

XD-4GBOX-ED

Fast manual

Thanks for purchasing XINJE XD series PLC and extension module. This manual will introduce the electric features and using method of XD series extension ED module. Please read this manual carefully before using the products, make sure the wiring operation is safe.

Features of analog extension module XD-4GBOX-ED

- Remote diagnosis of equipment fault
- Equipment after-sales maintenance, such as air compressor
- Ensure the test equipment data is real and reliable, such as Li battery test
- Intelligent city construction, such as sewage treatment, waste recycling, cold storage
- Intelligent agriculture and car industries, smart home

Safety precautions

Control system design attentions



- ◆ Make sure design the safety circuit, to ensure that the control system can still work safety when the external power supply cut off or PLC broken.
- ◆ Make sure set emergency braking circuit, protection circuit, interlock circuit of forward-reverse running in PLC external circuit and upper-lower limit switch to prevent from machine damage.
- ◆ In order to make the equipment safe operation, please design external protection circuit for important output signal.
- ◆ PLC CPU will close all the output when detecting the system error; the output will lose control when the PLC circuit has problem. Please design suitable external control circuit to ensure the device working normally.
- ◆ If the PLC relay or transistor unit is broken, the output cannot be ON or OFF.
- ◆ The PLC is designed for indoor environment, the lightning protection must be installed in the power supply system to avoid PLC and other device damage.

Installation and wiring attentions

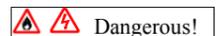


- ◆ Do not use the PLC in the following environment: dust, soot, corrosive gases, flammable gas, high temperature, condensation, vibration, impact, lightning, fire.
- ◆ Do not let the metal scrap and wire head drop into the ventilation hole of PLC, otherwise it will cause fire or error operation.
- ◆ Do not cover the ventilation hole of PLC, otherwise it will cause fire, error operation.
- ◆ The I/O wiring must be fixed enough, otherwise the bad contactor will cause fault.



- ◆ It can use external power supply for extension module DC24V power.
- ◆ Please use shield cable for high frequency I/O wiring to avoid interference.

Run and maintenance



- ◆ Please connect all the cable include PLC, extension module and BD board after shutting down the power supply.
- ◆ Please operate as the manual for online operation, forced output, RUN, STOP.



- ◆ Please discard the product as industrial waste.
- ◆ Make sure cut off the power supply when installing or uninstalling the extension card.

Product information

Naming rule

	①	②	③
Product series	XD: XD series extension module		
Module name	4G: 4G communication module		
ED	left extension		

Basic parameters

XD series PLC can connect 1 extension ED module, the type is not limited.

Table 1: analog extension module XD-4GBOX-ED general specifications

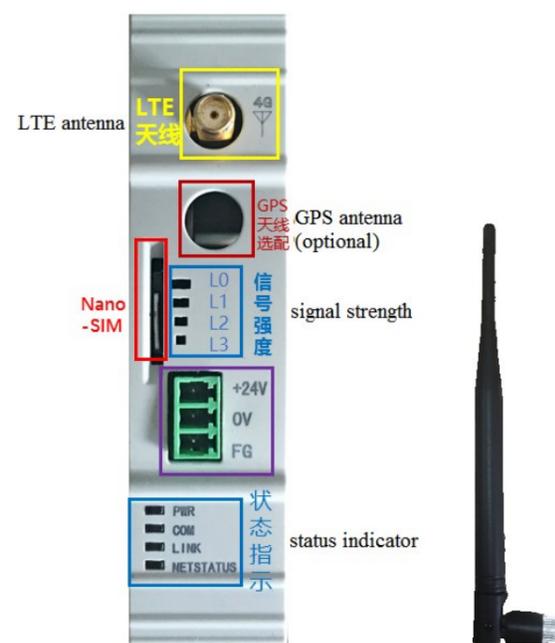
Item	Specifications
Using environment	No corrosive gas
Environment temperature	0°C~60°C
Storage temperature	-20~70°C
Environment humidity	5~95%RH
Storage humidity	5~95%RH
Installation	Fix with M3 screw or install on the rail DIN46277(width 35mm)
Dimension	25mm×100mm×90.0mm

