FX20 series Modular I/O System PROFINET Manual

Tianjin Elco Automation Co., Ltd

Content

1. Product introduction

The FX20 series modular I/O system is a new generation IP20 expandable I/O product launched by Elco. It's composed of bus adapters, I/O modules and functional modules, with the min. module width of only 15 mm, which is thin and compact, greatly saving space inside the control cabinet. The wiring terminal is designed with two separate sections, which facilitates module replacement and maintenance. Keeping the fresh family color scheme, it provides practical tool-free spring terminals for fast and convenient wiring. The terminal buttons are identified by color, and different colors represent different functions, improving the efficiency of wiring and checking to the most.

FX20 adopts high-speed backplane bus technology, with high communication bandwidth and fast response speed, which can meet the application of high-speed production takt. By simply replacing the bus coupler, different automation bus systems can be connected. Currently, it is mainly compatible with mainstream Ethernet bus protocols such as EtherCAT, PROFINET, EtherNet/IP, CC-Link IE Field Basic, and can expand up to 32 sub-modules.

FX20 has a wide range of functional modules with powerful functions, including digital input and output, relay output, analog input and output, temperature measurement, high-speed counting, IO-Link master station, communication bridge, etc. It can meet the needs of various automation systems and is widely used in industries such as automobile manufacturing, parts processing, 3C electronics, lithium battery equipment, photovoltaic, logistics, printing and packaging.

This manual mainly introduces the mechanical installation, electrical installation, and module configuration examples of FX20 products.

2. Version change record

Revision date	Version	Content changed
2023-08	V1.0	1st version
2025-01	V1.1	Content updates
2025-07	V1.2	Updated some product images and document formats Add some of module parameters Add output hold function description.
2025-12	V2.0	Update fonts and layouts

3. About obtaining manuals

This manual is not shipped with the product. You can obtain its PDF file through the following methods:

- Log in to Elco's official website (www.elcoautomation.com), search for keywords, and download.
- Use WeChat to search and subscribe the official account of "Elco Automation" to obtain the product manual.
- Contact Elco sales engineers in your area to obtain the latest manual materials.

4. Warranty statement

Under normal use, if the product malfunctions or is damaged, Elco will be responsible for an 18 months warranty (from and subject to the delivery date; executed according to the agreement, if there is a contract). When it's over 18 months, maintenance fees will be charged.

- Within 18 months, repair fees will be charged for product damaged by the following circumstances.
- Failure to operate according to the manual
- Fires, floods, and abnormal voltage
- Used for abnormal functions
- Beyond the application scope

- Force majeure (natural disasters, earthquakes, lightning strikes).

The service fees shall be calculated according to Elco's unified standards. Subject to the contract, if there is.

5. Precautions

5.1. Safety statement

1) Please read and follow these precautions before installing, operating, and maintaining the product.

2) To ensure personal and equipment safety, please follow all precautions indicated on the product and in the manual when installing, operating, and maintaining the product.

3) The 'caution', 'warning' and 'danger items in the manual do not represent all precautions that should be followed, but only serve as supplements to all safety precautions.

4) This product should be used in an environment that meets the design specifications, otherwise it may cause malfunctions. Functional abnormalities or component damage caused by non-compliance with relevant regulations are not within the scope of product quality assurance.

5) Elco will not bear any legal responsibility for personal safety accidents, property losses, etc. caused by mishandling of products.

5.2. Definition of safety level

Caution	If not operated properly, it may result in minor body injury or equipment damage
Warning	If not operated properly, it may result in death or serious bodily injury.
Danger	If not operated properly, it will result in death or serious bodily injury.

5.3. Safety and tips

	Reminding		Please refer to the relevant manual content before operation
	Risk of electrical shock		Information tips
	General tips		Only authorized electrical personnel can operate
	Earthing		Only authorized mechanical personnel can operate

When designing control systems

Dangerous!

- Please be sure to design a safety circuit to ensure that the control system can still work safely in the event of external power failure or PLC failure;
- When long time overcurrent caused by exceeding rated load current or short circuit, the module may smoke or catch fire. So, safety devices such as fuses or circuit breakers need to be installed.

When installing

Warning!

- Only professional maintenance personnel who have been trained on electrical equipment and have sufficient electrical knowledge can install this product.

Dangerous!

- During the operation, all external power supplies used by the system must be disconnected. If the power supply is not fully disconnected, it may cause electric shock, module failure or malfunction.
- Do not use programmable controller in the following conditions: places with dust, oil fumes, conductive dust, corrosive gases, and flammable gas.
- Exposed to high temperatures, condensation, and wind and rain; In situations with vibration and impact. Electric shock, fire, and mis-operation can also cause product damage and deterioration.
- The programmable controller is an Open type device, please install it in a control cabinet with a lock (the IP rating of the control cabinet housing > IP20). Only operators who have been trained on electrical equipment and have sufficient electrical knowledge can open the control cabinet.
- During installation, avoid metal shavings and wire ends falling into the ventilation hole of the controller, which may cause fire, malfunction, and mis-operation.

Caution!

- After installation, ensure that there are no foreign objects on the ventilation surface, otherwise it may cause poor heat dissipation, fire, malfunction, and mis-operation.
- When installing, it needs to be tightly connected to connectors and the module connection hooks need to be securely locked. If the module is installed improperly, it may cause mis-operation, malfunction, and detachment.

When wiring

Dangerous!

- Only professional maintenance personnel who have been trained on electrical equipment and have sufficient electrical knowledge can carry out the wiring of this product;
- During the operation, all external power supplies used by the system must be disconnected. If the power supply is not fully disconnected, it may cause electric shock, module failure or malfunction.

Dangerous!

- Cable terminals should be well insulated to ensure that the insulation distance between cables does not decrease after installation on the terminal block. Otherwise, it may cause electric shock or equipment damage.
- To avoid electric shock, please cut off the power supply before connecting to the power supply of this product;
- The input power specifications of this product can be found in technical specifications. Please provide the power supply strictly in accordance with the data in the technical specifications. If the power supply is not within the required range, it will seriously damage this product. Therefore, please regularly check whether the DC power supply provided by the switching power supply is stable.

During operation and maintenance

Caution!

- Only professional maintenance personnel who have been trained on electrical equipment and have sufficient electrical knowledge can carry out the maintenance.
- Do not touch the terminals when powered on, otherwise it may cause electric shock or malfunction.

- During the operation, all external power supplies used by the system must be disconnected. If the power supply is not fully disconnected, it may cause electric shock or malfunction.
- At locations where operators directly come into contact with mechanical parts, such as loading and unloading mechanical tools, or where machinery operates automatically, careful consideration must be given to the function of on-site manual devices or other backup means. It needs to be independent of programmable controllers and can start or interrupt the automatic operation of the system.
- If the program needs to be modified while the system is running, it is necessary to consider using locks or other protective measures to ensure that only authorized personnel can make necessary modifications.

When Scrapping

Caution!

- Please treat it as industrial waste;
- Scrapped equipment and products need to be disposed of and recycled according to industrial waste treatment standards to avoid environmental pollution.

Please keep the content of this safety precautions properly for future reference, and be sure to hand over this manual to the end user.

6. FX20 Product Introduction

6.1. Appearance and function of PROFINET bus adapter

Item	Name	Function	Status
1	Rail locking device	Lock FX20 module	Assembling completed: locking position Disassembling module: unlocking position
2	X1	PROFINET bus input	-
3	X2	PROFINET bus output	-
4	Module fixing device	Fixing module and rail	Pull out: Disassembling module; Press down: Assembling completed.
5	Coupler running indicators		
	PWR	Indicate power supply	Green: normal Off: abnormal
	BF	Indicate bus status	Green: normal Red: configuration error
	SF	Report system error	Green: normal Red: error
	STA	Indicate backplane communication status	Green: normal Red: Backplane communication error
6	Power input terminal 0 V	0 V access	-
7	Power input terminal 24 V+	24 V DC access	-
8	PE	System grounding	-

6.2. FX20 PROFINET adapter technical data

FX20-GW-PN00

ARTICLE PROPERTIES

PRODUCT TYPE	FX20 series modular I/O system PROFINET adapter	**PRODUCT GROUP**	IP20 modular I/O system
DESCRIPTION	Gateway module for PROFINET, 2 x RJ45, max. 32 cascadable modules, 24 V DC, IP20, DIN rail installation, overcurrent / reverse polarity / surge protection	**PU**	1 pc
		COUNTRY OF ORIGIN	CN

TECHNICAL DATA

COMMUNICATION PROTOCOL	PROFINET	**SUPPLY VOLTAGE (SYSTEM)**	24 V DC (± 20 %)
PROFINET I/O FEATURES	Integrierter 2 port switch, auto negotiation, MRP	**INPUT CURRENT (TYP.) AT NOMINAL LOAD (24 V)**	200 mA
TRANSMISSION MEDIUM	Twisted pair S-UTP, 100 Ω, Cat. 5	**BACKPLANE POWER SUPPLY VOLTAGE**	5 V DC
TRANSMISSION RATE	10/100 Mbit/s, 10 Mbit/s (ETHERNET protocols), 100 Mbit/s full duplex (PROFINET IO)	**BACKPLANE POWER SUPPLY CURRENT (MAX.)**	3 A
BUS SEGMENT LENGTH (MAX.)	100 m	**ELECTRICAL ISOLATION**	500 V (power supply and bus)
BUS NODE ADDRESS	Set by PLC configuration software	**POWER PROTECTION**	Overcurrent protection, reverse polarity protection, surge protection
MAX. NUMBER OF CASCADABLE MODULES	32	**FAULT DIAGNOSIS METHOD**	LED, communication message
INPUT AND OUTPUT PROCESS MAPPING (MAX.)	1440 bytes / 1440 bytes		

CONNECTION DATA

WIRE CONNECTION	Plug-in terminal block	**STRIPPED LENGTHS**	8 … 10 mm 0.315 … 0.394 in
CROSS SECTION	0.08 mm² … 2.5 mm² AWG 28 … 14		

ENVIRONMENTAL REQUIREMENTS

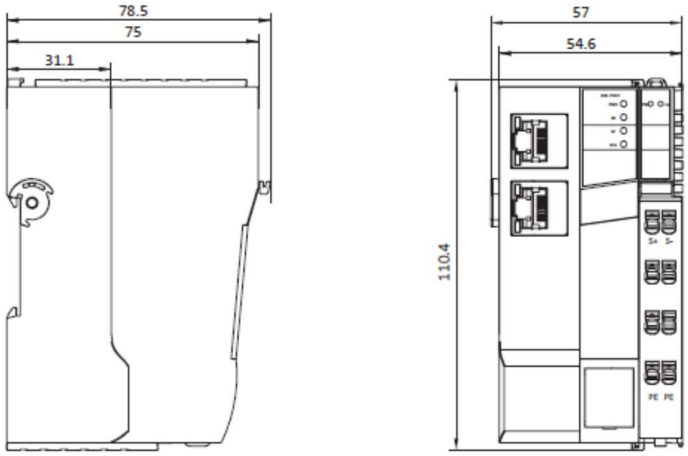
PROTECTION CLASS	IP20	**ELECTRICAL FAST TRANSIENT (EFT)**	Level A, per IEC 61000-4-4

MOUNTING TYPE	DIN-35 mm rail	**ELECTRO-STATIC DISCHARGE (ESD)**	Level A, per IEC 61000-4-2
AMBIENT TEMPERATURE	-5 ... +60 °C	**SURGE TEST**	Level A, per IEC 61000-4-5
STORAGE TEMPERATURE	-25 ... +70 °C	**VIBRATION RESISTANCE**	4 g, per IEC 60068-2-6
RELATIVE HUMIDITY	95%, non-condensing	**SHOCK RESISTANCE**	15 g, per IEC 60068-2-27
OPERATING ALTITUDE	0 … 2000 m / 0 … 6562 ft	**EU ROHS COMPLIANCE STATUS**	Yes
POLLUTION DEGREE	2, per IEC 61131-2	**MATERIAL COMPLIANCE**	Compliant with REACH

GENERAL DATA

OUSING MATERIAL	PPE	**DIMENSIONS (H X W X D)**	110.4 x 57 x 78.5 mm
WEIGHT	230 g	**MTTF (25 °C)**	111 years
COLOR	Light gray	**APPROVALS**	CE

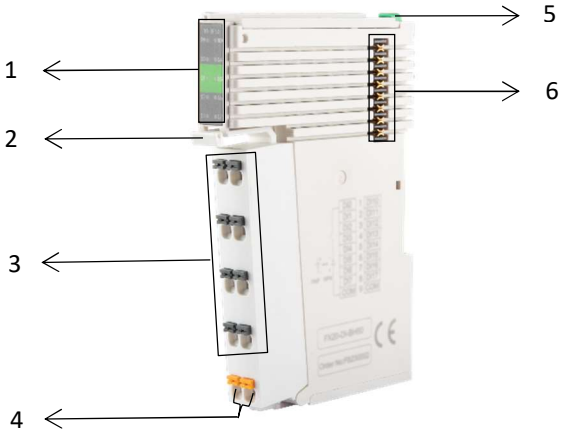
6.3. FX20 PROFINET adapter dimensions



6.4. Introduction to the appearance of I/O modules

6.4.1. 8-channel digital input/output module

6.4.1.1. 8-channel digital input module



Item	Name	Function	Status
1	Module running indicators		
	PW	Backplane power indicator	Green: normal; Red: I/O power supply abnormal; Off: no backplane power
	MD	Module error indicator	Green: normal Red: Module channel error Green blinking: Connected but not configured; Red and green blinking: Backplane communication abnormal;
	00-07	Input signal indicator	Green: input “1” Off: input “0”
2	Terminal disassembly device	Press the device to separate the terminal block from the module	-
3	IO input terminal 0-7	IO signal wiring	-
4	Common ground terminal	IO signal Common ground terminal	0 V when the input signal is PNP, 24 V+ when the input signal is NPN
5	Module fixing device	Used to fix the module to the standard mounting rail	Pulling up: assembling position; Pressing down: locking position
6	Backplane bus interface	Backplane communication among modules	-

6.4.1.2. 8-channel digital input module technical data

FX20-DI-BF60

ARTICLE PROPERTIES

PRODUCT TYPE	FX20 series modular I/O system digital input modules	**PRODUCT GROUP**	IP20 modular I/O system
DESCRIPTION	FX20-submoduel 8-channel input PNP / NPN, 24 V DC, IP20, DIN rail installation	**PU**	1 pc
		COUNTRY OF ORIGIN	CN

TECHNICAL DATA

NUMBER OF DIGITAL INPUTS	8	**INPUT FILTERING DELAY**	0 ms, 1 ms, 3 ms and 10 ms can be configured
INPUT TYPE	PNP / NPN	**CURRENT CONSUMPTION (5 V)**	60 mA
INPUT SIGNAL '0'	0 … 5 V DC	**PROCESS DATA LENGTH**	1 byte
INPUT SIGNAL '1'	18 … 30 V DC	**FAULT DIAGNOSIS METHOD**	LED, communication message

INPUT CURRENT PER CHANNEL FOR SIGNAL '1'	Typ. 4 mA

CONNECTION DATA

WIRE CONNECTION	Plug-in terminal block	**STRIPPED LENGTHS**	8 … 10 mm 0.315 … 0.394 in
CROSS SECTION	0.08 mm² … 2.5 mm² AWG 28 … 14		

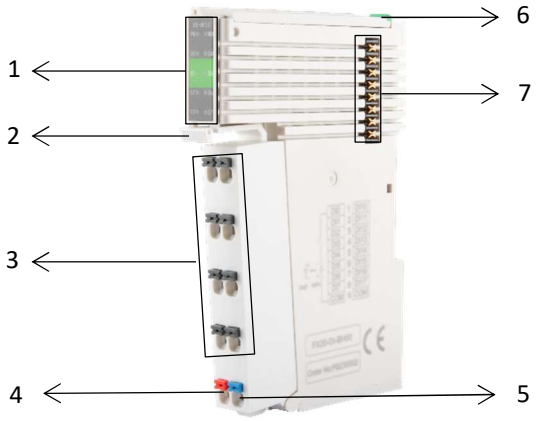
ENVIRONMENTAL REQUIREMENTS

PROTECTION CLASS	IP20	**ELECTRICAL FAST TRANSIENT (EFT)**	Level A, per IEC 61000-4-4
MOUNTING TYPE	DIN-35 mm rail	**ELECTRO-STATIC DISCHARGE (ESD)**	Level A, per IEC 61000-4-2
AMBIENT TEMPERATURE	-5 ... +60 °C	**SURGE TEST**	Level A, per IEC 61000-4-5
STORAGE TEMPERATURE	-25 ... +70 °C	**VIBRATION RESISTANCE**	4 g, per IEC 60068-2-6
RELATIVE HUMIDITY	95%, non-condensing	**SHOCK RESISTANCE**	15 g, per IEC 60068-2-27
OPERATING ALTITUDE	0 … 2000 m / 0 … 6562 ft	**EU ROHS COMPLIANCE STATUS**	Yes
POLLUTION DEGREE	2, per IEC 61131-2	**MATERIAL COMPLIANCE**	Compliant with REACH

GENERAL DATA

HOUSING MATERIAL	PPE	**DIMENSIONS (H X W X D)**	110.6 x 15 x 78.4 mm
WEIGHT	63 g	**MTTF (25 °C)**	155 years
COLOR	Light gray	**APPROVALS**	CE

6.4.1.3. 8-channel digital output modules



Item	Name	Function	Status
1	Module running indicators		
	PW	Backplane power indicator	Green: normal; Red: I/O power supply abnormal; Off: no backplane power
	MD	Module error indicator	Green: normal Red: Module channel error Green blinking: Connected but not

			configured; Red and green blinking: Backplane communication abnormal;
	00-07	Output signal indicator	Green: output “1” Off: output “0”
2	Terminal disassembly device	Press the device to separate the terminal block from the module	-
3	IO output terminal 0-7	IO signal wiring	-
4	24 V power terminal	24 V+	-
5	24 V power terminal	0 V	-
6	Module fixing device	Used to fix the module to the standard mounting rail	Pulling up: assembling position; Pressing down: locking position.
7	Backplane bus interface	Backplane communication	-

6.4.1.4. 8-channel digital output module technical data

FX20-DO-BF00

ARTICLE PROPERTIES

PRODUCT TYPE	FX20 series modular I/O system digital output modules	**PRODUCT GROUP**	IP20 modular I/O system
DESCRIPTION	FX20-submoduel 8-channel output PNP, 24 V DC, 0.5 A, IP20, DIN rail installation	**PU** **COUNTRY OF ORIGIN**	1 pc CN

TECHNICAL DATA

NUMBER OF DIGITAL OUTPUTS	8	**SWITCHING FREQUENCY**	Max. 1 kHz (Resistive loads) Max. 1 Hz (Inductive loads) Max. 10 Hz (Lamps)
OUTPUT TYPE	PNP	**OUTPUT HOLD**	Supports, configured by PLC or web server
OUTPUT VOLTAGE	24 V DC	**CURRENT CONSUMPTION (5 V)**	60 mA
OUTPUT CURRENT	Max. 0.5 A per channel, total 4 A per module	**PROCESS DATA LENGTH**	1 byte
OUTPUT LOAD TYPES	Resistive loads, inductive loads, lamps	**FAULT DIAGNOSIS METHOD**	LED, communication message

CONNECTION DATA

WIRE CONNECTION	Plug-in terminal block	**STRIPPED LENGTHS**	8 … 10 mm 0.315 … 0.394 in
CROSS SECTION	0.08 mm² … 2.5 mm² AWG 28 … 14		

ENVIRONMENTAL REQUIREMENTS

PROTECTION CLASS	IP20	**ELECTRICAL FAST TRANSIENT (EFT)**	Level A, per IEC 61000-4-4

MOUNTING TYPE	DIN-35 mm rail	**ELECTRO-STATIC DISCHARGE (ESD)**	Level A, per IEC 61000-4-2
AMBIENT TEMPERATURE	-5 ... +60 °C	**SURGE TEST**	Level A, per IEC 61000-4-5
STORAGE TEMPERATURE	-25 ... +70 °C	**VIBRATION RESISTANCE**	4 g, per IEC 60068-2-6
RELATIVE HUMIDITY	95%, non-condensing	**SHOCK RESISTANCE**	15 g, per IEC 60068-2-27
OPERATING ALTITUDE	0 … 2000 m / 0 … 6562 ft	**EU ROHS COMPLIANCE STATUS**	Yes
POLLUTION DEGREE	2, per IEC 61131-2	**MATERIAL COMPLIANCE**	Compliant with REACH

GENERAL DATA

HOUSING MATERIAL	PPE	**DIMENSIONS (H X W X D)**	110.6 x 15 x 78.4 mm
WEIGHT	63 g	**MTTF (25 °C)**	155 years
COLOR	Light gray	**APPROVALS**	CE

FX20-DO-BF50

ARTICLE PROPERTIES

PRODUCT TYPE	FX20 series modular I/O system digital output modules	**PRODUCT GROUP**	IP20 modular I/O system
DESCRIPTION	FX20-submoduel 8-channel output NPN, 24 V DC, 0.5 A, IP20, DIN rail installation	**PU**	1 pc
		COUNTRY OF ORIGIN	CN

TECHNICAL DATA

NUMBER OF DIGITAL OUTPUTS	8	**SWITCHING FREQUENCY**	Max. 1 kHz (Resistive loads) Max. 1 Hz (Inductive loads) Max. 10 Hz (Lamps)
OUTPUT TYPE	NPN	**OUTPUT HOLD**	Supports, configured by PLC or web server
OUTPUT VOLTAGE	24 V DC	**CURRENT CONSUMPTION (5 V)**	60 mA
OUTPUT CURRENT	Max. 0.5 A per channel, total 4 A per module	**PROCESS DATA LENGTH**	1 byte
OUTPUT LOAD TYPES	Resistive loads, inductive loads, lamps	**FAULT DIAGNOSIS METHOD**	LED, communication message

CONNECTION DATA

WIRE CONNECTION	Plug-in terminal block	**STRIPPED LENGTHS**	8 … 10 mm 0.315 … 0.394 in
CROSS SECTION	0.08 mm² … 2.5 mm² AWG 28 … 14		

ENVIRONMENTAL REQUIREMENTS

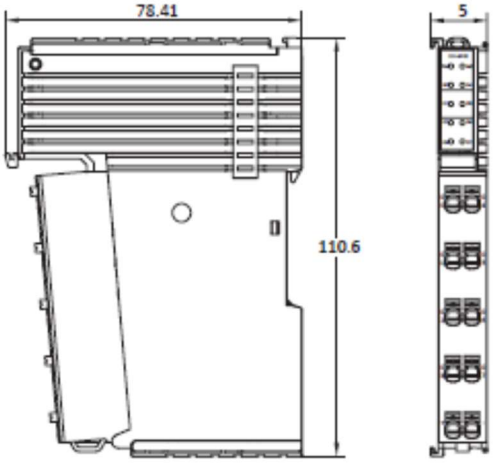
PROTECTION CLASS	IP20	**ELECTRICAL FAST TRANSIENT (EFT)**	Level A, per IEC 61000-4-4
MOUNTING TYPE	DIN-35 mm rail	**ELECTRO-STATIC DISCHARGE**	Level A, per IEC 61000-4-2

		(ESD)	
AMBIENT TEMPERATURE	-5 ... +60 °C	**SURGE TEST**	Level A, per IEC 61000-4-5
STORAGE TEMPERATURE	-25 ... +70 °C	**VIBRATION RESISTANCE**	4 g, per IEC 60068-2-6
RELATIVE HUMIDITY	95%, non-condensing	**SHOCK RESISTANCE**	15 g, per IEC 60068-2-27
OPERATING ALTITUDE	0 … 2000 m / 0 … 6562 ft	**EU ROHS COMPLIANCE STATUS**	Yes
POLLUTION DEGREE	2, per IEC 61131-2	**MATERIAL COMPLIANCE**	Compliant with REACH

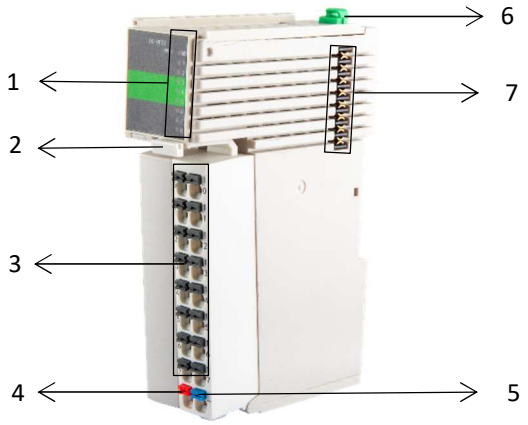
GENERAL DATA

HOUSING MATERIAL	PPE	**DIMENSIONS (H X W X D)**	110.6 x 15 x 78.4 mm
WEIGHT	63 g	**MTTF (25 °C)**	155 years
COLOR	Light gray	**APPROVALS**	CE

6.4.1.5. 8-channel digital input/output module profile drawing



6.4.1.6. 4/8-channel digital relay output modules



Item	Name	Function	Status
1	Module running indicator		
	PW	Backplane power indicator	Green: normal; Red: I/O power supply abnormal; Off: no backplane power
	MD	Module error indicator	Green: normal Red: Module channel error Green blinking: Connected but not configured; Red and green blinking: Backplane communication abnormal;
	00-07	Output signal indicator	Green: output “1” Off: output “0”
2	Terminal disassembly device	Press the device to separate the terminal block from the module	-
3	IO output terminal 0-7	IO signal wiring	-
4	24 V power terminal	24 V+	-
5	24 V power terminal	0 V	-
6	Module fixing device	Used to fix the module to the standard mounting rail	Pulling up: assembling position; Pressing down: locking position
7	Backplane bus interface	Backplane communication	-

6.4.1.7. 4/8-channel digital relay output modules technical data

FX20-DO-RD00

ARTICLE PROPERTIES

PRODUCT TYPE	FX20 series modular I/O system digital output modules	**PRODUCT GROUP**	IP20 modular I/O system
DESCRIPTION	FX20-submoduel 4-channel output SSR, 230 V AC, IP20, DIN rail installation	**PU**	1 pc
		COUNTRY OF ORIGIN	CN

TECHNICAL DATA

NUMBER OF DIGITAL OUTPUTS	4	**OUTPUT HOLD**	Supports, configured by PLC or web server
OUTPUT TYPE	AC solid state relay	**RELAY RESPONSE TIME**	3 ... 10 ms
CONTACT WORKING VOLTAGE	230 V AC	**ELECTRICAL LIFE**	20 million times
OUTPUT CURRENT	Max. 0.5 A per channel	**CURRENT CONSUMPTION (5 V)**	80 mA
OUTPUT LOAD TYPES	Resistive loads, lamps	**PROCESS DATA LENGTH**	1 byte
SWITCHING FREQUENCY	Max. 0.5 Hz	**FAULT DIAGNOSIS METHOD**	LED, communication message

CONNECTION DATA

WIRE CONNECTION	Plug-in terminal block	**STRIPPED LENGTHS**	8 … 10 mm 0.315 … 0.394 in
CROSS SECTION	0.08 mm² … 2.5 mm² AWG 28 … 14		

