VM-0008ETN Module

Manual

Version V1.1

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Veichi Electric Co., Ltd. provides customers with a full range of technical support, so users can reach the nearest Veichi Electric Co., Ltd. office or customer service center, or the company headquarters directly.

Veichi Electric Co.

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Preface

■ Profile

VM-0008ETN series digital output expansion module has 8-channel digital output via transistor NPN. It can be used with VM series master station and VM series VM-RTU-ECT or VM-RTU-PN interface modules.

■ Other Files

File	Content
VM-RTU-ECT	Introduction of product installation, wiring, use and other details
VM-RTU-PN	Introduction of product installation, wiring, use and other details
VM500/600/800	Introduction of product installation, wiring, use and other details

■ Version Change Log

Revision date	Version	Content
2023-3	A1.1	Minor error correction
2022-11	A1.0	First release of the manual

■ Manual Access

This manual is not shipped with the product, so users can get its PDF version in the following way:

- Log on to the official website of Veichi Electric (www.veichi.com), "Service and Support-Download", type in keywords and download.
- Scan the QR code on the product body to get the manual with mobile phone.

■ Warranty Statement

If malfunctions or damage occur on the product under normal use, Veichi Electric offers 18-month warranty (from the date of shipment from the factory, subject to the bar code on the body, and in accordance with the agreements between parties if there are some). Customers will be charged if it exceeds 18 months while damages caused by the following conditions will be charged if it is within 18 months.

- Product damage caused by wrong methods against this manual.
- Product damage caused by fire, flood, or abnormal voltage.
- Product damage caused for abnormal functions against this manual.
- Product damage caused for unspecified purposes against this manual.

- Secondary damage to the product caused by force majeure (natural disasters, earthquakes, lightning strikes) factors.

The relevant service costs are calculated according to the manufacturer's standards, and if there is a contract, the contract will be handled on a priority basis.

Please refer to the Product Warranty Card for detailed warranty description.

Safety Precaution

■ Safety Statement

- Read and follow these safety precautions before installing, operating, and maintaining the product.
- Follow all safety precautions stated on the product's labeling and in the manual when installing, operating, and maintaining the product for personal and equipment safety.
- The "CAUTION", "WARNING" and "DANGER" items in this manual do not mean all safety precautions to be observed, but are only supplementary to safety precautions.
- This product shall be used in an environment that complies with the design specifications, otherwise it may cause malfunction, and malfunction or damage to parts caused by failure to comply with the relevant regulations are not covered by the product warranty terms.
- Veichi will not take on any legal responsibility for personal safety accidents, property damage, etc., caused by unauthorized operation of the product.

■ Safety Level Definition

: "DANGER" means death or serious bodily injuries if not operated in accordance with the regulations.

: "WARNING" means death or serious bodily injuries if not operated in accordance with the regulations.

: "CAUTION" means minor bodily injuries or damage to the equipment if not operated in accordance with the regulations.

Keep this guide in a safe place in case it is needed, and be sure to give this manual to the end user.

During Control System Design
 : ➢ Be sure to design safety circuits so that the control system will still work safely when the external power supply drops out or the programmable controller malfunctions; ➢ If the rated load current is exceeded or the load is short-circuited, etc., resulting in prolonged overcurrent, the module may smoke or is on fire, so safety devices such as fuses or circuit breakers shall be installed externally.
 : ➢ Be sure to provide emergency brake circuits, protection circuits, interlock circuits for forward and reverse operation, and upper and lower position interlock switches to prevent damage to the

machine in the external circuits of the programmable controller;

- Design external protection circuits and safety mechanisms for output signals related to major accidents for safe operation of the equipment;
- The programmable controller CPU may stop all output when it detects an abnormality in its own system; when some of the controller's circuits fail, output may turn uncontrolled. Please design suitable external control circuits in order to ensure normal operation;
- Damage to output units such as relays and transistors of programmable controllers will cause their output uncontrolled to the ON or OFF state;
- The programmable controller is designed to be used in indoor, overvoltage class II electrical environments, and its power supply system should be equipped with lightning protection to ensure that lightning overvoltage is not added to the programmable controller's power input or signal input, control output and others, so as to avoid damage to the equipment.

Installation

WARNING:

- Only maintenance professionals with adequate electrical knowledge and training related to electrical equipment should carry on installation work;
- When removing or installing a module, the external power supply to the system must be completely disconnected beforehand. Failure to fully disconnect the power supply may result in electric shock or module malfunction and misoperation;
- Do not use the programmable controller in the following places: places with dust, grease, conductive dust, corrosive gases, flammable gases; places exposed to high temperature, condensation, wind and rain; and places subject to vibration and shock. Electric shock, fire, and misuse can also cause damage and deterioration to the product;
- Programmable controllers are open type devices, please install them in control cabinets with door locks (protection of the control cabinet housing > IP20), and only operators who have been trained with sufficient electrical knowledge about equipment shall open the control cabinets.

CAUTION:

- Avoid metal shavings and wire ends falling into the ventilation holes of the controller during installation, which may cause fire, malfunction, and misoperation;
- Ensure that there is no foreign matter on its ventilation surface after installation, otherwise it may lead to poor heat dissipation, which may cause fire, malfunction, and misoperation;
- Connect the modules tightly to their respective connectors and lock the module connection hooks securely. Improper installation of the module may result in malfunction, malfunction and disconnection.

