**RD11 Modbus option TCP/IP +24V Expansion Card Operating Instructions** 

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Thank you for using the network communication extension card of VEDA-in DRIVES. This card can be used on RD11 inverter to make RD11 inverter a server of ModbusTCP Industrial Ethernet and available for ModbusTCP Industrial Ethernet client control.

Before using this card, please read this manual carefully.

#### **1. Function Introduction**

Switch networking supported; DHCP IP addresses allocation via DHCP not supported; Maximum number of function codes read in a single session: 100; Up to 4 ModbusTCP client connections supported; Abnormal status indication supported.

#### 2. Hardware Appearance and Fault Indication Description

This card looks as follows:





As shown above, this card has 1 power indicator and 3 status indicators; the power indicator is always on after power on, and the status indicator is described in the table below.

	LED1	LED2	ED2 LED3		
No.	RED	GREEN	YELLO W	Status/fault type	Troubleshooting measure
1	flash	off	off	Handshaking to the inverters	Check if the extension card is correctly inserted into the card slot
2	on	on	flash	The network cable is disconnected; the protocol stack is starting up	Check network cable connection; Power up and restart
3	flash	off	flash	MAC address error	Power up and restart
4	flash	flash	flash	Stack initialization timeout	Power up and restart
5	off	flash	on	Communication parameter	Power up and restart



				setting error (IP obtaining failure)	
6	off	on	off	Hand-shaked successfully, no client accesses	
7	off	flash	off	Client access without data interaction	
8	off	flash	flash	With data interaction	
9	off	on	on	Receive buffer is full	Reduce the number of function codes accessed in a command; Increase the access period of periodic commands.
10	off	on	flash	Inverter reply to abnormal command	
11	off	off	flash	Inverter reply timeout	

Table 1

### 3. Wiring Description

Connection to a single client:



Figure 2

Connection to multiple clients:



Up to 253 slave station



#### 4.RD11 Inverter-related Function Code Configuration Description

No.	Code	Address	Function	Defa ult	Value range	Description
1	F19.00	0x5300	IP address 0	192	0-255	
2	F19.01	0x5301	IP address 1	168	0-255	The default value is
3	F19.02	0x5302	IP address 2	1	0-255	192.168.1.20
4	F19.03	0x5303	IP address 3	20	0-255	
5	F19.04	0x5304	Subnet mask 0	Subnet mask 0     255     0-255		
6	F19.05	0x5305	Subnet mask 1	255	0-255	The default value is
7	F19.06	0x5306	Subnet mask 2	255	0-255	255.255.255.0
8	F19.07	0x5307	Subnet mask 3	0	0-255	
9	F19.08	0x5308	Gateway 0	192	0-255	
10	F19.09	0x5309	Gateway 1	168	0-255	The default value is
11	F19.10	0x530A	Gateway 2	1	0-255	192.168.1.1
12	F19.11	0x530B	Gateway 3	1	0-255	
13	F19.12	0x530C	0x530C MAC address 0		0-255	
14	F19.13	0x530D	MAC address 1	0	0-255	
15	F19.14	0x530E	MAC address 2	0	0-255	The default value is
16	F19.15	0x530F	MAC address 3	0	0-255	02:00:00:00:00:00
17	F19.16	0x5310	MAC address 4	0	0-255	
18	F19.17	0x5311	MAC address 5	0	0-255	
19	F19.18	0x5312	Client 1 receive timeout	100	10-65535	100 by default, unit ms. 65535: timeout check off
20	F19.19	0x5313	Client 2 receive timeout	100	10-65535	100 by default, unit ms. 65535: timeout check off
21	F19.20	0x5314	Client 3 receive timeout	100	10-65535	100 by default, unit ms. 65535: timeout check off
22	F19.21	0x5315	Client 4 receive timeout	100	10-65535	100 by default, unit ms. 65535: timeout check off
			Table	2		

The function codes about this card in RD11 inverter are shown in the following table.

