XINJE

XD Series PLC Expansion Modules

User's Manual

WUXI XINJE ELECTRIC CO., LTD.

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XINJE Electric

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This manual contains the basic precautions to be observed for ensuring personal safety and protecting this product and its connected equipment; these precautions are highlighted in the manual using a warning triangle. For all other matters not covered herein, please adhere to the basic electrical operating procedures.

Installation Note



Please adhere to these operating precautions; failure to follow the correct operating procedures may result in incorrect or abnormal operation of the control system, and in severe cases, may lead to property damage.

Correct Application



This equipment and its components shall be used exclusively for the applications described in the product catalog and technical specifications, and shall only be used in conjunction with equipment or components manufactured by peripheral equipment suppliers that are recognized or recommended by XINJE.

The product can only operate correctly if it is transported, stored, configured, and installed properly, and if it is operated and maintained in accordance with the recommended procedures.

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1. Module Information Overview

1.1. Module Model and Configuration

The XD series PLCs not only feature powerful logic processing, data computation, and high-speed processing capabilities but also incorporate A/D and D/A conversion functions. By expanding these PLCs with digital I/O modules, analog input/output modules, temperature control modules, and other peripheral modules, the XD series PLCs have found widespread application in process control systems involving temperature, flow rate, liquid level, pressure, and other parameters.

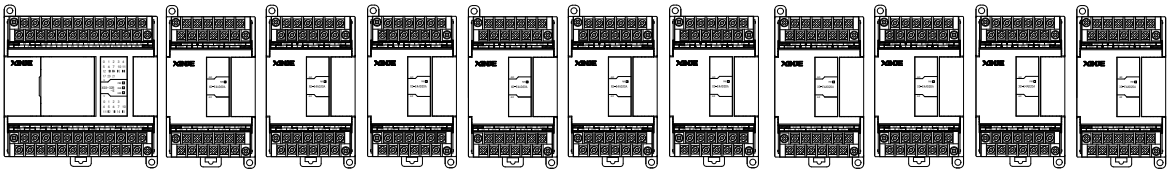
1.1.1.Module Model and Functions

Module Type	Model	Function
Digital Quantity Expansion	XD-EnXmY	n-inputs, m-outputs; PNP/NPN input; relay/ transistor output
Analog Signal Expansion	XD-E4AD2DA	4-channel analog input (14-bit) and 2-channel analog output (12-bit) module; input and output voltage and current options available.
	XD-E4AD	4-channel analog input module (14-bit); current and voltage inputs available as optional options
	XD-E8AD	8-channel analog input module (14-bit); current and voltage bipolar input
	XD-E8AD-A	8-channel analog input module (14-bit); bipolar current input
	XD-E8AD-V	8-channel analog input module (14-bit); bipolar voltage input
	XD-E12AD-V	12-channel analog input module (14-bit); bipolar voltage input
	XD-E2DA	2-channel analog output module (12-bit); current and voltage output options available
	XD-E4DA	4-channel analog output module (12-bit); current and voltage output options available
Pressure Measurement	XD-E1WT-A	1-channel pressure Measurement Module – Measurement Range: DC –39.06 mV to 39.06 mV
	XD-E2WT-A	2-channel pressure measurement module; detection range: DC –39.06 mV to 39.06 mV
	XD-E4WT-A	4-channel pressure measurement module; detection range: DC –39.06 mV to 39.06 mV
	XD-E2WT-B	2-channel pressure measurement module; detection range: DC 0 mV – 10 mV
	XD-E1WT-C	1-channel pressure Measurement Module – Measurement Range: DC 0 mV – 10 mV
	XD-E2WT-C	2-channel pressure measurement module; detection range: DC 0 mV – 10 mV

Module Type	Model	Function
	XD-E4WT-C	4-channel pressure measurement module; detection range: DC 0 mV – 10 mV
	XD-E1WT-D	1-channel pressure measurement module; measurement range: DC –20 mV to 20 mV
	XD-E2WT-D	2-channel pressure measurement module; detection range: DC –20 mV to 20 mV
	XD-E4WT-D	4-channel pressure measurement module; detection range: DC –20 mV to 20 mV
Temperature Control	XD-E6PT-P	6-channel thermal resistance temperature measurement module supporting Pt100 and Pt1000 platinum resistance thermometers, with a resolution of 0.1°C and PID regulation functionality.
	XD-E4PT3-P	4-channel thermal resistance (three-wire) temperature measurement module supporting Pt100 and Pt1000 platinum resistance thermistors, with a resolution of 0.1°C and PID regulation functionality.
	XD-E6TC-P	6-channel thermocouple temperature measurement module supporting K, S, E, N, B, J, and R type thermocouples; resolution: 0.1°C; equipped with PID regulation.
	XD-E6TC-P-H	6-channel thermocouple temperature measurement module supporting K, S, E, N, B, T, J, and R type thermocouples; resolution: 0.1°C; features PID regulation; each channel is isolated.
	XD-E2TC-P	2-channel thermocouple temperature measurement module supporting K, S, E, N, B, T, J, and R type thermocouples; resolution: 0.1°C; features PID regulation.
Encoder Detection	XD-E4SSI	4-channel SSI encoder position detection or displacement sensor position detection
Analog Temperature Mixing	XD-E2AD2PT2DA	2-channel analog input (16-bit), 2-channel PT100 temperature measurement, 2-channel analog output (10-bit); input and output voltage and current options available.
	XD-E3AD4PT2DA	3-channel analog input (14-bit), 4-channel PT100 temperature measurement, 2-channel analog output (10-bit); input current and output voltage are optional.

1.1.2.Module Configuration

The XD series expansion modules can be installed on the main unit, expansion unit, expansion module, or special function module of the XD series PLC – on the right side:



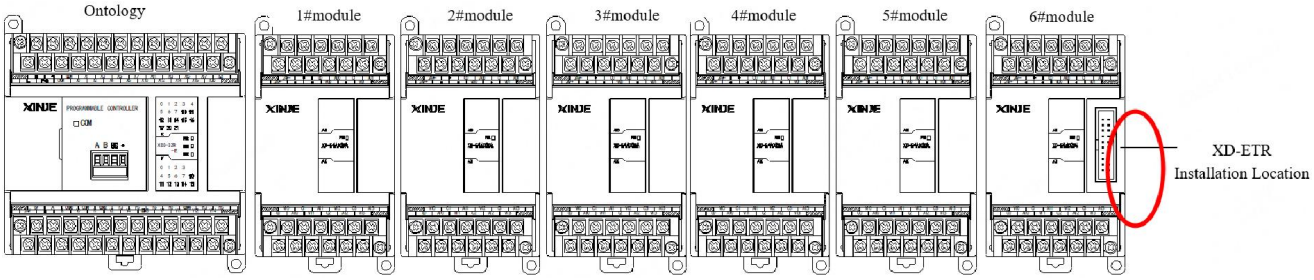
- The input/output digital signal sequence number is an octal number.
- The input/output analog quantity sequence number is a decimal number.
- The XD3/XD3E series PLCs can be connected to a maximum of 10 external expansion modules (the XD5/XDM/XDC/XD5E/XDME/XDH series PLCs support up to 16 modules; the XD1/XD2 series does not support expansion modules). There are no restrictions on the types of modules that can be used – they can be digital I/O switches, analog signals, temperature control modules, or other types of modules.

1.1.3.Terminal Resistor XD-ETR

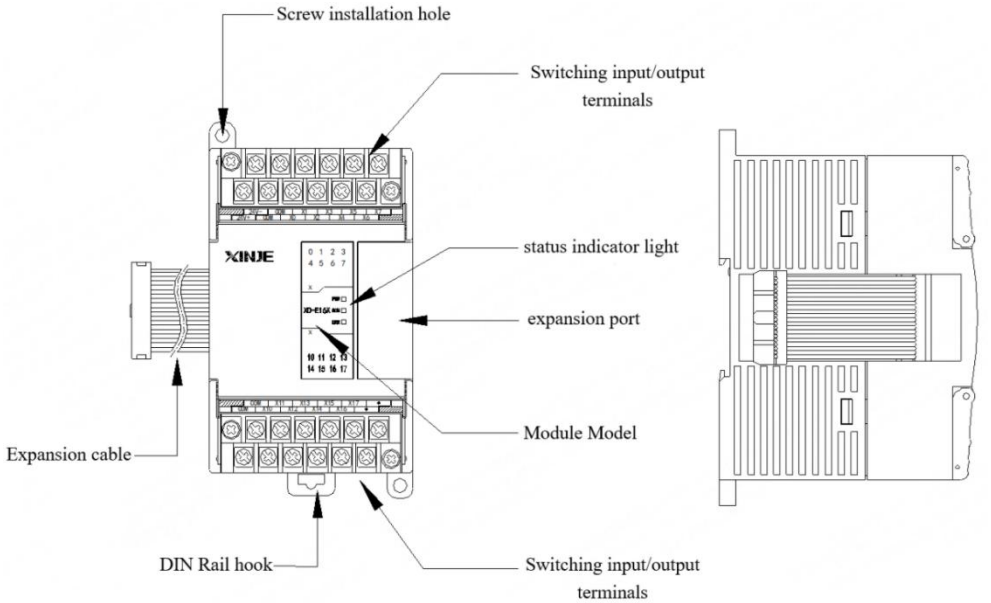
When the number of external right-side expansion modules for the XD series PLC is ≥5, the XD-ETR terminal resistor module must be used in conjunction.



When using the device, please connect the XD-ETR to the expansion port on the rightmost module, as shown in the figure below:



1.2. Part Names and Functions



Name		Function
Operating indicator light	PWR	When the module CPU board is powered, this indicator light will illuminate (red).
	RUN	When the module's communication port is functioning normally, this indicator light will illuminate (red).
	ERR	When a module error occurs, this indicator light will remain illuminated or flash (red). When the ERR indicator remains constantly lit, it indicates a severe application error has occurred, rendering the module unusable; the operating mode must be adjusted, and the PLC unit should be switched to the STOP state; When the ERR indicator flashes, it indicates that the module has encountered an application error, is operating abnormally, or is generating abnormal data, yet the PLC unit is still running (RUN).
Module Model		This special functional module's model number
Expansion port		Connect other expansion modules
Digital input/output terminals		Removable terminals for connecting inputs, outputs, and external devices
DIN rail hook		For direct module installation; simply pull down the DIN rail hook when disassembling.
Screw installation hole		Screw (M3) can be threaded into the installation hole to complete module installation.
Expansion cable		Connect via an expansion cable and the PLC expansion communication port to facilitate data transmission.



For certain model or lower-version module variants, the operating indicator light displays only "PWR".

1.3. Module Power and Usage Conditions

The XD series right-side expansion modules can only be used normally when the difference between the PLC's internal and external power supplies and the module's internal and external power consumption is greater than or equal to zero; if the PLC is equipped with a BD board or an ED module, its respective internal and external power consumption must also be deducted; if the right-side expansion module or the ED module is powered by an external power supply, no external power consumption should be deducted from the PLC.

1) Module Power List

Expansion Module Model	Internal Power (Expansion Cable)	External Power (Power Supply Terminal)
XD-E8X	1.7W	1.5W
XD-E8YR	2.1W	1.5W
XD-E8YT	1.7W	1.5W
XD-E8X8YR	2.1W	1.5W
XD-E8X8YT	1.7W	1.5W
XD-E16X	1W	2.9W
XD-E16YR	3.7W	0
XD-E16YT	2.6W	0
XD-E16X16YR- C	0.4W	6.1W
XD-E16X16YR-E	0.3W	19.6W
XD-E16X16YT- C	0.3W	5.1W
XD-E16X16YT-E	0.4W	15.6W
XD-E32YR- C	0.4W	5.9W
XD-E32YR-E	0.4W	18W
XD-E32YT- C	0.4W	4.9W
XD-E32YT-E	0.4W	16.1W
XD-E32X- C	0.4W	5.3W
XD-E32X-E	0.2W	15.8W
XD-E4AD2DA	1W	1.5W
XD-E4AD	1W	0.4W
XD-E8AD	1W	0.8W
XD-E8AD-A	1W	1W
XD-E8AD-V	0.9W	0.4W
XD-E12AD-V	0.9W	1.2W
XD-E2DA	1W	1.3W
XD-E4DA	0.9W	3.2W
XD-E6TC-P	0.8W	0.8W
XD-E6PT-P	0.6W	0.5W
XD-E2TC-P	0.6W	0.8W
XD-E2GRP	1.7W	0
XD-E4SSI	1.1W	1.6W
XD-E1WT-A	1W	0.7W

Expansion Module Model	Internal Power (Expansion Cable)	External Power (Power Supply Terminal)
XD-E2WT-A	1W	1.1W
XD-E4WT-A	1.1W	1.7W
XD-E2WT-B	0.7W	1W
XD-E1WT-C	1.1W	3.5W
XD-E2WT-C	1.1W	3.7W
XD-E4WT-C	1.1W	4.8W
XD-E1WT-D	0.8W	1.1W
XD-E2WT-D	0.9W	1.3W
XD-E4WT-D	1.2W	1.8W

2) PLC Power Consumption Table

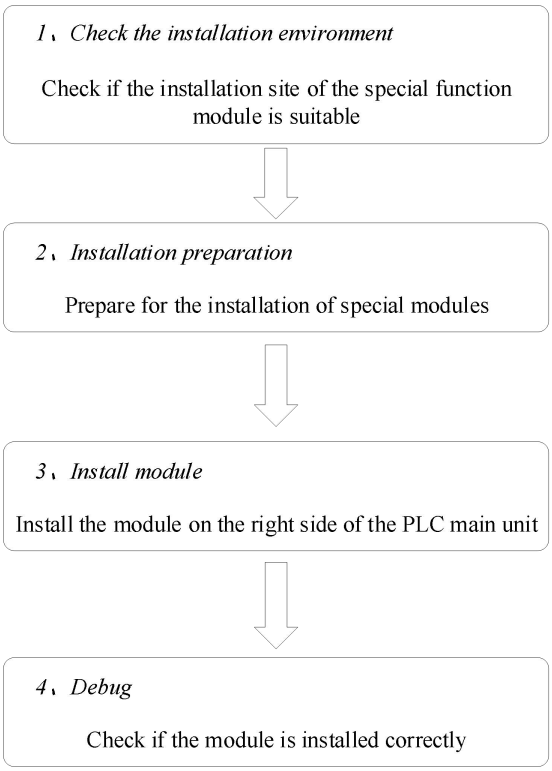
PLC Model	Internal Power	External Power
16-bit PLC	2.6~2.7W	1.7W
24-bit PLC	4.1~4.9W	3.0W
XD5-24D2T2	4.7W	2.0W
30-bit PLC	4.6~4.9W	3.4W
32-bit PLC	4.3~5.1W	3.8W
42-bit PLC	5.3W	5.1W
48-bit PLC	2.9~5.3W	5.9W
XD5-48D4T4	5.4W	5.3W
60-bit PLC	3.1~8.7W	7.6W
80-bit PLC	5.8	8.4

3) Other

Model	Internal Power	External Power
XD-2AD2PT-V-ED and other analog quantity EDs	Very small – negligible	0.5~2.5W
XD-NES-ED	1W	not have
BOX class ED	Very small – negligible	0.5~2.5W
XD-NE-BD, etc.	1W	not have

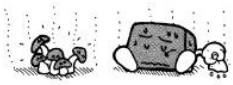
1.4. Module Installation

1) Installation Steps



2) Installation Environment

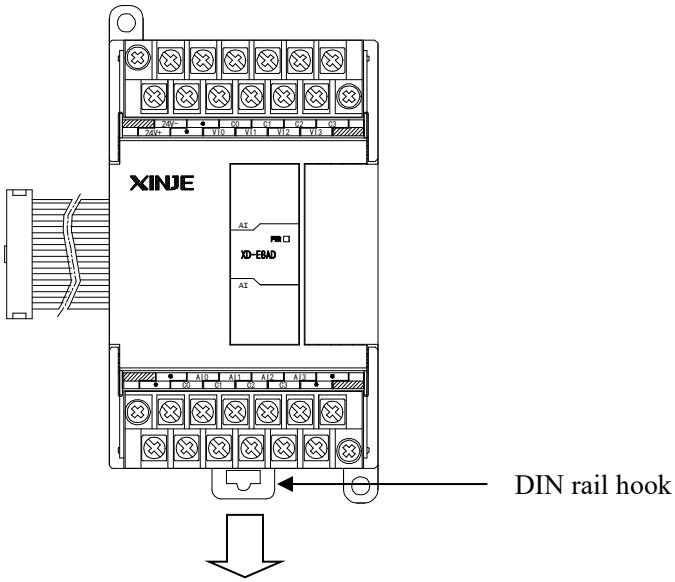
Do not install in the following environments:

Direct sunlight	Environmental temperature exceeds 0–50°C	Environmental temperature exceeds 35–85% RH
		
Condensation occurs due to sudden temperature changes.	Corrosive gases and combustible gases	High levels of dust, salt, iron filings, and cooking oil fumes
		
Exposed to direct vibration and impact	Spraying of oil, chemicals, etc.	Strong magnetic field, strong electric field
		

3) Installation Requirements

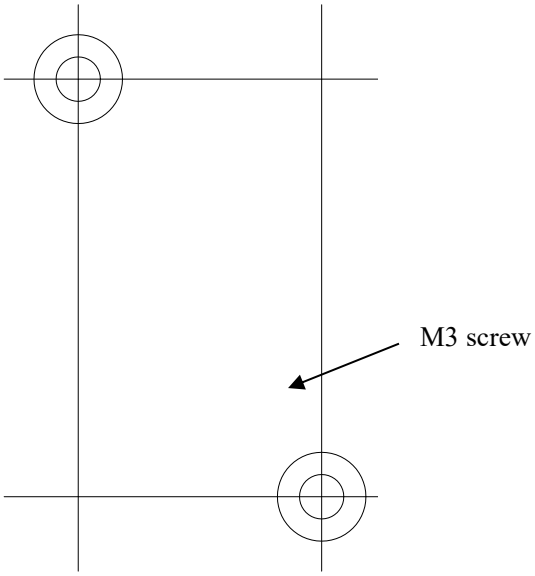
The XD Series analog input/output and temperature control modules can be installed on the right side of the XD Series PLC's main unit, expansion units, expansion modules, or special function modules. They can be mounted using a DIN 46277 rail (35 mm wide) or secured directly with M3 screws.

- Install using DIN46277 rail



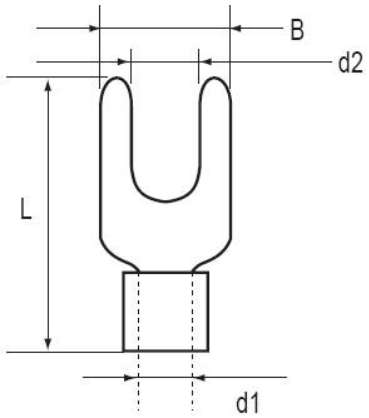
The basic unit and the expansion module are installed on a DIN46277 rail (35 mm wide). To remove the unit, simply pull down the assembly pull tab on the DIN rail and then take out the product.

- Screw installation − direct



4) Terminal Block Wiring

- Y-terminal product usage

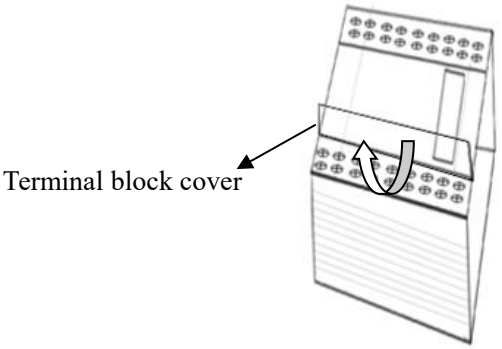


Y-shaped terminal dimensions:
B: Outer edge dimension of the Y-shaped section
d1: Outer diameter of the wire insertion section
d2: Inner edge dimension of the Y-shaped section (screw-pressing portion)
L:overall length

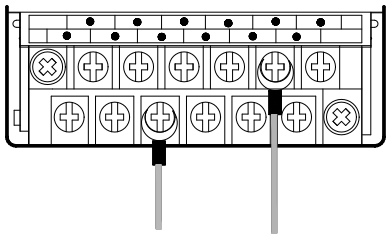
Suitable size:
B: ≤ 6 mm; L: ≤ 13 mm;
d2: ≤3.2 mm

- Cabling Method

1. Disconnect the power supply;
2. Open the analog I/O terminal block cover;



3. Install the crimped signal wire terminal onto the designated terminal; loosen the terminal screw using a screwdriver, then insert the crimped terminal; finally, tighten the terminal screw.

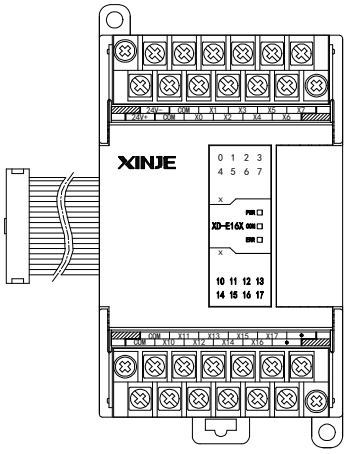


4. Close the analog I/O terminal block cover.

- Please confirm the specifications and select the appropriate module.
- During screw hole machining or wiring operations, avoid allowing cutting chips or wire debris to enter the module.
- Before connecting, please double-check the specifications of both the module and the connected device to ensure there are no issues.
- When connecting cables, ensure that the connection is secure; a loose connection can cause issues such as incorrect data transmission or short circuits.
- Installation, wiring, and other similar operations must be performed only after all power supplies have been disconnected.

2. Digital Expansion Module

2.1. Module Overview



The XD series PLCs can be externally expanded using XD-EnXmY input/output modules; each XD3/XD3E series PLC supports the expansion of up to 10 modules, while the XD5/XDM/XDC/XD5E/XDME/XDH series support the expansion of up to 16 modules; however, the XD1/XD2 series do not support the addition of expansion modules. With a wide range of module types and a compact design, these PLCs enable the integration of a greater number of input and output points, meeting the practical requirements of industrial production.

2.1.1. Naming Rule

XD−E○□○□−□
①②③④⑤⑥⑦

①	Series Name	XD: XD Series Expansion Modules
②	Reference Expansion Module	E: Represents an expansion module
③	Input point count	8, 16, or 32
④	Input point type	X: Indicates that the input point is of NPN type. PX: Indicates that the input point is a PNP-type input.
⑤	Output points	8, 16, or 32
⑥	Output form	YT: Transistor Output YR:relay output
⑦	Power supply type	E：AC220V　C：DC24V

- The XD-E8YT/R and XD-E16YT/R models do not require an external power supply; the XD-E8X, XD-E16X, and XD-E8X8YT/R models require a DC 24 V power supply.

2.1.2. Demonstration of the Type

Model		Function Declaration
NPN input type	PNP input type	
XD-E8X	XD-E8PX	8-channel discrete input
XD-E8YR	-	8-channel relay output
XD-E8YT	-	8-channel transistor output
XD-E8X8YR	XD-E8PX8YR	8-channel digital input, 8-channel relay output
XD-E8X8YT	XD-E8PX8YT	8-channel digital input, 8-channel transistor output
XD-E16X	XD-E16PX	16-channel discrete input
XD-E16YR	-	16-channel relay output
XD-E16YT	-	16-channel transistor output
XD-E16X16YR-E	XD-E16PX16YR-E	16-channel digital input, 16-channel relay output, AC 220 V
XD-E16X16YR-C	XD-E16PX16YR-C	16-channel digital input, 16-channel relay output, DC24V
XD-E16X16YT-E	XD-E16PX16YT-E	16-channel digital input, 16-channel transistor output, AC 220 V
XD-E16X16YT-C	XD-E16PX16YT-C	16-channel digital input, 16-channel transistor output, DC 24V
XD-E32YR-E	-	32-channel relay output, AC 220 V
XD-E32YR-C	-	32-channel relay output, DC24V
XD-E32YT-E	-	32-channel transistor output, AC220V
XD-E32YT-C	-	32-channel transistor output, DC 24V
XD-E32X-E	XD-E32PX-E	32-channel digital input, AC 220 V
XD-E32X-C	XD-E32PX-C	32-channel discrete input, DC24V

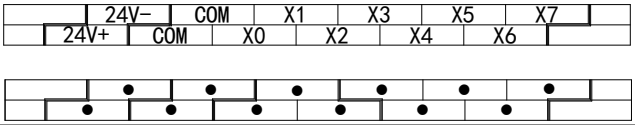
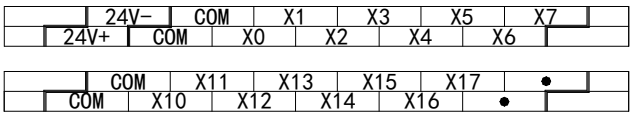
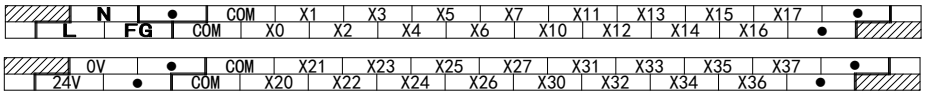
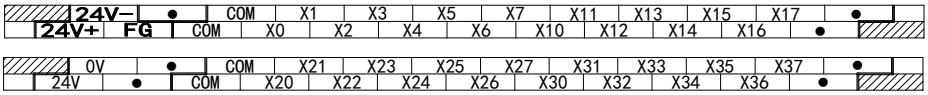
2.1.3. Module Specifications

Project	Specifications
Input power supply voltage	DC 24 V ±10% (the 32-pin I/O module operates on AC 220 V ±10%)
Service environment	Non-corrosive gases
Ambient temperature	0℃~60℃
Ambient humidity	5~95%
Install	Can be secured with M3 screws or installed directly onto a DIN46277 (35 mm wide) guide rail.

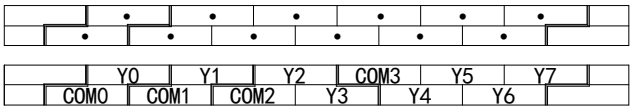
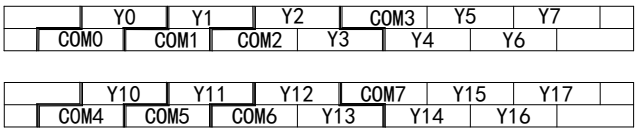
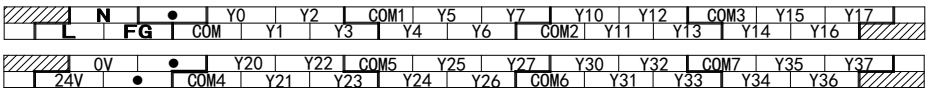
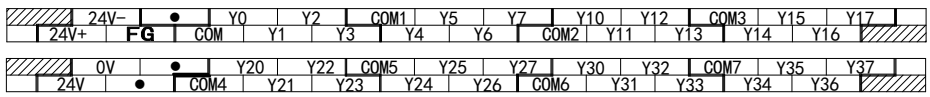
2.2. Terminal Arrangement

The NPN-input module has the same terminal arrangement as the PNP-input module.

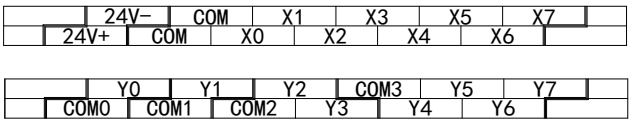
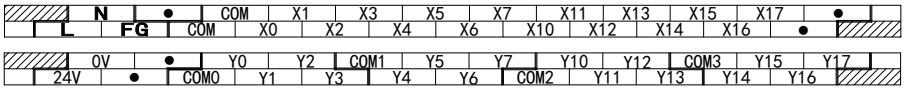
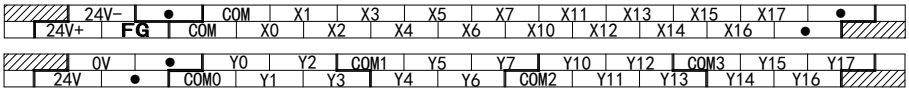
2.2.1. Digital Input Module Terminal Arrangement

Module Model	Terminal Arrangement
XD-E8X	
XD-E16X	
XD-E32X-E	
XD-E32X-C	

2.2.2. Digital Output Module Terminal Arrangement

Module Model	Terminal Arrangement
XD-E8YR XD-E8YT	
XD-E16YR XD-E16YT	
XD-E32YR-E XD-E32YT-E	
XD-E32YR-C XD-E32YT-C	

2.2.3. Digital I/O Module Terminal Arrangement

Module Model	Terminal Arrangement
XD-E8X8YR XD-E8X8YT	
XD-E16X16YR-E XD-E16X16YT-E	
XD-E16X16YR-C XD-E16X16YT-C	

The common terminal for the input points may vary depending on the model of the module; please refer to the actual physical label for specific details.

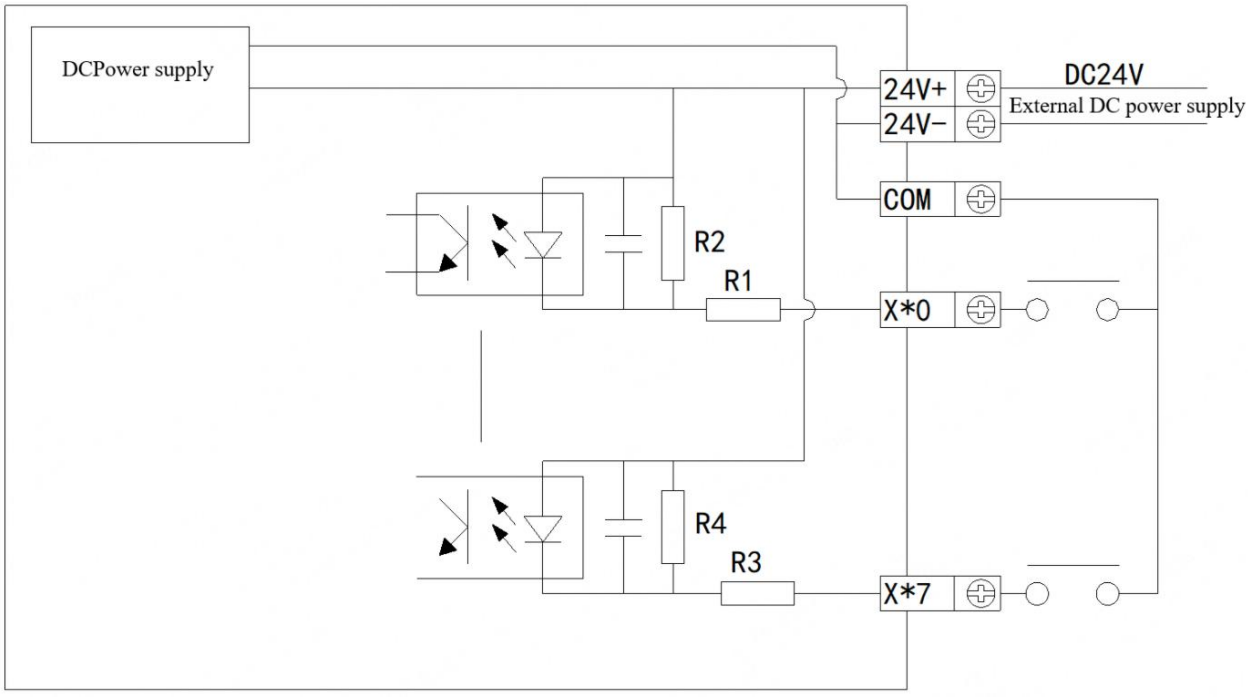
2.3. Input Specifications And Wiring

2.3.1. NPN Input Specifications And Wiring

1) NPN Input Specifications

project	explain
Input signal voltage	DC24V±10%
Input signal current	7mA/DC24V
Input ON current	≥4.5 mA
Input OFF current	Below 1.5 mA
Input response time	Approx. 10 ms
Input signal format	Contact input or NPN open-collector transistor
Circuit insulation	Optoelectronic coupling insulation
Input Action Display	The LED light turns on when the ON switch is activated.

2) NPN Input Wiring

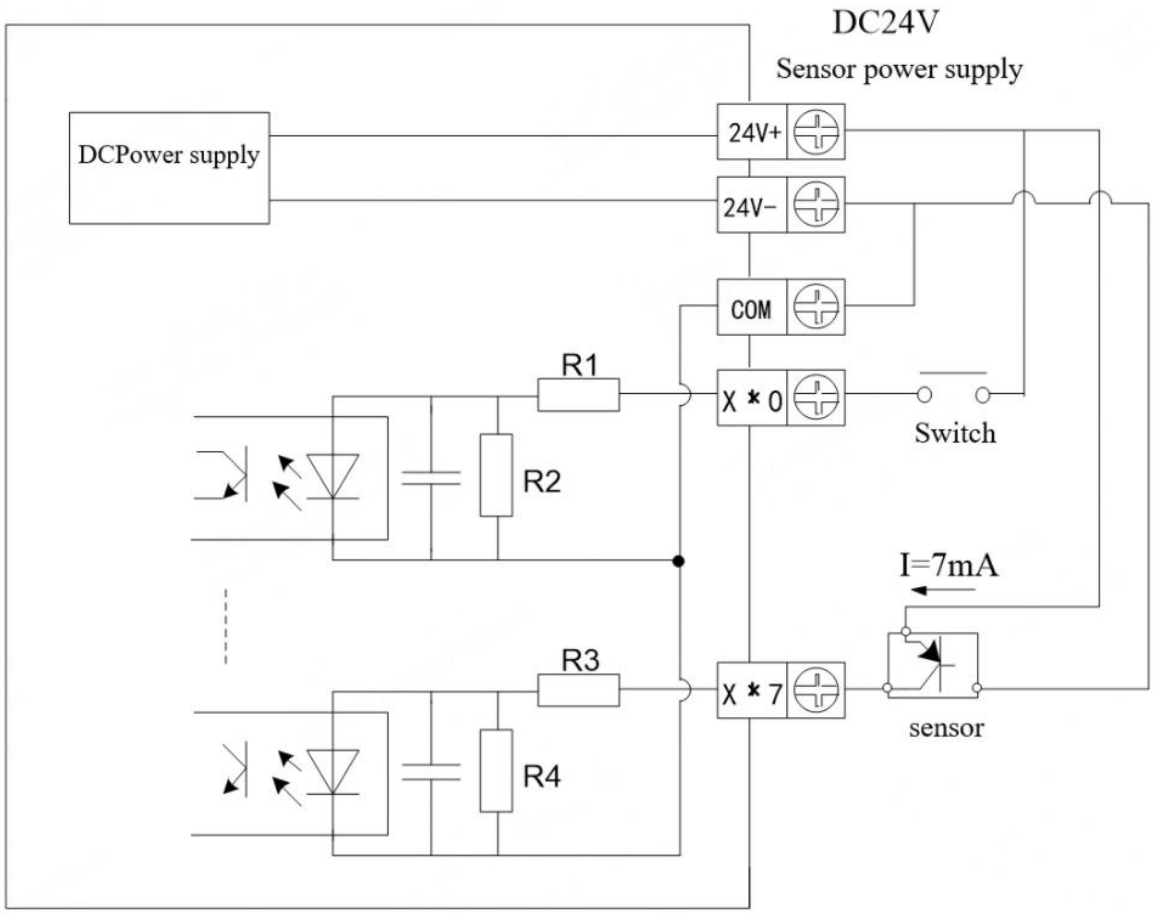


2.3.2. PNP Input Specifications and Wiring

1) PNP Input Specifications

Project	Explain
Input signal voltage	DC24V±10%
Input signal current	7mA/DC24V
Input ON current	≥4.5 mA
Input OFF current	Below 1.5 mA
Input response time	Approx. 10 ms
Input signal format	Contact input or PNP open-collector transistor
Circuit insulation	Optoelectronic coupling insulation
Input Action Display	The LED light turns on when the ON switch is activated.

2) PNP Input Wiring Example

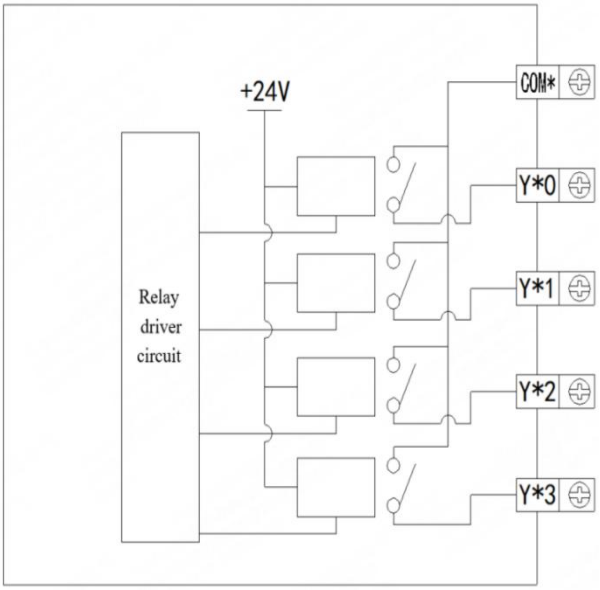


2.4. Output Specifications and Wiring

2.4.1. Output Specifications

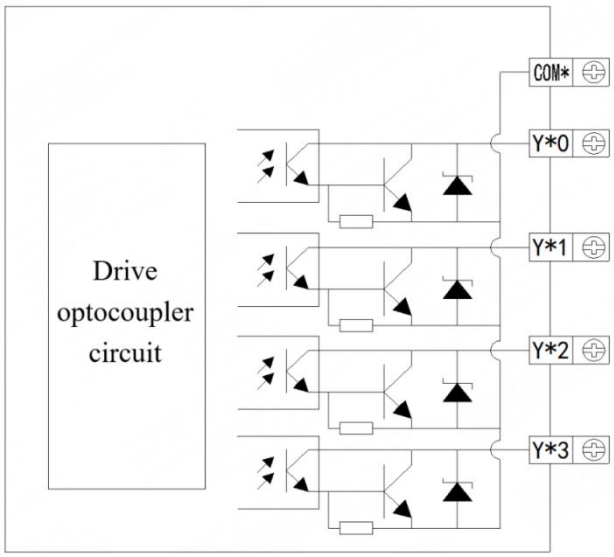
1) Relay Output

Project		Explain
External power supply		AC 250 V or DC 30 V or below
Circuit insulation		Mechanical insulation
Action instruction		LED pilot lamp
Maximum load	Resistive load	3A
	Inductive load	80VA
	Light load	100W
Minimum load		DC5V 2mA
Respond Time	OFF→ON	10ms
	ON→OFF	10ms



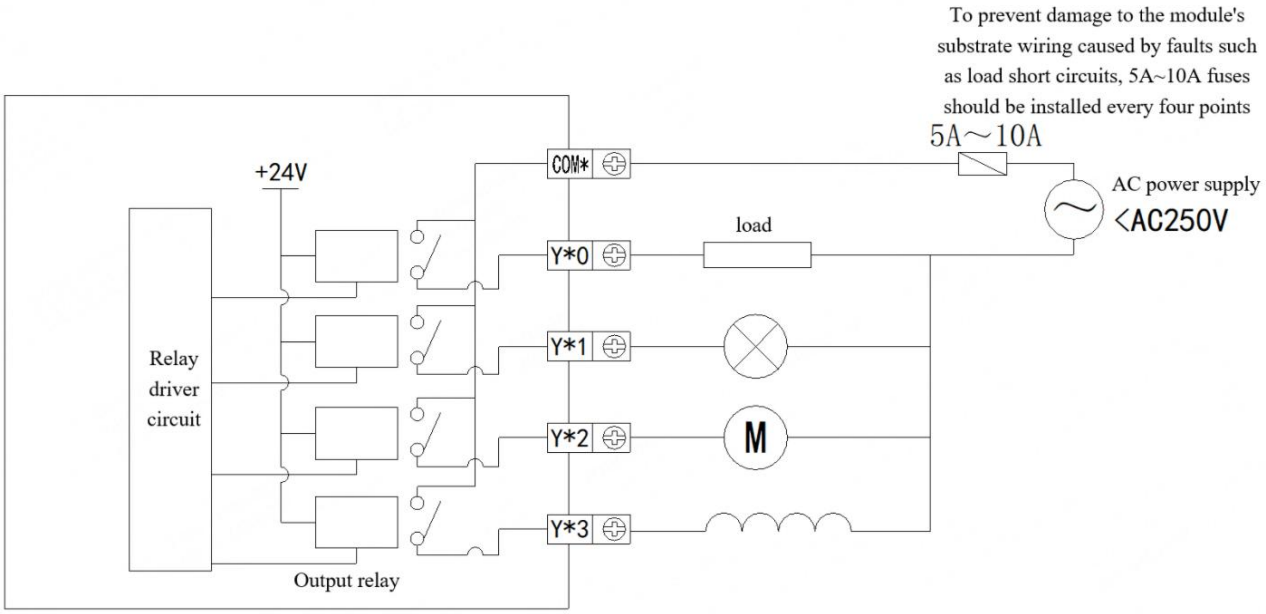
2) Standard Transistor Output

Project		Explain
External power supply		Below 30 V (DC)
Circuit insulation		Optical coupling insulation
Action instruction		LED pilot lamp
Maximum load	Resistive load	0.3A
	Inductive load	7.2W/DC24V
	Light load	1.5W/DC24V
Minimum load		DC5V 2mA
Open-circuit leakage current		Below 0.1 mA
Respond Time	OFF→ON	Less than 0.2 ms
	ON→OFF	Less than 0.2 ms

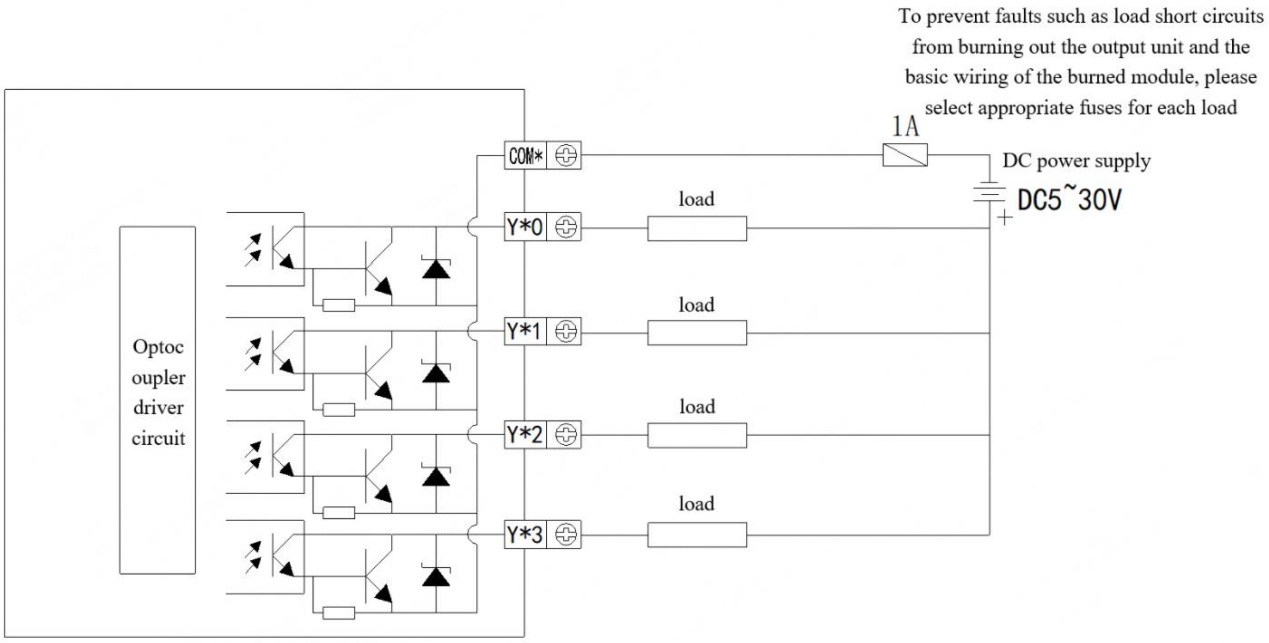


2.4.2. Output Connection

1) Relay-Type Output Wiring



2) Transistor-Type Output Wiring



2.5. Input/Output Definition Number Allocation

The XD3/XD3E series PLCs can be expanded with up to 10 expansion modules (the XD5/XDM/XDC/XD5E/XDME models support up to 16 modules; the XD1/XD2 models do not support expansion modules). The input and output terminal addresses are as follows: (Note: This example uses the NPN type; the terminal definition, addressing, and applicable modules for the PNP type are identical to those for the NPN type.)

2.5.1. Input Module Terminal Address Definition

- XD-E8X

	X0	X1	X2	X3	X4	X5	X6	X7
#1 Expansion Module	X10000	X10001	X10002	X10003	X10004	X10005	X10006	X10007
#2 Expansion Module	X10100	X10101	X10102	X10103	X10104	X10105	X10106	X10107
#3 Expansion Module	X10200	X10201	X10202	X10203	X10204	X10205	X10206	X10207
#4 Expansion Module	X10300	X10301	X10302	X10303	X10304	X10305	X10306	X10307
#5 Expansion Module	X10400	X10401	X10402	X10403	X10404	X10405	X10406	X10407
#6 Expansion Module	X10500	X10501	X10502	X10503	X10504	X10505	X10506	X10507
#7 Expansion Module	X10600	X10601	X10602	X10603	X10604	X10605	X10606	X10607
#8 Expansion Module	X10700	X10701	X10702	X10703	X10704	X10705	X10706	X10707
#9 Expansion Module	X11000	X11001	X11002	X11003	X11004	X11005	X11006	X11007
#10 Expansion Module	X11100	X11101	X11102	X11103	X11104	X11105	X11106	X11107
#11 Expansion Module	X11200	X11201	X11202	X11203	X11204	X11205	X11206	X11207
#12 Expansion Module	X11300	X11301	X11302	X11303	X11304	X11305	X11306	X11307
#13 Expansion Module	X11400	X11401	X11402	X11403	X11404	X11405	X11406	X11407

	X0	X1	X2	X3	X4	X5	X6	X7
#14 Expansion Module	X11500	X11501	X11502	X11503	X11504	X11505	X11506	X11507
#15 Expansion Module	X11600	X11601	X11602	X11603	X11604	X11605	X11606	X11607
#16 Expansion Module	X11700	X11701	X11702	X11703	X11704	X11705	X11706	X11707

- XD-E16X

	#Module 1	#Module 2	#Module 3	#Module 4	#Module 5	#Module 6	#Module 7	#Module 8
X0	X10000	X10100	X10200	X10300	X10400	X10500	X10600	X10700
X1	X10001	X10101	X10201	X10301	X10401	X10501	X10601	X10701
X2	X10002	X10102	X10202	X10302	X10402	X10502	X10602	X10702
X3	X10003	X10103	X10203	X10303	X10403	X10503	X10603	X10703
X4	X10004	X10104	X10204	X10304	X10404	X10504	X10604	X10704
X5	X10005	X10105	X10205	X10305	X10405	X10505	X10605	X10705
X6	X10006	X10106	X10206	X10306	X10406	X10506	X10606	X10706
X7	X10007	X10107	X10207	X10307	X10407	X10507	X10607	X10707
X10	X10010	X10110	X10210	X10310	X10410	X10510	X10610	X10710
X11	X10011	X10111	X10211	X10311	X10411	X10511	X10611	X10711
X12	X10012	X10112	X10212	X10312	X10412	X10512	X10612	X10712
X13	X10013	X10113	X10213	X10313	X10413	X10513	X10613	X10713
X14	X10014	X10114	X10214	X10314	X10414	X10514	X10614	X10714
X15	X10015	X10115	X10215	X10315	X10415	X10515	X10615	X10715
X16	X10016	X10116	X10216	X10316	X10416	X10516	X10616	X10716
X17	X10017	X10117	X10217	X10317	X10417	X10517	X10617	X10717
	#Module 9	#Module 10	#Module 11	#Module 12	#Module 13	#Module 14	#Module 15	#Module 16
X0	X11000	X11100	X11200	X11300	X11400	X11500	X11600	X11700
X1	X11001	X11101	X11201	X11301	X11401	X11501	X11600	X11701
X2	X11002	X11102	X11202	X11302	X11402	X11502	X11602	X11702
X3	X11003	X11103	X11203	X11303	X11403	X11503	X11603	X11703
X4	X11004	X11104	X11204	X11304	X11404	X11504	X11604	X11704
X5	X11005	X11105	X11205	X11305	X11405	X11505	X11605	X11705
X6	X11006	X11106	X11206	X11306	X11406	X11506	X11606	X11706
X7	X11007	X11107	X11207	X11307	X11407	X11507	X11607	X11707
X10	X11010	X11110	X11210	X11310	X11410	X11510	X11610	X11710
X11	X11011	X11111	X11211	X11311	X11411	X11511	X11611	X11711
X12	X11012	X11112	X11212	X11312	X11412	X11512	X11612	X11712
X13	X11013	X11113	X11213	X11313	X11413	X11513	X11613	X11713
X14	X11014	X11114	X11214	X11314	X11414	X11514	X11614	X11714

	#Module 1	#Module 2	#Module 3	#Module 4	#Module 5	#Module 6	#Module 7	#Module 8
X15	X11015	X11115	X11215	X11315	X11415	X11515	X11615	X11715
X16	X11016	X11116	X11216	X11316	X11416	X11516	X11616	X11716
X17	X11017	X11117	X11217	X11317	X11417	X11517	X11617	X11717

	#Module 1	#Module 2	#Module 3	#Module 4	#Module 5	#Module 6	#Module 7	#Module 8
X0	X10000	X10100	X10200	X10300	X10400	X10500	X10600	X10700
X1	X10001	X10101	X10201	X10301	X10401	X10501	X10601	X10701
X2	X10002	X10102	X10202	X10302	X10402	X10502	X10602	X10702
X3	X10003	X10103	X10203	X10303	X10403	X10503	X10603	X10703
X4	X10004	X10104	X10204	X10304	X10404	X10504	X10604	X10704
X5	X10005	X10105	X10205	X10305	X10405	X10505	X10605	X10705
X6	X10006	X10106	X10206	X10306	X10406	X10506	X10606	X10706
X7	X10007	X10107	X10207	X10307	X10407	X10507	X10607	X10707
X10	X10010	X10110	X10210	X10310	X10410	X10510	X10610	X10710
X11	X10011	X10111	X10211	X10311	X10411	X10511	X10611	X10711
X12	X10012	X10112	X10212	X10312	X10412	X10512	X10612	X10712
X13	X10013	X10113	X10213	X10313	X10413	X10513	X10613	X10713
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X17	X10017	X10117	X10217	X10317	X10417	X10517	X10617	X10717
X20	X10020	X10120	X10220	X10320	X10420	X10520	X10620	X10720
X21	X10021	X10121	X10221	X10321	X10421	X10521	X10621	X10721
X22	X10022	X10122	X10222	X10322	X10422	X10522	X10622	X10722
X23	X10023	X10123	X10223	X10323	X10423	X10523	X10623	X10723
	#Module 1	#Module 2	#Module 3	#Module 4	#Module 5	#Module 6	#Module 7	#Module 8
X24	X10024	X10124	X10224	X10324	X10424	X10524	X10624	X10724
X25	X10025	X10125	X10225	X10325	X10425	X10525	X10625	X10725
X26	X10026	X10126	X10226	X10326	X10426	X10526	X10626	X10726
X27	X10027	X10127	X10227	X10327	X10427	X10527	X10627	X10727
X30	X10030	X10130	X10230	X10330	X10430	X10530	X10630	X10730
X31	X10031	X10131	X10231	X10331	X10431	X10531	X10631	X10731
X32	X10032	X10132	X10232	X10332	X10432	X10532	X10632	X10732
X33	X10033	X10133	X10233	X10333	X10433	X10533	X10633	X10733
X34	X10034	X10134	X10234	X10334	X10434	X10534	X10634	X10734
X35	X10035	X10135	X10235	X10335	X10435	X10535	X10635	X10735
X36	X10036	X10136	X10236	X10336	X10436	X10536	X10636	X10736
X37	X10037	X10137	X10237	X10337	X10437	X10537	X10637	X10737
	#Module 9	#Module 10	#Module 11	#Module 12	#Module 13	#Module 14	#Module 15	#Module 16

X0	X11000	X11100	X11200	X11300	X11400	X11500	X11600	X11700
X1	X11001	X11101	X11201	X11301	X11401	X11501	X11601	X11701
X2	X11002	X11102	X11202	X11302	X11402	X11502	X11602	X11702
X3	X11003	X11103	X11203	X11303	X11403	X11503	X11603	X11703
X4	X11004	X11104	X11204	X11304	X11404	X11504	X11604	X11704
X5	X11005	X11105	X11205	X11305	X11405	X11505	X11605	X11705
X6	X11006	X11106	X11206	X11306	X11406	X11506	X11606	X11706
X7	X11007	X11107	X11207	X11307	X11407	X11507	X11607	X11707
X10	X11010	X11110	X11210	X11310	X11410	X11510	X11610	X11710
X11	X11011	X11111	X11211	X11311	X11411	X11511	X11611	X11711
X12	X11012	X11112	X11212	X11312	X11412	X11512	X11612	X11712
X13	X11013	X11113	X11213	X11313	X11413	X11513	X11613	X11713
X14	X11014	X11114	X11214	X11314	X11414	X11514	X11614	X11714
X15	X11015	X11115	X11215	X11315	X11415	X11515	X11615	X11715
X16	X11016	X11116	X11216	X11316	X11416	X11516	X11616	X11716
X17	X11017	X11117	X11217	X11317	X11417	X11517	X11617	X11717
X20	X11020	X11120	X11220	X11320	X11420	X11520	X11620	X11720
X21	X11021	X11121	X11221	X11321	X11421	X11521	X11621	X11721
X22	X11022	X11122	X11222	X11322	X11422	X11522	X11622	X11722
X23	X11023	X11123	X11223	X11323	X11423	X11523	X11623	X11723
X24	X11024	X11124	X11224	X11324	X11424	X11524	X11624	X11724
X25	X11025	X11125	X11225	X11325	X11425	X11525	X11625	X11725
X26	X11026	X11126	X11226	X11326	X11426	X11526	X11626	X11726
X27	X11027	X11127	X11227	X11327	X11427	X11527	X11627	X11727
X30	X11030	X11130	X11230	X11330	X11430	X11530	X11630	X11730
X31	X11031	X11131	X11231	X11331	X11431	X11531	X11631	X11731
X32	X11032	X11132	X11232	X11332	X11432	X11532	X11632	X11732
X33	X11033	X11133	X11233	X11333	X11433	X11533	X11633	X11733
X34	X11034	X11134	X11234	X11334	X11434	X11534	X11634	X11734
X35	X11035	X11135	X11235	X11335	X11435	X11535	X11635	X11735
	#Module 9	#Module 10	#Module 11	#Module 12	#Module 13	#Module 14	#Module 15	#Module 16
X36	X11036	X11136	X11236	X11336	X11436	X11536	X11636	X11736
X37	X11037	X11137	X11237	X11337	X11437	X11537	X11637	X11737

- XD-E32X

2.5.2. Output Module Terminal Address Definition

- XD-E8Y

	Y0	Y1	Y2	Y3	Y4	Y5	Y6	Y7
#Module1	Y10000	Y10001	Y10002	Y10003	Y10004	Y10005	Y10006	Y10007
#Module 2	Y10100	Y10101	Y10102	Y10103	Y10104	Y10105	Y10106	Y10107
#Module 3	Y10200	Y10201	Y10202	Y10203	Y10204	Y10205	Y10206	Y10207

#Module 4	Y10300	Y10301	Y10302	Y10303	Y10304	Y10305	Y10306	Y10307
#Module 5	Y10400	Y10401	Y10402	Y10403	Y10404	Y10405	Y10406	Y10407
#Module 6	Y10500	Y10501	Y10502	Y10503	Y10504	Y10505	Y10506	Y10507
#Module 7	Y10600	Y10601	Y10602	Y10603	Y10604	Y10605	Y10606	Y10607
#Module 8	Y10700	Y10701	Y10702	Y10703	Y10704	Y10705	Y10706	Y10707
#Module 9	Y11000	Y11001	Y11002	Y11003	Y11004	Y11005	Y11006	Y11007
#Module 10	Y11100	Y11101	Y11102	Y11103	Y11104	Y11105	Y11106	Y11107
#Module 11	Y11200	Y11201	Y11202	Y11203	Y11204	Y11205	Y11206	Y11207
#Module 12	Y11300	Y11301	Y11302	Y11303	Y11304	Y11305	Y11306	Y11307
#Module 13	Y11400	Y11401	Y11402	Y11403	Y11404	Y11405	Y11406	Y11407
#Module 14	Y11500	Y11501	Y11502	Y11503	Y11504	Y11505	Y11506	Y11507
#Module 15	Y11600	Y11601	Y11602	Y11603	Y11604	Y11605	Y11606	Y11607
#Module 16	Y11700	Y11701	Y11702	Y11703	Y11704	Y11705	Y11706	Y11707

- XD-E16Y

	#Module 1	#Module 2	#Module 3	#Module 4	#Module 5	#Module 6	#Module 7	#Module 8
Y0	Y10000	Y10100	Y10200	Y10300	Y10400	Y10500	Y10600	Y10700
Y1	Y10001	Y10101	Y10201	Y10301	Y10401	Y10501	Y10601	Y10701
Y2	Y10002	Y10102	Y10202	Y10302	Y10402	Y10502	Y10602	Y10702
Y3	Y10003	Y10103	Y10203	Y10303	Y10403	Y10503	Y10603	Y10703
Y4	Y10004	Y10104	Y10204	Y10304	Y10404	Y10504	Y10604	Y10704
Y5	Y10005	Y10105	Y10205	Y10305	Y10405	Y10505	Y10605	Y10705
Y6	Y10006	Y10106	Y10206	Y10306	Y10406	Y10506	Y10606	Y10706
Y7	Y10007	Y10107	Y10207	Y10307	Y10407	Y10507	Y10607	Y10707
Y10	Y10010	Y10110	Y10210	Y10310	Y10410	Y10510	Y10610	Y10710
Y11	Y10011	Y10111	Y10211	Y10311	Y10411	Y10511	Y10611	Y10711
Y12	Y10012	Y10112	Y10212	Y10312	Y10412	Y10512	Y10612	Y10712
Y13	Y10013	Y10113	Y10213	Y10313	Y10413	Y10513	Y10613	Y10713
Y14	Y10014	Y10114	Y10214	Y10314	Y10414	Y10514	Y10614	Y10714
Y15	Y10015	Y10115	Y10215	Y10315	Y10415	Y10515	Y10615	Y10715
Y16	Y10016	Y10116	Y10216	Y10316	Y10416	Y10516	Y10616	Y10716
Y17	Y10017	Y10117	Y10217	Y10317	Y10417	Y10517	Y10617	Y10717
	#Module 9	#Module 10	#Module 11	#Module 12	#Module 13	#Module 14	#Module 15	#Module 16
Y0	Y11000	Y11100	Y11200	Y11300	Y11400	Y11500	Y11600	Y11700
Y1	Y11001	Y11101	Y11201	Y11301	Y11401	Y11501	Y11600	Y11701
Y2	Y11002	Y11102	Y11202	Y11302	Y11402	Y11502	Y11602	Y11702

Y3	Y11003	Y11103	Y11203	Y11303	Y11403	Y11503	Y11603	Y11703
Y4	Y11004	Y11104	Y11204	Y11304	Y11404	Y11504	Y11604	Y11704
Y5	Y11005	Y11105	Y11205	Y11305	Y11405	Y11505	Y11605	Y11705
Y6	Y11006	Y11106	Y11206	Y11306	Y11406	Y11506	Y11606	Y11706
Y7	Y11007	Y11107	Y11207	Y11307	Y11407	Y11507	Y11607	Y11707
Y10	Y11010	Y11110	Y11210	Y11310	Y11410	Y11510	Y11610	Y11710
Y11	Y11011	Y11111	Y11211	Y11311	Y11411	Y11511	Y11611	Y11711
Y12	Y11012	Y11112	Y11212	Y11312	Y11412	Y11512	Y11612	Y11712
Y13	Y11013	Y11113	Y11213	Y11313	Y11413	Y11513	Y11613	Y11713
Y14	Y11014	Y11114	Y11214	Y11314	Y11414	Y11514	Y11614	Y11714
Y15	Y11015	Y11115	Y11215	Y11315	Y11415	Y11515	Y11615	Y11715
Y16	Y11016	Y11116	Y11216	Y11316	Y11416	Y11516	Y11616	Y11716
Y17	Y11017	Y11117	Y11217	Y11317	Y11417	Y11517	Y11617	Y11717

- XD-E32Y

	#Module 1	#Module 2	#Module 3	#Module 4	#Module 5	#Module 6	#Module 7	#Module 8
Y0	Y10000	Y10100	Y10200	Y10300	Y10400	Y10500	Y10600	Y10700
Y1	Y10001	Y10101	Y10201	Y10301	Y10401	Y10501	Y10601	Y10701
Y2	Y10002	Y10102	Y10202	Y10302	Y10402	Y10502	Y10602	Y10702
Y3	Y10003	Y10103	Y10203	Y10303	Y10403	Y10503	Y10603	Y10703
Y4	Y10004	Y10104	Y10204	Y10304	Y10404	Y10504	Y10604	Y10704
Y5	Y10005	Y10105	Y10205	Y10305	Y10405	Y10505	Y10605	Y10705
Y6	Y10006	Y10106	Y10206	Y10306	Y10406	Y10506	Y10606	Y10706
Y7	Y10007	Y10107	Y10207	Y10307	Y10407	Y10507	Y10607	Y10707
Y10	Y10010	Y10110	Y10210	Y10310	Y10410	Y10510	Y10610	Y10710
Y11	Y10011	Y10111	Y10211	Y10311	Y10411	Y10511	Y10611	Y10711
Y12	Y10012	Y10112	Y10212	Y10312	Y10412	Y10512	Y10612	Y10712
Y13	Y10013	Y10113	Y10213	Y10313	Y10413	Y10513	Y10613	Y10713
Y14	Y10014	Y10114	Y10214	Y10314	Y10414	Y10514	Y10614	Y10714
Y15	Y10015	Y10115	Y10215	Y10315	Y10415	Y10515	Y10615	Y10715
Y16	Y10016	Y10116	Y10216	Y10316	Y10416	Y10516	Y10616	Y10716
Y17	Y10017	Y10117	Y10217	Y10317	Y10417	Y10517	Y10617	Y10717
Y20	Y10020	Y10120	Y10220	Y10320	Y10420	Y10520	Y10620	Y10720
Y21	Y10021	Y10121	Y10221	Y10321	Y10421	Y10521	Y10621	Y10721
Y22	Y10022	Y10122	Y10222	Y10322	Y10422	Y10522	Y10622	Y10722
Y23	Y10023	Y10123	Y10223	Y10323	Y10423	Y10523	Y10623	Y10723
Y24	Y10024	Y10124	Y10224	Y10324	Y10424	Y10524	Y10624	Y10724
Y25	Y10025	Y10125	Y10225	Y10325	Y10425	Y10525	Y10625	Y10725
Y26	Y10026	Y10126	Y10226	Y10326	Y10426	Y10526	Y10626	Y10726
Y27	Y10027	Y10127	Y10227	Y10327	Y10427	Y10527	Y10627	Y10727
Y30	Y10030	Y10130	Y10230	Y10330	Y10430	Y10530	Y10630	Y10730
Y31	Y10031	Y10131	Y10231	Y10331	Y10431	Y10531	Y10631	Y10731
Y32	Y10032	Y10132	Y10232	Y10332	Y10432	Y10532	Y10632	Y10732

	#Module 1	#Module 2	#Module 3	#Module 4	#Module 5	#Module 6	#Module 7	#Module 8
Y33	Y10033	Y10133	Y10233	Y10333	Y10433	Y10533	Y10633	Y10733
Y34	Y10034	Y10134	Y10234	Y10334	Y10434	Y10534	Y10634	Y10734
Y35	Y10035	Y10135	Y10235	Y10335	Y10435	Y10535	Y10635	Y10735
Y36	Y10036	Y10136	Y10236	Y10336	Y10436	Y10536	Y10636	Y10736
Y37	Y10037	Y10137	Y10237	Y10337	Y10437	Y10537	Y10637	Y10737
	#Module 9	#Module 10	#Module 11	#Module 12	#Module 13	#Module 14	#Module 15	#Module 16
Y0	Y11000	Y11100	Y11200	Y11300	Y11400	Y11500	Y11600	Y11700
Y1	Y11001	Y11101	Y11201	Y11301	Y11401	Y11501	Y11601	Y11701
Y2	Y11002	Y11102	Y11202	Y11302	Y11402	Y11502	Y11602	Y11702
Y3	Y11003	Y11103	Y11203	Y11303	Y11403	Y11503	Y11603	Y11703
Y4	Y11004	Y11104	Y11204	Y11304	Y11404	Y11504	Y11604	Y11704
Y5	Y11005	Y11105	Y11205	Y11305	Y11405	Y11505	Y11605	Y11705
Y6	Y11006	Y11106	Y11206	Y11306	Y11406	Y11506	Y11606	Y11706
Y7	Y11007	Y11107	Y11207	Y11307	Y11407	Y11507	Y11607	Y11707
Y10	Y11010	Y11110	Y11210	Y11310	Y11410	Y11510	Y11610	Y11710
Y11	Y11011	Y11111	Y11211	Y11311	Y11411	Y11511	Y11611	Y11711
Y12	Y11012	Y11112	Y11212	Y11312	Y11412	Y11512	Y11612	Y11712
Y13	Y11013	Y11113	Y11213	Y11313	Y11413	Y11513	Y11613	Y11713
Y14	Y11014	Y11114	Y11214	Y11314	Y11414	Y11514	Y11614	Y11714
Y15	Y11015	Y11115	Y11215	Y11315	Y11415	Y11515	Y11615	Y11715
Y16	Y11016	Y11116	Y11216	Y11316	Y11416	Y11516	Y11616	Y11716
Y17	Y11017	X11117	X11217	X11317	X11417	X11517	X11617	X11717
Y20	Y11020	Y11120	Y11220	Y11320	Y11420	Y11520	Y11620	Y11720
Y21	Y11021	Y11121	Y11221	Y11321	Y11421	Y11521	Y11621	Y11721
Y22	Y11022	Y11122	Y11222	Y11322	Y11422	Y11522	Y11622	Y11722
Y23	Y11023	Y11123	Y11223	Y11323	Y11423	Y11523	Y11623	Y11723
Y24	Y11024	Y11124	Y11224	Y11324	Y11424	Y11524	Y11624	Y11724
Y25	Y11025	Y11125	Y11225	Y11325	Y11425	Y11525	Y11625	Y11725
Y26	Y11026	Y11126	Y11226	Y11326	Y11426	Y11526	Y11626	Y11726
Y27	Y11027	Y11127	Y11227	Y11327	Y11427	Y11527	Y11627	Y11727
Y30	Y11030	Y11130	Y11230	Y11330	Y11430	Y11530	Y11630	Y11730
Y31	Y11031	Y11131	Y11231	Y11331	Y11431	Y11531	Y11631	Y11731
Y32	Y11032	Y11132	Y11232	Y11332	Y11432	Y11532	Y11632	Y11732
Y33	Y11033	Y11133	Y11233	Y11333	Y11433	Y11533	Y11633	Y11733
Y34	Y11034	Y11134	Y11234	Y11334	Y11434	Y11534	Y11634	Y11734
Y35	Y11035	Y11135	Y11235	Y11335	Y11435	Y11535	Y11635	Y11735
Y36	Y11036	Y11136	Y11236	Y11336	Y11436	Y11536	Y11636	Y11736
Y37	Y11037	Y11137	Y11237	Y11337	Y11437	Y11537	Y11637	Y11737

2.5.3. I/O Module Terminal Address Definition

- XD-E8X8Y

	X0	X1	X2	X3	X4	X5	X6	X7
#Module1	X10000	X10001	X10002	X10003	X10004	X10005	X10006	X10007
#Module 2	X10100	X10101	X10102	X10103	X10104	X10105	X10106	X10107
#Module 3	X10200	X10201	X10202	X10203	X10204	X10205	X10206	X10207
#Module 4	X10300	X10301	X10302	X10303	X10304	X10305	X10306	X10307
#Module 5	X10400	X10401	X10402	X10403	X10404	X10405	X10406	X10407
#Module 6	X10500	X10501	X10502	X10503	X10504	X10505	X10506	X10507
#Module 7	X10600	X10601	X10602	X10603	X10604	X10605	X10606	X10607
#Module 8	X10700	X10701	X10702	X10703	X10704	X10705	X10706	X10707
#Module 9	X11000	X11001	X11002	X11003	X11004	X11005	X11006	X11007
#Module 10	X11100	X11101	X11102	X11103	X11104	X11105	X11106	X11107
#Module 11	X11200	X11201	X11202	X11203	X11204	X11205	X11206	X11207
#Module 12	X11300	X11301	X11302	X11303	X11304	X11305	X11306	X11307
#Module 13	X11400	X11401	X11402	X11403	X11404	X11405	X11406	X11407
#Module 14	X11500	X11501	X11502	X11503	X11504	X11505	X11506	X11507
#Module 15	X11600	X11601	X11602	X11603	X11604	X11605	X11606	X11607
#Module 16	X11700	X11701	X11702	X11703	X11704	X11705	X11706	X11707

	Y0	Y1	Y2	Y3	Y4	Y5	Y6	Y7
# Module1	Y10000	Y10001	Y10002	Y10003	Y10004	Y10005	Y10006	Y10007
#Module 2	Y10100	Y10101	Y10102	Y10103	Y10104	Y10105	Y10106	Y10107
#Module 3	Y10200	Y10201	Y10202	Y10203	Y10204	Y10205	Y10206	Y10207
#Module 4	Y10300	Y10301	Y10302	Y10303	Y10304	Y10305	Y10306	Y10307
#Module 5	Y10400	Y10401	Y10402	Y10403	Y10404	Y10405	Y10406	Y10407
#Module 6	Y10500	Y10501	Y10502	Y10503	Y10504	Y10505	Y10506	Y10507
#Module 7	Y10600	Y10601	Y10602	Y10603	Y10604	Y10605	Y10606	Y10607
#Module 8	Y10700	Y10701	Y10702	Y10703	Y10704	Y10705	Y10706	Y10707
#Module 9	Y11000	Y11001	Y11002	Y11003	Y11004	Y11005	Y11006	Y11007
#Module 10	Y11100	Y11101	Y11102	Y11103	Y11104	Y11105	Y11106	Y11107
#Module 11	Y11200	Y11201	Y11202	Y11203	Y11204	Y11205	Y11206	Y11207

#Module 12	Y11300	Y11301	Y11302	Y11303	Y11304	Y11305	Y11306	Y11307
#Module 13	Y11400	Y11401	Y11402	Y11403	Y11404	Y11405	Y11406	Y11407
#Module 14	Y11500	Y11501	Y11502	Y11503	Y11504	Y11505	Y11506	Y11507
#Module 15	Y11600	Y11601	Y11602	Y11603	Y11604	Y11605	Y11606	Y11607
#Module 16	Y11700	Y11701	Y11702	Y11703	Y11704	Y11705	Y11706	Y11707

- XD-E16X16Y

	#Module 1	#Module 2	#Module 3	#Module 4	#Module 5	#Module 6	#Module 7	#Module 8
X0	X10000	X10100	X10200	X10300	X10400	X10500	X10600	X10700
X1	X10001	X10101	X10201	X10301	X10401	X10501	X10601	X10701
X2	X10002	X10102	X10202	X10302	X10402	X10502	X10602	X10702
X3	X10003	X10103	X10203	X10303	X10403	X10503	X10603	X10703
X4	X10004	X10104	X10204	X10304	X10404	X10504	X10604	X10704
X5	X10005	X10105	X10205	X10305	X10405	X10505	X10605	X10705
X6	X10006	X10106	X10206	X10306	X10406	X10506	X10606	X10706
X7	X10007	X10107	X10207	X10307	X10407	X10507	X10607	X10707
X10	X10010	X10110	X10210	X10310	X10410	X10510	X10610	X10710
X11	X10011	X10111	X10211	X10311	X10411	X10511	X10611	X10711
X12	X10012	X10112	X10212	X10312	X10412	X10512	X10612	X10712
X13	X10013	X10113	X10213	X10313	X10413	X10513	X10613	X10713
X14	X10014	X10114	X10214	X10314	X10414	X10514	X10614	X10714
X15	X10015	X10115	X10215	X10315	X10415	X10515	X10615	X10715
X16	X10016	X10116	X10216	X10316	X10416	X10516	X10616	X10716
X17	X10017	X10117	X10217	X10317	X10417	X10517	X10617	X10717
	#Module 9	#Module 10	#Module 11	#Module 12	#Module 13	#Module 14	#Module 15	#Module 16
X0	X11000	X11100	X11200	X11300	X11400	X11500	X11600	X11700
X1	X11001	X11101	X11201	X11301	X11401	X11501	X11600	X11701
X2	X11002	X11102	X11202	X11302	X11402	X11502	X11602	X11702
X3	X11003	X11103	X11203	X11303	X11403	X11503	X11603	X11703
X4	X11004	X11104	X11204	X11304	X11404	X11504	X11604	X11704
X5	X11005	X11105	X11205	X11305	X11405	X11505	X11605	X11705
X6	X11006	X11106	X11206	X11306	X11406	X11506	X11606	X11706
X7	X11007	X11107	X11207	X11307	X11407	X11507	X11607	X11707
X10	X11010	X11110	X11210	X11310	X11410	X11510	X11610	X11710
X11	X11011	X11111	X11211	X11311	X11411	X11511	X11611	X11711
X12	X11012	X11112	X11212	X11312	X11412	X11512	X11612	X11712
X13	X11013	X11113	X11213	X11313	X11413	X11513	X11613	X11713

	#Module 1	#Module 2	#Module 3	#Module 4	#Module 5	#Module 6	#Module 7	#Module 8
X14	X11014	X11114	X11214	X11314	X11414	X11514	X11614	X11714
X15	X11015	X11115	X11215	X11315	X11415	X11515	X11615	X11715
X16	X11016	X11116	X11216	X11316	X11416	X11516	X11616	X11716
X17	X11017	X11117	X11217	X11317	X11417	X11517	X11617	X11717

	#Module 1	#Module 2	#Module 3	#Module 4	#Module 5	#Module 6	#Module 7	#Module 8
Y0	Y10000	Y10100	Y10200	Y10300	Y10400	Y10500	Y10600	Y10700
Y1	Y10001	Y10101	Y10201	Y10301	Y10401	Y10501	Y10601	Y10701
Y2	Y10002	Y10102	Y10202	Y10302	Y10402	Y10502	Y10602	Y10702
Y3	Y10003	Y10103	Y10203	Y10303	Y10403	Y10503	Y10603	Y10703
Y4	Y10004	Y10104	Y10204	Y10304	Y10404	Y10504	Y10604	Y10704
Y5	Y10005	Y10105	Y10205	Y10305	Y10405	Y10505	Y10605	Y10705
Y6	Y10006	Y10106	Y10206	Y10306	Y10406	Y10506	Y10606	Y10706
Y7	Y10007	Y10107	Y10207	Y10307	Y10407	Y10507	Y10607	Y10707
Y10	Y10010	Y10110	Y10210	Y10310	Y10410	Y10510	Y10610	Y10710
Y11	Y10011	Y10111	Y10211	Y10311	Y10411	Y10511	Y10611	Y10711
Y12	Y10012	Y10112	Y10212	Y10312	Y10412	Y10512	Y10612	Y10712
Y13	Y10013	Y10113	Y10213	Y10313	Y10413	Y10513	Y10613	Y10713
Y14	Y10014	Y10114	Y10214	Y10314	Y10414	Y10514	Y10614	Y10714
Y15	Y10015	Y10115	Y10215	Y10315	Y10415	Y10515	Y10615	Y10715
Y16	Y10016	Y10116	Y10216	Y10316	Y10416	Y10516	Y10616	Y10716
Y17	Y10017	Y10117	Y10217	Y10317	Y10417	Y10517	Y10617	Y10717
	#Module 9	#Module 10	#Module 11	#Module 12	#Module 13	#Module 14	#Module 15	#Module 16
Y0	Y11000	Y11100	Y11200	Y11300	Y11400	Y11500	Y11600	Y11700
Y1	Y11001	Y11101	Y11201	Y11301	Y11401	Y11501	Y11600	Y11701
Y2	Y11002	Y11102	Y11202	Y11302	Y11402	Y11502	Y11602	Y11702
Y3	Y11003	Y11103	Y11203	Y11303	Y11403	Y11503	Y11603	Y11703
Y4	Y11004	Y11104	Y11204	Y11304	Y11404	Y11504	Y11604	Y11704
Y5	Y11005	Y11105	Y11205	Y11305	Y11405	Y11505	Y11605	Y11705
Y6	Y11006	Y11106	Y11206	Y11306	Y11406	Y11506	Y11606	Y11706
Y7	Y11007	Y11107	Y11207	Y11307	Y11407	Y11507	Y11607	Y11707
Y10	Y11010	Y11110	Y11210	Y11310	Y11410	Y11510	Y11610	Y11710
Y11	Y11011	Y11111	Y11211	Y11311	Y11411	Y11511	Y11611	Y11711
Y12	Y11012	Y11112	Y11212	Y11312	Y11412	Y11512	Y11612	Y11712
Y13	Y11013	Y11113	Y11213	Y11313	Y11413	Y11513	Y11613	Y11713
Y14	Y11014	Y11114	Y11214	Y11314	Y11414	Y11514	Y11614	Y11714
Y15	Y11015	Y11115	Y11215	Y11315	Y11415	Y11515	Y11615	Y11715
Y16	Y11016	Y11116	Y11216	Y11316	Y11416	Y11516	Y11616	Y11716
Y17	Y11017	X11117	Y11217	Y11317	Y11417	Y11517	Y11617	Y11717

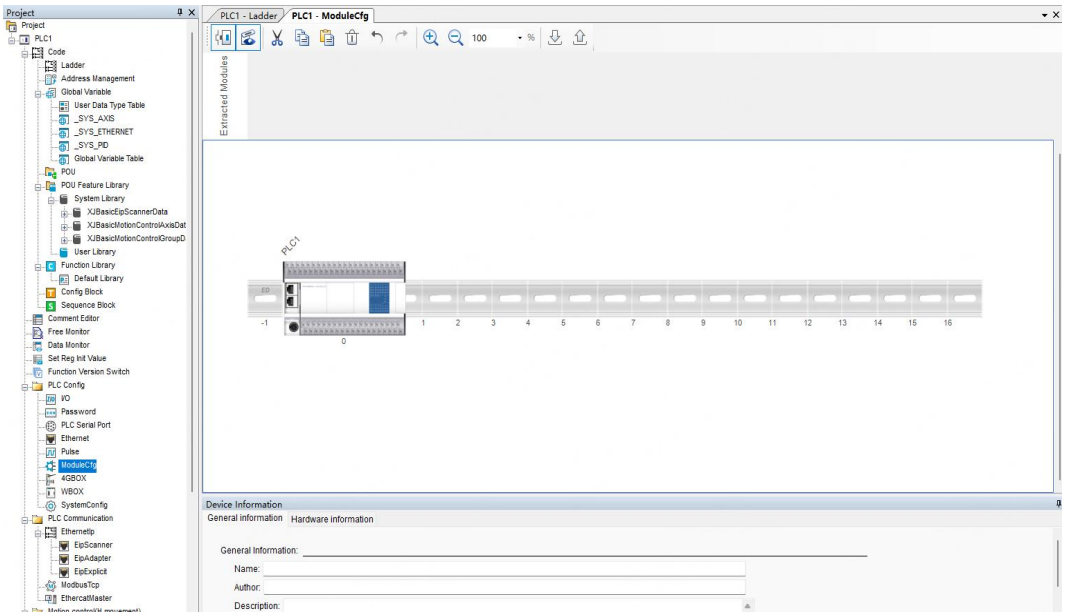
2.6. Work Mode Setup

There are two methods available for configuring the operating mode (these two methods yield equivalent results).

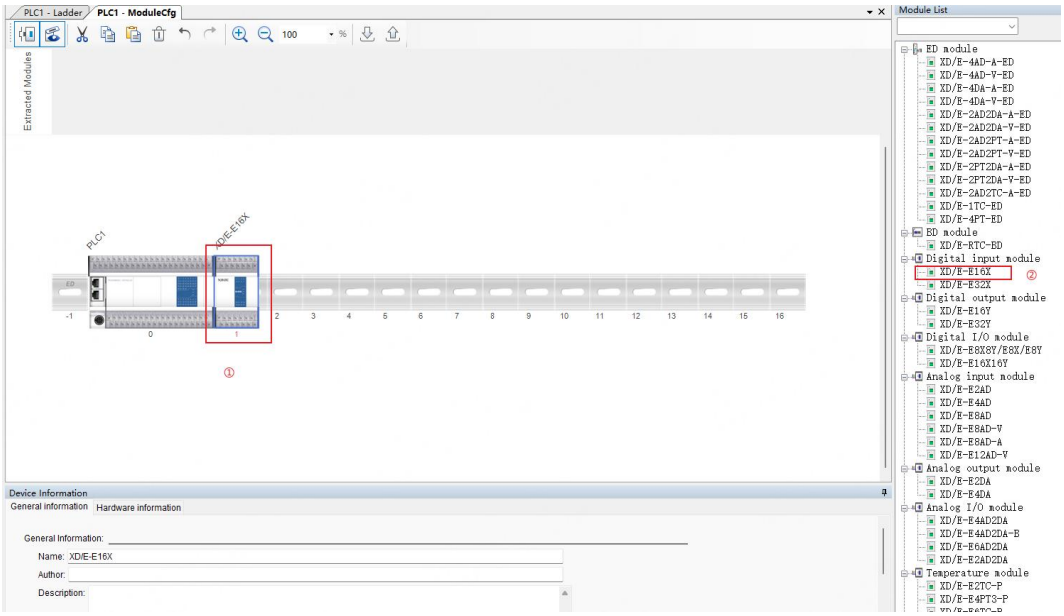
- Configure via the Control Panel;
- Set via Flash registers.

1) Configuration Panel Configuration

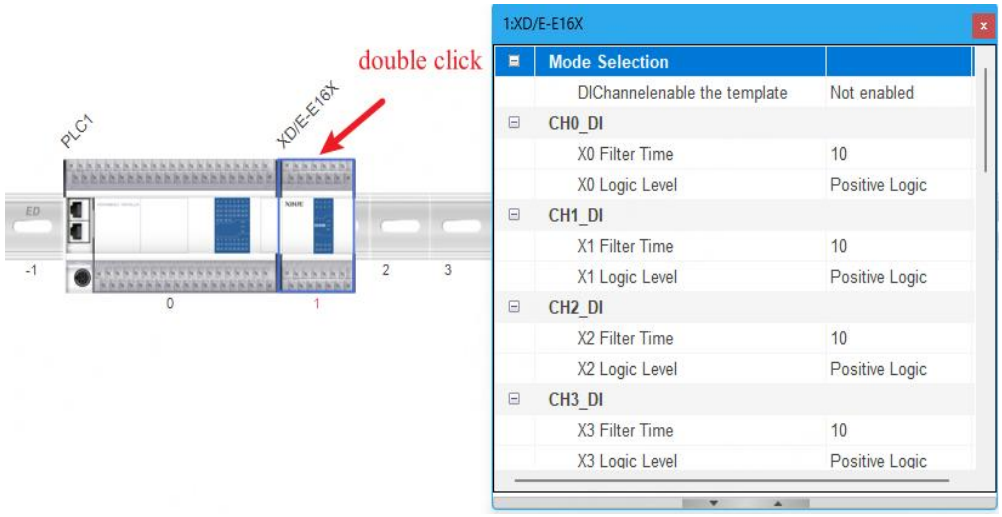
1. Use the XINJE PLC Programming Tool Software version 3.8.0a or later to configure the module; click [PLC Configuration] – [Module Configuration] in the left-side Engineering Bar to open the Expansion Module Settings window. For versions prior to 3.8.0a of the XINJE PLC Programming Tool Software, click [PLC Configuration] – [Expansion Module] in the left-side Engineering Bar to perform the configuration.



2. Select a module from the right-hand module list and drag it to the desired position, or double-click a module in the right-hand module list to select it:

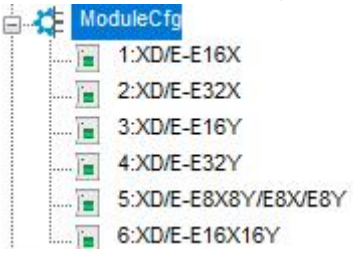


3. Double-click the corresponding module icon to access the module configuration interface and configure module parameters. Positive and negative logic can be adjusted, as well as the filtering time.



4. Click " " to view the default configuration parameters for the Expansion module.

5. After completing the parameter configuration for the expansion module, click "" to write the set values into the PLC; the changes will take effect only after the PLC is powered off and then powered on again. Under the Module Configuration Node, mount the configured module, then double-click to enter the Module Parameter Configuration screen.



2) Can be Modified Using the SFD Register

Configuration Information Address:

Module ID	Configuration Information Address	Module ID	Configuration Information Address
#1	SFD350~SFD359	#9	SFD430~SFD439
#2	SFD360~SFD369	#10	SFD440~SFD449
#3	SFD370~SFD379	#11	SFD450~SFD459
#4	SFD380~SFD389	#12	SFD460~SFD469
#5	SFD390~SFD399	#13	SFD470~SFD479
#6	SFD400~SFD409	#14	SFD480~SFD489
#7	SFD410~SFD419	#15	SFD490~SFD499
#8	SFD420~SFD429	#16	SFD500~SFD509

The specific allocation of the first 20 bytes of the COMMAND information is as follows:

- XD-E8X

Address	SFD350		SFD351		SFD352		SFD353~ SFD359
	Byte0	Byte1	Byte2	Byte3	Byte4	Byte5	
Bit7	X0−X3 Filtering Time set up	X4−X7 Filtering Time set up	-	-	-	-	-
Bit6			X3 Logic	X7 Logic	-	-	-
Bit5			-	-	-	-	-
Bit4			X2 Logic	X6 Logic	-	-	-
Bit3			-	-	-	-	-
Bit2			X1 Logic	X5 Logic	-	-	-
Bit1			-	-	-	-	-
Bit0			X0 Logic	X4 Logic	-	-	-
Explain	Filtering time (unit: ms): Time setting: 1−5, 10,15 20，25，30，35，40，45，50； Default value: 10		Note: 0 represents positive logic; 1 represents negative logic.				-

- XD-E8YR、XD-E8YT

Address	SFD350		SFD351		SFD352		SFD353~ SFD359
	Byte0	Byte1	Byte2	Byte3	Byte4	Byte5	
Bit7	-	-	-	-	-	-	-
Bit6			-	-	Y3 Logic	Y7 Logic	-
Bit5			-	-	-	-	-
Bit4			-	-	Y2 Logic	Y6 Logic	-
Bit3			-	-	-	-	-
Bit2			-	-	Y1 Logic	Y5 Logic	-
Bit1			-	-	-	-	-
Bit0			-	-	Y0 Logic	Y4 Logic	-
Explain	Filtering time (unit: ms): Time setting: 1−5, 10,15 20，25，30，35，40，45，50； Default value: 10		Note: 0 represents positive logic; 1 represents negative logic.				-

- XD-E8X8YR、XD-E8X8YT

Address	SFD350		SFD351		SFD352		SFD353~SFD359
	Byte0	Byte1	Byte2	Byte3	Byte4	Byte5	
Bit7	X0−X3 Filtering Time set up	X4−X7 Filtering Time set up	-	-	-	-	-
Bit6			X3 Logic	X7 Logic	Y3 Logic	Y7 Logic	-
Bit5			-	-	-	-	-
Bit4			X2 Logic	X6 Logic	Y2 Logic	Y6 Logic	-
Bit3			-	-	-	-	-
Bit2			X1 Logic	X5 Logic	Y1 Logic	Y5 Logic	-
Bit1			-	-	-	-	-
Bit0			X0 Logic	X4 Logic	Y0 Logic	Y4 Logic	-
Explain	Filtering time (unit: ms): Time setting: 1−5, 10,15 20, 25, 30, 35, 40, 45, 50; Default value: 10		Note: 0 represents positive logic; 1 represents negative logic.				-

- XD-E16X

Address	SFD350		SFD351		SFD352		SFD353		SFD354~SFD359
	Byte0	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7	
Bit7	X0~X3 Filtering time set up	X4~X7 Filtering time set up	X10~X13 Filtering time set up	X14~X17 Filtering time set up	-	-	-	-	-
Bit6					X3 logic	X7 logic	X13 logic	X17 logic	-
Bit5					-	-	-	-	-
Bit4					X2 logic	X6 logic	X12 logic	X16 logic	-
Bit3					-	-	-	-	-
Bit2					X1 logic	X5 logic	X11 logic	X15 logic	-
Bit1					-	-	-	-	-
Bit0					X0 logic	X4 logic	X10 logic	X14 logic	-
Explain	Filtering time (unit: ms): When configured, the time values range from 1−5, 10,15,20,25,30,35,40,45,50; when not configured, the value is 10.				Note: 0 represents positive logic; 1 represents negative logic.				-

- XD-E16X16Y

Register		Bit0	Bit1	Bit2	Bit3	Bit4	Bit5	Bit6	Bit7	Explain
SFD350	Byte0	X0–X3 filtering time setting								Filtering time (unit: ms): Can be configured; values range from 1–5, 10,15,20,25,30, 35,40,45,50; if not configured, the default value is 10.
	Byte1	X4–X7 filtering time setting								
SFD351	Byte2	X10–X13 filter time setting								
	Byte3	X14–X17 filtering time setting								
SFD352	Byte4	X0 logic	-	X1 logic	-	X2 logic	-	X3 logic	-	Note: 0 represents positive logic; 1 represents negative logic
	Byte5	X4 logic	-	X5 logic	-	X6 logic	-	X7 logic	-	
SFD353	Byte6	X10 logic	-	X11 logic	-	X12 logic	-	X13 logic	-	
	Byte7	X14 logic	-	X15 logic	-	X16 logic	-	X17 logic	-	
SFD354	Byte8	Y0 logic	-	Y1 logic	-	Y2 logic	-	Y3 logic	-	
	Byte9	Y4 logic	-	Y5 logic	-	Y6 logic	-	Y7 logic	-	
SFD355	Byte10	Y10 logic	-	Y11 logic	-	Y12 logic	-	Y13 logic	-	
	Byte11	Y14 logic	-	Y15 logic	-	Y16 logic	-	Y17 logic	-	
SFD356~SFD359		Keep								

- XD-E16Y/XD-E32Y

Register		Bit0	Bit1	Bit2	Bit3	Bit4	Bit5	Bit6	Bit7	Explain
SFD350	Byte0	Y0 Logic	-	Y1 Logic	-	Y2 Logic	-	Y3 Logic	-	pour: 0 represents positive logic;
	Byte1	Y4 Logic	-	Y5 Logic	-	Y6 Logic	-	Y7 Logic	-	
SFD351	Byte2	Y10 Logic	-	Y11 Logic	-	Y12 Logic	-	Y13 Logic	-	
	Byte3	Y14 Logic	-	Y15 Logic	-	Y16 Logic	-	Y17 Logic	-	

SFD352	Byte4	Y20 Logic	-	Y21 Logic	-	Y22 Logic	-	Y23 Logic	-	1 represents negative logic
	Byte5	Y24 Logic	-	Y25 Logic	-	Y26 Logic	-	Y27 Logic	-	
SFD353	Byte6	Y30 Logic	-	Y31 Logic	-	Y32 Logic	-	Y33 Logic	-	
	Byte7	Y34 Logic	-	Y35 Logic	-	Y36 Logic	-	Y37 Logic	-	
SFD354~SFD359		Keep								

- XD-E32X

Register		Bit0	Bit1	Bit2	Bit3	Bit4	Bit5	Bit6	Bit7	Explain
SFD350	Byte0	X0–X3 filtering time setting								Filtering time (unit: ms): Configurable; time values: 1−5, 10,15,20,25,30,35,40,45,50; Default value is 10.
	Byte1	X4–X7 filtering time setting								
SFD351	Byte2	X10–X13 filter time setting								
	Byte3	X14–X17 filtering time setting								
SFD352	Byte4	X20–X23 filter time setting								
	Byte5	X24–X27 filtering time setting								
SFD353	Byte6	X30–X33 Filter Time Setting								
	Byte7	X34–X37 filtering time setting								
SFD354	Byte8	X0 logic	-	X1 logic	-	X2 logic	-	X3 logic	-	Note: 0 represents positive logic; 1 represents negative logic
	Byte9	X4 logic	-	X5 logic	-	X6 logic	-	X7 logic	-	
SFD355	Byte10	X10 logic	-	X11 Logic	-	X12 Logic	-	X13 Logic	-	
	Byte11	X14 logic	-	X15 Logic	-	X16 Logic	-	X17 Logic	-	
SFD356	Byte12	X20 logic	-	X21 logic	-	X22 logic	-	X23 logic	-	
	Byte13	X24 logic	-	X25 logic	-	X26 logic	-	X27 logic	-	
SFD357	Byte14	X30 logic	-	X31 logic	-	X32 logic	-	X33 logic	-	
	Byte15	X34 logic	-	X35 logic	-	X36 logic	-	X37 logic	-	
SFD358~SFD359		Keep								

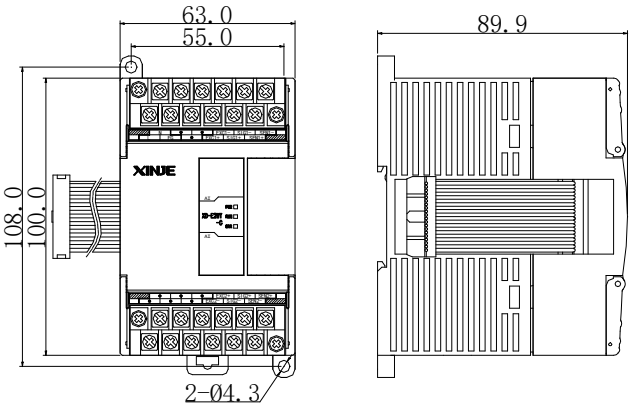
- The filtering duration for discrete input can be configured by the user; valid durations include 1, 2, 3, 4, 5, 10,15,20,25,30,35,40,45, and 50 ms. The default filtering duration is 10 ms.
- Users can configure the discrete input/output polarity: 0 represents positive logic; 1 represents negative logic.