ENVIRONMENTAL REQUIREMENTS

PROTECTION CLASS	IP20	**ELECTRICAL FAST TRANSIENT (EFT)**	Level A, per IEC 61000-4-4
MOUNTING TYPE	DIN-35 mm rail	**ELECTRO-STATIC DISCHARGE (ESD)**	Level A, per IEC 61000-4-2
AMBIENT TEMPERATURE	-5 ... +60 °C	**SURGE TEST**	Level A, per IEC 61000-4-5
STORAGE TEMPERATURE	-25 ... +70 °C	**VIBRATION RESISTANCE**	4 g, per IEC 60068-2-6
RELATIVE HUMIDITY	95%, non-condensing	**SHOCK RESISTANCE**	15 g, per IEC 60068-2-27
OPERATING ALTITUDE	0 … 2000 m / 0 … 6562 ft	**EU ROHS COMPLIANCE STATUS**	Yes
POLLUTION DEGREE	2, per IEC 61131-2	**MATERIAL COMPLIANCE**	Compliant with REACH

GENERAL DATA

HOUSING MATERIAL	PPE	**DIMENSIONS (H X W X D)**	110.6 x 28.1 x 78.4 mm
WEIGHT	90 g	**MTTF (25 °C)**	155 years
COLOR	Light gray	**APPROVALS**	CE

FX20-DO-RF50

ARTICLE PROPERTIES

PRODUCT TYPE	FX20 series modular I/O system digital output modules	**PRODUCT GROUP**	IP20 modular I/O system
DESCRIPTION	FX20-submoduel 8-channel output mechanical relays, output voltage 250 V AC / 30 V DC, IP20, DIN rail installation	**PU**	1 pc
		COUNTRY OF ORIGIN	CN

TECHNICAL DATA

NUMBER OF DIGITAL OUTPUTS	8	**OUTPUT HOLD**	Supports, configured by PLC or web server
OUTPUT TYPE	Mechanical relays	**RELAY RESPONSE TIME**	About 15 ms
CONTACT WORKING VOLTAGE	250 V AC / 30 V DC	**ELECTRICAL LIFE**	100,000 times
OUTPUT CURRENT	Max. 2 A per channel	**CURRENT CONSUMPTION (5 V)**	65 mA
OUTPUT LOAD TYPES	Resistive loads, lamps	**PROCESS DATA LENGTH**	1 byte
SWITCHING FREQUENCY	Less than 6 times per minute	**FAULT DIAGNOSIS METHOD**	LED, communication message

CONNECTION DATA

WIRE CONNECTION	Plug-in terminal block	**STRIPPED LENGTHS**	8 … 10 mm 0.315 … 0.394 in
CROSS SECTION	0.08 mm² … 2.5 mm² AWG 28 … 14		

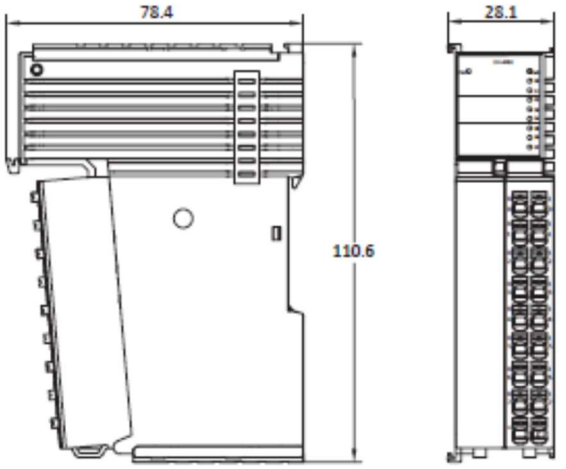
ENVIRONMENTAL REQUIREMENTS

PROTECTION CLASS	IP20	**ELECTRICAL FAST TRANSIENT (EFT)**	Level A, per IEC 61000-4-4
MOUNTING TYPE	DIN-35 mm rail	**ELECTRO-STATIC DISCHARGE (ESD)**	Level A, per IEC 61000-4-2
AMBIENT TEMPERATURE	-5 ... +60 °C	**SURGE TEST**	Level A, per IEC 61000-4-5
STORAGE TEMPERATURE	-25 ... +70 °C	**VIBRATION RESISTANCE**	4 g, per IEC 60068-2-6
RELATIVE HUMIDITY	95%, non-condensing	**SHOCK RESISTANCE**	15 g, per IEC 60068-2-27
OPERATING ALTITUDE	0 … 2000 m / 0 … 6562 ft	**EU ROHS COMPLIANCE STATUS**	Yes
POLLUTION DEGREE	2, per IEC 61131-2	**MATERIAL COMPLIANCE**	Compliant with REACH

GENERAL DATA

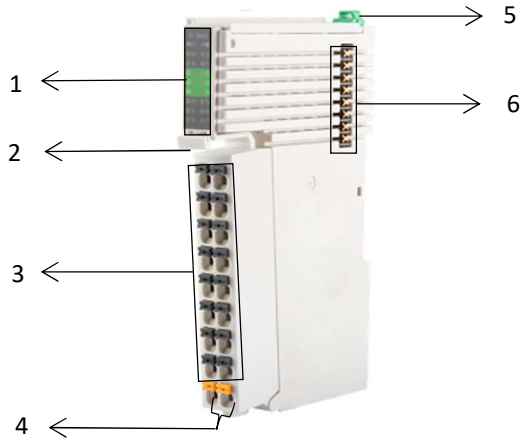
HOUSING MATERIAL	PPE	**DIMENSIONS (H X W X D)**	110.6 x 28.1 x 78.4 mm
WEIGHT	90 g	**MTTF (25 °C)**	155 years
COLOR	Light gray	**APPROVALS**	CE

6.4.1.8. 4/8-channel digital relay output module profile drawing



6.4.2. 16-channel digital input output module

6.4.2.1. 16-channel digital input module



Item	Name	Function	Status
1	Module running indicator		
	PW	Backplane power indicator	Green: normal; Off: no backplane power
	MD	Module error indicator	Green: normal Red: Module channel error Green blinking: Connected but not configured; Red and green blinking: Backplane communication abnormal;
	00-07 10-17	Input signal indicators	Green: output 1 Off: output 0
2	Terminal disassembly device	Press the device to separate the terminal block from the module	-

3	IO input terminal 00-07/10-17	IO signal wiring	-
4	Common terminals	IO signal common terminals	0 V when the input signal is PNP, 24 V+ when the input signal is NPN
5	Module fixing device	Used to fix the module to the standard mounting rail	Pulling up: assembling position; Pressing down: locking position
6	Backplane interface	Backplane communication	-

6.4.2.2. 16 digital input module technical data

FX20-DI-BL60

ARTICLE PROPERTIES

PRODUCT TYPE	FX20 series modular I/O system digital input modules	**PRODUCT GROUP**	IP20 modular I/O system
DESCRIPTION	FX20-submoduel 32-channel input PNP/ NPN, 24 V DC, IP20, DIN rail installation	**PU**	1 pc
		COUNTRY OF ORIGIN	CN

TECHNICAL DATA

NUMBER OF DIGITAL INPUTS	32	**INPUT FILTERING DELAY**	0 ms, 1 ms, 3 ms and 10 ms can be configured
INPUT TYPE	PNP / NPN	**CURRENT CONSUMPTION (5 V)**	60 mA
INPUT SIGNAL '0'	0 … 5 V DC	**PROCESS DATA LENGTH**	4 bytes
INPUT SIGNAL '1'	18 … 30 V DC	**FAULT DIAGNOSIS METHOD**	LED, communication message
INPUT CURRENT PER CHANNEL FOR SIGNAL '1'	Typ. 4 mA		

CONNECTION DATA

WIRE CONNECTION	Plug-in terminal block	**STRIPPED LENGTHS**	8 … 10 mm 0.315 … 0.394 in
CROSS SECTION	0.08 mm² … 2.5 mm² AWG 28 … 14		

ENVIRONMENTAL REQUIREMENTS

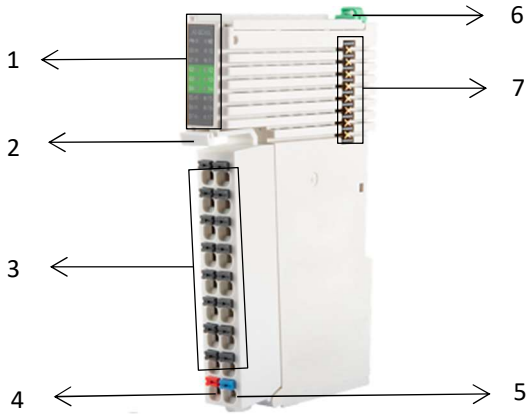
PROTECTION CLASS	IP20	**ELECTRICAL FAST TRANSIENT (EFT)**	Level A, per IEC 61000-4-4
MOUNTING TYPE	DIN-35 mm rail	**ELECTRO-STATIC DISCHARGE (ESD)**	Level A, per IEC 61000-4-2
AMBIENT TEMPERATURE	-5 … +60 °C	**SURGE TEST**	Level A, per IEC 61000-4-5
STORAGE TEMPERATURE	-25 … +70 °C	**VIBRATION RESISTANCE**	4 g, per IEC 60068-2-6
RELATIVE HUMIDITY	95%, non-condensing	**SHOCK RESISTANCE**	15 g, per IEC 60068-2-27
OPERATING ALTITUDE	0 … 2000 m / 0 … 6562 ft	**EU ROHS COMPLIANCE STATUS**	Yes

POLLUTION DEGREE	2, per IEC 61131-2	**MATERIAL COMPLIANCE**	Compliant with REACH

GENERAL DATA

HOUSING MATERIAL	PPE	**DIMENSIONS (H X W X D)**	110.6 x 28.1 x 78.4 mm
WEIGHT	128 g	**MTTF (25 ℃)**	155 years
COLOR	Light gray	**APPROVALS**	CE

6.4.2.3. 16-channel digital output module



Item	Name	Function	Status
1	Module running indicator		
	PW	Backplane power indicator	Green: normal; Red: I/O power supply abnormal; Off: no backplane power
	MD	Module error indicator	Green: normal Red: Module channel error Green blinking: Connected but not configured; Red and green blinking: Backplane communication abnormal;
	00-07 10-17	Output signal indicator	Green: output “1” Off: output “0”
2	Terminal disassembly device	Press the device to separate the terminal block from the module	-
3	I/O output terminal 0-7,10-17	I/O signal wiring	-
4	24 V power terminal	24 V+	-
5	24 V power terminal	0 V	-
6	Module fixing device	Used to fix the module to the standard mounting rail	Pulling up: assembling position; Pressing down: locking position
7	Backplane expansion interface	Backplane communication	-

6.4.2.4. 16-channel digital output module technical data

FX20-DO-BH00

ARTICLE PROPERTIES

PRODUCT TYPE	FX20 series modular I/O system digital output modules	**PRODUCT GROUP**	IP20 modular I/O system
DESCRIPTION	FX20-submoduel 16-channel output PNP, 24 V DC, 0.5 A, IP20, DIN rail installation	**PU**	1 pc
		COUNTRY OF ORIGIN	CN

TECHNICAL DATA

NUMBER OF DIGITAL OUTPUTS	16	**SWITCHING FREQUENCY**	Max. 1 kHz (Resistive loads) Max. 1 Hz (Inductive loads) Max. 10 Hz (Lamps)
OUTPUT TYPE	PNP	**OUTPUT HOLD**	Supports, configured by PLC or web server
OUTPUT VOLTAGE	24 V DC	**CURRENT CONSUMPTION (5 V)**	60 mA
OUTPUT CURRENT	Max. 0.5 A per channel, total 4 A per module	**PROCESS DATA LENGTH**	2 bytes
OUTPUT LOAD TYPES	Resistive loads, inductive loads, lamps	**FAULT DIAGNOSIS METHOD**	LED, communication message

CONNECTION DATA

WIRE CONNECTION	Plug-in terminal block	**STRIPPED LENGTHS**	8 … 10 mm 0.315 … 0.394 in
CROSS SECTION	0.08 mm² … 2.5 mm² AWG 28 … 14		

ENVIRONMENTAL REQUIREMENTS

PROTECTION CLASS	IP20	**ELECTRICAL FAST TRANSIENT (EFT)**	Level A, per IEC 61000-4-4
MOUNTING TYPE	DIN-35 mm rail	**ELECTRO-STATIC DISCHARGE (ESD)**	Level A, per IEC 61000-4-2
AMBIENT TEMPERATURE	-5 ... +60 °C	**SURGE TEST**	Level A, per IEC 61000-4-5
STORAGE TEMPERATURE	-25 ... +70 °C	**VIBRATION RESISTANCE**	4 g, per IEC 60068-2-6
RELATIVE HUMIDITY	95%, non-condensing	**SHOCK RESISTANCE**	15 g, per IEC 60068-2-27
OPERATING ALTITUDE	0 … 2000 m / 0 … 6562 ft	**EU ROHS COMPLIANCE STATUS**	Yes
POLLUTION DEGREE	2, per IEC 61131-2	**MATERIAL COMPLIANCE**	Compliant with REACH

GENERAL DATA

HOUSING MATERIAL	PPE	**DIMENSIONS (H X W X D)**	110.6 x 15 x 78.4 mm
WEIGHT	63 g	**MTTF (25 °C)**	155 years
COLOR	Light gray	**APPROVALS**	CE

FX20-DO-BH50

ARTICLE PROPERTIES

PRODUCT TYPE	FX20 series modular I/O system digital output modules	**PRODUCT GROUP**	IP20 modular I/O system
DESCRIPTION	FX20-submoduel 16-channel output NPN, 24 V DC, 0.5 A, IP20, DIN rail installation	**PU**	1 pc
		COUNTRY OF ORIGIN	CN

TECHNICAL DATA

NUMBER OF DIGITAL OUTPUTS	16	**SWITCHING FREQUENCY**	Max. 1 kHz (Resistive loads) Max. 1 Hz (Inductive loads) Max. 10 Hz (Lamps)
OUTPUT TYPE	NPN	**OUTPUT HOLD**	Supports, configed by PLC or web server
OUTPUT VOLTAGE	24 V DC	**CURRENT CONSUMPTION (5 V)**	60 mA
OUTPUT CURRENT	Max. 0.5 A per channel, total 4 A per module	**PROCESS DATA LENGTH**	2 bytes
OUTPUT LOAD TYPES	Resistive loads, inductive loads, lamps	**FAULT DIAGNOSIS METHOD**	LED, communication message

CONNECTION DATA

WIRE CONNECTION	Plug-in terminal block	**STRIPPED LENGTHS**	8 … 10 mm 0.315 … 0.394 in
CROSS SECTION	0.08 mm² … 2.5 mm² AWG 28 … 14		

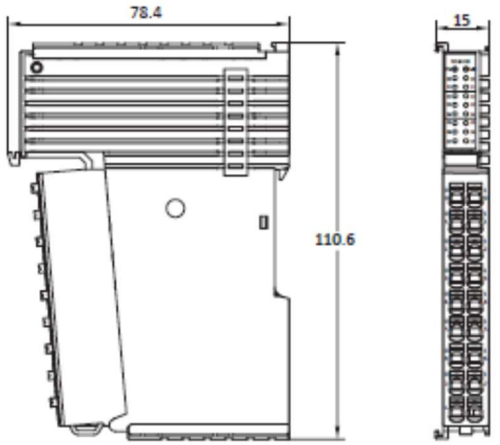
ENVIRONMENTAL REQUIREMENTS

PROTECTION CLASS	IP20	**ELECTRICAL FAST TRANSIENT (EFT)**	Level A, per IEC 61000-4-4
MOUNTING TYPE	DIN-35 mm rail	**ELECTRO-STATIC DISCHARGE (ESD)**	Level A, per IEC 61000-4-2
AMBIENT TEMPERATURE	-5 ... +60 °C	**SURGE TEST**	Level A, per IEC 61000-4-5
STORAGE TEMPERATURE	-25 ... +70 °C	**VIBRATION RESISTANCE**	4 g, per IEC 60068-2-6
RELATIVE HUMIDITY	95%, non-condensing	**SHOCK RESISTANCE**	15 g, per IEC 60068-2-27
OPERATING ALTITUDE	0 … 2000 m / 0 … 6562 ft	**EU ROHS COMPLIANCE STATUS**	Yes
POLLUTION DEGREE	2, per IEC 61131-2	**MATERIAL COMPLIANCE**	Compliant with REACH

GENERAL DATA

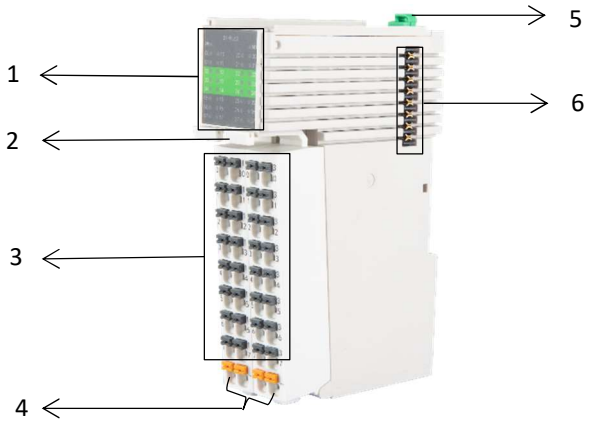
HOUSING MATERIAL	PPE	**DIMENSIONS (H X W X D)**	110.6 x 15 x 78.4 mm
WEIGHT	63 g	**MTTF (25 °C)**	155 years
COLOR	Light gray	**APPROVALS**	CE

6.4.2.5. 16 digital input output module profile drawing



6.4.3. 32-channel digital input output module

6.4.3.1. 32-channel digital input module



Item	Name	Function	Status
1	Module running indicator		
	PW	Backplane power indicator	Green: normal; Off: no backplane power
	MD	Module error indicator	Green: normal Red: Module channel error Green blinking: Connected but not configured; Red and green blinking: Backplane communication abnormal;
	00-07,10-17 20-27,30-37	Input signal indicator	Green: output “1” Off: output “0”
2	Terminal disassembly device	Press the device to separate the terminal block from the module	-
3	IO input terminal	I/O signal wiring	-

	00-07,10-17, 20-27,30-37		
4	Common terminals	I/O signal common terminals	0 V when the input signal is PNP, 24 V+ when the input signal is NPN
5	Module fixing device	Used to fix the module to the standard mounting rail	Pulling up: assembling position; Pressing down: locking position
6	Backplane expansion interface	Backplane communication	-

6.4.3.2. 32-channel digital input module technical data

FX20-DI-BL60

ARTICLE PROPERTIES

PRODUCT TYPE	FX20 series modular I/O system digital input modules	**PRODUCT GROUP**	IP20 modular I/O system
DESCRIPTION	FX20-submoduel 32-channel input PNP/ NPN, 24 V DC, IP20, DIN rail installation	**PU** **COUNTRY OF ORIGIN**	1 pc CN

TECHNICAL DATA

NUMBER OF DIGITAL INPUTS	32	**INPUT FILTERING DELAY**	0 ms, 1 ms, 3 ms and 10 ms can be configured
INPUT TYPE	PNP / NPN	**CURRENT CONSUMPTION (5 V)**	60 mA
INPUT SIGNAL '0'	0 … 5 V DC	**PROCESS DATA LENGTH**	4 bytes
INPUT SIGNAL '1'	18 … 30 V DC	**FAULT DIAGNOSIS METHOD**	LED, communication message
INPUT CURRENT PER CHANNEL FOR SIGNAL '1'	Typ. 4 mA		

CONNECTION DATA

WIRE CONNECTION	Plug-in terminal block	**STRIPPED LENGTHS**	8 … 10 mm 0.315 … 0.394 in
CROSS SECTION	0.08 mm² … 2.5 mm² AWG 28 … 14		

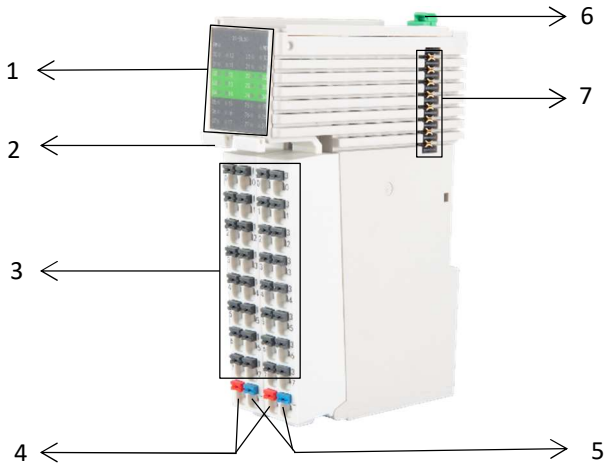
ENVIRONMENTAL REQUIREMENTS

PROTECTION CLASS	IP20	**ELECTRICAL FAST TRANSIENT (EFT)**	Level A, per IEC 61000-4-4
MOUNTING TYPE	DIN-35 mm rail	**ELECTRO-STATIC DISCHARGE (ESD)**	Level A, per IEC 61000-4-2
AMBIENT TEMPERATURE	-5 … +60 °C	**SURGE TEST**	Level A, per IEC 61000-4-5
STORAGE TEMPERATURE	-25 … +70 °C	**VIBRATION RESISTANCE**	4 g, per IEC 60068-2-6
RELATIVE HUMIDITY	95%, non-condensing	**SHOCK RESISTANCE**	15 g, per IEC 60068-2-27
OPERATING ALTITUDE	0 … 2000 m / 0 … 6562 ft	**EU ROHS COMPLIANCE STATUS**	Yes
POLLUTION DEGREE	2, per IEC 61131-2	**MATERIAL COMPLIANCE**	Compliant with REACH

GENERAL DATA

HOUSING MATERIAL	PPE	**DIMENSIONS (H X W X D)**	110.6 x 28.1 x 78.4 mm
WEIGHT	128 g	**MTTF (25 ℃)**	155 years
COLOR	Light gray	**APPROVALS**	CE

6.4.3.3. 32-channel digital output module



Item	Name	Function	Status
1	Module running indicators		
	PW	Backplane power indicator	Green: normal; Red: I/O power supply abnormal; Off: no backplane power
	MD	Module error indicator	Green: normal Red: Module channel error Green blinking: Connected but not configured; Red and green blinking: Backplane communication abnormal;
	00-07,10-17 20-27,30-37	Output signal indicator	Green: output “1” Off: output “0”
2	Terminal disassembly device	Press the device to separate the terminal block from the module	-
3	I/O output terminal 00-07,10-17, 20-27,30-37	I/O signal wiring	-
4	24 V power terminal	24V+	-
5	24 V power terminal	0V	-
6	Module fixing device	Used to fix the module to the standard mounting rail	Pulling up: assembling position; Pressing down: locking position
7	Backplane bus interface	Backplane communication	-

6.4.3.4. 32-channel digital output module technical data

FX20-DO-BL00

ARTICLE PROPERTIES

PRODUCT TYPE	FX20 series modular I/O system digital output modules	**PRODUCT GROUP**	IP20 modular I/O system
DESCRIPTION	FX20-submoduel 32-channel output PNP, 24 V DC, 0.5 A, IP20, DIN rail installation	**PU**	1 pc
		COUNTRY OF ORIGIN	CN

TECHNICAL DATA

NUMBER OF DIGITAL OUTPUTS	32	**SWITCHING FREQUENCY**	Max. 1 kHz (Resistive loads) Max. 1 Hz (Inductive loads) Max. 10 Hz (Lamps)
OUTPUT TYPE	PNP	**OUTPUT HOLD**	Supports, configed by PLC or web server
OUTPUT VOLTAGE	24 V DC	**CURRENT CONSUMPTION (5 V)**	60 mA
OUTPUT CURRENT	Max. 0.5 A per channel, total 4 A per module	**PROCESS DATA LENGTH**	4 bytes
OUTPUT LOAD TYPES	Resistive loads, inductive loads, lamps	**FAULT DIAGNOSIS METHOD**	LED, communication message

CONNECTION DATA

WIRE CONNECTION	Plug-in terminal block	**STRIPPED LENGTHS**	8 … 10 mm 0.315 … 0.394 in
CROSS SECTION	0.08 mm² … 2.5 mm² AWG 28 … 14		

ENVIRONMENTAL REQUIREMENTS

PROTECTION CLASS	IP20	**ELECTRICAL FAST TRANSIENT (EFT)**	Level A, per IEC 61000-4-4
MOUNTING TYPE	DIN-35 mm rail	**ELECTRO-STATIC DISCHARGE (ESD)**	Level A, per IEC 61000-4-2
AMBIENT TEMPERATURE	-5 ... +60 °C	**SURGE TEST**	Level A, per IEC 61000-4-5
STORAGE TEMPERATURE	-25 ... +70 °C	**VIBRATION RESISTANCE**	4 g, per IEC 60068-2-6
RELATIVE HUMIDITY	95%, non-condensing	**SHOCK RESISTANCE**	15 g, per IEC 60068-2-27
OPERATING ALTITUDE	0 … 2000 m / 0 … 6562 ft	**EU ROHS COMPLIANCE STATUS**	Yes
POLLUTION DEGREE	2, per IEC 61131-2	**MATERIAL COMPLIANCE**	Compliant with REACH

GENERAL DATA

HOUSING MATERIAL	PPE	**DIMENSIONS (H X W X D)**	110.6 x 28.1 x 78.4 mm
WEIGHT	128 g	**MTTF (25 °C)**	155 years
COLOR	Light gray	**APPROVALS**	CE

FX20-DO-BL50

ARTICLE PROPERTIES

PRODUCT TYPE	FX20 series modular I/O system digital output modules	**PRODUCT GROUP**	IP20 modular I/O system
DESCRIPTION	FX20-submoduel 32-channel output NPN, 24 V DC, 0.5 A, IP20, DIN rail installation	**PU**	1 pc
		COUNTRY OF ORIGIN	CN

TECHNICAL DATA

NUMBER OF DIGITAL OUTPUTS	32	**SWITCHING FREQUENCY**	Max. 1 kHz (Resistive loads) Max. 1 Hz (Inductive loads) Max. 10 Hz (Lamps)
OUTPUT TYPE	NPN	**OUTPUT HOLD**	Supports, configed by PLC or web server
OUTPUT VOLTAGE	24 V DC	**CURRENT CONSUMPTION (5 V)**	60 mA
OUTPUT CURRENT	Max. 0.5 A per channel, total 4 A per module	**PROCESS DATA LENGTH**	4 bytes
OUTPUT LOAD TYPES	Resistive loads, inductive loads, lamps	**FAULT DIAGNOSIS METHOD**	LED, communication message

CONNECTION DATA

WIRE CONNECTION	Plug-in terminal block	**STRIPPED LENGTHS**	8 … 10 mm 0.315 … 0.394 in
CROSS SECTION	0.08 mm² … 2.5 mm² AWG 28 … 14		

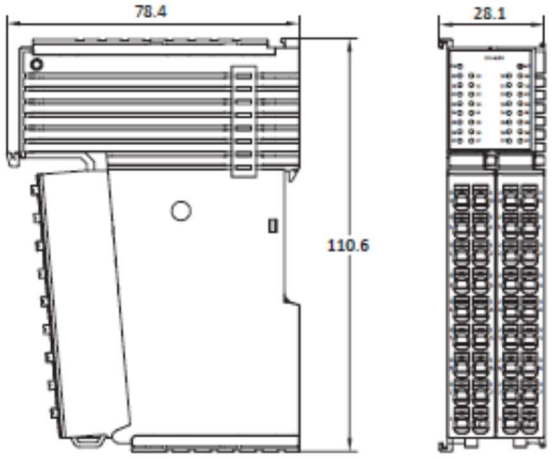
ENVIRONMENTAL REQUIREMENTS

PROTECTION CLASS	IP20	**ELECTRICAL FAST TRANSIENT (EFT)**	Level A, per IEC 61000-4-4
MOUNTING TYPE	DIN-35 mm rail	**ELECTRO-STATIC DISCHARGE (ESD)**	Level A, per IEC 61000-4-2
AMBIENT TEMPERATURE	-5 ... +60 °C	**SURGE TEST**	Level A, per IEC 61000-4-5
STORAGE TEMPERATURE	-25 ... +70 °C	**VIBRATION RESISTANCE**	4 g, per IEC 60068-2-6
RELATIVE HUMIDITY	95%, non-condensing	**SHOCK RESISTANCE**	15 g, per IEC 60068-2-27
OPERATING ALTITUDE	0 … 2000 m / 0 … 6562 ft	**EU ROHS COMPLIANCE STATUS**	Yes
POLLUTION DEGREE	2, per IEC 61131-2	**MATERIAL COMPLIANCE**	Compliant with REACH