Table 2: analog extension module XD-4GBOX-ED product features

Parameters	Description
Working frequency	GSM/GPRS: 900, 1800MHz EDGE: 900, 1800MHz UMTS: CDMA2000(BC0), WCDMA(B1, B8), TD-SCDMA(1.9G, 2G) LTE: FDD(B1, B3, B8) TDD(B38, B39, B40, B41) GNSS: GPS, GLONASS
Max transmission speed	100 Mbps
Max transmitting power	GSM/GPRS: 2W EDGE: 0.5W UMTS: 0.25W LTE: 0.25W
Working temperature	-10°C~50°C
Average standby current	<5mA

Product appearance

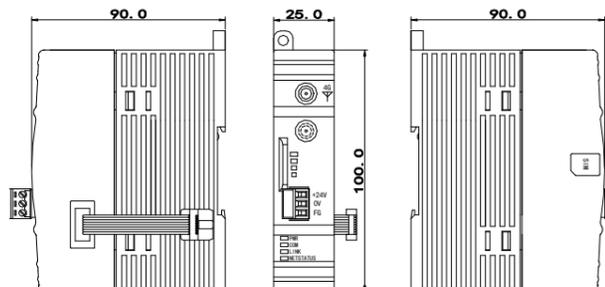
Product structure



Product dimension and installation

Product dimension (Unit: mm)

XD series extension ED module XD-4GBOX-ED dimension is shown as below:



Installation

Please connect the extension cable of XD-4GBOX-ED to XD series PLC left ED port, and install with screw or fix on DIN46277 rail.

Note:

- (1) Please do not let the chip and wire cuttings fall into the module when installing.
- (2) Please confirm the module and equipment specification before wiring.
- (3) Please pay attention to whether the connection is fixed and the loss of connection will cause incorrect data and short circuit. The installation, wiring and other operation must be done after the power supply is cut off.

Electric design reference

Structure

Terminals



Note: the view direction is facing the module at front side, the terminal sequence from up to down is +24V, 0V, FG. The module power supply voltage is 24V DC, the range is DC21.6V to 26.4V.

Status indicator

- PWR
- COM
- LINK
- NETSTATUS

Light	Function
PWR	Module power supply
COM	Module and PLC serial port connection succeeded
LINK	Log on target server succeeded

NETSTATUS	Visit telecom operator and build the network
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Signal strength

The module running state, 4GBOX visiting server succeeded. L0~L3 show the signal strength of network. In error state, L0~L3 will show the error type, please see below table:

L0	L1	L2	L3	Explanation
-	-	-	flashing	No SIM card or SIM card insert error
-	-	flashing	flashing	4GBOX cannot open the network (SIM card arrears or not open the data traffic service)
flashing	flashing	flashing	flashing	4GBOX not configure server information

DIP switch

S1	S2	S3	S4
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If the serial port configuration of 4GBOX is error and cannot connect the PLC, please turn on switch 1, then repower on the module to restore the out of factory parameters. The configured serial port connection flag, signal strength flag, SIM binding flag, white list still exist, no need to configure again. But remote parameters and serial port parameters are back to default value.

S1	S2	S3	S4	Function
ON	OFF	-	-	Back to default parameters when re-power on
OFF	OFF	-	-	Running mode
-	ON	-	-	Factory mode (XD-4GBOX-ED)
-	ON	-	-	Configuration mode (4GBOX-M)

Initialization time

The module initialization time is depend on the telecom operator. The table shows the time of Chinese telecom operators:

Telecom operator	Initialization time (s)
China mobile	21.31
China unicom	23.24
China telecom	59.89

Using steps

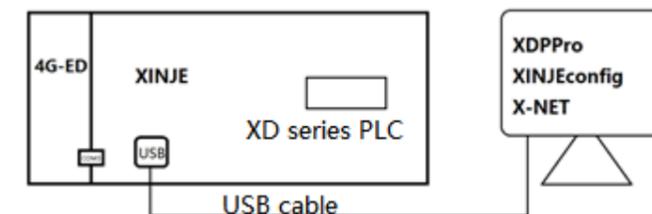
Preparation

- Open the function of data traffic for the Nano SIM card
- Open the message function (optional)
- XD series PLC hardware V3.4.5 and up
- XD/EPro programming software V3.5 and up
- XD series PLC programming cable
- PC (enable to visit internet, installed XD/EPro software)