Positive logic: When a signal is present at the input, the input point is ON; when no signal is present, the input point is OFF;

Negative logic: When no signal is present at the input, the input point is ON; when a signal is present, the input point is OFF.

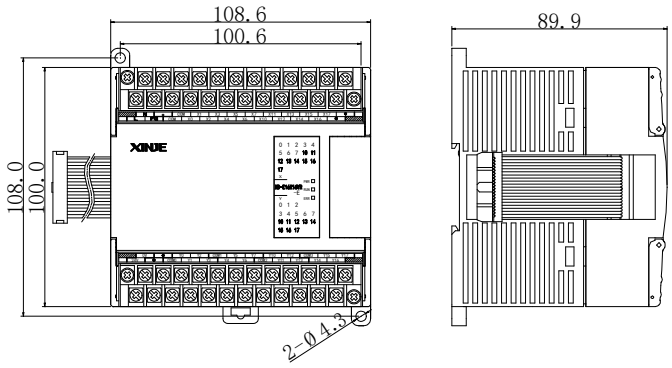
2.7. External Dimensions Diagram

unit:mm



Applicable Module

Import	IO	Output
XD-E8X XD-E16X	XD-E8X8Y	XD-E16Y



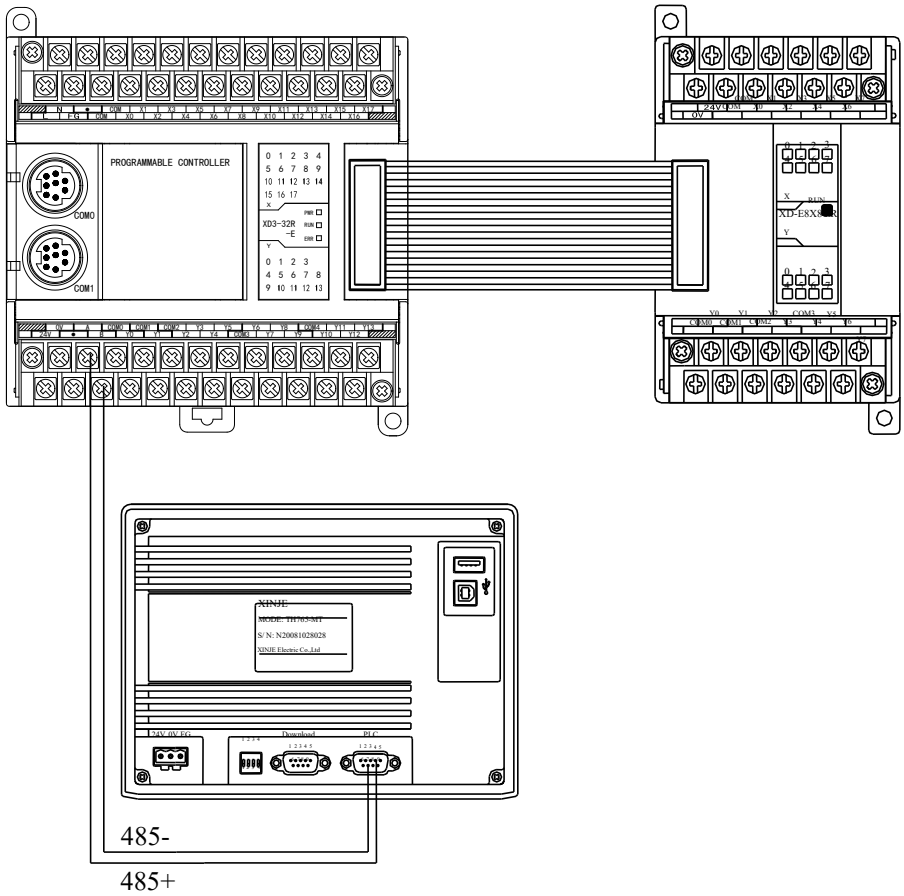
Applicable Module

Import	IO	Output
XD-E32X	XD-E16X16Y	XD-E32Y

2.8. Application Example

This chapter provides specific examples of how this module can be applied; for instance, the XINJE XD3 series 32-point PLC serves as a slave device, equipped with an XD-E8X8YR expansion module, and communicates with the XINJE Human-Machine Interface.

Communication between the XD-E8X8YR expansion module and the XINJE TH765 touchscreen.



In this example, the touchscreen serves as the main communication station; it reads the input point status of the expansion module and writes it to the local coil status of the touchscreen, while writing the internal coil status of the touchscreen to the output point of the expansion module.

1) Hardware Connection

Connect the XD-E8X8YR module to the XD3-32R-E, and then connect the RS485 communication terminals AB of the XD3-32R-E to the PLC port AB terminals of the TH765.

Communication parameter configuration: Select the following communication parameters – baud rate: 19,200 bps; 8 data bits; 1 stop bit; even parity; PLC Modbus station ID: 1. After setting the station ID, the PLC must be powered on again.

For the TH765 touchscreen: Select the PLC type as "Modbus RTU (Display as Master)"; set the communication parameters to a baud rate of 19,200 bps, 8 data bits, 1 stop bit, and even parity.

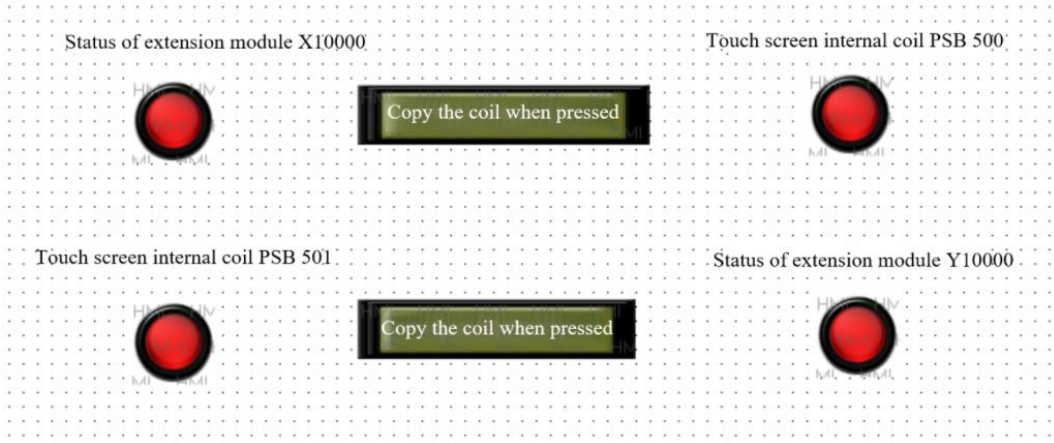
2) Program Application

The correspondence between module I/O point addresses and local coil addresses is as follows:

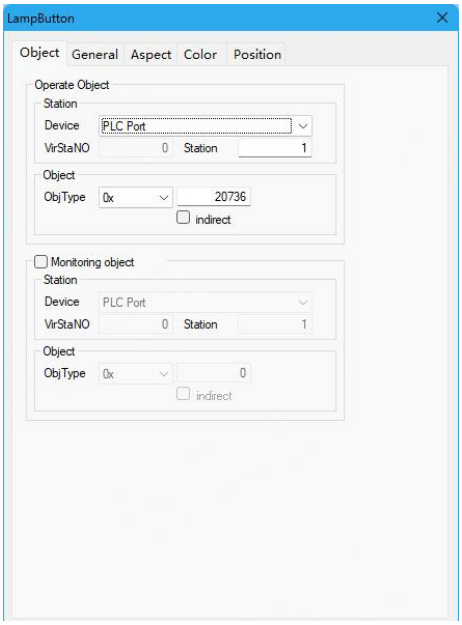
Local Coil Address		Module Input/ Output Points	Corresponding Modbus Address
PSB500	◄——►	X10000	K20736
PSB501	◄——►	Y10000	K24832

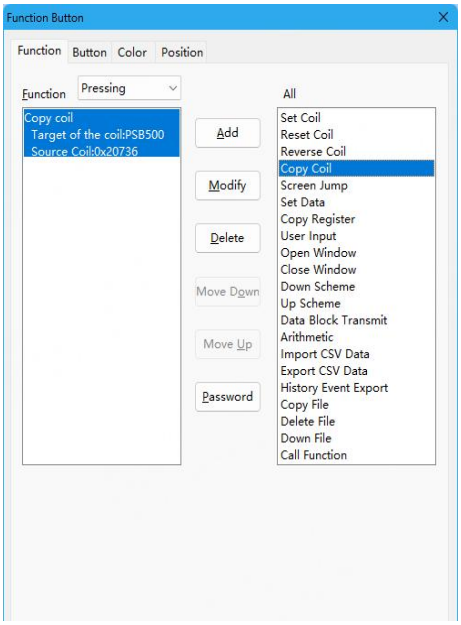
3) Image Editing

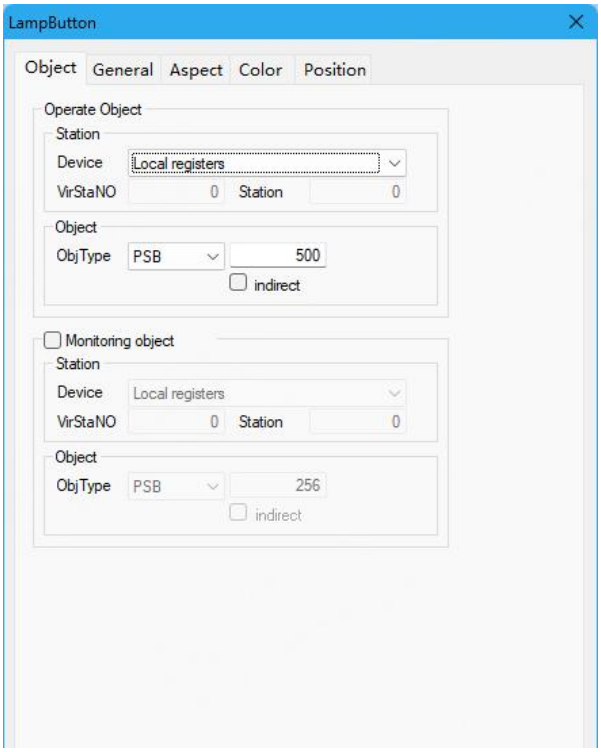
The touchscreen display appears as follows:



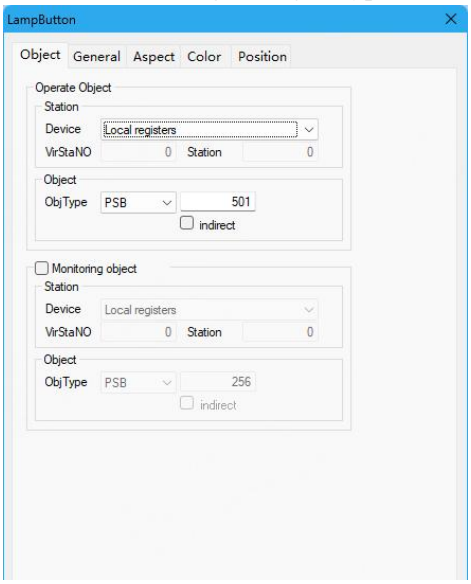
Perform status configuration for the X10000 expansion module by adding an indicator light; set the indicator light's object type to 0X, which corresponds to Modbus address coil 20736; select the function key button; set its function to copy the X10000 coil status to the PSB500 internal touchscreen coil upon pressing the button; configure the PSB500 internal touchscreen indicator light by selecting the indicator light object type as "PSB" and specifying the coil number as 500.

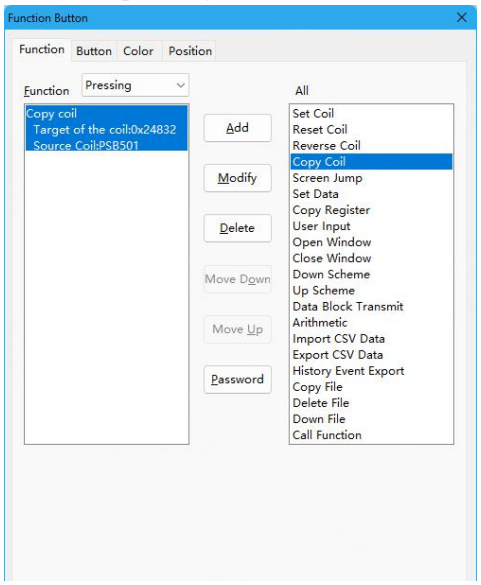


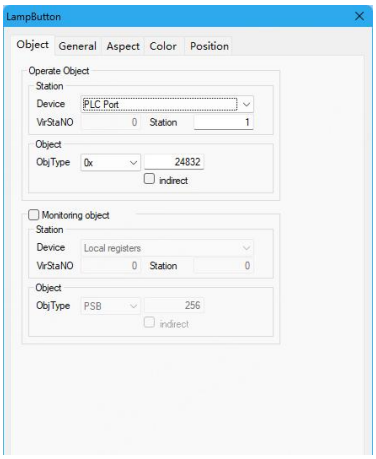




Similarly, select the internal PSB501 coil status button on the editing touchscreen; the indicator light button's object type is set to PSB, and the coil number is specified as 501. Then, select the function key button; when pressed, this button will copy the coil status of PSB501 to the coil on the Y10000 expansion module. For editing the status of the Y10000 expansion module, select the indicator light button; the indicator light's object type is set to 0X, and the corresponding Modbus address coil is 24832.







Once the video has been edited, download it to the touchscreen and then initiate communication.

3. Analog Input Module

3.1. Analog Input Module Overview

XD Series Analog Input Modules – support for 4–12 channels of current-or voltage-type input.

3.1.1.Naming Rule

XD－E○AD－□
① ② ③ ④ ⑤

①	Series Name	XD: XD Series Expansion Modules
②	Indicate Expansion Module	E: Indicates an expansion module
③	Number of Input Channels	4, 8, or 12
④	Analogue Input	AD: Indicates analog voltage or current input.
⑤	Analog Signal Type	A: Indicates current-mode V: Indicates a voltage-type converter

3.1.2.Model List

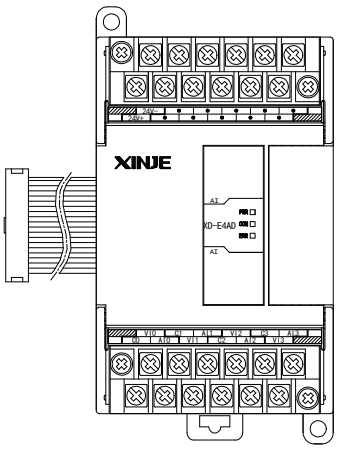
Model		Description
Analogue Input	XD-E4AD	4-channel analog input; supports current and voltage measurement modes; 14-bit resolution
	XD-E8AD	8-channel analog input, supporting current and voltage measurement modes, 14-bit resolution
	XD-E8AD-A	8-channel analog input, supports current mode, 14-bit resolution
	XD-E8AD-V	8-channel analog input with voltage-mode support and 14-bit resolution
	XD-E12AD-V	12-channel analog input with voltage-mode support, 14-bit resolution

3.1.3.General Requirements

Project	Specifications
Service Environment	Non-corrosive gases
Ambient Temperature	0~60℃
Maintain Ambient Temperature	-20~70℃
Ambient Humidity	5~95%RH
Maintain Ambient Humidity	5~95%RH
Install	Secure with M3 screws or install directly onto a DIN46277 (35 mm wide) guide rail.

3.2. 14 Bit Analog Current and Voltage Input Module XD-E4AD

3.2.1.Module Features and Specifications



The XD-E4AD analog input module converts four analog input signals into digital values and transmits them to the PLC main unit, enabling real-time data exchange with the PLC main unit.

1) Module Features

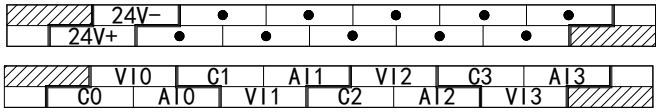
- 4-channel analog input: supports both voltage and current input modes.
- 14-bit high-precision analog input.
- As specialized functional modules for the XD series, the XD3/XD3E can support up to 10 additional modules connected to the right side of the PLC main unit; the XD5/XDM/XDC/XD5E/XDME/XDH can support up to 16 additional modules; whereas the XD1/XD2 do not support the addition of any modules.

2) Module Specifications

Project	Analogue Input	
	Voltage Input	Current Input
Analog Input Range	0~5V、0~10V、-5~5V、-10~10V (Impedance greater than 1 MΩ)	0~20mA、4~20mA、-20~20mA (Impedance: approximately 120 Ω)
Maximum Input Range	DC±15V	-40~40mA
Digital Output Range	0–16383 or-8192–8191	
Resolution Ratio	1/16383（14Bit）	
Overall Accuracy	±1%	
Conversion Rate	2ms/1 channel	
Module Power Supply	DC24V±10%，150mA	

XD-E4AD modules with versions below V7 do not support the voltage ranges of-5~5V, -10~10V, or-20~20mA.

3.2.2.Terminal Specifications



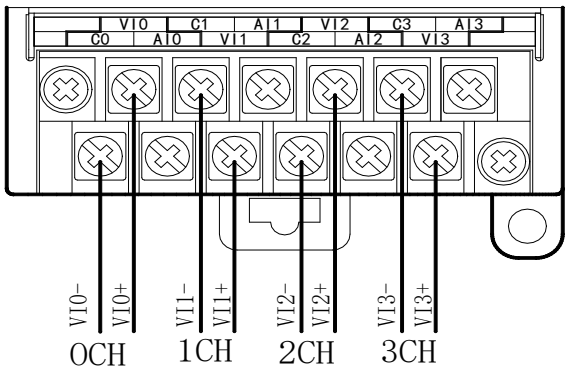
Channel	Terminal Name	Signal Name
CH0	AI0	Current analog input
	VI0	Voltage analog input
	C0	CH0 Analog Input Common Terminal
CH1	AI1	Current analog input
	VI1	Voltage analog input
	C1	CH1 Analog Input Common Terminal
CH2	AI2	Current analog input
	VI2	Voltage analog input
	C2	CH2 Analog Input Common Terminal
CH3	AI3	Current analog input
	VI3	Voltage analog input
	C3	CH3 analog input common terminal
-	24V+	+24V power supply
	24V-	Power supply common terminal

3.2.3.External Connection

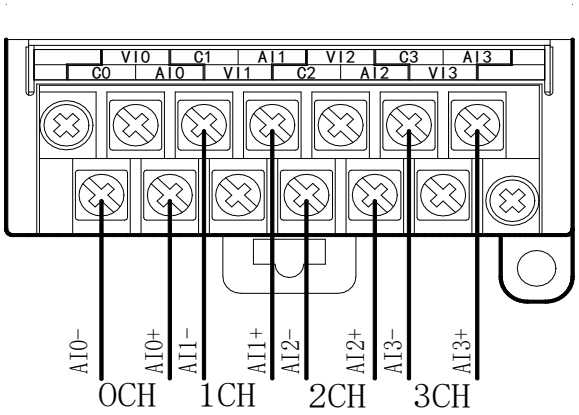
When establishing an external connection, please note the following two aspects:

- To prevent interference, please use shielded cable and perform single-point grounding of the shield layer.
- When connecting the XD-E4AD to an external +24V power supply, please use the 24V power supply built into the PLC unit to avoid interference.

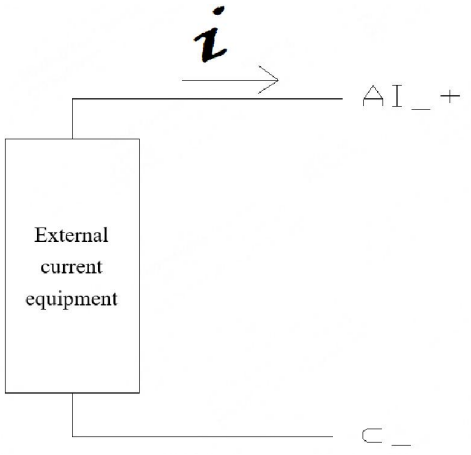
1) Single-Ended Voltage Input



2) Single-Ended Current Input



The XD-E4AD's current input-side wiring is shown in the figure below:



3.2.4.Input Definition Number Allocation

The XD series analog input modules do not occupy any I/O units; the converted values are directly written into the PLC registers. The definition numbers for the PLC registers corresponding to each channel are as follows:



Each channel can only be used when the enable switch is turned on.

First Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID10000	Y10000	X10000
1CH	ID10001	Y10001	X10001
2CH	ID10002	Y10002	X10002
3CH	ID10003	Y10003	X10003

Second Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID10100	Y10100	X10100
1CH	ID10101	Y10101	X10101
2CH	ID10102	Y10102	X10102
3CH	ID10103	Y10103	X10103

Third Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID10200	Y10200	X10200
1CH	ID10201	Y10201	X10201
2CH	ID10202	Y10202	X10202
3CH	ID10203	Y10203	X10203

Fourth Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID10300	Y10300	X10300
1CH	ID10301	Y10301	X10301
2CH	ID10302	Y10302	X10302
3CH	ID10303	Y10303	X10303

Fifth expansion module register definition number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID10400	Y10400	X10400
1CH	ID10401	Y10401	X10401
2CH	ID10402	Y10402	X10402
3CH	ID10403	Y10403	X10403

Sixth Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID10500	Y10500	X10500
1CH	ID10501	Y10501	X10501
2CH	ID10502	Y10502	X10502
3CH	ID10503	Y10503	X10503

Seventh expansion module register definition number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID10600	Y10600	X10600
1CH	ID10601	Y10601	X10601
2CH	ID10602	Y10602	X10602
3CH	ID10603	Y10603	X10603

Eighth expansion module register definition number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID10700	Y10700	X10700
1CH	ID10701	Y10701	X10701
2CH	ID10702	Y10702	X10702
3CH	ID10703	Y10703	X10703

Ninth Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID10800	Y11000	X11000
1CH	ID10801	Y11001	X11001
2CH	ID10802	Y11002	X11002
3CH	ID10803	Y11003	X11003

Tenth Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID10900	Y11100	X11100
1CH	ID10901	Y11101	X11101
2CH	ID10902	Y11102	X11102
3CH	ID10903	Y11103	X11103

Eleventh Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID11000	Y11200	X11200
1CH	ID11001	Y11201	X11201
2CH	ID11002	Y11202	X11202
3CH	ID11003	Y11203	X11203

Twelfth Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID11100	Y11300	X11300
1CH	ID11101	Y11301	X11301
2CH	ID11102	Y11302	X11302
3CH	ID11103	Y11303	X11303

Thirteenth Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID11200	Y11400	X11400
1CH	ID11201	Y11401	X11401
2CH	ID11202	Y11402	X11402
3CH	ID11203	Y11403	X11403

Fourteenth Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID11300	Y11500	X11500
1CH	ID11301	Y11501	X11501
2CH	ID11302	Y11502	X11502
3CH	ID11303	Y11503	X11503

Fifteenth Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID11400	Y11600	X11600
1CH	ID11401	Y11601	X11601
2CH	ID11402	Y11602	X11602
3CH	ID11403	Y11603	X11603

Sixteenth Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID11500	Y11700	X11700
1CH	ID11501	Y11701	X11701
2CH	ID11502	Y11702	X11702
3CH	ID11503	Y11703	X11703



- Disabling unused channels can increase the input/output scanning speed.
- When the input enable switch is turned off during operation, the corresponding input channel will not be able to capture any data (the data value will be displayed as 0).

3.2.5.Work Mode Setup

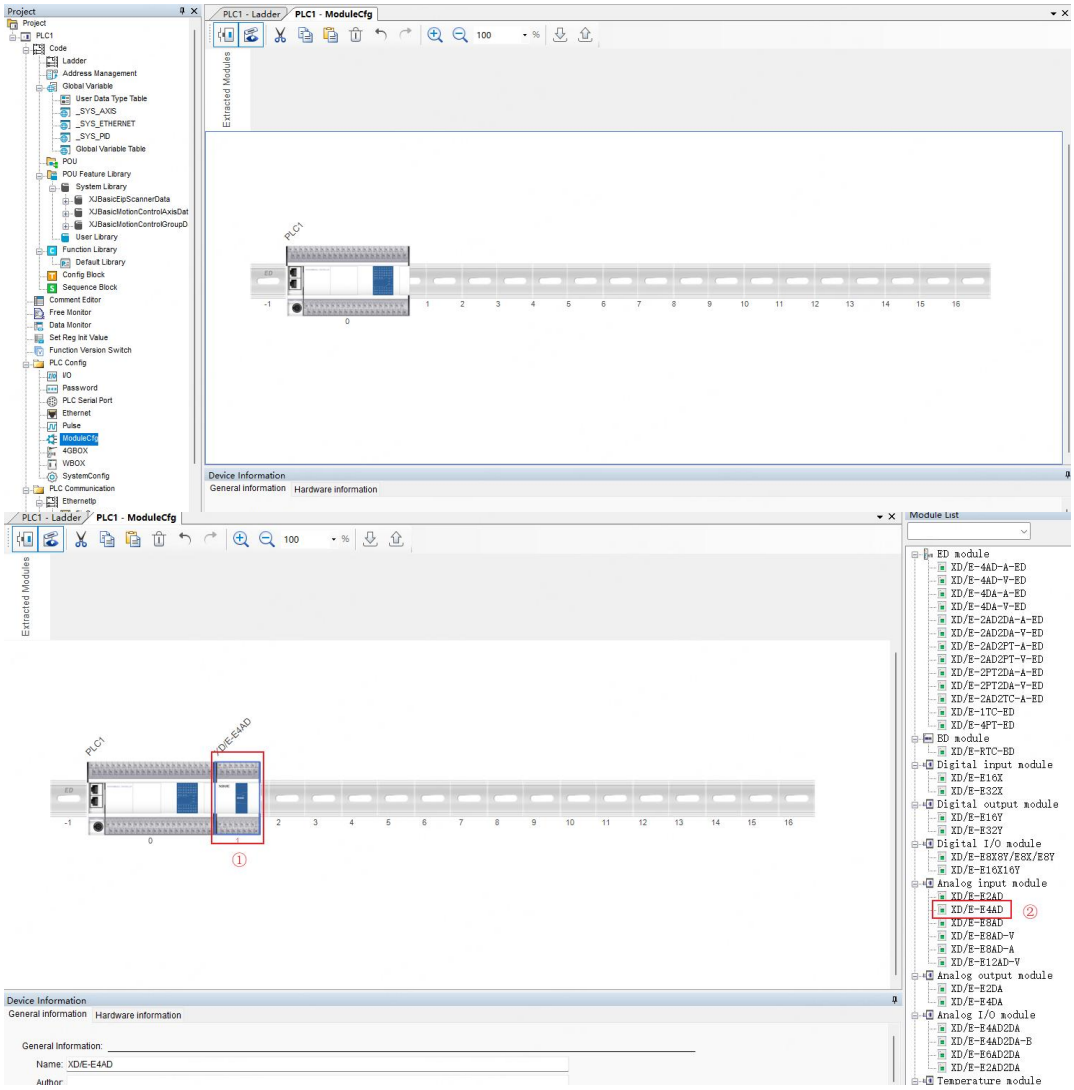
There are two methods for configuring the operating mode (these two methods yield equivalent results):

- Through Control Panel configuration
- Set via Flash registers

1) Configuration Panel Configuration

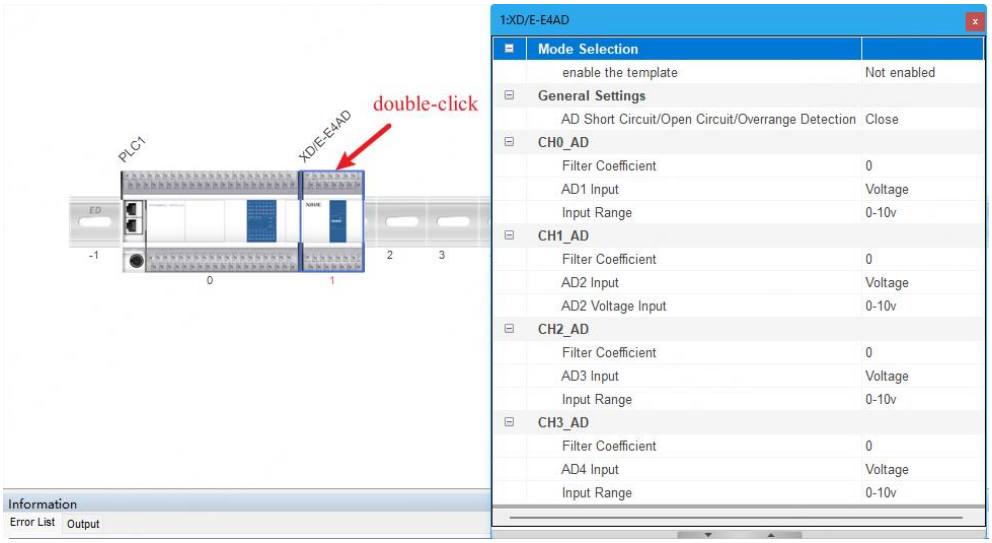
1. Use the XINJE PLC Programming Tool Software version 3.8.0a or later to configure the module; click [PLC Configuration] – [Module Configuration] in the left-side Engineering Bar to open the Expansion Module Settings window. For versions prior to 3.8.0a of the XINJE PLC Programming Tool Software, click [PLC Configuration] – [Expansion Module] in the left-side Engineering Bar to perform the configuration.

2. Select a module from the right-hand module list and drag it to the desired position, or double-click a module in the right-hand module list to select it:



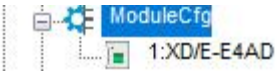
3.

Double-click the corresponding module icon to access the module configuration interface, where you can select the AD filter coefficient and the voltage or current input mode for the AD channel.



4. Click " " to view the default configuration parameters for the Expansion module.

5. After completing the parameter configuration for the expansion module, click "" to write the set values into the PLC; the changes will take effect only after the PLC is powered off and then powered on again. Under the Module Configuration Node, mount the configured module, then double-click to enter the Module Parameter Configuration screen.



- The first-order low-pass filtering method weights the current sample value by the previous filtered output value to obtain the effective filtered value.
- The filtering coefficient is set by the user between 0 and 254; a lower value results in more stable data but may cause data lag; a value of 1 corresponds to the strongest filtering effect, while a value of 254 corresponds to the weakest filtering effect; the default value is 0 (no filtering).
- ※ When the expansion module " AD Short Circuit/Open Circuit/Overrange Detection Close " is set to ON, you can check the channel status by examining the channel alarm flag bit X1xxxx.

  for instance:

  When the AD Channel 1 is set to voltage mode and the AD detection indicates a short circuit, open circuit, or out-of-range condition, the X10000 will be turned ON;

  When the AD channel 1 is configured in current-mode and the AD detection exceeds the range, the X10000 will be turned on.

2) Flash Register Configuration

The expansion module's input and output channels support two operating modes: voltage and current. The current range options include 0–20 mA, 4–20 mA, and –20–20 mA; the voltage range options include 0–5 V, 0–10 V, –5–5 V, and –10–10 V. These settings are configured using the SFD (Special FLASH Data Register) within the PLC. As shown below:

Module ID	Configuration Information Address	Module ID	Configuration Information Address
#1	SFD350~SFD359	#9	SFD430~SFD439
#2	SFD360~SFD369	#10	SFD440~SFD449
#3	SFD370~SFD379	#11	SFD450~SFD459
#4	SFD380~SFD389	#12	SFD460~SFD469
#5	SFD390~SFD399	#13	SFD470~SFD479
#6	SFD400~SFD409	#14	SFD480~SFD489
#7	SFD410~SFD419	#15	SFD490~SFD499
#8	SFD420~SFD429	#16	SFD500~SFD509



As shown above, each register is configured to set the mode for four channels; each register consists of 16 bits, and the modes for the four channels are configured sequentially in groups of four bits, from the lowest to the highest bit position.

3) SFD Bit Definition

Using the First Module as an example to illustrate the setup method.

<table>
<tr><th colspan="2">Register</th><th>Bit7</th><th>Bit6</th><th>Bit5</th><th>Bit4</th><th>Bit3</th><th>Bit2</th><th>Bit1</th><th>Bit0</th><th>Explain</th></tr>
<tr><td rowspan="2">SFD350</td><td>Byte0</td><td colspan="8">AD Channel 1, Channel 2 Filter Coefficient</td><td rowspan="2">AD filtering coefficient</td></tr>
<tr><td>Byte1</td><td colspan="8">AD Channel 3, Channel 4 filtering coefficient</td></tr>
<tr><td rowspan="4">SFD351</td><td rowspan="2">Byte2</td><td colspan="4">AD2</td><td colspan="4">AD1</td><td rowspan="4">Used to specify the input range for the AD module: the lower 4 bits of Byte2 represent the configuration bits for AD Channel 1, while the upper 4 bits represent the configuration bits for AD</td></tr>
<tr><td>Keep</td><td colspan="3">000：0~10V
001：0~5V
100：-10~10V
101：-5~5V
010：0~20mA
011：4~20mA
110：-20~20mA</td><td>Keep</td><td colspan="3">000：0~10V
001：0~5V
100：-10~10V
101：-5~5V
010：0~20mA
011：4~20mA
110：-20~20mA</td></tr>
<tr><td rowspan="2">Byte3</td><td colspan="4">AD4</td><td colspan="4">AD3</td></tr>
<tr><td>Keep</td><td colspan="3">000：0~10V
001：0~5V
100：-10~10V</td><td>Keep</td><td colspan="3">000：0~10V
001：0~5V
100：-10~10V</td></tr>
</table>

Register		Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0	Explain
			101：-5~5V 010：0~20mA 011：4~20mA 110：-20~20mA				101：-5~5V 010：0~20mA 011：4~20mA 110：-20~20mA			Channel 2; the lower 4 bits of Byte3 represent the configuration bits for AD Channel 3, while the upper 4 bits represent the configuration bits for AD Channel 4.
SFD352	Byte4	AD channel short-circuit/open-circuit/overshoot detection switch								
	Byte5	Keep								
SFD353~SFD359		Keep								

Example: Set the operating modes for Channels 3, 2, 1, and 0 of the first module to 0–20 mA, 4–20 mA, 0–10 V, and 0–5 V, respectively; set the filtering coefficients for Channels 1 and 2 to 254, and for Channels 3 and 4 to 100.

Method 1:

It can be configured directly from the configuration panel; the configuration method is shown in the figure above.

Method 2:

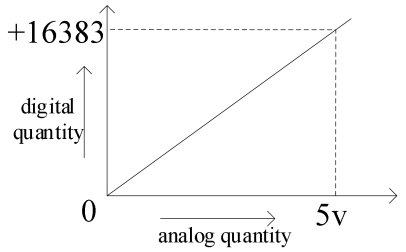
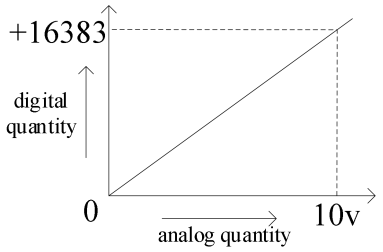
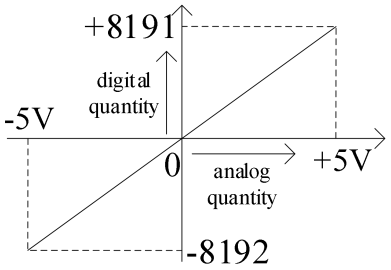
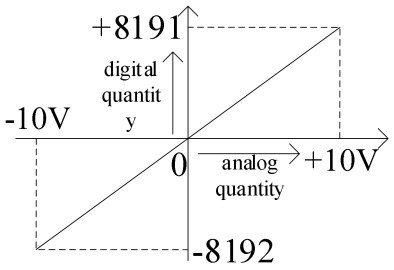
Set the SFD special register directly to the following value:

SFD350=64FEH SFD351=2301H SFD352=0000H SFD353=0000H

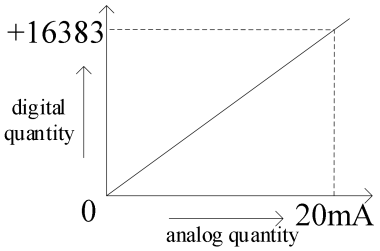
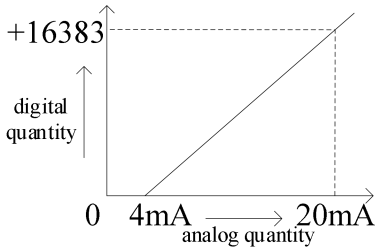
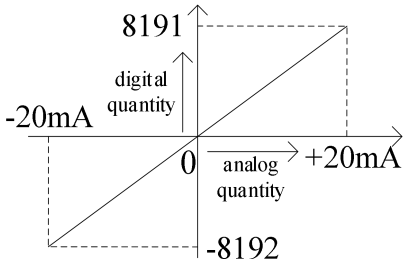
3.2.6.Analog-to-Digital Conversion Diagram

The relationship between the input analog signal and the converted digital signal is shown in the table below:

- Analog Voltage-to-Digital Conversion Diagram

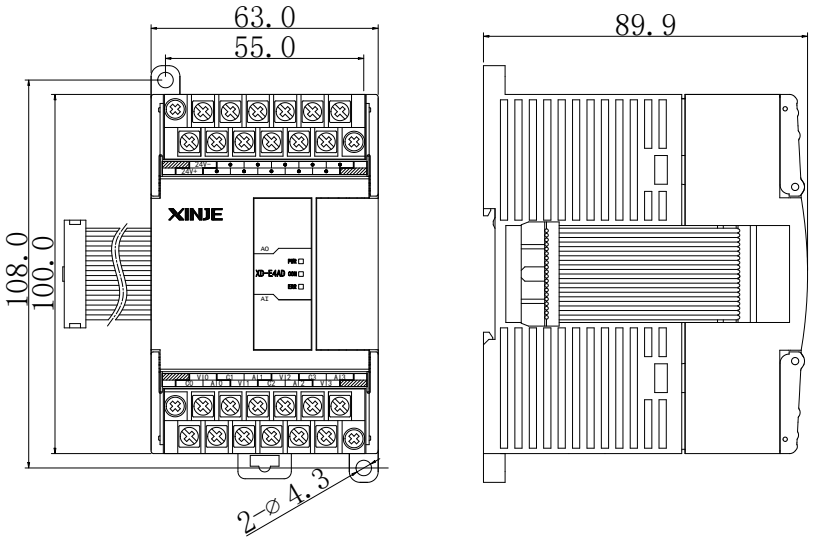
0–5 V Analog Input	0–10 V Analog Input
	
-5~5 V Analog Input	**-10~10 V Analog Input**
	

- Analog Current-to-Digital Converter Diagram

0–20 mA Analog Input	4–20 mA Analog Input
	
-20~20 mA Analog Input	
	

When the channel enable switch is turned on and the AD voltage input is open-circuit, the corresponding ID register displays the value 16383; when the AD current input is open-circuit, the corresponding ID register displays the value 0. When the channel enable switch is turned off, the ID register corresponding to the AD voltage/current input displays the value 0.

3.2.7.External Dimensions Diagram

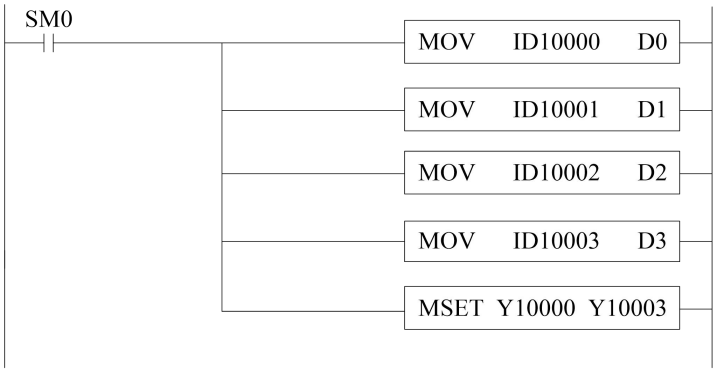


(unit:mm)

3.2.8.Programming Example

Example: Read real-time data from four channels (using the first module as an example).

Procedure:



Description:

SM0 is a normally ON coil that remains in the ON state throughout the PLC operation.

The PLC starts operating and continuously writes the data from Channel 0 of Module #1 into the data register D0;

Write data from Channel 1 into Data Register D1;

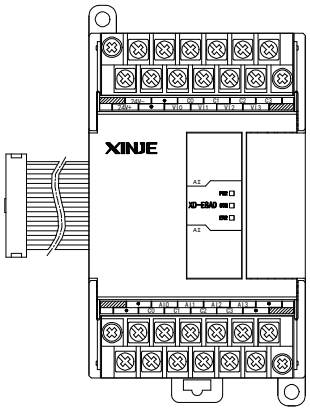
Write data from Channel 2 into Data Register D2;

Write data from Channel 3 into Data Register D3;

Since all channels are in use, enable all channel enable bits.

3.3. 14 Bit Analog Current and Voltage Input Module XD-E8AD

3.3.1.Module Features and Specifications



The XD-E8AD analog input module converts eight analog input signals into digital values and transmits them to the PLC main unit, enabling real-time data exchange with the PLC main unit.

1) Module Features

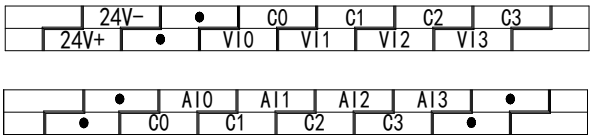
- 8-channel analog input: 4 front-end voltage inputs and 4 rear-end current inputs.
- 14-bit high-precision analog input.
- As specialized functional modules for the XD series, the XD3/XD3E can support up to 10 additional modules connected to the right side of the PLC main unit; the XD5/XDM/XDC/XD5E/XDME/XDH can support up to 16 additional modules; whereas the XD1/XD2 do not support the addition of any modules.

2) Module Specifications

Project	Read Analogue Input	
	Voltage Input	Current Input
Analog Input Range	0~5V、0~10V、-5~5V、-10~10V (Impedance greater than 1 M)	0~20mA、4~20mA、-20～20mA (Impedance: approximately 120 Ω)
Maximum Input Range	DC±15V	-40~40mA
Digital Output Range	0–16383 or-8192–8191	
Resolution Ratio	1/16383（14Bit）	
Overall Accuracy	±1%	
Conversion Rate	2ms/1 channel	
Module Power Supply	DC24V±10%，150mA	

The XD-E8AD module versions with a V8 or lower do not support input ranges of-5~5V, -10~10V, or-20~20mA.

3.3.2.Terminal Specifications



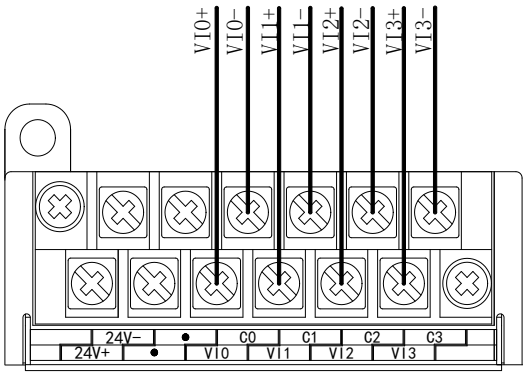
Channel	Terminal Name	Signal Name
CH0	VI0	Voltage analog input
	C0	CH0 Analog Input Common Terminal
CH1	VI1	Voltage analog input
	C1	CH1 Analog Input Common Terminal
CH2	VI2	Voltage analog input
	C2	CH2 Analog Input Common Terminal
CH3	VI3	Voltage analog input
	C3	CH3 analog input common terminal
CH4	AI0	Current analog input
	C0	CH0 Analog Input Common Terminal
CH5	AI1	Current analog input
	C1	CH1 Analog Input Common Terminal
CH6	AI2	Current analog input
	C2	CH2 Analog Input Common Terminal
CH7	AI3	Current analog input
	C3	CH3 analog input common terminal
-	24V+	+24V power supply
	24V-	Power supply common terminal

3.3.3.External Connection

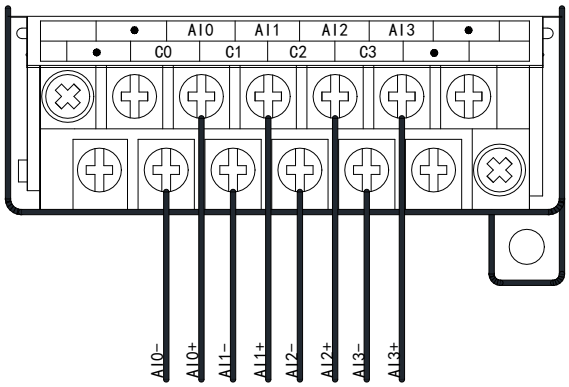
When establishing an external connection, please note the following aspects:

- To prevent interference, please use shielded cable and perform single-point grounding of the shield layer.
- When connecting the XD-E8AD to an external +24V power supply, please use the 24V power supply built into the PLC unit to avoid interference.

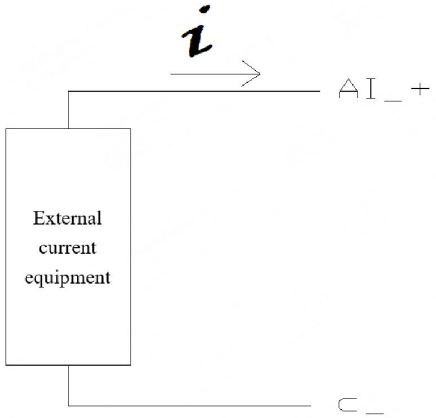
1) Single-Ended Voltage Input



2) Single-Ended Current Input



The current input-side wiring for the XD-E8AD is shown in the figure below:



3.3.4.Input Definition Number Allocation

The XD series analog input modules do not occupy any I/O units; the converted values are directly written into the PLC registers. The definition numbers for the PLC registers corresponding to each channel are as follows:

Each channel can only be used when the enable switch is turned on.

First Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID10000	Y10000	X10000
1CH	ID10001	Y10001	X10001
2CH	ID10002	Y10002	X10002
3CH	ID10003	Y10003	X10003
4CH	ID10004	Y10004	X10004
5CH	ID10005	Y10005	X10005
6CH	ID10006	Y10006	X10006
7CH	ID10007	Y10007	X10007

Second Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID10100	Y10100	X10100
1CH	ID10101	Y10101	X10101
2CH	ID10102	Y10102	X10102
3CH	ID10103	Y10103	X10103
4CH	ID10104	Y10104	X10104
5CH	ID10105	Y10105	X10105
6CH	ID10106	Y10106	X10106
7CH	ID10107	Y10107	X10107

Third Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID10200	Y10200	X10200
1CH	ID10201	Y10201	X10201
2CH	ID10202	Y10202	X10202
3CH	ID10203	Y10203	X10203
4CH	ID10204	Y10204	X10204
5CH	ID10205	Y10205	X10205
6CH	ID10206	Y10206	X10206
7CH	ID10207	Y10207	X10207

Fourth Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID10300	Y10300	X10300
1CH	ID10301	Y10301	X10301
2CH	ID10302	Y10302	X10302
3CH	ID10303	Y10303	X10303
4CH	ID10304	Y10304	X10304
5CH	ID10305	Y10305	X10305
6CH	ID10306	Y10306	X10306
7CH	ID10307	Y10307	X10307

Fifth Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID10400	Y10400	X10400
1CH	ID10401	Y10401	X10401
2CH	ID10402	Y10402	X10402
3CH	ID10403	Y10403	X10403
4CH	ID10404	Y10404	X10404
5CH	ID10405	Y10405	X10405
6CH	ID10406	Y10406	X10406
7CH	ID10407	Y10407	X10407

Sixth Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID10500	Y10500	X10500
1CH	ID10501	Y10501	X10501
2CH	ID10502	Y10502	X10502
3CH	ID10503	Y10503	X10503
4CH	ID10504	Y10504	X10504
5CH	ID10505	Y10505	X10505
6CH	ID10506	Y10506	X10506
7CH	ID10507	Y10507	X10507

Seventh Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID10600	Y10600	X10600
1CH	ID10601	Y10601	X10601
2CH	ID10602	Y10602	X10602
3CH	ID10603	Y10603	X10603
4CH	ID10604	Y10604	X10604
5CH	ID10605	Y10605	X10605
6CH	ID10606	Y10606	X10606
7CH	ID10607	Y10607	X10607

Eighth Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID10700	Y10700	X10700
1CH	ID10701	Y10701	X10701
2CH	ID10702	Y10702	X10702
3CH	ID10703	Y10703	X10703
4CH	ID10704	Y10704	X10704
5CH	ID10705	Y10705	X10705
6CH	ID10706	Y10706	X10706
7CH	ID10707	Y10707	X10707

Ninth Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID10800	Y11000	X11000
1CH	ID10801	Y11001	X11001
2CH	ID10802	Y11002	X11002
3CH	ID10803	Y11003	X11003
4CH	ID10804	Y11004	X11004
5CH	ID10805	Y11005	X11005
6CH	ID10806	Y11006	X11006
7CH	ID10807	Y11007	X11007

Tenth Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID10900	Y11100	X11100
1CH	ID10901	Y11101	X11101
2CH	ID10902	Y11102	X11102
3CH	ID10903	Y11103	X11103
4CH	ID10904	Y11104	X11104
5CH	ID10905	Y11105	X11105
6CH	ID10906	Y11106	X11106
7CH	ID10907	Y11107	X11107

Eleventh Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID11000	Y11200	X11200
1CH	ID11001	Y11201	X11201
2CH	ID11002	Y11202	X11202
3CH	ID11003	Y11203	X11203
4CH	ID11004	Y11204	X11204
5CH	ID11005	Y11205	X11205
6CH	ID11006	Y11206	X11206
7CH	ID11007	Y11207	X11207

Twelfth Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID11100	Y11300	X11300
1CH	ID11101	Y11301	X11301
Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
2CH	ID11102	Y11302	X11302
3CH	ID11103	Y11303	X11303
4CH	ID11104	Y11304	X11304
5CH	ID11105	Y11305	X11305
6CH	ID11106	Y11306	X11306
7CH	ID11107	Y11307	X11307

Thirteenth Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID11200	Y11400	X11400
1CH	ID11201	Y11401	X11401
2CH	ID11202	Y11402	X11402
3CH	ID11203	Y11403	X11403
4CH	ID11204	Y11404	X11404
5CH	ID11205	Y11405	X11405
6CH	ID11206	Y11406	X11406
7CH	ID11207	Y11407	X11407

Fourteenth Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID11300	Y11500	X11500
1CH	ID11301	Y11501	X11501
2CH	ID11302	Y11502	X11502
3CH	ID11303	Y11503	X11503
4CH	ID11304	Y11504	X11504
5CH	ID11305	Y11505	X11505
6CH	ID11306	Y11506	X11506
7CH	ID11307	Y11507	X11507

Fifteenth Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID11400	Y11600	X11600
1CH	ID11401	Y11601	X11601
2CH	ID11402	Y11602	X11602
3CH	ID11403	Y11603	X11603
4CH	ID11404	Y11604	X11604
5CH	ID11405	Y11605	X11605
6CH	ID11406	Y11606	X11606
7CH	ID11407	Y11607	X11607

Sixteenth Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID11500	Y11700	X11700
1CH	ID11501	Y11701	X11701
2CH	ID11502	Y11702	X11702
3CH	ID11503	Y11703	X11703
4CH	ID11504	Y11704	X11704
5CH	ID11505	Y11705	X11705
6CH	ID11506	Y11706	X11706
7CH	ID11507	Y11707	X11707

- Disabling unused channels can increase the input/output scanning speed.
- When the input enable switch is turned off during operation, the corresponding input channel will not capture any data (the data value will be displayed as 0).

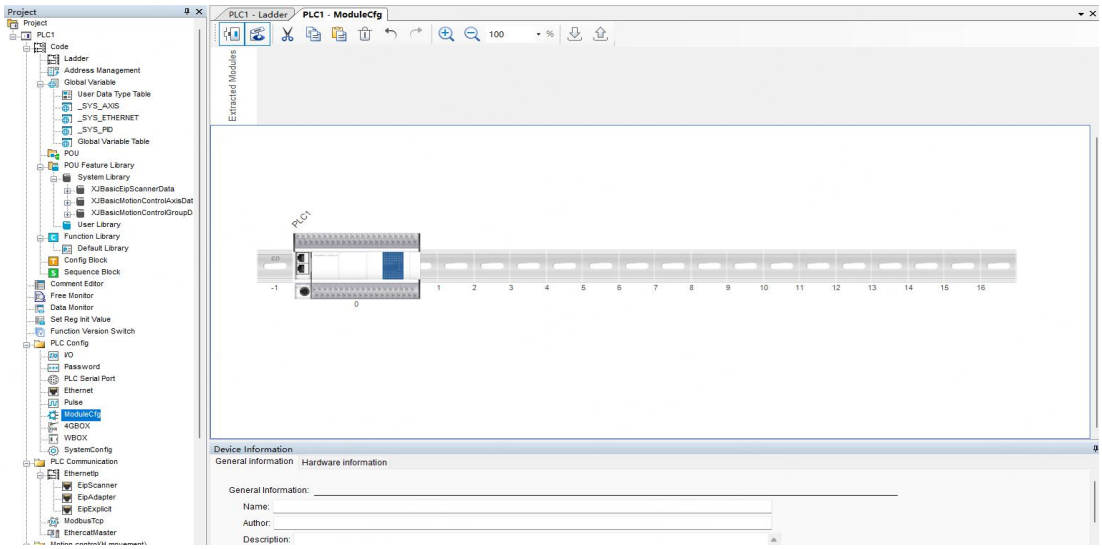
3.3.5.Work Mode Setup

There are two methods for configuring the operating mode (these two methods yield equivalent results):

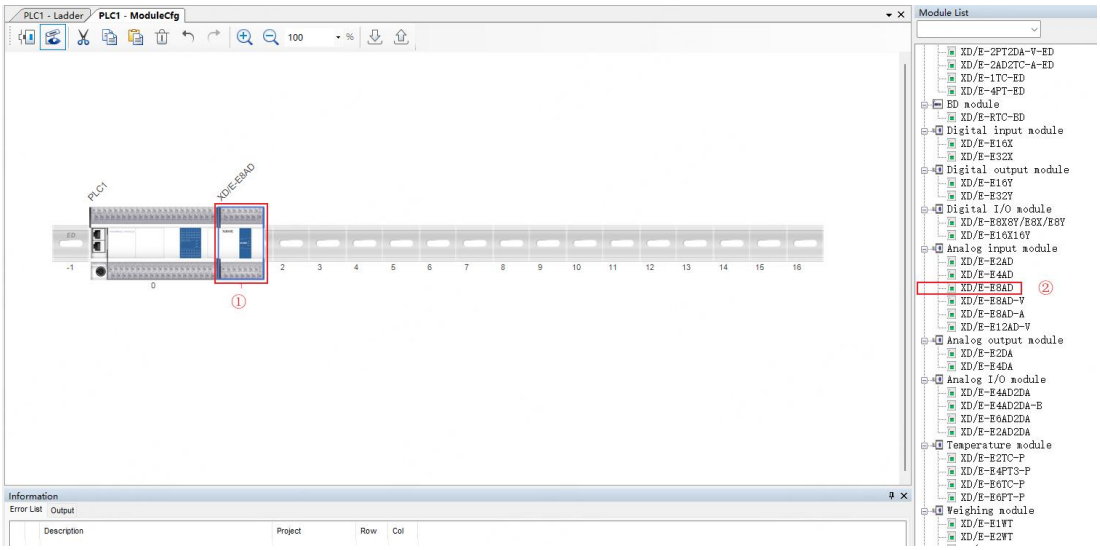
- Through Control Panel configuration
- Set via Flash registers

1) Configuration Panel Configuration

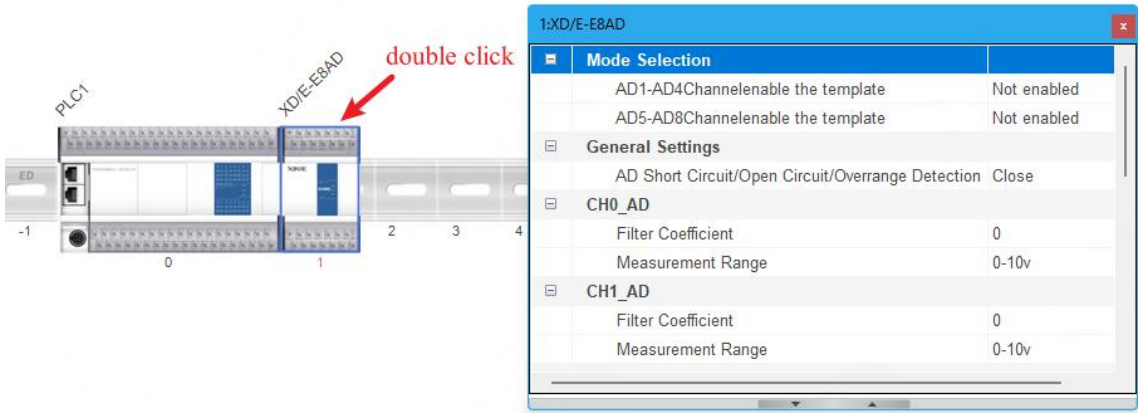
1. Use the XINJE PLC Programming Tool Software version 3.8.0a or later to configure the module; click [PLC Configuration] – [Module Configuration] in the left-side Engineering Bar to open the Expansion Module Settings window. For versions prior to 3.8.0a of the XINJE PLC Programming Tool Software, click [PLC Configuration] – [Expansion Module] in the left-side Engineering Bar to perform the configuration.



2. Select a module from the right-hand module list and drag it to the desired position, or double-click a module in the right-hand module list to select it:


PLC1 - Ladder
PLC1 - ModuleCfg
Module List
PLC1
XD/E-E8AD
①
②
Information
Error List
Output
Description
Project
Row
Col
XD/E-2PT2DA-V-ED
XD/E-2AD2TC-A-ED
XD/E-1TC-ED
XD/E-4PT-ED
BD module
XD/E-RTC-BD
Digital input module
XD/E-E16X
XD/E-E32X
Digital output module
XD/E-E16Y
XD/E-E32Y
Digital I/O module
XD/E-E8X8Y/E8X/E8Y
XD/E-E16X16Y
Analog input module
XD/E-E2AD
XD/E-E4AD
XD/E-E8AD
XD/E-E8AD-V
XD/E-E8AD-A
XD/E-E12AD-V
Analog output module
XD/E-E2DA
XD/E-E4DA
Analog I/O module
XD/E-E4AD2DA
XD/E-E4AD2DA-E
XD/E-E6AD2DA
XD/E-E2AD2DA
Temperature module
XD/E-E2TC-P
XD/E-E4PT3-P
XD/E-E6TC-P
XD/E-E6PT-P
Weighing module
XD/E-E1WT
XD/E-E2WT

3. Double-click the corresponding module icon to access the module configuration interface, where you can select the AD filter coefficient and the voltage or current input mode for the AD channel.



4. Click "" to view the default configuration parameters for the Expansion module.

5. After completing the parameter configuration for the expansion module, click "" to write the set values into the PLC; the changes will take effect only after the PLC is powered off and then powered on again. Under the Module Configuration Node, mount the configured module, then double-click to enter the Module Parameter Configuration screen.



- The first-order low-pass filtering method weights the current sample value by the previous filtered output value to obtain the effective filtered value.
- The filtering coefficient is set by the user between 0 and 254; a lower value results in more stable data but may cause data lag; a value of 1 corresponds to the strongest filtering effect, while a value of 254 corresponds to the weakest filtering effect; the default value is 0 (no filtering).
- ※ When the expansion module " AD Short Circuit/Open Circuit/Overrange Detection Close " is set to ON, you can check the channel status by examining the channel alarm flag bit X1xxxx.

  For instance:

  The first AD channel is configured in voltage mode; when the AD detects a short circuit, open circuit, or out-of-range condition, the X10000 will be turned on;

  The fifth AD channel is configured in current-mode; when the AD detects an over-range condition, the X10004 will be turned on.

2) Flash Register Configuration

The expansion module's input channels support two selectable operating modes: voltage and current. The current range options include 0–20 mA, 4–20 mA, and –20–20 mA; the voltage range options include 0–5 V, 0–10 V, –5–5 V, and –10–10 V. These settings are configured using the SFD (Special FLASH Data Register) within the PLC. As shown below:

Module ID	Configuration Information Address	Module ID	Configuration Information Address
#1	SFD350~SFD359	#9	SFD430~SFD439
#2	SFD360~SFD369	#10	SFD440~SFD449
#3	SFD370~SFD379	#11	SFD450~SFD459
#4	SFD380~SFD389	#12	SFD460~SFD469
#5	SFD390~SFD399	#13	SFD470~SFD479
#6	SFD400~SFD409	#14	SFD480~SFD489
#7	SFD410~SFD419	#15	SFD490~SFD499
#8	SFD420~SFD429	#16	SFD500~SFD509



As shown above, each register is configured to set the mode for four channels; each register consists of 16 bits, and the modes for the four channels are configured sequentially in groups of four bits, from the lowest to the highest bit position.

3) SFD Bit Definition

<table>
<tr><th colspan="2">Register</th><th>Bit7</th><th>Bit6</th><th>Bit5</th><th>Bit4</th><th>Bit3</th><th>Bit2</th><th>Bit1</th><th>Bit0</th><th>Explain</th></tr>
<tr><td rowspan="2">SFD350</td><td>Byte0</td><td colspan="8">AD Channel 2; Channel 1 filtering coefficient</td><td rowspan="4">AD filtering coefficient</td></tr>
<tr><td>Byte1</td><td colspan="8">AD Channel 4; Channel 3 filtering coefficient</td></tr>
<tr><td rowspan="2">SFD351</td><td>Byte2</td><td colspan="8">AD Channel 6; Channel 5 filtering coefficient</td></tr>
<tr><td>Byte3</td><td colspan="8">AD Channel 8; Channel 7 filtering coefficient</td></tr>
<tr><td rowspan="4">SFD352</td><td rowspan="2">Byte4</td><td colspan="4">AD2</td><td colspan="4">AD1</td><td rowspan="10">Used to specify the input range of the AD module; the lower 4 bits of Byte4 represent the configuration bits for AD Channel 1, while the upper 4 bits represent the configuration bits for AD Channel 2; The lower 4 bits of Byte5 represent the configuration bits for AD Channel 3; the upper 4 bits represent the configuration bits for AD Channel 4; the lower 4 bits of Byte6 represent the</td></tr>
<tr><td colspan="4">0000: Voltage 0–10 V
0001: Voltage 0–5 V
0010: Voltage – 10–10 V
0011: Voltage – 5~5 V</td><td colspan="4">0000: Voltage 0–10 V
0001: Voltage 0–5 V
0010: Voltage – 10–10 V
0011: Voltage – 5~5 V</td></tr>
<tr><td rowspan="2">Byte5</td><td colspan="4">AD4</td><td colspan="4">AD3</td></tr>
<tr><td colspan="4">0000: Voltage 0–10 V
0001: Voltage 0–5 V
0010: Voltage – 10–10 V
0011: Voltage – 5~5 V</td><td colspan="4">0000: Voltage 0–10 V
0001: Voltage 0–5 V
0010: Voltage – 10–10 V
0011: Voltage – 5~5 V</td></tr>
<tr><td rowspan="4">SFD353</td><td rowspan="2">Byte6</td><td colspan="4">AD6</td><td colspan="4">AD5</td></tr>
<tr><td colspan="4">1000: Current 0–20 mA
1001: Current: 4–20 mA
1010: Current – 20–20 mA</td><td colspan="4">1000: Current 0–20 mA
1001: Current: 4–20 mA
1010: Current – 20–20 mA</td></tr>
<tr><td rowspan="2">Byte7</td><td colspan="4">AD8</td><td colspan="4">AD7</td></tr>
<tr><td colspan="4">1000: Current 0–20 mA
1001: Current: 4–20 mA
1010: Current – 20–20 mA</td><td colspan="4">1000: Current 0–20 mA
1001: Current: 4–20 mA
1010: Current – 20–20 mA</td></tr>
<tr><td rowspan="2">SFD354</td><td>Byte8</td><td colspan="8">AD channel short-circuit/open-circuit/overshoot detection switch</td></tr>
<tr><td>Byte9</td><td colspan="8">Keep</td></tr>
</table>

Register	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0	Explain
SFD355~SFD359	Keep								configuration bits for AD Channel 5; the upper 4 bits represent the configuration bits for AD Channel 6; The lower 4 bits of Byte7 represent the configuration bits for AD Channel 7; the upper 4 bits represent the configuration bits for AD Channel 8.

Using the First Module as an example to illustrate the setup method.

Example: Set the operating mode for Input Channels 1 and 0 of the first module to 0–10 V; set the operating mode for Input Channels 3 and 2 to 0–5 V; set the operating mode for Input Channels 5 and 4 to 0–20 mA; set the operating mode for Input Channels 7 and 6 to 4–20 mA; set the filtering coefficient for Channels 0, 1, 2, and 3 to 254; set the filtering coefficient for Channels 4, 5, 6, and 7 to 100.

Method 1:

It can be configured directly from the configuration panel; the configuration method is shown in the figure above.

Method 2:

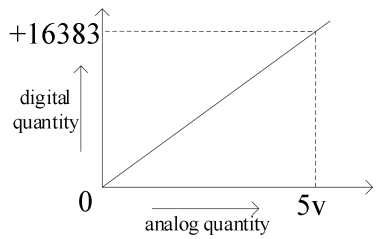
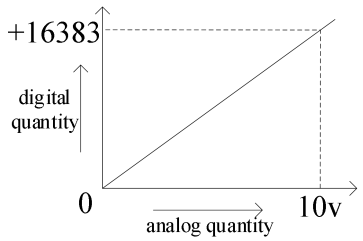
Set the SFD special register directly to the following value:

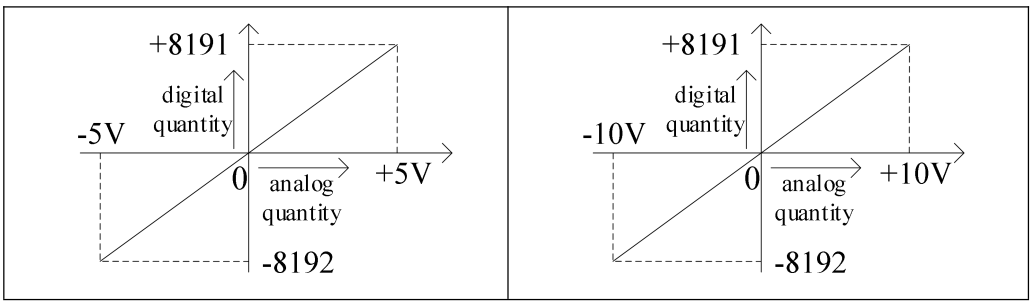
SFD350=FEFEH SFD351=6464H SFD352=1100H SFD353=9988H

3.3.6.Analog-to-Digital Conversion Diagram

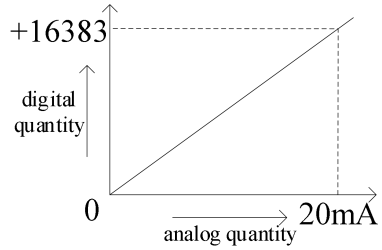
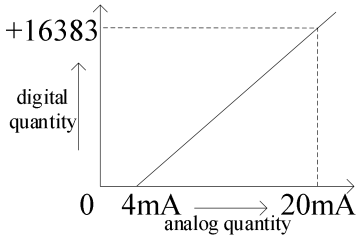
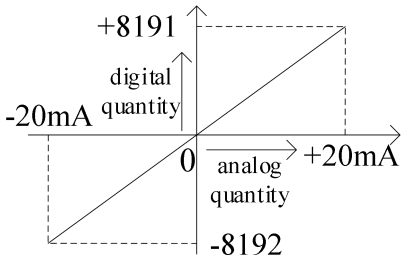
The relationship between the input analog signal and the converted digital signal is shown in the table below:

- Analog Voltage-to-Digital Conversion Diagram

0−5 V Analog Input	0−10 V Analog Input
	
-5~5 V Analog Input	-10~10 V Analog Input

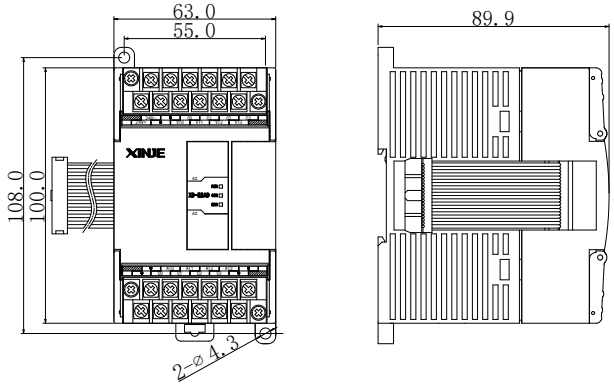


- Analog Current-To-Digital Converter Diagram

0–20 mA Analog Input	4–20 mA Analog Input
	
-20~20 mA Analog Input	
	

When the channel enable switch is turned on and the AD voltage input is open-circuit, the corresponding ID register displays the value 16383; when the AD current input is open-circuit, the corresponding ID register displays the value 0. When the channel enable switch is turned off, the ID register corresponding to the AD voltage/current input displays the value 0.

3.3.7.External Dimensions Diagram

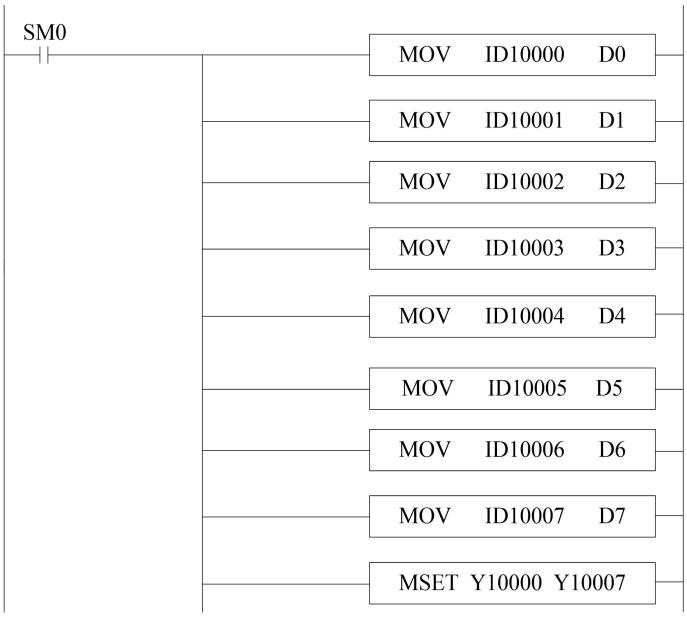


(unit:mm)

3.3.8.Programming Example

Example: Real-time data reading from 8 channels (using Module 1 as an example)

Procedure:



Description:

SM0 is a normally ON coil that remains in the ON state throughout the PLC operation.

The PLC starts operating and continuously writes the data from Channel 0 of Module #1 into the data register D0;

Write data from Channel 1 into Data Register D1;

Write data from Channel 2 into Data Register D2;

Write data from Channel 3 into Data Register D3;

Write data from Channel 4 into Data Register D4;

Write data from Channel 5 into Data Register D5;

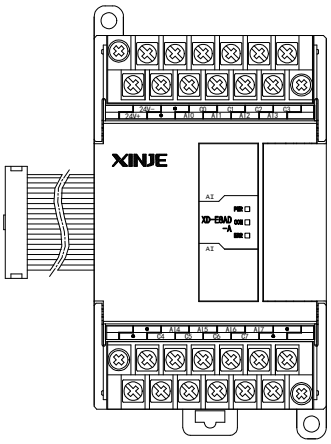
Write data from Channel 6 into Data Register D6;

Write data from Channel 7 into Data Register D7;

Since all channels are in use, enable all channel enable bits.

3.4. 14 Bit Analog Current Input Module XD-E8AD-A

3.4.1.Module Features and Specifications



The XD-E8AD-A analog input module converts eight analog current input signals into digital values and transmits them to the PLC main unit, enabling real-time data exchange with the PLC main unit.

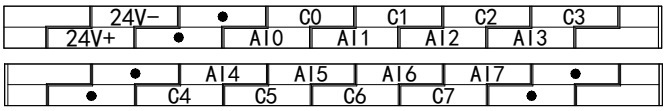
1) Module Features

- 8-channel analog input: Current input.
- 14-bit high-precision analog input.
- As specialized functional modules for the XD series, the XD3/XD3E can support up to 10 additional modules connected to the right side of the PLC main unit; the XD5/XDM/XDC/XD5E/XDME/XDH can support up to 16 additional modules; whereas the XD1/XD2 do not support the addition of any modules.

2) Module Specifications

Project	Analog Current Input
Analog input range	0–20 mA, 4–20 mA, –20–20 mA (impedance approximately 120 Ω)
Maximum input range	-40~40mA
Digital output range	0–16383 or-8192–8191
resolution ratio	1/16383（14Bit）
Overall accuracy	±1%
conversion rate	2ms/1 channel
Module Power Supply	DC24V±10%，150mA

3.4.2.Terminal Specifications



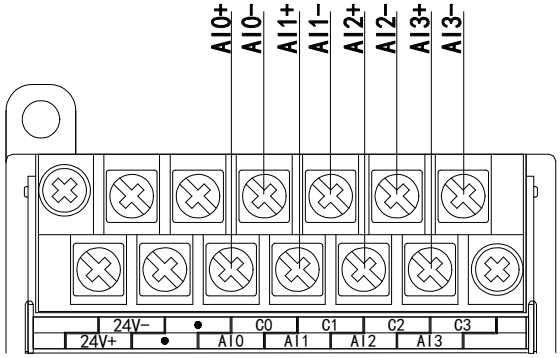
Channel	Terminal Name	Signal Name
CH0	AI0	Current analog input
	C0	CH0 Analog Input Common Terminal
CH1	AI1	Current analog input
	C1	CH1 Analog Input Common Terminal
CH2	AI2	Current analog input
	C2	CH2 Analog Input Common Terminal
CH3	AI3	Current analog input
	C3	CH3 analog input common terminal
CH4	AI4	Current analog input
	C4	CH4 analog input common terminal
CH5	AI5	Current analog input
	C5	CH5 Analog Input Common Terminal
CH6	AI6	Current analog input
	C6	CH6 Analog Input Common Terminal
CH7	AI7	Current analog input
	C7	CH7 Analog Input Common Terminal
—	24V+	DC + 24V power input
	24V-	Power supply common terminal

3.4.3.External Connection

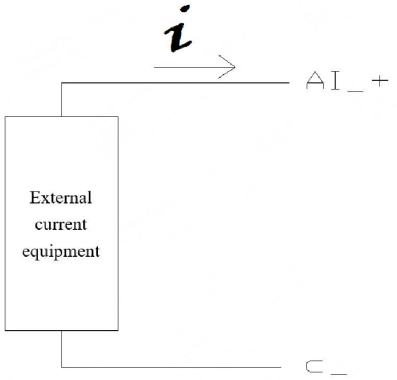
When establishing an external connection, please note the following aspects:

- To prevent interference, please use shielded cable and perform single-point grounding of the shield layer.
- When connecting the XD-E8AD-A to an external +24V power supply, please use the 24V power supply built into the PLC unit to avoid interference.

Current single-ended input



The current input-side wiring for the XD-E8AD-A is shown in the figure below:



3.4.4.Input Definition Number Allocation

The XD series analog input modules do not occupy any I/O units; the converted values are directly written into the PLC registers. The definition numbers for the PLC registers corresponding to each channel are as follows:

Each channel can only be used when the enable switch is turned on.

First Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID10000	Y10000	X10000
1CH	ID10001	Y10001	X10001
2CH	ID10002	Y10002	X10002
3CH	ID10003	Y10003	X10003
4CH	ID10004	Y10004	X10004
5CH	ID10005	Y10005	X10005
6CH	ID10006	Y10006	X10006
7CH	ID10007	Y10007	X10007

Second Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID10100	Y10100	X10100
1CH	ID10101	Y10101	X10101
2CH	ID10102	Y10102	X10102
3CH	ID10103	Y10103	X10103
4CH	ID10104	Y10104	X10104
5CH	ID10105	Y10105	X10105
6CH	ID10106	Y10106	X10106
7CH	ID10107	Y10107	X10107

Third Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID10200	Y10200	X10200
1CH	ID10201	Y10201	X10201
2CH	ID10202	Y10202	X10202
3CH	ID10203	Y10203	X10203
4CH	ID10204	Y10204	X10204
5CH	ID10205	Y10205	X10205
6CH	ID10206	Y10206	X10206
7CH	ID10207	Y10207	X10207

Fourth Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID10300	Y10300	X10300
1CH	ID10301	Y10301	X10301
2CH	ID10302	Y10302	X10302
3CH	ID10303	Y10303	X10303
4CH	ID10304	Y10304	X10304
5CH	ID10305	Y10305	X10305
6CH	ID10306	Y10306	X10306
7CH	ID10307	Y10307	X10307

Fifth Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID10400	Y10400	X10400
1CH	ID10401	Y10401	X10401
2CH	ID10402	Y10402	X10402
3CH	ID10403	Y10403	X10403
4CH	ID10404	Y10404	X10404
5CH	ID10405	Y10405	X10405
6CH	ID10406	Y10406	X10406
7CH	ID10407	Y10407	X10407

Sixth Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID10500	Y10500	X10500
1CH	ID10501	Y10501	X10501
2CH	ID10502	Y10502	X10502
3CH	ID10503	Y10503	X10503
4CH	ID10504	Y10504	X10504
5CH	ID10505	Y10505	X10505
6CH	ID10506	Y10506	X10506
7CH	ID10507	Y10507	X10507

Seventh Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID10600	Y10600	X10600
1CH	ID10601	Y10601	X10601
2CH	ID10602	Y10602	X10602
3CH	ID10603	Y10603	X10603
4CH	ID10604	Y10604	X10604
5CH	ID10605	Y10605	X10605
6CH	ID10606	Y10606	X10606
7CH	ID10607	Y10607	X10607

Eighth Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID10700	Y10700	X10700
1CH	ID10701	Y10701	X10701
2CH	ID10702	Y10702	X10702
3CH	ID10703	Y10703	X10703
4CH	ID10704	Y10704	X10704
5CH	ID10705	Y10705	X10705
6CH	ID10706	Y10706	X10706
7CH	ID10707	Y10707	X10707

Ninth Expansion Module Register Definition Number

channel	AD signal	Channel enable switch	Channel Alarm Flag Bit
0CH	ID10800	Y11000	X11000
1CH	ID10801	Y11001	X11001
2CH	ID10802	Y11002	X11002
3CH	ID10803	Y11003	X11003
4CH	ID10804	Y11004	X11004
5CH	ID10805	Y11005	X11005
6CH	ID10806	Y11006	X11006
7CH	ID10807	Y11007	X11007

Tenth Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID10900	Y11100	X11100
1CH	ID10901	Y11101	X11101
2CH	ID10902	Y11102	X11102
3CH	ID10903	Y11103	X11103
4CH	ID10904	Y11104	X11104
5CH	ID10905	Y11105	X11105
6CH	ID10906	Y11106	X11106
7CH	ID10907	Y11107	X11107

Eleventh Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID11000	Y11200	X11200
1CH	ID11001	Y11201	X11201
2CH	ID11002	Y11202	X11202
3CH	ID11003	Y11203	X11203
4CH	ID11004	Y11204	X11204
5CH	ID11005	Y11205	X11205
6CH	ID11006	Y11206	X11206
7CH	ID11007	Y11207	X11207

Twelfth Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID11100	Y11300	X11300
1CH	ID11101	Y11301	X11301
2CH	ID11102	Y11302	X11302
3CH	ID11103	Y11303	X11303
4CH	ID11104	Y11304	X11304
5CH	ID11105	Y11305	X11305
6CH	ID11106	Y11306	X11306
7CH	ID11107	Y11307	X11307

Thirteenth Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID11200	Y11400	X11400
1CH	ID11201	Y11401	X11401
2CH	ID11202	Y11402	X11402
3CH	ID11203	Y11403	X11403
4CH	ID11204	Y11404	X11404
5CH	ID11205	Y11405	X11405
6CH	ID11206	Y11406	X11406
7CH	ID11207	Y11407	X11407

Fourteenth Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID11300	Y11500	X11500
1CH	ID11301	Y11501	X11501
2CH	ID11302	Y11502	X11502
3CH	ID11303	Y11503	X11503
4CH	ID11304	Y11504	X11504
5CH	ID11305	Y11505	X11505
6CH	ID11306	Y11506	X11506
7CH	ID11307	Y11507	X11507

Fifteenth Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID11400	Y11600	X11600
1CH	ID11401	Y11601	X11601
2CH	ID11402	Y11602	X11602
3CH	ID11403	Y11603	X11603
4CH	ID11404	Y11604	X11604
5CH	ID11405	Y11605	X11605
6CH	ID11406	Y11606	X11606
7CH	ID11407	Y11607	X11607

Sixteenth Expansion Module Register Definition Code

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID11500	Y11700	X11700
1CH	ID11501	Y11701	X11701
2CH	ID11502	Y11702	X11702
3CH	ID11503	Y11703	X11703
4CH	ID11504	Y11704	X11704
5CH	ID11505	Y11705	X11705
6CH	ID11506	Y11706	X11706
7CH	ID11507	Y11707	X11707



- Disabling unused channels can increase the input/output scanning speed.
- When the input enable switch is turned off during operation, the corresponding input channel will not be able to capture any data (the data value will be displayed as 0).

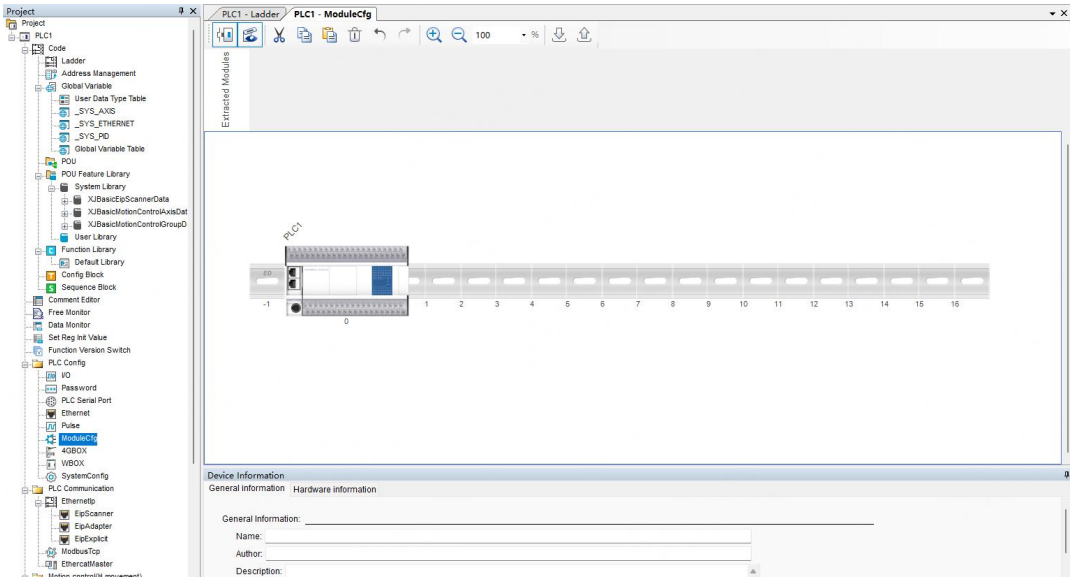
3.4.5.Work Mode Setup

There are two methods available for configuring the operating mode (these two methods yield equivalent results).

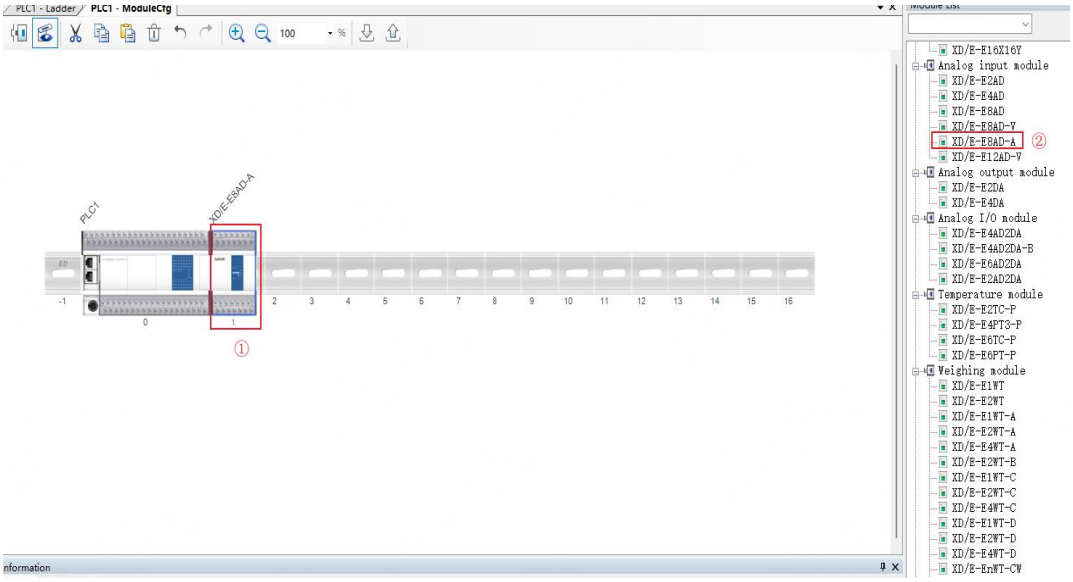
- Through Control Panel configuration
- Set via Flash registers

1) Configuration Panel Configuration

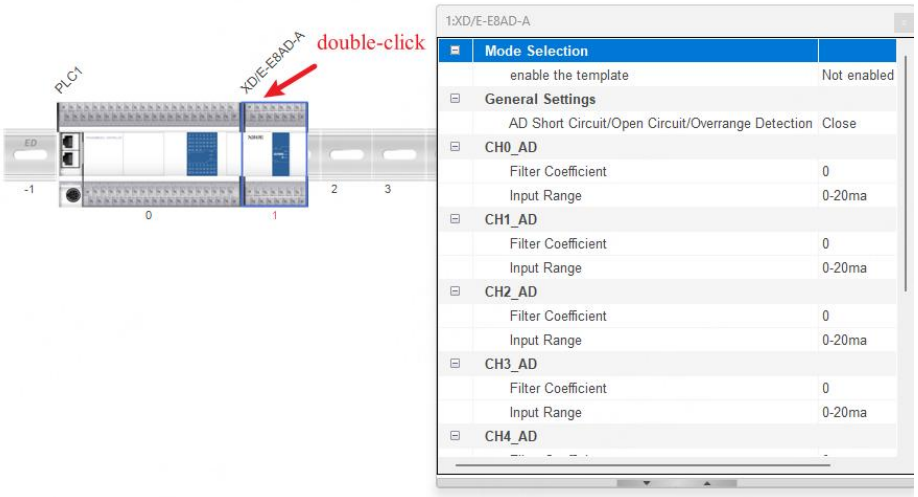
1. Use the XINJE PLC Programming Tool Software version 3.8.0a or later to configure the module; click [PLC Configuration] – [Module Configuration] in the left-side Engineering Bar to open the Expansion Module Settings window. For versions prior to 3.8.0a of the XINJE PLC Programming Tool Software, click [PLC Configuration] – [Expansion Module] in the left-side Engineering Bar to perform the configuration.



2. Select a module from the right-hand module list and drag it to the desired position, or double-click a module in the right-hand module list to select it:



3. Double-click the corresponding module icon to access the module configuration interface, where you can select the AD filter coefficient and the current input mode corresponding to the AD channel.



4. Click "  " to view the default configuration parameters for the Expansion module.

5. After completing the parameter configuration  for the expansion module, click "" to write the set values into the PLC; the changes will take effect only after the PLC is powered off and then powered on again. Under the Module Configuration Node, mount the configured module, then double-click to enter the Module Parameter Configuration screen.



