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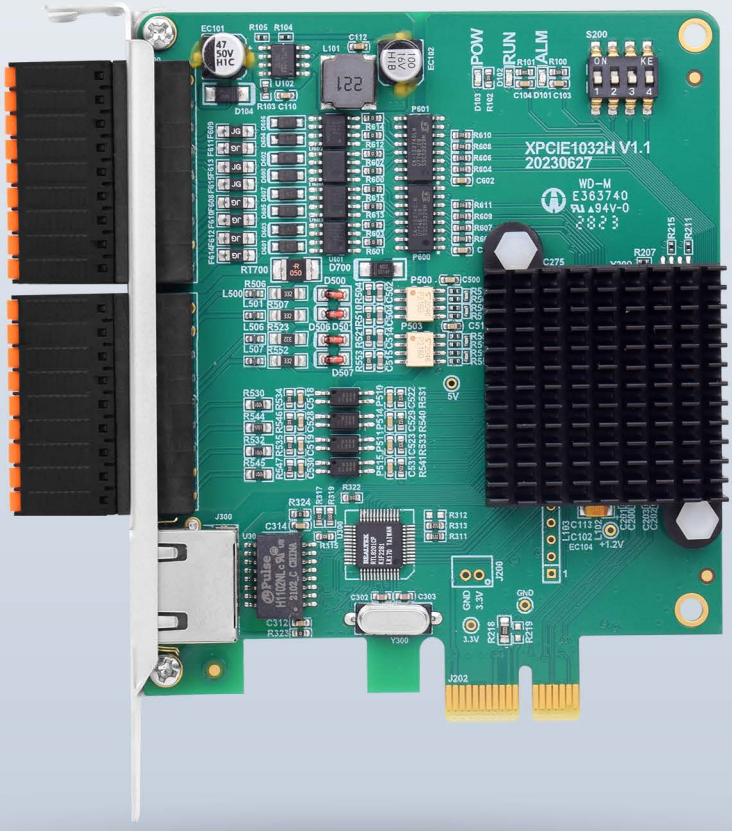
做最好用的运动控制
DO THE BEST TO USE MOTION CONTROL

EtherCAT Motion Control Card

XPCIE1032H



Vision Motion Controller

Motion Controlle

Motion Control Card

IO Expansion Module

HMI

Foreword

The motion controller provides rich interface, and it has excellent motion control performance, which can meet the expansion requirements of various projects.

For details about the ZMC controller software and the introduction and routine of each command, please refer to the ZBASIC software manual.

Information contained in this manual is only for reference. Due to improvements in design and functions and other aspects, Zmotion Technology reserves the final interpretation! Subject to change without notice!

Pay attention to safety when debugging the machine!

Please be sure to design an effective safety protection device in the machine, and add an error handling program in the software, otherwise Zmotion has no obligation or responsibility for the loss caused.

In order to ensure the safe, normal and effective use of the product, please be sure to read this product manual carefully before installing and using the product.

Safety Statement

- This chapter describes the safety precautions required for the correct use of this product. Before using this product, please read the instructions for use and correctly understand the relevant information on safety precautions.
- This product should be used in an environment that meets the design specifications, otherwise it may cause equipment damage or personal injury, and malfunctions or component damage caused by failure to comply with relevant regulations are not within the scope of product quality assurance.
- Zmotion will not take any legal responsibility for personal safety accidents and property losses caused by failure to comply with the contents of this manual or illegal operation of products.

Safety Level Definition

According to the level, it can be divided into " Danger " and " Caution ". Failure to operate as required may result in moderate injury, minor injury or equipment damage.

Please keep this guide in a safe place for reading when needed, and be sure to hand this manual to the end user.

Install	
 Danger	◆ When the controller is disassembled, all external power supplies used by the system should be disconnected before operation, otherwise it may cause misoperation or damage to the equipment. ◆ It is forbidden to use in the following places: places with dust, oil fume, conductive dust, corrosive gas and flammable gas; places exposed to high temperature, condensation, wind and rain; places with vibration and shock. Electric shock, fire and misuse can cause product damage and deterioration.
 Notice	◆ Avoid metal shavings and wire ends falling into the hardware circuit board during installation. ◆ After installation, ensure that there are no foreign objects on the hardware circuit board. ◆ When installing, make it tightly and firmly with the mounting frame.

	◆ Improper installation of the controller may result in misoperation, failure and fire.
Wiring	
 Danger	◆ The specifications and installation methods of the external wiring of the equipment shall comply with the requirements of local power distribution regulations. ◆ When wiring, all external power supplies used by the system should be disconnected before operation. ◆ When powering on and running after the wiring work is completed, the terminals attached to the product must be installed. ◆ Cable terminals should be well insulated to ensure that the insulation distance between cables will not be reduced after the cables are installed on the terminal block.
 Notice	◆ Avoid metal shavings and wire ends falling into the hardware circuit board during installation. ◆ The cable connection should be carried out correctly on the basis of confirming the type of the connected interface. ◆ It should be confirmed that the cables pressed into the terminals are in good contact. ◆ Do not bundle the control wires and communication cables with the main circuit or power supply wires, etc., and the distance between the wires should be more than 100 mm, otherwise noise may cause malfunction. ◆ If the controller is not installed properly, it may cause electric shock or equipment failure or malfunction.

Content

Chapter I Production Information

1.1. Production Introduction

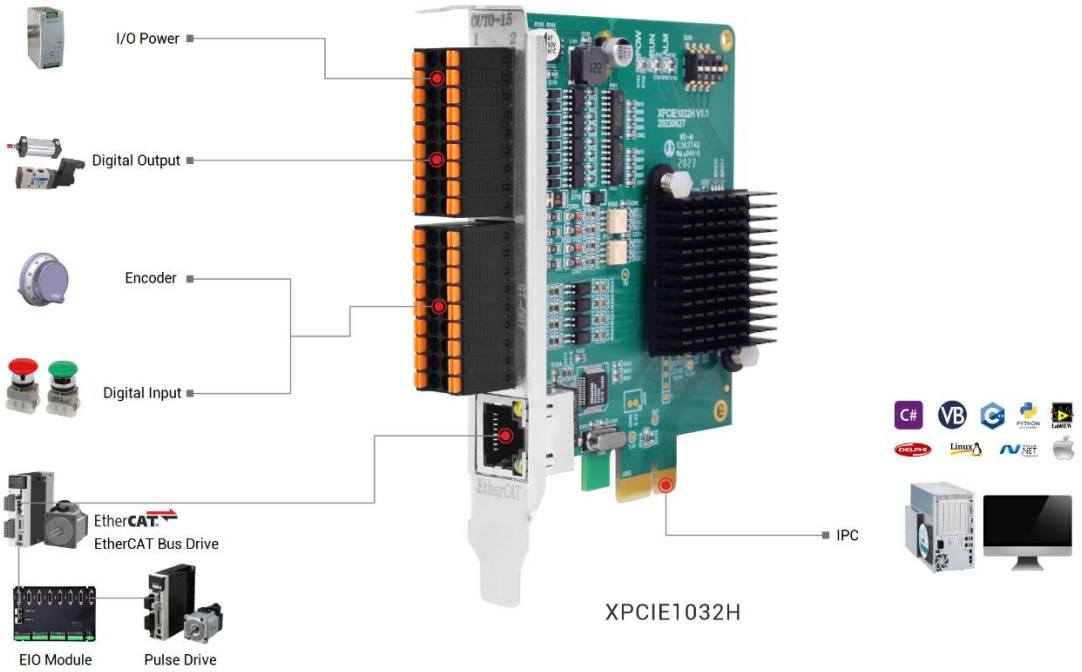
XPCIE1032H economical motion control card is a kind of EtherCAT bus and pulse type that is with PCIE interface. It supports up to 64 axes motion control, which can achieve linear interpolation, any circular interpolation, space arc, helical interpolation, electronic cam, electronic gear, synchronous follow, virtual axis, robot, and all kinds of control requirements.

XPCIE series motion control card can be applied in high-speed and high-precision occasions, such as, semi-conductor equipment, SMT processing, 3C automation production line, new energy equipment, laser processing and non-standard automatic equipment.

1.2. System Framework

XPCIE motion control card is a kind of new type XPCIE bus motion control card. And multiple stepper motors or digital servo motors can be controlled. In addition, EtherCAT bus and ordinary pulse control are valid. What's more, it supports many functions, multi-axis point to point, interpolation motion, trajectory planning, handwheel control, encoder position checking, IO control, position latch, etc.

XPCIE1032H card requires CPU benchmark i5-4 generation 4 cores or above, main frequency not lower than 2GHZ, running memory above 8G, and hard disk above 256M.



1.3. Functional Features

- XPCIE1032H supports up to 64 axes motion control.
- Pulse output mode: single-ended direction / pulse.
- Support encoder position measurement, which can be configured as handwheel input mode.
- Maximum pulse output frequency of pulse axis is 500kHZ.
- 4096 isolated inputs and 4096 outputs can be expanded through EtherCAT bus.
- The maximum output current of general digital outputs can reach 300mA, which can directly drive some kinds of solenoid valves.
- Support linear interpolation, arbitrary circular interpolation, helical interpolation, and continuous interpolation.
- Support electronic cam, electronic gear, position latch, synchronous follow, virtual axis, and other functions.
- Support pulse closed loop, pitch compensation and other functions.
- Support multi-file and multi-task programming in ZBasic.

- A variety of program encryption methods to protect the intellectual property rights of customers.

1.4. Model & Nameplate

XPCIE1032H-AX64-MO8-HW

XPCIE1032H-AX64-MO0-HW	
Mark	Product Interface
XPCIE	PCIE Interface
XPCIE1032H-AX64-MO0-HW	
Mark	Generation No.
1	Generation 1
XPCIE1032H-AX64-MO0-HW	
Mark	The Number of IO
032	32
XPCIE1032H-AX64-MO0-HW	
Mark	Meaning
H	High-performance
XPCIE1032H-AX64-MO0-HW	
Mark	The Number of Axis
AX6	6-Axis
AX8	8-Axis
AX16	16-Axis
AX24	24-Axis
AX32	32-Axis
AX64	64-Axis
XPCIE1032H-AX64-MO0-HW	
Mark	Motion Control Functions
MO0	Point to point
MO2	Point to point, electronic cam, linear interpolation
MO8	Point to point, electronic cam, linear interpolation, circular interpolation, continuous interpolation

XPCIE1032H-AX64-MO0-HW	
Mark	Other Functions
R	Robotic arm algorithm
NC	NC, G code
HW	Hardware comparison output
ZV	Vision commands & functions

1.5. Model Configuration

The description of the optional configuration of software functions is shown in the form below: including the selection of the number of axes, the selection of motion control functions, and the selection of other functions (PSO function, vision function, and manipulator function can be reselected).

Interface	Optional Functions	Definition Description
License Parameter	Frame	R1: suit to ordinary robots
	Robot	R6: suit to 6-joint robots and special structure robots.
	NcGcode	NC: suit to NC G code function.
	ZVision	ZV: suit to vision instruction and function.
	HW	HW: suit to HW hardware comparison output function, refer to high-speed output channel numbers selection.
	Motor	Select according to actual axes, the value set of axis needs to be larger than the number of axes used. AX4: 4 axes can be used at most. AX6: 6 axes can be used at most. AX8: 8 axes can be used at most. AX16: 16 axes can be used at most. AX24: 24 axes can be used at most.

		AX32: 32 axes can be used at most. AX64: 64 axes can be used at most.
	Motion	Valid motion control functions: MOO: point to point MO2: point to point, electronic cam, linear interpolation. MO8: point to point, electronic cam, linear interpolation, circular interpolation, continuous interpolation.

1.6. Connection Configuration

External equipment / software configuration:

- Main computer / industrial control computer, wired-mouse & keyboard.
- Displayer
- Win10 operating system professional edition, ZDevelop development platform and operating system software of various machine tool industries, etc.

