



# 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	11 <sup>th</sup> Jul. 2014

## Point to Point Function in C2000

### Devices and tools:

Inverter: VFD007C23A, Firmware V1.20 (D14281)

C2000 Optional Card: EMC-PG01U

PM motor: ECMA-C30602ES

### Operation Steps:

1. Wiring the power line of ECMA-C3 with C2000 UVW Ports based on Red(U) White(V) Black(W).
2. Set correct parameters 01-00, 01-01 and 01-02 based on PM you are using.
3. Key in the following parameters:

Pr. no	Definition	Setting value
05-33	IM or PM motor choice	1
05-34	PM motor rated current (A)	1.55
05-35	PM motor rated power (kw)	0.20
05-36	PM motor rated speed (rpm)	3000
05-37	PM magnetic roles	10
05-38	PM Inertia ( $E^{-4}$ kg-m <sup>2</sup> )	0.2

4. Set 05-00=5 for PM motor auto-tuning:

05-33 to 05-37 must be set before PM motor auto-tuning. However, 05-38 has nothing to do with auto-tuning but for automatical bandwidth in ASR.

5. Check the following parameters after PM motor auto-tuning:

05-39 stator resistance, 05-40 PM Ld, 05-41 PM Lq and 05-43 PM Ke

6. Set parameters about encoder:

10-00	Encoder types	2
10-01	Pulse Encoder PPR	2500
10-02	Encoder operation modes	1

7. Set 05-00=4 for PM magnetic angle detecting:

The angle would be set into 05-42 automatically after the magnetic angle detecting. And for ECMA series motor, 05-42 will be  $0^{\circ}$  or  $360^{\circ}$  because of the setting in factory. Hence, if the motor is ECMA, we can cancel the magnetic angle detecting but set 05-42=0 directly.

8. Set 00-11=4 for PM FOC PG control mode.

9. Repower the inverter:

Since ECMA use the ABZ encoder, the rotor magnetic information can be obtained only at the power-on time. So after the necessary parameters setting, we should repower inverter and makes PG can obtain the rotor magnetic information in case of fly run based on wrong magnetic information.

10. Set Pr11-00=2 for inertia auto-tuning (After tuning over, 11-00 will be 0 automatically):

- Keep empty load first.
- Set speed command= $\frac{2}{3}$ \*rated speed of motor (05-36).
- Set acceleration and deceleration time is 1s or 1.5s.
- Forward and reverse in turn until 11-01 is stable. And then press stop, the tuning is over.
- Connect the load, and repeat the inertia auto-tuning procedures again. If the inertia auto-tuning is OK, the loading inertia result is better. If the loading inertia not OK, we must input the 11-01 inertia by hand based on the tuning result in empty load.

11. Enable ASR bandwidth adjustment automatically function.

- If we keep Pr11-00=0, we just disable the ASR bandwidth adjustment automatically. And we only can use Pr11-06 to Pr11-11 and the PI ASR will be invariable during running.
- If we set Pr11-00=1, we enable the ASR bandwidth adjustment automatically, and we can use Pr11-03 to Pr11-05 (no Pr11-06 to Pr11-11 anymore), and Pr11-03 to Pr11-05 can

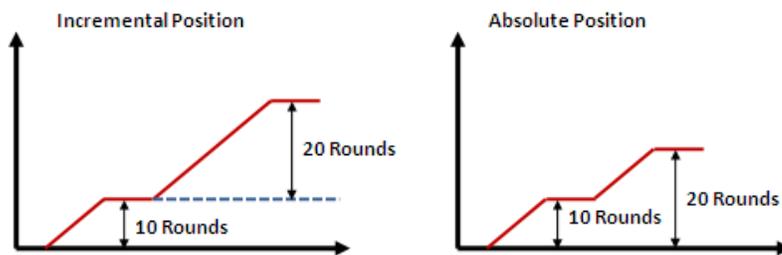
make real ASR PI changed automatically based on practical current situation. This is more flexible for practical commissioning.

12. Set Pr.00-10 to 1 namely control mode is Point to Point (P2P).

13. Set P2P mode in Pr.00-12

- Set Pr.00-12 to 0, P2P is incremental position.
- Set Pr.00-12 to 1, P2P is absolute position.

E.g. if we run 10 rounds at the first time and give 20 rounds position command again for running another 20 rounds at the second time, please set Pr.00-12 to incremental position. If we run 10 rounds at the first time and give 20 rounds position command again for running another 10 rounds at the second time, please set Pr.00-12 to absolute position.