GENERAL DATA

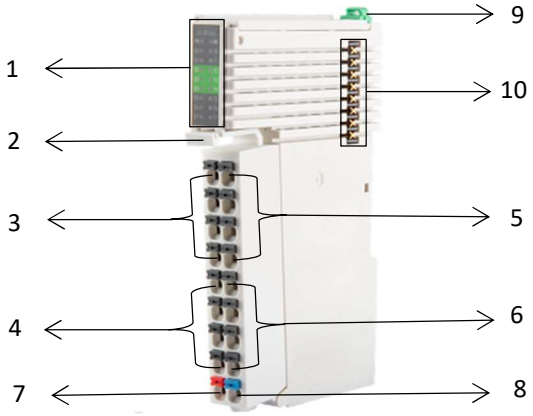
HOUSING MATERIAL	PPE	**DIMENSIONS (H X W X D)**	110.6 x 28.1 x 78.4 mm
WEIGHT	128 g	**MTTF (25 °C)**	155 years
COLOR	Light gray	**APPROVALS**	CE

6.4.3.5. 32-channel digital input/output module profile drawing



6.4.4. 4-channel analog input/output module

6.4.4.1. 4-channel analog input module



Item	Name	Function	Status
1	Module running indicators		
	PW	Backplane power indicator	Green: normal; Red: I/O power supply abnormal; Off: no backplane power
	MD	Module error indicator	Green: normal Red: Module channel error Green blinking: Connected but not configured; Red and green blinking: Backplane communication abnormal;
	C1-C4	Input signal indicator	Green: input normal Red: input over range
2	Terminal disassembly device	Press the device to separate the	-

		terminal block from the module	
3	Analog input channel 0	Analog input	-
4	Analog input channel 1	Analog input	-
5	Analog input channel 2	Analog input	-
6	Analog input channel 3	Analog input	-
7	24 V power terminal	24V+	-
8	24 V power terminal	0V	-
9	Module fixing device	Used to fix the module to the standard mounting rail	Pulling up: assembling position; Pressing down: locking position
10	Backplane bus interface	Backplane communication	-

6.4.4.2. 4-channel analog input module technical data

FX20-AI-BD60

ARTICLE PROPERTIES

PRODUCT TYPE	FX20 series modular I/O system analog input modules	**PRODUCT GROUP**	IP20 modular I/O system
DESCRIPTION	FX20-submodule 4-channel analog input, voltage / current types, 24 V DC, IP20, DIN rail installation	**PU**	1 pc
		COUNTRY OF ORIGIN	CN

TECHNICAL DATA

NUMBER OF ANALOG INPUTS	4	**MEASURING ACCURACY**	± 0.2 %
INPUT TYPE	0 … 10 V, ± 10 V, 1 … 5 V, 0/4 … 20 mA, ±20 mA	**OPERATING VOLTAGE**	24 V DC
INPUT IMPEDANCE	Current type: 250 Ω Voltage type: 1 MΩ	**CURRENT CONSUMPTION (5 V)**	60 mA
INPUT RESOLUTION	16 bits	**PROCESS DATA LENGTH**	8 bytes
CONVERTING TIME	3 ms	**FAULT DIAGNOSIS METHOD**	LED, communication message

CONNECTION DATA

WIRE CONNECTION	Plug-in terminal block	**STRIPPED LENGTHS**	8 … 10 mm 0.315 … 0.394 in
CROSS SECTION	0.08 … 2.5 mm² AWG 28 … 14		

ENVIRONMENTAL REQUIREMENTS

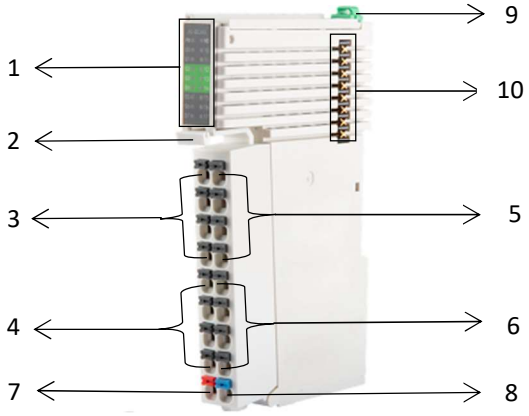
PROTECTION CLASS	IP20	**ELECTRICAL FAST TRANSIENT (EFT)**	Level A, per IEC 61000-4-4
MOUNTING TYPE	DIN-35 mm rail	**ELECTRO-STATIC DISCHARGE (ESD)**	Level A, per IEC 61000-4-2
AMBIENT TEMPERATURE	-5 ... +60 °C	**SURGE TEST**	Level A, per IEC 61000-4-5
STORAGE TEMPERATURE	-25 ... +70 °C	**VIBRATION RESISTANCE**	4 g, per IEC 60068-2-6

RELATIVE HUMIDITY	95%, non-condensing	**SHOCK RESISTANCE**	15 g, per IEC 60068-2-27
OPERATING ALTITUDE	0 … 2000 m / 0 … 6562 ft	**EU ROHS COMPLIANCE STATUS**	Yes
POLLUTION DEGREE	2, compliant with IEC 61131-2	**MATERIAL COMPLIANCE**	Compliant with REACH

GENERAL DATA

HOUSING MATERIAL	PPE	**DIMENSIONS (H X W X D)**	110.6 x 15 x 78.4 mm
WEIGHT	63 g	**MTTF (25 °C)**	196 years
COLOR	Light gray	**APPROVALS**	CE

6.4.4.3. 4-channel analog output module



Item	Name	Function	Status
1	Module running indicators		
	PW	Backplane power indicator	Green: normal; Red: I/O power supply abnormal; Off: no backplane power
	MD	Module error indicator	Green: normal Red: Module channel error Green blinking: Connected but not be configured; Red and green blinking: Backplane communication abnormal.
	C1-C4	Output signal indicator	Green: output normal Red: output over range
2	Terminal disassembly device	Press the device to separate the terminal block from the module	-
3	Analog output 0	Analog output	-
4	Analog output 1	Analog output	-
5	Analog output 2	Analog output	-

6	Analog output 3	Analog output	-
7	24 V power terminal	24 V+	-
8	24 V power terminal	0 V	-
9	Module fixing device	Used to fix the module to the standard mounting rail	Pulling up: assembling position; Pressing down: locking position
10	Backplane bus interface	Backplane communication	

6.4.4.4. 4-channel analog output module technical data

FX20-AO-BD60

ARTICLE PROPERTIES

PRODUCT TYPE	FX20 series modular I/O system analog output modules	**PRODUCT GROUP**	IP20 modular I/O system
DESCRIPTION	FX20-submodule 4-channel analog output, voltage/ current types, 24 V DC, IP20, DIN rail installation	**PU**	1 pc
		COUNTRY OF ORIGIN	CN

TECHNICAL DATA

NUMBER OF ANALOG INPUTS	4	**OPERATING VOLTAGE**	24 V DC
OUTPUT TYPE	0 … 10 V, ± 10 V, 1 … 5 V, 0/4 … 20 mA	**CURRENT CONSUMPTION (5 V)**	60 mA
OUTPUT RESOLUTION	16 bits	**PROCESS DATA LENGTH**	8 bytes
CONVERTING TIME	2 ms	**FAULT DIAGNOSIS METHOD**	LED, communication message
MEASURING ACCURACY	± 0.2 %		

CONNECTION DATA

WIRE CONNECTION	Plug-in terminal block	**STRIPPED LENGTHS**	8 … 10 mm 0.315 … 0.394 in
CROSS SECTION	0.08 mm² … 2.5 mm² AWG 28 … 14		

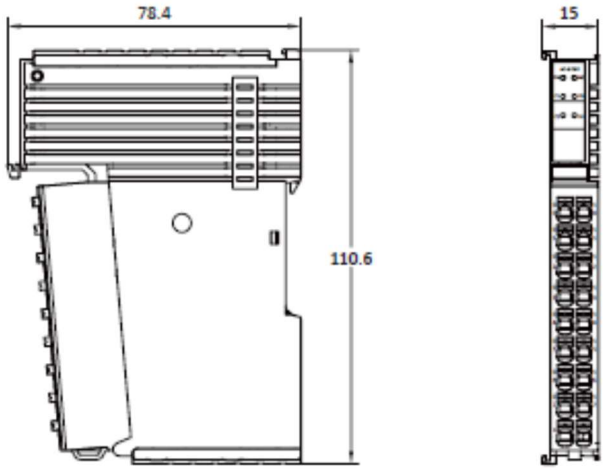
ENVIRONMENTAL REQUIREMENTS

PROTECTION CLASS	IP20	**ELECTRICAL FAST TRANSIENT (EFT)**	Level A, per IEC 61000-4-4
MOUNTING TYPE	DIN-35 mm rail	**ELECTRO-STATIC DISCHARGE (ESD)**	Level A, per IEC 61000-4-2
AMBIENT TEMPERATURE	-5 … +60 °C	**SURGE TEST**	Level A, per IEC 61000-4-5
STORAGE TEMPERATURE	-25 … +70 °C	**VIBRATION RESISTANCE**	4 g, per IEC 60068-2-6
RELATIVE HUMIDITY	95%, non-condensing	**SHOCK RESISTANCE**	15 g, per IEC 60068-2-27
OPERATING ALTITUDE	0 … 2000 m / 0 … 6562 ft	**EU ROHS COMPLIANCE STATUS**	Yes
POLLUTION DEGREE	2, per IEC 61131-2	**MATERIAL COMPLIANCE**	Compliant with REACH

GENERAL DATA

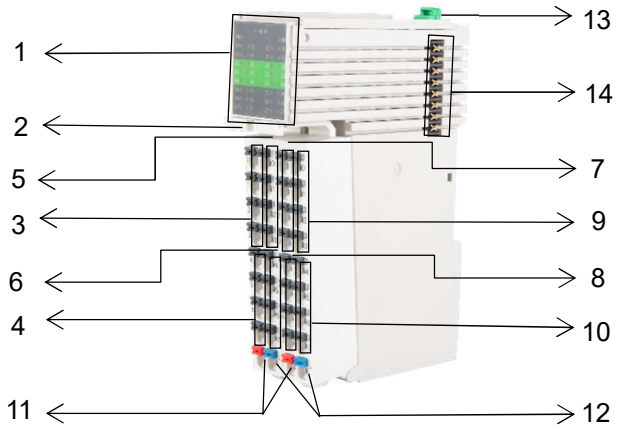
HOUSING MATERIAL	PPE	**DIMENSIONS (H X W X D)**	110.6 x 15 x 78.4 mm
WEIGHT	63 g	**MTTF (25 ℃)**	196 years
COLOR	Light gray	**APPROVALS**	CE

6.4.4.5. 4-channel analog input output module profile drawing



6.4.5. 8-channel analog input output modules

6.4.5.1. 8-channel analog input modules



Item	Name	Function	Status
1	Module running indicators		
	PW	Backplane power indicator	Green: normal; Red: I/O power supply abnormal; Off: no backplane power
	MD	Module error indicator	Green: normal Red: Module channel error Green blinking: Connected but not configured; Red and green blinking: Backplane communication abnormal;
	C1-C8	Input signal indicator	Green: input normal

			Red: input over range
2	Terminal disassembly device	Press the device to separate the terminal block from the module	-
3	Analog input channel 0	Analog input	-
4	Analog input channel 1	Analog input	-
5	Analog input channel 2	Analog input	-
6	Analog input channel 3	Analog input	-
7	Analog input channel 4	Analog input	-
8	Analog input channel 5	Analog input	-
9	Analog input channel 6	Analog input	-
10	Analog input channel 7	Analog input	-
11	24 V power terminal	24 V+	-
12	24 V power terminal	0 V	-
13	Module fixing device	Used to fix the module to the standard mounting rail	Pulling up: assembling position; Pressing down: locking position
14	Backplane bus interface	Backplane communication	-

6.4.5.2. 8-channel analog input module technical data

FX20-AI-BF60

ARTICLE PROPERTIES

PRODUCT TYPE	FX20 series modular I/O system analog input modules	**PRODUCT GROUP**	IP20 modular I/O system
DESCRIPTION	FX20-submodule 8-channel analog input, voltage / current types, 24 V DC, IP20, DIN rail installation	**PU**	1 pc
		COUNTRY OF ORIGIN	CN

TECHNICAL DATA

NUMBER OF ANALOG INPUTS	8	**MEASURING ACCURACY**	± 0.2 %
INPUT TYPE	0 … 10 V, ± 10 V, 1 … 5 V, 0/4 … 20 mA, ± 20 mA	**OPERATING VOLTAGE**	24 V DC
INPUT IMPEDANCE	Current type: 250 Ω Voltage type: 1 MΩ	**CURRENT CONSUMPTION (5 V)**	60 mA
INPUT RESOLUTION	16 bits	**PROCESS DATA LENGTH**	16 bytes
CONVERTING TIME	3 ms	**FAULT DIAGNOSIS METHOD**	LED, communication message

CONNECTION DATA

WIRE CONNECTION	Plug-in terminal block	**STRIPPED LENGTHS**	8 … 10 mm 0.315 … 0.394 in
CROSS SECTION	0.08 mm² … 2.5 mm² AWG 28 … 14		

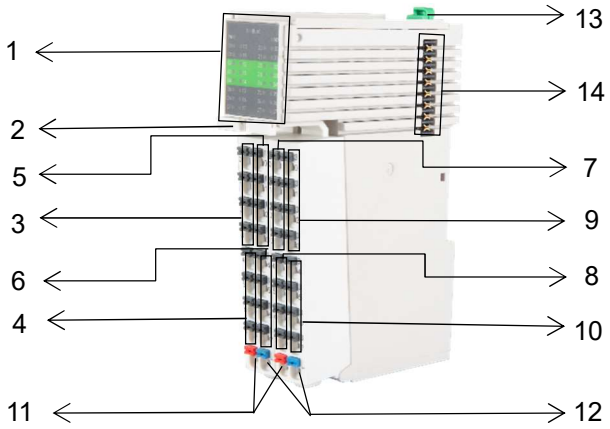
ENVIRONMENTAL REQUIREMENTS

PROTECTION CLASS	IP20	**ELECTRICAL FAST TRANSIENT (EFT)**	Level A, per IEC 61000-4-4
MOUNTING TYPE	DIN-35 mm rail	**ELECTRO-STATIC DISCHARGE (ESD)**	Level A, per IEC 61000-4-2
AMBIENT TEMPERATURE	-5 ... +60 °C	**SURGE TEST**	Level A, per IEC 61000-4-5
STORAGE TEMPERATURE	-25 ... +70 °C	**VIBRATION RESISTANCE**	4 g, per IEC 60068-2-6
RELATIVE HUMIDITY	95%, non-condensing	**SHOCK RESISTANCE**	15 g, per IEC 60068-2-27
OPERATING ALTITUDE	0 … 2000 m / 0 … 6562 ft	**EU ROHS COMPLIANCE STATUS**	Yes
POLLUTION DEGREE	2, per IEC 61131-2	**MATERIAL COMPLIANCE**	Compliant with REACH

GENERAL DATA

HOUSING MATERIAL	PPE	**DIMENSIONS (H X W X D)**	110.6 x 28.1 x 78.4 mm
WEIGHT	128 g	**MTTF (25 °C)**	196 years
COLOR	Light gray	**APPROVALS**	CE

6.4.5.3. 8-channel analog output module



Item	Name	Function	Status
1	Module running indicator		
	PW	Backplane power indicator	Green: normal; Red: I/O power supply abnormal; Off: no backplane power
	MD	Module error indicator	Green: normal Red: Module channel error Green blinking: Connected but not configured; Red and green blinking: Backplane communication abnormal;
	C1-C8	Output signal indicator	Green: output normal Red: output over range

2	Terminal disassembly device	Press the device to separate the terminal block from the module	-
3	Analog output 0	Analog output	-
4	Analog output 1	Analog output	-
5	Analog output 2	Analog output	-
6	Analog output 3	Analog output	-
7	Analog output 4	Analog output	-
8	Analog output 5	Analog output	-
9	Analog output 6	Analog output	-
10	Analog output 7	Analog output	-
11	24 V power terminal	24 V+	-
12	24 V power terminal	0 V	-
13	Module fixing device	Used to fix the module to the standard mounting rail	Pulling up: assembling position; Pressing down: locking position
14	Backplane bus interface	Backplane communication	-

6.4.5.4. 8-channel analog output module technical data

FX20-AO-BF60

ARTICLE PROPERTIES

PRODUCT TYPE	FX20 series modular I/O system analog output modules	**PRODUCT GROUP**	IP20 modular I/O system
DESCRIPTION	FX20-submodule 8-channel analog output, voltage / current types, 24 V DC, IP20, DIN rail installation	**PU**	1 pc
		COUNTRY OF ORIGIN	CN

TECHNICAL DATA

NUMBER OF ANALOG INPUTS	8	**OPERATING VOLTAGE**	24 V DC
OUTPUT TYPE	0 … 10 V, ± 10 V, 1 … 5 V, 0/4 … 20 mA	**CURRENT CONSUMPTION (5 V)**	60 mA
OUTPUT RESOLUTION	16 bits	**PROCESS DATA LENGTH**	16 bytes
CONVERTING TIME	2 ms	**FAULT DIAGNOSIS METHOD**	LED, communication message
MEASURING ACCURACY	± 0.2 %		

CONNECTION DATA

WIRE CONNECTION	Plug-in terminal block	**STRIPPED LENGTHS**	8 … 10 mm, 0.315 … 0.394 in
CROSS SECTION	0.08 mm² … 2.5 mm², AWG 28 … 14		

ENVIRONMENTAL REQUIREMENTS

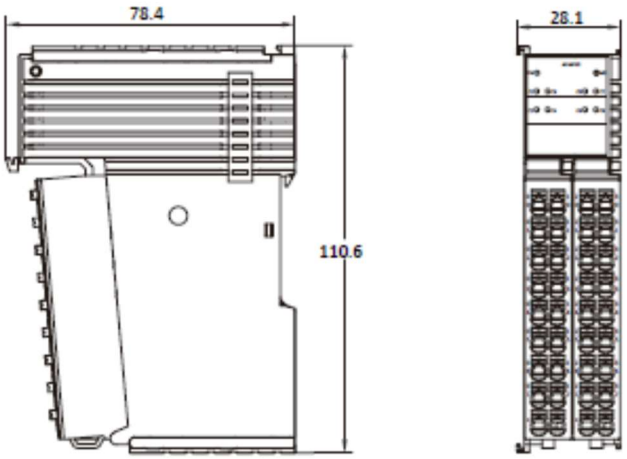
PROTECTION CLASS	IP20	**ELECTRO-STATIC DISCHARGE (ESD)**	Level A, per IEC 61000-4-2

MOUNTING TYPE	DIN-35 mm rail	**SURGE TEST**	Level A, per IEC 61000-4-5
AMBIENT TEMPERATURE	-5 ... +60 °C	**VIBRATION RESISTANCE**	4 g, per IEC 60068-2-6
STORAGE TEMPERATURE	-25 ... +70 °C	**SHOCK RESISTANCE**	15 g, per IEC 60068-2-27
RELATIVE HUMIDITY	95%, non-condensing	**EU ROHS COMPLIANCE STATUS**	Yes
OPERATING ALTITUDE	0 … 2000 m / 0 … 6562 ft	**MATERIAL COMPLIANCE**	Compliant with REACH
POLLUTION DEGREE	2, per IEC 61131-2	**DIMENSIONS (H X W X D)**	110.6 x 28 x 78.4 mm
ELECTRICAL FAST TRANSIENT (EFT)	Level A, per IEC 61000-4-4	**CONFORMITY MARKING**	CE

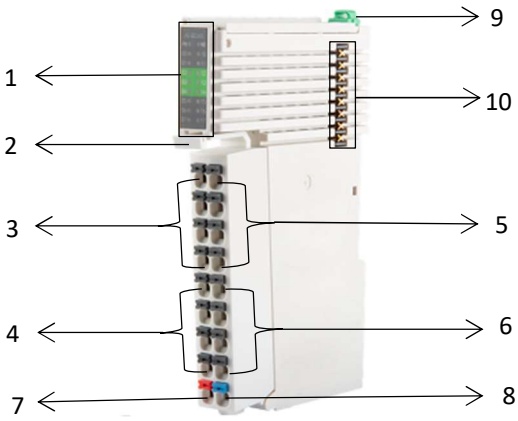
GENERAL DATA

HOUSING MATERIAL	PPE	**DIMENSIONS (H X W X D)**	110.6 x 28 x 78.4 mm
WEIGHT	63 g	**MTTF (25 °C)**	196 years
COLOR	Light gray	**APPROVALS**	CE

6.4.5.5. 8-channel analog input/output module profile drawing



6.4.6. 4-channel temperature measurement modules



Item	Name	Function	Status
1	Module running indicators		
	PW	Backplane power indicator	Green: normal; Red: I/O power supply abnormal; Off: no backplane power
	MD	Module error indicator	Green: normal Red: Module channel error Green blinking: Connected but not configured; Red and green blinking: Backplane communication abnormal;
	C1-C4	Temperature measurement signal indicator	Green: input normal Red: input over range
2	Terminal disassembly device	Press the device to separate the terminal block from the module	-
3	Temp measurement channel 0	Analog output	-
4	Temp measurement channel 1	Analog output	-
5	Temp measurement channel 2	Analog output	-
6	Temp measurement channel 3	Analog output	-
7	24 V power terminal	24V+	-
8	24 V power terminal	0V	-
9	Module fixing device	Used to fix the module to the standard mounting rail	Pulling up: assembling position; Pressing down: locking position
10	Backplane bus interface	Backplane communication	-

6.4.6.1. 4-channel temperature measurement modules technical data

FX20-AI-BD80

ARTICLE PROPERTIES

PRODUCT TYPE	FX20 series modular I/O system analog input modules	**PRODUCT GROUP**	IP20 modular I/O system
DESCRIPTION	FX20-submodule 4-channel RTD measurement, 24 V DC, IP20, DIN rail installation	**PU**	1 pc
		COUNTRY OF ORIGIN	CN

TECHNICAL DATA

NUMBER OF ANALOG INPUTS	4	**MEASUREMENT ACCURACY**	Within 2 °C

INPUT TYPE	Thermal resistance, (2-wire, 3-wire): PT100, PT1000	**OPERATING VOLTAGE**	24 V DC
INPUT RESOLUTION	16 bits	**CURRENT CONSUMPTION (5 V)**	60 mA
CONVERTING TIME(TYP.)	320 ms	**PROCESS DATA LENGTH**	8 bytes
SENSITIVITY	0.1 °C	**FAULT DIAGNOSIS METHOD**	LED, communication message

CONNECTION DATA

WIRE CONNECTION	Plug-in terminal block	**STRIPPED LENGTHS**	8 … 10 mm, 0.315 … 0.394 in
CROSS SECTION	0.08 mm² … 2.5 mm², AWG 28 … 14		

ENVIRONMENTAL REQUIREMENTS

PROTECTION CLASS	IP20	**ELECTRICAL FAST TRANSIENT (EFT)**	Level A, per IEC 61000-4-4
MOUNTING TYPE	DIN-35 mm rail	**ELECTRO-STATIC DISCHARGE (ESD)**	Level A, per IEC 61000-4-2
AMBIENT TEMPERATURE	-5 ... +60 °C	**SURGE TEST**	Level A, per IEC 61000-4-5
STORAGE TEMPERATURE	-25 ... +70 °C	**VIBRATION RESISTANCE**	4 g, per IEC 60068-2-6
RELATIVE HUMIDITY	95%, non-condensing	**VIBRATION RESISTANCE**	4 g, per IEC 60068-2-6
OPERATING ALTITUDE	0 … 2000 m / 0 … 6562 ft	**SHOCK RESISTANCE**	15 g, per IEC 60068-2-27
HOUSING MATERIAL	PPE	**EU ROHS COMPLIANCE STATUS**	Yes
POLLUTION DEGREE	2, compliant with IEC 61131-2	**MATERIAL COMPLIANCE**	Compliant with REACH

GENERAL DATA

HOUSING MATERIAL	PPE	**DIMENSIONS (H X W X D)**	110.6 x 15 x 78.4 mm
WEIGHT	63 g	**MTTF (25 °C)**	196 years
COLOR	Light gray	**APPROVALS**	CE

FX20-AI-BD90

ARTICLE PROPERTIES

PRODUCT TYPE	FX20 series modular I/O system analog input modules	**PRODUCT GROUP**	IP20 modular I/O system
DESCRIPTION	FX20-submodule 4-channel TC measurement, 24 V DC, IP20, DIN rail installation	**PU**	1 pc
		COUNTRY OF ORIGIN	CN

TECHNICAL DATA

NUMBER OF ANALOG INPUTS	4	**MEASUREMENT ACCURACY**	Within 2 °C
INPUT TYPE	Thermocouples: J, K, T, N, E types	**OPERATING VOLTAGE**	24 V DC

INPUT RESOLUTION	16 bits	**CURRENT CONSUMPTION (5 V)**	60 mA
CONVERTING TIME(TYP.)	320 ms	**PROCESS DATA LENGTH**	8 bytes
SENSITIVITY	0.1 °C	**FAULT DIAGNOSIS METHOD**	LED, communication message

CONNECTION DATA

WIRE CONNECTION	Plug-in terminal block	**STRIPPED LENGTHS**	8 … 10 mm,0.315 … 0.394 in
CROSS SECTION	0.08 mm² … 2.5 mm², AWG 28 … 14		

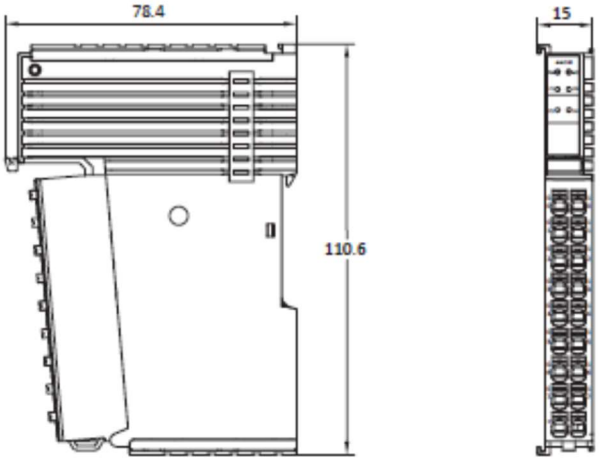
ENVIRONMENTAL REQUIREMENTS

PROTECTION CLASS	IP20	**ELECTRICAL FAST TRANSIENT (EFT)**	Level A, per IEC 61000-4-4
MOUNTING TYPE	DIN-35 mm rail	**ELECTRO-STATIC DISCHARGE (ESD)**	Level A, per IEC 61000-4-2
AMBIENT TEMPERATURE	-5 ... +60 °C	**SURGE TEST**	Level A, per IEC 61000-4-5
STORAGE TEMPERATURE	-25 ... +70 °C	**VIBRATION RESISTANCE**	4 g, per IEC 60068-2-6
RELATIVE HUMIDITY	95%, non-condensing	**SHOCK RESISTANCE**	15 g, per IEC 60068-2-27
OPERATING ALTITUDE	0 … 2000 m / 0 … 6562 ft	**EU ROHS COMPLIANCE STATUS**	Yes
POLLUTION DEGREE	2, per IEC 61131-2	**MATERIAL COMPLIANCE**	Compliant with REACH

