Technical Information

VR-2200 PLC Controller

V-RTU2000 | Remote Terminal Unit

Technical Specification Manual

VEESTA WORLD

Author: Veesta World Co., Engineering Department

TRADEMARKS

VEESTA and **VEESTA WORLD** are trademarks of Veesta World Co. Iran

V-RTU2000 is trademarks of RTU system of VEESTA WORLD Co.

VR-2200 is trademarks of PLC Controller and RTU system of VEESTA WORLD Co.

NOTICE

The information in this document is subject to change without notice and should not be construed as a commitment by VEESTA WORLD Co. Veesta World Co assumes no responsibility for any errors that may appear in this document.
In no event shall Veesta World Co be liable for direct, indirect, special, incidental or consequential damages of any nature or kind arising from the use of this document, nor shall Veesta World Co be liable for incidental or consequential damages arising from use of any software or hardware described in this document.

This document and parts thereof must not be reproduced or copied without Veesta World Co's written permission and the contents thereof must not be imparted to a third party nor be used for any unauthorized purpose.

DOCUMENT HISTORY

Version	Date	Comment
1.0	2016/02/01	First issue

CAll rights reserved. Passing on and copying of this document, use and communication of its contents not permitted without written authorization.

TABLE OF CONTENT

Chapter 1 - Introduction 9
1.1 General Information 9
1.2 Veesta World Co 9
1.3 Copyrights 10
Chapter 2 - System Overview 11
2.1 Overview 11
2.2 VR-2200 PLC Hardware Platform 12
2.2.1 CPU Module 12
2.2.2 CPU Main Features 13
2.2.3 Expansion Modules 14
2.3 VR-2200 Working Concepts 15
2.4 VR-2200 PLC Software Platform 17
2.5 VR-2200 Product Series Modules List 18
2.6 VR-2200 Series Hardware and Software Training 20
2.6.1 Curriculum Schedule Syllabus 20
2.7 Standards (Type Test) 21
2.7.1 Electromagnetic Radiation 21
2.7.2 Electromagnetic Compatibility (EMC) 21
2.7.3 Mechanical Standards 21
2.7.4 Environment Standards 22
Chapter 3 - CPU Module 23
3.1 General 23
3.2 CPU Modules Appearance 23
3.3 CPU Modules Function Description 24
3.4 CPU Modules Detail 24
3.4.1 Select CPU working mode 24
3.4.2 CPU Indicator Definitions 25
3.4.3 Communications Port 26
3.5 CPU Module Specifications 28
3.5.1 VR-2211 Specifications (14xDI,10xTR) 28
3.5.2 VR-2212 Specifications (14xDI,10xREL) 30
3.5.3 VR-2214 Specifications (8xDI,6xTR,4xAI,2xAO) 31
3.5.4 VR-2215 Specifications (8xDI,6xREL,4xAI,2xAO) 33

CAll rights reserved. Passing on and copying of this document, use and communication of its contents not permitted without written authorization.

Chapter 4 - Digital Expansion Modules 36
4.1 General 36
4.2 Digital Input Module 36
4.2.1 VR-2221 Specifications (8xDI) 37
4.2.2 VR-2222 Specifications (16xDI) 38
4.3 Digital Output Module 39
4.3.1 VR-2231 Specifications (8xDO Transistor) 39
4.3.2 VR-2232 Specifications (8xDO Relay) 40
4.4 Digital Input/Output Module 41
4.4.1 VR-2261 Specifications (4xDI, 4xDO Transistor) 41
4.4.2 VR-2262 Specifications (4xDI, 4xDO Relay) 42
Chapter 5 - Analog Expansion Module 43
5.1 General 43
5.2 Analog Input Module 43
5.2.1 VR-2242 Specifications (4xAI) 43
5.3 Analog Output Module 45
5.3.1 VR-2252 Specifications (4xAO) 45
5.4 Analog Input/Output Module 46
5.4.1 VR-2271 Specifications (4xAI, 2xAO) 46
Chapter 6 - Physical Installation Information 48
6.1 General 48
6.1.1 Ventilation and Cooling 48
6.1.2 Power Dissipation 50
6.1.3 Proper Location of Wirings 50
6.2 Electrical Safety 50
6.3 Mounting and Installation and Removal 51
6.3.1 Panel Mounting 51
6.3.2 DIN Rail Mounting 53
6.3.3 Expansion Cable Connection 55
6.4 Dimensions and Structures 56
Chapter 7 - Quick Application Guide 58
7.1 General 58
7.2 Packing-list Confirmation 58
7.3 Installation and Wiring 58
7.4 Connecting the Power Cable 58
7.5 Establishing Communications with the PC 59
7.6 Writing Control Programs 59
7.7 Running the Equipment 59
Chapter 8 - Terminal Definitions & Wiring 60
8.1 General 60
8.2 CPU Module Terminal & Wiring 60
8.2.1 VR-2211 CPU Module 60

©All rights reserved. Passing on and copying of this document, use and communication of its contents not permitted without written authorization.

8.2.2 VR-2212 CPU Module 63
8.2.3 VR-2214 CPU Module 65
8.2.4 VR-2215 CPU Module 67
8.3 Digital Expansion Terminal & Wiring 69
8.3.1 VR-2221 DI Module 8x Channel 69
8.3.2 VR-2222 DI Module 16x Channel 71
8.3.3 VR-2231 DO Module 8x Transistor 73
8.3.4 VR-2232 DO Module 8x Relay 75
8.3.5 VR-2261 DI/DO Module 4x Transistor 77
8.3.6 VR-2262 DI/DO Module 4x Relay 79
8.4 Analog Expansion Terminal & Wiring 81
8.4.1 VR-2242 AI Module 4x Channel 81
8.4.2 VR-2252 AO Module 4x Channel 83
8.4.3 VR-2271 AI / AO Module 85

©All rights reserved. Passing on and copying of this document, use and communication of its contents not permitted without written authorization.

TABLE OF FIGURES

Figure 1-1: Veesta World Co Logo and sign....10
Figure 2-1: VR-2200 Product Series....11
Figure 2-2: VR-2200, CPU module structure diagram....12
Figure 2-3: VR-2200, CPU module with expansion module....14
Figure 2-4: VR-2200, Working Concept Block Diagram....16
Figure 3-1: VR-2200, CPU Module Apperance....23
Figure 3-2: VR-2200, CPU Module under extension cover apperance....24
Figure 3-3: VR-2200, CPU Module Indicators....25
Figure 3-4: VR-2200, CPU Module Communication Interface....26
Figure 6-1: VR-2200, Recommended Ventilations....48
Figure 6-2: VR-2200, Mounting method to be avoided....49
Figure 6-3: VR-2200, Space Requirements in cubicle....49
Figure 6-4: VR-2200, Mounting Methods....51
Figure 6-5: VR-2200, Module mounting on panel....52
Figure 6-6: VR-2200, Module removing from panel....52
Figure 6-7: VR-2200, Standard 35mm DIN Rail....53
Figure 6-8: VR-2200, Case Rail Clip....53
Figure 6-9: VR-2200, Module mounting on DIN Rail....54
Figure 6-10: VR-2200, Module removing from DIN Rail....54
Figure 6-11: VR-2200, Expansion Cable connections among the modules....55
Figure 6-12: VR-2200, Side View Dimensions - All Modules....56
Figure 6-13: VR-2200, Front View Dimensions - CPU Module....56
Figure 6-14: VR-2200, Front View Dimensions - Extension Module....57
Figure 7-1: VR-2200, Connecting Programmin Cable....59
Figure 8-1: VR-2211 CPU Module Wiring Diagram....60
Figure 8-2: VR-2212 CPU Module Wiring Diagram....63
Figure 8-3: VR-2214 CPU Module Wiring Diagram....65
Figure 8-4: VR-2215 CPU Module Wiring Diagram....67
Figure 8-5: VR-2221 DI Module 8x Channel Wiring Diagram....69
Figure 8-6: VR-2222 DI Module 16x Channel Wiring Diagram....71
Figure 8-7: VR-2231 DO Module 8x Transistor Wiring Diagram....73
Figure 8-8: VR-2232 DO Module 8x Relay Wiring Diagram....75
Figure 8-9: VR-2261 DI / DO Module 4x Input, 4x Transistor Wiring Diagram....77
Figure 8-10: VR-2262 DI / DO Module 4x Input, 4x Relay Wiring Diagram....79
Figure 8-11: VR-2242 AI Module 4x Channel Wiring Diagram....81
Figure 8-12: VR-2252 AO Module 4x Channel Wiring Diagram....83
Figure 8-13: VR-2271 AI / AO Module Wiring Diagram....85

©All rights reserved. Passing on and copying of this document, use and communication of its contents not permitted without written authorization.

INDEX OF TABELS

Table 2-1: VR-2200 PLC Product Series main features 13
Table 2-2: VR-2200 Series, Module List 18
Table 2-3: VR-2200 Series, Training Syllabus 20
Table 3-1: VR-2200 Series, 3-positions CPU selector switch setting modes 25
Table 3-2: VR-2200 Series, CPU Indicator Definitions 26
Table 3-3: VR-2200 Series, RS-232 Communication Interface 27
Table 3-4: VR-2200 Series, RS-485 Communication Interface 27
Table 8-1: VR-2200 Series, VR-2211 CPU Module Terminal Definitions 61
Table 8-2: VR-2200 Series, VR-2212 CPU Module Terminal Definitions 64
Table 8-3: VR-2200 Series, VR-2214 CPU Module Terminal Definitions 66
Table 8-4: VR-2200 Series, VR-2215 CPU Module Terminal Definitions 68
Table 8-5: VR-2200 Series, VR-2221 DI Module Terminal Definitions 70
Table 8-6: VR-2200 Series, VR-2222 DI Module Terminal Definitions 72
Table 8-7: VR-2200 Series, VR-2231 DOI Module Terminal Definitions 74
Table 8-8: VR-2200 Series, VR-2232 DO Module Terminal Definitions 76
Table 8-9: VR-2200 Series, VR-2261 DI /DO Module Terminal Definitions 78
Table 8-10: VR-2200 Series, VR-2262 DI /DO Module Terminal Definitions 80
Table 8-11: VR-2200 Series, VR-2242 AI Module Terminal Definitions 82
Table 8-12: VR-2200 Series, VR-2252 AO Module Terminal Definitions 84
Table 8-13: VR-2200 Series, VR-2271 AI / AO Module Terminal Definitions 86

©All rights reserved. Passing on and copying of this document, use and communication of its contents not permitted without written authorization.

Chapter 1 - Introduction

1.1 General Information

This is technical information of design of Product of V-RTU2000 Series of VR-2200, the Programmable Logic Controller (PLC) and Remote Terminal Units from Veesta World Company. This document helps you to find about how VR-2200 Series works and designed for your purpose.

V-RTU2000, Series VR-2200 of RTU system adopted for from very small RTU Controller or PLC device from that can be used in as Feeder Terminal Unit up to very large scale PLC application and RTU for Generation and Transmission High Voltage Substations, and or other controlled stations.

Veesta World Co. from Iran associated with you! In planning, designing, manufacturing, supply, installation, commissioning and acceptance test for the PLC Controller and Remote Terminal Units in your projects. Veesta World Company will render full support and services to its customer to enable them to deliver first class services to the Automation Market.

1.2 Veesta World Co

Veesta World Co is a leading company in automation field in Iran and specialized in design and installation of IT Network of wide area and local area, Automation control units, control rooms, DCS design, PLC and SCADA application installation and system integration. The main advantage of Veesta World's products is complying international standards and do customs basic design.

Veesta World Co is a dynamic company located in the Tehran, IRAN, whose main commitment is the customer's satisfaction. Business vision and its future evolution together with the proper combination of new and existing technologies are the main aspects considered in the solutions proposed by Veesta World Co. Owing to this, key issues like Scalability, the Return of Investment or the Total Cost of Ownership are carefully considered. Consequently, the solutions offered by Veesta World Co are able to cope with the requirements of a sustainable growth. Veesta World Co is a service-oriented company and the customer perspective is its action guide. An added

©All rights reserved. Passing on and copying of this document, use and communication of its contents not permitted without written authorization.

value of the offer is the evaluation and Management of the risk. This issue is getting a major relevance in the changing environment in which new technologies have to be applied, particularly when profitability is a major concern.

The objective of Veesta World Co is focused on the creation of value for the customer through the proper business strategy alignment and the right combination of technologies. These principles, developed under the Total Quality Management practice, allow Veesta World Co to offer, in a seamless approach, consultancy, engineering and training services.
The founders of Veesta World Co are professionals with a large experience in the Telecommunication and Networking and Industrial fields.

Veesta World Co is formed by a balanced team of professionals that gather knowledge in a wide range of technologies and specific know-how on how to apply these technologies in mission-critical control networks.

1.3 Copyrights

All of documents and materials in related to this document and this document are copyrights of Veesta World Co and it is not permitted to use or transfer the contents to any other parties.

The Veesta World Co logo is registered trademark of Veesta World Co and its properties.

VEESTA WORLD

Figure 1-1: Veesta World Co Logo and sign

©All rights reserved. Passing on and copying of this document, use and communication of its contents not permitted without written authorization.

Chapter 2 - System Overview

2.1 Overview

As a line of small integrated programmable logic controller (PLC) products, V-RTU2000 the series of VR-2200 PLC provides powerful and complex control functions whether running independently or under network mode. As shown in the following figure, the compact exterior design, good scalability, reasonably low price and powerful instruction set combine to make VR-2200 PLC a perfect solution for fulfilling small-scale automation needs.

Figure 2-1: VR-2200 Product Series

This manual will help you install, configure, use and maintain your VR-2200 PLC, as well as assist you in connecting PLC effectively with other drivers. This manual contains all the hardware information of VR-2200 PLC. Please read the whole manual carefully to ensure your system is properly started up and running well.

CAll rights reserved. Passing on and copying of this document, use and communication of its contents not permitted without written authorization.

2.2 VR-2200 PLC Hardware Platform

VR-2200 PLC Product Series consists of a CPU module and various kinds of expansion modules with selected functions.

2.2.1 CPU Module

The hardware units that form the CPU module are: central processing unit (CPU), power supply and digital I/O circuits, all of which are integrated in a single, compact housing, as shown in Figure 2-2.

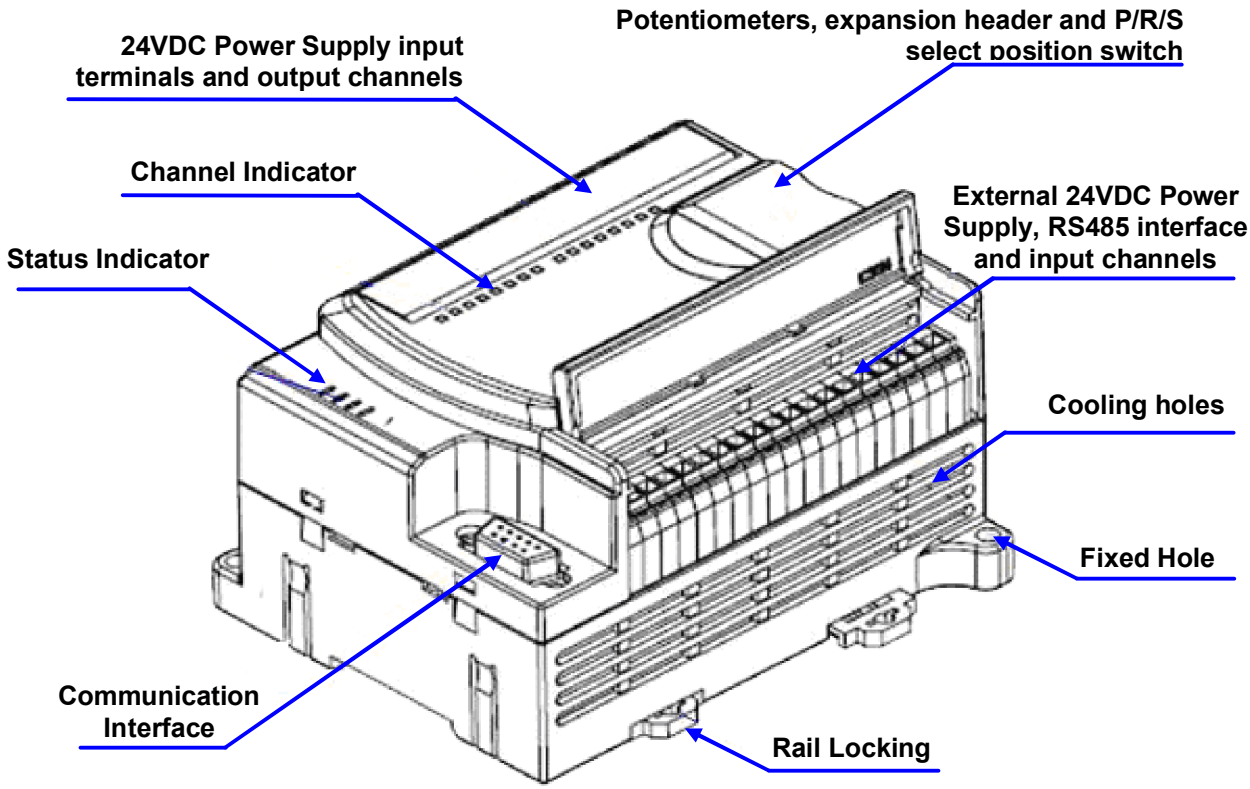


Figure 2-2: VR-2200, CPU module structure diagram

©All rights reserved. Passing on and copying of this document, use and communication of its contents not permitted without written authorization.

2.2.2 CPU Main Features

VR-2200 PLC Product Series offers a variety of CPU modules, in order to support different design requirements of automatic control. You can find feature comparison between various models in Table

Table 2-1: VR-2200 PLC Product Series main features

CPU Model : / Feature List :		VR-2211	VR-2212	VR-2214	VR-2215	VR-2216
Supply Voltage		24 VDC	24 VDC	24 VDC	24 VDC	24 VDC
I/O Points	DI	14x DC24V	14x DC24V	8x DC24V	8x DC24V	12x DC24V
	DO	10x Transistor	10x Relay Output	6x Transistor	6x Relay Output	10x Relay Output
	AI	-	-	4x Current Input	4x Current Input	5x Current Input
	AO	-	-	2x Current Out	2x Current Out	-
Storage Capacity	Program	128 K Byte	128K Byte	128K Byte	128K Byte	4M Byte
Processing Speed		0.2 us				
24VDC Output Source		400 mA				-
Max Expansion Module		7	7	7	7	7
Pulse Inputs		4				
Interrupt Inputs		2				
High Speed Counters	Single Phase	3x Channels (200 kHz)	3x Channels (200 kHz)	2x Channels (200 kHz)	2x Channels (200 kHz)	-
	Two Phase	2x Channels (100 kHz)	2x Channels (100 kHz)	1x Channels (100 kHz)	1x Channels (5 kHz)	-
High Speed Outputs	PTO	2x Channels (100 kHz)	-	2x Channels (100 kHz)	2x Channels (100 kHz)	-
	PWM	2x Channels (100 kHz)	-	2x Channels (100 kHz)	2x Channels (100 kHz)	-
Analog Potentiometers		2x Channels (8 bits resolution)				-
Timers		256				
Counters		256				
Password Protection		Yes				
Real-Time Clock		Yes				
On-board RS-232 Interface		1x Port	1x Port	1x Port	1x Port	1x Port
On-board RS-485 Interface		1x Port	1x Port	1x Port	1x Port	3x Port
On-board Ethernet Interface		-	-	-	-	1x Port

CAll rights reserved. Passing on and copying of this document, use and communication of its contents not permitted without written authorization.

2.2.3 Expansion Modules

The CPU module of VR-2200 Product Series itself integrates a certain number of local onboard I/O points, some of which have both high-speed counting and high-speed output functions. With the expanding range of applications, more I/O points will be needed. A selection of expansion modules allows you to add I/O to your CPU in order to meet the needs of control requirements under certain conditions.

Figure 2-2 illustrates a combination of VR-2200 CPU modules and expansion modules.

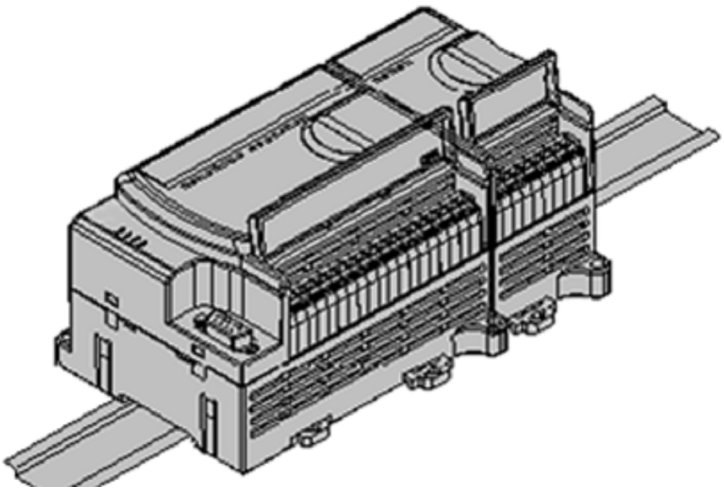


Figure 2-3: VR-2200, CPU module with expansion module

The expansion modules arranged in various types and specifications, you will find more detail information in future chapters in this manual.

