



# 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	SC	Author	John Zuo	Release Date	14 <sup>th</sup> June, 2013

## Internal Communication Control for C2000

### Devices and tools:

Inverter: VFD007C23A, 2PCS (Firmware V1.03 D13182)

C2000 Optional Card: EMC-PG01U (2PCS)

PM motor: ECMA-C30602ES 2PCS

HMI: DOP-B10E615

### Operation Steps:

- Setting necessary Parameters for C2000+PM motor with PG01U. (Please kindly refer to the announcements related to C2000+PM with PG01U)
- Set the necessary Parameters for C2000 Internal Communication Master:

Parameters	Descriptions	Value
09-31	Slave address for Internal Commun.	-10 (Master)

Besides:

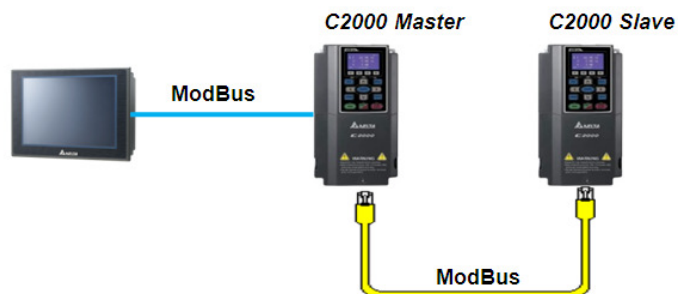
- please go to PLC mode for master.

- Set the necessary Parameters for C2000 Internal Communication slave:

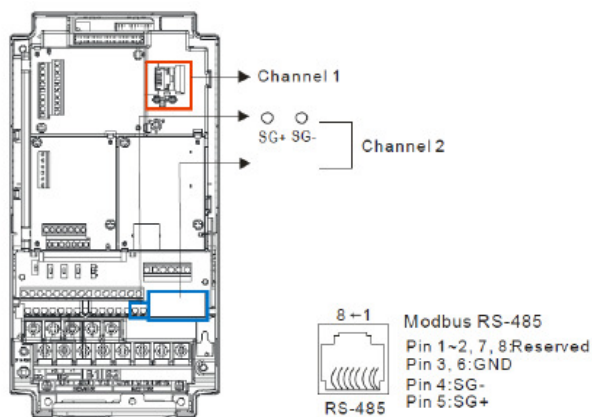
Pr. no	Definition	Setting value
00-11	Speed Mode Choices	4(for FOCPG+PM)
00-13	Torque Mode Choices	1(TQC for PM)
00-20	Source of Master Frequency Command	1(RS485)

00-21	Source of the Operation Command	2 (RS485)
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, So one MI wiring should be there for ORG)
09-31	Slave address for Internal Commun.	-1 (Slave 1)
11-33	Source of the Torque Command	1(RS485)
11-40	Source of the Position Command	2 (RS485)
11-43	P2P Maximum Frequency	30.00HZ
11-44	P2P Acce. Time	1.00s
11-45	P2P Dec. Time	3.00s

#### 4. Wiring C2000 Master and Slave together based on RS485.



There are two channels for C2000 in Modbus. For internal Modbus Communication in C2000, only channel two is available, and channel one can't support internal Modbus Communication. Hence, please connect C2000 master and slaves by channel 2 ( SG+ SG- or RJ45 port). HMI control the C2000 PLC built-in must be depend on Channel one since channel two is for internal modbus communication.



## 5. Understanding the Special Auxiliary Relays M.

Relay/Register	Descriptions
M1035 <sup>A</sup>	Internal Communication Enable
D1110 <sup>B</sup>	Communication nodes for network

A. M1035 must be On for enabling the internal communication.

B. D1110 is the total nodes for internal communication network. In this case, D1110 is 1 since there only is one C2000 slave.

## 6. Making the PLC program based on special register D for C2000 Master.

After considering M1035, D1110, we can use the special registers D in C2000 master for making program. D1120 is the most important and we must understand it very well.