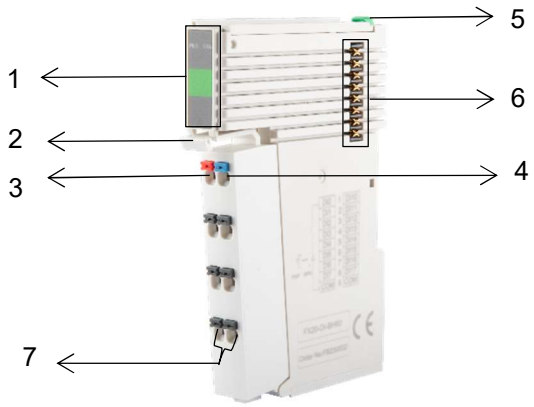
GENERAL DATA

HOUSING MATERIAL	PPE	**DIMENSIONS (H X W X D)**	110.6 x 15 x 78.4 mm
WEIGHT	63 g	**MTTF (25 °C)**	196 years
COLOR	Light gray	**APPROVALS**	CE

6.4.6.2. 4-channel temperature measurement module profile drawing



6.4.7. Auxiliary power module



Item	Name	Function	Status
1	Module running indicators		
	PW	24 V power indicator	Green: normal Red: 24V overvoltage
	Us	Backplane power indicator	Green: normal Off: no power supply
2	Terminal disassembly device	Press the device to separate the terminal block from the module	-
3	External power supply terminal	24 V+	-
4	External power supply terminal	0 V	-
5	Module fixing device	Used to fix the module to the standard mounting rail	Pulling up: assembling position; Pressing down: locking position
6	Backplane bus interface	Backplane communication	-
7	Grounding terminal	PE	-

6.4.7.1. Auxiliary power module technical data

FX20-PS-AB00

ARTICLE PROPERTIES

PRODUCT TYPE	FX20 series modular I/O system auxiliary power supply module	**PRODUCT GROUP**	IP20 modular I/O system
DESCRIPTION	FX20-submodul power supply, 24 V DC, IP20, DIN rail installation, overcurrent and reverse polarity protection	**PU** **COUNTRY OF ORIGIN**	1 pc CN

TECHNICAL DATA

INPUT VOLTAGE	24 V DC	**OUTPUT CURRENT**	Max. 3 A

INPUT VOLTAGE RANGE	20.4.....28.8 V DC	**POWER PROTECTION**	Overcurrent protection, power polarity reverse protection
OUTPUT VOLTAGE	5 V DC	**EFFICIENCY**	95%

CONNECTION DATA

WIRE CONNECTION	Plug-in terminal block	**STRIPPED LENGTHS**	8 … 10 mm 0.315 … 0.394 in
CROSS SECTION	0.08 mm² … 2.5 mm² AWG 28 … 14		

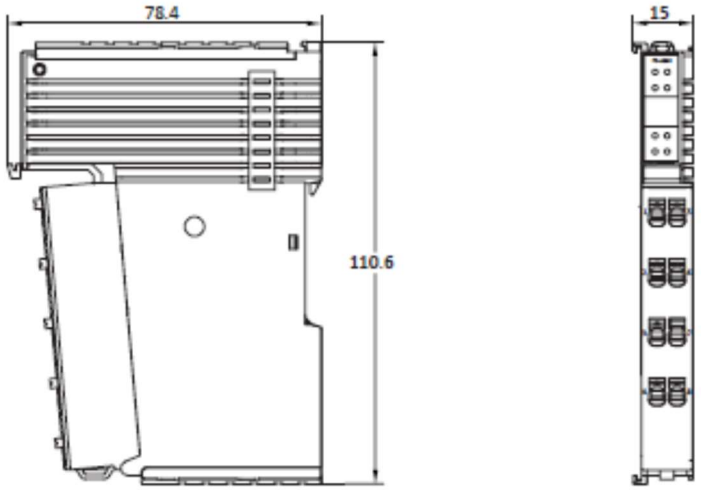
ENVIRONMENTAL REQUIREMENTS

PROTECTION CLASS	IP20	**ELECTRICAL FAST TRANSIENT (EFT)**	Level A, per IEC 61000-4-4
MOUNTING TYPE	DIN-35 mm rail	**ELECTRO-STATIC DISCHARGE (ESD)**	Level A, per IEC 61000-4-2
AMBIENT TEMPERATURE	-5 ... +60 °C	**SURGE TEST**	Level A, per IEC 61000-4-5
STORAGE TEMPERATURE	-25 ... +70 °C	**VIBRATION RESISTANCE**	4 g, per IEC 60068-2-6
RELATIVE HUMIDITY	95%, non-condensing	**SHOCK RESISTANCE**	15 g, per IEC 60068-2-27
OPERATING ALTITUDE	0 … 2000 m / 0 … 6562 ft	**EU ROHS COMPLIANCE STATUS**	Yes
POLLUTION DEGREE	2, per IEC 61131-2	**MATERIAL COMPLIANCE**	Compliant with REACH

GENERAL DATA

HOUSING MATERIAL	PPE	**DIMENSIONS (H X W X D)**	110.6 x 15 x 78.4 mm
WEIGHT	63 g	**APPROVALS**	CE
COLOR	Light gray		

6.4.7.2. Auxiliary power module profile drawing



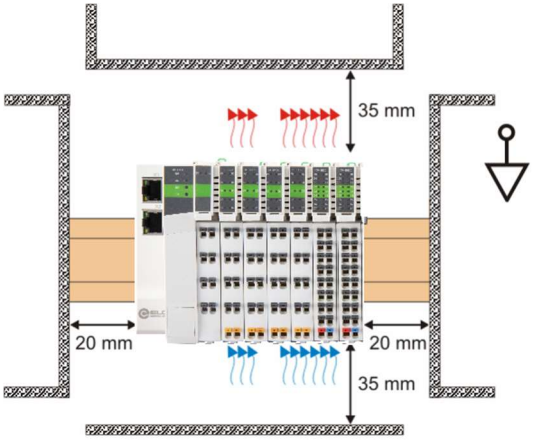
7. Mechanical installation and disassembly

7.1. Installation location and minimum installation distance

The installation position and reserved space are shown in the following figure. Install the installation guide rail horizontally to the designated installation position, and the connection surface of the connector and I/O modules must face forward.

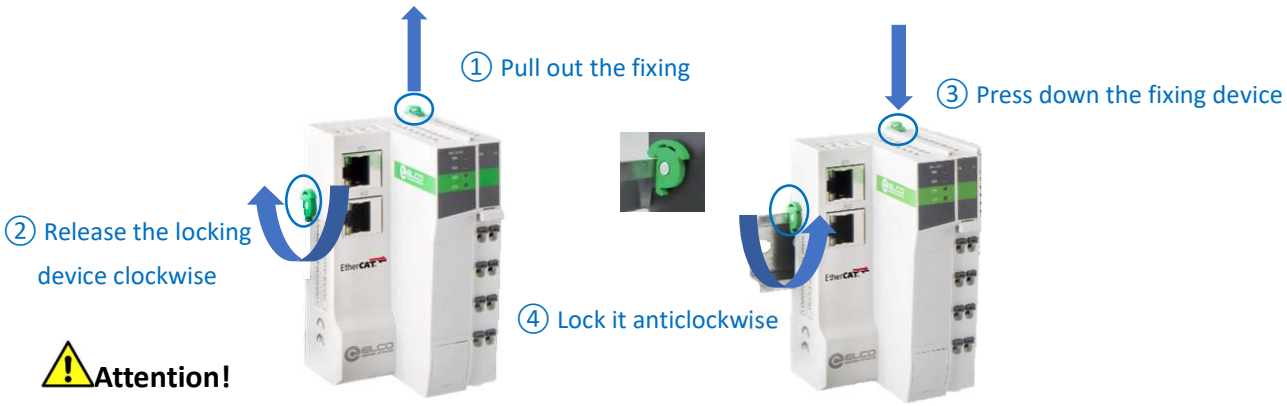
The installation position should maintain a certain distance from adjacent electrical components or cabinets to facilitate heat dissipation. The recommended minimum installation clearance can refer to the markings in the above figure.

Ensure that FX20 is ventilated from bottom to top and achieve optimal cooling through convective ventilation.



7.2. FX20 adapter installation

The installation is carried out according to the following steps:

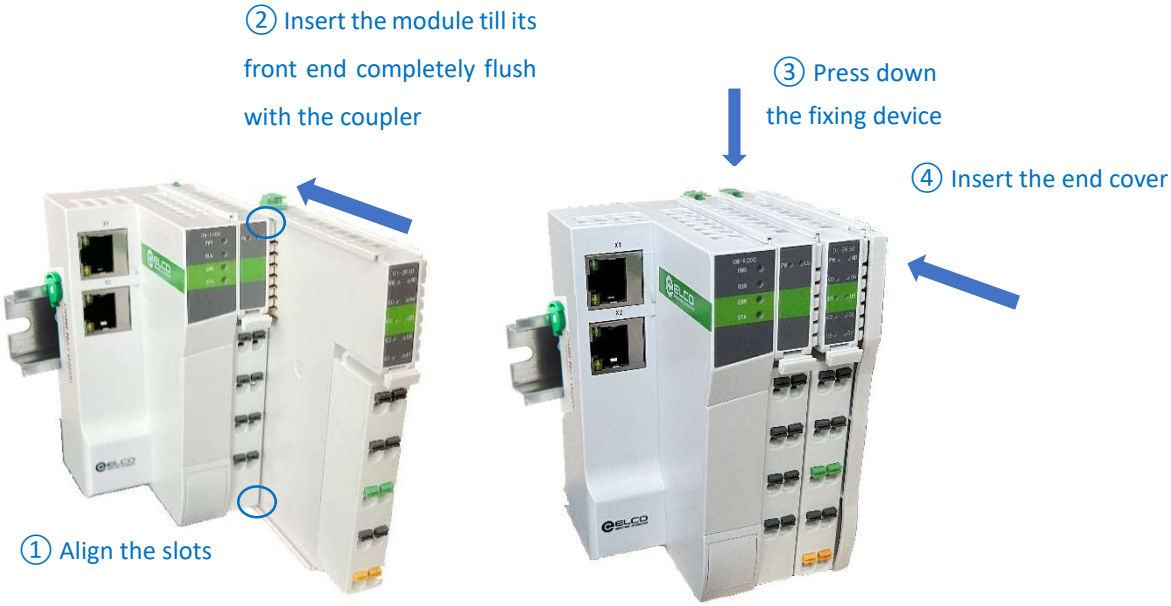


Attention!

During installation, align the module with the DIN rail and press the fixing device in the direction indicated by the arrow. After installation, there will be a noticeable clicking sound; change the position of the locking device slightly; after installing the module properly, make the locking device clamp the upper edge of the rail; to avoid damaging the product, do not apply excessive force.

7.3. I/O modules installation

After the installation of the adapter, the function modules can be sequentially inserted from the right side of the adapter. Before the insertion, ensure to pull out the fixing device and aligned with the two slots on the module.



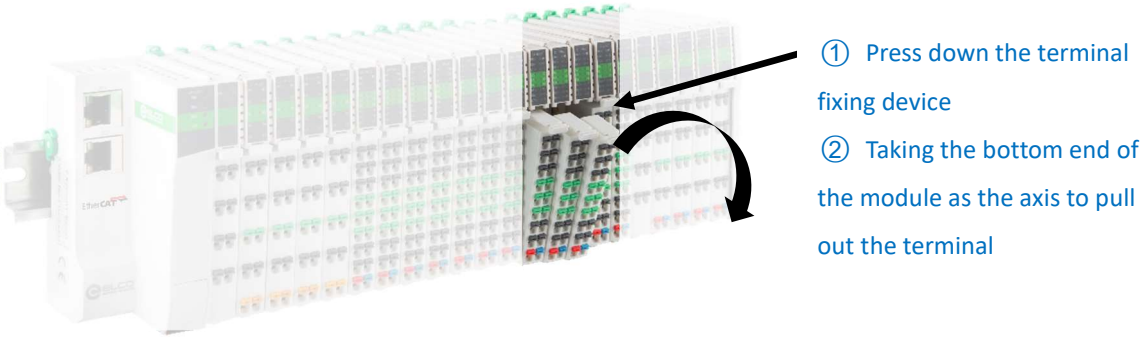
Caution!

The end cover is only to protect the backplane bus interface of the end module, and it is packaged and shipped together with the adapter.

7.4. Modules disassembly

Use a flat screwdriver or similar tool to pry up the locking device on the rail, and then pull the module away from the DIN rail.

The wiring terminals of all modules can be removed separately to facilitate module replacement, as follows:



Warning!

The mechanical installation and disassembly of modules require qualified professional mechanical personnel to operate and pay attention to the correct wearing and use of labor protection equipment.

8. Electrical installation and wiring

8.1. Cable specification

8.1.1. Communication cable

PROFINET bus communication uses shielded network cables for data transmission, without short circuits, misalignment, and poor contact; The length of the cable between devices cannot exceed 100m, as exceeding this length will cause signal attenuation and affect normal communication. The following specifications of communication cables are recommended:

Item	Specification
Cable type	Elastic crossover cable, S-FTP, category 5
Standards met	EIA/TIA568A,EN50173,ISO/IEC11801 EIA/TIA bulletin TSB,EIA/TIA SB40-A&TSB36
Conductor section	AWG26
Wire type	Twisted pair
Wire pair	4

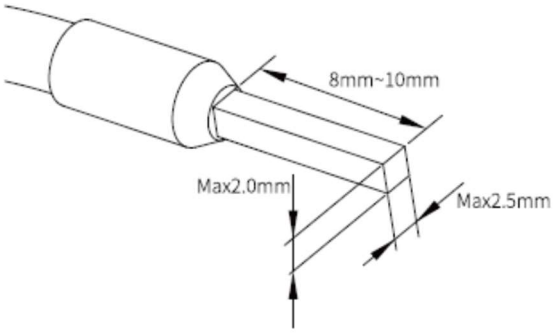
Pre-wired connectors are better for communication and construction. Elco pre-wired connectors can provide customized cable material and cable length in accordance with communication technology requirements. The following Elco Ethernet connectors are available:

Model	Description
E16DA4002M020	RJ45-M12 double-ended pre-wired Ethernet connector, male straight, D-CODE, 4-pin, Cat5e, PVC, 2 M, fixed installation
E66D04002M020	RJ45-RJ45 double-ended pre-wired Ethernet connector, male straight-male straight, 4-pin, Cat5e, PVC, 2 M, fixed installation
E16DA4004M020	RJ45-M12 double-ended pre-wired Ethernet connector, male straight, D-CODE,4-pin, Cat5e, PVC, 2 M, suitable for drag chain
E66D04004M020	RJ45-RJ45 double-ended pre-wired Ethernet connector, male straight-male straight,4-pin, Cat5e, PUR,2 M, suitable for drag chain

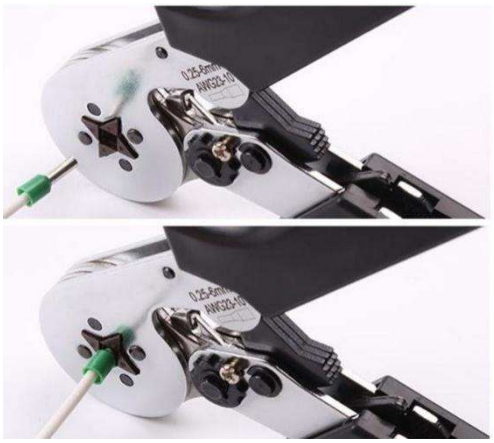
For more selection of Ethernet connectors, please refer to Elco's "Connectivity System Catalog".

8.1.2. Power and signal cables

The FX20 series adopts tool-free spring wiring terminals, and the wiring needs to be equipped with tube type cold pressing cable lugs. Please refer to the following figure for the stripping length and cable lug specifications:



Standard cable crimper can be used for pressing the wire ear, as shown in the following figure:

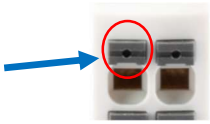


The wire connection does not need tools, and the wiring method is as follows:

1) Install the wire ear on the wire;
2) Insert the wire installed with the wire ear into the plug-in terminal to its most;
3) Pull the cable to ensure its fixed securely.

To release the wire:

1) Press the terminal spring button with your hand or a flat screwdriver
2) Pull out the wire and release the button.

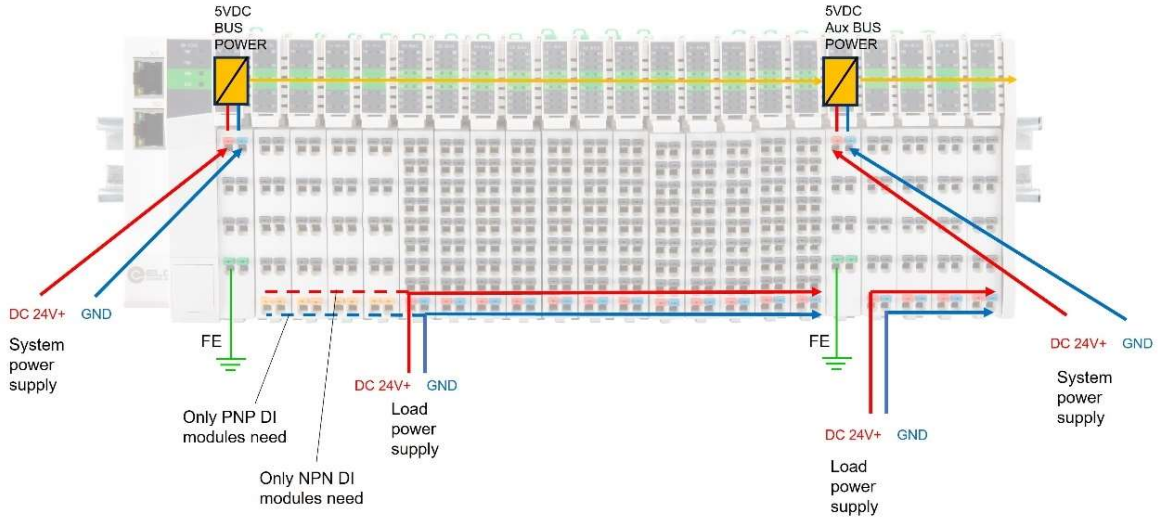


8.2. Modules wiring diagram

8.2.1. FX20 system power supply diagram

The FX20 series backplane 5 V DC power supply is provided by the adapter, and the load power supply for modules need to be provided separately. Additionally, an auxiliary power supply module can provide a larger backplane power supply current. Usually, when the number of modules exceeds 16 in FX20, the auxiliary power supply module should be considered.

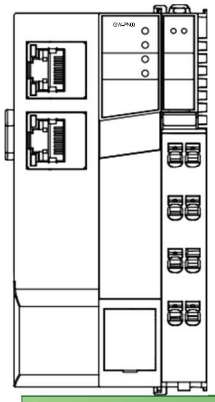
The power supply system diagram is as follows:

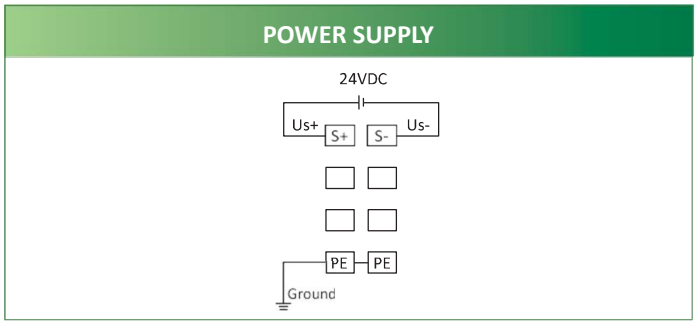


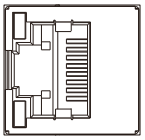
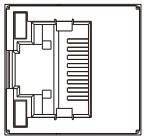
Warning !

- **Be sure to disconnect all power connections before wiring!**
- **To ensure safety, must reliably connect the module grounding terminal to the ground!**
- **The wiring work must be operated by authorized electrical personnel to ensure safety!**
- **Using cables that do not meet the requirements will result in serious equipment damage or personal injury!**
- **Please refer to this manual or the wiring diagram printed on the side of the module for wiring. Incorrect wiring will cause module damage or personal injury!**

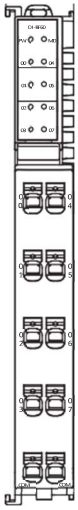
8.2.2. Bus adapters wiring diagram

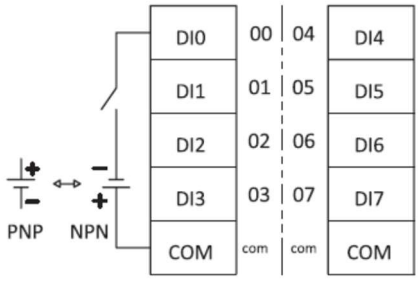




BUS IN (X1)		BUS OUT (X2)	
	1 - TD+: Tranceive Data+		1 - TD+: Tranceive Data+
	2 - TD-: Tranceive Data-		2 - TD-: Tranceive Data-
	3 - RD+: Receive Data+		3 - RD+: Receive Data+
	6 - TD-: Receive Data-		6 - TD-: Receive Data-

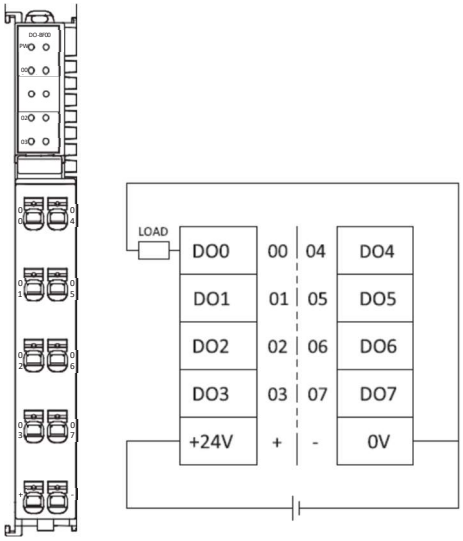
8.2.3. 8-channel DI module wiring diagram and I/O mapping





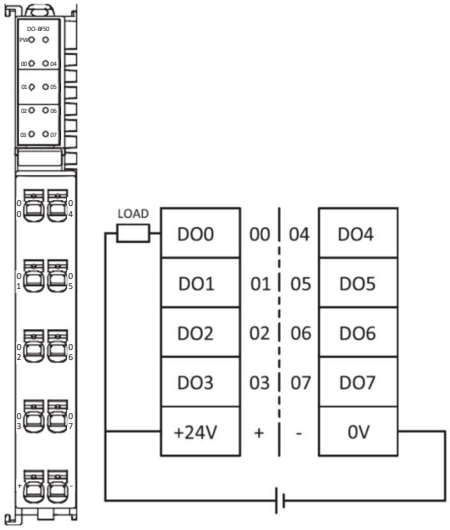
Model: FX20-DI-BF60									
Input	Terminal No.	07	06	05	04	03	02	01	00
Byte 0	Address	I n.7	I n.6	I n.5	I n.4	I n.3	I n.2	I n.1	I n.0
	Byte 0	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
n: Starting byte of configuration									

8.2.4. 8-channel DO PNP module wiring diagram and I/O mapping



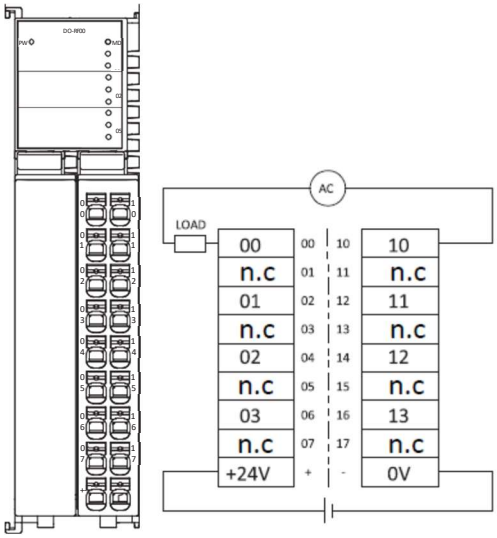
Model: FX20-DO-BF00									
Output	Terminal No.	07	06	05	04	03	02	01	00
Byte 0	Address	Q n.7	Q n.6	Q n.5	Q n.4	Q n.3	Q n.2	Q n.1	Q n.0
	Byte 0	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
n: Starting byte of configuration									

8.2.5. 8-channel DO NPN module wiring diagram and I/O mapping



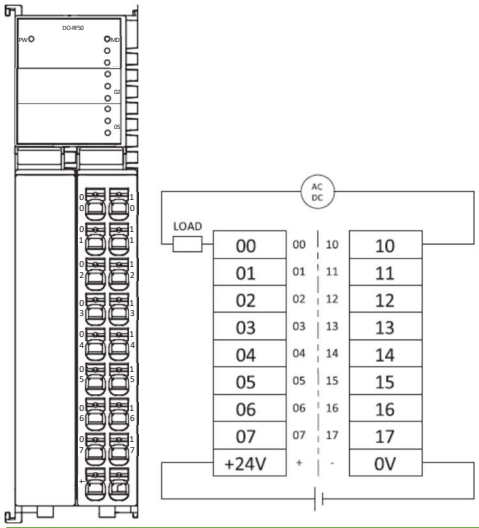
Model: FX20-DO-BF50									
Output	Terminal No.	07	06	05	04	03	02	01	00
Byte 0	Address	Q n.7	Q n.6	Q n.5	Q n.4	Q n.3	Q n.2	Q n.1	Q n.0
	Byte 0	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
n: Starting byte of configuration									

8.2.6. 4-channel SSR (AC) output module wiring diagram I/O mapping



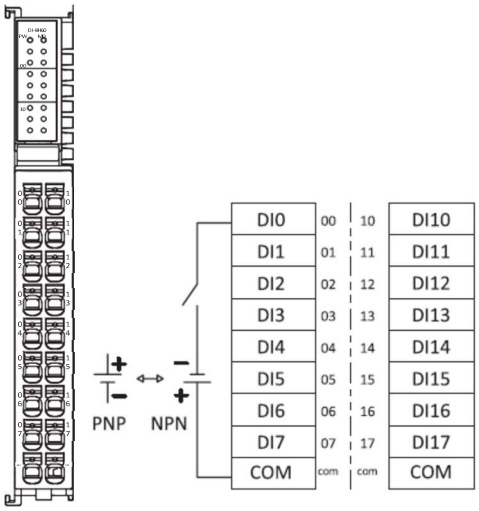
Model: FX20-DO-RD00									
Output Byte 0	Terminal No.	07	06	05	04	03	02	01	00
	Address	-	-	-	-	Q n.3	Q n.2	Q n.1	Q n.0
	Byte 0	-	-	-	-	Bit 3	Bit 2	Bit 1	Bit 0
-	Terminal No.	17	16	15	14	13	12	11	10
	Address	-	-	-	-	-	-	-	-
n: Starting byte of configuration									