- The first-order low-pass filtering method weights the current sample value by the previous filtered output value to obtain the effective filtered value.
- The filtering coefficient is set by the user between 0 and 254; a lower value results in more stable data but may cause data lag; a value of 1 corresponds to the strongest filtering effect, while a value of 254 corresponds to the weakest filtering effect; the default value is 0 (no filtering).
- ※ When the expansion module " AD Short Circuit/Open Circuit/Overrange Detection Close " is set to ON, you can check the channel status by examining the channel alarm flag bit X1xxxx.
- For example: When the first AD channel is configured in current-mode and the AD detects an out-of-range signal, X10000 will be turned on.

2) Flash Register Configuration

The expansion module's input channels operate in current-mode, with selectable ranges of 0–20 mA, 4–20 mA, or-20–20 mA; these settings are configured via the PLC's dedicated FLASH data register, SFD. As shown below:

Module ID	Configuration Information Address	Module ID	Configuration Information Address
#1	SFD350~SFD359	#9	SFD430~SFD439
#2	SFD360~SFD369	#10	SFD440~SFD449
#3	SFD370~SFD379	#11	SFD450~SFD459
#4	SFD380~SFD389	#12	SFD460~SFD469
#5	SFD390~SFD399	#13	SFD470~SFD479
#6	SFD400~SFD409	#14	SFD480~SFD489
#7	SFD410~SFD419	#15	SFD490~SFD499
#8	SFD420~SFD429	#16	SFD500~SFD509

As shown above, each register is configured to set the mode for four channels; each register consists of 16 bits, and the modes for the four channels are configured sequentially in groups of four bits, from the lowest to the highest bit position.

3) SFD Bit Definition

<table>
<tr><th colspan="2">Register</th><th>Bit7</th><th>Bit6</th><th>Bit5</th><th>Bit4</th><th>Bit3</th><th>Bit2</th><th>Bit1</th><th>Bit0</th><th>Explain</th></tr>
<tr><td rowspan="2">SFD350</td><td>Byte0</td><td colspan="8">AD Channel 2; Channel 1 filtering coefficient</td><td rowspan="4">AD filtering coefficient</td></tr>
<tr><td>Byte1</td><td colspan="8">AD Channel 4; Channel 3 filtering coefficient</td></tr>
<tr><td>SFD351</td><td>Byte2</td><td colspan="8">AD Channel 6; Channel 5 filtering coefficient</td></tr>
<tr><td></td><td>Byte3</td><td colspan="8">AD Channel 8; Channel 7 filtering coefficient</td></tr>
<tr><td rowspan="4">SFD352</td><td rowspan="2">Byte4</td><td colspan="4">AD2</td><td colspan="4">AD1</td><td rowspan="8">Used to specify the input range of the AD module; the lower 4 bits of Byte4 represent the configuration bits for AD Channel 1, while the upper 4 bits represent the configuration bits for AD Channel 2;
The lower 4 bits of Byte5 represent the configuration bits for AD</td></tr>
<tr><td colspan="4">1000: Current 0–20 mA
1001: Current: 4–20 mA
1010: Current – 20–20 mA</td><td colspan="4">1000: Current 0–20 mA
1001: Current: 4–20 mA
1010: Current – 20–20 mA</td></tr>
<tr><td rowspan="2">Byte5</td><td colspan="4">AD4</td><td colspan="4">AD3</td></tr>
<tr><td colspan="4">1000: Current 0–20 mA
1001: Current: 4–20 mA
1010: Current – 20–20 mA</td><td colspan="4">1000: Current 0–20 mA
1001: Current: 4–20 mA
1010: Current – 20–20 mA</td></tr>
<tr><td rowspan="4">SFD353</td><td rowspan="2">Byte6</td><td colspan="4">AD6</td><td colspan="4">AD5</td></tr>
<tr><td colspan="4">1000: Current 0–20 mA
1001: Current: 4–20 mA
1010: Current – 20–20 mA</td><td colspan="4">1000: Current 0–20 mA
1001: Current: 4–20 mA
1010: Current – 20–20 mA</td></tr>
<tr><td rowspan="2">Byte7</td><td colspan="4">AD8</td><td colspan="4">AD7</td></tr>
<tr><td colspan="4">1000: Current 0–20 mA
1001: Current: 4–20 mA
1010: Current – 20–20 mA</td><td colspan="4">1000: Current 0–20 mA
1001: Current: 4–20 mA
1010: Current – 20–20 mA</td></tr>
<tr><td rowspan="2">SFD354</td><td>Byte8</td><td colspan="8">AD channel short-circuit/open-circuit/overshoot detection switch</td><td rowspan="2">represent the configuration bits for AD</td></tr>
<tr><td>Byte9</td><td colspan="8">Keep</td></tr>
</table>

Register	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0	Explain
SFD355~ SFD359	Keep								Channel 3; the upper 4 bits represent the configuration bits for AD Channel 4; the lower 4 bits of Byte6 represent the configuration bits for AD Channel 5; the upper 4 bits represent the configuration bits for AD Channel 6; The lower 4 bits of Byte7 represent the configuration bits for AD Channel 7; the upper 4 bits represent the configuration bits for AD Channel 8.

Using the First Module as an example to illustrate the setup method.

Example: Set the operating mode for Input Channels 1 and 0 of the first module to 0–20 mA; set the operating mode for Input Channels 3 and 2 to 4–20 mA; set the operating mode for Input Channels 5 and 4 to 0–20 mA; set the operating mode for Input Channels 7 and 6 to-20–20 mA; set the filtering coefficient for Input Channels 0, 1, 2, and 3 to 254; set the filtering coefficient for Input Channels 4, 5, 6, and 7 to 100.

Method 1:

It can be configured directly from the configuration panel; the configuration method is shown in the figure above.

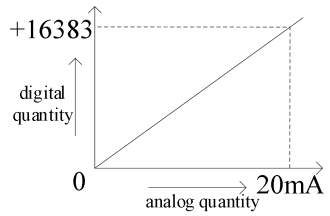
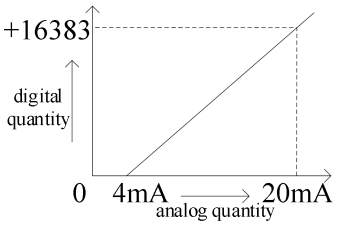
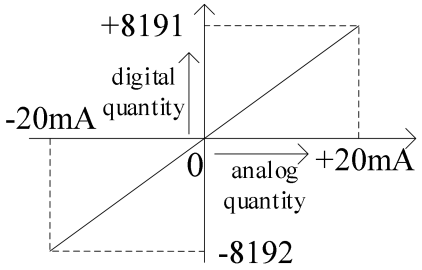
Method 2:

Set the SFD special register directly to the following value:

SFD350=FEFEH SFD351=6464H SFD352=9988H SFD353=AA88H

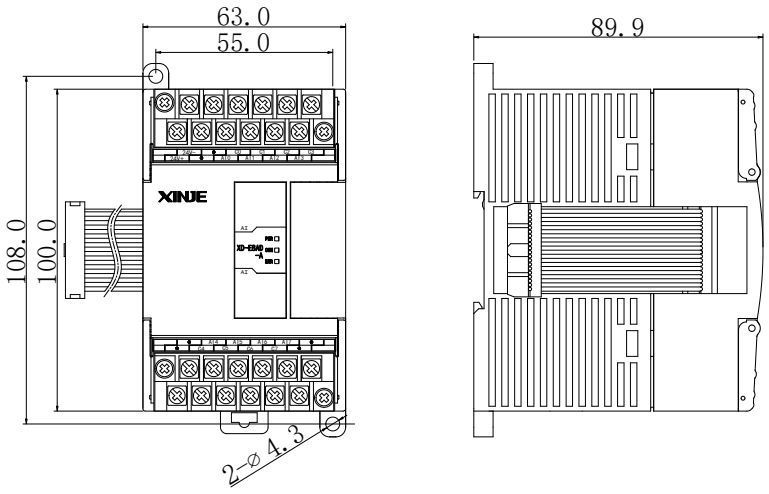
3.4.6.Analog-to-Digital Conversion Diagram

The relationship between the input analog signal and the converted digital signal is shown in the table below:

<table>
<tr><td>0−20 mA Analog Input</td><td>4−20 mA Analog Input</td></tr>
<tr><td>
</td><td>
</td></tr>
<tr><td>-20~20 mA Analog Input</td><td></td></tr>
<tr><td>
</td><td></td></tr>
</table>

When the channel enable switch is ON, if the analog voltage (AD) input is left floating, the corresponding ID register displays 16383; if the analog current (AD) input is left floating, the corresponding ID register displays 0. When the channel enable switch is OFF, the corresponding ID register displays 0 for both analog voltage and analog current inputs..

3.4.7.External Dimensions Diagram

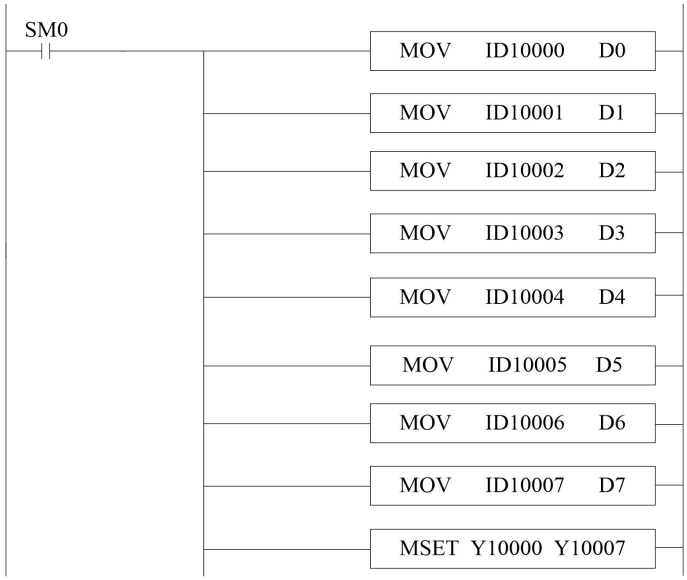


(unit:mm)

3.4.8.Programming Example

Example: Real-time data reading from 8 channels (using Module 1 as an example)

Procedure:



Description:

SM0 is a normally ON coil that remains in the ON state throughout the PLC operation.

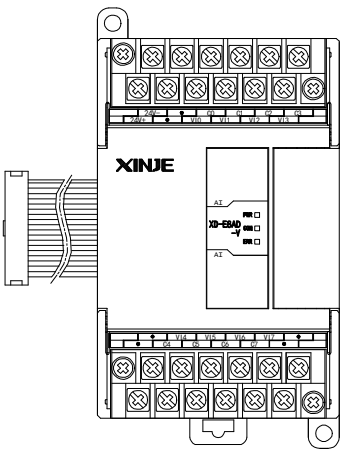
The PLC starts operating and continuously writes the data from Channel 0 of Module #1 into the data register D0;

Write data from Channel 1 into Data Register D1;
Write data from Channel 2 into Data Register D2;
Write data from Channel 3 into Data Register D3;
Write data from Channel 4 into Data Register D4;
Write data from Channel 5 into Data Register D5;
Write data from Channel 6 into Data Register D6;
Write data from Channel 7 into Data Register D7;

Since all channels are in use, enable all channel enable bits.

3.5. 14 Bit Analog Voltage Input Module XD-E8AD-V

3.5.1.Module Features and Specifications



The XD-E8AD-V analog input module converts eight analog input signals into digital values and transmits them to the PLC main unit, enabling real-time data exchange with the PLC main unit.

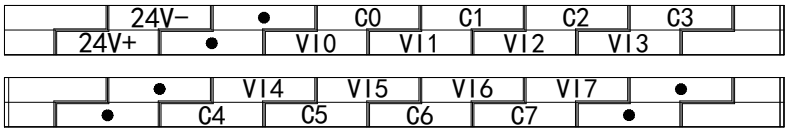
1) Module Features

- 8-channel analog input: Voltage input.
- 14-bit high-precision analog input.
- As specialized functional modules for the XD series, the XD3/XD3E can support up to 10 additional modules connected to the right side of the PLC main unit; the XD5/XDM/XDC/XD5E/XDME/XDH can support up to 16 additional modules; whereas the XD1/XD2 do not support the addition of any modules.

2) Module Specifications

Project	Analog Voltage Input
Analog Input Range	0−5 V, 0−10 V, -5−5 V, -10−10 V (impedance> 1 M)
Maximum Input Range	DC±15V
Digital Output Range	0−16383 or-8192−8191
Resolution Ratio	1/16383（14Bit）
Overall Accuracy	±1%
Conversion Rate	2ms/1 channel
Module Power Supply	DC24V±10%，150mA

3.5.2.Terminal Specifications



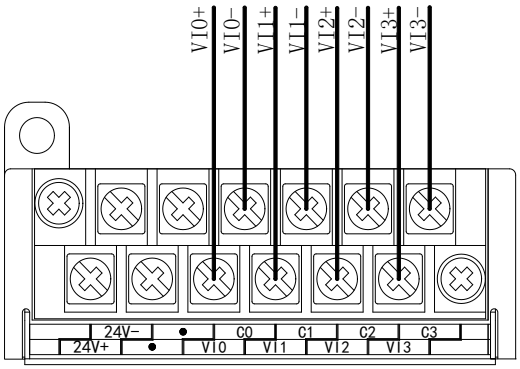
Channel	Terminal Name	Signal Name
CH0	VI0	Voltage analog input
	C0	CH0 Analog Input Common Terminal
CH1	VI1	Voltage analog input
	C1	CH1 Analog Input Common Terminal
CH2	VI2	Voltage analog input
	C2	CH2 Analog Input Common Terminal
CH3	VI3	Voltage analog input
	C3	CH3 analog input common terminal
CH4	VI4	Voltage analog input
	C4	CH4 analog input common terminal
CH5	VI5	Voltage analog input
	C5	CH5 Analog Input Common Terminal
CH6	VI6	Voltage analog input
	C6	CH6 Analog Input Common Terminal
CH7	VI7	Voltage analog input
	C7	CH7 Analog Input Common Terminal
—	24V+	+24V power supply
	24V-	Power supply common terminal

3.5.3.External Connection

When establishing an external connection, please note the following aspects:

- To prevent interference, please use shielded cable and perform single-point grounding of the shield layer.
- When connecting the XD-E8AD-V to an external +24V power supply, please use the 24V power supply built into the PLC unit to avoid interference.

Single-ended voltage input



3.5.4.Input Definition Number Allocation

The XD series analog input modules do not occupy I/O units; the converted values are directly written into the PLC registers. The definition numbers for the PLC registers corresponding to each channel are as follows:



Each channel can only be used when the enable switch is turned on.

First Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID10000	Y10000	X10000
1CH	ID10001	Y10001	X10001
2CH	ID10002	Y10002	X10002
3CH	ID10003	Y10003	X10003
4CH	ID10004	Y10004	X10004
5CH	ID10005	Y10005	X10005
6CH	ID10006	Y10006	X10006
7CH	ID10007	Y10007	X10007

Second Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID10100	Y10100	X10100
1CH	ID10101	Y10101	X10101
2CH	ID10102	Y10102	X10102
3CH	ID10103	Y10103	X10103
4CH	ID10104	Y10104	X10104
5CH	ID10105	Y10105	X10105
6CH	ID10106	Y10106	X10106
7CH	ID10107	Y10107	X10107

Third Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID10200	Y10200	X10200
1CH	ID10201	Y10201	X10201
2CH	ID10202	Y10202	X10202
3CH	ID10203	Y10203	X10203
4CH	ID10204	Y10204	X10204
5CH	ID10205	Y10205	X10205
6CH	ID10206	Y10206	X10206
7CH	ID10207	Y10207	X10207

Fourth Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID10300	Y10300	X10300
1CH	ID10301	Y10301	X10301
2CH	ID10302	Y10302	X10302
3CH	ID10303	Y10303	X10303
4CH	ID10304	Y10304	X10304
5CH	ID10305	Y10305	X10305
6CH	ID10306	Y10306	X10306
7CH	ID10307	Y10307	X10307

Fifth Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID10400	Y10400	X10400
1CH	ID10401	Y10401	X10401
2CH	ID10402	Y10402	X10402
3CH	ID10403	Y10403	X10403
4CH	ID10404	Y10404	X10404
5CH	ID10405	Y10405	X10405
6CH	ID10406	Y10406	X10406
7CH	ID10407	Y10407	X10407

Sixth Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID10500	Y10500	X10500
1CH	ID10501	Y10501	X10501
2CH	ID10502	Y10502	X10502
3CH	ID10503	Y10503	X10503
4CH	ID10504	Y10504	X10504
5CH	ID10505	Y10505	X10505
6CH	ID10506	Y10506	X10506
7CH	ID10507	Y10507	X10507

Seventh Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID10600	Y10600	X10600
1CH	ID10601	Y10601	X10601
2CH	ID10602	Y10602	X10602
3CH	ID10603	Y10603	X10603
4CH	ID10604	Y10604	X10604
5CH	ID10605	Y10605	X10605
6CH	ID10606	Y10606	X10606
7CH	ID10607	Y10607	X10607

Eighth Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID10700	Y10700	X10700
1CH	ID10701	Y10701	X10701
2CH	ID10702	Y10702	X10702
3CH	ID10703	Y10703	X10703
4CH	ID10704	Y10704	X10704
5CH	ID10705	Y10705	X10705
6CH	ID10706	Y10706	X10706
7CH	ID10707	Y10707	X10707

Ninth Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID10800	Y11000	X11000
1CH	ID10801	Y11001	X11001
2CH	ID10802	Y11002	X11002
3CH	ID10803	Y11003	X11003
4CH	ID10804	Y11004	X11004
5CH	ID10805	Y11005	X11005
6CH	ID10806	Y11006	X11006
7CH	ID10807	Y11007	X11007

Tenth Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID10900	Y11100	X11100
1CH	ID10901	Y11101	X11101
2CH	ID10902	Y11102	X11102
3CH	ID10903	Y11103	X11103
4CH	ID10904	Y11104	X11104
5CH	ID10905	Y11105	X11105
6CH	ID10906	Y11106	X11106
7CH	ID10907	Y11107	X11107

Eleventh Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID11000	Y11200	X11200
1CH	ID11001	Y11201	X11201
2CH	ID11002	Y11202	X11202
3CH	ID11003	Y11203	X11203
4CH	ID11004	Y11204	X11204
5CH	ID11005	Y11205	X11205
6CH	ID11006	Y11206	X11206
7CH	ID11007	Y11207	X11207

Twelfth Expansion Module Register Definition Number

channel	AD signal	Channel enable switch	Channel Alarm Flag Bit
0CH	ID11100	Y11300	X11300
1CH	ID11101	Y11301	X11301
2CH	ID11102	Y11302	X11302
3CH	ID11103	Y11303	X11303
4CH	ID11104	Y11304	X11304
5CH	ID11105	Y11305	X11305
6CH	ID11106	Y11306	X11306
7CH	ID11107	Y11307	X11307

Thirteenth Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID11200	Y11400	X11400
1CH	ID11201	Y11401	X11401
2CH	ID11202	Y11402	X11402
3CH	ID11203	Y11403	X11403
4CH	ID11204	Y11404	X11404
5CH	ID11205	Y11405	X11405
6CH	ID11206	Y11406	X11406
7CH	ID11207	Y11407	X11407

Fourteenth Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID11300	Y11500	X11500
1CH	ID11301	Y11501	X11501
2CH	ID11302	Y11502	X11502
3CH	ID11303	Y11503	X11503
4CH	ID11304	Y11504	X11504
5CH	ID11305	Y11505	X11505
6CH	ID11306	Y11506	X11506
7CH	ID11307	Y11507	X11507

Fifteenth Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID11400	Y11600	X11600
1CH	ID11401	Y11601	X11601
2CH	ID11402	Y11602	X11602
3CH	ID11403	Y11603	X11603
4CH	ID11404	Y11604	X11604
5CH	ID11405	Y11605	X11605
6CH	ID11406	Y11606	X11606
7CH	ID11407	Y11607	X11607

Sixteenth Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID11500	Y11700	X11700
1CH	ID11501	Y11701	X11701
2CH	ID11502	Y11702	X11702
3CH	ID11503	Y11703	X11703
4CH	ID11504	Y11704	X11704
5CH	ID11505	Y11705	X11705
6CH	ID11506	Y11706	X11706
7CH	ID11507	Y11707	X11707

- Disabling unused channels can increase the input/output scanning speed.
- When the input enable switch is turned off during operation, the corresponding input channel will not be able to capture any data (the data value will be displayed as 0).

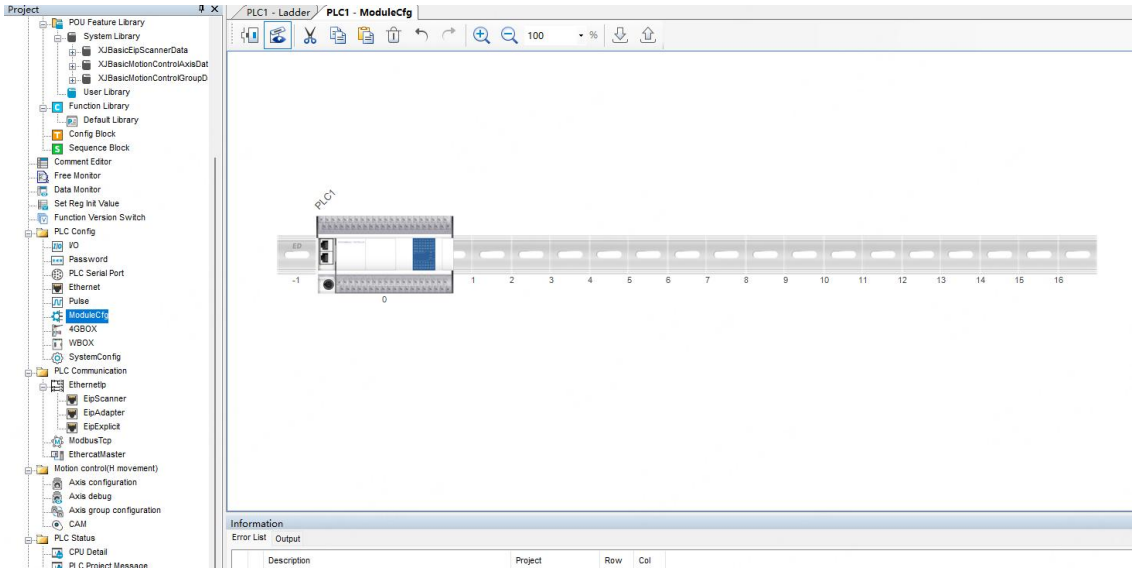
3.5.5.Work Mode Setup

There are two methods available for configuring the operating mode (these two methods yield equivalent results).

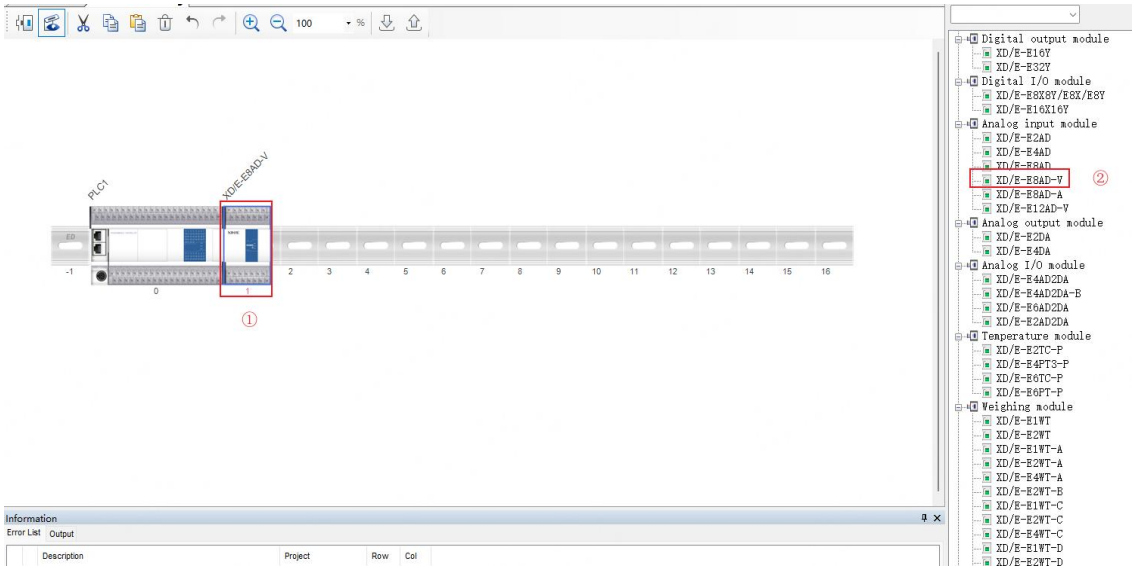
- Through Control Panel configuration
- Set via Flash registers

1) Configuration Panel Configuration

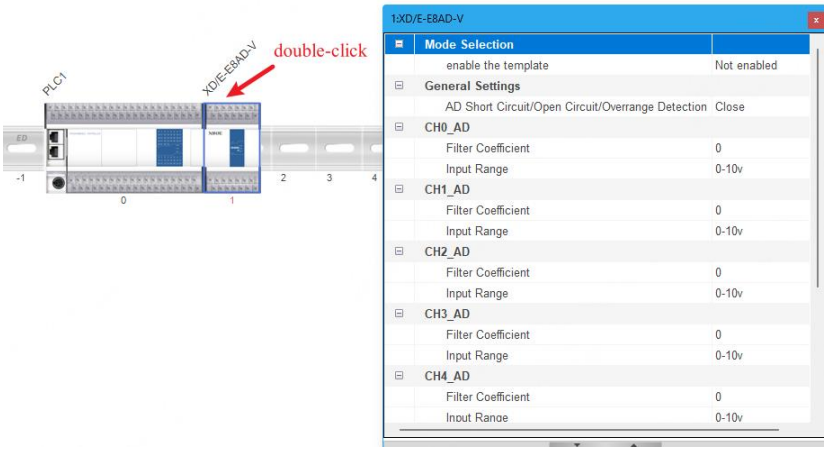
1. Use the XINJE PLC Programming Tool Software version 3.8.0a or later to configure the module; click [PLC Configuration] – [Module Configuration] in the left-side Engineering Bar to open the Expansion Module Settings window. For versions prior to 3.8.0a of the XINJE PLC Programming Tool Software, click [PLC Configuration] – [Expansion Module] in the left-side Engineering Bar to perform the configuration.



2. Select a module from the right-hand module list and drag it to the desired position, or double-click a module in the right-hand module list to select it:

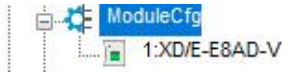


3. Double-click the corresponding module icon to access the module configuration interface, where you can select the AD filter coefficient and the voltage input mode for the AD channel.



4. Click "" to view the default configuration parameters for the Expansion module.

5. After completing the parameter configuration  for the expansion module, click "" to write the set values into the PLC; the changes will take effect only after the PLC is powered off and then powered on again. Under the Module Configuration Node, mount the configured module, then double-click to enter the Module Parameter Configuration screen.



- The first-order low-pass filtering method weights the current sample value by the previous filtered output value to obtain the effective filtered value.
- The filtering coefficient is set by the user between 0 and 254; a lower value results in more stable data but may cause data lag; a value of 1 corresponds to the strongest filtering effect, while a value of 254 corresponds to the weakest filtering effect; the default value is 0 (no filtering).
- ※ When the expansion module "" is set to ON, you can check the channel status by examining the channel alarm flag bit X1xxxx.

  ※ When the expansion module " AD Short Circuit/Open Circuit/Overrange Detection Close " is set to ON, you can check the channel status by examining the channel alarm flag bit X1xxxx.
  For example: When the first AD channel is configured in voltage mode and the AD detects a short circuit, open circuit, or exceeding the measurement range, X10000 will be turned on.

2) Flash Register Configuration

The expansion module's input and output channels operate in voltage mode, with selectable ranges of 0–5 V, 0–10 V, -5–5 V, or-10–10 V; these settings are configured via the PLC's internal special FLASH data register, SFD. As shown below:

Module ID	Configuration Information Address	Module ID	Configuration Information Address
#1	SFD350~SFD359	#9	SFD430~SFD439
#2	SFD360~SFD369	#10	SFD440~SFD449
#3	SFD370~SFD379	#11	SFD450~SFD459
#4	SFD380~SFD389	#12	SFD460~SFD469
#5	SFD390~SFD399	#13	SFD470~SFD479
#6	SFD400~SFD409	#14	SFD480~SFD489
#7	SFD410~SFD419	#15	SFD490~SFD499
#8	SFD420~SFD429	#16	SFD500~SFD509

As shown above, each register is configured to set the mode for four channels; each register consists of 16 bits, and the modes for the four channels are configured sequentially in groups of four bits, from the lowest to the highest bit position.

3) SFD Bit Definition

Register		Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0	Explain
SFD350	Byte0	AD Channel 2; Channel 1 filtering coefficient								AD filtering coefficient
	Byte1	AD Channel 4; Channel 3 filtering coefficient								
SFD351	Byte2	AD Channel 6; Channel 5 filtering coefficient								
	Byte3	AD Channel 8; Channel 7 filtering coefficient								
SFD35	Byte4	AD2				AD1				Used to specify the

<table>
<tr><th colspan="2">Register</th><th>Bit7</th><th>Bit6</th><th>Bit5</th><th>Bit4</th><th>Bit3</th><th>Bit2</th><th>Bit1</th><th>Bit0</th><th>Explain</th></tr>
<tr><td rowspan="8">2</td><td rowspan="2"></td><td colspan="4">0000: Voltage 0−10 V
0001: Voltage 0−5 V
0010: Voltage − 10−10 V
0011: Voltage −5~5V</td><td colspan="4">0000: Voltage 0−10 V
0001: Voltage 0−5 V
0010: Voltage − 10−10 V
0011: Voltage −5~5V</td><td rowspan="15">input range of the AD module; the lower 4 bits of Byte4 represent the configuration bits for AD Channel 1, while the upper 4 bits represent the configuration bits for AD Channel 2;
The lower 4 bits of Byte5 represent the configuration bits for AD Channel 3; the upper 4 bits represent the configuration bits for AD Channel 4;
the lower 4 bits of Byte6 represent the configuration bits for AD Channel 5; the upper 4 bits represent the configuration bits for AD Channel 6;
The lower 4 bits of Byte7 represent the configuration bits for AD Channel 7; the upper 4 bits represent the configuration bits for AD Channel 8.</td></tr>
<tr><td rowspan="6">Byte5</td><td colspan="4">AD4</td><td colspan="4">AD3</td></tr>
<tr><td colspan="4">0000: Voltage 0−10 V
0001: Voltage 0−5 V
0010: Voltage − 10−10 V
0011: Voltage −5~5V</td><td colspan="4">0000: Voltage 0−10 V
0001: Voltage 0−5 V
0010: Voltage − 10−10 V
0011: Voltage −5~5V</td></tr>
<tr><td rowspan="6">SFD353</td><td rowspan="3">Byte6</td><td colspan="4">AD6</td><td colspan="4">AD5</td></tr>
<tr><td colspan="4">0000: Voltage 0−10 V
0001: Voltage 0−5 V
0010: Voltage − 10−10 V
0011: Voltage −5~5V</td><td colspan="4">0000: Voltage 0−10 V
0001: Voltage 0−5 V
0010: Voltage − 10−10 V
0011: Voltage −5~5V</td></tr>
<tr><td colspan="4">AD8</td><td colspan="4">AD7</td></tr>
<tr><td rowspan="3">Byte7</td><td colspan="4">0000: Voltage 0−10 V
0001: Voltage 0−5 V
0010: Voltage − 10−10 V
0011: Voltage −5~5V</td><td colspan="4">0000: Voltage 0−10 V
0001: Voltage 0−5 V
0010: Voltage − 10−10 V
0011: Voltage −5~5V</td></tr>
<tr><td rowspan="2">SFD354</td><td>Byte8</td><td colspan="8">AD channel short-circuit/open-circuit/overshoot detection switch</td></tr>
<tr><td>Byte9</td><td colspan="8">Keep</td></tr>
<tr><td colspan="2">SFD355~SFD359</td><td colspan="8">Keep</td></tr>
</table>

Using the First Module as an example to illustrate the setup method.

Example: Set the operating mode for Input Channels 1 and 0 of the first module to 0–10 V; set the operating mode for Input Channels 3 and 2 to 0–5 V; set the operating mode for Input Channels 5 and 4

to-10–10 V; set the operating mode for Input Channels 7 and 6 to-5–5 V; set the filtering coefficient for Channels 0, 1, 2, and 3 to 254; and set the filtering coefficient for Channels 4, 5, 6, and 7 to 100.

Method 1:

It can be configured directly from the configuration panel; the configuration method is shown in the figure above.

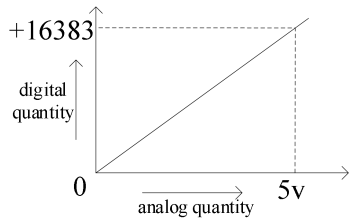
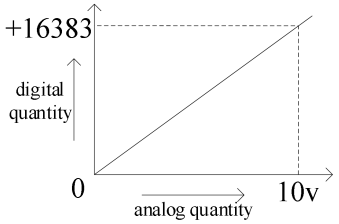
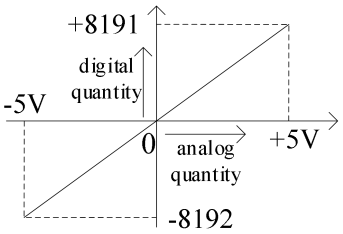
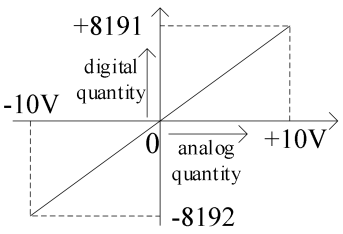
Method 2:

Set the SFD special register directly to the following value:

SFD350=FEFEH SFD351=6464H SFD352=1100H SFD353=3322H

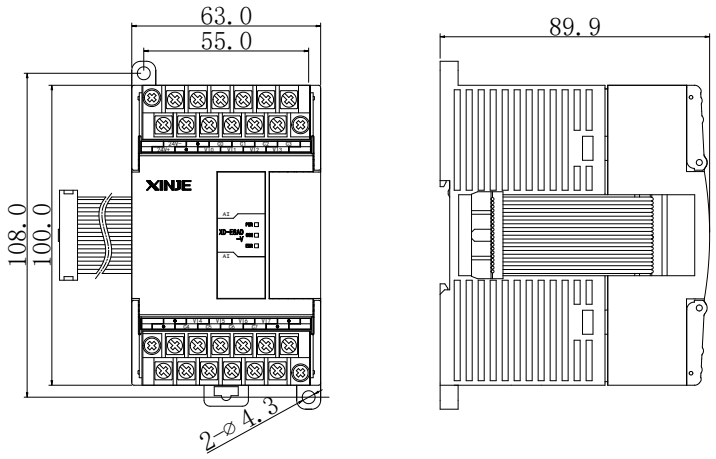
3.5.6.Analog-to-Digital Conversion Diagram

The relationship between the input analog signal and the converted digital signal is shown in the table below:

0–5 V Analog Input	0–10 V Analog Input
	
-5~5 V Analog Input	**-10~10 V Analog Input**
	

When the channel enable switch is turned on and the AD voltage input is open-circuit, the corresponding ID register displays the value 16383; when the AD current input is open-circuit, the corresponding ID register displays the value 0. When the channel enable switch is turned off, the ID register corresponding to the AD voltage/current input displays the value 0.

3.5.7.External Dimensions Diagram

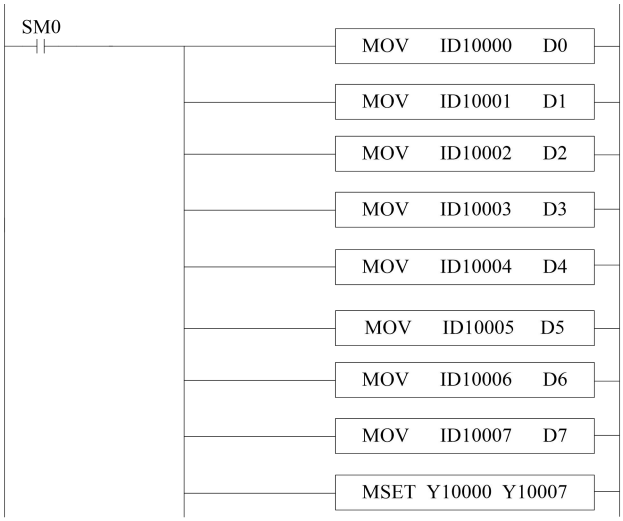


(unit:mm)

3.5.8.Programming Example

Example: Real-time data reading from 8 channels (using Module 1 as an example)

Procedure:



Description:

SM0 is a normally ON coil that remains in the ON state throughout the PLC operation.

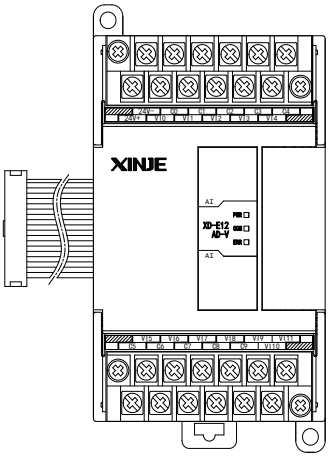
The PLC starts operating and continuously writes the data from Channel 0 of Module #1 into the data register D0;

Write data from Channel 1 into Data Register D1;
Write data from Channel 2 into Data Register D2;
Write data from Channel 3 into Data Register D3;
Write data from Channel 4 into Data Register D4;
Write data from Channel 5 into Data Register D5;
Write data from Channel 6 into Data Register D6;
Write data from Channel 7 into Data Register D7;

Since all channels are in use, enable all channel enable bits.

3.6. 14 Bit Analog Voltage Input Module XD-E12AD-V

3.6.1.Module Features and Specifications



The XD-E12AD-V analog input module converts 12 analog input signals into digital values and transmits them to the PLC main unit, enabling real-time data exchange with the PLC main unit.

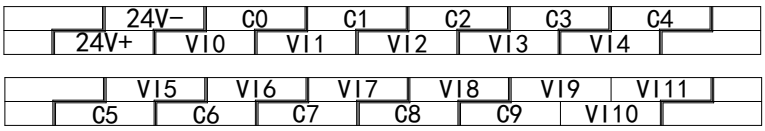
1) Module Features

- 12-channel analog input: Voltage input.
- 14-bit high-precision analog input.
- As specialized functional modules for the XD series, the XD3/XD3E can support up to 10 additional modules connected to the right side of the PLC main unit; the XD5/XDM/XDC/XD5E/XDME/XDH can support up to 16 additional modules; whereas the XD1/XD2 do not support the addition of any modules.

2) Module Specifications

Project	Analog Voltage Input
Analog Input Range	0−5 V, 0−10 V, -5−5 V, -10−10 V (impedance> 1 M)
Maximum Input Range	DC±15V
Digital Output Range	0−16383 or-8192−8191
Resolution Ratio	1/16383（14Bit）
Overall Accuracy	±1%
Conversion Rate	4 ms/All Channels
Module Power Supply	DC24V±10%，150mA

3.6.2.Terminal Specifications



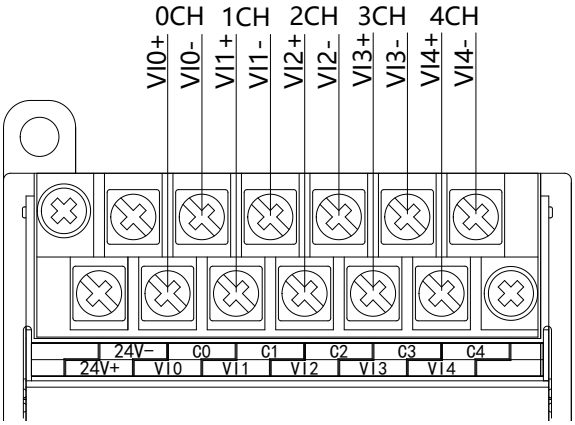
Channel	Terminal Name	Signal Name
CH0	VI0	CH0 Voltage Analog Input
	C0	CH0 Analog Input Common Terminal
CH1	VI1	CH1 Voltage Analog Input
	C1	CH1 Analog Input Common Terminal
CH2	VI2	CH2 Voltage Analog Input
	C2	CH2 Analog Input Common Terminal
CH3	VI3	CH3 voltage analog input
	C3	CH3 analog input common terminal
CH4	VI4	CH4 voltage analog input
	C4	CH4 analog input common terminal
CH5	VI5	CH5 Voltage Analog Input
	C5	CH5 Analog Input Common Terminal
CH6	VI6	CH6 Voltage Analog Input
	C6	CH6 Analog Input Common Terminal
CH7	VI7	CH7 Voltage Analog Input
	C7	CH7 Analog Input Common Terminal
CH8	VI8	CH8 Voltage Analog Input
	C8	CH8 Analog Input Common Terminal
CH9~CH11	VI9	CH9 Voltage Analog Input
	VI10	CH10 Voltage Analog Input
	VI11	CH11 Voltage Analog Input
	C9	CH9–CH11 Analog Input Common Terminal
—	24V+	+24V power supply
	24V-	Power supply common terminal

3.6.3.External Connection

When establishing an external connection, please note the following aspects:

- To prevent interference, please use shielded cable and perform single-point grounding of the shield layer.
- When connecting the XD-E12AD-V to an external +24V power supply, please use the 24V power supply built into the PLC unit to avoid interference.

Single-ended voltage input



3.6.4.Input Definition Number Allocation

The XD series analog input modules do not occupy I/O units; the converted values are directly written into the PLC registers. The definition numbers for the PLC registers corresponding to each channel are as follows:

Each channel can only be used when the enable switch is turned on.

First Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel	AD Signal	Channel Enable Switch
0CH	ID10000	Y10000	6CH	ID10006	Y10006
1CH	ID10001	Y10001	7CH	ID10007	Y10007
2CH	ID10002	Y10002	8CH	ID10008	Y10010
3CH	ID10003	Y10003	9CH	ID10009	Y10011
4CH	ID10004	Y10004	10CH	ID10010	Y10012
5CH	ID10005	Y10005	11CH	ID10011	Y10013

Second Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel	AD Signal	Channel Enable Switch
0CH	ID10100	Y10100	6CH	ID10106	Y10106
1CH	ID10101	Y10101	7CH	ID10107	Y10107
2CH	ID10102	Y10102	8CH	ID10108	Y10110
3CH	ID10103	Y10103	9CH	ID10109	Y10111
4CH	ID10104	Y10104	10CH	ID10110	Y10112
5CH	ID10105	Y10105	11CH	ID10111	Y10113

Third Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel	AD Signal	Channel Enable Switch
0CH	ID10200	Y10200	6CH	ID10206	Y10206
1CH	ID10201	Y10201	7CH	ID10207	Y10207
2CH	ID10202	Y10202	8CH	ID10208	Y10210
3CH	ID10203	Y10203	9CH	ID10209	Y10211
4CH	ID10204	Y10204	10CH	ID10210	Y10212
5CH	ID10205	Y10205	11CH	ID10211	Y10213

Fourth Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel	AD Signal	Channel Enable Switch
0CH	ID10300	Y10300	6CH	ID10306	Y10306
1CH	ID10301	Y10301	7CH	ID10307	Y10307
2CH	ID10302	Y10302	8CH	ID10308	Y10310
3CH	ID10303	Y10303	9CH	ID10309	Y10311
4CH	ID10304	Y10304	10CH	ID10310	Y10312
5CH	ID10305	Y10305	11CH	ID10311	Y10313

Fifth Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel	AD Signal	Channel Enable Switch
0CH	ID10400	Y10400	6CH	ID10406	Y10406
1CH	ID10401	Y10401	7CH	ID10407	Y10407
2CH	ID10402	Y10402	8CH	ID10408	Y10410
3CH	ID10403	Y10403	9CH	ID10409	Y10411
4CH	ID10404	Y10404	10CH	ID10410	Y10412
5CH	ID10405	Y10405	11CH	ID10411	Y10413

Sixth Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel	AD Signal	Channel Enable Switch
0CH	ID10500	Y10500	6CH	ID10506	Y10506
1CH	ID10501	Y10501	7CH	ID10507	Y10507
2CH	ID10502	Y10502	8CH	ID10508	Y10510
3CH	ID10503	Y10503	9CH	ID10509	Y10511
4CH	ID10504	Y10504	10CH	ID10510	Y10512
5CH	ID10505	Y10505	11CH	ID10511	Y10513

Seventh Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel	AD Signal	Channel Enable Switch
0CH	ID10600	Y10600	6CH	ID10606	Y10606

Channel	AD Signal	Channel Enable Switch	Channel	AD Signal	Channel Enable Switch
1CH	ID10601	Y10601	7CH	ID10607	Y10607
2CH	ID10602	Y10602	8CH	ID10608	Y10610
3CH	ID10603	Y10603	9CH	ID10609	Y10611
4CH	ID10604	Y10604	10CH	ID10610	Y10612
5CH	ID10605	Y10605	11CH	ID10611	Y10613

Eighth Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel	AD Signal	Channel Enable Switch
0CH	ID10700	Y10700	6CH	ID10706	Y10706
1CH	ID10701	Y10701	7CH	ID10707	Y10707
2CH	ID10702	Y10702	8CH	ID10708	Y10710
3CH	ID10703	Y10703	9CH	ID10709	Y10711
4CH	ID10704	Y10704	10CH	ID10710	Y10712
5CH	ID10705	Y10705	11CH	ID10711	Y10713

Ninth Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel	AD Signal	Channel Enable Switch
0CH	ID10800	Y11000	6CH	ID10806	Y11006
1CH	ID10801	Y11001	7CH	ID10807	Y11007
2CH	ID10802	Y11002	8CH	ID10808	Y11010
3CH	ID10803	Y11003	9CH	ID10809	Y11011
4CH	ID10804	Y11004	10CH	ID10810	Y11012
5CH	ID10805	Y11005	11CH	ID10811	Y11013

Tenth Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel	AD Signal	Channel Enable Switch
0CH	ID10900	Y11100	6CH	ID10906	Y11106
1CH	ID10901	Y11101	7CH	ID10907	Y11107
2CH	ID10902	Y11102	8CH	ID10908	Y11110
3CH	ID10903	Y11103	9CH	ID10909	Y11111
4CH	ID10904	Y11104	10CH	ID10910	Y11112
5CH	ID10905	Y11105	11CH	ID10911	Y11113

Eleventh Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel	AD Signal	Channel Enable Switch
0CH	ID11000	Y11200	6CH	ID11006	Y11206
1CH	ID11001	Y11201	7CH	ID11007	Y11207
2CH	ID11002	Y11202	8CH	ID11008	Y11210

Channel	AD Signal	Channel Enable Switch	Channel	AD Signal	Channel Enable Switch
3CH	ID11003	Y11203	9CH	ID11009	Y11211
4CH	ID11004	Y11204	10CH	ID11010	Y11212
5CH	ID11005	Y11205	11CH	ID11011	Y11213

Twelfth Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel	AD Signal	Channel Enable Switch
0CH	ID11100	Y11300	6CH	ID11106	Y11306
1CH	ID11101	Y11301	7CH	ID11107	Y11307
2CH	ID11102	Y11302	8CH	ID11108	Y11310
3CH	ID11103	Y11303	9CH	ID11109	Y11311
4CH	ID11104	Y11304	10CH	ID11110	Y11312
5CH	ID11105	Y11305	11CH	ID11111	Y11313

Thirteenth Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel	AD Signal	Channel Enable Switch
0CH	ID11200	Y11400	6CH	ID11206	Y11406
1CH	ID11201	Y11401	7CH	ID11207	Y11407
2CH	ID11202	Y11402	8CH	ID11208	Y11410
3CH	ID11203	Y11403	9CH	ID11209	Y11411
4CH	ID11204	Y11404	10CH	ID11210	Y11412
5CH	ID11205	Y11405	11CH	ID11211	Y11413

Fourteenth Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel	AD Signal	Channel Enable Switch
0CH	ID11300	Y11500	6CH	ID11306	Y11506
1CH	ID11301	Y11501	7CH	ID11307	Y11507
2CH	ID11302	Y11502	8CH	ID11308	Y11510
3CH	ID11303	Y11503	9CH	ID11309	Y11511
4CH	ID11304	Y11504	10CH	ID11310	Y11512
5CH	ID11305	Y11505	11CH	ID11311	Y11513

Fifteenth Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel	AD Signal	Channel Enable Switch
0CH	ID11400	Y11600	6CH	ID11406	Y11606
1CH	ID11401	Y11601	7CH	ID11407	Y11607
2CH	ID11402	Y11602	8CH	ID11408	Y11610
3CH	ID11403	Y11603	9CH	ID11409	Y11611
4CH	ID11404	Y11604	10CH	ID11410	Y11612

Channel	AD Signal	Channel Enable Switch	Channel	AD Signal	Channel Enable Switch
5CH	ID11405	Y11605	11CH	ID11411	Y11613

Sixteenth Expansion Module Register Definition Code

Channel	AD Signal	Channel Enable Switch	Channel	AD Signal	Channel Enable Switch
0CH	ID11500	Y11700	6CH	ID11506	Y11706
1CH	ID11501	Y11701	7CH	ID11507	Y11707
2CH	ID11502	Y11702	8CH	ID11508	Y11710
3CH	ID11503	Y11703	9CH	ID11509	Y11711
4CH	ID11504	Y11704	10CH	ID11510	Y11712
5CH	ID11505	Y11705	11CH	ID11511	Y11713

When the input enable switch is turned off during operation, the corresponding input channel will not be able to capture any data (the data value will be displayed as 0).

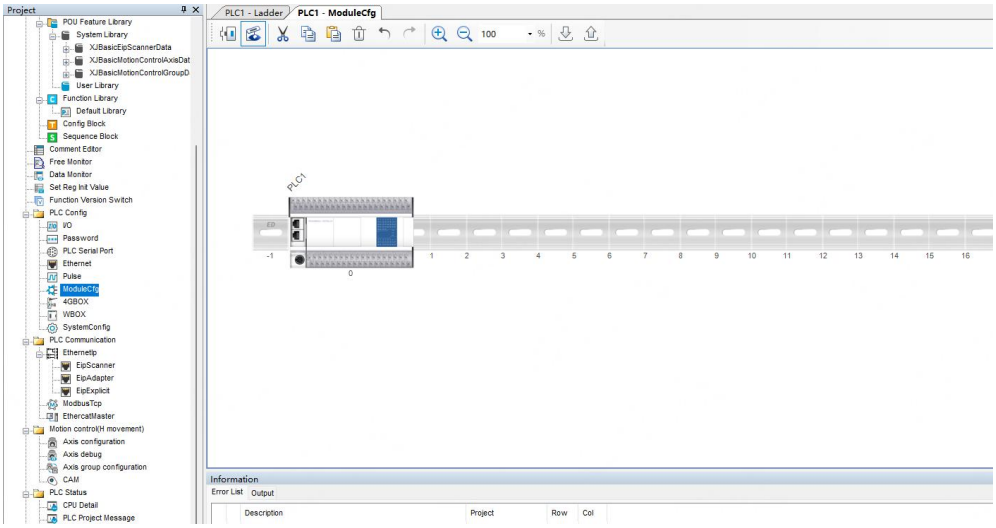
3.6.5.Work Mode Setup

There are two methods available for configuring the operating mode (these two methods yield equivalent results).

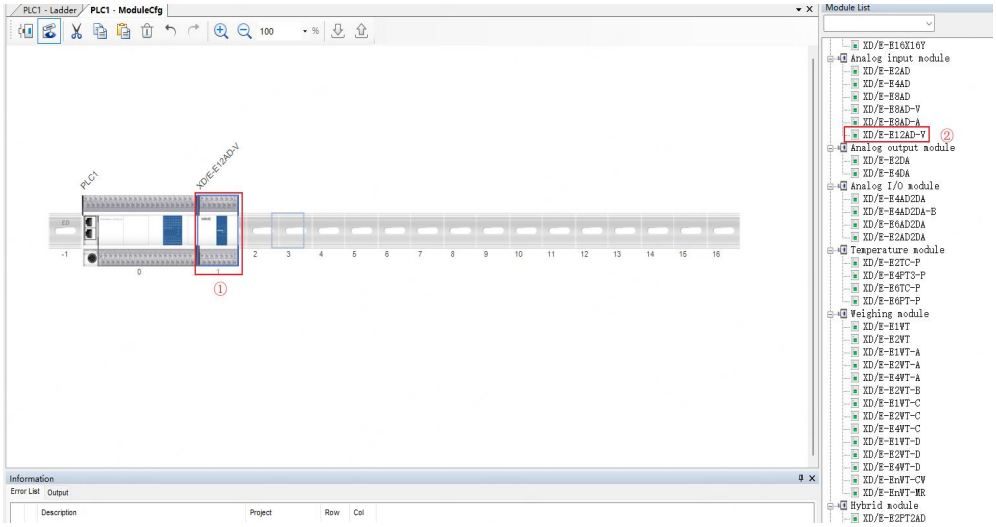
- Through Control Panel configuration
- Set via Flash registers

1) Configuration Panel Configuration

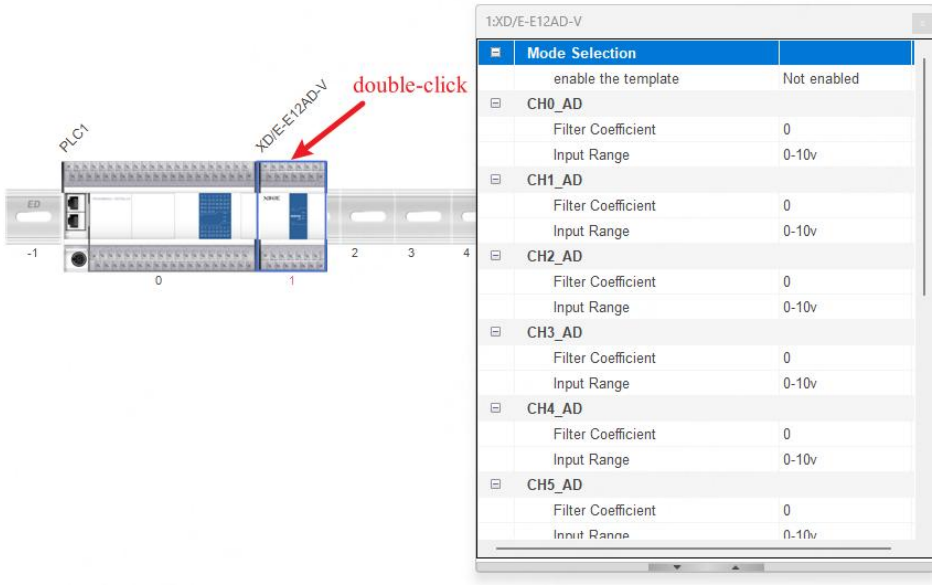
1. Use the XINJE PLC Programming Tool Software version 3.8.0a or later to configure the module; click [PLC Configuration] – [Module Configuration] in the left-side Engineering Bar to open the Expansion Module Settings window. For versions prior to 3.8.0a of the XINJE PLC Programming Tool Software, click [PLC Configuration] – [Expansion Module] in the left-side Engineering Bar to perform the configuration.



2. Select a module from the right-hand module list and drag it to the desired position, or double-click a module in the right-hand module list to select it:

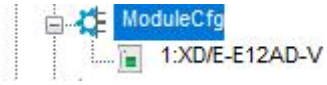


3. Double-click the corresponding module icon to access the module configuration interface, where you can select the AD filter coefficient and the voltage input mode for the AD channel.



4. Click "" to view the default configuration parameters for the Expansion module.

5. After completing the parameter configuration  for the expansion module, click "" to write the set values into the PLC; the changes will take effect only after the PLC is powered off and then powered on again. Under the Module Configuration Node, mount the configured module, then double-click to enter the Module Parameter Configuration screen.



- The first-order low-pass filtering method weights the current sample value by the previous filtered output value to obtain the effective filtered value.
- The filtering coefficient is set by the user between 0 and 254; a lower value results in more stable data but may cause data lag; a value of 1 corresponds to the strongest

filtering effect, while a value of 254 corresponds to the weakest filtering effect; the default value is 0 (no filtering).

2) Flash Register Configuration

The expansion module's input and output channels operate in voltage mode, with selectable ranges of 0–5 V, 0–10 V, -5–5 V, or-10–10 V; these settings are configured via the PLC's internal special FLASH data register, SFD. As shown below:

Module ID	Configuration Information Address	Module ID	Configuration Information Address
#1	SFD350~SFD359	#9	SFD430~SFD439
#2	SFD360~SFD369	#10	SFD440~SFD449
#3	SFD370~SFD379	#11	SFD450~SFD459
#4	SFD380~SFD389	#12	SFD460~SFD469
#5	SFD390~SFD399	#13	SFD470~SFD479
#6	SFD400~SFD409	#14	SFD480~SFD489
#7	SFD410~SFD419	#15	SFD490~SFD499
#8	SFD420~SFD429	#16	SFD500~SFD509



As shown above, each register is configured to set the mode for four channels; each register consists of 16 bits, and the modes for the four channels are configured sequentially in groups of four bits, from the lowest to the highest bit position.

3) SFD Bit Definition

<table>
<tr><th colspan="2">Register</th><th>Bit7</th><th>Bit6</th><th>Bit5</th><th>Bit4</th><th>Bit3</th><th>Bit2</th><th>Bit1</th><th>Bit0</th><th>Explain</th></tr>
<tr><td rowspan="2">SFD350</td><td>Byte0</td><td colspan="8">AD Channel 2; Channel 1 filtering coefficient</td><td rowspan="6">AD filtering coefficient</td></tr>
<tr><td>Byte1</td><td colspan="8">AD Channel 4; Channel 3 filtering coefficient</td></tr>
<tr><td rowspan="2">SFD351</td><td>Byte2</td><td colspan="8">AD Channel 6; Channel 5 filtering coefficient</td></tr>
<tr><td>Byte3</td><td colspan="8">AD Channel 8; Channel 7 filtering coefficient</td></tr>
<tr><td rowspan="2">SFD352</td><td>Byte4</td><td colspan="8">AD Channel 10; Channel 9 filtering coefficient</td></tr>
<tr><td>Byte5</td><td colspan="8">AD Channel 12; Channel 11 filtering coefficient</td></tr>
<tr><td rowspan="4">SFD353</td><td rowspan="2">Byte6</td><td colspan="4">AD2</td><td colspan="4">AD1</td><td rowspan="4">Used to specify the input range of the AD module; the lower 4 bits of Byte6 represent the configuration</td></tr>
<tr><td colspan="4">0000: Voltage 0–10 V
0001: Voltage 0–5 V
0010: Voltage – 10–10 V
0011: Voltage –5~5V</td><td colspan="4">0000: Voltage 0–10 V
0001: Voltage 0–5 V
0010: Voltage – 10–10 V
0011: Voltage –5~5V</td></tr>
<tr><td rowspan="2">Byte7</td><td colspan="4">AD4</td><td colspan="4">AD3</td></tr>
<tr><td colspan="4">0000: Voltage 0–10 V
0001: Voltage 0–5 V
0010: Voltage – 10–10 V
0011: Voltage –5~5V</td><td colspan="4">0000: Voltage 0–10 V
0001: Voltage 0–5 V
0010: Voltage – 10–10 V
0011: Voltage –5~5V</td></tr>
</table>

<table>
<tr><th colspan="2">Register</th><th>Bit7</th><th>Bit6</th><th>Bit5</th><th>Bit4</th><th>Bit3</th><th>Bit2</th><th>Bit1</th><th>Bit0</th><th>Explain</th></tr>
<tr><td rowspan="4">SFD354</td><td rowspan="2">Byte8</td><td colspan="4">AD6</td><td colspan="4">AD5</td><td rowspan="8">bits for AD Channel 1, while the upper 4 bits represent the configuration bits for AD Channel 2; The lower 4 bits of Byte7 represent the configuration bits for AD Channel 3; the upper 4 bits represent the configuration bits for AD Channel 4; the lower 4 bits of Byte8 represent the configuration bits for AD Channel 5; the upper 4 bits represent the configuration bits for AD Channel 6; The lower 4 bits of Byte9 represent the configuration bits for AD Channel 7; the upper 4 bits represent the configuration</td></tr>
<tr><td colspan="4">0000: Voltage 0–10 V
0001: Voltage 0–5 V
0010: Voltage – 10–10 V
0011: Voltage –5~5V</td><td colspan="4">0000: Voltage 0–10 V
0001: Voltage 0–5 V
0010: Voltage – 10–10 V
0011: Voltage –5~5V</td></tr>
<tr><td rowspan="2">Byte9</td><td colspan="4">AD8</td><td colspan="4">AD7</td></tr>
<tr><td colspan="4">0000: Voltage 0–10 V
0001: Voltage 0–5 V
0010: Voltage – 10–10 V
0011: Voltage –5~5V</td><td colspan="4">0000: Voltage 0–10 V
0001: Voltage 0–5 V
0010: Voltage – 10–10 V
0011: Voltage –5~5V</td></tr>
<tr><td rowspan="4">SFD355</td><td rowspan="2">Byte10</td><td colspan="4">AD10</td><td colspan="4">AD9</td></tr>
<tr><td colspan="4">0000: Voltage 0–10 V
0001: Voltage 0–5 V
0010: Voltage – 10–10 V
0011: Voltage –5~5V</td><td colspan="4">0000: Voltage 0–10 V
0001: Voltage 0–5 V
0010: Voltage – 10–10 V
0011: Voltage –5~5V</td></tr>
<tr><td rowspan="2">Byte11</td><td colspan="4">AD12</td><td colspan="4">AD11</td></tr>
<tr><td colspan="4">0000: Voltage 0–10 V
0001: Voltage 0–5 V
0010: Voltage – 10–10 V
0011: Voltage –5~5V</td><td colspan="4">0000: Voltage 0–10 V
0001: Voltage 0–5 V
0010: Voltage – 10–10 V
0011: Voltage –5~5V</td></tr>
<tr><td colspan="2">SFD356~SFD359</td><td colspan="8">Keep</td></tr>
</table>

Register	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0	Explain
									bits for AD Channel 8; the lower 4 bits of Byte10 represent the configuration bits for AD Channel 9; the upper 4 bits represent the configuration bits for AD Channel 10; the lower 4 bits of Byte11 represent the configuration bits for AD Channel 11; the upper 4 bits represent the configuration bits for AD Channel 12.

Using the First Module as an example to illustrate the setup method.

Example: Set the operating mode for Input Channels 1 and 0 of the first module to 0–10 V; set the operating mode for Input Channels 3 and 2 to 0–5 V; set the operating mode for Input Channels 7, 6, 5, and 4 to-10–10 V; set the operating mode for Input Channels 11,10,9, and 8 to-5–5 V; set the filtering coefficient for Input Channels 0, 1, 2, 3, 4, and 5 to 254; and set the filtering coefficient for Input Channels 6, 7, 8, 9, 10, and 11 to 100.

Method 1:

It can be configured directly from the configuration panel; the configuration method is shown in the figure above.

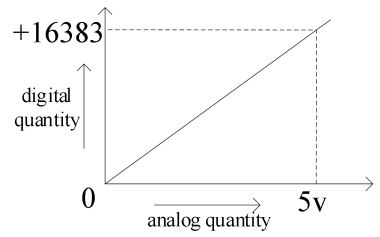
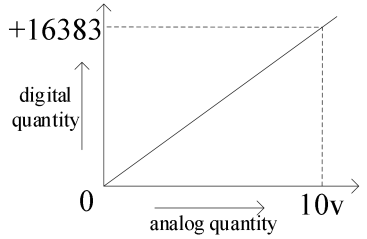
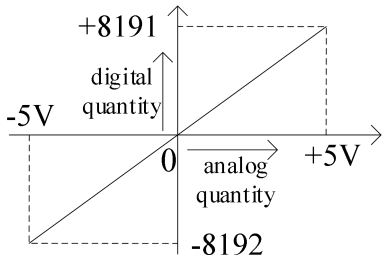
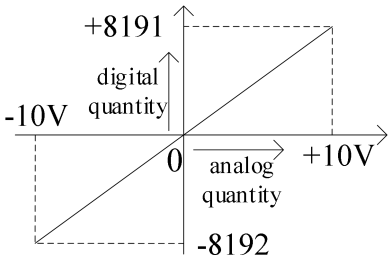
Method 2:

Set the SFD special register directly to the following value:

SFD350=FEFEH SFD351=64FEH SFD352=6464H SFD353=1100H SFD354=2222H SFD353=3333H

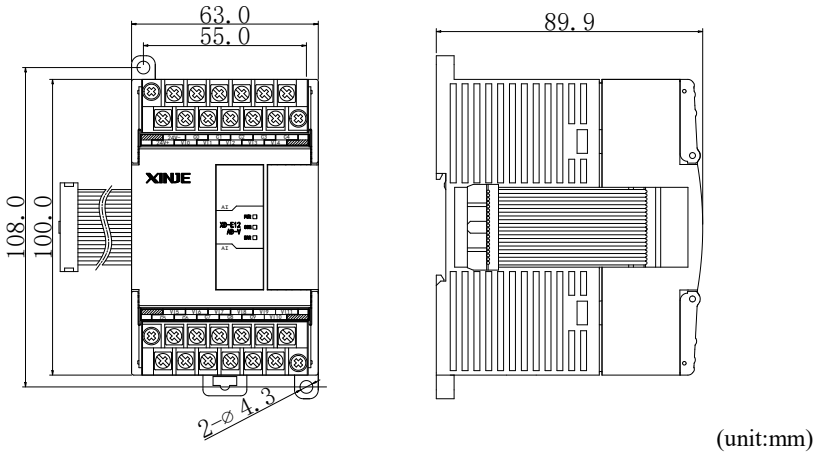
3.6.6.Analog-to-Digital Conversion Diagram

The relationship between the input analog signal and the converted digital signal is shown in the table below:

0–5 V Analog Input	0–10 V Analog Input
	
-5~5 V Analog Input	**-10~10 V Analog Input**
	

When the channel enable switch is ON, if the analog voltage (AD) input is left floating, the corresponding ID register displays 16383; if the analog current (AD) input is left floating, the corresponding ID register displays 0. When the channel enable switch is OFF, the corresponding ID register displays 0 for both analog voltage and analog current inputs.

3.6.7.External Dimensions Diagram

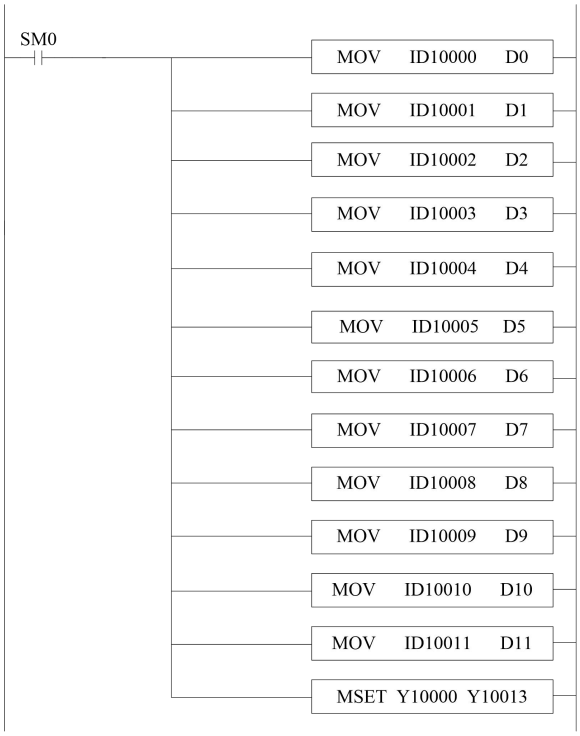


(unit:mm)

3.6.8.Programming Example

Example: Real-time data reading from 12 channels (using Module 1 as an example)

Procedure:



Description:

SM0 is a normally ON coil that remains in the ON state throughout the PLC operation.

The PLC starts operating and continuously writes the data from Channel 0 of Module #1 into the data register D0;

Write data from Channel 1 into Data Register D1;
Write data from Channel 2 into Data Register D2;
Write data from Channel 3 into Data Register D3;
Write data from Channel 4 into Data Register D4;
Write data from Channel 5 into Data Register D5;
Write data from Channel 6 into Data Register D6;
Write data from Channel 7 into Data Register D7;
Write data from Channel 8 into Data Register D8;
Write data from Channel 9 into Data Register D9;
Write data from Channel 10 into Data Register D10;
Write data from Channel 11 into Data Register D11;

Since all channels are in use, enable all channel enable bits.

4. Analog Output Module

4.1. Analog Output Module Overview

XD Series Analog Output Module – supports 2–4 current-or voltage-type output channels.

4.1.1.Naming Rule

XD－E○DA
① ② ③ ④

①	Series Name	XD: XD Series Expansion Modules
②	Reference Expansion Module	E: Represents an expansion module
③	Number of output channels	2 or 4
④	Analog output	DA: Represents analog voltage or current output.

4.1.2.Model List

Model		Description
Analog Output	XD-E2DA	Two-channel analog output, supporting current and voltage modes, 12-bit resolution
	XD-E4DA	4-channel analog output; supports current and voltage modes; 12-bit resolution

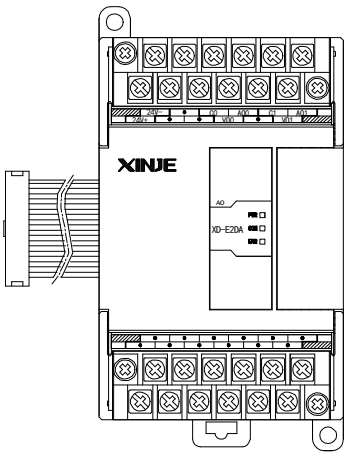
4.1.3.General Requirements

Project	Specifications
Service Environment	Non-corrosive gases
Ambient Temperature	0~60℃
Maintain Ambient Temperature	-20~70℃

Ambient Humidity	5~95%RH
Maintain Ambient Humidity	5~95%RH
Install	Can be secured with M3 screws or installed directly onto a DIN46277 (35 mm wide) guide rail.

4.2. 12 Bit Analog Current and Voltage Output Module XD-E2DA

4.2.1.Module Features and Specifications



The XD-E2DA analog input/output module converts two digital signals into analog signals and transmits them to the PLC main unit, enabling real-time data exchange with the PLC main unit.

1) Module Features

- 2-channel analog output.
- As specialized functional modules for the XD series, the XD3/XD3E can support up to 10 additional modules connected to the right side of the PLC main unit; the XD5/XDM/XDC/XD5E/XDME/XDH can support up to 16 additional modules; whereas the XD1/XD2 do not support the addition of any modules.

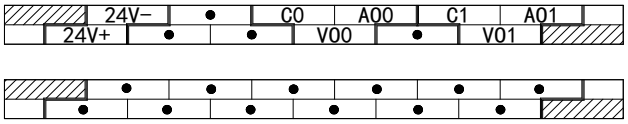
2) Module Specifications

Project	Analog Output	
	Voltage Output	Current Output
Analog Output Range	0~5V、0~10V、-5~5V、-10~10V (External load resistor: 2 kΩ–1 MΩ)	0~20mA、4~20mA (External load resistance <500 Ω)
Digital Input Range	0–4095 or-2048–2047	
Resolution Ratio	1/4095（12Bit）	

Overall Accuracy	±1%	
Conversion Rate	2ms/1 channel	2ms/1 channel
Module Power Supply	DC24V±10%，150mA	

XD-E2DA modules with versions below V7 do not support the voltage ranges of-5~5V or-10~10V.

4.2.2.Terminal Specifications



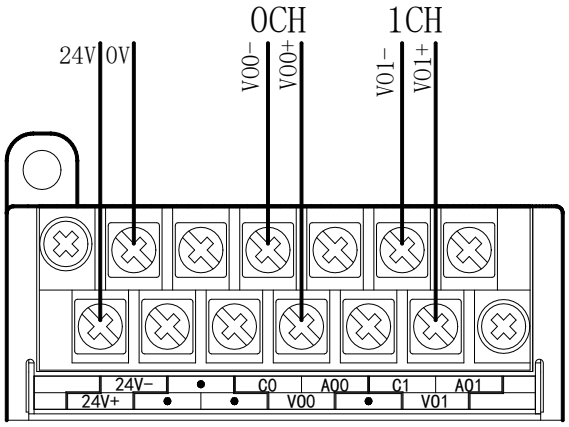
Channel	Terminal Name	Signal Name
CH0	AO0	Current analog output
	VO0	Voltage analog output
	C0	CH0 Analog Output Common Terminal
CH1	AO1	Current analog output
	VO1	Voltage analog output
	C1	CH1 Analog Output Common Terminal
-	24V+	+24V power supply
	24V-	Power supply common terminal

4.2.3.External Connection

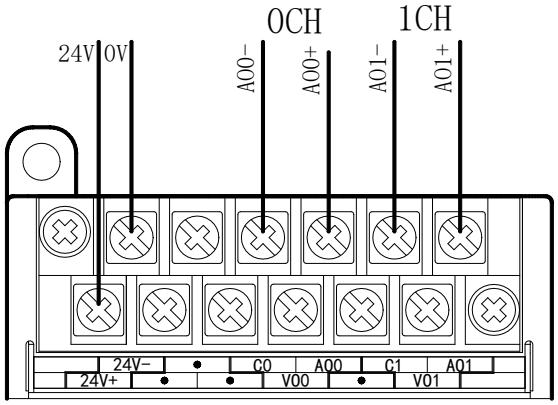
When establishing an external connection, please note the following aspects:

- To prevent interference, please use shielded cable and perform single-point grounding of the shield layer.
- When connecting the XD-E2DA to an external +24V power supply, please use the 24V power supply built into the PLC unit to avoid interference.

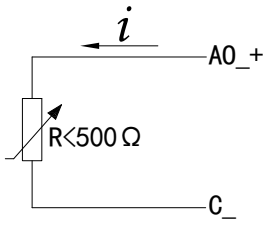
1) Single-Ended Voltage Output


0CH
1CH
24V
0V
V00-
V00+
V01-
V01+
24V-
C0
AO0
C1
AO1
24V+
V00
V01

2) Single-Ended Current Output



The XD-E2DA current output-side wiring is shown in the figure below:



4.2.4.Input/Output Definition Number Allocation

The XD series analog input modules do not occupy any I/O units; the converted values are directly written into the PLC registers. The definition numbers for the PLC registers corresponding to each channel are as follows:

Each channel can only be used when the enable switch is turned on.

First Expansion Module Register Definition Number

Channel	DA Signal	Channel Enable Switch
0CH	QD10000	Y10000
1CH	QD10001	Y10001

Second Expansion Module Register Definition Number

Channel	DA Signal	Channel Enable Switch
0CH	QD10100	Y10100
1CH	QD10101	Y10101

Third Expansion Module Register Definition Number

Channel	DA Signal	Channel Enable Switch
0CH	QD10200	Y10200
1CH	QD10201	Y10201

Fourth Expansion Module Register Definition Number

Channel	DA Signal	Channel Enable Switch
0CH	QD10300	Y10300
1CH	QD10301	Y10301

Fifth Expansion Module Register Definition Number

Channel	DA Signal	Channel Enable Switch
0CH	QD10400	Y10400
1CH	QD10401	Y10401

Sixth Expansion Module Register Definition Number

Channel	DA Signal	Channel Enable Switch
0CH	QD10500	Y10500
1CH	QD10501	Y10501

Seventh Expansion Module Register Definition Number

Channel	DA Signal	Channel Enable Switch
0CH	QD10600	Y10600
1CH	QD10601	Y10601

Eighth Expansion Module Register Definition Number

Channel	DA Signal	Channel Enable Switch
0CH	QD10700	Y10700
1CH	QD10701	Y10701

Ninth Expansion Module Register Definition Number

Channel	DA Signal	Channel Enable Switch
0CH	QD10800	Y11000
1CH	QD10801	Y11001

Tenth Expansion Module Register Definition Number

Channel	DA Signal	Channel Enable Switch
0CH	QD10900	Y11100
1CH	QD10901	Y11101

Eleventh Expansion Module Register Definition Number

Channel	DA Signal	Channel Enable Switch
0CH	QD11000	Y11200
1CH	QD11001	Y11201

Twelfth Expansion Module Register Definition Number

Channel	DA Signal	Channel Enable Switch
0CH	QD11100	Y11300
1CH	QD11101	Y11301

Thirteenth Expansion Module Register Definition Number

Channel	DA Signal	Channel Enable Switch
0CH	QD11200	Y11400
1CH	QD11201	Y11401

Fourteenth Expansion Module Register Definition Number

channel	DA signal	Channel enable switch
0CH	QD11300	Y11500
1CH	QD11301	Y11501

Fifteenth Expansion Module Register Definition Number

Channel	DA Signal	Channel Enable Switch
0CH	QD11400	Y11600
1CH	QD11401	Y11601

Sixteenth Expansion Module Register Definition Code

Channel	DA Signal	Channel Enable Switch
0CH	QD11500	Y11700
1CH	QD11501	Y11701



- Disabling unused channels can increase the input/output scanning speed.
- When the output enable switch is turned off during operation, the corresponding output channel maintains its original output level.

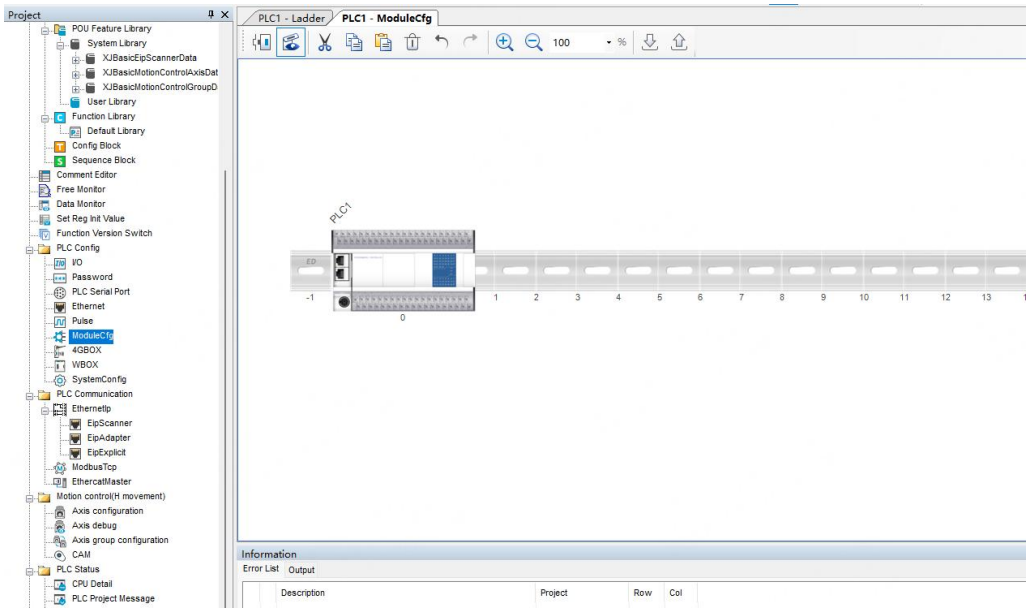
4.2.5.Work Mode Setup

There are two methods available for configuring the operating mode (these two methods yield equivalent results).

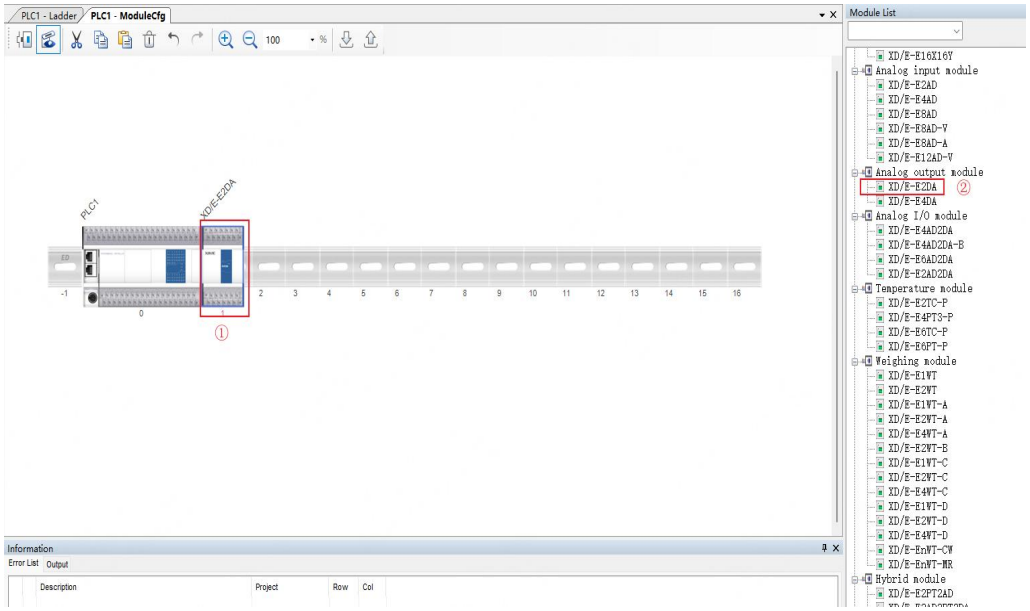
- Through Control Panel configuration
- Set via Flash registers

1) Configuration Panel Configuration

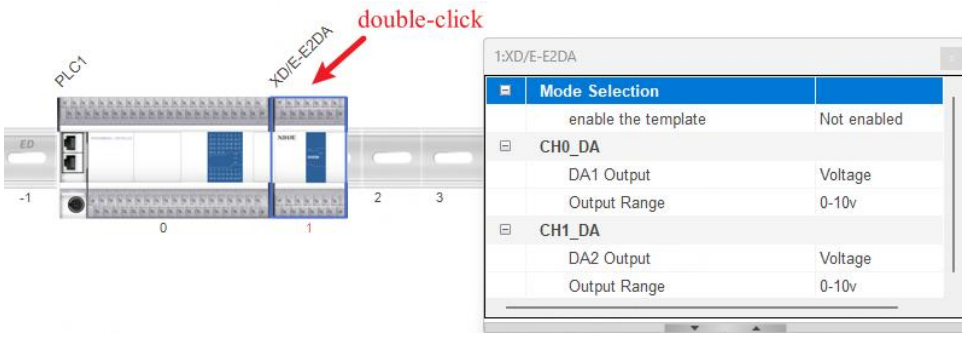
1. Use the XINJE PLC Programming Tool Software version 3.8.0a or later to configure the module. Click [PLC Configuration] – [Module Configuration] in the left-side Engineering Bar to open the Expansion Module Settings window. For XINJE PLC Programming Tool Software versions prior to 3.8.0a, click [PLC Configuration] – [Expansion Module] in the left-side Engineering Bar to perform the configuration.



2. Select a module from the right-hand module list and drag it to the desired position, or double-click a module in the right-hand module list to select it:



3. Double-click the corresponding module icon to access the module configuration interface and select the voltage or current output mode for the DA channel.



4. Click " " to view the default configuration parameters for the Expansion module.

5. After completing the parameter configuration for the expansion module, click "" to write the set values into the PLC; the changes will take effect only after the PLC is powered off and then powered on again. Under the Module Configuration Node, mount the configured module, then double-click to enter the Module Parameter Configuration screen.



2) Flash Register Configuration

The expansion module's output channels support two operating modes: voltage and current. The current mode offers two options – 0–20 mA or 4–20 mA – while the voltage mode offers two options – 0–5 V or 0–10 V. These settings can be configured using the SFD (Special FLASH Data Register) within the PLC. As shown below:

Module ID	Configuration Information Address	Module ID	Configuration Information Address
#1	SFD350~SFD359	#9	SFD430~SFD439
#2	SFD360~SFD369	#10	SFD440~SFD449
#3	SFD370~SFD379	#11	SFD450~SFD459
#4	SFD380~SFD389	#12	SFD460~SFD469
#5	SFD390~SFD399	#13	SFD470~SFD479
#6	SFD400~SFD409	#14	SFD480~SFD489
#7	SFD410~SFD419	#15	SFD490~SFD499
#8	SFD420~SFD429	#16	SFD500~SFD509

3) SFD Bit Definition

Using the First Module as an example to illustrate the setup method.

Register		Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0	Explain
SFD350	Byte0	DA2				DA1				Used to specify the input range of the DA module; the lower 4 bits of Byte0
		Keep	000：0~10V 001：0~5V			Keep	000：0~10V 001：0~5V			

Register		Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0	Explain
			100：-10~10V 101：-5~5V 010：0~20mA 011：4~20mA				100：-10~10V 101：-5~5V 010：0~20mA 011：4~20mA			represent the configuration bits for DA Channel 1, while the upper 4 bits represent the configuration bits for DA Channel 2.
	Byte1	Keep								
SFD351~SFD359		Keep								

Example: Set the operating modes for channels 1 and 0 to 0–10 V and 0–20 mA, respectively.

Method 1:

It can be configured directly via the configuration panel; the configuration method is shown in Figure 5-1 above.

Method 2:

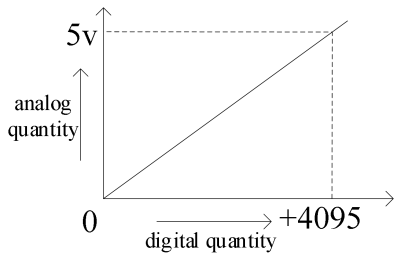
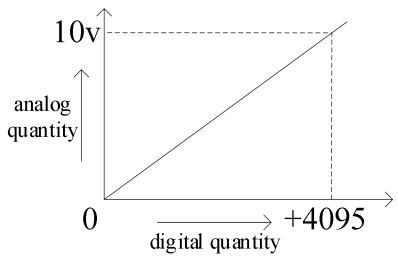
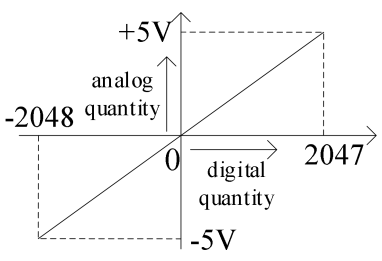
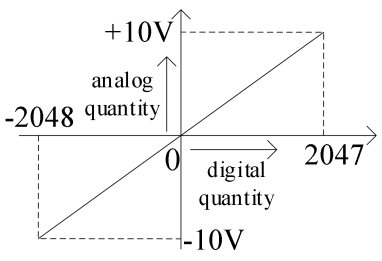
Set the SFD special register directly to the following value:

SFD350=2H

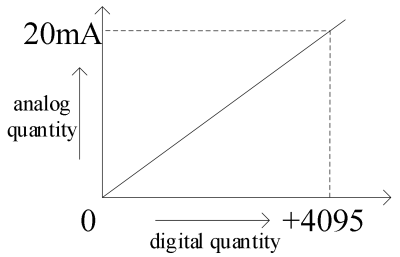
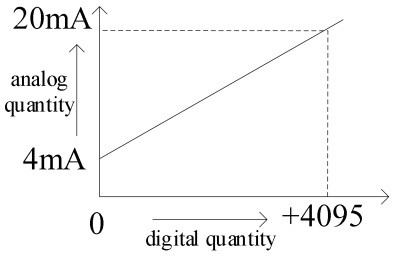
4.2.6.Analog-to-Digital Conversion Diagram

The relationship between the output digital signal and its corresponding analog signal data is shown in the table below:

- Analog Voltage-to-Digital Conversion Diagram

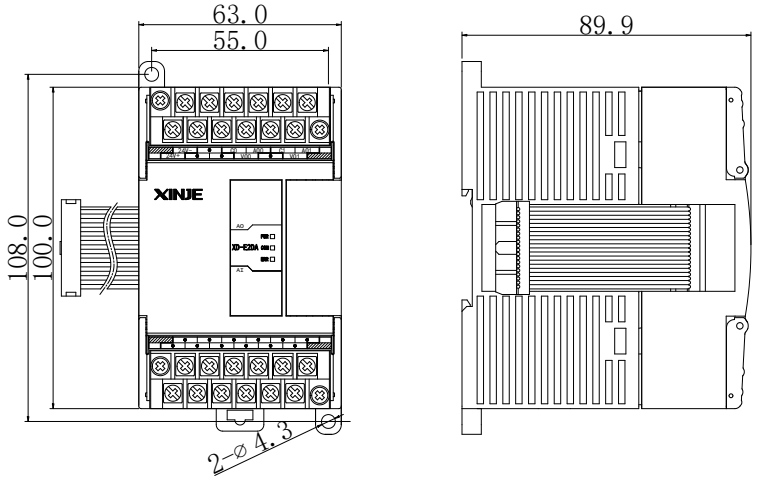
0−5 V Analog Output	0−10 V Analog Output
	
-5~5V Analog Output	**-10~10 V Analog Output**
	

- Analog Current-to-Digital Converter Diagram

0−20 mA Analog Output	4−20 mA Analog Output
	

When the input data exceeds K4095, the output analog data from the D/A converter remains constant at 5 V, 10 V, or 20 mA.

4.2.7.External Dimensions Diagram

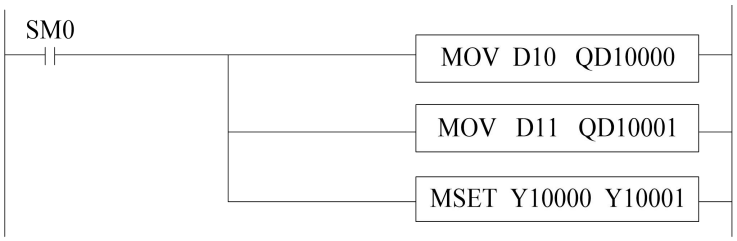


(unit:mm)

4.2.8.Programming Example

Example: Real-time writing of data to two channels (using the first module as an example)

Procedure:

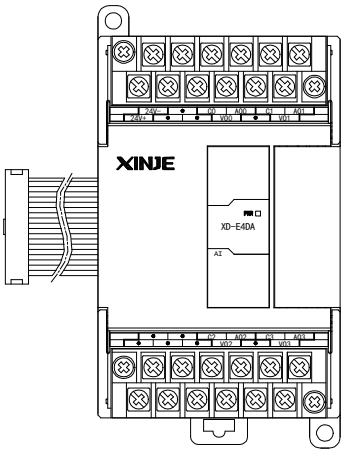


Description:

SM0 is a normally ON coil that remains in the ON state throughout the PLC operation.
Write data from data register D10 to output channel 0;
Write data from data register D11 to Output Channel 1.
Since all channels are in use, enable bits for all channels should be set to "on".

4.3. 12 Bit Analog Current and Voltage Output Module XD-E4DA

4.3.1.Module Features and Specifications



The XD-E4DA analog input/output module converts four digital signals into analog signals and transmits them to the PLC main unit, enabling real-time data exchange with the PLC main unit.

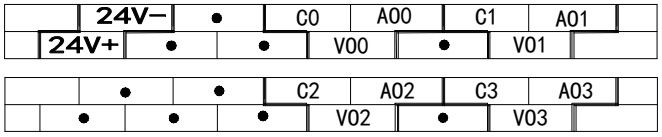
1) Module Features

- 4-channel analog output: supports both voltage output and current output modes.
- As specialized functional modules for the XD series, the XD3/XD3E can support up to 10 additional modules connected to the right side of the PLC main unit; the XD5/XDM/XDC/XD5E/XDME/XDH can support up to 16 additional modules; whereas the XD1/XD2 do not support the addition of any modules.