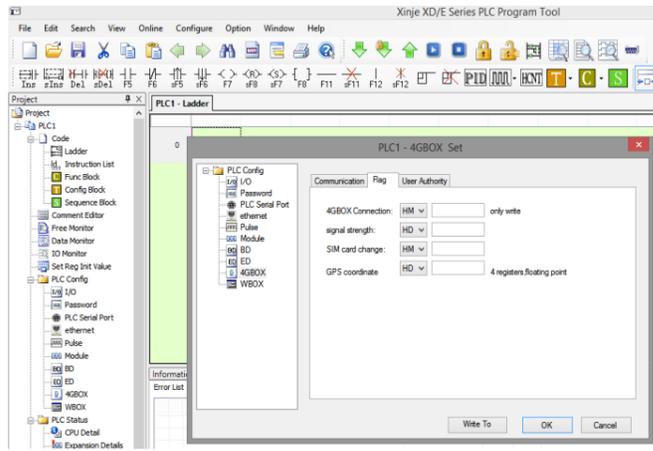
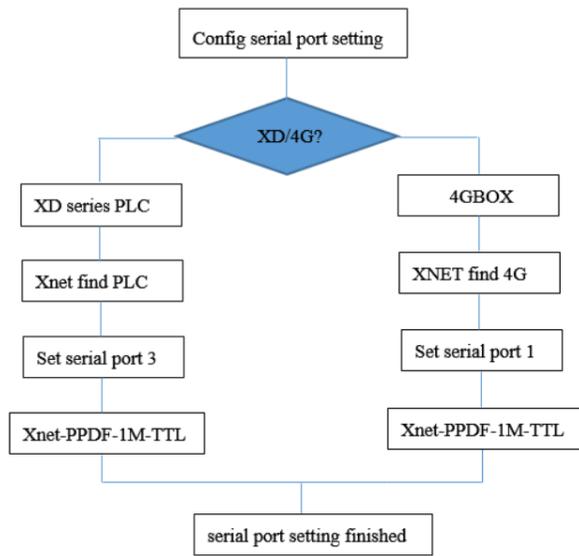
Module configuration

4GBOX is the left extension ED module of XD series PLC, the configuration needs XD/EPro software and Config tool. Please make sure the PLC hardware version is V3.4.5 and up, XD/EPro version is V3.5 and up, XinjeConfig tool version is v1.6.343 and up.

Serial port



XD series PLC serial port communication protocol includes Modbus RTU, XNET (OMMS/TBN/PPFD), free format protocol. For 4GBOX, PLC serial port protocol must set to XNET-PPFD, physical layer is TTL. The baud rate must be same. Network number, station number is recommended to use default parameters.



➤ **4GBOX connection**

4GBOX will communicate with PLC, set ON the appointed address every 5s after module initialization.

➤ **Signal strength**

4GBOX will communicate with PLC, write the signal strength in appointed address every 5s after module initialization. The signal range is 0 to 31, 31 is the strongest.

➤ **SIM card change**

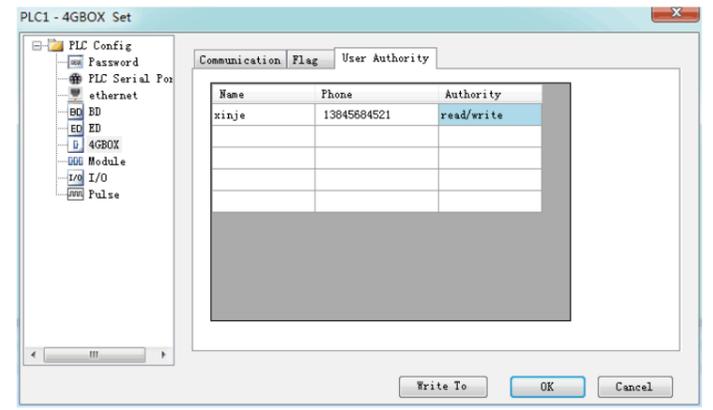
After the module initialization, 4GBOX will communicate with PLC, set ON the appointed address every 5s, if SIM is binding, reset the address every 5s.

Note:

- 4GBOX connection, SIM card change appointed address type: Y, M, HM, S, HS, T, HT, C, HC.
- Signal strength appointed address type: D, HD, TD, HTD, CD, HCD, FD.

