



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	22 nd Oct. 2013

C2000 Drive IM with FOC+PG

Devices and tools:

Inverter: VFD007C43A, Firmware V1.04(13305), PG: EMC-PG01L;

IM motor: Teco Motor with 1024 PPR Line driver Encoder

Operation Steps:

1. Set Pr00-02=9(50Hz) or 10(60Hz) to go back default setting.
2. Set correct parameters Pr01-00, Pr01-01 and Pr01-02 based on Motor.
3. Key in the following parameters base on IM you are using.

Pr. no	Definition	Setting value
05-01	Induction motor rated current (A)	Motor Nameplate
05-02	Induction motor rated power (kW)	Motor Nameplate
05-03	Induction motor rated speed (rpm)	Motor Nameplate
05-04	Induction motor pole numbers	Motor Nameplate

4. Set Pr05-00=1 and press the **【RUN】** key for IM dynamic auto-tuning.
Please kindly have your attention that motor will spin in dynamic auto-tuning method.
5. Check the following parameters after IM rotary auto-tuning.
05-05 IM No-load current, 05-06 IM Stator resistance, 05-07 IM Rotor resistance,
05-08 IM Lm, 05-09 IM Lx.

6. Set parameters about encoder:

10-00	Encoder types	1
10-01	Pulse Encoder PPR	1024
10-02	Encoder operation modes	1

7. Set 00-11=3 for IM FOCPG control mode.

Keep 00-10 is 0 namely speed control, and then set 00-11 to 3. Run the inverter and check any error there. If PGF is error there, please check your encoder wiring and change 10-02 to 2.

8. Set Pr11-00=2 for inertia auto-tuning:

- Set speed command= $2/3$ *rated speed of motor(05-03).
- Set acceleration and deceleration time is 1s or 1.5s.
- Forward and reverse in turn until 11-01 is stable.

9. Set ASR parameters based on the practical situations:

- Please set 11-03 11-04 11-05 if we set Pr11-00=1 and finish the inertia auto-tuning.
- Please set 11-06 to 11-11 if we set 11-00=0 which doesn't need the inertia auto-tuning.

The no-load running figure based on induction motor. (The rated frequency is 50Hz)



Attentions:

1. Is there any other auto-tuning method for IM with PG?

There are two auto-tuning methods for FOC+PG for IM.

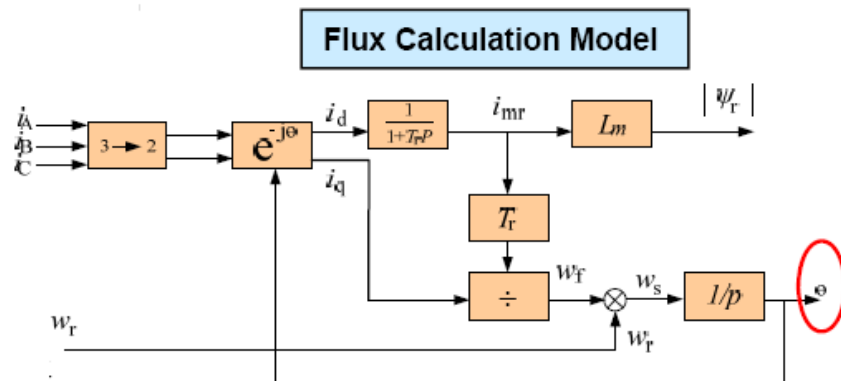
- Pr05-00=1 is dynamic auto-tuning. Every motor parameter can be learnt in this mode. The weakness is we must make the motor empty load every time.
- Pr05-00=2 is static auto-tuning. The motor don't need empty load so don't need to be separated from the load. The weakness is the auto-tuning precision is not so good like Pr05-00=1 and Pr05-05 namely IM no load current must be written before the static auto-tuning start.

2. Why is there no angle auto-tuning like PM?

The vector control for IM or PM is all based on clark-park transformation so the theta angle, which is the transformation angle in theory, is very important for realizing the vector control.

However, PM theta is based on magnet position so we must take the angle auto-tuning for PM to get the magnet position, and if not, PM can't be controlled well.

For IM, the theta can be obtained by current and motor speed feedback, so we don't need to take angle auto-tuning for IM.



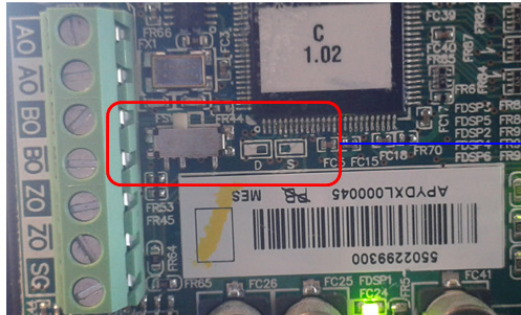
3. Do we must use PG card for motor auto-tuning in FOC+PG for IM?

The motor auto-tuning is nothing to do with PG card, so you don't need to use PG card for auto-tuning. Besides, the practical experience just suggests us PG card circuit will cause the static auto-tuning damage to inverter due to the disturbance to PG. Hence, please kindly remove PG when you take the any auto-tuning.

4. Can we use EMC-PG01U for receiving the ABZ incremental encoder like EMC-PG01L or PG01O?

This is possible. But we must follow 2 rules,

- The parameter 10-00 must be 4 if we use the PG01U.
- The Switch of PG-01U must be on the right for S. Namely only the S mode can support receive the motor with standard ABZ/UVW or the normal ABZ incremental encoder.



D: For Delta ECMA-C3 motor

S: For the motor with standard ABZ/UVW encoder