2) Module Specifications

Project	Analog Output	
	Voltage Output	Current Output
Analog Output Range	0~5V、0~10V (External load resistor: 2 kΩ–1 MΩ)	0~20mA、4~20mA (External load resistance <500 Ω)
Digital Input Range	0~4095	
Resolution Ratio	1/4095（12Bit）	
Overall Accuracy	±1%	
Conversion Rate	2ms/1 channel	2ms/1 channel
Module Power Supply	DC24V±10%，150Ma	

4.3.2.Terminal Specifications



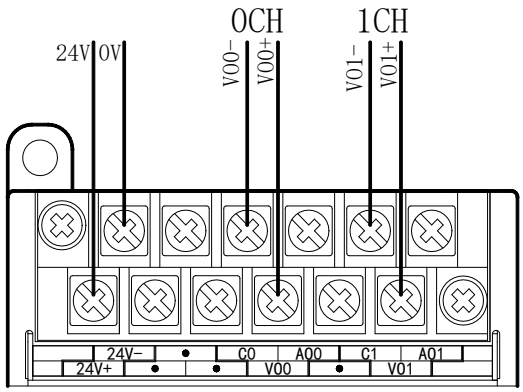
Channel	Terminal Name	Signal Name
CH0	AO0	Current analog output
	VO0	Voltage analog output
	C0	CH0 Analog Output Common Terminal
CH1	AO1	Current analog output
	VO1	Voltage analog output
	C1	CH1 Analog Output Common Terminal
CH2	AO2	Current analog output
	VO2	Voltage analog output
	C2	CH2 Analog Output Common Terminal
CH3	AO3	Current analog output
	VO3	Voltage analog output
	C3	CH3 analog output common terminal
-	24V+	+24V power supply
	24V-	Power supply common terminal

4.3.3.External Connection

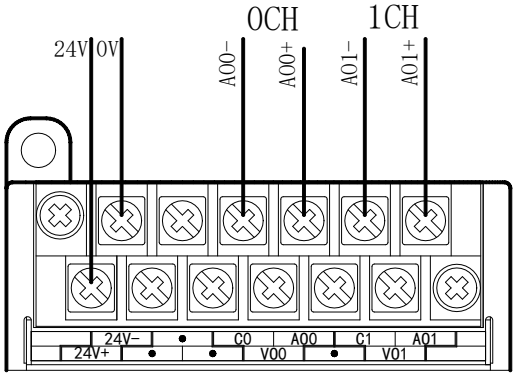
When establishing an external connection, please note the following aspects:

- To prevent interference, please use shielded cable and perform single-point grounding of the shield layer.
- When connecting the XD-E4DA to an external +24V power supply, please use the 24V power supply built into the PLC unit to avoid interference.

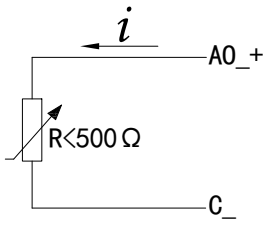
1) Single-Ended Voltage Output



2) Single-Ended Current Output



The XD-E4DA current output-side wiring is shown in the figure below:



4.3.4.Input/Output Definition Number Allocation

The XD series analog input modules do not occupy any I/O units; the converted values are directly written into the PLC registers. The definition numbers for the PLC registers corresponding to each channel are as follows:

Each channel can only be used when the enable switch is turned on.

First Expansion Module Register Definition Number

Channel	DA Signal	Channel Enable Switch
0CH	QD10000	Y10000
1CH	QD10001	Y10001
2CH	QD10002	Y10002
3CH	QD10003	Y10003

Second Expansion Module Register Definition Number

Channel	DA Signal	Channel Enable Switch
0CH	QD10100	Y10100
1CH	QD10101	Y10101
2CH	QD10102	Y10102
3CH	QD10103	Y10103

Third Expansion Module Register Definition Number

Channel	DA Signal	Channel Enable Switch
0CH	QD10200	Y10200
1CH	QD10201	Y10201
2CH	QD10202	Y10202
3CH	QD10203	Y10203

Fourth Expansion Module Register Definition Number

Channel	DA Signal	Channel Enable Switch
0CH	QD10300	Y10300
1CH	QD10301	Y10301
2CH	QD10302	Y10302
3CH	QD10303	Y10303

Fifth Expansion Module Register Definition Number

Channel	DA Signal	Channel Enable Switch
0CH	QD10400	Y10400
1CH	QD10401	Y10401
2CH	QD10402	Y10402
3CH	QD10403	Y10403

Sixth Expansion Module Register Definition Number

Channel	DA Signal	Channel Enable Switch
0CH	QD10500	Y10500
1CH	QD10501	Y10501
2CH	QD10502	Y10502
3CH	QD10503	Y10503

Seventh Expansion Module Register Definition Number

Channel	DA Signal	Channel Enable Switch
0CH	QD10600	Y10600
1CH	QD10601	Y10601
2CH	QD10602	Y10602
3CH	QD10603	Y10603

Eighth Expansion Module Register Definition Number

Channel	DA Signal	Channel Enable Switch
0CH	QD10700	Y10700
1CH	QD10701	Y10701
2CH	QD10702	Y10702
3CH	QD10703	Y10703

Ninth Expansion Module Register Definition Number

Channel	DA Signal	Channel Enable Switch
0CH	QD10800	Y11000
1CH	QD10801	Y11001
2CH	QD10802	Y11002
3CH	QD10803	Y11003

Tenth Expansion Module Register Definition Number

Channel	DA Signal	Channel Enable Switch
0CH	QD10900	Y11100
1CH	QD10901	Y11101
2CH	QD10902	Y11102
3CH	QD10903	Y11103

Eleventh Expansion Module Register Definition Number

Channel	DA Signal	Channel Enable Switch
0CH	QD11000	Y11200
1CH	QD11001	Y11201
2CH	QD11002	Y11202
3CH	QD11003	Y11203

Twelfth Expansion Module Register Definition Number

Channel	DA Signal	Channel Enable Switch
0CH	QD11100	Y11300
1CH	QD11101	Y11301
2CH	QD11102	Y11302
3CH	QD11103	Y11303

Thirteenth Expansion Module Register Definition Number

Channel	DA Signal	Channel Enable Switch
0CH	QD11200	Y11400
1CH	QD11201	Y11401
2CH	QD11202	Y11402
3CH	QD11203	Y11403

Fourteenth Expansion Module Register Definition Number

Channel	DA Signal	Channel Enable Switch
0CH	QD11300	Y11500
1CH	QD11301	Y11501
2CH	QD11302	Y11502
3CH	QD11303	Y11503

Fifteenth Expansion Module Register Definition Number

Channel	DA Signal	Channel Enable Switch
0CH	QD11400	Y11600
1CH	QD11401	Y11601
2CH	QD11402	Y11602
3CH	QD11403	Y11603

Sixteenth Expansion Module Register Definition Number

Channel	DA Signal	Channel Enable Switch
0CH	QD11500	Y11700
1CH	QD11501	Y11701
2CH	QD11502	Y11702
3CH	QD11503	Y11703

- Disabling unused channels can increase the input/output scanning speed.
- When the output enable switch is turned off during operation, the corresponding output channel maintains its original output level.

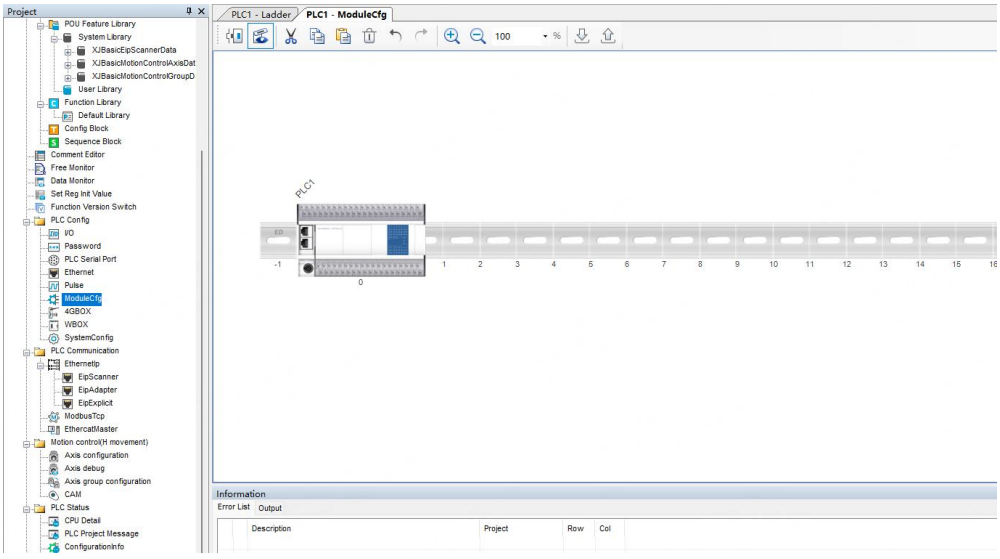
4.3.5.Work Mode Setup

There are two methods for configuring the operating mode (these two methods yield equivalent results).

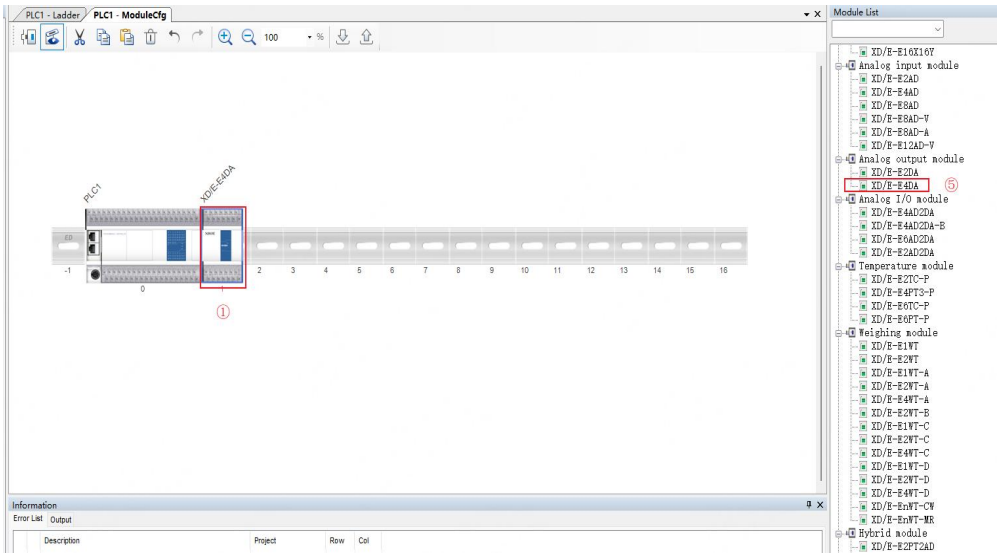
- Configure via Control Panel
- Set via Flash registers

1) Configuration Panel Configuration

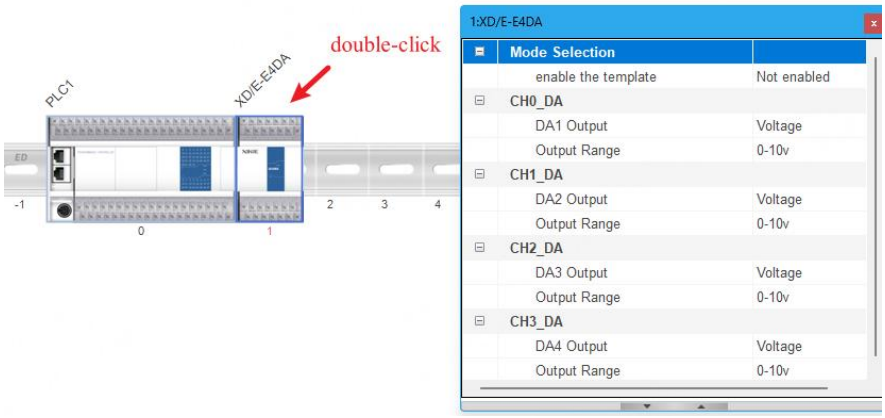
1. Use the XINJE PLC Programming Tool Software version 3.8.0a or later to configure the module; click [PLC Configuration] – [Module Configuration] in the left-side Engineering Bar to open the Expansion Module Settings window. For versions prior to 3.8.0a, click [PLC Configuration] – [Expansion Module] in the left-side Engineering Bar to perform the configuration.



2. Select a module from the right-side module list and drag it to the desired position, or double-click a module in the right-side module list to select it:

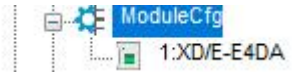


3. Double-click the corresponding module icon to access the module configuration interface and select the voltage or current output mode for the DA channel.



4. Click "" to view the default configuration parameters for the Expansion module.

5. After completing the parameter configuration  for the expansion module, click "" to write the set values into the PLC; the changes will take effect only after the PLC is powered off and then powered on again. Under the Module Configuration Node, mount the configured module, then double-click to enter the Module Parameter Configuration screen.



2) Flash register configuration

The expansion module's output channels support two operating modes: voltage and current. The current mode offers two options – 0–20 mA or 4–20 mA – while the voltage mode offers two options – 0–5 V or 0–10 V. These settings can be configured using the SFD (Special FLASH Data Register) within the PLC. As shown below:

Module ID	Configuration Information Address	Module ID	Configuration Information Address
#1	SFD350~SFD359	#9	SFD430~SFD439
#2	SFD360~SFD369	#10	SFD440~SFD449
#3	SFD370~SFD379	#11	SFD450~SFD459
#4	SFD380~SFD389	#12	SFD460~SFD469
#5	SFD390~SFD399	#13	SFD470~SFD479
#6	SFD400~SFD409	#14	SFD480~SFD489
#7	SFD410~SFD419	#15	SFD490~SFD499
#8	SFD420~SFD429	#16	SFD500~SFD509

3) SFD Bit Definition

Using the First Module as an example to illustrate the setup method.

<table>
<tr><th colspan="2">Register</th><th>Bit7</th><th>Bit6</th><th>Bit5</th><th>Bit4</th><th>Bit3</th><th>Bit2</th><th>Bit1</th><th>Bit0</th><th>Explain</th></tr>
<tr><td rowspan="4">SFD350</td><td rowspan="2">Byte0</td><td colspan="4">DA2</td><td colspan="4">DA1</td><td rowspan="4">Used to specify the input range of the DA module; the lower 4 bits of Byte0 represent the configuration bits for DA Channel 1, while the upper 4 bits represent the configuration bits for DA Channel 2.</td></tr>
<tr><td>Keep</td><td>Keep</td><td>0: Voltage Output
1: Current Output</td><td>0：0~10V
1：0~5V
0：0~20mA
1：4~20mA</td><td>Keep</td><td>Keep</td><td>0: Voltage Output
1: Current Output</td><td>0：0~10V
1：0~5V
0：0~20mA
1：4~20mA</td></tr>
<tr><td rowspan="2">Byte1</td><td colspan="4">DA4</td><td colspan="4">DA3</td></tr>
<tr><td>Keep</td><td>Keep</td><td>0: Voltage Output
1: Current Output</td><td>0：0~10V
1：0~5V
0：0~20mA
1：4~20mA</td><td>Keep</td><td>Keep</td><td>0: Voltage Output
1: Current Output</td><td>0：0~10V
1：0~5V
0：0~20mA
1：4~20mA</td></tr>
<tr><td colspan="2">SFD351~SFD359</td><td colspan="8">Keep</td></tr>
</table>

Example: Set the operating modes for Channels 3, 2, 1, and 0 to 0–10 V, 0–10 V, 0–20 mA, and 0–20 mA, respectively.

Method 1:

It can be configured directly via the configuration panel; the configuration method is illustrated in Section 7-1 above.

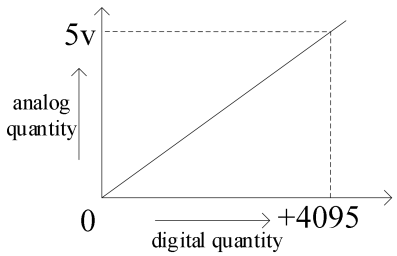
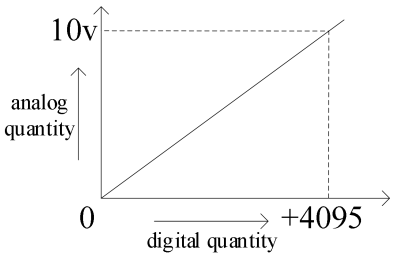
Method 2:

Set the SFD special register directly to the following value: SFD350 = 0022H

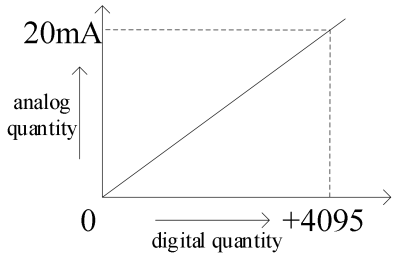
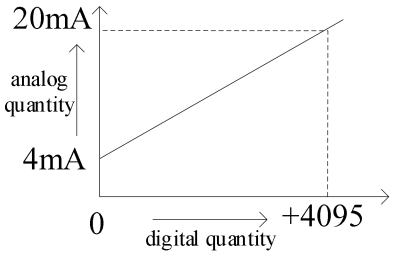
4.3.6.Analog-to-Digital Conversion Diagram

The relationship between the output digital signal and its corresponding analog signal data is shown in the table below:

- Analog Voltage-to-Digital Conversion Diagram

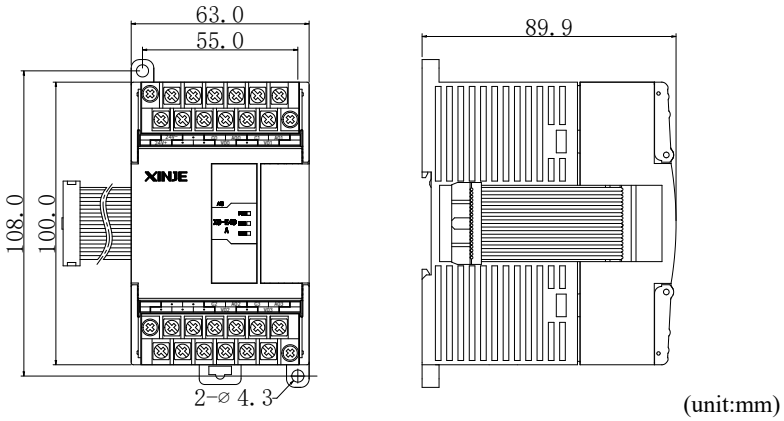
0–5 V Analog Output	0–10 V Analog Output
	

- Analog Current-to-Digital Converter Diagram

0–20 mA Analog Output	4–20 mA Analog Output
	

When the input data exceeds K4095, the output analog data from the D/A converter remains constant at 5 V, 10 V, or 20 mA.

4.3.7.External Dimensions Diagram

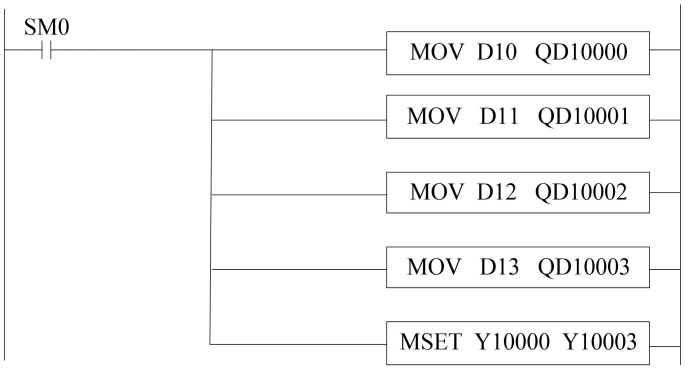


(unit:mm)

4.3.8.Programming Example

Example: Real-time data writing to four channels (using the first module as an example)

Procedure:



Description:

SM0 is a normally ON coil that remains in the ON state throughout the PLC operation.
Write data from data register D10 to output channel 0;
Write data from data register D11 to Output Channel 1;
Write data from data register D12 to Output Channel 2;
Write data from data register D13 to Output Channel 3.
Since all channels are in use, enable bits for all channels should be set to "on".

5. Analog Input/Output Module

5.1. Analog Input/Output Module Overview

XD Series Analog Input/Output Modules – supports 4 analog input channels and 2 analog output channels.

5.1.1.Naming Rule

XD－E○AD○DA
① ② ③ ④ ⑤ ⑥

①	Series Name	XD: XD Series Expansion Modules
②	Reference Expansion Module	E: Represents an expansion module
③	Number of input channels	4
④	read analogue input	AD: Represents analog voltage or current input.
⑤	Number of output channels	2
⑥	Analog output	DA: Represents analog voltage or current output.

5.1.2.Model List

Model		Description
Analog Output	XD-E4AD2DA	4-channel analog input and 2-channel analog output; supports current and voltage measurement modes; 12-bit resolution

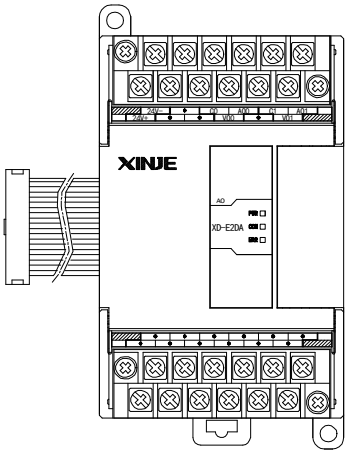
5.1.3.General Requirements

Project	Specifications
Service Environment	Non-corrosive gases
Ambient Temperature	0~60℃
Maintain Ambient Temperature	-20~70℃

Ambient Humidity	5~95%RH
Maintain Ambient Humidity	5~95%RH
Install	Can be secured with M3 screws or installed directly onto a DIN46277 (35 mm wide) guide rail.

5.2. Analog Input/Output Module XD-E4AD2DA

5.2.1.Module Features and Specifications



The XD-E4AD2DA analog input/output module converts four analog input signals into digital values and two digital signals into analog signals, then transmits these signals to the PLC main unit and enables real-time data exchange with the PLC main unit.

1) Module Features

- 4-channel analog input: supports both voltage and current input modes.
- 2-channel analog output.
- 14-bit high-precision analog input channels.
- As specialized functional modules for the XD series, the XD3/XD3E can support up to 10 additional modules connected to the right side of the PLC main unit; the XD5/XDM/XDC/XD5E/XDME/XDH can support up to 16 additional modules; whereas the XD1/XD2 do not support the addition of any modules.

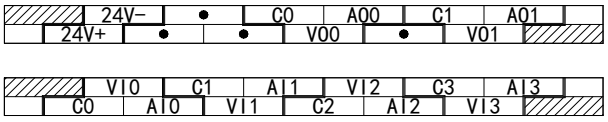
2) Module Specifications

Project	Read Analogue Input		Analog Output	
	Voltage Input	Current Input	Voltage Output	Current Output
Analog Input Range	0~5V、0~10V -5~5V、-10~10V (Impedance> 1 M)	0~20mA、 4~20mA、 -20~20mA (Impedance: approximately 120 Ω)	-	

Project	Read Analogue Input		Analog Output	
	Voltage Input	Current Input	Voltage Output	Current Output
Maximum Input Range	DC±15V	-40~40mA	-	
Analog Output Range	-		0~5V、0~10V -5~5V、-10~10V (External load resistor: 2 kΩ–1 MΩ)	0~20mA、4~20mA (External load resistance <500 Ω)
Digital Input Range	-		0–4095 or-2048–2047	
Digital Output Range	0–16383 or-8192–8191		-	
Resolution Ratio	1/16383（14Bit）		1/4095（12Bit）	
Overall Accuracy	±1%			
Conversion Rate	2ms/1 channel		2ms/1 channel	
Module Power Supply	DC24V±10%，150mA			

The XD-E4AD2DA module (V6 and earlier versions) does not support the voltage ranges of-5~5V, -10~10V, or-20~20mA.

5.2.2.Terminal Specifications



Channel	Terminal Name	Signal Name
CH0	AI0	Current analog input
	VI0	Voltage analog input
	C0	CH0 Analog Input Common Terminal
CH1	AI1	Current analog input
	VI1	Voltage analog input
	C1	CH1 Analog Input Common Terminal
CH2	AI2	Current analog input
	VI2	Voltage analog input
	C2	CH2 Analog Input Common Terminal
CH3	AI3	Current analog input
	VI3	Voltage analog input

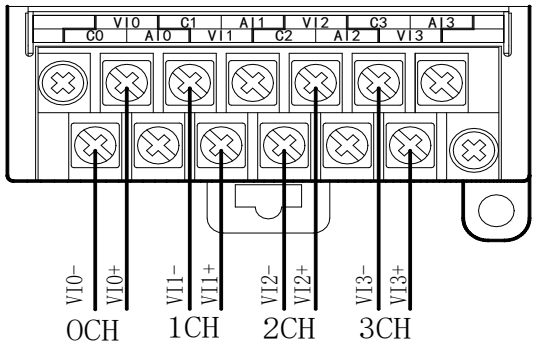
	C3	CH3 Analog Input Common Terminal
CH0	AO0	Current analog output
	VO0	Voltage analog output
	C0	CH0 Analog Output Common Terminal
CH1	AO1	Current analog output
	VO1	Voltage analog output
	C1	CH1 Analog Output Common Terminal
-	24V+	+24V power supply
	24V-	Power supply common terminal

5.2.3.External Connection

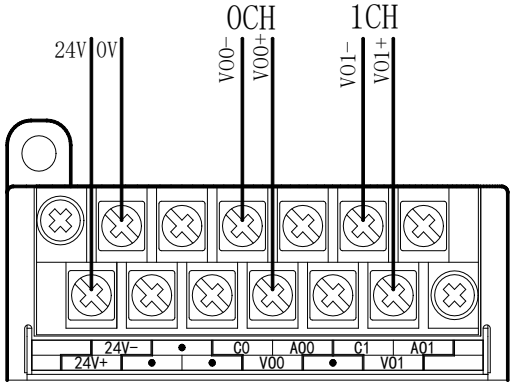
When establishing an external connection, please note the following aspects:

- To prevent interference, please use shielded cable and perform single-point grounding of the shield layer.
- When connecting the XD-E4AD2DA to an external +24V power supply, please use the 24V power supply built into the PLC unit to avoid interference.

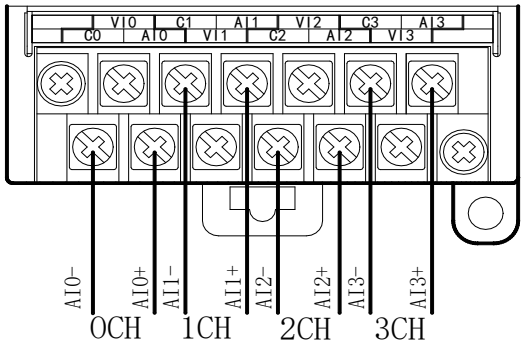
1) Single-Ended Voltage Input



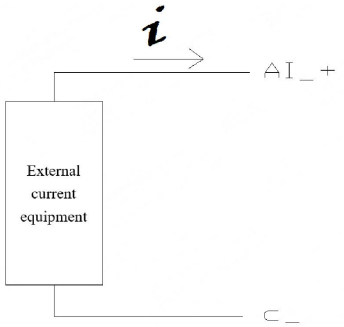
2) Single-Ended Voltage Output



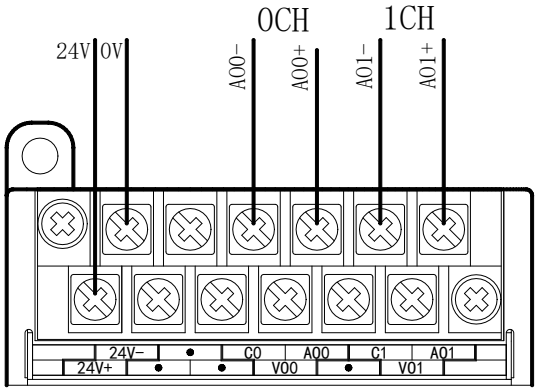
3) Single-Ended Current Input



The current input-side wiring for the XD-E4AD2DA is shown in the figure below:



4) Single-Ended Current Output



Current output requires no DC24V power supply in series!

5.2.4.Input/Output Definition Number Allocation

The XD series analog input modules do not occupy I/O units; the converted values are directly written into the PLC registers. The definition numbers for the PLC registers corresponding to each channel are as follows:

Each channel can only be used when the enable switch is turned on.

First Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID10000	Y10000	X10000
1CH	ID10001	Y10001	X10001
2CH	ID10002	Y10002	X10002
3CH	ID10003	Y10003	X10003
Channel	DA Signal	Channel Enable Switch	-
0CH	QD10000	Y10004	-
1CH	QD10001	Y10005	-

Second Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID10100	Y10100	X10100
1CH	ID10101	Y10101	X10101
2CH	ID10102	Y10102	X10102
3CH	ID10103	Y10103	X10103
Channel	DA Signal	Channel Enable Switch	-
0CH	QD10100	Y10104	-
1CH	QD10101	Y10105	-

Third Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID10200	Y10200	X10200
1CH	ID10201	Y10201	X10201
2CH	ID10202	Y10202	X10202
3CH	ID10203	Y10203	X10203
Channel	DA Signal	Channel Enable Switch	-
0CH	QD10200	Y10204	-
1CH	QD10201	Y10205	-

Fourth Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID10300	Y10300	X10300
1CH	ID10301	Y10301	X10301
2CH	ID10302	Y10302	X10302
3CH	ID10303	Y10303	X10303
Channel	DA Signal	Channel Enable Switch	-
0CH	QD10300	Y10304	-
1CH	QD10301	Y10305	-

Fifth Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID10400	Y10400	X10400
1CH	ID10401	Y10401	X10401
2CH	ID10402	Y10402	X10402
3CH	ID10403	Y10403	X10403
Channel	DA Signal	Channel Enable Switch	-
0CH	QD10400	Y10404	-
1CH	QD10401	Y10405	-

Sixth Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID10500	Y10500	X10500
1CH	ID10501	Y10501	X10501
2CH	ID10502	Y10502	X10502
3CH	ID10503	Y10503	X10503
Channel	DA Signal	Channel Enable Switch	-
0CH	QD10500	Y10504	-
1CH	QD10501	Y10505	-

Seventh Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID10600	Y10600	X10600
1CH	ID10601	Y10601	X10601
2CH	ID10602	Y10602	X10602
3CH	ID10603	Y10603	X10603
Channel	DA Signal	Channel Enable Switch	-
0CH	QD10600	Y10604	-
1CH	QD10601	Y10605	-

Eighth Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID10700	Y10700	X10700
1CH	ID10701	Y10701	X10701
2CH	ID10702	Y10702	X10702
3CH	ID10703	Y10703	X10703
Channel	DA Signal	Channel Enable Switch	-
0CH	QD10700	Y10704	-
1CH	QD10701	Y10705	-

Ninth Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID10800	Y11000	X11000

1CH	ID10801	Y11001	X11001
2CH	ID10802	Y11002	X11002
3CH	ID10803	Y11003	X11003
Channel	DA Signal	Channel Enable Switch	-
0CH	QD10800	Y11004	-
1CH	QD10801	Y11005	-

Tenth Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID10900	Y11100	X11100
1CH	ID10901	Y11101	X11101
2CH	ID10902	Y11102	X11102
3CH	ID10903	Y11103	X11103
Channel	DA Signal	Channel Enable Switch	-
0CH	QD10900	Y11104	-
1CH	QD10901	Y11105	-

Eleventh Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID11000	Y11200	X11200
1CH	ID11001	Y11201	X11201
2CH	ID11002	Y11202	X11202
3CH	ID11003	Y11203	X11203
Channel	DA Signal	Channel Enable Switch	-
0CH	QD11000	Y11204	-
1CH	QD11001	Y11205	-

Twelfth Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID11100	Y11300	X11300
1CH	ID11101	Y11301	X11301
2CH	ID11102	Y11302	X11302
3CH	ID11103	Y11303	X11303
Channel	DA Signal	Channel Enable Switch	-
0CH	QD11100	Y11304	-
1CH	QD11101	Y11305	-

Thirteenth Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID11200	Y11400	X11400
1CH	ID11201	Y11401	X11401
2CH	ID11202	Y11402	X11402
3CH	ID11203	Y11403	X11403
Channel	DA Signal	Channel Enable Switch	-

0CH	QD11200	Y11404	-
1CH	QD11201	Y11405	-

Fourteenth Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID11300	Y11500	X11500
1CH	ID11301	Y11501	X11501
2CH	ID11302	Y11502	X11502
3CH	ID11303	Y11503	X11503
Channel	DA Signal	Channel Enable Switch	-
0CH	QD11300	Y11504	-
1CH	QD11301	Y11505	-

Fifteenth Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID11400	Y11600	X11600
1CH	ID11401	Y11601	X11601
2CH	ID11402	Y11602	X11602
3CH	ID11403	Y11603	X11603
Channel	DA Signal	Channel Enable Switch	-
0CH	QD11400	Y11604	-
1CH	QD11401	Y11605	-

Sixteenth Expansion Module Register Definition Number

Channel	AD Signal	Channel Enable Switch	Channel Alarm Flag Bit
0CH	ID11500	Y11700	X11700
1CH	ID11501	Y11701	X11701
2CH	ID11502	Y11702	X11702
3CH	ID11503	Y11703	X11703
Channel	DA Signal	Channel Enable Switch	-
0CH	QD11500	Y11704	-
1CH	QD11501	Y11705	-



- Disabling unused channels can increase the input/output scanning speed.
- When the input enable switch is turned off during operation, the corresponding input channel will not be able to capture any data (the data value will be displayed as 0).
- When the output enable switch is turned off during operation, the corresponding output channel maintains its original output level.

5.2.5.Work Mode Setup

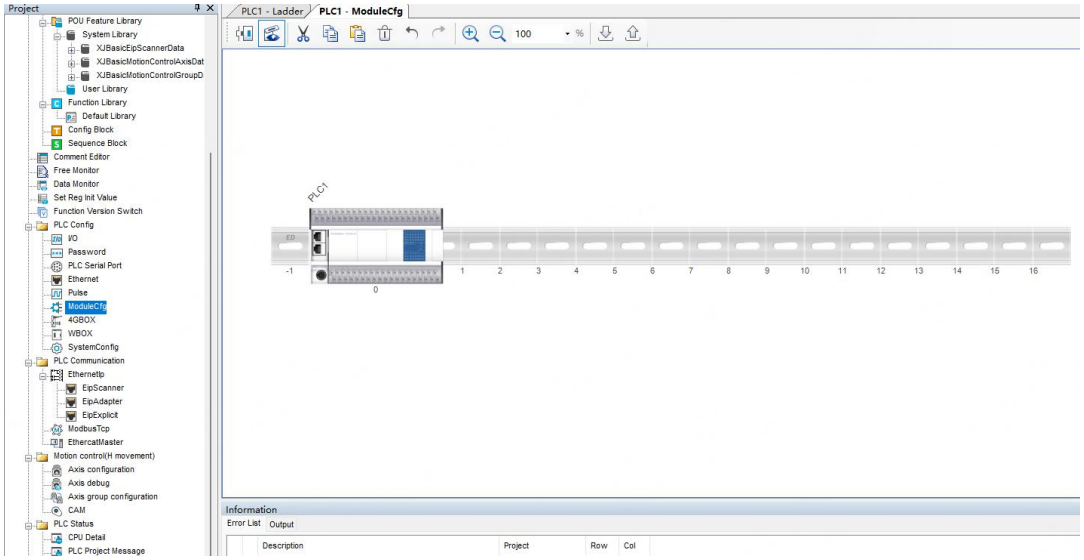
There are two methods for configuring the operating mode (the two methods yield equivalent results):

- Configure via Control Panel

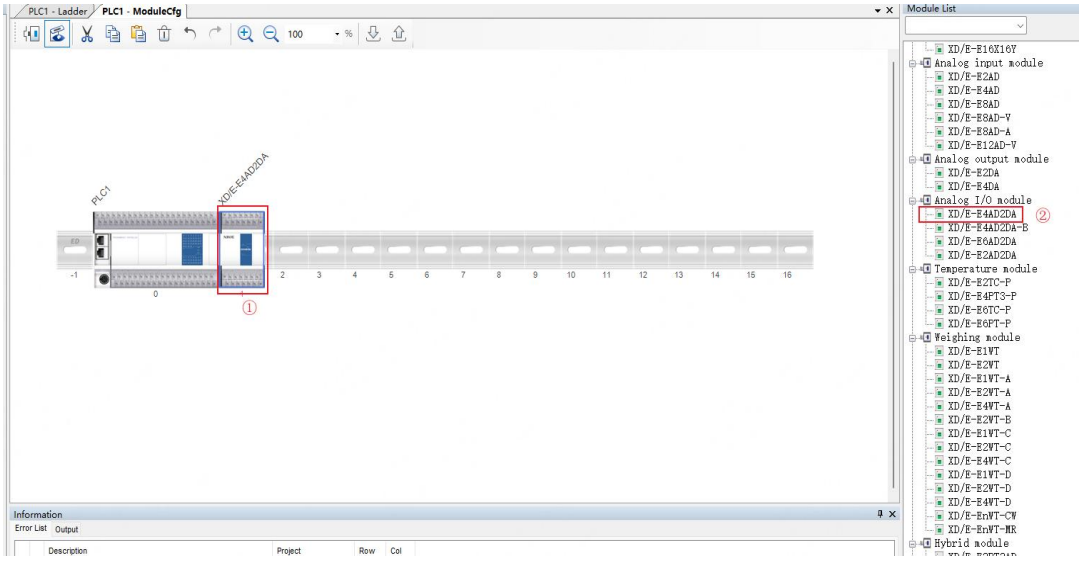
- Set via Flash registers

1) Configuration Panel Configuration

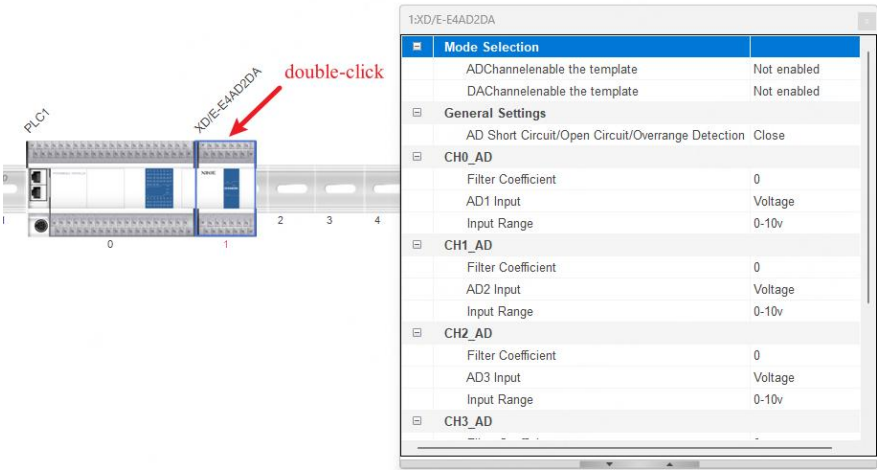
1. Use the XINJE PLC Programming Tool Software version 3.8.0a or later to configure the module; click [PLC Configuration] – [Module Configuration] in the left-side Engineering Bar to open the Expansion Module Settings window. For versions prior to 3.8.0a, click [PLC Configuration] – [Expansion Module] in the left-side Engineering Bar to perform the configuration.



2. Select a module from the right-side module list and drag it to the desired position, or double-click a module in the right-side module list to select it:

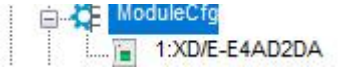


3. Double-click the corresponding module icon to access the module configuration interface, where you can select the AD filter coefficient and the voltage or current output mode for the AD/DA channel.



4. Click " " to view the default configuration parameters for the Expansion module.

5. After completing the parameter configuration for the expansion module, click "" to write the set values into the PLC; the changes will take effect only after the PLC is powered off and then powered on again. Under the Module Configuration Node, mount the configured module, then double-click to enter the Module Parameter Configuration screen.



- The first-order low-pass filtering method applies a weighting factor to the current sample value relative to the previous filtered output value to obtain the effectively filtered value.
- The filtering coefficient is set by the user between 0 and 254; a lower value results in more stable data but may cause data lag; a value of 1 corresponds to the strongest filtering effect, while a value of 254 corresponds to the weakest filtering effect; the default value is 0 (no filtering).
- ※ When the expansion module " AD Short Circuit/Open Circuit/Overrange Detection Close " is set to "ON", you can check the channel status by examining the channel alarm flag bit X1xxxx. ※ When the expansion module "" is set to "ON", you can check the channel status by examining the channel alarm flag bit X1xxxx.
  for instance:
  The first AD channel is configured in voltage mode; when the AD detects a short circuit, open circuit, or out-of-range condition, the X10000 will be turned on;
  The first AD channel is configured in current-mode; when the AD detection exceeds the range, the X10000 will be turned on.

2) Flash register configuration

The expansion module's input and output channels support two operating modes: voltage and current. The current range options include 0–20 mA, 4–20 mA, and –20–20 mA; the voltage range options

include 0–5 V, 0–10 V, –5–5 V, and –10–10 V. These settings are configured using the SFD (Special FLASH Data Register) within the PLC. As shown below:

Module ID	Configuration Information Address	Module ID	Configuration Information Address
#1	SFD350~SFD359	#9	SFD430~SFD439
#2	SFD360~SFD369	#10	SFD440~SFD449
#3	SFD370~SFD379	#11	SFD450~SFD459
#4	SFD380~SFD389	#12	SFD460~SFD469
#5	SFD390~SFD399	#13	SFD470~SFD479
#6	SFD400~SFD409	#14	SFD480~SFD489
#7	SFD410~SFD419	#15	SFD490~SFD499
#8	SFD420~SFD429	#16	SFD500~SFD509



As shown above, each register is configured to set the mode for four channels; each register contains 16 bits, and the modes for the four channels are configured sequentially in groups of four bits, from the lowest to the highest bit position.

3) SFD Bit Definition

Using the First Module as an example to illustrate the setup method.

<table>
<tr><th colspan="2" rowspan="2">Register</th><th>Bit7</th><th>Bit 6</th><th>Bit5</th><th>Bit4</th><th>Bit3</th><th>Bit2</th><th>Bit1</th><th>Bit0</th><th>Explain</th></tr>
<tr><td colspan="8">AD Channel 1, Channel 2 Filter Coefficient</td><td rowspan="2">AD filtering coefficient</td></tr>
<tr><td>SFD350</td><td>Byte1</td><td colspan="8">AD Channel 3, Channel 4 filtering coefficient</td></tr>
<tr><td rowspan="3">SFD351</td><td rowspan="2">Byte2</td><td colspan="4">AD2</td><td colspan="4">AD1</td><td rowspan="3">Used to specify AD and DA Module input Within the scope, Byte2 Low 4 Bit position: AD Channel 1 Set bit,</td></tr>
<tr><td>Keep</td><td colspan="3">000：0~10V
001：0~5V
100：-10~10V
101：-5~5V
010：0~20mA
011：4~20mA
110：-20~20mA</td><td>Keep</td><td colspan="3">000：0~10V
001：0~5V
100：-10~10V
101：-5~5V
010：0~20mA
011：4~20mA
110：-20~20mA</td></tr>
<tr><td>Byte3</td><td colspan="4">AD4</td><td colspan="4">AD3</td></tr>
</table>

<table>
<tr><td></td><td></td><td>Keep</td><td>000：0~10V
001：0~5V
100：-10~10V
101：-5~5V
010：0~20mA
011：4~20mA
110：-20~20mA</td><td>Keep</td><td>000：0~10V
001：0~5V
100：-10~10V
101：-5~5V
010：0~20mA
011：4~20mA
110：-20~20mA</td><td rowspan="5">The upper 4 bits are AD channel Setting for 2 Bit. Byte3 The lower 4 bits represent AD channel 3 Settings, The upper 4 bits are AD channel 4 Settings Bit. The lower 4 bits of Byte4 are the setting bits for DA channel 1, and the upper 4 bits are the setting bits for DA channel 2;</td></tr>
<tr><td rowspan="3">SFD352</td><td rowspan="2">Byte4</td><td colspan="2">DA2</td><td colspan="2">DA1</td></tr>
<tr><td>Keep</td><td>000：0~10V
001：0~5V
100：-10~10V
101：-5~5V
010：0~20mA
011：4~20mA</td><td>Keep</td><td>000：0~10V
001：0~5V
100：-10~10V
101：-5~5V
010：0~20mA
011：4~20mA</td></tr>
<tr><td>Byte5</td><td colspan="4">AD channel short-circuit/open-circuit/overshoot detection switch</td></tr>
<tr><td colspan="2">SFD353~SFD359</td><td colspan="4">Keep</td></tr>
</table>

Example: Configure the operating modes for Channels 3, 2, 1, and 0 of the first module as 0–20 mA, 4–20 mA, 0–10 V, and 0–5 V, respectively; set the filtering coefficients for Channels 1 and 2 to 254; set the filtering coefficients for Channels 3 and 4 to 100; configure the operating modes for Channels 1 and 0 as 0–10 V and 0–20 mA, respectively.

Method 1:

It can be configured directly on the configuration panel; the configuration method is shown above.

Method 2:

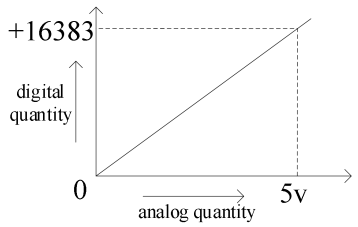
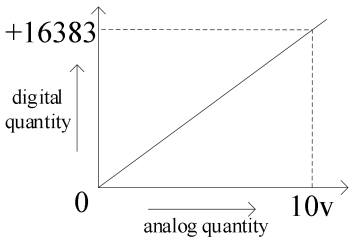
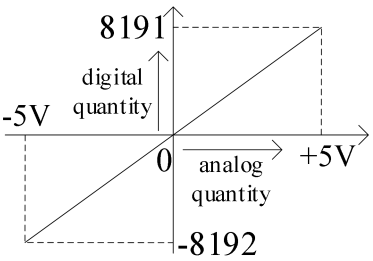
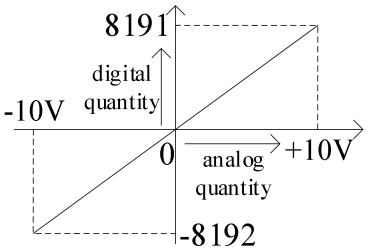
Set the SFD special register directly to the following value:

SFD350=64FEH SFD351=2301H SFD352=2H

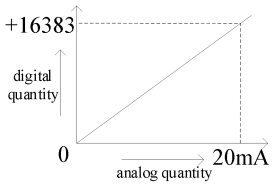
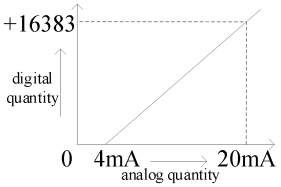
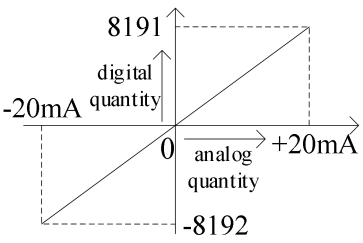
5.2.6.Analog-to-Digital Conversion Diagram

The relationship between the input analog signal and the converted digital signal is shown in the table below:

- Analog Voltage-to-Digital Conversion Diagram

Relationship Between Input Analog Signal and the Converted Digital Signal	
0–5 V Analog Input	0–10 V Analog Input
	
-5~5 V Analog Input	-10~10 V Analog Input
	

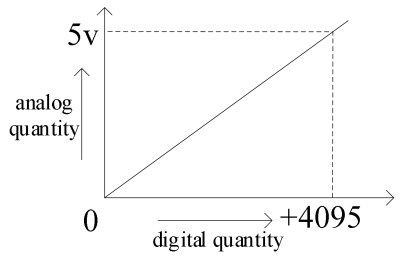
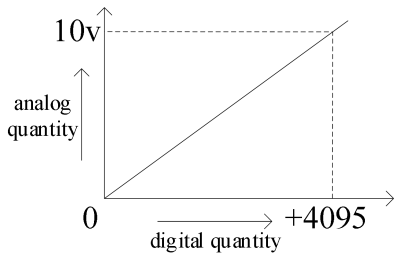
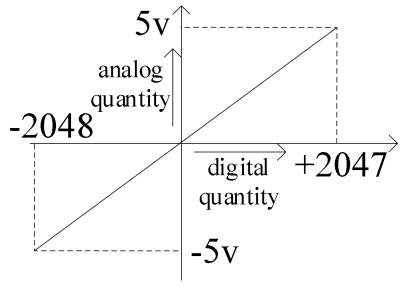
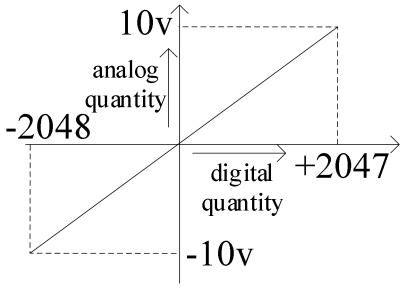
- Analog Current-to-Digital Converter Diagram

Relationship Between Input Analog Signal and the Converted Digital Signal		
0–20 mA Analog Input	4–20 mA Analog Input	-20~20 mA Analog Input
		

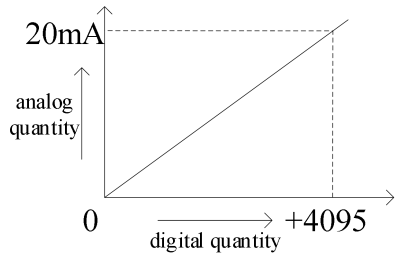
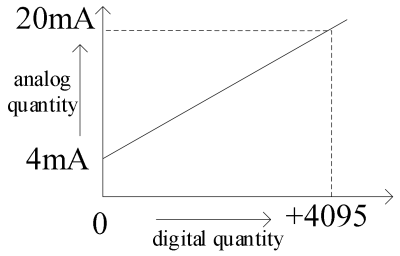
The relationship between the digital output and its corresponding analog data is shown in the table below:

- Analog Voltage-to-Digital Conversion Diagram

Relationship Between Input Digital Value and the Converted Analog Value	
0–5 V Analog Output	0–10 V Analog Output

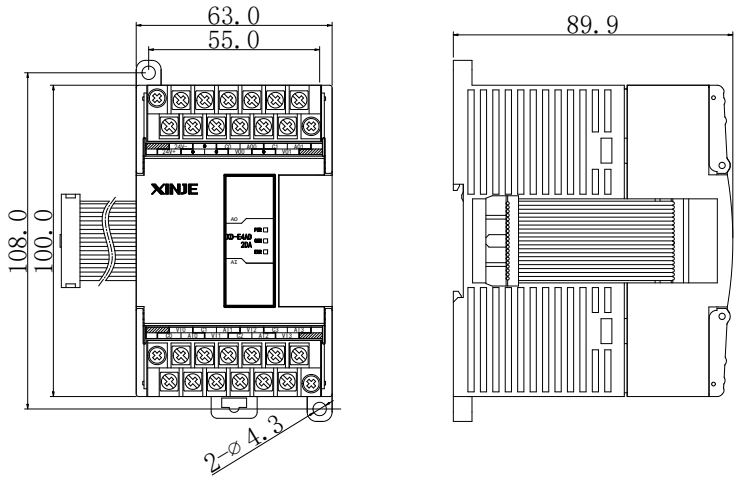
	
-5~5V Analog Output	-10~10 V Analog Output
	

- Analog Current-to-Digital Converter Diagram

Relationship Between Input Digital Value and the Converted Analog Value	
0–20 mA Analog Output	4–20 mA Analog Output
	

- When the channel enable switch is turned on and the AD voltage input is open-circuit, the corresponding ID register displays the value 16383; when the AD current input is open-circuit, the corresponding ID register displays the value 0. When the channel enable switch is turned off, the ID register corresponding to the AD voltage/current input displays the value 0.
- When the input data exceeds K4095, the analog output data from the DA conversion remains constant at 5 V, 10 V, or 20 mA.

5.2.7.External Dimensions Diagram



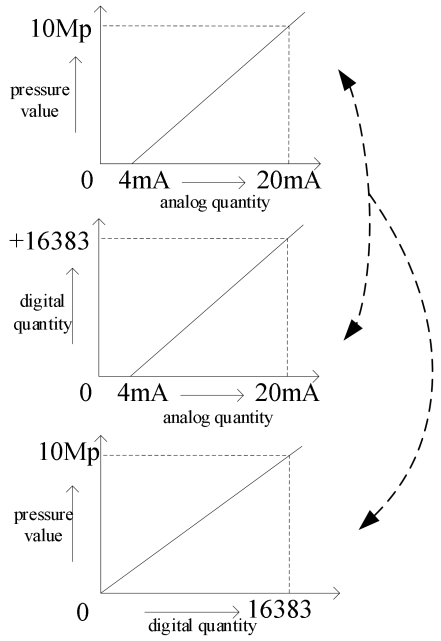
(unit:mm)

5.2.8.Programming Example

Example: A pressure sensor's output signal needs to be acquired (the sensor's performance parameters: detection pressure range of 0 MPa–10 MPa; output analog signal ranges from 4–20 mA); simultaneously, a 0 V–10 V voltage signal must be sent to the frequency converter.

Analyze:

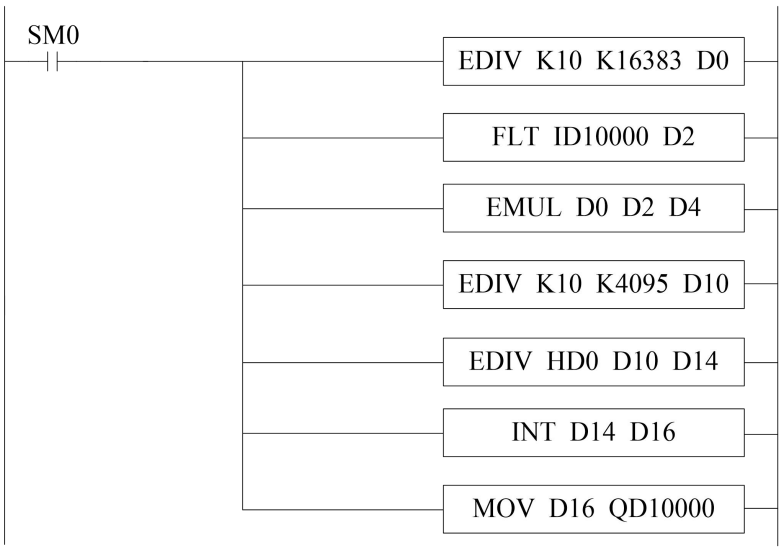
Since the pressure sensor's measurement range is 0 MPa–10 MPa, corresponding to an analog output of 4–20 mA, and the digital output range converted by the expansion module via analog-to-digital conversion is 0–16,383, we can bypass the intermediate analog-to-digital conversion step—meaning the digital output range directly corresponds to the pressure measurement range of 0 MPa–10 MPa (0–16,383). The mapping relationship is shown in the figure below. The value 10 MPa / 16,383 = 0.000610388 represents the pressure value corresponding to each digital "1" acquired by the expansion module; therefore, by multiplying the real-time digital value read from the expansion module's ID register by 0.000610388, the current pressure measured by the pressure sensor can be calculated. For example, if the digital value read from the ID register is 4,095, the corresponding pressure is 2.5 MPa.



Similarly, the configured digital value range of 0–4095 in the QD expansion module register corresponds to a voltage output signal ranging from 0 V to 10 V; the relationship 10 V / 4095 = 0.002442 indicates the voltage value corresponding to each digitally set value in the QD expansion module register. For example, if you need to output a voltage value of 3 V, then 3 V / 0.002442 = 1228.5; this calculated digital value should then be written into the corresponding QD register.

Please use floating-point arithmetic for calculations; otherwise, the calculation accuracy may be affected or the calculation may fail entirely!

procedure:



description:

SM0 is a normally ON coil that remains in the ON state throughout the PLC operation.
When the PLC starts operating, the analog signal acquisition first calculates the pressure value corresponding to each digital value of 1 captured by the expansion module; then, the digital value (integer type) acquired from the ID10000 register is converted into a floating-point number. Therefore, the current real-time pressure value can be determined by multiplying the real-time value acquired from the ID10000 register of the expansion module by the pressure value corresponding to each digital value of 1 captured by that expansion module.
Similarly, for an analog output, first calculate the voltage value corresponding to each digital value of 1 acquired by the expansion module; then, divide the set target voltage value by the voltage value corresponding to each digital value of 1 acquired by the expansion module to obtain the digital value (a floating-point number) that needs to be set. Since the QD10000 register can only store integers, the resulting floating-point digital value must be converted into an integer before being sent to the QD10000 register.



Please enable the corresponding channels by setting Y10000 and Y10004 to ON.

6. Pressure Measurement Module

6.1. Pressure Measurement Module Overview

XD Series Pressure Measurement Module – supports 1–4 pressure signal inputs.

6.1.1.Naming Rule

XD－E○WT－□
① ② ③ ④ ⑤

①	Series Name	XD: XD Series Expansion Modules
②	Reference Expansion Module	E: Represents an expansion module
③	Number of input channels	1, 2, or 4
④	Module Type	WT: Indicates pressure measurement
⑤	Development Serial Number	A, B, C, or D

6.1.2.Model List

Model		Description
Pressure Measurement	XD-E1WT-A	1-channel Pressure Measurement Module – Measurement Range: DC –39.06 mV to 39.06 mV
	XD-E2WT-A	2-channel pressure measurement module; detection range: DC –39.06 mV to 39.06 mV
	XD-E4WT-A	4-channel pressure measurement module; detection range: DC –39.06 mV to 39.06 mV
	XD-E2WT-B	2-channel pressure measurement module; detection range: DC 0 mV – 10 mV
	XD-E1WT-C	1-channel pressure measurement module; measurement range: DC 0 mV – 10 mV
	XD-E2WT-C	2-channel pressure measurement module; detection range: DC 0 mV – 10 mV
	XD-E4WT-C	4-channel pressure measurement module; detection range: DC 0 mV–10 mV

Model		Description
	XD-E1WT-D	1-channel Pressure Measurement Module – Measurement Range: DC –20 mV to 20 mV
	XD-E2WT-D	2-channel pressure measurement module; detection range: DC –20 mV to 20 mV
	XD-E4WT-D	4-channel pressure measurement module; detection range: DC –20 mV to 20 mV

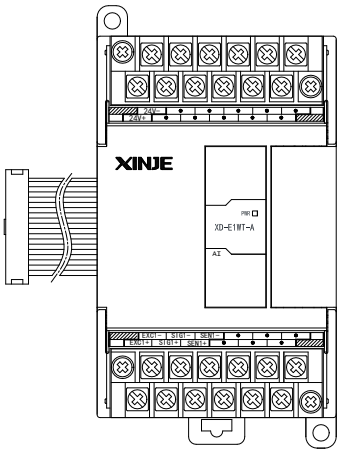
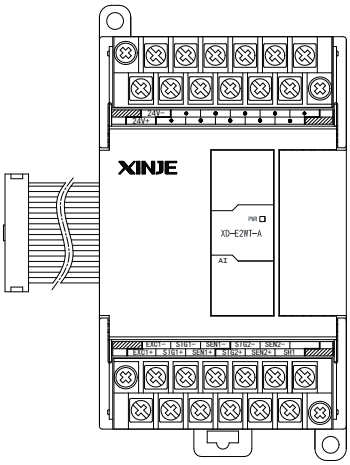
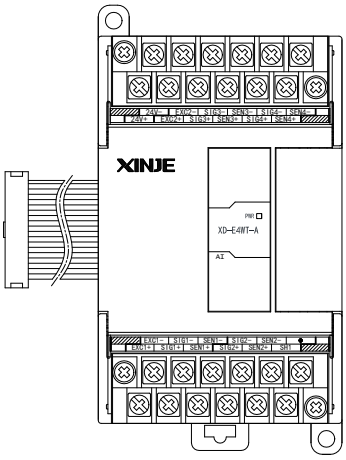
6.1.3.General Requirements

Project	Specifications
Service Environment	Non-corrosive gases
Ambient Temperature	0~60℃
Maintain Ambient Temperature	-20~70℃
Ambient Humidity	5~95%RH
Maintain Ambient Humidity	5~95%RH
Install	Can be secured with M3 screws or installed directly onto a DIN46277 (35 mm wide) guide rail.

6.2. 1~4 Channel Pressure Measurement Module (XD-EnWT-A)

6.2.1.Module Features and Specifications

The n-channel pressure measurement module XD-EnWT-A, serving as an expansion module for XD series PLCs, can be used to detect voltage signals ranging from −39.06 mV to 39.06 mV or to acquire voltage signals from pressure sensors; it then converts these analog voltage values into digital values via an A/D converter and performs further processing on them.

XD-E1WT-A	XD-E2WT-A	XD-E4WT-A
		

1) Module Features

- Can acquire analog voltage signals from 1, 2, or 4 pressure sensors;
- Detects voltage signals ranging from –39.06 mV to 39.06 mV;
- 24-bit high-precision A/D conversion;
- As specialized functional modules for the XD series, the XD3/XD3E can support up to 10 additional modules connected to the right side of the PLC main unit; the XD5/XDM/XDC/XD5E/XDME/XDH can support up to 16 additional modules; whereas the XD1/XD2 do not support the addition of any modules.

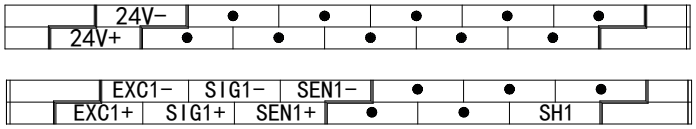
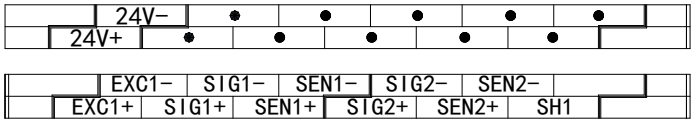
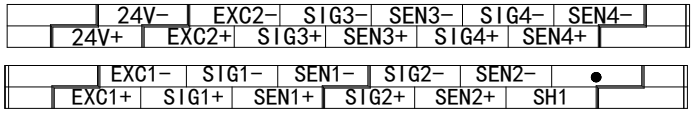
2) Module Specifications

Project	Content
Analog Input Range	DC -39.06mV ~ 39.06mV
Resolution Ratio	1/16777216（24Bit）
Overall Accuracy	±0.1%
Conversion Rate	0–250 cycles per second
Module Power Supply	DC24V±10%，100mA

Sensor Excitation Power Supply	5 VDC / 120 mA – allows for the parallel connection of up to four 350 Ω load cells
Service Environment	Non-corrosive gases
Ambient Temperature	0℃~60℃
Ambient Humidity	5–95% RH (non-condensing)
Software Release	V3.2 or later

6.2.2.Terminal Specifications

1) Terminal Block Layout

Module Model	Terminal Arrangement
XD-E1WT-A	
XD-E2WT-A	
XD-E4WT-A	

2) Terminal Signal

- XD-E1WT-A

Channel	Terminal Name	Signal Name	Meaning
CH1	EXC1+	Motivation voltage output positive terminal	Supply sensor with 5V power supply
	EXC1-	Motivation voltage output negative terminal	
	SIG1+	Signal input positive terminal	Sensor signal output terminal
	SIG1-	Signal input negative terminal	
	SEN1+	Motivation feedback voltage input (positive terminal)	Incentive voltage feedback signal
	SEN1-	Motivation feedback voltage input negative	

		terminal	
	SH1	shield line	
-	24V+	+24V power supply	Module Power Supply
	24V-	Power supply common terminal	

- XD-E2WT-A

Channel	Terminal Name	Signal Name	Meaning
CH1	EXC1+	Positive incentive	Power input terminal of the sensor
	EXC1-	Negative incentive	
	SIG1+	Positive Signal	Sensor signal output terminal
	SIG1-	Negative signal	
	SEN1+	Positive feedback	Sensor feedback voltage output terminal
	SEN1-	Negative feedback	
	SH1	shield	Sensor ground terminal
CH2	EXC1+	Positive incentive	Power input terminal of the sensor
	EXC1-	Negative incentive	
	SIG2+	Positive Signal	Sensor signal output terminal
	SIG2-	Negative signal	
	SEN2+	Positive feedback	Sensor feedback voltage output terminal
	SEN2-	Negative feedback	
	SH1	shield	Sensor ground terminal
-	24V+	+24V power supply	Module Power Supply
	24V-	Power supply common terminal	

- XD-E4WT-A

Channel	Terminal Name	Signal Name	Meaning
CH1	EXC1+	Positive incentive	Power input terminal of the sensor
	EXC1-	Negative incentive	
	SIG1+	Positive Signal	Sensor signal output terminal
	SIG1-	Negative signal	
	SEN1+	Positive feedback	Sensor feedback voltage output terminal
	SEN1-	Negative feedback	
CH2	EXC1+	Positive incentive	Power input terminal of the sensor
	EXC1-	Negative incentive	
	SIG2+	Positive Signal	Sensor signal output terminal
	SIG2-	Negative signal	
	SEN2+	Positive feedback	Sensor feedback voltage output terminal
	SEN2-	Negative feedback	
CH3	EXC2+	Positive incentive	Power input terminal of the

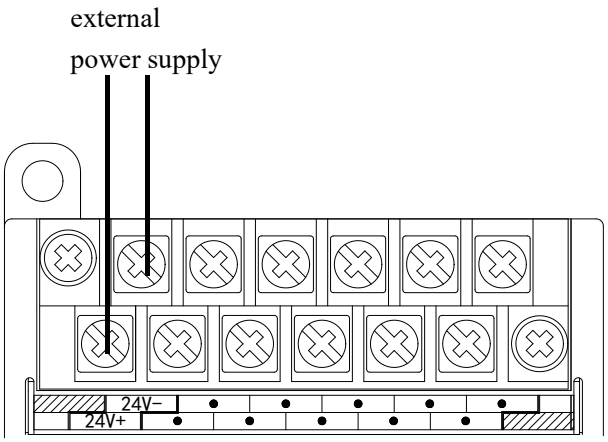
	EXC2-	Negative incentive	sensor
	SIG3+	Positive Signal	Sensor signal output terminal
	SIG3-	Negative signal	
	SEN3+	Positive feedback	Sensor feedback voltage output terminal
	SEN3-	Negative feedback	
CH4	EXC2+	Positive incentive	Power input terminal of the sensor
	EXC2-	Negative incentive	
	SIG4+	Positive Signal	Sensor signal output terminal
	SIG4-	Negative signal	
	SEN4+	Positive feedback	Sensor feedback voltage output terminal
	SEN4-	Negative feedback	
-	SH1	shield	Sensor ground terminal
	24V+	+24V power supply	Module Power Supply
	24V-	Power supply common terminal	

6.2.3.External Connection

When establishing an external connection, please note the following two aspects:

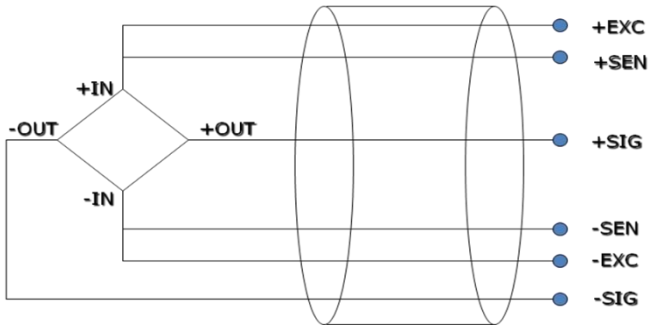
- When connecting the module to a +24V external power supply, please use the 24V power supply provided on the PLC unit to avoid interference.
- To prevent interference, please use shielded cable and perform single-point grounding of the shield layer.

1) Power Supply Wiring

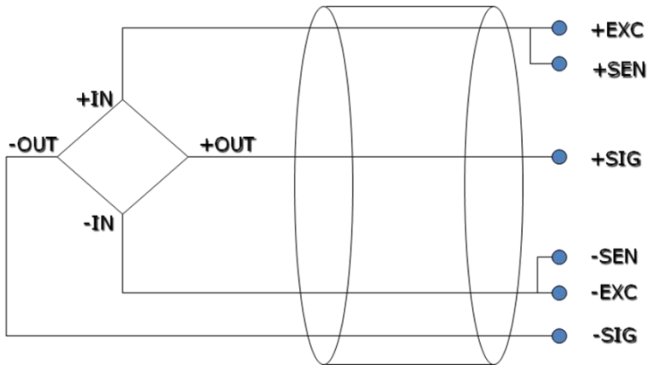


2) Connect To Sensor

- Six-wire connection method



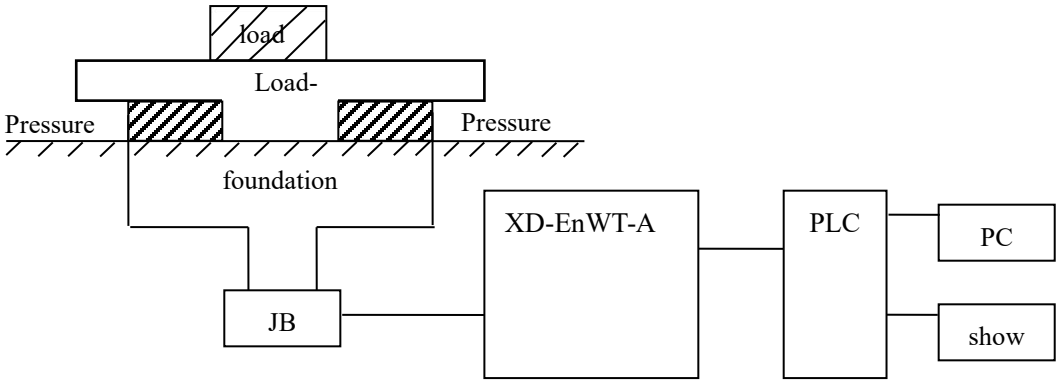
- Four-wire connection method



If the sensor is a four-wire system, short-circuit EXC1– to SEN1– and EXC1+ to SEN1+.

6.2.4.Weighing System Composition

A complete industrial weighing system (scale) primarily consists of the following components:



The above figure shows the configuration of a weighing system equipped with an XD-EnWT-A module.

Name	Explain
Load-Bearing Component	Load-bearing components are used to support the load to be weighed; these include platforms, hoppers, aerial handling vehicles, containers, and so on.

Pressure Sensor	A pressure sensor is a measuring device that converts a physical quantity (i.e., weight) into a proportional electrical signal.
Assembling Components	Assembly components ensure the proper operation of the weighing sensor; assembly and guiding components prevent overloading, as overloading can lead to measurement errors or damage the weighing sensor. Overloading is caused by a force (lateral force) acting in a direction not intended by the design of the weighing sensor's spring.
Connecting Box	The junction box (JB) is used to combine the signal lines from multiple parallelly connected load cells.
XD-EnWT-A	The XD-EnWT-A module can be used as an electronic evaluation device that captures signals from a pressure sensor and performs further analysis.

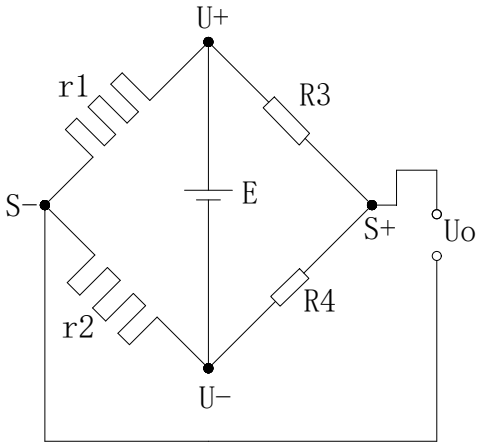
6.2.5.Module Function Description

The XD-EnWT-A pressure measurement module offers the following functions:

- Pressure sensor calibration
- Pressure sensor signal acquisition
- Weight value calculation
- Voltage signal detection (–39.06 mV to +39.06 mV)

Pressure Sensor Introduction

The pressure sensor operates on the principle of the resistive strain effect. Its schematic diagram is shown below:



R1 and R2 are strain resistors that, together with the two fixed resistors R3 and R4, form a bridge circuit. When the resistance values of R1 and R2 change, the bridge becomes unbalanced, thereby generating an unbalanced voltage Uo as the sensor's output signal.

U+ and U- represent the positive and negative terminals of the sensor power supply, respectively; the power supply can be either the 5 V supply provided by this module or an external power supply.

S+ and S- represent the positive and negative terminals of the sensor's output signal, respectively; connecting this millivolt voltage output signal to this module allows for the measurement of pressure magnitude.

6.2.6.Input/Output Definition Number Allocation

First Expansion Module Register Definition Number

Soft Components		Address	Explain	Remarks
Output Coil	CH1	Y10000	Fast sampling enable: ON enables fast sampling; OFF enables slow sampling.	
		Y10001	Write custom parameters	
		Y10002	Reset	
		Y10003	Calibration/Resonance Determination	
	CH2	Y10004	Quick Capture Enable	
		Y10005	Write custom parameters	
		Y10006	Reset	
		Y10007	Calibration/Resonance Determination	
	CH3	Y10010	Quick Capture Enable	
		Y10011	Write custom parameters	
		Y10012	Reset	
		Y10013	Calibration/Resonance Determination	
	CH4	Y10014	Quick Capture Enable	
		Y10015	Write custom parameters	
		Y10016	Reset	
		Y10017	Calibration/Resonance Determination	
Input Coil	CH1	X10000	CH1 Resonance Frequency Measurement Complete Indicator	
	CH2	X10001	CH2 resonance frequency determination completion indicator	
	CH3	X10002	CH3 resonance frequency determination completion indicator	
	CH4	X10003	CH4 resonance frequency determination completion indicator	
Input Register	CH1	ID10000	Current digital value	double character
		ID10002	Current weight	double character
	CH2	ID10004	Current digital value	double character
		ID10006	Current weight	double character
	CH3	ID10008	Current digital value	double character
		ID10010	Current weight	double character
	CH4	ID10012	Current digital value	double character

Soft Components		Address	Explain	Remarks
		ID10014	Current weight	double character

Second Expansion Module Register Definition Number

Soft Components		Address	Explain	Remarks
Output Coil	CH1	Y10100	Fast sampling enable: ON enables fast sampling; OFF enables slow sampling.	
		Y10101	Write custom parameters	
		Y10102	Reset	
		Y10103	Calibration/Resonance Determination	
	CH2	Y10104	Quick Capture Enable	
		Y10105	Write custom parameters	
		Y10106	Reset	
		Y10107	Calibration/Resonance Determination	
	CH3	Y10110	Quick Capture Enable	
		Y10111	Write custom parameters	
		Y10112	Reset	
		Y10113	Calibration/Resonance Determination	
	CH4	Y10114	Quick Capture Enable	
		Y10115	Write custom parameters	
		Y10116	Reset	
		Y10117	Calibration/Resonance Determination	
Input Coil	CH1	X10100	CH1 Resonance Frequency Measurement Complete Indicator	
	CH2	X10101	CH2 resonance frequency determination completion indicator	
	CH3	X10102	CH3 resonance frequency determination completion indicator	
	CH4	X10103	CH4 resonance frequency determination completion indicator	
Input Register	CH1	ID10100	Current digital value	double character
		ID10102	Current weight	double character
	CH2	ID10104	Current digital value	double character

Soft Components		Address	Explain	Remarks
		ID10106	Current weight	double character
	CH3	ID10108	Current digital value	double character
		ID10110	Current weight	double character
	CH4	ID10112	Current digital value	double character
		ID10114	Current weight	double character

。。。。。。

Sixteenth Expansion Module Register Definition Number

Soft Components		Address	Explain	Remarks
Output Coil	CH1	Y11700	Fast sampling enable: ON enables fast sampling; OFF enables slow sampling.	
		Y11701	Write custom parameters	
		Y11702	Reset	
		Y11703	Calibration/Resonance Determination	
	CH2	Y11704	Quick Capture Enable	
		Y11705	Write custom parameters	
		Y11706	Reset	
		Y11707	Calibration/Resonance Determination	
	CH3	Y11710	Quick Capture Enable	
		Y11711	Write custom parameters	
		Y11712	Reset	
		Y11713	Calibration/Resonance Determination	
	CH4	Y11714	Quick Capture Enable	
		Y11715	Write custom parameters	
		Y11716	Reset	
		Y11717	Calibration/Resonance Determination	
Input Coil	CH1	X11700	CH1 Resonance Frequency Measurement Complete Indicator	
	CH2	X11701	CH2 resonance frequency determination completion indicator	

Soft Components		Address	Explain	Remarks
	CH3	X11702	CH3 resonance frequency determination completion indicator	
	CH4	X11703	CH4 resonance frequency determination completion indicator	
Input Register	CH1	ID11500	Current digital value	double character
		ID11502	Current weight	double character
	CH2	ID11504	Current digital value	double character
		ID11506	Current weight	double character
	CH3	ID11508	Current digital value	double character
		ID11510	Current weight	double character
	CH4	ID11512	Current digital value	double character
		ID11514	Current weight	double character

XD-E1WT-A contains no CH2–CH3 group; XD-E2WT-A contains no CH3–CH4 group.

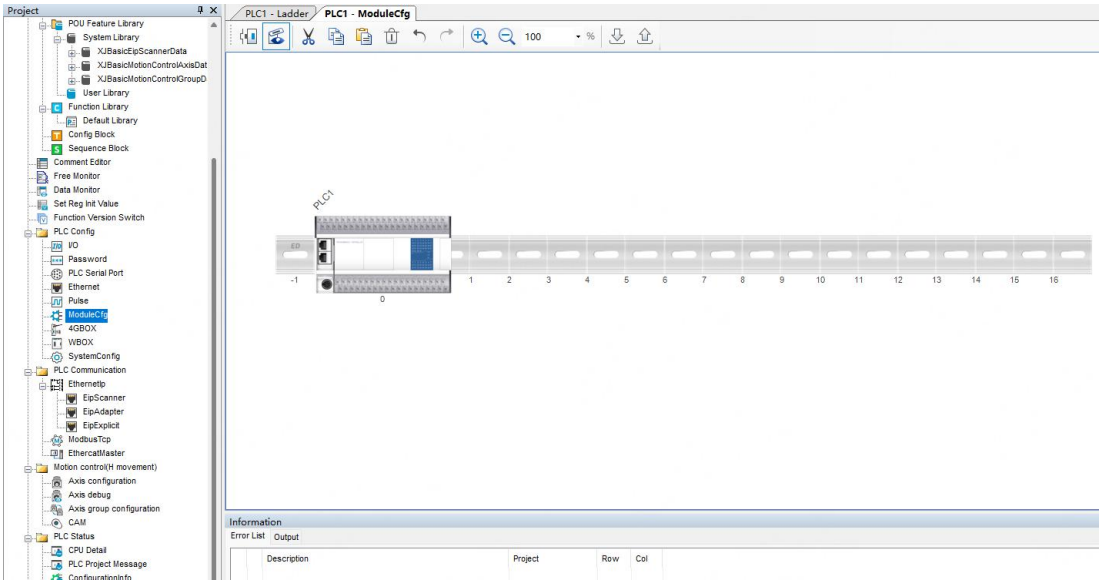
6.2.7.Work Mode Setup

There are two methods for configuring the operating mode (these two methods yield equivalent results).

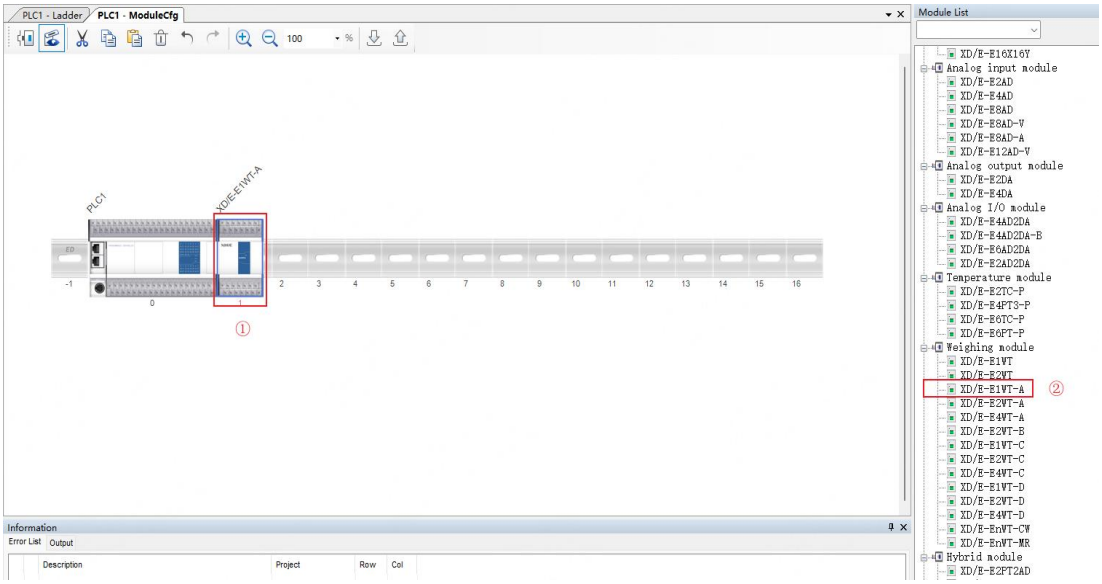
- Configure via Control Panel
- Set via Flash registers

1) Configuration Panel Configuration

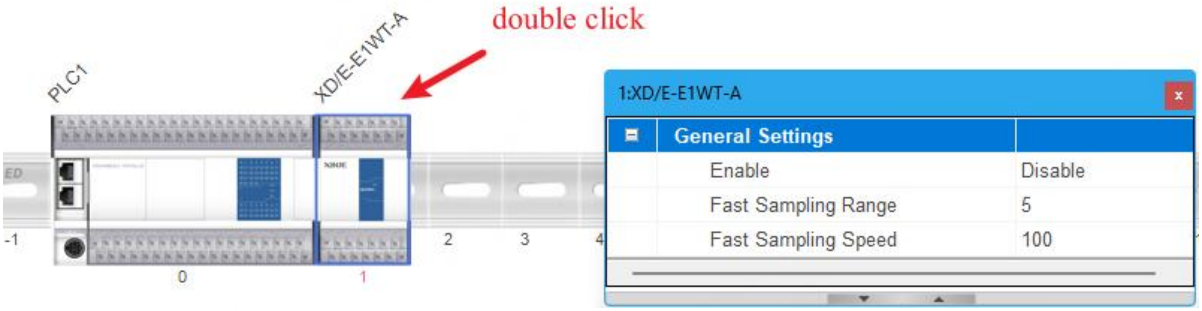
1. Use the XINJE PLC Programming Tool Software version 3.8.0a or later to configure the module; click [PLC Configuration] – [Module Configuration] in the left-side Engineering Bar to open the Expansion Module Settings window. For versions prior to 3.8.0a, click [PLC Configuration] – [Expansion Module] in the left-side Engineering Bar to perform the configuration.



2. Select a module from the right-side module list and drag it to the desired position, or double-click a module in the right-side module list to select it:



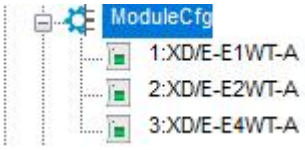
3. Double-click the corresponding module icon to access the module configuration interface, where you can select the rapid sampling mode and the rapid sampling speed.



4. Click " " to view the default configuration parameters for the Expansion module.

5. After completing the parameter configuration for the expansion module, click "" to write the set values into the PLC; the changes will take effect only after the PLC is powered off and then

powered on again. Under the Module Configuration Node, mount the configured module, then double-click to enter the Module Parameter Configuration screen.



2) Flash Register Configuration

The expansion module allows users to set gear positions and customize the fast sampling frequency; these settings are configured via the SFD (Special FLASH Data Register) within the PLC. As shown below:

Module ID	Configuration Information Address	Module ID	Configuration Information Address
#1	SFD350~SFD359	#9	SFD430~SFD439
#2	SFD360~SFD369	#10	SFD440~SFD449
#3	SFD370~SFD379	#11	SFD450~SFD459
#4	SFD380~SFD389	#12	SFD460~SFD469
#5	SFD390~SFD399	#13	SFD470~SFD479
#6	SFD400~SFD409	#14	SFD480~SFD489
#7	SFD410~SFD419	#15	SFD490~SFD499
#8	SFD420~SFD429	#16	SFD500~SFD509

SFD350–SFD359 Register Specifications:

<table>
<tr><th colspan="2">Register</th><th>Bit7</th><th>Bit6</th><th>Bit5</th><th>Bit4</th><th>Bit3</th><th>Bit2</th><th>Bit1</th><th>Bit0</th><th>Explain</th></tr>
<tr><td rowspan="2">SFD350</td><td>Byte0</td><td>CH4 Enable</td><td>CH3 Enable</td><td>CH2 Enable</td><td>CH1 Enable</td><td>-</td><td>-</td><td>-</td><td>-</td><td rowspan="10">The default slow sampling rate is 5 Hz. Quick Capture 15-Speed Settings – Custom Speed Settings</td></tr>
<tr><td>Byte1</td><td colspan="4">CH2 Fast Sampling Speed Setting (0–15)</td><td colspan="4">CH1 Fast Sampling Speed Setting (0–15)</td></tr>
<tr><td rowspan="2">SFD351</td><td>Byte2</td><td colspan="4">CH4 Fast Sampling Speed Setting (0–15)</td><td colspan="4">CH3 Fast Sampling Speed Setting (0–15)</td></tr>
<tr><td>Byte3</td><td colspan="8">CH1 Custom Fast Sampling Rate (Hz) (10–255)</td></tr>
<tr><td rowspan="2">SFD352</td><td>Byte4</td><td colspan="8">CH2 Custom Fast Sampling Rate (Hz) (10–255)</td></tr>
<tr><td>Byte5</td><td colspan="8">CH3 Custom Fast Sampling Rate (Hz) (10–255)</td></tr>
<tr><td rowspan="2">SFD353</td><td>Byte6</td><td colspan="8">CH4 Custom Fast Sampling Rate (Hz) (10–255)</td></tr>
<tr><td>Byte7</td><td colspan="8">Keep</td></tr>
<tr><td colspan="2">SFD354~SFD359</td><td colspan="8">Keep</td></tr>
</table>

XD-E1WT-A contains no CH2–CH3 group; XD-E2WT-A contains no CH3–CH4 group.

6.2.8.Module Configuration

Take Module 1, Channel 1 as an example:

1) Weighing Unit Setting

In the PLC program, the weight of the object is written using the `To` instruction. For example, if the weight of the object is 1 kg and the unit precision should be in kilograms, enter `1`; if the unit precision should be in grams, enter `1000`; and if the unit precision should be to 0.1 grams, enter `10000`.

2) Sampling Frequency Setting

The sampling frequency can be configured as either fast or slow sampling; this can be switched using the Y10003 device. The default slow sampling frequency is 5 Hz; for fast sampling, the appropriate setting can be selected from the PLC Expansion Module Configuration Table, which offers a total of 15 presets. Each of the presets from 0 to 14 corresponds to a different sampling frequency and filtering parameter; these settings increase from low to high. Users may select the appropriate preset based on their field requirements; for detailed information, please refer to the "Default Preset Parameter Table." Preset 15 represents a custom mode: when the default parameters for presets 0–14 do not meet field requirements or when users need to freely adjust the sampling frequency and filtering parameters, they can configure the fast sampling frequency (this parameter is invalid for other presets) and write the filtering parameters using the FROM/TO command via the configuration interface.

3) Resonant Frequency Measurement

1. The resonant frequency refers to the relatively constant vibrational disturbance generated by mechanical equipment; it should be measured only during the initial installation.
2. Power on the module again, or use the FROM/TO command to set the weight value to 0.
3. Then switch to Fast Sampling Mode (set Y10000 to ON), set Y10003; the module will automatically measure the resonant frequency. After completing the measurement, set Y10003 back to OFF; the measured frequency will then be automatically sent to the module without requiring manual entry. (The resonant frequency measurement must be performed when Fast Sampling Mode is enabled.)

4) Calibration

Before using the module for the first time, the pressure sensor must be calibrated.

Take Module 1, Channel 1 as an example:

1. Verify that the module is properly connected to the weighing system. To check this: use the host computer software to monitor whether the ID10000 value exhibits any fluctuation (the magnitude of the fluctuation depends on the sensor's measurement range); additionally, observe whether the load pressure value increases as the load is increased. If no value is detected for the ID10000, inspect the sensor and its wiring. If a value is detected but the load pressure value decreases as the load is increased, this indicates that the sensor is installed incorrectly; in this case, re-adjust the sensor's position or swap the positive and negative terminals of the sensor's output signal wiring.
2. Before calibration, disable the Fast Sampling Enable function on the Y10000;
3. Keep the pressure sensor unloaded; once the weighing platform has stabilized, reset the sensor to zero, then momentarily activate the Y10002 reset enable function;

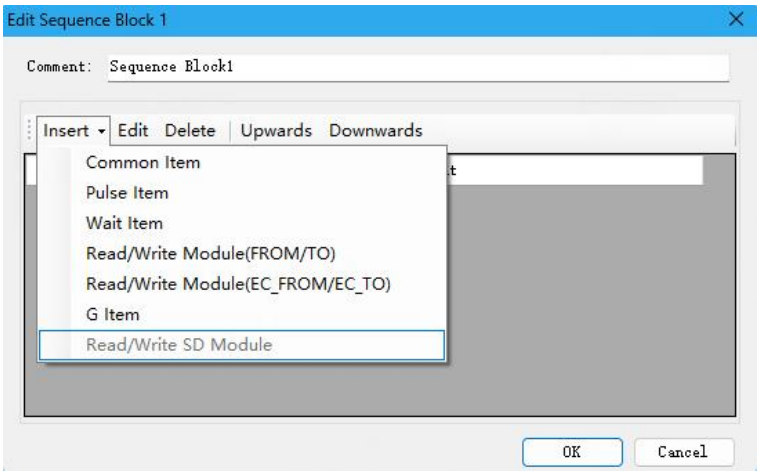
4. Place a certain weight of load on the scale body, write the corresponding weight of the weight through the To command, calibrate after the scale body is stable, and enable Y10003 for calibration. When the displayed value of ID10002 is equal to the weight value, the calibration is completed, and Y10003 is closed;
5. The calibration is now complete. During weighing, the module automatically calculates the adjustment based on the collected no-load and calibration values, and finally displays the correct weighing result.

