Modbus-RTU to CC-Link Communication Board Card

User Guide

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Control Techniques China

Service Hotline: 400-887-9230

Catalogue

Catalogue	1 -
1. Product Overview 2	2 -
1.1 Product function	2 -
1.2 Main technical parameters	2 -
1.3 The correspondence example illustration between PLC address and Modbus address	3 -
1.4 Error Code	5 -
2. Hardware Description	7 -
2.1 Product Appearance	7 -
2.2 LED Indicator Description	7 -
2.3 Setting CC-Link Slave transmission rate dial - code switch 9	9 -
2.4 Setting CC-Link Slave Address Dial - code Switch	9 -
2.5 CC-Link Interface 10) -
2.6 VFD interface pin definition 10) -
2.7 Installation Dimension 12	1 -
3. Product Application Topology 12	1 -
4. Test with Mitsubishi QJ61BT11N	13

1. Product Overview

1.1 Product function

This communication board could realize the conversion between MODBUS-RTU and CC-Link of field bus, and it could be applied with VFD NE-300/600. The RS485 interface of the board works as the Modbus master while the CC-Link interface works as the slave.

1.2 Main technical parameters

- 1. Supports CC-Link Ver.2
- 2. CC-Link communication rate :(10M/5M/ 2.5M /625K/156Kbps)

3. Number of memory stations occupied by CC-Link communication: 3 stations (not modifiable)

4. CC-link communication extended loop station setting: 8 times (not modifiable)

5. Modbus function code supported by ModbusRTU communication board: 03/06

6. Modbus slave address read by ModbusRTU communication board: 1 (not modifiable)

7. Baud rate of ModbusRTU communication board: 19200bps (not modifiable)

8. ModbusRTU communication setting on the communication board: data bit is 8, even check, 1 stop bit (not modifiable)

9. Working voltage: 24VDC, 5VDC

10. Working environment temperature: -40 \sim 85°C, relative humidity: 5 \sim 95% (no condensation)

- 11. Storage temperature: $-55 \sim 125^{\circ}C$
- 12. Installation: Fix it in the VFD with 3 pc of screws
- 13. Dimensions: 90.37*22*182(L * W * H, unit: mm)
- 14. Protection level: IP20

Note: Before usir	ng the board card, the VFD parameter	s should be set as follows:
Function code	Name	Set Value
F0.02	Run command control mode settings	2
F0.03	Frequency setting 1	4
F0.04	Frequency setting 1	4
Fd.00	485 communication function	1
Fd.01	IP Address	1
Fd.02	Baud rate selection	4

Fd.03Parity check selection0

1.3 The correspondence example illustration between PLC address and Modbus address

I MELSOFT系列 GX Works2 C:\Users\dell\De	Desktop\CC Link\NE300.gxw - [网络参数	CC-Link 一览设置]			- 0
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由 🙆 软元件存储器	Ver.2远程寄存器(RWr)				
👼 软元件初始值	Ver.2远程寄存器(RWw)				
_	特殊继电器(SB)				
	特殊寄存器(SW)				
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	待机主站站号	Mr.1			
	CPU右机指定 Interative	* * ■ ±	•	•	•
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1. For example, D1000-D1029 read the data address of NE300/600 for PLC, and D2000-D2003 wrote the data address of NE300/600 for PLC. See the table below:

D1	000-D1029 IW I	nput addr	ess, D2000-D2006 QW Output	address Description
	PLC data address	Data type	Modbus RTU address	Description
Р	D2000	WORD	Write area 4 address 40001	write communication commands
r 0	D2001	WORD	Write area 4 address 40002	Write communication set value address
C e	D2002	WORD	Write area 4 address 40003	Write output terminal definition
s	D2003	WORD	Write area 4 address 40004	Write Analog Output Setting
S	D1000	WORD	Read area 4 address 40001	Read communication control commands
D	D1001	WORD	Read area 4 address 40002	Read communication set value address
a t	D1002	WORD	Read area 4 address 40003	Read output terminal definition
a	D1003	WORD	Read area 4 address 40004	read analog output setting
	D1004	WORD	Read area 4 address 40020	Read VFD state
	D1005	WORD	Read area 4 address 40021	read failure content
	D1006	WORD	Read area 4 address 40022	read alarm content