Wiring

DANGER:

- Wiring of this product should only be carried out by specialized maintenance personnel with adequate electrical knowledge and training related to electrical equipment;
- During wiring, the external supply power to the system must be fully disconnected in advance. Failure to do so may result in electric shock or equipment failure or malfunction;
- The terminal cover supplied with the product must be installed before power-up and operation. Failure to install the terminal cover may result in electric shock;
- The cable terminals should be well insulated to ensure that the insulation distance between the cables is not reduced after the cables are installed in the terminal block. Failure to do so may result in electric shock or equipment damage.

CAUTION:

- To avoid electric shock, disconnect the power supply before connecting the power supply to this product;
- The input power supply of this product is DC24V, if the supplied power is not within ±20% of DC24V, this product will be seriously damaged. Therefore, please check whether the DC power supply provided by the switching power supply is stable or not regularly.

Maintenance

CAUTION:

- Only specialized maintenance personnel with adequate electrical knowledge and training related to electrical equipment shall carry out the operational maintenance of the product;
- When cleaning the module or re-tightening the bolts on the terminal strip or connectors, the external power supply to the system must be completely disconnected. Failure to do so may result in electric shock;
- When disassembling a module or making connections to or removing communication cables, the external supply power to the system must first be completely disconnected. Failure to fully disconnect may result in electric shock or malfunction.

Safety Recommendations

- Please consider the manual installation or other spare methods that are separate from PLC to stop or start the system when there are mechanical parts that will be touched directly by operators like position of loading/unloading tools or parts with auto running function.
- If it is necessary to modify the programs while the system is in operation, please consider to add locks or other safeguards to ensure that only authorized personnel can make the necessary modifications.

Scrapping

CAUTION:

- Dispose of this product as industrial waste, and the batteries should be handled separately in accordance with local laws and regulations;
- Dispose of equipment and products in accordance with industrial waste disposal standards to avoid environmental pollution.

1 Product Information

1.1 Naming Rules and Nameplate Description

VM – 00 08 E TN

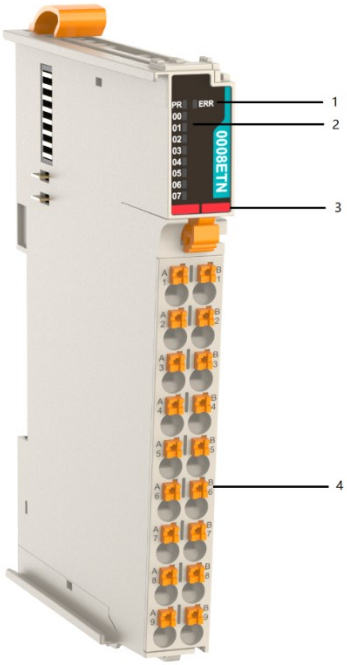
⓪ ① ② ③ ④

⓪ Product information VM: Veichi Flexible Series IO Module
① IO input channel 00: 0 channel
② IO output channel 08：8 channels
③ Module type E: Logic IO expansion module
④ Output type R: Relay output TP: Transistor output (source type) TN: Transistor output (drain type)

The relevant ordering data for this product is shown in the table below based on the above naming rules and nameplate information:

Model	Description	Machine code	Application
VM-0008ETN	VM series 8-channel digital drain output		VM-series PLC, VM-series coupler

1.2 Component Description



No.	Interface	Function definition			
1	Signal indicator	PR (POWER+RUN)	Power and Run indicator	On (green)	Module is working properly.
				Off	Module is abnormal.
				Flashing (green)	Module is in ready or stop state.
		ERR	Error indicator	On (red)	Module is in error state.
2	IO signal indicator	The left side (00~07) indicators correspond to the 8 output channels respectively, and the output indicator is on;			
3	Color	Yellow: IO input			Red: IO output
		Green: analog input			Blue:

			analog output
		Orange: temperature measurement input	
4	User terminal	See the terminal definition section for details.	

1.3 Specification

1.3.1 Power Specification

Item	Specification
Rated voltage of terminal input voltage	24V DC (20.4V DC~ 28.8V DC)
Rated current of terminal input power	2A (typical at 24V)
Rated voltage of bus input power	5V DC (4.75V DC~5.25V DC)
Rated current of bus input power	85mA (typical at 5V)
Power isolation	Relative isolation between 24V and V5
Rated voltage of terminal output power	None
Rated current of terminal output power	None
Module hot-swap function	Not available

1.3.2 Output Specification

Item	Specification
Output type	Digital output, transistor output
Output method	Drain type
Output channel	8
Output voltage level	24V DC±10% (21.6V DC~26.4V DC)
Output load (resistive load)	0.5A/terminal, 2A/module
Output load (inductive load)	7.2W/ terminal, 12W/ module
Output load (lamp load)	5W/ terminal, 18W/ module
Hardware response time ON/OFF	100us/100us
OFF leakage current	10uA
Switch frequency	Resistive load 100Hz, inductive load 0.5Hz, lamp load 10Hz
Isolated or not	Isolated
Output action display	Output indicator lights up when the output is on (it is

	controlled by software)
Output derating	50% derating at 55°C (output current not exceeding 1A while ON), or 10°C derating when output terminals are all ON
Protection	Short circuit protection, overcurrent protection