The expansion modules have been categorized in bellow types:

2.2.3.1 Digital Expansion Module

- **Digital Input modules:** consist only for digital input signal types. There are various types of 8x channels and 16x channels.
- **Digital Output modules:** consist only for digital out signal types like transistor output or relay output. There are various types of 8x channels and/or 16x channels
- **Digital Input/Output modules**: consist of mixed digital input and digital output signal types. These modules save the cost for some applications and very useful for some conditions.

CAll rights reserved. Passing on and copying of this document, use and communication of its contents not permitted without written authorization.

2.2.3.2 Analog Expansion Module

- **Analog Input modules**: consist only for analog input signal types. There are various type of signal count and signal types like current metering or voltage metering in various ranges.

- **Analog Output modules**: consist only for analog output signal types like current or voltage output.

- **Analog Input/Output modules**: consist of mixed analog input and analog output signal types. These modules save the cost for some applications and very useful for some conditions.

2.2.3.3 Communication Expansion Module

- **Serial media modules**: consist only for serial RS485 communication interface that support protocols like Modbus RTU for master side communication to get data from remotes and slave side communication to report to host.

- **Network media modules**: consist only for Ethernet media port supporting to provide the multi instance protocols for master and slave side.

- **Combo media modules**: consist of mixed serial line RS485 and networked Ethernet ports to provide multi master and slave side of communication standard protocols like Modbus RTU and Modbus TCP.

2.3 VR-2200 Working Concepts

In practical engineering applications, some I/O functions shall be implemented on the local CPU module, while some other specific functions will be realized through expansion modules or PLC networks. Taking the above situations into consideration, VR-2200 Product Series of PLC supports the following four modes of operations:

- **CPU module running stand-alone:** This mode is applied when only a few I/O points are needed, or just a certain function I/O point is needed;

- **CPU module running with expansion modules:** CPU module connected to the special function modules through expansion ribbon cable. This mode is adopted when local I/O points on CPU module ontology are not adequate, or when special needs, such as analog I/O requirements, occur;

©All rights reserved. Passing on and copying of this document, use and communication of its contents not permitted without written authorization.

- **CPU module with a local communication:** Under such mode, some data terminals that support RS232 serial communication, such as PCs or handheld equipment, could be directly connected to the CPU module. The above mentioned modes are still valid under such circumstance;

- **CPU module with Network module:** In this mode, a 485 network can be established with conversion to 485 communications. All above mentioned modes are still valid under such circumstance.

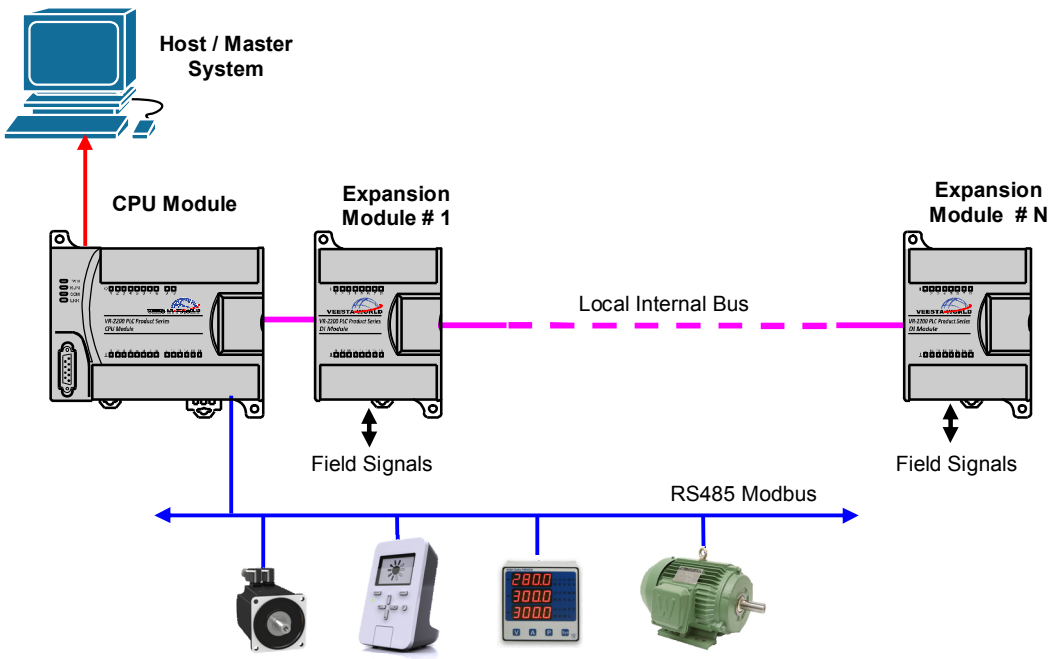


Figure 2-4: VR-2200, Working Concept Block Diagram

CAll rights reserved. Passing on and copying of this document, use and communication of its contents not permitted without written authorization.

2.4 VR-2200 PLC Software Platform

VR-2200 Product Series has integrated programming software based on Microsoft Windows platform. It contains a program editor and a simulator for debugger.

VR-2200 Programming Software is a set of standard programmable logic control program package that fully supports IEC61131-3 standard and uses five languages, including Ladder Diagram (LD), Instruction List (IL), Function Block Diagram (FBD), Sequential Flow Charts (SFC) and Structured Text (ST).

With VR-2200 Programming Software, users can develop a variety of automation control projects, and gain a powerful off-line simulation debug tool.

For future information please refer to the "*VR-2200 Programming Software Manual*"

CAll rights reserved. Passing on and copying of this document, use and communication of its contents not permitted without written authorization.

2.5 VR-2200 Product Series Modules List

The VR-2200 Product Series consist of various modules and components, you can find in bellow table detail information and full list of the VR-2200 Product Series modules and accessories. During your order you should study each Model name with its specifications then place order to avoid any mistake

Table 2-2: VR-2200 Series, Module List

No.	VEESTA Model	Name	Specification
1	VR-2211	CPU Module	Input: 14x DI 24VDC Output: 10x DO Transistor Ports: 1*RS232, 1*RS485 System: DC24V Supply, RTC, 128KB Program Memory
2	VR-2212	CPU Module	Input: 14x DI 24VDC Output: 10x DO Relay Ports: 1*RS232, 1*RS485 System: DC24V Supply, RTC, 128KB Program Memory
3	VR-2214	CPU Module	Input: 8x DI 24VDC, 4x AI 4~20mA Output: 6x DO Transistor, 2x AO 4~20mA, 24VDC Output Ports: 1*RS232, 1*RS485 System: DC24V Supply, RTC, 128KB Program Memory
4	VR-2215	CPU Module	Input: 8x DI 24VDC, 4x AI 4~20mA Output: 6x DO Relay, 2x AO 4~20mA, 24VDC Output Ports: 1*RS232, 1*RS485 System: DC24V Supply, RTC, 128KB Program Memory
5	VR-2216	CPU Module	Input: 12x DI 24VDC, 5x AI 4-20mA, 1x Pt100 Temperature Output: 10x DO Relay Ports: 1*Ethernet, 1*RS232, 3*RS485 System: DC24V Supply, RTC, 4MB Program Memory
6	VR-2221	Digital Module	Input: 8x DI 24VDC
7	VR-2222	Digital Module	Input: 16x DI 24VDC
8	VR-2231	Digital Module	Output: 8x DO Transistor
9	VR-2232	Digital Module	Output: 8x DO Relay
10	VR-2261	Digital Module	Input: 4x DI 24VDC Output: 4x DO Transistor
11	VR-2262	Digital Module	Input: 4x DI 24VDC Output: 4x DO Relay
12	VR-2242	Analog Module	Input: 4x AI, 12 bits, current or voltage mode -10V~10V, 0V~10V, -5V~5V, 0V~5V, 0~20mA, 4~20mA
13	VR-2252	Analog Module	Output: 4x AO, 12 bits, current or voltage mode -10V~10V, 0V~10V, -5V~5V, 0V~5V, 0~20mA, 4~20mA

CAll rights reserved. Passing on and copying of this document, use and communication of its contents not permitted without written authorization.

No.	VEESTA Model	Name	Specification
14	VR-2271	Analog Module	Input: 4x AI, 12 bits, current or voltage mode -10V~10V, 0V~10V, -5V~5V, 0V~5V, 0~20mA, 4~20mA Output: 2x AO, 12 bits, current or voltage mode -10V~10V, 0V~10V, -5V~5V, 0V~5V, 0~20mA, 4~20mA
15	VR-2281	Communication Module	2x RS485 port, Programmable Communication module to provide the master / slave protocols
16	VR-2282	Communication Module	2x RS485 port, Programmable 1x Ethernet 10/100, Programmable Communication module to provide the master / slave protocols
17	VR-2284	Communication Module	GPRS Modem Module Support Ethernet and Serial
18	VR-2291	HMI Module	7 inch (16:9) TFT True color, Resolution 800x 480 1x RS232, 1x RS485, 1x Ethernet port
19	VR-2292	HMI Module	10.4 inch (4:316:9) TFT True color, Resolution 640x 480 1x RS232, 1x RS485, 1x Ethernet port
20	VR-2201-6	Accessories	Bus extension cable, length = 60 cm
21	VR-2201-8	Accessories	Bus extension cable, length = 80 cm
22	VR-2201-10	Accessories	Bus extension cable, length = 100 cm

CAll rights reserved. Passing on and copying of this document, use and communication of its contents not permitted without written authorization.

2.6 VR-2200 Series Hardware and Software Training

The training is disported into two stages one stage is include the principle of Substation before install the system which last 1~3 days.

The other stage is in the laboratory after installation and debugging of the products which last 1~2 days for workshop.

During the whole training, every day has 8 periods.

2.6.1 Curriculum Schedule Syllabus

Training items	Times	Training contents	Personnel attended
Alternation layer part (CPU modules) collectivity introduce	Day 1	System block diagrams System configuration Function of adopted devices	Run maintenance personnel System development personnel
Function introduce of network and communication for Alternation layer part	Day 1	Function introduce of network and communication for system introduce of CPU introduce of inside network communication with attempter computer interface and communication with other IED	Run maintenance personnel System development personnel
Introduce of every expansion module and network for Alternation layer part	Day 1	Introduce of hardware system use and maintenance of every expansion module and terminal unit, principle and technical index of every expansion module type and terminal unit.	Run maintenance personnel System development personnel
Assembly and wiring part	Day 2	Advert problem of locale connection	Run maintenance personnel
Programming and Maintenance	Day 2	Introduce of maintenance and programming PLC software for Alternation layer part through use PC.	Run maintenance personnel System development personnel
Workshop	Day 3~4	In the workshop practice all of training program	Run maintenance personnel System development personnel

Table 2-3: VR-2200 Series, Training Syllabus

©All rights reserved. Passing on and copying of this document, use and communication of its contents not permitted without written authorization.

2.7 Standards (Type Test)

2.7.1 Electromagnetic Radiation

1- IEC 61131-2: Radiation Interferences
30~230MHz, 10m, Quasi-peak, value < 40dB (µV/m)
230~1000MHz, 10m, Quasi-peak, value < 47dB (µV/m)

2- IEC 61131-2: Conducted Interferences
0.15~0.5MHz, Quasi-peak, value < 79dB (µV)
Average value <66dB (µV)
0.5~30MHz, Quasi-peak value < 73dB (µV)
Average value < 60dB (µV)

2.7.2 Electromagnetic Compatibility (EMC)

1- IEC 61000-4-2: Electrostatic discharge
±8kV (Air) / ±6kV (Contact)

2- IEC 61000-4-3: Radiated Electromagnetic field
10V/m, Frequency 80MHz ~ 1GHz

3- IEC 61000-4-4: Fast Transient
±2kV (Power) / ±1kV (I/O)

4- IEC 61000-4-5: Surge Immunity
2kV (CM) / 1kV (DM)

5- IEC 61000-4-12: Oscillatory wave Immunity
2.5kV (CM) / 1kV (DM)

2.7.3 Mechanical Standards

1- IEC 60068-2-6: Vibration (sinusoidal)
Part 2-6/10 up 58 Hz,
Uniform amplitude 0.075 mm 1G (acceleration of gravity)
Amplitude 0.3mm, Frequency 58~150Hz

2- IEC 60068-2-27: Shock
15G, dwell time 11ms

3- IEC 60068-2-31: Drop
50mm, drop 4 times (unpacked)

CAll rights reserved. Passing on and copying of this document, use and communication of its contents not permitted without written authorization.

4- IEC 60068-2-32:	Free-fall 1m, fall down 5 times (transport package)
5- IEC 60529:	Protection Class Shell Protection IP 20 (External protection is required for dust, dirt, water, and foreign objects of <12 mm)

2.7.4 Environment Standards

1- Operating Temperature:	-10°C ~ +55°C
2- Operating Humidity:	5% ~ 95% non-condensing
3- Operating Altitude:	0 ~ 3000 m
4- Storage Temperature:	-40°C ~ +70°C
5- Storage Humidity:	5% ~ 95% non-condensing

©All rights reserved. Passing on and copying of this document, use and communication of its contents not permitted without written authorization.

Chapter 3 - CPU Module

3.1 General

VR-2200 Product Series CPU module is the core of the entire PLC system control, and it is required for its completion of the control, scheduling, monitoring, diagnosis and other tasks. Therefore, it is very important to understand the CPU module.

3.2 CPU Modules Appearance

VR-2200 Product Series CPU module's lights, terminal blocks, communication interfaces and labels, and most other user interfaces are located in the module's front panel, as shown in Figure 3-1.

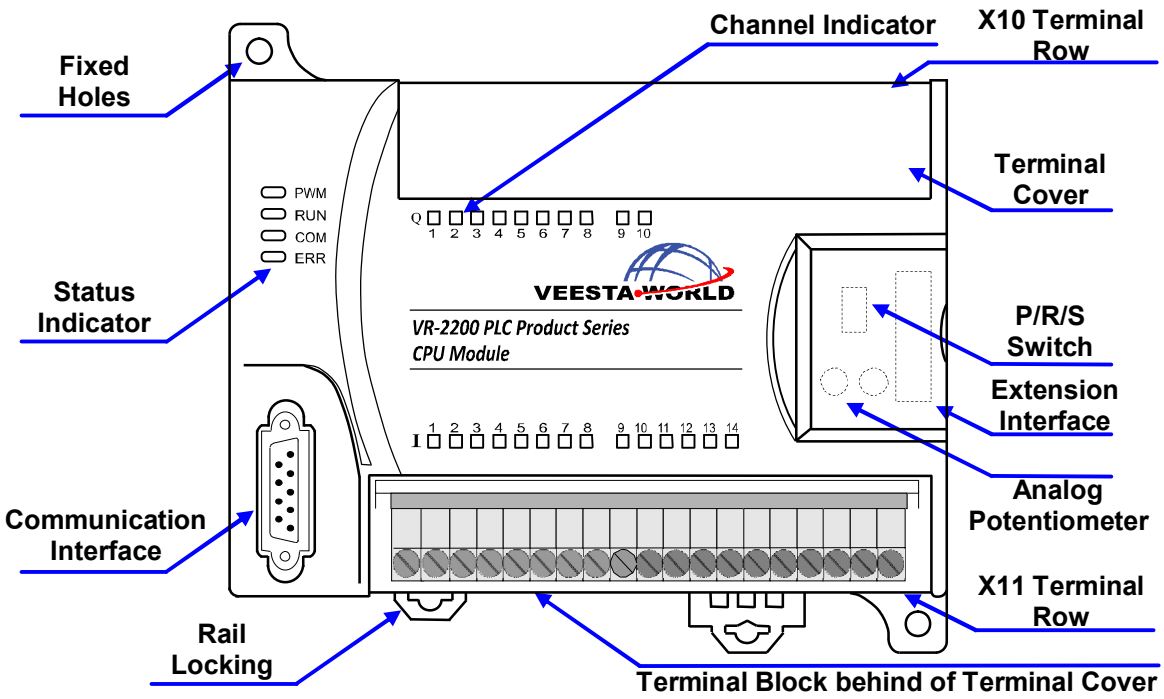


Figure 3-1: VR-2200, CPU Module Apperance

©All rights reserved. Passing on and copying of this document, use and communication of its contents not permitted without written authorization.

3.3 CPU Modules Function Description

CPU module provides the following key features:

- Use sliding switch to select CPU module operating mode;
- Adjustable potentiometer used to achieve a given value of the user's settings;
- Real-time clock, used to record running time and control the process time;
- To provide communication synchronization pulses for the high-speed data transmission between CPU module and expansion module ;
- With RS232 communication interface for the user program downloading, RS485 interface use to communicate with other devices;
- Binary input / output processing;
- High-speed I/O processing.

3.4 CPU Modules Detail

As shown in Figure 3-2, on the right of the CPU module, most important user interfaces are placed in this, such as the working mode selector switch, adjustable potentiometer and expansion of cable interface.

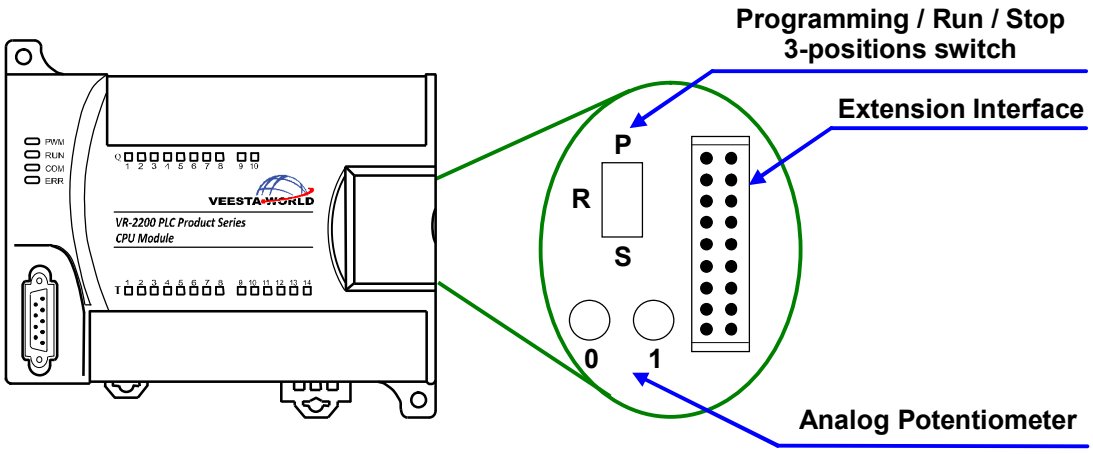


Figure 3-2: VR-2200, CPU Module under extension cover apperance

3.4.1 Select CPU working mode

VR-2200 Product Series CPU module has three working mode switch selector as shown in Figure 3-2 can be chosen to one of working mode of CPU. Please see details in Table 3-1 .

CAll rights reserved. Passing on and copying of this document, use and communication of its contents not permitted without written authorization.

Table 3-1: VR-2200 Series, 3-positions CPU selector switch setting modes

Switch State	Description
P (Programming Mode)	PLC is programmed state, can be downloaded user program;
R (Run Mode)	PLC is in normal operation state, the user program is running;
S (Stop Mode)	PLC is in stop state, the user program is not running, the output is not implemented;

3.4.2 CPU Indicator Definitions

The status indicator lights of CPU module and channels are located on the front panel of the module, as shown in Figure 3-3. These lights can help users to understand the CPU module's operating status.