D1007	WORD	Read area 4 address 40023	Read running
			frequency
D1008	WORD	Read area 4 address 40024	Read set frequency
D1009	WORD	Read area 4 address 40025	Read bus bar voltage
D1010	WORD	Read area 4 address 40026	Read output voltage
D1011	WORD	Read area 4 address 40027	Read output current
D1012	WORD	Read area 4 address 40028	Read operating
			rotate speed
D1013	WORD	Read area 4 address 40029	read output
			frequency
D1014	WORD	Read area 4 address 4002A	read output torque
D1015	WORD	Read area 4 address 4002B	Read PID set value
D1016	WORD	Read area 4 address 4002C	Read PID feedback
			value
			value
D1017	WORD	Read area 4 address 4002D	Read analog AI1
D1017 D1018	WORD WORD	Read area 4 address 4002D Read area 4 address 4002E	Read analog AI1 Read analog AI2
D1017 D1018 D1019	WORD WORD WORD	Read area 4 address 4002DRead area 4 address 4002ERead area 4 address 4002F	Read analog AI1 Read analog AI2 Reserved
D1017 D1018 D1019 D1020	WORD WORD WORD WORD	Read area 4 address 4002DRead area 4 address 4002ERead area 4 address 4002FRead area 4 address 40030	Read analog AI1 Read analog AI2 Reserved Read terminal state
D1017 D1018 D1019 D1020 D1021	WORD WORD WORD WORD	Read area 4 address 4002DRead area 4 address 4002ERead area 4 address 4002FRead area 4 address 40030Read area 4 address 40031	Read analog AI1 Read analog AI2 Reserved Read terminal state Reserved
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D1017 D1018 D1019 D1020 D1021 D1022 D1023 D1024	WORD WORD WORD WORD WORD WORD WORD	Read area 4 address 4002DRead area 4 address 4002ERead area 4 address 4002FRead area 4 address 40030Read area 4 address 40031Read area 4 address 40032Read area 4 address 40033Read area 4 address 40033Read area 4 address 40033Read area 4 address 40034	Read analog AI1 Read analog AI2 Reserved Read terminal state Reserved Reserved Reserved Reserved Read external
D1017 D1018 D1019 D1020 D1021 D1022 D1023 D1024	WORD WORD WORD WORD WORD WORD WORD	Read area 4 address 4002DRead area 4 address 4002ERead area 4 address 4002FRead area 4 address 40030Read area 4 address 40031Read area 4 address 40032Read area 4 address 40033Read area 4 address 40034	Read analog AI1 Read analog AI2 Reserved Read terminal state Reserved Reserved Reserved Reserved Read external counting
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D1017 D1018 D1019 D1020 D1021 D1022 D1023 D1023 D1024 D1025 D1026	WORD WORD WORD WORD WORD WORD WORD WORD	Read area 4 address 4002DRead area 4 address 4002ERead area 4 address 4002FRead area 4 address 40030Read area 4 address 40031Read area 4 address 40032Read area 4 address 40033Read area 4 address 40033Read area 4 address 40034Read area 4 address 40034Read area 4 address 40035Read area 4 address 40036	Read analog AI1 Read analog AI2 Reserved Read terminal state Reserved Reserved Reserved Read external counting Read X1 state Read X2 state
D1017 D1018 D1019 D1020 D1021 D1022 D1023 D1023 D1024 D1025 D1026 D1027	WORD WORD WORD WORD WORD WORD WORD WORD	Read area 4 address 4002DRead area 4 address 4002ERead area 4 address 4002FRead area 4 address 40030Read area 4 address 40031Read area 4 address 40032Read area 4 address 40033Read area 4 address 40033Read area 4 address 40034Read area 4 address 40035Read area 4 address 40035Read area 4 address 40036Read area 4 address 40037	Read analog AI1 Read analog AI2 Reserved Read terminal state Reserved Reserved Reserved Read external counting Read X1 state Read X2 state Read X3 state
D1017 D1018 D1019 D1020 D1021 D1022 D1023 D1023 D1024 D1025 D1026 D1027 D1028	WORD WORD WORD WORD WORD WORD WORD WORD	Read area 4 address 4002DRead area 4 address 4002ERead area 4 address 4002FRead area 4 address 40030Read area 4 address 40031Read area 4 address 40032Read area 4 address 40033Read area 4 address 40033Read area 4 address 40034Read area 4 address 40035Read area 4 address 40035Read area 4 address 40036Read area 4 address 40037Read area 4 address 40038	Read analog AI1 Read analog AI2 Reserved Read terminal state Reserved Reserved Reserved Read external counting Read X1 state Read X2 state Read X3 state Read X4 state