5) Default Gear Parameters Table

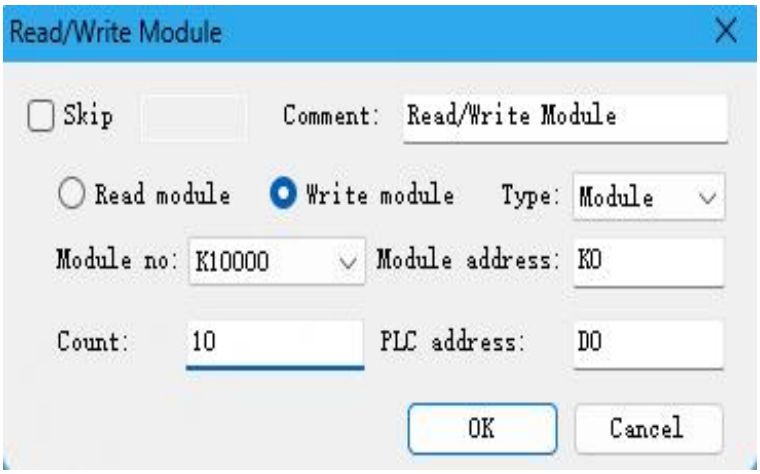
Velocity Gear	Quick Capture Velocity(Hz)	Fast Sampling Filter Width	Kalman Filter Depth	IIRtape Width Coefficient	IIRratio of Attenuation Coefficient	Low-Pass Cutoff Frequency
0	60	5	30	10	10	10
1	80	5	40	10	10	10
2	100	10	50	10	10	10
3	120	10	60	10	10	10
4	140	15	70	10	10	15
5	160	15	80	10	10	15
6	180	20	90	10	10	15
7	200	20	100	10	10	15
8	220	25	110	10	10	15
9	240	25	120	10	10	15
10	250	25	125	10	10	15

6.2.9.From/To Command Usage Instructions

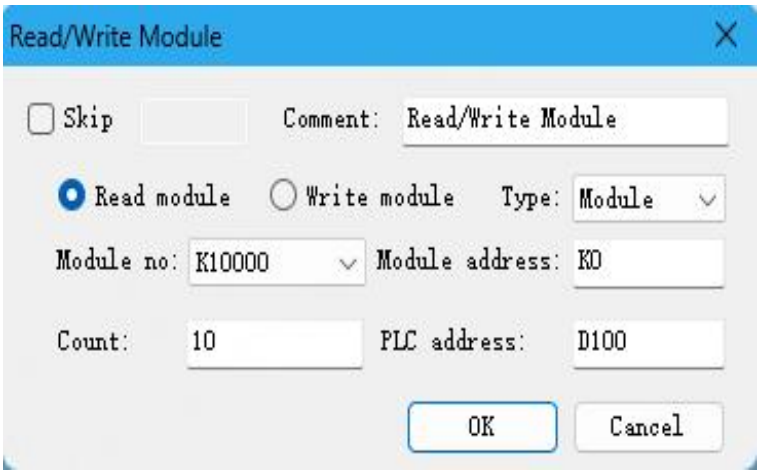
Reading and writing operations for the XD-EnWT-A module must be performed using the FROM/TO instruction within the BLOCK Sequential Function Block, as shown in the figure below:



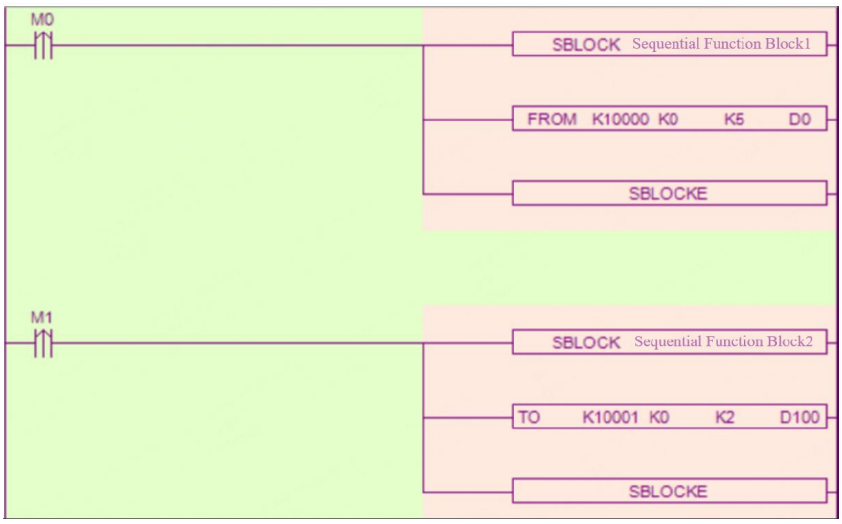
(a) Insert "Read/Write Module (FROM/TO)"



(b) Writing Module



(c)Read Through Model

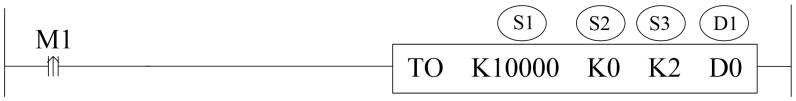


(d) Convert to a Ladder Diagram

1) Instruction Parsing

- Write Module Instruction: TO

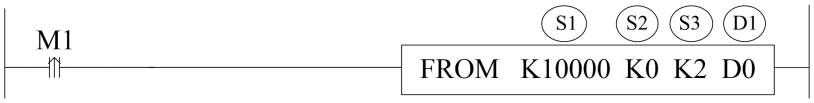
Write the specified register data to the designated module address, using a byte as the operation unit.



Operand	Function	Available Operands
S1	Target Module Number – Range: 10000–10015.	K、TD，CD，D，HD，FD
S2	Write the starting address of the module.	K、TD，CD，D，HD，FD
S3	Number of registers to write to (number of words).	K、TD，CD，D，HD，FD
D1	The starting address of the register where written data is stored within the device.	TD，CD，D，HD，FD

- Read module instruction: FROM

Read data from the specified module address into the designated register of the device, using a byte as the operation unit.



Operand	Function	Available Operands
S1	Target Module Number – Range: 10000–10015.	K、TD，CD，D，HD，FD
S2	Read the starting address of the module.	K、TD，CD，D，HD，FD
S3	Number of registers to read (number of words).	K、TD，CD，D，HD，FD
D1	The body receives the starting address of the register.	TD，CD，D，HD，FD

- The FROM/TO instruction can only be written within a BLOCK sequential function block; for XD series PLCs with firmware version below V3.4.5, a maximum of 8 BLOCK function blocks are permitted; for XD/XL series PLCs with firmware version V3.4.5 or later, a maximum of 100 BLOCKs can be written into the program, but only up to 8 can be executed simultaneously.
- The module starting number begins at K10000; Module #1 is K10000, Module #2 is K10001, and so on; Module #16 is K10015.

2) Module Parameter Internal Address

From/Todata	Explain	Remarks
K0	CH1 – Calibrated weight	double character
K2	CH1 Fast Acquisition Filter Width	character
K3	CH1 filtering depth	character

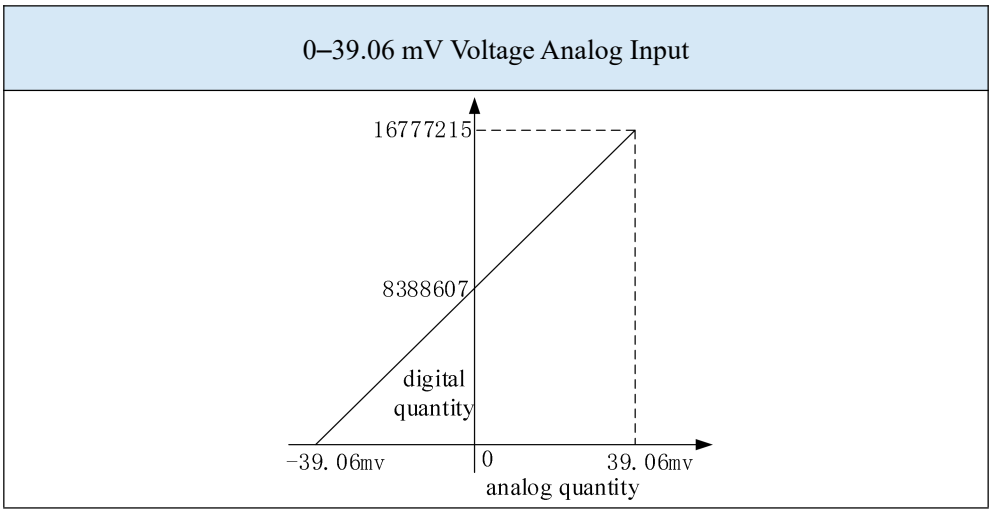
From/Todata	Explain	Remarks
K4	CH1 Bandwidth Coefficient	character
K5	CH1 Attenuation Ratio Coefficient	character
K6	CH1 Low-pass cutoff frequency	character
K7	CH1 resonant frequency (0.1 Hz)	character
K8	CH2 calibration weight	double character
K10	CH2 Fast Sampling Filter Width	character
K11	CH2 Filter Depth	character
K12	CH2 Bandwidth Coefficient	character
K13	CH2 attenuation ratio coefficient	character
K14	CH2 low-pass cutoff frequency	character
K15	CH2 resonance frequency (0.1 Hz)	character
K16	CH3 calibration weight	double character
K18	CH3 Fast Sampling Filter Width	character
K19	CH3 filtering depth	character
K20	CH3 bandwidth coefficient	character
K21	CH3 attenuation ratio coefficient	character
K22	CH3 low-pass cutoff frequency	character
K23	CH3 resonance frequency (0.1 Hz)	character
K24	CH4 calibration weight	double character
K26	CH4 Fast Extraction Filter Width	character
K27	CH4 filtering depth	character
K28	CH4 bandwidth coefficient	character
K29	CH4 attenuation ratio coefficient	character
K30	CH4 low-pass cutoff frequency	character
K31	CH4 resonance frequency (0.1 Hz)	character

3) Parameter Description

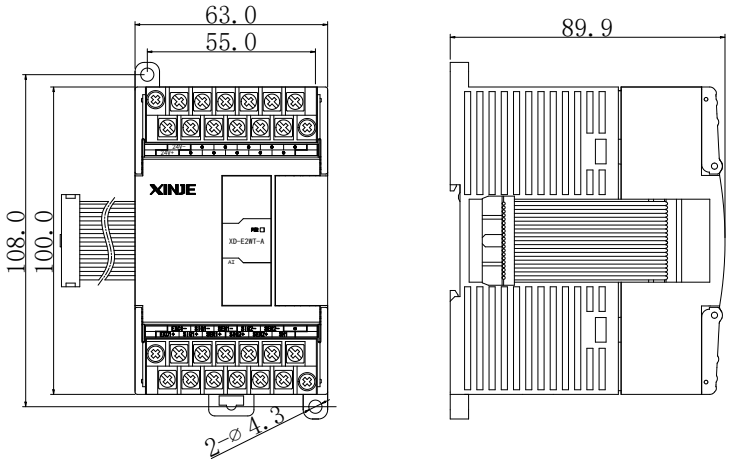
Parameter Name	Explain
Calibration Weight	The corresponding weight value written during calibration;
Fast Sampling Filter Width	Number of averaging cycles during rapid sampling;
Attenuation Ratio Coefficient	A larger numerical setting results in greater stability; however, it should not be set too high, as an excessively high setting can cause distortion of the sampled values and reduce sensitivity;
Bandwidth Ratio	ditto;
Resonance Frequency	The natural frequency of the scale itself can be obtained through internal measurement, and the more accurate the data, the better the filtering effect;
Filter Depth	The higher the numerical setting, the more stable the system; the lower the sensitivity.

6.2.10. Analog-to-Digital Conversion Diagram

The relationship between the input voltage (analog signal) and the converted digital signal is shown in the figure below:



6.2.11. External Dimensions Diagram

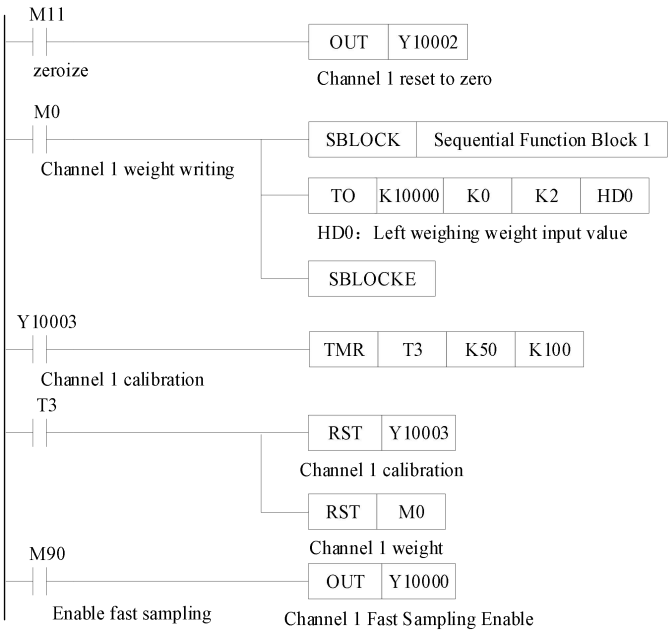


(unit:mm)

6.2.12. Programming Example

Example: Take Module #1, Channel 1 as an example:

procedure:



description:

Reset using Y10002.

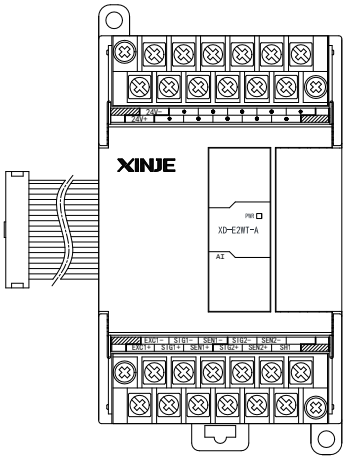
To write a weight value using the FORM/TO command: first, input the weight value into the data register HD0 and set M0; then, write the data register HD0 into Channel 1 of Module #1;

Place the weight and calibrate it using Y10003. When the weight display value matches the weight value, the calibration is complete;

The Y10000 enables rapid and slow sampling mode switching: when the Y10000 is turned on, Channel 1 collects data at the currently set fast sampling frequency; when the Y10000 is turned off, Channel 1 collects data at the currently set slow sampling frequency.

6.3. 2 Channel Pressure Measurement Module XD-E2WT-B

6.3.1.Module Features and Specifications



The XD-E2WT-B dual-channel pressure measurement module, designed as an expansion module for XD-series PLCs, can be used to detect voltage signals ranging from 0 to 10 mV or to acquire voltage signals from pressure sensors; it then converts these analog voltage values into digital values via an A/D converter and performs further processing on them.

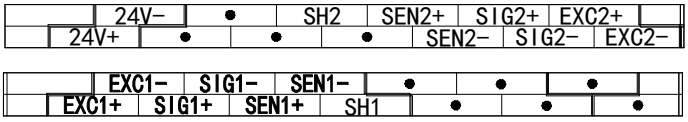
1) Module Features

- Capable of acquiring analog voltage signals from two pressure sensors;
- Can detect voltage signals ranging from 0 to 10 mV;
- 24-bit high-precision A/D conversion;
- As specialized functional modules for the XD series, the XD3/XD3E can support up to 10 additional modules connected to the right side of the PLC main unit; the XD5/XDM/XDC/XD5E/XDME/XDH can support up to 16 additional modules; whereas the XD1/XD2 do not support the addition of any modules.

2) Module Specifications

Project	Explain
Analog Input Range	DC0 ~ 10mV
Resolution Ratio	1/16777216（24Bit）
Overall Accuracy	>0.01%
Conversion Rate	10–200 times/second (selectable)
Module Power Supply	DC24V±10%，100mA
Sensor Excitation Power Supply	5 VDC / 120 mA – Up to 4 350 Ω load cells can be connected in parallel;
Service Environment	Non-corrosive gases
Ambient Temperature	-10℃~50℃
Ambient Humidity	5–95% RH (non-condensing)
Software Release	V3.4 or later

6.3.2.Terminal Specifications



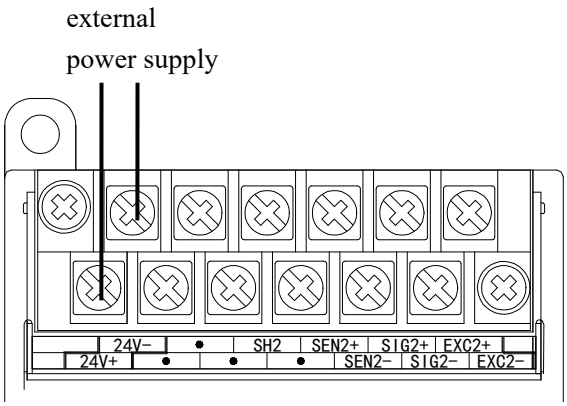
Channel	Terminal Name	Signal Name	Meaning
CH1	EXC1+	Positive incentive	Power input terminal of the sensor
	EXC1-	Negative incentive	
	SIG1+	Positive Signal	Sensor signal output terminal
	SIG1-	Negative signal	
	SEN1+	Positive feedback	Sensor feedback voltage output terminal
	SEN1-	Negative feedback	
	SH1	shield	Sensor ground terminal
CH2	EXC2+	Positive incentive	Power input terminal of the sensor
	EXC2-	Negative incentive	
	SIG2+	Positive Signal:	Sensor signal output terminal
	SIG2-	Negative signal	
	SEN2+	Positive feedback	Sensor feedback voltage output terminal
	SEN2-	Negative feedback	
	SH2	shield	Sensor ground terminal
-	24V+	+24V power supply	Module Power Supply
	24V-	Power supply common terminal	

6.3.3.External Connection

When establishing an external connection, please note the following two aspects:

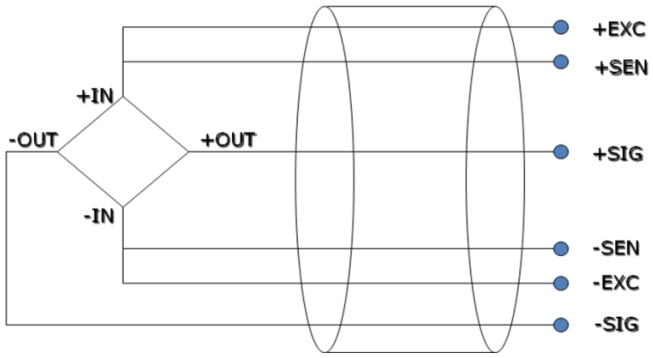
- When connecting the module to a +24V external power supply, please use the 24V power supply provided on the PLC unit to avoid interference.
- To prevent interference, please use shielded cable and perform single-point grounding of the shield layer.

1) Power Supply Wiring

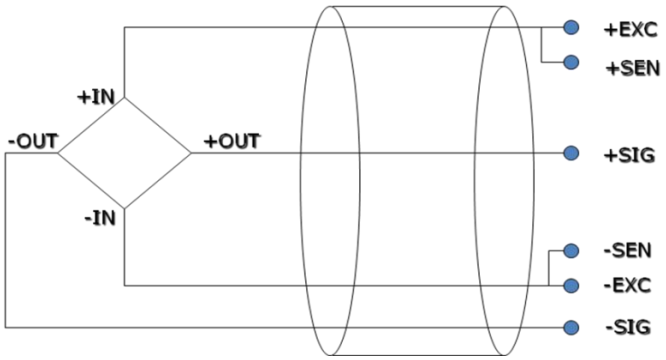


2) Connect to Sensor

- Six-wire connection method



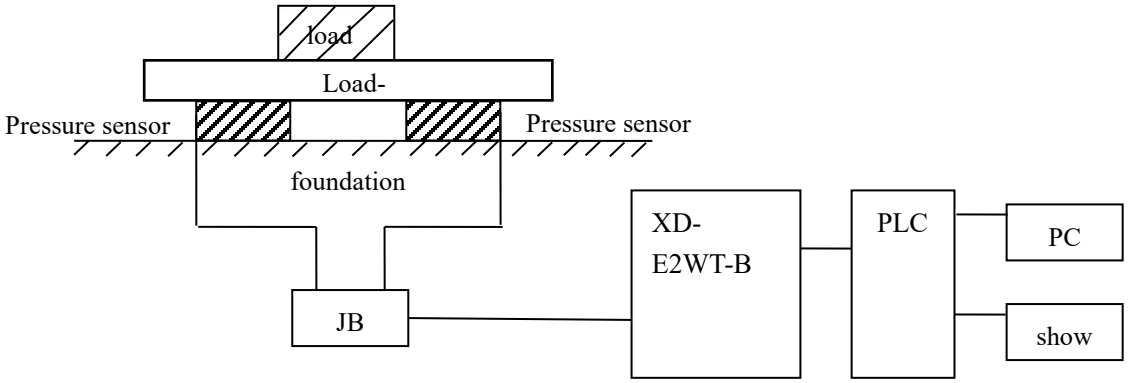
- Four-wire connection method



If the sensor is a four-wire system, short-circuit EXC1– to SEN1– and EXC1+ to SEN1+.

6.3.4.Weighing System Composition

A complete industrial weighing system (scale) primarily consists of the following components:



The figure above shows the configuration of a weighing system equipped with an XD-E2WT-B module.

Name	Explain
Load-Bearing Component	Load-bearing components are used to support the load to be weighed; these include platforms, hoppers, aerial handling vehicles, containers, and so on.
Pressure Sensor	A pressure sensor is a measuring device that converts a physical quantity (i.e., weight) into a proportional electrical signal.
Assembling Components	Assembly components ensure the proper operation of the weighing sensor; assembly and guiding components prevent overloading, as overloading can lead to measurement errors or damage the weighing sensor. Overloading is caused by a force (lateral force) acting in a direction not intended by the design of the weighing sensor's spring.
Connecting Box	The junction box (JB) is used to combine the signal lines from multiple parallelly connected load cells.
XD-E2WT-B	The XD-E2WT-B module can be used as an electronic evaluation device that captures signals from a pressure sensor and performs further analysis.

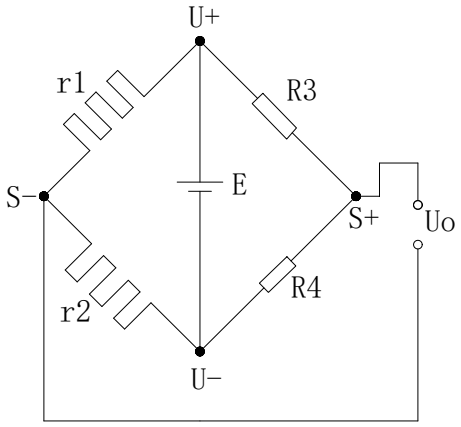
6.3.5.Module Function Description

The XD-E2WT-B dual-pressure measurement module provides the following functions:

- Pressure sensor calibration
- Pressure sensor signal acquisition
- Weight value calculation
- 0–10 mV voltage signal detection

1) Pressure Sensor Introduction

The pressure sensor operates on the principle of the resistive strain effect. Its schematic diagram is shown below:



R1 and R2 are strain resistors that, together with the two fixed resistors R3 and R4, form a bridge circuit. When the resistance values of R1 and R2 change, the bridge becomes unbalanced, thereby generating an unbalanced voltage Uo as the sensor's output signal.

U+ and U-represent the positive and negative terminals of the sensor power supply, respectively; the power supply can be either the 5 V supply provided by this module or an external power supply.

S+ and S-represent the positive and negative terminals of the sensor's output signal, respectively; connecting this millivolt voltage output signal to this module allows for the measurement of pressure magnitude.

6.3.6.Input/Output Definition Number Allocation

First Expansion Module Register Definition Number

Soft Components	Channel	Address	Explain	Remarks
Output Coil	CH1	Y10000	Resonance measurement	
		Y10001	Write custom parameters	
		Y10002	Reset	
		Y10003	demarcate	
	CH2	Y10004	Resonance measurement	
		Y10005	Write custom parameters	
		Y10006	Reset	
		Y10007	demarcate	
Input Coil	CH1	X10000	CH1 Error	
	CH1	X10001	CH1 notch enable	
	CH2	X10002	CH2 Error	
	CH2	X10003	CH2 notch enable	
Input Register	CH1	ID10000	Current digital value/CH1 resonance frequency display	double character
		ID10002	Current weight	double character
	CH2	ID10004	Current digital value/CH2 resonance frequency display	double character

Soft Components	Channel	Address	Explain	Remarks
		ID10006	Current weight	double character

Second Expansion Module Register Definition Number

Soft Components	Channel	Address	Explain	Remarks
Output Coil	CH1	Y10100	Resonance measurement	
		Y10101	Write custom parameters	
		Y10102	Reset	
		Y10103	demarcate	
	CH2	Y10104	Resonance measurement	
		Y10105	Write custom parameters	
		Y10106	Reset	
		Y10107	demarcate	
Input Coil	CH1	X10100	CH1 Error	
	CH1	X10101	CH1 notch enable	
	CH2	X10102	CH2 Error	
	CH2	X10103	CH2 notch enable	
Input Register	CH1	ID10100	Current digital value/CH1 resonance frequency display	double character
		ID10102	Current weight	double character
	CH2	ID10104	Current digital value/CH2 resonance frequency display	double character
		ID10106	Current weight	double character

。。。。。。

Sixteenth Expansion Module Register Definition Number

Soft Components	Channel	Address	Explain	Remarks
Output Coil	CH1	Y11700	Resonance measurement	
		Y11701	Write custom parameters	
		Y11702	Reset	
		Y11703	demarcate	
	CH2	Y11704	Resonance measurement	
		Y11705	Write custom parameters	

Soft Components	Channel	Address	Explain	Remarks
		Y11706	Reset	
		Y11707	demarcate	
Input Coil	CH1	X11700	CH1 Error	
	CH1	X11701	CH1 notch enable	
	CH2	X11702	CH2 Error	
	CH2	X11703	CH2 notch enable	
Input Register	CH1	ID11500	Current digital value/CH1 resonance frequency display	double character
		ID11502	Current weight	double character
	CH2	ID11504	Current digital value/CH2 resonance frequency display	double character
		ID11506	Current weight	double character

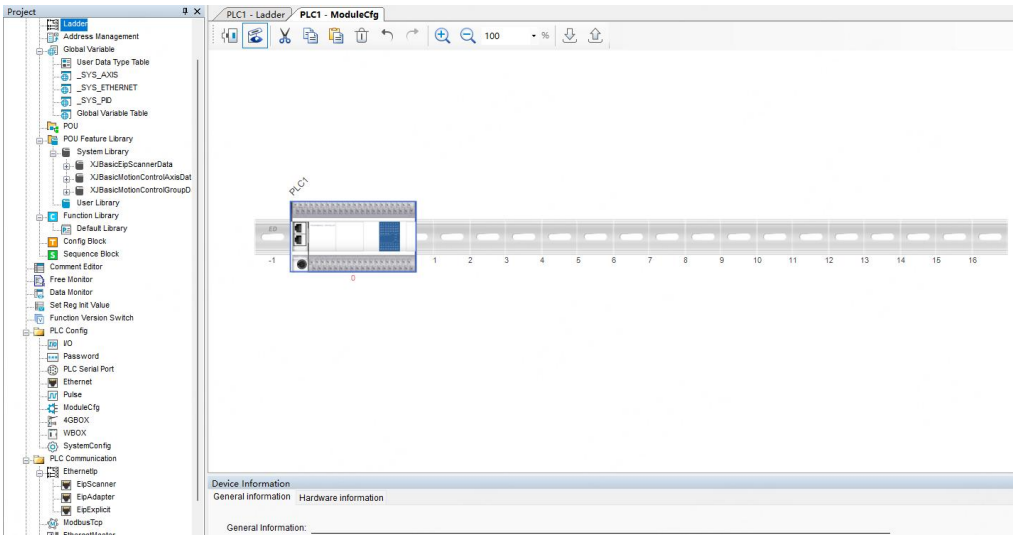
6.3.7.Work Mode Setup

There are two methods for configuring the operating mode (these two methods yield equivalent results).

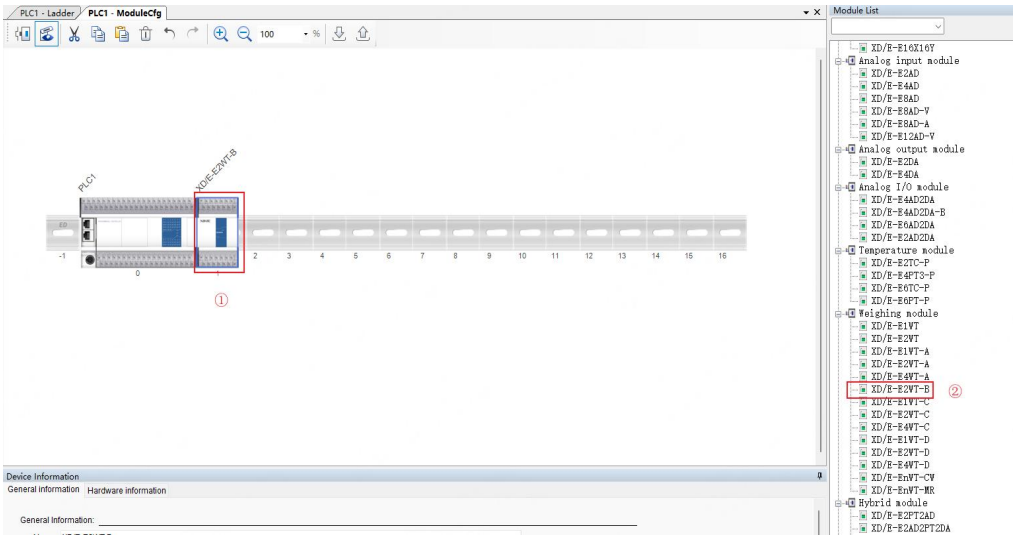
- Configure via Control Panel
- Set via Flash registers

1) Configuration Panel Configuration

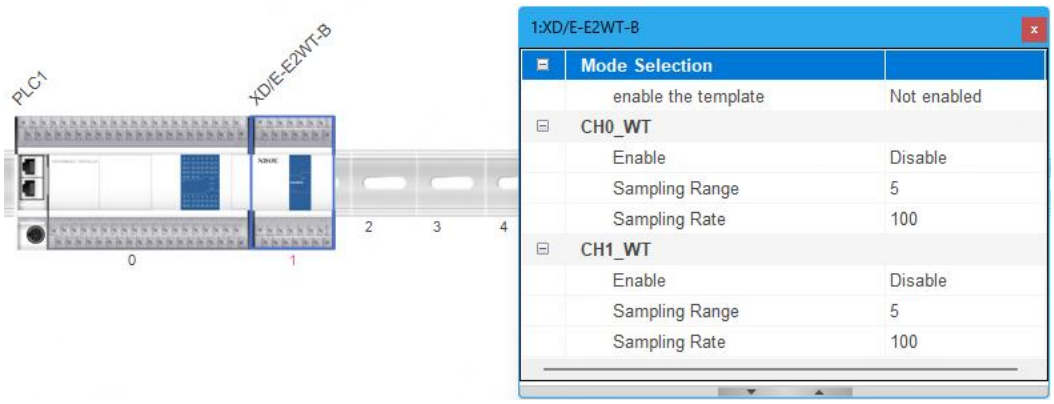
1. Use the XINJE PLC Programming Tool Software version 3.8.0a or later to configure the module; click [PLC Configuration] – [Module Configuration] in the left-side Engineering Bar to open the Expansion Module Settings window. For versions prior to 3.8.0a, click [PLC Configuration] – [Expansion Module] in the left-side Engineering Bar to perform the configuration.



2. Select a module from the right-side module list and drag it to the desired position, or double-click a module in the right-side module list to select it:

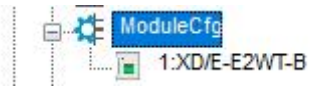


3. Double-click the corresponding module icon to access the module configuration interface, where you can select the AD filter coefficient and the voltage input mode for the AD channel.



4. Click "" to view the default configuration parameters for the Expansion module.

5. After completing the parameter configuration  for the expansion module, click "" to write the set values into the PLC; the changes will take effect only after the PLC is powered off and then powered on again. Under the Module Configuration Node, mount the configured module, then double-click to enter the Module Parameter Configuration screen.



2) Flash Register Configuration

The expansion module allows users to set gear positions and customize the fast sampling frequency; these settings are configured via the SFD (Special FLASH Data Register) within the PLC. As shown below:

Module ID	Configuration Information Address	Module ID	Configuration Information Address
#1	SFD350~SFD359	#9	SFD430~SFD439
#2	SFD360~SFD369	#10	SFD440~SFD449
#3	SFD370~SFD379	#11	SFD450~SFD459
#4	SFD380~SFD389	#12	SFD460~SFD469
#5	SFD390~SFD399	#13	SFD470~SFD479
#6	SFD400~SFD409	#14	SFD480~SFD489
#7	SFD410~SFD419	#15	SFD490~SFD499
#8	SFD420~SFD429	#16	SFD500~SFD509

SFD350−SFD359 Register Specifications

Register		Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0	Explain
SFD350	Byte0			CH2 Enable	CH1 Enable	-	-	-	-	
	Byte1	CH2 Fast Sampling Speed Setting (0−12)				CH1 Fast Sampling Speed Setting (0−12)				
SFD351	Byte2	-				-				
	Byte3	CH1 − Custom Fast Sampling Rate (Hz) (10−200)								
SFD352	Byte4	CH2 Custom Fast Sampling Rate (Hz) (10−200)								
	Byte5	Save								
SFD353~SFD359		Save								

6.3.8.Module Configuration

Take Module 1, Channel 1 as an example:

1) Module Parameter Settings

When the PLC sampling range is set to 12 positions, the parameters are written into the PLC program using the To instruction. The remaining positions correspond to fixed parameters that cannot be adjusted.

The parameter list is as follows:

Fromtodata	Explain	Remarks
K0	CH1 – Calibrated weight	double character
K2	CH1 Average Filter Width (0–50)	character
K3	CH1 Median Filter Width	character
K4	CH1 Kalman Filter Depth (0–200)	character
K5	CH1 First-Order Filter Setting (0–6)	character
K6	CH1 filtering attenuation factor (0–40)	character
K7	CH1 User Error Code	character
K8	CH2 calibration weight	double character
K10	CH2 Average Filter Width (0–50)	character
K11	CH2 median filter width	character
K12	CH2 Kalman Filter Depth (0–200)	character
K13	CH2 First-Order Filter Setting (0–6)	character
K14	CH2 filtering attenuation factor (0–40)	character
K15	CH2 User Error Code	character

2) Default Gear Parameters Table

Speed Stage	Average Filter Width	Median Width	Kalman Filter Depth	First-Order Lag Setting	Band-Stop Attenuation Factor
0	3	0	0	1	0
1	3	3	0	1	0
2	5	5	40	2	2
3	8	7	0	2	20
4	10	9	0	2	30
5	12	10	0	3	40
6	15	12	20	3	40
7	20	15	20	3	40
8	12	10	20	2	30
9	15	10	20	3	30
10	15	12	20	4	30
11	15	15	40	4	40

3) Weighing Unit Setup

In the PLC program, the weight of the object is written using the `To` instruction. For example, if the weight of the object is 1 kg and the unit precision should be in kilograms, enter `1`; if the unit precision should be in grams, enter `1000`; and if the unit precision should be to 0.1 grams, enter `10000`.

4) Resonant Frequency Measurement

1. The resonant frequency refers to the relatively constant vibrational disturbance generated by mechanical equipment; it should be measured only during the initial installation.
2. Power on the module again to confirm that the module parameter settings have been completed.
3. Set Y10000; the module will automatically initiate the resonance frequency measurement, monitor whether the ID10000 value jumps out of the measured frequency range, and then turn off Y10000.

5) Calibration

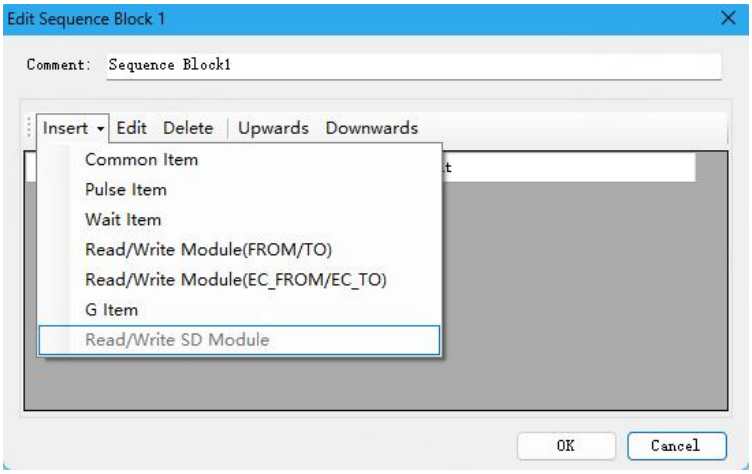
Before using the module for the first time, the pressure sensor must be calibrated.

Take Module 1, Channel 1 as an example:

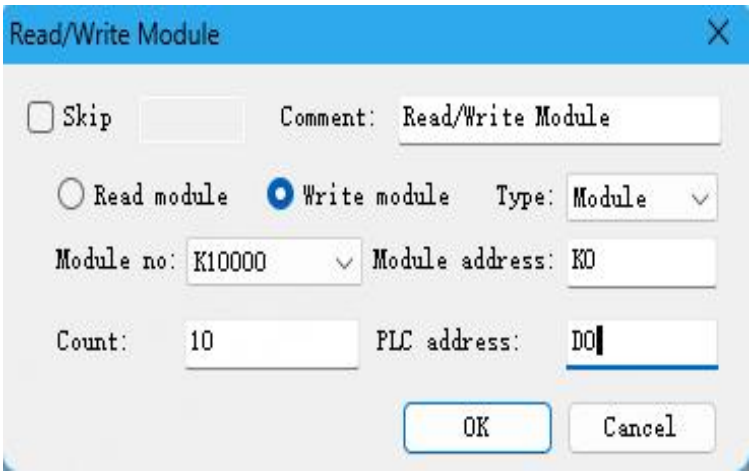
1. Verify that the module is properly connected to the weighing system. To check this: use the host computer software to monitor whether the ID10000 value exhibits any fluctuation (the magnitude of the fluctuation depends on the sensor's measurement range); additionally, observe whether the load pressure value increases as the load is increased. If no value is detected for the ID10000, inspect the sensor and its wiring. If a value is detected but the load pressure value decreases as the load is increased, this indicates that the sensor is installed incorrectly; in this case, re-adjust the sensor's position or swap the positive and negative terminals of the sensor's output signal wiring.
2. Keep the pressure sensor unloaded; once the scale has stabilized, reset it to zero, then momentarily activate the Y10002 reset enable function;
3. Place a certain weight of load on the scale body, write the corresponding weight of the weight through the To command, calibrate after the scale body is stable, and enable Y10003 for calibration. When the displayed value of ID10002 is equal to the weight value, the calibration is completed, and Y10003 is closed;
4. The calibration is now complete. During weighing, the module automatically calculates and applies the necessary adjustments based on the collected no-load and calibration values, and finally displays the correct weighing result.

6.3.9.From/To Command Usage Instructions

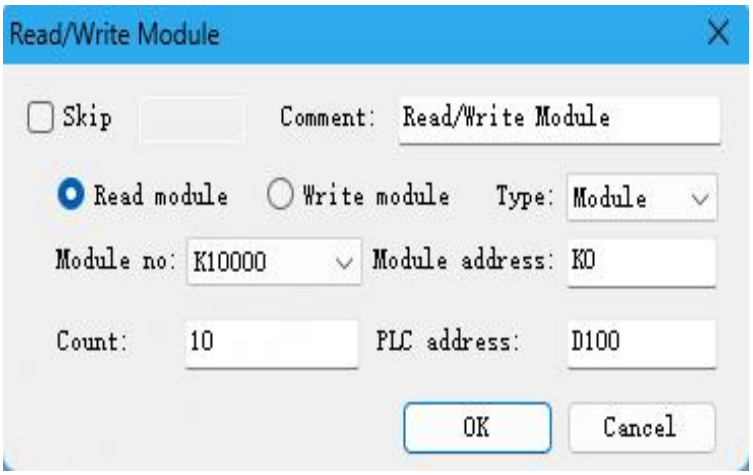
Reading and writing operations for the XD-E2WT-B module must be performed using the FROM/TO instruction within the Sequential Function Block , as shown in the figure below:



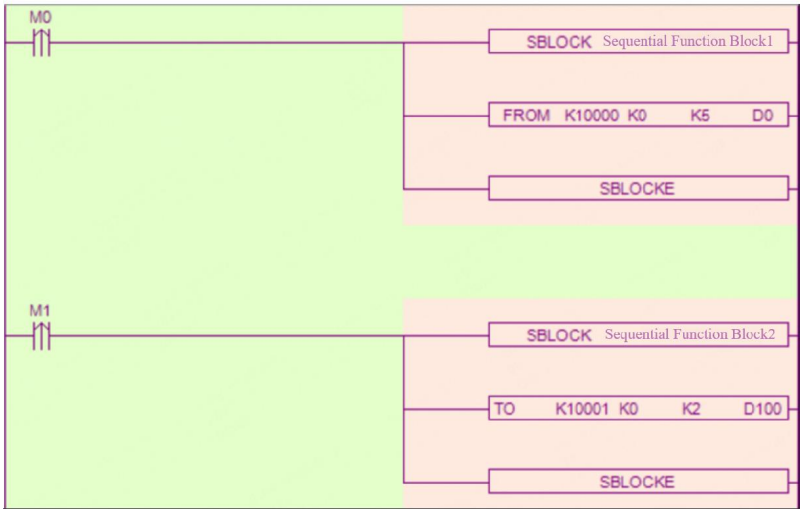
(a) Insert "Read/Write Module (FROM/TO)"



(b) Writing Module



(c)Read Through Model

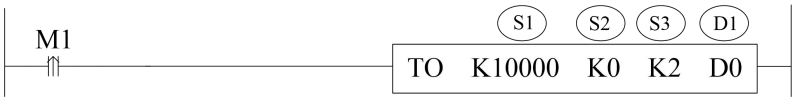


(d) Convert to a Ladder Diagram

instruction parse

- Write Module Instruction: TO

Write the specified register data to the designated module address, using a byte as the operation unit.



Operand	Function	Available Operands
S1	Target Module Number – Range: 10000–10015.	K、TD，CD，D，HD，FD
S2	Write the starting address of the module.	K、TD，CD，D，HD，FD
S3	Number of registers to write to (number of words).	K、TD，CD，D，HD，FD
D1	The starting address of the register where written data is stored within the device.	TD，CD，D，HD，FD

-
- Read module instruction: FROM

Read data from the specified module address into the designated register of the device, using a byte as the operation unit.



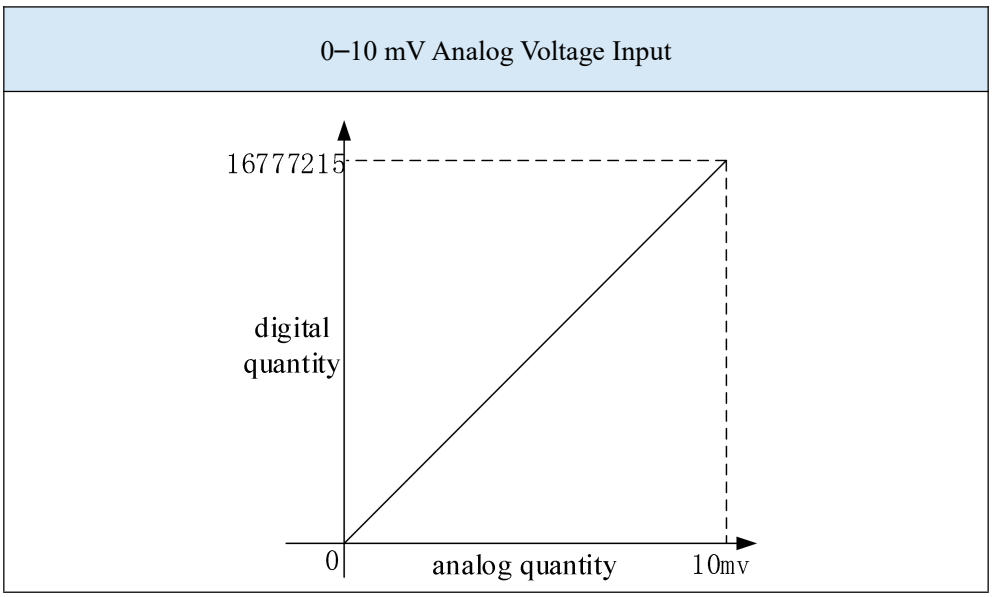
Operand	Function	Available Operands
S1	Target Module Number – Range: 10000–10015.	K、TD，CD，D，HD，FD
S2	Read the starting address of the module.	K、TD，CD，D，HD，FD
S3	Number of registers to read (number of words).	K、TD，CD，D，HD，FD
D1	The body receives the starting address of the register.	TD，CD，D，HD，FD



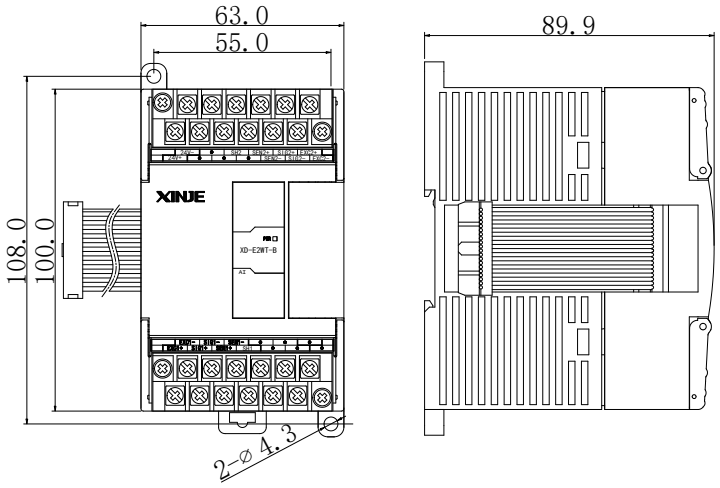
- The FROM/TO instruction can only be written within a BLOCK sequential function block; for XD series PLCs with firmware version below V3.4.5, a maximum of 8 BLOCK function blocks are permitted; for XD/XL series PLCs with firmware version V3.4.5 or later, a maximum of 100 BLOCKs can be written into the program, but only up to 8 can be executed simultaneously.
- The module starting number begins at K10000; Module #1 is K10000, Module #2 is K10001, and so on; Module #16 is K10015.

6.3.10. Analog-to-Digital Conversion Diagram

The relationship between the input voltage (analog signal) and the converted digital signal is shown in the figure below:



6.3.11. External Dimensions Diagram

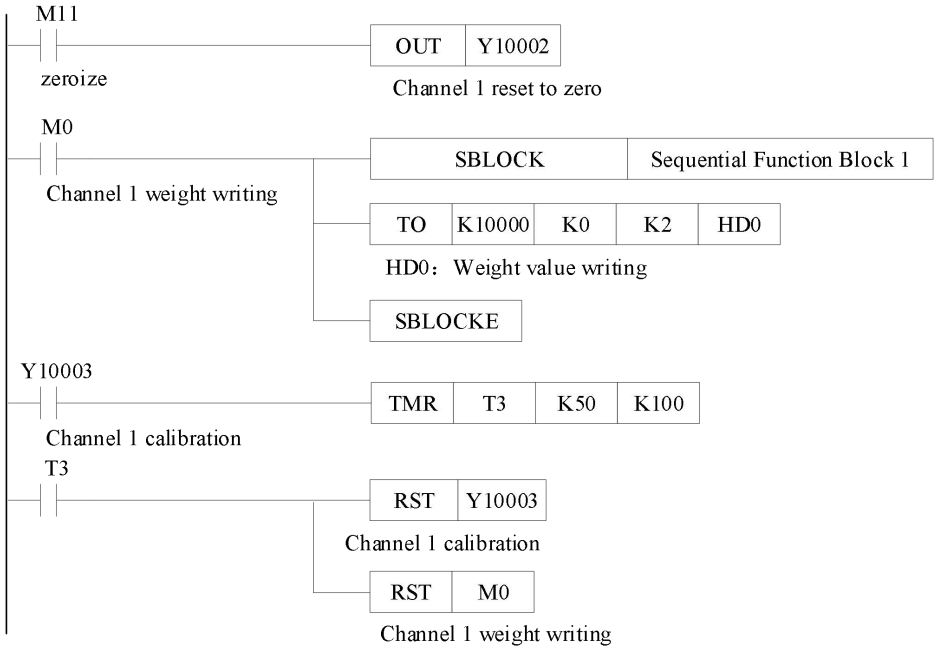


(unit:mm)

6.3.12. Programming Example

Example: Take Module #1, Channel 1 as an example:

procedure:



description:

Reset using Y10002.

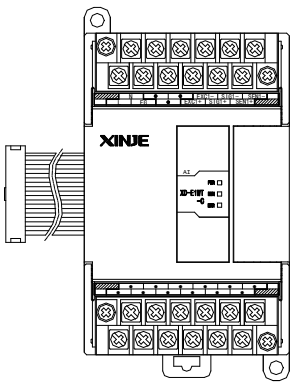
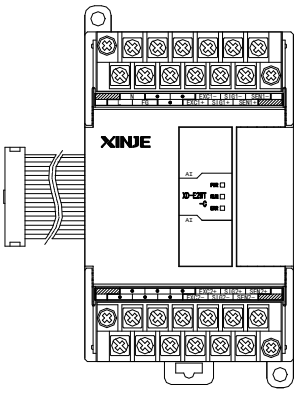
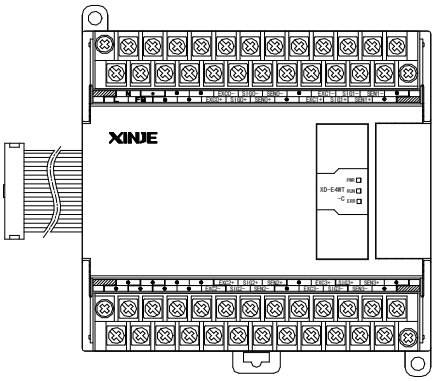
To write a weight value using the FORM/TO command: first, input the weight value into the data register HD0 and set M0; then, write the data register HD0 into Channel 1 of Module #1;

Place the weight, and then calibrate it using Y10003. When the weight display value matches the weight value, the calibration is complete.

6.4. 1~4 Channel Pressure Measurement Module (XD-EnWT-C)

6.4.1.Module Features and Specifications

The 1/2/4-channel pressure measurement module XD-E1/2/4WT-C, designed as an expansion module for XD series PLCs, can be used to detect voltage signals ranging from 0 to 10 mV or to acquire voltage signals from pressure sensors; it then converts these analog voltage values into digital values via an A/D converter and performs further processing on them.

XD-E1WT-C	XD-E2WT-C	XD-E4WT-C
		

1) Module Features

- It can acquire analog voltage signals from 1, 2, or 4 pressure sensors.
- Can detect voltage signals ranging from 0 to 10 mV.
- 20-bit high-precision A/D conversion.
- As specialized functional modules for the XD series, the XD3/XD3E can support up to 10 additional modules connected to the right side of the PLC main unit; the XD5/XDM/XDC/XD5E/XDME/XDH can support up to 16 additional modules; whereas the XD1/XD2 do not support the addition of any modules.

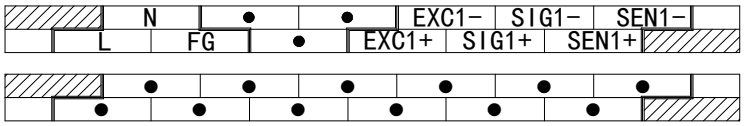
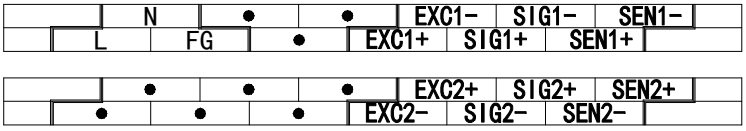
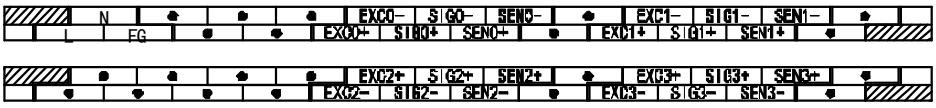
2) Module Specifications

Project	Explain
Analog Input Range	DC 0–10 mV (Sensor: 2 mV/v)
A/D Practical Resolving Power	1/1048575（20Bit）
Maximum Display Resolution	1/300000
No Linear	0.01%F.S
Conversion Rate	Available options: 150 Hz, 300 Hz, or 450 Hz
Module Power Supply	AC220V±10% 50/60Hz
Sensor Excitation Power Supply	5 VDC / 120 mA – Up to 4 350 Ω load cells can be connected in parallel;

Service Environment	Non-corrosive gases
Ambient Temperature	-10℃~50℃
Ambient Humidity	5–95% RH (non-condensing)
Software Release	V3.5.1 or later

6.4.2.Terminal Specifications

1) Terminal Block Arrangement

Module Model	Terminal Arrangement
XD-E1WT-C	
XD-E2WT-C	
XD-E4WT-C	

2) Terminal Signal

- XD-E1WT-C

Channel	Terminal Name	Signal Name	Meaning
CH1	EXC1+	Positive incentive	Power input terminal of the sensor
	EXC1-	Negative incentive	
	SIG1+	Positive Signal	Sensor signal output terminal
	SIG1-	Negative signal	
	SEN1+	Positive feedback	Sensor feedback voltage output terminal
	SEN1-	Negative feedback	

-	L，N	Module Power Supply	Power supply for the module: AC 220 V ± 10%,50/60 Hz
	FG	Power Ground	earth terminal

- XD-E2WT-C

Channel	Terminal Name	Signal Name	Meaning
CH1	EXC1+	Positive incentive	Power input terminal of the sensor
	EXC1-	Negative incentive	
	SIG1+	Positive Signal	Sensor signal output terminal
	SIG1-	Negative signal	
	SEN1+	Positive feedback	Sensor feedback voltage output terminal
	SEN1-	Negative feedback	
CH2	EXC2+	Positive incentive	Power input terminal of the sensor
	EXC2-	Negative incentive	
	SIG2+	Positive Signal	Sensor signal output terminal
	SIG2-	Negative signal	
	SEN2+	Positive feedback	Sensor feedback voltage output terminal
	SEN2-	Negative feedback	
-	L，N	Module Power Supply	Power supply for the module: AC 220 V ± 10%,50/60 Hz
	FG	Power Ground	earth terminal

- XD-E4WT-C

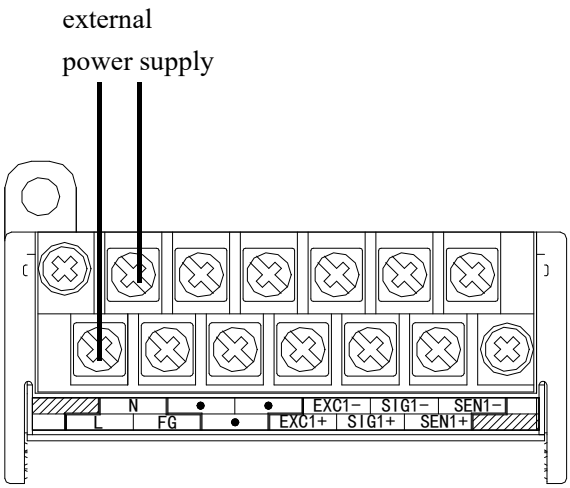
Channel	Terminal Name	Signal Name	Meaning
CH1	EXC1+	Positive incentive	Power input terminal of the sensor
	EXC1-	Negative incentive	
	SIG1+	Positive Signal	Sensor signal output terminal
	SIG1-	Negative signal	
	SEN1+	Positive feedback	Sensor feedback voltage output terminal
	SEN1-	Negative feedback	
CH2	EXC2+	Positive incentive	Power input terminal of the sensor
	EXC2-	Negative incentive	
	SIG2+	Positive Signal	Sensor signal output terminal
	SIG2-	Negative signal	
	SEN2+	Positive feedback	Sensor feedback voltage output terminal
	SEN2-	Negative feedback	
CH3	EXC3+	Positive incentive	Power input terminal of the sensor
	EXC3-	Negative incentive	
	SIG3+	Positive Signal	Sensor signal output terminal
	SIG3-	Negative signal	
	SEN3+	Positive feedback	Sensor feedback voltage output terminal
	SEN3-	Negative feedback	
CH4	EXC4+	Positive incentive	Power input terminal of the sensor
	EXC4-	Negative incentive	
	SIG4+	Positive Signal	Sensor signal output terminal

	SIG4-	Negative signal	
	SEN4+	Positive feedback	Sensor feedback voltage output terminal
	SEN4-	Negative feedback	
-	L、N	Module power supply terminals	Power supply for the module: AC 220 V ± 10%,50/60 Hz
	FG	Power Ground	earth terminal

6.4.3.External Connection

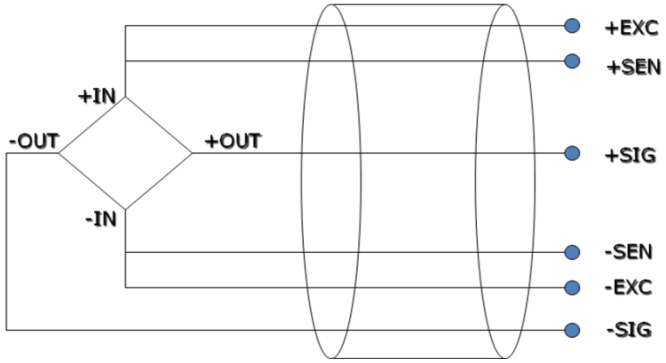
When connecting externally, to avoid interference, please use a shielded cable and perform single-point grounding of the shield.

1) Power Supply Wiring

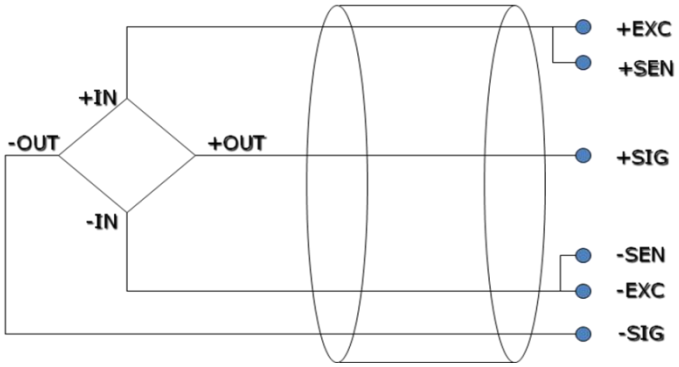


2) Connect to Sensor

- Six-wire connection method



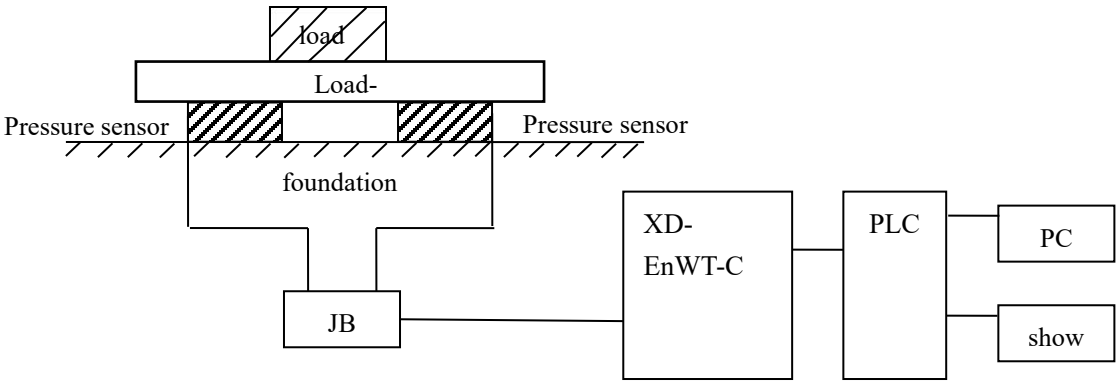
- Four-wire connection method



If the sensor is a four-wire system, short-circuit EXC– to SEN– and EXC+ to SEN+.

6.4.4.Weighing System Composition

A complete industrial weighing system (scale) primarily consists of the following components:



The figure above shows the setup of a weighing system equipped with an XD-EnWT-C module.

Name	Explain
Load-Bearing Component	Load-bearing components are used to support the load to be weighed; these include platforms, hoppers, aerial handling vehicles, containers, and so on.

Pressure Sensor	A pressure sensor is a measuring device that converts a physical quantity (i.e., weight) into a proportional electrical signal.
Assembling Components	Assembly components ensure the proper operation of the weighing sensor; assembly and guiding components prevent overloading, as overloading can lead to measurement errors or damage the weighing sensor. Overloading is caused by a force (lateral force) acting in a direction not intended by the design of the weighing sensor's spring.
Connecting Box	The junction box (JB) is used to combine the signal lines from multiple parallelly connected load cells.
XD-EnWT-C	The XD-EnWT-C module can be used as an electronic evaluation device that captures signals from a pressure sensor and performs further analysis.

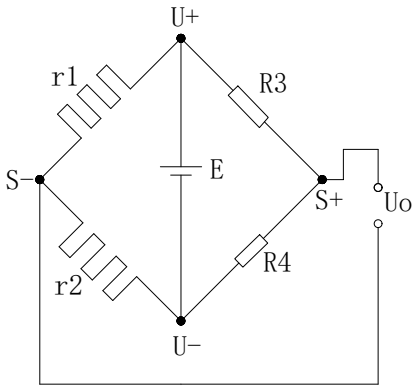
6.4.5.Module Function Description

The XD-EnWT-C pressure measurement module offers the following functions:

- Pressure sensor calibration
- Pressure sensor signal acquisition
- Weight value calculation
- 0–10 mV voltage signal detection

Pressure Sensor Introduction

The pressure sensor operates on the principle of the resistive strain effect. Its schematic diagram is shown below:



R1 and R2 are strain resistors that, together with the two fixed resistors R3 and R4, form a bridge circuit. When the resistance values of R1 and R2 change, the bridge becomes unbalanced, thereby generating an unbalanced voltage Uo as the sensor's output signal.
U+ and U-represent the positive and negative terminals of the sensor power supply, respectively; the power supply can be either the 5 V supply provided by this module or an external power supply.
S+ and S-represent the positive and negative terminals of the sensor's output signal, respectively; connecting this millivolt voltage output signal to this module allows for the measurement of pressure magnitude.

6.4.6.Input/Output Definition Number Allocation

First Expansion Module Register Definition Number

Soft Components		Address	Explain	Remarks
Output Coil	CH1	Y10000	Filter Level Switching	
		Y10001	Reset	
		Y10002	Zero-point calibration	
		Y10003	Gain calibration	
	CH2	Y10004	Filter Level Switching	
		Y10005	Reset	
		Y10006	Zero-point calibration	
		Y10007	Gain calibration	
	CH3	Y10010	Filter Level Switching	
		Y10011	Reset	
		Y10012	Zero-point calibration	
		Y10013	Gain calibration	
	CH4	Y10014	Filter Level Switching	
		Y10015	Reset	
		Y10016	Zero-point calibration	
		Y10017	Gain calibration	
	ALL	Y10020	Restore to factory settings	
Input Coil	CH1	X10000	Stability Indicator	
		X10001	overflow flag	
		X10002	Calibration Successful Indicator	
		X10003	Calibration Failure Flag	
	CH2	X10004	Stability Indicator	
		X10005	overflow flag	
		X10006	Calibration Successful Indicator	
		X10007	Calibration Failure Flag	
	CH3	X10010	Stability Indicator	
		X10011	overflow flag	
		X10012	Calibration Successful Indicator	
		X10013	Calibration Failure Flag	
	CH4	X10014	Stability Indicator	
		X10015	overflow flag	
		X10016	Calibration Successful Indicator	
		X10017	Calibration Failure Flag	
Input Register	CH1	ID10000	Current weight	double character
		ID10002	Current digital value / Current input voltage	double character

Soft Components		Address	Explain	Remarks
	CH2	ID10004	Current weight	double character
		ID10006	Current digital value / Current input voltage	double character
	CH3	ID10008	Current weight	double character
		ID10010	Current digital value / Current input voltage	double character
	CH4	ID10012	Current weight	double character
		ID10014	Current digital value / Current input voltage	double character

Second Expansion Module Register Definition Number

Soft Components		Address	Explain	Remarks
Output Coil	CH1	Y10100	Filter Level Switching	
		Y10101	Reset	
		Y10102	Zero-point calibration	
		Y10103	Gain calibration	
	CH2	Y10104	Filter Level Switching	
		Y10105	Reset	
		Y10106	Zero-point calibration	
		Y10107	Gain calibration	
	CH3	Y10110	Filter Level Switching	
		Y10111	Reset	
		Y10112	Zero-point calibration	
		Y10113	Gain calibration	
	CH4	Y10114	Filter Level Switching	
		Y10115	Reset	
		Y10116	Zero-point calibration	
		Y10117	Gain calibration	
	ALL	Y10120	Restore to factory settings	
Input Coil	CH1	X10100	Stability Indicator	
		X10101	overflow flag	
		X10102	Calibration Successful Indicator	
		X10103	Calibration Failure Flag	
	CH2	X10104	Stability Indicator	
		X10105	overflow flag	
		X10106	Calibration Successful Indicator	
		X10107	Calibration Failure Flag	
	CH3	X10110	Stability Indicator	
		X10111	overflow flag	

Soft Components		Address	Explain	Remarks
		X10112	Calibration Successful Indicator	
		X10113	Calibration Failure Flag	
	CH4	X10114	Stability Indicator	
		X10115	overflow flag	
		X10116	Calibration Successful Indicator	
		X10117	Calibration Failure Flag	
Input Register	CH1	ID10100	Current weight	double character
		ID10102	Current digital value / Current input voltage	double character
	CH2	ID10104	Current weight	double character
		ID10106	Current digital value / Current input voltage	double character
	CH3	ID10108	Current weight	double character
		ID10110	Current digital value / Current input voltage	double character
	CH4	ID10112	Current weight	double character
		ID10114	Current digital value / Current input voltage	double character

。。。。。。

Sixteenth Expansion Module Register Definition Number

Soft Components		Address	Explain	Remarks
Output Coil	CH1	Y11700	Filter Level Switching	
		Y11701	Reset	
		Y11702	Zero-point calibration	
		Y11703	Gain calibration	
	CH2	Y11704	Filter Level Switching	
		Y11705	Reset	
		Y11706	Zero-point calibration	
		Y11707	Gain calibration	
	CH3	Y11710	Filter Level Switching	
		Y11711	Reset	
		Y11712	Zero-point calibration	
		Y11713	Gain calibration	
	CH4	Y11714	Filter Level Switching	
		Y11715	Reset	

Soft Components		Address	Explain	Remarks
		Y11716	Zero-point calibration	
		Y11717	Gain calibration	
	ALL	Y11720	Restore to factory settings	
Input Coil	CH1	X11700	Stability Indicator	
		X11701	overflow flag	
		X11702	Calibration Successful Indicator	
		X11703	Calibration Failure Flag	
	CH2	X11704	Stability Indicator	
		X11705	overflow flag	
		X11706	Calibration Successful Indicator	
		X11707	Calibration Failure Flag	
	CH3	X11710	Stability Indicator	
		X11711	overflow flag	
		X11712	Calibration Successful Indicator	
		X11713	Calibration Failure Flag	
	CH4	X11714	Stability Indicator	
		X11715	overflow flag	
		X11716	Calibration Successful Indicator	
		X11717	Calibration Failure Flag	
Input Register	CH1	ID11500	Current weight	double character
		ID11502	Current digital value / Current input voltage	double character
	CH2	ID11504	Current weight	double character
		ID11506	Current digital value / Current input voltage	double character
	CH3	ID11508	Current weight	double character
		ID11510	Current digital value / Current input voltage	double character
	CH4	ID11512	Current weight	double character
		ID11514	Current digital value / Current input voltage	double character

XD-E1WT-C contains no CH2–CH3 group; XD-E2WT-C contains no CH3–CH4 group.

Address Information

Parameter Name	Function Declaration
1: Filter Level Switching	ON: Filter Level A; OFF: Filter Level B;

2: Reset	Resetting within the specified range is valid; the zero point is not saved.
3: Zero-point calibration	Used for system zero-point calibration;
4: Gain Calibration	Used for system linearity correction;
5: Stability Indicator	When the stability determination range and stability determination time conditions are satisfied, this signal output becomes effective;
6: Overflow Flag	When the signal voltage exceeds 10 mV, this signal output becomes valid;
7: Calibration Successful Indicator	When zero-point calibration and gain calibration are successful, this signal output becomes valid;
8: Calibration Failure Flag	When zero-point calibration or gain calibration fails, this signal output becomes valid; (for the specific reason, refer to the module's application error message)
9: Current digital value / Current input voltage	The setting can be configured via the host computer; when switched to the current input voltage mode, the unit is millivolt (mV) with four decimal places;

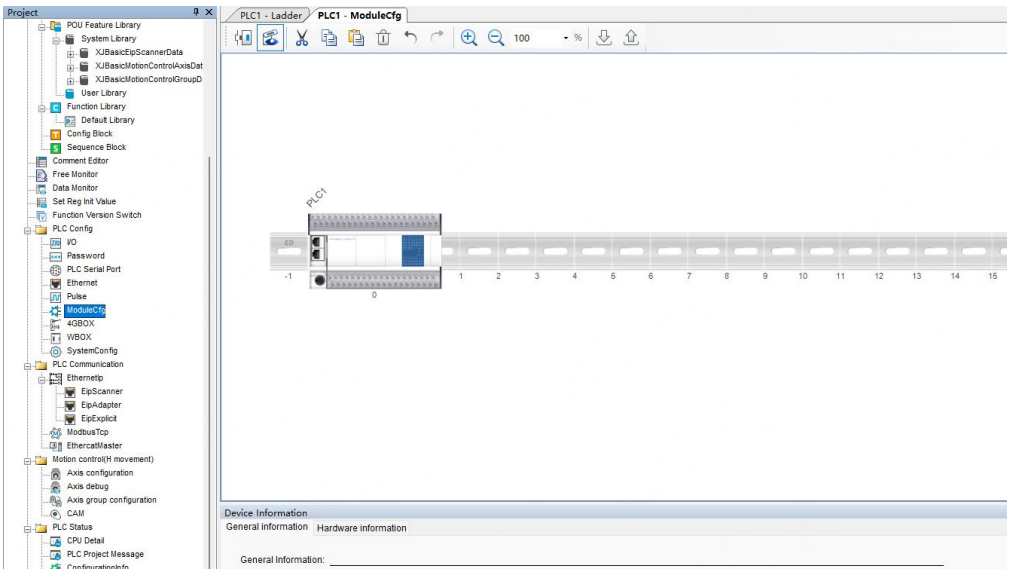
6.4.7.Work Mode Setup

There are two methods for configuring the operating mode (these two methods yield equivalent results).

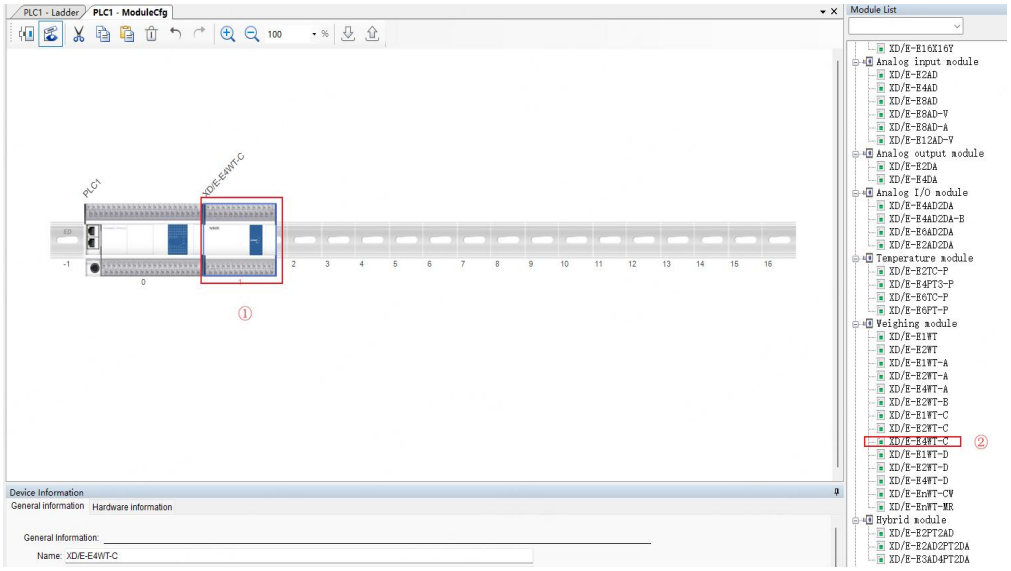
- Configure via Control Panel
- Set via Flash registers

1) Configuration Panel Configuration

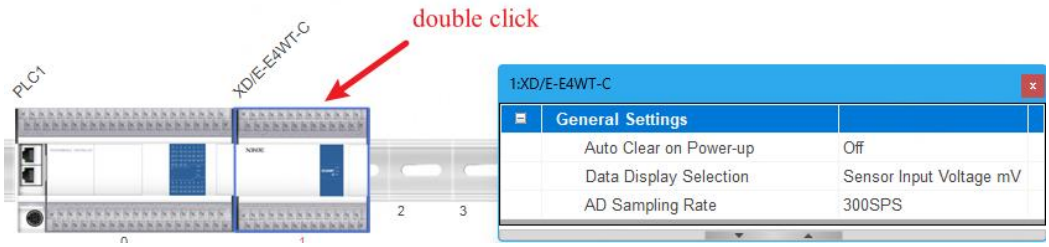
1. Use the XINJE PLC Programming Tool Software version 3.8.0a or later to configure the module; click [PLC Configuration] – [Module Configuration] in the left-side Engineering Bar to open the Expansion Module Settings window. For versions prior to 3.8.0a, click [PLC Configuration] – [Expansion Module] in the left-side Engineering Bar to perform the configuration.



2. Select a module from the right-side module list and drag it to the desired position, or double-click a module in the right-side module list to select it:



3. Double-click the corresponding module icon to access the module configuration interface, where you can select whether to perform automatic power-on reset, configure data display options, or set the AD sampling rate.

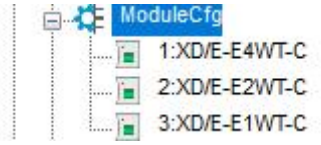


parameter declaration:

Parameter Name	Function Declaration
1: Automatic reset upon power-on	When enabled, the module will automatically reset itself every time it is powered on;
2: Data Selection	Configuration switching is available; when switched to the current input voltage, the unit is mV with 4 decimal places;
3: AD sampling rate	Select the AD sampling rate.

4. Click " " to view the default configuration parameters for the Expansion module.

5. After completing the parameter configuration for the expansion module, click "" to write the set values into the PLC; the changes will take effect only after the PLC is powered off and then powered on again. Under the Module Configuration Node, mount the configured module, then double-click to enter the Module Parameter Configuration screen.



2) Flash Register Configuration

The expansion module allows users to set gear positions and customize the fast sampling frequency; these settings are configured via the SFD (Special FLASH Data Register) within the PLC. As shown below:

Module ID	Configuration Information Address	Module ID	Configuration Information Address
#1	SFD350~SFD359	#9	SFD430~SFD439
#2	SFD360~SFD369	#10	SFD440~SFD449
#3	SFD370~SFD379	#11	SFD450~SFD459
#4	SFD380~SFD389	#12	SFD460~SFD469
#5	SFD390~SFD399	#13	SFD470~SFD479
#6	SFD400~SFD409	#14	SFD480~SFD489
#7	SFD410~SFD419	#15	SFD490~SFD499
#8	SFD420~SFD429	#16	SFD500~SFD509

SFD350–SFD359 Register Specifications

Register		Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0	Explain
SFD350	Byte0	ADsampling rate Range: 0–2 Initial value: 1 0: 150 times/second 1,300 times/second 2: 450 times/second						Sampling Data Mode Initial value: 0 0: Sensor Input voltage(mv) 1: AD sampling digital value	Power-on automatic reset Initial value: 0 0: Off 1: Turn on	whole channel
	Byte1	Save								
SFD351~SFD359		Save								

6.4.8.Module Configuration

1) Module Parameter List

Address	Content	Explain		Attribute	Explanatory Note
K0	Zero-Point Tracking Range	Range: 0–9 Initial value: 5	All Channels	Word R/W	If the weight value fluctuates within the k0 range (centered at zero) and this fluctuation persists for a duration of k1 seconds, then the fluctuating value within this range is not recorded, and the weight value is displayed as 0.
K1	Zero-point tracking time	Range: 500–5000 (ms) Initial value: 2000		Word R/W	
K2	Zeroing Range	Range: 1–99 (%)		Word R/W	The reset operation is permitted within the parameter range defined by

Address	Content	Explain		Attribute	Explanatory Note
		Initial value: 50			the maximum measurement range.
K3	Stability Range	Range: 1−99 Initial value: 3		Word R/W	If the difference between the current weight value and the previous weight value falls within the K3 range and remains within this range for a duration of k4 seconds, then the current weight value is considered to have stabilized.
K4	Steady-state time	Range: 10−5000 (ms) Initial value: 100		Word R/W	
K5	Filter Level A	Range: 0−9 Initial value: 3		Word R/W	/
K6	Filtering Level B	Range: 0−9 Initial value: 5		Word R/W	/
K7~K9	Keep				
K10	Zero-point calibration voltage return value	Returns the current sensor input voltage value after calibrating the zero point.	CH1	Dword R	/
K12	Gain calibration value / Gain calibration voltage return value	During gain calibration, this value is used as the weight input; during non-calibration, it serves as the returned relative voltage value.		Dword R/W	/
K14	CH1 Minimum Scale Division	Range: 1, 2, 5, 10,20,50		Word R/W	/
K15	CH1 Maximum Range	Range: <1,000,000		Dword R/W	/
K17	Keep				
K20	Zero-point calibration voltage return value	Returns the current sensor input voltage value after	CH2	Dword R	/

Address	Content	Explain		Attribute	Explanatory Note
		calibrating the zero point.			
K22	Gain calibration value / Gain calibration voltage return value	During gain calibration, this value is used as the weight input; during non-calibration, it serves as the returned relative voltage value.		Dword R/W	/
K24	CH2 Minimum Scale Division	Range: 1, 2, 5, 10,20,50		Word R/W	/
K25	CH2 Maximum Range	Range: <1,000,000		Dword R/W	/
K27	Keep				
K30	Zero-point calibration voltage return value	Returns the current sensor input voltage value after calibrating the zero point.	CH3	Dword R	/
K32	Gain calibration value / Gain calibration voltage return value	During gain calibration, this value is used as the weight input; during non-calibration, it serves as the returned relative voltage value.		Dword R/W	/
K34	CH3 minimum scale division	Range: 1, 2, 5, 10,20,50		Word R/W	/
K35	CH3 maximum range	Range: <1,000,000		Dword R/W	/
K37	Keep				
K40	Zero-point calibration voltage return value	Returns the current sensor input voltage value after	CH4	Dword R	/

Address	Content	Explain		Attribute	Explanatory Note
		calibrating the zero point.			
K42	Gain calibration value / Gain calibration voltage return value	During gain calibration, this value is used as the weight input; during non-calibration, it serves as the returned relative voltage value.		Dword R/W	/
K44	CH4 minimum scale division	Range: 1, 2, 5, 10,20,50		Word R/W	/
K45	CH4 maximum range	Range: <1,000,000		Dword R/W	/
K47	Keep				

2) Weighing Unit Setting

Take Module 1, Channel 1 as an example:

In the PLC program, the weight of the object is written using the To instruction. For example, if the weight of the object is 1 kg and the unit precision is required to be in kilograms, then the value 1 is written; if the unit precision is required to be in grams, then the value 1000 is written; and if the unit precision is required to be to the nearest 0.1 gram, then the value 10000 is written. This satisfies the formula: Resolution = 1 kg / Written Value.

3) Calibration

Whenever the sensor is replaced, the pressure sensor must be recalibrated.

Take Module 1, Channel 1 as an example:

1. Verify whether the module and sensor are functioning correctly;
   Judgment Method:
   ① Check whether the overflow flag X10001 is in the OFF state; if it is ON, this indicates that the sensor is not properly connected or is damaged;
   ② Use the host computer software to monitor whether the ID10002 output value fluctuates upward or downward according to the sensor readings (the magnitude of the fluctuation depends on the sensor's measurement range); if the output value increases as the load pressure increases, or decreases as the load pressure increases, this indicates: ① The sensor is installed incorrectly – reposition the sensor or swap the positive and negative terminals of the sensor's output signal; ② The input voltage signal has exceeded its allowable range – appropriately reduce the load.
2. Set the pressure sensor to no-load condition; when the stabilization indicator X10000 is set to ON, initiate the zero-point calibration function Y10002. Setting X10002 to ON indicates a successful

zero-point calibration; if, after waiting for a few seconds, X10003 is set to ON, it indicates a failed zero-point calibration.

3. Place a load of known weight on the scale body and write the corresponding weight using the To command. When the stability flag X10000 is set to ON, calibrate the gain Y10003. When X10002 is set to ON, it indicates successful calibration. Turn off Y10003. If X10003 is ON after waiting for a few seconds, it indicates a failed zero calibration;

4. The calibration is now complete. During weighing, the module automatically calculates and applies the necessary adjustments based on the collected no-load and calibration values, and finally displays the correct weighing result.

6.4.9.Module Error Message

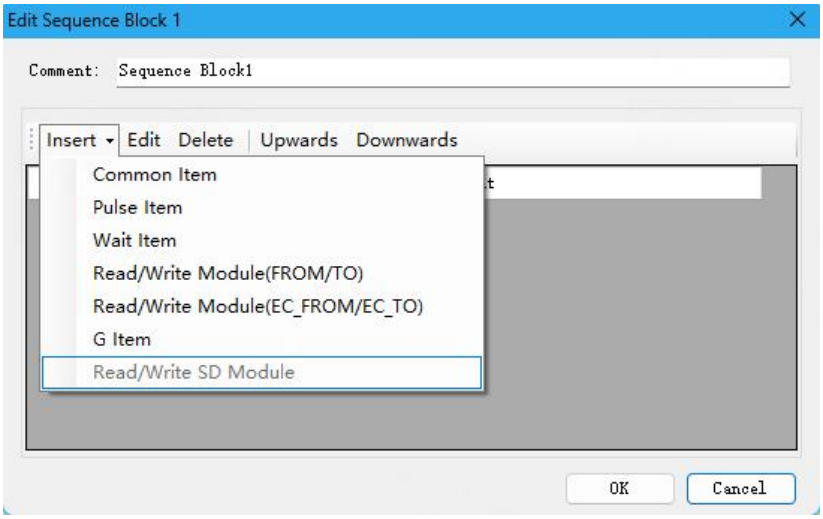
Severe application error (corresponds to the high 8 bits of the Body Register Address SD503)

Error Code			Meaning
Binary System	Hexadecimal	Decimal System	
0000 0001	0x01	1	Unconnected 24V supply
0000 0010	0x02	2	Configuration not completed within 5 seconds
0000 0011	0x03	3	Inconsistent module models
0000 0100	0x04	4	Communication anomaly with the PLC unit

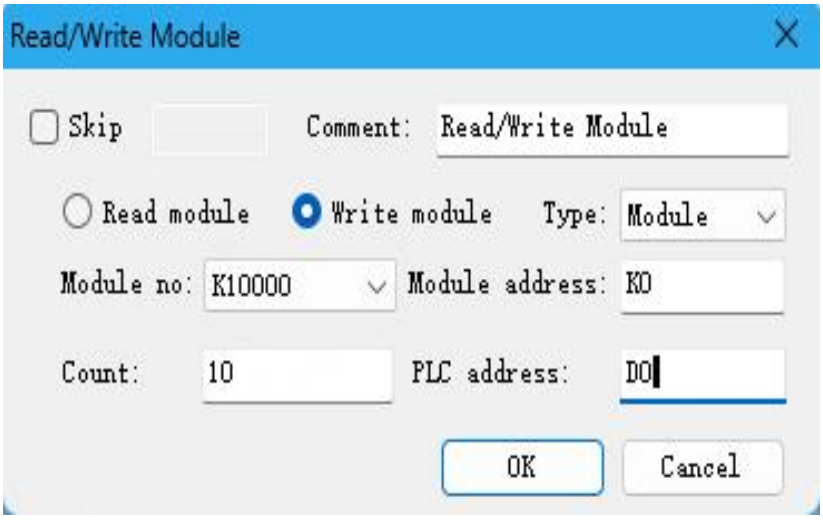
How to use this error code: Write the module number to the SD500; to view the error code for the first module, write "10000".

6.4.10. From/To Command Usage Instructions

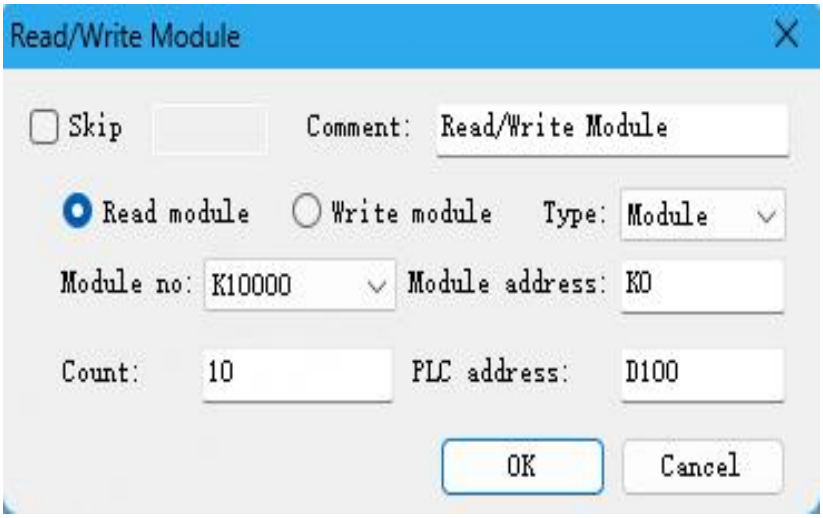
The read/write operations for the XD-EnWT-C module must be performed using the FROM/TO instruction within the BLOCK Sequential Function Block, as shown in the figure below:



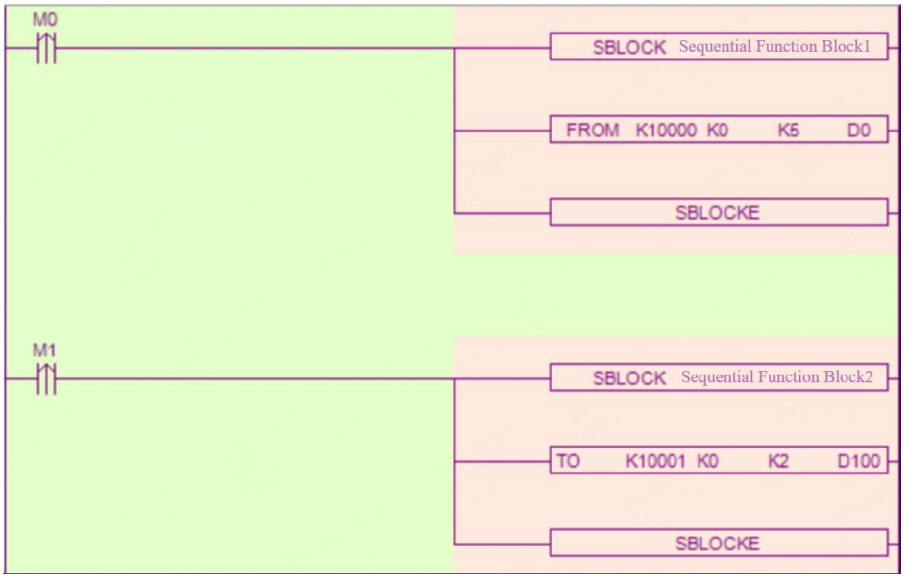
(a) Insert "Read/Write Module (FROM/TO)"



(b) Writing Module



(c)Read Through Model

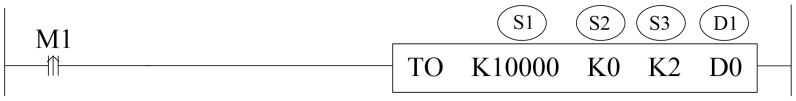


(d) Convert to a Ladder Diagram

Instruction parse

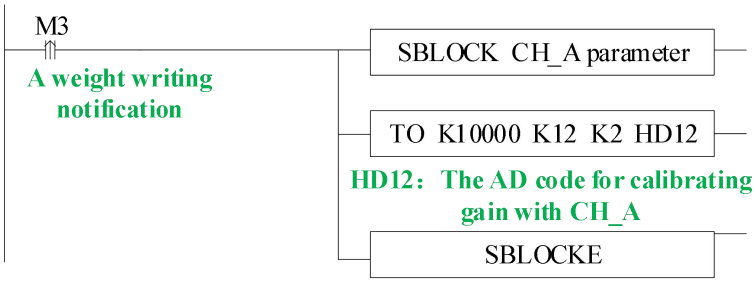
- Write Module Instruction: TO

Write the specified register data to the designated module address, using a byte as the operation unit.



Operand	Function	Available Operands
S1	Target Module Number – Range: 10000–10015.	K、TD，CD，D，HD，FD
S2	Write the starting address of the module.	K、TD，CD，D，HD，FD
S3	Number of registers to write to (number of words).	K、TD，CD，D，HD，FD
D1	The starting address of the register where written data is stored within the device.	TD，CD，D，HD，FD

For example: Write the weight value to the first channel of the first module.



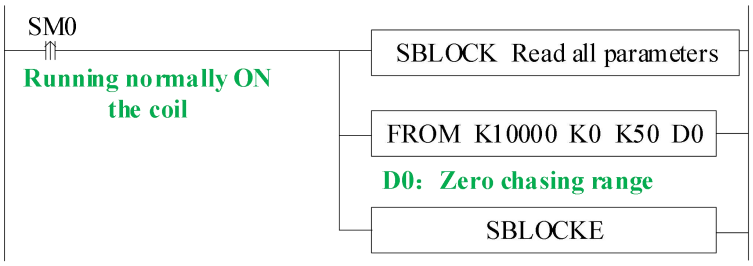
- Read module instruction: FROM

Read data from the specified module address into the designated register of the device, using a byte as the operation unit.



Operand	Function	Available Operands
S1	Target Module Number – Range: 10000–10015.	K、TD，CD，D，HD，FD
S2	Read the starting address of the module.	K、TD，CD，D，HD，FD
S3	Number of registers to read (number of words).	K、TD，CD，D，HD，FD
D1	The body receives the starting address of the register.	TD，CD，D，HD，FD

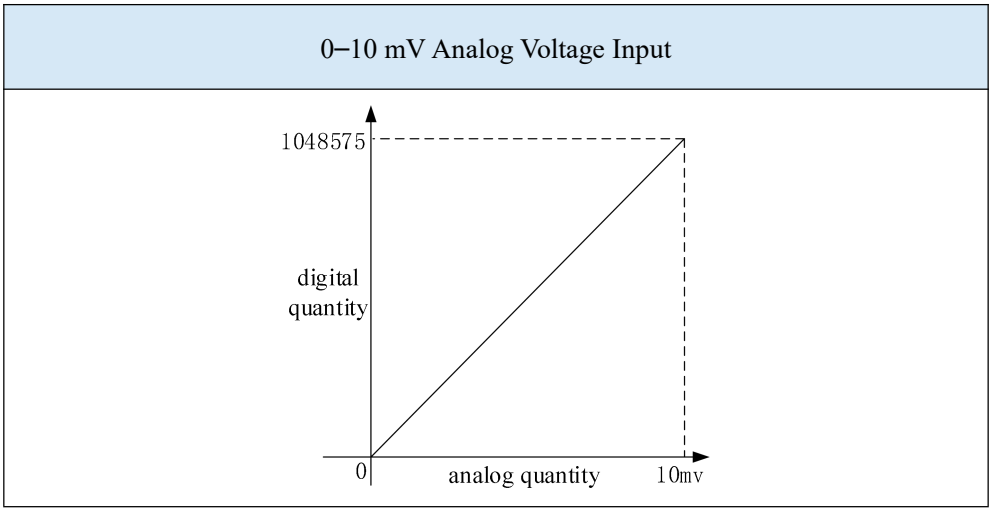
For example: Read all parameters of the first module.