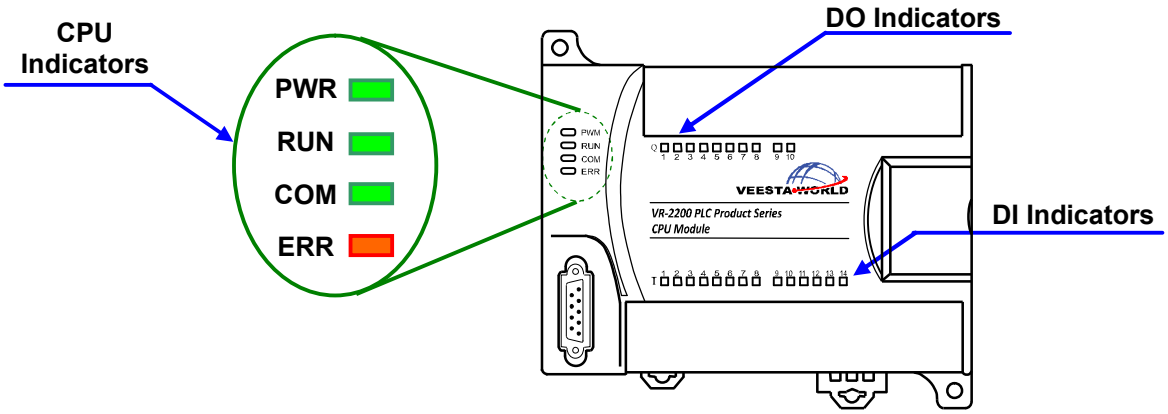


Figure 3-3: VR-2200, CPU Module Indicators

VR-2200 Product Series CPU module indicator is divided into the following categories:

- **Channel Indicator:** used to indicate the working status of each channel on the PLC, including the digital signal input channel (DI) and digital signal output channel (DO);
- **Working Status Indicator:** CPU modules are used to indicate the state, including: running, stop and user program downloads, etc.;
- **Communication Indicator:** the communication state between CPU and expansion modules is shown;
- **Fault Indicator:** when the system is in the diagnosis of a variety of errors, the indicator can be used for instruction.

Table 3-2 shows the VR-2200 Product Series CPU module's specific meaning of each indicator.

CAll rights reserved. Passing on and copying of this document, use and communication of its contents not permitted without written authorization.

Table 3-2: VR-2200 Series, CPU Indicator Definitions

LED	Status	Description
PWR	Light Green	Power Connected and OK.
	Off	Power is not connected or failure.
RUN	Flash Slowly	PLC is in normal operation state, the user's program is running
	Flash Quickly	PLC is in programmed state, can be downloaded user's program
	Off	PLC is in stop state, the user's program is not running, the output is not implemented
COM	Light Green	PLC and the expansion module communication are normal
ERR	Light Red	PLC error occurred, which can be diagnostic
DI (1-n)	Light Green	Signal load input or digital input status is ON
	Off	No input signal or digital status is OFF
DO (1-n)	Light Green	Output load is ON or relay output is in ON state
	Off	Output load is OFF or relay output is in OFF State

3.4.3 Communications Port

On the left of the CPU module, providing a standard RS232 serial communication interface, as shown in Figure 3-4. Users can use this communication interface, so that PLC and personal computer (PC) via serial port programming cable to connect in order to facilitate programs to download and modify the PLC functions.

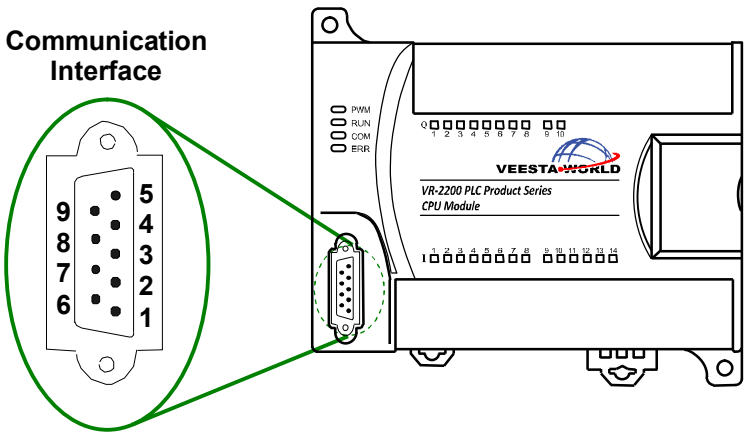


Figure 3-4: VR-2200, CPU Module Communication Interface

©All rights reserved. Passing on and copying of this document, use and communication of its contents not permitted without written authorization.

Table 3-3 shows the RS232 communication interface in D-Type 9 pins connector and Table 3-4 shows the wiring of RS485 communication interface in D-Type and terminals of CPU module

Table 3-3: VR-2200 Series, RS-232 Communication Interface

Pin Number (D-Sub 9 pins)	Definitions
2	RX Data: The receiving port of the RS232 port 1 of CPU
3	TX Data: The transmit port of RS232 port 1 of CPU
5	GND: The reference ground level of RS232 port 1 of CPU
Others	N/C: Other pins for RS232 communication should be disconnected

Table 3-4: VR-2200 Series, RS-485 Communication Interface

Pin Number (D-Sub 9 pins)	Definitions
7	A+ (RS485): The A+ signal of RS485 port 2 of CPU
8	B- (RS485): The B- signal of Rs485 port 2 of CPU
5	GND: The reference signal of RS485 port 2 of CPU
Others	N/C: Other pins for RS485 communication should be disconnected
Terminal Connection	**Definitions**
A2	A+ (RS485): The A+ signal of RS485 port 2 of CPU
B2	B- (RS485): The B- signal of Rs485 port 2 of CPU

©All rights reserved. Passing on and copying of this document, use and communication of its contents not permitted without written authorization.

3.5 CPU Module Specifications

CPU Module is the portion of VR-2200 Product Series which also communicate with the master and optionally with other expansion modules through communication channels.

In this section you will find the specifications of each CPU module from the various types of them that has been produced for your convenience in usage and cost of your design and project needs.

3.5.1 VR-2211 Specifications (14xDI,10xTR)

1.	**Local Points**	: Digital Inputs: Digital Outputs:	14x 24VDC 10x Transistor type
2.	**Storage Capacity**	: Program Code: NVRAM:	128 Kbytes 2 Kbytes
3.	**Supply Voltage**	: 24 VDC	
4.	**Aux Supply**	: 24VDC, 400mA	
5.	**Extension Modules**	: Maximum to power consumption of 15W (Normally 7 extension modules)	
6.	**Number of Pulse Capture**	: 4x Inputs	
7.	**Number of Interrupt**	: 4x Inputs	
8.	**High Speed Counter**	: Single-Phase counter: Two-Phase counter:	3x Channels, each 200kHz 2x Channels, each 100kHz
9.	**High Speed Output**	: Pulse Train Output (PTO): Pulse Width Modulation:	2x Channels, each 100kHz 2x Channels, each 100kHz
10.	**Analog Potentiometer**	: 2x Channels, 8-bit resolution	
11.	**Timer Number (T)**	: 256	
12.	**Counter Number (C)**	: 256	
13.	**Password Protection**	: Yes	

CAll rights reserved. Passing on and copying of this document, use and communication of its contents not permitted without written authorization.

14. Real-Time Clock : Yes

15. Integrated Communication : 1x RS-232 Interface
1x RS-485 Interface
Communication rate 300-38400 bps
Modbus RTU master/slave or User defined Protocols

16. Digital Input Characteristics

Input Type:	Drain Type / Source Type
Input Voltage:	24VDC
Input Range:	0~36VDC
Isolation Method:	Photoelectric
Isolation Group:	2
Isolation Voltage:	2500 / 5000 V r.m.s

17. Digital Output Characteristics

Output Type:	Transistor (Drain/Source) Type
Rated Voltage:	24VDC
Common Terminal:	4A rated current
Single Channel:	500mA maximum current
Isolation Method:	Photoelectric
Isolation Group:	2
Isolation Voltage:	2500 / 5000 V r.m.s

18. Power Consumptions : Maximum 400mA

19. Module Dimension : 125mm(L) * 90mm(W) * 68.5mm(H)
Weight 400 grams

20. Environment

Operating Temperature	: -10°C to 55°C
Storage Temperature	: -40°C to 70°C
Relative Humidity	: 5% to 95% non-condensing

CAll rights reserved. Passing on and copying of this document, use and communication of its contents not permitted without written authorization.

3.5.2 VR-2212 Specifications (14xDI,10xREL)

1. Local Points	: Digital Inputs:	14x 24VDC
	Digital Outputs:	10x Relay type
2. Storage Capacity	: Program Code:	128 Kbytes
	NVRAM:	2 Kbytes
3. Supply Voltage	: 24 VDC	
4. Aux Supply	: 24VDC, 400mA	
5. Extension Modules	: Maximum to power consumption of 15W (Normally 7 extension modules)	
6. Number of Pulse Capture	: 4x Inputs	
7. Number of Interrupt	: 4x Inputs	
8. High Speed Counter	: Single-Phase counter:	3x Channels, each 200kHz
	Two-Phase counter:	2x Channels, each 100kHz
9. High Speed Output	: None (Regarding Relay output type)	
10. Analog Potentiometer	: 2x Channels, 8-bit resolution	
11. Timer Number (T)	: 256	
12. Counter Number (C)	: 256	
13. Password Protection	: Yes	
14. Real-Time Clock	: Yes	
15. Integrated Communication	: 1x RS-232 Interface 1x RS-485 Interface Communication rate 300-38400 bps Modbus RTU master/slave or User defined Protocols	
16. Digital Input Characteristics	: Input Type:	Drain Type / Source Type
	Input Voltage:	24VDC
	Input Range:	0~36VDC
	Isolation Method:	Photoelectric
	Isolation Group:	2
	Isolation Voltage:	2500 / 5000 V r.m.s

CAll rights reserved. Passing on and copying of this document, use and communication of its contents not permitted without written authorization.

17. Digital Output Characteristics	: Output Type:	Relay Type
	Rated Voltage:	24VDC or 220VAC
	Common Terminal:	10A rated current
	Single Channel:	3A maximum current
	Isolation Method:	Coil isolated from contact
	Isolation Group:	3
	Isolation Voltage:	3000 V r.m.s
18. Power Consumptions	: Maximum 400mA	
19. Module Dimension	: 125mm(L) * 90mm(W) * 68.5mm(H)	
	Weight 450 grams	
20. Environment		
Operating Temperature	: -10°C to 55°C	
Storage Temperature	: -40°C to 70°C	
Relative Humidity	: 5% to 95% non-condensing	

3.5.3 VR-2214 Specifications (8xDI,6xTR,4xAI,2xAO)

1. Local Points	: Digital Inputs:	8x 24VDC
	Digital Outputs:	6x Transistor type
	Analog Inputs:	4x Current type (0-20mA)
	Analog Outputs:	2x Current type (4-20mA)
2. Storage Capacity	: Program Code:	128 Kbytes
	NVRAM:	2 Kbytes
3. Supply Voltage	: 24 VDC	
4. Aux Supply	: 24VDC, 400mA	
5. Extension Modules	: Maximum to power consumption of 15W	
	(Normally 7 extension modules)	
6. Number of Pulse Capture	: 4x Inputs	
7. Number of Interrupt	: 4x Inputs	
8. High Speed counter	: Single-Phase counter:	2x Channels, each 200kHz
	Two-Phase counter:	2x Channels, each 100kHz

CAll rights reserved. Passing on and copying of this document, use and communication of its contents not permitted without written authorization.

9. High Speed Output : Pulse Train Output (PTO): 2x Channels, each 100kHz
Pulse Width Modulation: 2x Channels, each 100kHz

10. Analog Potentiometer : 2x Channels, 8-bit resolution

11. Timer Number (T) : 256

12. Counter Number (C) : 256

13. Password Protection : Yes

14. Real-Time Clock : Yes

15. Integrated Communication : 1x RS-232 Interface
1x RS-485 Interface
Communication rate 300-38400 bps
Modbus RTU master/slave or User defined Protocols

16. Digital Input Characteristics

Input Type:	Drain Type / Source Type
Input Voltage:	24VDC
Input Range:	0~36VDC
Isolation Method:	Photoelectric
Isolation Group:	2
Isolation Voltage:	2500 / 5000 V r.m.s

17. Digital Output Characteristics

Output Type:	Transistor (Drain/Source) Type
Rated Voltage:	24VDC
Common Terminal:	4A rated current
Single Channel:	500mA maximum current
Isolation Method:	Photoelectric
Isolation Group:	1
Isolation Voltage:	2500 / 5000 V r.m.s

18. Analog Input Characteristics

Input Type:	Single ended input type
A/D Resolutions:	10 bits
Signal Type:	0~20 mA
Data Format:	0~20000
Maximum Input:	25mA
A/D Conversion Time:	< 200 us
Input Step response time:	1ms
Common-mode rejection ratio:	80dB

CAll rights reserved. Passing on and copying of this document, use and communication of its contents not permitted without written authorization.

19. Analog Output Characteristics : Output Type: Current type
D/A Resolutions: 10 bits
Signal Type: 4~20 mA
Data Format: 400~20000
Resistive Load Set Time: 0.1 ms
Capacitive Load Set Time: 3.3 ms
Inductive Load Set Time: 0.5 ms (1mH)
Accuracy (relative out range): 0.2%

20. Power Consumptions : Maximum 400mA

21. Module Dimension : 125mm(L) * 90mm(W) * 68.5mm(H)
Weight 400 grams

22. Environment
Operating Temperature : -10°C to 55°C
Storage Temperature : -40°C to 70°C
Relative Humidity : 5% to 95% non-condensing

3.5.4 VR-2215 Specifications (8xDI,6xREL,4xAI,2xAO)

1. Local Points : Digital Inputs: 8x 24VDC
Digital Outputs: 6x Relay type
Analog Inputs: 4x Current type (0-20mA)
Analog Outputs: 2x Current type (4-20mA)

2. Storage Capacity : Program Code: 128 Kbytes
NVRAM: 2 Kbytes

3. Supply Voltage : 24 VDC

4. Aux Supply : 24VDC, 400mA

5. Extension Modules : Maximum to power consumption of 15W
(Normally 7 extension modules)

6. Number of Pulse Capture : 4x Inputs

7. Number of Interrupt : 4x Inputs

CAll rights reserved. Passing on and copying of this document, use and communication of its contents not permitted without written authorization.

8. High Speed counter	: Single-Phase counter:	2x Channels, each 200kHz
	Two-Phase counter:	2x Channels, each 100kHz
9. High Speed Output	: None (Regarding Relay output type)	
10. Analog Potentiometer	: 2x Channels, 8-bit resolution	
11. Timer Number (T)	: 256	
12. Counter Number (C)	: 256	
13. Password Protection	: Yes	
14. Real-Time Clock	: Yes	
15. Integrated Communication	: 1x RS-232 Interface	
	1x RS-485 Interface	
	Communication rate 300-38400 bps	
	Modbus RTU master/slave or User defined Protocols	
16. Digital Input Characteristics	: Input Type:	Drain Type / Source Type
	Input Voltage:	24VDC
	Input Range:	0~36VDC
	Isolation Method:	Photoelectric
	Isolation Group:	2
	Isolation Voltage:	2500 / 5000 V r.m.s
17. Digital Output Characteristics	: Output Type:	Relay Type
	Rated Voltage:	24VDC or 220VAC
	Common Terminal:	10A rated current
	Single Channel:	3A maximum current
	Isolation Method:	Coil isolated from contact
	Isolation Group:	3
	Isolation Voltage:	3000 V r.m.s
18. Analog Input Characteristics	: Input Type:	Single ended input type
	A/D Resolutions:	10 bits
	Signal Type:	0~20 mA
	Data Format:	0~20000
	Maximum Input:	25mA
	A/D Conversion Time:	< 200 us
	Input Step response time:	1ms
	Common-mode rejection ratio:	80dB

CAll rights reserved. Passing on and copying of this document, use and communication of its contents not permitted without written authorization.

19. Analog Output Characteristics : Output Type: Current type
D/A Resolutions: 10 bits
Signal Type: 4~20 mA
Data Format: 400~20000
Resistive Load Set Time: 0.1 ms
Capacitive Load Set Time: 3.3 ms
Inductive Load Set Time: 0.5 ms (1mH)
Accuracy (relative out range): 0.2%

20. Power Consumptions : Maximum 400mA

21. Module Dimension : 125mm(L) * 90mm(W) * 68.5mm(H)
Weight 450 grams

22. Environment
Operating Temperature : -10°C to 55°C
Storage Temperature : -40°C to 70°C
Relative Humidity : 5% to 95% non-condensing

CAll rights reserved. Passing on and copying of this document, use and communication of its contents not permitted without written authorization.

Chapter 4 - Digital Expansion Modules

4.1 General

VR-2200 Product Series Offers a variety of Expansion modules to users. From various expansion module types we describe about the type of digital data like digital input and digital output modules in this chapter.

4.2 Digital Input Module

VR-2200 Product Series digital input expansion modules can be connected to a standard switch inputs and 2-wire proximity switch inputs, its main technical performances are as follows:

- Can connect sink or source input signal;
- Rated Input voltage is 24VDC;
- Apply to standard switch and 2-wire proximity switch;
- Non-need hardware setting, the CPU Module Load parameters automatically after startup;
- Every channel has independent electrical isolation, which insures the whole module can run safely when any channel's signal is disturbed by strong electrical interference.

CAll rights reserved. Passing on and copying of this document, use and communication of its contents not permitted without written authorization.

4.2.1 VR-2221 Specifications (8xDI)

1. **Input Channels** : 8 points

2. **Input Type** : Sink / Source

3. **Input Voltage** : 24 VDC (Rated Value)
   "ON State" : 15~30 VDC
   "OFF State" : 0~5 VDC

4. **Isolation Method** : Optoelectronic isolation

5. **Isolation Group** : 1

6. **Isolation Voltage** : 5000 V r.m.s

7. **Power Consumptions** : Maximum 35mA

8. **Module Dimension** : 75mm(L) * 90mm(W) * 68.5mm(H)

9. **Environment**
   Operating Temperature : -10°C to 55°C
   Storage Temperature : -40°C to 70°C
   Relative Humidity : 5% to 95% non-condensing

©All rights reserved. Passing on and copying of this document, use and communication of its contents not permitted without written authorization.

4.2.2 VR-2222 Specifications (16xDI)

1. **Input Channels** : 16 points

2. **Input Type** : Sink / Source

3. **Input Voltage** : 24 VDC (Rated Value)
   "ON State" : 15~30 VDC
   "OFF State" : 0~5 VDC

4. **Isolation Method** : Optoelectronic isolation

5. **Isolation Group** : 2

6. **Isolation Voltage** : 5000 V r.m.s

7. **Power Consumptions** : Maximum 35mA

8. **Module Dimension** : 75mm(L) * 90mm(W) * 68.5mm(H)

9. **Environment**
   Operating Temperature : -10°C to 55°C
   Storage Temperature : -40°C to 70°C
   Relative Humidity : 5% to 95% non-condensing

©All rights reserved. Passing on and copying of this document, use and communication of its contents not permitted without written authorization.

4.3 Digital Output Module

Digital output modules of VR-2200 Product Series are used to connect solenoid, contactors, low-power motors, lights, motor starters and other equipments, its main technical performances are shown as follows:

- 16 channels output (MAX);
- Output mode is transistor or relay ;
- Each group of output have fuse protection can auto-protect the module if it is over loaded
- Intelligent module, with self-diagnostic function, can be reset and reboot automatically without setting when it is faulty;

4.3.1 VR-2231 Specifications (8xDO Transistor)

1. **Output Channels** : 8 points
2. **Output Type** : Transistor
3. **Sum Current of Common Terminal** : 3A
4. **Max Current per Channel** : 500 mA
5. **Isolation Method** : Optoelectronic method
6. **Isolation Group** : 2
7. **Isolation Voltage** : 3750 V r.m.s
8. **Power Consumptions** : Maximum 25mA
9. **Module Dimension** : 75mm(L) * 90mm(W) * 68.5mm(H)
   Weight 160 grams
10. **Environment**
    - **Operating Temperature** : -10°C to 55°C
    - **Storage Temperature** : -40°C to 70°C
    - **Relative Humidity** : 5% to 95% non-condensing

CAll rights reserved. Passing on and copying of this document, use and communication of its contents not permitted without written authorization.

4.3.2 VR-2232 Specifications (8xDO Relay)

1. **Output Channels** : 8 points
2. **Output Type** : Relay
3. **Sum Current of Common Terminal** : 10A
4. **Max Current per Channel** : 3A
5. **Relay Contact Life** : 100000 times
6. **Isolation Method** : Mechanical Contact / coil
7. **Isolation Group** : 2
8. **Isolation Voltage** : 3000 V r.m.s
9. **Power Consumptions** : Maximum 35mA
10. **Module Dimension** : 75mm(L) * 90mm(W) * 68.5mm(H)
    Weight 160 grams
11. **Environment**
    - **Operating Temperature** : -10°C to 55°C
    - **Storage Temperature** : -40°C to 70°C
    - **Relative Humidity** : 5% to 95% non-condensing

CAll rights reserved. Passing on and copying of this document, use and communication of its contents not permitted without written authorization.

4.4 Digital Input/Output Module

Digital input/output modules of VR-2200 Product Series are special modules that provide the digital input signal types within the digital output signal type all in one module. This feature have a lot of help to user to achieve a cost per solution providing proposal as well as in many case cause you save cost while you need some points inputs and some points outputs.

