



Product Solutions Announcement

Delta Industrial Automation Global Solution Center



Product	AMD	Type	VFD-C2000	Security Level	<input checked="" type="checkbox"/> General <input type="checkbox"/> High <input type="checkbox"/> Top
				No.	N/A
Issued by	Global SC	Author	John Zuo	Release Date	20 th Jan. 2014

C2000 CanOpen Slave in Position Mode

Devices and tools:

Inverter: VFD007C23A, Firmware V1.04 (D13305)

C2000 Optional Card: EMC-PG01U EMC-COP01

PM motor: ECMA-C30602ES

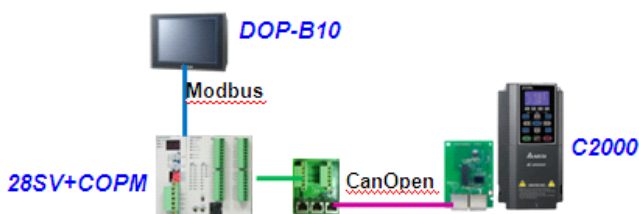
PLC: DVP28SV11T+DVPCOPM

HMI: DOP-B10E615

Connector: TAP-CN03

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 28SV, C2000 and HMI for one network.



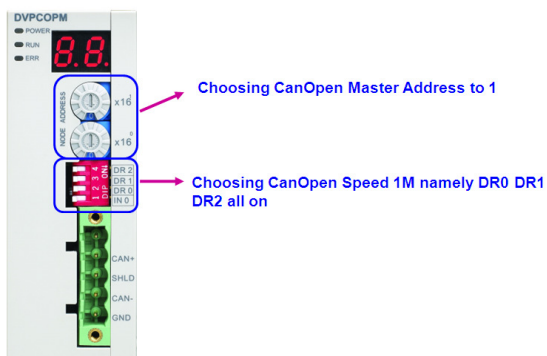
3. The Understanding for CanOpen Slave in Speed Mode.

Parameters Setting	CanOpen Protocols	Index Setting in Torque Mode
09-40=1	DS402	6040H Operation Control, 607AH Pos. Com. 6060H Control Mode ^A 2061H-03 Fre. Display ^B 2061H-05 Pos. Display(32-bit) ^B 2061H-01 Operation Status ^B

09-40=0	09-30=1	60XX	Delta Self-Definition	2060H-01 Operation Control, 2060H-05 Pos. Com.(32-bit) 6060H Control Mode ^A 2061H-01 Operation Status 2061H-05 Pos. Display(32-bit) 2021H-04 Fre. Display ^B
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- A. 6060H is the control mode index for every CanOpen protocol including 60XX or DS402 as long as Pr00-21 is 3 and in the CanOpen mode. If Pr00-21 is not 3, 6060H is not available again and we must change the control mode by Pr00-10.
- B. For TXPDO, there is no Protocol limitation. E.g. if you are in DS402, you also can read 60XX or 20XX TXPDO, if you are in 60XX, you also can read DS402 or 20XX TXPDO, and the same to 20XX.

4. Setting COPM CanOpen Master address & CanOpen Speed.



The CanOpen Master address is 1 and speed is 1M.

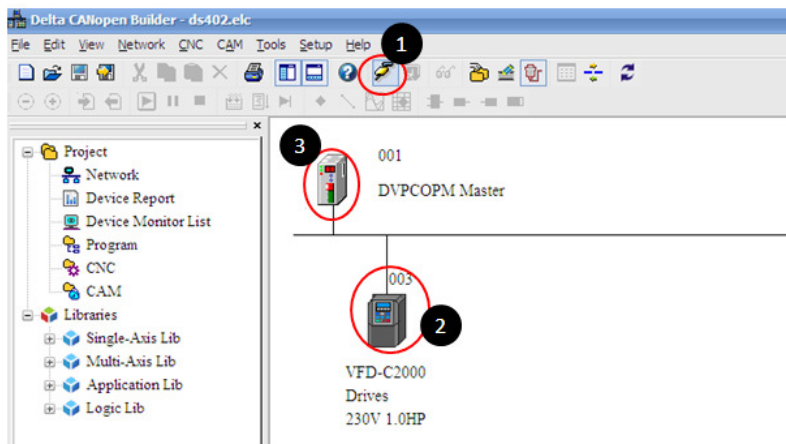
5. Setting CanOpen Slave Parameters in C2000.