\1.3.3 Software Specification

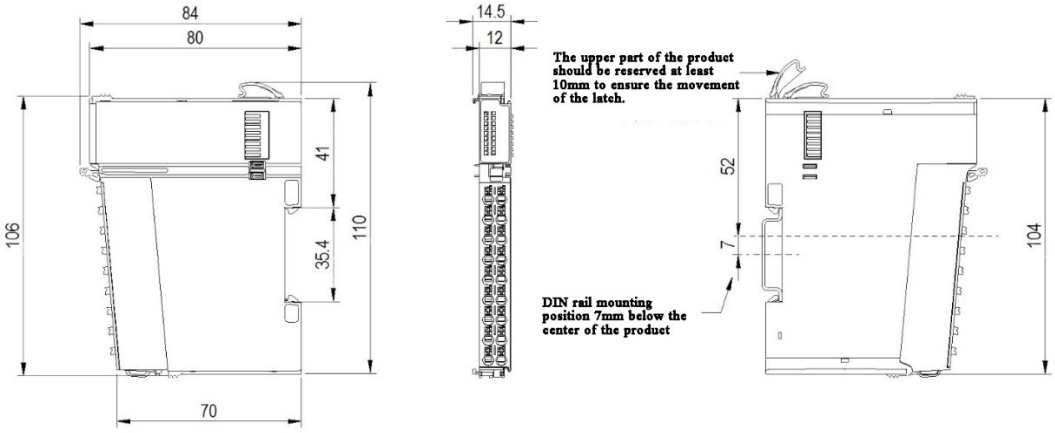
Item	Specification
Output status mode under fault stop	Cleared, keep current values and output according to preset value
Preset output under fault stop	0 or 1
Abnormality detection and indication of output	None
Logic level configuration of output	Not available
Independent terminal configuration	Not available
Diagnosis report configuration	Not available
Stop mode	Output without refreshes
IO mapping	Support three IO mapping methods: per-bit access, per-byte access and per-word access

2 Mechanical Installation

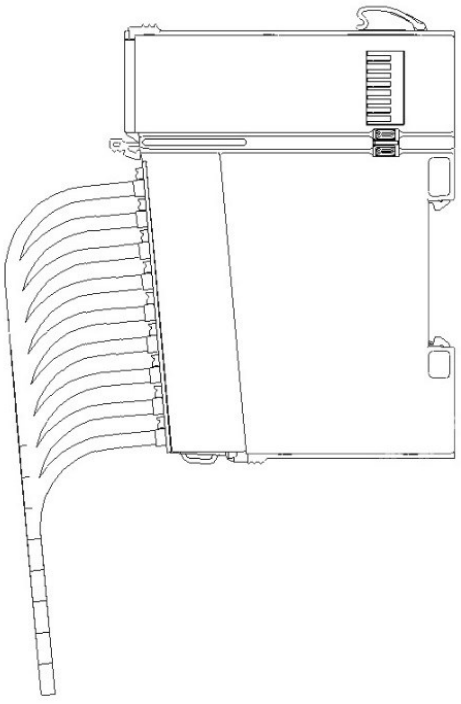
2.1 Mounting Dimensions

2.1.1 Module

Mounting dimension information is shown below in (mm).



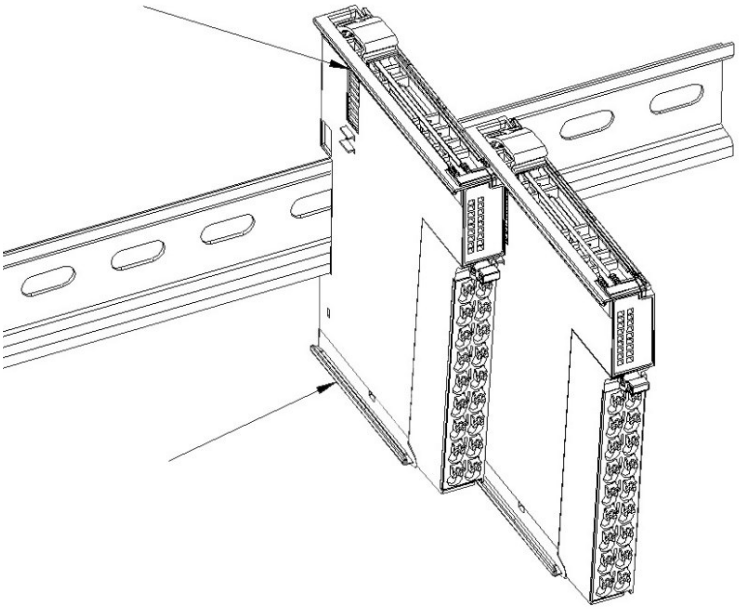
2.1.2 Connection Cables



2.2 Installation

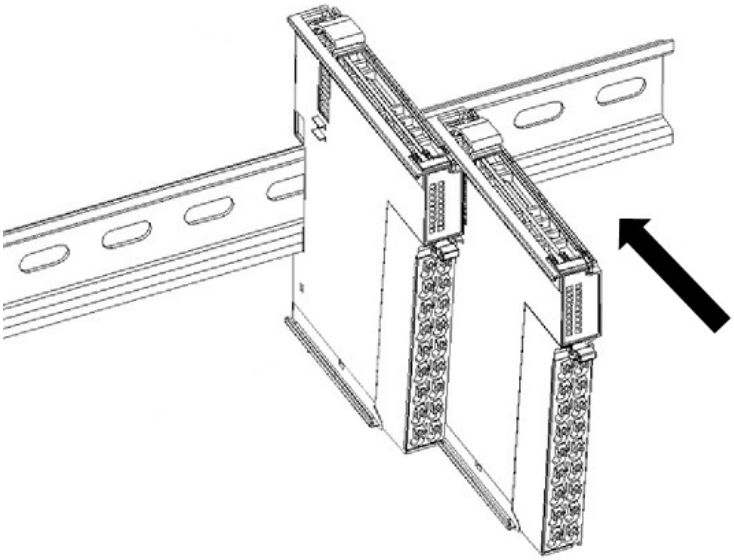
2.2.1 Inter-module Installation

Inter-module assemblies are slide-mounted via the top and bottom rails.