◆ **User authority**

It is white list function. If the list is no phone number, 4GBOX will execute the message control instruction without distinguishing the phone number. if there is phone number in the list, 4GBOX will distinguish the number and authority to monitor the equipment.



■ **Message function**

◆ **Message monitoring(phone => 4GBOX => PLC)**

User can edit the message as fixed format to monitor the equipment.

Read soft component (example)

- Sending message format: R M0 returning message format: M0=ON
- Sending message format: R D5 returning message format: D5=K1234
- Sending message format: R DD0 returning message format: DD0=K654321

R D0 S20 return Thinget Made (S means the string length in decimal format expected to be read)

Write soft component

- Sending message format: W M0 1 //set ON M0
- Sending message format: W Y23 0 //set OFF Y23

- Sending message format: W Y35 1 //set ON Y35
- Sending message format: W D5 K1234 //D5=1234(decimal format)
- Sending message format: W DD0 H654321 //DD0(double word)=654321(hex format), DD0 occupies D0 and D1.
- W D0 "XINJE Made" //write the string in the address starting from D0 (occupy D0.....Dn, total n characters)

Error code:

If the message format, user authority, soft component type is error, the returning message will be error code. If there is no error, the returning message is OK.

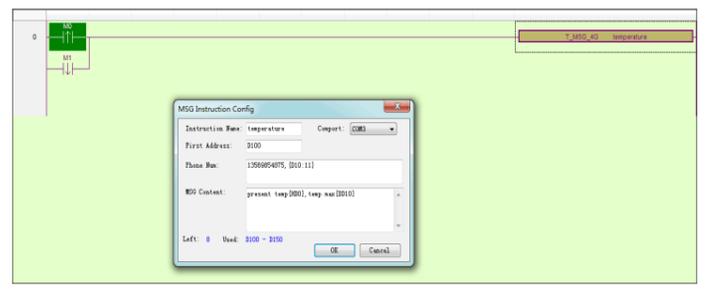
- Error1: the phone number which sending the message is not in the white list.
- Error2: message format is not correct
- Error3: the soft component is not correct
- Error4: the phone number only has read authority, but it wanted to write in
- Error5: 4GBOX and PLC BWO read write failure
- Error6: 4GBOX and PLC BWO read write failure
- Error7: 4GBOX and PLC BWO read write failure
- Error8: 4GBOX and PLC BWO read write failure

Note:

- all the letters must be capitalized.
- The command, register, operands are separated by a space, the whole message should not exceed 99 English characters.
- To send the character message, quotation mark must be English half angle “
- Message function only support China mobile, China unicom.

◆ **Message sending (PLC => 4G-BOX => phone)**

The 4GBOX will send message to user's phone in certain condition. Please refer to below example.

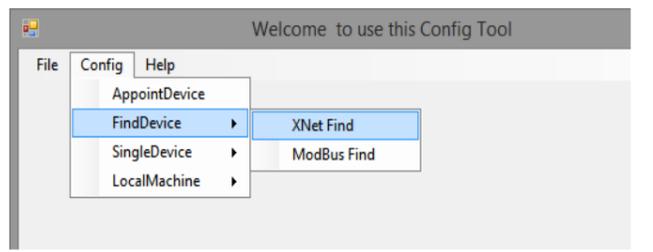


- The trigger coil should be edge signal(falling or rising edge of pulse).
- In the message configuration window, 4GBOX connects the left extension port of XD series PLC, set the port to com3
- First address can be D or HD, these registers cannot be used in other place of program
- Support multi phone number type-in and set the phone number on the HMI, the using method please refer to above picture, multi numbers are separated by “,”
- The message support Chinese and English contents, such as “present temp {HD0}”, and user will receive the message “present temp 30” for example. Register analysis function supports single and double words, such as D, DD, HD, DHD, but not support DM.
- China mobile, China unicom SIM card support Chinese/English and register analysis function, China telecom only supports English and register analysis function.