Pr. no	Definition	Setting value
00-40	Homing Mode Choice	3(for ORG and Z pulse)
00-41	Homing First Speed	8.00HZ
00-42	Homing Second Speed	2.00HZ
02-01	MI1 Definition	46(ORG)
00-20	Source of Master Frequency Command	6 (CanOpen)
00-21	Source of the Operation Command	3 (CanOpen)
09-30	Delta Self-definition CanOpen Protocol	1 (60XX)
09-36	CanOpen Slave Address	3 ^A
09-37	CanOpen Speed	0 (1M) ^B

09-40	CanOpen Protocol	0 (Delta Self-definition) ^C 1 (CanOpen DS402 Standard)
11-40	Source of the Position Command	3 (CanOpen) ^D
11-43	P2P Maximum Frequency	30.00HZ
11-44	P2P Acce. Time	1.00s
11-45	P2P Dec. Time	3.00s

- A. The CanOpen Slave Address must be different with master, so here I set 09-36=3.
- B. The CanOpen speed should be the same in the one network, so 09-36=0 for 1M speed.
- C. When 09-40=0, we must choose 09-30=1 for confirming Delta Self-definition 60XX since 20XX can't support Position Mode.
- D. Position Command Source must be 3 namely CanOpen. If not, we can't realize position control by CanOpen.

6. Open the CanOpen Builder for configuring the CanOpen Indexes mapping.



- 1) Click the scanning button for scanning the network notes. The result is one COPM master and one C2000 slave.
- 2) Click the C2000, and go to PDO mapping. The DS402 60XX PDO mappings in this case are below.

Protocols	RXPDO ^A	TXPDO ^B
DS402	6040H Operation Command	2061H-01 Operation Status
	607AH Position Command	2061H-03 Frequency Display
	6060H Control Mode	2061H-05 Position Display
60XX	2060H-01 Operation Command	2061H-01 Operation Status
	2060H-05 Position Command	2061H-05 Position Display
	6060H Control Mode	2021H-04 Frequency Display

A. RXPDO is the PDO for writing data to slave in any CanOpen Protocol. However, different

CanOpen Protocols have different PDO lists, so we can't write another protocol RXPDO in the current protocol. E.g. we can't write 6040H as the Operation command when we are in the 60XX protocol. 604FH 6050H 6060H are the exceptions and they can be written in any protocol as long as 00-21=3 in the CanOpen Mode.

- B. TXPDO is the PDO for reading data from slave in any CanOpen Protocol. Besides, TXPDO can be used freely and there is no protocol limitation for TXPDO.

- 3) Click the DVPCOPM Master for enabling the PDO mapping.

Please kindly refer to the CanOpen Builder Samples [DS402](#) [60XX](#).

7. Download the CanOpen Builder Configuration to 28SV and make the PLC program in 28SV.

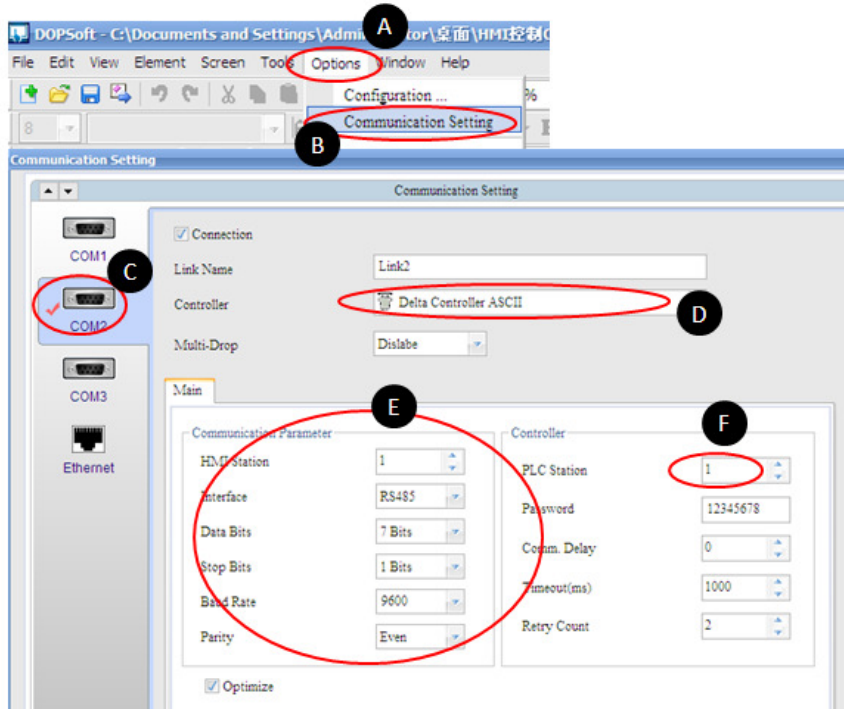
8. Understanding the RXPDO 6040H for better Homing & Position Control.