2.2.2 Rail Installation

DIN rail mounting is adopted here. When installing, align the module with the DIN rail and press the snap until there is a clear click sound. As shown in the figure below.

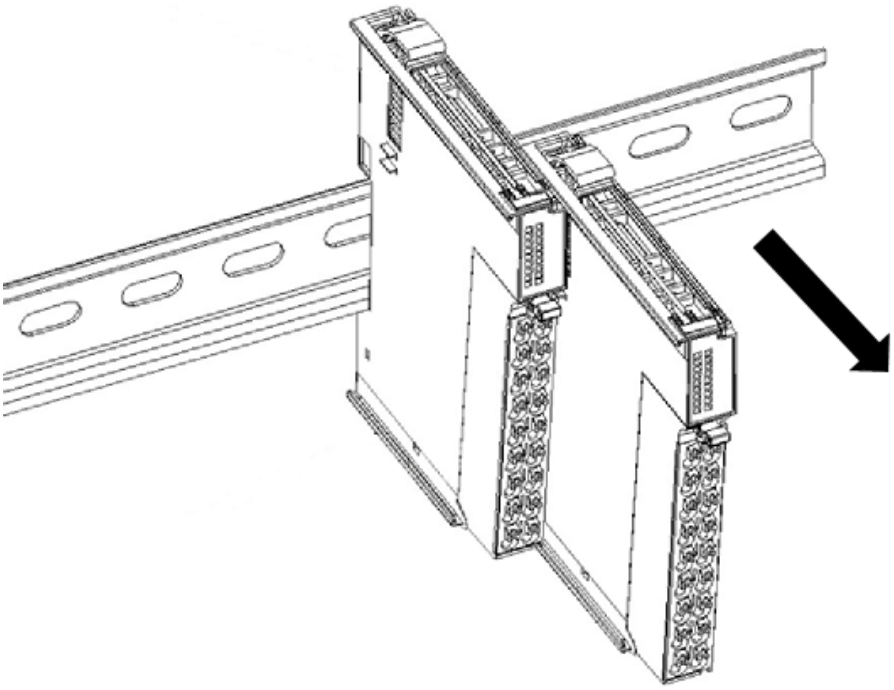


Note: Push the rail snaps first to open state, place the module onto the DIN rail, press down the top of the snaps with your hand until it is in place. Install a DIN rail clamp at each end of the main unit or module and when install them, hook the bottom of the DIN rail clamp to the bottom of the DIN rail and

then rotate the DIN rail clamp so that the top end of the DIN rail clamp is hooked to the top end of the DIN rail, and then finally tighten the screws to lock the DIN rail clamp.

2.2.3 Disassembly

Push the rail snap with your finger and pull the module out in the direction away from the DIN rail.



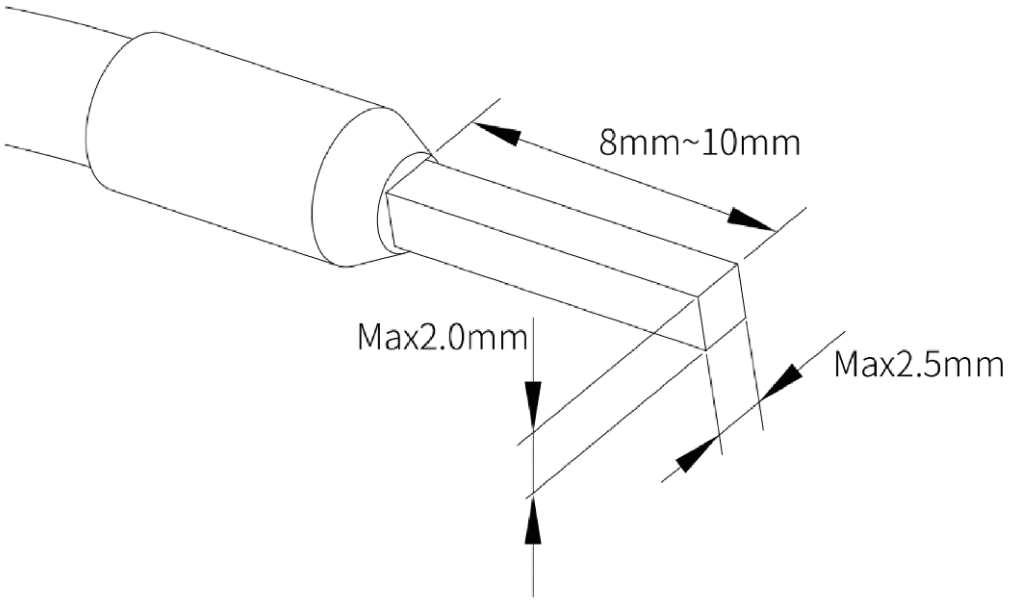
3 Electrical Installation

3.1 Cable Selection

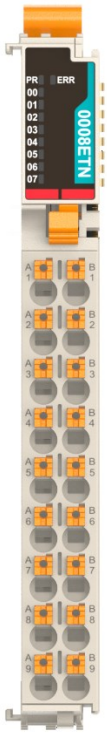
The wire lug diameters in the following table are for reference only, and can be adjusted according to reasonable calculations based on practical use.

