



Product Solutions Announcement

Delta Industrial Automation Global Solution Center



Product	AMD	Type	VFD-C2000	Security Level	☒ General ☐ High ☐ Top
				No.	N/A
Issued by	Global SC	Author	John Zuo	Release Date	18 th July 2012

C2000 Modbus TCP Client in Torque Mode

Devices and tools:

Inverter: VFD007C23A, Firmware V9.020 (12274)

C2000 Optional Card: EMC-PG01U CMC-MOD01(V1.00)

PM motor: ECMA-C30602ES

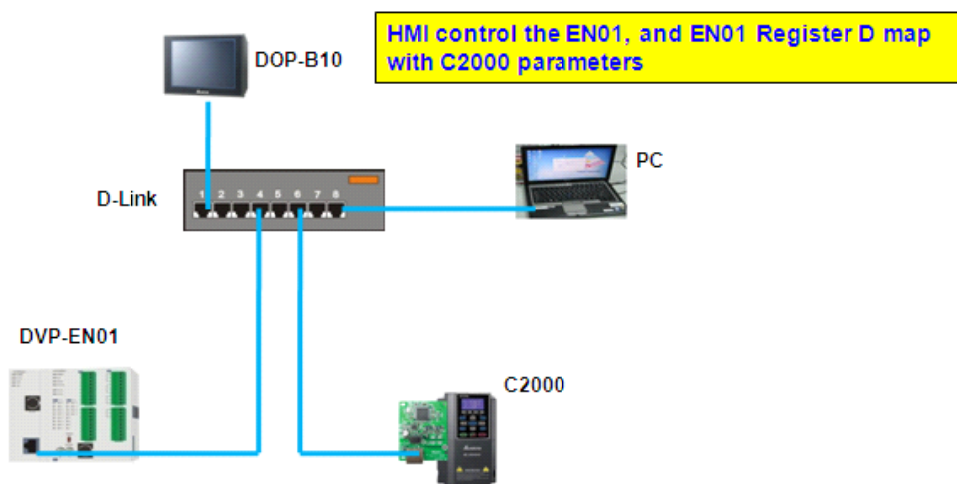
PLC: DVP28SV11T+DVPEN01(V2.06)

HMI:DOP-B10E615

HUB:D-Link

Operation Steps:

1. Setting necessary Parameters for C2000+PM motor with PG01U. (Please kindly refer to the announcements related to C2000+PM with PG01U).
2. Wiring C2000, 28SV, DOP-B10, PC into one Modbus TCP network.



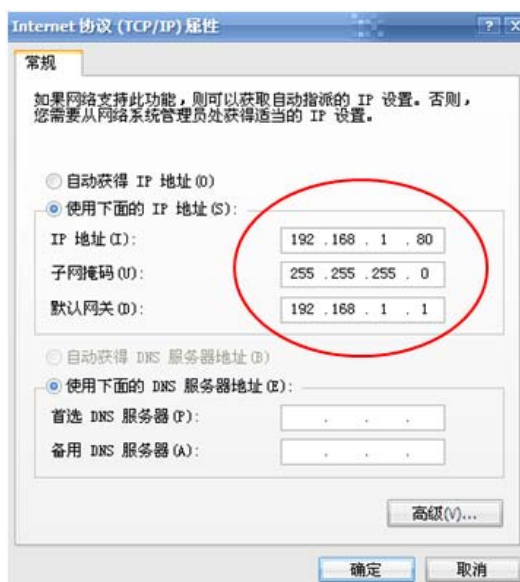
3. Setting C2000 parameters for Modbus TCP.

Pr. no	Definition	Setting value
00-10	Control Mode Choice	2 (Torque Mode)
00-13	Torque Mode Choice	1 (TQCPG for PM)
00-20	Source of Master Frequency Command	8(for communication card)
00-21	Source of the Operation Command	5(for communication card)
09-00	C2000 Communication Address	3 ^A
09-30	Communication Decoding Method	0(20XXH) 1(60XX) ^B
09-75	IP Configuration	0(Static) 1(DHCP) ^C
09-76	IP Address 1	192
09-77	IP Address 2	168
09-78	IP Address 3	1
09-79	IP Address 4	5
09-80	Net Mask 1	255
09-81	Net Mask 2	255
09-82	Net Mask 3	255
09-83	Net Mask 4	0
09-84	Gateway 1	192
09-85	Gateway 2	168
09-86	Gateway 3	1
09-87	Gateway 4	1
09-91	Ethernet Extra Setting	2 ^D
11-33	Source of Torque Command	0 (11-34), 5 (Communication Card) ^E
11-36	Choice of Speed Limit	0 (11-37 11-38), 2 (By 00-20) ^F

