sub-index object data | name | meaning |
|---|---|---|
| 0 | Ramp Enable | Open ramp |
| 1 | Ramp Disable | Close the ramp |

Table DTD41A0:

| Sub-index object data | name | meaning |
|---|---|---|
| 0 | Positive | Direction output positive logic |
| 1 | Negative | Direction output negative logic |

Table DTE41A0:

| Sub-index object data | name | meaning |
|---|---|---|
| 0 | OpenDrain | Open-drain output |
| 1 | Difference 5V | Differential output |

Table DTF41A0:

| Sub-index object data | name | meaning |
|---|---|---|
| 0 | Duty cycle enable | Duty cycle adjustment enable |
| 1 | Duty cycle disable | Duty cycle adjustment is off, default is 50% |

Table DTA41B0:

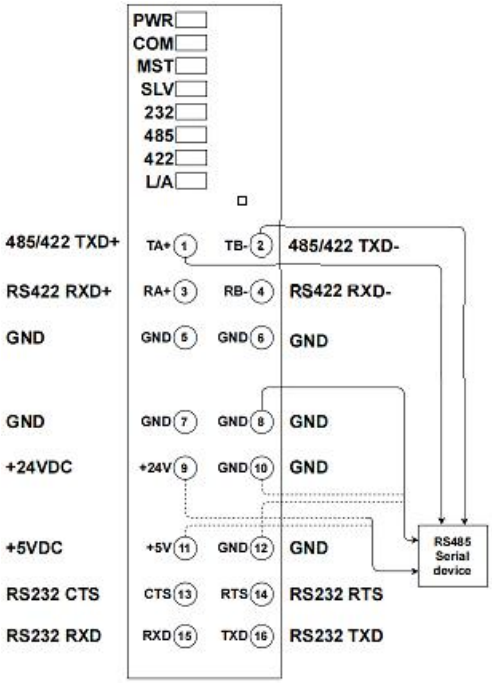
| Sub-index object data | name | meaning |
|---|---|---|
| 0 | 20Hz~1.2kHz | |
| 1 | 40Hz~2.4kHz | |
| 2 | 50Hz~3kHz | |
| 3 | 100Hz~6kHz | |
| 4 | 140Hz~8.4kHz | |
| 5 | 200Hz~12kHz | |

# 3.45DF20-M-1COM-232/485/422：Serial communication module

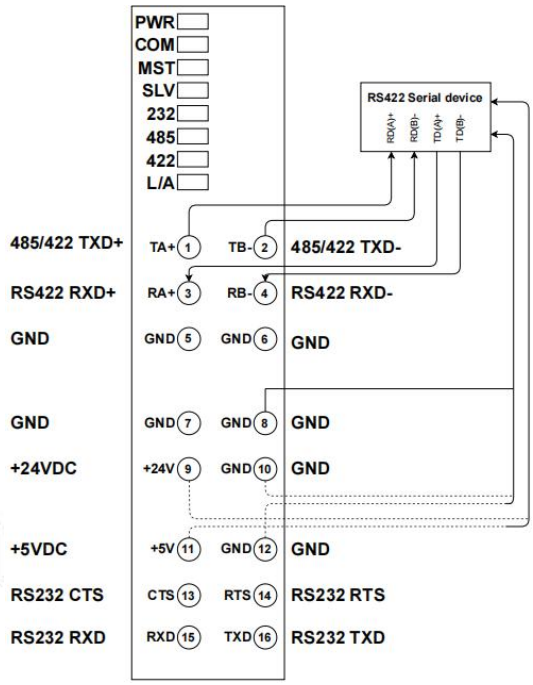
## 3.45.1 Technical parameters

| **Electrical parameters** | |
|---|---|
| Bus input power rated | DC5V |
| Bus input power rated | 75mA |
| interface | RS232/RS485/RS422 |
| Number of channels | 1 channel |
| protocol | Modbus RTU/ASCII master and slave modes; free protocol |
| Baud rate | 2400bps - 512000bps |
| Data bits | 7bit/8bit |
| Check digit | None/Even/Odd |
| Stop bits | 1bit/2bit |
| Maximum data frame | 40 bytes |
| Power supply for | 5V/500mA |
| Power supply for | 24V/500mA |
| **General parameters** | |
| Vibration Testing | 1g, in accordance with IEC 60068-2-6 |
| Shock Test | 15g, compliant with IEC 60068-2-27 |
| Electromagnetic | Compliant with EN 61000-4standard |
| Protection level | IP20 |
| Operating temperature | -25～75℃ |
| Storage temperature | -40℃~+85℃ |
| Relative humidity | 5～95%RH (no condensation) |
| Installation | 35mm rail mounting |
| Dimensions | 100mm × 12mm × 67mm |
| Maximum crimping | 2.5mm² |
| Maximum crimping | AWG14 |
| Minimum crimping | 0.2mm² |
| Minimum crimping | AWG28 |
| Line length | 8...9mm |

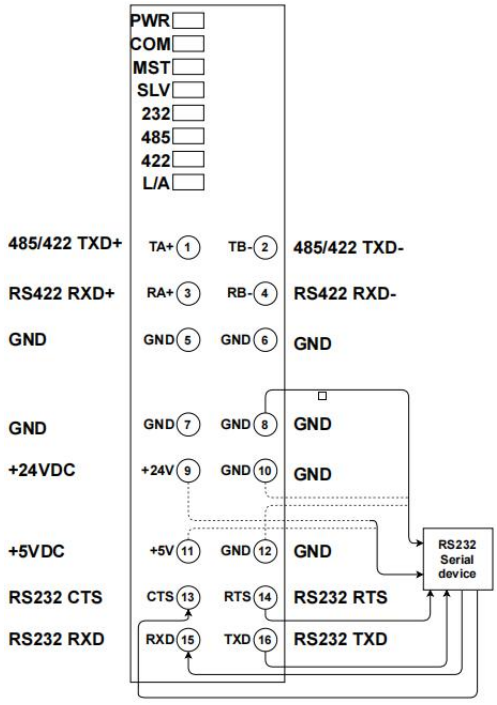
## 3.45.2 Status indicator light and wiring diagram




RS485 wiring diagram




RS422 wiring diagram




RS232 Wiring Diagram

The status indicator lights are shown in the table below:

| LED No | Status and meaning |
|---|---|
| PWR | When the power supply is normal, the green light is always on. |
| CUSTOM | In free protocol mode, green is always on |
| MASTER | In MASTER mode, green is always on |
| SLAVE | In SLAVE mode, green is always on |

| | |
|---|---|
| RS232 | In RS232 mode, green is always on |
| RS485 | In RS485 mode, green is always on |
| RS422 | In RS422 mode, green is always on |
| L/A | Power-on stage:<br>Green light is on when powered on;<br>Turns off after the internal bus is initialized. |
| | Operation phase:<br>When the module is operating normally, it flashes green;<br>When the module operates abnormally, the green light goes out. |
| Tx | Flashing: sending data; Off: no data |
| Rx | Flashing: receiving data; Off: no data |

### 3.45.3 Module process data definition

Process Data Definition

Process number of serial port moduleAs neededAccording to the operation modeDifferent data formats can be selected by adding submodules. By clicking on the coupler's property page, you can switch between different modes, namely Free Protocol/Modbus RTU Master/Modbus RTUThere are three modes for Slave, the default is Free Protocol. In Free Protocol mode, you can add submodules with a maximum input and output data of 128 bytes.

Modbus RTU MasterThe mode can add up to 28 submodules, supporting function codes 01, 02, 03, 04, 05, 15, and 16.Modbus RTUSlave mode can add up to 28 sub-modules and supports function codes 01, 02, 03, 04, 05, 15, and 16.

### 3.45.4 Configuration parameter definition

General parameter configuration

| Module parameters | Parameter meaning | Initial Value |
|---|---|---|
| OperationMode | 0: Custom free protocol 1: Modbus RTU Master 2: Modbus RTU Slave | 0:Custom |
| Interface Type<br>Interfance | 0:RS232 Flow OFF 1:RS232 Flow ON<br>2:RS485 3:RS422 | 2: RS485 |
| Check digit<br>Parity | 0:None 1:Odd<br>2: Even | 0:None |
| Data bits<br>Data bits | 0:8 bits<br>1:7 bits | 0:8 bits |
| Stop bits<br>Stop bit | 0:1Bit<br>1:2Bits | 0:1Bit |
| Baud rate<br>Baudrate | 300bps-512000bps<br>(0-17 enumeration value setting) | 11:115200 |
| Custom Baudrate | Custom baud rate (valid when not 0) | 0 |

Module Status Description

| Normal state value | Status Name | meaning |
|---|---|---|
| 16#0000 | OP_SUCCESS | Configuration or write operation successful |
| 16#0001 | DATA_FULL | Data has been updated and can be read |
| 16#0002 | WRITE_IDLE | Write idle, writable |
| 16#0003 | DATA_EMPTY | Read idle, receive data not updated |
| Error Status Value | Status Name | meaning |
| 16#E0A1 | WRITE_BUSY | Write busy, can't write |
| 16#E0A2 | DATA_LARGE | Data length exceeds limit |
| 16#E0A3 | CMD_ERR | Command Error |
| 16#E0A4 | PARA_ERR | Configuration parameter error |
| 16#E0A5 | CHECK_ERR | Verification Error |
| 16#E0A6 | SLAVE_NOEXIT | The slave device does not exist |
| 16#E0A7 | PACK_LOSS | Packet Loss |
| 16#E0A8 | OVER_FLOW | Data overflow |

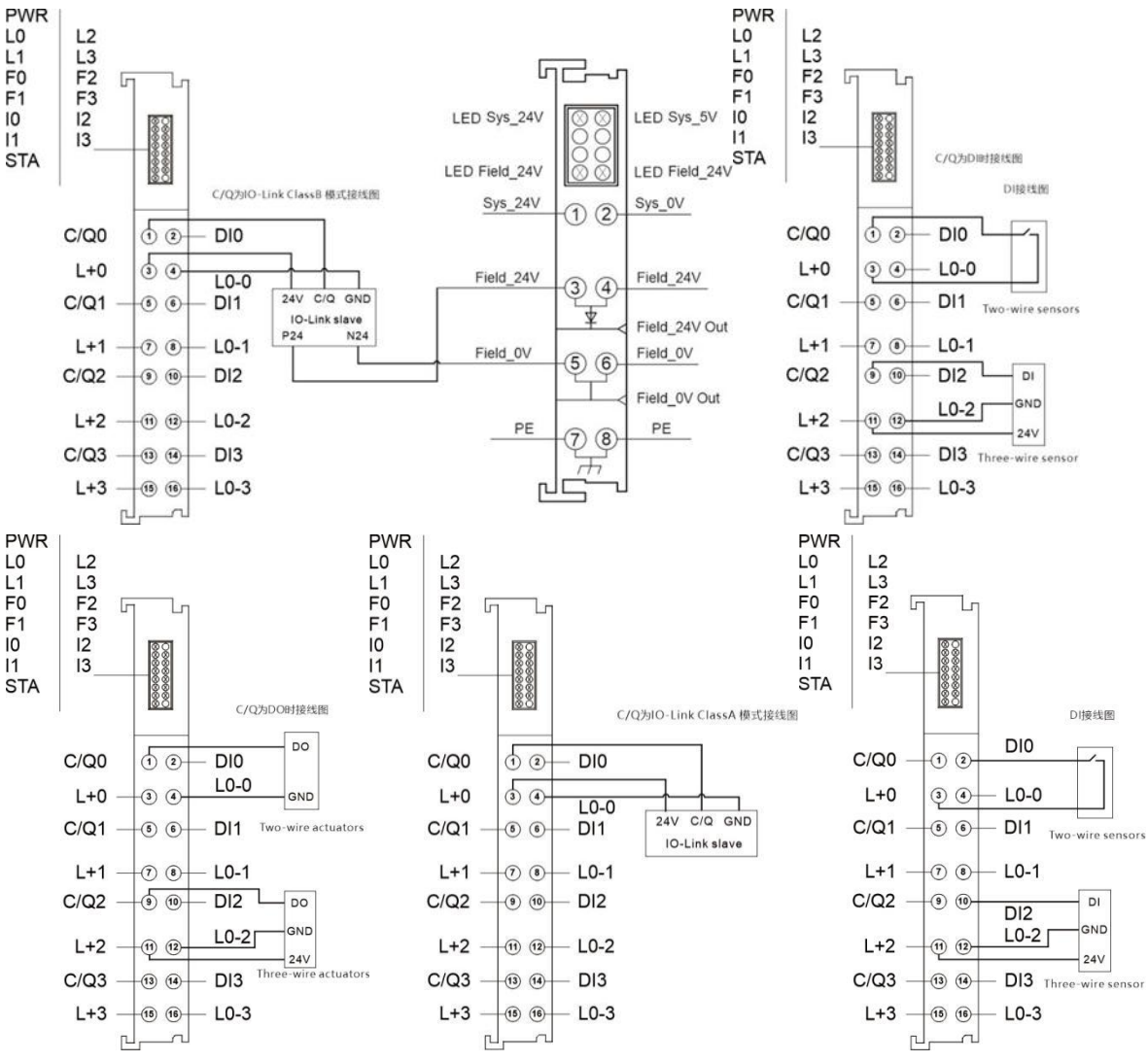
# 3.46 DF20-M-4IOL:4-channel IO-LinkCommunication module

## 3.46.1 Technical Parameters

| **Electrical parameters** | |
|---|---|
| **Common digital port input parameters** | |
| Number of channels | IEC 61131-2: Type 1 PNP |
| Input voltage range,0"Signal | -0.3 V DC ... 8 V DC |
| Input voltage range,1"Signal | 12.9 V DC ... 24.3 V DC |
| **IO-LINKPort input parameters** | |
| IO-LINK Mode | |
| Number of ports | 4 |
| Connection | Push-in connection |
| Connecting the system | 3Wire/5Wire |
| Port Type | Akind |
| Connect the cables | Length not exceeding20 m, when encountering heavy interference, it is recommended to useRVVPShielded cable, ground the shielding layer according to the site conditions |
| Communication rate | COM1:4.8kbit/s COM2:38.4kbit/s |
| Digital input mode | |
| Input Description | IO-LinkPort in digital input (DI) mode |
| Input quantity | maximum4 |
| Input Type | IEC 61131-2 :Type 1 PNP |
| Connection | Push-in connection |
| Connecting the system | 3Wire |
| Rated input voltage | 24 V DC |
| Input voltage range,0"Signal | -0.3 V DC ... 8 V DC |
| Input voltage range,1"Signal | 12.9 V DC ... 24.3 V DC |
| Digital output mode | |
| Output Description | IO-LinkPort in digital output (DO) mode |
| Number of outputs | maximum4 |
| Output Type | IEC 61131-2 :Type 0.5 PNP |
| Connection | Push-in connection |
| Connecting the system | 2,3Wire |
| Rated output voltage | 24 V DC |
| Rated current per channel | 500 mA |
| **Basic parameters** | |
| Coupler Support Quantity | maximum6 |

| General parameters | |
|---|---|
| Vibration Testing | 1g, in accordance with IEC 60068-2-6 |
| Shock Test | 15g, compliant with IEC 60068-2-27 |
| Electromagnetic compatibility | Compliant with EN 61000-4standard |
| Protection level | IP20 |
| Operating temperature | -25～75℃ |
| Storage temperature | -40°C~+85°C |
| Relative humidity | 5～95%RH (no condensation) |
| Installation | 35mm rail mounting |
| Dimensions | 100mm × 12mm × 67mm |
| Maximum crimping area of | 2.5mm² |
| Maximum crimping area of | AWG14 |
| Minimum crimping area of | 0.2mm² |
| Minimum crimping area for | AWG28 |
| Line length | 8...9mm |

## 3.46.2 Status indicator lights and wiring diagram



The status indicator lights are shown in the table below:

| LED No | Status and meaning | |
|---|---|---|
| PWR | On: Internal bus power supply is normal | |
| | Off: Internal bus power supply abnormality | |
| STA | Power-on stage: | Green: Module initialization error |
| | | Green off: Module initialization is normal |
| | Operation phase: | Green flash: The internal bus of the module is working normally |
| | | Green off: The internal bus of the module is working abnormally |
| L0~L3 | Green: The corresponding channel IO-LINK is communicating normally | |
| | Green flash: No IO-LINK slave is connected to the corresponding channel | |
| | Green off: The corresponding channel is not configured as IO-LINK mode | |
| F0~F3 | Red: The corresponding channel reports an error | |
| | Red off: No error reported on the corresponding channel | |
| I0~I3 | Green: DI input valid signal | |
| | Green off: DI has no valid input signal | |

## 3.46.3 Module process data definition

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

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

| | | | | |
|---|---|---|---|---|
| | | (Port 2 device error real-time flag) | device communication status) | |
| Byte9~Byte10 | The most recent event code of port 3. For details, see the port event code table. | | | |
| Byte11 | reserve | 0: Normal working state 1: Error working state (Port 3 device error real-time flag) | 0: Slave disconnected 1: Slave connection status (Real-time flag of port 3 device communication status) | reserve |

| **Output Data** | |
|---|---|
| Byte 0 | Port 0 operation command, for details, see the port operation code table |
| Byte 1 | Port 1 operation command, for details, see the port operation code table |
| Byte 2 | Port 2 operation commands, see the port operation code table for details |
| Byte 3 | Port 3 operation commands, see the port operation code table for details |

**Port event code:**

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

**Port operation code:**

| Command | illustrate |
|---|---|
| 0x00 | Normally obtain the port event code |
| 0x01 | Clear port event codes |
| other | reserve |

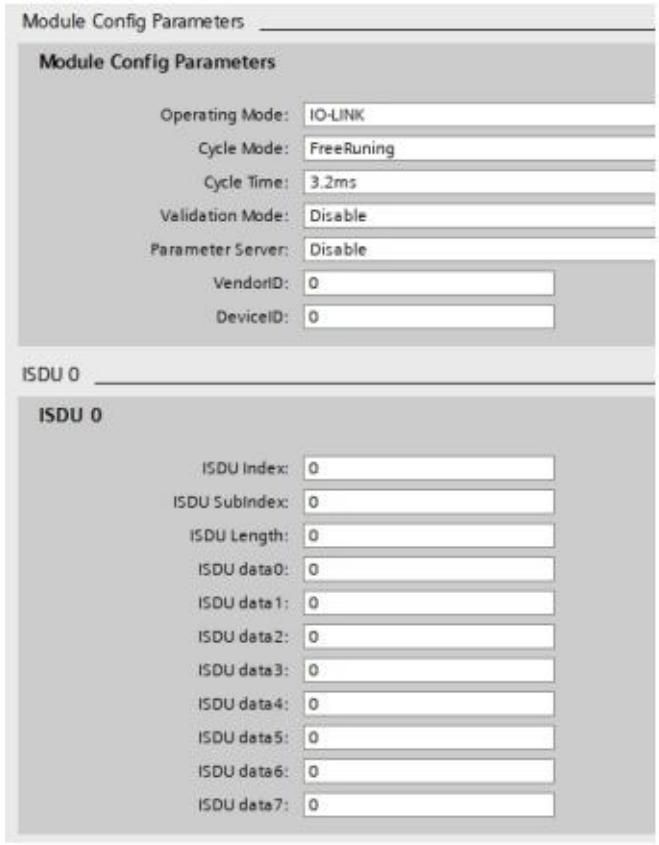
### 3.46.3.2Port0~Port3 subslot process data

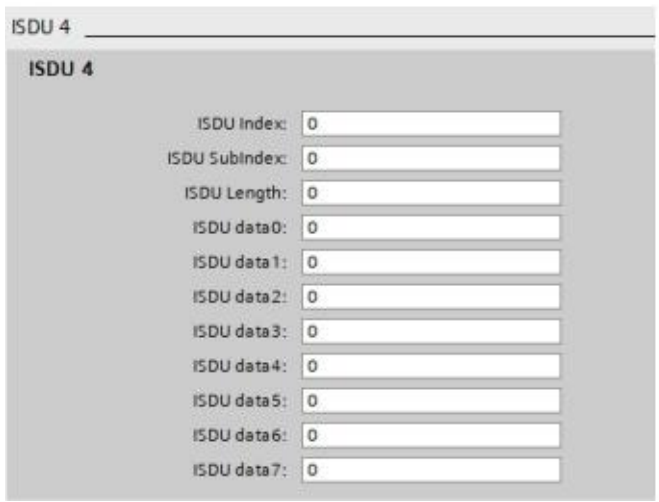
| **Input data (1 byte fixed data + N bytes of data exchanged with slaves)** | | | | |
|---|---|---|---|---|
| Byte 0 (fixed data) | Bit 7~Bit 3 | Bit 2 | Bit 1 | Bit 0 |
| | reserve | Valid bit Note 1 | C/Q DI Note 2 | DI |
| Byte 1...Byte N | Process data of IO-Link decisions | | | |
| **Output data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

Note 1: Valid bit indicates data validity. Whether the data is valid is determined by whether this bit is true.
Note 2: When the channel is configured in IO-link mode, this bit is invalid;
When the channel is configured in DI mode, this bit indicates the peripheral input status.
Note 3: When the channel is configured in IO-link mode, this bit is invalid;
When the channel is configured as DO mode, this bit is used to control the module channel output.

## 3.46.4 Configuration parameter definition

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




| Configuration items | Configuration parameters | default value |
|---|---|---|
| Operating Mode<br>Working Mode | 0:disable 1:IO-LINK<br>2:DI 4:DO | 1 |
| Cycle Mode<br>Cycle Mode | 0:Free Running 1:Fixed Time<br>2:Message sync (not supported yet) | 0 |
| Cycle Time<br>Cycle time | 3.2ms~132.8ms (This parameter is only effective when Cycle Mode is Fixed Time) | 3.2ms |
| Validation Mode<br>Verification Mode | 0:disable 1:compatible<br>2:identical (not supported yet) | 0 |
| Parameter Server<br>Parameter Service | 0:disable 1:BackUp/Restore<br>2:Restore | 0 |

| | | |
|---|---|---|
| VendorID<br>Vendor ID | Vendor ID (unsigned 16 bits) | 0 |
| DeviceID<br>Device ID | Device ID (unsigned 32-bit) binary | 0 |
| ISDU Parameter 0 | ISDU Index | 0~65535 |
| | ISDU Subindex | 0~255 |
| | ISDU Length | 0~8 |
| | ISDU data 0 | 0~255 |
| | ISDU data 1 | 0~255 |
| | ISDU data 2 | 0~255 |
| | ISDU data 3 | 0~255 |
| | ISDU data 4 | 0~255 |
| | ISDU data 5 | 0~255 |
| | ISDU data 6 | 0~255 |
| | ISDU data 7 | 0~255 |
| ISDU Parameter 1 | ISDU Index | 0~65535 |
| | ISDU Subindex | 0~255 |
| | ISDU Length | 0~8 |
| | ISDU data 0 | 0~255 |
| | ISDU data 1 | 0~255 |
| | ISDU data 2 | 0~255 |
| | ISDU data 3 | 0~255 |
| | ISDU data 4 | 0~255 |
| | ISDU data 5 | 0~255 |
| | ISDU data 6 | 0~255 |
| | ISDU data 7 | 0~255 |
| ISDU Parameter 2 | ISDU Index | 0~65535 |
| | ISDU Subindex | 0~255 |
| | ISDU Length | 0~8 |
| | ISDU data 0 | 0~255 |
| | ISDU data 1 | 0~255 |
| | ISDU data 2 | 0~255 |
| | ISDU data 3 | 0~255 |
| | ISDU data 4 | 0~255 |
| | ISDU data 5 | 0~255 |
| | ISDU data 6 | 0~255 |
| | ISDU data 7 | 0~255 |
| ISDU Parameter 3 | ISDU Index | 0~65535 |
| | ISDU Subindex | 0~255 |
| | ISDU Length | 0~8 |
| | ISDU data 0 | 0~255 |
| | ISDU data 1 | 0~255 |
| | ISDU data 2 | 0~255 |
| | ISDU data 3 | 0~255 |
| | ISDU data 4 | 0~255 |
| | ISDU data 5 | 0~255 |
| | ISDU data 6 | 0~255 |
| | ISDU data 7 | 0~255 |

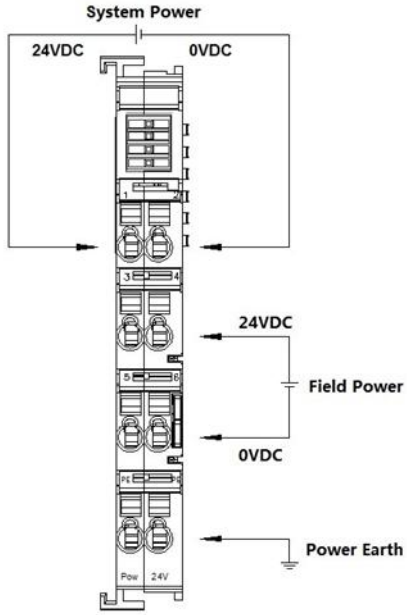
| | | |
|---|---|---|
| ISDU Parameter 4 | ISDU Index | 0~65535 |
| | ISDU Subindex | 0~255 |
| | ISDU Length | 0~8 |
| | ISDU data 0 | 0~255 |
| | ISDU data 1 | 0~255 |
| | ISDU data 2 | 0~255 |
| | ISDU data 3 | 0~255 |
| | ISDU data 4 | 0~255 |
| | ISDU data 5 | 0~255 |
| | ISDU data 6 | 0~255 |
|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

# 3.47 DF20-M-DC-UD-5:Power Supply Modules

## 3.47.1 Technical Parameters

| | | |
|---|---|---|
| **Electrical parameters** | | |
| System Power | Power Input | 24V DC (18~36V) |
| | Power Output | 5V DC/2A |
| Common power supply | Power Input | 24V DC（±20%） |
| | Rated current | 8A |
| **General parameters** | | |
| Vibration Testing | 1g, in accordance with IEC 60068-2-6 | |
| Shock Test | 15g, compliant with IEC 60068-2-27 | |
| Electromagnetic compatibility | Compliant with EN 61000-4standard | |
| Protection level | IP20 | |
| Operating temperature | -25～75℃ | |
| Storage temperature | -40°C~+85°C | |
| Relative humidity | 5～95%RH (no condensation) | |
| Installation | 35mm rail mounting | |
| Dimensions | 100mm × 12mm × 67mm | |
| Maximum crimping area of | 2.5mm² | |
| Maximum crimping area of | AWG14 | |
| Minimum crimping area of | 0.2mm² | |
| Minimum crimping area for | AWG28 | |
| Line length | 8...9mm | |

## 3.47.2 Status indicator lights and wiring diagram




The status indicator lights are shown in the table below:

| LED No | Status and meaning |
|---|---|
| ledSys-24V | Off: System power supply24VInput disconnect |
| | On: System power supply24VInput Normal |
| ledSys-5V | Off: System power supply5VOutput disconnect |
| | On: System power supply5VOutput is normal |
| ledField-24V | Off: Load power supply24VInput disconnect |
| | On: Load power supply24VInput Normal |
| ledField-24V | Off: Load power supply24VOutput disconnect |
| | On: Load power supply24VOutput is normal |

# 4 Software Configuration Instructions

➢ This chapterspecialDo not use Siemens TIA Portal as a configuration software adapterDF20-C-PN-RT-V10

The use of is introduced.

## 4.1 TIA Portal Configuration Process

➢ This section uses the PLC model 6ES7211-1BE40-0XB0.

### 4.1.1 New Project

➢ Open the TIA Portal software and select "Create New Project" from the menu bar to create a new project:

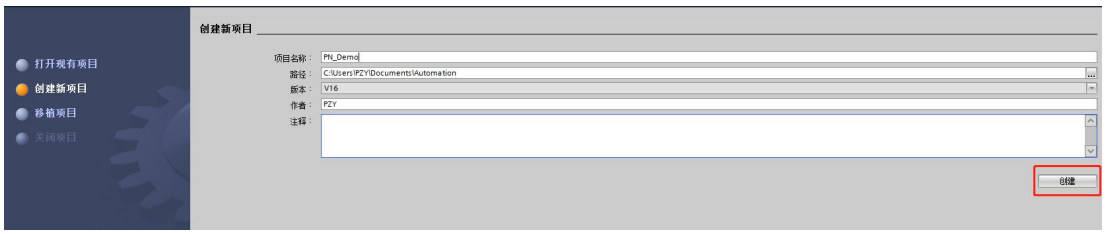



Figure 4-1

➢ Enter the project name PN_Demo and save path, then create a project and open the projectSeepicture:


Figure 4-2(a)

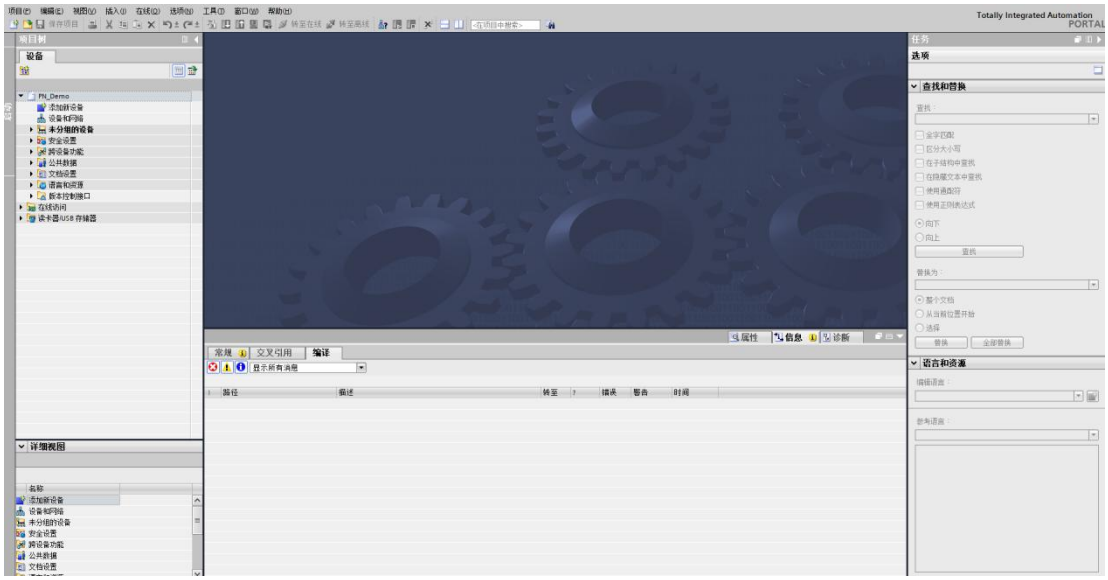


Figure 4-2(b)

➢ Add the GSD file as shown below:

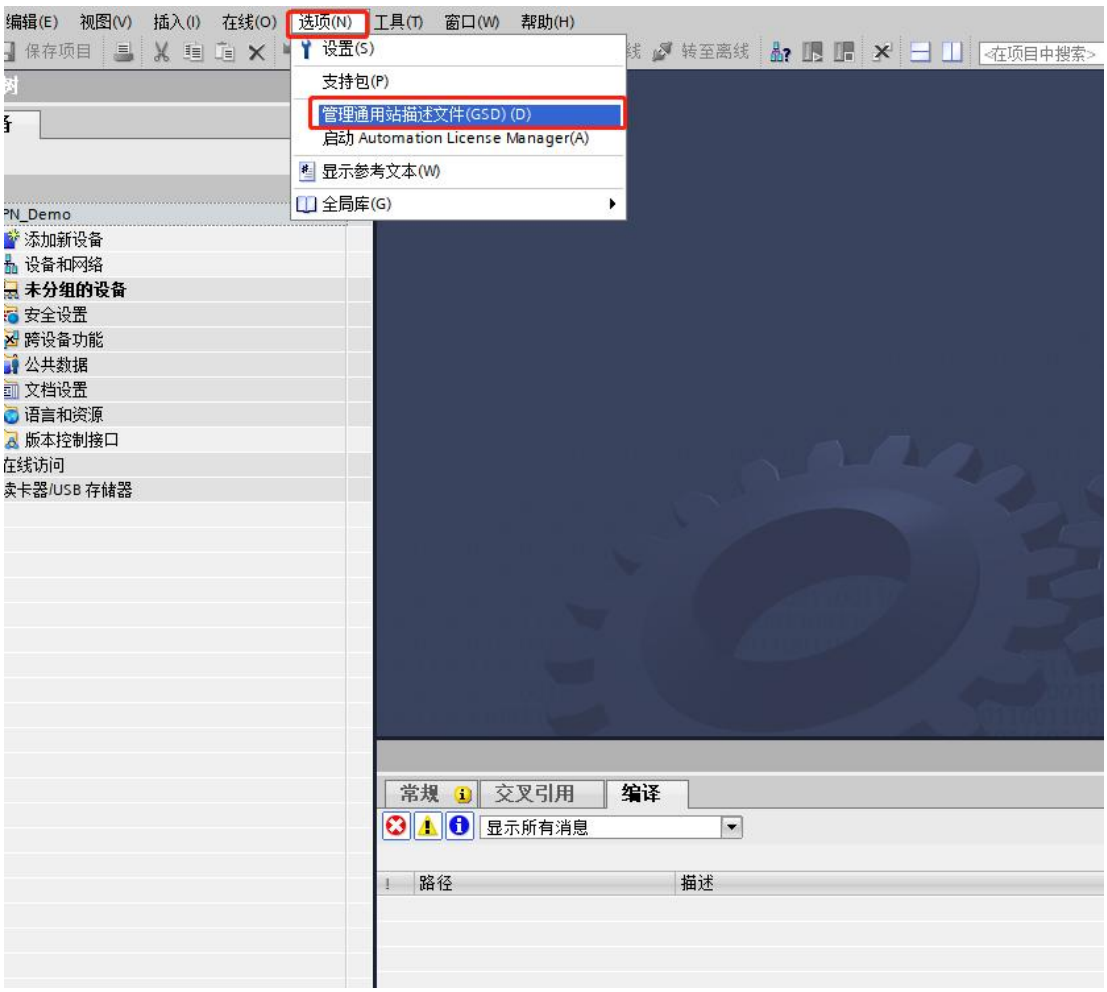



Figure 4-3(a)