Material name	Wire diameter	
	PRC standard /mm2	American standard (US) /AWG
Tube lug	0.3	22
	0.5	20
	0.75	18
	1.0	18
	1.5	16

If other tube lugs are used, crimp them to the stranded wire, shape and size are required as shown below.



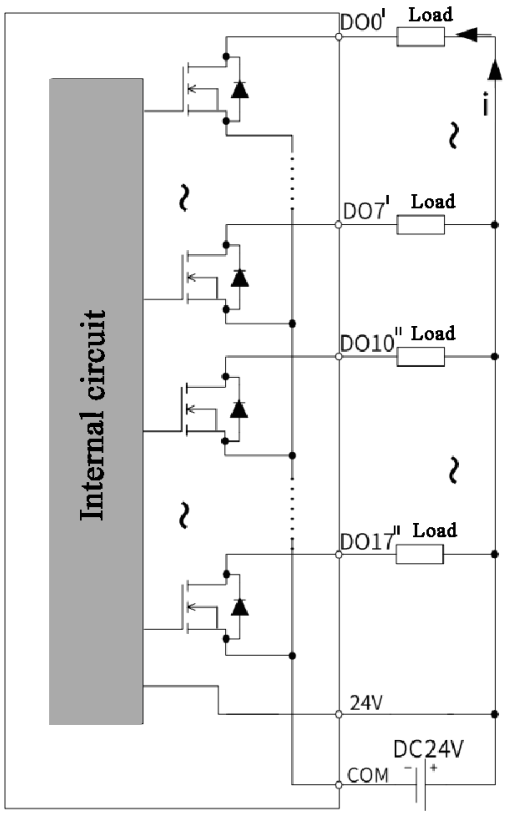
3.2 Terminal Definition



Left indicator	Left signal	Left terminal	Right terminal	Right signal	Right indicator
00	Y00	A1	B1	/	/
01	Y01	A2	B2	/	/
02	Y02	A3	B3	/	/
03	Y03	A4	B4	/	/
04	Y04	A5	B5	/	/
05	Y05	A6	B6	/	/
06	Y06	A7	B7	/	/
07	Y07	A8	B8	/	/
/	24V	A9	B9	COM	/