14. Set P2P position command from 04-15 to 04-44. Actually, we have 15 groups P2P position commands and every group has two parameters which are rounds and pulses. MIs status can determine which position group you can use. Please refer to as follows:

MI4	MI3	MI2	MI1	Point to Point		
0	0	0	0		0	
0	0	0	1	NO.1	04-15 for Rounds	04-16 for Pulses
0	0	1	0	NO.2	04-17 for Rounds	04-18 for Pulses
0	0	1	1	NO.3	04-19 for Rounds	04-20 for Pulses
0	1	0	0	NO.4	04-21 for Rounds	04-22 for Pulses
0	1	0	1	NO.5	04-23 for Rounds	04-24 for Pulses
0	1	1	0	NO.6	04-25 for Rounds	04-26 for Pulses
0	1	1	1	NO.7	04-27 for Rounds	04-28 for Pulses
1	0	0	0	NO.8	04-29 for Rounds	04-30 for Pulses
1	0	0	1	NO.9	04-31 for Rounds	04-32 for Pulses
1	0	1	0	NO.10	04-33 for Rounds	04-34 for Pulses
1	0	1	1	NO.11	04-35 for Rounds	04-36 for Pulses
1	1	0	0	NO.12	04-37 for Rounds	04-38 for Pulses
1	1	0	1	NO.13	04-39 for Rounds	04-40 for Pulses
1	1	1	0	NO.14	04-41 for Rounds	04-42 for Pulses
1	1	1	1	NO.15	04-43 for Rounds	04-44 for Pulses

15. Set P2P position speed from 11-43 to 11-45.

- 11-43 is the max frequency during P2P position control.
- 11-44 is the acceleration time for P2P position speed, namely the time from 0 to 11-43.
- 11-45 is the deceleration time for P2P position speed, namely the time from 11-43 to 0.

16. Set Homing Function for P2P.

We should add MI ports for realizing the Homing Function. The related MI definitions as follows:

MI setting	Definition	Remark
44	Negative Limitation	Usually will be warning when MI=44 is ON
45	Positive Limitation	Usually will be warning when MI=45 is ON
46	ORG	Usually for Homing Finish Judgement
47	Homing Enable	When MI=47 is ON, Homing just is enabled

17. Pr00-40 must be set correctly since it is the Homing mode setting parameter.

We strongly suggest you set 00-40=2 or 3 namely ORG as the Homing Finish Judgement, NL and PL will be warning for limitation, Z pulse would be considered.

Please kindly refer to the 00-40 explanation in manual.

18. Setting Homing Speed from Pr00-41 & Pr00-42.

- 00-41 is the max frequency during Homing before getting the position sensor like ORG.
- 00-42 is the max frequency during Homing after getting the position sensor like ORG. When we get the position sensor like ORG, if we still go to look for Z signal, 00-42 will be for this process.

19. Setting Pr11-40=0 for choosing P2P source is from external terminal.

20. Running P2P function.

**FAQ:**

1. Can we set Pr00-10=1 for Homing?

Yes, Pr00-10=1 is enabling the P2P function (including Homing function also), and as long as setting Pr00-40 correctly and use MI to option 44 45 46 47, we can use homing function also.

2. Is MI=47 always on during the Homing Process?

MI=47 must be enabled all the time for Homing Process. If Homing is not finished, we just disable MI=47, the Homing will not be finished even if the ORG sensor is ON.

### 3. Is the Pulse Record always there?

Yes, the pulse record will be there even if you stop the inverter. But if you power off the inverter, the pulse record can be removed.

If you want to remove pulse record during power on, you can use Homing function.

### 4. Can we enable Homing mode with Multi-Pos input (Mix)=on?

Yes, the Homing can work. **But please don't do that with Multi-Pos input is on since the position chaos will be there after Homing. We suggest you make all Multi-Pos input off before going to Homing Mode.**

E.g., MI1=1 MI2=2, and MI1=ON for POS1=2 rounds, MI1=ON, MI2=ON for POS3=5 round, and,

- Incremental P2P mode, when MI1 ON, MI2 ON also, you go to Homing. After it, once you make MI2 off, it will run 2 rounds since MI1 still ON, and it is POS1 there. Hence, C2000 will recognize the new status after Homing. But incremental P2P is OK since the status is normal logic.
- Absolute P2P mode, when MI1 ON, MI2 ON also, you go to Homing. After it, once you make MI2 off, it will run 3 reverse rounds. And if you make MI1 off also, it will run 2 reverse rounds.

This is because, even if homing, C2000 still regard the current status as 5 rounds position, and once MI2 off, it go to POS1 namely 2 rounds, so absolute P2P will give negative 3 rounds command, so 3 reverse rounds. And when MI1 off, it go to 0 rounds, so negative 2 rounds there.

**Hence, absolute P2P will be chaos after Homing if we never make Multi-Pos Input off before Homing.**

**In a word, please make Multi-Pos input off before homing mode in the external terminal P2P mode.**