4.4.1 VR-2261 Specifications (4xDI, 4xDO Transistor)

1. **Number of Channels** : 4 points Input
   4 points Output
2. **Channel Type** : Input: Sink / Source
   Output: Transistor
3. **Input Voltage** : 24 VDC (Rated Value)
   "ON State" : 15~30 VDC
   "OFF State" : 0~5 VDC
4. **Input Isolation** : Optoelectronic Isolation Method
   1x Group
   5000 V r.m.s
5. **Sum Current of Output Common Terminal** : 3A
6. **Max Current per Output Channel** : 500 mA
7. **Output Isolation** : Optoelectronic Isolation Method
   1x Group
   3750 V r.m.s
8. **Power Consumptions** : Maximum 25mA
9. **Module Dimension** : 75mm(L) * 90mm(W) * 68.5mm(H)
   Weight 160 grams
10. **Environment**
    Operating Temperature : -10°C to 55°C
    Storage Temperature : -40°C to 70°C
    Relative Humidity : 5% to 95% non-condensing

CAll rights reserved. Passing on and copying of this document, use and communication of its contents not permitted without written authorization.

4.4.2 VR-2262 Specifications (4xDI, 4xDO Relay)

1. **Number of Channels** : 4 points Input
   4 points Output

2. **Channel Type** : Input: Sink / Source
   Output: Relay

3. **Input Voltage** : 24 VDC (Rated Value)
   "ON State" : 15~30 VDC
   "OFF State" : 0~5 VDC

4. **Input Isolation** : Optoelectronic Isolation Method
   1x Group
   5000 V r.m.s

5. **Sum Current of Output Common Terminal** : 10A

6. **Max Current per Output Channel** : 3A

7. **Output Isolation** : Contact / Coil Method
   1x Group
   3000 V r.m.s

8. **Relay Contact Life** : 100000 times

9. **Power Consumptions** : Maximum 25mA

10. **Module Dimension** : 75mm(L) * 90mm(W) * 68.5mm(H)
    Weight 160 grams

11. **Environment**
    Operating Temperature : -10°C to 55°C
    Storage Temperature : -40°C to 70°C
    Relative Humidity : 5% to 95% non-condensing

©All rights reserved. Passing on and copying of this document, use and communication of its contents not permitted without written authorization.

Chapter 5 - Analog Expansion Module

5.1 General

VR-2200 Product Series Offers a variety of Expansion modules to users. From various expansion module types we describe about the type of analog data signals like analog input and analog output modules in this chapter.

5.2 Analog Input Module

VR-2200 Product Series analog input expansion modules can be connected to voltage and current sensors, its main technical specifications are as follows:

- Maximum provide the 8x analog input;
- Signal type: Voltage or Current for each channel selectable
- Measurement accuracy: 12 bit;
- Input type: Single-ended;
- Intelligent module, with self-diagnostic function, can be reset and reboot automatically when it is faulty in module operation;
- Non-need hardware setting, the CPU Module Load parameters on it automatically after startup.

5.2.1 VR-2242 Specifications (4xAI)

1.	**Input Channels**	: 4 points		
2.	**Input Type**	: Single-ended		
3.	**A/D Resolutions**	: 12 bits		
4.	**A/D Conversion Time**	: < 100 us		
5.	**Signal Type / Data Format**	: Voltage:	-10V ~ +10V	/ 0 ~ 20000
			0V ~ +10V	/ 0 ~ 20000
			-5V ~ +5V	/ 0 ~ 20000
			0V ~ +5V	/ 0 ~ 20000
		Current:	0 ~ 20mA	/ 0 ~ 20000
			4 ~ 20mA	/ 400 ~ 20000
6.	**Input Step Response**	: 5 ms		

CAll rights reserved. Passing on and copying of this document, use and communication of its contents not permitted without written authorization.

7. **Common Mode Rejection Ratio** : 120 dB (CMMR)
8. **Temperature Drift** : ±100ppm/°C
9. **Power Consumptions** : Maximum 25mA
10. **Module Dimension** : 75mm(L) * 90mm(W) * 68.5mm(H)
    Weight 160 grams
11. **Environment**
    - **Operating Temperature** : -10°C to 55°C
    - **Storage Temperature** : -40°C to 70°C
    - **Relative Humidity** : 5% to 95% non-condensing

CAll rights reserved. Passing on and copying of this document, use and communication of its contents not permitted without written authorization.

5.3 Analog Output Module

VR-2200 Product Series analog output expansion modules connect the analog actuator; its main specifications are shown as follows:

- Maximum 4 channel analog output;
- Output range: 0-20mA, 4-20mA, 0-10V, -10V ~ +10V;
- Accuracy is 0.2%;
- Intelligent module, with self-diagnostic function, can be reset and reboot automatically when it is faulty in module operation;
- Non-need hardware setting, the CPU Module Load parameters on it automatically after startup

5.3.1 VR-2252 Specifications (4xAO)

1. **Output Channels** : 4 points

2. **D/A Resolutions** : 12 bits

3. **D/A Conversion Time** : 100 us

4. **Drive Capability** : Voltage Output Min 2000 Ω
   Current Output Min 500 Ω

5. **Accuracy (Relative to Output Range)** : 0.2 %

6. **Signal Type / Data Format** :

Voltage:	-10V ~ +10V	/	0 ~ 20000
	0V ~ +10V	/	0 ~ 20000
	-5V ~ +5V	/	0 ~ 20000
	0V ~ +5V	/	0 ~ 20000
Current:	0 ~ 20mA	/	0 ~ 20000
	4 ~ 20mA	/	400 ~ 20000

7. **Power Consumptions** : Maximum 90mA

8. **Module Dimension** : 75mm(L) * 90mm(W) * 68.5mm(H)
   Weight 160 grams

9. **Environment**
   - **Operating Temperature** : -10°C to 55°C
   - **Storage Temperature** : -40°C to 70°C
   - **Relative Humidity** : 5% to 95% non-condensing

CAll rights reserved. Passing on and copying of this document, use and communication of its contents not permitted without written authorization.

5.4 Analog Input/Output Module

Analog input/output modules of VR-2200 Product Series are special modules that provide the analog input signal types within the analog output signal type all in one module. This feature have a lot of help to user to achieve a cost per solution providing proposal as well as in many case cause you save cost while you need some points inputs and some points outputs.

Analog input/output module has the following features:

- Maximum providing 4 points analog input and 2 points analog output;
- Signal type: voltage or current;
- Measurement accuracy: 12 bits
- Output accuracy: 2 bits
- Input type: Single-ended;
- Intelligent module, with self-diagnostic function, can be reset and reboot automatically when it is faulty in running;
- Non-need hardware setting, the CPU Module Load parameters on it automatically after startup.

5.4.1 VR-2271 Specifications (4xAI, 2xAO)

1.	**Number of Channels**	: 4 points Analog Input Single-ended 2 points Analog Output
2.	**A/D Resolutions**	: 12 bits
3.	**D/A Resolutions**	: 12 bits
4.	**A/D Conversion Time**	: < 100 us
5.	**D/A Conversion Time**	: 100 us
6.	**Common Mode Rejection Ratio**	: 120 dB (CMMR)
7.	**Drive Capability**	: Voltage Output Min 2000 Ω Current Output Min 500 Ω
8.	**Accuracy (Relative to Output Range)**	: 0.2 %
9.	**Temperature Drift**	: ±100ppm/°C

©All rights reserved. Passing on and copying of this document, use and communication of its contents not permitted without written authorization.

10. Signal Type / Data Format (Analog Input & Output)	: Voltage:	-10V ~ +10V	/	0 ~ 20000
		0V ~ +10V	/	0 ~ 20000
		-5V ~ +5V	/	0 ~ 20000
		0V ~ +5V	/	0 ~ 20000
	Current:	0 ~ 20mA	/	0 ~ 20000
		4 ~ 20mA	/	400 ~ 20000

11. Power Consumptions : Maximum 90mA

12. Module Dimension : 75mm(L) * 90mm(W) * 68.5mm(H)
Weight 160 grams

13. Environment

Operating Temperature : -10°C to 55°C
Storage Temperature : -40°C to 70°C
Relative Humidity : 5% to 95% non-condensing

CAll rights reserved. Passing on and copying of this document, use and communication of its contents not permitted without written authorization.

Chapter 6 - Physical Installation Information

6.1 General

This chapter provides general installing principles for installing system components, and how to ensure the installation accordant with electromagnetic compatibility requirements, so that you could have an effective and use of PLC VR-2200 Product Series safely.

6.1.1 Ventilation and Cooling

Continuously working under fierce environment such as peak load, ultra-high temperature or other extreme conditions will usually shorten the life time of electrical equipment. As a result, ventilation and cooling shall be taken into serious consideration.

The PLC of VR-2200 Product Series devices are designed for natural convection cooling, so special location and space of installation are required for these modules.

Whatever the installation mode is, the PLC modules shall be installed in a way as shown in Figure 6-1 for good ventilation and cooling.

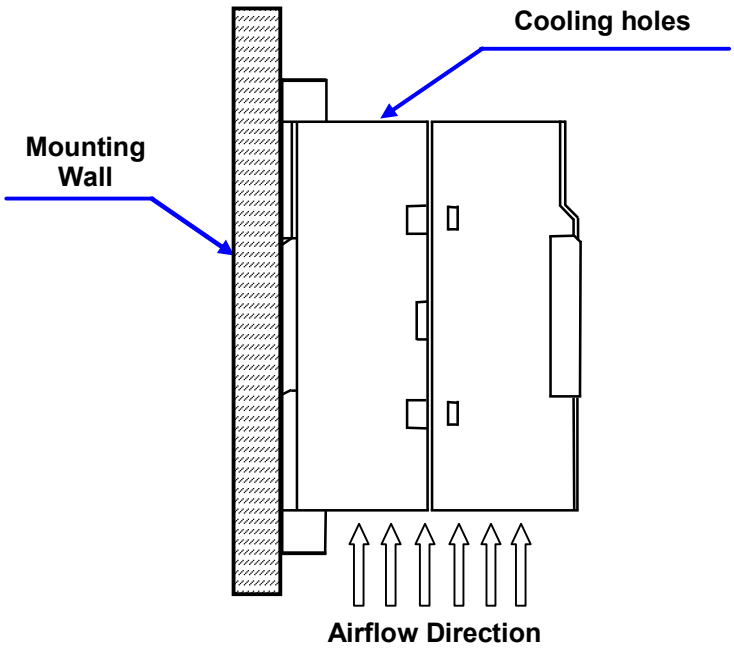


Figure 6-1: VR-2200, Recommended Ventilations

©All rights reserved. Passing on and copying of this document, use and communication of its contents not permitted without written authorization.

To avoid any malfunction caused by poor ventilation, please do not install the PLC in the ways as shown in Figure 6-2.

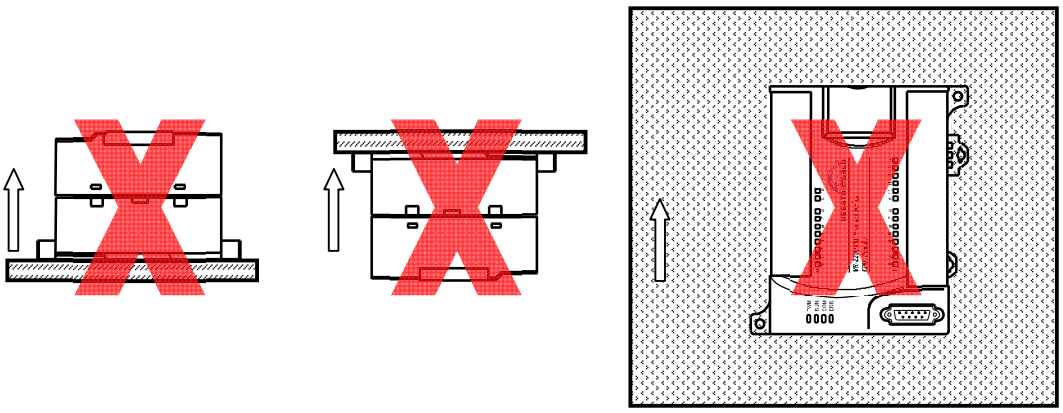


Figure 6-2: VR-2200, Mounting method to be avoided

For proper cooling, a clearance of at least 50 mm above and below each module must be provided. If the front baffle is used the depth between baffles must be kept at 100mm as shown in Figure 6-3.

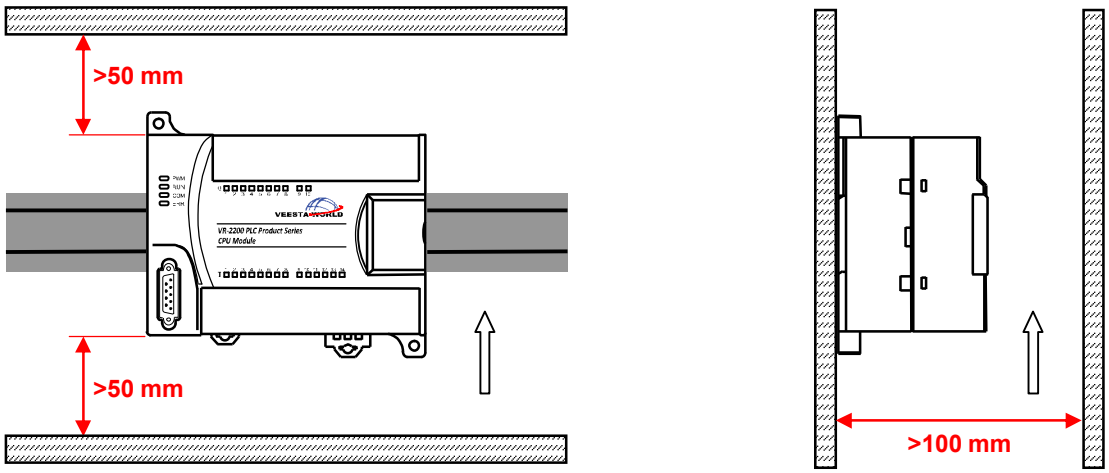


Figure 6-3: VR-2200, Space Requirements in cubicle

Finally, when planning the layout for the VR-2200 system, should set aside enough space for the expansion wiring and communications cable connections.

CAll rights reserved. Passing on and copying of this document, use and communication of its contents not permitted without written authorization.

6.1.2 Power Dissipation

VR-2200 Product Series PLC CPUs have an internal power supply module to provide power for the CPU, the expansion modules, and other field equipments such as sensors or actuators. All VR-2200 Product Series CPUs provide 24VDC output.

Pay attention to the numbers of your selected expansion modules, so that system overall power need will not exceed what your selected CPUs can supply. Refer to relevant part of this manual for information about the expansion module numbers that each CPU could support and the power consumption that each expansion module makes.

6.1.3 Proper Location of Wirings

Some general principles of cable installation and field wiring are listed as below:

- The distance between PLC and field equipments shall be as short as possible, so as to shorten cable length;
- Cables of equal length are preferred;
- The cables are to be numbered and divided into different types according to their functions;
- The installation of both input and output cables in the same cable slot shall be avoided;
- Data cables and signal cables must be shielded
- The AC cables and high-energy DC cables shall be separated from the low-energy signal cables;
- The installation of big-current cables in the same slot with signal or data cables shall be avoided;
- Avoid connecting an external power supply in parallel with DC supply to provide power, which might result in a countercurrent conflicting with output.

For detailed wiring specifications, please refer to the Chapter 8 - as different modules require different wiring methods.

6.2 Electrical Safety

When put VR-2200 Product Series PLC into operation and for the safety of personnel and equipments, it is suggested to set up safety loops, aiming at functions such as redundant protection, power overload protection or emergency shutdowns, independently from the VR-2200 Product Series PLC system to avoid any emergencies.

CAll rights reserved. Passing on and copying of this document, use and communication of its contents not permitted without written authorization.

6.3 Mounting and Installation and Removal

Failure to cut off all power to the VR-2200 Product Series PLC and related equipments during installation or removal procedures might result in serious injury to personnel, and/or damage to equipments.

Always follow appropriate safety precautions and ensure that power to the VR-2200 Product Series PLC is cut off before attempting to install or remove the VR-2200 Product series and or related equipments.

There are two installation modes for VR-2200 Product Series. In different engineering environments, one can mount modules either on a flat panel or in the DIN standard rail, as shown in Figure 6-4.
Expansion modules can also be connected to CPUs with an expansion cable.

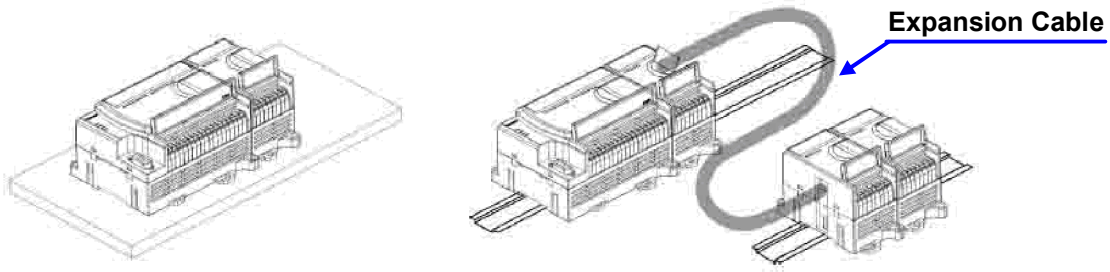


Figure 6-4: VR-2200, Mounting Methods

6.3.1 Panel Mounting

6.3.1.1 Mounting on Panel

1- Set the mounting holes according to module size and installation location hole.
2- Secure the CPU(s) to the panel, using appropriate screws.
3- If using expansion modules, place them side by side and fasten them.
4- Connect the expansion module ribbon cable into the connector on the right side of the adjacent module in the correct direction;
5- Connect cables;

CAll rights reserved. Passing on and copying of this document, use and communication of its contents not permitted without written authorization.

The mounting process is explained in Figure 6-5.

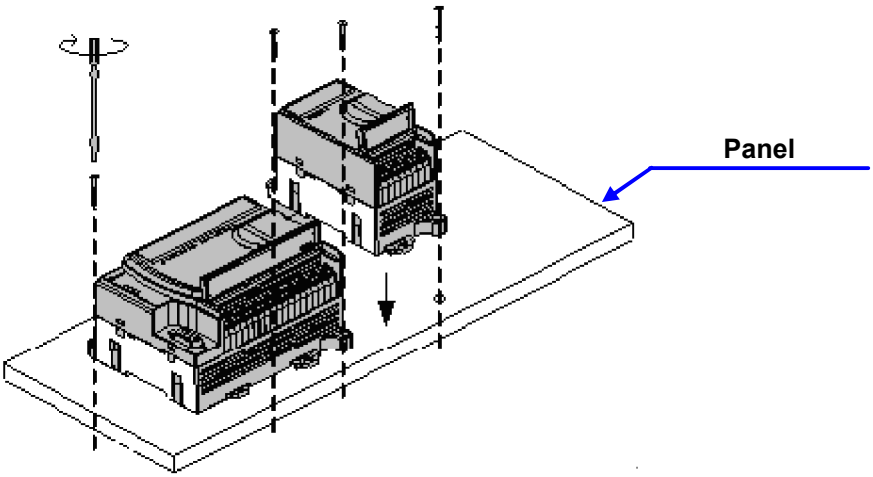


Figure 6-5: VR-2200, Module mounting on panel

6.3.1.2 Removing from Panel

1- Remove all cables;
2- Disconnect cables that are attached to adjacent modules;
3- Loosen the mounting screws and take off modules in turn.

Removing process is displayed in Figure 6-6

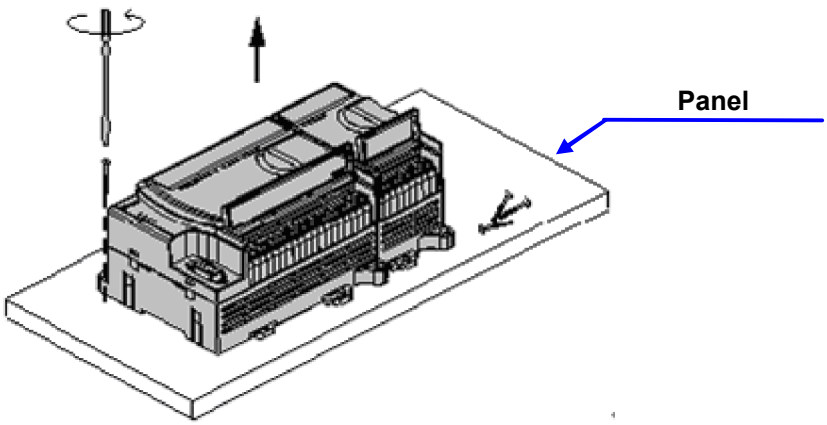


Figure 6-6: VR-2200, Module removing from panel

©All rights reserved. Passing on and copying of this document, use and communication of its contents not permitted without written authorization.