3.3 Terminal Wiring

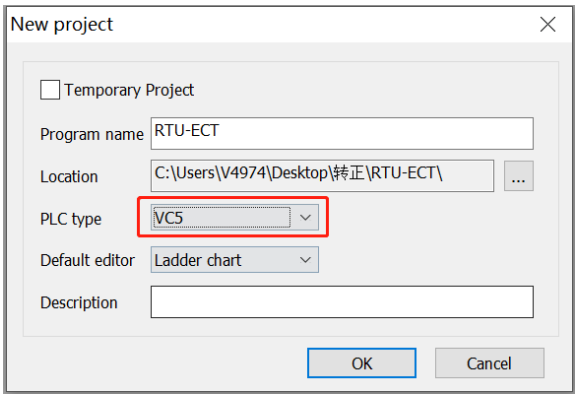
3.3.1 Output Terminal Wiring



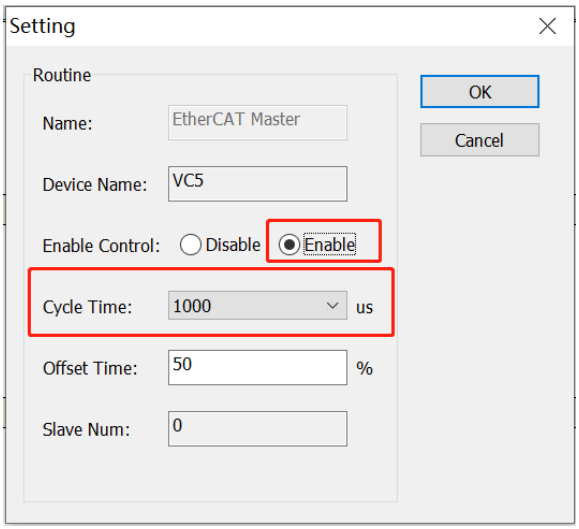
4 Module Programming Example

4.3 Veichi Auto Studio with VC5

4.1.1 Create A New Project

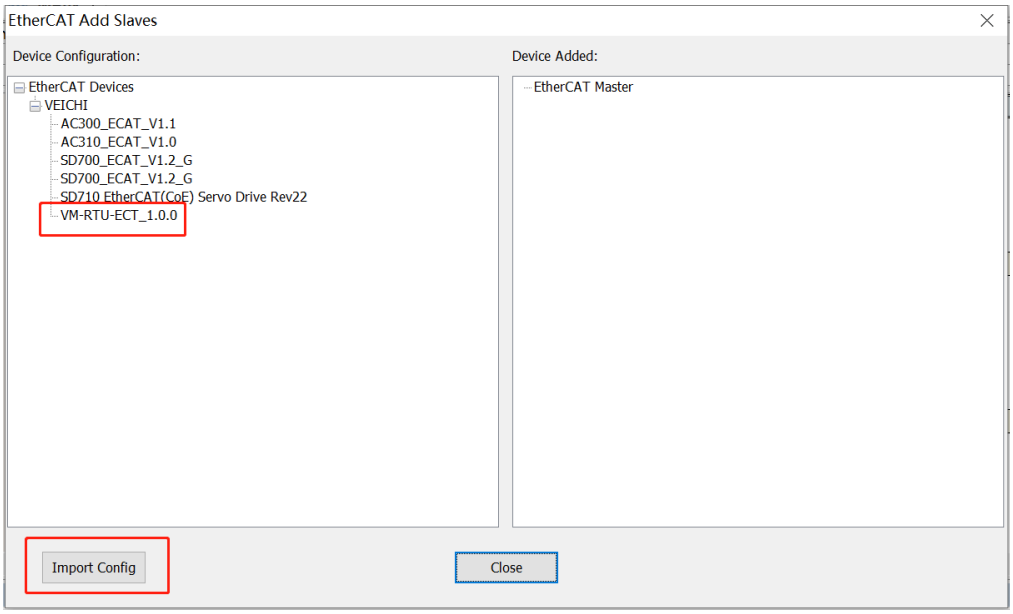


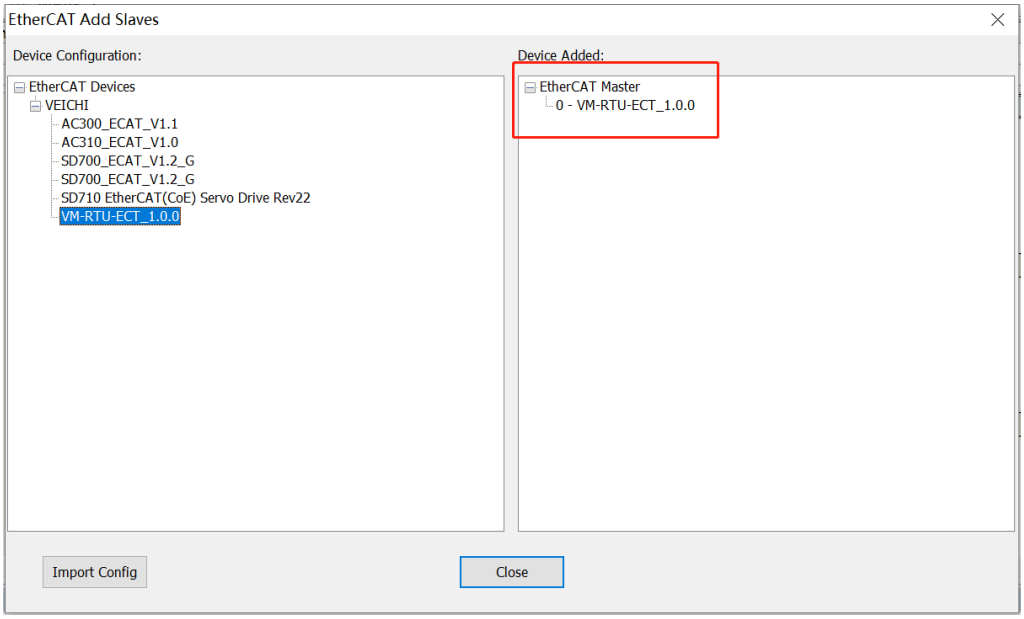
4.1.2 Configure EtherCAT Task



4.1.3 Import the xml File

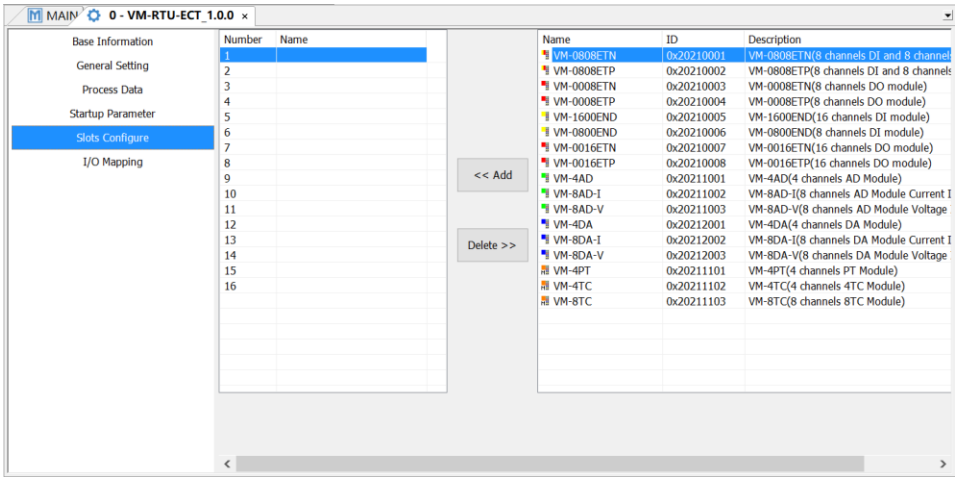
Import the current latest version of VM-RTU-ECT_1.0.0.xml description file and double click to add it to the device:





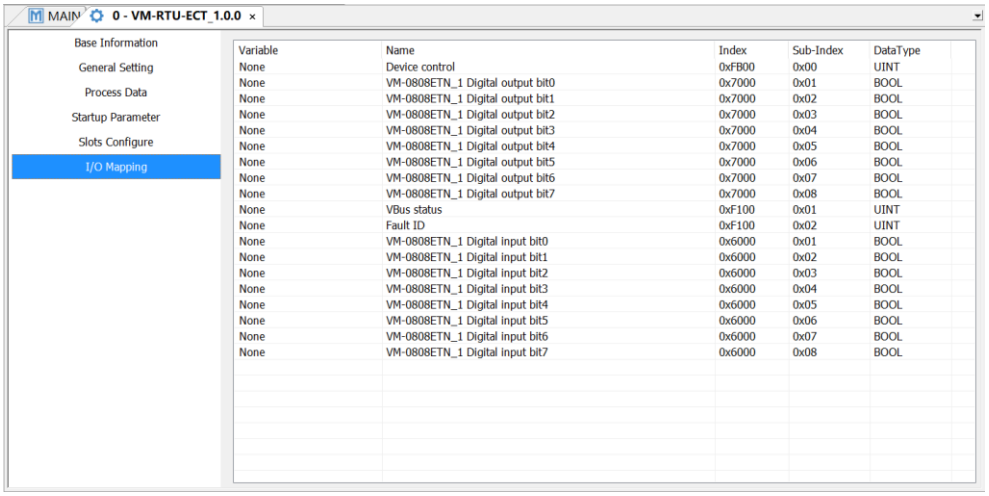
4.1.4 Slot Configuration

Currently, VC5 requires slot configuration of the device first, and the configuration of the expansion modules and the order must be consistent with the physical object, otherwise an alarm will pop up to indicate that the configuration does not match what is connected.



4.1.5 IO Mapping

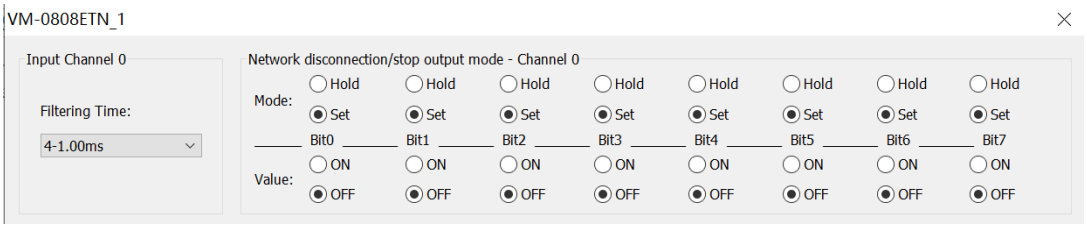
VC5 default setting is no mapping, so it is necessary to map the registers that will be controlled and monitored to the soft components before actual use, otherwise users can not operate on them.



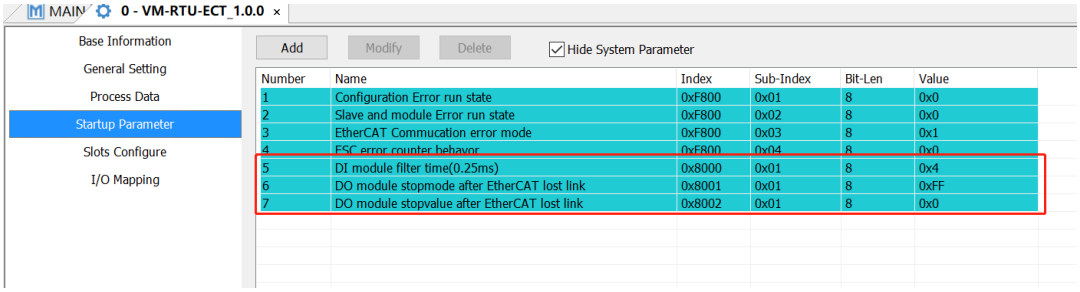
4.1.6 Set Parameters

1.stopmode: failure stop output mode (index number in EtherCAT application: 0x8001+0x40*slot number), each channel corresponds to 1 bit respectively, 0 is hold, 1 is preset value corresponding to output stopvalue.

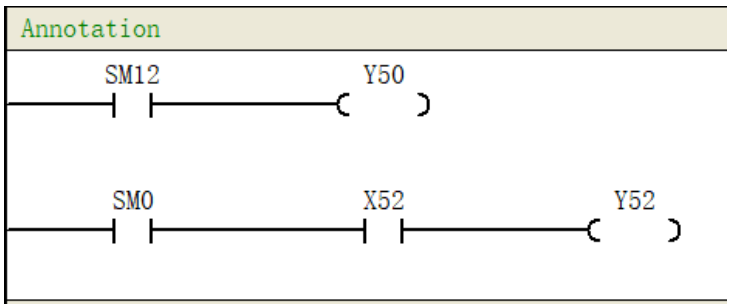
2.Stopvalue: failure stop output preset value (index number in EtherCAT application: 0x8002+0x40*slot number), each channel corresponds to a 1-bit value respectively.



