VC1 Series PLC Quick Start User Manual

This quick start manual is to offer you a quick guide to the design, installation, connection and maintenance of VC1 series PLC, convenient for on-site reference. Briefly introduced in this booklet are the hardware specs, features, and usage of VC1 series PLC, plus the optional parts and FAQ for your reference. For more detailed product information, please refer to the user manual of "VC series programing manual" and "Autostudio programming software" issued by our company. If necessary, consult the supplier. You can also log in www.veichi.org to download PLC related technical data or feed back PLC related problems on the website.

1　Product Introduction

1.1　Model designation

The model designation is shown in the following figure.

VC1 - 1614 M A T 1

To Customers:

Thank you for choosing our products. To improve the product and provide better service for you, could you please fill in the form after the product has been operated for 1 month, and mail or fax it to our Customer Service Center? We will send you an exquisite souvenir upon receiving the complete Product Quality Feedback Form. Furthermore, if you can give us some advices on improving the product and service quality, you will be awarded a special gift. Thank you very much!

Veichi Electric Co., LTD.

Product Quality Feedback Form

Customer name		Tele	
Address		Zip code	
Model		Date of use	
Machine SN			
Appearance or structure			
Performance			
Package			
Material			
Quality problem during usage			
Suggestion about improvement			

1.2　Outline

The outline of the VC1 series module is shown in the following figure by taking the example of VC1-1614MAR.

PORT0 adopts the RS232, and the Mini DIN8 socket. 1 RS-485, USB interface is Type-C. The right extension module interface is used for extension module connection, the left extension module is used for communication module connection. RUN and STOP switched by MODE selection. Two RS-485 terminal resistor, the resistance is 120Ω.

1.3　Terminal Introduction

1．24 point module I/O points are shown below:
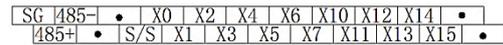
Input terminal:
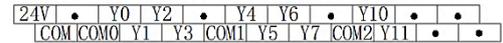
Output terminal:

2．30 point module I/O points are shown below:
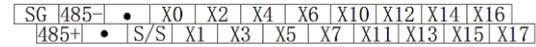
Input terminal:

Output terminal:
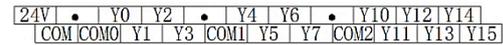
3.　Power supply

The specification of PLC built-in power and power for extension modules is listed in the following table.

Item		Unit	Min.	Rated	Max.	Note
Power supply voltage		Vac	85	220	264	Normal startup and operation
Input current		A	/	/	1.5	Input: 90Vac, 100% output
Rated output current	5V/GND	mA	/	1500	/	The total power of outputs 5V/GND and 24V/GND ≤ 30W.
	24V/GND	mA	/	1000	/	
	24V/COM	mA	/		/	

3　Digital input and output characteristics

3.1　Input Characteristic And Specification

The input characteristic and specs are shown as follows:

Item		High-speed input terminals X0~X7	General input terminal
Sigal input type		Source mode or sink mode, user set through "S/S" terminal	
Electric parameters	Input voltage	24Vdc	
	Input impedance	3.3KΩ	4.3kΩ
	Input ON	External circuit resistance < 400Ω	External circuit resistance < 400Ω
	Input OFF	External circuit resistance > 24KΩ	External circuit resistance > 24KΩ
Filtering function	Digital filter	X0~X7 have digital filtering function. Filtering time: 0~60ms setting by user programing.	
	Hardware filter	Input terminals other than X0 ~ X7 are of hardware filtering. Filtering time: about 10ms	
High speed function		X0~X7: high-speed counting, interrupt, and pulse catching X0 and X1: up to 50kHz counting frequency X2~X5: up to 10kHz counting frequency The sum of input frequency should be less than 60kHz	
Common terminal		Only one common terminal: S/S	

The counter input port has a corresponding maximum frequency limit.. Any frequency higher than that may result in incorrect counting or abnormal system operation. Make sure that the input terminal arrangement is reasonable and external sensors used are proper.