Bit	Operation mode					
	Velocity mode	Profile position mode	Profile velocity mode	Profile torque mode	Homing mode	Interpolation position mode
4	rfg enable	New set-point	reserved	reserved	Homing operation start	Enable ip mode
5	rfg unlock	Change set immediately	reserved	reserved	reserved	reserved
6	rfg use ref	abs / rel	reserved	reserved	reserved	reserved
8	Halt	Halt	Halt	Halt	Halt	Halt

- A. Bit 4~Bit 6 of 6040H has the different definitions for different control mode.
- B. For Profile Position Mode (P2P in C2000), Bit 6 can determine incremental position or absolute position. And if bit 6 is off, it is absolute, if bit 6 is on, it is incremental. Bit 5 is not used in firmware. Bit 4 is for enabling the new point setting. So if you want the incremental, I suggest you give 6040H H5F. If you want the absolute, I suggest you give 6040H H1F. Of course, before you provide H5F or H1F, you should give HE to 6040H first.
- C. For Homing Mode, Bit 5 Bit 6 are not used. Bit 4 is for Homing start, so if you want to go to Home, you should give 6040H H1F. Of course, before you provide H1F, you also should give HE to 6040H first.

9. Making Program and download to PLC. Please kindly refer to “DS402.dvp” and “60XX.dvp”.

10. Setting HMI Communication Protocol.

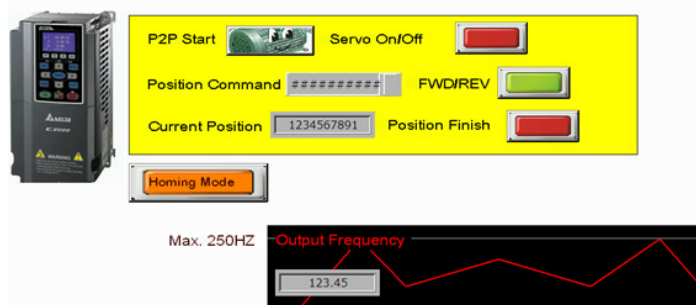


- A. Choosing Options in DOP soft.
- B. Choosing Communication Setting in Options.
- C. Choosing COM2 in this case. Because I connect HMI to 28SV by COM2.
- D. The controller is Delta Controller ASCII.
- E. The communication parameters must be the same as 28SV namely 7 E 1 9600 ASCII.
HMI address should be different with 28SV address.
- F. 28SV Modbus address is 1.

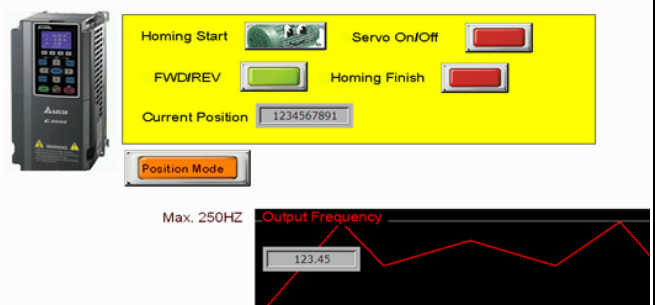
11. Making HMI program and download to HMI. Please kindly refer to “P2P for 60XX CanOpen in C2000.dps” and “P2P for DS402 CanOpen in C2000.dps”

12. Running the program.

Global Solution Center_Position



Global Solution Center_Homing Mode



FAQ:

1. How to choose incremental or absolute position in 60XX?

We can choose Incremental or Absolute Position in 2060H-01 bit2. If bit2 is Off, it is incremental. If bit2 is On, it is absolute.

2. Why can't Homing Finish or Position Target Reach relay be ON in 2061H-01?

The Pulses will have error there if the PG resolution is not so high or some interference outside. So the 2061H-01 Homing Finish or Position Target Reach relay can't be on even if the position or homing are finished. Hence, we must enhance the bandwidth of APR namely 11-03 11-04 11-05 or 11-06 11-08 11-10 based on the inertia function enable or not. In this case, 11-03=11-04=11-05=80HZ, and Homing Finish, Position Target Reach relay all worked very well.

3. How to reset 2061H-05 position display?

2061H-05 is very important especially for Absolute Position. E.g. if 2061H-05 is 10W pulses, when we give 20W pulses command, motor will run only 10 rounds (1W one round). So we can see 2061H-05 is the pulses record for position mode.

Hence, we should have the ability to reset it in the practical application. Please take the Homing Mode, and [2061H-05 will be reset after Homing Mode.](#)

[2061H-05 never be reset in Position Mode even if it is servo off.](#)