- The FROM/TO instruction can only be written within a BLOCK sequential function block; for XD series PLCs with firmware version below V3.4.5, a maximum of 8 BLOCK function blocks are permitted; for XD/XL series PLCs with firmware version V3.4.5 or later, a maximum of 100 BLOCKs can be written into the program, but only up to 8 can be executed simultaneously.
- The module starting number begins at K10000; Module #1 is K10000, Module #2 is K10001, and so on; Module #16 is K10015.

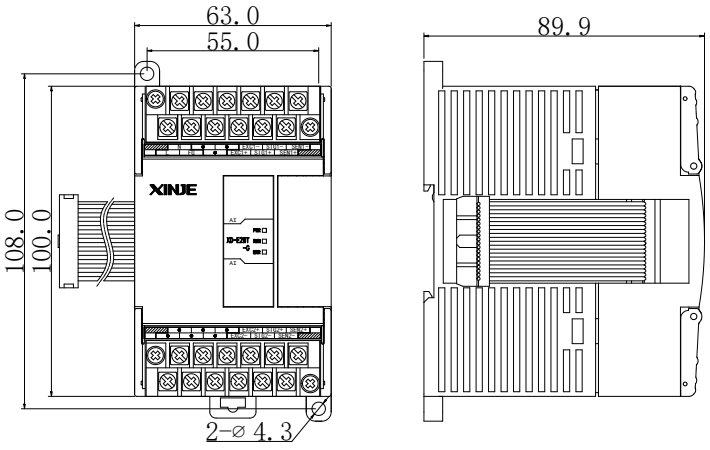
6.4.11. Analog-to-Digital Conversion Diagram

The relationship between the input voltage (analog signal) and the converted digital signal is shown in the figure below:



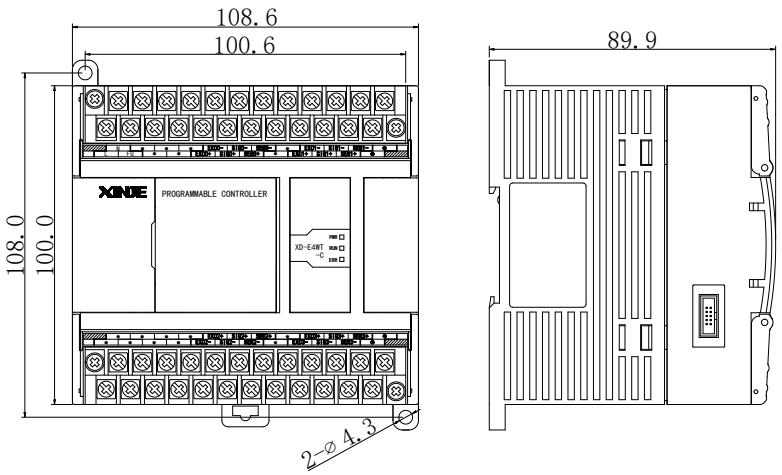
6.4.12. External Dimensions Diagram

unit:mm



Applicable Modules

pressure measurement
XD-E1WT-C
XD-E2WT-C



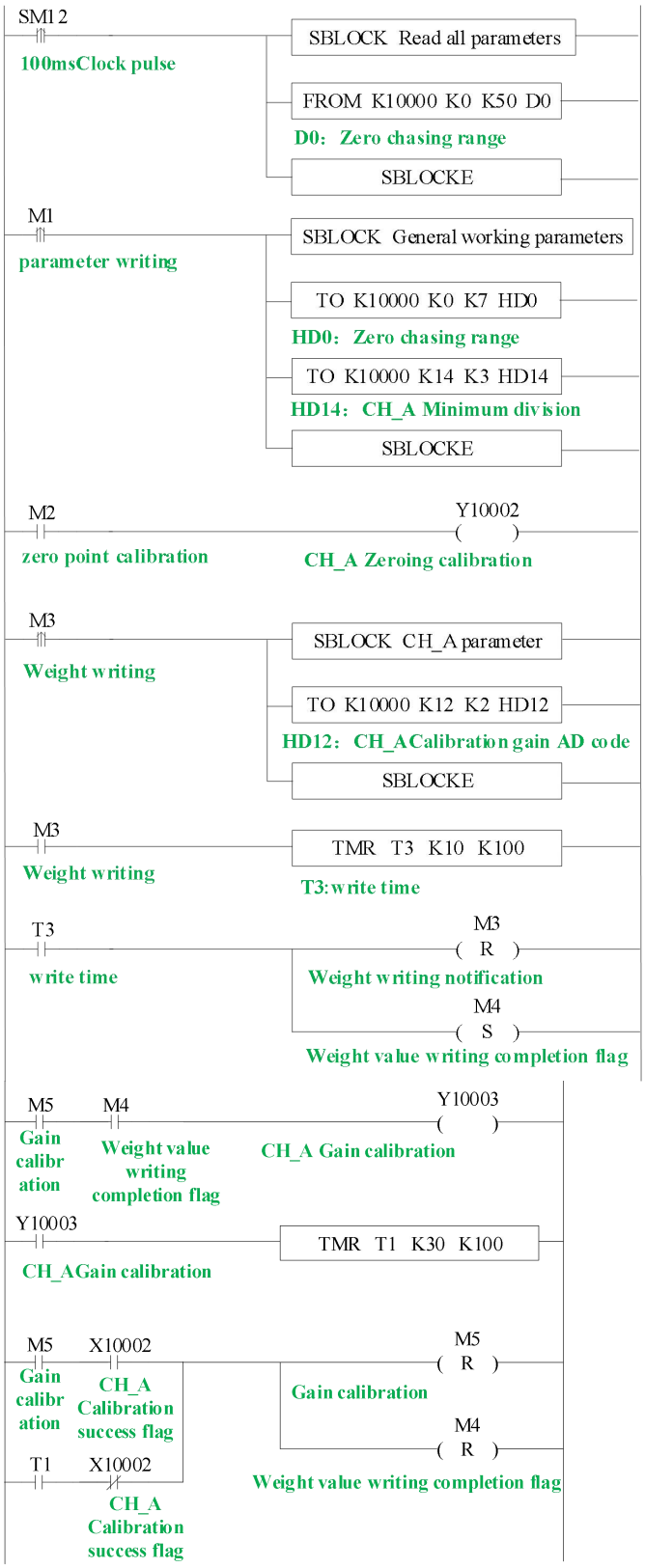
Applicable Modules

pressure measurement
XD-E4WT-C

6.4.13. Programming Example

Example: Take Module #1, Channel 1 as an example:

procedure:



description:

Read all parameters and write general operating parameters using the FORM/TO command;

Set M1 to write all parameters to Channel 1;

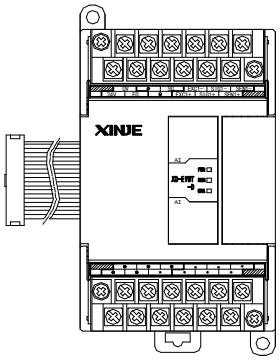
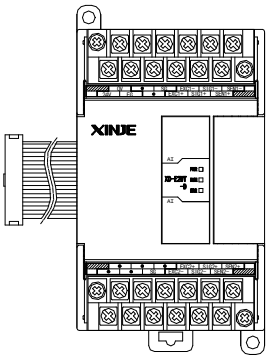
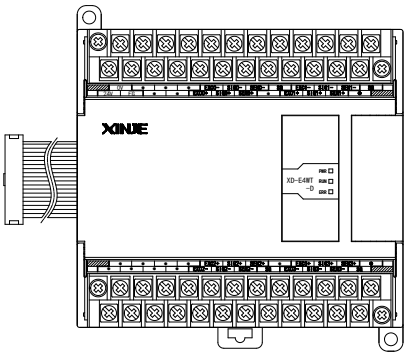
Zero-point calibration: Set M2 and perform zero-point calibration; if the calibration is successful, set X10002 to ON;

Gain calibration: Before performing gain calibration, first write the weight value, set M3, and then write the HD12 weight value into the module. After the write operation is successful, turn ON the completion flag M4 before proceeding with the gain calibration; set M5 to initiate the gain calibration process with a preset stabilization time of 3 seconds – wait until the weighing platform stabilizes. If the gain calibration is successful, turn ON X10002 or wait until calibration time T1 expires; then reset M4 and M5 – the gain calibration is now complete.

6.5. 1~4 Channel Pressure Measurement Module (XD-EnWT-D)

6.5.1.Module Features and Specifications

The 1/2/4-channel pressure measurement module XD-E1/2/4WT-D, designed as an expansion module for XD-series PLCs, can be used to detect voltage signals ranging from-20 to 20 mV or to acquire voltage signals from pressure sensors; it then converts these analog voltage values into digital values via an A/D converter and performs further processing on them.

XD-E1WT-D	XD-E2WT-D	XD-E4WT-D
		

1) Module Features

- It can acquire analog voltage signals from 1, 2, or 4 pressure sensors.
- Detects voltage signals ranging from-20 to 20 mV.
- 23–24-bit high-precision A/D conversion.
- As specialized functional modules for the XD series, the XD3/XD3E can support up to 10 additional modules connected to the right side of the PLC main unit; the XD5/XDM/XDC/XD5E/XDME/XDH can support up to 16 additional modules; whereas the XD1/XD2 do not support the addition of any modules.

2) Module Specifications

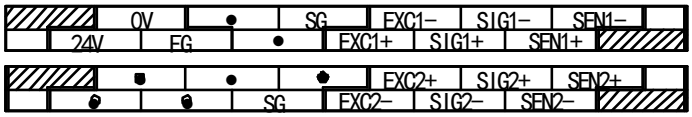
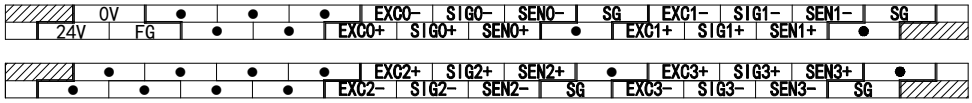
Project	Explain
Analog Input Range	DC-20～20mV
A/D Practical Resolving Power	1/8388607（23Bit）、1/16777215（24Bit）
Maximum Display Resolution	1/500000
No Linear	0.01%F.S
Conversion Rate	Available options: 150 Hz, 300 Hz, or 450 Hz
Source	DC24V±10%

Sensor Excitation Power Supply	5 VDC / 120 mA − Up to 4 350 Ω load cells can be connected in parallel;
Service Environment	Non-corrosive gases
Ambient Temperature	-10℃~50℃
Ambient Humidity	5–95% RH (non-condensing)
Software Release	V3.5.3 or later

- For module versions prior to V9, the resolution is 23 bits; for versions starting from V9, the resolution is 24 bits.

6.5.2.Terminal Specifications

1) Terminal Block Arrangement

Module Model	Terminal Arrangement
XD-E1WT-D	
XD-E2WT-D	
XD-E4WT-D	

2) Terminal Signal

- XD-E1WT-D

Channel	Terminal Name	Signal Name	Meaning
CH1	EXC1+	Positive incentive	Power input terminal of the sensor
	EXC1-	Negative incentive	
	SIG1+	Positive Signal	Sensor signal output terminal

	SIG1-	Negative signal	
	SEN1+	Positive feedback	Sensor feedback voltage output terminal
	SEN1-	Negative feedback	
	SG	Signal Ground	earth terminal
-	24V，0V	terminals for power supplies	Power supply for the module: DC 24 V ±10%
	FG	Power Ground	earth terminal

- XD-E2WT-D

Channel	Terminal Name	Signal Name	Meaning
CH1	EXC1+	Positive incentive	Power input terminal of the sensor
	EXC1-	Negative incentive	
	SIG1+	Positive Signal	Sensor signal output terminal
	SIG1-	Negative signal	
	SEN1+	Positive feedback	Sensor feedback voltage output terminal
	SEN1-	Negative feedback	
	SG	Signal Ground	earth terminal
CH2	EXC2+	Positive incentive	Power input terminal of the sensor
	EXC2-	Negative incentive	
	SIG2+	Positive Signal	Sensor signal output terminal
	SIG2-	Negative signal	
	SEN2+	Positive feedback	Sensor feedback voltage output terminal
	SEN2-	Negative feedback	
	SG	Signal Ground	earth terminal
-	24V，0V	terminals for power supplies	Power supply for the module: DC 24 V ±10%

Channel	Terminal Name	Signal Name	Meaning
	FG	Power Ground	earth terminal

- XD-E4WT-D

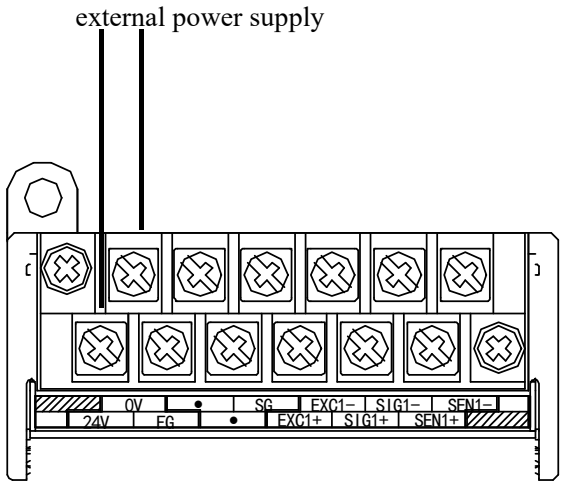
Channel	Terminal Name	Signal Name	Meaning
CH1	EXC0+	Positive incentive	Power input terminal of the sensor
	EXC0-	Negative incentive	
	SIG0+	Signal: Positive	Sensor signal output terminal
	SIG0-	Negative signal	
	SEN0+	Positive feedback	Sensor feedback voltage output terminal
	SEN0-	Negative feedback	
	SG	Signal Ground	earth terminal
CH2	EXC1+	Positive incentive	Power input terminal of the sensor
	EXC1-	Negative incentive	
	SIG1+	Signal: Positive	Sensor signal output terminal
	SIG1-	Negative signal	
	SEN1+	Positive feedback	Sensor feedback voltage output terminal
	SEN1-	Negative feedback	
	SG	Signal Ground	earth terminal
CH3	EXC2+	Positive incentive	Power input terminal of the sensor
	EXC2-	Negative incentive	
	SIG2+	Signal: Positive	Sensor signal output terminal
	SIG2-	Negative signal	

	SEN2+	Positive feedback	Sensor feedback voltage output terminal
	SEN2-	Negative feedback	
	SG	Signal Ground	earth terminal
CH4	EXC3+	Positive incentive	Power input terminal of the sensor
	EXC3-	Negative incentive	
	SIG3+	Signal: Positive	Sensor signal output terminal
	SIG3-	Negative signal	
	SEN3+	Positive feedback	Sensor feedback voltage output terminal
	SEN3-	Negative feedback	
	SG	Signal Ground	earth terminal
-	24V，0V	terminals for power supplies	Power supply for the module: DC 24 V ±10%
	FG	Power Ground	earth terminal

6.5.3.External Connection

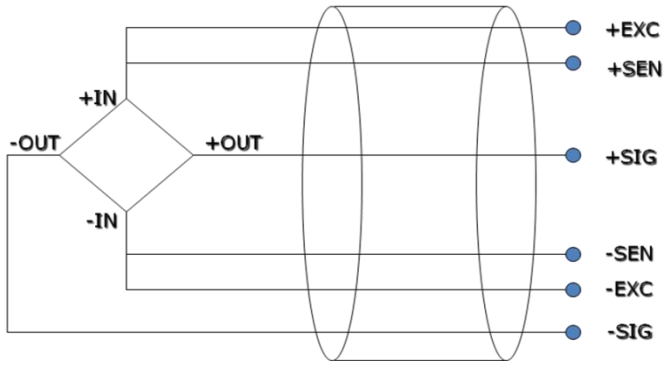
When connecting externally, to avoid interference, please use a shielded cable and perform single-point grounding of the shield.

1) Power Supply Wiring

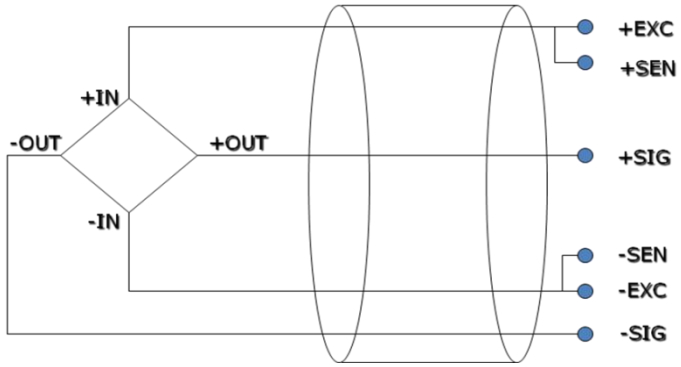


2) Connect to Sensor

- Six-wire connection method



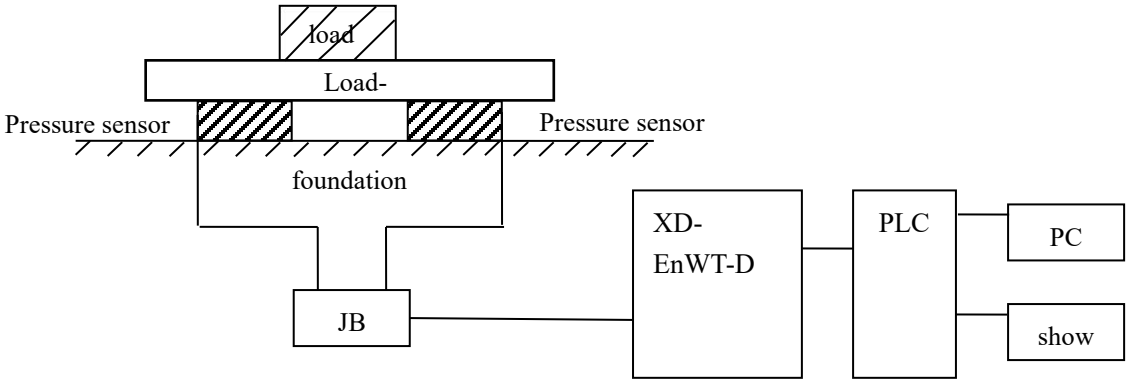
- Four-wire connection method



If the sensor is a four-wire system, short-circuit EXC– to SEN– and EXC+ to SEN+.

6.5.4.Weighing System Composition

A complete industrial weighing system (scale) primarily consists of the following components:



The figure above shows the setup of a weighing system equipped with an XD-EnWT-D module.

Name	Explain
Load-Bearing Component	Load-bearing components are used to support the load to be weighed; these include platforms, hoppers, aerial handling vehicles, containers, and so on.
Pressure Sensor	A pressure sensor is a measuring device that converts a physical quantity (i.e., weight) into a proportional electrical signal.
Assembling Components	Assembly components ensure the proper operation of the weighing sensor; assembly and guiding components prevent overloading, as overloading can lead to measurement errors or damage the weighing sensor. Overloading is caused by a force (lateral force) acting in a direction not intended by the design of the weighing sensor's spring.
Connecting Box	The junction box (JB) is used to combine the signal lines from multiple parallelly connected load cells.
XD-EnWT-D	The XD-EnWT-D module can be used as an electronic evaluation device that captures signals from a pressure sensor and performs further analysis.

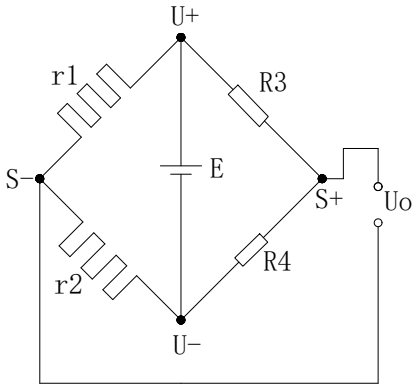
6.5.5.Module Function Description

The XD-EnWT-D n-channel pressure measurement module provides the following functions:

- Pressure sensor calibration
- Pressure sensor signal acquisition
- Weight value calculation
- -20 to 20 mV voltage signal detection

Pressure Sensor Introduction

The pressure sensor operates on the principle of the resistive strain effect. Its schematic diagram is shown below:



R1 and R2 are strain resistors that, together with the two fixed resistors R3 and R4, form a bridge circuit. When the resistance values of R1 and R2 change, the bridge becomes unbalanced, thereby generating an unbalanced voltage Uo as the sensor's output signal.
U+ and U-represent the positive and negative terminals of the sensor power supply, respectively; the power supply can be either the 5 V supply provided by this module or an external power supply.
S+ and S-represent the positive and negative terminals of the sensor's output signal, respectively; connecting this millivolt voltage output signal to this module allows for the measurement of pressure magnitude.

6.5.6.Input/Output Definition Number Allocation

First Expansion Module Register Definition Number

Soft Components	Channel	Address	Explain	Remarks
Output Coil	CH1	Y10000	Filter Level Switching	
		Y10001	Reset	
		Y10002	Zero-point calibration	
		Y10003	Gain calibration	
	CH2	Y10004	Filter Level Switching	
		Y10005	Reset	
		Y10006	Zero-point calibration	
		Y10007	Gain calibration	
	CH3	Y10010	Filter Level Switching	
		Y10011	Reset	
		Y10012	Zero-point calibration	
		Y10013	Gain calibration	
	CH4	Y10014	Filter Level Switching	
		Y10015	Reset	
		Y10016	Zero-point calibration	
		Y10017	Gain calibration	
	ALL	Y10020	Restore to factory settings	
Input Coil	CH1	X10000	Stability Indicator	
		X10001	overflow flag	
		X10002	Calibration Successful Indicator	

Soft Components	Channel	Address	Explain	Remarks
		X10003	Calibration Failure Flag	
		X10020	AD Update Flag	
	CH2	X10004	Stability Indicator	
		X10005	overflow flag	
		X10006	Calibration Successful Indicator	
		X10007	Calibration Failure Flag	
		X10021	AD Update Flag	
	CH3	X10010	Stability Indicator	
		X10011	overflow flag	
		X10012	Calibration Successful Indicator	
		X10013	Calibration Failure Flag	
		X10022	AD Update Flag	
	CH4	X10014	Stability Indicator	
		X10015	overflow flag	
		X10016	Calibration Successful Indicator	
		X10017	Calibration Failure Flag	
		X10023	AD Update Flag	
Input Register	CH1	ID10000	Current weight	double character
		ID10002	Current digital value / Current input voltage	double character
	CH2	ID10004	Current weight	double character
		ID10006	Current digital value / Current input voltage	double character
	CH3	ID10008	Current weight	double character
		ID10010	Current digital value / Current input voltage	double character
	CH4	ID10012	Current weight	double character
		ID10014	Current digital value / Current input voltage	double character

Second Expansion Module Register Definition Number

Soft Components	Channel	Address	Explain	Remarks
Output Coil	CH1	Y10100	Filter Level Switching	
		Y10101	Reset	
		Y10102	Zero-point calibration	
		Y10103	Gain calibration	
	CH2	Y10104	Filter Level Switching	

Soft Components	Channel	Address	Explain	Remarks
		Y10105	Reset	
		Y10106	Zero-point calibration	
		Y10107	Gain calibration	
	CH3	Y10110	Filter Level Switching	
		Y10111	Reset	
		Y10112	Zero-point calibration	
		Y10113	Gain calibration	
	CH4	Y10114	Filter Level Switching	
		Y10115	Reset	
		Y10116	Zero-point calibration	
		Y10117	Gain calibration	
	ALL	Y10120	Restore to factory settings	
Input Coil	CH1	X10100	Stability Indicator	
		X10101	overflow flag	
		X10102	Calibration Successful Indicator	
		X10103	Calibration Failure Flag	
		X10120	AD Update Flag	
	CH2	X10104	Stability Indicator	
		X10105	overflow flag	
		X10106	Calibration Successful Indicator	
		X10107	Calibration Failure Flag	
		X10121	AD Update Flag	
	CH3	X10110	Stability Indicator	
		X10111	overflow flag	
		X10112	Calibration Successful Indicator	
		X10113	Calibration Failure Flag	
		X10122	AD Update Flag	
	CH4	X10114	Stability Indicator	
		X10115	overflow flag	
		X10116	Calibration Successful Indicator	
		X10117	Calibration Failure Flag	
		X10123	AD Update Flag	
Input Register	CH1	ID10100	Current weight	double character
		ID10102	Current digital value / Current input voltage	double character
	CH2	ID10104	Current weight	double character
		ID10106	Current digital value / Current input voltage	double character
	CH3	ID10108	Current weight	double character

Soft Components	Channel	Address	Explain	Remarks
		ID10110	Current digital value / Current input voltage	double character
	CH4	ID10112	Current weight	double character
		ID10114	Current digital value / Current input voltage	double character

。。。。。。

Sixteenth Expansion Module Register Definition Number

Soft Components	Channel	Address	Explain	Remarks
Output Coil	CH1	Y11700	Filter Level Switching	
		Y11701	Reset	
		Y11702	Zero-point calibration	
		Y11703	Gain calibration	
	CH2	Y11704	Filter Level Switching	
		Y11705	Reset	
		Y11706	Zero-point calibration	
		Y11707	Gain calibration	
	CH3	Y11710	Filter Level Switching	
		Y11711	Reset	
		Y11712	Zero-point calibration	
		Y11713	Gain calibration	
	CH4	Y11714	Filter Level Switching	
		Y11715	Reset	
		Y11716	Zero-point calibration	
		Y11717	Gain calibration	
	ALL	Y11720	Restore to factory settings	
Input Coil	CH1	X11700	Stability Indicator	
		X11701	overflow flag	
		X11702	Calibration Successful Indicator	
		X11703	Calibration Failure Flag	
		X11720	AD Update Flag	
	CH2	X11704	Stability Indicator	
		X11705	overflow flag	
		X11706	Calibration Successful Indicator	
		X11707	Calibration Failure Flag	
		X11721	AD Update Flag	
	CH3	X11710	Stability Indicator	
		X11711	overflow flag	
		X11712	Calibration Successful Indicator	

Soft Components	Channel	Address	Explain	Remarks
		X11713	Calibration Failure Flag	
		X11722	AD Update Flag	
	CH4	X11714	Stability Indicator	
		X11715	overflow flag	
		X11716	Calibration Successful Indicator	
		X11717	Calibration Failure Flag	
		X11723	AD Update Flag	
Input Register	CH1	ID11500	Current weight	double character
		ID11502	Current digital value / Current input voltage	double character
	CH2	ID11504	Current weight	double character
		ID11506	Current digital value / Current input voltage	double character
	CH3	ID11508	Current weight	double character
		ID11510	Current digital value / Current input voltage	double character
	CH4	ID11512	Current weight	double character
		ID11514	Current digital value / Current input voltage	double character

XD-E1WT-D contains no CH2–CH4; XD-E2WT-D contains no CH3 or CH4.

Address Information

Parameter Name	Function Declaration
1: Filter Level Switching	ON: Filter Level A; OFF: Filter Level B;
2: Reset	Resetting within the specified range is valid; the zero point is not saved.
3: Zero-point calibration	Used for system zero-point calibration;
4: Gain Calibration	Used for system linearity correction;
5: Stability Indicator	When the stability determination range and stability determination time conditions are satisfied, this signal output becomes effective;
6: Overflow Flag	When the signal voltage exceeds the set range, this signal output becomes active;
7: Calibration Successful Indicator	When zero-point calibration and gain calibration are successful, this signal output becomes valid;
8: Calibration Failure Flag	When zero-point calibration or gain calibration fails, this signal output becomes valid; (For specific reasons, please refer to the module application error

	message.)
9: AD Update Flag	Each AD value acquisition triggers a bit set;
10: Current digital value / Current input voltage	The setting can be configured via the host computer; when switched to the current input voltage, the unit is millivolt (mV) with four decimal places.

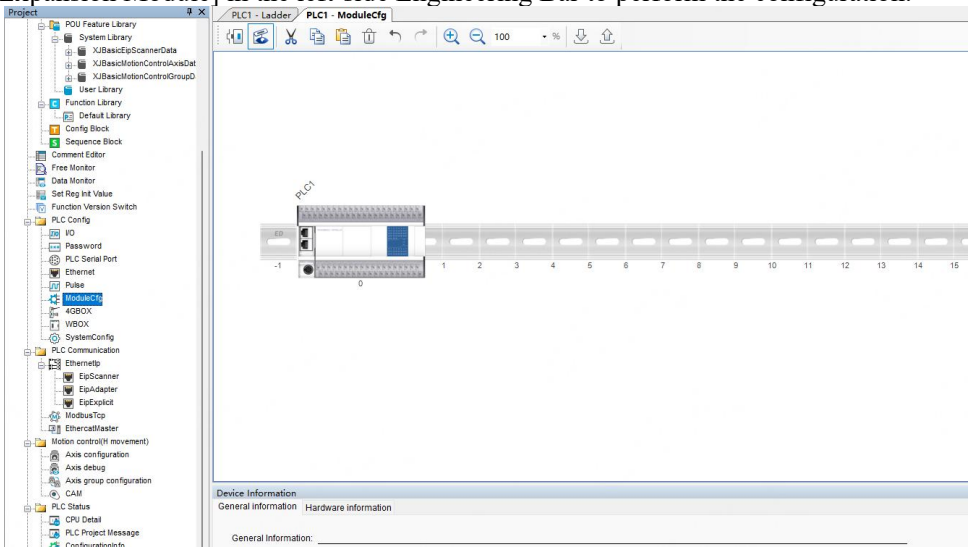
6.5.7.Work Mode Setup

There are two methods for configuring the operating mode (these two methods yield equivalent results).

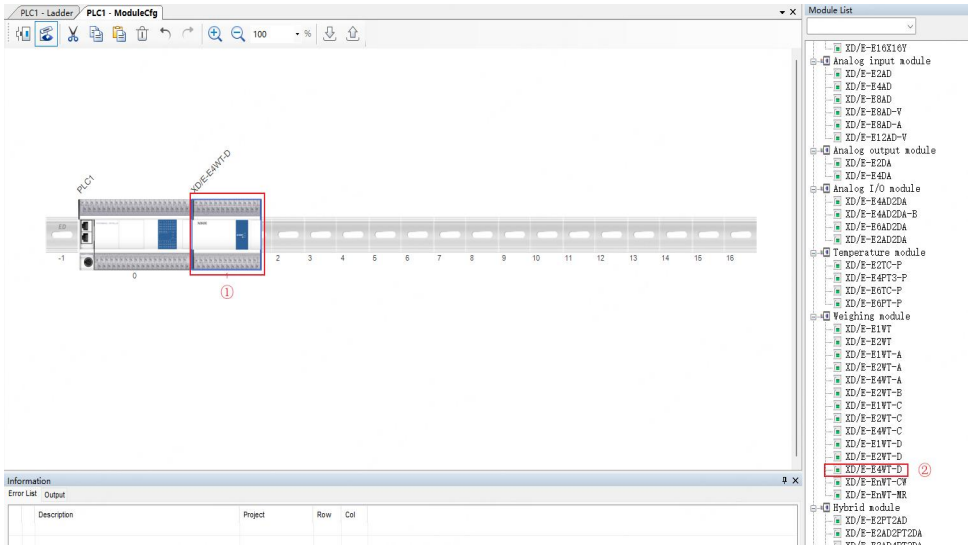
- Configure via Control Panel
- Set via Flash registers

1) Configuration Panel Configuration

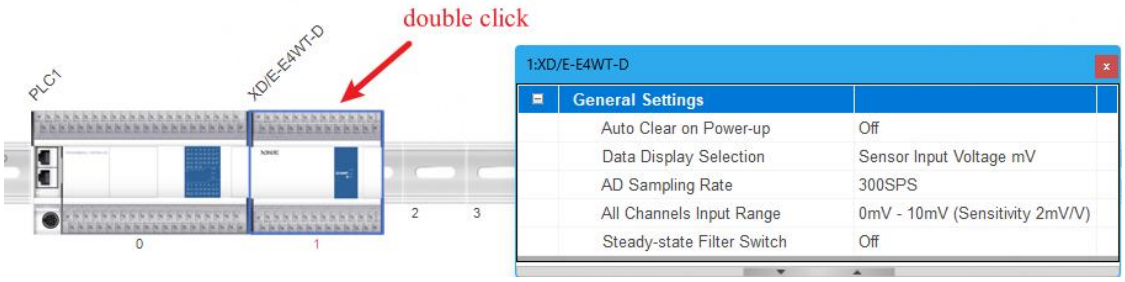
1. Use the XINJE PLC Programming Tool Software version 3.8.0a or later to configure the module; click [PLC Configuration] – [Module Configuration] in the left-side Engineering Bar to open the Expansion Module Settings window. For versions prior to 3.8.0a, click [PLC Configuration] – [Expansion Module] in the left-side Engineering Bar to perform the configuration.



2. Select a module from the right-side module list and drag it to the desired position, or double-click a module in the right-side module list to select it:



3. Double-click the corresponding module icon to access the module configuration interface, where you can configure settings such as automatic power-on reset, data display options, and AD sampling rate.

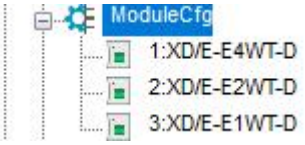


parameter declaration

Parameter Name	Function Declaration
1: Automatic reset upon power-on	When enabled, the module will automatically reset itself every time it is powered on.
2: Data Selection	Configuration switching is available; when switched to the current input voltage, the unit is mV with 4 decimal places;
3: AD sampling rate	Select the AD sampling rate.
4: All channel input range	Supports voltage signal detection ranging from-20 to 20 mV; the measurement range can be selected as required.
5: Steady-state filtering switch	The steady-state filtering switch: when set to OFF, the TO_FROM value can be written as the steady-state filtering coefficient; however, this value is effectively ignored. When set to ON, it is active during steady-state operation.

4. Click "  " to view the default configuration parameters for the Expansion module.

5. After completing the parameter configuration  for the expansion module, click "" to write the set values into the PLC; the changes will take effect only after the PLC is powered off and then powered on again. Under the Module Configuration Node, mount the configured module, then double-click to enter the Module Parameter Configuration screen.



2) Flash Register Configuration

The expansion module allows users to set gear positions and customize the fast sampling frequency; these settings are configured via the SFD (Special FLASH Data Register) within the PLC. As shown below:

Module ID	Configuration Information Address	Module ID	Configuration Information Address
#1	SFD350~SFD359	#9	SFD430~SFD439
#2	SFD360~SFD369	#10	SFD440~SFD449
#3	SFD370~SFD379	#11	SFD450~SFD459
#4	SFD380~SFD389	#12	SFD460~SFD469

#5	SFD390~SFD399	#13	SFD470~SFD479
#6	SFD400~SFD409	#14	SFD480~SFD489
#7	SFD410~SFD419	#15	SFD490~SFD499
#8	SFD420~SFD429	#16	SFD500~SFD509

SFD350–SFD359 Register Specifications

<table>
<tr><th colspan="2">Register</th><th>Bit7</th><th>Bit6</th><th>Bit5</th><th>Bit4</th><th>Bit3</th><th>Bit2</th><th>Bit1</th><th>Bit0</th><th>Explain</th></tr>
<tr><td rowspan="2">SFD350</td><td>Byte0</td><td colspan="4">AD sampling rate
Range: 0–2
Initial value: 1
0: 150 times/second
1,300 times/second
2: 450 times/second</td><td>Steady-state filtering –
Initial value: 0
0: Off | 1: On</td><td></td><td>Sampling Data Mode
Initial value: 0
0: Sensor input voltage (mV)
1: AD sampling digital value</td><td>Power-on automatic reset
Initial value: 0
0: Off
1: Turn on</td><td rowspan="3">All Channels</td></tr>
<tr><td>Byte1</td><td colspan="8">All channel input range:
0x00:0–10 mV (Default)
0x01：0-5mv
0x02：0-15mv
0x03：0-20mv
0x08：-10-10mv
0x09：-5-5mv
0x0A：-15-15mv
0x0B：-20-20mv</td></tr>
<tr><td colspan="2">SFD351~SFD359</td><td colspan="8">Keep</td></tr>
</table>

6.5.8.Module Configuration

1) Module Parameter List

Address	Content	Explain		Attribute	Explanatory Note
K0	Zero-Point Tracking Range	Range: 0–99 Initial value: 5	All Channels	Word R/W	When the weight value fluctuates within the K0 range (centered at zero) for a duration of K1 seconds, the fluctuating value within this range is not recorded, and the weight value is displayed as 0.
K1	Zero-point tracking time	Range: 10–5000 (ms) Initial value: 2000		Word R/W	
K2	Zeroing Range	Range: 1–99 (%) Initial value: 50		Word R/W	The reset operation is permitted within the parameter range defined by the maximum measurement range.
K3	Stability Range	Range: 1–99 Initial value: 3		Word R/W	When the difference between the current weight value and the previous weight value falls within the K3 range and remains within the K4 time period, the current weight value is considered to have stabilized.
K4	Steady-state time	Range: 10 − 5000 (ms) Initial value: 100		Word R/W	
K5	Filter Level A	Range: 0–34 Initial value: 3		Word R/W	/
K6	Filtering Level B	Range: 0–34 Initial value: 5		Word R/W	/
K8	Steady-state filtering coefficient	Range: 0–34 Initial value: 0		Word R/W	/
K9	Keep				
K10	Gain calibration relative digital return value	Gain calibration digital quantity − Zero calibration digital quantity	CH1	Dword R	/
K12	Gain calibration weight value	Gain calibration weight value		Dword R/W	/
K14	CH1 Minimum Scale Division	Range: 1, 2, 5, 10,20,50		Word R/W	/

Address	Content	Explain		Attribute	Explanatory Note
K15	CH1 Maximum Range	Range: ≤ Division × 500,000		Dword R/W	/
K20	Gain calibration relative digital return value	Gain calibration digital quantity − Zero calibration digital quantity	CH2	Dword R	
K22	Gain calibration weight value	Gain calibration weight value		Dword R/W	
K24	CH2 Minimum Scale Division	Range: 1, 2, 5, 10,20,50		Word R/W	
K25	CH2 Maximum Range	Range: ≤ Division × 500,000		Dword R/W	
K27	Keep				
K30	Gain calibration relative digital return value	Gain calibration digital quantity − Zero calibration digital quantity	CH3	Dword R	
K32	Gain calibration weight value	Gain calibration weight value		Dword R/W	
K34	CH3 minimum scale division	Range: 1, 2, 5, 10,20,50		Word R/W	
K35	CH3 maximum range	Range: ≤ Division × 500,000		Dword R/W	
K37	Keep				
K40	Gain calibration relative	Gain calibration digital quantity −	CH4	Dword R	

Address	Content	Explain		Attribute	Explanatory Note
	digital return value	Zero calibration digital quantity			
K42	Gain calibration weight value	Gain calibration weight value		Dword R/W	
K44	CH4 minimum scale division	Range: 1, 2, 5, 10,20,50		Word R/W	
K45	CH4 maximum range	Range: ≤ Division × 500,000		Dword R/W	
K47	Keep				

2) Weighing Unit Setting

Take Module 1, Channel 1 as an example:

In the PLC program, the weight of the object is written using the To instruction. For example, if the weight of the object is 1 kg and the unit precision is required to be in kilograms, then the value 1 is written; if the unit precision is required to be in grams, then the value 1000 is written; and if the unit precision is required to be to the nearest 0.1 gram, then the value 10000 is written. This satisfies the formula: Resolution = 1 kg / Written Value.

3) Calibration

Whenever the sensor is replaced, the pressure sensor must be recalibrated.

Take Module 1, Channel 1 as an example:

1. Verify whether the module and sensor are functioning correctly;
   Judgment Method:
   ① Check whether the overflow flag X10001 is in the OFF state; if it is ON, this indicates that the sensor is not properly connected or is damaged;
   ② Use the host computer software to monitor whether the ID10002 output value fluctuates upward or downward according to the sensor readings (the magnitude of the fluctuation depends on the sensor's measurement range); if the output value increases as the load pressure increases, or decreases as the load pressure increases, this indicates: ① The sensor is installed incorrectly – reposition the sensor or swap the positive and negative terminals of the sensor's output signal; ② The input voltage signal has exceeded its allowable range – appropriately reduce the load.
2. Set the pressure sensor to no-load condition; when the stabilization indicator X10000 is set to ON, initiate the zero-point calibration function Y10002. Setting X10002 to ON indicates a successful zero-point calibration; if, after waiting for a few seconds, X10003 is set to ON, it indicates a failed zero-point calibration.

3. Place a load of known weight on the scale body and write the corresponding weight using the To command. When the stability flag X10000 is set to ON, conduct the gain calibration Y10003. When X10002 is set to ON, it indicates successful calibration. Close Y10003. If X10003 is ON after waiting for a few seconds, it indicates a failed gain calibration;
4. The calibration is now complete. During weighing, the module automatically calculates and applies the necessary adjustments based on the collected no-load and calibration values, and finally displays the correct weighing result.

6.5.9.Module Error Message

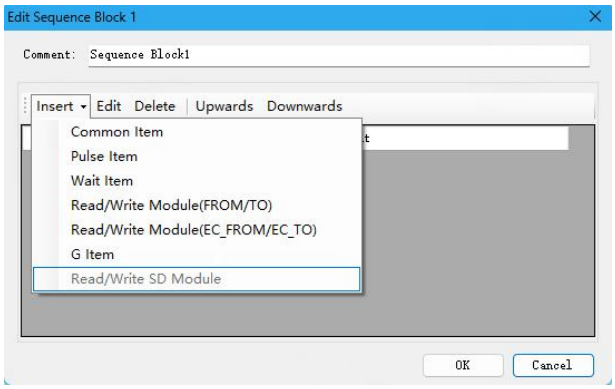
Severe application error (corresponds to the high 8 bits of the Body Register Address SD503)

Error Code			Meaning
Binary System	Hexadecimal	Decimal System	
0000 0001	0x01	1	Unconnected 24V supply
0000 0010	0x02	2	Configuration not completed within 5 seconds
0000 0011	0x03	3	Inconsistent module models
0000 0100	0x04	4	Communication anomaly with the PLC unit

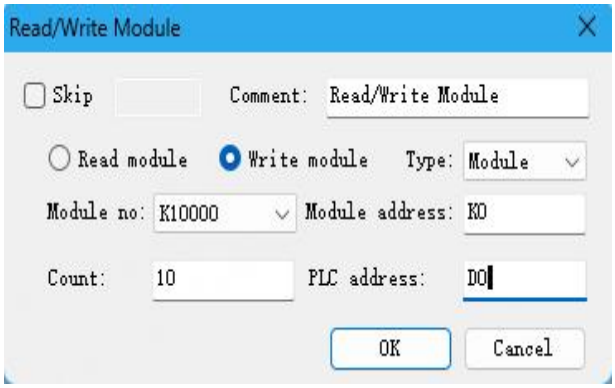
How to use this error code: Write the module number to the SD500; to view the error code for the first module, write "10000".

6.5.10. From/To Command Usage Instructions

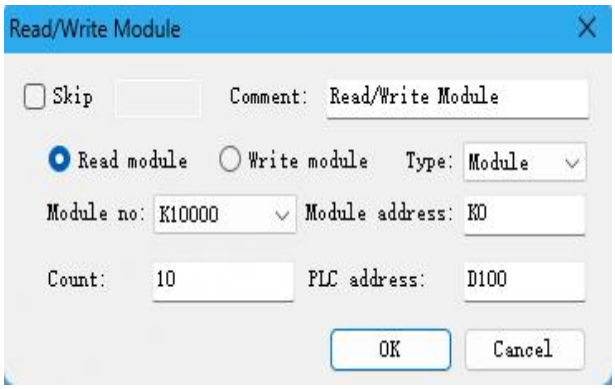
Reading and writing operations for the XD-EnWT-D module must be performed using the FROM/TO instruction within the BLOCK Sequential Function Block, as shown in the figure below:



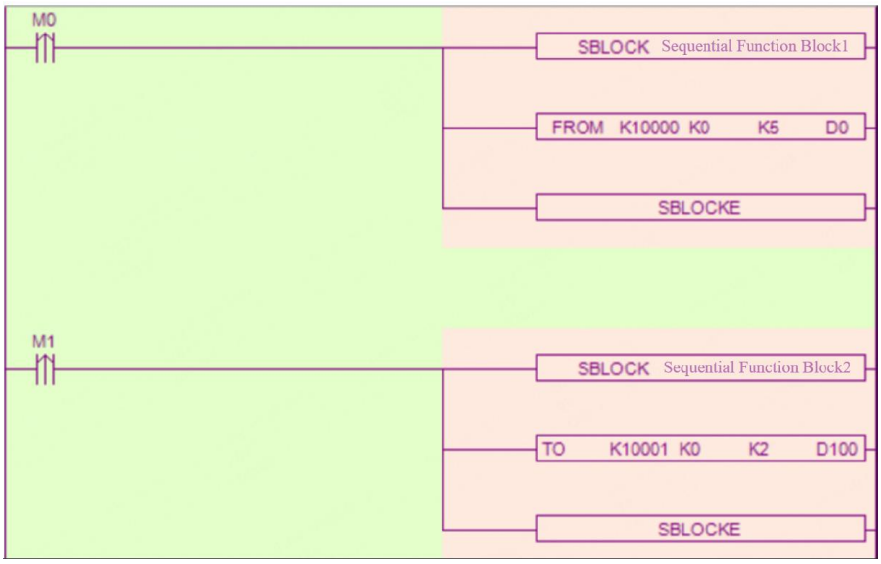
(a) Insert "Read/Write Module (FROM/TO)"



(b) Writing Module



(c)Read Through Model

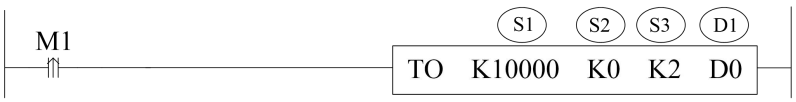


(d) Convert to a Ladder Diagram

Instruction parse

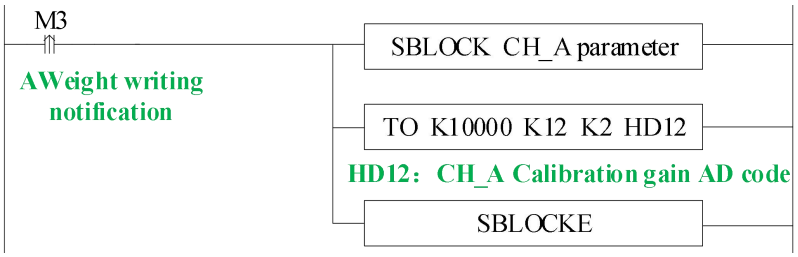
- Write Module Instruction: TO

Write the specified register data to the designated module address, using a byte as the operation unit.



Operand	Function	Available Operands
S1	Target Module Number – Range: 10000–10015.	K、TD，CD，D，HD，FD
S2	Write the starting address of the module.	K、TD，CD，D，HD，FD
S3	Number of registers to write to (number of words).	K、TD，CD，D，HD，FD
D1	The starting address of the register where written data is stored within the device.	TD，CD，D，HD，FD

For example: Write the weight value to the first channel of the first module.



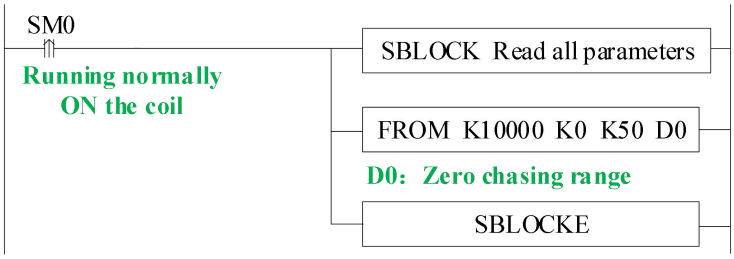
- Read module instruction: FROM

Read data from the specified module address into the designated register of the device, using a byte as the operation unit.



Operand	Function	Available Operands
S1	Target Module Number – Range: 10000–10015.	K、TD，CD，D，HD，FD
S2	Read the starting address of the module.	K、TD，CD，D，HD，FD
S3	Number of registers to read (number of words).	K、TD，CD，D，HD，FD
D1	The body receives the starting address of the register.	TD，CD，D，HD，FD

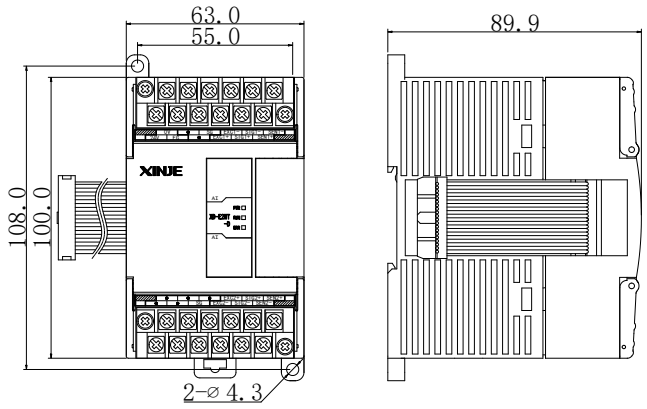
For example: Read all parameters of the first module.



- The FROM/TO instruction can only be written within a BLOCK sequential function block; for XD series PLCs with firmware version below V3.4.5, a maximum of 8 BLOCK function blocks are permitted; for XD/XL series PLCs with firmware version V3.4.5 or later, a maximum of 100 BLOCKs can be written into the program, but only up to 8 can be executed simultaneously.
- The module starting number begins at K10000; Module #1 is K10000, Module #2 is K10001, and so on; Module #16 is K10015.

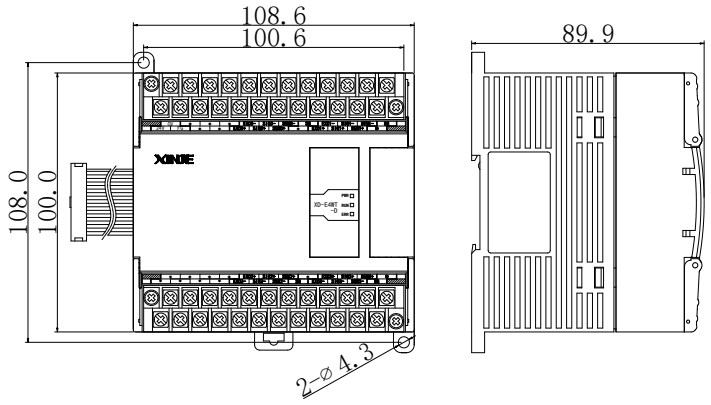
6.5.11. External Dimensions Diagram

unit:mm



Applicable Modules

pressure measurement
XD-E1WT-D
XD-E2WT-D



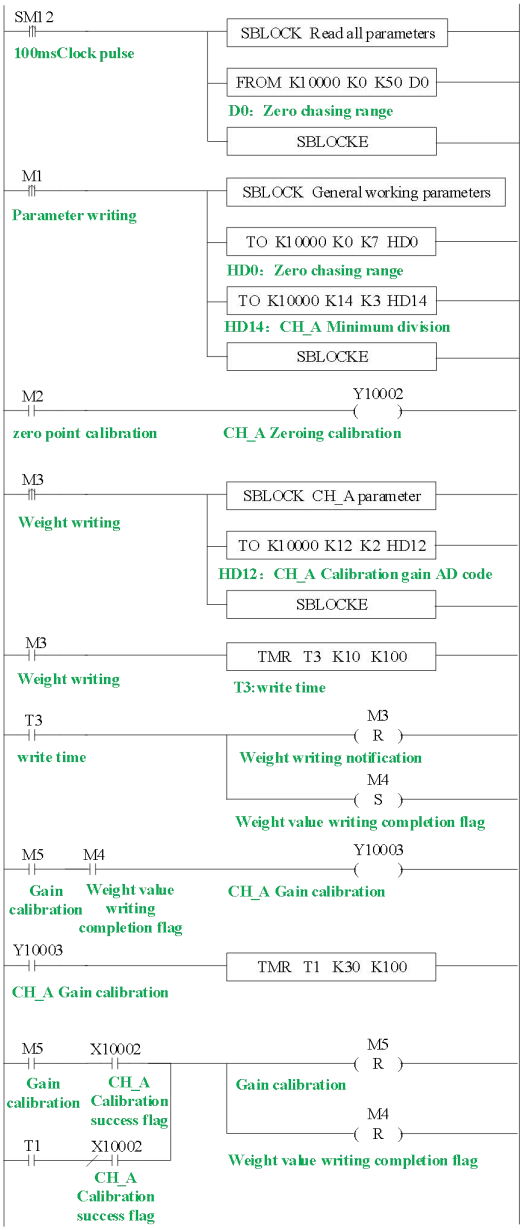
Applicable Modules

pressure measurement
XD-E4WT-D

6.5.12. Programming Example

Example: Take Module #1, Channel 1 as an example:

procedure:



description:

Read all parameters and write general operating parameters using the FORM/TO command;

Set M1 to write all parameters to Channel 1;

Zero-point calibration: Set M2 and perform zero-point calibration; if the calibration is successful, set X10002 to ON;

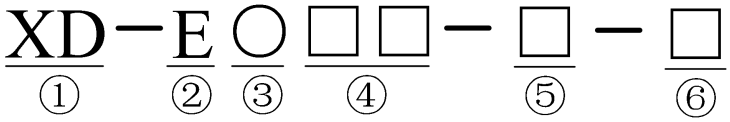
Gain calibration: Before performing gain calibration, first write the weight value, set M3, and then write the HD12 weight value into the module. After the write operation is successful, turn ON the completion flag M4 before proceeding with the gain calibration; set M5 to initiate the gain calibration process with a preset stabilization time of 3 seconds – wait until the weighing platform stabilizes. If the gain calibration is successful, turn ON X10002 or wait until calibration time T1 expires; then reset M4 and M5 – the gain calibration is now complete.

7. Temperature Control Module

7.1. Temperature Control Module Overview

XD Series Temperature Control Module – supports 2–6 temperature control channels.

7.1.1.Naming Rule



①	Series Name	XD: XD Series Expansion Modules
②	Reference Expansion Module	E: Represents an expansion module
③	Number of input channels	2, 4, or 6
④	Incoming Signal	PT: Indicates a two-wire thermal resistance signal PT3: Indicates a three-wire thermal resistance signal TC: Represents a thermocouple signal
⑤	PID control	P: Indicates support for PID control
⑥	Is isolation required?	H: Indicates isolated processing for each channel

7.1.2.Model List

Model		Description
Temperature Control	XD-E6PT-P	6-channel thermal resistance temperature measurement module supporting Pt100 and Pt1000 platinum resistance thermistors, with a resolution of 0.1°C and PID regulation functionality.
	XD-E4PT3-P	4-channel thermal resistance (three-wire) temperature measurement module supporting Pt100 and Pt1000 platinum resistance thermistors, with a resolution of 0.1°C and PID regulation functionality.

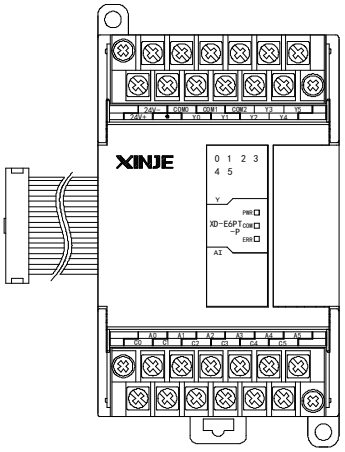
Model		Description
	XD-E6TC-P	6-channel thermocouple temperature measurement module supporting K, S, E, N, B, T, J, and R type thermocouples; resolution: 0.1℃; features PID regulation.
	XD-E6TC-P-H	6-channel thermocouple temperature measurement module supporting K, S, E, N, B, J, and R type thermocouples; resolution: 0.1℃; features PID regulation; each channel is isolated.
	XD-E2TC-P	2-channel thermocouple temperature measurement module supporting K, S, E, N, B, T, J, and R type thermocouples; resolution: 0.1℃; features PID regulation.

7.1.3.General Requirements

Project	Specifications
Service Environment	Non-corrosive gases
Ambient Temperature	0~60℃
Maintain Ambient Temperature	-20~70℃
Ambient Humidity	5~95%RH
Maintain Ambient Humidity	5~95%RH
Install	Can be secured with M3 screws or installed directly onto a DIN46277 (35 mm wide) guide rail.

7.2. 6 Channel, Dual-Wire Thermal Resistance Temperature Control Module XD-E6PT-P

7.2.1.Module Features and Specifications



The XD-E6PT-P Temperature PID Control Module processes six thermal resistance temperature signals and transmits them to the PLC main unit.

1) Module Features

- Second-tier platinum resistance thermometer input; calibration scales: Pt100 and Pt1000.
- 6-channel input, 6-channel output, 6 independent PID parameters, with auto-tuning functionality supported.
- 1 mA constant-current output, unaffected by external environmental changes.
- Resolution accuracy: 0.1°C.
- As specialized functional modules for the XD series, the XD3/XD3E can support up to 10 additional modules when connected to the right side of the PLC main unit; the XD5/XDM/XDC/XD5E/XDME/XDH can support up to 16 additional modules; however, the XD1/XD2 do not support the addition of any modules.

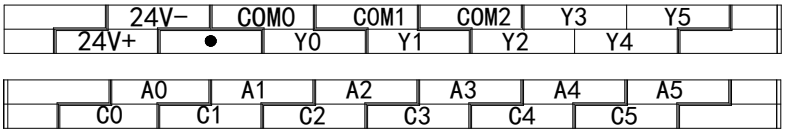
2) Module Specifications

Project	Content
Analog Input Signal	Pt100, Pt1000 platinum resistance temperature detectors
Temperature Measurement Range	-100.0℃ ~ 500.0℃
Digital Output Range	-1000 ~ 5000
Resolution Ratio	0.1℃
Overall Accuracy	±0.5% (relative maximum value)
Conversion Rate	480ms/6 channel
Module Power Supply	DC24V±10%，50mA

When the module is in an abnormal state, the ID1xxxx register will display a corresponding abnormality value; even if line break detection is disabled in the module configuration, an abnormality value will still be displayed. The abnormality values for different types of alarms are as follows:

- When the 24V power supply is disconnected, the data for all channels is-2.
- The thermal resistance temperature control module: when no sensor is connected, its channel data corresponds to the maximum digital output value (5000).
- When the sensor signal falls below the lower limit of the measurement range, the channel data corresponds to the minimum value of the digital output range (-1000).
- When the sensor signal exceeds the upper limit of the measurement range, the channel data corresponds to the maximum value of the digital output range (5000).
- When both sensor wire breakage and 24V power supply wire breakage occur simultaneously, an abnormality indicator (-2) indicating a 24V power supply wire breakage is displayed.

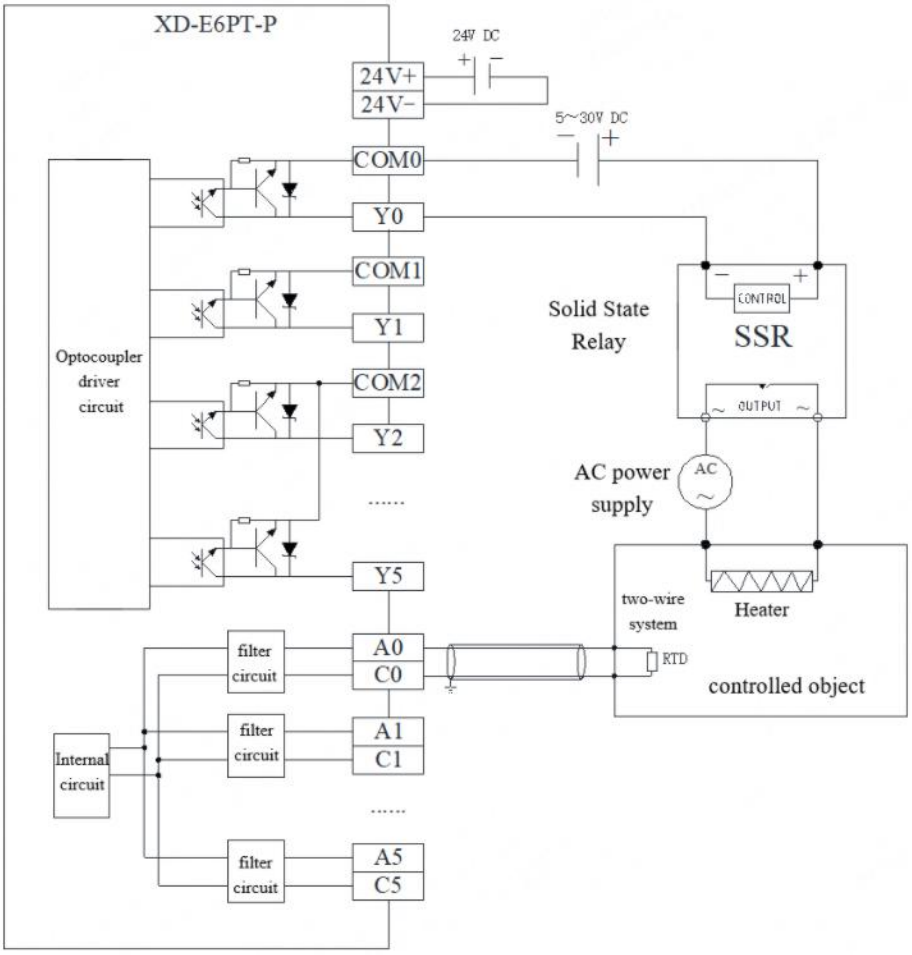
7.2.2.Terminal Specifications



Channel	Terminal	Signal Name
Power Supply Terminal	24V+	External 24V power supply (positive
	24V-	External 24V power supply (negative terminal) for the module
CH0	A0	CH0 thermal resistance input terminal
	C0	CH0 thermal resistance input common
CH1	A1	CH1 thermal resistance input terminal
	C1	CH1 thermal resistance input common
CH2	A2	CH2 thermal resistance input terminal
	C2	CH2 thermal resistance input common
CH3	A3	CH3 thermal resistance input terminal
	C3	CH3 thermal resistance input common
CH4	A4	CH4 thermal resistance input terminal
	C4	CH4 thermal resistor common input
CH5	A5	CH5 thermal resistance input terminal
	C5	CH5 thermal resistance input common
Output Terminal	COM0	CH0 Output Common Terminal
	Y0	CH0 Output Terminal
	COM1	CH1 Output Common Terminal
	Y1	CH1 Output Terminal
	COM2	CH2−CH5 output common terminal
	Y2	CH2 Output Terminal

Channel	Terminal	Signal Name
	Y3	CH3 output terminal
	Y4	CH4 output terminal
	Y5	CH5 Output Terminal

7.2.3.Input/Output Wiring Example



- For a two-wire platinum thermistor, connect the two leads of the sensor to terminal A and terminal C respectively, without distinguishing between positive and negative.
- For a three-wire platinum resistance thermometer, connect two leads of the same color to terminal C, and connect the remaining lead to terminal A.
- Output terminal: Transistor-output terminal; please use a smooth DC 5V–30V power supply.
- Circuit insulation: The internal circuits of the programmable logic controller and its output transistors are optically isolated using optical couplers; additionally, each individual module is isolated from the others.
- Response time: The time from the programmable logic controller driving (or breaking) the optocoupler to the transistor turning on/off shall not exceed 0.2 ms.
- Output current: To limit temperature rise, a maximum output load of 50 mA is supported.
- Open-circuit leakage current: below 0.1 mA.

- When connecting an external 24V power supply, please use the 24V power supply built into the PLC unit to avoid interference.
- The housing of the device where the temperature sensor is installed must be grounded.
- To prevent interference, the temperature sensor should be connected using a shielded cable with the shield grounded at a single point.
- "The maximum output current supports an output load of 50 mA" means that, whether point Y is used as a standard digital output point or as an output for a PID control function, the maximum output load is always 50 mA.

7.2.4.Input/Output Definition Number Allocation

The XD series analog input modules do not occupy any I/O units; the converted values are directly written into the PLC registers. The definition numbers for the PLC registers corresponding to each channel are as follows:

Relevant Parameter	Explain				
	Module ID	CH0	CH1	. . . . .	CH5
Temperature Display Value (Unit: 0.1°C)	Module 1	ID10000	ID10001	ID1000x	ID10005
	Module 2	ID10100	ID10101	ID1010x	ID10105
	.....	ID1xx00	ID1xx01	ID1xx0x	ID1xx05
	Module 16	ID11500	ID11501	ID1150x	ID11505
Enable Channel Signal (0: Off; 1: On)	Module 1	Y10000	Y10001	Y1000x	Y10005
	Module 2	Y10100	Y10101	Y1010x	Y10105
	.....	Y1xx00	Y1xx01	Y1xx0x	Y1xx05
	Module 16	Y11700	Y11701	Y1170x	Y11705
	When the "Y Function Selection" is set to "Immediate Output," Y0−Y5 represent standard digital output terminals; the Y10000−Y10005 (using Module #1 as an example) can be used to directly control the Y0−Y5 outputs on the module. When the "Y Function Selection" is set to "Channel Enable," Y0−Y5 serve as PID output terminals; the corresponding channel's PID control can be enabled using Y10000−Y10005 (for example, using Module #1), and the Y0−Y5 outputs on the module are controlled by automatic PID calculations.				
PID Contact Output	Module 1	X10000	X10001	X1000x	X10005
	Module 2	X10100	X10101	X1010x	X10105
	.....	X1xx00	X1xx01	X1xx0x	X1xx05
	Module 16	X11700	X11701	X1170x	X11705

Relevant Parameter	Explain				
	Module ID	CH0	CH1	. . . . .	CH5
(Return the X input to the subject)	When the "Y Function Selection" is set to "Channel Enable," Y10000−Y10005 (taking Module #1 as an example) represent the PID enable bits; the PID duty cycle output should be monitored against X10000−X10005 (taking Module #1 as an example).				
Channel fault/power supply detection (0: Connected; 1: Broken connection)	Module 1	X10010	X10011	X1001x	X10015
	Module 2	X10110	X10111	X1011x	X10115
	.....	X1xx10	X1xx11	X1xx1x	X1xx15
	Module 16	X11710	X11711	X1171x	X11715
PID auto-tuning error (0: Normal; 1: Self-tuning parameter error)	Module 1	X10020	X10021	X1002x	X10025
	Module 2	X10120	X10121	X1012x	X10125
	.....	X1xx20	X1xx21	X1xx2x	X1xx25
	Module 16	X11720	X11721	X1172x	X11725

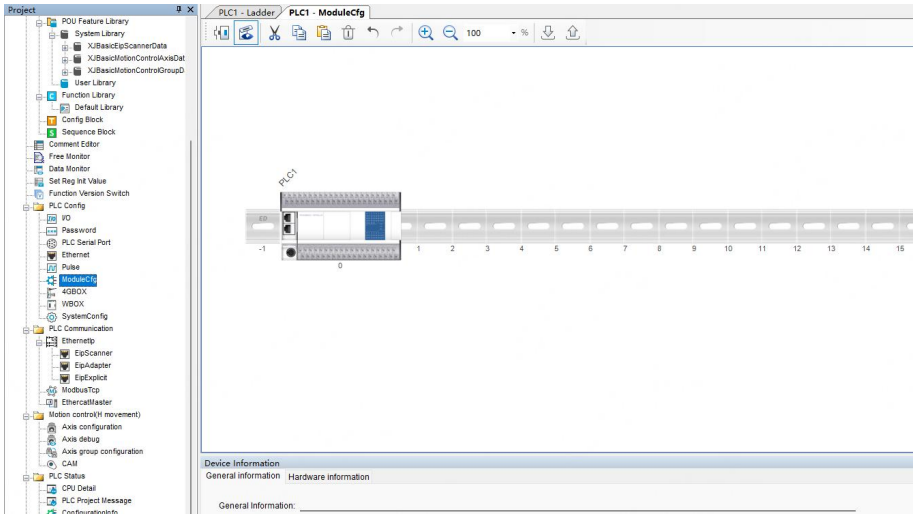
7.2.5.Work Mode Setup

There are two methods available for configuring the operating mode (these two methods yield equivalent results):

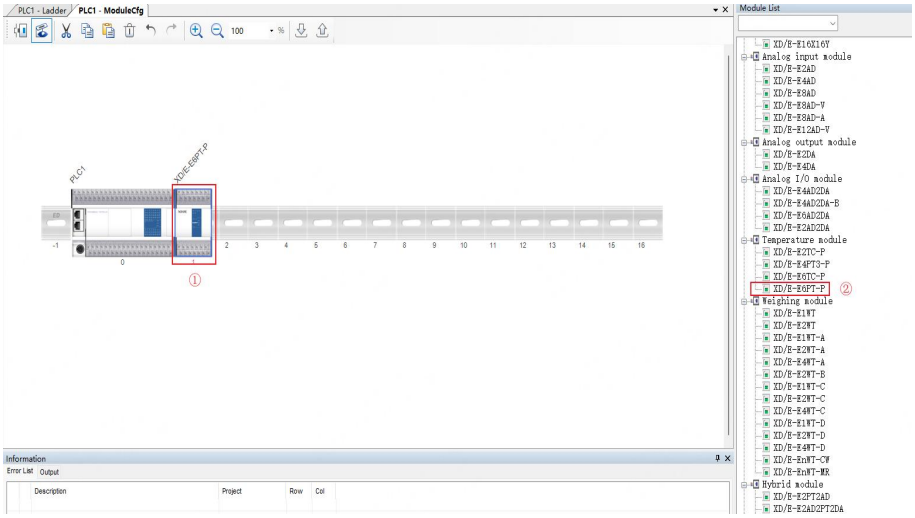
- Configure via the Settings Panel
- Set via Flash register (SFD)

1) Configuration Panel Configuration

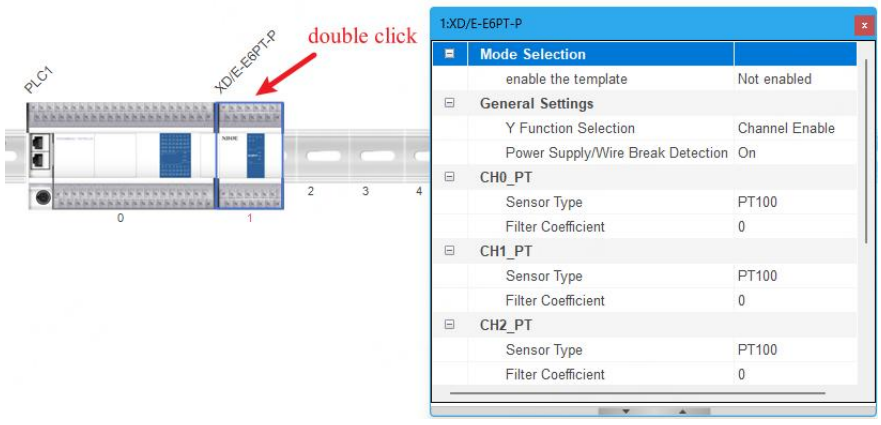
1. Use the XINJE PLC Programming Tool Software version 3.8.0a or later to configure the module; click [PLC Configuration] − [Module Configuration] in the left-side Engineering Bar to open the Expansion Module Settings window. For versions prior to 3.8.0a, click [PLC Configuration] − [Expansion Module] in the left-side Engineering Bar to perform the configuration.



2. Select a module from the right-side module list and drag it to the desired position, or double-click a module in the right-side module list to select it:

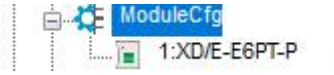


3. Double-click the corresponding module icon to access the module configuration interface, where you can select the sensor type, filtering coefficient, line-break detection switch, and Y-function selection for the respective channel.



4. Click "" to view the default configuration parameters for the Expansion module.

5. After completing the parameter configuration  for the expansion module, click "" to write the set values into the PLC; the changes will take effect only after the PLC is powered off and then powered on again. Under the Module Configuration Node, mount the configured module, then double-click to enter the Module Parameter Configuration screen.



- The temperature input channel employs a first-order low-pass filtering method, where the current sample value is weighted against the previous filtered output value to obtain the effective filtered value; the filtering coefficient can be set by the user between 0 and 254 – a lower value results in more stable data but may introduce data lag; a value of 1 corresponds to the strongest filtering effect, while a value of 254 corresponds to the weakest filtering effect; the default value is 0 (no filtering).
- The "Y Function Selection" setting is used to specify the function for modules Y10000–Y10005 (e.g., Module #1); by default, this setting is set to "Channel Enable," which enables the module's built-in PID control functionality. When this setting is configured as "Immediate Output," the output points Y0–Y5 on the module serve as standard digital output points, while the module retains only its temperature acquisition functionality; for temperature control applications, please use the PID instruction on the PLC main unit.



- PT1000 sensor type – supported only by firmware version V103 or later for temperature modules; must be used in conjunction with XDPPro software version V3.7.16 or later for configuration.
- Module 24V power supply detection function – supported only on temperature modules with firmware version V104 or later.

2) Flash Register Configuration

The CH0–CH5 expansion module channels allow the configuration of sensor type, filtering coefficient, and Y function selection; these settings are made using the SFD (Special FLASH Data Register) within the PLC. As shown below:

Module ID	Configuration Information Address	Module ID	Configuration Information Address
#1	SFD350~SFD359	#9	SFD430~SFD439
#2	SFD360~SFD369	#10	SFD440~SFD449
#3	SFD370~SFD379	#11	SFD450~SFD459
#4	SFD380~SFD389	#12	SFD460~SFD469
#5	SFD390~SFD399	#13	SFD470~SFD479
#6	SFD400~SFD409	#14	SFD480~SFD489
#7	SFD410~SFD419	#15	SFD490~SFD499
#8	SFD420~SFD429	#16	SFD500~SFD509

3) SFD Bit Definition

Using the First Module as an example to illustrate the setup method:

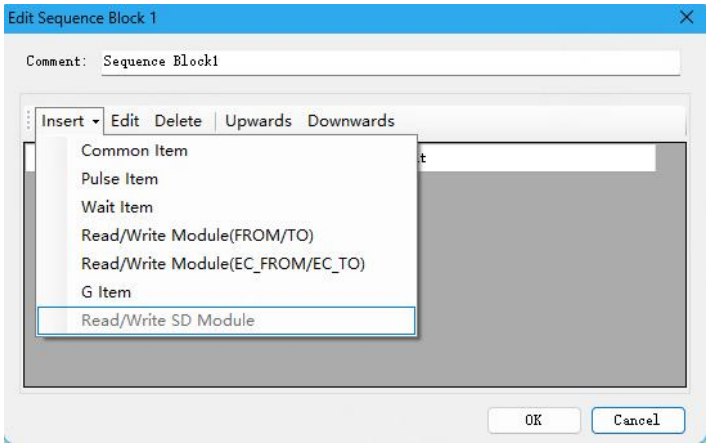
Register		Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
SFD350	Byte0	PT1 filtering coefficient (0 − no filtering; 1−254 − filtering intensity decreases sequentially; default: 0)							
	Byte1	PT2 filtering coefficient (0 − no filtering; 1−254 − filtering intensity decreases sequentially; default: 0)							
SFD351	Byte2	PT3 filtering coefficient (0 − no filtering; 1−254 − filtering intensity decreases sequentially; default: 0)							
	Byte3	PT4 filtering coefficient (0 − no filtering; 1−254 − filtering intensity decreases sequentially; default: 0)							
SFD352	Byte4	PT5 filtering coefficient (0 − no filtering; 1−254 − filtering intensity decreases sequentially; default: 0)							
	Byte5	PT6 filtering coefficient (0 − no filtering; 1−254 − filtering intensity decreases sequentially; default: 0)							
SFD353	Byte6	Save							
	Byte7	Save							
SFD354	Byte8	-				PT Channel Fault/Power Supply Detection Switch 00:00 − Start 01: Close		YFS 00: Channel Enable 01: Output Immediately	
	Byte9	-				-			
SFD355	Byte10	PT2 Sensor Type				PT1 Sensor Type			
		0000：PT 100 0001：PT 1000				0000：PT 100 0001：PT 1000			
	Byte11	PT4 Sensor Type				PT3 Sensor Type			
		0000：PT 100 0001：PT 1000				0000：PT 100 0001：PT 1000			
SFD356	Byte12	PT6 Sensor Type				PT5 Sensor Type			
		0000：PT 100 0001：PT 1000				0000：PT 100 0001：PT 1000			

	Byte13	-	-
SFD357~SFD359		Save	

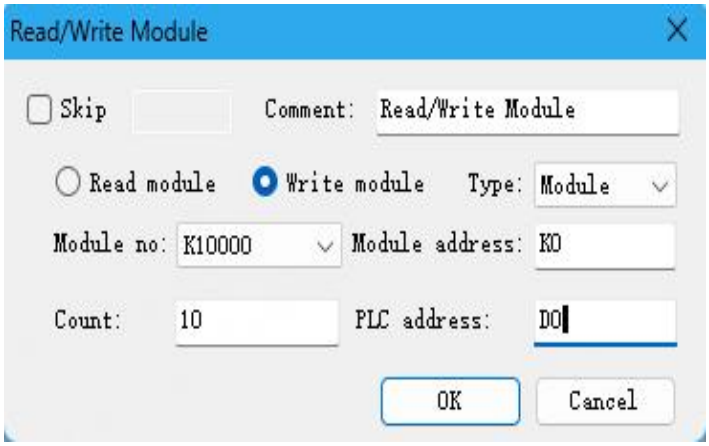
7.2.6.From/To Command Usage Instructions

1) Instruction Manual

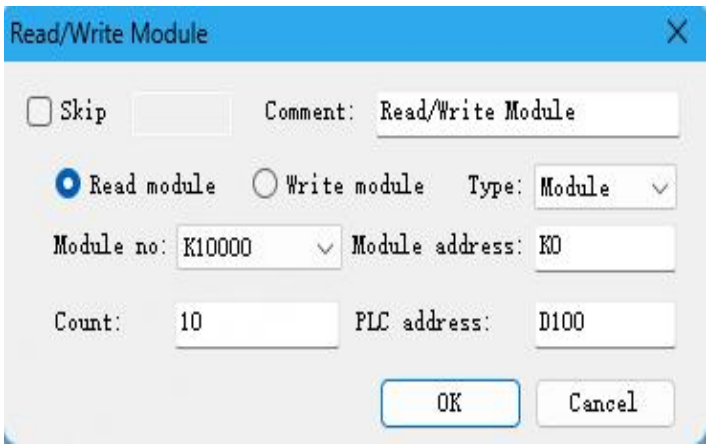
Reading and writing operations for the thermal resistance temperature control module must be performed using the FROM/TO instruction within the BLOCK Sequential Function Block, as shown in the figure below:



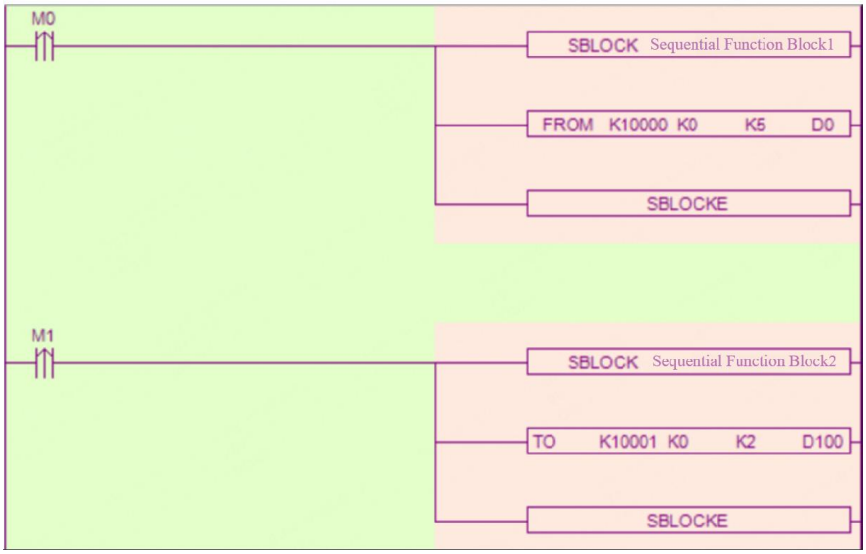
(a) Insert "Read/Write Module (FROM/TO)"



(b) Writing Module



(c)Read Through Model

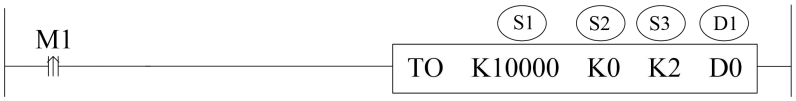


(d) Convert to a Ladder Diagram

Instruction parse

- Write Module Instruction: TO

Write the specified register data to the designated module address, using a byte as the operation unit.



Operand	Function	Available Operands
S1	Target Module Number – Range: 10000–10015.	K、TD，CD，D，HD，FD
S2	Write the starting address of the module.	K、TD，CD，D，HD，FD
S3	Number of registers to write to (number of words).	K、TD，CD，D，HD，FD
D1	The starting address of the register where written data is stored within the device.	TD，CD，D，HD，FD

- Read module instruction: FROM

Read data from the specified module address into the designated register of the device, using a byte as the operation unit.



Operand	Function	Available Operands
S1	Target Module Number − Range: 10000−10015.	K、TD，CD，D，HD，FD
S2	Read the starting address of the module.	K、TD，CD，D，HD，FD
S3	Number of registers to read (number of words).	K、TD，CD，D，HD，FD
D1	The body receives the starting address of the register.	TD，CD，D，HD，FD



- The FROM/TO instruction can only be written within a BLOCK sequential function block; for XD series PLCs with firmware version below V3.4.5, a maximum of 8 BLOCK function blocks are permitted; for XD/XL series PLCs with firmware version V3.4.5 or later, a maximum of 100 BLOCKs can be written into the program, but only up to 8 can be executed simultaneously.
- The module starting number begins at K10000; Module #1 is K10000, Module #2 is K10001, and so on; Module #16 is K10015.

2) Related Address Definition

During the use of this module, operations involving the reading and writing of relevant parameters are performed; the following provides an explanation of the address arrangement:

From_To Data		initial value	CH1	CH2	CH3	CH4	CH5	CH6	R/W
Auto-tuning Enable		0	K0	K0	K0	K0	K0	K0	RW
PID output value (0−4095)		-	K1	K2	K3	K4	K5	K6	R
Temperature setpoint (unit: 0.1℃)		0	K7	K8	K9	K10	K11	K12	RW
PIDparameter	Kp	40	K13	K17	K21	K25	K29	K33	RW
	Ki	240	K14	K18	K22	K26	K30	K34	RW
	Kd	60	K15	K19	K23	K27	K31	K35	RW
	Diff (Unit: 0.1℃)	1000	K16	K20	K24	K28	K32	K36	RW
Temperature control cycle (Unit: 0.1 s)		20	K37	K38	K39	K40	K41	K42	RW

Output amplitude (Range: 0–100)	100	K43	K44	K45	K46	K47	K48	RW
Temperature deviation value δ (unit: 0.1°C)	0	K49	K50	K51	K52	K53	K54	RW
Calibrate ambient temperature value (Unit: 0.1°C)	-	K55	K56	K57	K58	K59	K60	W
From/To data initialization	-	K61	K61	K61	K61	K61	K61	W

From/To Parameter Description

Relevant Parameter	Explain
Auto-tuning Enable	Self-tuning enable signal: when set to 1, the system enters the self-tuning phase. Upon completion of the self-tuning process, the PID parameter values and the temperature control cycle value are updated, and the enable bit is automatically cleared to 0. The user can also read the status; a value of 1 indicates that the self-tuning process is in progress, while a value of 0 indicates that the self-tuning process has not yet begun or has already been completed. The self-tuning method employs the critical oscillation technique.
PID output value (0～4095)	When the PID output is used for analog control (e.g., steam valve opening degree or thyristor conduction angle), this value can be transmitted to an analog output module to fulfill the control requirements.
Temperature setpoint (Unit: 0.1°C)	The target temperature value for the control system. The setpoint range is-1000 to 5000, i.e., -100.0 to 500.0°C.
PID parameter (P、I、D)	The optimal parameter values can be determined using PID self-tuning. If the current PID control does not adequately meet the control requirements, the user may directly input empirical PID parameters; the module will then perform PID control based on the PID parameters set by the user.
PID operation range (Diff) (Unit: 0.1°C)	Let: the operating range be T_{diff}, the setpoint temperature be T_{set}, and the displayed temperature be T. When $T_{set}-T_{diff} \le T \le T_{set}+T_{diff}$, the output is controlled by a PID controller. When T ≤ T_set − T_diff, the output is set to its maximum value. When $T_{set}+T_{diff} \le T$, the output is 0.
Temperature Control Cycle (Unit: 0.1 s)	The control cycle adjustment range is 0.1s to 200s, with a minimum accuracy of 0.1s. The written value is the actual temperature control cycle value multiplied by 10; for example, writing 5 corresponds to an actual temperature control cycle of 0.5s.

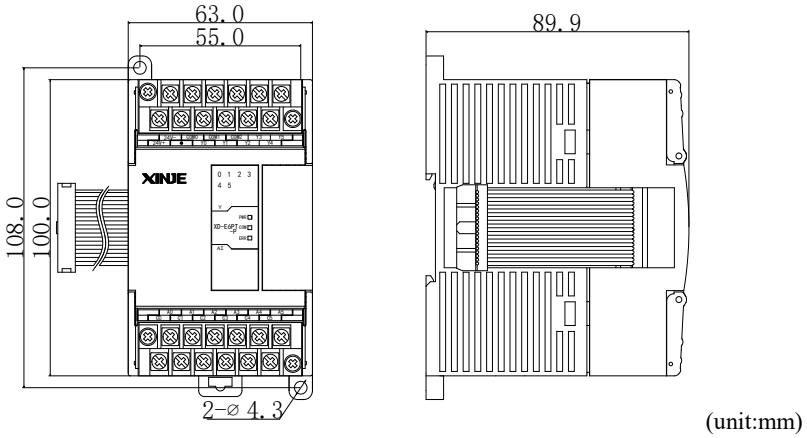
Relevant Parameter	Explain
output amplitude	The PID calculation output amplitude is expressed in%; a value of 100 corresponds to 100% of the full-scale output, while a value of 80 corresponds to 80% of the full-scale output. Note: When set to 0, the PID controller will produce no output.
Temperature deviation value δ (Unit: 0.1°C)	Temperature display value = (Sampling temperature value + Temperature deviation value δ) / 10. This parameter is a signed integer with a unit of 0.1°C; it represents the power-off hold value, with a default value of 0. The setpoint range is-40.0°C to 40.0°C.
Calibrate ambient temperature value (Unit: 0.1°C)	When the user determines that the ambient temperature value does not match the temperature value displayed on the module's channel, they can write the known ambient temperature value into this parameter. At the moment of writing, the module calculates the temperature deviation value δ and stores it. Calculate the temperature deviation value δ = calibrated ambient temperature value − sampling temperature value. Unit: 0.1°C. For example: Under thermal equilibrium conditions, the user measures the ambient temperature using a mercury thermometer and obtains a reading of 60.0°C; however, the displayed temperature at that moment is 55.0°C (corresponding to a sampling temperature of 55.0°C), resulting in a temperature deviation δ = 0. At this point, the user writes the value 600 into this parameter; the temperature deviation δ is then recalculated as 50 (5°C). Consequently, the displayed temperature = (sampling temperature value + temperature deviation δ) / 10 = 60°C. **Note:** When entering the calibration temperature value, ensure that it matches the ambient temperature. This data is critical; any input error could lead to a significant calculation error in the temperature deviation value (δ), which in turn would affect the displayed temperature.
From/To Data Initialization	This function restores the parameters in the aforementioned table to their factory settings; when using this function, set K61 to 1 − setting it to any other value will have no effect. The Automatic Tuning Enable function cannot be initialized; it will revert to its default value only after the tuning process is completed or after the device is powered on again.

- When the "Y Function Selection" is set to "Immediate Output", only the 'Temperature Deviation Value δ' and 'Calibrated Ambient Temperature Value' among the above parameters are valid; all other parameters are inactive.
- The module can automatically save the set temperature value, PID parameters, temperature control cycle, output amplitude, temperature deviation, and temperature calibration parameters, with the saved values retained even during power outages. When writing these parameters, use rising-edge-triggered writing; avoid continuous writing operations. It is recommended to write only the parameters that are actually needed; for programming convenience, writing data to the entire chip is not advised, as setting certain addresses to zero may prevent the system from operating correctly.
- Self-tuning enable address K0: The K0 address occupies a contiguous 8-bit address space; the 6-channel module enable bit corresponds to the first 6 bits of this address space, while the last 2 bits remain unused (but cannot be repurposed). When the read/write enable bit is active, K0 may refer to either a coil or a register; if it refers to a coil, the coil serves as the starting address for occupying a contiguous 8-bit segment; if it refers to a register, the entire register is occupied.

  For example, if you want to set the first and third channels of the module to Auto-Tuning Mode and the remaining four channels to Manual PID Mode, and the command is "To K10000 K0 K1 M10," then set M10 and M12 to ON and set M11, M13, M14, and M15 to OFF; if the command is "To K10000 K0 K1 D100," then assign a value of 5 to D100.

The "From/To Data Initialization" feature requires a module firmware version of V102 or later.

7.2.7.Outline Dimensional Drawing

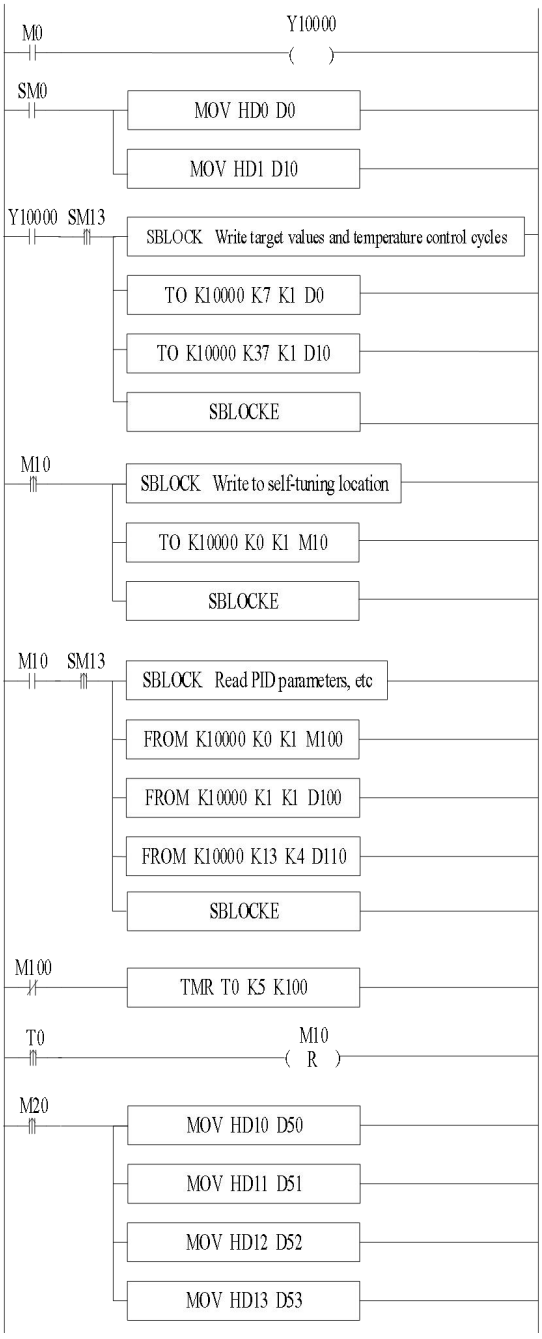


(unit:mm)

7.2.8.Programming Example

Example: Take Module #1 as an example, and apply PID control to its CH0.

procedure:



// Enable PID bit

// Set target value (unit: 0.1℃)

// Set temperature control cycle (unit: 0.1 seconds)

// Schedule the target value and temperature control cycle; can be modified in real time.