8.2.7. 8-channel relay output module wiring diagram and I/O mapping



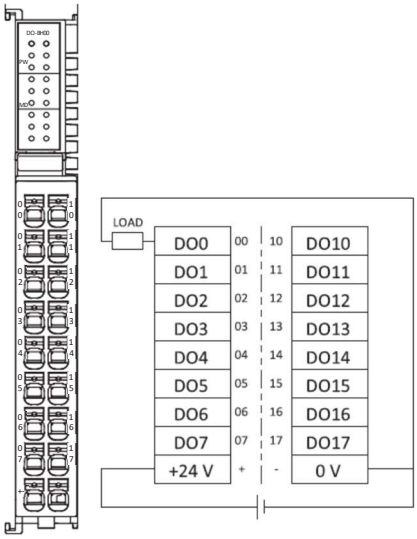
Model: FX20-DO-RF50									
Output Byte 0	Terminal No.	07	06	05	04	03	02	01	00
	Address	Q n.7	Q n.6	Q n.5	Q n.4	Q n.3	Q n.2	Q n.1	Q n.0
	Byte 0	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
-	Terminal No.	17	16	15	14	13	12	11	10
	Address	-	-	-	-	-	-	-	-
n: Starting byte of configuration									

8.2.8. 16-channel DI module wiring diagram and I/O mapping



Model: FX20-DI-BH60									
Input Byte 0	Terminal No.	07	06	05	04	03	02	01	00
	Address	I n.7	I n.6	I n.5	I n.4	I n.3	I n.2	I n.1	I n.0
	Byte 0	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Input Byte 1	Terminal No.	17	16	15	14	13	12	11	10
	Address	I(n+1).7	I(n+1).6	I (n+1).5	I(n+1).4	I(n+1).3	I (n+1).2	I (n+1).1	I (n+1).0
	Byte 1	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
n: Starting byte of configuration									

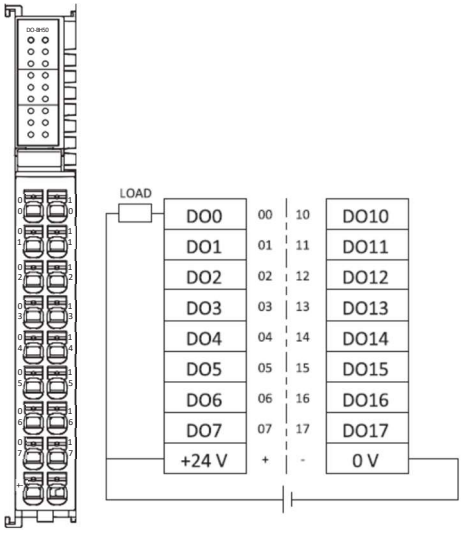
8.2.9. 16-channel DO PNP module wiring diagram and I/O mapping



Model: FX20-DO-BH00									
Output Byte 0	Terminal No.	07	06	05	04	03	02	01	00
	Address	Q n.7	Q n.6	Q n.5	Q n.4	Q n.3	Q n.2	Q n.1	Q n.0
	Byte 0	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Output Byte 1	Terminal No.	17	16	15	14	13	12	11	10
	Address	Q(n+1).7	Q(n+1).6	Q (n+1).5	Q(n+1).4	Q(n+1).3	Q (n+1).2	Q (n+1).1	Q (n+1).0
	Byte 1	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0

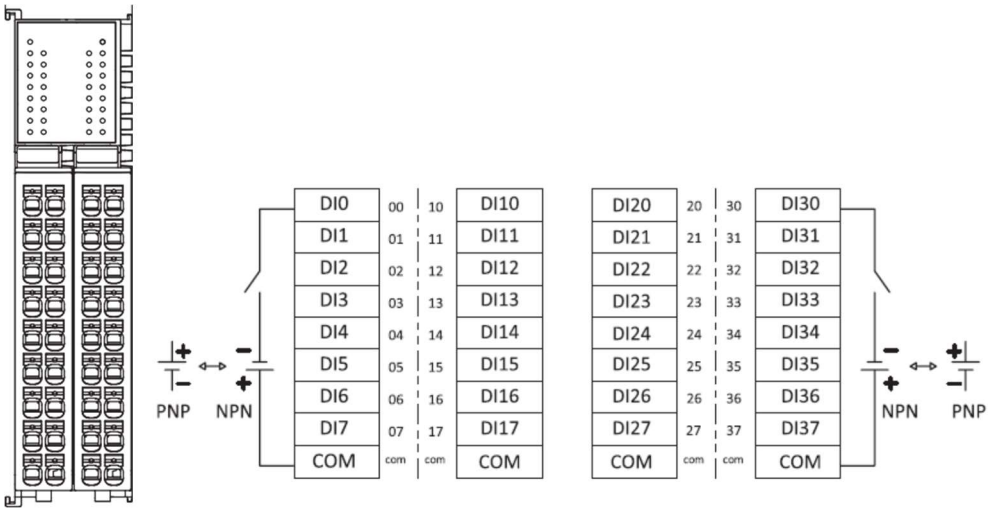
n: Starting byte of configuration

8.2.10. 16-channel DO NPN module wiring diagram and I/O mapping



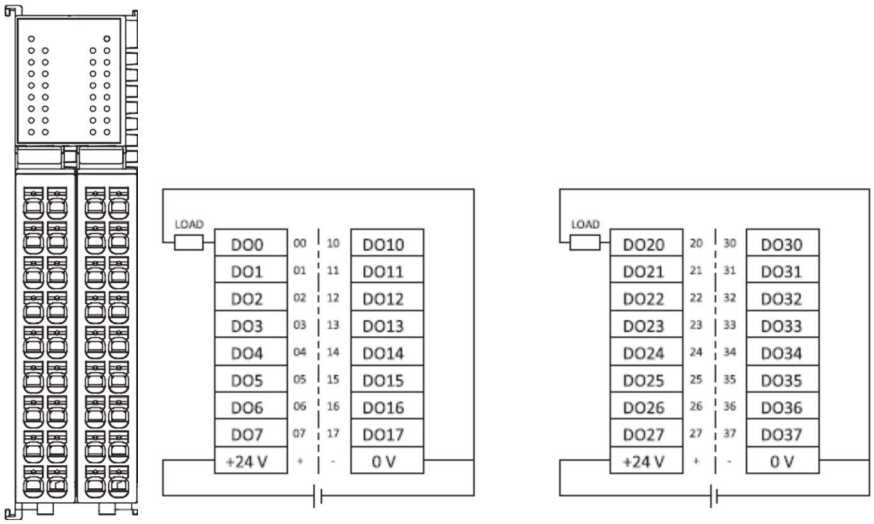
Model: FX20-DO-BH50									
Output Byte 0	Terminal No.	07	06	05	04	03	02	01	00
	Address	Q n.7	Q n.6	Q n.5	Q n.4	Q n.3	Q n.2	Q n.1	Q n.0
	Byte 0	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Output Byte 1	Terminal No.	17	16	15	14	13	12	11	10
	Address	Q(n+1).7	Q(n+1).6	Q (n+1).5	Q(n+1).4	Q(n+1).3	Q (n+1).2	Q (n+1).1	Q (n+1).0
	Byte 1	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
n: Starting byte of configuration									

8.2.11. 32-channel DI module wiring diagram and I/O mapping



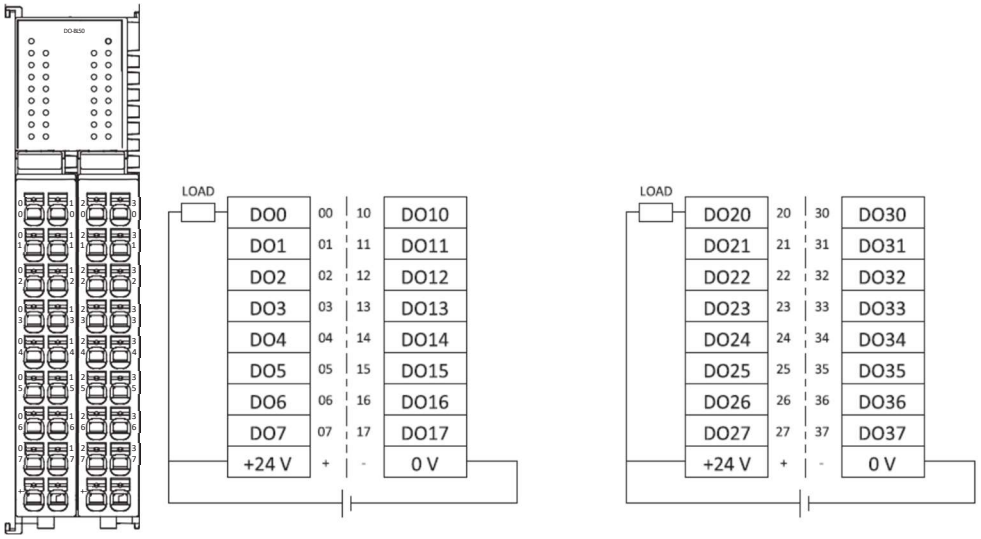
Model: FX20-DI-BL60									
Input Byte 0	Terminal No.	07	06	05	04	03	02	01	00
	Address	I n.7	I n.6	I n.5	I n.4	I n.3	I n.2	I n.1	I n.0
	Byte 0	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Input Byte 1	Terminal No.	17	16	15	14	13	12	11	10
	Address	I(n+1).7	I(n+1).6	I (n+1).5	I(n+1).4	I(n+1).3	I (n+1).2	I (n+1).1	I (n+1).0
	Byte 1	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Input Byte 2	Terminal No.	27	26	25	24	23	22	21	20
	Address	I(n+2).7	I(n+2).6	I (n+2).5	I(n+2).4	I(n+2).3	I (n+2).2	I (n+2).1	I (n+2).0
	Byte 2	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Input Byte 3	Terminal No.	37	36	35	34	33	32	31	30
	Address	I(n+3).7	I(n+3).6	I (n+3).5	I(n+3).4	I(n+3).3	I (n+3).2	I (n+3).1	I (n+3).0
	Byte 3	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
n: Starting byte of configuration									

8.2.12. 32-channel DO PNP module wiring diagram and I/O mapping



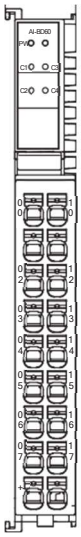
Model: FX20-DO-BL00									
Output Byte 0	Terminal No.	07	06	05	04	03	02	01	00
	Address	Q n.7	Q n.6	Q n.5	Q n.4	Q n.3	Q n.2	Q n.1	Q n.0
	Byte 0	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Output Byte 1	Terminal No.	17	16	15	14	13	12	11	10
	Address	Q(n+1).7	Q(n+1).6	Q (n+1).5	Q(n+1).4	Q(n+1).3	Q (n+1).2	Q (n+1).1	Q (n+1).0
	Byte 1	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Output Byte 2	Terminal No.	27	26	25	24	23	22	21	20
	Address	Q(n+2).7	Q(n+2).6	Q (n+2).5	Q(n+2).4	Q(n+2).3	Q (n+2).2	Q (n+2).1	Q (n+2).0
	Byte 2	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Output Byte 3	Terminal No.	37	36	35	34	33	32	31	30
	Address	Q(n+3).7	Q(n+3).6	Q (n+3).5	Q(n+3).4	Q(n+3).3	Q (n+3).2	Q (n+3).1	Q (n+3).0
	Byte 3	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
n: Starting byte of configuration									

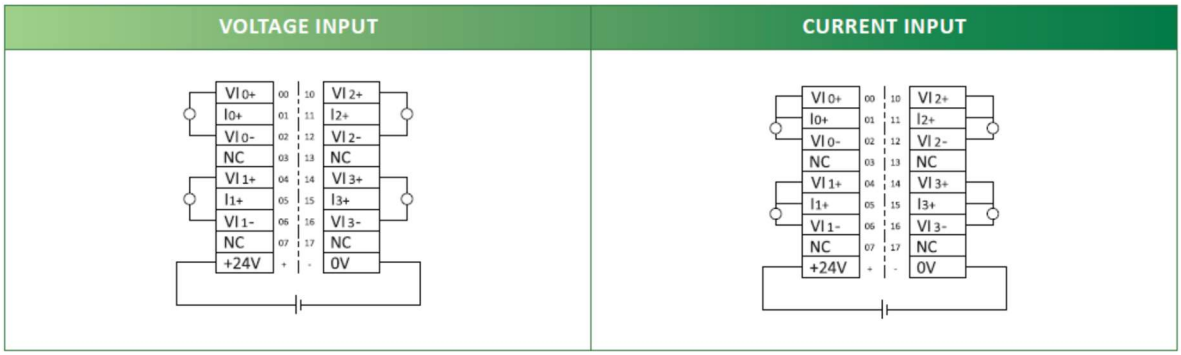
8.2.13. 32-channel DO NPN module wiring diagram and I/O mapping



Model: FX20-DO-BL50									
Output Byte 0	Terminal No.	07	06	05	04	03	02	01	00
	Address	Q n.7	Q n.6	Q n.5	Q n.4	Q n.3	Q n.2	Q n.1	Q n.0
	Byte 0	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Output Byte 1	Terminal No.	17	16	15	14	13	12	11	10
	Address	Q(n+1).7	Q(n+1).6	Q (n+1).5	Q(n+1).4	Q(n+1).3	Q (n+1).2	Q (n+1).1	Q (n+1).0
	Byte 1	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Output Byte 2	Terminal No.	27	26	25	24	23	22	21	20
	Address	Q(n+2).7	Q(n+2).6	Q (n+2).5	Q(n+2).4	Q(n+2).3	Q (n+2).2	Q (n+2).1	Q (n+2).0
	Byte 2	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Output Byte 3	Terminal No.	37	36	35	34	33	32	31	30
	Address	Q(n+3).7	Q(n+3).6	Q (n+3).5	Q(n+3).4	Q(n+3).3	Q (n+3).2	Q (n+3).1	Q (n+3).0
	Byte 3	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
n: Starting byte of configuration									

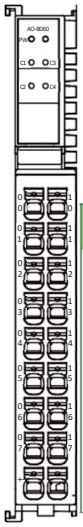
8.2.14. 4-channel AI module wiring diagram and I/O mapping





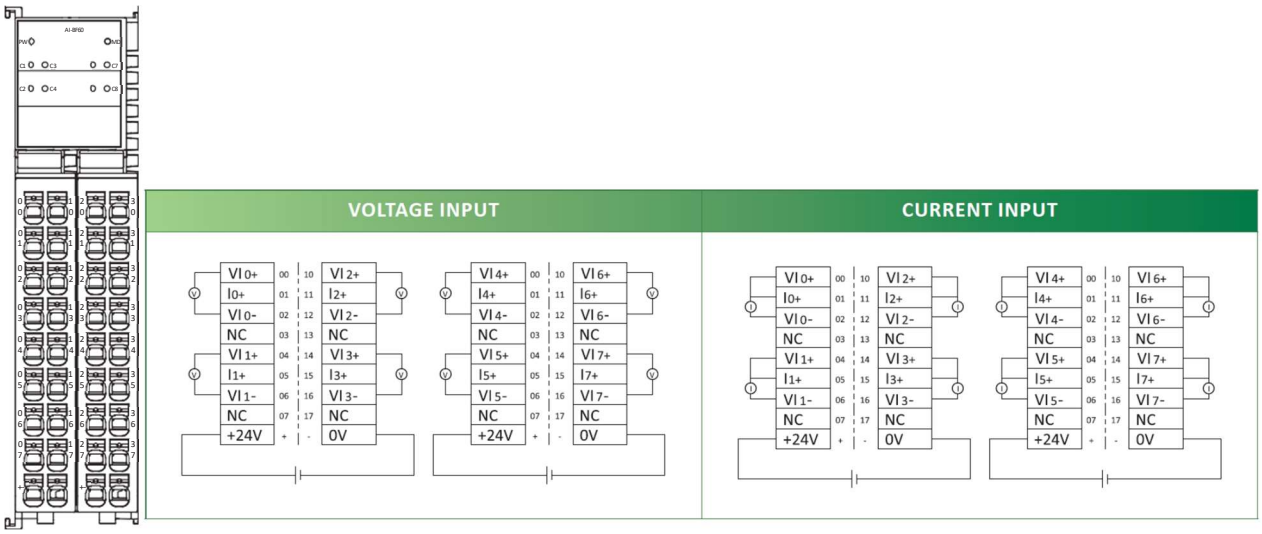
Model: FX20-AI-BD60								
Terminal No.	07	06	05	04	03	02	01	00
Address	IW n+2				IW n			
Channel	Channel 1				Channel 0			
Terminal No.	17	16	15	14	13	12	11	10
Address	IW n+6				IW n+4			
Channel	Channel 3				Channel 2			
n: Starting byte of configuration								

8.2.15. 4-channel AO module wiring diagram and I/O mapping



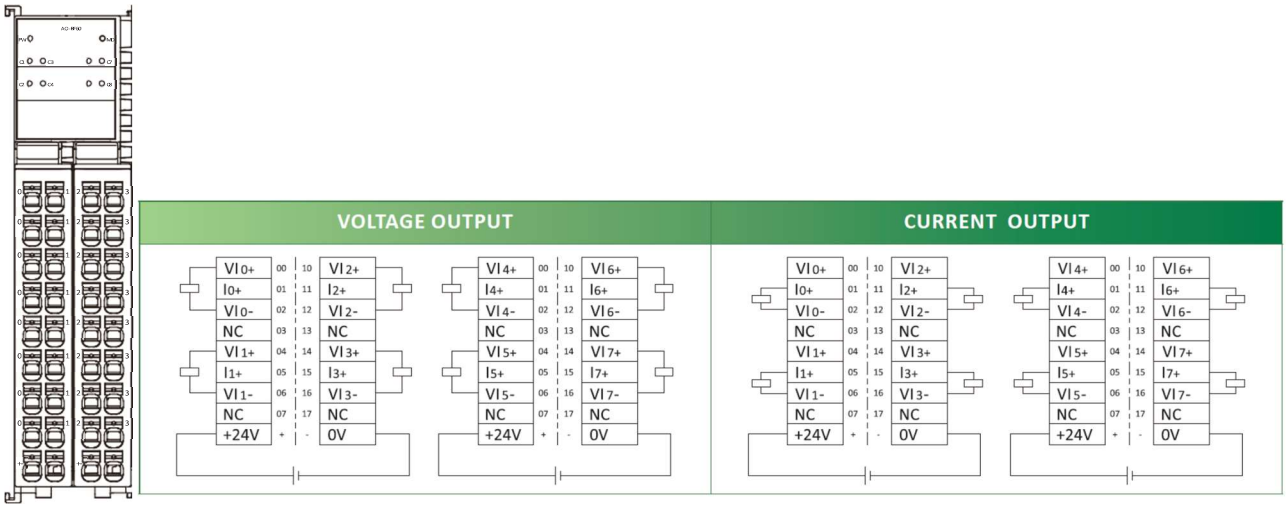
Model: FX20-AO-BD60								
Terminal No.	07	06	05	04	03	02	01	00
Address	QW n+2				QW n			
Channel	Channel 1				Channel 0			
Terminal No.	17	16	15	14	13	12	11	10
Address	QW n+6				QW n+4			
Channel	Channel 3				Channel 2			
n: Starting byte of configuration								

8.2.16. 8-channel AI module wiring diagram and I/O mapping



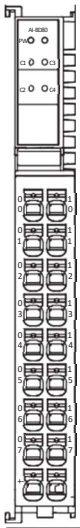
Model: FX20-AI-BF60								
Terminal No.	07	06	05	04	03	02	01	00
Address	IW n+2				IW n			
Channel	Channel 1				Channel 0			
Terminal No.	17	16	15	14	13	12	11	10
Address	IW n+6				IW n+4			
Channel	Channel 3				Channel 2			
Terminal No.	27	26	25	24	23	22	21	20
Address	IW n+10				IW n+8			
Channel	Channel 5				Channel 4			
Terminal No.	37	36	35	34	33	32	31	30
Address	IW n+14				IW n+12			
Channel	Channel 7				Channel 6			
n: Starting byte of configuration								

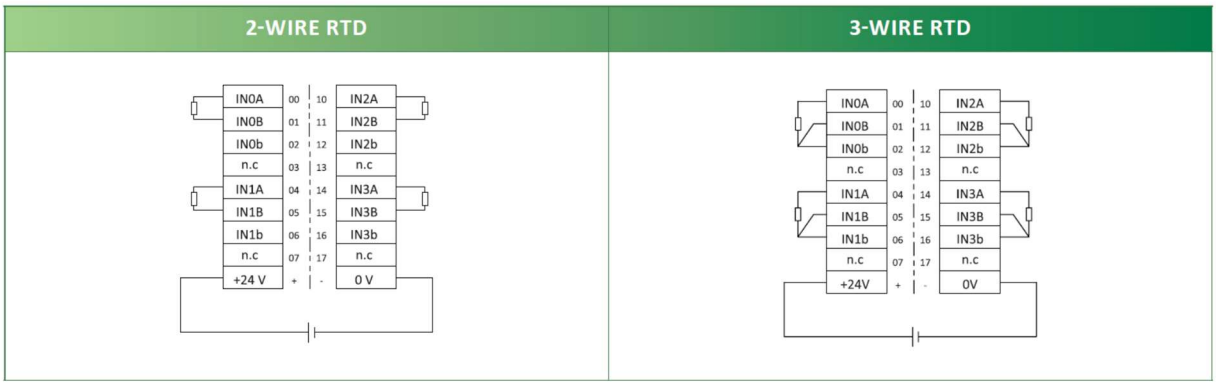
8.2.17. 8-channel AO module wiring diagram and I/O mapping



Model: FX20-AO-BF60								
Terminal No.	07	06	05	04	03	02	01	00
Address	QW n+2				QW n			
Channel	Channel 1				Channel 0			
Terminal No.	17	16	15	14	13	12	11	10
Address	QW n+6				QW n+4			
Channel	Channel 3				Channel 2			
Terminal No.	27	26	25	24	23	22	21	20
Address	QW n+10				QW n+8			
Channel	Channel 5				Channel 4			
Terminal No.	37	36	35	34	33	32	31	30
Address	QW n+14				QW n+12			
Channel	Channel 7				Channel 6			
n: Starting byte of configuration								

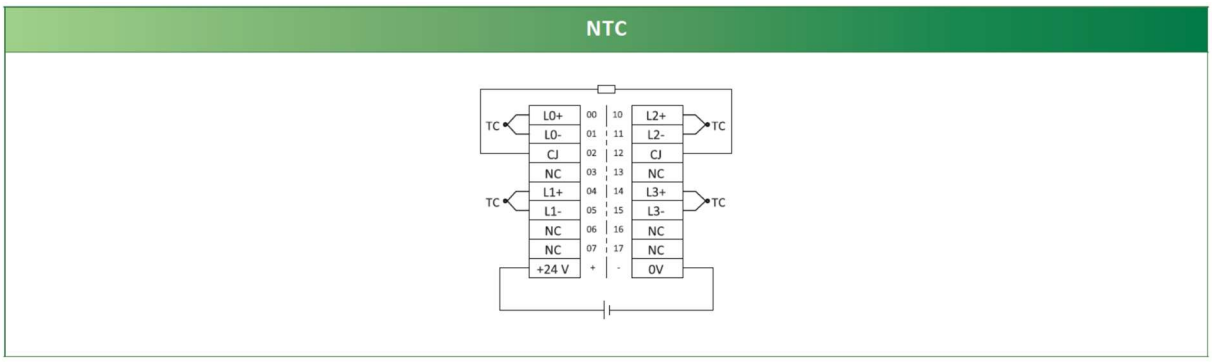
8.2.18. 4-channel RTD module wiring diagram and I/O mapping





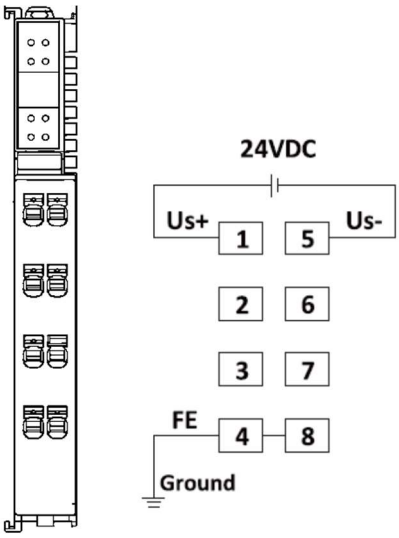
Model: FX20-AI-BD80								
Terminal No.	07	06	05	04	03	02	01	00
Address	IW n+2				IW n			
Channel	Channel 1				Channel 0			
Terminal No.	17	16	15	14	13	12	11	10
Address	IW n+6				IW n+4			
Channel	Channel 3				Channel 2			
n: Starting byte of configuration								

8.2.19. 4-channel TC module wiring diagram and I/O mapping



Model: FX20-AI-BD90								
Terminal No.	07	06	05	04	03	02	01	00
Address	IW n+2				IW n			
Channel	Channel 1				Channel 0			
Terminal No.	17	16	15	14	13	12	11	10
Address	IW n+6				IW n+4			
Channel	Channel 3				Channel 2			
n: Starting byte of configuration								

8.2.20. Auxiliary power module wiring diagram



Warning !

- Module wiring diagrams are printed on the side of the module for easy reference during wiring and debugging.
- Only electrical technicians can carry out wiring and related operations.