PLC provides a port "S/S" to select the input mode of the signal, which can be set to source input mode or sink input mode. Connect "S/S" to "＋24V", that is, set to sink input mode, and NPN type sensor can be connected.

Wiring of source input mode using module internal power

Wiring of source input mode using external auxiliary power

Wiring of sink input mode using module internal power

Wiring of sink input mode using external auxiliary power
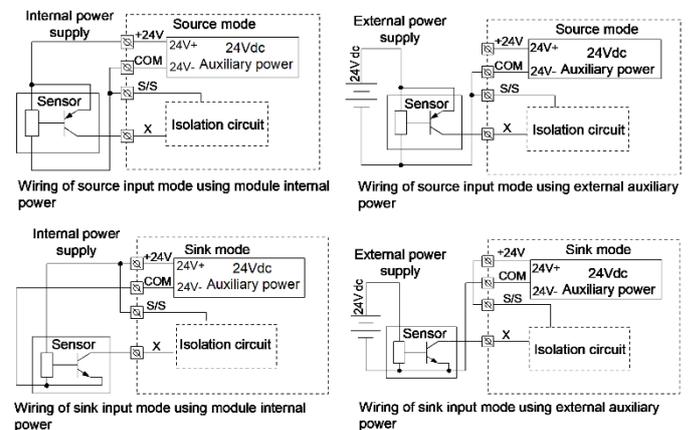
Input connection example

The following diagram shows an example of VC1-1614MAR in connection with an VC-0808ENR, which realizes simple positioning control. The positioning signals from the PG are input through high speed counting terminals X0 and X1, the limit switch signals that require

high-speed response can be input through high-speed terminals X2 ~ X7. Other user signals can be input through any other input terminals.
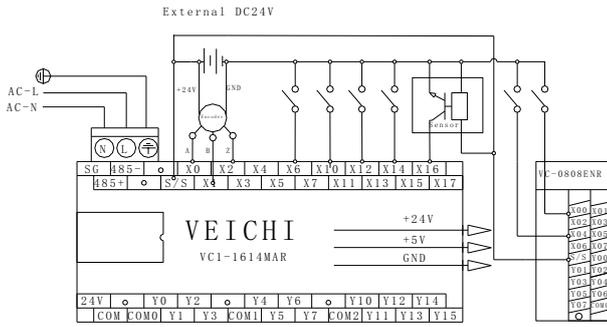
3.2 Output Characteristic And Specification

The following table shows the relay output and transistor output.

Item	Relay output	Transistor output
Output mode	On when the output status is "ON". Off when the output status is "OFF".	
Common terminal	Divided into multiple groups, each with a common terminal COMn, suitable for control circuits with different potentials. All common terminals are isolated from each other	
Voltage	220Vac, 24Vdc, no polarity requirement	24Vdc, with polarity requirement
Current	Accord with output electric specs	
Difference	High driving voltage, large current	Small driving current, high frequency, long service life
Application	Loads with low action frequency such as intermediate relay, contactor coil, and indicator light	Control servo amplifier, frequent action electromagnet and other applications requiring high frequency and long service life.

The output electrical specifications are shown in the table below.