6.3.2 DIN Rail Mounting

6.3.2.1 Standard DIN rail and DIN rail clip

VR-2200 Product Series can be mounted on a standard 35mm DIN rail, and PLC modules can be slide horizontally along the rail.

Figure 6-7 shows the sizes of common DIN rails and Figure 6-8 illustrates the DIN rail clip of VR-2200 Product Series.

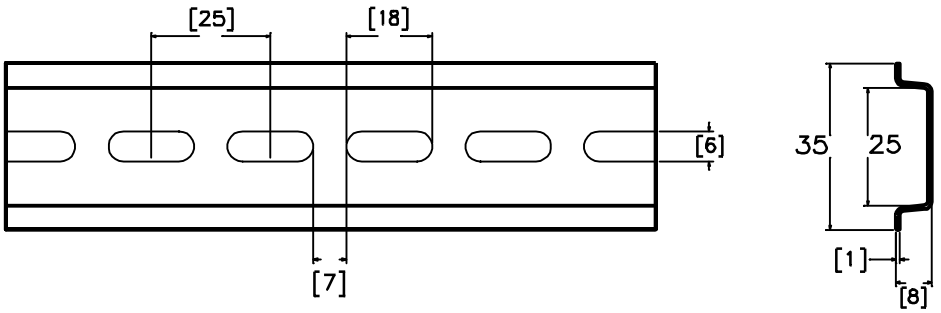


Figure 6-7: VR-2200, Standard 35mm DIN Rail

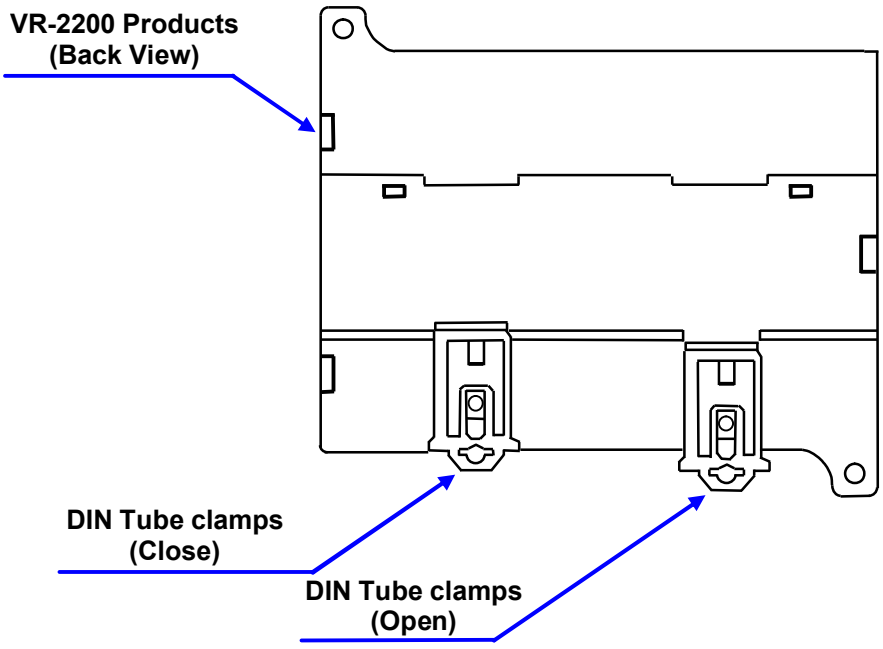


Figure 6-8: VR-2200, Case Rail Clip

©All rights reserved. Passing on and copying of this document, use and communication of its contents not permitted without written authorization.

6.3.2.2 Mounting on Rail

1- Loose the DIN clip at the bottom of CPU module or expansion module , and place the module on the DIN rail;
2- Close the DIN clip and ensure that the CPU module or expansion module is fixed closely with the rail;
3- Fasten the expansion modules, if any, side by side on the rail;
4- Connect the expansion module cable to the connector on the right side of the adjacent module in correct direction;
5- Connect the cables;

The installation process is shown in Figure 2-3-6.

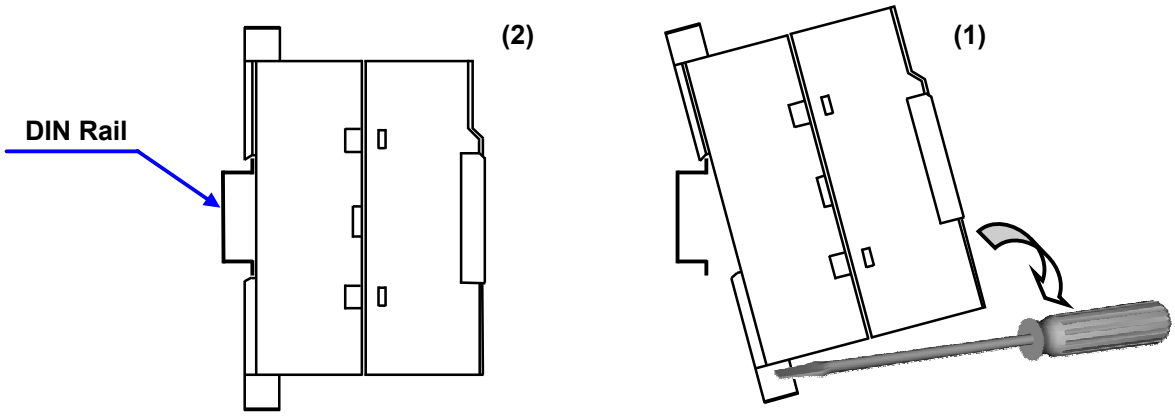


Figure 6-9: VR-2200, Module mounting on DIN Rail

6.3.2.3 Removing from Rail

1- Disconnect all the wiring and cabling that are attached to the module;
2- Disconnect the expansion module cable from the adjacent modules;
3- Loosen DIN clip and remove modules in turn.

Removing process is shown in Figure 6-10

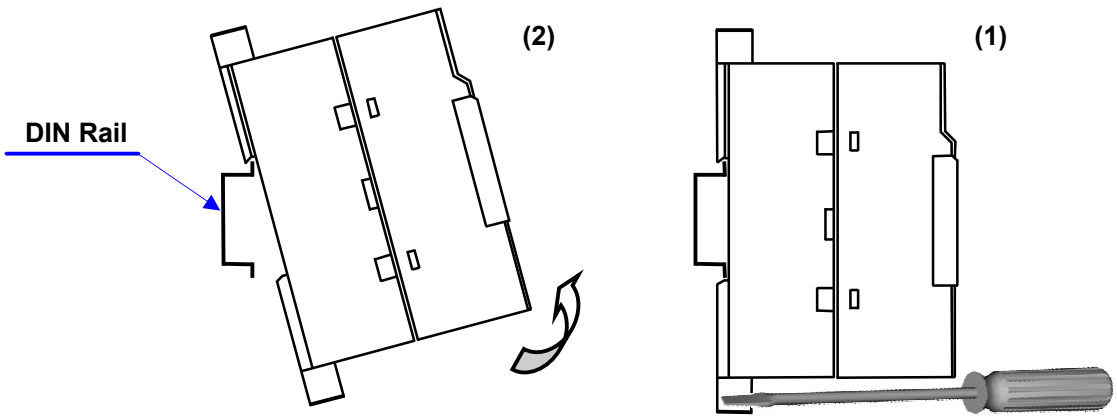


Figure 6-10: VR-2200, Module removing from DIN Rail

CAll rights reserved. Passing on and copying of this document, use and communication of its contents not permitted without written authorization.

6.3.3 Expansion Cable Connection

When making connection between modules, one should ensure that expansion cable plug is in the same direction as the socket notch of the expansion interface of adjacent module, as shown in Figure2-3-8.

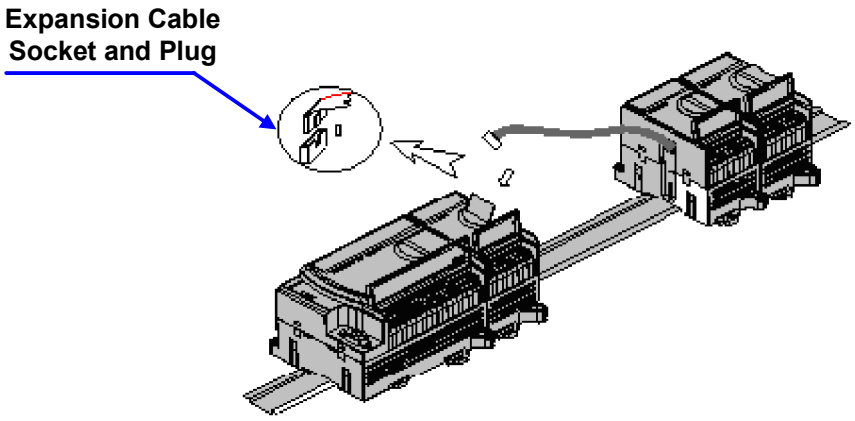


Figure 6-11: VR-2200, Expansion Cable connections among the modules

Be sure to pay attention to the following:

If improper modules are replaced during maintenance, control program may not work correctly. Replacement of wrong expansion modules or cables will result in serious consequences. Hence, be sure to replace modules with the same model and locate the modules correctly.

CAll rights reserved. Passing on and copying of this document, use and communication of its contents not permitted without written authorization.

6.4 Dimensions and Structures

The VR-2200 Product Series has two types of case, one for CPU modules and another for extension modules. The height and width of CPU module and extension modules are same but the length of them has difference. You can see the dimension and structure of modules in side view in Figure 6-12 and for CPU module in Figure 6-13 and extension modules in Figure 6-14.

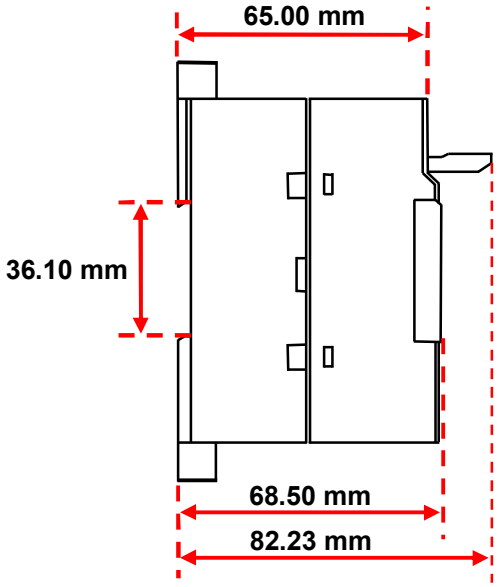


Figure 6-12: VR-2200, Side View Dimensions - All Modules

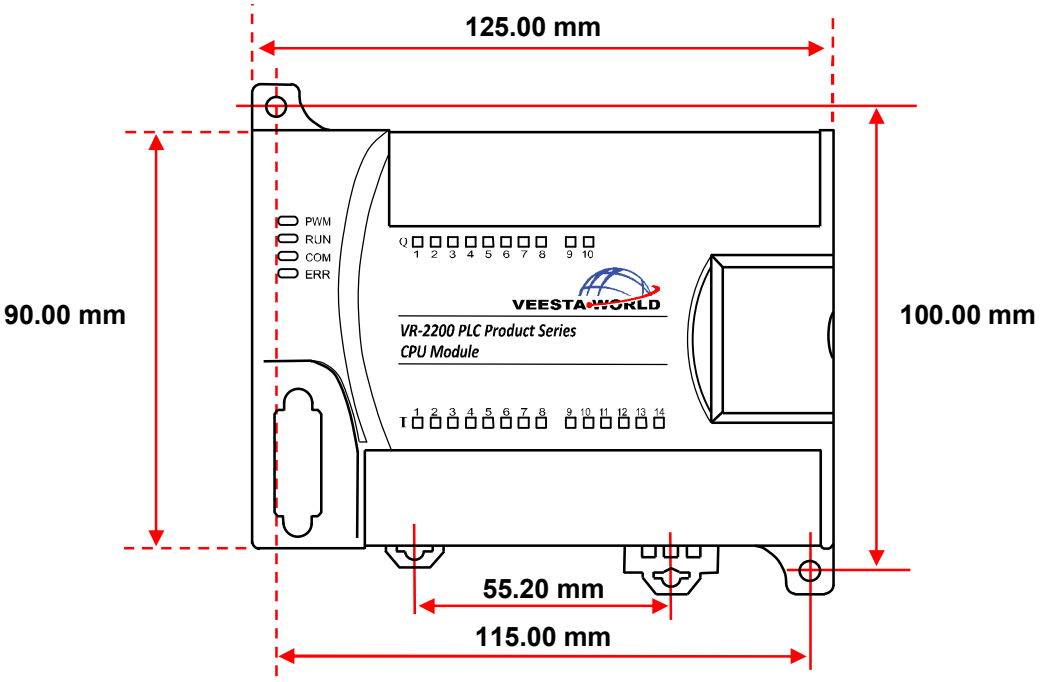


Figure 6-13: VR-2200, Front View Dimensions - CPU Module

©All rights reserved. Passing on and copying of this document, use and communication of its contents not permitted without written authorization.

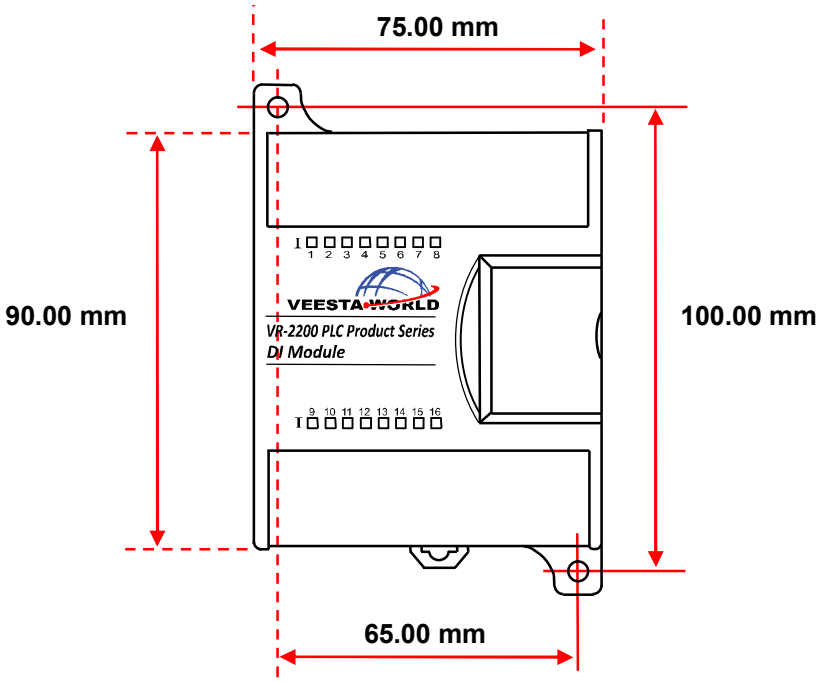


Figure 6-14: VR-2200, Front View Dimensions - Extension Module

©All rights reserved. Passing on and copying of this document, use and communication of its contents not permitted without written authorization.

Chapter 7 - Quick Application Guide

7.1 General

If you already have experiences in using PLC, the following guide will help you quickly set up a simple control system based on products of VR-2200 PLC Product Series.

7.2 Packing-list Confirmation

Please confirm whether your product components are in line with your order model number and check the packing integrity. If the packaging is damaged, or there are missing product parts, contact your supplier vendor as soon as possible.

Please check Table 2-2 in page 18 in Chapter 2 - for detail list of modules and model names.

7.3 Installation and Wiring

First of all, choose the right CPU module and expansion modules according to the actual project needs.

Secondly, decide the installation mode based on on-site circumstance, and tentatively determine the PLC working mode.

Finally, plan and arrange reasonable wiring design, and connect on-site sensors or actuators to terminals on the PLC module. (For detailed installation instructions and wiring principles, please see Chapter 8 - Terminal Definitions & Wiring Guidelines).

7.4 Connecting the Power Cable

Based on the model and type of CPU modules selected, connect the power cord to VR-2200 PLC CPU (for more details please see Chapter 8 - Section 8.2 CPU Module Terminal & Wiring in page 60 of this manual for specific guidelines).

- **Note:** When the power cord is connected, the terminal cover should be fastened so as to avoid unnecessary personnel injury or equipment damage!

After the power cord is connected, do not switch on the power immediately. Make sure that all the cables are correctly connected before turning on the system power, and check after power on if PWR LED of CPU light indicates a normal status on CPU module panel, so as to ensure reliable operations of PLC.

7.5 Establishing Communications with the PC

To establish a data transfer channel, the CPU module can be connected to a personal computer (PC) through matched programming cable, as shown in Figure 7-1.

As the RS232 communication interface of CPU module is not isolated, the programming cable connection should be carried out before the PLC power is on.

- **Note:** Please select three-position switch to position "P" before downloading PLC program files.

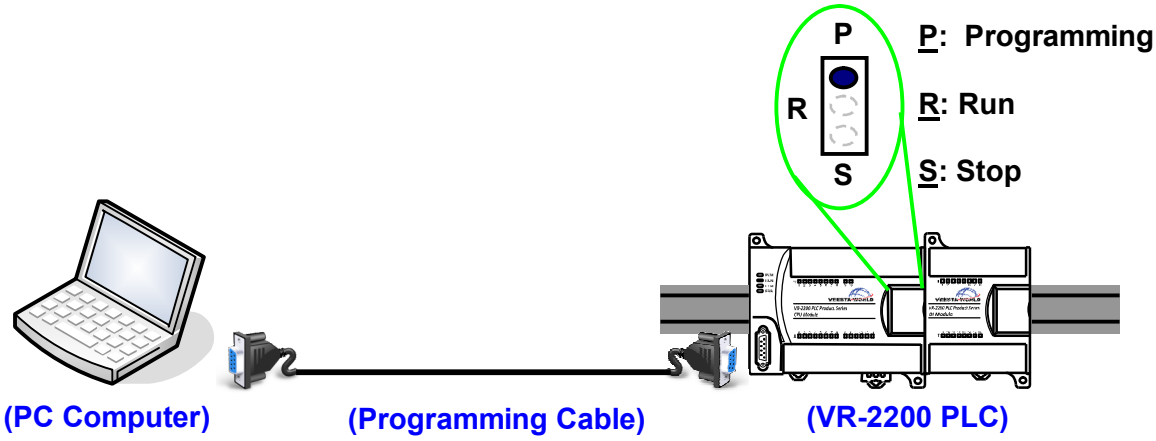


Figure 7-1: VR-2200, Connecting Programmin Cable

7.6 Writing Control Programs

To achieve and meet your control needs, the programming software “VR-2200 - PLC Software” should be installed on a personal computer (PC), so as to establish communication with the CPU module, to set the hardware parameters, and to develop appropriate engineering programs. (For more details on programming software “VR-2200 - PLC Program”, please refer to "*VR-2200 Programming Software Manual*").

7.7 Running the Equipment

Check and ensure that each step has been correctly carried out, and download the debugged control program onto the PLC.

- **Note:** Please select three-position switch to position "R" after downloading PLC program files.

Now, a set of VR-2200 PLC-base control system is ready to run.

*** Good Luck ***

Chapter 8 - Terminal Definitions & Wiring

8.1 General

In VR-2200 Product Series PLC system, for easy installation and maintenance, all wiring for outset connection is through the Terminal Block and the PLC device with its expansions modules designed to install over the rail or panel easy. So your maintenance will be easy for technicians and users.

In this chapter you will find detail information for the wiring and cabling and guides about terminal blocks and rules of them.

8.2 CPU Module Terminal & Wiring

8.2.1 VR-2211 CPU Module

For the VR2211 CPU module, the corresponding terminal definition and wiring is shown in Figure 8-1. VR-2211 CPU modules should use the DC 24V power supply. The upper row of the module terminals is output channel (DO), and the lower row of terminals is input channel (DI). 24VDC power supply and protective earthling should be connected to the terminals on the right side of upper row.