**Note 1:** The latest version of the inverter software will default to configure the above function code parameters, if it's not the latest version of the software, please set manually;

**Note 2:** If multiple extension modules are included under the same network segment, different MAC addresses and IP addresses need to be set for each module;

**Note 3:** F19.18-F19.21 are used to set the timeout time for each client, and in the case of multiple clients, it is not recommended to set it to 65535 (i.e. it is not recommended to turn off the timeout check), since the client will continue to occupy communication resources if access timeout occurs with the check is off, resulting in affecting the normal access of other clients;

**Note 4:** If multiple clients accessed have periodic commands, the access period of these commands needs to be increased, otherwise the extension card is prone to enter the cache full state, resulting in fault codes sent to each client.

#### 5. Operation Examples

#### **5.1 Parameter Configuration Process**

When using with the inverter for the first time or changing the inverter network parameters, the following procedure should be followed.



Figure 5

#### 5.2 Setting up communication between RD11 frequency converter and PLC VC5

#### 5.2.1 Master-Slave Configuration

#### **Slave configuration:**

Configure the slave inverter communication parameters according to the parameter configuration process of 5.1: set the IP address to 192.168.1.30, subnet mask to 255.255.255.0, gateway to 192.168.1.1, MAC address to 02:00:00:00:00:01, and client timeout time to 100ms through the keyboard.

In addition, this example is to realize the control of inverter start/stop through the extension

card, so we need to select the source of the operation command as "given by the optional card", that is, set the F01.01 function code to 3; in actual cases, if the start/stop command is given by other ways, set it according to other definitions of the function code.

Function Designation		Setting range	Setting	Meaning
code			value	
		0: Keyboard setting		
F01.01	Command selection for running	1: Terminal setting		
		2: RS485 setting	3	Run the commands
		3 : Optional card setting	5	given via optional cards
		4: Terminal switch command		
		setting		



#### Master configuration:

Open Auto Studio software, select "File->New Project", and select VC5 for PLC type.

New project	×
Temporary	Project
Program	test01
Location	C:\Users\Administrator\Desktop\test01\
PLC type	VC5 ~
Default editor	Ladder chart $\checkmark$
Description	
	OK Cancel



Double click "EtherNet" to open the "Ethernet Configuration" window, this example uses the default network parameters, configure VC5 as the master, click OK

Project Manager 🛛 🛛 🖛 🗙	MAIN	×			•	Instruction Tree # ×
🖃 Data block 🔷 🗍	ndev Var	iable Name	Variable Type	Data Type	Comm 🔿	
🗈 🖃 System block	Idex Va	able Hame	TEMP	BOOL	comm	🕀 🗮 Basic Instruct 🔨
Extension Modules		Ethernet Configuration		×	~	🖶 🗮 Program con
		jj			>	🗄 🗮 Program con
🖶 🛄 Cross reference table	Annotation	1			^	🖶 🗮 SFC instructio
🖶 🍽 Element monitoring		IP Address: 192 168 1	10			🕀 🗮 Data transmi:
Element Memory Tak						🕀 🗮 Integer math
🖶 🚍 Instruction Wizard		Mask: 255 . 255 . 25	5.0			🖶 🗮 Floating poin
🖨 📽 Communication Conf						🖶 🗮 Accumulator
COM0	Annotation	Cotoursus 100 100 1				🕀 🗮 Word logic ir
COM1		Gateway: 192 . 168 . 1	. 1			🗄 🗮 Shift/rotate i
COM2						Enhanced bit
- CAN		Port1: 502 (Modbus	TCP)			High-speed I
EtherNet						
Axis Config	Annotation	Port2: 9016 (Program	port protocol)			External equi
Axis Group Config						Real-time cic
EtherCAT		Master/Slave: Master ~			~	
< > <					>	< >
Output Window		Note: self-define option means you car	n set the last section o	of IP		τ×
		to 254.	n the nonc panel, rang	yes nom 1		^
						$\sim$
HAPP Compile Communication	Convertion		ОК	Cancel		>
For help, press F1						OVR
		Figure 7	1			