Item		Relay output terminal	Transistor output terminal
Circuit Power Voltage		Below 250Vac, 30Vdc	5~24Vdc
Circuit insulation		Relay mechanism insulation	Optocoupler insulation
Operation indication		The relay output contact is closed and the indicator light is on	The indicator light is on when the optocoupler is driven
Leakage current in open circuit		/	Less than 0.1mA/30Vdc
Minimum load		2mA/5Vdc	5mA (5~24Vdc)
Maximum output current	Resistive load	2A/1 point 8A/4 point 8A/6 point 8A/8 point	Y0/Y1/Y2: 0.3A/1 point Others: 0.3A/1 point, 0.8A/4 point, 1.2A/6 point, 1.6A/8 point. Above 8 points, total current increases 0.1A at each point increase
	Inductive load	220Vac, 80VA	Y0/Y1/Y2: 7.2W/24Vdc Others: 12W/24Vdc
	Illumination load	220Vac, 100W	Y0/Y1/Y2: 0.9W/24Vdc Others: 1.5W/24Vdc
Response time	OFF→ON	20ms Max	Y0/Y1/Y2: 10µs
	ON→OFF	20ms Max	Others: 0.5ms
Y0,Y1,Y2 Maximum output frequency		/	Each channel: 100kHz
Output common terminal		Y0/ Y1/Y2/Y3－COM0. Y4/ Y5/Y6/Y7－COM1. After Y10, Max 8 terminals use one isolated common terminal	
Fuse protection		No	

Output connection example

The following diagram shows an example of VC1-1614MAR in connection with an VC-0808ENR. Different output groups can be connected to different signal circuits with different voltages. Some (like Y1-COM0) are connected to the 24Vdc circuit powered by local 24V-COM, some (like Y5-COM1) are connected to the 5Vdc low voltage signal circuit, and others (such as Y11, Y13, Y15) are connected to the 220Vac voltage signal circuit.
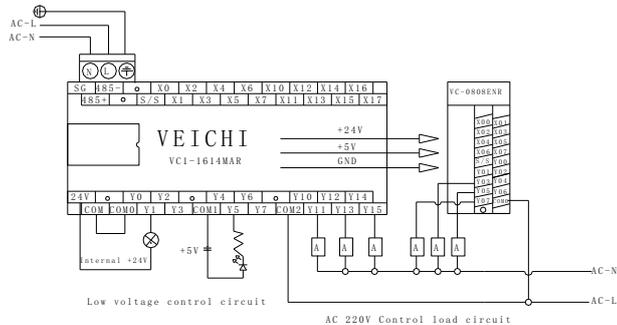
4 Communication port

VC1 series PLC module has 2 serial asynchrounous communication ports: COM0 and COM1. Supported baud rates: 115200, 57600, 38400, 19200, 9600, 4800, 2400, 1200bps. The mode selection switch determines the communication protocol of COM0. As shown in below figure:

PIN	Name	Discription
3	GND	Grounding PIN
4	RXD	Serial data reception PIN (RS-232 to PLC)
5	TXD	Serial transmit PIN (PLC to RS-232)
1, 2, 6. 7. 8	Reserved	Undefined PIN
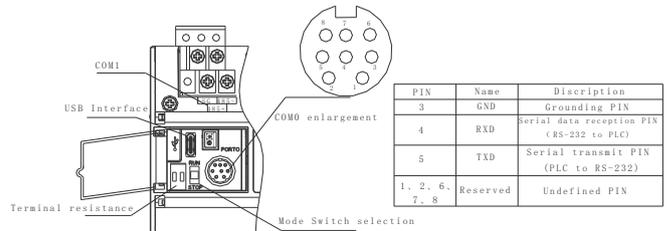
As a dedicated interface to user programming, COM0 can be converted to programming protocol through the mode selection switch. The relationship between PLC operation status and the protocol used by COM0 is shown in the following table.

Mode selection switch position	Status	COM0 operation protocol
ON	RUN	Programming protocol, or Modbus protocol as determined by user program and system configuration
OFF	STOP	If the system configuration of user program is Modbus protocol, it converts to programming protocol automatically after stop. Otherwise, the system protocol keeps unchanged

COM1 are ideal for connection with equipment that can communicate (such as inverters). With Modbus protocol or RS485 terminal free protocol, it can control multiple devices through the network. Its terminals are fixed with screws. You can use a shielded twisted-pair as the signal cable to connect communication ports by yourself.

USB is Type-C interface, it can support upload, download, on line upgrade firmware and monitoring function.

5 Installation

PLC is applicable to Installation category II, Pollution degree 2.