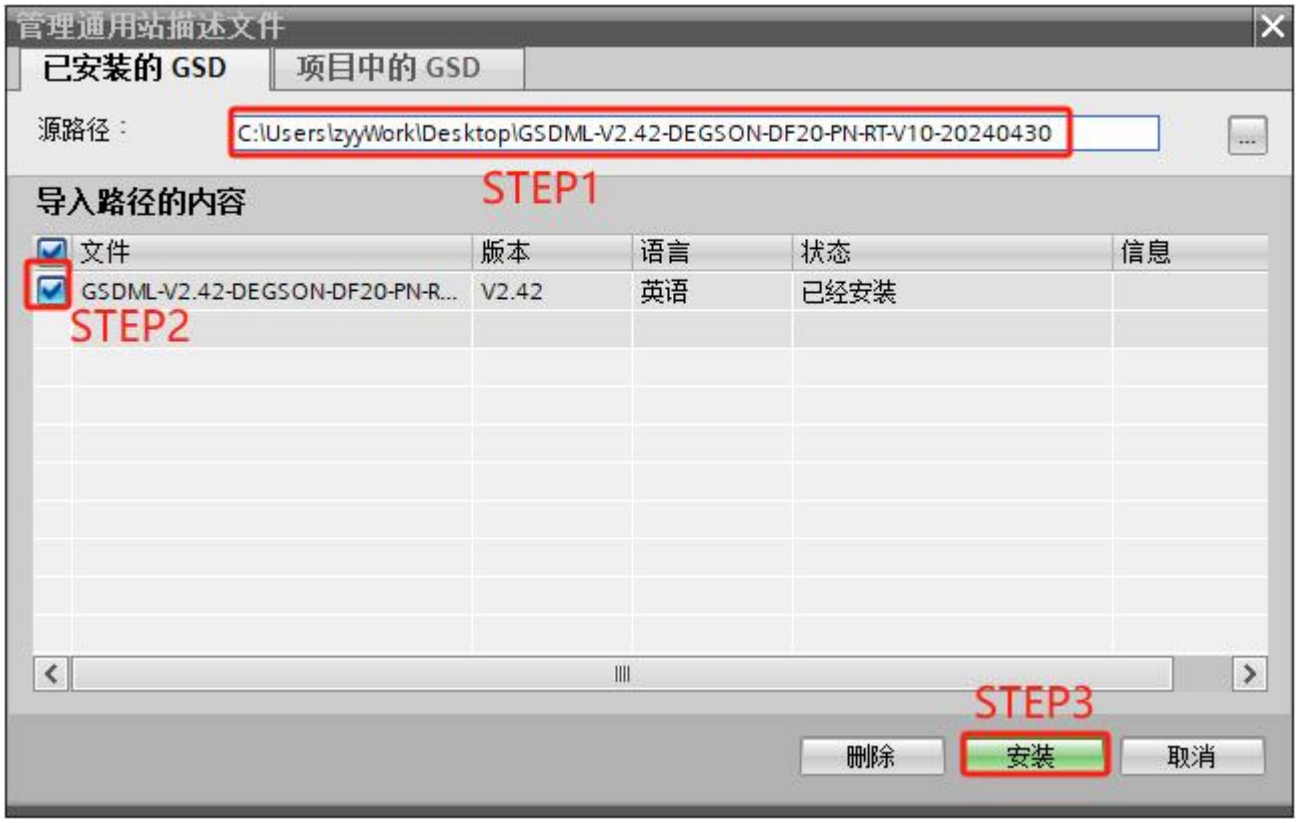



Figure 4-3(b)


Figure 4-3(c)

- Add the controller module as shown:

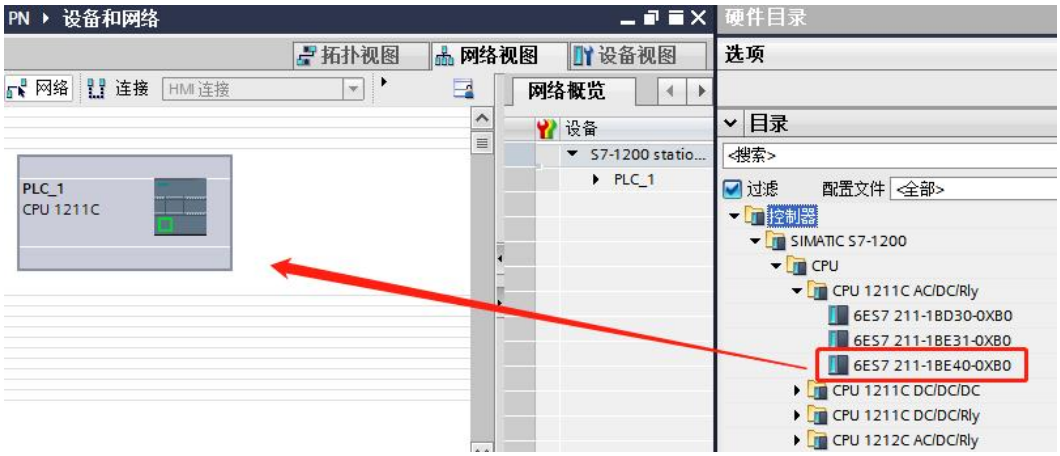



Figure 4-4

➢ Add the adapter as shownDF20-C-PN-RT-V10:

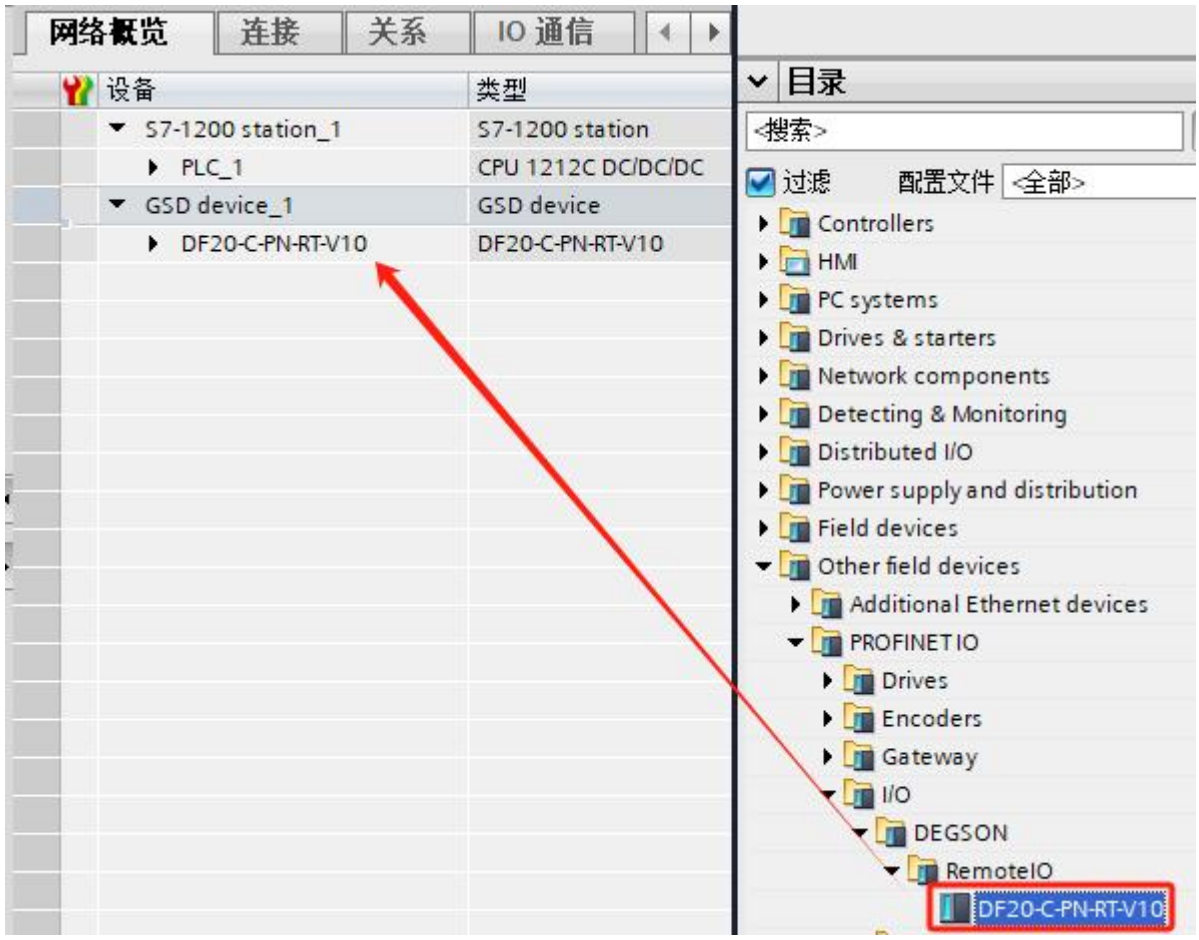



Figure 4-5

➢ Assign network interfaces to the adapter as shown:

Figure 4-6(a)

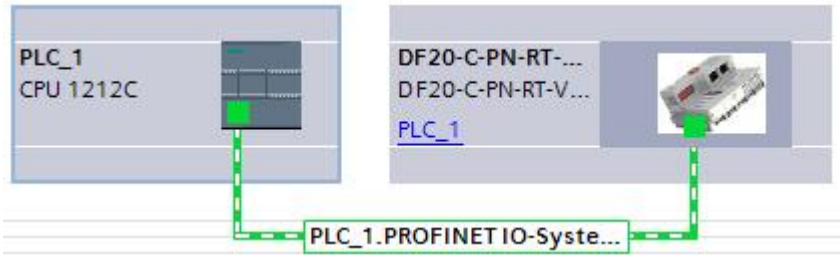



Figure 4-6(b)

- Double-click the adapter as shown in the figure, and add modules in the device tree according to the modules plugged in behind the adapter. The topology of this example is as follows:

DF20-C-PN-RT-V10+DF20-M-16DI-N+DF20-M-16DO-N,DF20-C-PN-RT-V10A virtual alarm module is configured by default to display the error information of the IO modules in the topology.

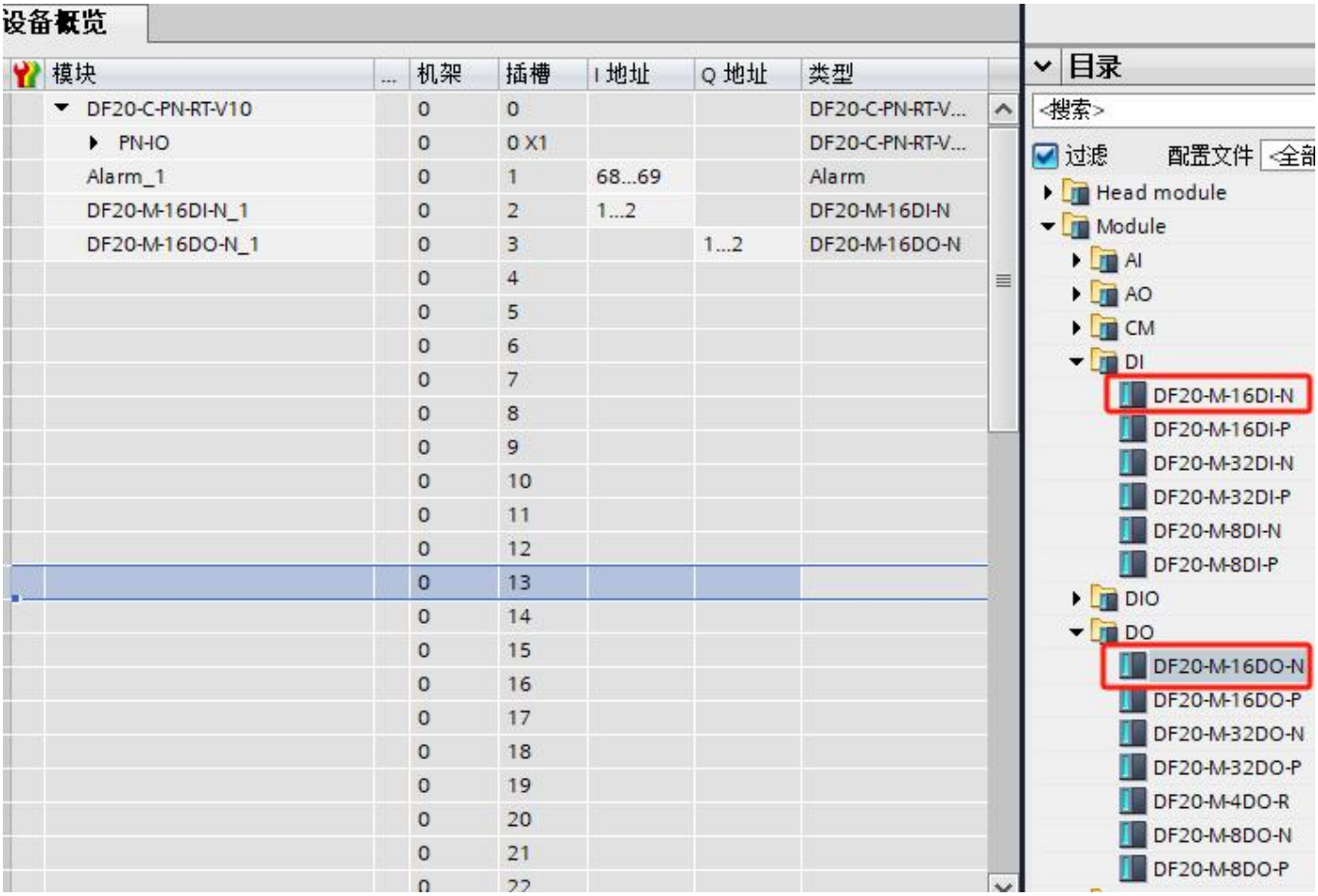



Figure 4-7

➢ After the module configuration is complete, download

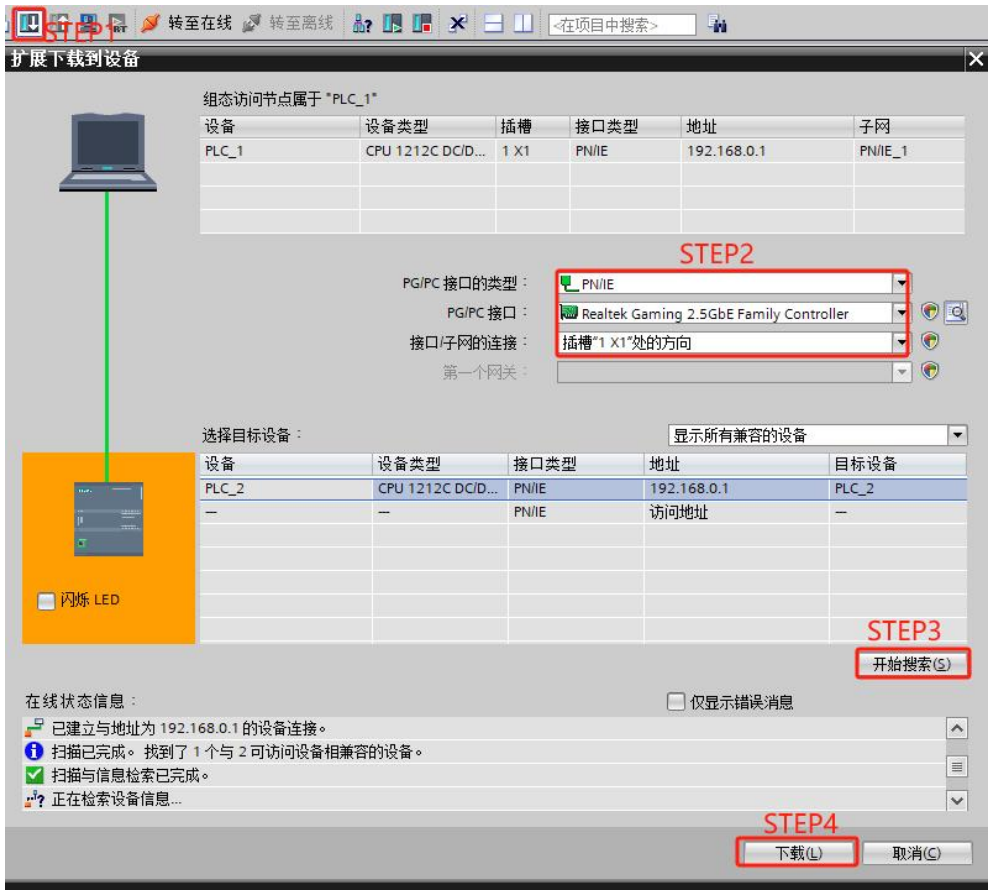



Figure 4-8(a)

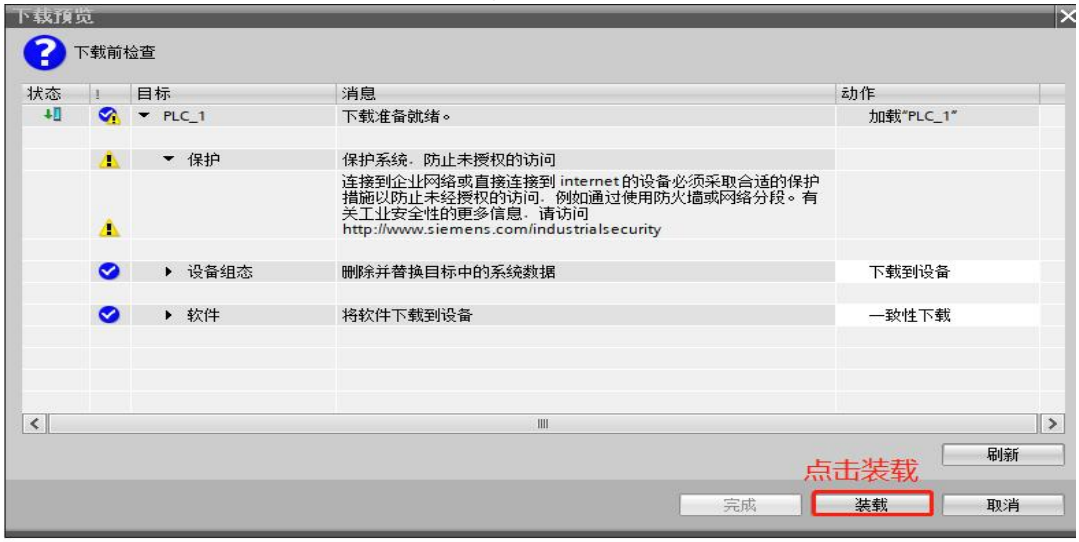



Figure 4-8(b)

### 4.1.2 Running PLC

➢ As shown in the figure,Click to start PLC, let the PLC run in RUN state:


Figure 4-9

- Operate the attached I/O modules according to the input and output addresses assigned during hardware configuration

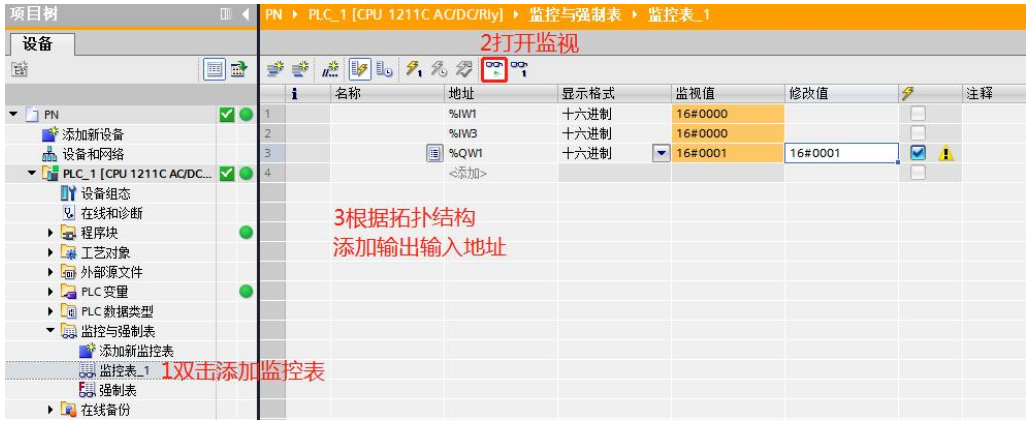



Figure 4-10

# 5 Application examples of different functional modules

➢ All examples in this section use the PLC model 6ES7211-1BE40-0XB0, the configuration software used is TIA Portal.

## 5.1Digital quantity and Alarm module usage routine

➢ This example usesDF20-C-PN-RT-V10+ DF20-M-8DI-N+ DF20-M-16DI-N+ DF20-M-32DI-N+ DF20-M-8DO-N+ DF20-M-16DO-N+DF20-M-32DO-N + DF20-M-8DIO-NTopology. The digital module currently only supports 1-wire sensor devices. Add the module according to the steps in Section 4.1.1 as shown in the figure, then compile and download the project and run the PLC.

设备概览

| 模块 | ... | 机架 | 插槽 | I 地址 | Q 地址 | 类型 |
|---|---|---|---|---|---|---|
| DF20-C-PN-RT-V10 | | 0 | 0 | | | DF20-C-PN-RT-V... |
| PN-IO | | 0 | 0 X1 | | | DF20-C-PN-RT-V... |
| Alarm_1 | | 0 | 1 | 1...2 | | Alarm |
| DF20-M-8DI-N_1 | | 0 | 2 | 3 | | DF20-M-8DI-N |
| DF20-M-16DI-N_1 | | 0 | 3 | 4...5 | | DF20-M-16DI-N |
| DF20-M-32DI-N_1 | | 0 | 4 | 6...9 | | DF20-M-32DI-N |
| DF20-M-8DO-N_1 | | 0 | 5 | | 1 | DF20-M-8DO-N |
| DF20-M-16DO-N_1 | | 0 | 6 | | 2...3 | DF20-M-16DO-N |
| DF20-M-32DO-N_1 | | 0 | 7 | | 4...7 | DF20-M-32DO-N |
| DF20-M-8DIO-N_1 | | 0 | 8 | 10 | 8 | DF20-M-8DIO-N |

Figure 5-1

➢ As shown in the figure, the input and output data are operated according to the module address.

| | 名称 | 地址 | 显示格式 | 监视值 | 修改值 | | 注释 |
|---|---|---|---|---|---|---|---|
| 1 | | %IW1 | 十六进制 | 16#0000 | | ☐ | Alarm模块数据 |
| 2 | | %IB3 | 十六进制 | 16#00 | | ☐ | DI8(NPN)数据 |
| 3 | | %IW4 | 十六进制 | 16#0000 | | ☐ | DI16(NPN)数据 |
| 4 | | %IW6 | 十六进制 | 16#0000 | | ☐ | DI32(NPN)低16位数据 |
| 5 | | %IW8 | 十六进制 | 16#0000 | | ☐ | DI32(NPN)高16位数据 |
| 6 | | %QB1 | 十六进制 | 16#00 | | ☐ | DO8(NPN)数据 |
| 7 | | %QW2 | 十六进制 | 16#0000 | | ☐ | DO16(NPN)数据 |
| 8 | | %QW4 | 十六进制 | 16#0000 | | ☐ | DO32(NPN)低16位数据 |
| 9 | | %QW6 | 十六进制 | 16#FFFF | 16#FFFF | ☑ ⚠ | DO32(NPN)高16位数据 |
| 10 | | %IB10 | 十六进制 | 16#00 | | ☐ | 8DIO(NPN)输入数据 |
| 11 | | %QB8 | 十六进制 | 16#FF | 16#FF | ☑ ⚠ | 8DIO(NPN)输出数据 |

Figure 5-2

➢ When the slave deviceDF20-C-PN-RT-V10If the IO module plugged in later fails or data is lost, the ERR light will be on and the error message will be displayed in the Alarm module.4When an IO module fails or data is lost, the Alarm input information is as shown in the figure:

| | 名称 | 地址 | 显示格式 | 监视值 | 修改值 | | 注释 |
|---|---|---|---|---|---|---|---|
| 1 | | %IW1 | 十六进制 | 16#0104 | | | Alarm模块数据 |
| 2 | | %IB3 | 十六进制 | 16#00 | | | DI8(NPN)数据 |
| 3 | | %IW4 | 十六进制 | 16#0000 | | | DI16(NPN)数据 |
| 4 | | %IW6 | 十六进制 | 16#0000 | | | DI32(NPN)低16位数据 |
| 5 | | %IW8 | 十六进制 | 16#0000 | | | DI32(NPN)高16位数据 |
| 6 | | %QB1 | 十六进制 | 16#00 | | | DO8(NPN)数据 |
| 7 | | %QW2 | 十六进制 | 16#0000 | | | DO16(NPN)数据 |
| 8 | | %QW4 | 十六进制 | 16#0000 | | | DO32(NPN)低16位数据 |
| 9 | | %QW6 | 十六进制 | 16#FFFF | 16#FFFF | | DO32(NPN)高16位数据 |

Figure 5-3

➢ As shown in the figure, the high 8-bit data 0x01 is an error flag, and the low 8-bit data 0x04Representative4An error occurred in the module. Similarly, if the3If an error occurs in a module, the input data of Alarm is 16#0103; If an error occurs in the second module, the input data of Alarm is 16#0102.

## 5.2Analog input module usage routine

➢ This example usesDF20-C-PN-RT-V10+DF20-M-4AI-U-0+DF20-M-4AI-U-1+DF20-M-4AI-I-2+DF20-M-4AI-I-3Topological structure.DF20-M-4AI-U-0(±10V input)For example: This type of module has two status indicator lights. When the module is powered normally, LED1 is always on. When the module enters the working state, LED2 flashes.

➢ As shown in the figure, add modules in order according to the steps in Section 4.1.1, then compile and download the project and run the PLC.

设备概览

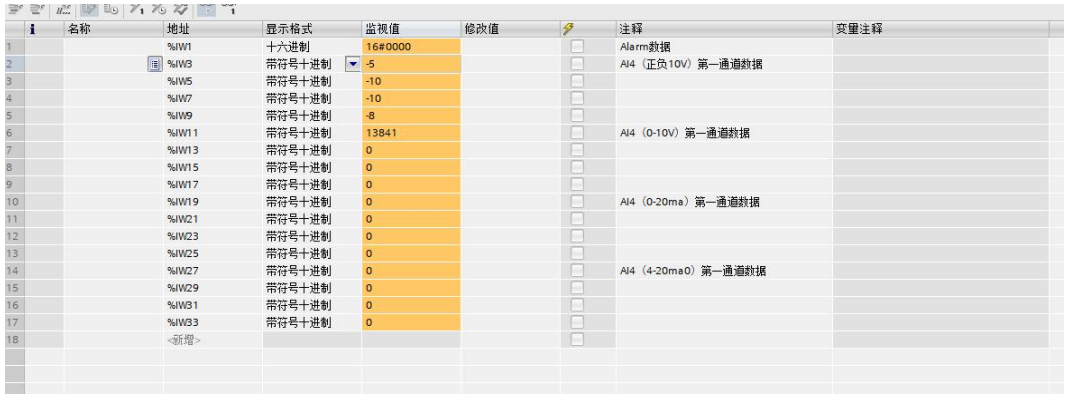
| 模块 | ... | 机架 | 插槽 | I 地址 | Q 地址 | 类型 |
|---|---|---|---|---|---|---|
| DF20-C-PN-RT-V10 | | 0 | 0 | | | DF20-C-PN-RT-V... |
| PN-IO | | 0 | 0 X1 | | | DF20-C-PN-RT-V... |
| Alarm_1 | | 0 | 1 | 1...2 | | Alarm |
| DF20-M-4AI-U-0_1 | | 0 | 2 | 3...10 | | DF20-M-4AI-U-0 |
| DF20-M-4AI-U-1_1 | | 0 | 3 | 11...18 | | DF20-M-4AI-U-1 |
| DF20-M-4AI-I-2_1 | | 0 | 4 | 19...26 | | DF20-M-4AI-I-2 |
| DF20-M-4AI-I-3_1 | | 0 | 5 | 27...34 | | DF20-M-4AI-I-3 |

Figure 5-5

➢ The input data is operated according to the module address as shown in the figure.

| | 名称 | 地址 | 显示格式 | 监视值 | 修改值 | | 注释 | 变量注释 |
|---|---|---|---|---|---|---|---|---|
| 1 | | %IW1 | 十六进制 | 16#0000 | | | Alarm数据 | |
| 2 | | %IW3 | 带符号十进制 | 13844 | | | AI4（正负10V）第一通道数据 | |
| 3 | | %IW5 | 带符号十进制 | -7 | | | | |
| 4 | | %IW7 | 带符号十进制 | -8 | | | | |
| 5 | | %IW9 | 带符号十进制 | -8 | | | | |
| 6 | | %IW11 | 带符号十进制 | 0 | | | AI4（0-10V）第一通道数据 | |
| 7 | | %IW13 | 带符号十进制 | 0 | | | | |
| 8 | | %IW15 | 带符号十进制 | 0 | | | | |
| 9 | | %IW17 | 带符号十进制 | 0 | | | | |
| 10 | | %IW19 | 带符号十进制 | 0 | | | AI4（0-20ma）第一通道数据 | |
| 11 | | %IW21 | 带符号十进制 | 0 | | | | |
| 12 | | %IW23 | 带符号十进制 | 0 | | | | |
| 13 | | %IW25 | 带符号十进制 | 0 | | | | |
| 14 | | %IW27 | 带符号十进制 | 0 | | | AI4（4-20ma0）第一通道数据 | |
| 15 | | %IW29 | 带符号十进制 | 0 | | | | |
| 16 | | %IW31 | 带符号十进制 | 0 | | | | |
| 17 | | %IW33 | 带符号十进制 | 0 | | | | |
| 18 | | <新增> | | | | | | |

Figure 5-6 (a)



| | 名称 | 地址 | 显示格式 | 监视值 | 修改值 | | 注释 | 变量注释 |
|---|---|---|---|---|---|---|---|---|
| 1 | | %IW1 | 十六进制 | 16#0000 | | | Alarm数据 | |
| 2 | | %IW3 | 带符号十进制 | -5 | | | AI4（正负10V）第一通道数据 | |
| 3 | | %IW5 | 带符号十进制 | -10 | | | | |
| 4 | | %IW7 | 带符号十进制 | -10 | | | | |
| 5 | | %IW9 | 带符号十进制 | -8 | | | | |
| 6 | | %IW11 | 带符号十进制 | 13841 | | | AI4（0-10V）第一通道数据 | |
| 7 | | %IW13 | 带符号十进制 | 0 | | | | |
| 8 | | %IW15 | 带符号十进制 | 0 | | | | |
| 9 | | %IW17 | 带符号十进制 | 0 | | | | |
| 10 | | %IW19 | 带符号十进制 | 0 | | | AI4（0-20ma）第一通道数据 | |
| 11 | | %IW21 | 带符号十进制 | 0 | | | | |
| 12 | | %IW23 | 带符号十进制 | 0 | | | | |
| 13 | | %IW25 | 带符号十进制 | 0 | | | | |
| 14 | | %IW27 | 带符号十进制 | 0 | | | AI4（4-20ma0）第一通道数据 | |
| 15 | | %IW29 | 带符号十进制 | 0 | | | | |
| 16 | | %IW31 | 带符号十进制 | 0 | | | | |
| 17 | | %IW33 | 带符号十进制 | 0 | | | | |
| 18 | | <新增> | | | | | | |

Figure 5-6 (b)

PN_Demo_ ▸ PLC_1 [CPU 1212C DC/DC/DC] ▸ 监控与强制表 ▸ 监控表_2

| | 名称 | 地址 | 显示格式 | 监视值 | 修改值 | | 注释 | 变量注释 |
|---|---|---|---|---|---|---|---|---|
| 1 | | %IW1 | 十六进制 | 16#0000 | | | Alarm数据 | |
| 2 | | %IW3 | 带符号十进制 | -7 | | | AI4（正负10V）第一通道数据 | |
| 3 | | %IW5 | 带符号十进制 | -9 | | | | |
| 4 | | %IW7 | 带符号十进制 | -10 | | | | |
| 5 | | %IW9 | 带符号十进制 | -10 | | | | |
| 6 | | %IW11 | 带符号十进制 | 0 | | | AI4（0-10V）第一通道数据 | |
| 7 | | %IW13 | 带符号十进制 | 0 | | | | |
| 8 | | %IW15 | 带符号十进制 | 0 | | | | |
| 9 | | %IW17 | 带符号十进制 | 0 | | | | |
| 10 | | %IW19 | 带符号十进制 | 13838 | | | AI4（0-20ma）第一通道数据 | |
| 11 | | %IW21 | 带符号十进制 | 0 | | | | |
| 12 | | %IW23 | 带符号十进制 | 0 | | | | |
| 13 | | %IW25 | 带符号十进制 | 0 | | | | |
| 14 | | %IW27 | 带符号十进制 | 0 | | | AI4（4-20ma0）第一通道数据 | |
| 15 | | %IW29 | 带符号十进制 | 0 | | | | |
| 16 | | %IW31 | 带符号十进制 | 0 | | | | |
| 17 | | %IW33 | 带符号十进制 | 0 | | | | |
| 18 | | <新增> | | | | | | |

Figure 5-6 (c)

| | 名称 | 地址 | 显示格式 | 监视值 | 修改值 | | 注释 | 变量注释 |
|---|---|---|---|---|---|---|---|---|
| | | %IW1 | 十六进制 | 16#0000 | | | Alarm数据 | |
| | | %IW3 | 带符号十进制 | -8 | | | AI4（正负10V）第一通道数据 | |
| | | %IW5 | 带符号十进制 | -9 | | | | |
| | | %IW7 | 带符号十进制 | -10 | | | | |
| | | %IW9 | 带符号十进制 | -9 | | | | |
| | | %IW11 | 带符号十进制 | 0 | | | AI4（0-10V）第一通道数据 | |
| | | %IW13 | 带符号十进制 | 0 | | | | |
| | | %IW15 | 带符号十进制 | 0 | | | | |
| | | %IW17 | 带符号十进制 | 0 | | | | |
| 0 | | %IW19 | 带符号十进制 | 0 | | | AI4（0-20ma）第一通道数据 | |
| 1 | | %IW21 | 带符号十进制 | 0 | | | | |
| 2 | | %IW23 | 带符号十进制 | 0 | | | | |
| 3 | | %IW25 | 带符号十进制 | 0 | | | | |
| 4 | | %IW27 | 带符号十进制 | 13878 | | | AI4（4-20ma0）第一通道数据 | |
| 5 | | %IW29 | 带符号十进制 | 0 | | | | |
| 6 | | %IW31 | 带符号十进制 | 0 | | | | |
| 7 | | %IW33 | 带符号十进制 | 0 | | | | |
| 8 | | <新增> | | | | | | |

Figure 5-6 (d)

- GiveDF20-M-4AI-U-0The first channel is connected to a 5V voltage signal, as shown in the figure5-6 (a)ShownDF20-M-4AI-U-0The input data of the first channel of the module is13844, -10V~+10V-27648~+27648Indicates that the collected voltage value is 5.007V.
- GiveDF20-M-4AI-U-1The first channel is connected to a 5V voltage signal, as shown in the figure5-6(b)ShownDF20-M-4AI-U-1The first channel data of the module is13841, 0~+10V uses 0~27648Indicates that the collected voltage value is 5.006V.
- GiveDF20-M-4AI-I-2The first channel access10The current signal of ma is shown in the figure5-6(c)ShownDF20-M-4AI-I-2The first channel data of the module is13838, 0~20ma use 0~27648Indicates that the collected current value is 10.01ma.
- GiveDF20-M-4AI-I-3The first channel access 12maThe current signal is shown in

Figure5-6(d)ShownDF20-M-4AI-I-3The first channel data of the module is13878, 4~20ma use 0~27648Indicates that the collected current value is 12.008ma.