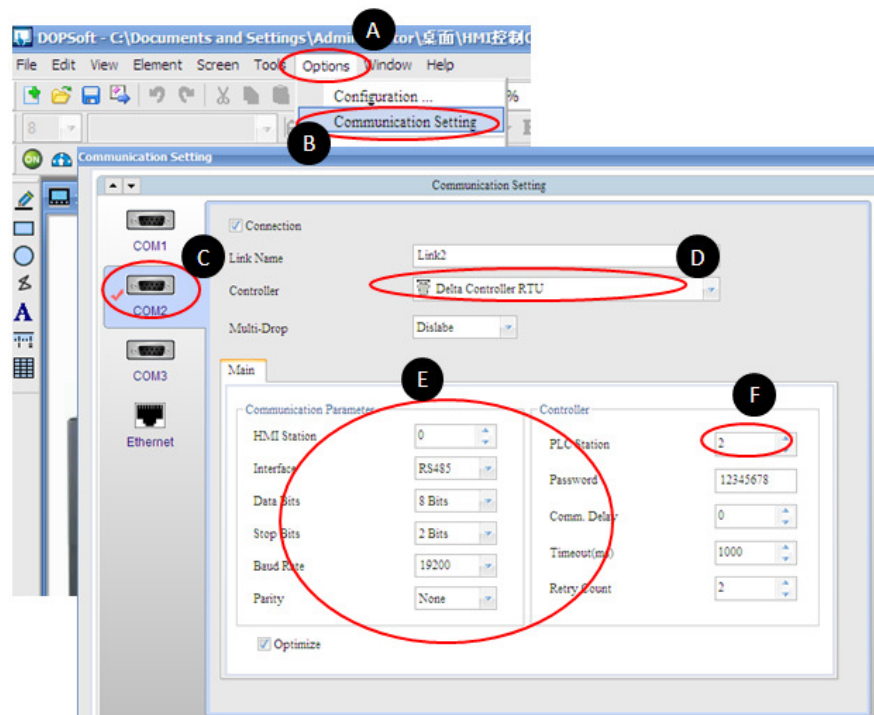
Special D	Function Description					
	Definition	Bit	Speed Mode	Position Mode	Torque Mode	Homing Mode
D1120+10*N <sup>A</sup>		0	Com. Enable	Change Right Now		Homing Start
		1	Reverse			
		2		0: Incre. 1: Absolute		
		3	Stop & Servo on	Stop & servo on		
		4	Freq. Holding			Stop & servo on
		5	JOG			
		6	Quick Stop	Quick Stop	Quick Stop	Quick Stop
		7	Servo ON	Servo ON	Servo ON	Servo ON
		15	Reset Error	Reset Error	Reset Error	Reset Error

A. N is from 0~7 to mapping the slave 1 ~slave 8.

7. Downloading the program to our C2000 Master.

Please kindly refer to the program <Internal Communication Control for C2000>(.dvp).

8. 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 C2000 by COM2.

D. The controller must be Delta Controller RTU.

E. The communication parameters must be 8 N 2 19200. HMI address should be different with C2000 PLC address.

F. C2000 PLC address must be the same as Pr09-35 namely 2.

9. Downloading the program to HMI.

Please kindly refer to the program <Internal Communication Control for C2000>(.dps).

10. Running Program.

## Attentions:

### A. Any other special D for Internal Communication Control Mode?

Special D	Function Description						
	Definition	Bit	Speed Mode	Position Mode	Torque Mode	Homing Mode	Attribute
D1121+10*N	Control mode		0	1	2	3	RW
D1122+10*N	Command 1		Speed Command (unsigned)	Position Command (Signed)	Torque Command (Signed)	N/A	RW
D1123+10*N	Command 2		N/A	N/A	Speed Limi.	N/A	RW
D1126+10*N	Status	0	Freq. At	Pos. At	Torque At	Home At	RO
		1	FWD	FWD	FWD	FWD	
			REV	REV	REV	REV	
		2	Warning	Warning	Warning	Warning	
		3	Error	Error	Error	Error	
		5	Jog				
		6	Quick Stop	Quick Stop	Quick Stop	Quick Stop	
		7	Servo On	Servo On	Servo On	Servo On	
D1127+10*N			Practical Fre.	Practical Pos. (Signed)	Practical Torque (Signed)	N/A	RO
D1128+10*N			N/A		N/A	N/A	

### B. Can we read or write the common parameters in Internal Communication Mode?

Of course, we can read or write the common parameters like 01-12, 01-13 of C2000 slave based on instructions ICOMW & ICOMR. Please kindly refer to the PLC sample program and you can see the rolling method for ICOMW ICOMR.

Besides, the first operator of ICOMW ICOMR is the slave address, if your slave address is 1, please set decimal 0 for this operator, namely Operator is 0 to 7 is on behalf of slave address 1 to 8.

### C. How fast is Internal Communication Mode?

The communicate rate for internal communication mode is almost 1M since we remove several normal Modbus Mechanism and enhance the speed.

Hence, this is one good replacement for CanOpen Master if you think CanOpen Master is a

little complicated.

**D. Why can't we download the PLC program to C2000 master by channel 2?**

Once we set C2000 as internal Modbus master, the channel 2 will be assigned to be connected to the C2000 slave automatically. So we only can use channel 1 as PLC program download or HMI control.

So, please use channel 1 to PLC download, and the protocol is fixed, 8 N 2, 19200 RTU.

**E. How many slaves can be supported in Internal Communication Control mode?**

The maximum is 8.