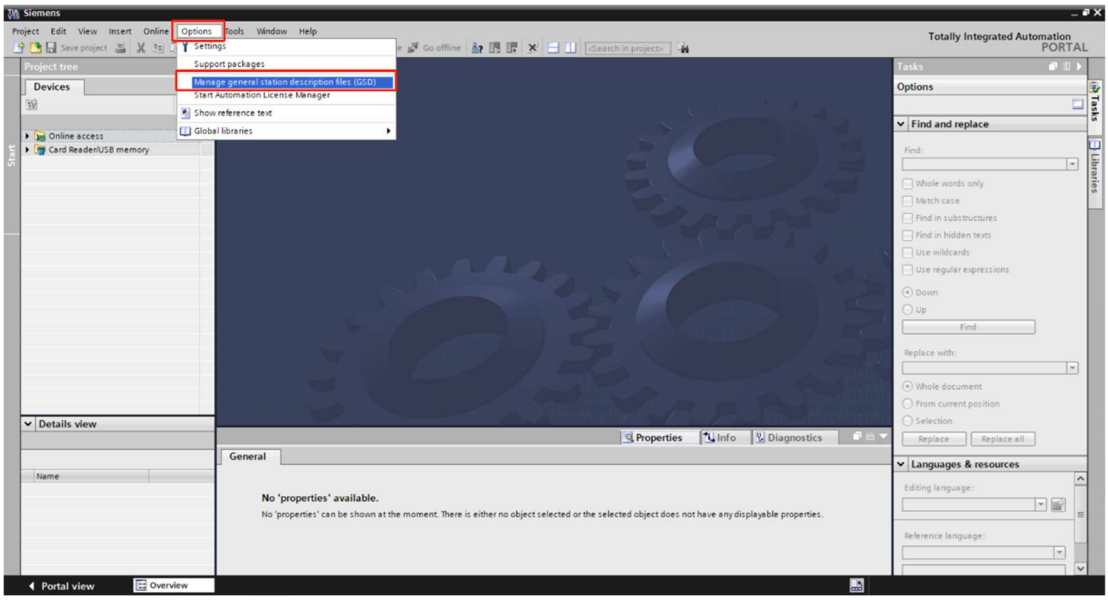
9. Configuration and debugging

9.1. FX20 GSD file

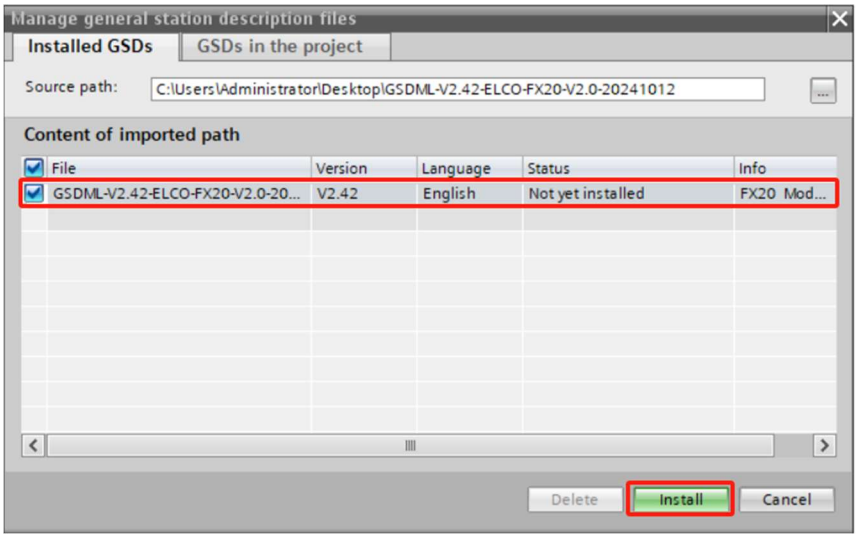
Configure the FX20 series modules using a GSD file (in .xml format), which is used to integrate the FX20 series modules into your system as a standard PROFINET IO slave. You can visit Elco website to obtain the latest GSD files or call the customer service hotline to contact technical personnel.

The integration of GSD files into the system depends on the configuration software you are using. Typically, the Siemens Portal programming software used in the PROFINET system integrates GSD files according to the following steps:

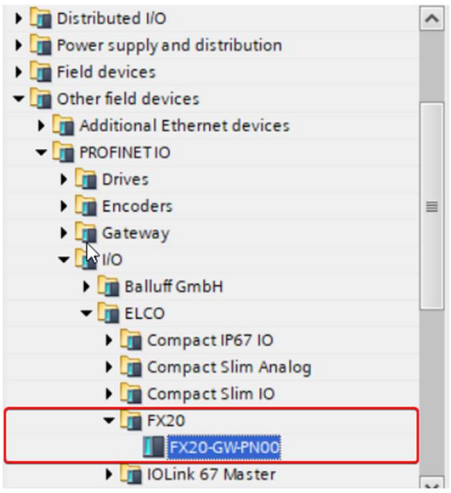
9.1.1. Run the Portal software and select "Options>Manage general station description files_GSD" in the menu bar.



9.1.2. In the pop-up dialog box, select the FX20 latest GSD file to install, and then click on "Install" to proceed with the installation operation.



9.1.3. The newly installed FX20 adapter module is displayed in the "Other Field Devices>PROFINET IO>I/O>ELCO>FX20" hardware directory.



Users can configure FX20 series I/O modules in Portal based on actual usage.

9.2. Configuration in Siemens TIA Portal

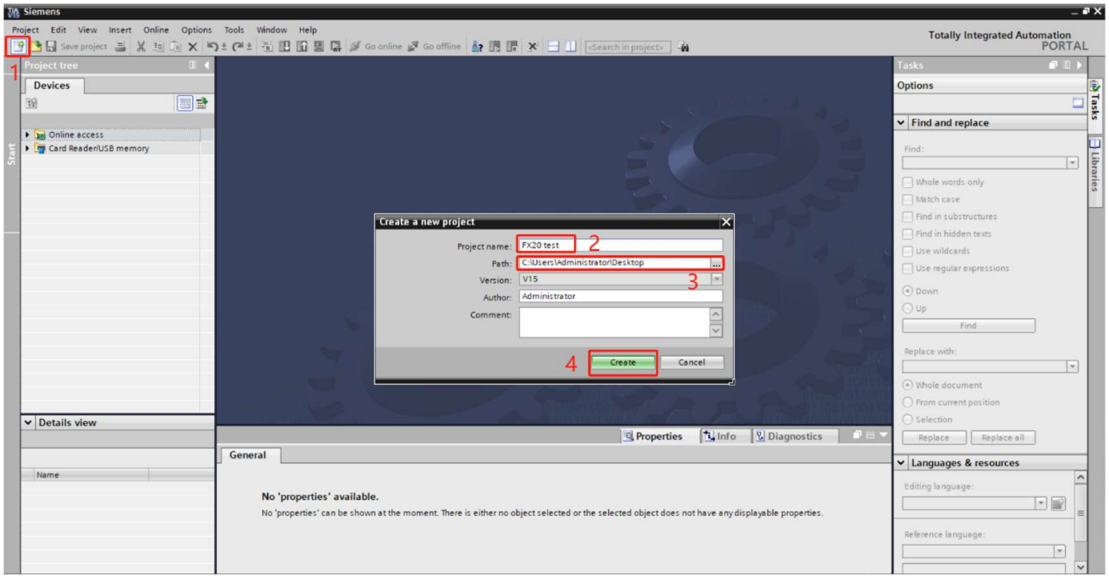
This section provides users with a comprehensive understanding of the actual use of FX20 series distributed modules through a configuration process. This example uses the FX20 distributed I/O from Elco as the PROFINET slave station, and connects to Siemens' PLC - CPU1211C through the PROFINET bus. By default, all power supply and bus connections have been completed, and the device name of the FX20 adapter module is set to "fx gateway".

The FX20 series distributed I/O uses the following products as configuration examples:

Model	Description	Quantity
FX20-GW-PN00	PROFINET adapter	1
FX20-DI-BF60	8 digital PNP/NPN input module	1
FX20-DO-BF00	8 digital PNP output module	1
FX20-AI-BD60	4 analog input module	1
FX20-AO-BD60	4 analog output module	1

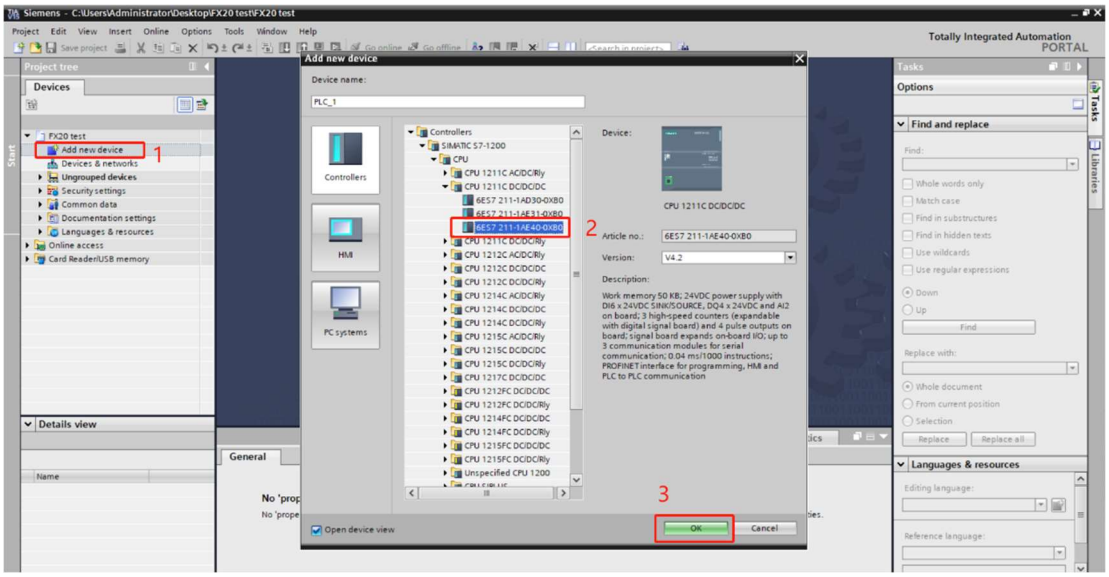
9.2.1. Create a new Portal project.

Open TIA portal, Click the "Create New Project" button, enter the project name, storage path, and click "Create".

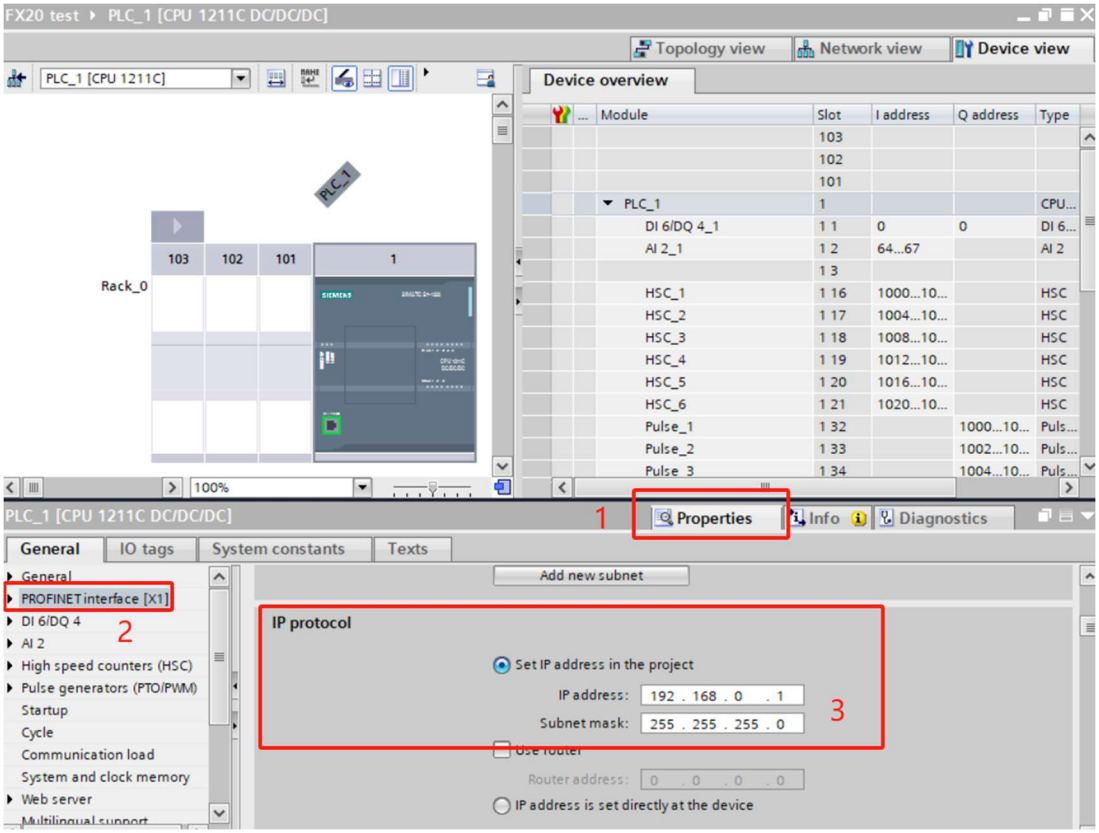


9.2.2. Install the GSD files for the Elco FX20 series modular I/O system. For specific methods, refer to "9.1 GSD files".

9.2.3. Double clicks on "Add New Device" on the left side and select the PLC model used in the "Controller" window.



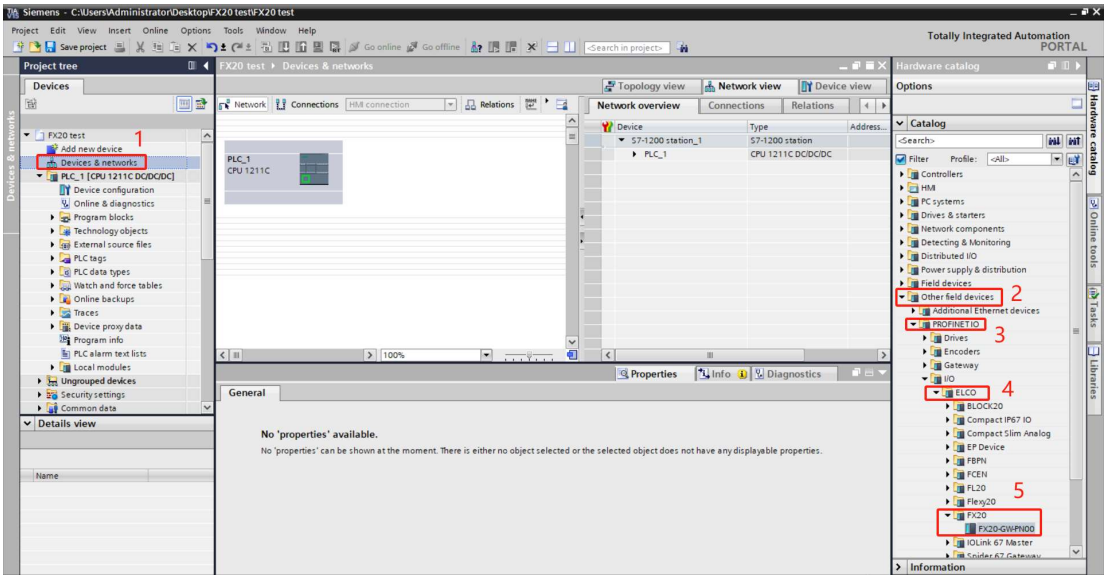
9.2.4. Double clicks on the "Device Configuration" window on the left, and in the "Device View" window, select "Properties" ->"PROFINET Interface [X1]" ->"Ethernet Address" to set the IP address of the PLC.



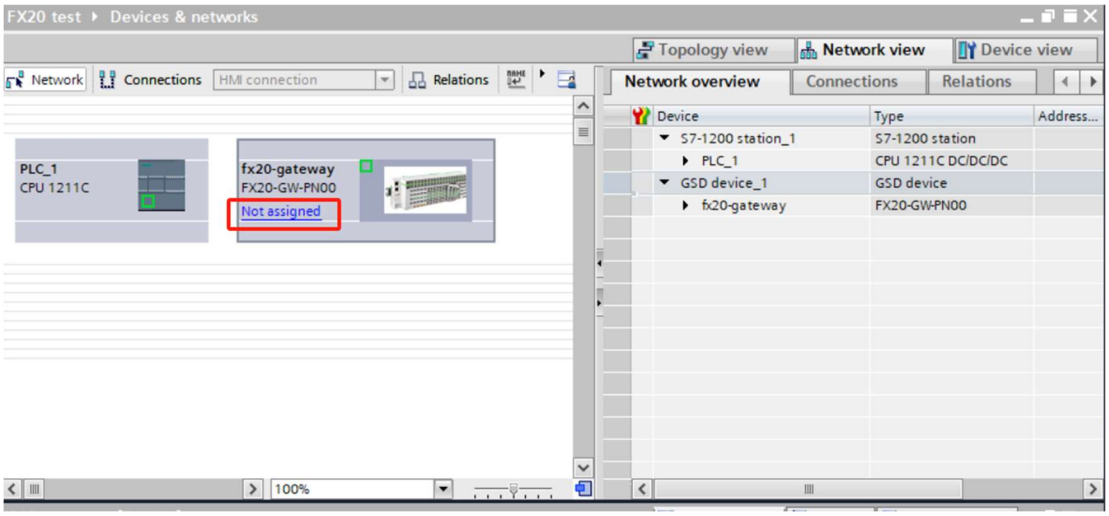
9.2.5. Add FX20 adapter module and communicate with PLC.

9.2.5.1. Double clicks on "Devices and Networks" on the left to enter the "Network View" interface. In the

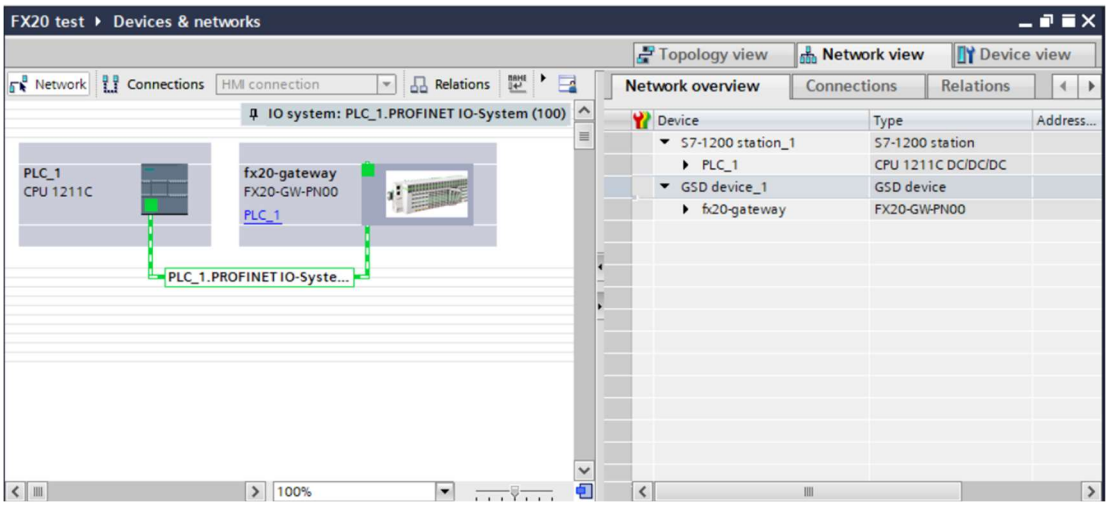
"Hardware Directory", select FX20-GW-PN00 adapter through "Other Field Devices ->PROFINET IO ->I/O ->ELCO ->FX20 ", and double-click or drag to add it to the network.



9.2.5.2. Click on 'Not assigned' and select 'PLC_1. PROFINET interface_1'.

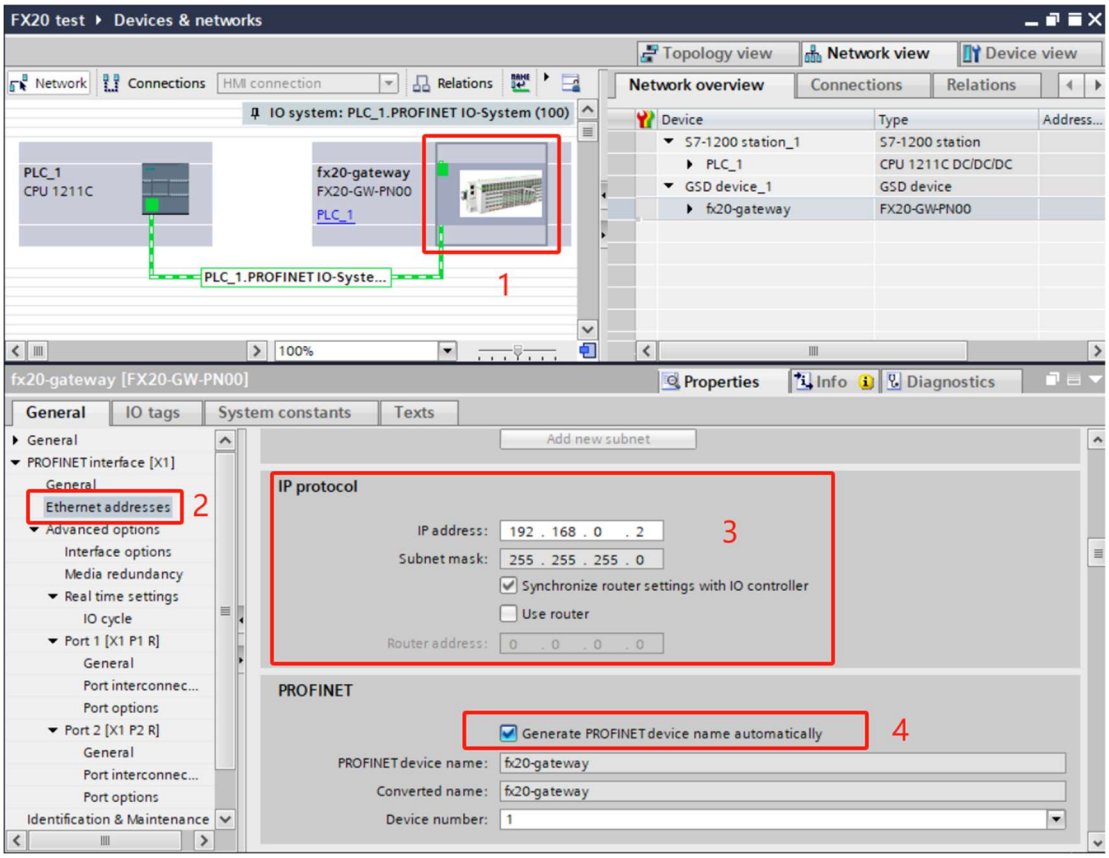


9.2.5.3. The FX20 adapter module is connected to the PLC for communication.

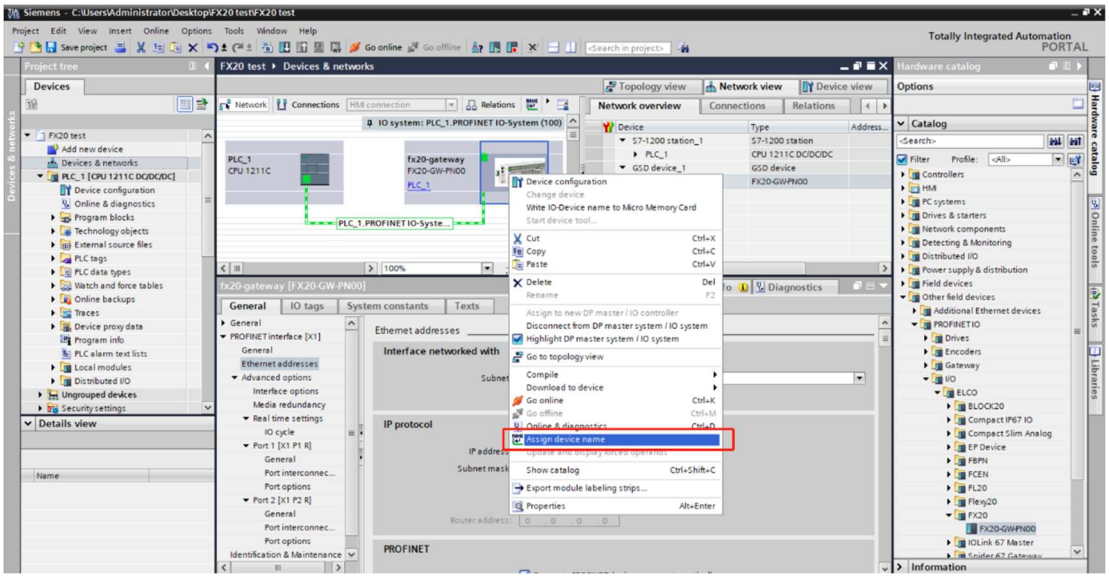


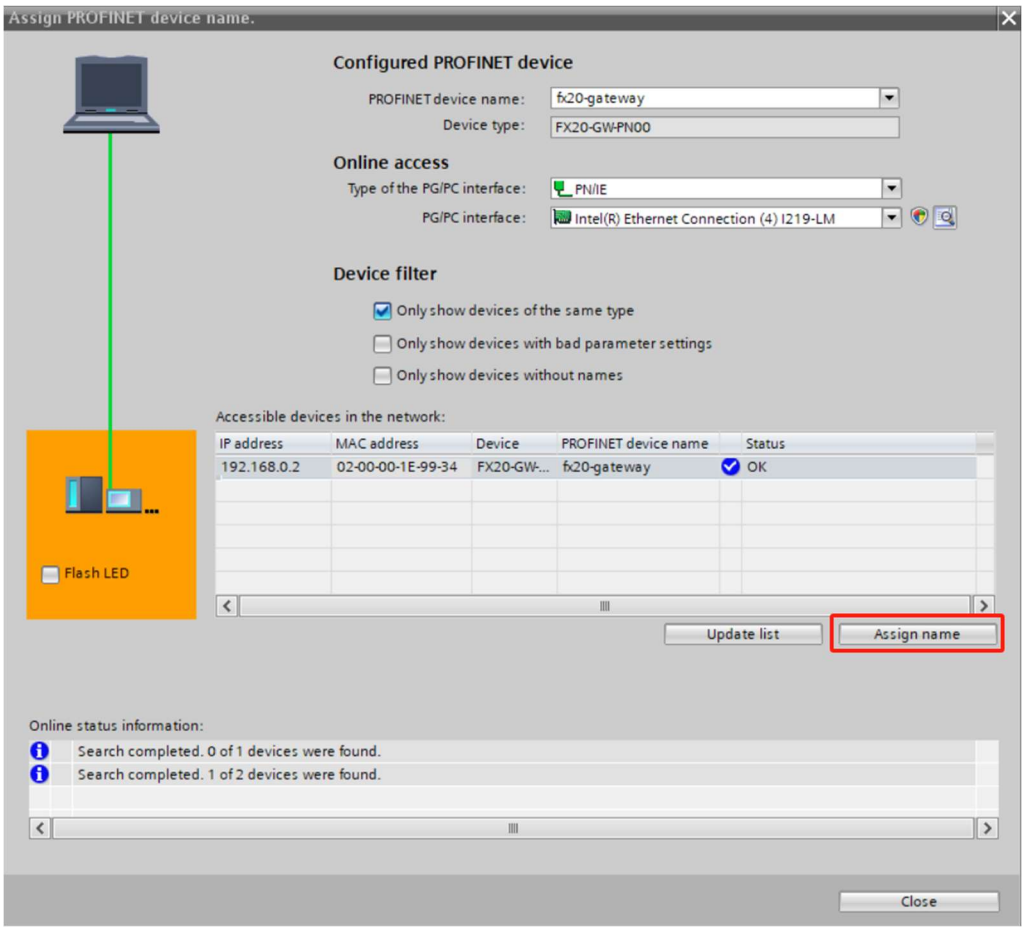
9.2.6. Modify the device name and IP address settings of the FX20 adapter module.

9.2.6.1. Click on the FX20 adapter module in the "Network View", select "Properties ->PROFINET Interface ->Ethernet Address", set the FX20 adapter module device Namefx20 gateway in the window, and set the IP address. (It should be in the same network segment as the IP address of the PLC).