2. Address read of D1030-D1033

D1030 Input Data									
Bit 7	Bit	6	Bit 5	í	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
	1 m IB9 erro	eans write or	1 mea IB8w error	ans rite	1means IB7write error	1 means IB9 write error	1 means IB5 read error	1 means IB4 read error	1 means IB3 read error
Data address		Data	bit	Da	ata type	Des	scription		
D1030		8-]	F		Byte	Command 1 erro 4)	r code(read a	rea 4 1-	Error

D1031	0-7	Byte	Command 2 error code(read area 4 20-2F)	code see 1.4
D1031	8-F	Byte	Command 3 error code(read area 4 30-39)	
D1032	0-7	Byte	Command 4 error code(write 40001)	
D1032	8-F	Byte	Command 5 error code(write 40002)	
D1033	0-7	Byte	Command 6 error code(write 40003)	
D1033	8-F	Byte	Command 7 error code(write 40004)	

3. Read address D1034-D1037 of NE300/600, and wrote to address D2004-D2006 of NE300/600.

Slot 3 IW Input Address, QW output address description				
	Data Address	Data Type	Description	
	D2004	WORD	Wrote to EEPROM parameter address	
EEPROM Control	D2005	WORD	Wrote to EEPROM parameter data	
	D2006	WORD	Wrote to EEPROM enable(1 valid)	
	D1034	WORD	Read address which was written to EEPROM	
	D1035	WORD	Read data which was written to EEPROM	
	D1036	WORD	Read enable state(1 is normal)	
	D1037	WORD	Read and wrote state(0 is normal)	

1.4 Error Code

Error Code	Failure Description	Troubleshooting
0x00	Slave works	N/A
	normally	
0x01	Illegal function code	Slave does not support the current function code,
		please refer the slave user manual and choose
		relevant function code.
0x02	Illegal data address	Slave address exceeds its address range
0x03	Illegal data value	Data length error
0x04	Slave device failure	Checking slave device state
0x06	Slave device busy	Checking slave device state
0x07	Parity checking error	Checking parity checking, baud rate and stop bit
0x02		
0x08	Reserved	Reserved
0x09	CRC checking error	Slave response message CRC calculation error,
		checking slave state.
0x0B	Slave device	Increasing timeout time, check hardware
	responding timeout	connection state, check baud rate and other
		communication parameter Settings.

Modbus-RTU to CC-Link Communication Board Card User Guide

0x0E	Error in response message length	Increasing the receiving character spacing
0x0F	Writing slave device response error	Checking hardware connection state

2. Hardware Description

2.1 Product Appearance



2.2 LED Indicator Description

The equipment has five LED state indicators, whose symbol definition and state description are shown in "Table 2.2".

