



Product Solutions Announcement

Delta Industrial Automation Global Solution Center



Product	AMD	Type	VFD-CP2000	Security Level	☒ General ☐ High ☐ Top
				No.	N/A
Issued by	GSC	Author	John Zuo	Release Date	28 th September 2012

Fixed Time Circulation + Fixed Quantity Control in CP2000

Devices and tools:

The Circulation Testing DEMO

- VFD007CP23A. Testing firmware is V9.020 D12381.
- EMC-R6AA.



Operation Steps:

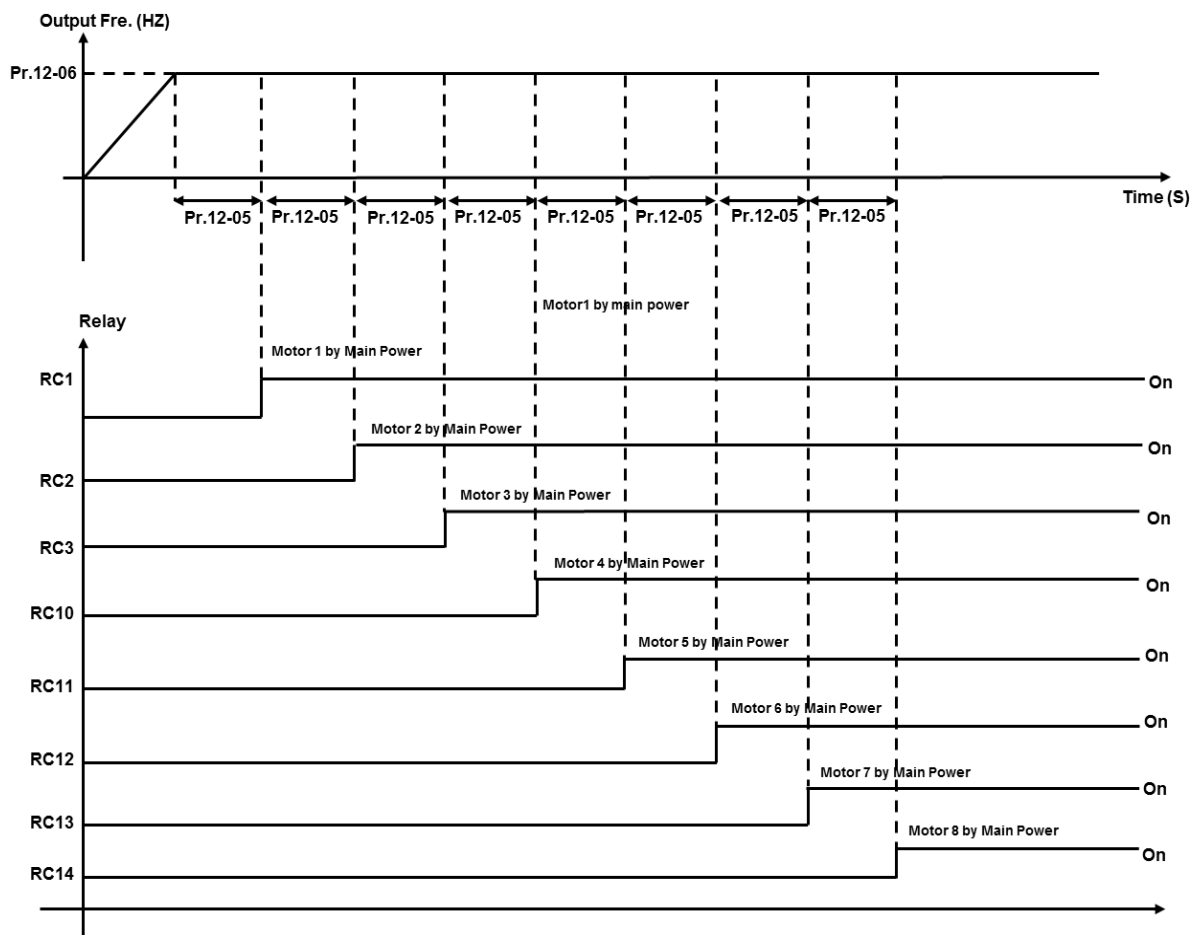
1. Setting necessary Parameters for CP2000 Fixed Quantity Circulation Control.

Pr. no	Definition	Setting value
12-00	Circulation Control Mode	5
12-01	Number of Motors to be connected	8
12-02	Operating Time of each motor (minutes)	1
12-03	Delay Time due to the Acceleration at Motor Switching	6.0 s

12-05	Delay Time while fixed quantity circulation at Motor Switching	1.0 s
12-06	Frequency when switching motors at fixed quantity circulation	40.00HZ
12-08	Frequency when stopping auxiliary motor	10.00HZ
08-00	Input Terminal for PID feedback	1 (for negative PID feedback)
03-00	Analogue Input 1 (AVI1)	5 (PID feedback signal)
01-12	Acceleration Time	1.00 s
01-13	Deceleration Time	1.00 s