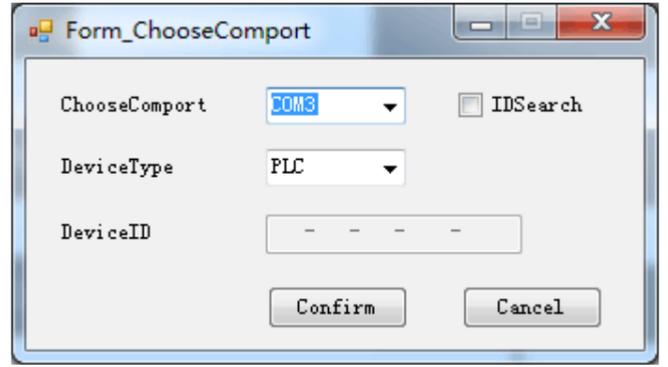
■ **Online monitoring**

◆ **Serial port setting**

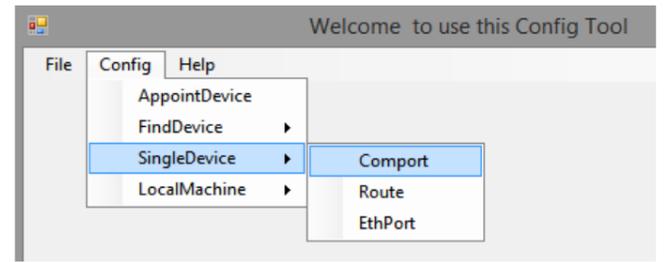
- Connect XD series PLC with PC through USB cable, open the XINJE config tool, click config/find device/Xnet find.



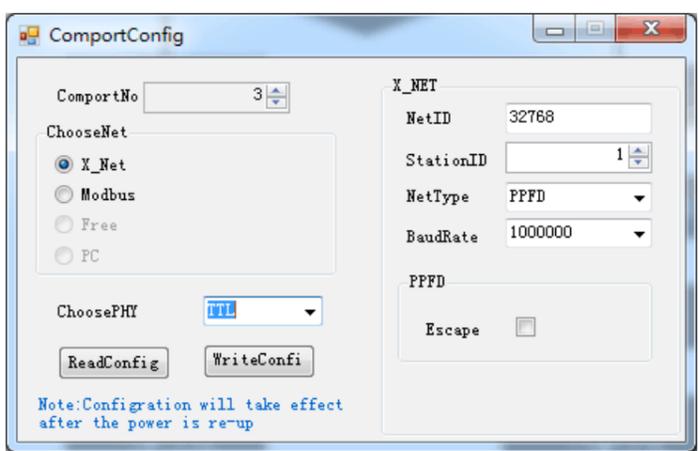
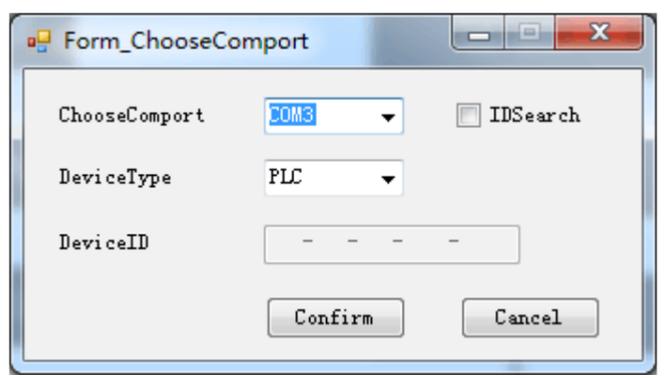
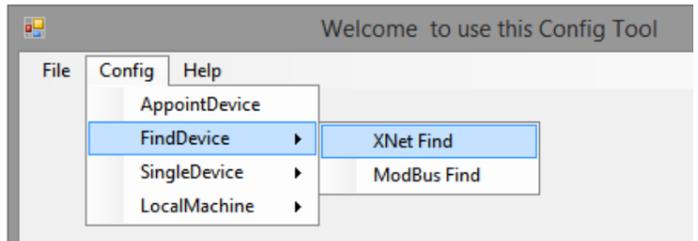
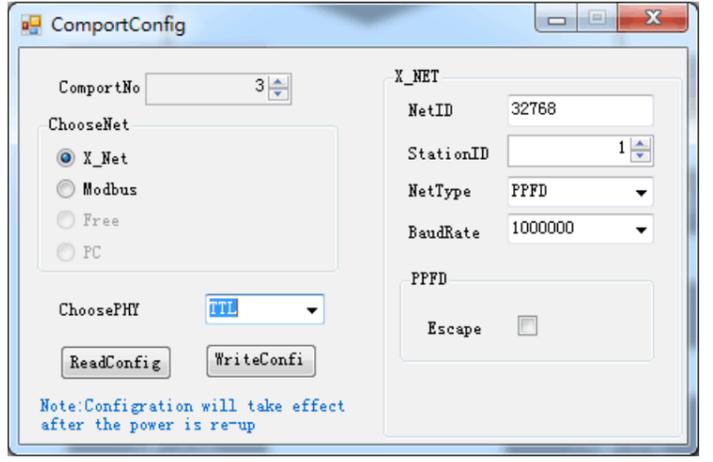
- choose PLC for device type, click confirm.