or



4.1.7 Write User Programs



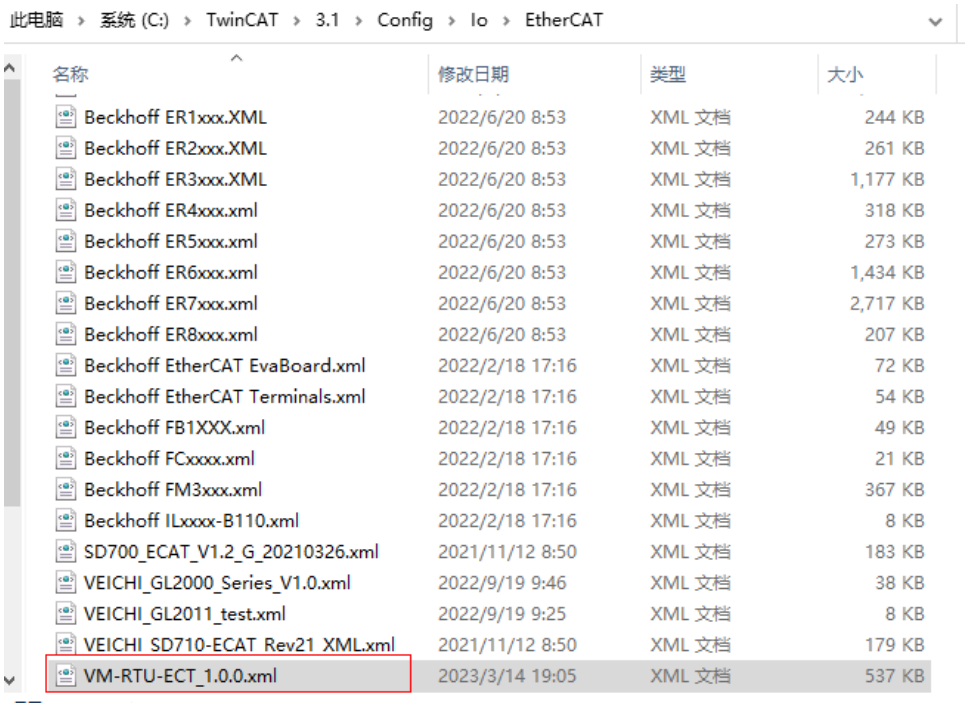
4.1.8 Compile, Download and Run

If there are no errors during compiling, download and run it.

4.4 Simple Commissioning with Beckhoff TwinCAT

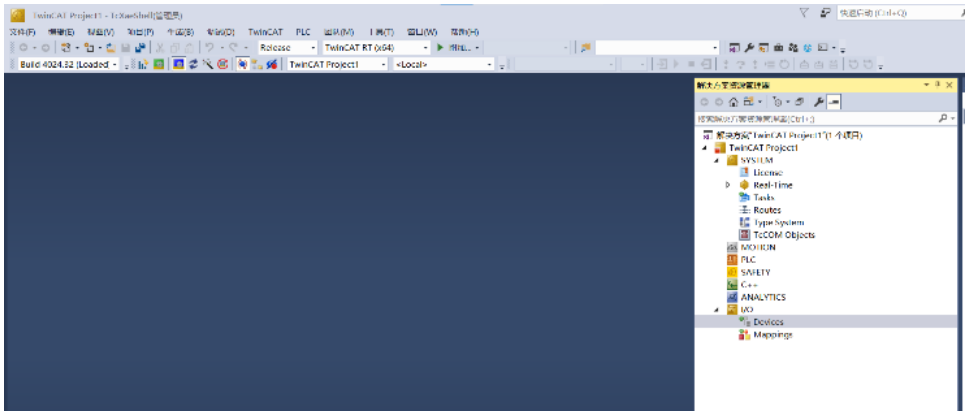
4.2.1 Import the xml File

Copy the current latest version of the description file VM-RTU-ECT_1.0.0.xml to the TwinCAT installation directory under TwinCAT\3.1\Config\Io\EtherCAT.



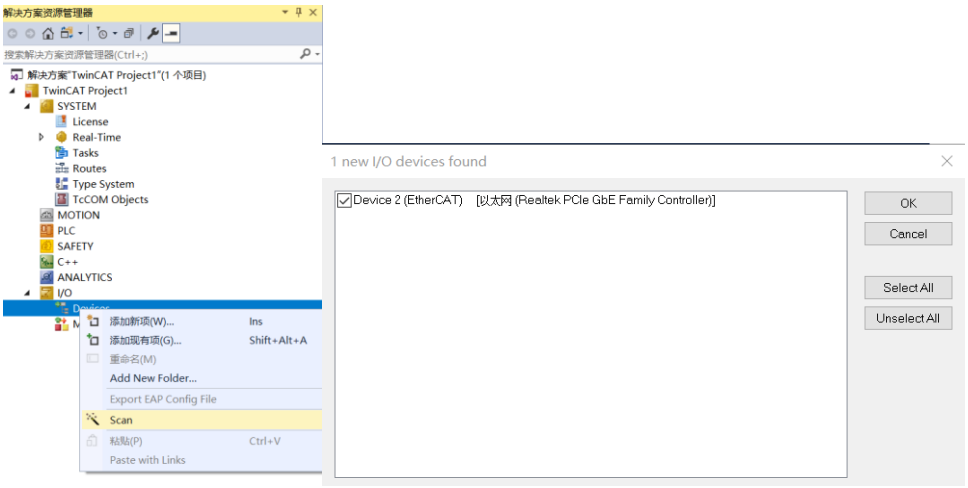
4.2.2 Create A New TwinCAT Project

Open the TwinCAT software to create a new TwinCAT project, connect the VM-RTU-ECT to the VM-0008ETN and power up and connect it to the Ethernet interface of the PC.



4.2.3 Scan the Devices

Ensure that the VM-RTU-ECT and VM-0008ETN are connected for device scanning, and follow the pop-up confirmation to make it run to OP.



Note: A new installation of TwinCAT software requires the installation of the real-time NIC driver before this step.

4.2.4 IO Monitoring and Commissioning

As shown in the figure below, scan to a 0008ETN expansion module under the device VM-RTU-ECT coupler for IO monitoring and debugging its input and output.