## 5.3Analog output module usage routine

- This example usesDF20-C-PN-RT-V10+DF20-M-4AO-U-0+DF20-M-4AO-U-1+DF20-M-4AO-I-2+DF20-M-4AO-I-3Topology. This type of module has two status indicators. When the module is powered normally, LED1 is always on. When the module enters the working state, LED2 flashes.
- As shown in the figure, add modules in order according to the steps in Section 4.1.1, then compile and download the project and run the PLC.


Figure 5-7

- The output data is operated according to the module address as shown in the figure.

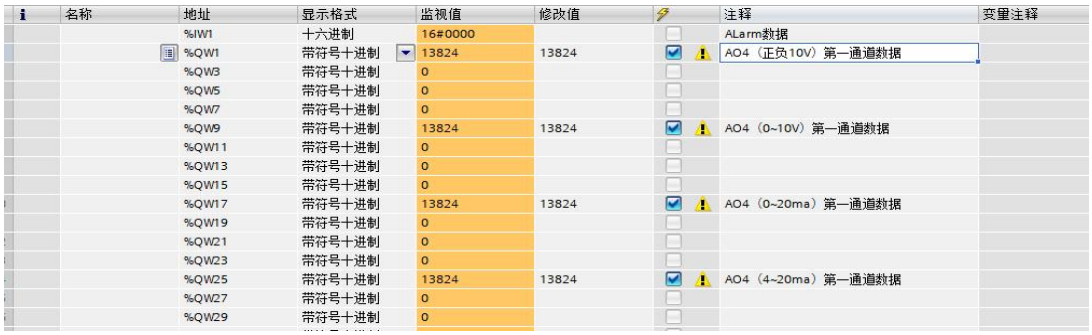



Figure 5-8

- As shown5-8As shown,DF20-M-4AO-U-0Module first channel write13824, -10V~+10V use -27648~27648Indicates that the output voltage value is 5.00V.
- As shown5-8As shown,DF20-M-4AO-U-1Module first channel write13824, 0~+10V uses 0~27648Indicates that the output voltage value is 5.00V.
- As shown5-8As shown,DF20-M-4AO-I-2Module first channel write13824, 0~20ma use 0~27648Indicates that the output current value is 10.00ma.
- As shown5-8As shown,DF20-M-4AO-I-3Module first channel write13824, that is, 4~20ma uses 0~27648Indicates that the output current value is 12.00ma.

## 5.4AnalogMixed InputOutput module usage routine

- This example usesDF20-C-PN-RT-V10+DF20-M-4AI-U-4+DF20-M-4AI-I-5+DF20-M-8AI-U-4+DF20-M-8AI-I-5+DF20-M-4AO-U-4+DF20-M-4AO-I-5 + DF20-M-8AO-U-4+DF20-M-8AO-I-5Topology. This type of module has two status indicators. When the module is powered normally, LED1 is always on. When the module enters the working state, LED2 flashes.
- As shown in the figure, add modules in order according to the steps in Section 4.1.1, then compile and download the project and run the PLC.

设备概览

| 模块 | ... | 机架 | 插槽 | I 地址 | Q 地址 | 类型 |
|---|---|---|---|---|---|---|
| DF20-C-PN-RT-V10 | | 0 | 0 | | | DF20-C-PN-RT-V... |
| PN-IO | | 0 | 0 X1 | | | DF20-C-PN-RT-V... |
| Alarm_1 | | 0 | 1 | 1...2 | | Alarm |
| DF20-M-4AI-U-4_1 | | 0 | 2 | 3...10 | | DF20-M-4AI-U-4 |
| DF20-M-4AI-I-5_1 | | 0 | 3 | 11...18 | | DF20-M-4AI-I-5 |
| DF20-M-8AI-U-4_1 | | 0 | 4 | 86...101 | | DF20-M-8AI-U-4 |
| DF20-M-8AI-I-5_1 | | 0 | 5 | 102...117 | | DF20-M-8AI-I-5 |
| DF20-M-4AO-U-4_1 | | 0 | 6 | | 1...8 | DF20-M-4AO-U-4 |
| DF20-M-4AO-I-5_1 | | 0 | 7 | | 9...16 | DF20-M-4AO-I-5 |
| DF20-M-8AO-U-4_1 | | 0 | 8 | | 80...95 | DF20-M-8AO-U-4 |
| DF20-M-8AO-I-5_1 | | 0 | 9 | | 96...111 | DF20-M-8AO-I-5 |

Figure 5-9

- DF20-M-4AI-U-4supportsixkindVoltage input range,To configure the input range and sampling frequency,As shown5-10As shown,Select the input range,System DefaultSupport -10V~+10V; select

sampling frequency, the system defaults to 20Hz.


Figure 5-10

➢ DF20-M-4AI-I-5supporttwokindCurrent input range,To configure the input range and sampling frequency,As shown5-11As shown,Select the input range,System DefaultSupport 0~20ma; select sampling frequency, the system defaults to 20Hz.


Figure 5-11

➢ DF20-M-8AI-U-4supportsixkindVoltage input range,To configure the input range and sampling frequency,As shown5-12As shown,Select the input range,System DefaultThe channel is disabled, select the sampling frequency, the system default is 100Hz.

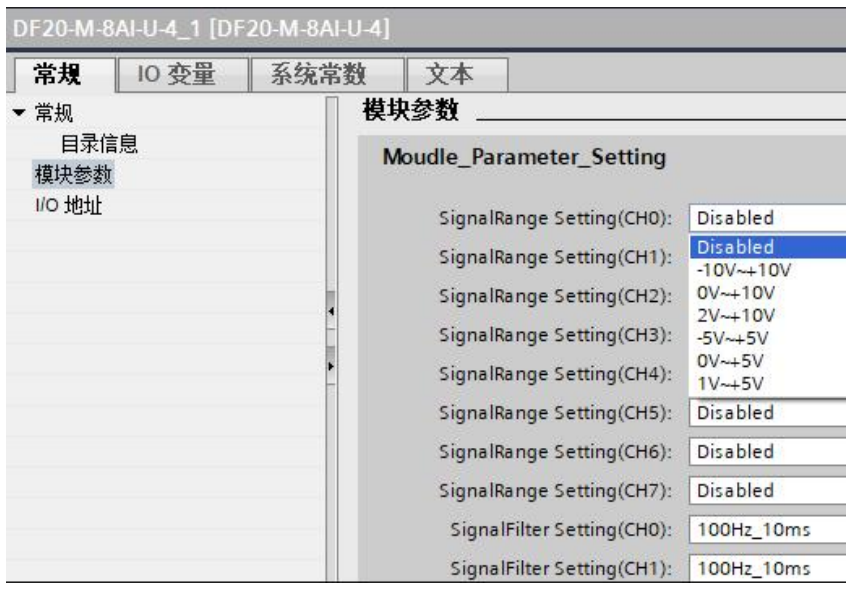


Figure 5-12

➢ DF20-M-8AI-I-5supporttwokindCurrent input range,To configure the input range and sampling frequency,As shown5-13As shown,Select the input range,System DefaultThe channel is disabled, select the sampling frequency, the system default is 100Hz.

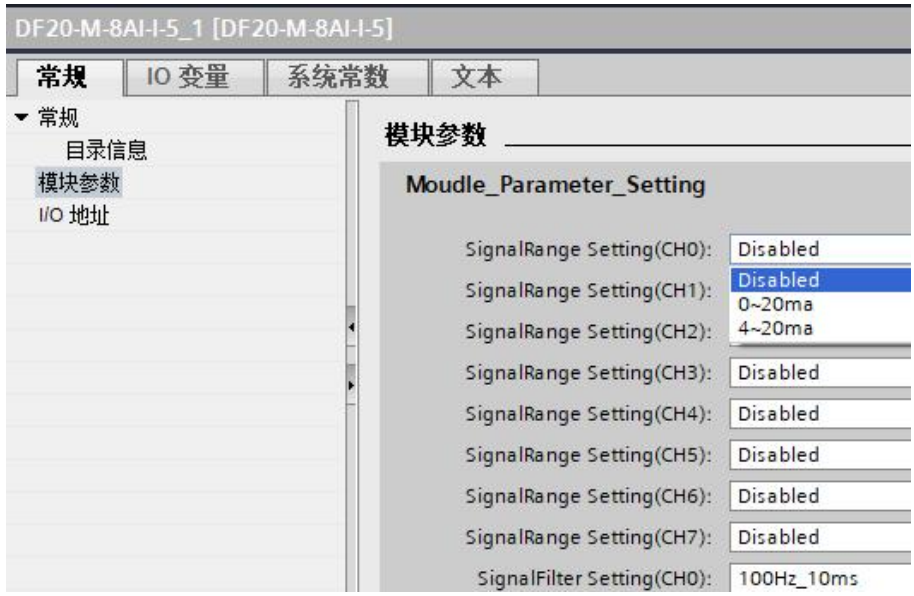



Figure 5-13

➢ DF20-M-4AO-U-4supportsixkindVoltage output range,To configure the output range,As shown5-14As shown,Select the output range,System DefaultSupport -10V~+10V.


Figure 5-14

➢ DF20-M-4AO-I-5supporttwokindCurrent output range,To configure the output range,As shown5-15As shown,Select the output range,System DefaultSupport 0~20ma.


Figure 5-15

➢ DF20-M-8AO-U-4supportsixkindVoltage output range,To configure the output range,As shown5-16As shown,Select the output range,System DefaultThe channel is disabled..

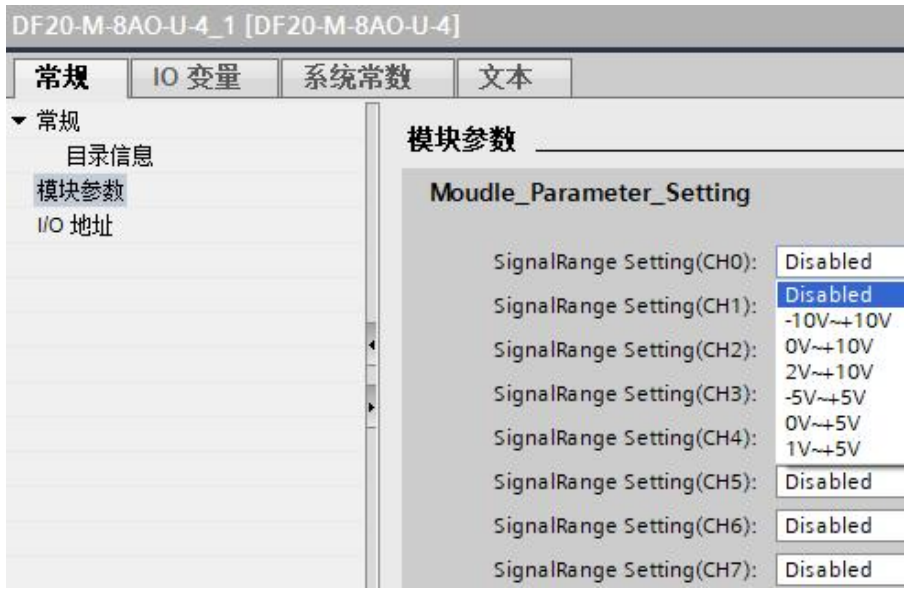



Figure 5-16

➢ DF20-M-8AO-I-5supporttwokindCurrent output range,To configure the output range,As shown5-17As shown,Select the output range,System DefaultThe channel is disabled..

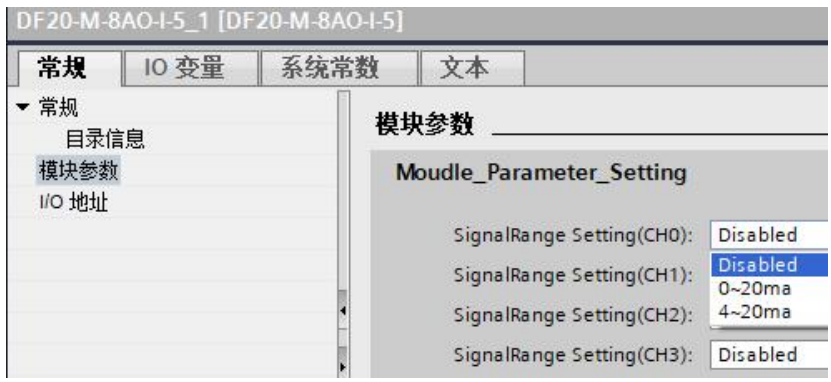



Figure 5-17

➢ The output data is operated according to the module address as shown in the figure.

| | 名称 | 地址 | 显示格式 | 监视值 | 修改值 | | 注释 | 变量注释 |
|---|---|---|---|---|---|---|---|---|
| 1 | | %IW1 | 无符号十进制 | 0 | | | Alarm模块数据 | |
| 2 | | %IW3 | 带符号十进制 | 13834 | | | AI4(±10V/0~10V)第一通道 | |
| 3 | | %IW5 | 带符号十进制 | 3 | | | | |
| 4 | | %IW7 | 带符号十进制 | 3 | | | | |
| 5 | | %IW9 | 带符号十进制 | -1 | | | | |
| 6 | | %IW11 | 带符号十进制 | 13849 | | | AI4(0-20ma/4-20mA)第一通道 | |
| 7 | | %IW13 | 带符号十进制 | 0 | | | | |
| 8 | | %IW15 | 带符号十进制 | 0 | | | | |
| 9 | | %IW17 | 带符号十进制 | 0 | | | | |
| 10 | | %QW1 | 带符号十进制 | 13824 | 13824 | | AO4(±10V/0~10V)第一通道 | |
| 11 | | %QW3 | 带符号十进制 | 0 | | | | |
| 12 | | %QW5 | 带符号十进制 | 0 | | | | |
| 13 | | %QW7 | 带符号十进制 | 0 | | | | |
| 14 | | %QW9 | 带符号十进制 | 13824 | 13824 | | AO4(0-20ma/4-20mA)第一通道 | |
| 15 | | %QW11 | 带符号十进制 | 0 | | | | |
| 16 | | %QW13 | 带符号十进制 | 0 | | | | |
| 17 | | %QW15 | 带符号十进制 | 0 | | | | |

Figure 5-18

| | 名称 | 地址 | 显示格式 | 监视值 | 修改值 | | 注释 |
|---|---|---|---|---|---|---|---|
| 1 | | %IW86 | 带符号十进制 | 13824 | | | AI8_U第一通道 |
| 2 | | %IW102 | 带符号十进制 | 13822 | | | AI8_I第一通道 |
| 3 | | %QW80 | 带符号十进制 | 13824 | 13824 | | AO8_U第一通道 |
| 4 | | %QW96 | 带符号十进制 | 13824 | 13824 | | AO8_I第一通道 |

Figure 5-19

- GiveDF20-M-4AI-U-4The first channel is connected to a 5V voltage signal, as shown in the figure5-18ShownDF20-M-4AI-U-4The input data of the first channel of the module is13834, -10V~+10V-27648~+27648Indicates that the collected voltage value is 5.004V.
- GiveDF20-M-4AI-I-5The first channel access10The current signal of ma is shown in the figure5-18ShownDF20-M-4AI-I-5The first channel data of the module is13849, 0~20ma use 0~27648Indicates that the collected current value is 10.02ma.
- GiveDF20-M-8AI-U-4The first channel is connected to a 5V voltage signal, as shown in the figure5-19ShownDF20-M-8AI-U-4The input data of the first channel of the module is13824, -10V~+10V-27648~+27648Indicates that the collected voltage value is 5.000V.
- GiveDF20-M-8AI-I-5The first channel access10The current signal of ma is shown in the figure5-19ShownDF20-M-8AI-I-5The first channel data of the module is13822, 0~20ma use 0~27648The current value collected is9.998ma.
- As shown5-19As shown,DF20-M-8AO-U-4Module first channel write13824, -10V~+10V uses 0~27648Indicates that the output voltagePressureValue is5V.
- As shown5-19As shown,DF20-M-8AO-I-5Module first channel write13824,Right now0~20ma uses 0~27648Indicates that the output current value is 10.00ma.

## 5.5Pressure sensor data acquisition module usage routine

- Reference DF20-M-2LC-S-5Wiring diagram, pins 1 and 2 are 5V excitation power supply, which supplies power to the pressure sensor; pins 3 and 4 are the signal ports of the first pressure sensor, port 3 is connected to the positive signal, and port 4 is connected to the negative signal; pins 5 and 6 are the signal ports of the second pressure sensor, port 5 is connected to the positive signal, and port 6 is connected to the

negative signal; ports 7 and 8 are connected to the ground. The module has two status indicators. When the module is powered normally, LED1 is always on, and when the module enters the working state, LED2 flashes.

- As shown in the figure, add modules in order according to the steps in Section 4.1.1, then compile and download the project and run the PLC.


Figure 5-15

- The input data is operated according to the module address as shown in the figure.


Figure 5-16

- The pressure sensor used in this example has a resolution of 2mV/V and a weight range of 0~5KG.DF20-M-2LC-S-5The module excitation power supply is 5V, so the voltage signal range of the pressure sensor output is 0~10mV, that is, 0~10mV corresponds to 0~32767.5-16As shown:The first onePlace a pressure sensor on3KG weight, the first channel data is19605,The voltage value collected by the corresponding channel is5.983mV,The corresponding weight value is2.992KG.

## 5.6Routine use of thermal resistance sensor data acquisition module

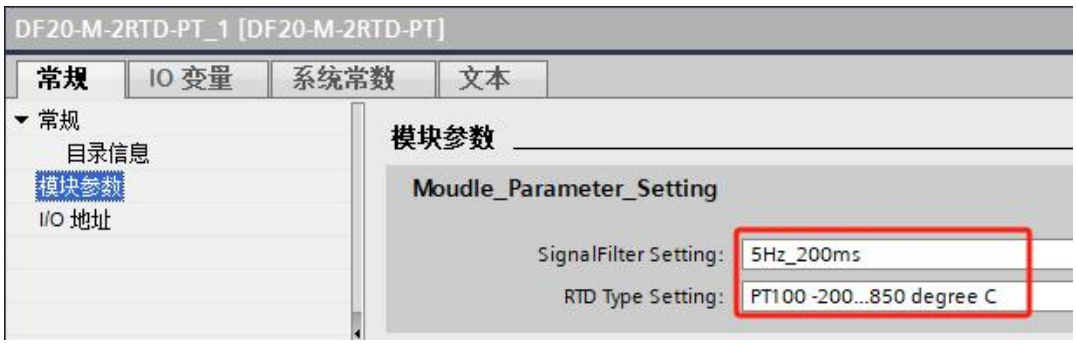
➢ This example usesDF20-C-PN-RT-V10+DF20-M-2RTD-PT+DF20-M-4RTD-PTTopology,DF20-M-2RTD-PT and DF20-M-4RTD-PT modulessupportSensor type PT100/PT200/PT500/ PT1000,Ni100/Ni120/Ni200/Ni500/Ni1000,Cu10/Cu50/Cu53/Cu100,KTY84-130/KTY84-150/KTY84-151, Ressistor40ohm/Ressistor80ohm/Ressistor150ohm/Ressistor300ohm ,Ressistor500ohm/Ressistor1000ohm/ Ressistor2000ohm/Ressistor4000ohm/KTY83-110/KTY83-120/KTY83-121/KTY83-122/KTY83-150/KTY 83-151/NTC-5K/NTC-10K.This type of module has two status indicator lights. When the module is powered normally, LED1 is always on. When the module enters the working state, LED2 flashes.

➢ As shown in the figure, add modules in order according to the steps in Section 4.1.1, then compile and download the project and run the PLC.


Figure 5-17

➢ To configure the sensor type andFilter configuration,As shown5-18As shown,Select the sensor type,System DefaultSupport PT100; select

Filter configuration, the system default is 5Hz_200ms.




picture5-18

➢ DF20-M-2RTD-PTBy default, PT100 type sensors are supported.5-19As shown in the figure, the first channel is connected to the PT100 sensor, and the second channel is not connected to the sensor. The temperature data is shown as shown in the figure5-19As shown, the first channel reading is167,represent16.7°, no sensor connectedofchannel, the reading is -32768, indicating a broken line.

| | i | 名称 | 地址 | 显示格式 | 监视值 | 修改值 | | 注释 |
|---|---|---|---|---|---|---|---|---|
| 1 | | | %IW68 | 十六进制 | 16#0000 | | | Alarm |
| 2 | | | %IW70 | 带符号十进制 | 167 | | | 2通道RTD第一通道 |
| 3 | | | %IW72 | 带符号十进制 | -32768 | | | 2通道RTD第二通道 |
| 4 | | | %IW74 | 带符号十进制 | -32768 | | | 4通道RTD第一通道 |
| 5 | | | %IW76 | 带符号十进制 | -32768 | | | 4通道RTD第二通道 |
| 6 | | | %IW78 | 带符号十进制 | -32768 | | | 4通道RTD第三通道 |
| 7 | | | %IW80 | 带符号十进制 | -32768 | | | 4通道RTD第四通道 |

picture5-19

## 5.7Thermocouple temperature data acquisition module usage routine

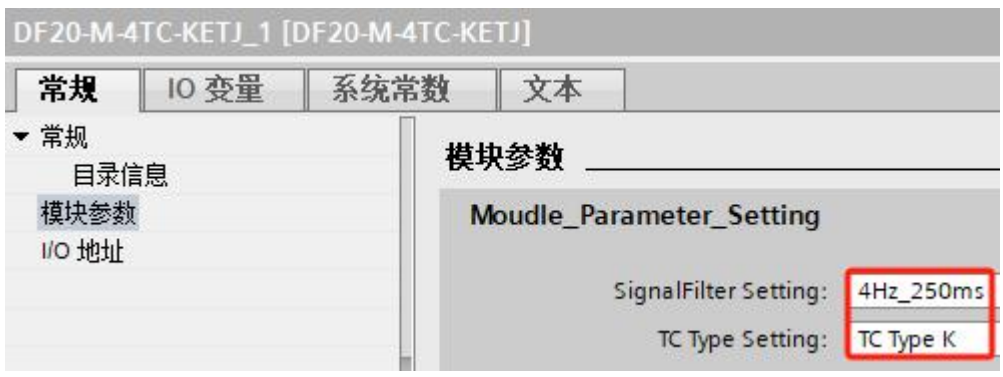
- This example usesDF20-C-PN-RT-V10+DF20-M-4TC-KETJ+DF20-M-8TC-KETJTopology,DF20-M-4TC-KETJ and DF20-M-8TC-KETJModulesSupported sensor types:K/E/T/J/B/S/R/N/C/L type thermocouple+/-15.625mv,+/-31.25mv,+/-62.5mv,+/-125mv,+/-250mv,+/-500mv,+/-1000mv,+/-2000mv.This type of module has two status indicator lights. When the module is powered normally, LED1 is always on. When the module enters the working state, LED2 flashes.
- As shown in the figure, add modules in order according to the steps in Section 4.1.1, then compile and download the project and run the PLC.

设备概览

| 模块 | ... | 机架 | 插槽 | I 地址 | Q 地址 | 类型 |
|---|---|---|---|---|---|---|
| DF20-C-PN-RT-V10 | | 0 | 0 | | | DF20-C-PN-RT-V... |
| PN-IO | | 0 | 0 X1 | | | DF20-C-PN-RT-V... |
| Alarm_1 | | 0 | 1 | 68...69 | | Alarm |
| DF20-M-4TC-KETJ_1 | | 0 | 2 | 70...77 | 64...71 | DF20-M-4TC-KETJ |
| DF20-M-8TC-KETJ_1 | | 0 | 3 | 78...93 | 72...87 | DF20-M-8TC-KETJ |

picture5-20

- As shown5-twenty oneAs shown,To configure the sensor type,System DefaultSupports K-type thermocouples; selectFilter configuration, the system default is 4Hz_250ms.




picture5-twenty one

| Object Name | illustrate | Remark |
|---|---|---|
| Tc ValueCH1 | The first channel | When thermocouples measure temperature, their cold end (the measuring end is the hot |
| Tc ValueCH2 | Second channel | |

| | | |
|---|---|---|
| Tc ValueCH3 | The third channel | |
| Tc ValueCH4 | The fourth channel | |
| Offset Value CH1 | Temperature | |
| Offset Value CH2 | Second channel | |
| Offset Value CH3 | Temperature | |
| Offset Value CH4 | Temperature | |

➢ DF20-M-4TC-KETJBy default, K-type thermocouples are supported.5-twenty twoShownFirstChannel access to K-type thermocouple,The last threeIf the channel is not connected to the sensor, the temperature data will be displayed as shown in the figure5-twenty twoAs shown, the first channel reading is177,represent17.7°,The last threeThe channel is not connected to a sensor and the reading is -32768, indicating a disconnection.DF20-M-8TC-KETJ is the same as DF20-M-4TC-KETJ except for the number of channels.As shown5-twenty twoAs shown, this routine does not perform temperature compensation on the first two channels.

| | 名称 | 地址 | 显示格式 | 监视值 | 修改值 | | 注释 |
|---|---|---|---|---|---|---|---|
| 1 | | %IW68 | 十六进制 | 16#0000 | | | Alarm |
| 2 | | %IW70 | 带符号十进制 | 177 | | | 4通道TC第一通道 |
| 3 | | %IW72 | 带符号十进制 | -32768 | | | 4通道TC第二通道 |
| 4 | | %IW74 | 带符号十进制 | -32768 | | | 4通道TC第三通道 |
| 5 | | %IW76 | 带符号十进制 | -32768 | | | 4通道TC第四通道 |
| 6 | | %QW64 | 带符号十进制 | 0 | | | 4通道TC第一通道补偿 |
| 7 | | %QW66 | 带符号十进制 | 0 | | | 4通道TC第二通道补偿 |
| 8 | | %QW68 | 带符号十进制 | 0 | | | 4通道TC第三通道补偿 |
| 9 | | %QW70 | 带符号十进制 | 0 | | | 4通道TC第四通道补偿 |
| 10 | | %IW78 | 带符号十进制 | -32768 | | | 8通道TC第一通道 |
| 11 | | %IW80 | 带符号十进制 | -32768 | | | 8通道TC第二通道 |
| 12 | | %IW82 | 带符号十进制 | -32768 | | | 8通道TC第三通道 |
| 13 | | %IW84 | 带符号十进制 | -32768 | | | 8通道TC第四通道 |
| 14 | | %IW86 | 带符号十进制 | -32768 | | | 8通道TC第五通道 |
| 15 | | %IW88 | 带符号十进制 | -32768 | | | 8通道TC第六通道 |
| 16 | | %IW90 | 带符号十进制 | -32768 | | | 8通道TC第七通道 |
| 17 | | %IW92 | 带符号十进制 | -32768 | | | 8通道TC第八通道 |
| 18 | | %QW72 | 带符号十进制 | 0 | | | 8通道TC第一通道补偿 |
| 19 | | %QW74 | 带符号十进制 | 0 | | | 8通道TC第二通道补偿 |
| 20 | | %QW76 | 带符号十进制 | 0 | | | 8通道TC第三通道补偿 |
| 21 | | %QW78 | 带符号十进制 | 0 | | | 8通道TC第四通道补偿 |
| 22 | | %QW80 | 带符号十进制 | 0 | | | 8通道TC第五通道补偿 |
| 23 | | %QW82 | 带符号十进制 | 0 | | | 8通道TC第六通道补偿 |
| 24 | | %QW84 | 带符号十进制 | 0 | | | 8通道TC第七通道补偿 |
| 25 | | %QW86 | 带符号十进制 | 0 | | | 8通道TC第八通道补偿 |

picture5-twenty two

## 5.8Encoder data acquisition module usage routine

➢ Encoder data acquisition module hasDF20-M-1CNT-EL-5andDF20-M-1CNT-EL-4Two models, the wiring and usage of the two modules are the same, the difference isDF20-M-1CNT-EL-5The connected signal is 5V encoder signal.DF20-M-1CNT-EL-4The connected encoder signal is 24V.DF20-M-1CNT-EL-4Module examples.

➢ DF20-M-1CNT-EL-4Module features:

(1) Quadrature encoder A+/A-, B+/B- differential input, 4 times frequency;

(2) Electron probe input;

(3) Two LED indicator outputs. After the module is powered on, Led1 is always on, indicating that the module is powered on and initialized normally. Different display states of Led2 represent different working states of the module: when the module is running in the data sampling state, Led2 flashes; when the module is running in the idle or clearing sampling data state, Led2 is not on.

➢ Reference DF20-M-1CNT-EL-4Wiring diagram, the quadrature encoder input A+/A- and B+/B- correspond to pins 3, 4, 5, and 6; the electronic probe input corresponds to pins 1 and 2. The module supports NPN switch input by default, that is, pin 1 is internally connected to 24V, and pin 2 is externally connected to a low-active signal; ports 7 and 8 are connected to the ground.

➢ As shown in the figure, add modules in order according to the steps in Section 4.1.1, then compile and download the project and run the PLC.