(note: users can download the latest RTSys (ZDevelop) version from the official website of Zmotion or contact us. Users who use other upper computer development platforms can also contact us to obtain function library files. And this product does not come with an operating system, and there is no built-in MotionRT software. Users need to go to the official website to download the MotionRT installation package)

Chapter II Product Specification

2.1.Basic Specification

Item	Description
Model	XPCIE1032H
Basic Axes	6/8/16/24/32/64 axes, configure according to actual needs.
Basic Axes Type	EtherCAT/Local Pulse axes
HW	16 outputs can be configured as HW function.
PWM	4 outputs can be configured as PWM function.
Internal IO	16 inputs, 16 outputs (with overcurrent protection), and 8 are high-speed inputs, 16 are high-speed outputs.
Max extended IO	4096 inputs and 4096 outputs.
Pulse bit	64
Encoder bit	64
Speed accel bit	64
Max pulse frequency	500kHz
VR power failure storage space	2048
Power Supply	24V DC input
Communication interface	EtherCAT
Dimensions	90*106mm
Work temperature	-10°C ~ 55°C
Work humidity	10% ~ 95% (no condensation)

- PCIE doesn't support plug in and out when power on, please turn off the computer before plugging in and out the card.

- Please handle it carefully. Before touching the control card circuit or plugging in/out the control card, please wear anti-static gloves or touch an effectively grounded metal object to discharge the human body to prevent possible static electricity from damaging the motion control card.

2.2. IO Interface Specification

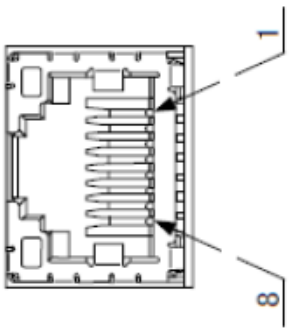
Item	Specification	Description
Internal IO	16+16	16 inputs, 16 outputs (with overcurrent protection)
Max extended IO	512 inputs, 512 outputs	Match with expansion module to expand IO
High-speed input	8	IN0-7, 8 are high-speed inputs
High-speed output	16	OUT0-15, 16 are high-speed outputs
Latch input	4	4 can be configured as latch input, IN0-3
Single-ended encoder	2	Input is reused, IN0-2, IN4-6
PWM output	4	4 can be configured as PWM, OUT0-3
Hardware comparison output	16	16 outputs can be configured as hardware comparison output (PSO function), and precision output can be compatible, OUT0-15.
Single-ended pulse output	4	Output is reused, OUT8-15
IO power input	DC24V	24 DC input, IO needs to be supplied by external power separately.

Chapter III Wiring Communication Configuration & Network

3.1.EtherCAT Bus Interface

XPCIE1032H motion controller has a 100M EtherCAT communication interface, and it supports EtherCAT protocol. In addition, EtherCAT driver or EtherCAT expansion module can be connected.

→ Interface Definition

ECAT	PIN	Name	Description
	1	TX+	Send signal (+)
	2	TX-	Send signal (-)
	3	RX+	Receive signal (+)
	4	NC	Reserved
	5	NC	Reserved
	6	RX-	Receive signal (-)
	7	NC	Reserved
	8	NC	Reserved

→ Specification

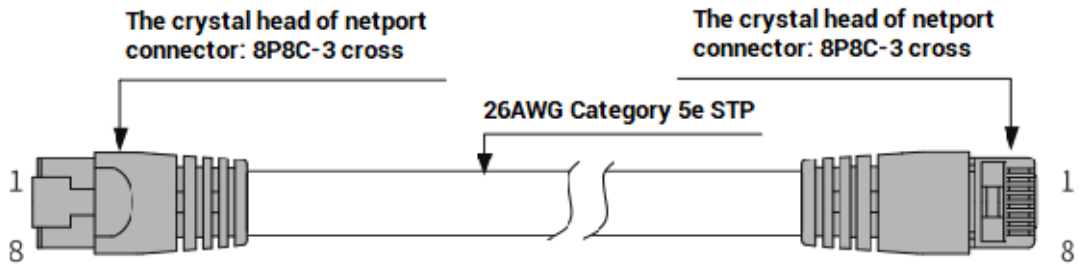
Item	Specification
Communication protocol	EtherCAT protocol
Valid service	CoE(PDO, SDO), FoE
Synchronization method	IO adopts input and output synchronization / DC-distributed clock
Physical level	100BASE-TX
Duplex mode	Full duplex
Topology	linear topology

Transfer media	Cable
Transfer distance	It is less than 100M between 2 nodes
Process data	Maximum 1486 bytes of one single frame
Synchronization shaking of two slave stations	<1us
Refresh	For 1000 digital input and output, about 30us.

→ Communication Cable Requirements

Both ETHERNET communication interface and EtherCAT communication interface adopt standard Ethernet RJ45 interface.

The network cable adopts Category 5e STP, and the crystal head has a metal shell to reduce interference and to prevent information from being eavesdropped. As shown below:



Item	Specification
Cable type	Flexible crossover cable, Category 5e
traverse	twisted pair
Line pairs	4
Isolation	cross skeleton
Connector	Crystal head with iron shell
Cable material	PVC
Cable length	Less than 100m

Use RJ45 network cable connection method:

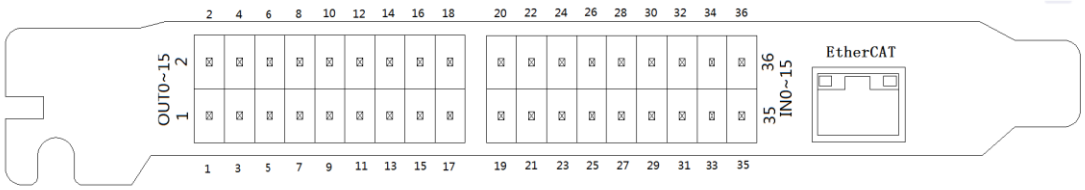
- When installing, hold the crystal head that is with the cable and insert it into the RJ45 interface until it makes a "click" sound (kada).
- In order to ensure the stability of communication, please fix the cables with cable ties.
- When disassembling, press the tail mechanism of the crystal head, and pull out the

connector and the module in a horizontal direction.

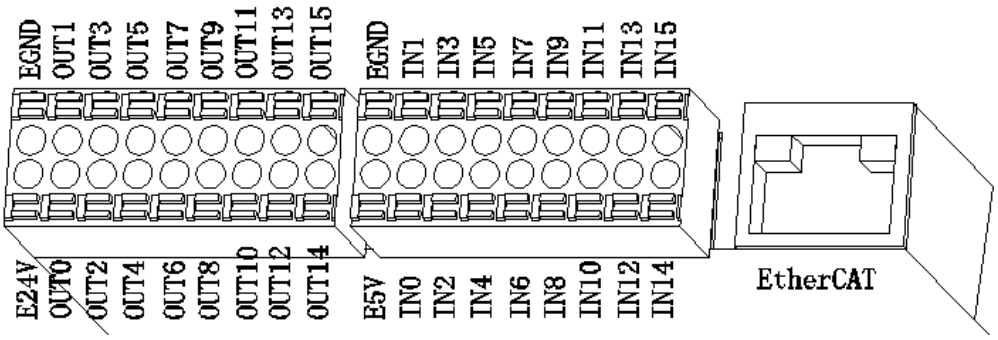
Please use tube-type pre-insulated terminals and cables with appropriate wire diameters to connect the user terminals.

3.2. Digital Inputs & Outputs

General IO includes 16 inputs and 16 outputs (all are NPN types), when the number is not enough, expansion is valid. For IO, it needs to connect to 24V DC power externally.



3.2.1. Terminal Definition



PIN	Signal	Description	Note
1	E24V	IO power 24V input	IO power terminal to supply power
2	EGND	IO power ground / IO public end	
3	OUT0	Output 0, PWM0	1. All outputs are high-speed outputs, default are general outputs.
4	OUT1	Output 1, PWM1	
5	OUT2	Output 2, PWM2	

6	OUT3	Output 3, PWM3	2. OUT0-3 can be configured as PWM output or pulse output through RTSys (ZDevelop). 3. OUT0-15 support hardware comparison output or precision output. 4. OUT8-15 can be configured as 4 pulse outputs.
7	OUT4	Output 4	
8	OUT5	Output 5	
9	OUT6	Output 6	
10	OUT7	Output 7	
11	OUT8	Output 8, single-ended DIR3	
12	OUT9	Output 9, single-ended PUL3	
13	OUT10	Output 10, single-ended DIR2	
14	OUT11	Output 11, single-ended PUL2	
15	OUT12	Output 12, single-ended DIR1	
16	OUT13	Output 13, single-ended PUL1	
17	OUT14	Output 14, single-ended DIR0	
18	OUT15	Output 15, single-ended PUL0	
19	E5V	E5V power output	Supply power for external equipment
20	EGND	E5V power ground / IO public end	
21	IN0	Input 0, latch R0, encoder EA0	1. IN0-7 all are high-speed inputs, default are general inputs. 2. IN0-3 can be configured as latch input through RTSys (ZDevelop). 3. IN0-2 and 4-6 can be configured as 2 encoder inputs.
22	IN1	Input 1, latch R1, encoder EB0	
23	IN2	Input 2, latch R2, encoder EZ0	
24	IN3	Input 3, latch R3	
25	IN4	Input 4, encoder EA1	
26	IN5	Input 5, encoder EB1	
27	IN6	Input 6, encoder EZ1	
28	IN7	Input 7	
29	IN8	Input 8	IN8-15 are ordinary inputs, which can connect to the button, switch and other elements.
30	IN9	Input 9	
31	IN10	Input 10	
32	IN11	Input 11	
33	IN12	Input 12	

34	IN13	Input 13	
35	IN14	Input 14	
36	IN15	Input 15	

Note:

- Only 24V encoders can be used. The maximum pulse frequency of encoder 0 and encoder 1 is 500kHz, which can be connected to high-speed encoders, the others are common inputs, the maximum pulse frequency is 10kHz, and it can only be connected to low-speed encoders such as handwheels.
- The No. after inputting pulse output and encoder input is default axis No., and it can be switched into ordinary IO through ATYPE command (ATYPE = 0: ordinary IO, ATYPE = 1: pulse output, ATYPE = 3: encoder input, ATYPE = 4: pulse output + encoder input)

3.2.2. Digital Specification

→ High-speed Digital Output Specification

Item	High Speed Output
Channel	16 (OUT0-OUT15)
Output method	Transistor NPN type, OD outputs
Output frequency	≤400kHz
Voltage level	Load power ≤36V
Max output current	+300mA
Max leakage current when off	25μA
Respond time to conduct	1μs (resistive load typical value)
Respond time to close	3μs
Isolation method	Capacitive isolation
Overcurrent protection	Support, action current is 600mA

Respond time	Below 0.5ms

Note:

- ✧ The times in the form are typical based on the resistive load, and may change when the load circuit changes.
- ✧ Due to the leak-type output, the shutdown of the output will be obviously affected by the external load circuit, and the output frequency should not be set too high in the application.