- after finding the device, click config/single device/com port



- choose comportNo 3, click ReadConfig. The Net please choose X-Net. PHY please choose TTL. The NetType please choose PPDF. The baud rate please set to 1000000. NetID and StationID no need to change. Then click WriteConfig, it will show “write configuration success”.



◆ **Flag register**

The flag can control the remote equipment stop, detect the signal and so on. this function must be configured through USB port in XNET mode.

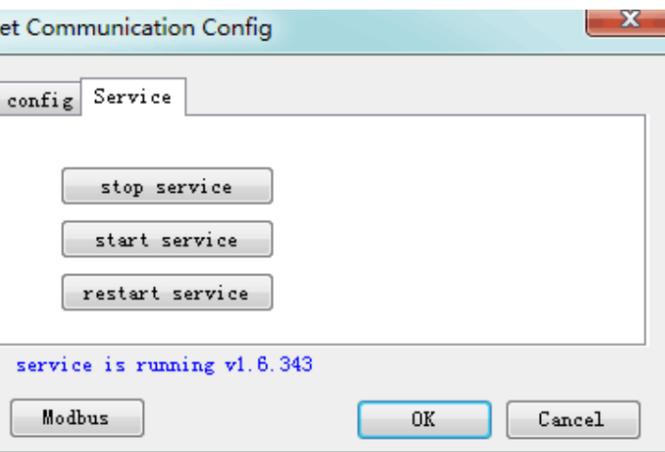
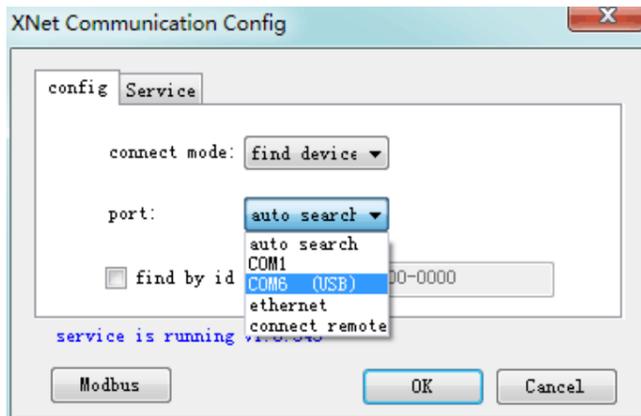


5. Hardware connection and settings

- (1) connect the 4GBOX to the left extension port of XD series PLC.
- (2) make sure the SIM card is installed in the 4GBOX, and SIM card has data traffic function, repower on the 4GBOX.
- (3) make sure indicator PWR always lights, COM and NETSTATUS is flashing, LINK always ON means 4GBOX has successfully log on the server(wait 30 seconds or 1 minute after power on). The light L0 to L3 ON numbers means signal strength.