Figure 5-23

- DF20-M-1CNT-EL-4The module input and output control variables are described in the table below:

DF20-M-1CNT-EL-5(DF20-M-1CNT-EL-4)Module input and output control variables

| Output data description | Number of bytes | Data Types | Remark |
|---|---|---|---|
| Command Data | 2 | Uint16 | 0x012B: Sampling command<br>0x012C: Sampling data clear command<br>Other Data: Idle Commands |
| Input Data Description | Number of bytes | Data Types | Remark |
| Status data | 2 | Uint16 | 0x010B: Sampling status<br>0x010C: Data clearing completed status<br>0x0109: Idle state |
| Encoder sampling data | 4 | Int32 | Data range: -2147483648~2147483647 |
| Current latch position data | 4 | Int32 | Data range: -2147483648~2147483647 |

- As shown in the figureDF20-M-1CNT-EL-4Module to operate.


Figure 5-24

- As shown5-24As shown, the module automatically enters the idle state when powered on. Enter the 0x012B command to make the module enter the counting state. When the status word feedback is 0x010B, the module counts normally. At this time, the encoder data sampled is 0x00026886, the latch position is 0x00026886; If you need to clear the current position data and the electronic probe latch value, write the

0x012C command to clear the data in the module. When the status word is judged to be 0x010C, the clearing is completed. When sampling again, just change the command data to 0x012B.

## 5.9 Two-channel pulse data acquisition module usage routine

Note: The pulse acquisition module is divided into two types: DF20-M-2CNT-PIL-5 and DF20-M-2CNT-PIL-4. The wiring and usage methods of the two modules are the same. The difference is that DF20-M-2CNT-PIL-5 is connected to a 5V pulse signal, and DF20-M-2CNT-PIL-4 is connected to a 24V pulse signal.

DF20-M-2CNT-PIL-5 (DF20-M-2CNT-PIL-4) module functions:

- Two-channel pulse input and position comparison;
- Two-channel electronic probe input, can latch the current pulse input value of two channels respectively;

- The current two channel count values can be cleared to zero respectively according to the external trigger signal;
- Two LED indicator outputs. After the module is powered on, LED1 is always on, indicating that the module is powered on and initialized normally. LED2 is different

The display status represents that the module is in different working states: when the module is running in the data sampling state, LED2 flashes; when the module is running in the idle state, LED2 is not lit.

DF20-M-2CNT-PIL-5 (DF20-M-2CNT-PIL-4) module wiring instructions:

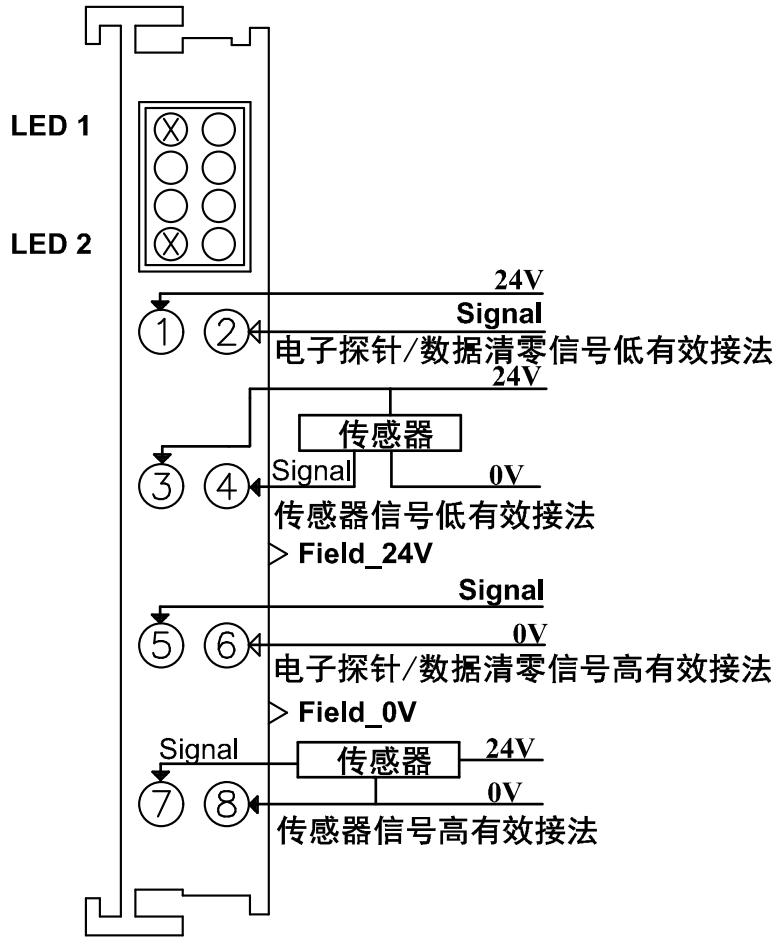



Figure 1 DF20-M-2CNT-PIL-5(DF20-M-2CNT-PIL-4)Wiring Diagram

- As shown in Figure 1, this is the wiring diagram of DF20-M-2CNT-PIL-5 (DF20-M-2CNT-PIL-4): Pins 1 and 2 are the first channel electronic probes.[Note 1]/The first channel data reset signal input, the specific function to be selected can be configured according to needs; 5 and 6 pins are the second channel electronic probe[Note 1]/The second channel data reset signal input; the usage is the same as the first channel electronic probe/first channel data reset signal input. Pins 3 and 4 are the first pulse input channel, as shown in the figure, the sensor signal is low effective connection; pins 7 and 8 are the second pulse input channel, as shown in the figure, the sensor signal is high effective connection.

Note 1: The latch of the counting module is the electronic probe function that is often found in the servo. After the electronic probe signal (such as a photoelectric switch) is triggered, the card directly latches the current value. This is much

faster than judging the probe signal through the host computer PLC and then latching the position. The host computer judgment has a delay and the position is inaccurate. Some packaging industries need to use this function. If not, just ignore this function.

DF20-M-2CNT-PIL-5 (DF20-M-2CNT-PIL-4) module process data description:

- Bus adapterThe corresponding input and output addresses will be allocated according to the different modules installed later;

As shown in the tableDF20-M-2CNT-PIL-5(DF20-M-2CNT-PIL-4)Meaning of input and output data, data length and data type.

Table 1

| 输出数据 | 字节数 | 数据类型 |
|---|---|---|
| 通道1命令输出数据 | 1 | Uint8 |
| 通道1脉冲比较直输出 | 4 | Uint32 |
| 通道2命令输出数据 | 1 | Uint8 |
| 通道2脉冲比较直输出 | 4 | Uint32 |
| 输入数据 | 字节数 | 数据类型 |
| 通道1状态输入数据 | 1 | Uint8 |
| 通道1脉冲数 | 4 | Uint32 |
| 通道1锁存脉冲数 | 4 | Uint32 |
| 通道2状态输入数据 | 1 | Uint8 |
| 通道2脉冲数 | 4 | Uint32 |
| 通道2锁存脉冲数 | 4 | Uint32 |

- according toInput and output data meaning, data length and data typeCreate monitoring table.

设备概览

| 模块 | ... | 机架 | 插槽 | I 地址 | Q 地址 | 类型 |
|---|---|---|---|---|---|---|
| DF20-C-PN-RT-V10 | | 0 | 0 | | | DF20-C-PN-RT-V... |
| PN-IO | | 0 | 0 X1 | | | DF20-C-PN-RT-V... |
| Alarm_1 | | 0 | 1 | 68...69 | | Alarm |
| DF20-M-2CNT-PIL-5_1 | | 0 | 2 | 1...18 | 1...10 | DF20-M-2CNT-PI... |

picture5-25

| | 名称 | 地址 | 显示格式 | 监视值 | 修改值 | | 注释 |
|---|---|---|---|---|---|---|---|
| 1 | | %IW68 | 十六进制 | | | | Alarm |
| 2 | | %QB1 | 十六进制 | | 16#05 | | 通道1命令输出数据 |
| 3 | | %QW2 | 十六进制 | | | | 通道1脉冲比较直输出 |
| 4 | | %QW4 | 十六进制 | | | | 通道1脉冲比较直输出 |
| 5 | | %QB6 | 十六进制 | | 16#05 | | 通道2命令输出数据 |
| 6 | | %QW7 | 十六进制 | | | | 通道2脉冲比较直输出 |
| 7 | | %QW9 | 十六进制 | | | | 通道2脉冲比较直输出 |
| 8 | | %IB1 | 十六进制 | | | | 通道1状态输入数据 |
| 9 | | %IW2 | 十六进制 | | | | 通道1脉冲数 |
| 10 | | %IW4 | 十六进制 | | | | 通道1脉冲数 |
| 11 | | %IW6 | 十六进制 | | | | 通道1锁存脉冲数 |
| 12 | | %IW8 | 十六进制 | | | | 通道1锁存脉冲数 |
| 13 | | %IB10 | 十六进制 | | | | 通道2状态输入数据 |
| 14 | | %IW11 | 十六进制 | | | | 通道2脉冲数 |
| 15 | | %IW13 | 十六进制 | | | | 通道2脉冲数 |
| 16 | | %IW15 | 十六进制 | | | | 通道2锁存脉冲数 |
| 17 | | %IW17 | 十六进制 | | | | 通道2锁存脉冲数 |

picture5-26

➢ Output data meaning

Table 2

| Output data meaning | |
|---|---|
| 0byte | |
| bit7~bit3 | Reserved seat |
| bit2 | 0: Disable channel 1 comparison value; 1: Enable channel 1 comparison value |
| bit1 | 0: Enable the electronic probe function of channel 1; 1: Enable the count clear function triggered by external signal of channel 1 |
| bit0 | 0: Channel 1 stops counting and the original count is reset to zero; 1: Channel 1 starts counting |
| 1~4byte | Channel 1 pulse comparison value output, unsigned 32-bit data |
| 5byte | |
| bit7~bit3 | Reserved seat |
| bit2 | 0: Disable channel 2 comparison value; 1: Enable channel 2 comparison value |
| bit1 | 0: Enable the electronic probe function of channel 2; 1: Enable the count clearing function triggered by external signal of channel 2 |
| bit0 | 0: Channel 2 stops counting and the original count is cleared; 1: Channel 2 starts counting |
| 6~9byte | Channel 2 pulse comparison value output, unsigned 32-bit data |

➢ Input data meaning

Table 3

| Input data meaning | |
|---|---|
| 0 bytes | |
| bit7~bit3 | Reserved seat |
| bit2 | 0: The count value of channel 1 is less than the comparison value; 1: The count value of channel 1 is greater than the comparison value. |
| bit1 | 0: No electronic probe/first channel count reset signal; 1: Electronic probe/first channel count reset signal |
| bit0 | 0: Channel 1 counting stop state, the original count is cleared; 1: Channel 1 counting state |

| | |
|---|---|
| 1~4 bytes | Channel 1 pulse input value, unsigned 32-bit data |
| 5~8 bytes | Channel 1 pulse input latch value, unsigned 32-bit data |
| 9 bytes | |
| bit7~bit3 | Reserved seat |
| bit2 | 0: The count value of channel 2 is less than the comparison value; 1: The count value of channel 2 is greater than the comparison value. |
| bit1 | 0: No electronic probe/count clear signal on channel 2; 1: Electronic probe/count clear signal on channel 2 |
| bit0 | 0: Channel 2 counting stop state, the original count is cleared; 1: Channel 2 counting state |
| 10~13 bytes | Channel 2 pulse input value, unsigned 32-bit data |
| 14~17 bytes | Channel 2 pulse input latch value, unsigned 32-bit data |

➢ As shown in Figure 4-1-21DF20-M-2CNT-PIL-5 usage examples:

Channel 1 command output dataWrite5(Channel 1 starts counting, enables the electronic probe function of channel 1, and enables the comparison value of channel 1).

| | 名称 | 地址 | 显示格式 | 监视值 | 修改值 | | 注释 |
|---|---|---|---|---|---|---|---|
| 1 | | %IW68 | 十六进制 | 16#0000 | | | Alarm |
| 2 | | %QB1 | 十六进制 | 16#05 | 16#05 | ☑ ⚠ | 通道1命令输出数据 |
| 3 | | %QW2 | 十六进制 | 16#0000 | | | 通道1脉冲比较直输出 |
| 4 | | %QW4 | 十六进制 | 16#0000 | | | 通道1脉冲比较直输出 |
| 5 | | %QB6 | 十六进制 | 16#05 | 16#05 | ☑ ⚠ | 通道2命令输出数据 |
| 6 | | %QW7 | 十六进制 | 16#0000 | | | 通道2脉冲比较直输出 |
| 7 | | %QW9 | 十六进制 | 16#0000 | | | 通道2脉冲比较直输出 |
| 8 | | %IB1 | 十六进制 | 16#05 | | | 通道1状态输入数据 |
| 9 | | %IW2 | 十六进制 | 16#0000 | | | 通道1脉冲数 |
| 10 | | %IW4 | 十六进制 | 16#0000 | | | 通道1脉冲数 |
| 11 | | %IW6 | 十六进制 | 16#0000 | | | 通道1锁存脉冲数 |
| 12 | | %IW8 | 十六进制 | 16#0000 | | | 通道1锁存脉冲数 |
| 13 | | %IB10 | 十六进制 | 16#05 | | | 通道2状态输入数据 |
| 14 | | %IW11 | 十六进制 | 16#0000 | | | 通道2脉冲数 |
| 15 | | %IW13 | 十六进制 | 16#0000 | | | 通道2脉冲数 |
| 16 | | %IW15 | 十六进制 | 16#0000 | | | 通道2锁存脉冲数 |
| 17 | | %IW17 | 十六进制 | 16#0000 | | | 通道2锁存脉冲数 |
| 18 | | | | | | | |

picture5-27

## 5.10Two-channel encoder data acquisition module usage routine

Note: The two-channel encoder data acquisition module is divided into DF20-M-2CNT-EL-5 and DF20-M-2CNT-EL-4Two models, the wiring and usage of the two modules are the same, the difference isDF20-M-2CNT-EL-5The connected signal is 5V.DF20-M-2CNT-EL-4The input signal is 24V.

This example usesDF20-C-PN-RT-V10+DF20-M-2CNT-EL-5The topological structure ofDF20-M-2CNT-EL-5For example, during the power-on phase, the PWR power indicator and FP 5V indicator are always on, the module enters the working state, and the STA status indicator flashes.

➢ As shown in the figure, add modules in order according to the steps in Section 4.1.1, then compile and download the project and run the PLC.DF20-M-2CNT-EL-4Data objects and functions andDF20-M-2CNT-EL-5same.

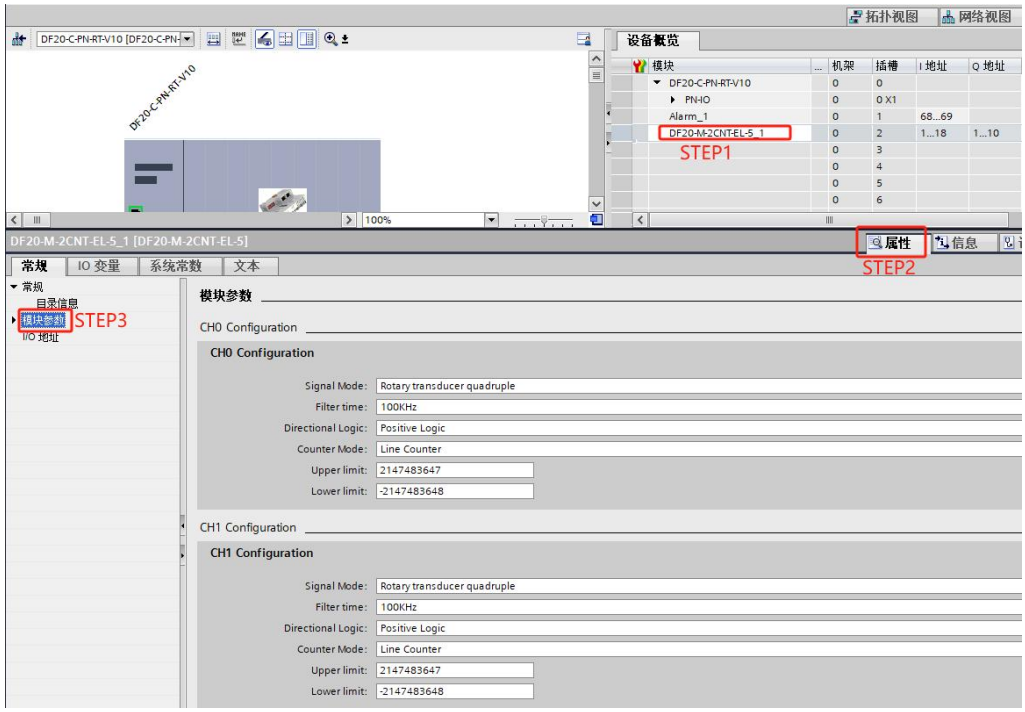
设备概览

| 模块 | ... | 机架 | 插槽 | I 地址 | Q 地址 | 类型 |
|---|---|---|---|---|---|---|
| DF20-C-PN-RT-V10 | | 0 | 0 | | | DF20-C-PN-RT-V... |
| PN-IO | | 0 | 0 X1 | | | DF20-C-PN-RT-V... |
| Alarm_1 | | 0 | 1 | 68...69 | | Alarm |
| DF20-M-2CNT-EL-5_1 | | 0 | 2 | 1...18 | 1...10 | DF20-M-2CNT-E... |

picture5-28

➢ Module configuration parameter settings: As shown in Figure 5-29, the card is configured as orthogonal encoding input mode by default. Taking CH1 channel as an example,

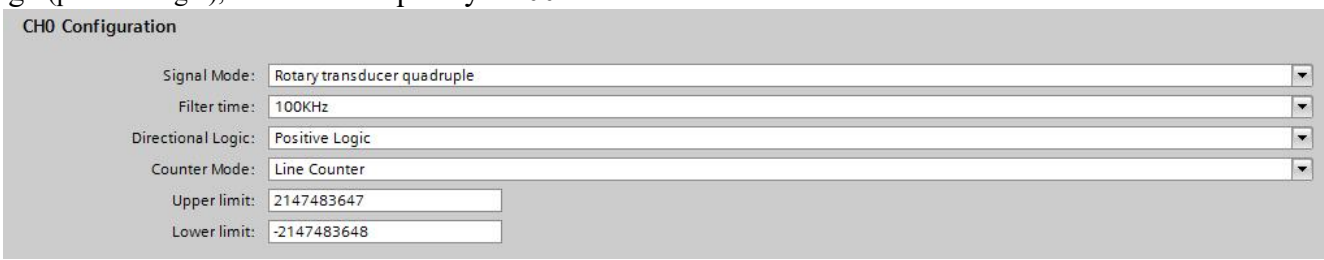
The counting mode of CH1 channel is linear mode, the signal is input at 4 times the frequency, and the filtering frequency is100KMHz. For the specific meaning of the parameter, refer to3.42.4 Configuration parameter definition.




picture5-29

### 5.10.1 Signal 4x frequency input usage example

1)DF20-M-2CNT-EL-5The module CH1 channel configuration diagram is shown in the figure below. The CH1 channel counting mode is Line Counter (linear counting), the input signal type is Rotary transducer quadruple (orthogonal encoding 4 times frequency), and the signal input direction logic is Positive Logic(positive logic),The filter frequency is100KHz.




picture5-30

2）As shown in Figure 5-31, reference3.42.4 Module process data definitionFill in the address in the monitoring table to conduct monitoring.

| | i | 名称 | 地址 | 显示格式 | 监视值 | 修改值 | | 注释 |
|---|---|---|---|---|---|---|---|---|
| 1 | | | %IW68 | 十六进制 | 16#0000 | | □ | Alarm模块数据 |
| 2 | // | | | | | | | |
| 3 | | | %QB1 | 十六进制 | 16#00 | | □ | 通道1命令输出数据 |
| 4 | | | %QD2 | 带符号十进制 | 0 | | □ | 通道1脉冲比较值 |
| 5 | | | %QB6 | 十六进制 | 16#00 | | □ | 通道2命令输出数据 |
| 6 | | | %QD7 | 带符号十进制 | 0 | | □ | 通道2脉冲比较值 |
| 7 | // | | | | | | | |
| 8 | | | %IB1 | 带符号十进制 | 0 | | □ | 通道1状态输入数据 |
| 9 | | | %ID2 | 带符号十进制 | 0 | | □ | 通道1脉冲数 |
| 10 | | | %ID6 | 带符号十进制 | 0 | | □ | 通道1锁存脉冲数 |
| 11 | | | %IB10 | 带符号十进制 | 0 | | □ | 通道2状态输入数据 |
| 12 | | | %ID11 | 带符号十进制 | 0 | | □ | 通道2脉冲数 |
| 13 | | | %ID15 | 带符号十进制 | 0 | | □ | 通道2锁存脉冲数 |

picture5-31

2) Write 1 to the channel 1 command (channel 1 counting function enabled, electronic probe function enabled, comparison function disabled). Set the signal generator frequency to 10Khz and output 10,000 pulse signals. Module control command reference3.42.3 Module process data definition.


| | i | 名称 | 地址 | 显示格式 | 监视值 | 修改值 | | 注释 |
|---|---|---|---|---|---|---|---|---|
| 1 | | | %IW68 | 十六进制 | 16#0000 | | | Alarm模块数据 |
| 2 | // | | | | | | | |
| 3 | | | %QB1 | 十六进制 | 16#00 | 16#01 | ☑ | 通道1命令输出数据 |
| 4 | | | %QD2 | 带符号十进制 | 0 | | | 通道1脉冲比较值 |
| 5 | | | %QB6 | 十六进制 | 16#00 | | | 通道2命令输出数据 |
| 6 | | | %QD7 | 带符号十进制 | 0 | | | 通道2脉冲比较值 |
| 7 | // | | | | | | | |
| 8 | | | %IB1 | 带符号十进制 | 0 | | | 通道1状态输入数据 |
| 9 | | | %ID2 | 带符号十进制 | 0 | | | 通道1脉冲数 |
| 10 | | | %ID6 | 带符号十进制 | 0 | | | 通道1锁存脉冲数 |
| 11 | | | %IB10 | 带符号十进制 | 0 | | | 通道2状态输入数据 |
| 12 | | | %ID11 | 带符号十进制 | 0 | | | 通道2脉冲数 |
| 13 | | | %ID15 | 带符号十进制 | 0 | | | 通道2锁存脉冲数 |

picture5-32

3) The signal generator outputs AB orthogonal signal with 10,000 pulses. The number of pulses received by the card is shown in the figure.

| | i | 名称 | 地址 | 显示格式 | 监视值 | 修改值 | | 注释 |
|---|---|---|---|---|---|---|---|---|
| 1 | | | %IW68 | 十六进制 | 16#0000 | | | Alarm模块数据 |
| 2 | // | | | | | | | |
| 3 | | | %QB1 | 十六进制 | 16#01 | 16#01 | ☑ | 通道1命令输出数据 |
| 4 | | | %QD2 | 带符号十进制 | 0 | | | 通道1脉冲比较值 |
| 5 | | | %QB6 | 十六进制 | 16#00 | | | 通道2命令输出数据 |
| 6 | | | %QD7 | 带符号十进制 | 0 | | | 通道2脉冲比较值 |
| 7 | // | | | | | | | |
| 8 | | | %IB1 | 带符号十进制 | 1 | | | 通道1状态输入数据 |
| 9 | | | %ID2 | 带符号十进制 | 40000 | | | 通道1脉冲数 |
| 10 | | | %ID6 | 带符号十进制 | 0 | | | 通道1锁存脉冲数 |
| 11 | | | %IB10 | 带符号十进制 | 0 | | | 通道2状态输入数据 |
| 12 | | | %ID11 | 带符号十进制 | 0 | | | 通道2脉冲数 |
| 13 | | | %ID15 | 带符号十进制 | 0 | | | 通道2锁存脉冲数 |

picture5-33

4) Draw out a 24V signal from the DC power supply and connect it to DI1+, DI1- to trigger the electronic probe function to latch the current count value.

| | i | 名称 | 地址 | 显示格式 | 监视值 | 修改值 | | 注释 |
|---|---|---|---|---|---|---|---|---|
| 1 | | | %IW68 | 十六进制 | 16#0000 | | | Alarm模块数据 |
| 2 | // | | | | | | | |
| 3 | | | %QB1 | 十六进制 | 16#01 | 16#01 | ☑ | 通道1命令输出数据 |
| 4 | | | %QD2 | 带符号十进制 | 0 | | | 通道1脉冲比较值 |
| 5 | | | %QB6 | 十六进制 | 16#00 | | | 通道2命令输出数据 |
| 6 | | | %QD7 | 带符号十进制 | 0 | | | 通道2脉冲比较值 |
| 7 | // | | | | | | | |
| 8 | | | %IB1 | 带符号十进制 | 1 | | | 通道1状态输入数据 |
| 9 | | | %ID2 | 带符号十进制 | 40000 | | | 通道1脉冲数 |
| 10 | | | %ID6 | 带符号十进制 | 40000 | | | 通道1锁存脉冲数 |
| 11 | | | %IB10 | 带符号十进制 | 0 | | | 通道2状态输入数据 |
| 12 | | | %ID11 | 带符号十进制 | 0 | | | 通道2脉冲数 |
| 13 | | | %ID15 | 带符号十进制 | 0 | | | 通道2锁存脉冲数 |

picture5-34

5) Write channel 1 command 7 (channel 1 counting function enable, channel 1 count clear enable,

comparison function enable), and set the comparison value to 2000.


| | | 名称 | 地址 | 显示格式 | 监视值 | 修改值 | | 注释 |
|---|---|---|---|---|---|---|---|---|
| 1 | | | %IW68 | 十六进制 | 16#0000 | | | Alarm模块数据 |
| 2 | // | | | | | | | |
| 3 | | | %QB1 | 十六进制 | 16#01 | 16#07 | | 通道1命令输出数据 |
| 4 | | | %QD2 | 带符号十进制 | 0 | 2000 | | 通道1脉冲比较值 |
| 5 | | | %QB6 | 十六进制 | 16#00 | | | 通道2命令输出数据 |
| 6 | | | %QD7 | 带符号十进制 | 0 | | | 通道2脉冲比较值 |
| 7 | // | | | | | | | |
| 8 | | | %IB1 | 带符号十进制 | 1 | | | 通道1状态输入数据 |
| 9 | | | %ID2 | 带符号十进制 | 40000 | | | 通道1脉冲数 |
| 10 | | | %ID6 | 带符号十进制 | 40000 | | | 通道1锁存脉冲数 |
| 11 | | | %IB10 | 带符号十进制 | 0 | | | 通道2状态输入数据 |
| 12 | | | %ID11 | 带符号十进制 | 0 | | | 通道2脉冲数 |
| 13 | | | %ID15 | 带符号十进制 | 0 | | | 通道2锁存脉冲数 |

picture5-35

6) At this time, the channel count value is greater than 2000, and PulseState Count Ch1 is 5 (Channel 1 count value is greater than or equal to the comparison value, channel 1 has no electronic probe, channel 1 count status). Module input data meaning reference3.42.3 Module process data definition.

| | | 名称 | 地址 | 显示格式 | 监视值 | 修改值 | | 注释 |
|---|---|---|---|---|---|---|---|---|
| 1 | | | %IW68 | 十六进制 | 16#0000 | | | Alarm模块数据 |
| 2 | // | | | | | | | |
| 3 | | | %QB1 | 十六进制 | 16#07 | 16#07 | | 通道1命令输出数据 |
| 4 | | | %QD2 | 带符号十进制 | 2000 | 2000 | | 通道1脉冲比较值 |
| 5 | | | %QB6 | 十六进制 | 16#00 | | | 通道2命令输出数据 |
| 6 | | | %QD7 | 带符号十进制 | 0 | | | 通道2脉冲比较值 |
| 7 | // | | | | | | | |
| 8 | | | %IB1 | 带符号十进制 | 5 | | | 通道1状态输入数据 |
| 9 | | | %ID2 | 带符号十进制 | 40000 | | | 通道1脉冲数 |
| 10 | | | %ID6 | 带符号十进制 | 0 | | | 通道1锁存脉冲数 |
| 11 | | | %IB10 | 带符号十进制 | 0 | | | 通道2状态输入数据 |
| 12 | | | %ID11 | 带符号十进制 | 0 | | | 通道2脉冲数 |
| 13 | | | %ID15 | 带符号十进制 | 0 | | | 通道2锁存脉冲数 |

picture5-36

7) DI1+, DI1- are connected to 24V signal, the count clearing function is triggered, and the count value is cleared. PulseState Count Ch1 is 1 (Channel 1 count value is less than the comparison value, channel 1 has no electronic probe, channel 1 count status).

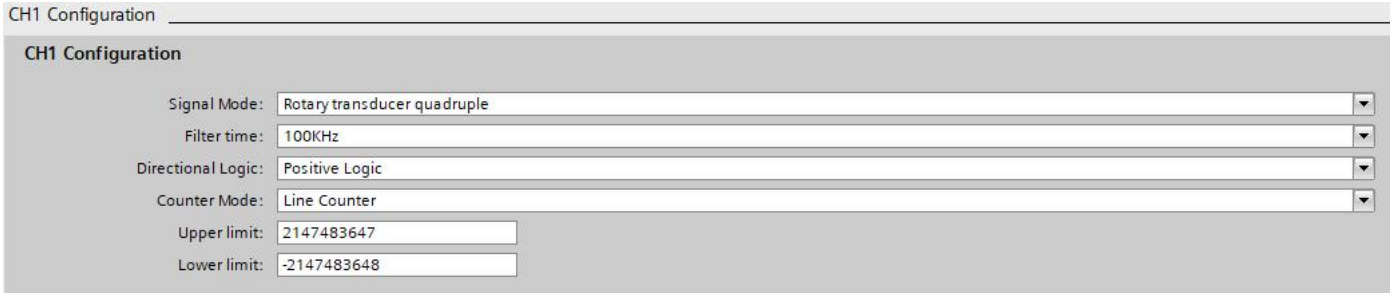
| | | 名称 | 地址 | 显示格式 | 监视值 | 修改值 | | 注释 |
|---|---|---|---|---|---|---|---|---|
| 1 | | | %IW68 | 十六进制 | 16#0000 | | | Alarm模块数据 |
| 2 | // | | | | | | | |
| 3 | | | %QB1 | 十六进制 | 16#07 | 16#07 | | 通道1命令输出数据 |
| 4 | | | %QD2 | 带符号十进制 | 2000 | 2000 | | 通道1脉冲比较值 |
| 5 | | | %QB6 | 十六进制 | 16#00 | | | 通道2命令输出数据 |
| 6 | | | %QD7 | 带符号十进制 | 0 | | | 通道2脉冲比较值 |
| 7 | // | | | | | | | |
| 8 | | | %IB1 | 带符号十进制 | 1 | | | 通道1状态输入数据 |
| 9 | | | %ID2 | 带符号十进制 | 0 | | | 通道1脉冲数 |
| 10 | | | %ID6 | 带符号十进制 | 0 | | | 通道1锁存脉冲数 |
| 11 | | | %IB10 | 带符号十进制 | 0 | | | 通道2状态输入数据 |
| 12 | | | %ID11 | 带符号十进制 | 0 | | | 通道2脉冲数 |
| 13 | | | %ID15 | 带符号十进制 | 0 | | | 通道2锁存脉冲数 |

picture5-37

### 5.10.2 pulse plus direction function usage routine

DF20-M-2CNT-EL-5The module CH1 channel configuration diagram is shown in the figure below. The

CH1 channel counting mode is Line Counter (linear counting), the input signal type is Pulse and Directions (pulse plus direction), the signal input direction logic is Positive Logic (positive logic), and the filter frequency is 100KHz. ;




picture5-38

The control instructions and module input data of pulse plus direction mode and orthogonal mode have the same meaning.3.42.3 Module process data definition, module input data meaning reference3.42.3 Module process data definition.

### 5.10.2.1 Instructions for single pulse differential input wiring

A1+A1- pins are left hanging (0V signal), B1+B1- are connected to pulse signals, please refer to the wiring method3.42.2 Status indicator light and wiring diagram.