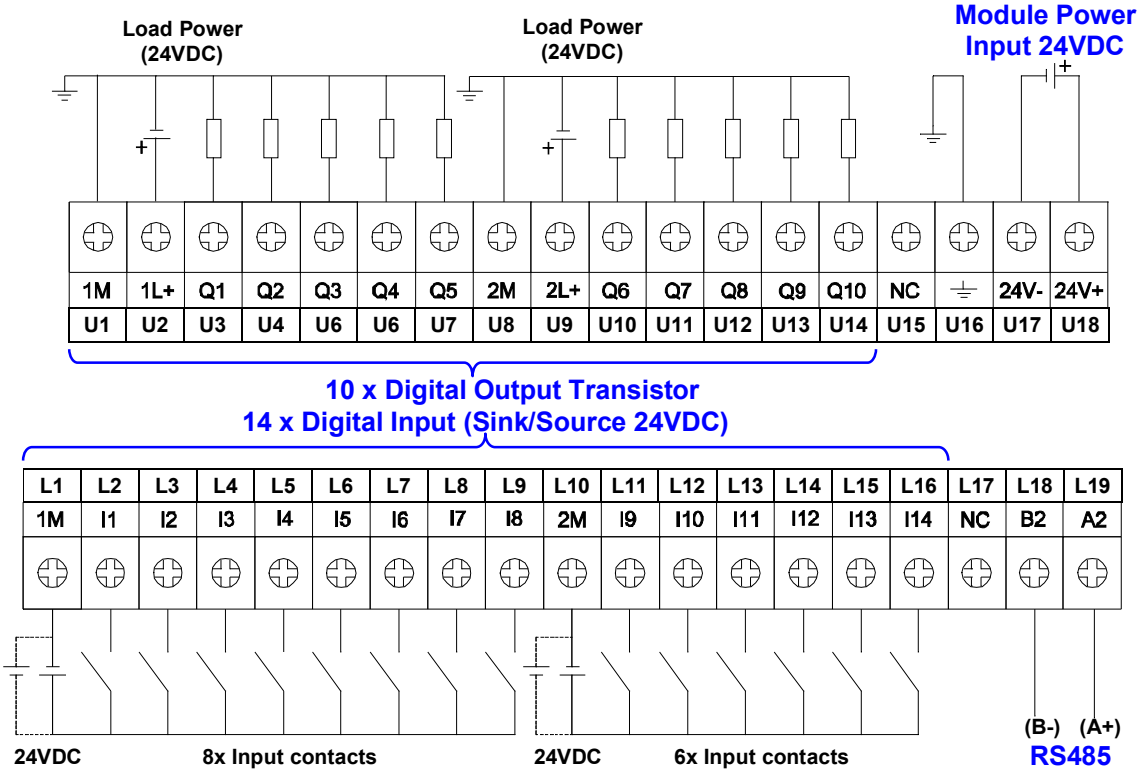


Figure 8-1: VR-2211 CPU Module Wiring Diagram

8.2.1.1 Terminal and Wiring Descriptions

1- The module's terminal tag rules are unified from top to bottom, from left to right increment;
2- The 1M, 2M terminal of the input channel (DI) is the external common side of DI. The user can choose to connect the M terminal to power supply 24VDC positive side or a ground terminal to accommodate the source type / drain type DI;
3- The 1M, 1L+ , 2M, 2L+ terminals of output channel (DO) provides load power supply when the DO-channel is connected to the MOS-type external load and should connect to DC 24V;
4- 24V-, 24V+ on the right of the upper row connected to 24VDC is for the CPU module's power supply terminals;
5- A2, B2 on the right of the lower row is the terminals of serial port 2 (RS485);
6- "NC" indicates that this channel is not the actual physical connection or no connection.

8.2.1.2 Terminal Customizations

A2, B2 are used for RS485 port and or the 24V power supply output terminal that what has been shown here is the factory defaults of RS485 port 2 of PLC CPU. It is possible the reuse of terminals and during order process we can customize according to needs to the 24VDC Output supply or RS485 port.

8.2.1.3 Terminal Numbers Tag Definitions

In the table bellow you can find the Terminal number tag definitions:

Table 8-1: VR-2200 Series, VR-2211 CPU Module Terminal Definitions

Upper Row Terminal		Definitions
U1	1M	The negative power supply terminal
U2	1L+	The positive power supply terminal
U3	Q1	The output terminal
U4	Q2	The output terminal
U5	Q3	The output terminal
U6	Q4	The output terminal
U7	Q5	The output terminal
U8	2M	The negative power supply terminal
U9	2L+	The positive power supply terminal

Lower Row Terminal		Definitions
L1	1M	The common input terminal for I1- I8
L2	I1	The input terminal
L3	I2	The input terminal
L4	I3	The input terminal
L5	I4	The input terminal
L6	I5	The input terminal
L7	I6	The input terminal
L8	I7	The input terminal
L9	I8	The input terminal

Upper Row Terminal		Definitions
U10	Q6	The output terminal
U11	Q7	The output terminal
U12	Q8	The output terminal
U13	Q9	The output terminal
U14	Q10	The output terminal
U15	NC	Not connected
U16	⏚	The protective earthing terminal
U17	24V-	PLC Power Supply 24V-
U18	24V+	PLC Power Supply 24V+

Lower Row Terminal		Definitions
L10	2M	The common input terminal for I9- I14
L11	I9	The input terminal
L12	I10	The input terminal
L13	I11	The input terminal
L14	I12	The input terminal
L15	I13	The input terminal
L16	I14	The input terminal
L17	NC	Not connected
L18	B2	RS485-
L19	A2	RS485+

8.2.2 VR-2212 CPU Module

For the VR-2212 CPU module, the corresponding terminal definition and wiring is shown in Figure 8-2. VR-2212 CPU modules should use the 24VDC power supply. The X10 terminal block name as upper row of the module terminals is output channels (DO), and X11 terminal block name as the lower row of terminals is input channels (DI). 24VDC power supply and protective earthing should be connected to the terminals on the right side of X10 upper row, and 24VDC external supply terminal should be connected to X11 the lower row of the right.

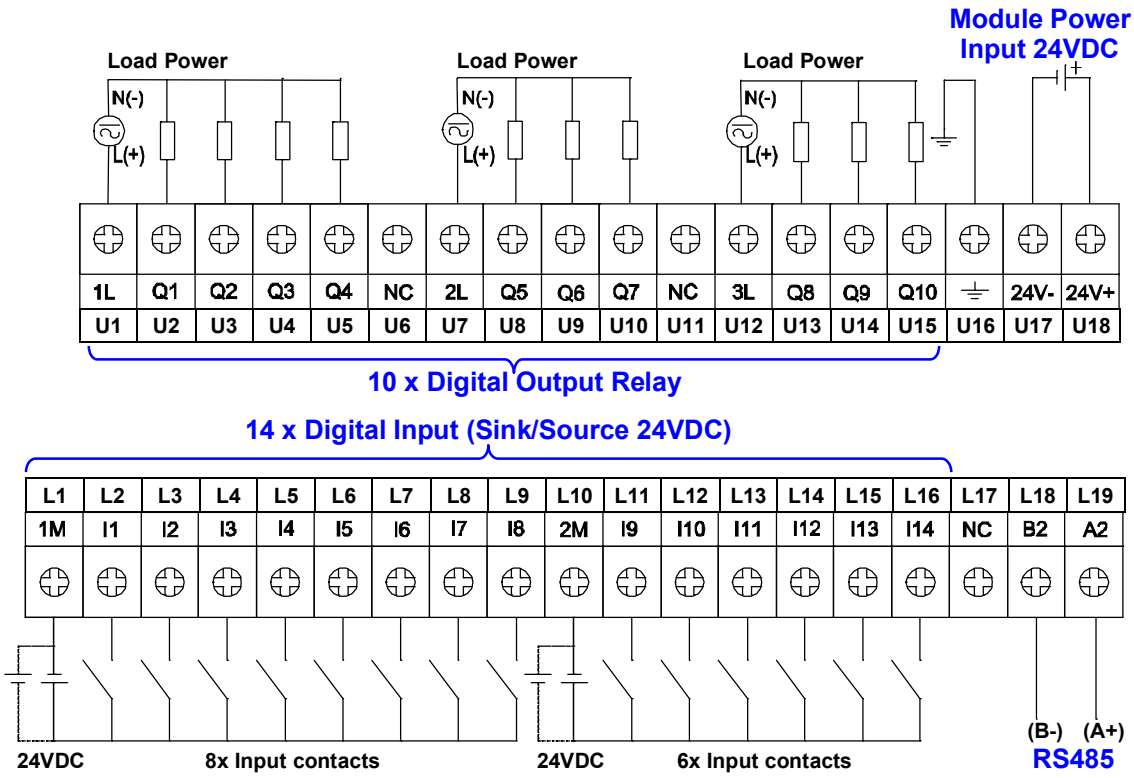


Figure 8-2: VR-2212 CPU Module Wiring Diagram

8.2.2.1 Terminal and Wiring Descriptions

1- The module's terminal tag rules are unified from top to bottom, from left to right increment;
2- The 1M, 2M terminal of the input channel (DI) is the external common side of DI. The user can choose to connect the M terminal to power supply 24VDC positive side or a ground terminal to accommodate the source type / drain type DI;
3- The 1L, 2L , 3L terminals in the Output Channel (DO) are the common terminals for the output relay channels;
4- 24V-, 24V+ on the right of the upper row connected to 24VDC is for the CPU module's power supply terminals;
5- A2, B2 on the right of the lower row is the terminals of serial port 2 (RS485);

6- "NC" indicates that this channel is not the actual physical connection or no connection.

8.2.2.2 Terminal Customizations

A2, B2 are used for RS485 port and or the 24V power supply output terminal that what has been shown here is the factory defaults of RS485 port 2 of PLC CPU. It is possible the reuse of terminals and during order process we can customize according to needs to the 24VDC Output supply or RS485 port.

8.2.2.3 Terminal Numbers Tag Definitions

In the table bellow you can find the Terminal number tag definitions:

Table 8-2: VR-2200 Series, VR-2212 CPU Module Terminal Definitions

Upper Row Terminal		Definitions	Lower Row Terminal		Definitions
U1	1L	The common output terminal for Q1-Q4	L1	1M	The common input terminal for I1- I8
U2	Q1	The output terminal	L2	I1	The input terminal
U3	Q2	The output terminal	L3	I2	The input terminal
U4	Q3	The output terminal	L4	I3	The input terminal
U5	Q4	The output terminal	L5	I4	The input terminal
U6	NC	Not connected	L6	I5	The input terminal
U7	2L	The common output terminal for Q5-Q6	L7	I6	The input terminal
U8	Q5	The output terminal	L8	I7	The input terminal
U9	Q6	The output terminal	L9	I8	The input terminal
U10	Q7	The output terminal	L10	2M	The common input terminal for I9- I14
U11	NC	Not connected	L11	I9	The input terminal
U12	3L	The common output terminal for Q8-Q10	L12	I10	The input terminal
U13	Q8	The output terminal	L13	I11	The input terminal
U14	Q9	The output terminal	L14	I12	The input terminal
U15	Q10	The output terminal	L15	I13	The input terminal
U16	⏚	The protective earthing terminal	L16	I14	The input terminal
U17	24V-	PLC Power Supply 24V-	L17	NC	Not connected
U18	24V+	PLC Power Supply 24V+	L18	B2	RS485-
			L19	A2	RS485+

8.2.3 VR-2214 CPU Module

For the VR-2214 CPU module, the corresponding terminal definition and wiring, is shown in Figure 8-3. VR-2214 CPU modules should use the DC 24V power supply. The X10 terminal block as upper row of the module terminals is output channel (DO), and X11 as the lower row of terminals is an input channel (DI). 24VDC power supply and protective earthing should be connected to the terminals on the right side of upper row, and 24VDC external supply terminal should be connected to the lower row of the right.

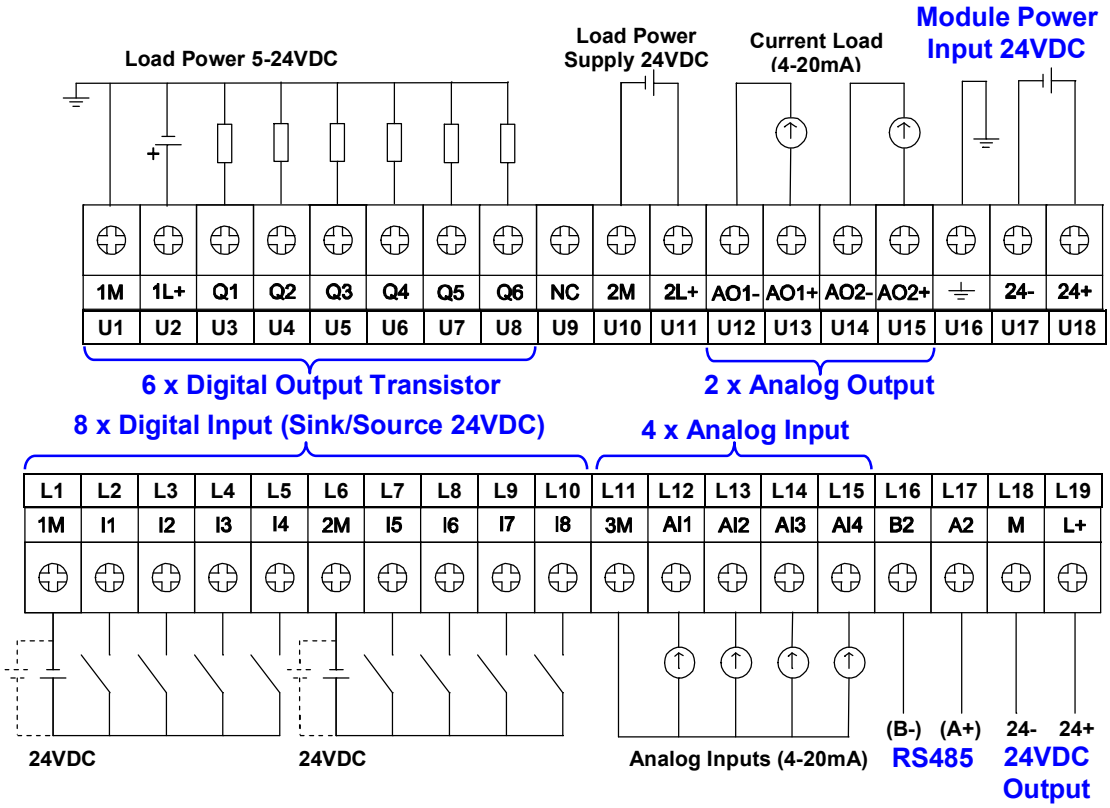


Figure 8-3: VR-2214 CPU Module Wiring Diagram

8.2.3.1 Terminal and Wiring Descriptions

1- The module's terminal tag rules are unified from top to bottom, from left to right increment;
2- The 1M, 2M terminal of the input channel (DI) is the external common side of DI. The user can choose to connect the M terminal to power supply 24VDC positive side or a ground terminal to accommodate the source type / drain type DI;
3- The 3M is the common terminal input signal of analog inputs;
4- The 1M, 1L+, 2M, 2L+ terminals of output channel (DO) provides load power when the DO-channel is connected to the MOS-type external load and should connect to DC 24V;
5- 24V-, 24V+ on the right of the upper row connected to 24VDC is for the CPU module's power supply terminals;

6- A2, B2 on the right of the lower row is the terminals of serial port 2 (RS485);
7- The M, L+ is the terminals for 24V transmitter power source supply, this can be use for AO and or digital input load power;
8- "NC" indicates that this channel is not the actual physical connection or no connection.

8.2.3.2 Terminal Numbers Tag Definitions

In the table bellow you can find the Terminal number tag definitions:

Table 8-3: VR-2200 Series, VR-2214 CPU Module Terminal Definitions

Upper Row Terminal		Definitions
U1	1M	The negative power supply terminal
U2	1L+	The positive power supply terminal
U3	Q1	The output terminal
U4	Q2	The output terminal
U5	Q3	The output terminal
U6	Q4	The output terminal
U7	Q5	The output terminal
U8	Q6	The output terminal
U9	NC	Not connected
U10	2M	Terminal of 24- (Power Supply for A01-AO2)
U11	2L+	Terminal of 24+ (Power Supply for A01-AO2)
U12	AO1-	The analog output terminal
U13	AO1+	The analog output terminal
U14	AO2-	The analog output terminal
U15	AO2+	The analog output terminal
U16	⏚	The protective earthing terminal
U17	24V-	PLC Power Supply 24V-
U18	24V+	PLC Power Supply 24V+

Lower Row Terminal		Definitions
L1	1M	The common input terminal for I1- I4
L2	I1	The input terminal
L3	I2	The input terminal
L4	I3	The input terminal
L5	I4	The input terminal
L6	2M	The common input terminal for I5- I8
L7	I5	The input terminal
L8	I6	The input terminal
L9	I7	The input terminal
L10	I8	The input terminal
L11	3M	The analog input common terminal
L12	AI1	The analog input terminal
L13	AI2	The analog input terminal
L14	AI3	The analog input terminal
L15	AI4	The analog input terminal
L16	B2	RS485-
L17	A2	RS485+
L18	M	Transmitter Power 24V-
L19	L+	Transmitter Power 24V+

8.2.4 VR-2215 CPU Module

For the VR-2215 CPU module, the corresponding terminal definition and wiring, is shown in Figure 8-4. The VR-2215 CPU modules should use the 24VDC power supply. The X10 terminal block name as upper row of the module terminals is output channels (DO), and the X11 as lower row of terminals is input channels (DI). 24VDC power supply and protective earthing should be connected to the terminals on the right side of upper row, and 24VDC external supply terminal should be connected to the lower row of the right.

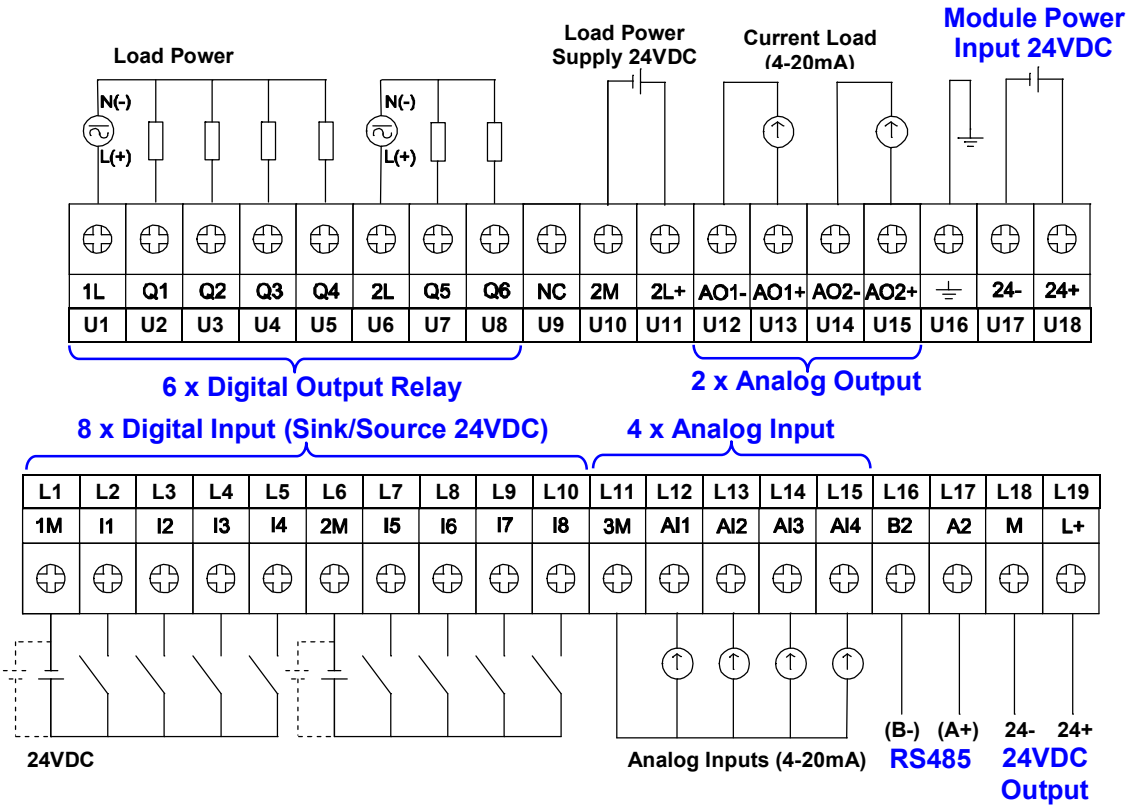


Figure 8-4: VR-2215 CPU Module Wiring Diagram

8.2.4.1 Terminal and Wiring Descriptions

1- The module's terminal tag rules are unified from top to bottom, from left to right increment;
2- The 1M, 2M terminal of the input channel (DI) is the external common side of DI. The user can choose to connect the M terminal to power supply 24VDC positive side or a ground terminal to accommodate the source type / drain type DI;
3- The 3M is the common terminal input signal of analog inputs;
4- The 1L, 2L terminal in the Output Channel (DO) is the common terminals for the output relay channels;
5- 24V-, 24V+ on the right of the upper row connected to 24VDC is for the CPU module's power supply terminals;

6- A2, B2 on the right of the lower row is the terminals of serial port 2 (RS485);
7- The M, L+ is the terminals for 24V transmitter power source supply, this can be use for AO and or digital input load power;
8- "NC" indicates that this channel is not the actual physical connection or no connection.