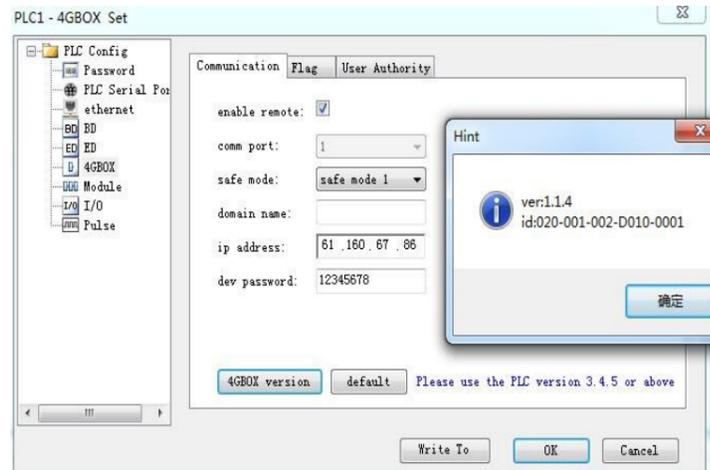
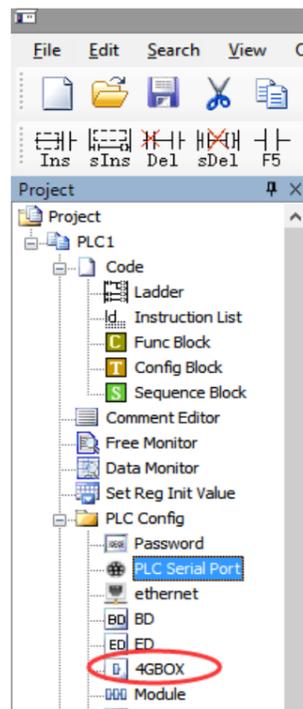
Remote monitoring

1. Connect XD series PLC with PC through USB cable, open the XD/EPPro software, click software serial port config, choose XNET communication config. Connect mode please set to find device, port please set to USB to serial port, here is com6, then click ok. If the connection is error, please click service/restart service.

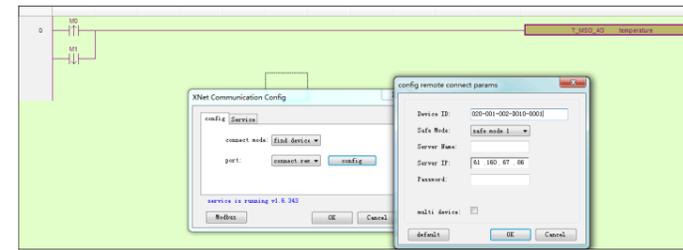
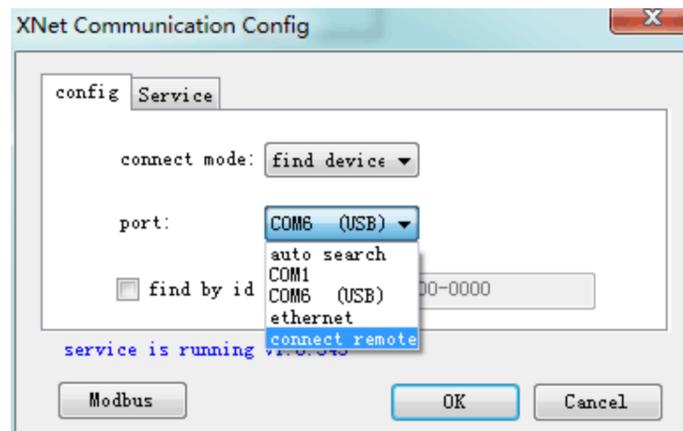


2. How to get the device ID of 4GBOX?

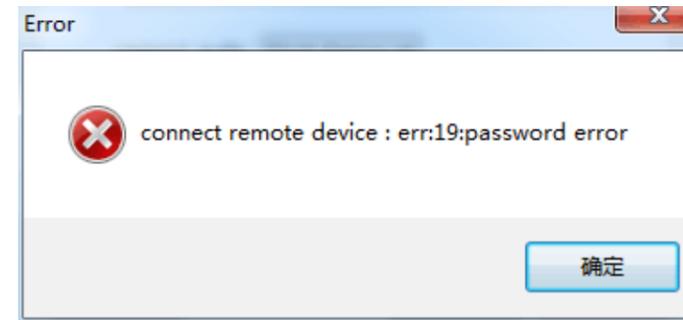
Click 4GBOX in the project bar, then click 4GBOX version, it will show version 1.1.4, ID: 020-001-002-D010-0001. User also can check this ID on the product label. There is no password for 4GBOX when out of factory, user can set password as needs.



3. click software serial port config, connect mode set to find device, port is connect remote, click "config".



4. input the device ID of 4GBOX, if you set the password, please input the password. If the password is error, it will show below message.



5. after the success of connection, the PLC can be monitored online, and the program can be downloaded and uploaded remotely.