→ Digital Input Specification

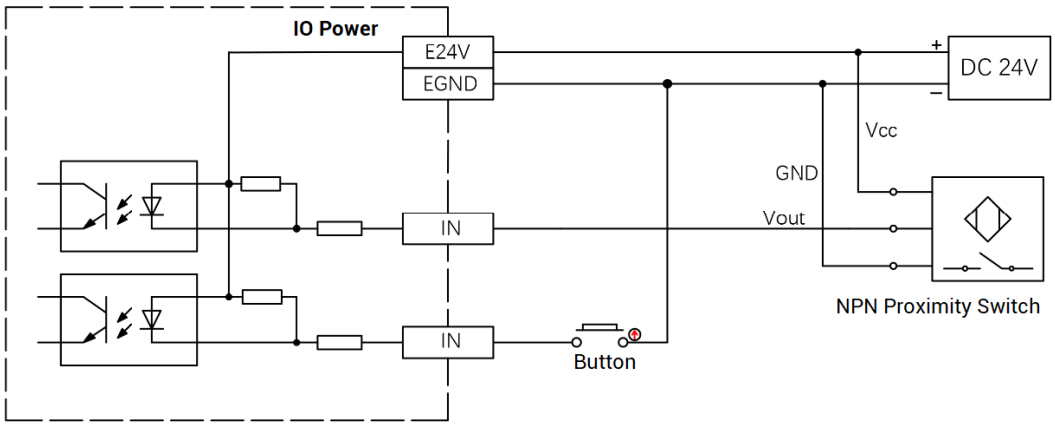
Item	High-Speed Input (IN0-7)	Low-Speed Input (IN8-15)
Input mode	NPN type	NPN type
Frequency	≤100kHz	≤5kHz
Voltage level	DC24V (-15%~+20%)	DC24V (-15%~+20%)
Current (typical value)	6.8mA	4.8mA
The voltage to open	<15V	<14.5V
Minimal current	2.3mA	1.8mA
Impedance	3.3KΩ	4.7KΩ
Isolation method	optoelectronic isolation	optoelectronic isolation
Respond time	Below 10ms	Below 10ms

Note:

- ➢ There are high-speed inputs and low-speed inputs.
- ➢ The above parameters are standard values when the voltage of controller power supply (E+24V port) is 24V.

3.2.3. General Input Wiring

→ Wiring Reference

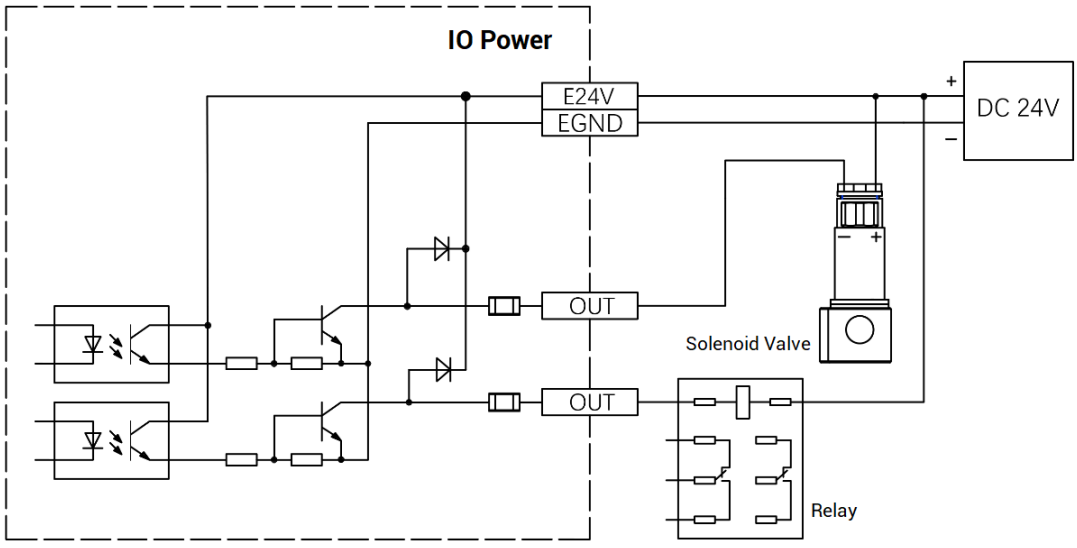


→ Wiring Note:

- The wiring principle of high-speed digital input IN (0-7) and low-speed digital input IN (8-15) is shown in the figure above. The external signal source can be an optocoupler, a key switch or a sensor, etc., all can be connected as long as the requirements on output of electric level can be achieved.
- For the public end, please connect the "EGND" port on the power supply to the "COM" terminal of the external input device.

3.2.4.General Output Wiring

→ Wiring Reference



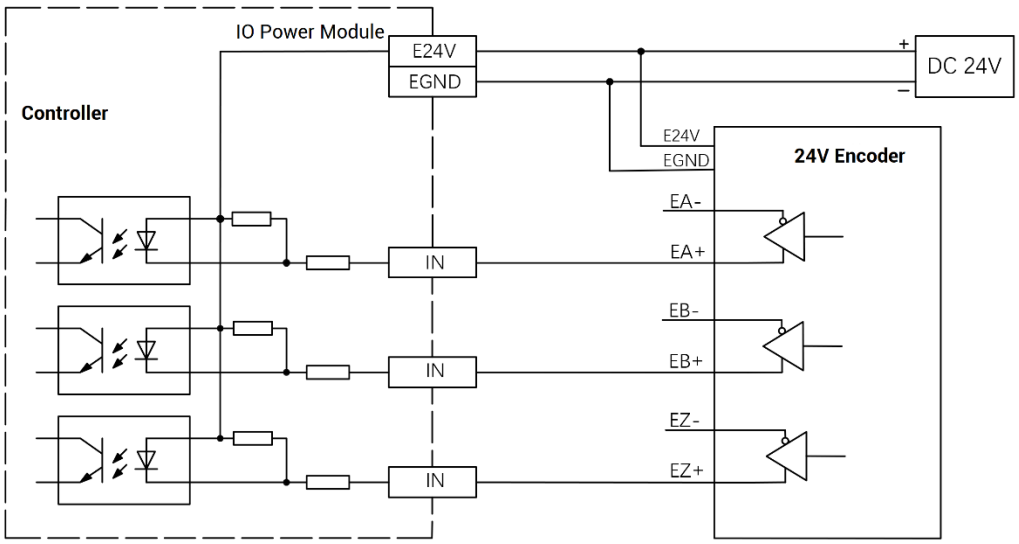
→ Wiring Note:

- The wiring principle of high-speed digital output OUT (0-15) is shown in the figure above. The external signal receiving end can be an optocoupler or a relay or solenoid valve, all can be connected as long as the input current does not exceed 300mA.
- For the connection of the public end, please connect the "EGND" port on the IO power supply to the negative pole of the DC power supply of the external input device.

3.2.5. Wiring – IN as Encoder

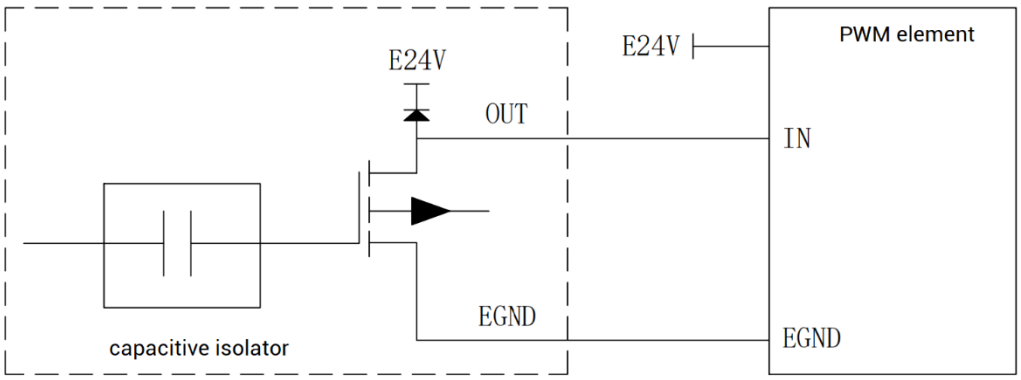
There are 2 24V single-ended encoder inputs on board for XPCIE1032H.

Here, use IN4-6 to connect to encoder, when wiring is done, IN can be used as encoder input signal through ATYPE (1) = 3. IN4 is EA1, IN5 is EB1, IN6 is EZ1, and corresponding encoder axis No. is 1.



3.2.6. Wiring – OUT as PWM

Please use OUT that supports PWM function, OUT0~OUT3 can be selected.