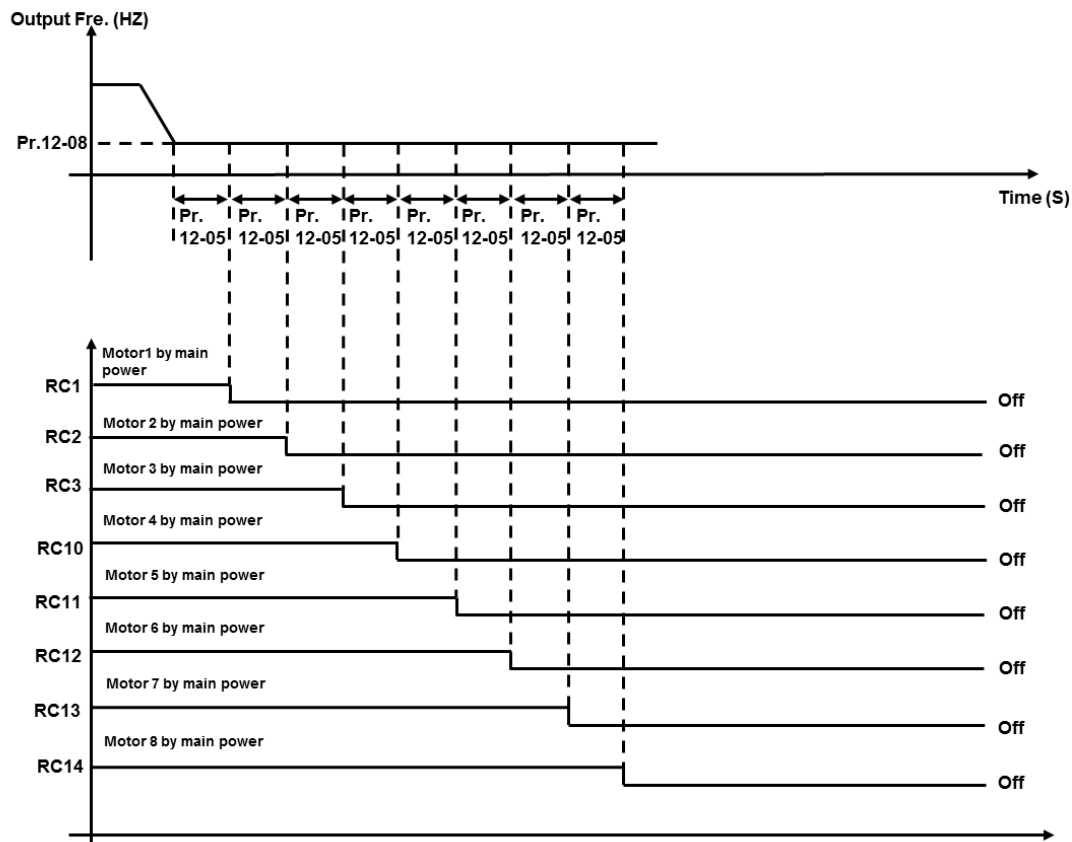
2. Understanding the Fixed Quantity Circulation Control Process.

- When the pressure or flow is not enough, the output frequency of inverter will go up, and auxiliary motor should be added into. The process is:



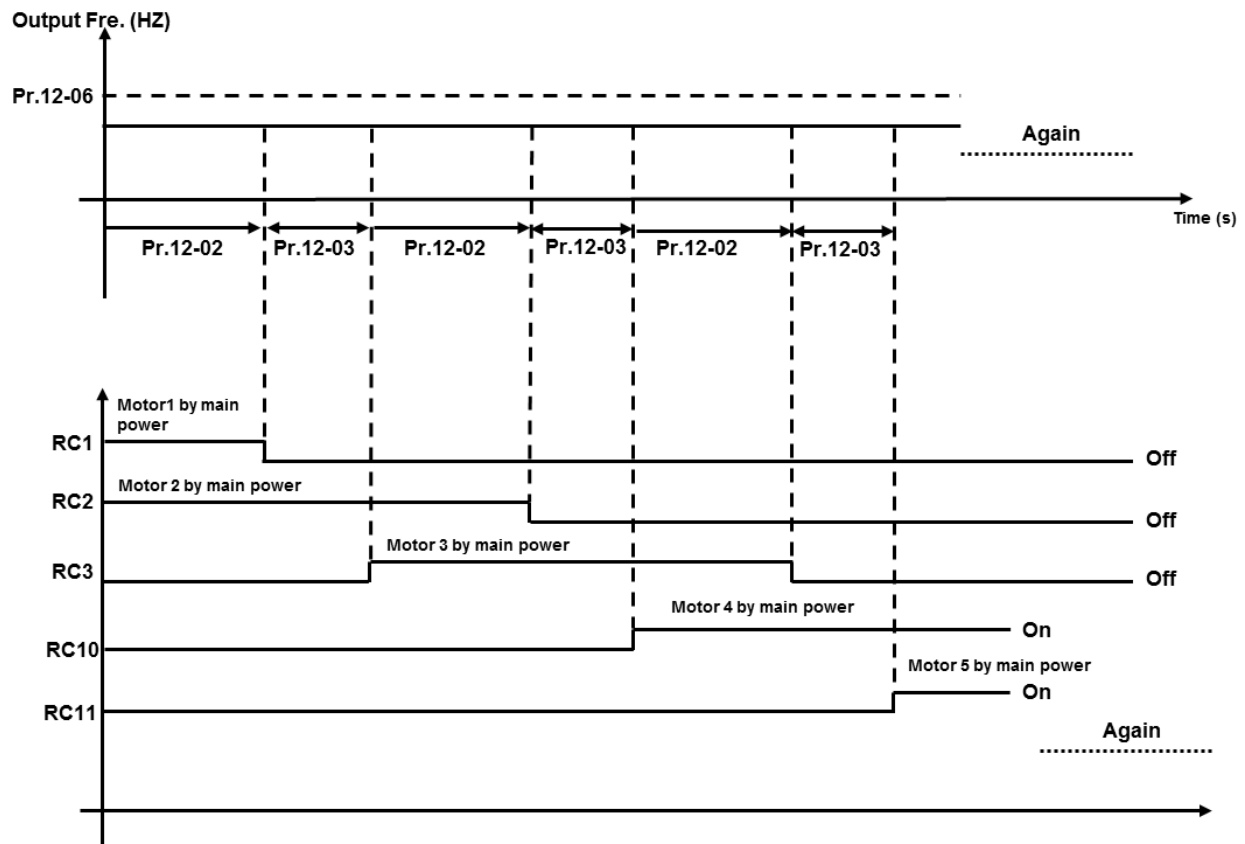
- A. CP2000 will control one main motor always, and 8 relays are to connect 8 Auxiliary motors. Sometimes, 8 relays could be all on if the pressure or flow is too low.