- A. Modbus TCP is based on Modbus, so the 09-00 Modbus Address of C2000 must be set correctly. And it should be different with PLC modbus address.
- B. Modbus TCP can support 20XX and 60XX based on 09-30 setting.
- C. IP Configuration should be Static if your HUB can't distribute the IP automatically. Of course, if you are using Router, and it can distribute IP automatically, please set 09-75=1 namely DHCP.
- D. When we finish the IP address setting, please set 09-91 to 2 for enabling the setting.
- E. If 11-33 is 0, the torque command source will be 11-34, so we can set the torque command to 11-34 by Modbus TCP. If 11-33 is 5, the torque command source will be by 20XX or 60XX namely communication card. However, 20XX can't support Torque mode so 60XX is only you can do if 11-33 is 5, and 09-30 should be 1 namely 60XX at this time.
- F. When 11-33 is 0, if we set 11-36 to 0, Speed limit can be set to 11-37 or 11-38 by Modbus TCP. If we set 11-36 to 2, Speed limit can be set to 2001H by Modbus TCP since 00-20 is 8 namely Communication card. When 11-33 is 5, Torque Speed Limit is nothing to do with 11-36 but only to 6007H.

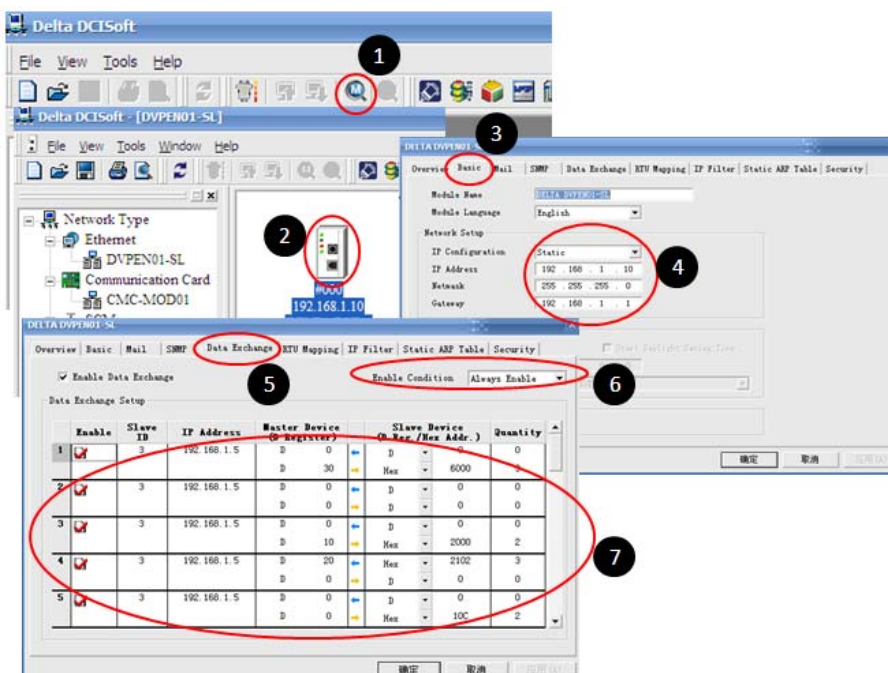
4. Setting PC IP address based on the C2000 IP setting 09-76~09-87. The Top three IP address should be the same as C2000 namely 192.168.1, but the final one should be different. In this case, PC IP address is 192. 168. 1. 80.

Net mask and Gateway are the same as C2000.