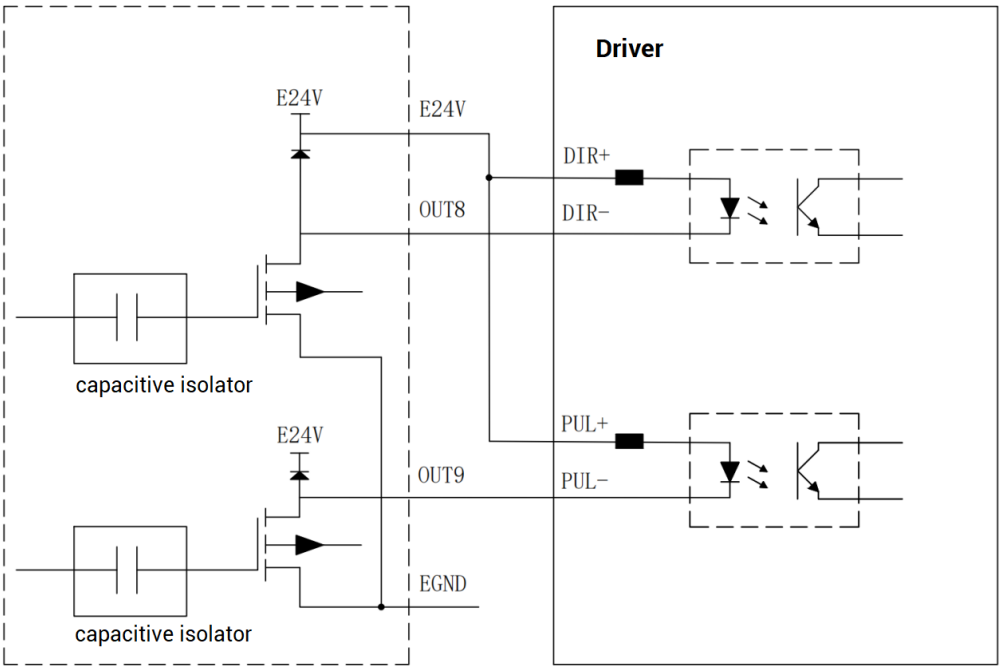


3.2.7. Wiring – OUT as Pulse

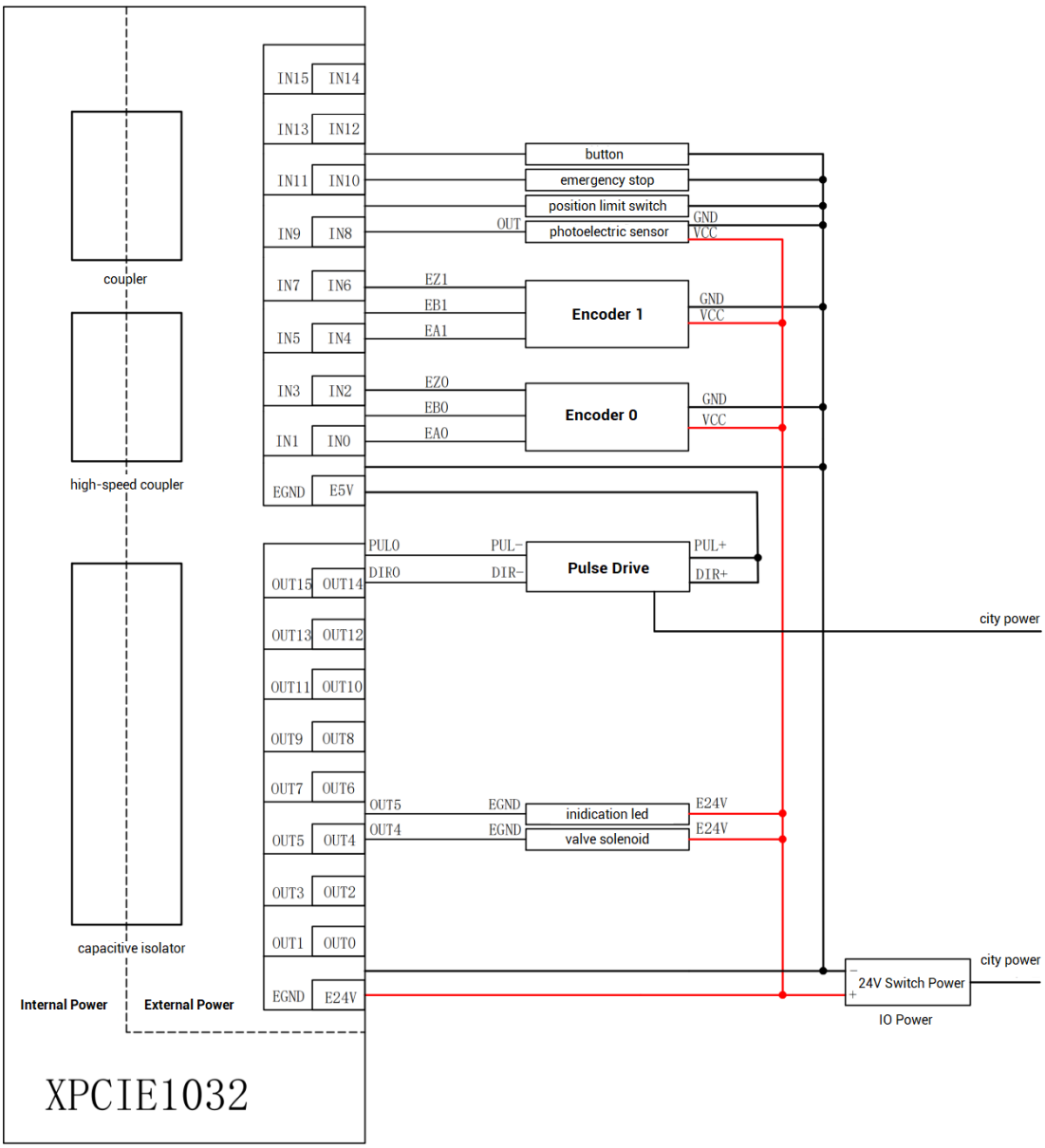
There are 4 single-ended pulse outputs on board for XPCIE1032H.

Here, use OUT8 and OUT9 to connect to driver, when wiring is done, when OUT8 and OUT9 are configured through ATYPE (3) = 1. OUT 8 is DIR3, OUT9 is PUL3, and corresponding pulse driver axis No. is 3.

E24V or E5V can be used according to specific driver.



3.3.Whole Wiring Reference



Chapter IV Expansion Module

The control card can expand digital IO, analog AD/DA, pulse axis and other resources through EtherCAT bus expansion module or ZMIO310-ECAT series vertical bus expansion module.

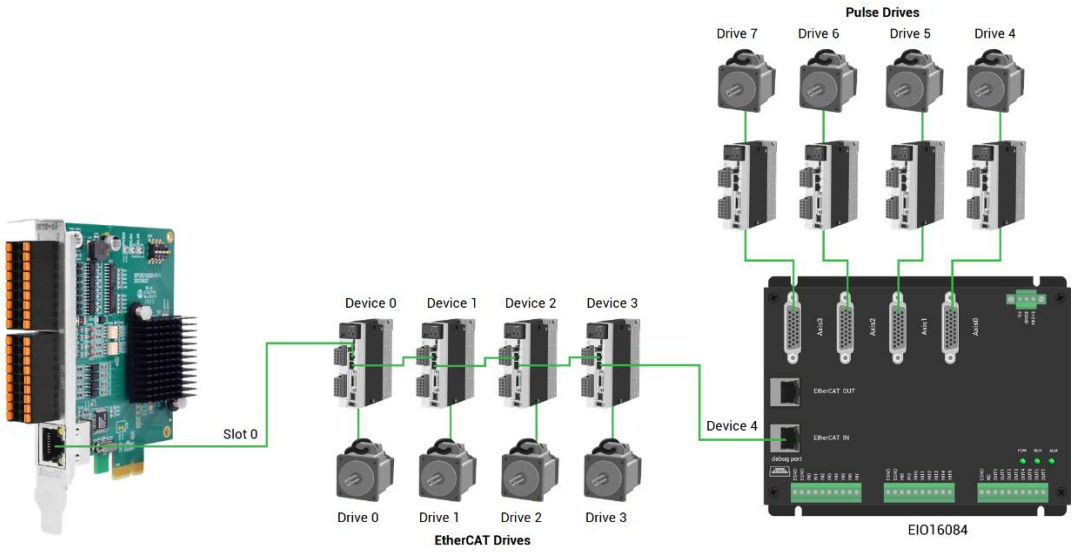
The EIO expansion modules and ZMIO310-ECAT are expansion modules used by the EtherCAT bus controller. For example, EIO series can expand the resources of digital IO and pulse axis. When the resources of the controller are insufficient, the EtherCAT bus controller can be connected to multiple EIO expansion modules for expansion, you can view the maximum number of IO expansion points and the maximum number of expansion axes of the controller, and in this way, it supports IO remote expansion.

4.1. EtherCAT Bus Expansion Wiring

After the expansion wiring is completed, each EIO expansion module does not need to develop again. It only needs to manually configure the unique IO address and axis address in the EtherCAT master controller, and it can be accessed after the configuration is completed.

The IO address number is set through the bus command NODE_IO, and the program on the controller can access the resources on the expansion module only through the IO number. The configuration of the axis address uses the AXIS_ADDRESS command to map axis number, and when the binding is completed, specify the axis number through the BASE or AXIS command.

When wiring, pay attention that EtherCAT IN is connected to the upper-level module, and EtherCAT OUT is connected to the lower-level module. The IN and OUT ports cannot be mixed.



Involved number concepts in above figure are as follows: the bus-related command parameters will use the following numbers:

Slot number (slot):

The slot number refers to the number of the bus interface on the controller, and the slot number of the EtherCAT bus is 0.

Device number (node):

The device number refers to the number of all devices connected to a slot. It starts from 0 and is automatically numbered according to the connection sequence of the devices on the bus. You can view the total number of devices connected to the bus through the NODE_COUNT(slot) command.

Drive number:

The controller will automatically identify the drive on the slot, and the number starts from 0, and the number is automatically numbered according to the connection sequence of the drive on the bus.

The drive number is different from the device number. Only the drive device number on the slot is assigned, and other devices are ignored. The drive number will be used when mapping the axis number.

4.2. EtherCAT Bus Expansion Resource Mapping

→ IO Mapping:

The program on the controller can access the resources on the expansion module only through the IO number. The IO number of the EtherCAT bus expansion module is set

through the bus command NODE_IO, and the input and output are configured at the same time.

When IO mapping, first check the maximum IO number of the controller itself (including the external IO interface and the interface in the pulse axis), and then use the command to set.

If the extended IO coincides with the IO number of the controller itself, the two will work at the same time, so the mapped number of the IO mapping must not be repeated in the entire control system.

IO mapping syntax:

NODE_ IO(slot, node) = iobase

slot: slot number, 0-default

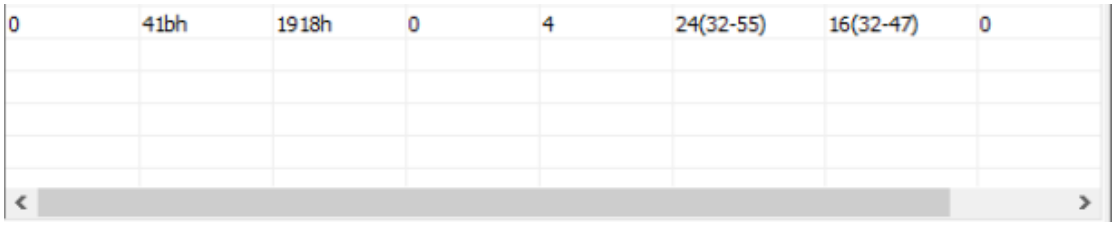
node: device number, starting from 0

iobase : mapping the IO start number, the setting result will only be a multiple of 8

Example:

NODE_IO(0,0)=32 'set the IO start number of slot 0 interface device 0 to 32

If device 0 is EIO16084, after configuration according to the above syntax, the IO numbers corresponding to input IN0-15 are 32-47 in turn, and the IO numbers corresponding to OUT0-7 are 32-39 in turn.



→ AXIS Mapping:

Before using the axis of the expansion module, you need to use the AXIS_ADDRESS command to map the axis number, and the axis mapping also needs to pay attention to the axis number of the entire system cannot be repeated. The mapping syntax of the EIO series extended axis is the same as that of the bus driver.

Axis mapping syntax:

AXIS_ADDRESS(axis number)=(slot number<<16)+driver number+1

Example:

AXIS_ADDRESS(0)=(0<<16)+0+1

'the first drive on the EtherCAT bus, drive number 0, bound as axis 0

AXIS_ADDRESS(1)=(0<<16)+1+1

'the second drive on the EtherCAT bus, drive number 1, bound as axis 1

If the first node is EIO16084, and EIO16084 is connected to drive, then driver 0 here is the first pulse driver connected to EIO16084, otherwise it is the EtherCAT driver.

Chapter V Installation Requirements

5.1.Installation Environment

Environment temperature: the ambient temperature has a great impact on the life of the device, and the operating environment temperature of the device is not allowed to exceed the allowable temperature range (-10°C to 55°C).

Please install it in a place that is not easy to vibrate. Vibration should not be greater than 4.9m/s^2. Take special care to stay away from equipment such as punch presses.

Avoid placing in direct sunlight, humidity, and water drops.

Avoid installing in places with corrosive, flammable and explosive gases in the air.

Avoid installing in places with oil and dust, the pollution level of the installation place is PD2.

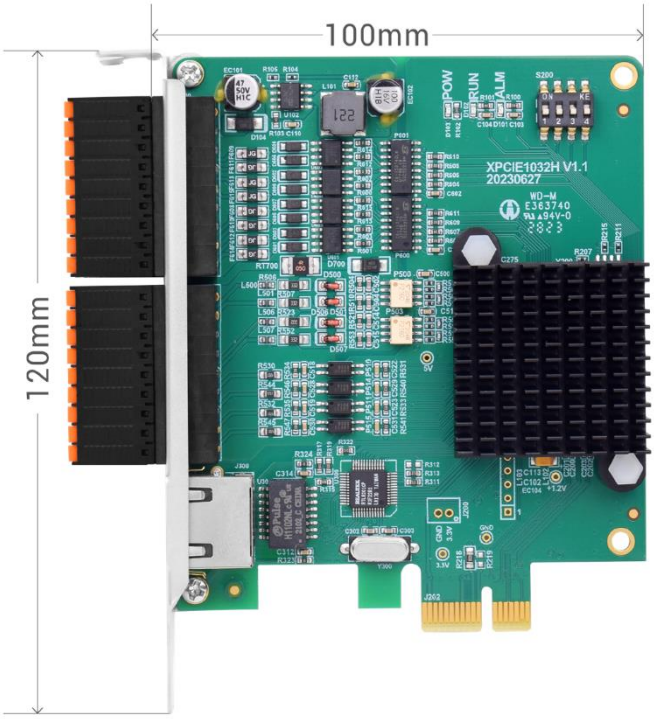
This product is installed in the cabinet and needs to be installed in the final system. The final system should provide corresponding fireproof enclosures, electrical protection enclosures, and mechanical protection enclosures, etc., in compliance with relevant IEC standards.

CPU heat dissipation should be considered when the chassis is fully enclosed and there is no air circulation.