8.2.4.2 Terminal Numbers Tag Definitions

In the table bellow you can find the Terminal number tag definitions:

Table 8-4: VR-2200 Series, VR-2215 CPU Module Terminal Definitions

Upper Row Terminal		Definitions
U1	1L	The common output terminal for Q1-Q4
U2	Q1	The output terminal
U3	Q2	The output terminal
U4	Q3	The output terminal
U5	Q4	The output terminal
U6	2L	The common output terminal for Q5-Q6
U7	Q5	The output terminal
U8	Q6	The output terminal
U9	NC	Not connected
U10	2M	Terminal of 24- (Power Supply for A01-AO2)
U11	2L+	Terminal of 24+ (Power Supply for A01-AO2)
U12	AO1-	The analog output terminal
U13	AO1+	The analog output terminal
U14	AO2-	The analog output terminal
U15	AO2+	The analog output terminal
U16	⏚	The protective earthing terminal
U17	24V-	PLC Power Supply 24V-
U18	24V+	PLC Power Supply 24V+

Lower Row Terminal		Definitions
L1	1M	The common input terminal for I1-I4
L2	I1	The input terminal
L3	I2	The input terminal
L4	I3	The input terminal
L5	I4	The input terminal
L6	2M	The common input terminal for I5-I8
L7	I5	The input terminal
L8	I6	The input terminal
L9	I7	The input terminal
L10	I8	The input terminal
L11	3M	The analog input common terminal
L12	AI1	The analog input terminal
L13	AI2	The analog input terminal
L14	AI3	The analog input terminal
L15	AI4	The analog input terminal
L16	B2	RS485-
L17	A2	RS485+
L18	M	Transmitter Power 24V-
L19	L+	Transmitter Power 24V+

8.3 Digital Expansion Terminal & Wiring

8.3.1 VR-2221 DI Module 8x Channel

VR-2221 the 8×DC24V Digital input module terminal definition and typical wiring are shown in Figure 8-5.

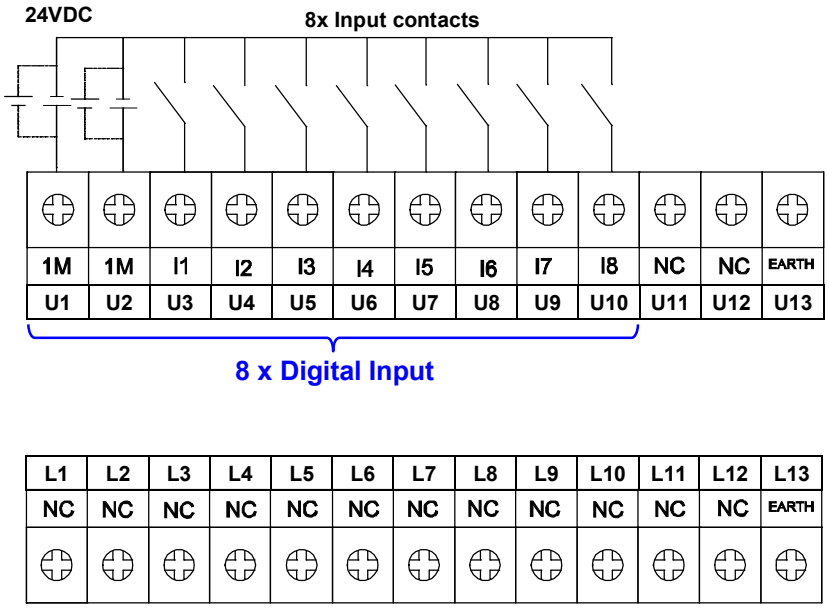


Figure 8-5: VR-2221 DI Module 8x Channel Wiring Diagram

8.3.1.1 Terminal and Wiring Descriptions

1- The module's terminal tag rules are unified from top to bottom, from left to right increment;
2- The 1M terminals of the input channel (DI) are common terminals of digital input signal. Users can choose to connect the common terminals to positive of 24VDC or negative, corresponds to the source type / sink type;
3- " NC" means this channel is not wired or no physical connection;
4- "EARTH" means this terminal should connect to earth.

8.3.1.2 Terminal Numbers Tag Definitions

In the table bellow you can find the Terminal number tag definitions:

Table 8-5: VR-2200 Series, VR-2221 DI Module Terminal Definitions

Upper Row Terminal		Definitions	Lower Row Terminal		Definitions
U1	1M	The common input terminal for I1-I8	L1	NC	Not connected
U2	1M	The common input terminal for I1-I8	L2	NC	Not connected
U3	I1	The input terminal	L3	NC	Not connected
U4	I2	The input terminal	L4	NC	Not connected
U5	I3	The input terminal	L5	NC	Not connected
U6	I4	The input terminal	L6	NC	Not connected
U7	I5	The input terminal	L7	NC	Not connected
U8	I6	The input terminal	L8	NC	Not connected
U9	I7	The input terminal	L9	NC	Not connected
U10	I8	The input terminal	L10	NC	Not connected
U11	NC	Not connected	L11	NC	Not connected
U12	NC	Not connected	L12	NC	Not connected
U13	EARTH	The protective earthing terminal	L13	EARTH	The protective earthing terminal

8.3.2 VR-2222 DI Module 16x Channel

VR-2222 the 16×DC24V Digital input module terminal definition and typical wiring are shown in Figure 8-6.

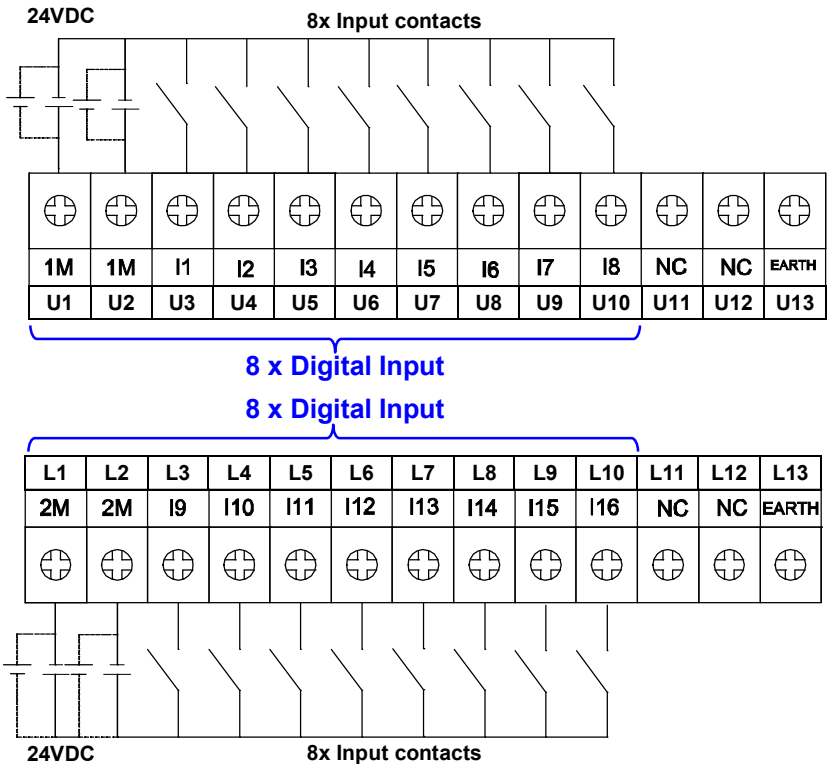


Figure 8-6: VR-2222 DI Module 16x Channel Wiring Diagram

8.3.2.1 Terminal and Wiring Descriptions

1- The module's terminal tag rules are unified from top to bottom, from left to right increment;
2- The 1M, 2M terminals of the input channel (DI) are common terminals of digital input signal. Users can choose to connect the common terminals to positive of 24VDC or negative, corresponds to the source type / sink type;
3- " NC" means this channel is not wired or no physical connection;
4- "EARTH" means this terminal should connect to earth.

8.3.2.2 Terminal Numbers Tag Definitions

In the table bellow you can find the Terminal number tag definitions:

Table 8-6: VR-2200 Series, VR-2222 DI Module Terminal Definitions

Upper Row Terminal		Definitions	Lower Row Terminal		Definitions
U1	1M	The common input terminal for I1-I8	L1	2M	The common input terminal for I9-I16
U2	1M	The common input terminal for I1-I8	L2	2M	The common input terminal for I9-I16
U3	I1	The input terminal	L3	I9	The input terminal
U4	I2	The input terminal	L4	I10	The input terminal
U5	I3	The input terminal	L5	I11	The input terminal
U6	I4	The input terminal	L6	I12	The input terminal
U7	I5	The input terminal	L7	I13	The input terminal
U8	I6	The input terminal	L8	I14	The input terminal
U9	I7	The input terminal	L9	I15	The input terminal
U10	I8	The input terminal	L10	I16	The input terminal
U11	NC	Not connected	L11	NC	Not connected
U12	NC	Not connected	L12	NC	Not connected
U13	EARTH	The protective earthing terminal	L13	EARTH	The protective earthing terminal

8.3.3 VR-2231 DO Module 8x Transistor

The VR-2231 8xTransistor Digital output module Terminal definition and typical field wiring are shown in Figure 8-7.

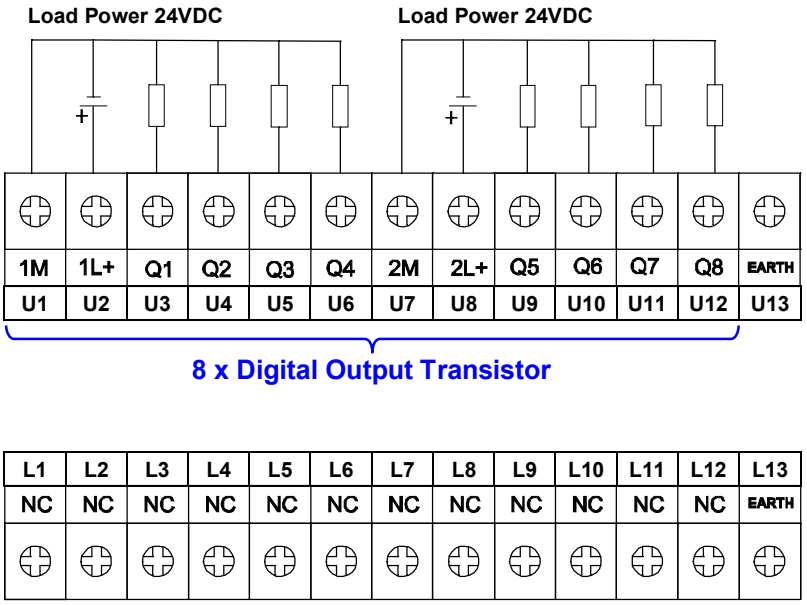


Figure 8-7: VR-2231 DO Module 8x Transistor Wiring Diagram

8.3.3.1 Terminal and Wiring Descriptions

1- The module's terminal tag rules are unified from top to bottom, from left to right increment;
2- The 1M, 1L+, 2M, 2L+ terminals of output channel (DO) provides load power when the DO-channel is connected to the MOS-type external load and should connect to DC 24V;
3- " NC" means this channel is not wired or no physical connection;
4- "EARTH" means this terminal should connect to earth.

8.3.3.2 Terminal Numbers Tag Definitions

In the table bellow you can find the Terminal number tag definitions:

Table 8-7: VR-2200 Series, VR-2231 DOI Module Terminal Definitions

Upper Row Terminal		Definitions	Lower Row Terminal		Definitions
U1	1M	The negative power supply terminal	L1	NC	Not connected
U2	1L+	The positive power supply terminal	L2	NC	Not connected
U3	Q1	The output terminal	L3	NC	Not connected
U4	Q2	The output terminal	L4	NC	Not connected
U5	Q3	The output terminal	L5	NC	Not connected
U6	Q4	The output terminal	L6	NC	Not connected
U7	2M	The negative power supply terminal	L7	NC	Not connected
U8	2L+	The positive power supply terminal	L8	NC	Not connected
U9	Q5	The output terminal	L9	NC	Not connected
U10	Q6	The output terminal	L10	NC	Not connected
U11	Q7	The output terminal	L11	NC	Not connected
U12	Q8	The output terminal	L12	NC	Not connected
U13	EARTH	The protective earthing terminal	L13	EARTH	The protective earthing terminal

8.3.4 VR-2232 DO Module 8x Relay

The VR-2232 8xRelay Digital output module Terminal definition and typical field wiring are shown in Figure 8-8.

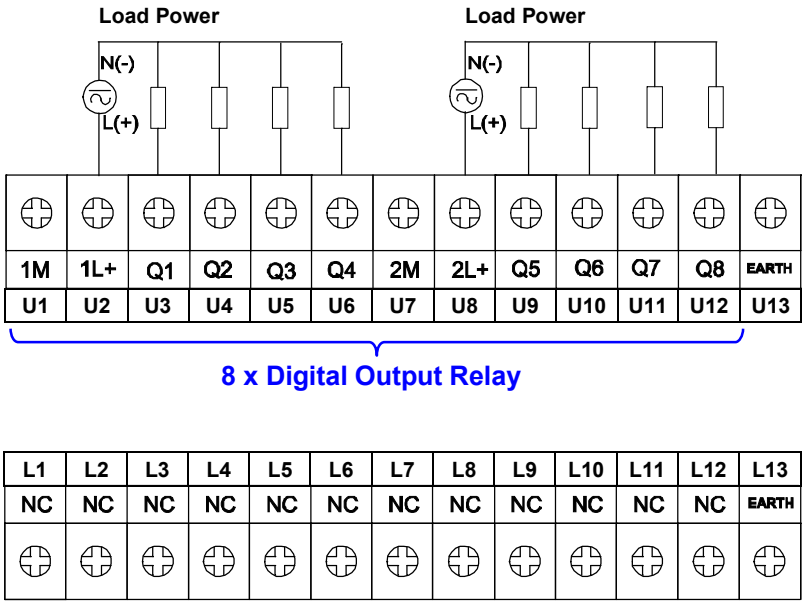


Figure 8-8: VR-2232 DO Module 8x Relay Wiring Diagram

8.3.4.1 Terminal and Wiring Descriptions

1- The module's terminal tag rules are unified from top to bottom, from left to right increment;
2- The 1L+, 2L+ terminal in the Output Channel (DO) is the common terminals for the output relay channels;
3- The 1M, 2M terminal will not use in the DO channel with Relay output function;
4- " NC" means this channel is not wired or no physical connection;
5- "EARTH" means this terminal should connect to earth.

8.3.4.2 Terminal Numbers Tag Definitions

In the table bellow you can find the Terminal number tag definitions:

Table 8-8: VR-2200 Series, VR-2232 DO Module Terminal Definitions

Upper Row Terminal		Definitions	Lower Row Terminal		Definitions
U1	1M	Not used	L1	NC	Not connected
U2	1L+	The common output terminal for Q1-Q4	L2	NC	Not connected
U3	Q1	The output terminal	L3	NC	Not connected
U4	Q2	The output terminal	L4	NC	Not connected
U5	Q3	The output terminal	L5	NC	Not connected
U6	Q4	The output terminal	L6	NC	Not connected
U7	2M	Not used	L7	NC	Not connected
U8	2L+	The common output terminal for Q4-Q8	L8	NC	Not connected
U9	Q5	The output terminal	L9	NC	Not connected
U10	Q6	The output terminal	L10	NC	Not connected
U11	Q7	The output terminal	L11	NC	Not connected
U12	Q8	The output terminal	L12	NC	Not connected
U13	EARTH	The protective earthing terminal	L13	EARTH	The protective earthing terminal

8.3.5 VR-2261 DI/DO Module 4x Transistor

The VR-2261 4x DC24V Input and 4x Transistor Output, Terminal definition & typical wiring are shown in Figure 8-9.

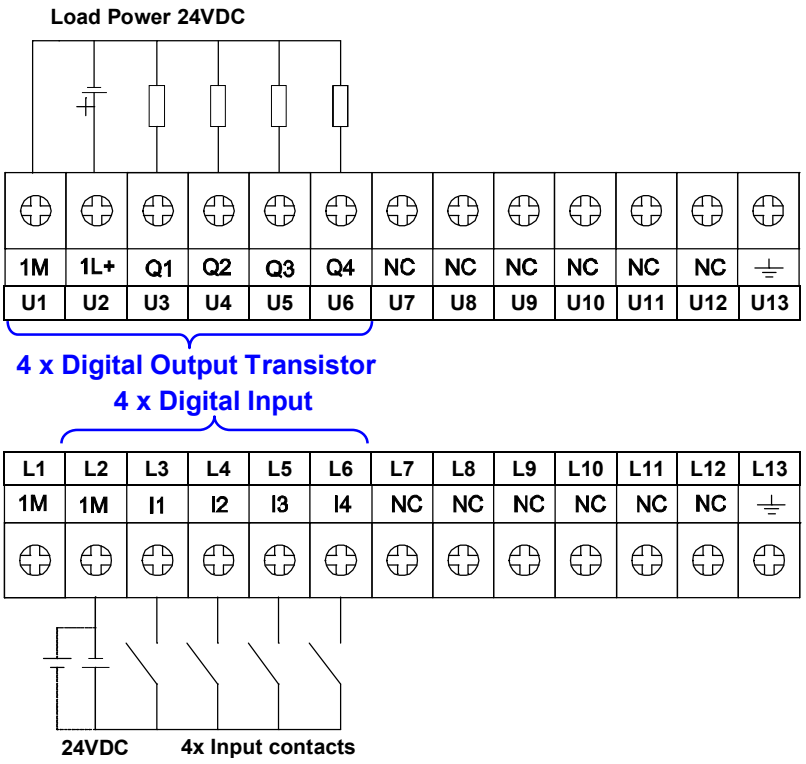


Figure 8-9: VR-2261 DI / DO Module 4x Input, 4x Transistor Wiring Diagram

8.3.5.1 Terminal and Wiring Descriptions

1- The module's terminal tag rules are unified from top to bottom, from left to right increment;
2- The 1M, 1L+ terminals of output channel (DO) in X10 terminal row provides load power when the DO-channel is connected to the MOS-type external load and should connect to DC 24V;
3- The 1M terminals of the input channel (DI) in X11 terminal row is common terminals of digital input signal. Users can choose to connect the common terminals to positive of 24VDC or negative, corresponds to the source type / sink type;
4- " NC" means this channel is not wired or no physical connection;
5- "EARTH" means this terminal should connect to earth.

8.3.5.2 Terminal Numbers Tag Definitions

In the table bellow you can find the Terminal number tag definitions:

Table 8-9: VR-2200 Series, VR-2261 DI /DO Module Terminal Definitions

Upper Row Terminal		Definitions
U1	1M	The negative power supply terminal
U2	1L+	The positive power supply terminal
U3	Q1	The output terminal
U4	Q2	The output terminal
U5	Q3	The output terminal
U6	Q4	The output terminal
U7	NC	Not connected
U8	NC	Not connected
U9	NC	Not connected
U10	NC	Not connected
U11	NC	Not connected
U12	NC	Not connected
U13	EARTH	The protective earthing terminal

Lower Row Terminal		Definitions
L1	1M	The common input terminal for I1-I4
L2	1M	The common input terminal for I1-I4
L3	I1	The input terminal
L4	I2	The input terminal
L5	I3	The input terminal
L6	I4	The input terminal
L7	NC	Not connected
L8	NC	Not connected
L9	NC	Not connected
L10	NC	Not connected
L11	NC	Not connected
L12	NC	Not connected
L13	EARTH	The protective earthing terminal

8.3.6 VR-2262 DI/DO Module 4x Relay

The VR-2262 4x DC24V Input and 4x Relay Output, Terminal definition & typical wiring are shown in Figure 8-10.