Channel 1 command writes 1 (channel 1 counting function is enabled, electronic probe function is enabled, and comparison function is disabled).


| | i | 名称 | 地址 | 显示格式 | 监视值 | 修改值 | | 注释 |
|---|---|---|---|---|---|---|---|---|
| 1 | | | %IW68 | 十六进制 | 16#0000 | | | Alarm模块数据 |
| 2 | // | | | | | | | |
| 3 | | | %QB1 | 十六进制 | 16#00 | 16#01 | ☑ | 通道1命令输出数据 |
| 4 | | | %QD2 | 带符号十进制 | 0 | | | 通道1脉冲比较值 |
| 5 | | | %QB6 | 十六进制 | 16#00 | | | 通道2命令输出数据 |
| 6 | | | %QD7 | 带符号十进制 | 0 | | | 通道2脉冲比较值 |
| 7 | // | | | | | | | |
| 8 | | | %IB1 | 带符号十进制 | 0 | | | 通道1状态输入数据 |
| 9 | | | %ID2 | 带符号十进制 | 0 | | | 通道1脉冲数 |
| 10 | | | %ID6 | 带符号十进制 | 0 | | | 通道1锁存脉冲数 |
| 11 | | | %IB10 | 带符号十进制 | 0 | | | 通道2状态输入数据 |
| 12 | | | %ID11 | 带符号十进制 | 0 | | | 通道2脉冲数 |
| 13 | | | %ID15 | 带符号十进制 | 0 | | | 通道2锁存脉冲数 |

picture5-39

1) As shown in the figure, the number of pulses received by CH1 channel continues to increase.

| | 名称 | 地址 | 显示格式 | 监视值 | 修改值 | | 注释 |
|---|---|---|---|---|---|---|---|
| 1 | | %IW68 | 十六进制 | 16#0000 | | ☐ | Alarm模块数据 |
| 2 | // | | | | | | |
| 3 | | %QB1 | 十六进制 | 16#01 | 16#01 | ☑ ⚠ | 通道1命令输出数据 |
| 4 | | %QD2 | 带符号十进制 | 0 | | ☐ | 通道1脉冲比较值 |
| 5 | | %QB6 | 十六进制 | 16#00 | | ☐ | 通道2命令输出数据 |
| 6 | | %QD7 | 带符号十进制 | 0 | | ☐ | 通道2脉冲比较值 |
| 7 | // | | | | | | |
| 8 | | %IB1 | 带符号十进制 | 1 | | ☐ | 通道1状态输入数据 |
| 9 | | %ID2 | 带符号十进制 | 69439 | | ☐ | 通道1脉冲数 |
| 10 | | %ID6 | 带符号十进制 | 0 | | ☐ | 通道1锁存脉冲数 |
| 11 | | %IB10 | 带符号十进制 | 0 | | ☐ | 通道2状态输入数据 |
| 12 | | %ID11 | 带符号十进制 | 0 | | ☐ | 通道2脉冲数 |
| 13 | | %ID15 | 带符号十进制 | 0 | | ☐ | 通道2锁存脉冲数 |

| | 名称 | 地址 | 显示格式 | 监视值 | 修改值 | | 注释 |
|---|---|---|---|---|---|---|---|
| 1 | | %IW68 | 十六进制 | 16#0000 | | ☐ | Alarm模块数据 |
| 2 | // | | | | | | |
| 3 | | %QB1 | 十六进制 | 16#01 | 16#01 | ☑ ⚠ | 通道1命令输出数据 |
| 4 | | %QD2 | 带符号十进制 | 0 | | ☐ | 通道1脉冲比较值 |
| 5 | | %QB6 | 十六进制 | 16#00 | | ☐ | 通道2命令输出数据 |
| 6 | | %QD7 | 带符号十进制 | 0 | | ☐ | 通道2脉冲比较值 |
| 7 | // | | | | | | |
| 8 | | %IB1 | 带符号十进制 | 1 | | ☐ | 通道1状态输入数据 |
| 9 | | %ID2 | 带符号十进制 | 253360 | | ☐ | 通道1脉冲数 |
| 10 | | %ID6 | 带符号十进制 | 0 | | ☐ | 通道1锁存脉冲数 |
| 11 | | %IB10 | 带符号十进制 | 0 | | ☐ | 通道2状态输入数据 |
| 12 | | %ID11 | 带符号十进制 | 0 | | ☐ | 通道2脉冲数 |
| 13 | | %ID15 | 带符号十进制 | 0 | | ☐ | 通道2锁存脉冲数 |

picture5-40

### 5.10.2.2 Pulse plus direction differential input wiring instructions

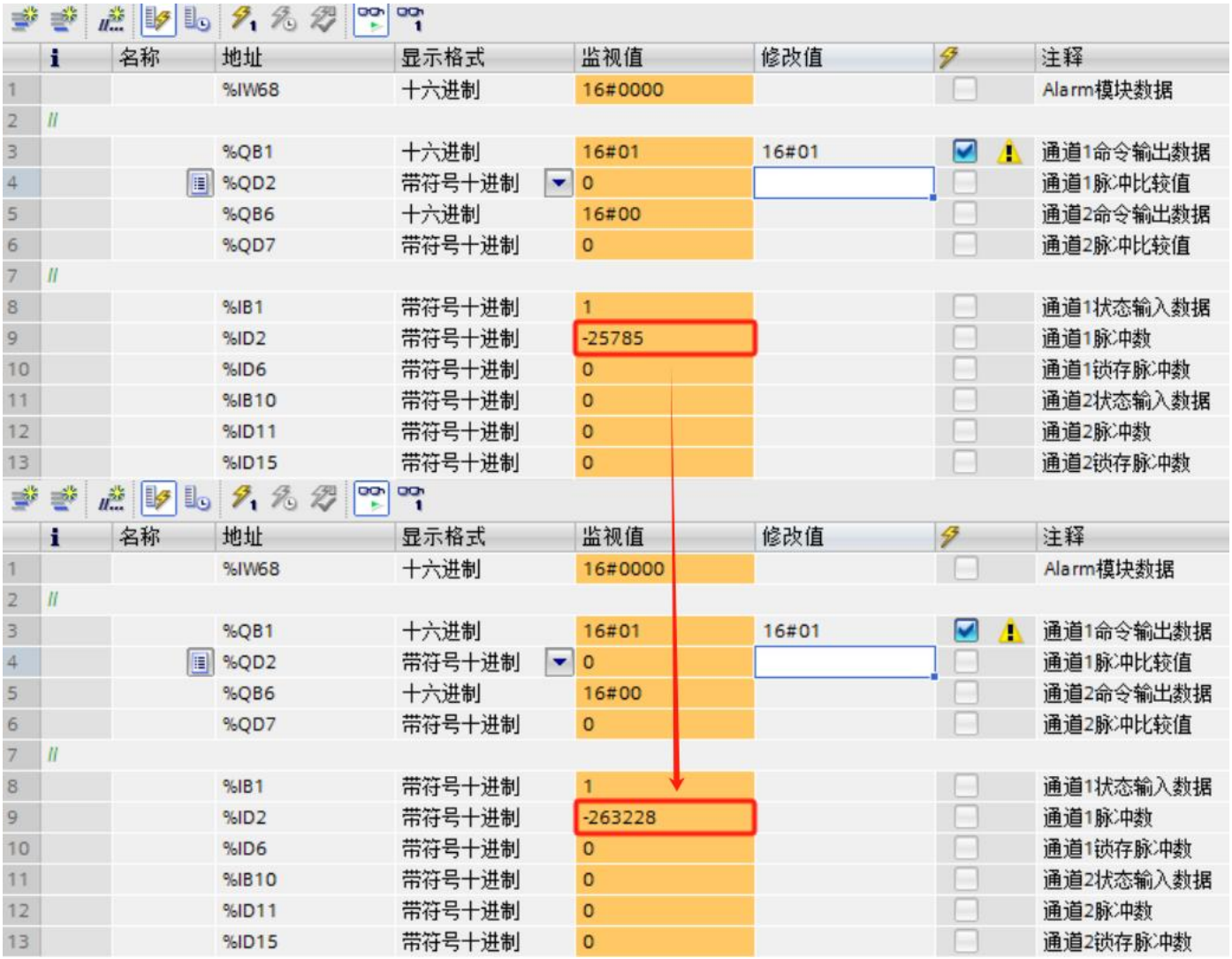
A1+A1- is connected to the direction signal (5V signal), B1+B1- is connected to the pulse signal, the wiring method refers to3.42.2 Status indicator light and wiring diagram.

Channel 1 command writes 1 (channel 1 counting function is enabled, electronic probe function is enabled, and comparison function is disabled).

| | 名称 | 地址 STEP2 | 显示格式 | 监视值 | 修改值 | | 注释 |
|---|---|---|---|---|---|---|---|
| 1 | | %IW68 | 十六进制 | 16#0000 | | ☐ | Alarm模块数据 |
| 2 | // | | | | STEP1 | | |
| 3 | | %QB1 | 十六进制 | 16#00 | 16#01 | ☑ ⚠ | 通道1命令输出数据 |
| 4 | | %QD2 | 带符号十进制 | 0 | | ☐ | 通道1脉冲比较值 |
| 5 | | %QB6 | 十六进制 | 16#00 | | ☐ | 通道2命令输出数据 |
| 6 | | %QD7 | 带符号十进制 | 0 | | ☐ | 通道2脉冲比较值 |
| 7 | // | | | | | | |
| 8 | | %IB1 | 带符号十进制 | 0 | | ☐ | 通道1状态输入数据 |
| 9 | | %ID2 | 带符号十进制 | 0 | | ☐ | 通道1脉冲数 |
| 10 | | %ID6 | 带符号十进制 | 0 | | ☐ | 通道1锁存脉冲数 |
| 11 | | %IB10 | 带符号十进制 | 0 | | ☐ | 通道2状态输入数据 |
| 12 | | %ID11 | 带符号十进制 | 0 | | ☐ | 通道2脉冲数 |
| 13 | | %ID15 | 带符号十进制 | 0 | | ☐ | 通道2锁存脉冲数 |

picture5-41

1) As shown in the figure, the number of pulses received by the CH1 channel continues to decrease.



| | 名称 | 地址 | 显示格式 | 监视值 | 修改值 | 注释 |
|---|---|---|---|---|---|---|
| 1 | | %IW68 | 十六进制 | 16#0000 | | Alarm模块数据 |
| 2 | | | | | | |
| 3 | | %QB1 | 十六进制 | 16#01 | 16#01 | 通道1命令输出数据 |
| 4 | | %QD2 | 带符号十进制 | 0 | | 通道1脉冲比较值 |
| 5 | | %QB6 | 十六进制 | 16#00 | | 通道2命令输出数据 |
| 6 | | %QD7 | 带符号十进制 | 0 | | 通道2脉冲比较值 |
| 7 | | | | | | |
| 8 | | %IB1 | 带符号十进制 | 1 | | 通道1状态输入数据 |
| 9 | | %ID2 | 带符号十进制 | -25785 | | 通道1脉冲数 |
| 10 | | %ID6 | 带符号十进制 | 0 | | 通道1锁存脉冲数 |
| 11 | | %IB10 | 带符号十进制 | 0 | | 通道2状态输入数据 |
| 12 | | %ID11 | 带符号十进制 | 0 | | 通道2脉冲数 |
| 13 | | %ID15 | 带符号十进制 | 0 | | 通道2锁存脉冲数 |

| | 名称 | 地址 | 显示格式 | 监视值 | 修改值 | 注释 |
|---|---|---|---|---|---|---|
| 1 | | %IW68 | 十六进制 | 16#0000 | | Alarm模块数据 |
| 2 | | | | | | |
| 3 | | %QB1 | 十六进制 | 16#01 | 16#01 | 通道1命令输出数据 |
| 4 | | %QD2 | 带符号十进制 | 0 | | 通道1脉冲比较值 |
| 5 | | %QB6 | 十六进制 | 16#00 | | 通道2命令输出数据 |
| 6 | | %QD7 | 带符号十进制 | 0 | | 通道2脉冲比较值 |
| 7 | | | | | | |
| 8 | | %IB1 | 带符号十进制 | 1 | | 通道1状态输入数据 |
| 9 | | %ID2 | 带符号十进制 | -263228 | | 通道1脉冲数 |
| 10 | | %ID6 | 带符号十进制 | 0 | | 通道1锁存脉冲数 |
| 11 | | %IB10 | 带符号十进制 | 0 | | 通道2状态输入数据 |
| 12 | | %ID11 | 带符号十进制 | 0 | | 通道2脉冲数 |
| 13 | | %ID15 | 带符号十进制 | 0 | | 通道2锁存脉冲数 |

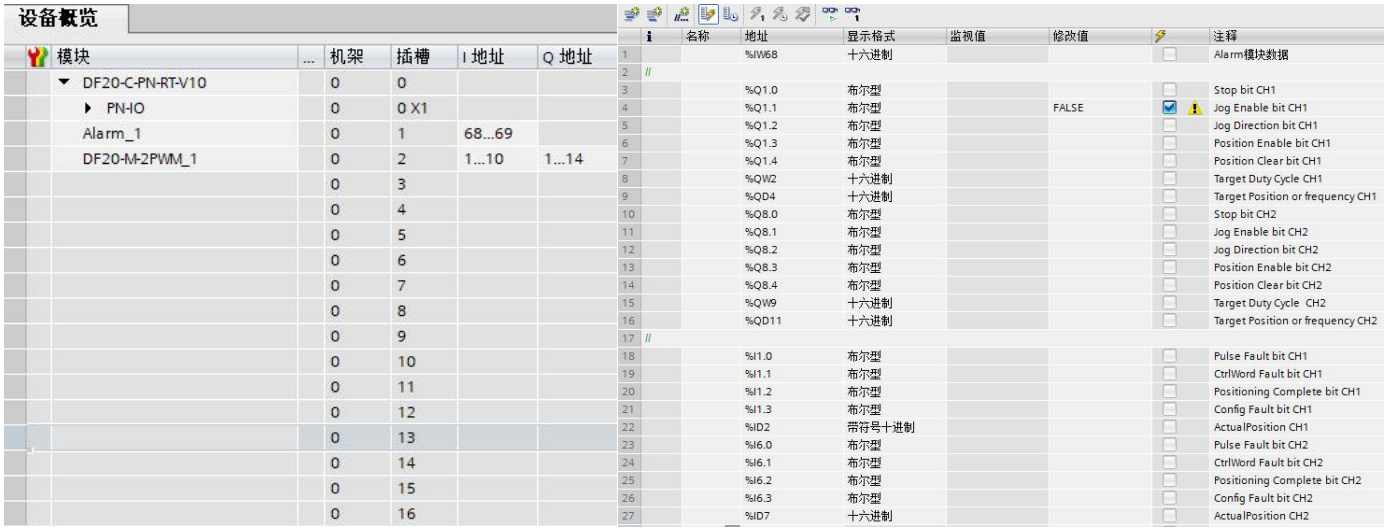
picture5-42

## 5.11Two-channel pulse output module usage routine

This example usesDF20-C-PN-RT-V10+DF20-M-2PWMDuring the power-on phase, the PWR power indicator and FP indicator are always on, the module enters the working state, and the STA status indicator flashes.

- As shown in the figure, add modules in order according to the steps in Section 4.1.1, then compile and download the project and run the PLC. Module Control

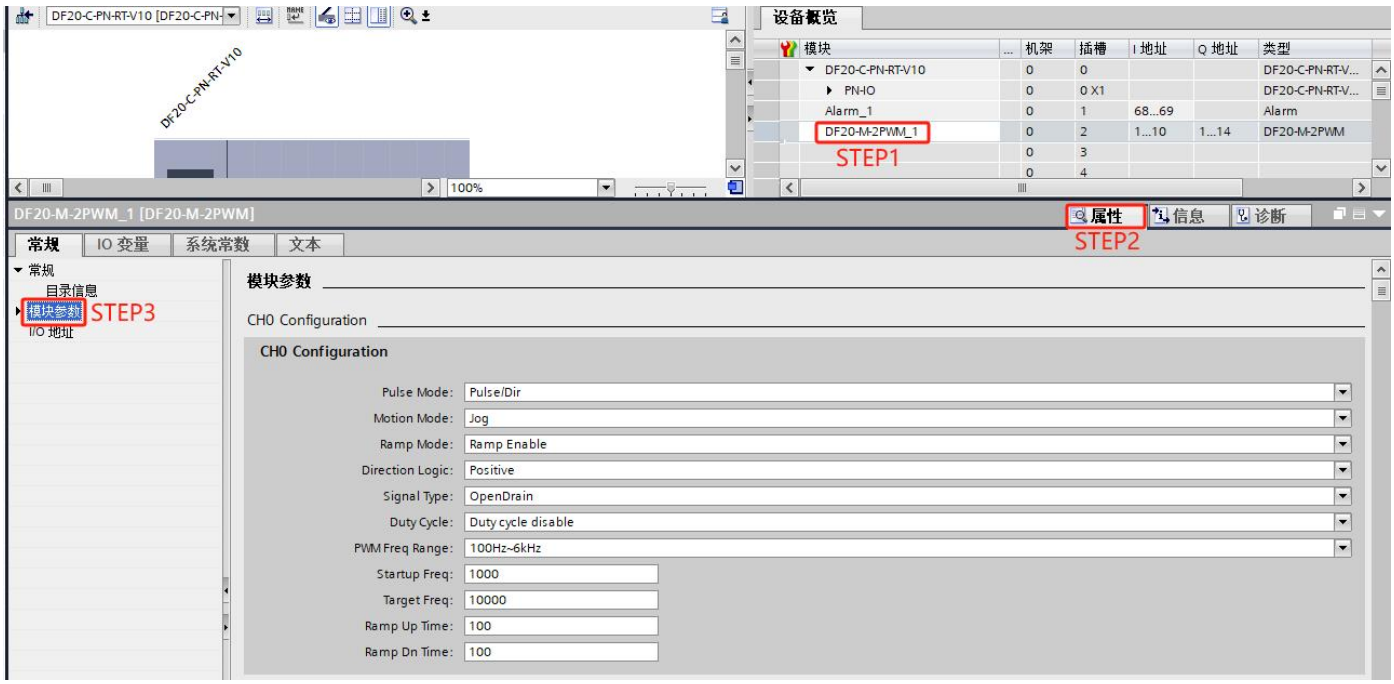
Command reference3.44.3 Module process data definition.




picture5-43

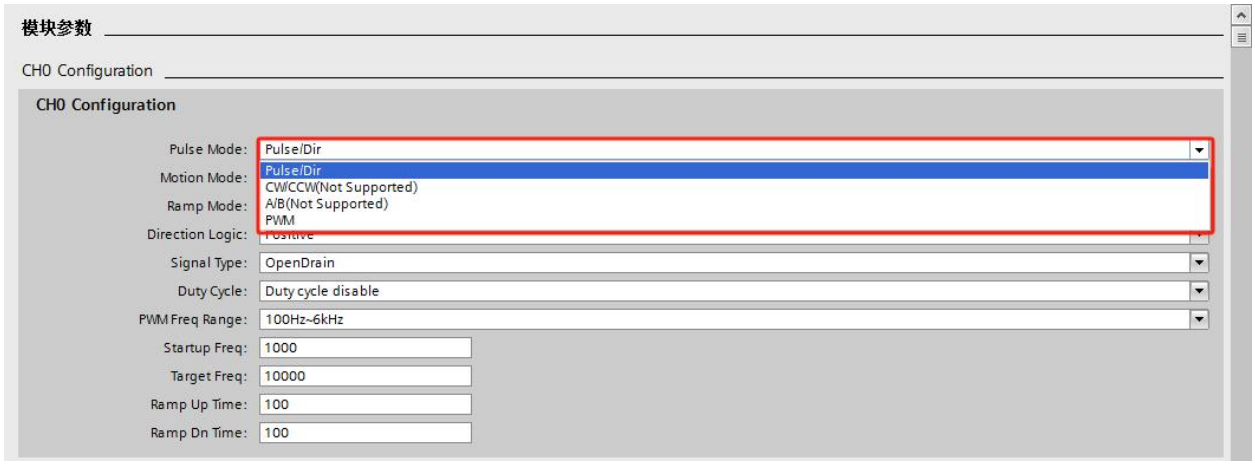
- The card is configured as pulse plus direction mode by default. Taking CH1 as an example, the CH1 channel is configured as jog mode by default.

Yes. Parameter meaning reference3.44.4 Configuration parameter definition.




picture5-44

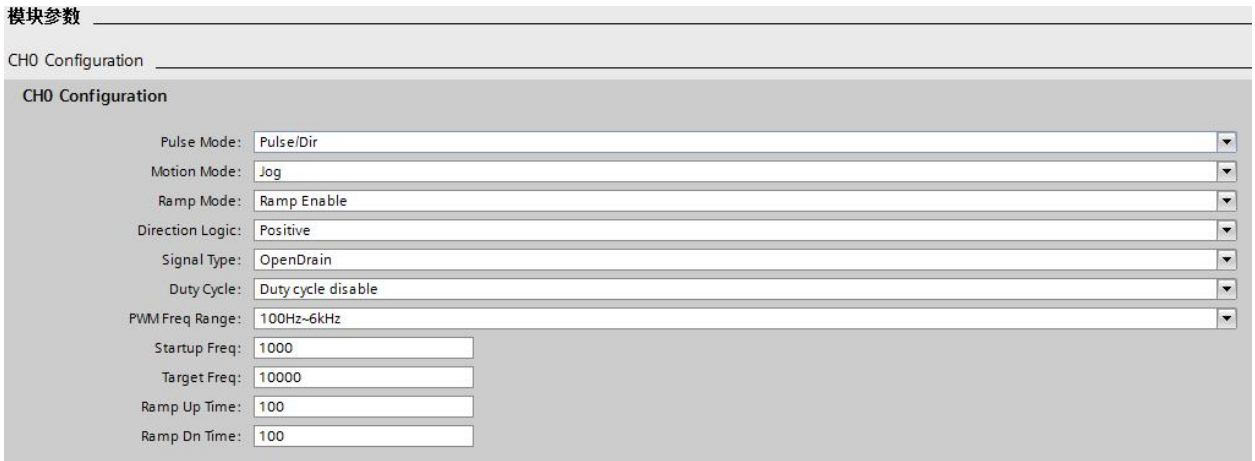
- Double-click the parameter option to change the configuration options, as shown in the figure below




picture5-45

### 5.11.1 Instructions for use of pulse plus direction mode + jog mode

1)DF20-M-2PWMThe module CH1 channel is set to pulse plus direction mode, the output mode is set to jog mode, the frequency ramp enable is turned on, the pulse frequency rise buffer time is set to 100ms, the fall buffer time is 100ms, the start frequency is set to 1000Hz, the target frequency is set to 10000Hz, the pulse output direction is positive logic, and the configuration diagram is shown in the figure below.




picture5-46

2) Inching switch enable

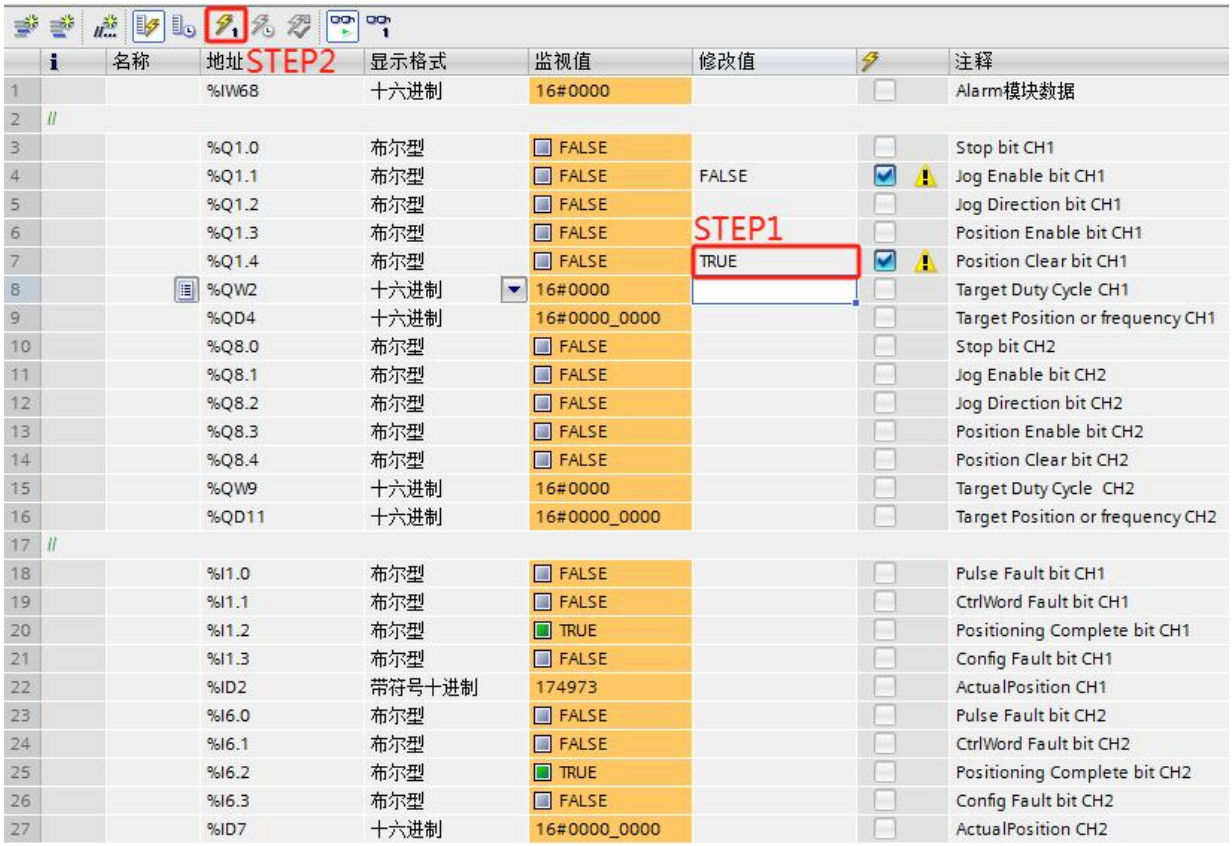

picture5-47

3) Observe the oscilloscope at this time, the current pulse output frequency is 10000HZ.DF20-M-2PWMThe number of module pulses continues to accumulate, as shown in the figure below.

| | i | 名称 | 地址 | 显示格式 | 监视值 | 修改值 | | 注释 |
|---|---|---|---|---|---|---|---|---|
| 1 | | | %IW68 | 十六进制 | 16#0000 | | | Alarm模块数据 |
| 2 | // | | | | | | | |
| 3 | | | %Q1.0 | 布尔型 | FALSE | | | Stop bit CH1 |
| 4 | | | %Q1.1 | 布尔型 | TRUE | TRUE | | Jog Enable bit CH1 |
| 5 | | | %Q1.2 | 布尔型 | FALSE | | | Jog Direction bit CH1 |
| 6 | | | %Q1.3 | 布尔型 | FALSE | | | Position Enable bit CH1 |
| 7 | | | %Q1.4 | 布尔型 | FALSE | | | Position Clear bit CH1 |
| 8 | | | %QW2 | 十六进制 | 16#0000 | | | Target Duty Cycle CH1 |
| 9 | | | %QD4 | 十六进制 | 16#0000_0000 | | | Target Position or frequency CH1 |
| 10 | | | %Q8.0 | 布尔型 | FALSE | | | Stop bit CH2 |
| 11 | | | %Q8.1 | 布尔型 | FALSE | | | Jog Enable bit CH2 |
| 12 | | | %Q8.2 | 布尔型 | FALSE | | | Jog Direction bit CH2 |
| 13 | | | %Q8.3 | 布尔型 | FALSE | | | Position Enable bit CH2 |
| 14 | | | %Q8.4 | 布尔型 | FALSE | | | Position Clear bit CH2 |
| 15 | | | %QW9 | 十六进制 | 16#0000 | | | Target Duty Cycle CH2 |
| 16 | | | %QD11 | 十六进制 | 16#0000_0000 | | | Target Position or frequency CH2 |
| 17 | // | | | | | | | |
| 18 | | | %I1.0 | 布尔型 | FALSE | | | Pulse Fault bit CH1 |
| 19 | | | %I1.1 | 布尔型 | FALSE | | | CtrlWord Fault bit CH1 |
| 20 | | | %I1.2 | 布尔型 | FALSE | | | Positioning Complete bit CH1 |
| 21 | | | %I1.3 | 布尔型 | FALSE | | | Config Fault bit CH1 |
| 22 | | | %ID2 | 带符号十进制 | 105993 | | | ActualPosition CH1 |
| 23 | | | %I6.0 | 布尔型 | FALSE | | | Pulse Fault bit CH2 |
| 24 | | | %I6.1 | 布尔型 | FALSE | | | CtrlWord Fault bit CH2 |
| 25 | | | %I6.2 | 布尔型 | TRUE | | | Positioning Complete bit CH2 |
| 26 | | | %I6.3 | 布尔型 | FALSE | | | Config Fault bit CH2 |
| 27 | | | %ID7 | 十六进制 | 16#0000_0000 | | | ActualPosition CH2 |

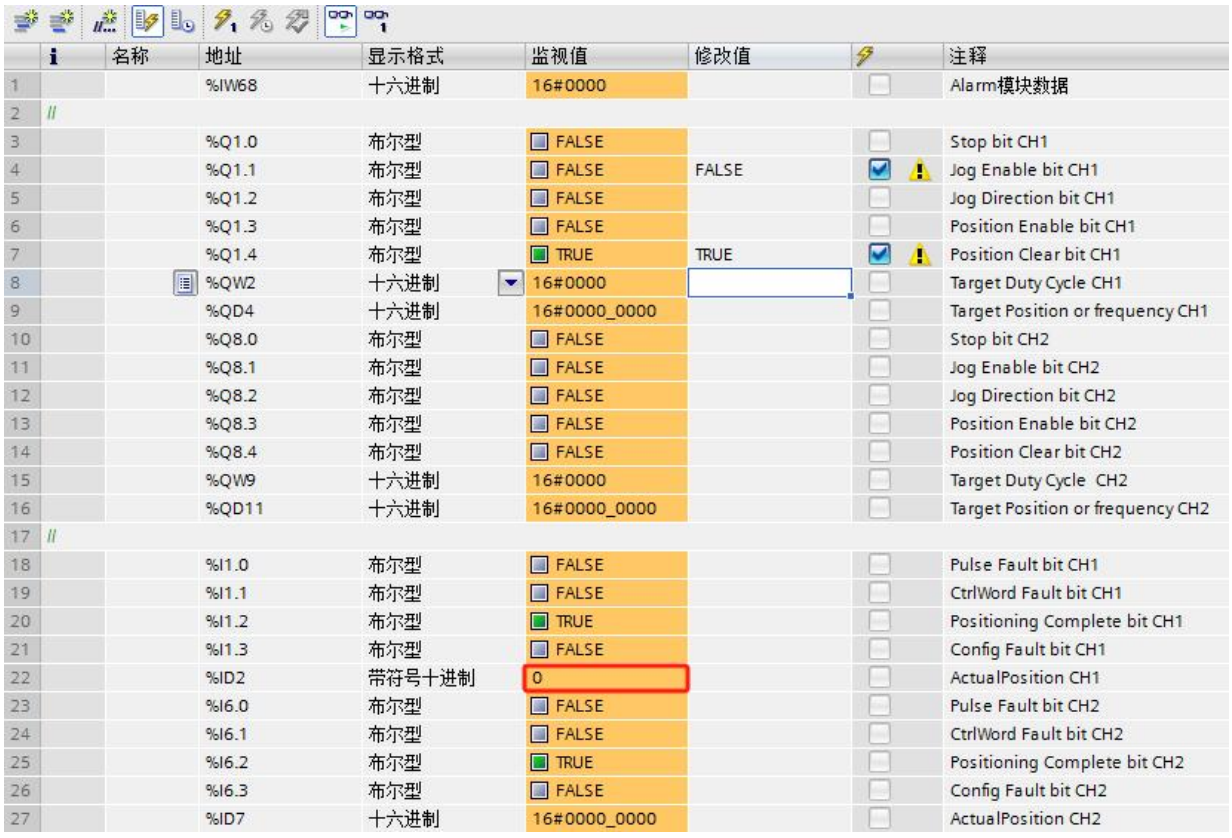
picture5-48

2）Jog Enable bit CH1First write "0" to stop jog.Write "1" to Position Clear bit CH1 to clear the current accumulated pulse count. After clearing, write "0" to Position Clear bit CH1.