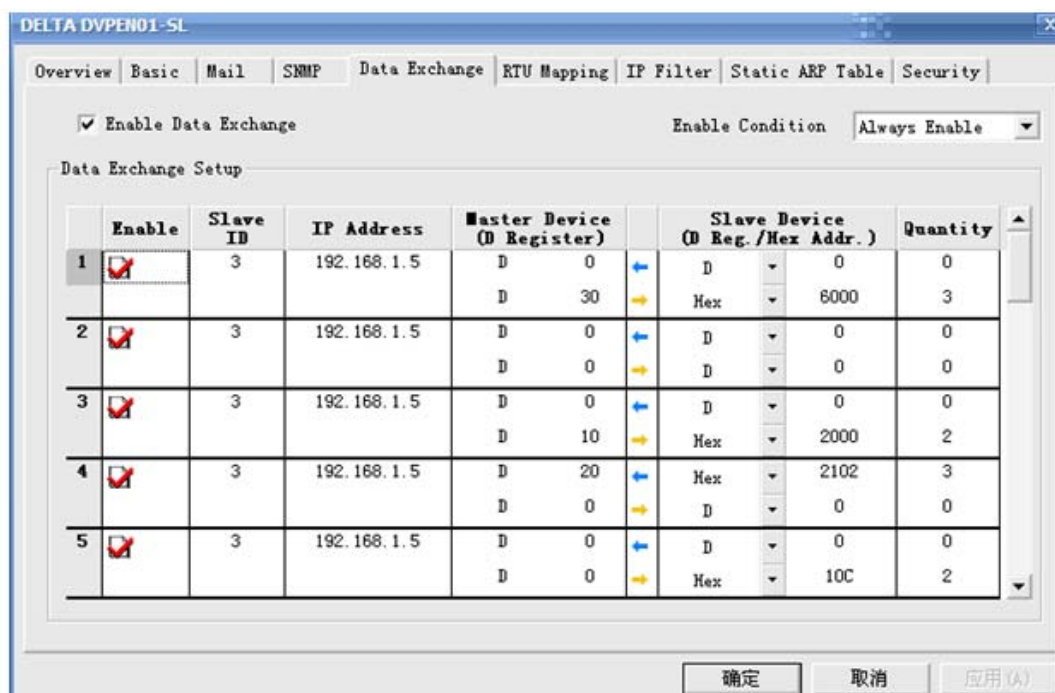
5. Repower DVP-EN01 and C2000.

6. Open the DCISoft for searching the modules in the network.



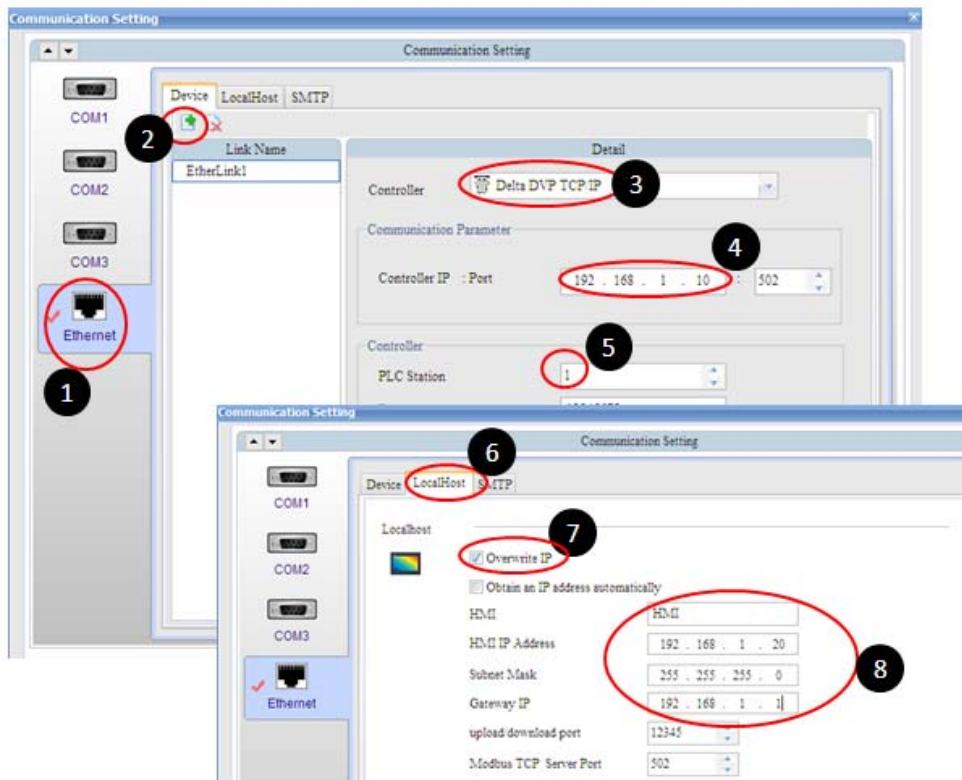
- 1) Click Searching based on the modules.
- 2) DN01 and C2000 will be searched there, and click the EN01.
- 3) Click the “Basic”.
- 4) Set the IP address of EN01, and the IP address top three should be the same as C2000 and PC, but the final one should be different. Netmask and Gateway are the same as C2000 and PC. In this case, EN01 IP address is 192. 168. 1. 10.
Besides, IP configuration also is Static since we are using HUB not Router.
- 5) Click the “Data Exchange”.
- 6) Set the “Enable Condition” to Always Enable.
- 7) Setting the mapping to C2000 in EN01. Slave IP should be the C2000 Pr09-00, IP address should be the C2000 IP, Master Device (D register) is the D in PLC, Slave Device is the parameter address of C2000 and you can choose HEX type or D type. In this case, HEX type is there since it is more convenient.