- When the pressure or flow is too big, the output frequency of inverter will go down, and auxiliary motor should be removed automatically. The process is:



A. Sometimes, 8 relays will be all off if pressure or flow is too big.

- When the pressure or flow is in the balance, the fixed time circulation will be available. E.g., if motor 1 and motor 2 are in the main power, when the stable run time get P12-02, motor 1 is disconnected to main power, and then after P12-03 time, motor 3 is connected to main power, and go to stable again. After P12-02 time, motor 2 is disconnected to main power, and after P12-03 time, motor 4 is connected to main power, so go to next circulation again.



A. Pr.12-03 is usually very short and based on Second, so the system will go to stable very quickly when one motor disconnect and other motor connect again. This is why Output Frequency figure can be almost the same level all the time. In fact, there is a little small jump for output frequency at the time motors switch caused by Pr.12-03 time setting.

3. Running CP2000 and test the Fixed Time Circulation + Fixed Quantity Control.

Attentions:

1. Do we have to operate fixed quantity control in PID mode?

No, we don't have to. If you never use PID but the normal mode, it is also OK. However, sometimes PID application should be the main for fixed quantity circulation control.

2. Can we prohibit some motors run in fixed quantity circulation control?

Yes, there are 8 motors which fixed quantity mode can control as the maximum. If we want to prohibit one of them, that is available. We can set 02-01~02-08 as follows:

Pr02-01~02-08	60	61	62	63	64	65	66	67	68
Motors prohibited	All	Motor 1	Motor 2	Motor 3	Motor 4	Motor 5	Motor 6	Motor 7	Motor 8

3. How can we choose the Relays relationship match with auxiliary motors?

If we set Pr12-00 to no zero, the circulation function is enabled and the relay mode parameters have been set automatically for circulation function. For Fixed Quantity Control, the relay parameters can be set automatically as follows:

P12-01	01	02	03	04	05	06	07	08	
P02-13 RC1	55	55	55	55	55	55	55	55	Motor #1 by mains
P02-14 RC2		56	56	56	56	56	56	56	Motor #2 by mains
P02-15 RC3			57	57	57	57	57	57	Motor #3 by mains
P02-36 RC10				58	58	58	58	58	Motor #4 by mains
P02-37 RC11					59	59	59	59	Motor #5 by mains
P02-38 RC12						60	60	60	Motor #6 by mains
P02-39 RC13							61	61	Motor #7 by mains
P02-40 RC14								62	Motor #8 by mains

P02-13 ~ P02-15 and P02-36 ~ P02-40 are not able to be changed if Pr12-00 is no zero namely in circulation control mode. The setting values above in the table will be stable and fixed into these parameters unless you set Pr12-00=0 for disabling circulation pump.

4. What is the default relay situation when we power on?

When we power on CP2000, there is no any relay to be on in Fixed Quantity Control mode.

5. Is there no any requirement for Pr12-06 & Pr12-08?

The Pr12-06 should be higher than Pr12-08. If we can't ensure this, the firmware will go to disorder. From the logical idea, Pr12-06 also should be higher than Pr12-08, so this is one reasonable precondition.

6. Is possible for realizing time + fixed quantity when 8 motors all in run?

If the PID is stable when 8 motors all run, the time + fixed quantity won't have action but only keep the 8 motors run state. Only when pressure or flow is changed and PID is not stable and cause some motors stop, the time + fixed quantity will have action again.

This idea will be executed after V1.02 D12403.