Symbol	Definition	State	Description
D2	CC Link is normal	Green LED on	CC Link Bus communication is normal
D1	CC Link is in error	Red LED on	CC Link Bus communication is in error
D9	Serial port sending	Green LED flashing	Serial port is sending data
	uuu	Green LED not flashing	Serial port is not sending data
D8	Serial port receiving data	Green LED flashing	Serial port is receiving data
		Green LED not flashing	Serial port is not receiving data

Table2.2	LED Indicator Description
1 40102.2	

D10	Power Indicator	Red LED on	Power connected		
		Red LED off	Power not connected		

2.3 Setting CC-Link Slave transmission rate dial code switch



Transmission rate dial - code switch

CC-Link supports transmission rate as: 156kbps, 625kbps, 2.5Mbps, 5Mbps, 10Mbps When the dial code switch is dialed to 0, the transmission rate is: 156kbps When the dial code switch is dialed to 1, the transmission rate is: 625kbps When the dial code switch is dialed to 2, the transmission rate is: 2.5Mbps When the dial code switch is dialed to 3, the transmission rate is: 5Mbps When the dial code switch is dialed to 4, the transmission rate is: 10Mbps When the dial code switch is dialed to 5, 6, 7, 8, 9 and the transmission rate is: 156kbps

2.4 Setting CC-Link Slave Address Dial - code Switch



As shown in the above PIC, the high-order dial-code switch (X10) set by CC-Link slave address is dialed to 0, and the low-order dial-code switch (X1) is dialed to 2, so this is indicating that the slave address of this module in CC-Link network is set as:

0*10+2=2.

Cc-link slave valid address range is 1-64, after the dial code exceeds the range, the default setting of the board card is: 1.

2.5 CC-Link Interface



CC-Link communication interface pin definition is as below:

DA	Signal DA
DB	Signal DB
DG	Signal Ground
SLD	Shielding Ground
FG	Grounding

2.6 VFD interface pin definition

Pin No.	Signal	Definition				
	Name					
1	COM	GND of 24V				
2	VCC	+5V output voltage				
3	P24	+24V output voltage				
4	GND	GND of 5V				
12	GND	GND of 5V				
15	485+	Receiving and sending data –P (Modbus- RTU interface)				
16	485-	Receiving and sending data –N (Modbus- RTU interface)				



2.7 Installation Dimension



3. Product Application Topology



4. Test with Mitsubishi QJ61BT11N

4.1. Opening the GX Works2 software, and create a new project, then

select the CPU series and model.



4.2. Clicking "Parameters" under the left project tree \rightarrow "Network Parameters" \rightarrow double-clicking "CC Link" to configure CC Link communication parameters.

Number of modules: 1

Type: Master

Mode Setting: Remote Network (Ver 2 mode)

Total number of connections: 1

Remote register (RWr): set to D1000 (programmatically defined)

Remote register (RWw): Set to D2000 (programmatically defined)

Station information: Ver.2 Remote equipment station (fixed 8 times setting,

occupying 3 stations)



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CC-Link							
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- 👼 软元件初始值	Configuration is finished						
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山 用户库	中断设置 中断设置						
4 连接目标							
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4.3. After the configuration is finished \rightarrow clicking in the menu bar to

download to the PLC.

III MELSOFT系列 GX Works2Ac	dministrator.USER-20190610MK\I	Desktop\NE300.gxw		
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4.4. Clicking the "Online" in the toolbar \rightarrow the "Monitor" in the drop - down menu \rightarrow Soft Component/Buffer Bulk Monitoring in the drop - down menu.



u MELSOFT系列 GX Works2Administrat	or.USER-20190610	MK\Desktop\NE300.gxw						
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工程	吹元件/缓冲存储器	比量监视-1 (监视执行中)			🔛 软元件/缓冲存储器排	比量监视-2 (监视执	行中)	
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	D1002	00000000000000000	0 0 0000		D2002	000000	0 0 0 0 0 0 0 0 0 0	0000
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	D1009	00000001101111	1 0 01BE		12009	000000	00000000000	0000
	D1010		1 0 0156		2010	000000	0000000000	0000
	D1011	000000000000000000	1 0 0022		12011	000000		0000
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4	D1021		0 0 0000		B2021	000000	0 0 0 0 0 0 0 0 0 0	0000
└────	D1022	00000000000000000	0 0 0000		D2022	000000	0 0 0 0 0 0 0 0 0 0	0000
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