5.1 Dimension

Model	Length	Width	Height	Net weight
VC1-1410MAR	115mm	90mm	92.7mm	576g
VC1-1410MAT				548g
VC1-1614MAR	115mm	90mm	92.7mm	596g
VC1-1614MAT				552g

5.2 Installation method

DIN rail mounting

Generally you can mount the PLC onto a 35mm-wide rail (DIN), as shown in the following figure.
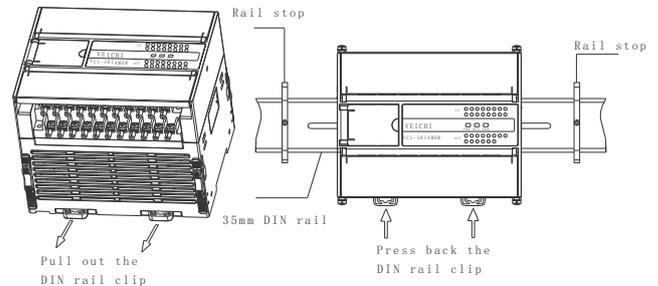
The specific installation steps are as follows:

1．Fix the DIN rail horizontally on the mounting backplane.

2．Pull out the DIN rail buckle under the bottom of the module.

3．Hang the module on the DIN.

4．Press the buckle back to its original position to lock the module.

5．Finally, fixed both ends of the module with DIN rail clips to avoid sliding.

Other VC1 series PLC can be installed in DIN rail according to the above steps.

Use scews to install and fix

For occasions with large oscillations, the main module can be installed with screw holes. When installing the expansion module, first slide the sliding lock up to the top, align it and push it toward the main module, and then slide the sliding lock down to the end to complete the fixation. As shown below. (Note: The main module requires optional accessories for screw installation, and the expansion module does not support screw installation)

Φ4 Optional installation hole   Sliding latch

Push right   Push left
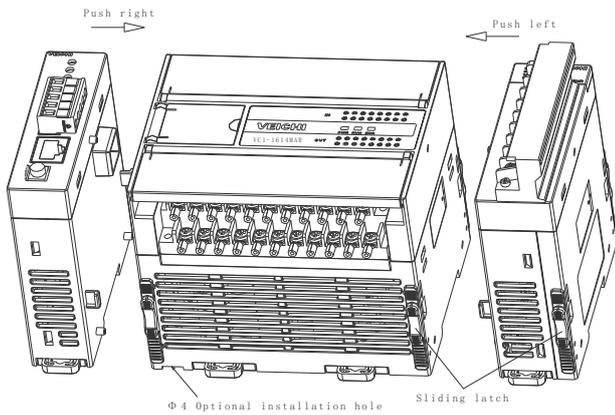
5.3   Cable Connection And Specification

Connecting power cable and grounding cable, it is recommended that the user add an air switch and fuse protection circuit to the PLC power input. The connection example of AC power supply and auxiliary power supply is shown in the figure below.

Connect the PLC ⏚ terminal to the grounding electrode. To ensure reliable grounding cable connection, which makes the equipment safer and protects it from EMI. use AWG12~16 cable, and make the cable as short as possible.

Avoid sharing route with the grounding cable of other equipment (particularly those with strong EMI). See the following figure.

Best   Good   Bad
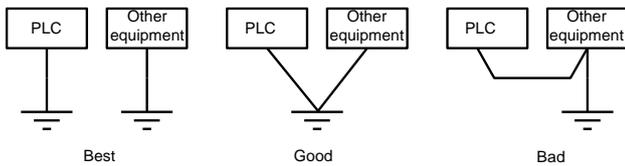
Cable specification

When wiring a PLC, use multi-strand copper wire and ready-made insulated terminals to ensure the quality. The recommended model and the cross-sectional area of the cable are shown in the following table.