Item		Parameters
Work Temperature		-10℃-55℃
Work relative Humidity		10%-95% non-condensing
Storage Temperature		-40℃ ~ 70℃ (not frozen)
Storage Humidity		Below 90%RH (no frost)
vibration	Frequency	5-150Hz
	Displacement	3.5mm(directly install)(<9Hz)
	Acceleration	1g(directly install)(>9Hz)
	Direction	3 axial direction
Shock (collide)		15g, 11ms, half sinusoid, 3 axial direction

Degree of Protection	IP20

5.2. Installation Size



The card slot is designed according to PCIE*1, but actually it is compatible with PCIE*1 to PCIE*6.

5.3. Installment Method

1. Turn off the power to the computer.
2. Open the computer case, select a free XPCIE card slot, and use a screwdriver to remove the corresponding baffle strip.
3. Insert the motion control card into the slot securely, and tighten the fixing screws on the baffle strip.

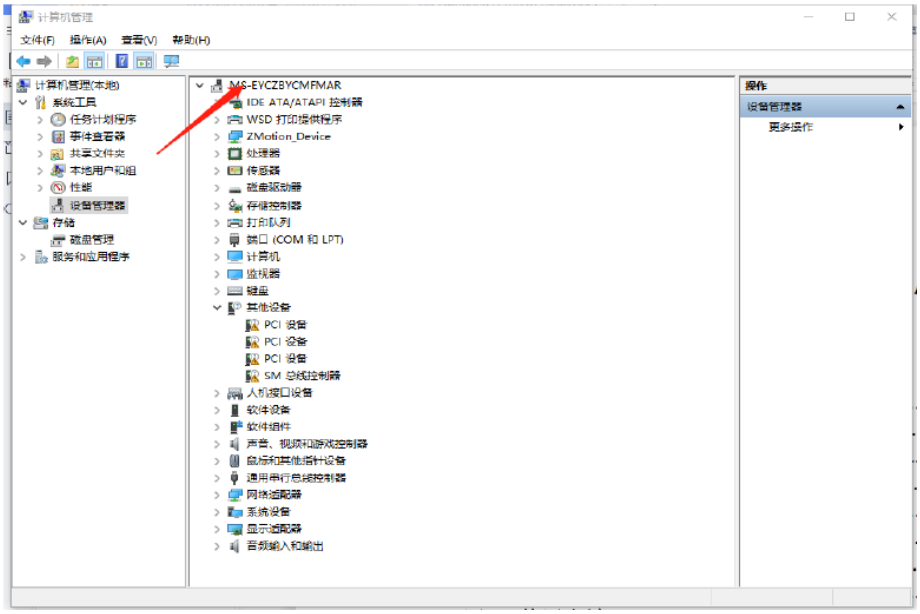
5.4. Drive Program Installation

The driver of the test version is not signed, and it can be installed only after pressing F8 when Windows starts to disable the driver signature authentication. The signed version does not need to disable the signature.

5.4.1. Unauthorized Version

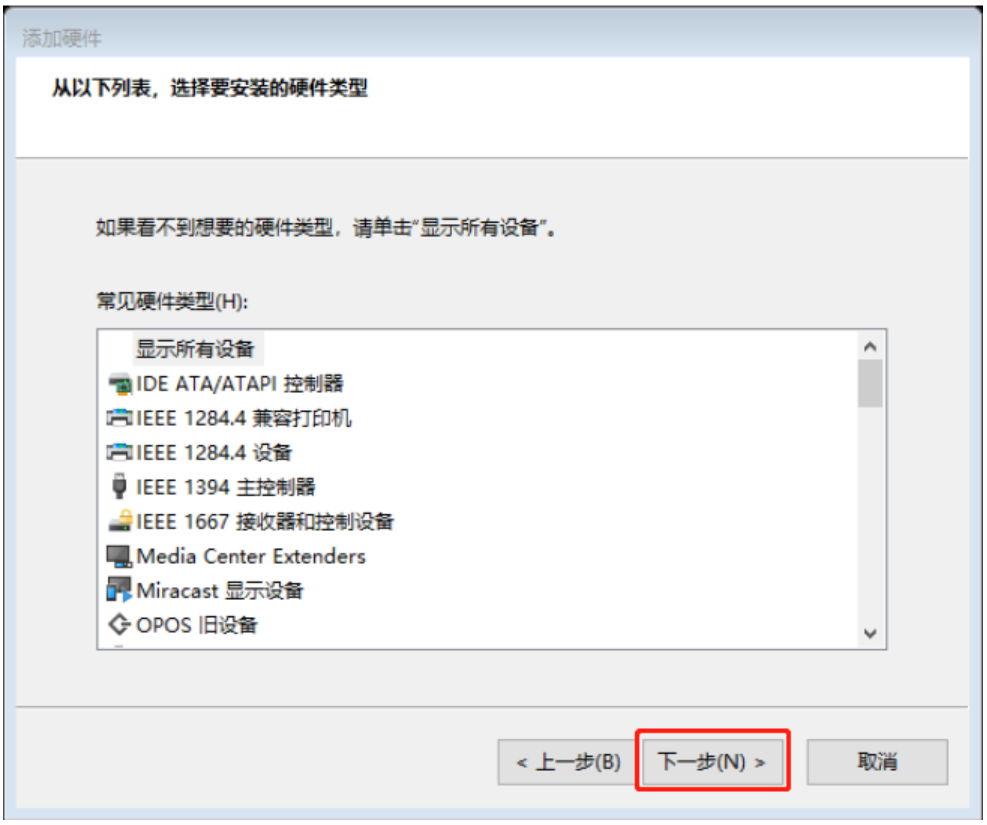
When there is no PCI card device, in the device manager, the menu: "Operation" - "Add Obsolete Hardware", if there is no "Operation", right click.

1. Find “Add Obsolete Hardware".



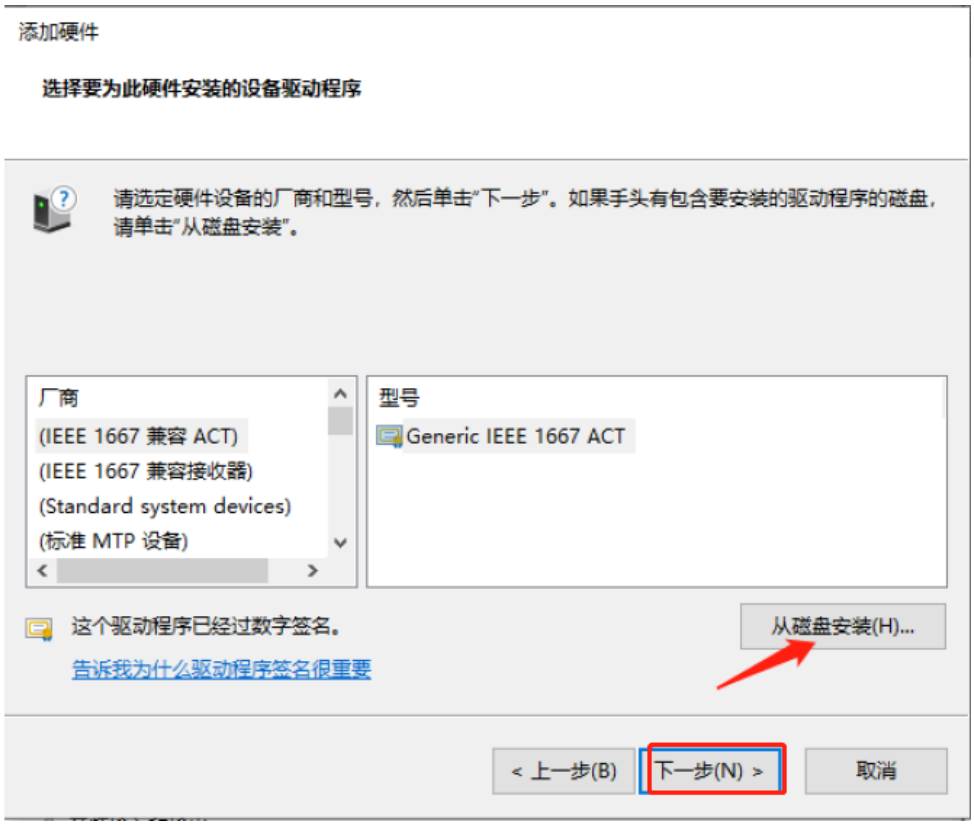
2. Select “Manual”, click “next".

3. Select “next”.



4. Choose to install from disk, (all options are default items, no need to choose

manufacturer and model)



5. Select the driver directory and click OK.

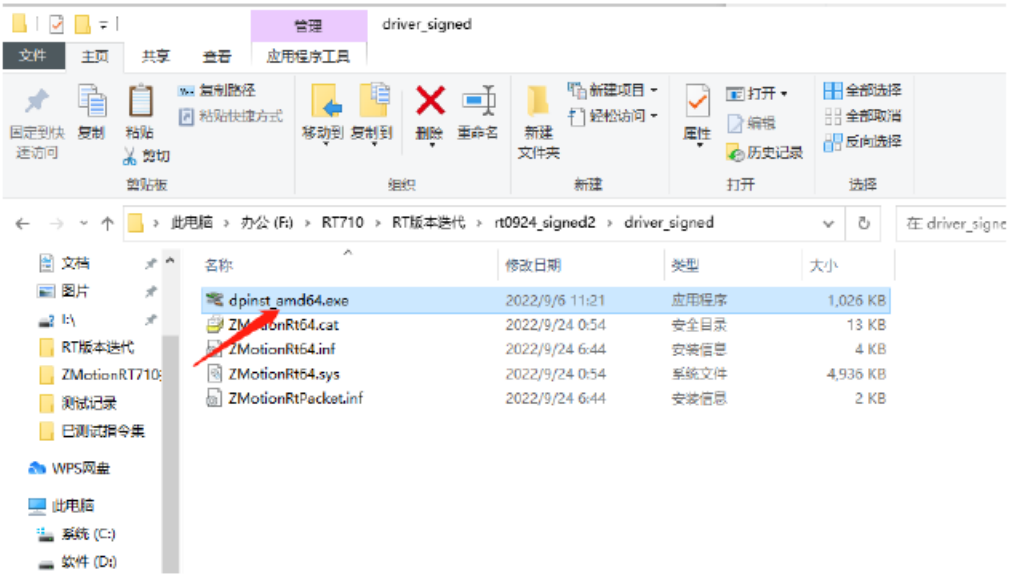
6. If there is ZMotionRT Controller in the device manager, the installation is successful. If no, right click any device, and select “scan to detect hardware changing”. Fail to install, restart the PC, and scan again to install again.

5.4.2. Authorized Version

It is used with the card.

Method 1: install automatically

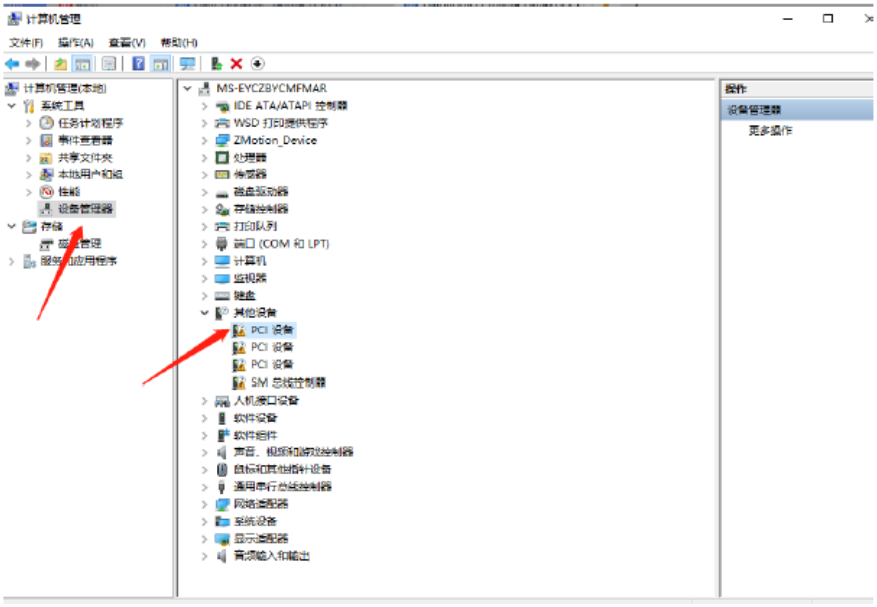
Use the built-in installation wizard software dpinst_amd64.exe in the driver directory to automatically install, and the specific operation is according to the software guide.