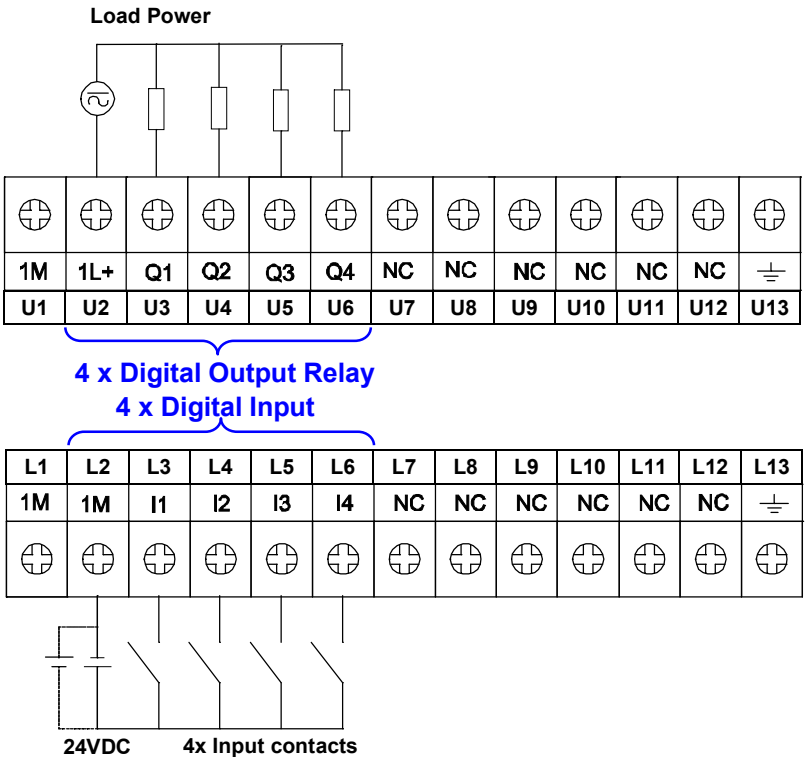


Figure 8-10: VR-2262 DI / DO Module 4x Input, 4x Relay Wiring Diagram

8.3.6.1 Terminal and Wiring Descriptions

1- The module's terminal tag rules are unified from top to bottom, from left to right increment;
2- The 1L+ terminal in the Output Channel (DO) in X10 terminal block is the common terminals for the output relay channels;
3- The 1M terminal will not use in the DO channel in X10 terminal block with Relay output function;
4- The 1M terminals of the input channel (DI) in X11 terminal row is common terminals of digital input signal. Users can choose to connect the common terminals to positive of 24VDC or negative, corresponds to the source type / sink type;
5- " NC" means this channel is not wired or no physical connection;
6- "EARTH" means this terminal should connect to earth.

8.3.6.2 Terminal Numbers Tag Definitions

In the table bellow you can find the Terminal number tag definitions:

Table 8-10: VR-2200 Series, VR-2262 DI /DO Module Terminal Definitions

Upper Row Terminal		Definitions
U1	1M	Not used
U2	1L+	The common output terminal for Q1-Q4
U3	Q1	The output terminal
U4	Q2	The output terminal
U5	Q3	The output terminal
U6	Q4	The output terminal
U7	NC	Not connected
U8	NC	Not connected
U9	NC	Not connected
U10	NC	Not connected
U11	NC	Not connected
U12	NC	Not connected
U13	EARTH	The protective earthing terminal

Lower Row Terminal		Definitions
L1	1M	The common input terminal for I1-I4
L2	1M	The common input terminal for I1-I4
L3	I1	The input terminal
L4	I2	The input terminal
L5	I3	The input terminal
L6	I4	The input terminal
L7	NC	Not connected
L8	NC	Not connected
L9	NC	Not connected
L10	NC	Not connected
L11	NC	Not connected
L12	NC	Not connected
L13	EARTH	The protective earthing terminal

8.4 Analog Expansion Terminal & Wiring

8.4.1 VR-2242 AI Module 4x Channel

The VR-2242 provides 4x channels Analog current or voltage inputs, terminal definition & typical wiring are shown in Figure 8-11.

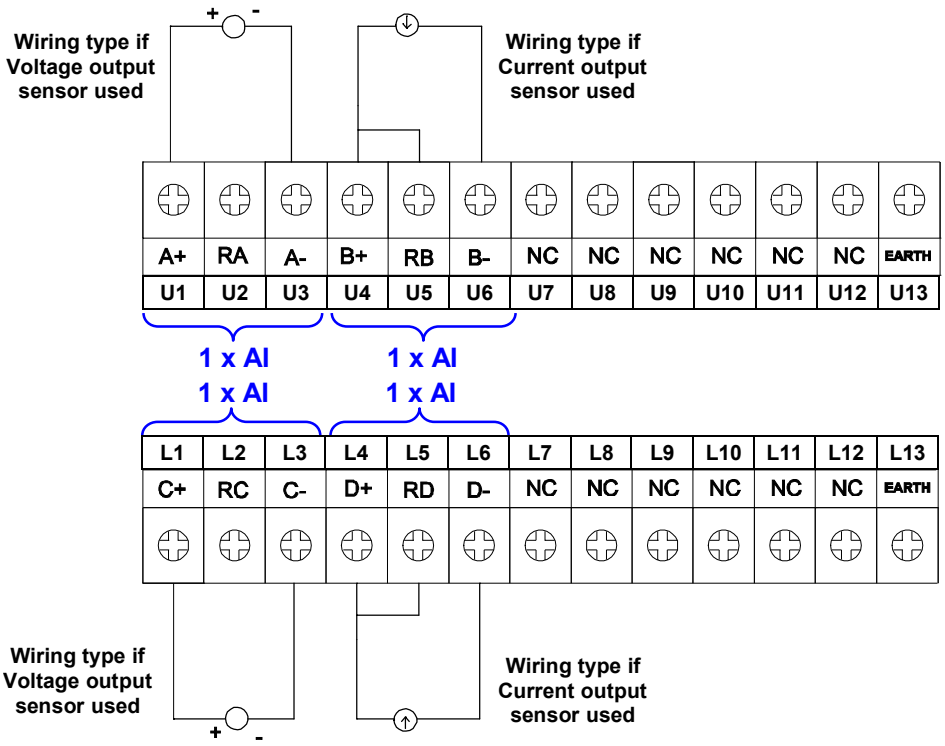


Figure 8-11: VR-2242 AI Module 4x Channel Wiring Diagram

8.4.1.1 Terminal and Wiring Descriptions

1- The module's terminal tag rules are unified from top to bottom, from left to right increment;
2- The terminal A+, A- ,B+, B-, C+, C-, D+, D- represent each channel's Analog input respectively;
3- The terminal RA, RB, RC and RD are shorted when input type is current (shown sample in Figure 8-11)
4- "NC" means this channel is not wired or no physical connection;
5- "EARTH" means this terminal should connect to earth.

8.4.1.2 Terminal Numbers Tag Definitions

In the table bellow you can find the Terminal number tag definitions:

Table 8-11: VR-2200 Series, VR-2242 AI Module Terminal Definitions

Upper Row Terminal		Definitions
U1	A+	The positive analog input terminal
U2	RA	Current mode selection input A; shorted to A+
U3	A-	The negative analog input terminal
U4	B+	The positive analog input terminal
U5	RB	Current mode selection input B; shorted to B+
U6	B-	The negative analog input terminal
U7	NC	Not connected
U8	NC	Not connected
U9	NC	Not connected
U10	NC	Not connected
U11	NC	Not connected
U12	NC	Not connected
U13	EARTH	The protective earthing terminal

Lower Row Terminal		Definitions
L1	C+	The positive analog input terminal
L2	RC	Current mode selection input C; shorted to C+
L3	C-	The negative analog input terminal
L4	D+	The positive analog input terminal
L5	RD	Current mode selection input D; shorted to D+
L6	D-	The negative analog input terminal
L7	NC	Not connected
L8	NC	Not connected
L9	NC	Not connected
L10	NC	Not connected
L11	NC	Not connected
L12	NC	Not connected
L13	EARTH	The protective earthing terminal

8.4.2 VR-2252 AO Module 4x Channel

The VR-2252 provides 4x channel Analog current or voltage output, terminal definition & typical field wiring are shown in Figure 8-12.

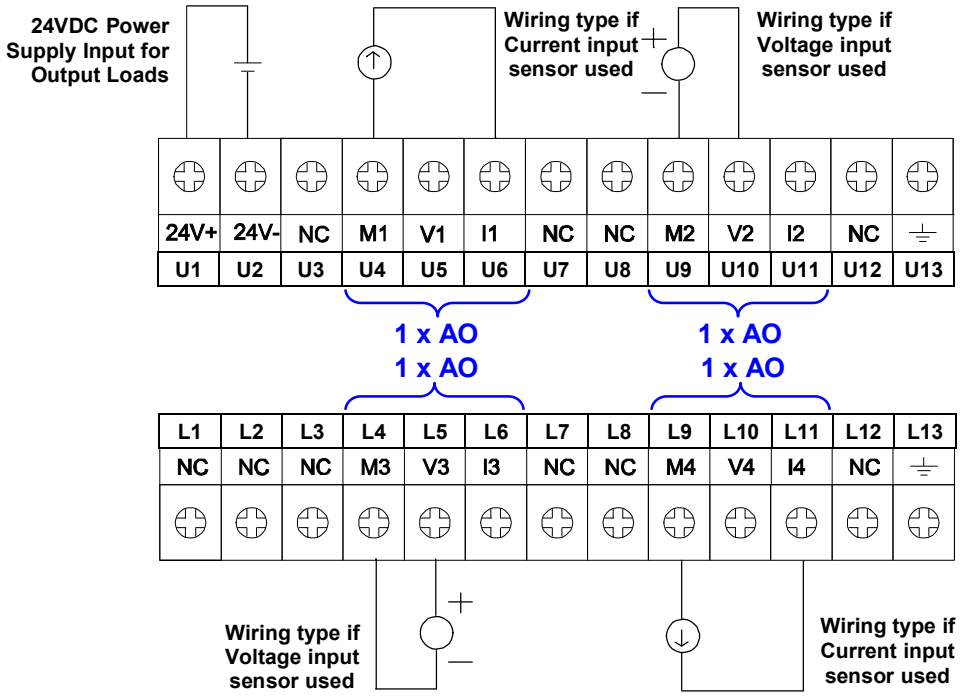


Figure 8-12: VR-2252 AO Module 4x Channel Wiring Diagram

8.4.2.1 Terminal and Wiring Descriptions

1- The module's terminal tag rules are unified from top to bottom, from left to right increment;
2- The terminal M1, V1, I1 are the terminals of first analog output channel and corresponding M2, V1, I2 is for second and M3, V3, I3 for third and finally M4, V4, I4 for forth analog output channel;
3- The terminal Vx connect to the positive of voltage output if user select analog output as voltage mode output (sample shown in Figure 8-12) ;
4- The terminal Ix connect to the positive of current output if user select analog output as current mode output (sample shown in Figure 8-12);
5- The terminal Mx is the common side of the signal output;
6- The terminal 24V+, 24V- are power supply source of voltage or current output of module; you can use from external 24VDC or from 24VDC supplied by CPU module;
7- "NC" means this channel is not wired or no physical connection;
8- "EARTH" means this terminal should connect to earth.

8.4.2.2 Terminal Numbers Tag Definitions

In the table bellow you can find the Terminal number tag definitions:

Table 8-12: VR-2200 Series, VR-2252 AO Module Terminal Definitions

Upper Row Terminal		Definitions
U1	24V+	Positive 24V+ Power supply source for AO1-4
U2	24V-	Negative 24V- Power supply source for AO1-4
U3	NC	Not connected
U4	M1	The common of output AO1 terminal
U5	V1	Voltage output of AO1 terminal select
U6	I1	Current output of AO1 terminal select
U7	NC	Not connected
U8	NC	Not connected
U9	M2	The common of output AO2 terminal
U10	V2	Voltage output of AO2 terminal select
U11	I2	Current output of AO2 terminal select
U12	NC	Not connected
U13	Earth	The protective earthing terminal

Lower Row Terminal		Definitions
L1	NC	Not connected
L2	NC	Not connected
L3	NC	Not connected
L4	M3	The common of output AO3 terminal
L5	V3	Voltage output of AO3 terminal select
L6	I3	Current output of AO3 terminal select
L7	NC	Not connected
L8	NC	Not connected
L9	M4	The common of output AO4 terminal
L10	V4	Voltage output of AO4 terminal select
L11	I4	Current output of AO4 terminal select
L12	NC	Not connected
L13	Earth	The protective earthing terminal

8.4.3 VR-2271 AI / AO Module

The VR-2271 provides 4x channel analog input within 2x channel analog output in current and voltage mode, terminal definition & typical field wiring are shown in Figure 8-13.

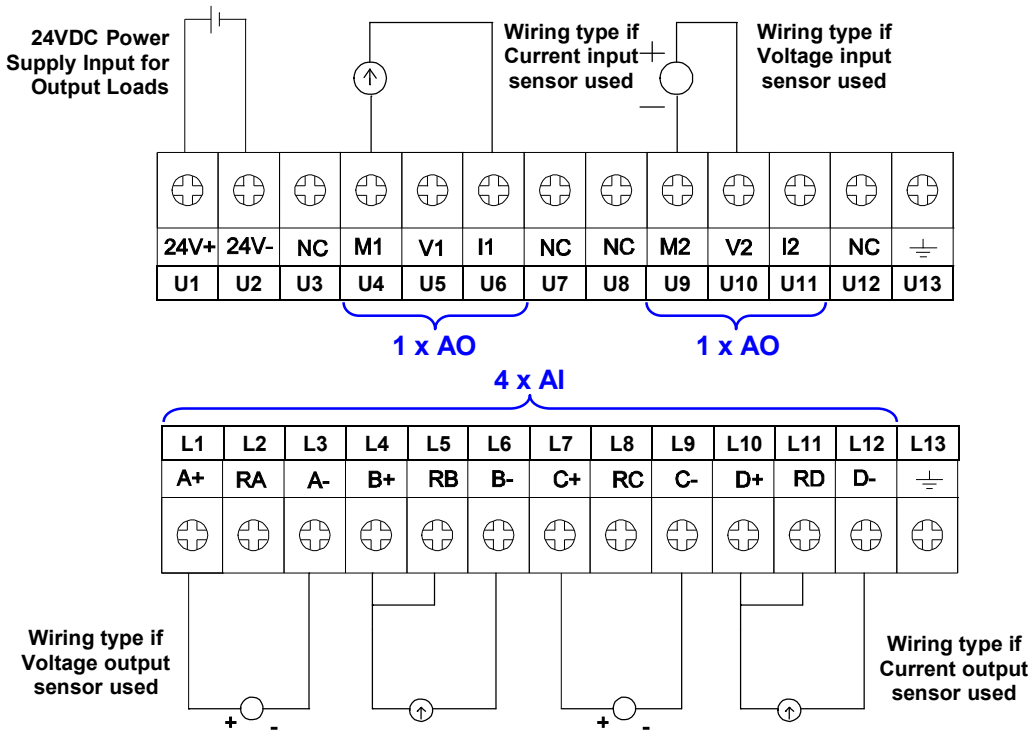


Figure 8-13: VR-2271 AI / AO Module Wiring Diagram

8.4.3.1 Terminal and Wiring Descriptions

1- The module's terminal tag rules are unified from top to bottom, from left to right increment;
2- The terminal M1, V1, I1 are the terminals of first analog output channel and corresponding M2, V1, I2 is for second analog output channel;
3- The terminal V1, V2 connect to the positive of voltage output if user select analog output as voltage mode output (sample shown in Figure 8-13) ;
4- The terminal I1, I2 connect to the positive of current output if user select analog output as current mode output (sample shown in Figure 8-13);
5- The terminal M1, M2 is the common side of the signal output;

6- The terminal 24V+, 24V- are power supply source of voltage or current output of module; you can use from external 24VDC or from 24VDC supplied by CPU module;
7- The terminal A+, A- ,B+, B-, C+, C-, D+, D- represent each channel's Analog input respectively;
8- The terminal RA, RB, RC and RD are shorted when input type is current (shown sample in Figure 8-13)
9- "NC" means this channel is not wired or no physical connection;
10-"EARTH" means this terminal should connect to earth.

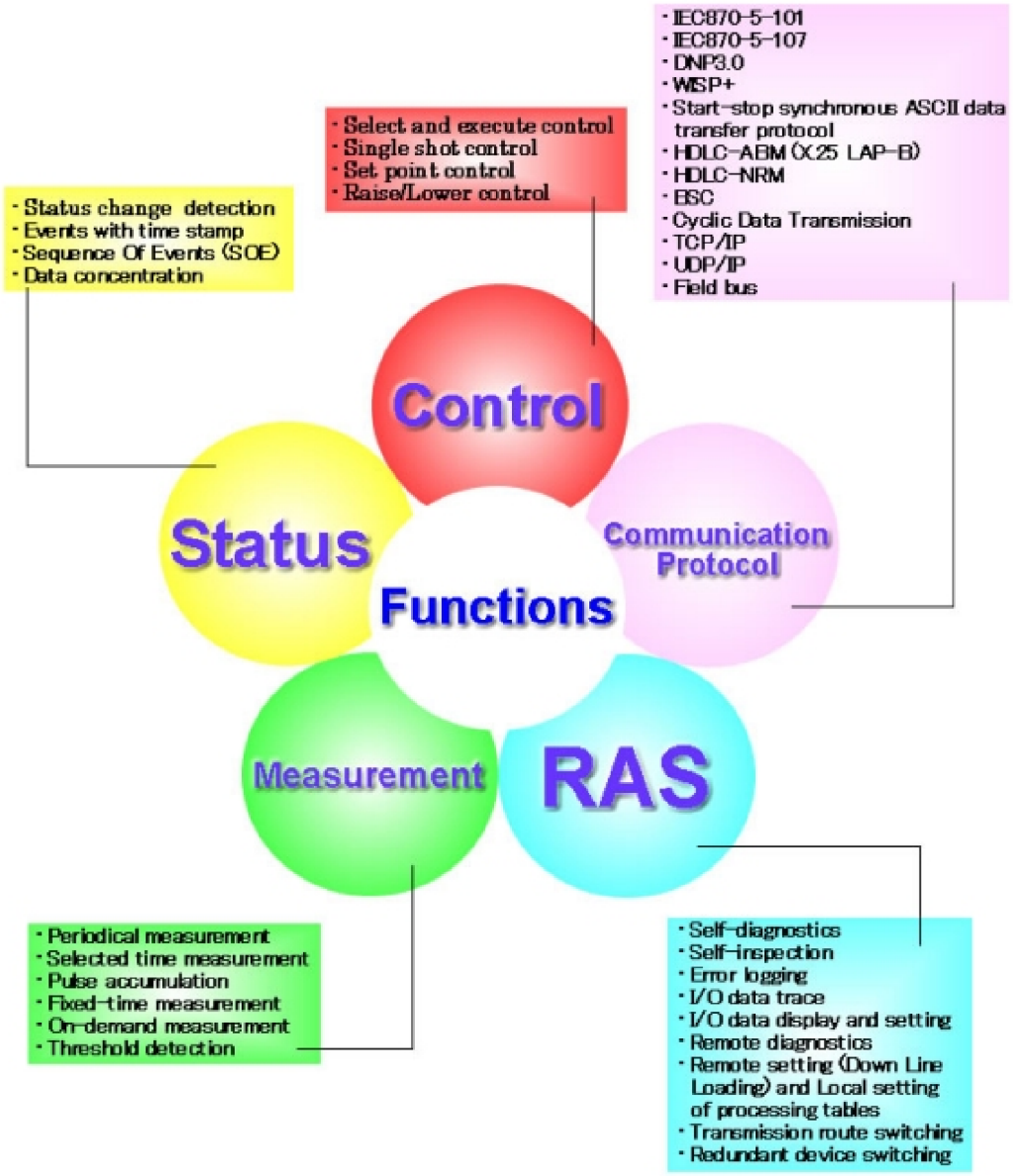
8.4.3.2 Terminal Numbers Tag Definitions

In the table bellow you can find the Terminal number tag definitions:

Table 8-13: VR-2200 Series, VR-2271 AI / AO Module Terminal Definitions

Upper Row Terminal		Definitions
U1	24V+	Positive 24V+ Power supply source for AO1-2
U2	24V-	Negative 24V- Power supply source for AO1-2
U3	NC	Not connected
U4	M1	The common of output AO1 terminal
U5	V1	Voltage output of AO1 terminal select
U6	I1	Current output of AO1 terminal select
U7	NC	Not connected
U8	NC	Not connected
U9	M2	The common of output AO2 terminal
U10	V2	Voltage output of AO2 terminal select
U11	I2	Current output of AO2 terminal select
U12	NC	Not connected
U13	Earth	The protective earthing terminal

Lower Row Terminal		Definitions
L1	A+	The positive analog input terminal
L2	RA	Current mode selection input A; shorted to A+
L3	A-	The negative analog input terminal
L4	B+	The positive analog input terminal
L5	RB	Current mode selection input B; shorted to B+
L6	B-	The negative analog input terminal
L7	C+	The positive analog input terminal
L8	RC	Current mode selection input C; shorted to C+
L9	C-	The negative analog input terminal
L10	D+	The positive analog input terminal
L11	RD	Current mode selection input D; shorted to D+
L12	D-	The negative analog input terminal
L13	Earth	The protective earthing terminal



VEESTA WORLD

Veesta World Co
World Wide Web: http://www.veesta-world.com/
E-Mail: info@veesta-world.com