Right-click "EtherNet", select "Add Configuration", and then double-click "Ethernet



	CAN CAN Chern Axis Co Axis G Axis G Cherc PLC Com	Open Add config table Encrypt/Decrypt Delete		
	Fig	ure 8		
5 SBR_01 1 INT_01	Modbus Tcp	Setur		×
Global variable table Data block	Slave ID	IP Address	Port	Set
	Slave 1	0.0.0.0	502	
Extension Modules	Slave 2	0.0.0.0	502	
	Slave 3	0.0.0.0	502	
Cross reference table Element monitoring table		0 0 0 0	502	
Element Memory Table	Sidve 4	0 0 0 0	502	
🕀 🚍 Instruction Wizar	Slave 5	0.0.0.0	502	
🖶 📽 Communication Config	Slave 6	0.0.0.0	502	
- COM0	Slave 7	0.0.0.0	502	
	Slave 8	0.0.0.0	502	
	Slave 9	0.0.0.0	502	
🖃 🛲 EtherNet	Slave 10	0.0.0.0	502	
Ethernet Config	Slave 11	0.0.0.0	502	
Axis Config	Slave 12	0.0.0.0	502	
EtherCAT	Slave 13	0.0.0.0	502	
🖶 ◄ PLC Communication		0 0 0 0	502	
	Sidve 14	0 0 0 0	502	
	Slave 15	0.0.0.0	502	
	Slave 16	0.0.0.0	502	
< >>		Of	( Car	ncel

Configuration" to open the "Modbus Tcp Configuration" window.



Enter the configured slave IP address 192.168.1.30, using port number 502.

Modbus Tcp Setup				
Slave ID	IP Address	Port	Set	
Slave 1	192 . 168 . 1 . 30	502		



Click Settings to open the "MODBUSTCP Configuration" window. According to the RD11 inverter manual, the command given address of the optional card communication control is 0x3101, so the command shown in the "MODBUSTCP Configuration" window is added to trigger the write access function code 0x3101.

Address	Function description	Data description	<b>R/W characteristics</b>	
0x3100	Given communication	Unit 0.01Hz, so 5000 corresponds to	D/W/	
0x3100	frequency	50.00Hz	IV/ VV	
		0: No command		
0x3101		1 : Forward running		
	Communication command	2 : Reverse running	R/W	
		3 : Forward jogging		
	setting	4 : Reverse jogging		
		5 : Deceleration stop		
		6 : Free stop		

7 : Fault reset	
8 : Run-prohibited command	
9 : Run-allowed command	

#### Table 4

MODBUSTCP Config X								×	
Num	Slave ID	Comm Type	Func	Trigger Elem	Slave Reg(H)	Length	Master Elem	Remark	
0	1	trigger	set resistor(16)	M2000	16#3101	1	D3000		HEX
									ODEC
2									Append
L 2 3									Delete
5									Down
									Clear
Im	port	Export						ОК	Cancel
	Figure 11								

Once connected to the PLC, click on Compile 🚢, execution download 😐, open monitoring

window , add the variables M2000, D3000.

Output Window							
	Component Name	Data Type	Display Format	Current value	New value	Componen	
1	M2000	BOOL	BIN	OFF			
2	D3000	INT	DEC	1	1		
3		INT	DEC				
4		INT	DEC				
5		INT	DEC				

Figure 12

#### 5.2.2 Start/stop frequency converters

Setting D3000 to 1 to trigger M2000 to start the inverter;

Reset D3000 to 6 and trigger M2000 to stop the inverter freely.

Output Window									
	Component Name	Data Type	Display Format	Current value	New value	Componen			
1	M2000	BOOL	BIN	OFF	On				
2	D3000	INT	DEC	6	6				
3		INT	DEC						
4		INT	DEC						
5		INT	DEC						

Figure 13

6. **8** 

The extension card supports connecting external 24V power supply to power the control board when the power supply of the frequency converter is turned off. Maximum current consumption 200 mA.



Figure 14