| | i | 名称 | 地址 | 显示格式 | 监视值 | 修改值 | | 注释 |
|---|---|---|---|---|---|---|---|---|
| 1 | | | %IW68 | 十六进制 | 16#0000 | | | Alarm模块数据 |
| 2 | // | | | | | | | |
| 3 | | | %Q1.0 | 布尔型 | FALSE | | | Stop bit CH1 |
| 4 | | | %Q1.1 | 布尔型 | FALSE | FALSE | | Jog Enable bit CH1 |
| 5 | | | %Q1.2 | 布尔型 | FALSE | | | Jog Direction bit CH1 |
| 6 | | | %Q1.3 | 布尔型 | FALSE | | | Position Enable bit CH1 |
| 7 | | | %Q1.4 | 布尔型 | FALSE | TRUE | | Position Clear bit CH1 |
| 8 | | | %QW2 | 十六进制 | 16#0000 | | | Target Duty Cycle CH1 |
| 9 | | | %QD4 | 十六进制 | 16#0000_0000 | | | Target Position or frequency CH1 |
| 10 | | | %Q8.0 | 布尔型 | FALSE | | | Stop bit CH2 |
| 11 | | | %Q8.1 | 布尔型 | FALSE | | | Jog Enable bit CH2 |
| 12 | | | %Q8.2 | 布尔型 | FALSE | | | Jog Direction bit CH2 |
| 13 | | | %Q8.3 | 布尔型 | FALSE | | | Position Enable bit CH2 |
| 14 | | | %Q8.4 | 布尔型 | FALSE | | | Position Clear bit CH2 |
| 15 | | | %QW9 | 十六进制 | 16#0000 | | | Target Duty Cycle CH2 |
| 16 | | | %QD11 | 十六进制 | 16#0000_0000 | | | Target Position or frequency CH2 |
| 17 | // | | | | | | | |
| 18 | | | %I1.0 | 布尔型 | FALSE | | | Pulse Fault bit CH1 |
| 19 | | | %I1.1 | 布尔型 | FALSE | | | CtrlWord Fault bit CH1 |
| 20 | | | %I1.2 | 布尔型 | TRUE | | | Positioning Complete bit CH1 |
| 21 | | | %I1.3 | 布尔型 | FALSE | | | Config Fault bit CH1 |
| 22 | | | %ID2 | 带符号十进制 | 174973 | | | ActualPosition CH1 |
| 23 | | | %I6.0 | 布尔型 | FALSE | | | Pulse Fault bit CH2 |
| 24 | | | %I6.1 | 布尔型 | FALSE | | | CtrlWord Fault bit CH2 |
| 25 | | | %I6.2 | 布尔型 | TRUE | | | Positioning Complete bit CH2 |
| 26 | | | %I6.3 | 布尔型 | FALSE | | | Config Fault bit CH2 |
| 27 | | | %ID7 | 十六进制 | 16#0000_0000 | | | ActualPosition CH2 |

picture5-49



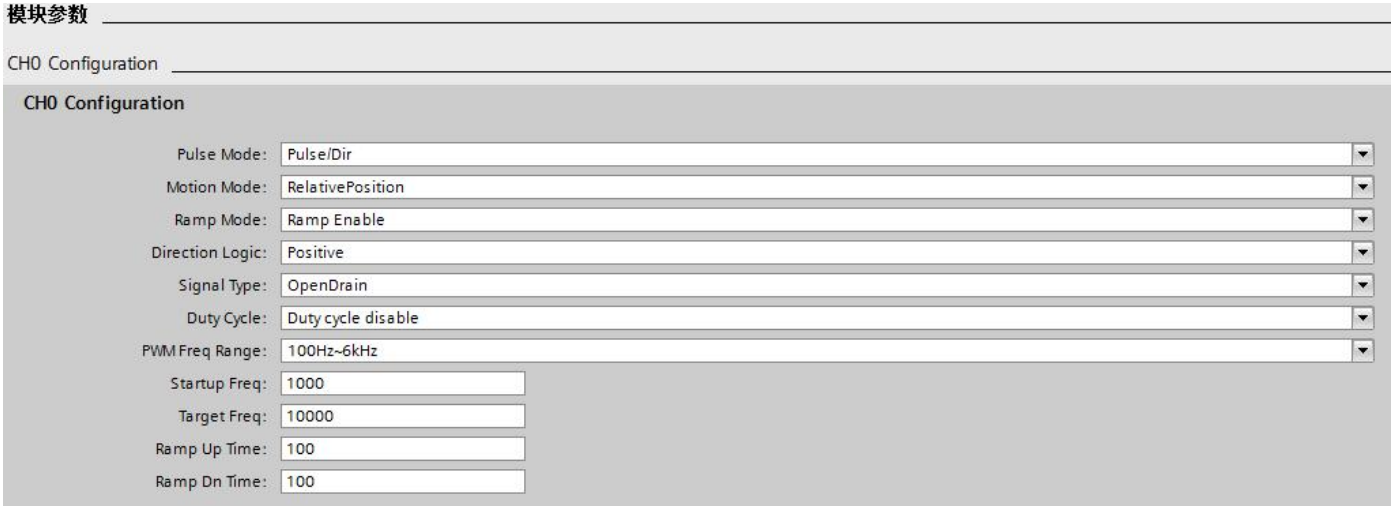
| | i | 名称 | 地址 | 显示格式 | 监视值 | 修改值 | | 注释 |
|---|---|---|---|---|---|---|---|---|
| 1 | | | %IW68 | 十六进制 | 16#0000 | | | Alarm模块数据 |
| 2 | // | | | | | | | |
| 3 | | | %Q1.0 | 布尔型 | FALSE | | | Stop bit CH1 |
| 4 | | | %Q1.1 | 布尔型 | FALSE | FALSE | | Jog Enable bit CH1 |
| 5 | | | %Q1.2 | 布尔型 | FALSE | | | Jog Direction bit CH1 |
| 6 | | | %Q1.3 | 布尔型 | FALSE | | | Position Enable bit CH1 |
| 7 | | | %Q1.4 | 布尔型 | TRUE | TRUE | | Position Clear bit CH1 |
| 8 | | | %QW2 | 十六进制 | 16#0000 | | | Target Duty Cycle CH1 |
| 9 | | | %QD4 | 十六进制 | 16#0000_0000 | | | Target Position or frequency CH1 |
| 10 | | | %Q8.0 | 布尔型 | FALSE | | | Stop bit CH2 |
| 11 | | | %Q8.1 | 布尔型 | FALSE | | | Jog Enable bit CH2 |
| 12 | | | %Q8.2 | 布尔型 | FALSE | | | Jog Direction bit CH2 |
| 13 | | | %Q8.3 | 布尔型 | FALSE | | | Position Enable bit CH2 |
| 14 | | | %Q8.4 | 布尔型 | FALSE | | | Position Clear bit CH2 |
| 15 | | | %QW9 | 十六进制 | 16#0000 | | | Target Duty Cycle CH2 |
| 16 | | | %QD11 | 十六进制 | 16#0000_0000 | | | Target Position or frequency CH2 |
| 17 | // | | | | | | | |
| 18 | | | %I1.0 | 布尔型 | FALSE | | | Pulse Fault bit CH1 |
| 19 | | | %I1.1 | 布尔型 | FALSE | | | CtrlWord Fault bit CH1 |
| 20 | | | %I1.2 | 布尔型 | TRUE | | | Positioning Complete bit CH1 |
| 21 | | | %I1.3 | 布尔型 | FALSE | | | Config Fault bit CH1 |
| 22 | | | %ID2 | 带符号十进制 | 0 | | | ActualPosition CH1 |
| 23 | | | %I6.0 | 布尔型 | FALSE | | | Pulse Fault bit CH2 |
| 24 | | | %I6.1 | 布尔型 | FALSE | | | CtrlWord Fault bit CH2 |
| 25 | | | %I6.2 | 布尔型 | TRUE | | | Positioning Complete bit CH2 |
| 26 | | | %I6.3 | 布尔型 | FALSE | | | Config Fault bit CH2 |
| 27 | | | %ID7 | 十六进制 | 16#0000_0000 | | | ActualPosition CH2 |

picture5-50

### 5.11.2 Instructions for use of pulse plus direction mode + relative position mode

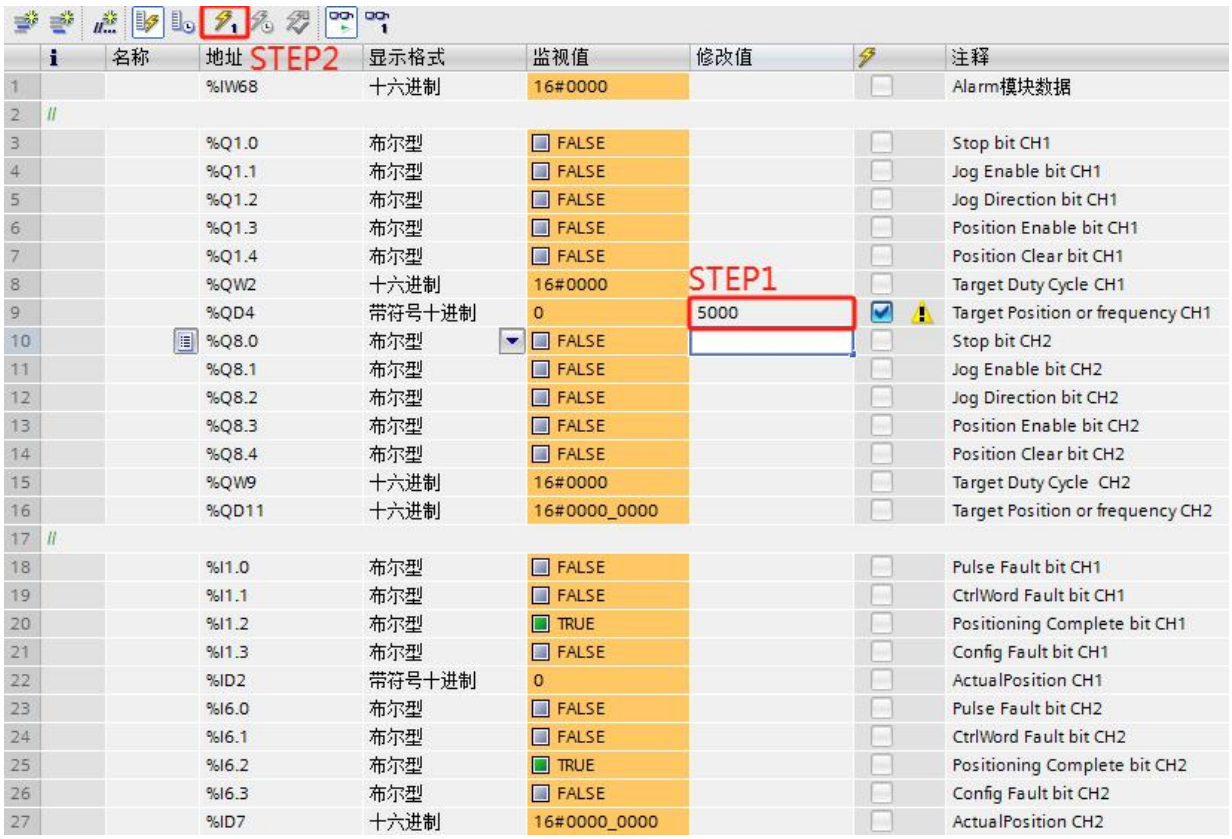
1)DF20-M-2PWMThe module CH1 channel is set to pulse plus direction mode, the output mode is set to

relative position mode, the frequency ramp is enabled, the pulse frequency rise buffer time is set to 100ms, the fall buffer time is set to 100ms, the start frequency is set to 1000Hz, the target frequency is set to 10000Hz, the pulse output direction is positive logic, and the CH1 channel configuration diagram is shown in the figure below.To switch modes, you need to clear "Jog Enable bit CH1" to 0.




picture5-51

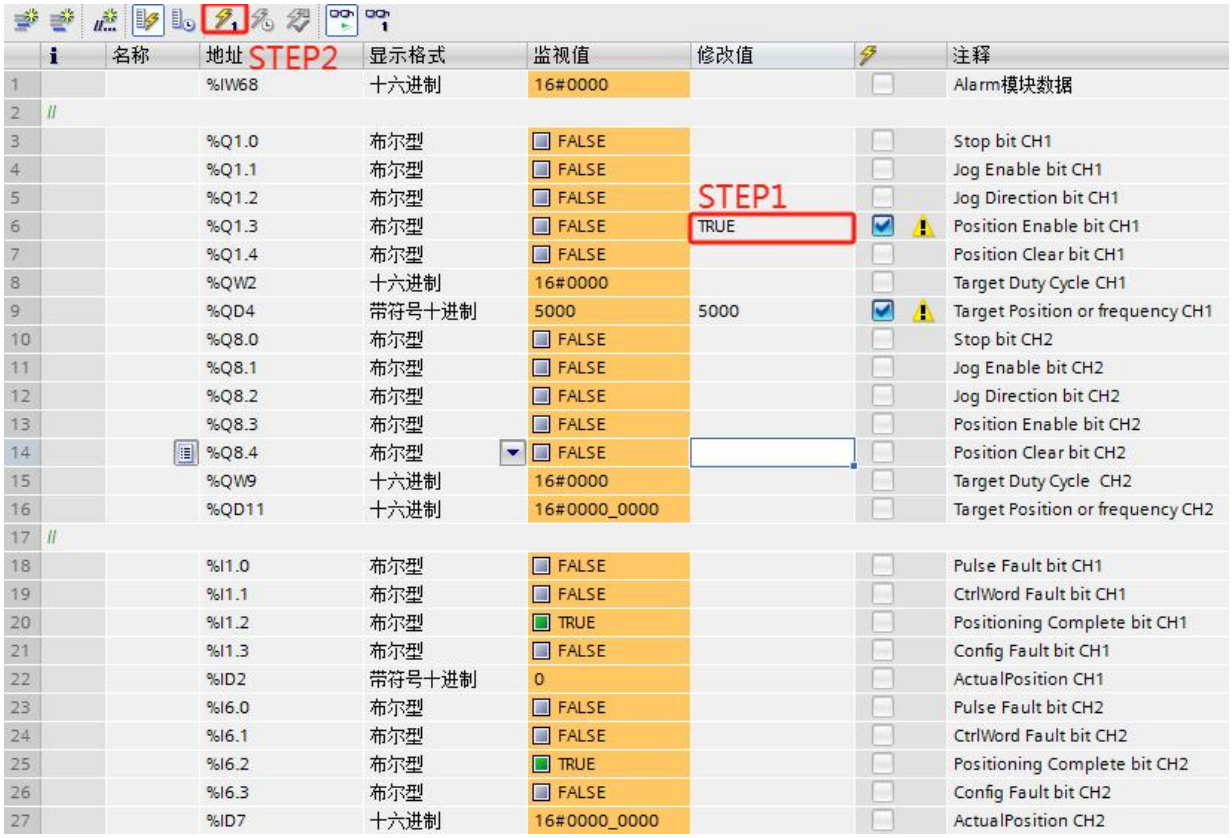
3) Set the target output pulse number to 5000.




| | i | 名称 | 地址 | 显示格式 | 监视值 | 修改值 | | 注释 |
|---|---|---|---|---|---|---|---|---|
| 1 | | | %IW68 | 十六进制 | 16#0000 | | | Alarm模块数据 |
| 2 | // | | | | | | | |
| 3 | | | %Q1.0 | 布尔型 | FALSE | | | Stop bit CH1 |
| 4 | | | %Q1.1 | 布尔型 | FALSE | | | Jog Enable bit CH1 |
| 5 | | | %Q1.2 | 布尔型 | FALSE | | | Jog Direction bit CH1 |
| 6 | | | %Q1.3 | 布尔型 | FALSE | | | Position Enable bit CH1 |
| 7 | | | %Q1.4 | 布尔型 | FALSE | | | Position Clear bit CH1 |
| 8 | | | %QW2 | 十六进制 | 16#0000 | | | Target Duty Cycle CH1 |
| 9 | | | %QD4 | 带符号十进制 | 0 | 5000 | | Target Position or frequency CH1 |
| 10 | | | %Q8.0 | 布尔型 | FALSE | | | Stop bit CH2 |
| 11 | | | %Q8.1 | 布尔型 | FALSE | | | Jog Enable bit CH2 |
| 12 | | | %Q8.2 | 布尔型 | FALSE | | | Jog Direction bit CH2 |
| 13 | | | %Q8.3 | 布尔型 | FALSE | | | Position Enable bit CH2 |
| 14 | | | %Q8.4 | 布尔型 | FALSE | | | Position Clear bit CH2 |
| 15 | | | %QW9 | 十六进制 | 16#0000 | | | Target Duty Cycle CH2 |
| 16 | | | %QD11 | 十六进制 | 16#0000_0000 | | | Target Position or frequency CH2 |
| 17 | // | | | | | | | |
| 18 | | | %I1.0 | 布尔型 | FALSE | | | Pulse Fault bit CH1 |
| 19 | | | %I1.1 | 布尔型 | FALSE | | | CtrlWord Fault bit CH1 |
| 20 | | | %I1.2 | 布尔型 | TRUE | | | Positioning Complete bit CH1 |
| 21 | | | %I1.3 | 布尔型 | FALSE | | | Config Fault bit CH1 |
| 22 | | | %ID2 | 带符号十进制 | 0 | | | ActualPosition CH1 |
| 23 | | | %I6.0 | 布尔型 | FALSE | | | Pulse Fault bit CH2 |
| 24 | | | %I6.1 | 布尔型 | FALSE | | | CtrlWord Fault bit CH2 |
| 25 | | | %I6.2 | 布尔型 | TRUE | | | Positioning Complete bit CH2 |
| 26 | | | %I6.3 | 布尔型 | FALSE | | | Config Fault bit CH2 |
| 27 | | | %ID7 | 十六进制 | 16#0000_0000 | | | ActualPosition CH2 |

picture5-52

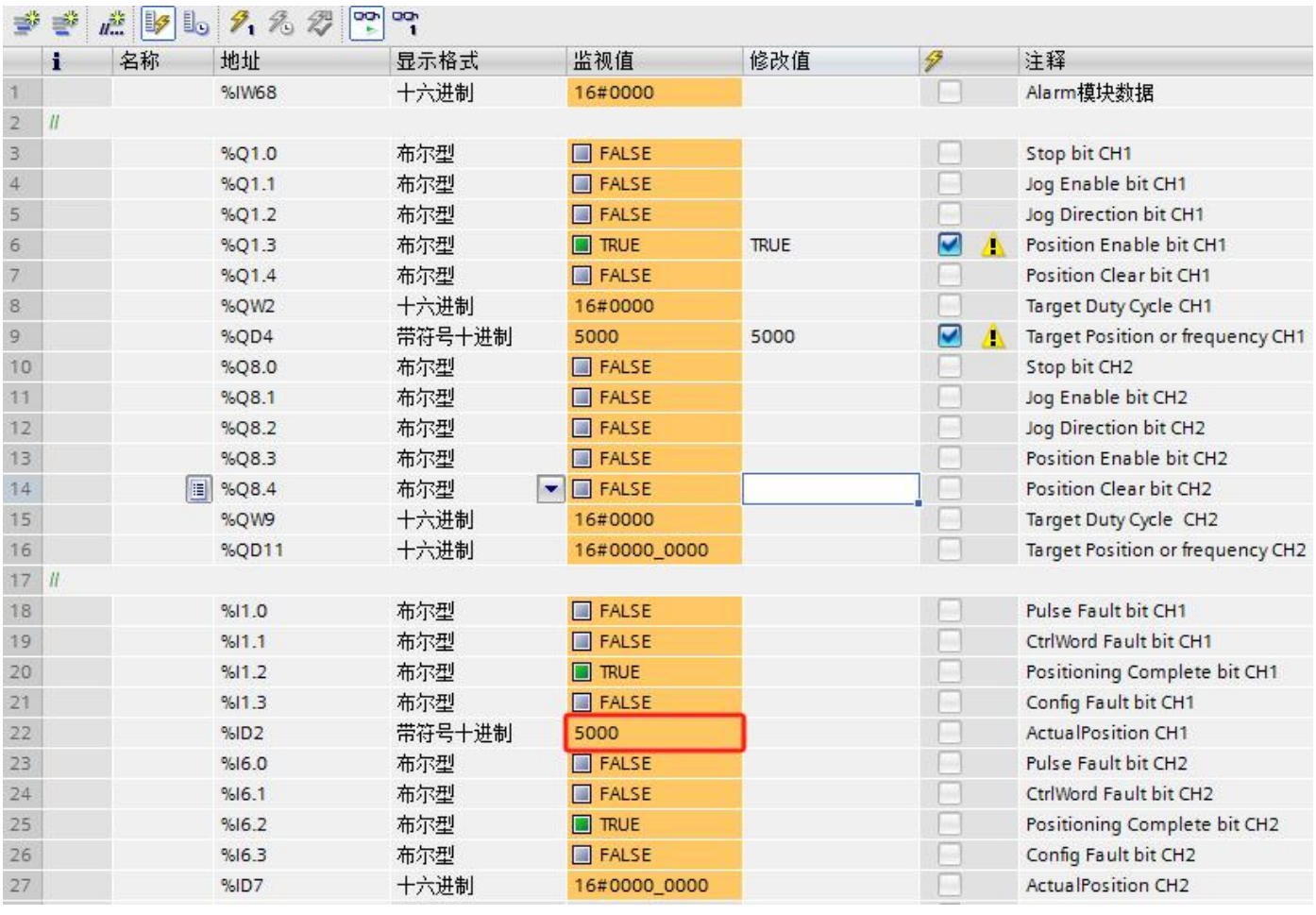
4) enables module pulse output.




| | i | 名称 | 地址 | 显示格式 | 监视值 | 修改值 | | 注释 |
|---|---|---|---|---|---|---|---|---|
| 1 | | | %IW68 | 十六进制 | 16#0000 | | | Alarm模块数据 |
| 2 | // | | | | | | | |
| 3 | | | %Q1.0 | 布尔型 | FALSE | | | Stop bit CH1 |
| 4 | | | %Q1.1 | 布尔型 | FALSE | | | Jog Enable bit CH1 |
| 5 | | | %Q1.2 | 布尔型 | FALSE | | | Jog Direction bit CH1 |
| 6 | | | %Q1.3 | 布尔型 | FALSE | TRUE | ⚠ | Position Enable bit CH1 |
| 7 | | | %Q1.4 | 布尔型 | FALSE | | | Position Clear bit CH1 |
| 8 | | | %QW2 | 十六进制 | 16#0000 | | | Target Duty Cycle CH1 |
| 9 | | | %QD4 | 带符号十进制 | 5000 | 5000 | ⚠ | Target Position or frequency CH1 |
| 10 | | | %Q8.0 | 布尔型 | FALSE | | | Stop bit CH2 |
| 11 | | | %Q8.1 | 布尔型 | FALSE | | | Jog Enable bit CH2 |
| 12 | | | %Q8.2 | 布尔型 | FALSE | | | Jog Direction bit CH2 |
| 13 | | | %Q8.3 | 布尔型 | FALSE | | | Position Enable bit CH2 |
| 14 | | | %Q8.4 | 布尔型 | FALSE | | | Position Clear bit CH2 |
| 15 | | | %QW9 | 十六进制 | 16#0000 | | | Target Duty Cycle CH2 |
| 16 | | | %QD11 | 十六进制 | 16#0000_0000 | | | Target Position or frequency CH2 |
| 17 | // | | | | | | | |
| 18 | | | %I1.0 | 布尔型 | FALSE | | | Pulse Fault bit CH1 |
| 19 | | | %I1.1 | 布尔型 | FALSE | | | CtrlWord Fault bit CH1 |
| 20 | | | %I1.2 | 布尔型 | TRUE | | | Positioning Complete bit CH1 |
| 21 | | | %I1.3 | 布尔型 | FALSE | | | Config Fault bit CH1 |
| 22 | | | %ID2 | 带符号十进制 | 0 | | | ActualPosition CH1 |
| 23 | | | %I6.0 | 布尔型 | FALSE | | | Pulse Fault bit CH2 |
| 24 | | | %I6.1 | 布尔型 | FALSE | | | CtrlWord Fault bit CH2 |
| 25 | | | %I6.2 | 布尔型 | TRUE | | | Positioning Complete bit CH2 |
| 26 | | | %I6.3 | 布尔型 | FALSE | | | Config Fault bit CH2 |
| 27 | | | %ID7 | 十六进制 | 16#0000_0000 | | | ActualPosition CH2 |

picture5-53

5) The current pulse count is 5000.

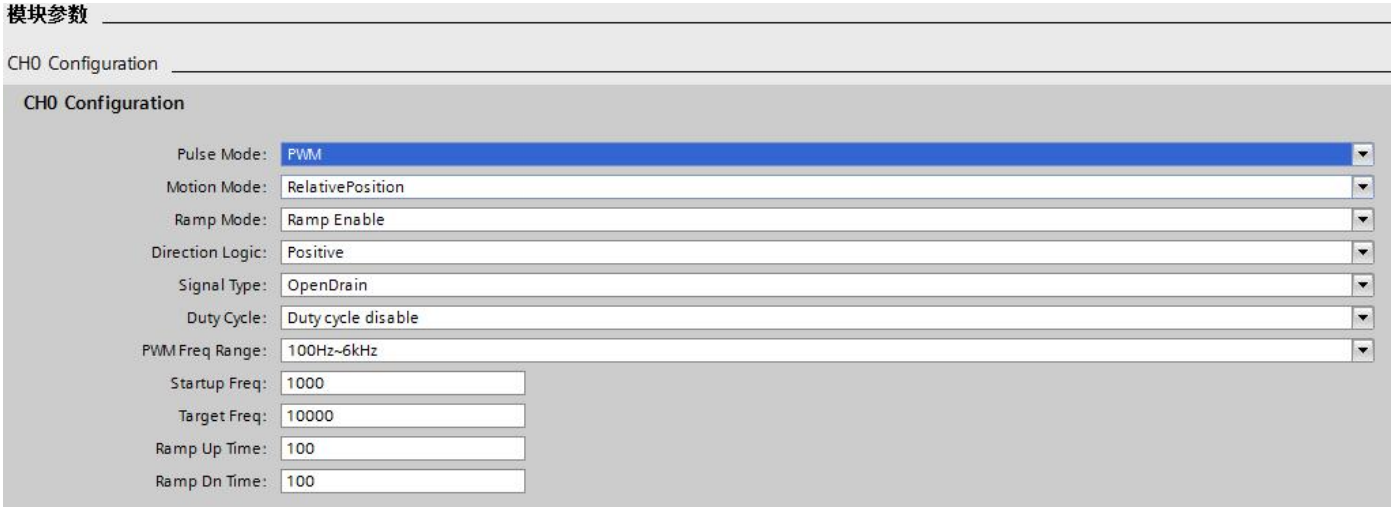


| | i | 名称 | 地址 | 显示格式 | 监视值 | 修改值 | | 注释 |
|---|---|---|---|---|---|---|---|---|
| 1 | | | %IW68 | 十六进制 | 16#0000 | | | Alarm模块数据 |
| 2 | // | | | | | | | |
| 3 | | | %Q1.0 | 布尔型 | FALSE | | | Stop bit CH1 |
| 4 | | | %Q1.1 | 布尔型 | FALSE | | | Jog Enable bit CH1 |
| 5 | | | %Q1.2 | 布尔型 | FALSE | | | Jog Direction bit CH1 |
| 6 | | | %Q1.3 | 布尔型 | TRUE | TRUE | ⚠ | Position Enable bit CH1 |
| 7 | | | %Q1.4 | 布尔型 | FALSE | | | Position Clear bit CH1 |
| 8 | | | %QW2 | 十六进制 | 16#0000 | | | Target Duty Cycle CH1 |
| 9 | | | %QD4 | 带符号十进制 | 5000 | 5000 | ⚠ | Target Position or frequency CH1 |
| 10 | | | %Q8.0 | 布尔型 | FALSE | | | Stop bit CH2 |
| 11 | | | %Q8.1 | 布尔型 | FALSE | | | Jog Enable bit CH2 |
| 12 | | | %Q8.2 | 布尔型 | FALSE | | | Jog Direction bit CH2 |
| 13 | | | %Q8.3 | 布尔型 | FALSE | | | Position Enable bit CH2 |
| 14 | | | %Q8.4 | 布尔型 | FALSE | | | Position Clear bit CH2 |
| 15 | | | %QW9 | 十六进制 | 16#0000 | | | Target Duty Cycle CH2 |
| 16 | | | %QD11 | 十六进制 | 16#0000_0000 | | | Target Position or frequency CH2 |
| 17 | // | | | | | | | |
| 18 | | | %I1.0 | 布尔型 | FALSE | | | Pulse Fault bit CH1 |
| 19 | | | %I1.1 | 布尔型 | FALSE | | | CtrlWord Fault bit CH1 |
| 20 | | | %I1.2 | 布尔型 | TRUE | | | Positioning Complete bit CH1 |
| 21 | | | %I1.3 | 布尔型 | FALSE | | | Config Fault bit CH1 |
| 22 | | | %ID2 | 带符号十进制 | 5000 | | | ActualPosition CH1 |
| 23 | | | %I6.0 | 布尔型 | FALSE | | | Pulse Fault bit CH2 |
| 24 | | | %I6.1 | 布尔型 | FALSE | | | CtrlWord Fault bit CH2 |
| 25 | | | %I6.2 | 布尔型 | TRUE | | | Positioning Complete bit CH2 |
| 26 | | | %I6.3 | 布尔型 | FALSE | | | Config Fault bit CH2 |
| 27 | | | %ID7 | 十六进制 | 16#0000_0000 | | | ActualPosition CH2 |

picture5-54

### 5.11.3 PWM Mode Instructions

1)DF20-M-2PWMThe module CH1 channel is set to PWM mode, and the PWM frequency range is set to 100Hz-6kHz. The configuration is shown in the figure below.




picture5-55

2) Set the PWM output frequency and observe the oscilloscopeDF20-M-2PWMThe module pulses are continuously output and the number is accumulated.

| | i | 名称 | 地址 | 显示格式 | 监视值 | 修改值 | | 注释 |
|---|---|---|---|---|---|---|---|---|
| 1 | | | %IW68 | 十六进制 | 16#0000 | | | Alarm模块数据 |
| 2 | // | | | | | | | |
| 3 | | | %Q1.0 | 布尔型 | FALSE | | | Stop bit CH1 |
| 4 | | | %Q1.1 | 布尔型 | FALSE | | | Jog Enable bit CH1 |
| 5 | | | %Q1.2 | 布尔型 | FALSE | | | Jog Direction bit CH1 |
| 6 | | | %Q1.3 | 布尔型 | FALSE | | | Position Enable bit CH1 |
| 7 | | | %Q1.4 | 布尔型 | FALSE | | | Position Clear bit CH1 |
| 8 | | | %QW2 | 带符号十进制 | 500 | 500 | | Target Duty Cycle CH1 |
| 9 | | | %QD4 | 带符号十进制 | 5000 | | | Target Position or frequency CH1 |
| 10 | | | %Q8.0 | 布尔型 | FALSE | | | Stop bit CH2 |
| 11 | | | %Q8.1 | 布尔型 | FALSE | | | Jog Enable bit CH2 |
| 12 | | | %Q8.2 | 布尔型 | FALSE | | | Jog Direction bit CH2 |
| 13 | | | %Q8.3 | 布尔型 | FALSE | | | Position Enable bit CH2 |
| 14 | | | %Q8.4 | 布尔型 | FALSE | | | Position Clear bit CH2 |
| 15 | | | %QW9 | 十六进制 | 16#0000 | | | Target Duty Cycle CH2 |
| 16 | | | %QD11 | 十六进制 | 16#0000_0000 | | | Target Position or frequency CH2 |
| 17 | // | | | | | | | |
| 18 | | | %I1.0 | 布尔型 | FALSE | | | Pulse Fault bit CH1 |
| 19 | | | %I1.1 | 布尔型 | FALSE | | | CtrlWord Fault bit CH1 |
| 20 | | | %I1.2 | 布尔型 | FALSE | | | Positioning Complete bit CH1 |
| 21 | | | %I1.3 | 布尔型 | FALSE | | | Config Fault bit CH1 |
| 22 | | | %ID2 | 带符号十进制 | 366417 | | | ActualPosition CH1 |
| 23 | | | %I6.0 | 布尔型 | FALSE | | | Pulse Fault bit CH2 |
| 24 | | | %I6.1 | 布尔型 | FALSE | | | CtrlWord Fault bit CH2 |
| 25 | | | %I6.2 | 布尔型 | TRUE | | | Positioning Complete bit CH2 |
| 26 | | | %I6.3 | 布尔型 | FALSE | | | Config Fault bit CH2 |
| 27 | | | %ID7 | 十六进制 | 16#0000_0000 | | | ActualPosition CH2 |

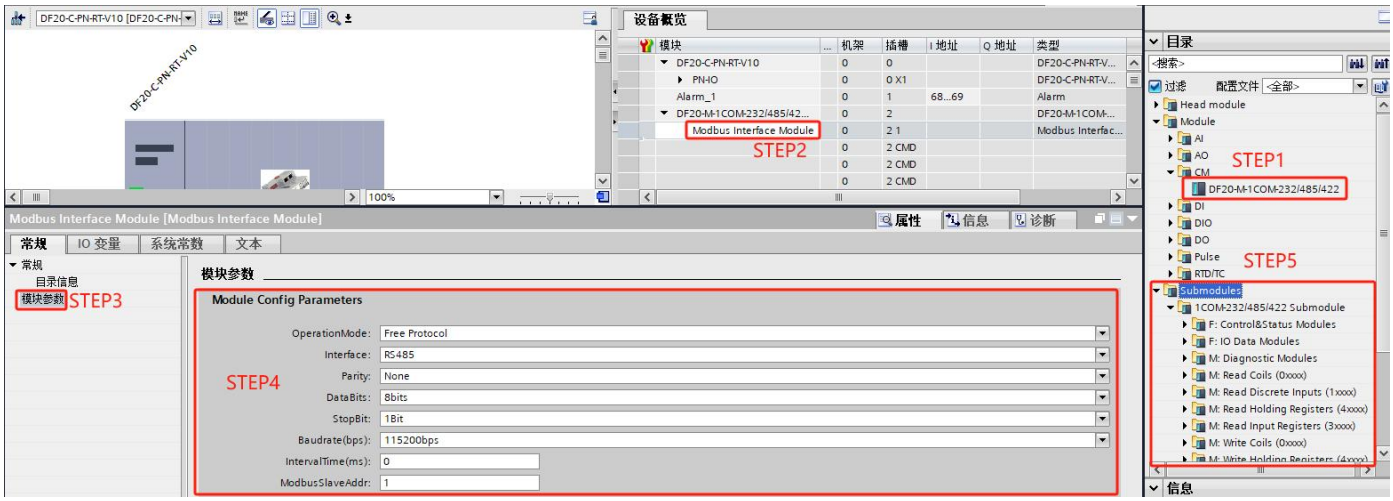
picture5-56

## 5.12Single channel serial communication module usage routine

This example usesDF20-C-PN-RT-V10+DF20-M-1COM-232/485/422During the power-on phase, the PWR power indicator is always on, the module enters the working state, and the STA status indicator flashes.4The status lights corresponding to 85/422/232 and CUSTOM/MASTER/SLAVE are always on.