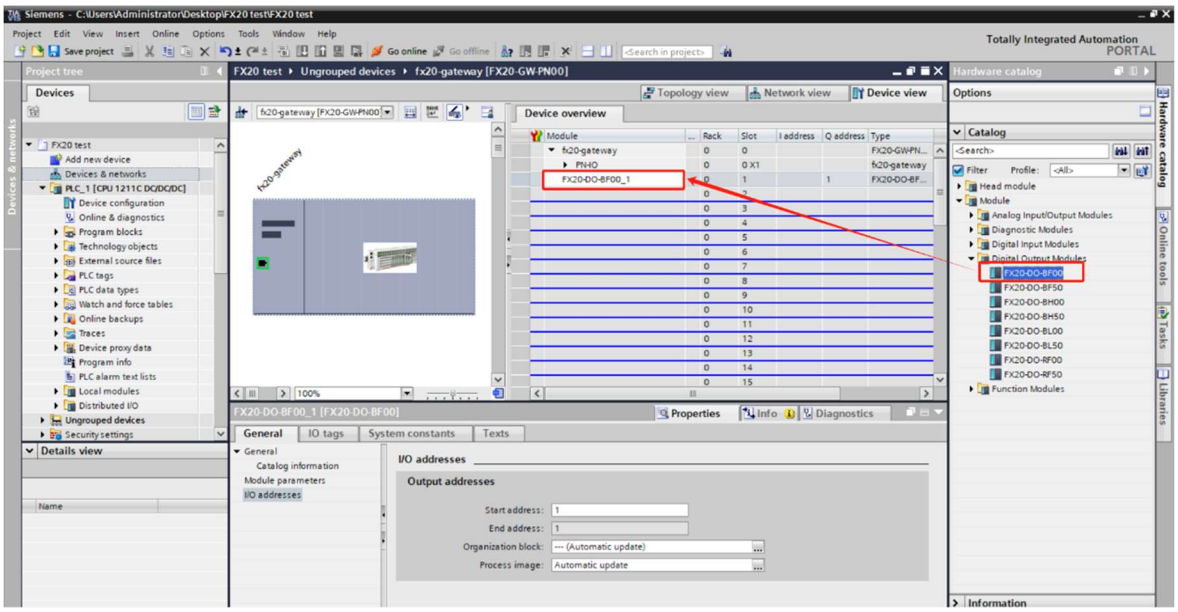
9.2.6.2. Select FX20-GW-PN00, then select "Assign Device Name" from the right-click menu. In the Assign PROFINET Device Name interface, click "Update List", and the Name and MAC address of the connected FX20 adapter module will be scanned. Select the device that matches the MAC address and click on 'Assign Name'.



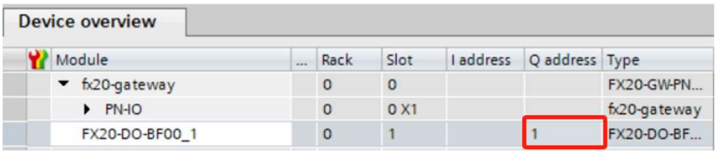


9.2.7. Add the corresponding model of the distributed I/O module in the "Device Overview"

9.2.7.1. Configure digital output module. In the "Hardware Directory" window, select the "Module -->Digital Output Modules -->FX20-DO-BF00" double click or drag it to the slot of FX20 gateway.

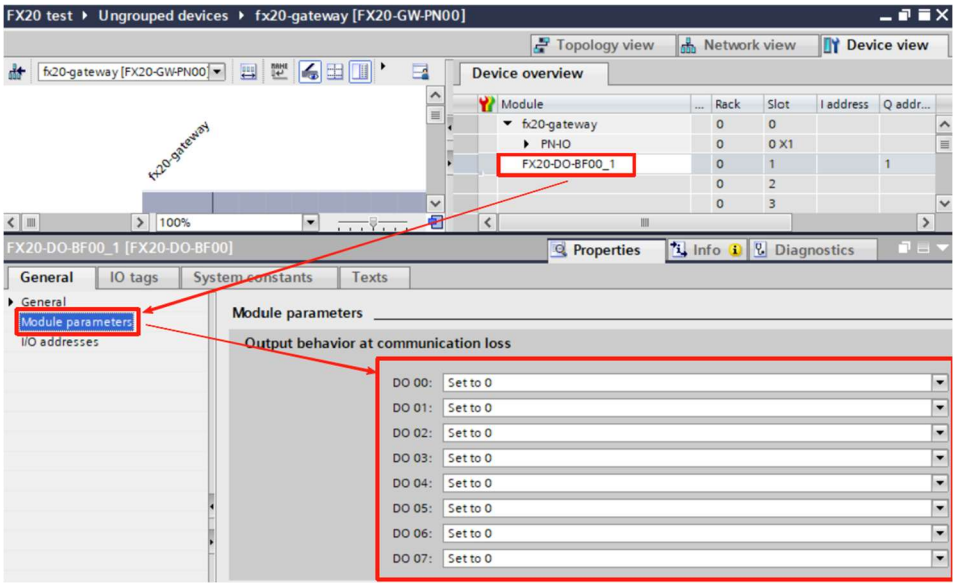


a) The system automatically assigns I/O addresses based on module attributes. As this module is a digital output, it only has Q addresses starting from "1". Of course, it can also be manually modified to other unoccupied addresses.

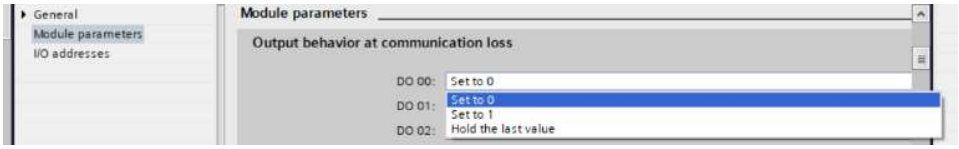


b) In the setting parameters of the digital output module, the output hold function of each output channel can be set.

c) Select "FX20-DO-BF00" and click on the module parameters to see the behavior options for each channel after losing communication connection.



d) Each channel has 3 settings: Set to 0, Set to 1, and Hold the Last Vule.



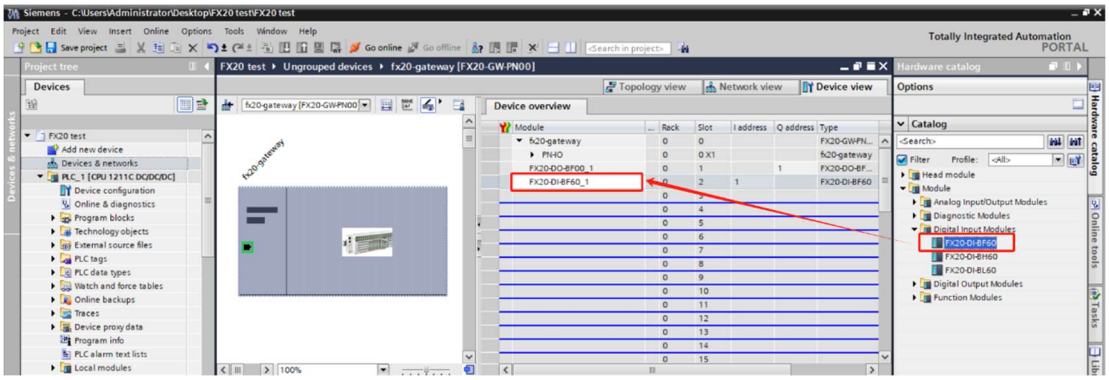
Set to 0: When communication loss between FX20 and the PLC, the output channel (DO 00) will be low level.

Set to 1: When communication loss between FX20 and the PLC, the output channel (DO 00) will be high level.

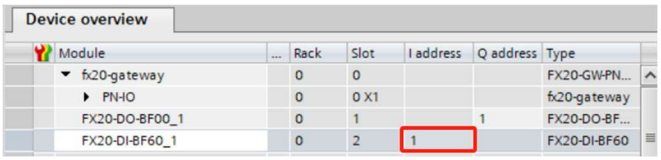
Hold the last value: After a bus network interruption, the output channel (DO 00) will maintain their respective output states unchanged.

The default setting is "set to 0". The setting method for other channels is the same as that for channel DO 00.

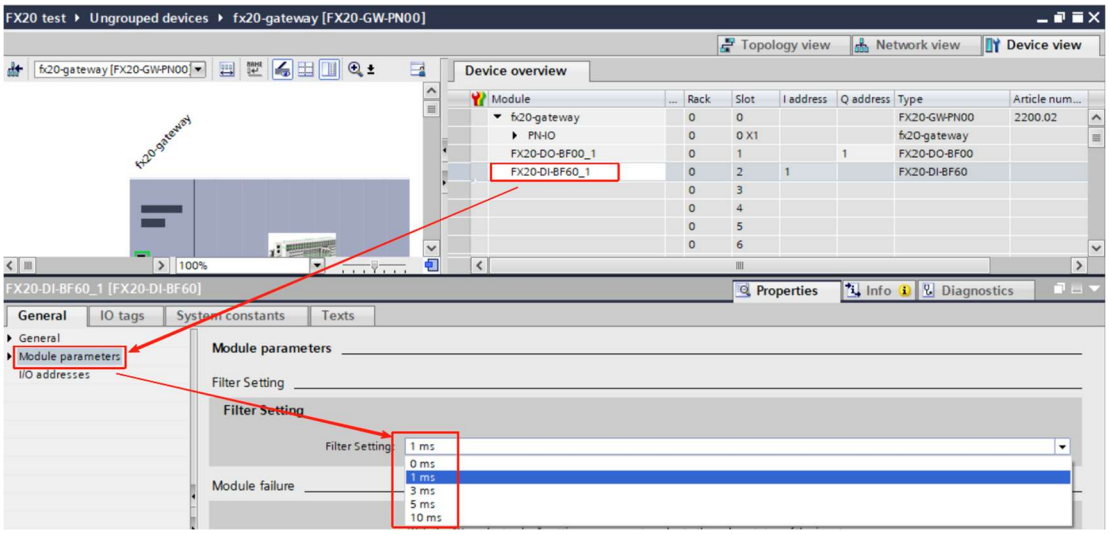
9.2.7.2. Configure digital input module. In the "Hardware Directory" window, select the "Module -->Digital Input Modules -->FX20-DI-BF60" double click or drag it to the slot of FX20 gateway.



a) The system automatically assigns I/O addresses based on module attributes. As this module is a digital input, it only has I addresses starting from "1". Of course, it can also be manually modified to other unoccupied addresses.

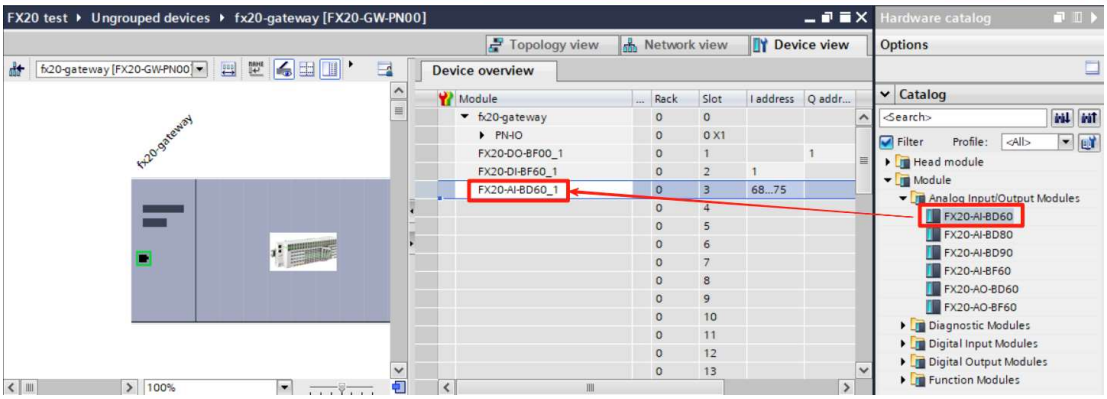


b) In the parameter settings of the digital input module, the filtering time can be set.

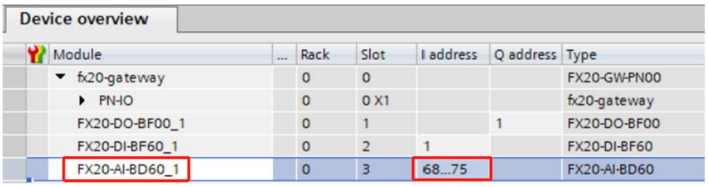


The configurable option for the digital input module can be selected from five options: 0, 1, 3, 5, and 10ms. The longer the filtering time, the more effective the software will be in filtering out interference, and the corresponding input state acquisition period will also be extended. Please choose the appropriate filtering time as needed. Default is 1 ms.

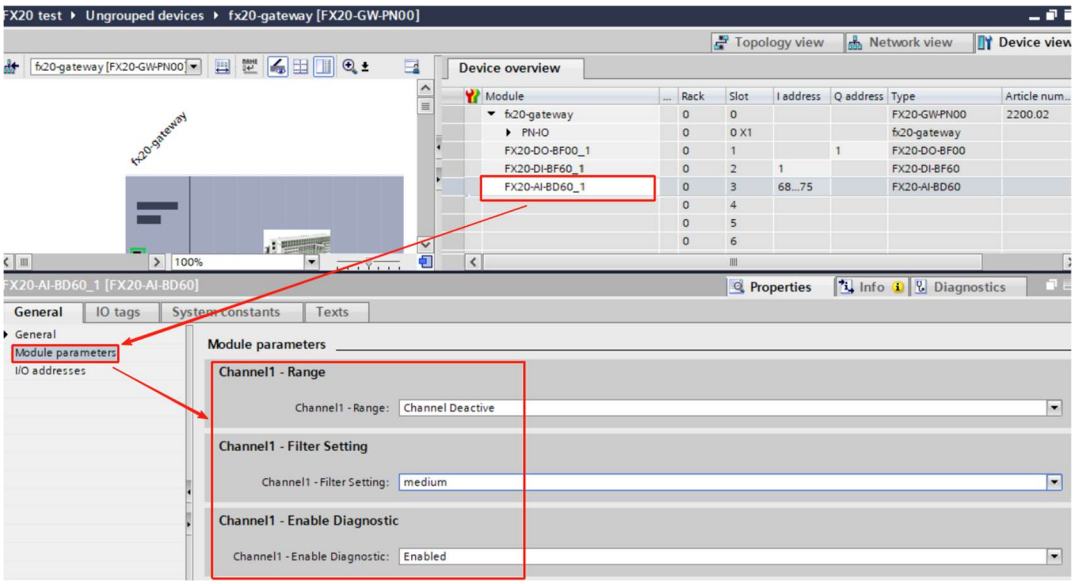
9.2.7.3. Configure analog input module. In the "Hardware Directory" window, select the "Module -->Analog Input/Output Modules -->FX20-AI-BD60" double click or drag it to the slot of FX20 gateway.



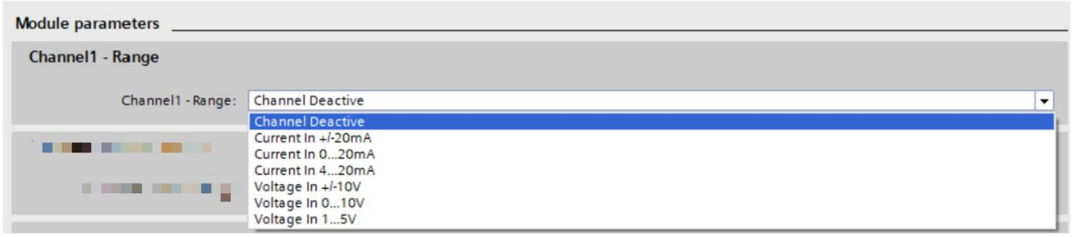
a) The system automatically assigns I/O addresses based on module attributes. As this module is an analog input module, it only has I addresses starting from "68" to “75. Of course, it can also be manually modified to other unoccupied addresses.



b) Select FX20-AI-BD60 and click on the module parameters to configure the parameters for each channel of the analog input module.

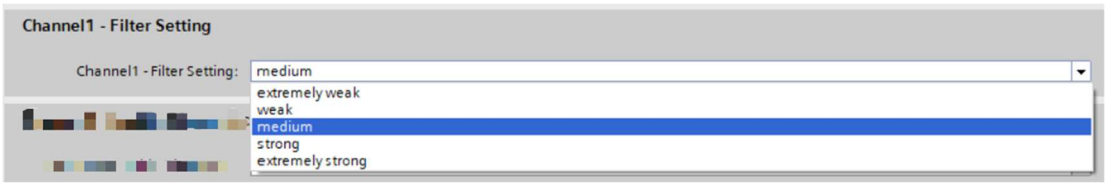


i. **Channel1-Range:** Default channel deactive, select the correct signal type and range based on the connected analog signal.



ii. **Channel1-Filter Setting:** Default medium. The selection of filtering strength adopts software filtering method. Filtering enhancement will reduce interference signals, but it will also lower

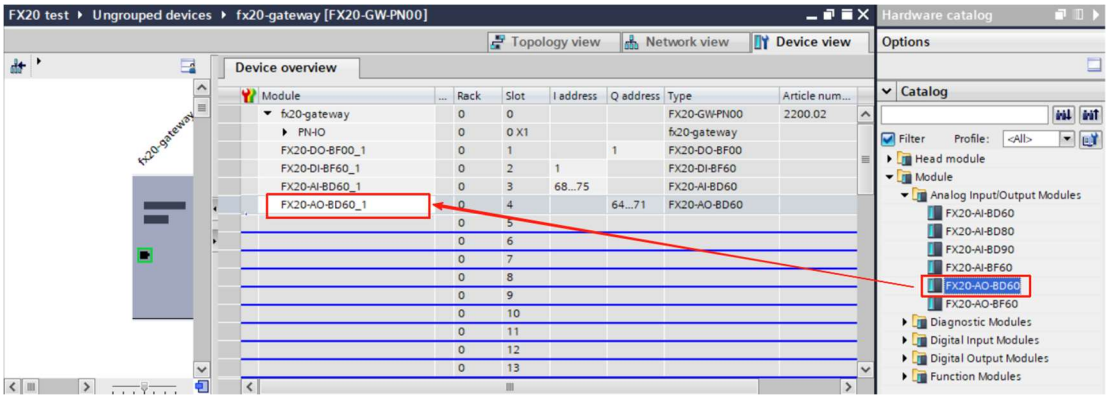
the sampling frequency, affecting the real-time performance of the signal. On the contrary, weakening the filtering will improve the real-time signal acquisition, but it will also introduce clutter interference. Please choose the appropriate software filtering strength according to the situation.



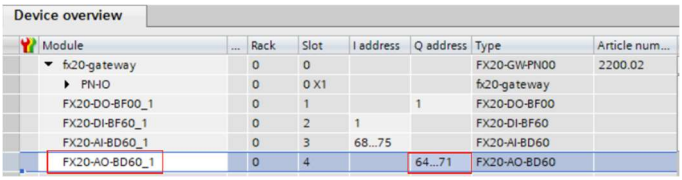
iii. **Channel1-Enable Diagnostic:** Default enable. When this option is “Enabled”, the diagnostic bytes of the gateway module will provide feedback on the alarm information of the channel. When this option is disabled, the analog module does not transmit alarm information to the FX20 network adapter module.

Other channels can be configured according to the setting method of channel 1 based on actual needs.

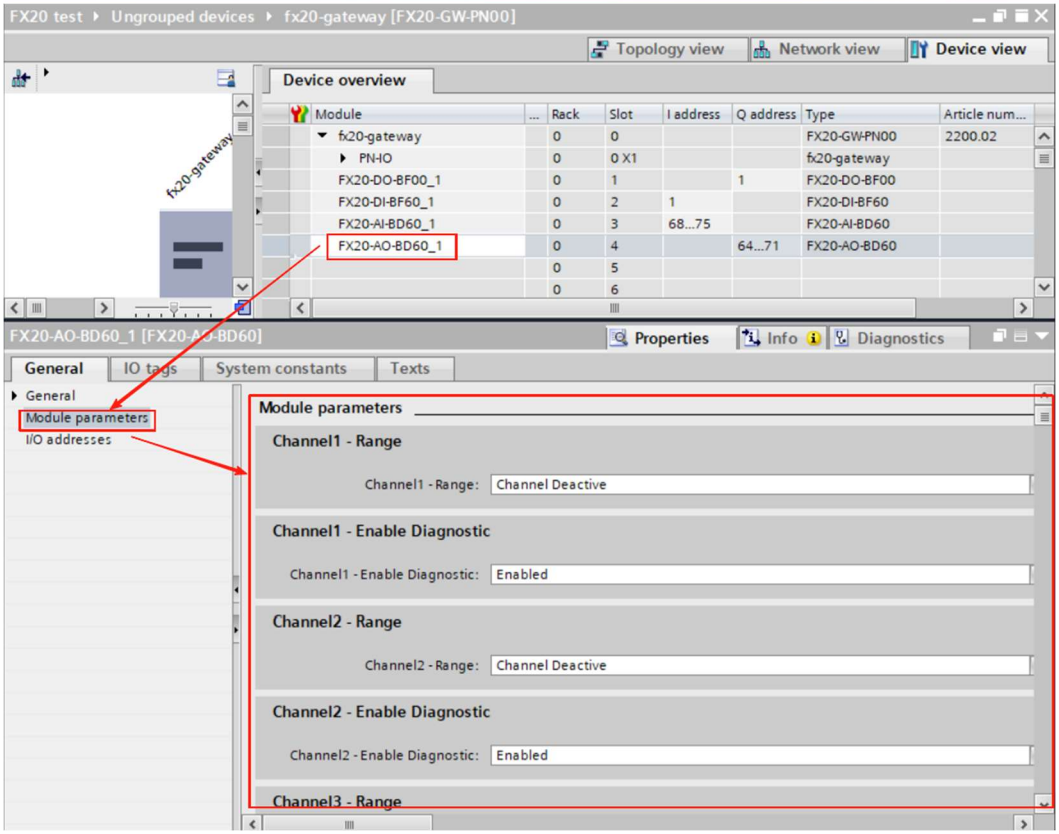
9.2.7.4. Configure analog output module. In the "Hardware Directory" window, select the "Module ->Analog Input/Output Modules -->FX20-AO-BD60" double click or drag it to the slot of FX20 gateway.



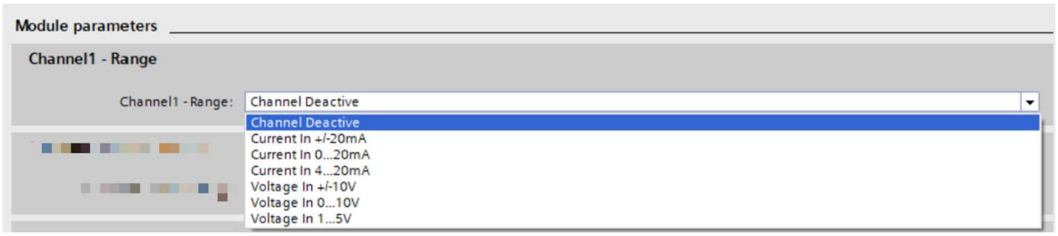
a) The system automatically assigns I/O addresses based on module attributes. As this module is an analog output module, it only has Q addresses starting from "64" to “71”. Of course, it can also be manually modified to other unoccupied addresses.



b) Select FX20-AO-BD60 and click on the module parameters to configure the parameters for each channel of the analog output module.



i. **Channel1-Range:** Default channel deactive, select the correct signal type and range based on the connected analog signal.



ii. **Channel1-Enable Diagnostic:** Default enable. When this option is “Enabled”, the diagnostic bytes of the gateway module will provide feedback on the alarm information of the channel. When this option is disabled, the analog module does not transmit alarm information to the FX20 network adapter module

Other channels can be configured according to the setting method of channel 1 based on actual needs.

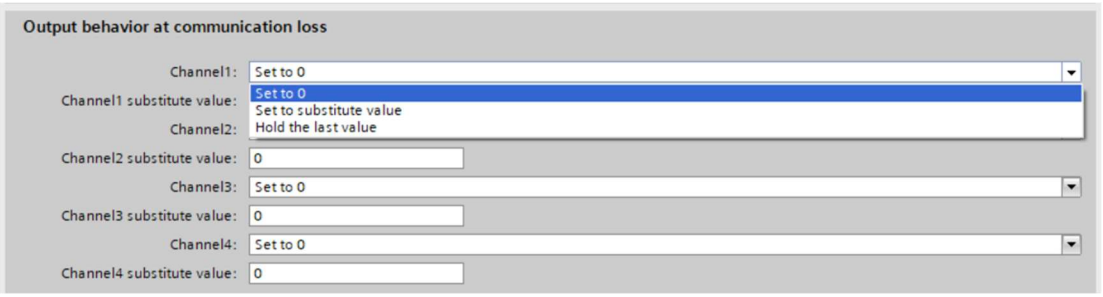
iii. **Endian setting:** Default Big-endian, the correct byte storage format for analog data needs to be selected based on the PLC.

Little Endian: The low byte of the numerical value is stored in the low bit address of the memory, and the high byte is stored in the high bit address of the memory.

Big-endian: The high-order byte of the numerical value is stored in the low order address of

the memory, and the low order byte is stored in the high-order address of the memory.

iv. The output behavior options at communication loss or the analog output hold function setting.



Set to 0: After a bus network interruption, all analog output channels of the module have output values of 0.

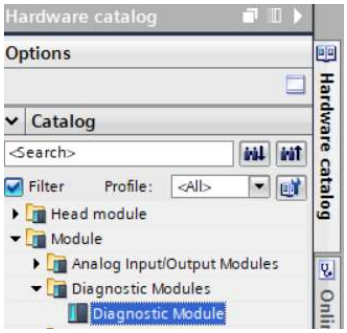
Set to substitute value: After the bus network is interrupted, the output channel of the module outputs a preset substitute value, with a range of decimal 0-65535.

Hold the last value: After a bus network interruption, all output channels will maintain their respective output states unchanged.

The default setting is "set to 0".

9.2.8. Configuration of diagnostic module

9.2.8.1. The FX20 diagnostic module is a virtual module used to provide feedback on the error and communication status of the I/O modules. Users can configure it as needed, and the diagnostic function of the I/O module needs to be set to "Enabled". The setting method has been introduced in "9.2.7" I/O module configuration method.



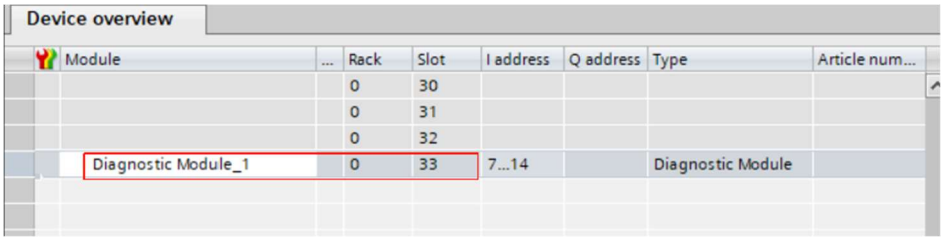
9.2.8.2. The diagnostic module occupies a total of 8 bytes in the input mapping area, with the first 4 bytes corresponding to the alarm information of 1-32 slot modules, such as overvoltage, undervoltage, overload, short circuit, etc; The last 4 bytes correspond to the communication status of 1-32 slot modules. Diagnostic bit “0” is normal, “1” indicates an alarm.