// Write the self-tuning startup flag

// Periodically read the setpoint and PID parameters

// Read entire position

// Read PID output value

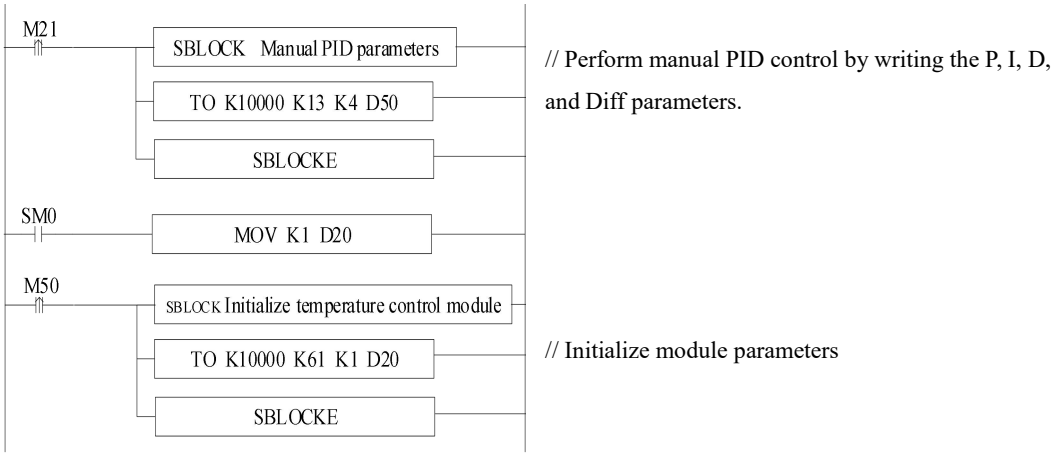
// Read P, I, D, and DIFF parameters

// After the automatic tuning has been reset for 0.5s, reset the automatic tuning start flag.

// Set P-value

// Set I value

// Set D-value



description:

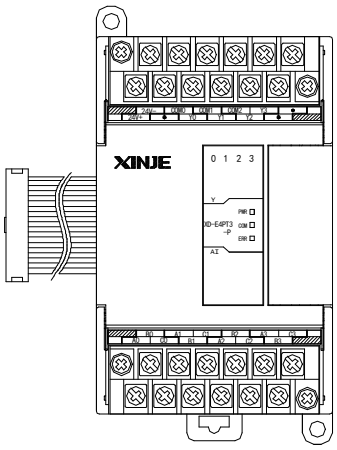
- When the Auto-Tuning Enable function is activated, this command immediately occupies eight bits (M10–M17); M10–M15 correspond to the auto-tuning enable settings for each channel respectively. To enable tuning for a specific channel, simply set the corresponding coil to ON. M16 and M17 currently have no assigned function and should remain unset.
- If the output is a solid-state relay, the recommended temperature control cycle is 1–3s; if the output is a traditional relay, the recommended temperature control cycle is 3–15s.
- Due to differing unit systems, the PID parameters for the main unit and the module PID parameters cannot be directly interchangeable. The main unit's PID parameters are denoted in uppercase letters, while the module's PID parameters are denoted in lowercase letters. The specific conversion relationships are as follows: p = P/100; i = I/10; d = D/100.

Soft components function:

M0	Enable PID control
SM0	Set target values and temperature control cycle
M10	Write Self-Positioning
M20	Set manual P, I, and D parameters
M21	Enter the P, I, and D parameters manually.
M10	Reads the setpoint, PID parameters, and PID output value.
M50	Initialization Module
Y10000	Channel 0 PID enable bit
D0	Set target value
D10	Temperature Control Cycle
D50	P
D51	I
D52	D
D53	DIFF

7.3. 4 Channel, 3 Wire Resistance Temperature Sensor Control Module XD-E4PT3-P

7.3.1.Module Features and Specifications



The XD-E4PT3-P Temperature PID Control Module processes four thermal resistance temperature signals and transmits them to the PLC main unit.

1) Module Features

- Three-wire platinum resistance thermometer input; calibration scales: Pt100 and Pt1000.
- 4-channel input, 4-channel output, 4 independent PID parameters, with auto-tuning functionality supported.
- 1 mA constant-current output, unaffected by external environmental changes.
- Resolution accuracy: 0.1°C.
- As specialized functional modules for the XD series, the XD3/XD3E can support up to 10 additional modules when connected to the right side of the PLC main unit; the XD5/XDM/XDC/XD5E/XDME/XDH can support up to 16 additional modules; however, the XD1/XD2 do not support the addition of any modules.

2) Module Specifications

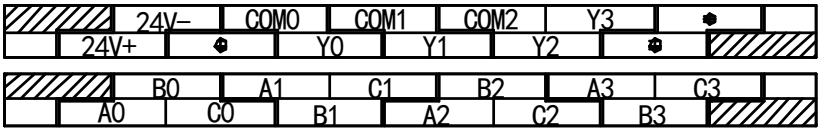
Project	Content
Analog Input Signal	Pt100, Pt1000 platinum resistance temperature detectors
Temperature Measurement Range	-100.0℃ ~ 500.0℃
Digital Output Range	-1000 ~ 5000
Resolution Ratio	0.1℃
Overall Accuracy	±0.5% (relative maximum value)
Conversion Rate	450ms/4 channel

Module Power Supply	DC24V±10%，50mA

When the module is in an abnormal state, the ID1xxxx register will display a corresponding abnormality value; even if line break detection is disabled in the module configuration, an abnormality value will still be displayed. The abnormality values for different types of alarms are as follows:

- When the 24V power supply is disconnected, the data for all channels is-2.
- The thermal resistance temperature control module: when no sensor is connected, its channel data corresponds to the maximum digital output value (5000).
- When the sensor signal falls below the lower limit of the measurement range, the channel data corresponds to the minimum value of the digital output range (-1000).
- When the sensor signal exceeds the upper limit of the measurement range, the channel data corresponds to the maximum value of the digital output range (5000).
- When both sensor wire breakage and 24V power supply wire breakage occur simultaneously, an abnormality indicator (-2) indicating a 24V power supply wire breakage is displayed.

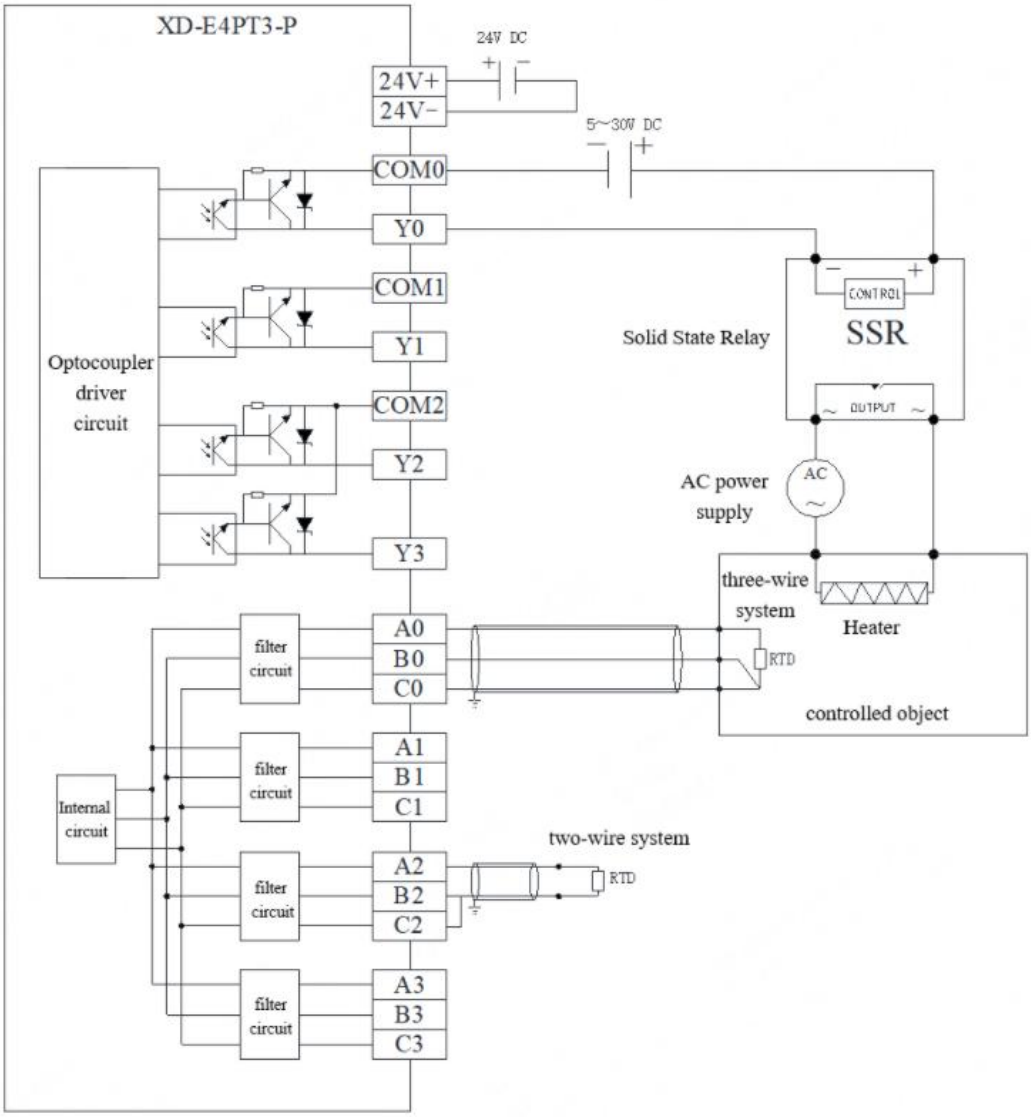
7.3.2.Terminal Specifications



Channel	Terminal Name	Function
Terminals for Power Supplies	24V+	External 24V power supply (positive terminal) for the module
	24V-	External 24V power supply (negative terminal) for the module
CH0	A0	CH0 thermal resistance input terminal
	B0	CH0 thermal resistance input common terminal
	C0	CH0 thermal resistance input common terminal
CH1	A1	CH1 thermal resistance input terminal
	B1	CH1 thermal resistance input common terminal
	C1	CH1 thermal resistance input common terminal
CH2	A2	CH2 thermal resistance input terminal
	B2	CH2 thermal resistance input common terminal
	C2	CH2 thermal resistance input common terminal
CH3	A3	CH3 thermal resistance input terminal

	B3	CH3 thermal resistance input common terminal
	C3	CH3 thermal resistance input common terminal
Leading-Out Terminal	COM0	CH0 Output Common Terminal
	Y0	CH0 Output Terminal
	COM1	CH1 Output Common Terminal
	Y1	CH1 Output Terminal
	COM2	CH2, CH3 common output terminal
	Y2	CH2 Output Terminal
	Y3	CH3 output terminal

7.3.3.Input/Output Wiring Example



- For a two-wire thermal resistance sensor, connect one end of the sensor to Terminal A and the other end to Terminal C; then short-circuit Terminal B and Terminal C using a wire.

- For a three-wire thermal resistance sensor, connect two wires of the same color as the sensor to terminals B and C, respectively; connect the remaining wire to terminal A.
- Output terminal: Transistor-output terminal; please use a smooth DC 5V–30V power supply.
- Circuit insulation: The internal circuits of the programmable logic controller and its output transistors are optically isolated using optical couplers; additionally, each individual module is isolated from the others.
- Response time: The time from the programmable logic controller driving (or breaking) the optocoupler to the transistor turning on/off shall not exceed 0.2 ms.
- Output current: To limit temperature rise, a maximum output load of 50 mA is supported.
- Open-circuit leakage current: below 0.1 mA.



- When connecting an external 24V power supply, please use the 24V power supply built into the PLC unit to avoid interference.
- The housing of the device where the temperature sensor is installed must be grounded.
- To prevent interference, the temperature sensor should be connected using a shielded cable with the shield grounded at a single point.
- "The maximum output current supports an output load of 50 mA" means that, whether point Y is used as a standard digital output point or as an output for the PID control function, the maximum output load is always 50 mA.

7.3.4.Input/Output Definition Number Allocation

The XD series analog input modules do not occupy any I/O units; the converted values are directly written into the PLC registers. The definition numbers for the PLC registers corresponding to each channel are as follows:

Relevant Parameter	Explain				
	Module ID	CH0	CH1	CH2	CH3
Temperature display (Unit: 0.1°C)	Module 1	ID10000	ID10001	ID10002	ID10003
	Module 2	ID10100	ID10101	ID10102	ID10103
	.....	ID1xx00	ID1xx01	ID1xx02	ID1xx03
	Module 16	ID11500	ID11501	ID11502	ID11503
PID Enable Signal (0: Disabled; 1: Enabled)	Module 1	Y10000	Y10001	Y10002	Y10003
	Module 2	Y10100	Y10101	Y10102	Y10103
	((((((	Y1xx00	Y1xx01	Y1xx02	Y1xx03
	Module 16	Y11700	Y11701	Y11702	Y11703

Relevant Parameter	Explain				
	Module ID	CH0	CH1	CH2	CH3
	When the "Y Function Selection" is set to "Immediate Output," Y0−Y3 represent standard digital output terminals; the Y10000−Y10003 (using Module #1 as an example) can be used to directly control the Y0−Y3 outputs of the module; When the "Y Function Selection" is set to "Channel Enable," Y0−Y3 serve as PID output terminals; the channels corresponding to these can be enabled using Y10000−Y10003 (for example, using Module #1) to activate PID control for those channels; the Y0−Y3 outputs of the module are then controlled by automatic PID calculations.				
PID contact output (X input returning to the main unit)	Module 1	X10000	X10001	X10002	X10003
	Module 2	X10100	X10101	X10102	X10103
	.....	X1xx00	X1xx01	X1xx02	X1xx03
	Module 16	X11700	X11701	X11702	X11703
	When the "Y Function Selection" is set to "Channel Enable," Y10000−Y10003 (taking Module #1 as an example) represent the PID enable bits; the PID duty cycle output should be monitored using X10000−X10003 (taking Module #1 as an example).				
Channel fault/power supply detection (0: Connected; 1: Broken connection)	Module 1	X10010	X10011	X10012	X10013
	Module 2	X10110	X10111	X10112	X10113
	.....	X1xx10	X1xx11	X1xx12	X1xx13
	Module 16	X11710	X11711	X11712	X11713
PID automatic tuning error (0: Normal; 1: Automatic tuning parameter error)	Module 1	X10020	X10021	X10022	X10023
	Module 2	X10120	X10121	X10122	X10123
	.....	X1xx20	X1xx21	X1xx22	X1xx23
	Module 16	X11720	X11721	X11722	X11723

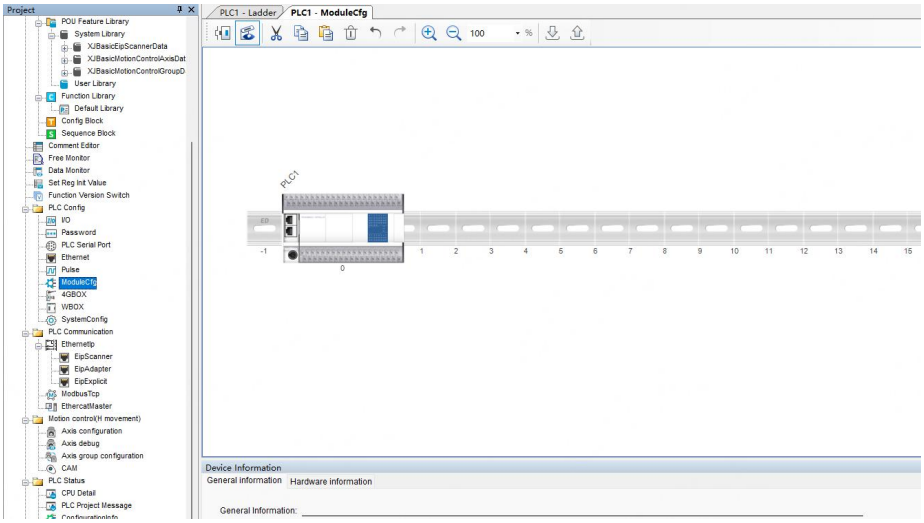
7.3.5.Work Mode Setup

There are two methods available for configuring the operating mode (these two methods yield equivalent results):

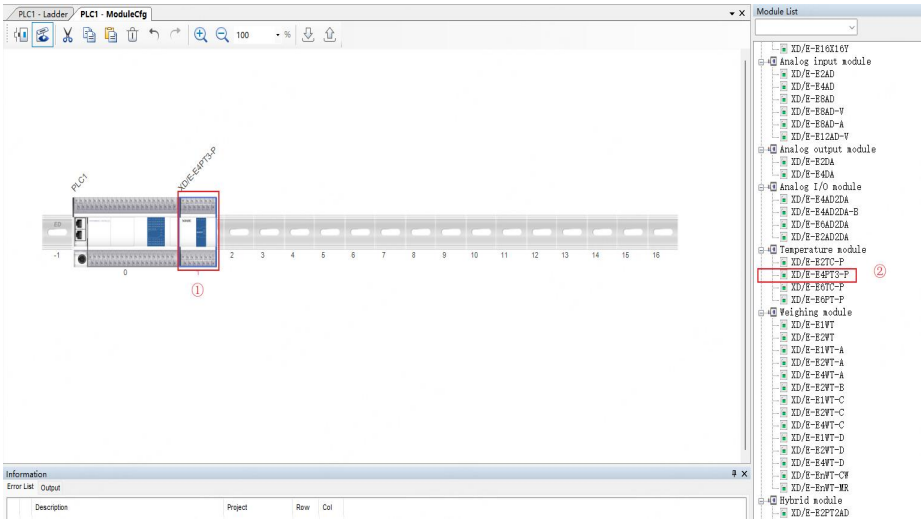
- Configure via the Settings Panel
- Set via Flash register (SFD)

1) Configuration Panel Configuration

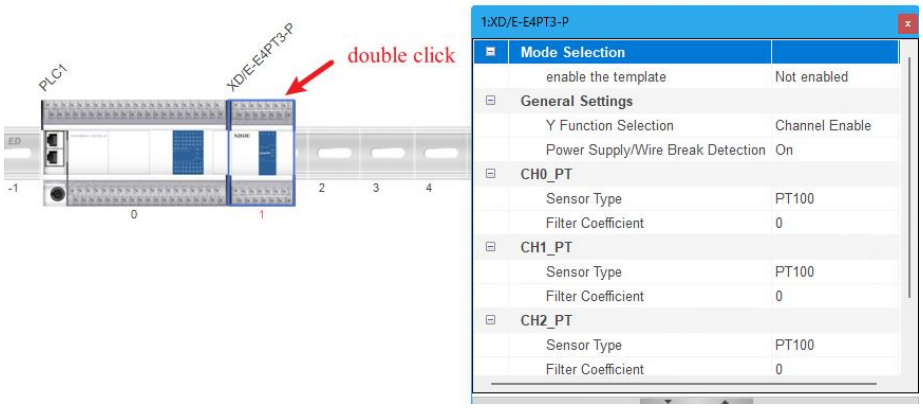
1. Use the XINJE PLC Programming Tool Software version 3.8.0a or later to configure the module; click [PLC Configuration] – [Module Configuration] in the left-side Engineering Bar to open the Expansion Module Settings window. For versions prior to 3.8.0a of the XINJE PLC Programming Tool Software, click [PLC Configuration] – [Expansion Module] in the left-side Engineering Bar to perform the configuration.



2. Select a module from the right-hand module list and drag it to the desired position; alternatively, double-click a module in the right-hand module list to select it:



3. Double-click the corresponding module icon to access the module configuration interface, where you can select the sensor type, filtering coefficient, line-break detection switch, and Y-function selection for the respective channel.



4. Click "" to view the default configuration parameters for the Expansion module.

5. After completing the parameter configuration for the expansion module, click "" to write the set values into the PLC; the changes will take effect only after the PLC is powered off and then powered on again. Under the Module Configuration Node, mount the configured module, then double-click to enter the Module Parameter Configuration screen.



- The temperature input channel employs a first-order low-pass filtering method, where the current sample value is weighted against the previous filtered output value to obtain the effective filtered value; the filtering coefficient can be set by the user between 0 and 254 – a lower value results in more stable data but may introduce data lag; a value of 1 corresponds to the strongest filtering effect, while a value of 254 corresponds to the weakest filtering effect; the default value is 0 (no filtering).
- The "Y Function Selection" setting is used to specify the function for modules Y10000–Y10005 (e.g., Module #1); by default, this setting is set to "Channel Enable," which enables the module's built-in PID control functionality. When this setting is configured as "Immediate Output," the output points Y0–Y5 on the module serve as standard digital output points, while the module retains only its temperature acquisition functionality; for temperature control applications, please use the PID instruction on the PLC main unit.

- PT1000 sensor type – supported only by firmware version V103 or later for temperature modules; must be used in conjunction with XDPPro software version V3.7.16 or later for configuration.
- Module 24V power supply detection function – supported only on temperature modules with firmware version V104 or later.

2) Flash Register Configuration

The CH0–CH3 expansion module channels allow the configuration of sensor type, filtering coefficient, and Y function selection; these settings are made using the SFD (Special FLASH Data Register) within the PLC. As shown below:

Module ID	Configuration Information Address	Module ID	Configuration Information Address
#1	SFD350~SFD359	#9	SFD430~SFD439
#2	SFD360~SFD369	#10	SFD440~SFD449
#3	SFD370~SFD379	#11	SFD450~SFD459
#4	SFD380~SFD389	#12	SFD460~SFD469
#5	SFD390~SFD399	#13	SFD470~SFD479
#6	SFD400~SFD409	#14	SFD480~SFD489
#7	SFD410~SFD419	#15	SFD490~SFD499
#8	SFD420~SFD429	#16	SFD500~SFD509

3) SFD Bit Definition

Using the First Module as an example to illustrate the setup method:

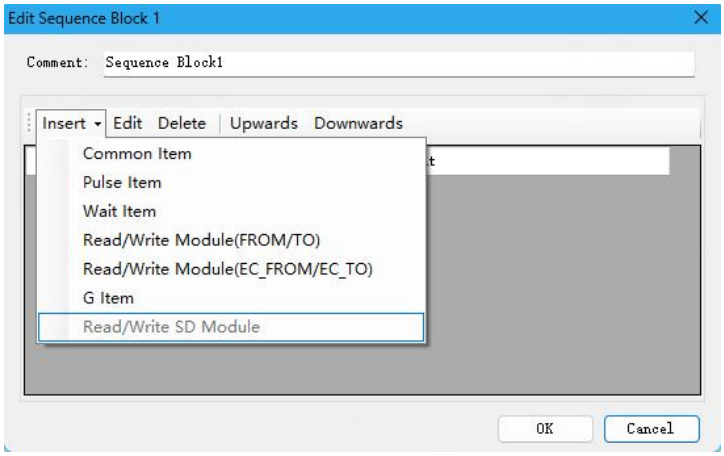
Register		Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
SFD350	Byte0	PT1 filtering coefficient (0 − no filtering; 1−254 − filtering intensity decreases sequentially; default: 0)							
	Byte1	PT2 filtering coefficient (0 − no filtering; 1−254 − filtering intensity decreases sequentially; default: 0)							
SFD351	Byte2	PT3 filtering coefficient (0 − no filtering; 1−254 − filtering intensity decreases sequentially; default: 0)							
	Byte3	PT4 filtering coefficient (0 − no filtering; 1−254 − filtering intensity decreases sequentially; default: 0)							
SFD352	Byte4	Keep							
	Byte5	Keep							
SFD353	Byte6	Keep							
	Byte7	Keep							
SFD354	Byte8	-				PT Channel Fault/Power Supply Detection Switch 00: Open 01: Close		Y Function Selection 00: Channel Enable 01: Output Immediately	
	Byte9	-				-			
SFD355	Byte10	PT2 Sensor Type				PT1 Sensor Type			
	Byte11	0000：PT 100 0001：PT 1000				0000：PT 100 0001：PT 1000			
SFD356	Byte12	PT4 Sensor Type				PT3 Sensor Type			

	Byte13	0000：PT 100 0001：PT 1000	0000：PT 100 0001：PT 1000
SFD357~SFD359		Save	

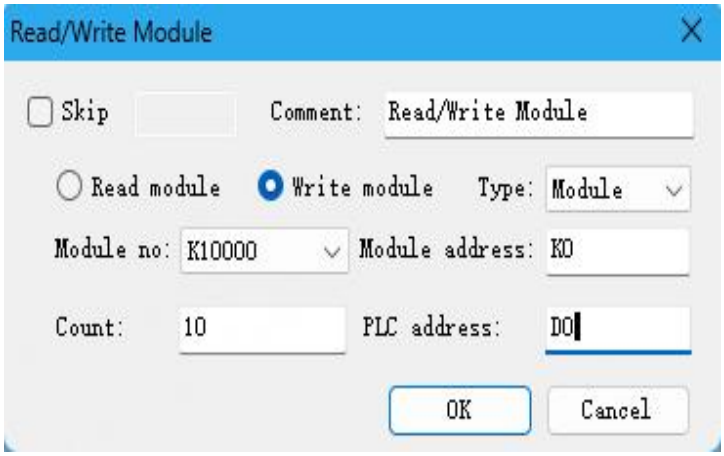
7.3.6.From/To Command Usage Instructions

1) Instruction Manual

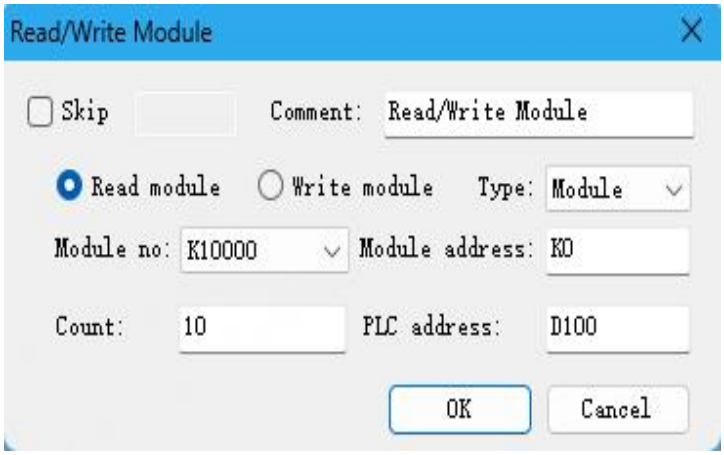
Reading and writing operations for the thermal resistance temperature control module must be performed using the FROM/TO instruction within the BLOCK Sequential Function Block, as shown in the figure below:



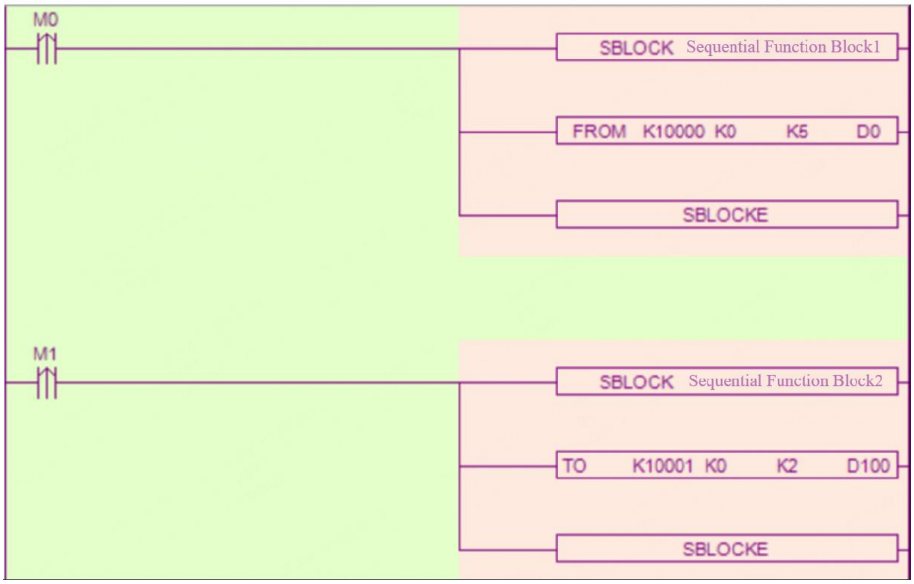
(a) Insert "Read/Write Module (FROM/TO)"



(b) Writing Module



(c)Read Through Model

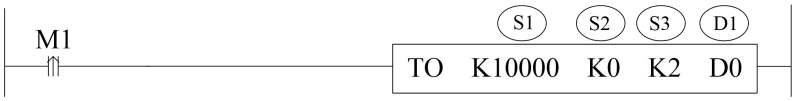


(d) Convert to a Ladder Diagram

Instruction parse

- Write Module Instruction TO

Write the specified register data to the designated module address, using a byte as the operation unit.



Operand	Function	Available Operands
S1	Target Module Number – Range: 10000–10015.	K、TD，CD，D，HD，FD
S2	Write the starting address of the module.	K、TD，CD，D，HD，FD
S3	Number of registers to write to (number of words).	K、TD，CD，D，HD，FD
D1	The starting address of the register where written data is stored within the device.	TD，CD，D，HD，FD

- Read module instruction FROM

Read data from the specified module address into the designated register of the device, using a byte as the operation unit.



Operand	Function	Available Operands
S1	Target Module Number − Range: 10000−10015.	K、TD，CD，D，HD，FD
S2	Read the starting address of the module.	K、TD，CD，D，HD，FD
S3	Number of registers to read (number of words).	K、TD，CD，D，HD，FD
D1	The body receives the starting address of the register.	TD，CD，D，HD，FD



- The FROM/TO instruction can only be written within a BLOCK sequential function block; for XD series PLCs with firmware version below V3.4.5, a maximum of 8 BLOCK function blocks are permitted; for XD/XL series PLCs with firmware version V3.4.5 or later, a maximum of 100 BLOCKs can be written into the program, but only up to 8 can be executed simultaneously.
- The module starting number begins at K10000; Module #1 is K10000, Module #2 is K10001, and so on; Module #16 is K10015.

2) Related Address Definition

During the use of this module, operations involving the reading and writing of relevant parameters are performed; the following provides an explanation of the address arrangement:

From_To Data		initial value	CH1	CH2	CH3	CH4	R/W
Auto-tuning Enable		0	K0	K0	K0	K0	RW
PID output value (0−4095)		-	K1	K2	K3	K4	R
Temperature setpoint (Unit: 0.1°C)		0	K5	K6	K7	K8	RW
PID parameter	Kp	40	K9	K13	K17	K21	RW
	Ki	240	K10	K14	K18	K22	RW
	Kd	60	K11	K15	K19	K23	RW
	Diff (Unit: 0.1°C)	1000	K12	K16	K20	K24	RW
Temperature control cycle (Unit: 0.1 s)		20	K25	K26	K27	K28	RW
Output amplitude (Range: 0−100)		100	K29	K30	K31	K32	RW

Temperature deviation value δ (unit: 0.1℃)	0	K33	K34	K35	K36	RW
Calibrate ambient temperature value (unit: 0.1℃)	-	K37	K38	K39	K40	W
From/To data initialization	-	K41	K41	K41	K41	W

From/To Parameter Description

Relevant Parameter	Explain
Auto-tuning Enable	Self-tuning enable signal: when set to 1, the system enters the self-tuning phase. Upon completion of the self-tuning process, the PID parameter values and the temperature control cycle value are updated, and the enable bit is automatically cleared to 0. The user can also read the status; a value of 1 indicates that the self-tuning process is in progress, while a value of 0 indicates that the self-tuning process has not yet begun or has already been completed. The self-tuning method employs the critical oscillation technique.
PID output value （0～4095）	When the PID output is used for analog control (e.g., steam valve opening degree or thyristor conduction angle), this value can be transmitted to an analog output module to fulfill the control requirements.
Temperature setpoint (Unit: 0.1℃)	The target temperature value for the control system. The setpoint range is-1000 to 5000, i.e., -100.0 to 500.0°C.
PID parameter （P、I、D）	The optimal parameter values can be determined using PID self-tuning. If the current PID control does not adequately meet the control requirements, the user may directly input empirical PID parameters; the module will then perform PID control based on the PID parameters set by the user.
PID operation range （Diff） (Unit: 0.1℃)	Let: the operating range be Tdiff, the setpoint temperature be Tset, and the displayed temperature be T. When Tset–Tdiff ≤ T ≤ Tset+Tdiff, the output is controlled by a PID controller. When T ≤ T_set – T_diff, the output is set to its maximum value. When Tset + Tdiff ≤ T, the output is 0.
Temperature Control Cycle (Unit: 0.1 s)	The control cycle adjustment range is 0.1s to 200s, with a minimum accuracy of 0.1s. The written value is the actual temperature control cycle value multiplied by 10; for example, writing 5 corresponds to an actual temperature control cycle of 0.5s.
Output amplitude	The PID calculation output amplitude is expressed in%; a value of 100 corresponds to 100% of the full-scale output, while a value of 80 corresponds to 80% of the full-scale output.

Relevant Parameter	Explain
	Note: When set to 0, the PID controller will produce no output.
Temperature deviation value δ (Unit: 0.1°C)	Temperature display value = (Sampling temperature value + Temperature deviation value δ) / 10. This parameter is a signed integer with a unit of 0.1°C; it represents the power-off hold value, with a default value of 0. The setpoint range is-40.0°C to 40.0°C.
Calibrate ambient temperature value (Unit: 0.1°C)	When the user determines that the ambient temperature value does not match the temperature value displayed on the module's channel, they can write the known ambient temperature value into this parameter. At the moment of writing, the module calculates the temperature deviation value δ and stores it. Calculate the temperature deviation value δ = calibrated ambient temperature value – sampling temperature value. Unit: 0.1°C. For example: Under thermal equilibrium conditions, the user measures the ambient temperature using a mercury thermometer and obtains a reading of 60.0°C; however, the displayed temperature at that moment is 55.0°C (corresponding to a sampling temperature of 55.0°C), resulting in a temperature deviation δ = 0. At this point, the user writes the value 600 into this parameter; the temperature deviation δ is then recalculated as 50 (5°C). Consequently, the displayed temperature = (sampling temperature value + temperature deviation δ) / 10 = 60°C. **Note:** When entering the calibration temperature value, ensure that it matches the ambient temperature. This data is critical; any input error could lead to a significant calculation error in the temperature deviation value (δ), which in turn would affect the displayed temperature.
From/To Data Initialization	This function resets the parameters in the above table to their factory settings; when using this function, set K41 to 1 – setting it to any other value will have no effect. The Automatic Tuning Enable feature cannot be initialized; it will revert to its default value only after the tuning process is completed or after the device is powered on again.

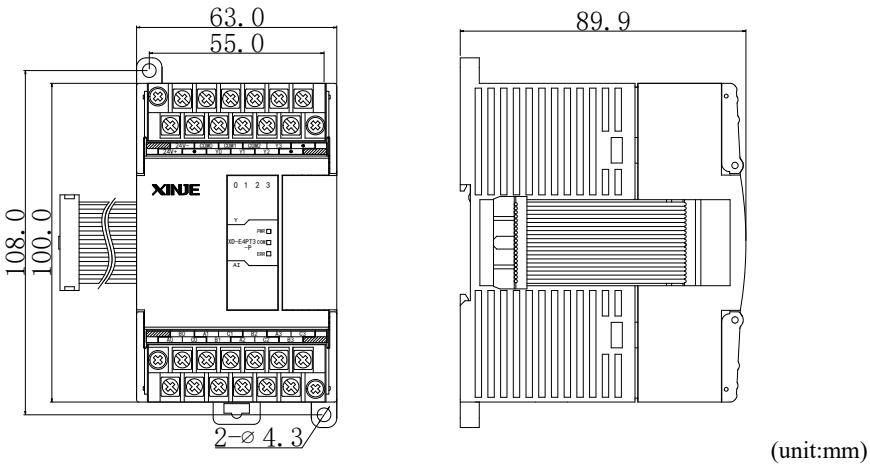
- When the "Y Function Selection" is set to "Immediate Output", only the 'Temperature Deviation Value δ' and 'Calibrated Ambient Temperature Value' among the above parameters are valid; all other parameters are inactive.
- The module can automatically save the set temperature value, PID parameters, temperature control cycle, output amplitude, temperature deviation, and temperature calibration parameters, with the saved values retained even during power outages. When writing these parameters, use rising-edge-triggered writing; avoid continuous writing operations. It is recommended to write only the parameters that are actually needed; for programming convenience, writing data to the entire chip is not advised, as setting certain addresses to zero may prevent the system from operating correctly.
- Self-tuning enable address K0: The K0 address occupies a contiguous 8-bit address space; the 4-channel module enable bit corresponds to the first 4 bits of this address space, while the remaining 4 bits remain unused (but cannot be repurposed). When the read/write enable bit is active, K0 may refer to a coil or a register; if it refers to a coil, the coil serves as the starting

address for occupying a contiguous 8-bit segment; if it refers to a register, the entire register is occupied.

For example, if you want to set the first and third channels of the module to Auto-tuning mode and the remaining two channels to Manual PID mode, when the command is "To K10000 K0 K1 M10," set M10 and M12 to ON and set M11, M13, M14, and M15 to OFF; when the command is "To K10000 K0 K1 D100," assign the value 5 to D100.

The "From/To Data Initialization" feature requires a module firmware version of V102 or later.

7.3.7.Outline Dimensional Drawing



(unit:mm)

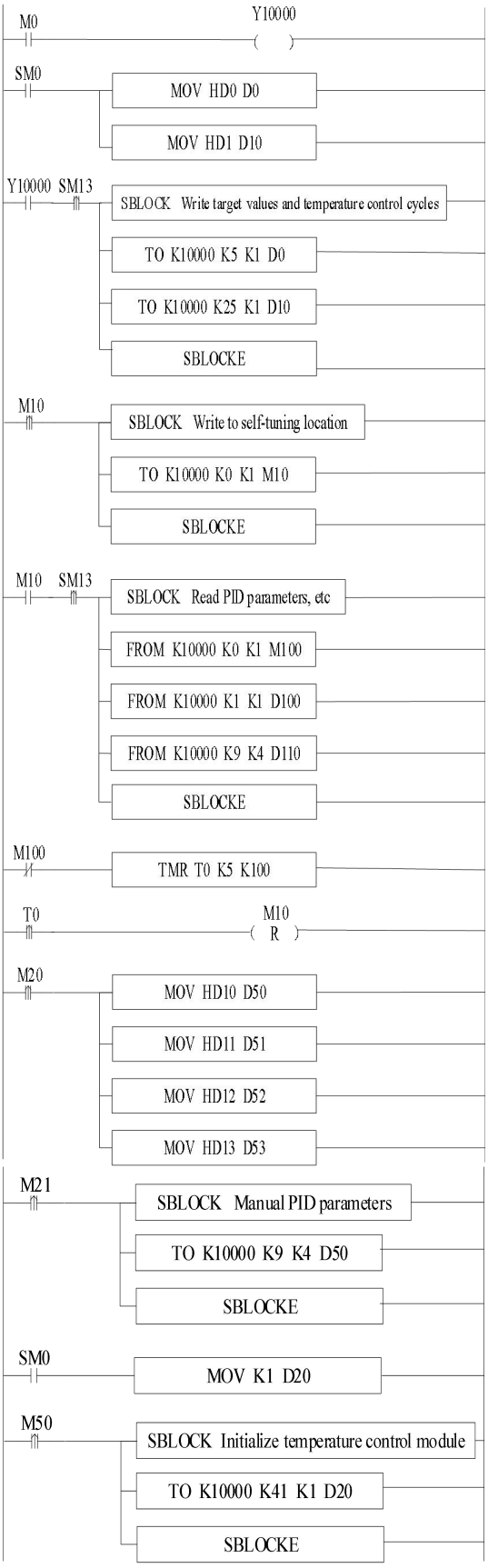
7.3.8.Programming Example

When temperature control is required, two programming methods are available:

- To implement temperature control using the PID function on the PLC unit, switch the Y function selection to 'Immediate Output'. For a detailed programming example, refer to Chapter 7, 'PID Control Function', in the *XD and XL Series Programmable Logic Controllers User Manual (Basic Instructions Section)*.
- Use the built-in PID controller for temperature regulation; in this case, switch the Y function selection to 'Channel Enable' – as demonstrated in Example 1.

Example: Take Module #1 as an example, and apply PID control to its CH0.

procedure:



// Enable PID bit

// Set target value (unit: 0.1°C)

// Set temperature control cycle (unit: 0.1 seconds)

// Write target value and temperature control cycle

// Periodically write the self-tuning startup flag

// Periodically read the setpoint and PID parameters

// Read entire position

// Read PID output value

// Set P, I, and D values

// After the automatic tuning has been reset for 0.5s,

reset the automatic tuning start flag

// Set P-value

// Set I value

// Set D-value

// Perform manual PID control by writing the P, I, D, and Diff parameters.

// Initialize module parameters

description:

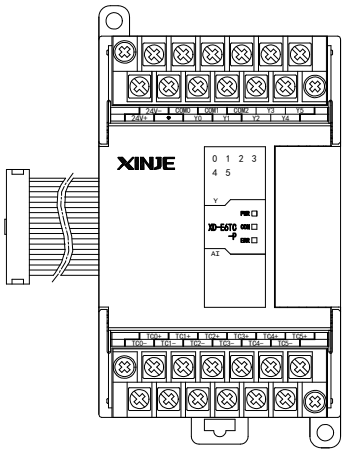
- When the Auto-Tuning Enable function is activated, this command immediately occupies eight bits (M10–M17); M10–M13 correspond to the Auto-Tuning Enable status for each channel respectively. To enable tuning for a specific channel, simply set the corresponding coil to ON. M14–M17 currently have no assigned function and should remain unset.
- If the output is a solid-state relay, the recommended temperature control cycle is 1–3s; if the output is a traditional relay, the recommended temperature control cycle is 3–15s.
- Due to differing unit systems, the PID parameters for the main unit and the module PID parameters cannot be directly interchangeable. The main unit's PID parameters are denoted in uppercase letters, while the module's PID parameters are denoted in lowercase letters. The specific conversion relationships are as follows: p = P/100; i = I/10; d = D/100.

Soft components function:

M0	Enable PID control
SM0	Set target values and temperature control cycle
M1	Write target value, temperature control cycle
M3	Set manual P, I, and D parameters
M4	Enter the P, I, and D parameters manually.
M10	Reads the setpoint, PID parameters, and PID output value.
M50	Initialization Module
Y10000	Channel 0 PID enable bit
D0	Set target value
D10	Temperature Control Cycle
D80	P
D81	I
D82	D
D83	DIFF

7.4. Thermocouple Temperature Control Module XD-E6TC-P(-H), XD-E2TC-P

7.4.1.Module Features and Specifications



The XD-E6TC-P/XD-E6TC-P-H/XD-E2TC-P Temperature PID Control Module processes 6/2-point thermocouple temperature signals and transmits them to the PLC main unit.

1) Module Features

- Thermocouple temperature sensor – uses analog input.
- XD-E6TC-P Module: 6-channel input, 6-channel output, 6 independent PID parameters, supports automatic tuning function.
- XD-E6TC-P-H Module: Features 6-channel input and 6-channel output, supports 6 sets of independent PID parameters with self-tuning functionality; each channel is isolated for enhanced anti-interference performance, broader sampling range, and faster sampling rate.
- XD-E2TC-P Module: 2-channel input, 2-channel output, 2 sets of independent PID parameters, supports automatic tuning function.
- Integrated cold-end compensation circuit.
- Resolution accuracy: 0.1°C.
- As specialized functional modules for the XD series, the XD3/XD3E can connect up to 10 modules on the right side of the PLC main unit; the XD5/XDM/XDC/XD5E/XDME/XDH can support up to 16 modules; whereas the XD1/XD2 do not support the addition of expansion modules.

2) Module Specifications

- XD-E6TC-P、XD-E2TC-P

Project	Content	
Analog Input Signal	K, S, E, N, B, T, J, R type thermocouples	
Temperature Measurement	K-type	-200.0℃ ~ 1300.0℃

Project	Content	
Range	S-type	0.0℃ ~ 1700.0℃
	E-type	-200.0℃ ~ 600.0℃
	N-type	-200.0℃ ~ 1200.0℃
	B-type	250.0℃ ~ 1700.0℃
	T-type	-200.0℃ ~ 400.0℃
	J-type	-200.0℃ ~ 800.0℃
	R-type	0.0℃ ~ 1700.0℃
Digital Output Range	Minimum temperature measurement value × 10 – Maximum temperature measurement value × 10 (For example, with the K-type sensor, the digital output range is-2000 to 13000)	
Resolution Ratio	0.1℃	
Overall Accuracy	±1% (relative maximum value)	
Conversion Rate	XD-E6TC-P	480ms/6 channel
	XD-E2TC-P	160ms/2 channel
Module Power Supply	DC24V±10%，50mA	

- XD-E6TC-P-H

Project	Content	
Analog Input Signal	K, S, E, N, B, T, J, R type thermocouples	
Temperature Measurement Range	K-type	-200.0℃ ~ 1372.0℃
	S-type	-50.0℃ ~ 1768.0℃
	E-type	-200.0℃ ~ 1000.0℃
	N-type	-200.0℃ ~ 1300.0℃
	B-type	-250.0℃ ~ 1798.0℃
	T-type	-200.0℃ ~ 400.0℃

Project	Content	
	J-type	-210.0℃ ~ 1200.0℃
	R-type	-50.0℃ ~ 1768.0℃
Digital Output Range	Minimum temperature measurement value × 10 – Maximum temperature measurement value × 10 (For example, with the K-type sensor, the digital output range is-2000 to 13720)	
Resolution Ratio	0.1℃	
Overall Accuracy	±1% (relative maximum value)	
Conversion Rate	80 ms/All Channels	
Module Power Supply	DC24V±10%，50mA	

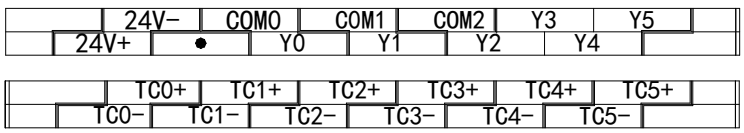
When the module is in an abnormal state, the ID1xxxx register will display a corresponding abnormality value; even if line break detection is disabled in the module configuration, an abnormality value will still be displayed. The abnormality values for different types of alarms are as follows:

- When the 24V power supply is disconnected, the data for all channels is-2.
- The thermocouple temperature control module: when no sensor is connected, its channel data is-1.
- When the sensor signal falls below the lower limit of the measurement range, the channel data represents the minimum value within the digital output range of the selected sensor type. (Note: The XD-E6TC-P-H and XD-EnTC-P have different measurement ranges).
- When the sensor signal exceeds the upper limit of the measurement range, the channel data represents the maximum value within the digital output range for the selected sensor type. (Note: The XD-E6TC-P-H and XD-EnTC-P have different measurement ranges).



- Unlike the XD-E6TC-P, the XD-E6TC-P-H features isolated processing for each channel, enabling simultaneous sampling across multiple channels and a faster sampling rate.
- Negative temperature detection function: The XD-E6TC-P module requires firmware version 16 or later; the XD-E2TC-P module requires firmware version 15 or later; the XD-E6TC-P-H module is supported by all firmware versions.

7.4.2.Terminal Specifications

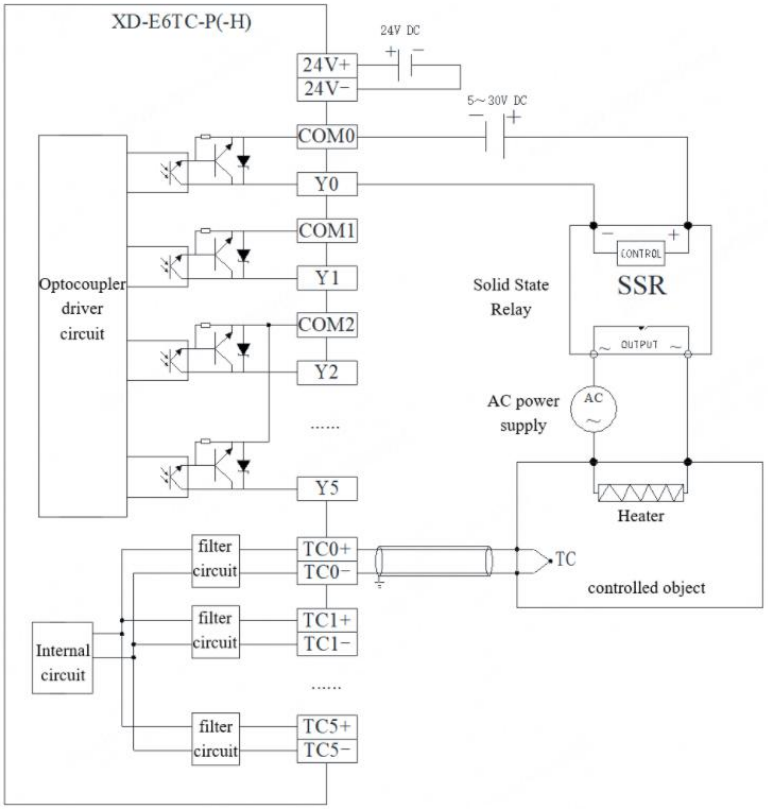


Channel	Terminal Name	Signal Name
Terminals for Power Supplies	24V+	External 24V power supply (positive terminal) for the module
	24V-	External 24V power supply (negative terminal) for the module
CH0	TC0+	CH0 thermocouple positive input terminal
	TC0-	CH0 thermocouple negative input terminal
CH1	TC1+	CH1 thermocouple positive input terminal
	TC1-	CH1 thermocouple negative input terminal
CH2	TC2+	CH2 thermocouple positive input terminal
	TC2-	CH2 thermocouple negative input terminal
CH3	TC3+	CH3 thermocouple – Positive input terminal
	TC3-	CH3 thermocouple negative input terminal
CH4	TC4+	CH4 thermocouple positive input terminal
	TC4-	CH4 thermocouple negative input terminal
CH5	TC5+	CH5 thermocouple positive input terminal
	TC5-	CH5 thermocouple negative input terminal
leading-out terminal	COM0	CH0 Output Common Terminal
	Y0	CH0 Output Terminal
	COM1	CH1 Output Common Terminal
	Y1	CH1 Output Terminal
	COM2	CH_2–CH_5 output common terminal
	Y2	CH2 Output Terminal
	Y3	CH3 output terminal
	Y4	CH4 output terminal
	Y5	CH5 Output Terminal



The XD-E2TC-P module features only two channels: CH0 and CH1.

7.4.3.Input/Output Wiring Example



- Output terminal: Transistor-output terminal; please use a smooth DC 5V–30V power supply.
- Circuit insulation: The internal circuits of the programmable logic controller and its output transistors are optically isolated using optical couplers; additionally, each individual module is isolated from the others.
- Response time: The time from the programmable logic controller driving (or breaking) the optocoupler to the transistor turning on/off shall not exceed 0.2 ms.
- Output current: To limit temperature rise, a maximum output load of 50 mA is supported.
- Open-circuit leakage current: below 0.1 mA.

- When connecting an external 24V power supply, please use the 24V power supply built into the PLC unit to avoid interference.
- The housing of the device where the temperature sensor is installed must be grounded.
- To prevent interference, the temperature sensor should be connected using a shielded cable with the shield grounded at a single point.
- When the "Cold-End Compensation Method Selection" is set to "Internal Compensation," the thermocouple's cold end is located at a terminal block on the module; in this case, an extension cable made of the same material or a dedicated compensation cable must be used for extending the cable – otherwise, the measurement accuracy will be affected.
- "The maximum output current supports an output load of 50 mA" means that, whether point Y is used as a standard digital output point or as an output for the PID control function, the maximum output load is always 50 mA.

7.4.4.Input/Output Definition Number Allocation

The XD series analog input modules do not occupy any I/O units; the converted values are directly written into the PLC registers. The definition numbers for the PLC registers corresponding to each channel are as follows:

Relevant Parameter	Explain				
	Module ID	CH0	CH1	. . . . .	CH5
Temperature display value (Unit: 0.1℃)	Module 1	ID10000	ID10001	ID1000x	ID10005
	Module 2	ID10100	ID10101	ID1010x	ID10105
	.....	ID1xx00	ID1xx01	ID1xx0x	ID1xx05
	Module 16	ID11500	ID11501	ID1150x	ID11505
Enable channel signal (0: Disabled; 1: Enabled)	Module 1	Y10000	Y10001	Y1000x	Y10005
	Module 2	Y10100	Y10101	Y1010x	Y10105
	.....	Y1xx00	Y1xx01	Y1xx0x	Y1xx05
	Module 16	Y11700	Y11701	Y1170x	Y11705
	When the "Y Function Selection" is set to "Immediate Output," Y0–Y5 represent standard digital output terminals; the Y10000–Y10005 (using Module #1 as an example) can be used to directly control the Y0–Y5 outputs on the module. When the "Y Function Selection" is set to "Channel Enable," Y0–Y5 serve as PID output terminals; the corresponding channel's PID control can be enabled using Y10000–Y10005 (for example, using Module #1), and the Y0–Y5 outputs on the module are controlled by automatic PID calculations.				
PID contact output (Return the X input to the subject)	Module 1	X10000	X10001	X1000x	X10005
	Module 2	X10100	X10101	X1010x	X10105
	.....	X1xx00	X1xx01	X1xx0x	X1xx05
	Module 16	X11700	X11701	X1170x	X11705
	When the "Y Function Selection" is set to "Channel Enable," Y10000–Y10005 (taking Module #1 as an example) represent the PID enable bits; the PID duty cycle output should be monitored against X10000–X10005 (taking Module #1 as an example).				
Channel fault/power supply detection (0: Connected; 1: Broken connection)	Module 1	X10010	X10011	X1001x	X10015
	Module 2	X10110	X10111	X1011x	X10115
	.....	X1xx10	X1xx11	X1xx1x	X1xx15
	Module 16	X11710	X11711	X1171x	X11715
PID automatic tuning error (0: Normal; 1: Automatic tuning parameter error)	Module 1	X10020	X10021	X1002x	X10025
	Module 2	X10120	X10121	X1012x	X10125
	.....	X1xx20	X1xx21	X1xx2x	X1xx25
	Module 16	X11720	X11721	X1172x	X11725

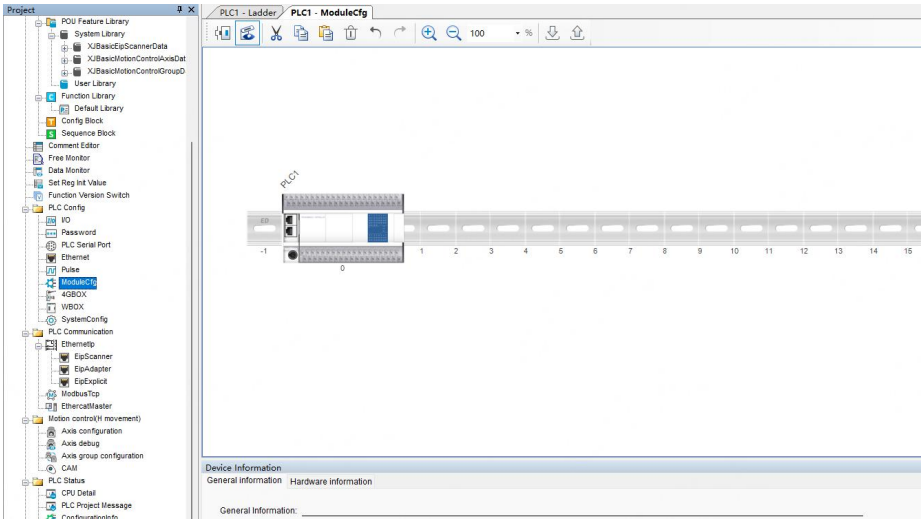
7.4.5.Work Mode Setup

There are two methods available for configuring the operating mode (these two methods yield equivalent results):

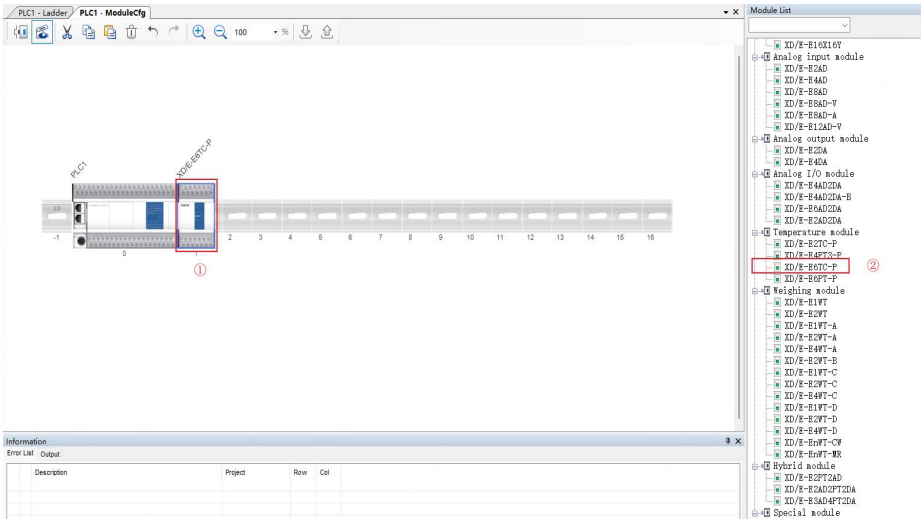
- Configure via the Settings Panel
- Set via Flash register (SFD)

1) Configuration Panel Configuration

1. Use the XINJE PLC Programming Tool Software version 3.8.0a or later to configure the module; click [PLC Configuration] – [Module Configuration] in the left-side Engineering Bar to open the Expansion Module Settings window. For versions prior to 3.8.0a of the XINJE PLC Programming Tool Software, click [PLC Configuration] – [Expansion Module] in the left-side Engineering Bar to perform the configuration.

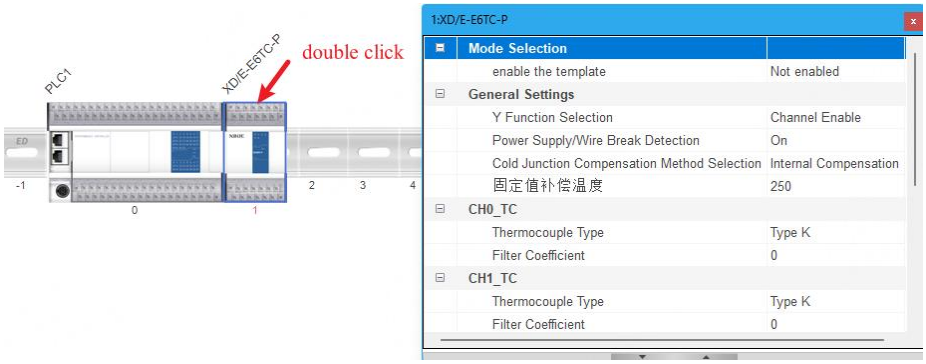


2. Select a module from the right-side module list and drag it to the desired position; alternatively, double-click a module in the right-side module list (for the XD-E6TC-P-H, use the same selection method as for the XD-E6TC-P – select XD/E-E6TC-P):



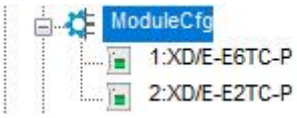
3. Double-click the corresponding module icon to access the module configuration interface, where you can select the appropriate thermocouple model (supports 8 thermocouple types), the broken-wire

detection switch, the Y-function selection, the fixed-value compensation method, and the fixed-value compensation temperature.

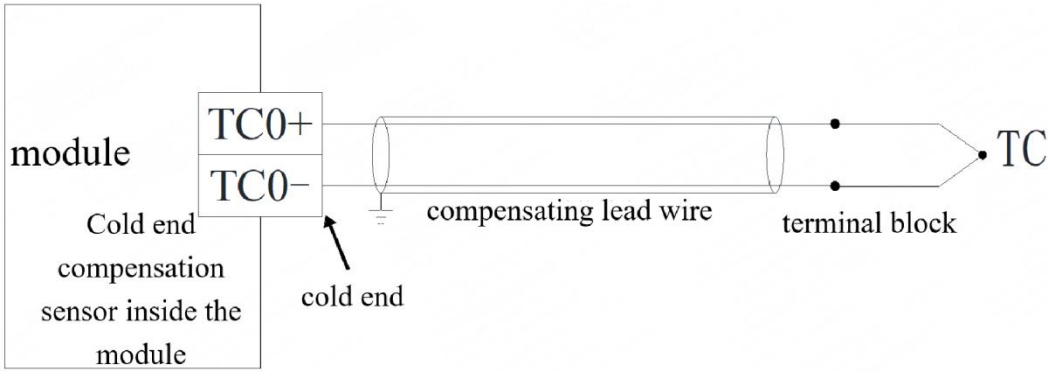


4. Click "" to view the default configuration parameters for the Expansion module.

5. After completing the parameter configuration for the expansion module, click "" to write the set values into the PLC; the changes will take effect only after the PLC is powered off and then powered on again. Under the Module Configuration Node, mount the configured module, then double-click to enter the Module Parameter Configuration screen.



- The "Y Function Selection" setting is used to specify the function for modules Y10000–Y10005 (e.g., Module #1); by default, this setting is set to "Channel Enable," which supports the module's built-in self-tuning and PID control functions. The output points Y0–Y5 on the module switch on or off based on the PID output value; when this setting is configured as "Immediate Output," the output points Y0–Y5 on the module function as standard digital output points – setting Y10000–Y10005 will activate Y0–Y5, while the module retains only its temperature acquisition functionality; if temperature control functionality is required, please use the PID instruction on the PLC main unit to implement it.
- A thermocouple consists of two conductors made of different metals or metal alloys; the ends of these two conductors are welded together, and this welded junction is known as the temperature measurement point; the other ends of the two conductors remain open, and these ends are referred to as the cold junction.



- The module supports two cold-end compensation methods: "Internal Compensation" and "Fixed Value Compensation." The "Cold-End Compensation Method Selection" menu allows you to switch between these two modes; by default, the module uses "Internal Compensation," in which case the cold-end temperature is measured by the module's built-in cold-end sensor.

When set to "Fixed Value Compensation," the cold-end temperature is determined by a predefined "Fixed Value Compensation Temperature." The default "Fixed Value Compensation Temperature" is 250 (25.0°C), with a configurable range of –1000 to 1000°C. However, it is important to ensure that the configured "Fixed Value Compensation Temperature" matches the actual temperature at the location where the cold end is situated.



- The 'Fixed Value Compensation' feature requires firmware version V2 or later on the XD-E6TC-P-H for support.
- The 'Fixed Value Compensation' feature requires firmware version V15 or later for support on the XD-EnTC-P.
- The 24V power supply detection function requires firmware version V3 or later on the XD-E6TC-P-H.
- Module 24V power supply detection function – requires firmware version V16 or later for XD-EnTC-P support.

2) Flash Register Configuration

The CH0–CH5 expansion module channels allow the configuration of thermocouple type and Y function selection; this is done using the internal PLC FLASH data register SFD. As shown below:

Module ID	Configuration Information Address	Module ID	Configuration Information Address
#1	SFD350~SFD359	#9	SFD430~SFD439
#2	SFD360~SFD369	#10	SFD440~SFD449
#3	SFD370~SFD379	#11	SFD450~SFD459
#4	SFD380~SFD389	#12	SFD460~SFD469
#5	SFD390~SFD399	#13	SFD470~SFD479
#6	SFD400~SFD409	#14	SFD480~SFD489
#7	SFD410~SFD419	#15	SFD490~SFD499
#8	SFD420~SFD429	#16	SFD500~SFD509

3) SFD Bit Definition

Using the First Module as an example to illustrate the setup method:

Register		Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
SFD350	Byte0	TC2 Sensor Type				TC1 Sensor Type			
		0000：K 0001：S 0010：E 0011：N 0100：J				0000：K 0001：S 0010：E 0011：N 0100：J			

<table>
<tr><th colspan="2">Register</th><th>Bit7</th><th>Bit6</th><th>Bit5</th><th>Bit4</th><th>Bit3</th><th>Bit2</th><th>Bit1</th><th>Bit0</th></tr>
<tr><td rowspan="3"></td><td></td><td colspan="4">0101：T
0110：R
0111：B</td><td colspan="4">0101：T
0110：R
0111：B</td></tr>
<tr><td rowspan="2">Byte1</td><td colspan="4">TC4 Sensor Type</td><td colspan="4">TC3 Sensor Type</td></tr>
<tr><td colspan="4">0000：K
0001：S
0010：E
0011：N
0100：J
0101：T
0110：R
0111：B</td><td colspan="4">0000：K
0001：S
0010：E
0011：N
0100：J
0101：T
0110：R
0111：B</td></tr>
<tr><td rowspan="3">SFD351</td><td rowspan="2">Byte2</td><td colspan="4">TC6 Sensor Type</td><td colspan="4">TC5 Sensor Type</td></tr>
<tr><td colspan="4">0000：K
0001：S
0010：E
0011：N
0100：J
0101：T
0110：R
0111：B</td><td colspan="4">0000：K
0001：S
0010：E
0011：N
0100：J
0101：T
0110：R
0111：B</td></tr>
<tr><td>Byte3</td><td colspan="8">-</td></tr>
<tr><td>SFD352</td><td>Byte4</td><td colspan="2">-</td><td colspan="2">Cold-end compensation method selection:</td><td colspan="2">TC Channel Disconnection/Po</td><td>Y Function Selection 00: Channel Enable</td></tr>
</table>

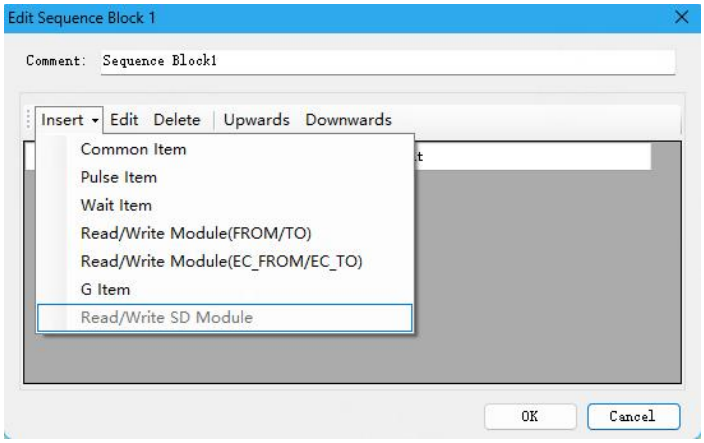
Register		Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
				00: Internal Compensation 01: Fixed Value Compensation		wer Supply Detection Switch 00:00 − Start 01: Close		01: Output Immediately	
	Byte5	-							
SFD353	Byte6	Fixed-value compensation temperature (unit: 0.1°C; setpoint range: -1000 to 1000; default: 250)							
	Byte7								
SFD354	Byte8	TC1 filtering coefficient (0 − no filtering; 1−254 − filtering intensity decreases sequentially; default: 0)							
	Byte9	TC2 filtering coefficient (0 − no filtering; 1−254 − filtering intensity decreases sequentially; default: 0)							
SFD355	Byte10	TC3 filtering coefficient (0 − no filtering; 1−254 − filtering intensity decreases sequentially; default: 0)							
	Byte11	TC4 filtering coefficient (0 − no filtering; 1−254 − filtering intensity decreases sequentially; default: 0)							
SFD356	Byte12	TC5 filtering coefficient (0 − no filtering; 1−254 − filtering intensity decreases sequentially; default: 0)							
	Byte13	TC6 filtering coefficient (0 − no filtering; 1−254 − filtering intensity decreases sequentially; default: 0)							
SFD357	Byte12	-							
	Byte13	-							
SFD358~SFD359		Keep							

The XD-E2TC-P module features only two channels: TC0 and TC1.

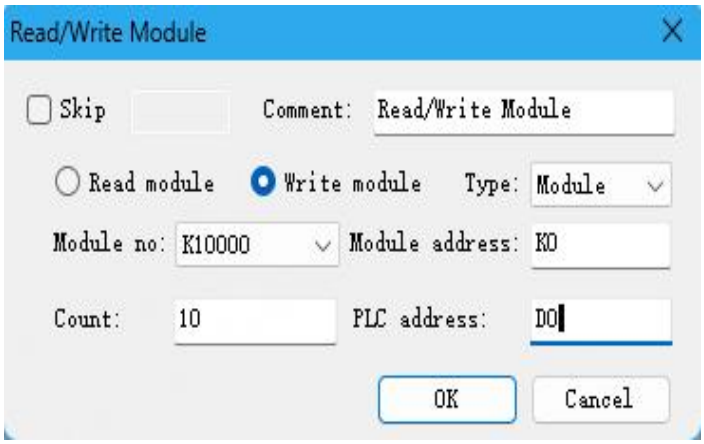
7.4.6.From/To Command Usage Instructions

1) Instruction Manual

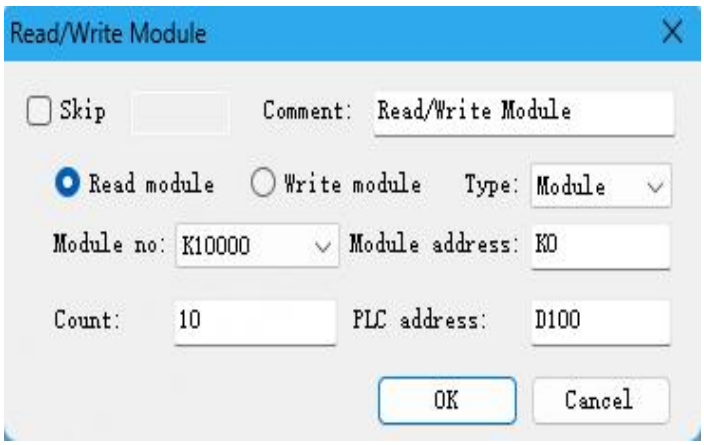
The read/write operations for the thermocouple temperature control module must be performed using the FROM/TO instruction within the BLOCK Sequential Function Block, as shown in the figure below:



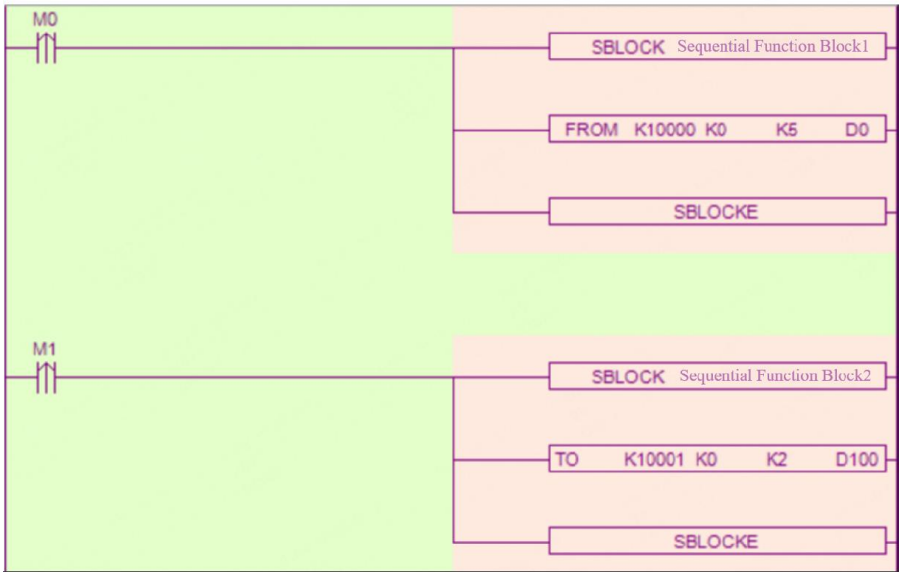
(a) Insert "Read/Write Module (FROM/TO)"



(b) Writing Module



(c)Read Through Model

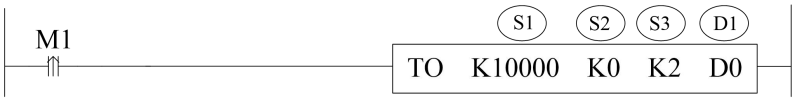


(d) Convert to a Ladder Diagram

Instruction parse

- Write Module Instruction: TO

Write the specified register data to the designated module address, using a byte as the operation unit.



Operand	Function	Available Operands
S1	Target Module Number − Range: 10000−10015.	K、TD，CD，D，HD，FD
S2	Write the starting address of the module.	K、TD，CD，D，HD，FD
S3	Number of registers to write to (number of words).	K、TD，CD，D，HD，FD
D1	The starting address of the register where written data is stored within the device.	TD，CD，D，HD，FD

- Read module instruction: FROM

Read data from the specified module address into the designated register of the device, using a byte as the operation unit.



Operand	Function	Available Operands
S1	Target Module Number − Range: 10000−10015.	K、TD，CD，D，HD，FD

S2	Read the starting address of the module.	K、TD，CD，D，HD，FD
S3	Number of registers to read (number of words).	K、TD，CD，D，HD，FD
D1	The body receives the starting address of the register.	TD，CD，D，HD，FD



- The FROM/TO instruction can only be written within a BLOCK sequential function block; for XD series PLCs with firmware version below V3.4.5, a maximum of 8 BLOCK function blocks are permitted; for XD/XL series PLCs with firmware version V3.4.5 or later, a maximum of 100 BLOCKs can be written into the program, but only up to 8 can be executed simultaneously.
- The module starting number begins at K10000; Module #1 is K10000, Module #2 is K10001, and so on; Module #16 is K10015.

2) Related Address Definition

During the use of this module, operations involving the reading and writing of relevant parameters are performed; the following provides an explanation of the address arrangement:

- XD-E6TC-P/XD-E6TC-P-H

From-To Data		Initial Value	CH1	CH2	CH3	CH4	CH5	CH6	R/W
Auto-tuning Enable		0	K0	K0	K0	K0	K0	K0	RW
PID output value (0–4095)		-	K1	K2	K3	K4	K5	K6	R
Temperature setpoint (Unit: 0.1°C)		0	K7	K8	K9	K10	K11	K12	RW
PID parameter	Kp	40	K13	K17	K21	K25	K29	K33	RW
	Ki	240	K14	K18	K22	K26	K30	K34	RW
	Kd	60	K15	K19	K23	K27	K31	K35	RW
	Diff (Unit: 0.1°C)	1000	K16	K20	K24	K28	K32	K36	RW
Temperature control cycle (Unit: 0.1 s)		20	K37	K38	K39	K40	K41	K42	RW
Output amplitude (Range: 0–100)		100	K43	K44	K45	K46	K47	K48	RW
Temperature deviation value δ (unit: 0.1°C)		0	K49	K50	K51	K52	K53	K54	RW
Calibrate ambient temperature value (unit: 0.1°C)		-	K55	K56	K57	K58	K59	K60	W
From/To data initialization		-	K61	K61	K61	K61	K61	K61	W

- XD-E2TC-P

From-To Data	Initial Value	CH1	CH2	R/W
Auto-tuning Enable	0	K0	K0	RW
PID output value (0–4095)	-	K1	K2	R
Temperature setpoint (Unit:	0	K3	K4	RW

From-To Data		Initial Value	CH1	CH2	R/W
0.1°C)					
PID	Kp	40	K5	K9	RW
	Ki	240	K6	K10	RW
	Kd	60	K7	K11	RW
	Diff (Unit: 0.1°C)	1000	K8	K12	RW
Temperature control cycle (Unit: 0.1 s)		20	K13	K14	RW
Output amplitude (Range: 0–100)		100	K15	K16	RW
Temperature deviation value δ (unit: 0.1°C)		0	K17	K18	RW
Calibrate ambient temperature value (unit: 0.1°C)		-	K19	K20	W
From/To data initialization		-	K21	K21	W

- From/To Parameter Description

Relevant Parameter	Explain
Auto-tuning Enable	Self-tuning enable signal: when set to 1, the system enters the self-tuning phase. Upon completion of the self-tuning process, the PID parameter values and the temperature control cycle value are updated, and the enable bit is automatically cleared to 0. The user can also read the status; a value of 1 indicates that the self-tuning process is in progress, while a value of 0 indicates that the self-tuning process has not yet begun or has already been completed. The self-tuning method employs the critical oscillation technique.
PID output value (0～4095)	When the PID output is used for analog control (e.g., steam valve opening degree or thyristor conduction angle), this value can be transmitted to an analog output module to fulfill the control requirements.
Temperature setpoint (Unit: 0.1°C)	The target temperature value for the control system. The setpoint range corresponds to the digital values corresponding to the upper and lower temperature limits of the selected thermocouple type.
PID parameter (P、I、D)	The optimal parameter values can be determined using PID self-tuning. If the current PID control does not adequately meet the control requirements, the user may directly input empirical PID parameters; the module will then perform PID control based on the PID parameters set by the user.
PID operation range (Diff) (Unit: 0.1°C)	Let: the operating range be T_{diff}, the setpoint temperature be T_{set}, and the displayed temperature be T. When $T_{set}-T_{diff} \leqslant T \leqslant T_{set}+T_{diff}$, the output is controlled by a PID controller. When $T \leqslant T_{set}-T_{diff}$, the output is set to its maximum value. When $T_{set}+T_{diff} \leqslant T$, the output is 0.
Temperature Control Cycle (Unit: 0.1 s)	The control cycle adjustment range is 0.1s to 200s, with a minimum accuracy of 0.1s.

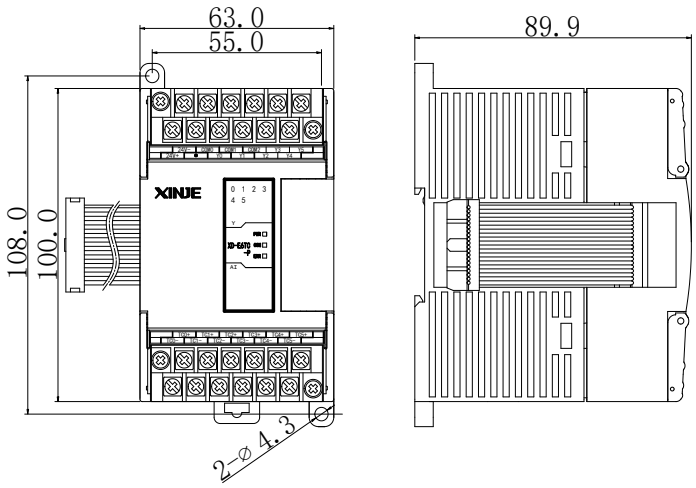
Relevant Parameter	Explain
	The written value is the actual temperature control cycle value multiplied by 10; for example, writing 5 corresponds to an actual temperature control cycle of 0.5s.
output amplitude	The PID calculation output amplitude is expressed in%; a value of 100 corresponds to 100% of the full-scale output, while a value of 80 corresponds to 80% of the full-scale output. Note: When set to 0, the PID controller will produce no output.
Temperature deviation value δ (Unit: 0.1°C)	Temperature display value = (Sampling temperature value + Temperature deviation value δ) / 10. This parameter is a signed integer with a unit of 0.1°C; it represents the power-off hold value, with a default value of 0. The setpoint range is-40.0°C to 40.0°C.
Calibrate ambient temperature value (Unit: 0.1°C)	When the user determines that the ambient temperature value does not match the temperature value displayed on the module's channel, they can write the known ambient temperature value into this parameter. At the moment of writing, the module calculates the temperature deviation value δ and stores it. Calculate the temperature deviation value δ = calibrated ambient temperature value – sampling temperature value. Unit: 0.1°C. For example: Under thermal equilibrium conditions, the user measures the ambient temperature using a mercury thermometer and obtains a reading of 60.0°C; however, the displayed temperature at that moment is 55.0°C (corresponding to a sampling temperature of 55.0°C), resulting in a temperature deviation δ = 0. At this point, the user writes the value 600 into this parameter; the temperature deviation δ is then recalculated as 50 (5°C). Consequently, the displayed temperature = (sampling temperature value + temperature deviation δ) / 10 = 60°C. Note: When entering the calibration temperature value, ensure that it matches the ambient temperature. This data is critical; any incorrect entry could lead to a significant calculation error in the temperature deviation value (δ), which in turn would affect the displayed temperature.
From/To Data Initialization	This function resets the parameters in the above table to their factory settings; to use this function, set the K61 or K21 to 1 – setting it to any other value will have no effect. The Auto-Tuning Enable feature cannot be initialized separately; it will automatically revert to its default values only after the tuning process is completed or after the device is powered on again.

- When the "Y Function Selection" is set to "Immediate Output", only the 'Temperature Deviation Value δ' and 'Calibrated Ambient Temperature Value' among the above parameters are valid; all other parameters are inactive.
- The module can automatically save the set temperature value, PID parameters, temperature control cycle, output amplitude, temperature deviation, and temperature calibration parameters. When writing these parameters, use rising-edge triggered writing; avoid continuous writing. It is recommended to write only the parameters that are actually in use; for programming convenience, writing data to the entire chip is not advisable, as setting certain addresses to zero may prevent the system from operating correctly.

- Self-tuning enable address K0: The K0 address occupies a contiguous 8-bit address space; the 6-channel module enable bit corresponds to the first 6 bits of this address space, while the last 2 bits remain unused (but cannot be repurposed). When the read/write enable bit is active, K0 may refer to either a coil or a register; if it refers to a coil, the coil serves as the starting address for occupying a contiguous 8-bit segment; if it refers to a register, the entire register is occupied. For example, to set the first and third channels of the module to self-tuning mode and the remaining four channels to manual PID mode, the command `To K10000 K0 K1 M10` requires setting M10 and M12 to ON, and setting M11, M13, M14, and M15 to OFF; to set the first four channels to manual PID mode and the remaining four channels to self-tuning mode, the command `To K10000 K0 K1 D100` requires assigning the value 5 to D100.

The "From/To Data Initialization" function is supported by the XD-E6TC-P-H module and the XD-EnTC-P device running firmware version V10 or V104 or later.

7.4.7.Outline Dimensional Drawing



(unit:mm)

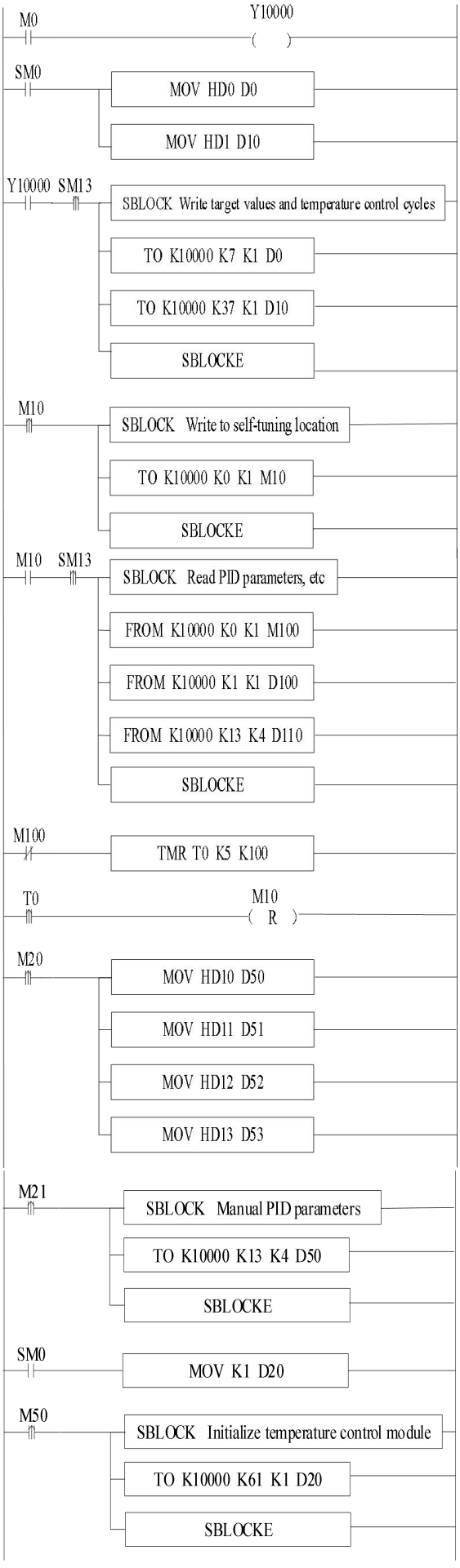
7.4.8.Programming Example

When temperature control is required, two programming methods are available:

- To implement temperature control using the PID function on the PLC unit, switch the Y function selection to 'Immediate Output'. For a detailed programming example, refer to Chapter 7, 'PID Control Function', in the *XD and XL Series Programmable Logic Controllers User Manual (Basic Instructions Section)*.
- Use the built-in PID controller for temperature regulation; in this case, switch the Y function selection to 'Channel Enable' – as demonstrated in Example 1.

Example: Take Module #1 as an example, and apply PID control to its CH0.

procedure:



// Enable PID bit

// Set target value (unit: 0.1°C)

// Set temperature control cycle (unit: 0.1 seconds)

// Schedule the target value and temperature control cycle; can be modified in real time.

// Write the self-tuning startup flag

// Periodically read the setpoint and PID parameters

// Read entire position

// Read PID output value

// Read P, I, D, and DIFF parameters

// After the automatic tuning has been reset for 0.5s, reset the automatic tuning start flag.

// Set P-value

// Set I value

// Set D-value

// Perform manual PID control by writing the P, I, D, and Diff parameters.

// Initialize module parameters

Description:

- When the Auto-Tuning Enable function is activated, this command immediately occupies eight bits (M10–M17); M10–M15 correspond to the auto-tuning enable settings for each channel respectively. To enable tuning for a specific channel, simply set the corresponding coil to ON. M16 and M17 currently have no assigned function and should remain unset.
- If the output is a solid-state relay, the recommended temperature control cycle is 1–3s; if the output is a traditional relay, the recommended temperature control cycle is 3–15s.
- Due to differing unit systems, the PID parameters for the main unit and the module PID parameters cannot be directly interchangeable. The main unit's PID parameters are denoted in uppercase letters, while the module's PID parameters are denoted in lowercase letters. The specific conversion relationships are as follows: p = P/100; i = I/10; d = D/100.

Soft components function:

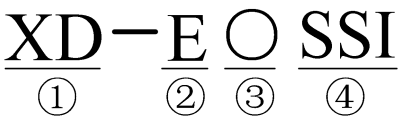
M0	Enable PID control
SM0	Set target values and temperature control cycle
M10	Write Self-Positioning
M20	Set manual P, I, and D parameters
M21	Enter the P, I, and D parameters manually.
M10	Reads the setpoint, PID parameters, and PID output value.
M50	Initialization Module
Y10000	Channel 0 PID enable bit
D0	Set target value
D10	Temperature Control Cycle
D50	P
D51	I
D52	D
D53	DIFF

8. Encoder Detection Module

8.1. Encoder Detection Module Overview

XD Series Encoder Detection Module – supports 4-channel SSI encoder position detection or displacement sensor position detection.

8.1.1.Naming Rule



①	Series Name	XD: XD Series Expansion Modules
②	Reference Expansion Module	E: Represents an expansion module
③	Number of input channels	4
④	incoming signal	SSI: Represents the SSI encoder or displacement sensor signal.

8.1.2.Model List

Model		Description
Encoder Detection	XD-E4SSI	4-channel SSI encoder position detection or displacement sensor position detection

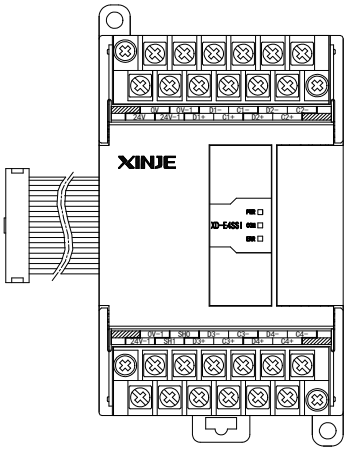
8.1.3.General Requirements

Project	Specifications
Service Environment	No corrosive gases
Ambient Temperature	0~60℃
Maintain Ambient Temperature	-20~70℃

Ambient Humidity	5~95%RH
Maintain Ambient Humidity	5~95%RH
Install	Can be secured with M3 screws or installed directly onto a DIN46277 (35 mm wide) guide rail.

8.1.4.4 Channel SSI Encoder Detection Module － XD-E4SSI

8.1.5.Module Features and Specifications



The XD-E4SSI Encoder Detection Module performs position detection for a 4-point absolute encoder or position sensor and transmits the detected data to the PLC main unit.

1) Module Features

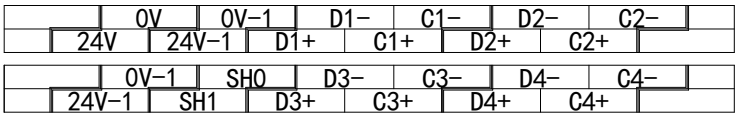
- Supports 4-channel SSI absolute encoder position detection or 4-channel displacement sensor detection.
- Suitable for SSI encoders with 10–31-bit input.
- Supports communication frequencies ranging from 125 kHz to 1 MHz.
- Supports Gray code or binary format encoding.
- Features a broken-wire detection and alarm function.
- As specialized functional modules for the XD series, the XD3/XD3E can connect up to 10 modules on the right side of the PLC main unit; the XD5/XDM/XDC/XD5E/XDME/XDH can support up to 16 modules; whereas the XD1/XD2 do not support additional modules.