### 5.12.1 Port ParametersConfiguration

- This example usesDF20-C-PN-RT-V10 Test, module485passUSBConverters andPCComputer connection.
- EnterDF20-C-PN-RT-V10In the device view, add a subslot for the serial port module;




① From the Module list, find the CM Gateway Module column, click it to display the serial port module 1COM-232/485/422, double-click it to add it to the slot of the DF20-M-1COM-232/485/422 device on the left, and the serial port module automatically adds a sub slot Modbus Interface Module;

② The sub-slot Modbus Interface Module is used for interface configuration, where you can select different protocol modes, different hardware interfaces, and serial communication formats, etc. IntervalTime is only valid under Free Protocol and Modbus RTU Slave, and SlaveAddr is only valid under Modbus RTU Slave.

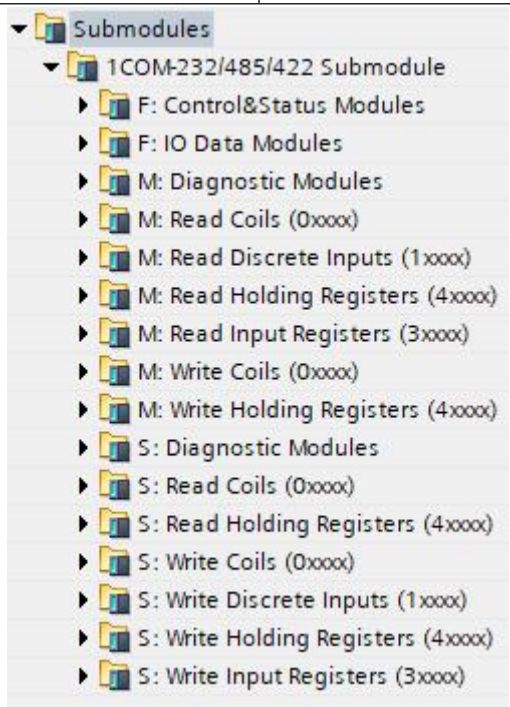
Sub-slot Modbus Interface Module configuration parameter table:

| Module parameters | Parameter meaning | Initial Value |
|---|---|---|
| OperationMode | 0:Free Protocol<br>1:Modbus RTU Master 2:Modbus RTU Slave | 0:Free |
| Interface TypeInterfance | 0:RS232 Flow OFF 1:RS232 Flow ON<br>2:RS485 3:RS422 | 2: RS485 |
| Check digit Parity | 0:None 1:Odd<br>2: Even | 0:None |
| Data bits Data bits | 0:8 bits<br>1:7 bits | 0:8 bits |
| Stop bits Stop bit | 0:1Bit<br>1:2Bits | 0:1Bit |
| Baud rate | 2400bps-256000bps | 11:115200 |

| | | |
|---|---|---|
| Baudrate | (3-14 enumeration value setting) | |
| Interval time<br>IntervalTime | Free mode: the interval between two data frames, in ms<br>Modbus RTU Slave mode: Slave response to Master delay | 0:0ms |
| Slave Address<br>Slave addr | This address is valid when the module is in Modbus RTU Slave mode, and invalid in other modes. | 1 |

③ According to the operation mode OperationMode selected in the second step, select the subslot applicable to this mode.

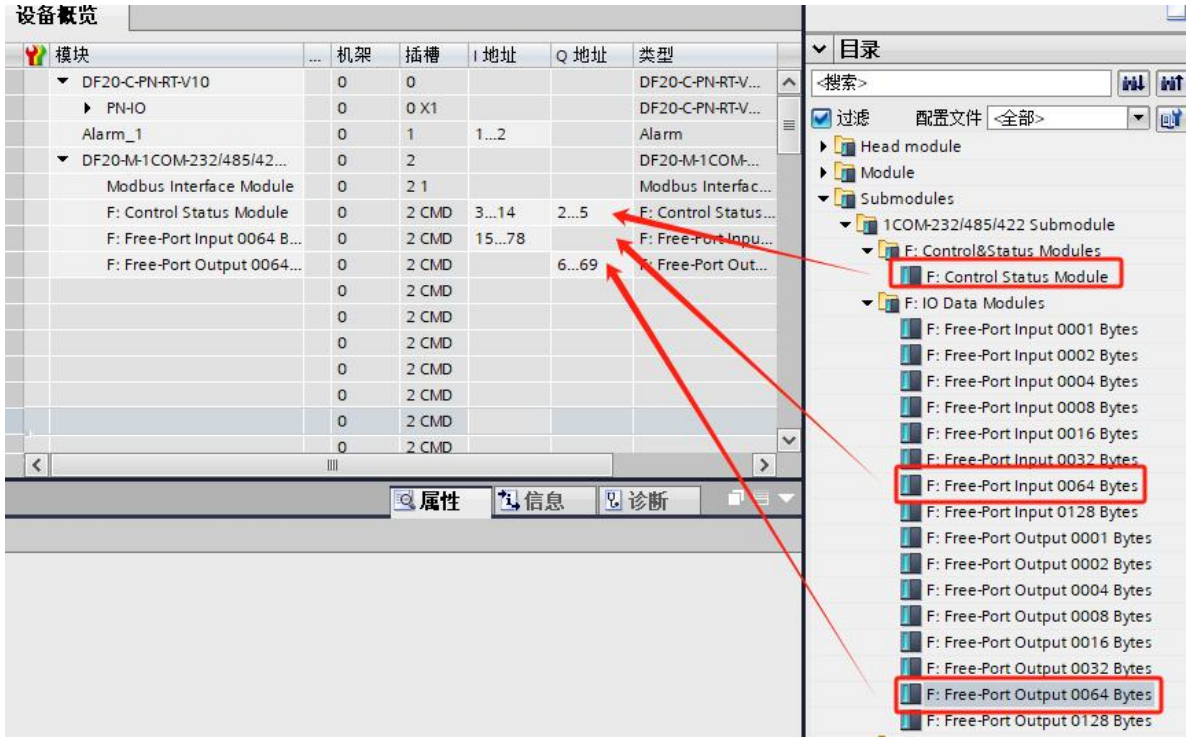
| OperationMode | Corresponding subslot |
|---|---|
| 0:Free Protocol | 2 seed slots starting with F |
| 1:Modbus RTU Master | 7 seed slots starting with M |
| 2:Modbus RTU Slave | 7 seed slots starting with S |




### 5.12.2 FreeProtocolmodel

Add the corresponding subslots in free transparent transmission mode to the list on the left. The F: Control Status Module subslot is fixedly added to the second subslot, the F: Free-Port Input subslot is fixedly added to the third subslot, and the F: Free-Port Input subslot is fixedly added to the fourth subslot.

F: Control Status Module subslot has a module parameter, Normal is the default setting, and other functions are not yet available in this version.




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

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

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

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

**Note: Coupler**Each time the power is turned on again, the configuration will be automatically sentCONFIGUREPORTThe command configures the serial port module. After success, the serial port module entersREADCUSTOMStatus and feedbackStateWordThe status is 16#0003.

StateWord contains the following states:

| Normal state value | Status Name | meaning |
|---|---|---|
| 16#0000 | OP_SUCCESS | Configuration or write operation successful |
| 16#0001 | DATA_FULL | Data has been updated and can be read |

| | | |
|---|---|---|
| 16#0002 | WRITE_IDLE | Write idle, writable |
| 16#0003 | DATA_EMPTY | Read idle, receive data not updated |
| Error Status Value | Status Name | meaning |
| 16#E0A1 | WRITE_BUSY | Write busy, can't write |
| 16#E0A2 | DATA_LARGE | Data length exceeds limit |
| 16#E0A3 | CMD_ERR | Command Error |
| 16#E0A4 | PARA_ERR | Configuration parameter error |
| 16#E0A5 | CHECK_ERR | Verification Error |
| 16#E0A6 | SLAVE_NOEXIT | The slave device does not exist |
| 16#E0A7 | PACK_LOSS | Packet Loss |
| 16#E0A8 | OVER_FLOW | Data overflow |

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

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

**5.12.3 Free Protocol Use Cases:**

The following will take reading pressure sensor data as an example and use pseudo code (ST language) to show the operating principle:

Variable declaration area:

```
TxDataCNT_Last :UINT:=65535;//Create a new variable to record the last sent sequence number
RxDataCNT_Last :UINT:=65535;//Create a new variable to record the last received sequence number
RxByte_ARR:ARRAY[0..64] OF BYTE;//Create a new user data variable to store the pressure sensor value
```

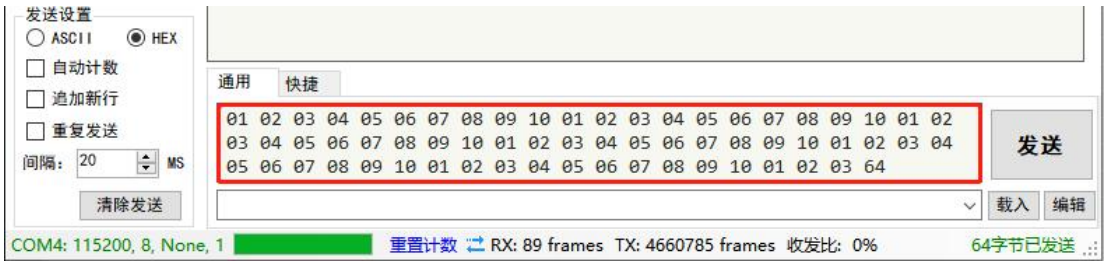
Program Area:

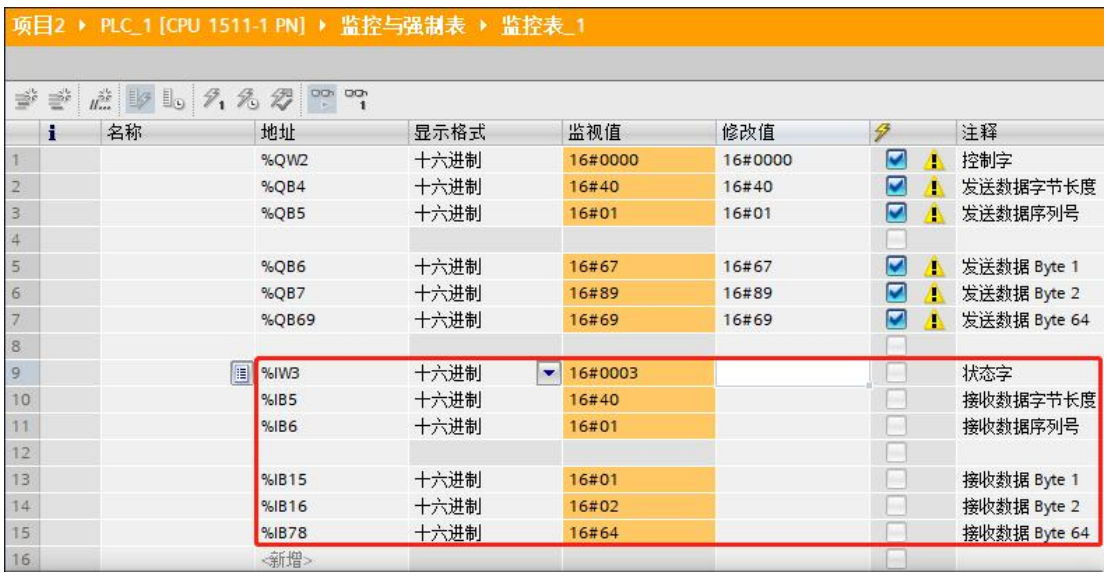
```
//When the PLC program runs for the first time, RxDataCNT_Last = 65535, RxDataCNT = 0; first enter the sending process
//When the serial port module receives data update, RxDataCNT will automatically increase by 1
//Get new received data by judging that the current value of RxDataCNT is not equal to the previous value
IF RxDataCNT_Last<>RxDataCNT THEN
    RxByte_ARR[0-17] := Free-Port Input[0-17];//Read data, the weighing sensor has a total of 18 bytes
//When sending data, PLC needs to switch CtrlWord to the sending state: 16#00C1 and set the TxDataCNT value +1, update the output data at the same time (can also remain unchanged). If TxDataCNT is not updated, the serial port module will not send data;
    CtrlWord:=16#00C1;//Switch the control word to send state: 16#00C1
    TxDataCNT:=TxDataCNT+1;//Send new data by controlling the send data frame counter
    TxDataLEN:=4; //Send data length
    Free-Port Output[0-3] := "ST/r/n"; //Send data, ASCII code, read pressure command
    RxDataCNT_Last:=RxDataCNT;
END_IF
IF StateWord=0 THEN//The status word is 0, indicating successful sending
    CtrlWord:=16#00C2;//Switch the control word to receive status: 16#00C2
END_IF
```

**Free Protocol Botu test:**

Botu monitoring table test: connect the module to a 485 to USB device and use the serial port assistant to send and receive data.

Receive data test: After the module is configured in free-running mode, it will automatically enter the receive mode. Use the serial port assistant to send 64 bytes of data. The received data, data length, serial number and status information can be read in the variable monitoring table.

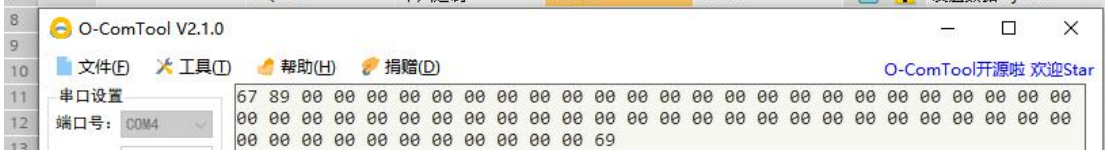



| | 名称 | 地址 | 显示格式 | 监视值 | 修改值 | 注释 |
|---|---|---|---|---|---|---|
| 1 | | %QW2 | 十六进制 | 16#0000 | 16#0000 | 控制字 |
| 2 | | %QB4 | 十六进制 | 16#40 | 16#40 | 发送数据字节长度 |
| 3 | | %QB5 | 十六进制 | 16#01 | 16#01 | 发送数据序列号 |
| 4 | | | | | | |
| 5 | | %QB6 | 十六进制 | 16#67 | 16#67 | 发送数据 Byte 1 |
| 6 | | %QB7 | 十六进制 | 16#89 | 16#89 | 发送数据 Byte 2 |
| 7 | | %QB69 | 十六进制 | 16#69 | 16#69 | 发送数据 Byte 64 |
| 8 | | | | | | |
| 9 | | %IW3 | 十六进制 | 16#0003 | | 状态字 |
| 10 | | %IB5 | 十六进制 | 16#40 | | 接收数据字节长度 |
| 11 | | %IB6 | 十六进制 | 16#01 | | 接收数据序列号 |
| 12 | | | | | | |
| 13 | | %IB15 | 十六进制 | 16#01 | | 接收数据 Byte 1 |
| 14 | | %IB16 | 十六进制 | 16#02 | | 接收数据 Byte 2 |
| 15 | | %IB78 | 十六进制 | 16#64 | | 接收数据 Byte 64 |
| 16 | | <新增> | | | | |

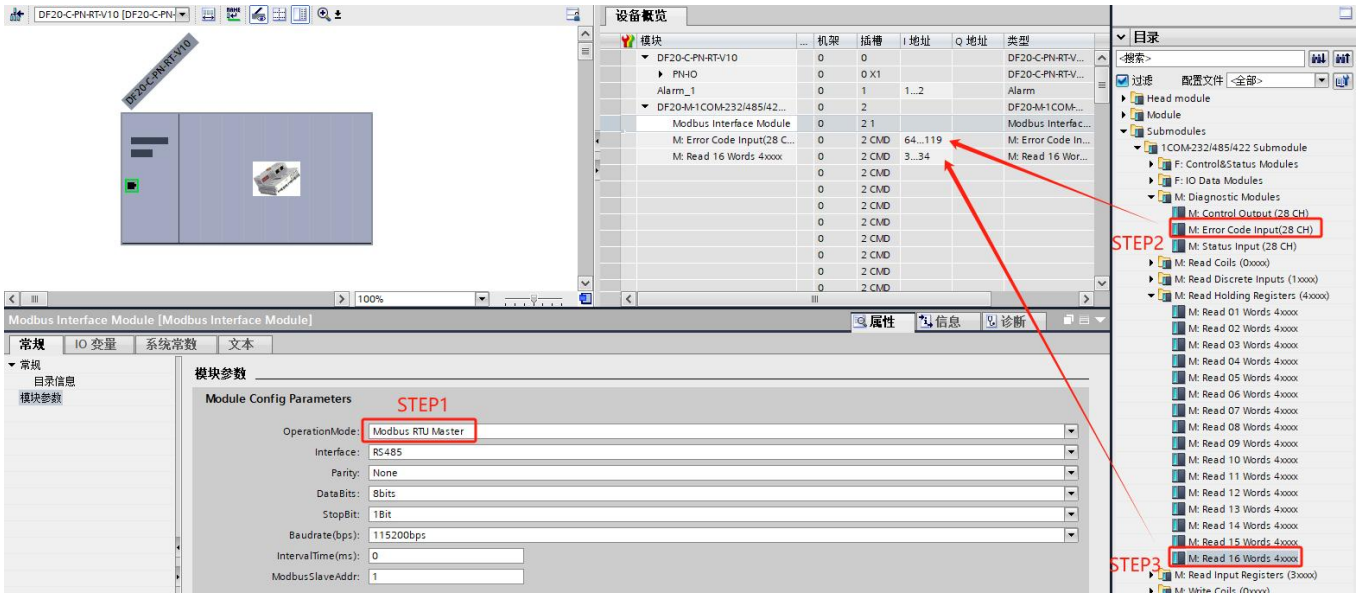
Send data test: set the control word to 16#00C1, set the send data length to 64 bytes, set the send sequence number to 1, assign values to Byte0, 1 and Byte64 of the send data respectively, and then perform the write action together. The received 64Byte data can be read using the serial port assistant, as shown in the figure below: (To send again, just loop and accumulate the send sequence number)

| | 名称 | 地址 | 显示格式 | 监视值 | 修改值 | 注释 |
|---|---|---|---|---|---|---|
| 1 | | %QW2 | 十六进制 | 16#00C1 | 16#00C1 | 控制字 |
| 2 | | %QB4 | 十六进制 | 16#40 | 16#40 | 发送数据字节长度 |
| 3 | | %QB5 | 十六进制 | 16#01 | 16#01 | 发送数据序列号 |
| 4 | | | | | | |
| 5 | | %QB6 | 十六进制 | 16#67 | 16#67 | 发送数据 Byte 1 |
| 6 | | %QB7 | 十六进制 | 16#89 | 16#89 | 发送数据 Byte 2 |
| 7 | | %QB69 | 十六进制 | 16#69 | 16#69 | 发送数据 Byte 64 |



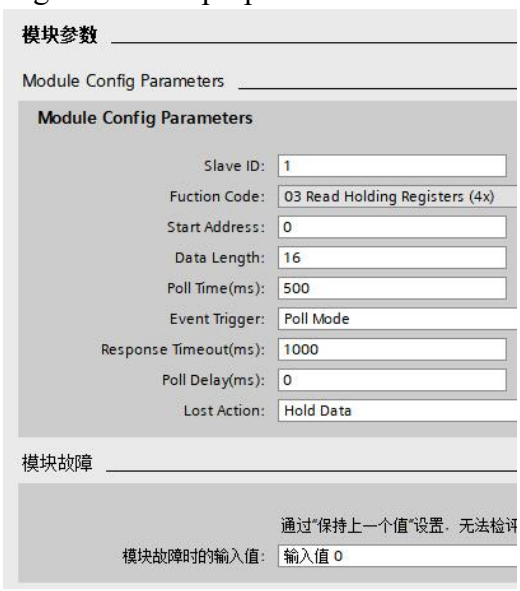

### 5.12.4 Modbus RTU Master Mode

①First, set the operation mode OperationMode to Modbus RTU Master mode:




② Add the diagnostic module M: Error Code Input (28 CH) to the second subslot, which contains the diagnostic information of up to 28 subsequent subslots, and each subslot occupies 2 bytes of diagnostic information;

③ Select the required function codes from the 6 function codes starting with M and add them to the third sub-slot. If you need to read and write more data, you can add different sub-slot types continuously, up to 28 sub-slots, including the first interface sub-slot and the diagnostic sub-slot, for a total of 30 sub-slots. Right-click the properties of the third sub-slot to configure the protocol information.




Data definition:

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

设备概览

| 模块 | ... | 机架 | 插槽 | I 地址 | Q 地址 | 类型 |
|---|---|---|---|---|---|---|
| DF20-C-PN-RT-V10 | | 0 | 0 | | | DF20-C-PN-RT-V... |
| PN-IO | | 0 | 0 X1 | | | DF20-C-PN-RT-V... |
| Alarm_1 | | 0 | 1 | 1...2 | | Alarm |
| DF20-M-1COM-232/485/42... | | 0 | 2 | | | DF20-M-1COM-... |
| Modbus Interface Module | | 0 | 2 1 | | | Modbus Interfac... |
| M: Error Code Input(28 C... | | 0 | 2 CMD | 3...58 | | M: Error Code In... |
| M: Read 16 Words 4xxxx | | 0 | 2 CMD | 59...90 | | M: Read 16 Wor... |
| M: Write 02 Words 4xxxx | | 0 | 2 CMD | | 2...5 | M: Write 02 Wor... |

M: Error Code Input (28 CH) contains 28 word data, corresponding to the diagnostic information of 28 slave slots. The PLC program can clearly understand the current slave status by monitoring the diagnostic information. The diagnostic information includes the following:

| Normal state value | Status Name | meaning |
|---|---|---|
| 16#0000 | OP_SUCCESS | Configuration or write operation successful |
| 16#0001 | DATA_FULL | Data has been updated and can be read |
| 16#0002 | WRITE_IDLE | Write idle, writable |
| 16#0003 | DATA_EMPTY | Read idle, receive data not updated |
| Error Status Value | Status Name | meaning |
| 16#E0A1 | WRITE_BUSY | Write busy, can't write |
| 16#E0A2 | DATA_LARGE | Data length exceeds limit |
| 16#E0A3 | CMD_ERR | Command Error |
| 16#E0A4 | PARA_ERR | Configuration parameter error |
| 16#E0A5 | CHECK_ERR | Verification Error |
| 16#E0A6 | SLAVE_NOEXIT | The slave device does not exist |
| 16#E0A7 | PACK_LOSS | Packet Loss |
| 16#E0A8 | OVER_FLOW | Data overflow |

M: Read 16 Words 4xxxx contains 16 words of data. According to the configuration information, the data represents the register value of the slave with node address 1 and address 0-15;

M: Write 02 Words 4xxxx contains 2 words of data. According to the configuration information, the data will be written to the registers of the slave station with node address 1 and address 4000 and 4001;

模块参数

Module Config Parameters

| | |
|---|---|
| Slave ID: | 1 |
| Fuction Code: | 16 Write Multiple Registers (4x) |
| Start Address: | 4000 |
| Data Length: | 2 |
| Poll Time(ms): | 500 |
| Event Trigger: | Poll Mode |
| Response Timeout(ms): | 1000 |
| Poll Delay(ms): | 0 |
| Lost Action: | Hold Data |

### 5.12.5 Modbus RTU Master use case:

Sub slots are added as follows. Pay attention to configuring the node address, register, cycle, etc. for each sub slot.

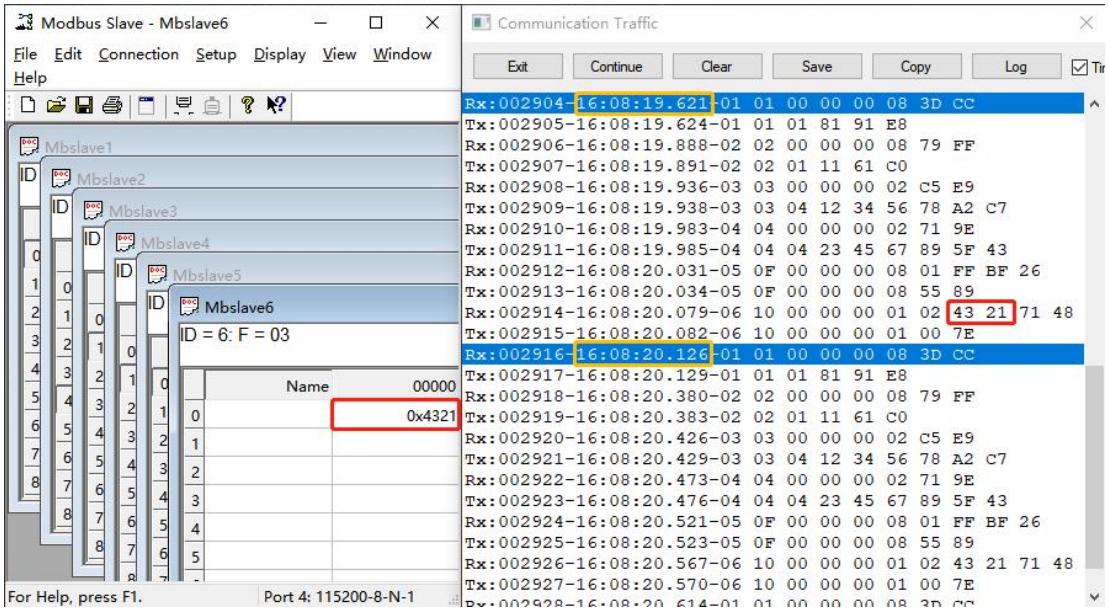
| | | | | | | |
|---|---|---|---|---|---|---|
| DF20-M-1COM-232/485/42... | | 0 | 2 | | | DF20-M-1COM-... |
| Modbus Interface Module | | 0 | 2 1 | | | Modbus Interfac... |
| M: Error Code Input(28 C... | | 0 | 2 CMD | 3...58 | | M: Error Code In... |
| M: Read 008 Bits 0xxxx | | 0 | 2 CMD | 59 | | M: Read 008 Bits... |
| M: Read 008 Bits 1xxxx | | 0 | 2 CMD | 60 | | M: Read 008 Bits... |
| M: Read 02 Words 4xxxx | | 0 | 2 CMD | 61...64 | | M: Read 02 Wor... |
| M: Read 02 Words 3xxxx | | 0 | 2 CMD | 65...68 | | M: Read 02 Wor... |
| M: Write 008 Bits 0xxxx | | 0 | 2 CMD | | 2 | M: Write 008 Bit... |
| M: Write 01 Words 4xxxx | | 0 | 2 CMD | | 3...4 | M: Write 01 Wor... |

Create a new variable table to send and receive data:

项目2 ▸ PLC_1 [CPU 1511-1 PN] ▸ 监控与强制表 ▸ Modbus RTU Master

| | 名称 | 地址 | 显示格式 | 监视值 | 修改值 | | 注释 |
|---|---|---|---|---|---|---|---|
| 1 | | %IW3 | 十六进制 | 16#0001 | | | 子槽3 Read 008 Bits 0xxxx的状态字 |
| 2 | | %IW5 | 十六进制 | 16#0001 | | | 子槽4 Read 008 Bits 1xxxx的状态字 |
| 3 | | %IW7 | 十六进制 | 16#0001 | | | 子槽5 Read 02 Words 4xxxx的状态字 |
| 4 | | %IW9 | 十六进制 | 16#0001 | | | 子槽6 Read 02 Words 3xxxx的状态字 |
| 5 | | %IW11 | 十六进制 | 16#0000 | | | 子槽7 Write 008 Bits 0xxxx的状态字 |
| 6 | | %IW13 | 十六进制 | 16#0000 | | | 子槽8 Write 01 Words 4xxxx的状态字 |
| 7 | | | | | | | |
| 8 | | %IB59 | 十六进制 | 16#81 | | | 子槽3 Read 008 Bits 0xxxx的线圈输入数据 |
| 9 | | | | | | | |
| 10 | | %IB60 | 十六进制 | 16#11 | | | 子槽4 Read 008 Bits 1xxxx的离散量输入数据 |
| 11 | | | | | | | |
| 12 | | %IW61 | 十六进制 | 16#1234 | | | 子槽5 Read 02 Words 4xxxx的保持寄存器输入数据1 |
| 13 | | %IW63 | 十六进制 | 16#5678 | | | 子槽5 Read 02 Words 4xxxx的保持寄存器输入数据2 |
| 14 | | | | | | | |
| 15 | | %IW65 | 十六进制 | 16#2345 | | | 子槽6 Read 02 Words 3xxxx的输入寄存器输入数据1 |
| 16 | | %IW67 | 十六进制 | 16#6789 | | | 子槽6 Read 02 Words 3xxxx的输入寄存器输入数据2 |
| 17 | | | | | | | |
| 18 | | %QB2 | 十六进制 | 16#FF | 16#FF | ☑ ⚠ | 子槽7 Write 008 Bits 0xxxx的线圈写入数据 |
| 19 | | | | | | | |
| 20 | | %QW3 | 十六进制 | 16#4321 | 16#4321 | ☑ ⚠ | 子槽8 Write 01 Words 4xxxx的保持寄存器写入数据 |

Use Modbus Slave software to create 6 new slave stations to communicate with the module, and obtain the status of each slave station through IW3~IW14. Currently, the display is normal. The communication data message and timestamp are shown in the following figure:



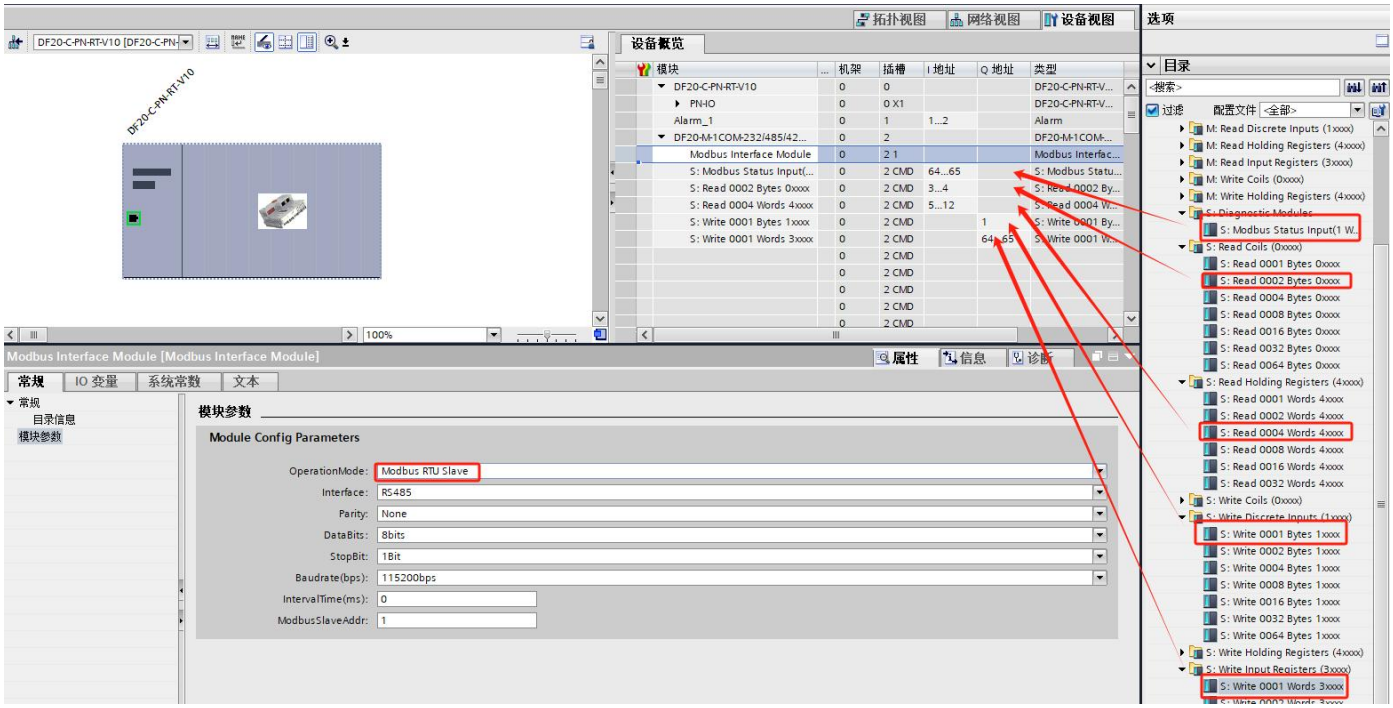

The red box is the holding register value of Mbslave6 corresponding to subslot 8, and the data of 16#4321 is correct;

The yellow box is the polling time of Mbslave1, which corresponds to the reading period of sub-slot 3 to read the coil value. The sub-slot is configured with a polling period of 500ms. The actual test result is

20.126s - 19.621s = 505ms, which is consistent with the configuration.