9.2.8.3. The definition of diagnostic bits is as follows:

Byte1	**Bit7**	**Bit6**	**Bit5**	**Bit4**	**Bit3**	**Bit2**	**Bit1**	**Bit0**
	Slot8 Err	Slot7 Err	Slot6 Err	Slot5 Err	Slot4 Err	Slot3 Err	Slot2 Err	Slot1 Err
Byte2	**Bit7**	**Bit6**	**Bit5**	**Bit4**	**Bit3**	**Bit2**	**Bit1**	**Bit0**
	Slot16 Err	Slot15 Err	Slot14 Err	Slot13 Err	Slot12 Err	Slot11 Err	Slot10 Err	Slot9 Err
Byte3	**Bit7**	**Bit6**	**Bit5**	**Bit4**	**Bit3**	**Bit2**	**Bit1**	**Bit0**
	Slot24 Err	Slot23 Err	Slot22 Err	Slot21 Err	Slot20 Err	Slot19 Err	Slot18 Err	Slot17 Err

Byte4	**Bit7**	**Bit6**	**Bit5**	**Bit4**	**Bit3**	**Bit2**	**Bit1**	**Bit0**
	Slot32 Err	Slot31 Err	Slot30 Err	Slot29 Err	Slot28 Err	Slot27 Err	Slot26 Err	Slot25 Err
Byte5	**Bit7**	**Bit6**	**Bit5**	**Bit4**	**Bit3**	**Bit2**	**Bit1**	**Bit0**
	slot8 comm fail	slot7 comm fail	slot6 comm fail	slot5 comm fail	slot4 comm fail	slot3 comm fail	slot2 comm fail	slot1 comm fail
Byte6	**Bit7**	**Bit6**	**Bit5**	**Bit4**	**Bit3**	**Bit2**	**Bit1**	**Bit0**
	slot16 comm fail	slot15 comm fail	slot14 comm fail	slot13 comm fail	slot12 comm fail	slot11 comm fail	slot10 comm fail	slot9 comm fail
Byte7	**Bit7**	**Bit6**	**Bit5**	**Bit4**	**Bit3**	**Bit2**	**Bit1**	**Bit0**
	slot24 comm fail	slot23 comm fail	slot22 comm fail	slot21 comm fail	slot20 comm fail	slot19 comm fail	slot18 comm fail	slot17 comm fail
Byte8	**Bit7**	**Bit6**	**Bit5**	**Bit4**	**Bit3**	**Bit2**	**Bit1**	**Bit0**
	slot32 comm fail	slot31 comm fail	slot30 comm fail	slot29 comm fail	slot28 comm fail	slot27 comm fail	slot26 comm fail	slot25 comm fail

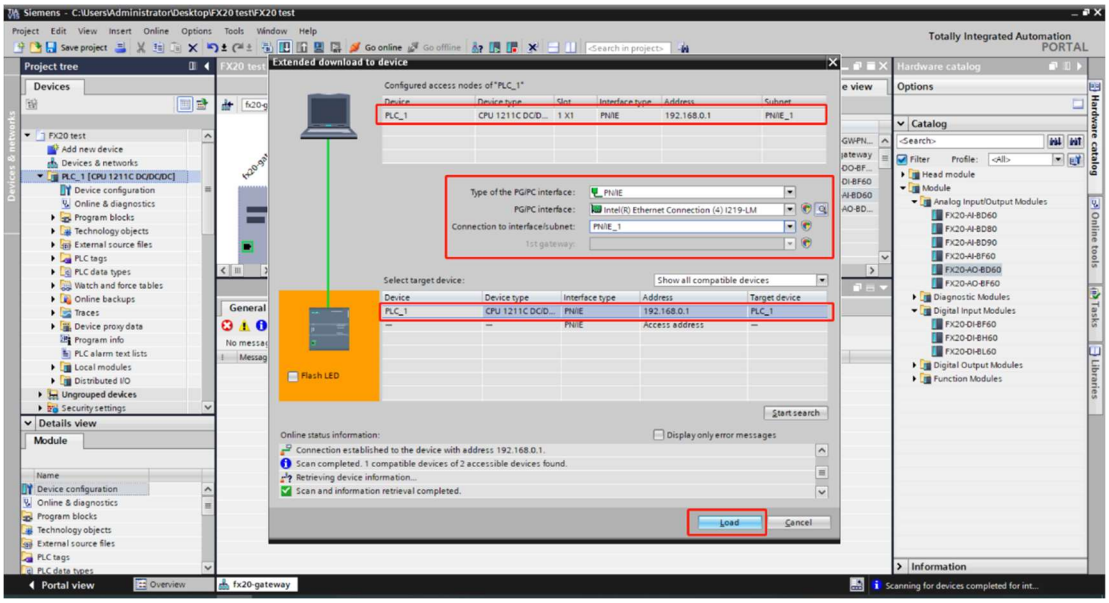
9.2.8.4. When configuring the diagnostic function of FX20, regardless of how many I/O modules are configured in the coupler, the diagnostic module can only be configured into slot 33 of FX20.



9.2.8.5. By checking the 0 or 1 status corresponding to the I address mapping area of the diagnostic module configuration, module level diagnosis can be performed on the I/O of FX20.

For example, as shown in the above figure, if the configuration starting address of the diagnostic module is 1, and I1.0 is monitored as "TRUE", it indicates that there is a fault in the I/O module of slot 1 of FX20, such as overvoltage, undervoltage, overload, short circuit, etc. Combining traditional error checking methods such as checking cable connections can quickly locate the fault point.

9.2.9. After saving the compiling, download the configuration to the PLC.



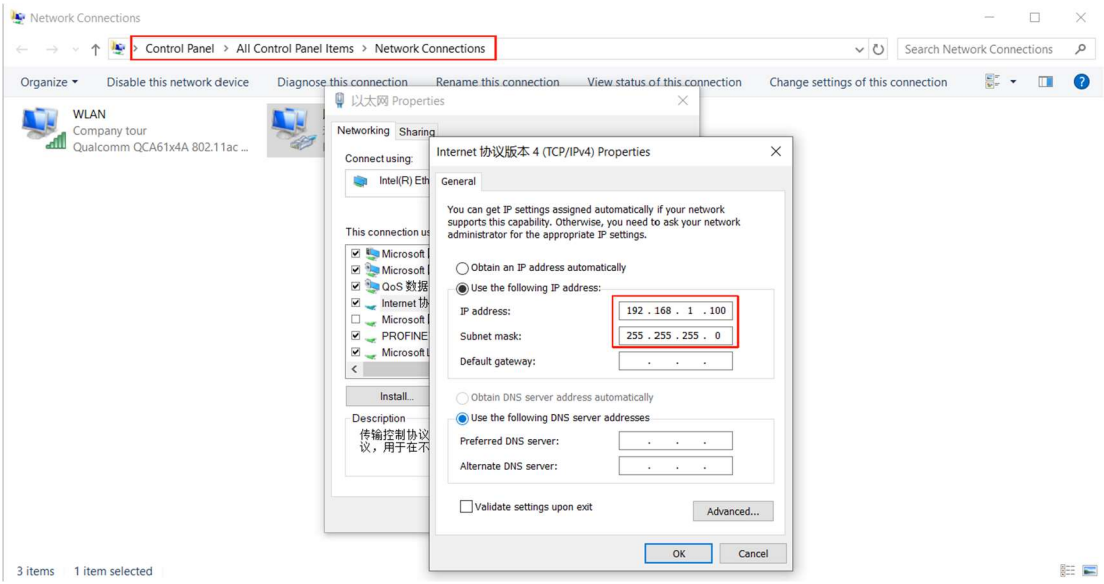
9.2.10. At this point, if everything is configured correctly, the indicators of the FX20 adapter are all in green, and the MD indicator of the I/O module is in green. The module can read/output data normally.

9.3. Introduction for FX20 PROFINET adapter Web Server

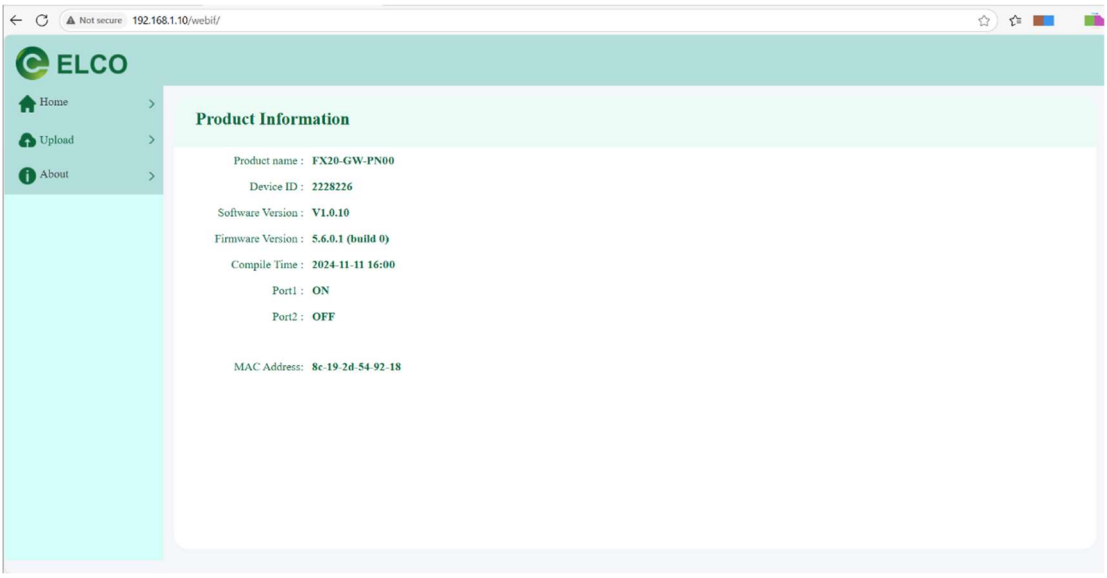
The FX20 PROFINET adapter has a built-in web server that only supports firmware version queries and upgrades for regular I/O modules. For specific functional modules, such as IO-Link master modules, specialized configuration functions will be provided. Please refer to the relevant manual for specific operations.

9.3.1. How to use web server

9.3.1.1. Disconnect the FX20 from the PLC and connect it directly to the computer network port via Ethernet cable. Set the computer IP address to the same network segment as FX20, FX20 IP address is configured through TIA PORTAL software. In the case, the IP address of FX20 has been set to 192.168.1.10.

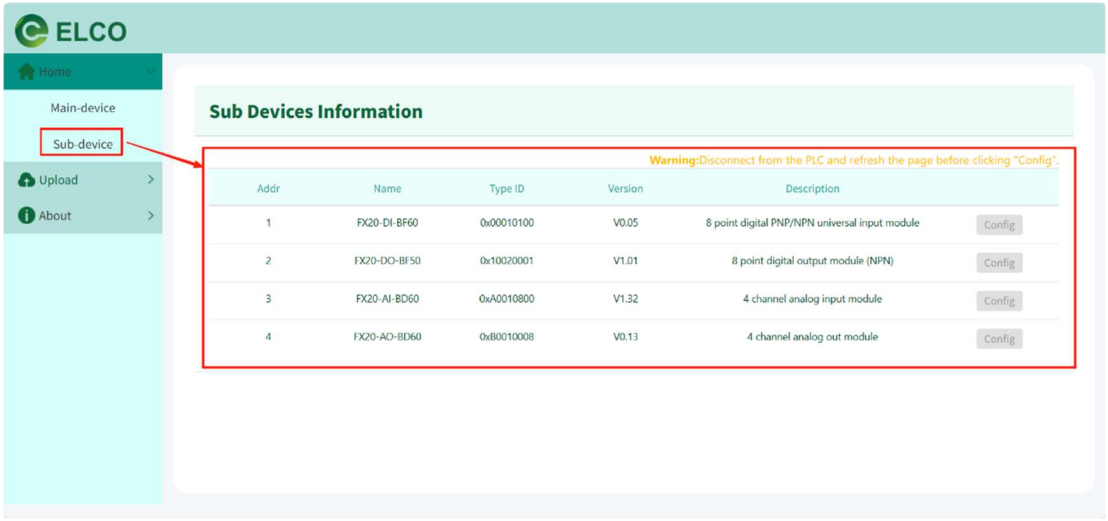


9.3.1.2. Open the computer browser, enter the IP address of the FX20 PROFINET adapter in the address bar, press enter, and enter the FX20 web server homepage. On the homepage, you can view the product name, device ID, firmware version, MAC address, current IP address, and other information of the gateway module.



9.3.1.3. Click on "Home>Sub device" to view the I/O modules information connected to the gateway module.

It can be seen that the "Config" button for all I/O modules are grayed out and unavailable, and only the name of the I/O modules, ID, firmware version, description and other information can be viewed.

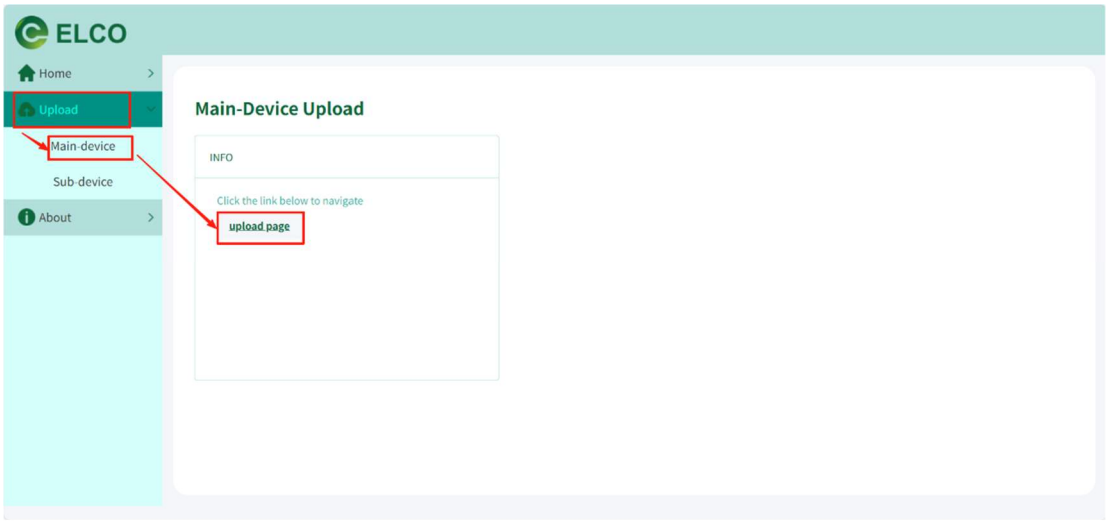


9.3.1.4. Upload upgrade function

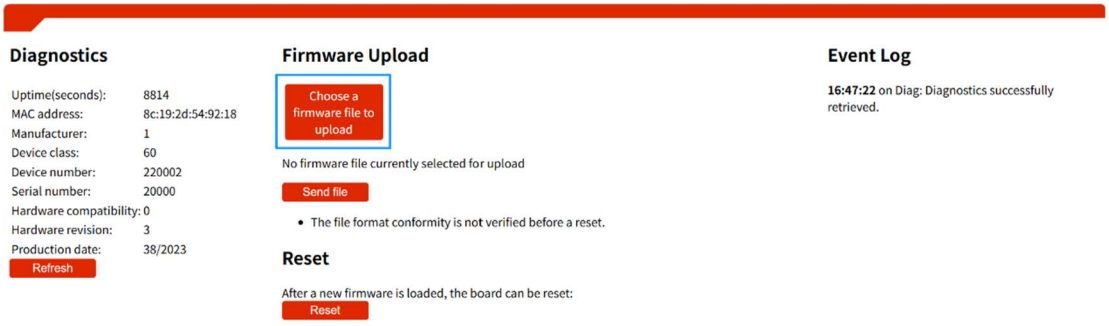
FX20 supports firmware upgrade operations through web servers. By importing upgrade files, firmware upgrades can be performed on FX20 adapters and I/O modules.

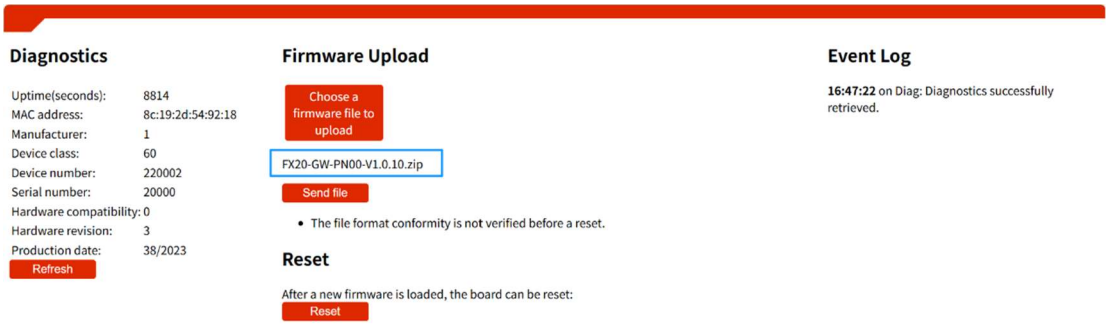
a) Main-Device Upload

i. Click on the "Upload" menu on the left side of the page, select "Main Device" to enter the gateway module upgrade interface, and click the "Upload page" button.

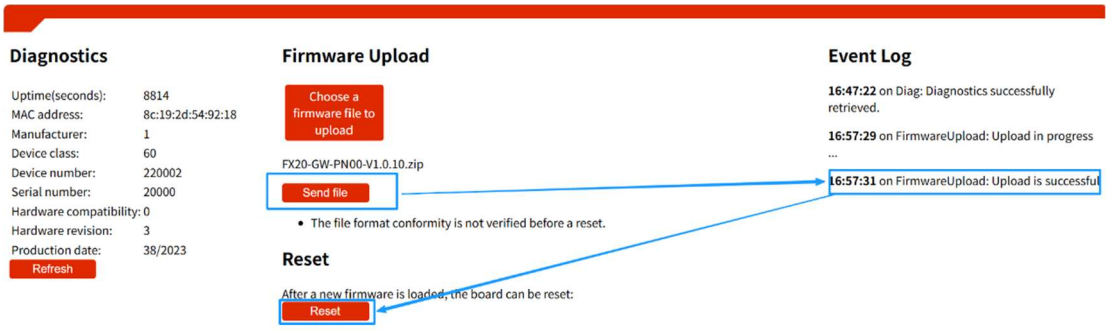


ii. In the main device upload page, click the "choose a firmware file to upload" button, choose the correct upgrade file, usually in compressed file (*. zip) format, do not decompress.



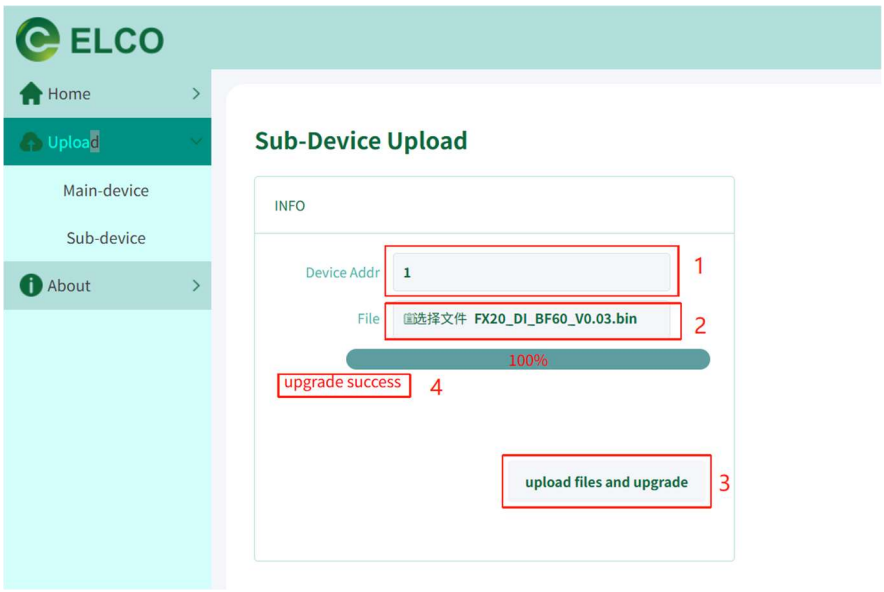


iii. Click the "send file" button and wait for a few seconds for the file to be transferred until the "upload is successful" prompt appears. Click "Reset" to complete the gateway module upgrade.



b) Sub-Device Upload

Select the slot number of the I/O module that needs to be upgraded, and then choose the corresponding upgrade file. Please note that the name of the upgrade file must be consistent with the module model (. bin format). Click the "Upload files and upgrade" button and wait for the successful upgrade prompt.



Caution!

1. Do not attempt to upgrade on your own unless necessary;
2. The upgrade file must be provided by the official ELCO company;
3. Do not power off during the upgrade process;
4. After the upgrade is completed, the FX20 power supply needs to be restarted.

9.4. Representation of analog module values

The PLC processes analog values in binary format. The FX20 analog input module converts analog process signals into digital format, and the analog output module converts digital output values into analog signals.

Digital analog values are applicable to input and output values within the same rated range. Each analog signal occupies PLC address of 1 word, which means each analog signal corresponds to a 16bit value. The symbol of the analog value is always set at the highest bit 15: 0 represents positive and 1 represents negative. For analog modules with a resolution less than 16 bits, analog values are stored in a left aligned manner, and the unused least significant bits are filled with 0. For example, the analog value 18035 can be represented as the following binary value:

Bits	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
16bit	0	1	0	0	0	1	1	0	0	1	1	1	0	0	1	1
14bit	0	1	0	0	0	1	1	0	0	1	1	1	0	0	0	0

Analog signal types can be divided into bipolar and unipolar, with a current bipolar value of ± 20mA (input only) and a voltage bipolar value of ± 10 V, the current unipolarity values are 0-20mA and 4-20mA, and the voltage unipolarity values are 1-5 V and 0-10 V.

The thermal resistor supports 2-wire and 3-wire PT100/1000, and the thermocouple can support multiple TC types (internal compensation) such as J, K, T, N, E, etc.

9.4.1. Analog value representation within the input and output range of bipolar current

System value			Current input/output range	
	Decimalism	Hexadecimal	±20 mA	
118.515%	32767	7FFF	≥ 23.7 mA	Overflow, locking max. value

	27649	6C01		Overshoot range
100%	27648	6C00	20 mA	Rated range
75%	20736	5100	15 mA	
0.00362%	1	1	723.4 nA	
0%	0	0	0 mA	
	-1	FFFF	-723.4 nA	
-75%	-20736	AF00	-15 mA	
-100%	-27648	9400	-20 mA	
	-27649	93FF		Overshoot range
-118.519%	-32768	8000	≤ -23.7 mA	Underflow, locking min. value

9.4.2. Analog value representation within the input and output range of bipolar voltage

System value			Current input/output range	
	Decimalism	Hexadecimal	± 10V	
	32767	7FFF	> 10.24 V	Overflow, locking max. value
102.4%	28310	6E96	10.24 V	Overshoot range
	27649	6C01		
100%	27648	6C00	10 V	Rated range
75%	20736	5100	7.5 V	
0.00362%	1	1	361.7 µV	
0%	0	0	0 V	
	-1	FFFF	-361.7 µV	
-75%	-20736	AF00	-7.5 V	
-100%	-27648	9400	-10 V	
	-27649	93FF		Overshoot range
-102.4%	-28310	916A	-10.24 V	
	-32768	8000	< -10.24V	Underflow, locking min. value

9.4.3. Analog value representation within the input and output range of unipolar current

System value			Current input/output range		
	Decimalism	Hexadecimal	0~20mA	4~20mA	
118.515%	32767	7FFF	≥ 23.7 mA	≥ 22.96 mA	Overflow, locking max. value

	27649	6C01			Overshoot range
100%	27648	6C00	20 mA	20 mA	Rated range
75%	20736	5100	15 mA	16 mA	
0.00362%	1	1	723.4 nA	4mA+578.7nA	
0%	0	0	0 mA	4 mA	
-0.00362%	-1	FFFF			Overshoot range
-17.59%	-4864	ED00	-3.52 mA	1.185 mA	
	-32768	8000	<-3.52 mA	< 1.185 mA	Underflow, locking min. value

9.4.4. Analog value representation within the input and output range of unipolar voltage

System value			Current input/output range		
	Decimalism	Hexadecimal	1~5 V	0~10 V	
	32767	7FFF	> 5.7 V	> 10.24 V	Overflow, locking max. value
118.515%	32767	7FFF	5.7 V		Overshoot range
102.4%	28310	6E96		10.24 V	
100%	27648	6C00	5 V	10 V	Rated range
75%	20736	5100	4 V	7.5 V	
0.00362%	1	1	1V+144.7 µV	361.7 µV	
0%	0	0	1 V	0 V	
	-1	FFFF			Overshoot range
-17.59%	-4864	ED00		-1.759 V	
-25%	-6912	E500	0 V		
	-32768	8000	< 0 V	< -1.759 V	Underflow, locking min. value

9.4.5. Analog value representation within the measurement range of PT x00 standard thermal resistance

System value		Current input range	
Decimalism	Hexadecimal	-200~+850 ℃	
32767	7FFF	≥ 850.1 ℃	Overflow, locking max. value
8500	2134	850 ℃	Rated range
6375	18E7	637.5 ℃	
10	A	1 ℃	
0	0	0 ℃	
-10	FFF6	-1 ℃	
-1500	FA24	-150 ℃	
-2000	F830	-200 ℃	
-32768	8000	≤ -200.1 ℃	Underflow, locking min. value

9.4.6. Representation of simulated values within the measurement range of thermocouples

For J. K, T, N, and E type thermocouples, determine the rated input and output range based on the temperature range of the graduation table. Divide the decimalism value of the system by 10 to obtain the current temperature, with a resolution of 0.1 ℃, and lock max. or min. value when exceeding the limit.

10. Fault diagnosis

Name	Status	Meaning	Recommended treatment
Adapter indicators			
PWR	Green	Normal	None
	Off	Power abnormal	1. Check if the polarity of the power wiring is correct; 2. Check if the power supply voltage is normal; 3. Adapter failure, replace it.
BF	Green	Normal	None
	Red	Communication abnormal	1. Check if the network cable is connected reliably; 2. Check for configuration errors; 3. Adapter failure, replace it.
SF	Green	Normal	None
	Red	Error occurred	1. Check if there is a short circuit or overload in the I/O module; 2. Adapter or I/O module faulty, replace it;
STA	Green	Normal	None
	Red	Backplane communication error	1. Check if the backplane connection between modules is reliable; 2. Attempt to power off and restart the FX20 system again;
Digital I/O indicators			
PW	Green	Normal	None
	Off	24V power supply abnormal	1. Check if the 24V wiring of the I/O module is correct; 2. Check if the 24V power supply voltage of the I/O module is normal; 3. I/O module damaged, replace it.
MD	Green	Normal	None
	Green blinking	Connected but not configured	Check if the modules are configured correctly.
	Green and red blinking	Backplane communication abnormal	1.Check if the connections between modules are reliable; 2. Restart FX20 system power supply; 3. I/O module malfunction, replace it.
	Red	Module error	1. Check if the I/O module is configured correctly; 2. Check if there is a short circuit or overload in the I/O module; 3. I/O module damaged, replace it.
00-07/10-17	Green	Signal “1”	None
	Off	Signal “0”	None
Analog I/O indicators			
PW	Green	Normal	
	Off	24V power supply	1. Check if the 24V wiring of the I/O module is correct;

		abnormal	2. Check if the 24V power supply voltage of the I/O module is normal; 3. I/O module damaged, replace.
MD	Green	Normal	None
	Green blinking	Connected but not configured	Check if the modules are configured correctly;
	Green and red blinking	Backplane communication abnormal;	1.Check if the connections between modules are reliable; 2. Restart FX20 system power supply; 3. I/O module malfunction, replace it.
	Red	Module error	1. Check if the I/O module is configured correctly; 2. Check if there is a short circuit or overload in the I/O module; 3. I/O module damaged, replace it.
C1-C4	Off	Normal	None
	Red	Channel over range	Check the analog input output signal range.
Auxiliary power supply module indicators			
PW	Green	Normal	None
	Red	24V overvoltage or undervoltage	Check if the input 24V power supply voltage is normal.
Us	Green	Normal	None
	Off	No backplane 5V power supply	1. Check if the backplane connection between modules is reliable; 2. Power module damaged, replace.