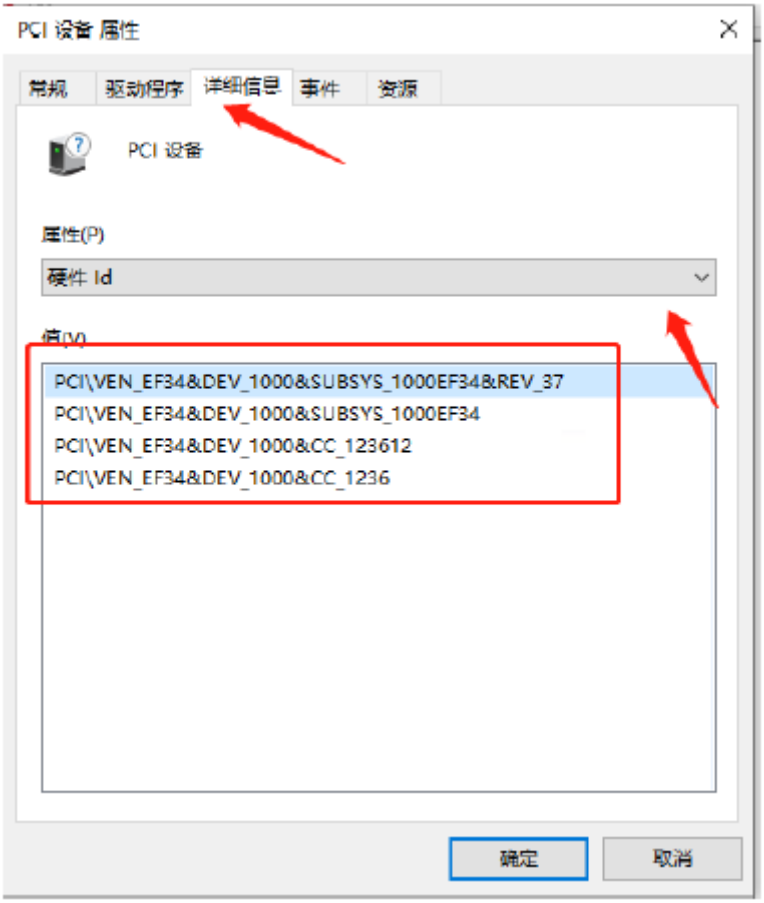
Note: If there is no PCI device, the software cannot be installed successfully, only the ZMotionRT64.sys file can be installed! !

Method 2: install manually

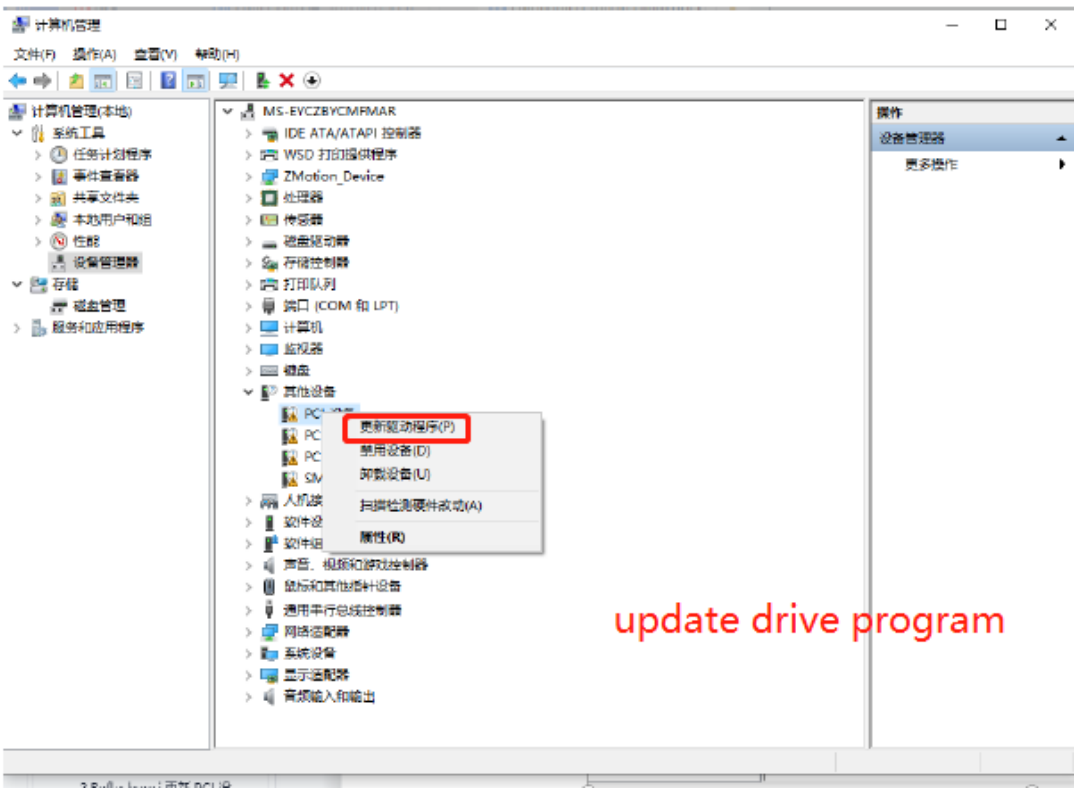
1. Open the Device Manager menu and select the PCI device in Other Devices.



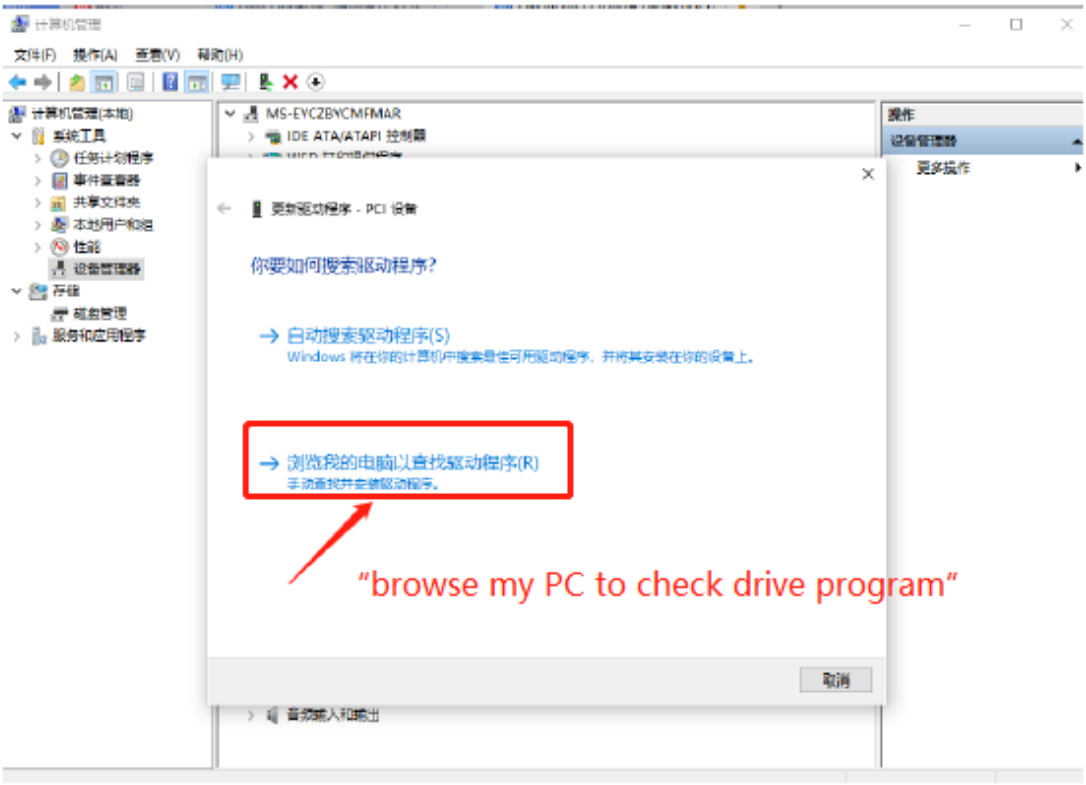
2. If there are multiple PCI devices, right-click "Properties" to view detailed information, select "Hardware ID" for properties, and confirm that it is a PCI device starting with PCI\VEN_EF34&DEV_1000&.



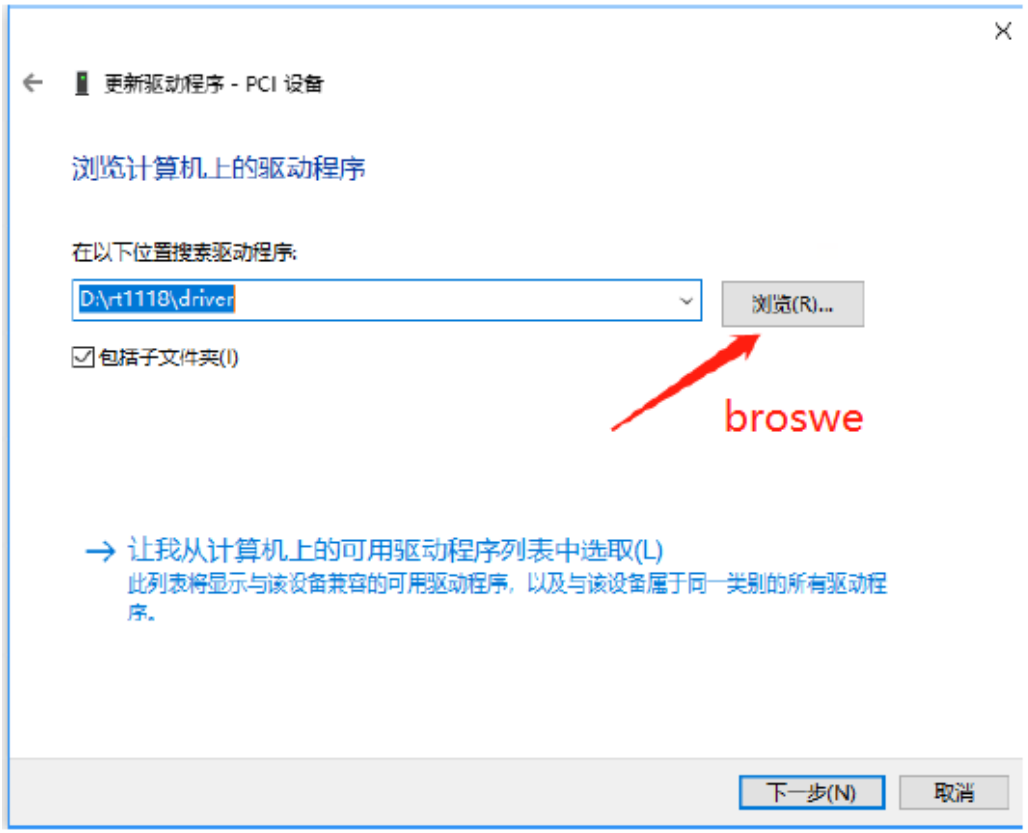
3. Find PCI Device, right-click to select “update drive program".