### 5.12.6 Modbus RTU Slave Mode

①First, set the operation mode OperationMode to Modbus RTU Slave mode, set the Slave response Master delay time IntervalTime (can be 0), and finally set the Slave's node address.




② Add the diagnostic module S: Modbus Status Input (1 Word) to the second subslot, which contains the diagnostic information of the SLAVE slave.

③ Select the required type from the 6 types starting with S and add it to the third sub-slot. If you need to read and write more data, you can add different sub-slot types continuously, up to 28 sub-slots, plus the first interface sub-slot and diagnostic sub-slot, a total of 30 sub-slots. Right-click the properties of the third sub-slot to configure the protocol information. Both reading and writing can set the register first address. Input data can set whether the data is cleared or retained after the module fails:

④When the module is used as a slave station, the data can be freely read and written by the RTU external master station, including 128 input registers, 128 holding registers, 1024 coils and 1024 discrete quantities.


### 5.12.7 Modbus RTU Slave use case:

First, set the interface configuration parameters to Modbus RTU Slave mode, the node address to 1,

then insert 6 seed slots, and select 64Byte for the data length;

| | | | | | |
|---|---|---|---|---|---|
| DF20-M-1COM-232/485/42... | 0 | 2 | | | DF20-M-1COM-... |
| Modbus Interface Module | 0 | 2 1 | | | Modbus Interfac... |
| S: Modbus Status Input(... | 0 | 2 CMD | 3...4 | | S: Modbus Statu... |
| S: Read 0064 Bytes 0xxxx | 0 | 2 CMD | 5...68 | | S: Read 0064 By... |
| S: Read 0032 Words 4xxxx | 0 | 2 CMD | 69...132 | | S: Read 0032 W... |
| S: Write 0064 Bytes 0xxxx | 0 | 2 CMD | | 2...65 | S: Write 0064 By... |
| S: Write 0064 Bytes 1xxxx | 0 | 2 CMD | | 66...129 | S: Write 0064 By... |
| S: Write 0032 Words 4xxxx | 0 | 2 CMD | | 130...193 | S: Write 0032 W... |
| S: Write 0032 Words 3xxxx | 0 | 2 CMD | | 194...257 | S: Write 0032 W... |

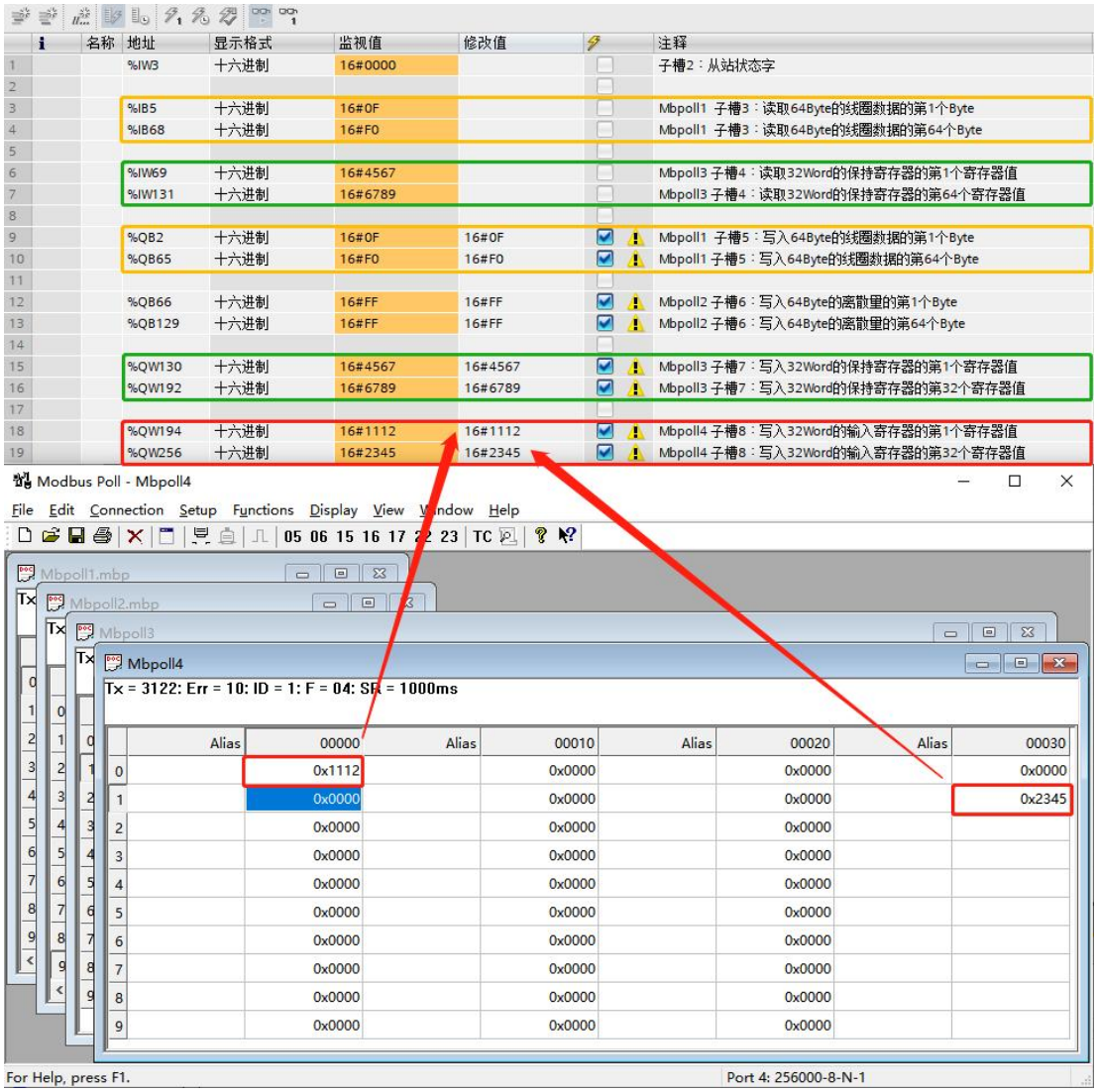
Create a new variable table to send and receive data: 6 subslots correspond to 4 address areas

Subslot 1 and subslot 3 correspond to the coil 0xxxx address area of Mbpoll1, which can read and write self-verification;

Subslot 2 and subslot 5 correspond to the holding register 3xxxx address area of Mbpoll3, which can read and write self-verification;

Subslot 4 corresponds to the discrete 1xxxx address area of Mbpoll2, and data is read through Mbpoll2;

Subslot 6 corresponds to the input register 4xxxx address area of Mbpoll4. The data read by Mbpoll4 are the contents of register 0 address 16#1112 and the contents of register 31 address 16#2345.




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

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

| Normal state value | Status Name | meaning |
|---|---|---|
| 16#0000 | OP_SUCCESS | Configuration or write operation successful |
| 16#0001 | DATA_FULL | Data has been updated and can be read |
| 16#0002 | WRITE_IDLE | Write idle, writable |
| 16#0003 | DATA_EMPTY | Read idle, receive data not updated |
| Error Status Value | Status Name | meaning |
| 16#E0A1 | WRITE_BUSY | Write busy, can't write |
| 16#E0A2 | DATA_LARGE | Data length exceeds limit |
| 16#E0A3 | CMD_ERR | Command Error |
| 16#E0A4 | PARA_ERR | Configuration parameter error |
| 16#E0A5 | CHECK_ERR | Verification Error |
| 16#E0A6 | SLAVE_NOEXIT | The slave device does not exist |
| 16#E0A7 | PACK_LOSS | Packet Loss |
| 16#E0A8 | OVER_FLOW | Data overflow |

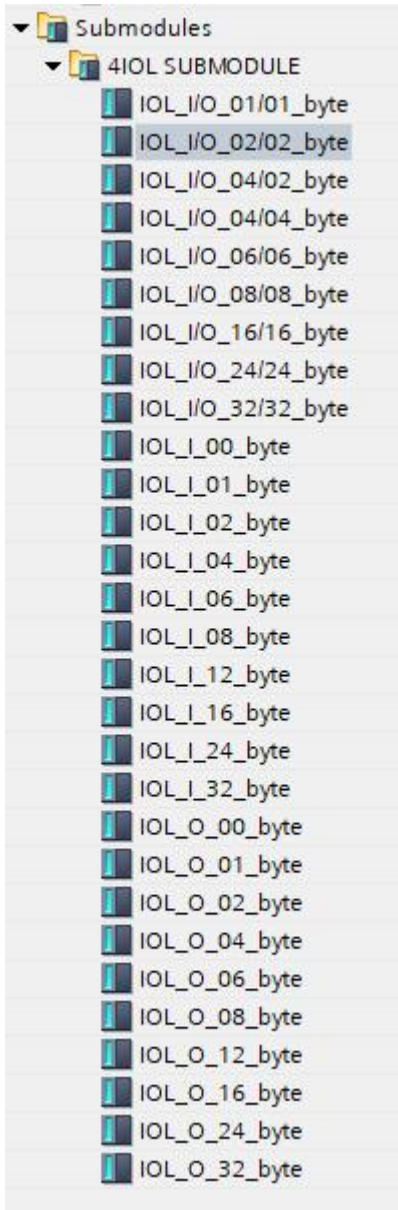
## 5.13Four-channel IO-Link communication module usage routine

➢ This example uses the DF20-C-PN-RT-V10+DF20-M-4IOL topology. For wiring methods, please refer toSection 3.46.2,After adding the module, it will look like the following figure.

Device overview

| Module | ... | Rack | Slot | I address | Q address | Type |
|---|---|---|---|---|---|---|
| DF20-C-PN-RT-V10 | | 0 | 0 | | | DF20-C-PN-RT-V... |
| PN-IO | | 0 | 0 X1 | | | DF20-C-PN-RT-V... |
| Alarm_1 | | 0 | 1 | 64...65 | | Alarm |
| DF20-M-4IOL_1 | | 0 | 2 | | | DF20-M-4IOL |
| IO-link State | | 0 | 2 1 | 1...12 | 1...4 | IO-link State |
| IOL_I/O_02/02_byte | | 0 | 2 POR... | 13...15 | 5...7 | IOL_I/O_02/02_... |
| IOL_I_00_byte | | 0 | 2 POR... | 16 | | IOL_I_00_byte |
| IOL_O_00_byte | | 0 | 2 POR... | | 64 | IOL_O_00_byte |
| IOL_I/O_02/02_byte_1 | | 0 | 2 POR... | 17...19 | 8...10 | IOL_I/O_02/02_... |

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




➢ Submodule meaning:

| | | | | | |
|---|---|---|---|---|---|
| IOL_I/O_01/01_byte | Input 1 byte | IOL_I_00_byte | Enter 0 bytes for | IOL_O_00_byte | Output 0 bytes, |

| | Output 1 byte | | DI mode | | used in DO mode |
|---|---|---|---|---|---|
| IOL_I/O_02/02_byte | Input 2 bytes<br>Output 2 bytes | IOL_I_01_byte | Input 1 byte | IOL_O_01_byte | Output 1 byte |
| IOL_I/O_04/02_byte | Input 4 bytes<br>Output 2 bytes | IOL_I_02_byte | Input 2 bytes | IOL_O_02_byte | Output 2 bytes |
| IOL_I/O_04/04_byte | Input 4 bytes<br>Output 4 bytes | IOL_I_04_byte | Input 4 bytes | IOL_O_04_byte | Output 4 bytes |
| IOL_I/O_06/06_byte | Input 6 bytes<br>Output 6 bytes | IOL_I_06_byte | Input 6 bytes | IOL_O_06_byte | Output 6 bytes |
| IOL_I/O_08/08_byte | Input 8 bytes<br>Output 8 bytes | IOL_I_08_byte | Input 8 bytes | IOL_O_08_byte | Output 8 bytes |
| IOL_I/O_16/16_byte | Input 16 bytes<br>Output 16 bytes | IOL_I_12_byte | Input 12 bytes | IOL_O_12_byte | Output 12 bytes |
| IOL_I/O_24/24_byte | Input 24 bytes<br>Output 24 bytes | IOL_I_16_byte | Input 16 bytes | IOL_O_16_byte | Output 16 bytes |
| IOL_I/O_32/32_byte | Input 32 bytes<br>Output 32 bytes | IOL_I_twenty four_byte | Input 24 bytes | IOL_O_twenty four_byte | Output 24 bytes |
| | | IOL_I_32_byte | Input 32 bytes | IOL_O_32_byte | Output 32 bytes |

## 5.13.1IO-LINK StateStatus Information

➢ After adding the DF20-M-4IOL module, there is a default slot "IO-LINK State" to display the status information of each port of the module. Fill in the IO-LINK State address into the monitoring table as shown below. For the specific meaning of State, please refer toSection 3.46.3.1.

| Address | Display format | Monitor value | Modify value | | Comment |
|---|---|---|---|---|---|
| %IW1 | Hex | 16#0000 | | | Port0 Event code |
| %I3.5 | Bool | TRUE | | | Port0 Working status |
| %I3.6 | Bool | FALSE | | | Port0 Communication status |
| | | | | | |
| %IW4 | Hex | 16#0000 | | | Port1 Event code |
| %I6.5 | Bool | FALSE | | | Port1 Working status |
| %I6.6 | Bool | FALSE | | | Port1 Communication status |
| | | | | | |
| %IW7 | Hex | 16#0000 | | | Port2 Event code |
| %I9.5 | Bool | FALSE | | | Port2 Working status |
| %I9.6 | Bool | FALSE | | | Port2 Communication status |
| | | | | | |
| %IW10 | Hex | 16#1800 | | | Port3 Event code |
| %I12.5 | Bool | FALSE | | | Port3 Working status |
| %I12.6 | Bool | TRUE | | | Port3 Communication status |
| | | | | | |
| %QB1 | Hex | 16#00 | | | Port0 Command |
| %QB2 | Hex | 16#00 | | | Port1 Command |
| %QB3 | Hex | 16#00 | | | Port2 Command |
| %QB4 | Hex | 16#00 | | | Port3 Command |

➢ PORT0 is connected to an IO-link slave, the event code is displayed as "16#0000", the working status is "TRUE" indicating that it is in normal working state, and the communication status is "FALSE" indicating that it is in slave connection state.

➢ PORT1 and PORT2 are in DI and DO mode, and the event code is displayed as "16#0000".

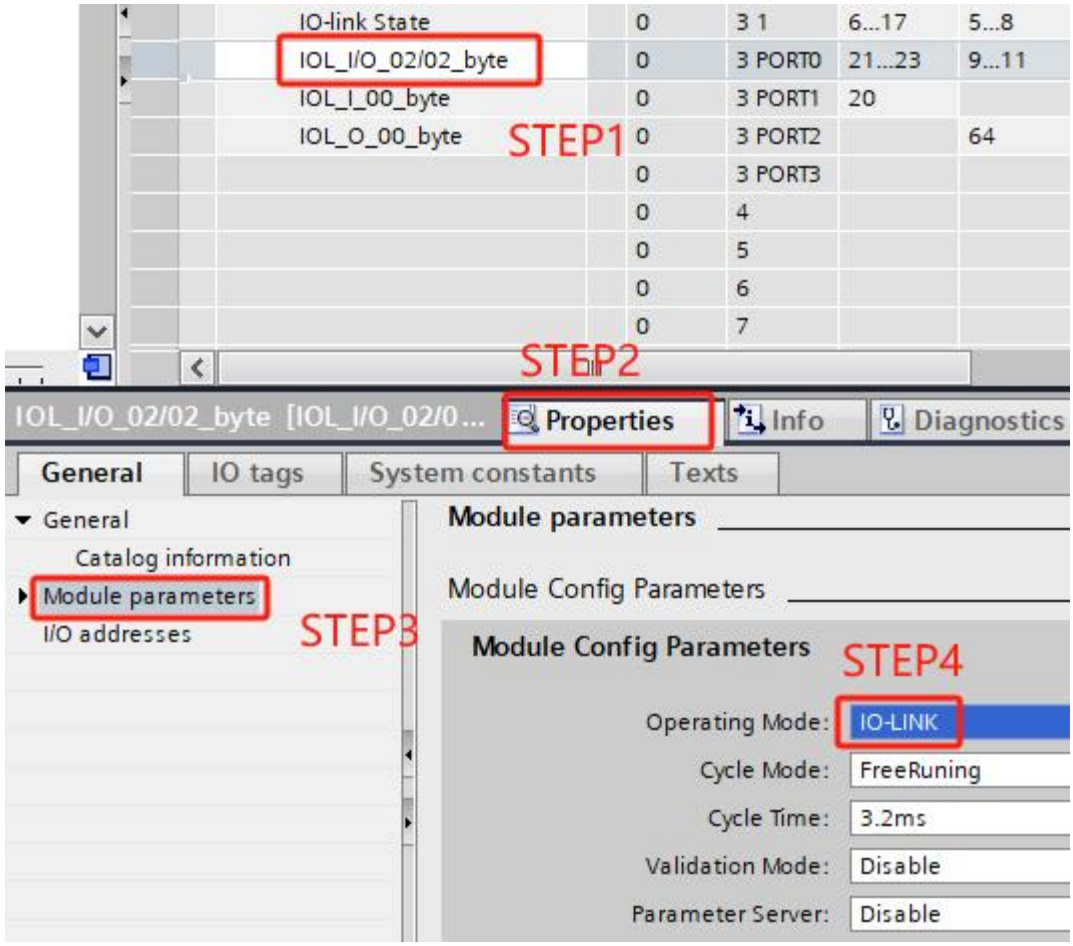
➢ PORT3 is not connected to a device, and the event code is displayed as "16#1800". According to the port event code, the IO-LINK slave is offline. The working status is "FALSE", indicating that it is in an incorrect working state, and the communication status is "TRUE", indicating that the slave is disconnected.

➢ As shown in the figure below, writing "0x01" in Port1 Command can clear the event code of Port1.

| Address | Display format | Monitor value | Modify value | | Comment |
|---|---|---|---|---|---|
| %IW6 | Hex | 16#0000 | | ☐ | Port0 Event code |
| %I8.5 | Bool | TRUE | | ☐ | Port0 Working status |
| %I8.6 | Bool | FALSE | | ☐ | Port0 Communication status |
| | | | | ☐ | |
| %IW9 | Hex | 16#0000 | | ☐ | Port1 Event code |
| %I11.5 | Bool | FALSE | | ☐ | Port1 Working status |
| %I11.6 | Bool | TRUE | | ☐ | Port1 Communication status |
| | | | | ☐ | |
| %IW12 | Hex | 16#1800 | | ☐ | Port2 Event code |
| %I14.5 | Bool | FALSE | | ☐ | Port2 Working status |
| %I14.6 | Bool | TRUE | | ☐ | Port2 Communication status |
| | | | | ☐ | |
| %IW15 | Hex | 16#0000 | | ☐ | Port3 Event code |
| %I17.5 | Bool | FALSE | | ☐ | Port3 Working status |
| %I17.6 | Bool | FALSE | | ☐ | Port3 Communication status |
| | | | | ☐ | |
| %QB5 | Hex | 16#00 | | ☐ | Port0 Command |
| %QB6 | Hex | 16#01 | 16#01 | ☑ ⚠ | Port1 Command |
| %QB7 | Hex | 16#00 | | ☐ | Port2 Command |
| %QB8 | Hex | 16#00 | | ☐ | Port3 Command |

## 5.13.2IO-LINKmodel

➢ As shown in the figure below, configure PORT0 to IO-link mode. The default mode is IO-link mode. For other configurable information, please refer toSection 3.46.4. Note that you need to re-download the configuration after the configuration is completed.




➢ This routine uses a16aisleDO/DIofIO-LINKAccess from the stationPort0For example, other slave stations pleaseCheck its manualThe slave parameter tableISDUIndex is64, sub-index0, parameter size2Bytes, corresponding to16Channel digital enable bit.

➢ Parameter table of slave station:

| ISDU | | name | length | default value | meaning |
|---|---|---|---|---|---|
| Index | SubIndex | | | | |
| 64 | 0 | Digital enable control | 2 | 16#0000 | Bit0~bit15 correspond to 16 channel signal enable bits |

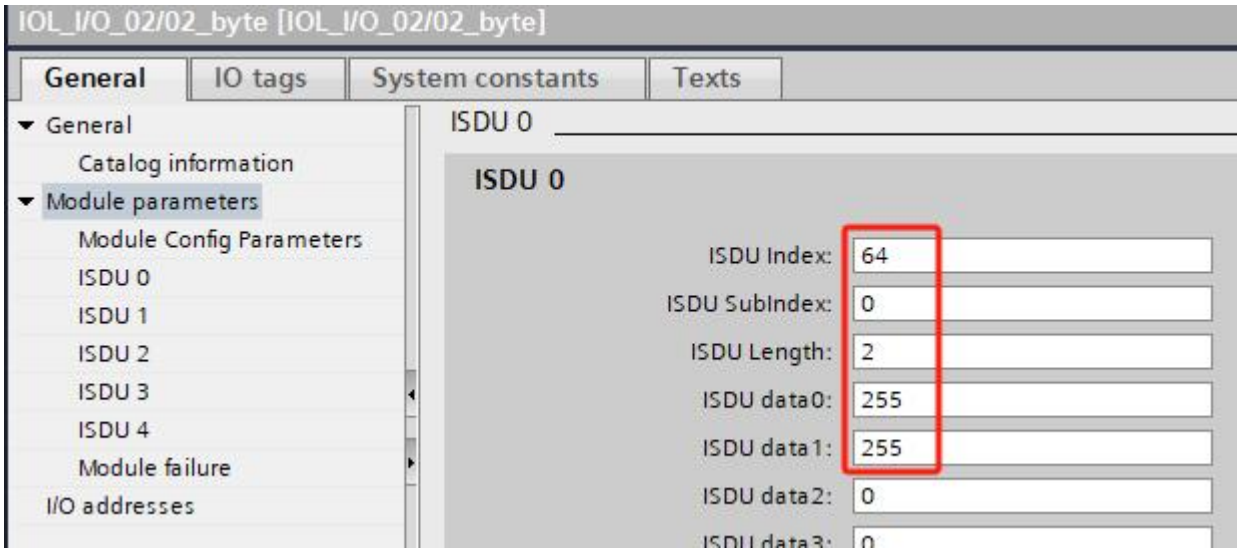
➢ The process output data table of the slave station:

| Byte | 1 | | | | | | | | 0 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bit | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Description | Output port 7 pin 2 | Output port 7 pin 4 | Output port 6 pin 2 | Output port 6 pin 4 | Output port 5 pin 2 | Output port 5 pin 4 | Output port 4 pin 2 | Output port 4 pin 4 | Output port 3 pin 2 | Output port 3 pin 4 | Output port 2 pin 2 | Output port 2 pin 4 | Output port 1 pin 2 | Output port 1 pin 4 | Output port 0 pin 2 | Output port 0 pin 4 |

- Process input data table of the slave station:

| Byte | 1 | | | | | | | | 0 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bit | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Description | Input port 7 pin 2 | Input port 7 pin 4 | Input port 6 pin 2 | Input port 6 pin 4 | Input port 5 pin 2 | Input port 5 pin 4 | Input port 4 pin 2 | Input port 4 pin 4 | Input port 3 pin 2 | Input port 3 pin 4 | Input port 2 pin 2 | Input port 2 pin 4 | Input port 1 pin 2 | Input port 1 pin 4 | Input port 0 pin 2 | Input port 0 pin 4 |
| Byte | 3 | | | | | | | | 2 | | | | | | | |
| Bit | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Description | Reserve | Reserve | Reserve | Reserve | Reserve | Reserve | Reserve | Reserve | Short circuit port 7 | Short circuit port 6 | Short circuit port5 | Short circuit port 4 | Short circuit port 3 | Short circuit port 2 | Short circuit port 1 | Short circuit port 0 |

- This exampleThe ISDU configuration is shown in the following figure.




➢ Fill in the Port0 address in the monitoring table. For its meaning, please refer toSection 3.46.3.2.

| Address | Display format | Monitor value | Modify value | | Comment |
|---|---|---|---|---|---|
| %I13.0 | Bool | FALSE | | | DI |
| %I13.1 | Bool | FALSE | | | C/Q DI |
| %I13.2 | Bool | TRUE | | | Valid bit |
| %IB14 | Hex | 16#00 | | | Process data |
| %IB15 | Hex | 16#00 | | | Process data |
| | | | | | |
| %Q5.1 | Bool | FALSE | | | C/Q DO |
| %Q5.2 | Bool | FALSE | | | Valid bit |
| %QB6 | Hex | 16#00 | | | Process data |
| %QB7 | Hex | 16#00 | | | Process data |

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

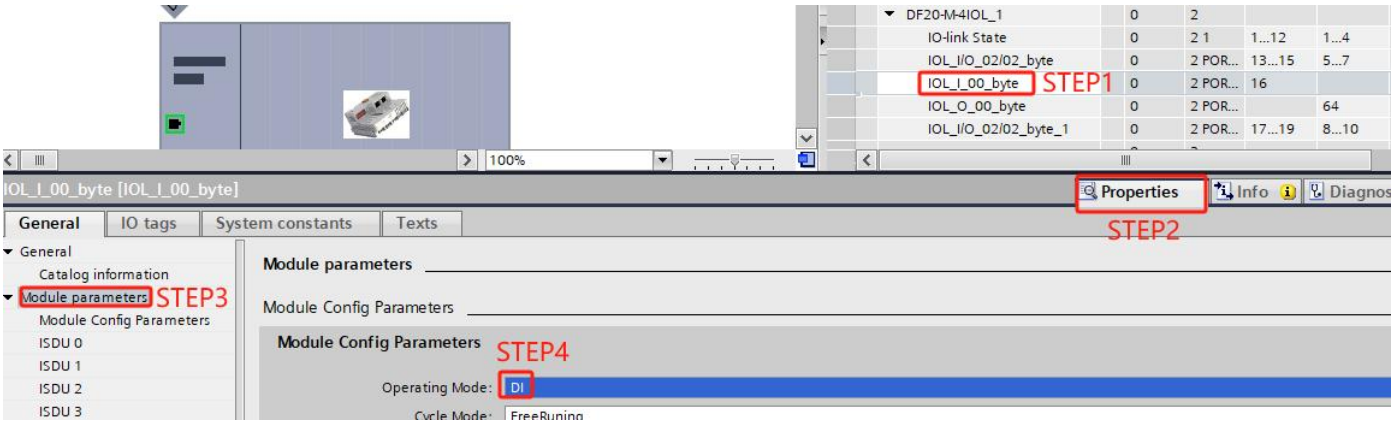
| Address | Display format | Monitor value | Modify value | | Comment |
|---|---|---|---|---|---|
| %I13.0 | Bool | FALSE | | | DI |
| %I13.1 | Bool | FALSE | | | C/Q DI |
| %I13.2 | Bool | TRUE | | | Valid bit |
| %IB14 | Hex | 16#FF | | | Process data |
| %IB15 | Hex | 16#FF | | | Process data |
| | | | | | |
| %Q5.1 | Bool | FALSE | | | C/Q DO |
| %Q5.2 | Bool | TRUE | TRUE | ⚠ | Valid bit |
| %QB6 | Hex | 16#FF | 16#FF | ⚠ | Process data |
| %QB7 | Hex | 16#FF | 16#FF | ⚠ | Process data |

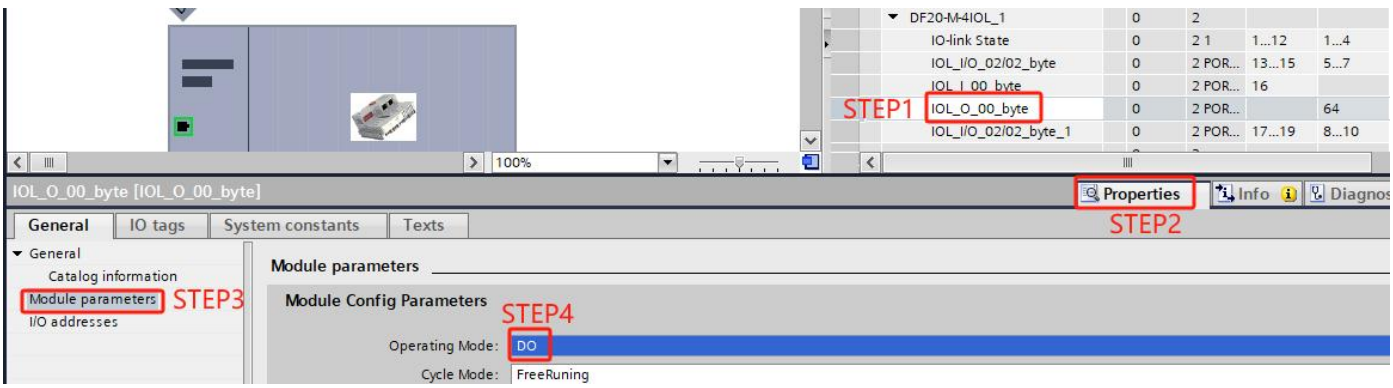
➢ **Data reception:**As shown in the figure below, if the Valid bit is "TRUE", it means the received data is valid, and the Process data is the received data. The data received this time is "16#FF". In this mode, the C/Q DI bit is invalid.

| Address | Display format | Monitor value | Modify value | | Comment |
|---|---|---|---|---|---|
| %I13.0 | Bool | FALSE | | | DI |
| %I13.1 | Bool | FALSE | | | C/Q DI |
| %I13.2 | Bool | TRUE | | | Valid bit |
| %IB14 | Hex | 16#FF | | | Process data |
| %IB15 | Hex | 16#FF | | | Process data |
| | | | | | |
| %Q5.1 | Bool | FALSE | | | C/Q DO |
| %Q5.2 | Bool | TRUE | TRUE | ⚠ | Valid bit |
| %QB6 | Hex | 16#FF | 16#FF | ⚠ | Process data |
| %QB7 | Hex | 16#FF | 16#FF | ⚠ | Process data |

## 5.13.3DI/DOmodel

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




➢ Fill in the Port1 and Port2 addresses in the monitoring table. For their meanings, please refer toSection 3.46.3.2For wiring method, please refer toSection 3.46.2.

| Address | Display format | Monitor value | Modify value | | Comment |
|---|---|---|---|---|---|
| %I16.0 | Bool | FALSE | | | Port1 DI |
| %I16.1 | Bool | FALSE | | | Port1 C/Q DI |
| | | | | | |
| %Q64.1 | Bool | FALSE | | | Port2 C/Q DO |

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

| Address | Display format | Monitor value | Modify value | | Comment |
|---|---|---|---|---|---|
| %I16.0 | Bool | TRUE | | | Port1 DI |
| %I16.1 | Bool | TRUE | | | Port1 C/Q DI |
| | | | | | |
| %Q64.1 | Bool | FALSE | | | Port2 C/Q DO |

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

| Address | Display format | Monitor value | Modify value | | Comment |
|---|---|---|---|---|---|
| %I16.0 | Bool | FALSE | | | Port1 DI |
| %I16.1 | Bool | FALSE | | | Port1 C/Q DI |
| | | | | | |
| %Q64.1 | Bool | TRUE | TRUE | | Port2 C/Q DO |

# 6 Frequently Asked Questions

1. Q: GSDML file installation failed.

   ACK: Check the GSDML file to make sure the name has not changed when it is copied. The GSDML normal file nameFor "GSDML-V2.3-DF20-C-PN-RT-V10.08-20220424", when copying, "GSDML-V2.3-DF20-C-PN-RT-V10.08-20220424(1)", just delete "(1)".

2. Q: After successful configuration, the digital module cannot read input data or the output module has no signal output.

   ACK: Check whether the common power supply of the adapter is connected normally. If it is connected normally, the "LED Field_24V" indicator on the adapter will light up.

3. Q: After completing the configuration and downloading the program to the PLC, both the PLC and the adapter will light up red to indicate an error.

   ACK: The device name of the adapter is "DF20-C-PN-RT-V10",During configuration, customers may modify the device name of the adapter according to actual needs. It is necessary to re-assign a name to the adapter according to the device name during configuration to ensure that the device name during configuration is consistent with the actual adapter device name.