2) Module Specifications

Project	Content
Incoming Signal	SSI absolute encoder or position sensor signal
Module Power Supply	DC 24V (Input range: 20.4–28.8 V)
Module Dissipation	1 W (no-load)
Position Detection Mode	absolute mode

Project	Content
SSI Data and Clock Signal Discrepancy	Complies with RS422 standard
Supported Encoder Bit Depth	10bit～31bit
Digital Output Range	0– Maximum encoder feedback value
Resolution Ratio	1/Maximum encoder feedback value
Communication Frequency	125KHz~1MHz
Encoding Type	Gray code or binary encoding
Overall Accuracy	1% (relative maximum)
Conversion Rate	400us/1 channel
Encoder Power Supply	DC 24 V ±10%,100 mA or 300 mA
Shielded Twisted Pair Cable Length	At a communication frequency of 125 kHz: maximum range of 320 m At a communication frequency of 250 kHz: maximum range of 160 m At a communication frequency of 500 kHz: maximum range of 60 m At a communication frequency of 1 MHz: maximum range of 20 m

8.1.6.Terminal Specifications



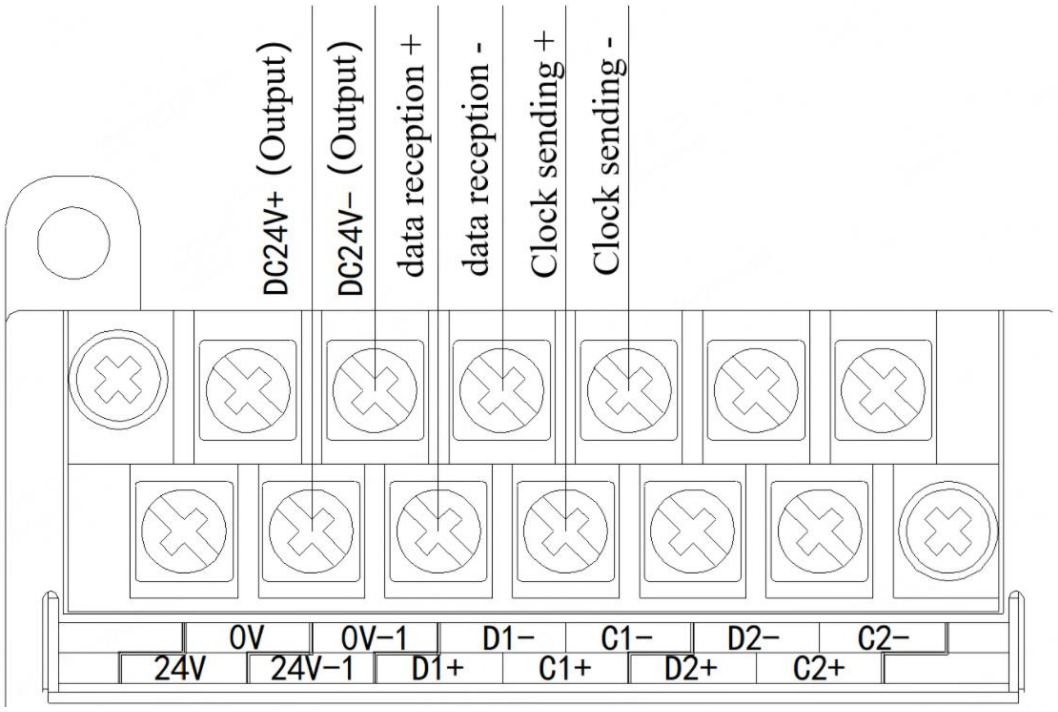
Channel	Terminal Name	Signal Name
CH0	D1+	Data acceptance+
	D1-	Data acceptance-
	C1+	Clock Send +
	C1-	Clock Transmission-
CH1	D2+	Data acceptance+
	D2-	Data acceptance-
	C2+	Clock Send +
	C2-	Clock Transmission-
CH2	D3+	Data acceptance+
	D3-	Data acceptance-
	C3+	Clock Send +
	C3-	Clock Transmission-
CH3	D4+	Data acceptance+
	D4-	Data acceptance-
	C4+	Clock Send +

	C4-	Clock Transmission-
Module Power Supply	24V	+24V power supply
	0V	Power supply common terminal
Encoder Power Supply	24V-1	Supply power to the encoder +24V power supply
	0V-1	Encoder power supply common terminal
Shielded terminal	SH0	External encoder shielded ground connection
	SH1	External encoder shielded ground connection

8.1.7.External Connection

When establishing an external connection, please note the following aspects:

- To prevent interference, please use shielded cable and apply single-point grounding to the shield.
- When connecting the XD-E4SSI power supply, please connect it to the 24V output terminal on the PLC unit whenever possible to minimize interference.
- When the modular power supply is powered by a 24 V supply from the PLC unit, it can output a current of 100 mA (for 16-point PLC units) or 300 mA (for 24-point or higher PLC units) via the 24V-1 and 0V-1 terminals; if the current exceeds these values, the encoder must be connected to an external 24 V power supply.



8.1.8.Input/Output Definition Number Allocation

The XD series analog input modules do not occupy any I/O units; the converted values are directly written into the PLC registers. The definition numbers for the PLC registers corresponding to each channel are as follows:

Each channel can only be used when the enable switch is turned on!

First Expansion Module Register Definition Number

Channel	Encoder Signal (Double-Word)	Channel Enable Switch	Cable Break Alarm
0CH	ID10000	Y10000	X10000
1CH	ID10002	Y10001	X10001
2CH	ID10004	Y10002	X10002
3CH	ID10006	Y10003	X10003

Second Expansion Module Register Definition Number

Channel	Encoder Signal (Double-Word)	Channel Enable Switch	Cable Break Alarm
0CH	ID10100	Y10100	X10100
1CH	ID10102	Y10101	X10101
2CH	ID10104	Y10102	X10102
3CH	ID10106	Y10103	X10103

Third Expansion Module Register Definition Number

Channel	Encoder Signal (Double-Word)	Channel Enable Switch	Cable Break Alarm
0CH	ID10200	Y10200	X10200
1CH	ID10202	Y10201	X10201
2CH	ID10204	Y10202	X10202
3CH	ID10206	Y10203	X10203

Fourth Expansion Module Register Definition Number

Channel	Encoder Signal (Double-Word)	Channel Enable Switch	Cable Break Alarm
0CH	ID10300	Y10300	X10300
1CH	ID10302	Y10301	X10301
2CH	ID10304	Y10302	X10302
3CH	ID10306	Y10303	X10303

Fifth Expansion Module Register Definition Number

Channel	Encoder Signal (Double-Word)	Channel Enable Switch	Cable Break Alarm
0CH	ID10400	Y10400	X10400
1CH	ID10402	Y10401	X10401
2CH	ID10404	Y10402	X10402
3CH	ID10406	Y10403	X10403

Sixth Expansion Module Register Definition Number

Channel	Encoder Signal (Double-Word)	Channel Enable Switch	Cable Break Alarm
0CH	ID10500	Y10500	X10500
1CH	ID10502	Y10501	X10501
2CH	ID10504	Y10502	X10502
3CH	ID10506	Y10503	X10503

Seventh Expansion Module Register Definition Number

Channel	Encoder Signal (Double-Word)	Channel Enable Switch	Cable Break Alarm
0CH	ID10600	Y10600	X10600
1CH	ID10602	Y10601	X10601
2CH	ID10604	Y10602	X10602
3CH	ID10606	Y10603	X10603

Eighth Expansion Module Register Definition Number

Channel	Encoder Signal (Double-Word)	Channel Enable Switch	Cable Break Alarm
0CH	ID10700	Y10700	X10700
1CH	ID10702	Y10701	X10701
2CH	ID10704	Y10702	X10702
3CH	ID10706	Y10703	X10703

Ninth Expansion Module Register Definition Number

Channel	Encoder Signal (Double-Word)	Channel Enable Switch	Cable Break Alarm
0CH	ID10800	Y11000	X11000
1CH	ID10802	Y11001	X11001
2CH	ID10804	Y11002	X11002
3CH	ID10806	Y11003	X11003

Tenth Expansion Module Register Definition Number

Channel	Encoder Signal (Double-Word)	Channel Enable Switch	Cable Break Alarm
0CH	ID10900	Y11100	X11100
1CH	ID10902	Y11101	X11101
2CH	ID10904	Y11102	X11102
3CH	ID10906	Y11103	X11103

Eleventh Expansion Module Register Definition Number

Channel	Encoder Signal (Double-Word)	Channel Enable Switch	Cable Break Alarm
0CH	ID11000	Y11200	X11200
1CH	ID11002	Y11201	X11201
2CH	ID11004	Y11202	X11202
3CH	ID11006	Y11203	X11203

Twelfth Expansion Module Register Definition Number

Channel	Encoder Signal (Double-Word)	Channel Enable Switch	Cable Break Alarm
0CH	ID11100	Y11300	X11300
1CH	ID11102	Y11301	X11301
2CH	ID11104	Y11302	X11302
3CH	ID11106	Y11303	X11303

Thirteenth Expansion Module Register Definition Number

Channel	Encoder Signal (Double-Word)	Channel Enable Switch	Cable Break Alarm
0CH	ID11200	Y11400	X11400
1CH	ID11202	Y11401	X11401
2CH	ID11204	Y11402	X11402
3CH	ID11206	Y11403	X11403

Fourteenth Expansion Module Register Definition Number

Channel	Encoder Signal (Double-Word)	Channel Enable Switch	Cable Break Alarm
0CH	ID11300	Y11500	X11500
1CH	ID11302	Y11501	X11501
2CH	ID11304	Y11502	X11502
3CH	ID11306	Y11503	X11503

Fifteenth Expansion Module Register Definition Number

Channel	Encoder Signal (Double-Word)	Channel Enable Switch	Cable Break Alarm
0CH	ID11400	Y11500	X11500
1CH	ID11402	Y11501	X11501
2CH	ID11404	Y11502	X11502
3CH	ID11406	Y11503	X11503

Sixteenth Expansion Module Register Definition Number

Channel	Encoder Signal (Double-Word)	Channel Enable Switch	Cable Break Alarm
0CH	ID11500	Y11600	X11600
1CH	ID11502	Y11601	X11601
2CH	ID11504	Y11602	X11602
3CH	ID11506	Y11603	X11603

- Disabling unused channels can increase the input scanning speed.
- When the input enable switch is turned off during operation, the data for the corresponding input channel will no longer be refreshed.
- The wire breakage alarm is used to detect whether there are any wire breaks or incorrect connections on the data or clock signal lines of a channel.
- When each channel is first powered on, the ID register is initialized to 0.

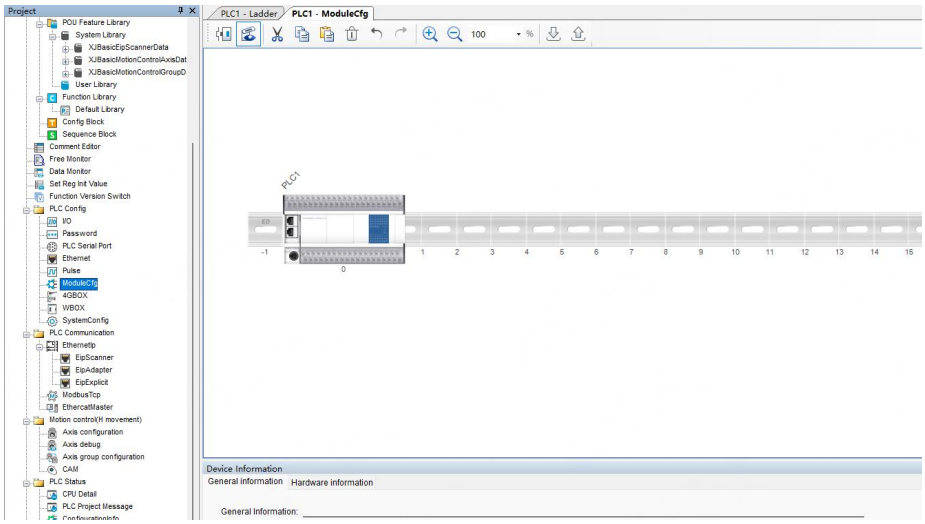
8.1.9.Work Mode Setup

There are two methods available for configuring the operating mode (these two methods yield equivalent results):

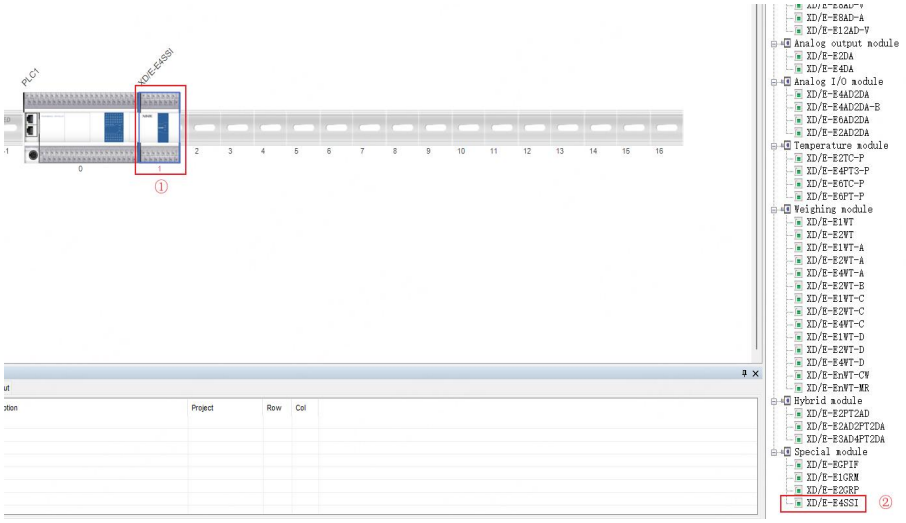
- Configure via the Settings Panel
- Set via Flash register (SFD)

1) Configuration Panel Configuration

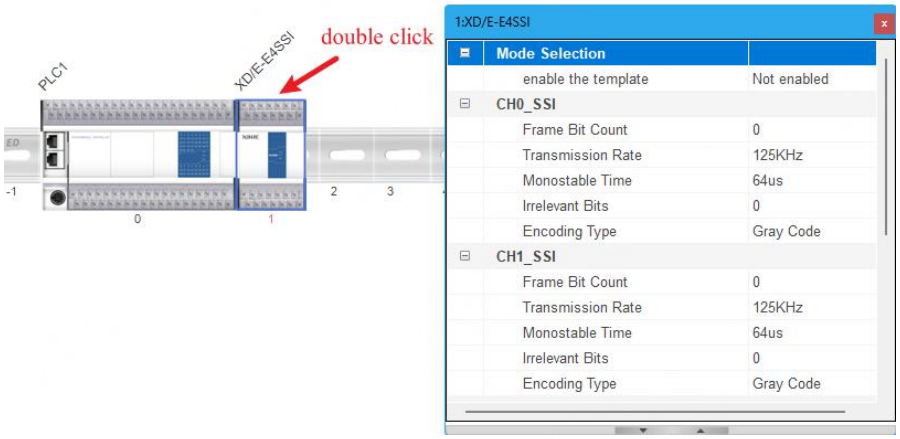
1. Use the XINJE PLC Programming Tool Software version 3.8.0a or later to configure the module; click [PLC Configuration] – [Module Configuration] in the left-side Engineering Bar to open the Expansion Module Settings window. For versions prior to 3.8.0a of the XINJE PLC Programming Tool Software, click [PLC Configuration] – [Expansion Module] in the left-side Engineering Bar to perform the configuration.



2. Select a module from the right-hand module list and drag it to the desired position; alternatively, double-click a module in the right-hand module list to select it:

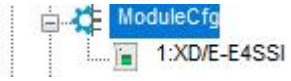


3. Double-click the corresponding module icon to access the module configuration interface, where you can configure the relevant encoder parameters. Based on the parameters of the encoder to be connected, set the number of encoder bits and the encoder type within the module. For example, if the encoder is a 16-bit encoder, enter "16" for the frame bit count and select "Binary" as the encoder type. The transmission rate should be selected in accordance with the length of the shielded twisted-pair cable specified in the "Module Specifications" table in Section 8-2-1.



4. Click "" to view the default configuration parameters for the Expansion module.

5. After completing the parameter configuration for the expansion module, click "" to write the set values into the PLC; the changes will take effect only after the PLC is powered off and then powered on again. Under the Module Configuration Node, mount the configured module, then double-click to enter the Module Parameter Configuration screen.



2) Flash Register Configuration

The parameters for expansion modules (channels 0CH–3CH) can be configured using the dedicated FLASH data register FD within the PLC. As shown below:

Module ID	Configuration Information Address	Module ID	Configuration Information Address
#1	SFD350~SFD359	#9	SFD430~SFD439
#2	SFD360~SFD369	#10	SFD440~SFD449
#3	SFD370~SFD379	#11	SFD450~SFD459
#4	SFD380~SFD389	#12	SFD460~SFD469
#5	SFD390~SFD399	#13	SFD470~SFD479
#6	SFD400~SFD409	#14	SFD480~SFD489
#7	SFD410~SFD419	#15	SFD490~SFD499
#8	SFD420~SFD429	#16	SFD500~SFD509

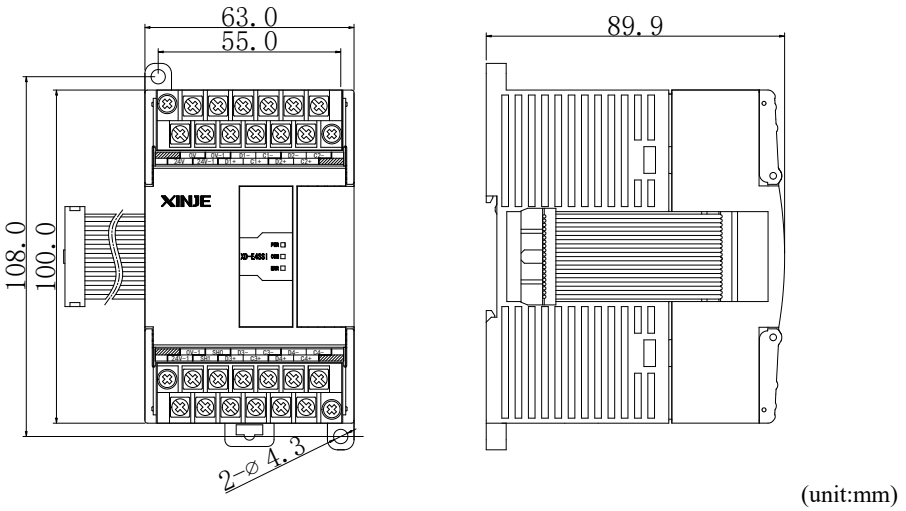
3) SFD Bit Definition

Using the First Module as an example to illustrate the setup method:

<table>
<tr><th colspan="2">Register</th><th>Bit7</th><th>Bit6</th><th>Bit5</th><th>Bit4</th><th>Bit3</th><th>Bit2</th><th>Bit1</th><th>Bit0</th></tr>
<tr><td rowspan="2">SFD350</td><td>Byte0</td><td colspan="8">SSI1 frame length (0−31 bits)</td></tr>
<tr><td>Byte1</td><td colspan="8">SSI2 frame length (0−31 bits)</td></tr>
<tr><td rowspan="2">SFD351</td><td>Byte2</td><td colspan="8">SSI3 frame length (0−31 bits)</td></tr>
<tr><td>Byte3</td><td colspan="8">SSI4 frame length (0−31 bits)</td></tr>
<tr><td rowspan="4">SFD352</td><td rowspan="2">Byte4</td><td>Save</td><td colspan="3">SSI2 transmission rate</td><td>Save</td><td colspan="3">SSI1 transmission rate</td></tr>
<tr><td>X</td><td colspan="3">0：125KHz 1：250KHz
2：500KHz 3：1MHz</td><td>X</td><td colspan="3">0：125KHz 1：250KHz
2：500KHz 3：1MHz</td></tr>
<tr><td rowspan="2">Byte5</td><td>Save</td><td colspan="3">SSI4 transmission rate</td><td>Save</td><td colspan="3">SSI3 transmission rate</td></tr>
<tr><td>X</td><td colspan="3">0：125KHz 1：250KHz
2：500KHz 3：1MHz</td><td>X</td><td colspan="3">0：125KHz 1：250KHz
2：500KHz 3：1MHz</td></tr>
<tr><td rowspan="4">SFD353</td><td rowspan="2">Byte6</td><td colspan="5">SSI2 monostable time</td><td colspan="4">SSI1 monostable time</td></tr>
<tr><td colspan="5">0：64us；1：48us；2：32us；3：16us</td><td colspan="4">0：64us；1：48us；2：32us；3：16us</td></tr>
<tr><td rowspan="2">Byte7</td><td colspan="5">SSI4 monostable time</td><td colspan="4">SSI3 monostable time</td></tr>
<tr><td colspan="5">0：64us；1：48us；2：32us；3：16us</td><td colspan="4">0：64us；1：48us；2：32us；3：16us</td></tr>
<tr><td rowspan="2">SFD354</td><td>Byte8</td><td colspan="8">Save</td></tr>
<tr><td>Byte9</td><td colspan="8">Save</td></tr>
</table>

Register		Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
SFD355	Byte10	SSI4 encoding type		SSI3 encoding type		SSI2 encoding type		SSI1 encoding type	
		0: Gray Code 1: Binary		0: Gray Code 1: Binary		0: Gray Code 1: Binary		0: Gray Code 1: Binary	
	Byte11	Save							
SFD356~SFD359		Save							

8.1.10. Outline Dimensional Drawing



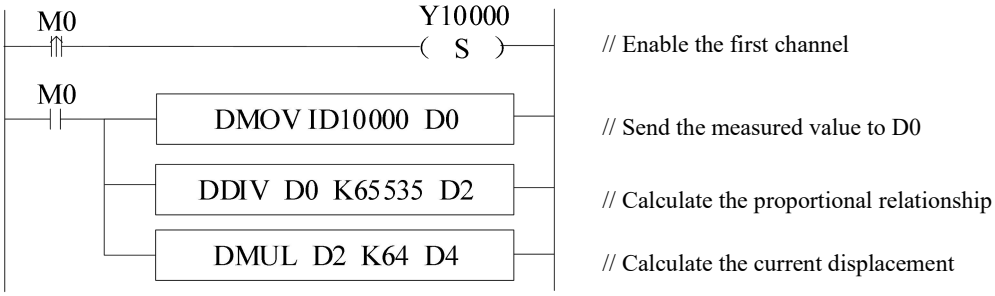
(unit:mm)

8.1.11. Programming Example

example:

A single-axis displacement sensor is used to measure distance (measuring range: 0–64 mm; encoder bits: 16-bit). In this case, the first channel of Module #1 is employed for measurement.

procedure:



description:

When configuring the module, set the SSI1 frame length to 16; leave all other parameters at their default values.

The procedure is illustrated in the figure above; M0 serves as the range measurement function switch. When the rising edge of M0 is detected, the first channel enable switch is activated first.

Since the SSI1 frame length is 16 bits, the range of ID10000 is 0–65535, which corresponds to the displacement sensor's range of 0–64 mm; therefore, by performing a simple calculation using this module, the digital value can be converted into a displacement value.

Assuming the digital value in ID10000 is 4095, the corresponding displacement is 64 × (4095/65535) = 4 mm.

9. Analog Temperature Mixing Module

9.1. Analog Temperature Mixing Module Overview

XD Series Analog Temperature Mixing Module – supports analog input, temperature input, and analog output.

9.1.1.Naming Rule

XD－E○AD○PT○DA
① ② ③ ④ ⑤ ⑥ ⑦ ⑧

①	Series Name	XD: XD Series Expansion Modules
②	Reference Expansion Module	E: Represents an expansion module
③	Number of input channels	2 or 3
④	Signal Type	AD: Represents analog signal input
⑤	Number of input channels	2 or 4
⑥	Signal Type	PT: Indicates the PT100 platinum resistance thermometer signal.
⑦	Number of output channels	2
⑧	Signal Type	DA: Represents analog signal output

9.1.2.Model List

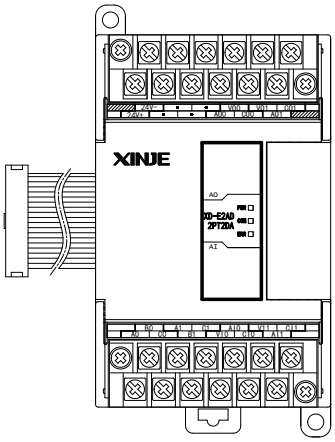
Model		Description
Analog temperature mixing	XD-E2AD2PT2DA	2-channel analog input (16-bit), 2-channel PT100 temperature measurement, 2-channel analog output (10-bit); input and output voltage and current options available.
	XD-E3AD4PT2DA	3-channel analog input (14-bit), 4-channel PT100 temperature measurement, 2-channel analog output (10-bit); input current and output voltage are optional.

9.1.3.General Requirements

Project	Specifications
Service Environment	No corrosive gases
Ambient Temperature	0~60℃
Maintain Ambient Temperature	-20~70℃
Ambient Humidity	5~95%RH
Maintain Ambient Humidity	5~95%RH
Install	Can be secured with M3 screws or installed directly onto a DIN46277 (35 mm wide) guide rail.

9.2. Analog Temperature Mixing Module XD-E2AD2PT2DA

9.2.1.Module Features and Specifications



The XD-E2AD2PT2DA analog expansion module converts two analog input signals into digital values to process two-point PT100 temperature signals; it then converts these digital values back into analog signals and transmits them to the PLC main unit, enabling real-time data exchange with the PLC main unit.

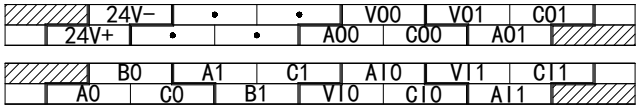
1) Module Features

- Features two-channel 16-bit precision analog input channels, two-channel PT100 temperature input channels, and two-channel 10-bit precision analog output channels.
- Two-channel current and voltage inputs are available: current ranges include 0–20 mA or 4–20 mA; voltage ranges include 0–5 V or 0–10 V; these can be configured via a host computer.
- As XD series expansion modules, the XD3/XD3E series can connect up to 10 modules; the XD5/XDM/XDC/XD5E/XDME/XDH series can connect up to 16 modules (the XD1/XD2 series does not support this).

2) Module Specifications

Project	Analog Input (AD)		Temperature Input (PT)	Analog Output (DA)	
	Voltage Input (V)	Current Input(mA)		Voltage Output (V)	Current Output (mA)
Analog Input Range	0~5,0~10V (Impedance greater than 1 M)	0~20,4~20mA (Impedance: approximately 120 Ω)	-100~500℃	—	
Maximum Input Range	DC 0~15V	-20~40mA	—		
Analog Output Range	—		—	0~5、0~10V External load resistor: 2 kΩ–1 MΩ	0~20、4~20mA External load resistance is less than 500 Ω
Digital Input Range	—		—	0~1023	
Digital Output Range	0~65535		-1000~5000	—	
Resolution Ratio	1/65535(16Bit)		0.1℃	1/1023(10Bit)	
Overall Accuracy	±0.8%		±1% (relative maximum value)	±1%	
Conversion Rate	2ms/1 channel			2ms/1 channel	
Module Power Supply	DC24V±10%，150mA				

9.2.2.Terminal Specifications



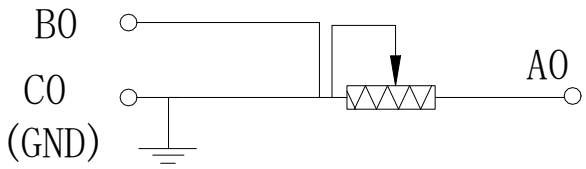
Channel	Terminal Name	Signal Name
CH0	AI0	Current analog input
	VI0	Voltage analog input
	C0	CH0 Analog Input Common Terminal
CH1	AI1	Current analog input
	VI1	Voltage analog input

	C1	CH1 Analog Input Common Terminal
CH0	A0	CH0 temperature input
	B0	CH0 Input Common Terminal
	C0	CH0 Input Common Terminal
CH1	A1	CH1 temperature input
	B1	CH1 Input Common Terminal
	C1	CH1 Input Common Terminal
CH0	AO0	Current analog output
	VO0	Voltage analog output
	C0	CH0 Analog Output Common Terminal
CH1	AO1	Current analog output
	VO1	Voltage analog output
	C1	CH1 Analog Output Common Terminal
-	24V+	+24V power supply
	24V-	Power supply common terminal

9.2.3.External Connection

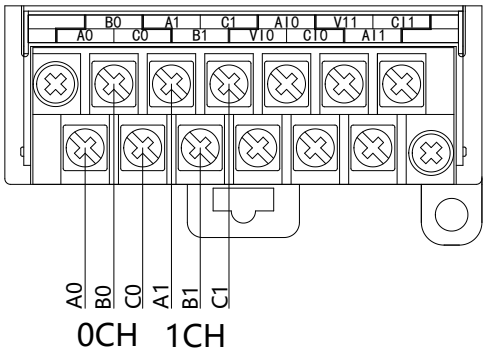
When establishing an external connection, please note the following aspects:

- To prevent interference, please use shielded cable and apply single-point grounding to the shield.
- When connecting the XD-E2AD2PT2DA to an external +24V power supply, please use the 24V power supply built into the PLC unit to avoid interference.
- The input wiring method for a three-wire PT100 platinum resistance thermometer is as follows:

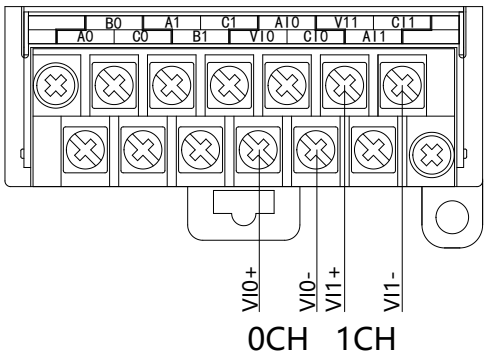


For a standard three-wire PT100 platinum resistance thermometer, the wiring configuration can be determined by the color of the wires; two wires of the same color can be randomly connected to the B0 and C0 terminals, while the remaining wire can be connected to the A0 terminal.

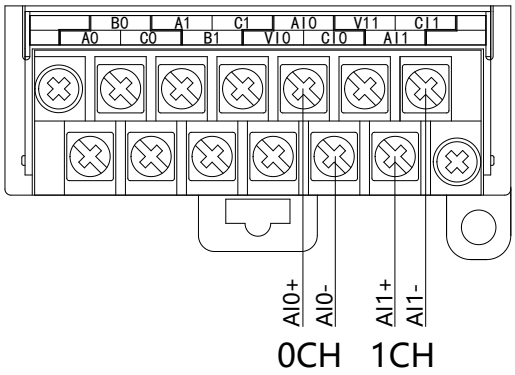
1) Three-Wire Thermal Resistance Input



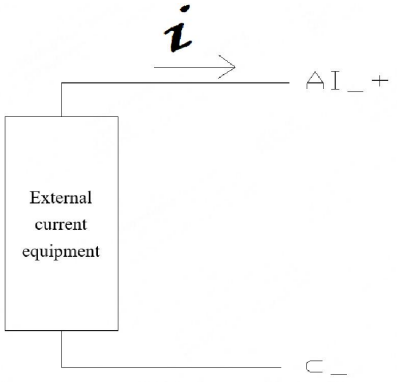
2) Single-Ended Voltage Input



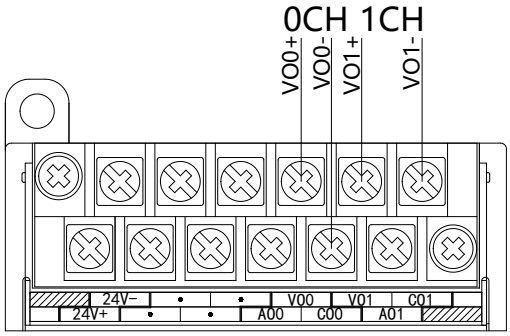
3) Single-Ended Current Input



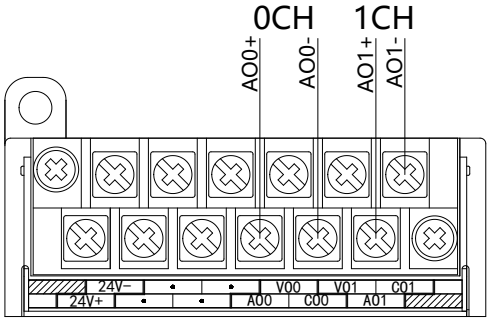
The current input-side wiring for the XD-E2AD2PT2DA is shown in the figure below:



4) Single-Ended Voltage Output



5) Single-Ended Current Output



Current output requires no DC24V power supply in series!

9.2.4.Input/Output Definition Number Allocation

The XD series analog input modules do not occupy any I/O units; the converted values are directly written into the PLC registers. The definition numbers for the PLC registers corresponding to each channel are as follows:

Each channel can only be used when the enable switch is turned on.

First Expansion Module Register Definition Number

AD Channel	AD Signal	Channel Enable Switch
0CH	ID10000 (Double-byte)	Y10000
1CH	ID10002 (Double-byte)	Y10001
PT Channel	PT Signal	Channel Enable Switch
0CH	ID10004	Y10002
1CH	ID10005	Y10003
DA Channel	DA Signal	Channel Enable Switch
0CH	QD10000	Y10004
1CH	QD10001	Y10005

Second Expansion Module Register Definition Number

AD Channel	AD Signal	Channel Enable Switch
0CH	ID10100 (Double-byte)	Y10100
1CH	ID10102 (Double-byte)	Y10101
PT Channel	PT Signal	Channel Enable Switch
0CH	ID10104	Y10102
1CH	ID10105	Y10103
DA Channel	DA Signal	Channel Enable Switch
0CH	QD10100	Y10104
1CH	QD10101	Y10105

Third Expansion Module Register Definition Number

AD Channel	AD Signal	Channel Enable Switch
0CH	ID10200 (Double-byte)	Y10200
1CH	ID10202 (Double-byte)	Y10201
PT Channel	PT Signal	Channel Enable Switch
0CH	ID10204	Y10202
1CH	ID10205	Y10203
DA Channel	DA Signal	Channel Enable Switch
0CH	QD10200	Y10204
1CH	QD10201	Y10205

Fourth Expansion Module Register Definition Number

AD Channel	AD Signal	Channel Enable Switch
0CH	ID10300 (Double-byte)	Y10300
1CH	ID10302 (Double-byte)	Y10301
PT Channel	PT Signal	Channel Enable Switch
0CH	ID10304	Y10302
1CH	ID10305	Y10303
DA Channel	DA Signal	Channel Enable Switch
0CH	QD10300	Y10304
1CH	QD10301	Y10305

Fifth Expansion Module Register Definition Number

AD Channel	AD Signal	Channel Enable Switch
0CH	ID10400 (Double-byte)	Y10400
1CH	ID10402 (Double-byte)	Y10401
PT Channel	PT Signal	Channel Enable Switch
0CH	ID10404	Y10402
1CH	ID10405	Y10403
DA Channel	DA Signal	Channel Enable Switch
0CH	QD10400	Y10404
1CH	QD10401	Y10405

Sixth Expansion Module Register Definition Number

AD Channel	AD Signal	Channel Enable Switch
0CH	ID10500 (Double-byte)	Y10500
1CH	ID10502 (Double-byte)	Y10501
PT Channel	PT Signal	Channel Enable Switch
0CH	ID10504	Y10502
1CH	ID10505	Y10503
DA Channel	DA Signal	Channel Enable Switch
0CH	QD10500	Y10504
1CH	QD10501	Y10505

Seventh Expansion Module Register Definition Number

AD Channel	AD Signal	Channel Enable Switch
0CH	ID10600 (Double-byte)	Y10600
1CH	ID10602 (Double-byte)	Y10601
PT Channel	PT Signal	Channel Enable Switch
0CH	ID10604	Y10602
1CH	ID10605	Y10603
DA Channel	DA Signal	Channel Enable Switch
0CH	QD10600	Y10604
1CH	QD10601	Y10605

Eighth Expansion Module Register Definition Number

AD Channel	AD Signal	Channel Enable Switch
0CH	ID10700 (Double-byte)	Y10700
1CH	ID10702 (Double-byte)	Y10701
PT Channel	PT Signal	Channel Enable Switch
0CH	ID10704	Y10702
1CH	ID10705	Y10703
DA Channel	DA Signal	Channel Enable Switch
0CH	QD10700	Y10704
1CH	QD10701	Y10705

Ninth Expansion Module Register Definition Number

AD Channel	AD Signal	Channel Enable Switch
0CH	ID11000 (Double-byte)	Y11000
1CH	ID11002 (Double-byte)	Y11001
PT Channel	PT Signal	Channel Enable Switch
0CH	ID11004	Y11002
1CH	ID11005	Y11003
DA Channel	DA Signal	Channel Enable Switch
0CH	QD11000	Y11004
1CH	QD11001	Y11005

Tenth Expansion Module Register Definition Number

AD Channel	AD Signal	Channel Enable Switch
0CH	ID11100 (Double-byte)	Y11100
1CH	ID11102 (Double-byte)	Y11101
PT Channel	PT Signal	Channel Enable Switch
0CH	ID11104	Y11102
1CH	ID11105	Y11103
DA Channel	DA Signal	Channel Enable Switch
0CH	QD11100	Y11104
1CH	QD11101	Y11105

Eleventh Expansion Module Register Definition Number

AD Channel	AD Signal	Channel Enable Switch
0CH	ID11200 (Double-byte)	Y11200
1CH	ID11202 (Double-byte)	Y11201
PT Channel	PT Signal	Channel Enable Switch
0CH	ID11204	Y11202
1CH	ID11205	Y11203
DA Channel	DA Signal	Channel Enable Switch
0CH	QD11200	Y11204
1CH	QD11201	Y11205

Twelfth Expansion Module Register Definition Number

AD Channel	AD Signal	Channel Enable Switch
0CH	ID11300 (Double-byte)	Y11300
1CH	ID11302 (Double-byte)	Y11301
PT Channel	PT Signal	Channel Enable Switch
0CH	ID11304	Y11302
1CH	ID11305	Y11303
DA Channel	DA Signal	Channel Enable Switch
0CH	QD11300	Y11304
1CH	QD11301	Y11305

Thirteenth Expansion Module Register Definition Number

AD Channel	AD Signal	Channel Enable Switch
0CH	ID11400 (Double-byte)	Y11400
1CH	ID11402 (Double-byte)	Y11401
PT Channel	PT Signal	Channel Enable Switch
0CH	ID11404	Y11402
1CH	ID11405	Y11403
DA Channel	DA Signal	Channel Enable Switch
0CH	QD11400	Y11404
1CH	QD11401	Y11405

Fourteenth Expansion Module Register Definition Number

AD Channel	AD Signal	Channel Enable Switch
0CH	ID11500 (Double-byte)	Y11500
1CH	ID11502 (Double-byte)	Y11501
PT Channel	PT Signal	Channel Enable Switch
0CH	ID11504	Y11502
1CH	ID11505	Y11503
DA Channel	DA Signal	Channel Enable Switch
0CH	QD11500	Y11504
1CH	QD11501	Y11505

Fifteenth Expansion Module Register Definition Number

AD Channel	AD Signal	Channel Enable Switch
0CH	ID11600 (Double-byte)	Y11600
1CH	ID11602 (Double-byte)	Y11601
PT Channel	PT Signal	Channel Enable Switch
0CH	ID11604	Y11602
1CH	ID11605	Y11603
DA Channel	DA Signal	Channel Enable Switch
0CH	QD11600	Y11604
1CH	QD11601	Y11605

Sixteenth Expansion Module Register Definition Number

AD Channel	AD Signal	Channel Enable Switch
0CH	ID11700 (Double-byte)	Y11700
1CH	ID11702 (Double-byte)	Y11701
PT Channel	PT Signal	Channel Enable Switch
0CH	ID11704	Y11702
1CH	ID11705	Y11703
DA Channel	DA Signal	Channel Enable Switch
0CH	QD11700	Y11704
1CH	QD11701	Y11705



- Disabling unused channels can increase the input/output scanning speed.
- When the input enable switch is turned off during operation, the corresponding input channel will fail to acquire any data (the data value will be displayed as 0).
- When the output enable switch is turned off during operation, the corresponding output channel retains its original data.

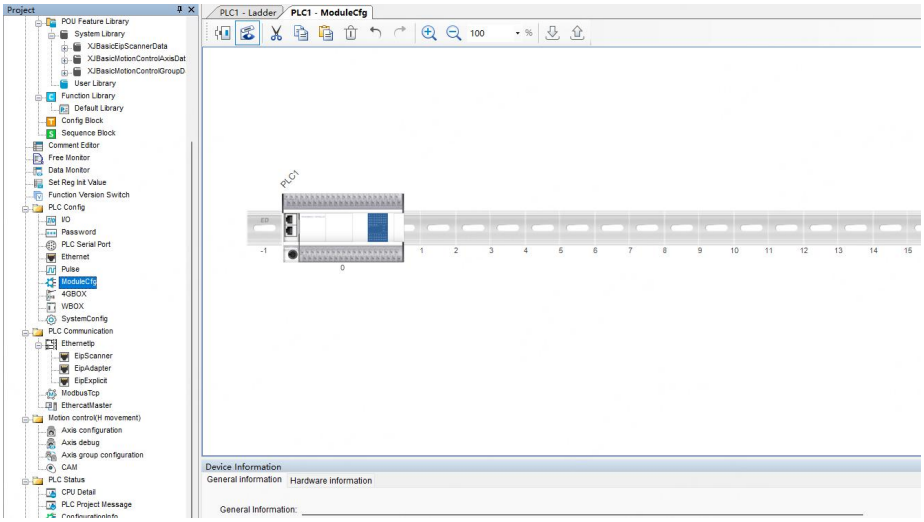
9.2.5.Work Mode Setup

There are two methods for configuring the operating mode (these two methods yield equivalent results):

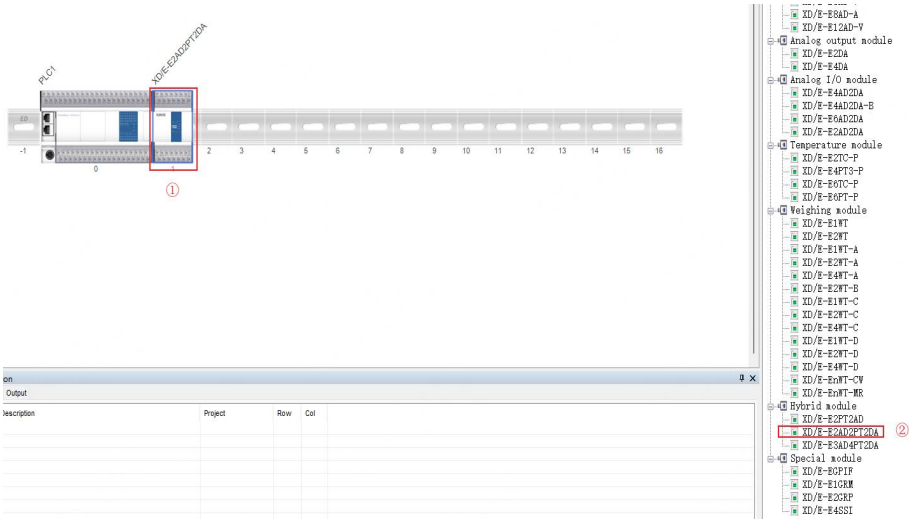
- Through Control Panel configuration
- Set via Flash registers

1) Configuration Panel Configuration

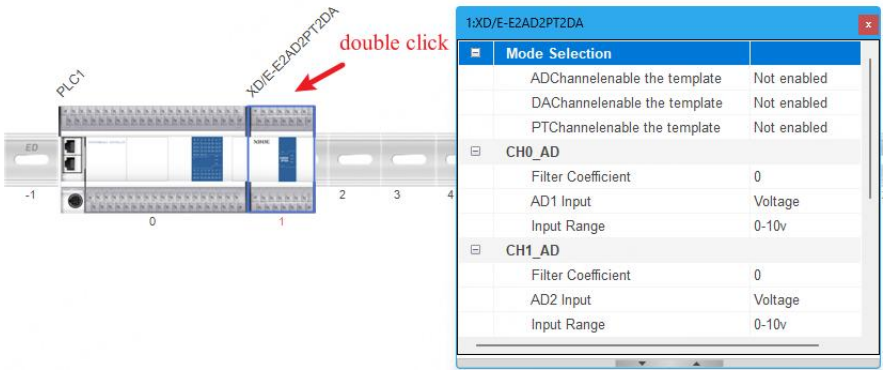
1. Use the XINJE PLC Programming Tool Software version 3.8.0a or later to configure the module; click [PLC Configuration] – [Module Configuration] in the left-side Engineering Bar to open the Expansion Module Settings window. For versions prior to 3.8.0a of the XINJE PLC Programming Tool Software, click [PLC Configuration] – [Expansion Module] in the left-side Engineering Bar to perform the configuration.



2. Select a module from the right-hand module list and drag it to the desired position; alternatively, double-click a module in the right-hand module list to select it:

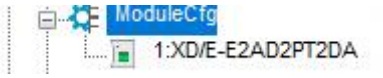


3. Double-click the corresponding module icon to access the module configuration interface, where you can select the AD filter coefficient and the voltage or current input mode for the AD/DA channel.



4. Click " " to view the default configuration parameters for the Expansion module.

5. After completing the parameter configuration for the expansion module, click "" to write the set values into the PLC; the changes will take effect only after the PLC is powered off and then powered on again. Under the Module Configuration Node, mount the configured module, then double-click to enter the Module Parameter Configuration screen.



- The first-order low-pass filtering method weights the current sample value by the previous filtered output value to obtain the effectively filtered value.
- The filtering coefficient is set by the user between 0 and 254; a lower value results in more stable data but may cause data lag; a value of 1 applies the strongest filtering effect, while a value of 254 applies the weakest filtering effect; the default value is 0 (no filtering).

2) Flash Register Configuration

The expansion module's input and output channels support two selectable modes: voltage and current. The current mode offers options of 0–20 mA or 4–20 mA, while the voltage mode offers options of 0–5 V or 0–10 V. These settings are configured using the SFD (Special FLASH Data Register) within the PLC. As shown below:

Module ID	Configuration Information Address	Module ID	Configuration Information Address
#1	SFD350~SFD359	#9	SFD430~SFD439
#2	SFD360~SFD369	#10	SFD440~SFD449
#3	SFD370~SFD379	#11	SFD450~SFD459
#4	SFD380~SFD389	#12	SFD460~SFD469
#5	SFD390~SFD399	#13	SFD470~SFD479
#6	SFD400~SFD409	#14	SFD480~SFD489
#7	SFD410~SFD419	#15	SFD490~SFD499
#8	SFD420~SFD429	#16	SFD500~SFD509

As shown above, each register is configured to set the mode for four channels; each register consists of 16 bits, and the modes for the four channels are configured sequentially in groups of four bits, from the lowest to the highest bit position.

3) SFD Bit Definition

Using the First Module as an example to illustrate the setup method.

<table>
<tr><th colspan="2">Register</th><th>Bit7</th><th>Bit6</th><th>Bit5</th><th>Bit4</th><th>Bit3</th><th>Bit2</th><th>Bit1</th><th>Bit0</th><th>Explain</th></tr>
<tr><td rowspan="2">SFD350</td><td>Byte0</td><td colspan="8">AD Channel 0 Filter Coefficient</td><td rowspan="2">AD filtering coefficient</td></tr>
<tr><td>Byte1</td><td colspan="8">AD Channel 1 Filter Coefficient</td></tr>
<tr><td rowspan="2">SFD351</td><td>Byte2</td><td colspan="8">PT Channel 0 Filter Coefficient</td><td rowspan="2">PT filtering coefficient</td></tr>
<tr><td>Byte3</td><td colspan="8">PT Channel 1 Filter Coefficient</td></tr>
<tr><td rowspan="6">SFD352</td><td rowspan="3">Byte4</td><td>Bit7</td><td>Bit6</td><td>Bit5</td><td>Bit4</td><td>Bit3</td><td>Bit2</td><td>Bit1</td><td>Bit0</td><td rowspan="12">Used to specify the input range for the AD and DA modules; the lower 4 bits of Byte4 serve as the configuration bits for AD Channel 1, while the upper 4 bits serve as the configuration bits for AD Channel 2; the lower 4 bits of Byte5 serve as the configuration bits for DA Channel 1, while the upper 4 bits serve as the configuration bits for DA Channel 2.</td></tr>
<tr><td colspan="4">AD2</td><td colspan="4">AD1</td></tr>
<tr><td>Save</td><td colspan="3">000：0~10V
001：0~5V
010：0~20mA
011：4~20mA</td><td>Save</td><td colspan="3">000：0~10V
001：0~5V
010：0~20mA
011：4~20mA</td></tr>
<tr><td rowspan="3">Byte5</td><td>Bit7</td><td>Bit6</td><td>Bit5</td><td>Bit4</td><td>Bit3</td><td>Bit2</td><td>Bit1</td><td>Bit0</td></tr>
<tr><td colspan="4">DA2</td><td colspan="4">DA1</td></tr>
<tr><td>Save</td><td colspan="3">000：0~10V
001：0~5V
010：0~20mA
011：4~20mA</td><td>Save</td><td colspan="3">000：0~10V
001：0~5V
010：0~20mA
011：4~20mA</td></tr>
<tr><td colspan="2">SFD353~SFD359</td><td colspan="8">Save</td></tr>
</table>

Example: Set the operating modes for Channels 3, 2, 1, and 0 of the first module to 0–20 mA, 4–20 mA, 0–10 V, and 0–5 V, respectively; set the filtering coefficients for Channels 1 and 2 to 254; set the filtering coefficients for Channels 3 and 4 to 100; set the operating modes for Channels 1 and 0 at the output to 0–10 V and 0–20 mA, respectively.

Method 1:

It can be configured directly on the configuration panel; the configuration method is shown above.

Method 2:

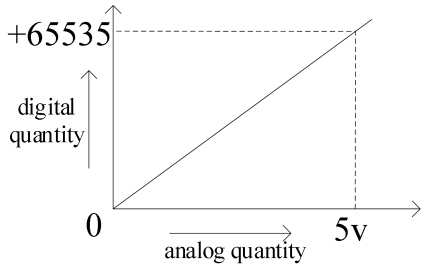
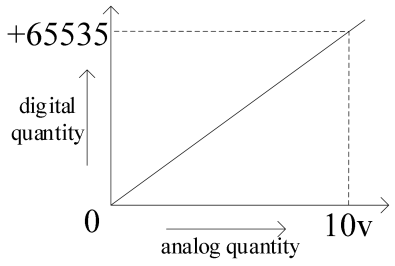
Set the SFD special register directly to the following value:

SFD350=FEFEH SFD351=4C1H SFD352=10H

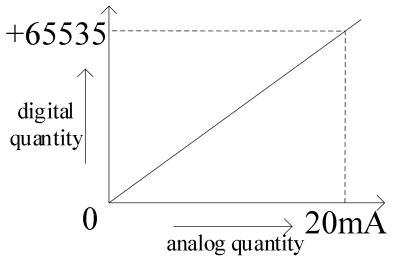
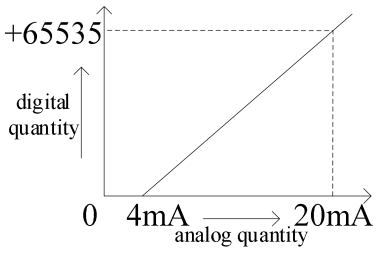
9.2.6.Analog-to-Digital Conversion Diagram

The relationship between the input analog signal and the converted digital signal is shown in the table below:

- Analog voltage analog-to-digital conversion diagram

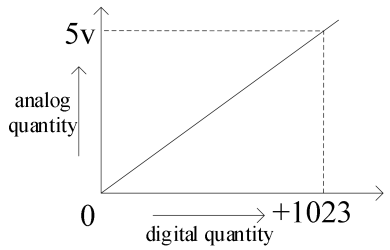
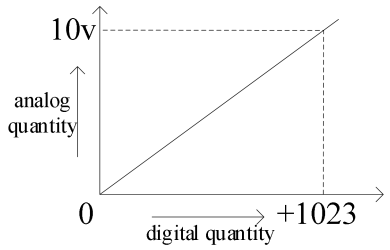
Relationship Between Input Analog Signal and the Converted Digital Signal	
0−5 V Analog Input	0−10 V Analog Input
	

- Analog current analog-to-digital conversion diagram

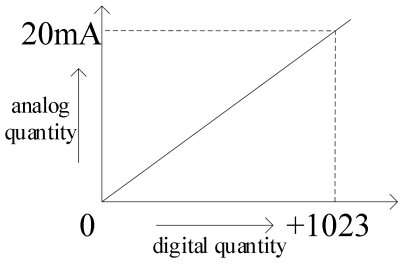
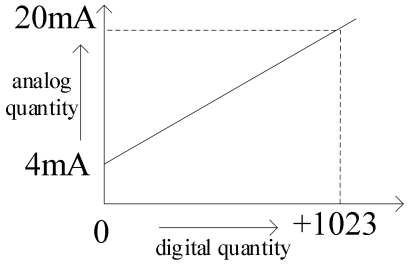
Relationship Between Input Analog Signal and the Converted Digital Signal	
0−20 mA Analog Input	4−20 mA Analog Input
	

The relationship between the digital output and its corresponding analog data is shown in the table below:

- Analog voltage analog-to-digital conversion diagram

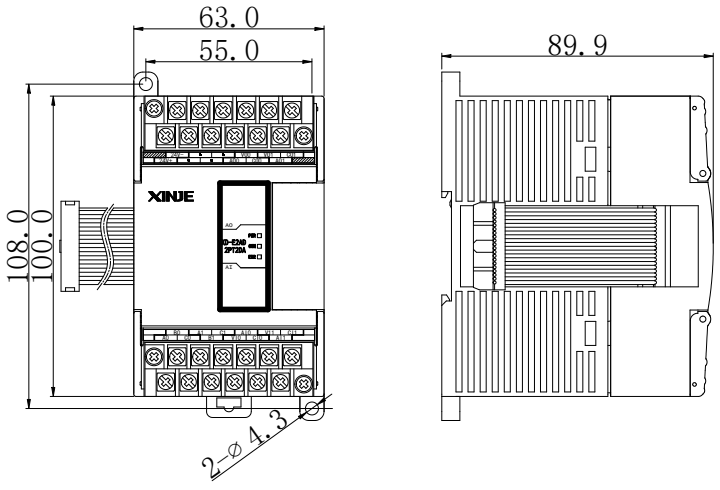
Relationship Between Input Digital Values and Output Analog Values	
0−5 V Analog Output	0−10 V Analog Output
	

- Analog current analog-to-digital conversion diagram

Relationship Between Input Digital Signal and Output Analog Signal	
0−20 mA Analog Output	4−20 mA Analog Output
	

When the input data exceeds K1023, the output analog data from the D/A converter remains constant at 5 V, 10 V, or 20 mA.

9.2.7.Outline Dimensional Drawing



(unit:mm)

9.2.8.Programming Example

Example: A single pressure sensor output signal needs to be acquired (Pressure sensor performance parameters: detection pressure range of 0 MPa–10 MPa; output analog signal ranges from 4–20 mA); simultaneously, a 0 V–10 V voltage signal must be output to the frequency converter.

Analyze:

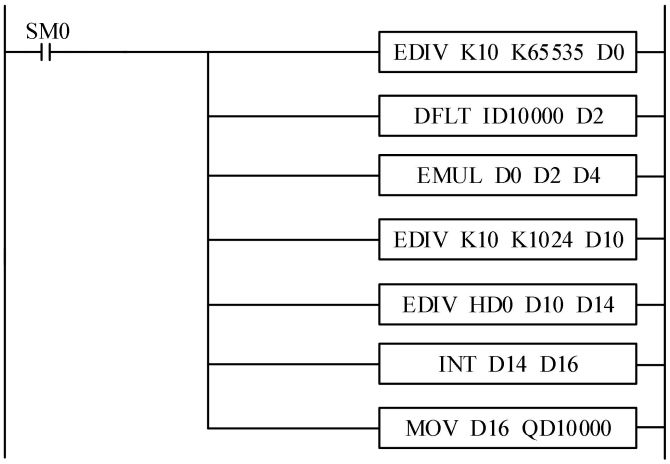
Since the pressure sensor's measurement range is 0 MPa–10 MPa, corresponding to an analog output of 4–20 mA, and the digital output range converted by the expansion module via analog-to-digital conversion is 0–65,535, we can bypass the intermediate analog-to-digital conversion step—meaning the digital output range directly corresponds to the pressure measurement range of 0 MPa–10 MPa (i.e., 0–65,535). The value 10 MPa / 65,536 = 0.0001525879 represents the pressure value corresponding to each digital unit captured by the expansion module. Therefore, by multiplying the real-time digital value read from the expansion module's ID register by 0.0001525879, the current pressure measured by the sensor can be calculated. For example, if the digital value read from the ID register is 16,384, the corresponding pressure is 2.5 MPa.

Similarly, the digitally set range of 0–1023 in the QD expansion module register corresponds to a voltage output signal ranging from 0 V to 10 V; the value 10 V/1024 = 0.0097656 indicates the voltage value corresponding to each digitally set value in the QD expansion module register. For example, if you need to output a voltage of 3 V, then 3 V / 0.0097656 = 307; this calculated digital value should then be written into the corresponding QD register.



Please use floating-point arithmetic for calculations; otherwise, the calculation accuracy may be affected, or the calculation may even be impossible!

procedure:



description:

SM0 is a normally ON coil that remains in the ON state throughout the PLC operation.

When the PLC starts operating, the analog signal acquisition first calculates the pressure value corresponding to each digital value of 1 acquired by the expansion module; then, the digital value (integer type) acquired from the ID10000 register is converted into a floating-point number. Therefore, the current real-time pressure value can be determined by multiplying the real-time value acquired from the ID10000 register of the expansion module by the pressure value corresponding to each digital value of 1 acquired by the expansion module.

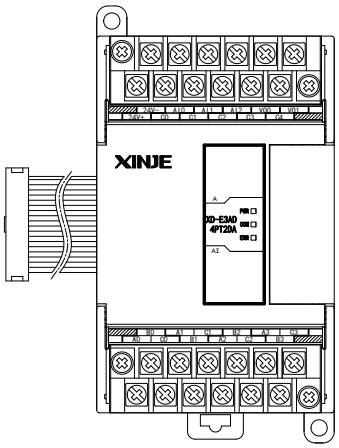
Similarly, for an analog output, first calculate the voltage value corresponding to each digital value of 1 acquired by the expansion module; then divide the set target voltage value by this voltage value to obtain the required digital value (as a floating-point number). Since the QD10000 register can only store integers, the resulting floating-point digital value must be converted into an integer before being transmitted to the QD10000 register.



Please enable the corresponding channel by setting Y10000 and Y1004 to ON.

9.3. Analog Temperature Mixing Module XD-E3AD4PT2DA

9.3.1.Module Features and Specifications



The XD-E3AD4PT2DA analog expansion module converts three analog input signals into digital values to process four-point PT100 temperature signals; it also converts two digital signals into analog signals and transmits them to the PLC main unit, enabling real-time data exchange with the PLC main unit.

1) Module Features

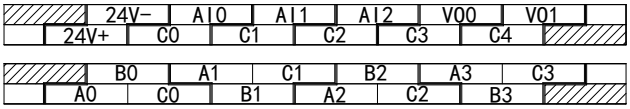
- Features a 3-channel, 14-bit precision current input, a 4-channel PT100 temperature input, and a 2-channel, 10-bit precision voltage output.
- Three-channel current inputs (0–20 mA or 4–20 mA) and two-channel voltage outputs (0–5 V or 0–10 V) are optionally available; these can be configured via a host computer.
- As XD series expansion modules, the XD3/XD3E series can connect up to 10 modules; the XD5/XDM/XDC/XD5E/XDME/XDH series can connect up to 16 modules (the XD1/XD2 series does not support this).

2) Module Specifications

Project	Analog Input (AD)	Temperature Input (PT)	Analog Output (DA)
	Current Input(mA)	—	Voltage Output (V)
Analog Input Range	0~20,4~20mA (Impedance: approximately 120 Ω)	-100~500℃	—
Maximum Input Range	-20~40mA	—	
Analog Output Range	—	—	0~5、0~10V External load resistor: 2 kΩ–1 MΩ
Digital Input Range	—	—	0~1023

Digital Output Range	0~16383	-1000~5000	—
Resolution Ratio	1/16383(14Bit)	0.1℃	1/1023(10Bit)
Overall Accuracy	1%	±1% (relative maximum value)	±1%
Conversion Rate	2ms/1 channel		2ms/1 channel
Module Power Supply	DC24V±10%，150mA		

9.3.2.Terminal Specifications

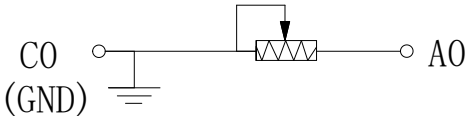


Channel	Terminal Name	Signal Name
CH0	AI0	0CH Current Input
	C0	0CH Current Input Common Terminal
CH1	AI1	1CH Current Input
	C1	1CH Current Input Common Terminal
CH2	AI2	2CH current input
	C2	2CH Current Input Common Terminal
CH0	A0	0°C temperature input
	B0	-
	C0	0CH Input Common Terminal
CH1	A1	1CH temperature input
	B1	-
	C1	1CH Input Common Terminal
CH2	A2	2-channel temperature input
	B2	-
	C2	2CH Input Common Terminal
CH3	A3	3CH temperature input
	B3	-
	C3	3CH Input Common Terminal
CH0	VO0	0V voltage output
	C3	0V voltage output common terminal
CH1	VO1	1CH voltage output
	C4	1CH Voltage Output Common Terminal
-	24V	+24V power input
	0V	Power supply common terminal

9.3.3.External Connection

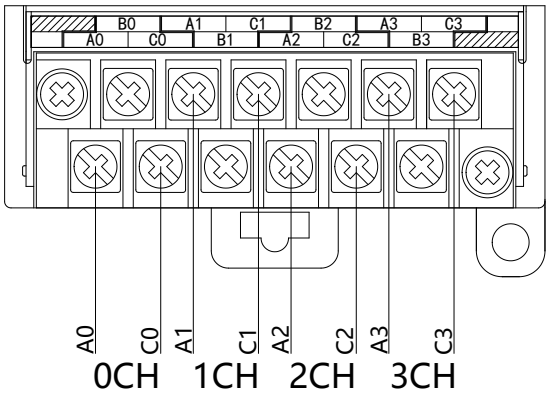
When establishing an external connection, please note the following aspects:

- To prevent interference, please use shielded cable and apply single-point grounding to the shield.
- When connecting an external +24V power supply to the XD-E3AD4PT2DA, please use the 24V power supply built into the PLC unit to avoid interference.
- The input wiring method for a two-wire PT100 platinum resistance thermometer is as follows:

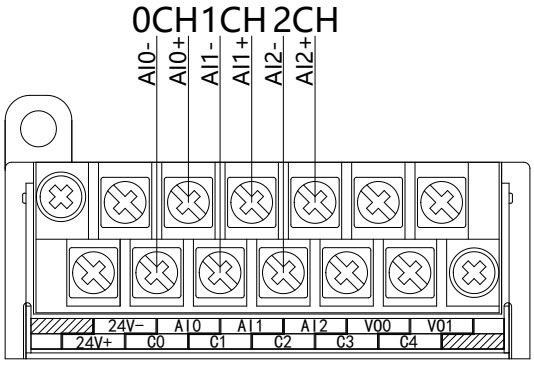


The temperature signal supports only a two-wire PT100 platinum resistance thermometer input.

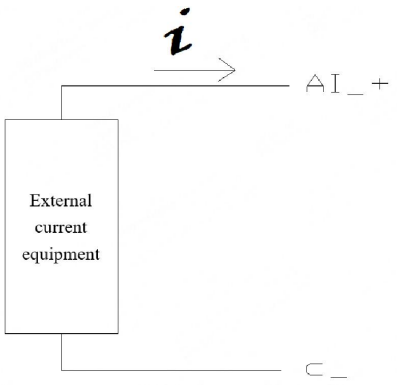
1) Two-Wire Thermal Resistance Input



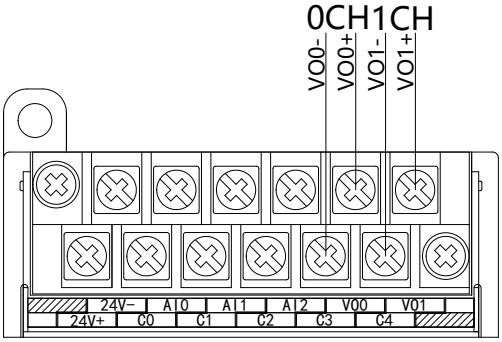
2) Single-Ended Current Input



The current input-side wiring for the XD-E3AD4PT2DA is shown in the figure below:



3) Single-Ended Voltage Output



9.3.4.Input/Output Definition Number Allocation

The XD series analog input modules do not occupy any I/O units; the converted values are directly written into the PLC registers. The definition numbers for the PLC registers corresponding to each channel are as follows:

Each channel can only be used when the enable switch is turned on.

First Expansion Module Register Definition Number

AD Channel	AD Signal	Channel Enable Switch
0CH	ID10000	Y10000
1CH	ID10001	Y10001
2CH	ID10002	Y10002
PT Channel	PT Signal	Channel Enable Switch
0CH	ID10003	Y10003
1CH	ID10004	Y10004
2CH	ID10005	Y10005
3CH	ID10006	Y10006
DA Channel	DA Signal	Channel Enable Switch
0CH	QD10000	Y10007

1CH	QD10001	Y10010

Second Expansion Module Register Definition Number

AD channel	AD signal	Channel enable switch
0CH	ID10100	Y10100
1CH	ID10101	Y10101
2CH	ID10102	Y10102
PT channel	PT signal	Channel enable switch
0CH	ID10103	Y10103
1CH	ID10104	Y10104
2CH	ID10105	Y10105
3CH	ID10106	Y10106
DA channel	DA signal	Channel enable switch
0CH	QD10100	Y10107
1CH	QD10101	Y10110

Third Expansion Module Register Definition Number

AD Channel	AD Signal	Channel Enable Switch
0CH	ID10200	Y10200
1CH	ID10201	Y10201
2CH	ID10202	Y10202
PT Channel	PT Signal	Channel Enable Switch
0CH	ID10203	Y10203
1CH	ID10204	Y10204
2CH	ID10205	Y10205
3CH	ID10206	Y10206
DA Channel	DA Signal	Channel Enable Switch
0CH	QD10200	Y10207
1CH	QD10201	Y10210

Fourth Expansion Module Register Definition Number

AD Channel	AD Signal	Channel Enable Switch
0CH	ID10300	Y10300
1CH	ID10301	Y10301
2CH	ID10302	Y10302
PT Channel	PT Signal	Channel Enable Switch
0CH	ID10303	Y10303
1CH	ID10304	Y10304
2CH	ID10305	Y10305
3CH	ID10306	Y10306
DA Channel	DA Signal	Channel Enable Switch
0CH	QD10300	Y10307
1CH	QD10301	Y10310

Fifth Expansion Module Register Definition Number

AD Channel	AD Signal	Channel Enable Switch
0CH	ID10400	Y10400
1CH	ID10401	Y10401
2CH	ID10402	Y10402
PT Channel	PT Signal	Channel Enable Switch
0CH	ID10403	Y10403
1CH	ID10404	Y10404
2CH	ID10405	Y10405
3CH	ID10406	Y10406
DA Channel	DA Signal	Channel Enable Switch
0CH	QD10400	Y10407
1CH	QD10401	Y10410

Sixth Expansion Module Register Definition Number

AD Channel	AD Signal	Channel Enable Switch
0CH	ID10500	Y10500
0CH	ID10501	Y10501
2CH	ID10502	Y10502
PT Channel	PT Signal	Channel Enable Switch
0CH	ID10503	Y10503
1CH	ID10504	Y10504
2CH	ID10505	Y10505
3CH	ID10506	Y10506
DA Channel	DA Signal	Channel Enable Switch
0CH	QD10500	Y10507
1CH	QD10501	Y10510

Seventh Expansion Module Register Definition Number

AD Channel	AD Signal	Channel Enable Switch
0CH	ID10600	Y10600
1CH	ID10601	Y10601
2CH	ID10602	Y10602
PT Channel	PT Signal	Channel Enable Switch
0CH	ID10603	Y10603
1CH	ID10604	Y10604
2CH	ID10605	Y10605
3CH	ID10606	Y10606
DA Channel	DA Signal	Channel Enable Switch
0CH	QD10600	Y10607
1CH	QD10601	Y10610

Eighth Expansion Module Register Definition Number

AD Channel	AD Signal	Channel Enable Switch
0CH	ID10700	Y10700
1CH	ID10701	Y10701
2CH	ID10702	Y10702
PT Channel	PT Signal	Channel Enable Switch
0CH	ID10703	Y10703
1CH	ID10704	Y10704
2CH	ID10705	Y10705
3CH	ID10706	Y10706
DA Channel	DA Signal	Channel Enable Switch
0CH	QD10700	Y10707
1CH	QD10701	Y10710

Ninth Expansion Module Register Definition Number

AD Channel	AD Signal	Channel Enable Switch
0CH	ID11000	Y11000
1CH	ID11001	Y11001
2CH	ID11002	Y11002
PT Channel	PT Signal	Channel Enable Switch
0CH	ID11003	Y11003
1CH	ID11004	Y11004
2CH	ID11005	Y11005
3CH	ID11006	Y11006
DA Channel	DA Signal	Channel Enable Switch
0CH	QD11000	Y11007
1CH	QD11001	Y11010

Tenth Expansion Module Register Definition Number

AD Channel	AD Signal	Channel Enable Switch
0CH	ID11100	Y11100
1CH	ID11101	Y11101
2CH	ID11102	Y11102
PT Channel	PT Signal	Channel Enable Switch
0CH	ID11103	Y11103
1CH	ID11104	Y11104
2CH	ID11105	Y11105
3CH	ID11106	Y11106
DA Channel	DA Signal	Channel Enable Switch
0CH	QD11100	Y11107
1CH	QD11101	Y11110

Eleventh Expansion Module Register Definition Number

AD Channel	AD Signal	Channel Enable Switch
0CH	ID11200	Y11200
1CH	ID11201	Y11201
2CH	ID11202	Y11202
PT Channel	PT Signal	Channel Enable Switch
0CH	ID11203	Y11203
1CH	ID11204	Y11204
2CH	ID11205	Y11205
3CH	ID11206	Y11206
DA Channel	DA Signal	Channel Enable Switch
0CH	QD11200	Y11207
1CH	QD11201	Y11210

Twelfth Expansion Module Register Definition Number

AD Channel	AD Signal	Channel Enable Switch
0CH	ID11300	Y11300
1CH	ID11301	Y11301
2CH	ID11302	Y11302
PT Channel	PT Signal	Channel Enable Switch
0CH	ID11303	Y11303
1CH	ID11304	Y11304
2CH	ID11305	Y11305
3CH	ID11306	Y11306
DA Channel	DA Signal	Channel Enable Switch
0CH	QD11300	Y11307
1CH	QD11301	Y11310

Thirteenth Expansion Module Register Definition Number

AD Channel	AD Signal	Channel Enable Switch
0CH	ID11400	Y11400
1CH	ID11401	Y11401
2CH	ID11402	Y11402
PT Channel	PT Signal	Channel Enable Switch
0CH	ID11403	Y11403
1CH	ID11404	Y11404
2CH	ID11405	Y11405
3CH	ID11406	Y11406
DA Channel	DA Signal	Channel Enable Switch
0CH	QD11400	Y11407
1CH	QD11401	Y11410

Fourteenth Expansion Module Register Definition Number

AD Channel	AD Signal	Channel Enable Switch
0CH	ID11500	Y11500
1CH	ID11501	Y11501
2CH	ID11502	Y11502
PT Channel	PT Signal	Channel Enable Switch
0CH	ID11503	Y11503
1CH	ID11504	Y11504
2CH	ID11505	Y11505
3CH	ID11506	Y11506
DA Channel	DA Signal	Channel Enable Switch
0CH	QD11500	Y11507
1CH	QD11501	Y11510

Fifteenth Expansion Module Register Definition Number

AD Channel	AD Signal	Channel Enable Switch
0CH	ID11600	Y11600
1CH	ID11601	Y11601
2CH	ID11602	Y11602
PT Channel	PT Signal	Channel Enable Switch
0CH	ID11603	Y11603
1CH	ID11604	Y11604
2CH	ID11605	Y11605
3CH	ID11606	Y11606
DA Channel	DA Signal	Channel Enable Switch
0CH	QD11600	Y11607
1CH	QD11601	Y11610

Sixteenth Expansion Module Register Definition Number

AD Channel	AD Signal	Channel Enable Switch
0CH	ID11700	Y11700
1CH	ID11701	Y11701
2CH	ID11702	Y11702
PT Channel	PT Signal	Channel Enable Switch
0CH	ID11703	Y11703
1CH	ID11704	Y11704
2CH	ID11705	Y11705
3CH	ID11706	Y11706
DA Channel	DA Signal	Channel Enable Switch
0CH	QD11700	Y11707
1CH	QD11701	Y11710

- Disabling unused channels can increase the input/output scanning speed.
- When the input enable switch is turned off during operation, the corresponding input channel will no longer collect any data (the data value will be displayed as 0).
- When the output enable switch is turned off during operation, the corresponding output channel maintains its original output level.

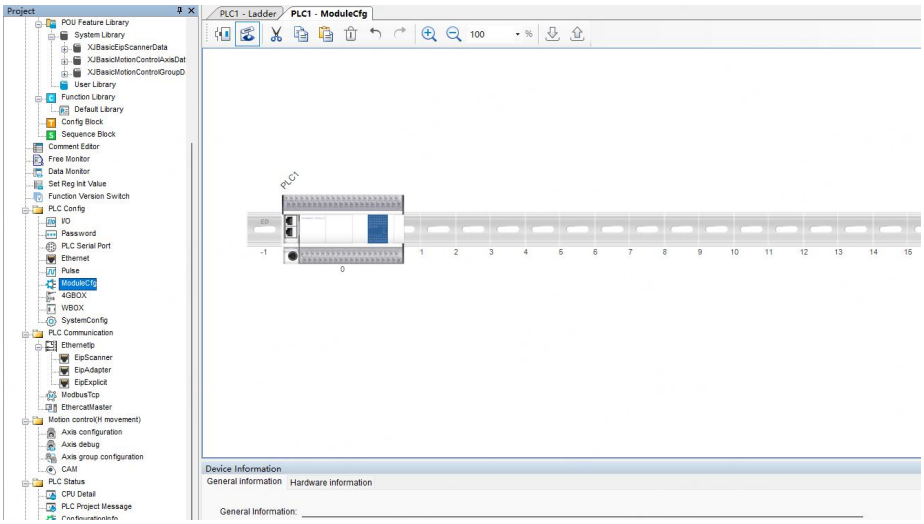
9.3.5.Work Mode Setup

There are two methods for configuring the operating mode (these two methods yield equivalent results):

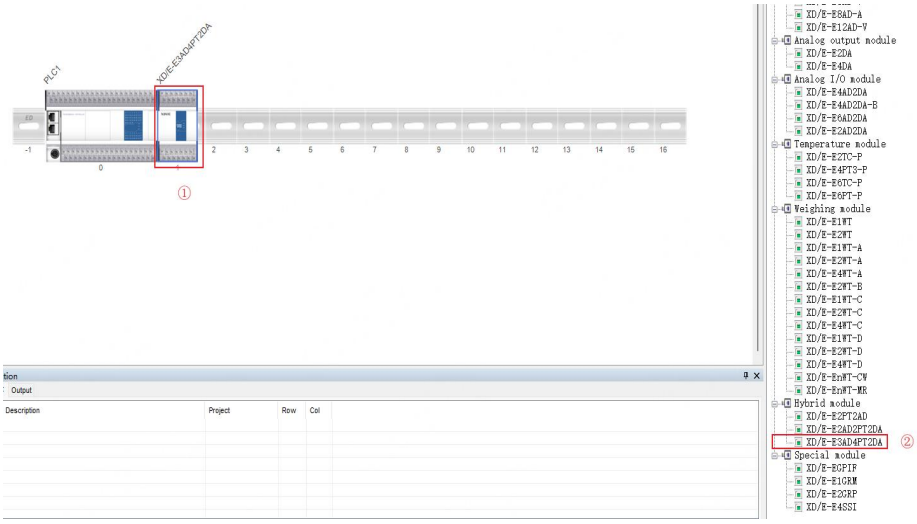
- Through Control Panel configuration
- Set via Flash registers

1) Configuration Panel Configuration

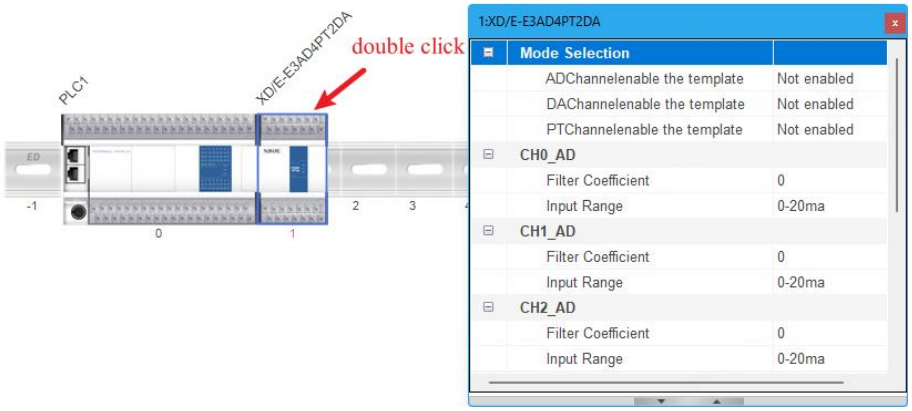
1. Use the XINJE PLC Programming Tool Software version 3.8.0a or later to configure the module; click [PLC Configuration] – [Module Configuration] in the left-side Engineering Bar to open the Expansion Module Settings window. For versions prior to 3.8.0a of the XINJE PLC Programming Tool Software, click [PLC Configuration] – [Expansion Module] in the left-side Engineering Bar to perform the configuration.



2. Select a module from the right-hand module list and drag it to the desired position, or double-click a module in the right-hand module list to select it:

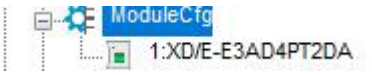


3. Double-click the corresponding module icon to access the module configuration interface, where you can select the AD filter coefficient and the voltage or current output mode for the AD/DA channel.



4. Click " " to view the default configuration parameters for the Expansion module.

5. After completing the parameter configuration for the expansion module, click "" to write the set values into the PLC; these changes will take effect only after the PLC is powered off and then powered on again. Under the Module Configuration Node, mount the configured module, then double-click it to enter the module parameter configuration interface.



- The first-order low-pass filtering method applies weighting to the current sample value and the previous filtered output value to obtain the effective filtered value.
- The filtering coefficient is set by the user between 0 and 254; a lower value results in more stable data but may cause data lag; a value of 1 provides the strongest filtering effect, while a value of 254 provides the weakest filtering effect; the default value is 0 (no filtering).

2) Flash Register Configuration

The expansion module's input channels operate in current mode, with selectable current ranges of 0–20 mA or 4–20 mA; its output channels operate in voltage mode, with selectable voltage ranges of 0–5 V or

0–10 V. These settings are configured via the SFD (Special FLASH Data Register) within the PLC. As shown below:

Module ID	Configuration Information Address	Module ID	Configuration Information Address
#1	SFD350~SFD359	#9	SFD430~SFD439
#2	SFD360~SFD369	#10	SFD440~SFD449
#3	SFD370~SFD379	#11	SFD450~SFD459
#4	SFD380~SFD389	#12	SFD460~SFD469
#5	SFD390~SFD399	#13	SFD470~SFD479
#6	SFD400~SFD409	#14	SFD480~SFD489
#7	SFD410~SFD419	#15	SFD490~SFD499
#8	SFD420~SFD429	#16	SFD500~SFD509



As shown above, each register is configured to set the mode for four channels; each register contains 16 bits, and the modes for the four channels are configured sequentially in groups of four bits, from the lowest to the highest bit position.

3) SFD Bit Definition

Using the First Module as an example to illustrate the setup method.

<table>
<tr><th colspan="2">Register</th><th>Bit7</th><th>Bit6</th><th>Bit5</th><th>Bit4</th><th>Bit3</th><th>Bit2</th><th>Bit1</th><th>Bit0</th><th>Explain</th></tr>
<tr><td rowspan="2">SFD350</td><td>Byte0</td><td colspan="8">AD Channel 0 Filter Coefficient</td><td rowspan="3">AD filtering coefficient</td></tr>
<tr><td>Byte1</td><td colspan="8">AD Channel 1 Filter Coefficient</td></tr>
<tr><td>SFD351</td><td>Byte2</td><td colspan="8">AD Channel 2 Filter Coefficient</td></tr>
<tr><td rowspan="2">SFD352</td><td>Byte3</td><td colspan="8">PT Channel 0 Filter Coefficient</td><td rowspan="4">PT filtering coefficient</td></tr>
<tr><td>Byte4</td><td colspan="8">PT Channel 1 Filter Coefficient</td></tr>
<tr><td>Byte5</td><td colspan="8">PT Channel 2 Filter Coefficient</td></tr>
<tr><td rowspan="4">SFD353</td><td>Byte6</td><td colspan="8">PT Channel 3 Filter Coefficient</td></tr>
<tr><td rowspan="3">Byte7</td><td>Bit7</td><td>Bit6</td><td>Bit5</td><td>Bit4</td><td>Bit3</td><td>Bit2</td><td>Bit1</td><td>Bit0</td><td rowspan="12">Used to specify the input range of AD and DA modules, Byte7 has the lower 4 bits as the setting bit for AD channel 1 and the higher 4 bits as the setting bit for AD channel 2. The lower 4 bits of Byte8 are the settings for AD channel 3, and</td></tr>
<tr><td colspan="4">AD2</td><td colspan="4">AD1</td></tr>
<tr><td>Keep</td><td colspan="3">010：0~20mA
011：4~20mA</td><td>Keep</td><td colspan="3">010：0~20mA
011：4~20mA</td></tr>
<tr><td rowspan="6">SFD354</td><td rowspan="3">Byte8</td><td>Bit7</td><td>Bit6</td><td>Bit5</td><td>Bit4</td><td>Bit3</td><td>Bit2</td><td>Bit1</td><td>Bit0</td></tr>
<tr><td colspan="4">DA1</td><td colspan="4">AD3</td></tr>
<tr><td>Keep</td><td colspan="3">000：0~10V
001：0~5V</td><td>Keep</td><td colspan="3">010：0~20mA
011：4~20mA</td></tr>
<tr><td rowspan="3">Byte9</td><td>Bit7</td><td>Bit6</td><td>Bit5</td><td>Bit4</td><td>Bit3</td><td>Bit2</td><td>Bit1</td><td>Bit0</td></tr>
<tr><td colspan="4"></td><td colspan="4">DA2</td></tr>
<tr><td>Keep</td><td colspan="3"></td><td>Keep</td><td colspan="3">000：0~10V</td></tr>
</table>

					001：0~5V	the higher 4 bits are the settings for DA channel 1. The lower 4 bits of Byte9 are the setting bits for DA channel 2, while the higher 4 bits are reserved.
SFD355~SFD359		Keep				

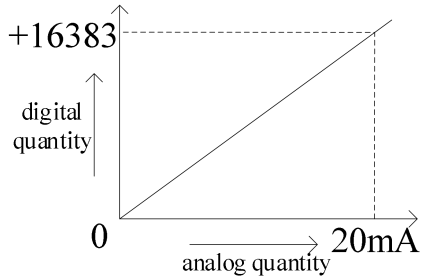
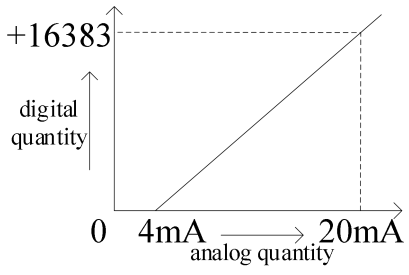
Example: Configure the operating modes for Channels 3, 2, 1, and 0 of the first module as 0–20 mA, 4–20 mA, 0–10 V, and 0–5 V, respectively; set the filtering coefficients for Channels 1 and 2 to 254; set the filtering coefficients for Channels 3 and 4 to 100; configure the operating modes for Channels 1 and 0 as 0–10 V and 0–20 mA, respectively.

Method 1:
It can be configured directly on the configuration panel; the configuration method is shown above.

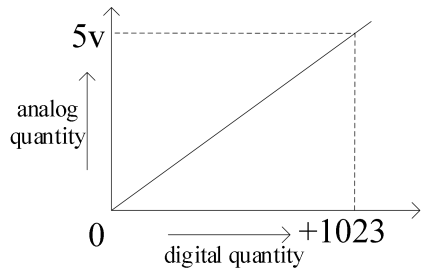
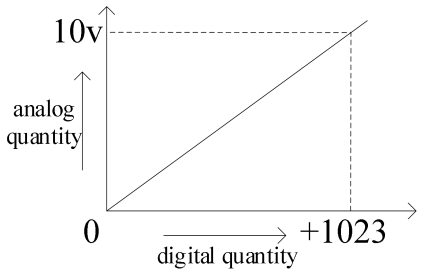
Method 2:
Set the SFD special register directly to the following value:
SFD350=FEFEH SFD351=4C1H SFD352=10H

9.3.6.Analog-to-Digital Conversion Diagram

The relationship between the input analog signal and the converted digital signal is shown in the table below:

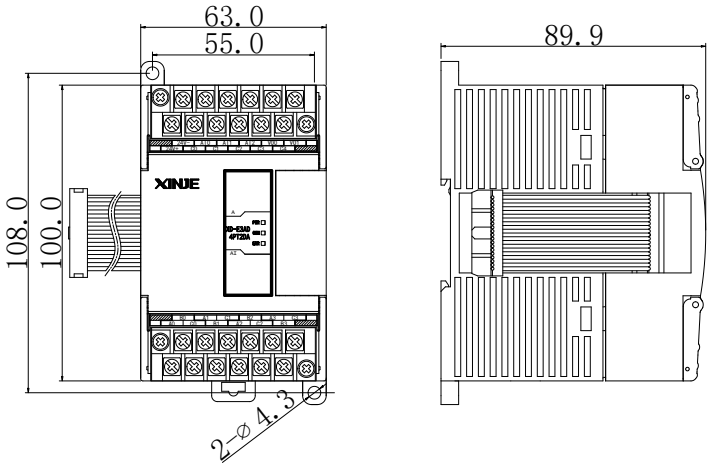
Relationship Between Input Analog Signal and the Converted Digital Signal	
0–20 mA Analog Input	4–20 mA Analog Input
	

The relationship between the digital output and its corresponding analog data is shown in the table below:

The Relationship Between The Output Analog Signal and the Input Digital Signal	
0−5 V Analog Output	0−10 V Analog Output
	

When the input data exceeds K1023, the output analog data from the D/A converter remains constant at 5 V, 10 V, or 20 mA.

9.3.7.Outline Dimensional Drawing



(unit:mm)

9.3.8.Programming Example

Example: A pressure sensor's output signal needs to be acquired (the sensor's performance parameters: detection pressure range of 0 MPa–10 MPa; output analog signal ranges from 4–20 mA); simultaneously, a 0 V–10 V voltage signal must be sent to the frequency converter.

analyse:

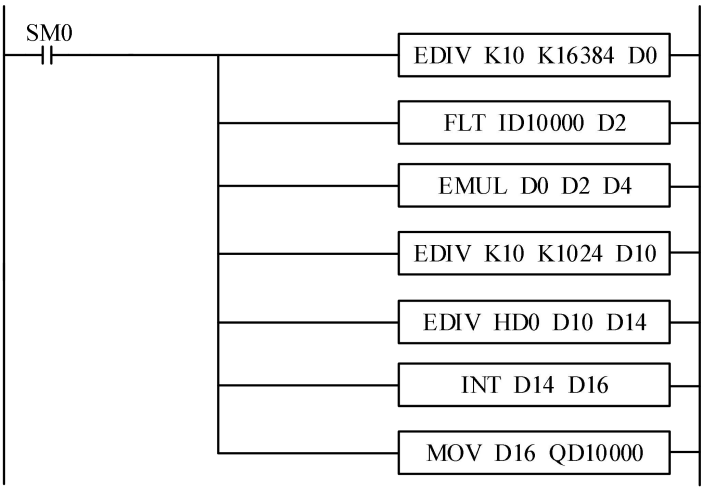
Since the pressure sensor's measurement range is 0 MPa–10 MPa, corresponding to an analog output of 4–20 mA, and the digital output range converted by the expansion module via analog-to-digital conversion is 0–16,383, we can bypass the intermediate analog-to-digital conversion step—meaning the digital output range directly corresponds to the pressure measurement range of 0 MPa–10 MPa (i.e., 0–16,383). The value 10 MPa / 16,384 = 0.0006103515 represents the pressure value corresponding to each digital unit captured by the expansion module. Therefore, by multiplying the real-time digital value read from the

expansion module's ID register by 0.0006103515, the current pressure measured by the sensor can be calculated. For example, if the digital value read from the ID register is 4,096, the corresponding pressure is 2.5 MPa.

Similarly, the digitally set range of 0–1023 in the QD expansion module register corresponds to a voltage output signal ranging from 0 V to 10 V; the value 10 V/1023 = 0.0097656 indicates the voltage value corresponding to each digitally set value in the QD expansion module register. For example, if you need to output a voltage of 3 V, then 3 V / 0.0097656 = 307; this calculated digital value should then be written into the corresponding QD register.

Please use floating-point arithmetic for calculations; otherwise, the calculation accuracy may be affected, or the calculation may even fail!

procedure:



description:

SM0 is a normally ON coil that remains in the ON state throughout the PLC operation.

When the PLC is activated, the analog signal acquisition first calculates the pressure value corresponding to each digital value of 1 acquired by the expansion module; then, the digital value (integer type) retrieved from the ID10000 register is converted into a floating-point number. Therefore, the current real-time pressure value can be determined by multiplying the real-time value acquired from the ID10000 register of the expansion module by the pressure value corresponding to each digital value of 1 acquired by that expansion module.

Similarly, for an analog output, first calculate the voltage value corresponding to each digital value of 1 acquired by the expansion module; then divide the set target voltage value by this voltage value corresponding to each digital value of 1 acquired by the expansion module to obtain the digital value (a floating-point number) that needs to be set. Since the QD10000 register can only store integers, the resulting floating-point digital value must be converted into an integer before being transmitted to the QD10000 register.

Please enable the corresponding channel by setting Y10000 and Y1007 to ON.

Manual Update Log

The document reference number for this manual is located in the lower right corner of the cover. Information regarding this manual's revision is summarized below:

NO.	Document Reference Number	Chapters and Sections	Update Content
1	PD04 20230322 1.0	-	1. New XD3E model added; 2. Add analog-to-digital conversion annotations; 3. Resolve issues identified in the previous edition of the manual;
2	PD04 20230511 1.1	1-3	Modify the operating indicator light instructions.
		-	Update the relevant instructions in the manual pertaining to the temperature module.
3	PD04 20240416 1.2	-	1. Update the documentation related to the PT and TC temperature modules; 2. Manual structure adjustment.
4	PD04 20240823 1.2.1	1-3	Adjust module power and operating conditions.
		9-1	Modify the title of the Analog Temperature Mixing Module Overview.
5	PD04 20250221 1.2.2	-	1、 Modify the configuration instructions for sections 6.2.7, 6.3.7, 6.4.7, and 6.5.7; 2、 Modify the precautions in sections 7.2.3, 7.3.3, and 7.4.3; 3、 Other erroneous modifications.
6	PD04 20250716 1.2.3	-	1、 Modify module operating mode settings; 2、 Fix issues in the previous version of the manual.
7	PD04 20260516 1.2.4		1. 2.1.1 – Supplementary Module Power Supply Method Description; 2. Chapter 6.5 now includes a version description for XD-EnWT-D; 3. Manual error correction.

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WUXI XINJE ELECTRIC CO., LTD.

Whats APP: +86 1806833 9655

Website: en.xinje.com

Email: sales@xinje.com tech@xinje.com

Address: No.816, Jianzhu West Road, Binhu District, Wuxi City, Jiangsu Province