The Mapping information as follows:



Reading Data				Writing Data			
Parameter	HEX	Register D	Definition	Parameter	HEX	Register D	Definition
2102H	2102H	D20	Fre. Com.	2000H	2000H	D10	Ope. Com.
2103H	2103H	D21	Output Fre.	2001H	2001H	D11	Fre. Com.
2104H	2104H	D22	Output Cur.	01-12	01-0CH	D0	Acc. Time
				01-13	01-0DH	D1	Dec. Time
				6000H	6000H	D30	Ope. Com.
				6006H	6006H	D40	Tor. Com.
				6007H	6007H	D41	Speed Limit
				2208H	2208H	D50	Output Tor.
				11-34	B22H	D60	Tor. Com.
				11-37	B25	D70	+Spe. Limit
				11-38	B26	D71	-Spe. Limit

7. Open the DOPSOFT and setting the HMI MODBUS TCP setting.



- 1) Go to the "communication setting" of DOPSOFT, and click Ethernet.
- 2) Clicking "add new connection".
- 3) Choose the "Delta DVP TCP/IP".
- 4) Setting the IP address for the device you want to use HMI to control. In this case, HMI is to control EN01, so here is the EN01 IP address, 192.168.1.10.
- 5) Setting the modbus address for the device you want to use HMI to control. In this case, HMI is to control EN01, so here is the 28SV modbus address namely 1.
- 6) Clicking "LocalHost"
- 7) Clicking "Overwrite IP"
- 8) Setting the IP address for HMI, the top three IP address should be the same as C2000, PC and EN01, but the final one should be the different. In this case, the IP address of HMI is 192.168.1.20. Besides, Netmask and Gateway should be the same as C2000, PC and EN01.

8. Double check the IP address for C2000, EN01, DOP and PC for ensuring they are all different.

PLC	192.168.1.10
C2000	192.168.1.5
DOP-B10	192.168.1.20
PC	192.168.1.80

9. Making the PLC and DOP program.

11-33=0 ^A		11-33=5 ^B
11-36=0	11-36=2	Modbus TCP 60XX Speed Sample Program(.dps & .dvp)
MODBUS TCP Speed limit is 11-37 11-38 Sample Program(.dps & .dvp)	MODBUS TCP 20XX Speed Sample Program(.dps & .dvp)	

- A. When 11-33=0, torque command is by 11-34 not communication, so I suggest you use 20XX namely 09-30=0.
- B. When 11-33=5, torque command is by communication card, and 60XX must be there since 20XX can't support torque command. So 09-30=1.

10. Running the program.

Attentions:

1. Is Accele. or Decele. Time available for Torque Control in Modbus TCP ?

When the 11-36 is 2, the acceleration time and deceleration time are available for Torque control not only for Modbus TCP but also for other methods.

Besides, if the 11-36 is 1, the acceleration time and deceleration time also are available under the situation related to 00-20. E.g. if you choose 11-36 to 1 under FWD, the acceleration & deceleration time will be available when you FWD run, but it is not available when you REV run since REV is related to 11-38.