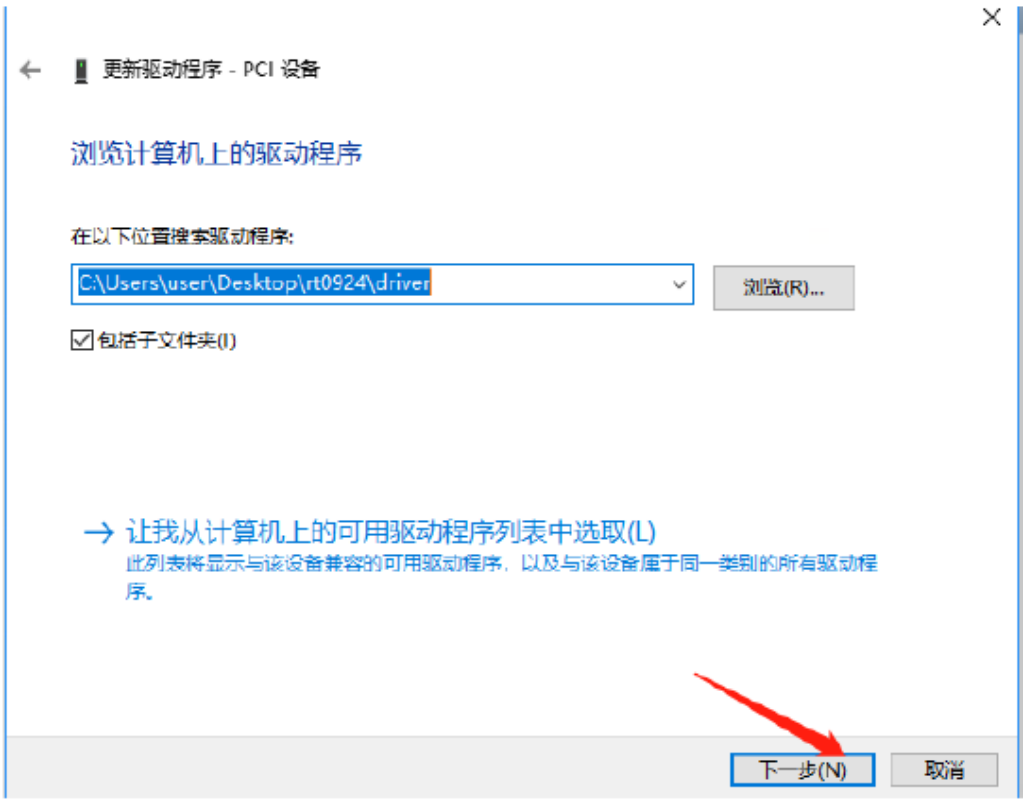
4. Select “browse my PC to check drive program”.



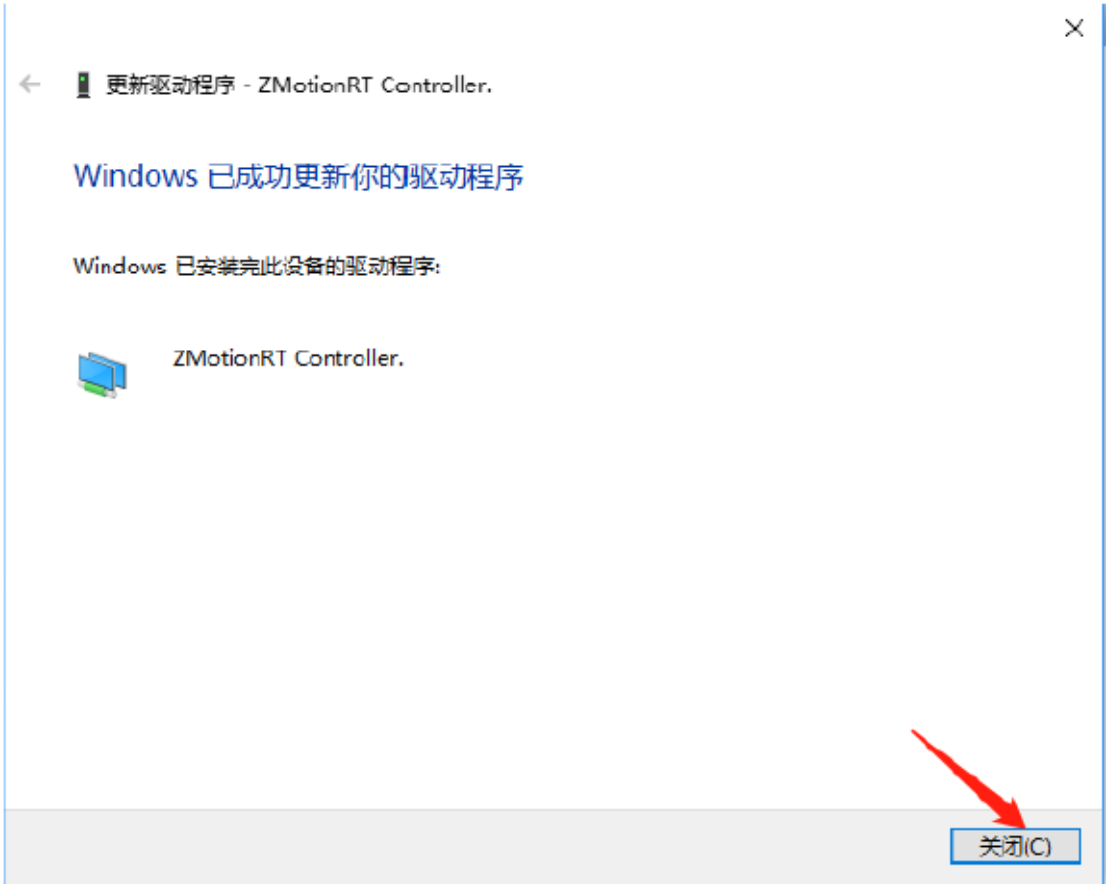
5. Click “browse", and select driver folder.



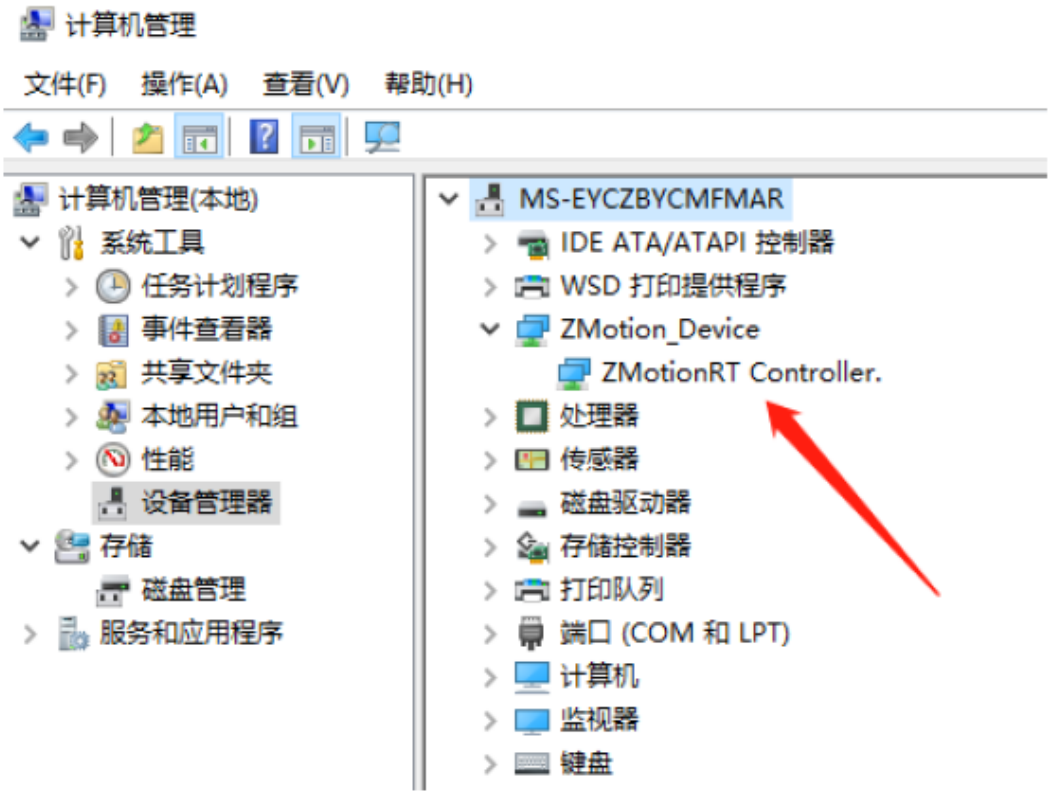
6. Click “next step”.