Wire	Cross-sectional area	Recommended model	Cable lug and heat-shrink tube
AC power cable (L, N)	1.0～2.0mm²	AWG12, 18	H1.5/14 round insulated lug, or tinned cable lug
Grounding cable (⏚)	2.0mm²	AWG12	H2.0/14 round insulated lug, or tinned cable end
Input signal cable (X)	0.8～1.0mm²	AWG18, 20	UT1-3 or OT1-3 solderless lug Φ3 or Φ4 heat shrinkable tube
Output signal cable (Y)	0.8～1.0mm²	AWG18、20	

Fix the prepared cable head onto the PLC terminals with screws. Fastening torque: 0.5~0.8Nm.

The recommended cable processing-method is shown in the following figure.

≤ 5.0   ≤ 5.0

UT solderless lug ┐ ┌ Heat shrinkable tube ┌ Cable
18
└ Cable SN label

OT solderless lug ┐ ┌ Heat shrinkable tube
47

┌ H type round insulated lug
682

Tinned cable end ┐ ┌ Cable
PG

6   Power-on Operation And Maintenance
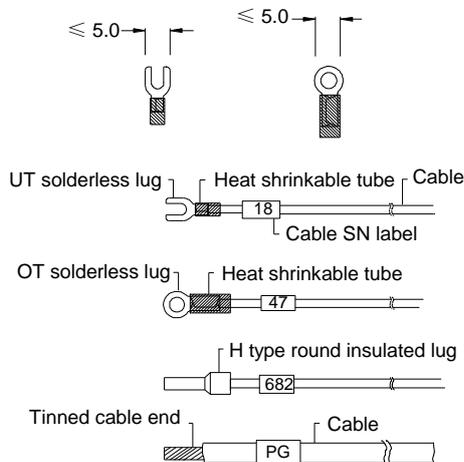
6.1   Startup

Check the cable connection carefully. Make sure that the PLC is clear of alien objects and the heat dissipation channel is clear.

1. Power on the PLC, the PLC POWER indicator should be on.

2. Start the AutoStudio software on the PC and download the user program to the PLC.

3. After checking the download program, switch the mode selection switch to the ON position, the RUN indicator should be on. If the ERR indicator is on, the user program or the system is faulty. Loop up in the VC series PLC Programming Manual and remove the fault.

4. Power on the PLC external system to start system debugging.

6.2   Routine Maintenance

Do the following:

1. Ensure the PLC a clean environment. Protect it from aliens and dust.

2. Keep the ventilation and heat dissipation of PLC in good condition.

3. Ensure that the cable connections are reliable and in good condition.

⚠ Warning

1. Never connect the transistor output to an AC circuit (like 220Vac). The design of the output circuit must abide by the requirements of electric parameters, and no over-voltage or over-current is allowed.

2. Use the relay contacts only when necessary, because the use life of relay contacts depends largely on its action times.

3. The relay contacts can support loads smaller than 2A. To support larger loads, use external contacts or mid-relay.

4. Note that the relay contact may fail to close when the current is smaller than 5mA.

Notice

1. The warranty range is confined to the PLC only.

2. Warranty period is 18 months, within which period Emerson Network Power conducts free maintenance and repairing to the PLC that has any fault or damage under the normal operation conditions.

3. The start time of warranty period is the delivery date of the product, of which the product SN is the sole basis of judgment. PLC without a product SN shall be regarded as out of warranty.

4. Even within 18 months, maintenance will also be charged in the following situations:

- Damages incurred to the PLC due to mis-operations, which are not in compliance with the User Manual;
- Damages incurred to the PLC due to fire, flood, abnormal voltage, etc;
- Damages incurred to the PLC due to the improper use of PLC functions.

5. The service fee will be charged according to the actual costs. If there is any contract, the contract prevails.

6. Please keep this paper and show this paper to the maintenance unit when the product needs to be repaired.

7. If you have any question, please contact the distributor or our company directly.

Veichi Electric Co., LTD.

Web: www.veichi.org

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