7. Wait until installed, click close.

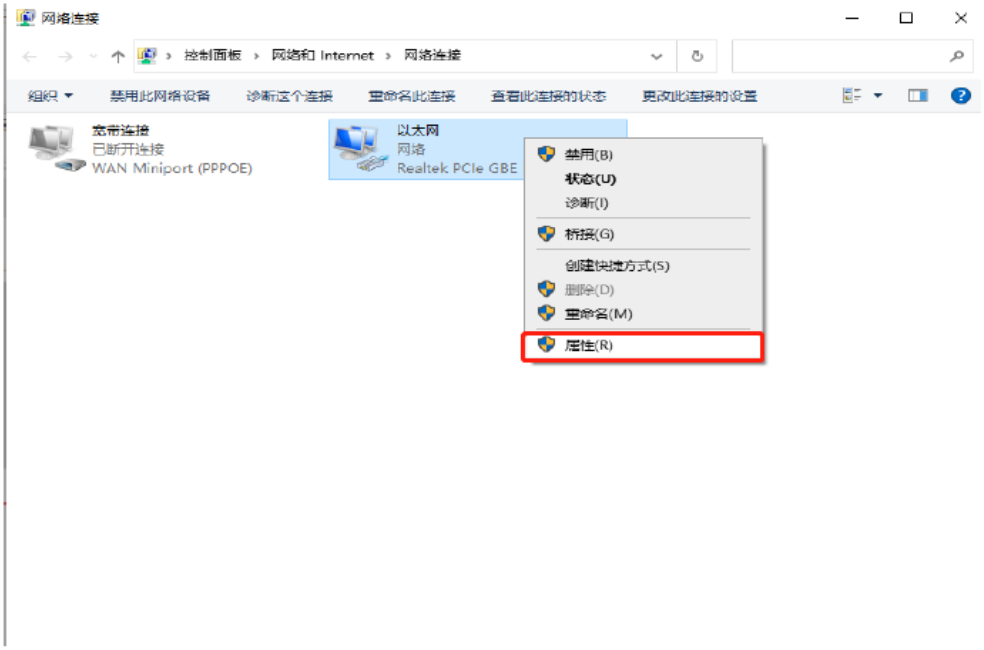


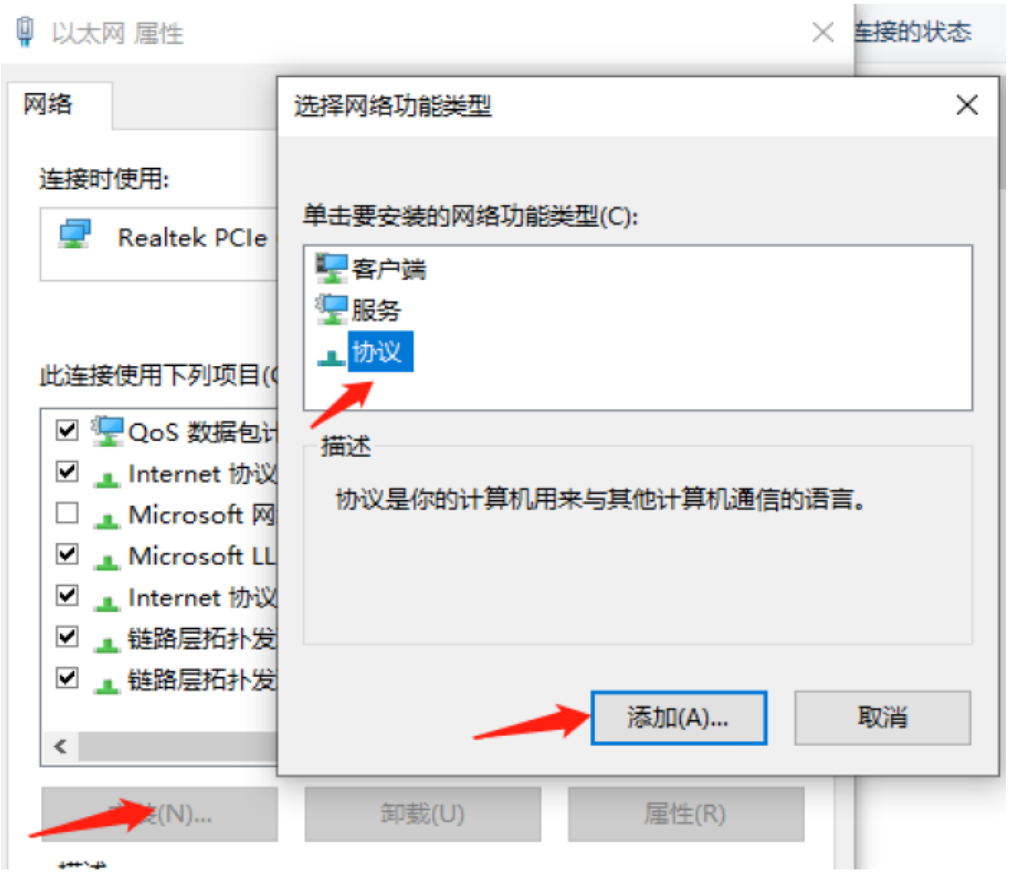
8. If there is ZMotionRTController in the device manager, the installation is successful.



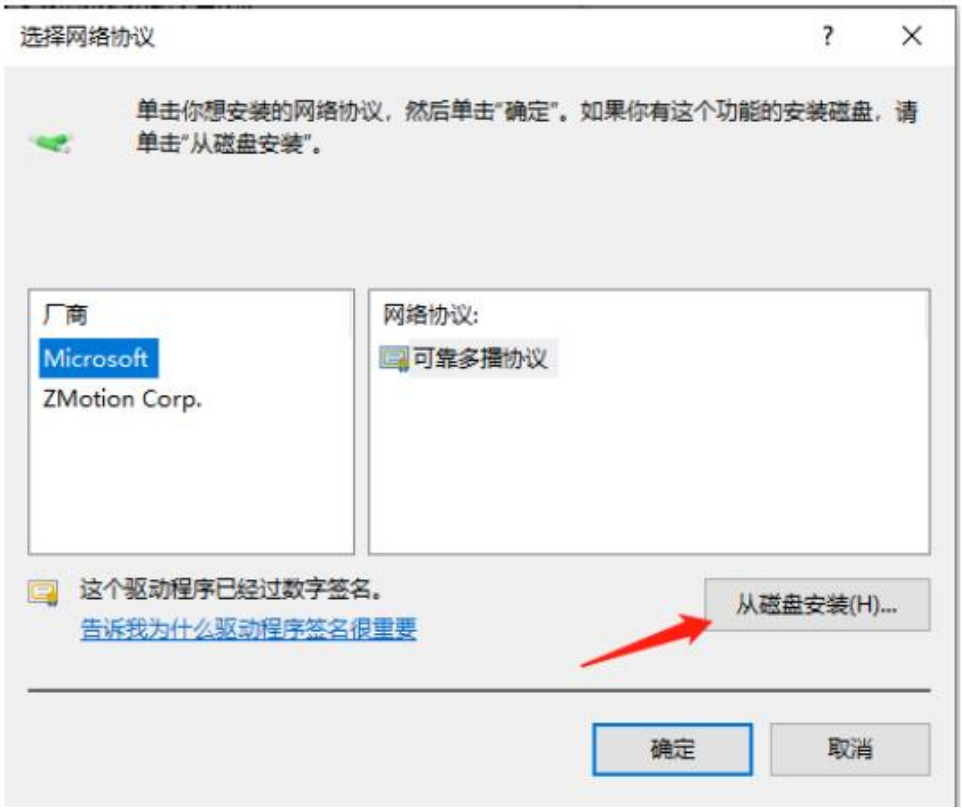
5.4.3. Ordinary Network Card Install EtherCAT Bus Protocol

1. On the Windows network connection interface, select the network port that needs to be used as the bus, right-click Properties->Installation->Protocol->Add.

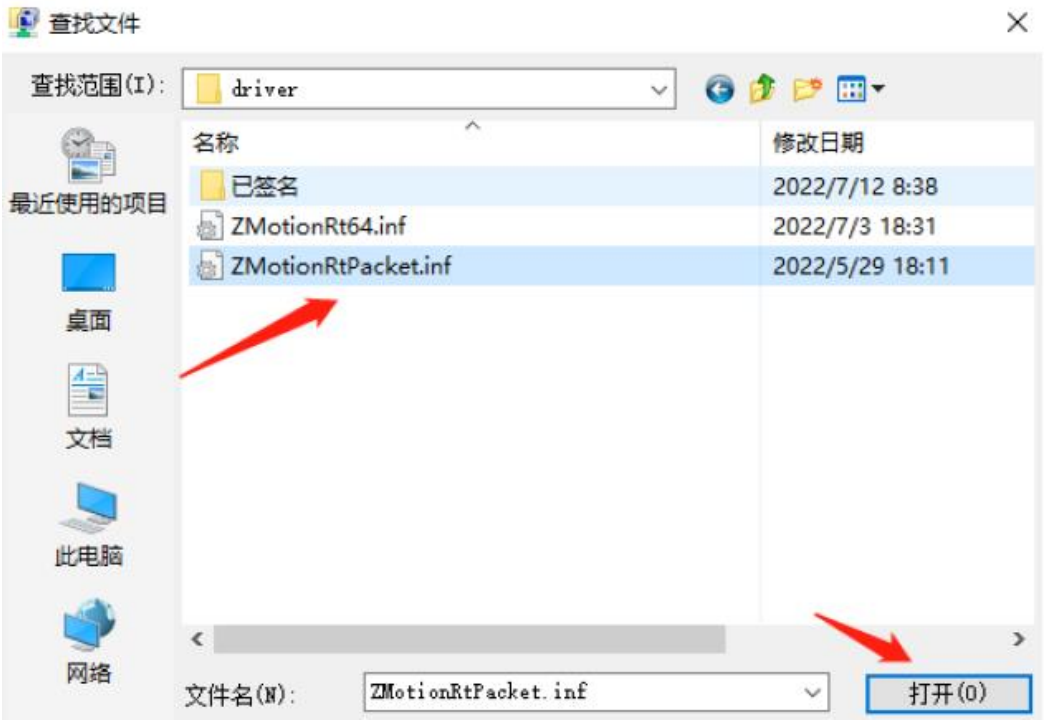




2. Select “installation from disk".



3. Brower drive position, select “ZMotionRtPacket.inf".



4. Click “ok".

Note: The installation wizard software cannot install this agreement! !

If there is ZMotionRT64PacketProtocolDriver in the properties, it means the installation is successful, and you can add the corresponding network port bus protocol if you check it. The network port that does not connect to the device can be unchecked here.

5.5. Notes

- Be sure to pay attention to anti-shielding treatment during application, please use special anti-shielding wires for wiring.
- If the scan fails, try to use the cycle scan until it is successful and then turn it on. It usually occurs when the device is powered on or the first scan of the device is added or removed.
- If the scanning device is successful but the number of devices is 0, please first check whether the slot number matches, if the slot number is correct and still fails, please try stop to stop ZMotionRT7 and start ZMotionRT7 again.

- If there is strong interference on site, the bus may lose packets for a short time as the interference intensity of the equipment increases. After continuous packet loss, the motor may stop or the drive may report an error. Power off and restart to restore. The packet loss can be checked by ZTEST(60,3,0) for the dedicated port, and the interruption can be checked by ZTEST(61,1), and the non-dedicated port can be checked by the bus packet capture tool.
- To troubleshoot the failure caused by interference, you can try to stop the ZMotionRT7 without power supply and then re-run the download program. If an error occurs, it means interference. Or check whether the network port network becomes unconnected.
- Please deploy the application environment under the specified number of devices. Scan exceptions or other error reports may occur after exceeding the specifications.

Chapter VI Run and Maintain

6.1.Regular Inspection and Maintenance

The working environment has an impact on the device. Therefore, it is usually inspected regularly based on the inspection cycle of 6 months to 1 year. The inspection cycle of the device can be appropriately adjusted according to the surrounding environment to make it work within the specified standard environment.

Check item	Check content	Inspection standards
Whole machine	Whether there is accumulation of garbage, dirt and dust on the surface.	Confirm whether the power distribution cabinet is powered off. Use a vacuum cleaner to remove garbage or dust to avoid touching the parts, if the surface dirt cannot be removed, wipe it with alcohol and let it dry and evaporate completely.
Cable	Whether the power line and connection are discolored. Whether the insulation layer is aged or cracked.	Replace cracked cables. replace damaged connection terminals.
Electromagnetic contactor peripheral	Whether the suction is not firm or makes abnormal noise during the action. whether there is a short circuit, water contamination, expansion, or rupture of peripheral devices	Replace abnormal components.
Air duct vent	Whether the air duct and heat sink are blocked. Whether the fan is damaged.	Clean the air duct. Change the fan.
Control circuit	Whether the control components are with poor contact. Whether the terminal screws	Clean the foreign objects on the surface of control lines and connection terminals. Replace damaged and corroded

	are loose. Whether the control cables have insulation cracks.	control cables.

6.2. Common Problems

Problems	Suggestions
Motor does not rotate.	1. Check whether the ATYPE of the controller is correct. 2. Check whether hardware position limit, software position limit, alarm signal work, and whether axis states are normal. 3. Check whether motor is enabled successfully. 4. Confirm whether pulse amount UNITS and speed values are suitable. If there is the encoder feedback, check whether MPOS changes. 5. Check whether pulse mode and pulse mode of drive are matched. 6. Check whether alarm is produced on motion controller station or drive station. 7. Check whether the wiring is correct. 8. Confirm whether controller sends pulses normally.
Controller works normally, and pulses are sent normally, but motor doesn't rotate.	1. Check whether the connection between driver and motor is correct, and whether the wiring between driver and controller is good contact. 2. Please ensure driver works normally, no warning appeared.
Motor can rotate, but it works abnormally.	1. Check whether set deceleration and speed exceed the equipment limit. 2. Check whether output pulse frequency exceeds driver receive limit. 3. Check whether controller and driver are grounded correctly, and whether anti-interference is well done. 4. The current limiting resistor used in the photoelectric isolation circuit of the pulse and direction signal

	output is too large, but the working current is too small.
It can control motor, but motor appears vibration or overshoot.	1. Driver parameter configuration may be incorrect, check driver parameters. 2. Set improper acceleration and deceleration time and motion speed.
No signal comes to the input.	1. Check whether the limit sensor is working normally, and whether the "input" view can watch the signal change of the limit sensor. 2. Check whether the mapping of the limit switch is correct. 3. Check whether the limit sensor is connected to the common terminal of the controller.
The output does not work.	1. Check whether IO power is needed. 2. Check whether the output number matches the ID of the IO board.
Fail to connect controller to PC through net port.	1. Whether net port led is ON? 2. Whether DC net cable is used but PC doesn't support automatic wiring. 3. Whether controller IP address is modified. 4. Whether IP address of PC network card and controller are in the same network segment.
XPCIE card can not be found.	1. Whether specified drive is installed. 2. Is the XPCIE card inserted properly and the baffle is fixed with screws? 3. Is the XPCIE card inserted before the computer is turned on?