

The frequency inverter is a special inverter for constant pressure water supply. The parameters of the frequency inverter, which is based on ALPHA 6000 series universal frequency inverter, are functionally improved for the requirements of constant pressure water supply industry. In addition to the modification of the following parameters, the other functions are consistent with the universal parameters of ALPHA 6000. Therefore, it must be used with the instruction of ALPHA 6000 series general frequency inverter of our company.

I Functional parameters table:

P3: I/O terminal control function

Function Code	Parameter Name	LCD Display	Setting Range	Default	Change	MODBUS Address
P3.00	Terminal action mode	Terminal action mode	0: Close valid 1: Open valid (normal open/normal close are not limited)	0	×	0400
P3.01	X1 terminal function	X1 terminal function	52: No.1 pump state 53: No.2 pump state 54: No.3 pump state 55: No.4 pump state 56: No.5 pump state	1	×	0401
P3.02	X2 terminal function	X2 terminal function		2	×	0402
P3.03	X3 terminal function	X3 terminal function		37	×	0403
P3.04	X4 terminal function	X4 terminal function		26	×	0404
P3.05	X5 terminal function	X5 terminal function		27	×	0405
P3.06	X6 terminal function	X6 terminal function		28	×	0406
P3.07	X7 terminal function	X7 terminal function		0~56: Same as above 57: PUL pulse input (If there are two inputs, use the X7) 58: Single phase speed measurement input (If there are two inputs, use the X7)	0	×
P3.08	X8 terminal function	X8 terminal function	59: Speed measurement input SM1 (set for X7 only) 60: Speed measurement input SM2 (set for X8 only)	0	×	0408

Function Code	Parameter Name	LCD Display	Setting Range	Default	Change	MODBUS Address
P3.13	D0 terminal function	D0 terminal function	31: No.1 pump power frequency control terminal 32: No.2 pump power frequency control terminal 33: No.3 pump power frequency control terminal 34: No.4 pump power frequency control terminal 35: No.5 pump power frequency control terminal 36: No.1 variable frequency control terminal 37: No.2 variable frequency control terminal 38: Disconnection detection output	0	×	040D
P3.14	Y1 terminal function	Y1 terminal function		1	×	040E
P3.15	Y2 terminal function	Y2 terminal function		2	×	040F
P3.16	Relay 1	Relay output		19	×	0410
P3.17	Relay 2			0	×	0411

P8: Constant pressure water supply function code

Function Code	Parameter Name	LCD Display	Setting Range	Default	Change	MODBUS Address
P8.00	Working mode selection	Working mode selection	0: Pump stop 1: Single variable pump, with auxiliary pump switch 2: Multiple variable pump, with auxiliary pump switch 3: Single variable pump with auxiliary pump switching regularly 4: Multiple variable pumps switch regularly, with auxiliary pump	0	×	0900

Function Code	Parameter Name	LCD Display	Setting Range	Default	Change	MODBUS Address
P8.01	Adding pump delay	Adding pump delay	0.1~999.9s	0.1s	○	0901
P8.02	Removing pump delay	Removing pump delay	0.1~999.9s	0.1s	○	0902
P8.03	Adding pump speed reaches delay	Adding pump speed reaches delay	0.1~999.9s	0.1s	○	0903
P8.04	Removing pump zero flow delay	Removing pump zero flow delay	0.1~999.9s	0.1s	○	0904
P8.05	Adding pump frequency	Adding pump frequency	P8.06~P0.08	50.00Hz	○	0905
P8.06	Removing pump frequency	Removing pump frequency	P0.09 ~ 50.00Hz	0.00 Hz	○	0906
P8.07	Pressure head compensation	Pressure head compensation	0.0~10.0	0.0	○	0907
P8.08	Switching delay time	Switching delay time	0.1~3.0s	1.0s	×	0908
P8.09	No.1 pump state	No.1 pump state	0: Standby 1: enable	0	○	0909
P8.10	No.2 pump state	No.2 pump state	0: Standby 1: enable	0	○	090A
P8.11	No.3 pump state	No.3 pump state	0: Standby 1: enable	0	○	090B
P8.12	No.4 pump state	No.4 pump state	0: Standby 1: enable	0	○	090C
P8.13	No.4 pump state	No.4 pump state	0: Standby 1: enable	0	○	090D
P8.14	Disconnection signal detection selection	Disconnection signal detection selection	0: NULL 1: AI1 2: AI2	1	○	090E
P8.15	Disconnection detection analog signal upper limit	Analog signal upper limit	P8.1~10.00V	8.00V	○	090F
P8.16	Disconnection detection analog signal lower limit	Analog signal lower limit	0.00V~ P8.15	2.00V	○	0910

Function Code	Parameter Name	LCD Display	Setting Range	Default	Change	MODBUS Address
P8.17	Disconnection detection delay	Disconnection detection delay	0.1s ~ 100.0s	10.0s	○	0911
P8.18	Regular switching interval	Regular switching interval	10~3600	240	×	0912
P8.19	Modification time reference	Modification time reference	0: second 1: minute	1	×	0913
P8.20	Quantity of Power frequency pump	Quantity of Power frequency pump	1~5	5	×	0914
P8.21	Reserve	Reserve		-	-	0915

II Detailed function description

P3: IO terminal control function

P3.01 X1 terminal function definition	Setting range: 0~56 [1]
P3.02 X2 terminal function definition	Setting range: 0~56 [2]
P3.03 X3 terminal function definition	Setting range: 0~56 [37]
P3.04 X4 terminal function definition	Setting range: 0~56 [26]
P3.05 X5 terminal function definition	Setting range: 0~56 [27]
P3.06 X6 terminal function definition	Setting range: 0~56 [28]
P3.07 X7 terminal function definition	Setting range: 0~59 [0]
P3.08 X8 terminal function definition	Setting range: 0~59 [0]

Explanation:

The control terminals X1 ~ X8 are multifunctional terminals. The specific functions are defined by setting P3.01 ~ P3.08 values and duplicate definition is allowable. The function is effective if one of duplicative defined terminals is effective. 52 ~ 56 are special functions for constant pressure water supply. The instructions are as follows:

◆ 52 ~ 56: No.1~5 pump state

When terminal functions of X1 ~ X8 are defined as 52~56 and the terminal is effective, the pump corresponding to the terminal is allowed to put into operation. If the terminal is invalid and state selection of the corresponding pumps in P8.09 ~ P8.13 is 1, put into operation, the pump is still allowed to put into operation. If the selection is 0: standby, the pump is not allowed to put into operation.

P3.13 D0 terminal function	Setting range: 0~38 [0]
P3.14 Y1 terminal function	Setting range: 0~38 [1]
P3.15 Y2 terminal function	Setting range: 0~38 [2]
P3.16 Relay 1	Setting range: 0~38 [19]
P3.17 Relay 2	Setting range: 0~38 [0]

Explanation:

- ◆ No. 31~37 functions are special for constant pressure water supply.
- ◆ If constant pressure water supply is by single variable pump, you need to select a terminal function 36: No.1 pump variable frequency control terminal. Set the functions of the other arbitrary terminals are 32 ~ 35: No.2 ~No.4 pumps power frequency control terminals. It could support up to one variable pump + 4 auxiliary pump operation.
- ◆ If constant pressure water supply is by Multiple variables pump, you should select two groups of terminal functions:

31, 36: No.1 pump variable frequency, power frequency control terminals

32, 37: No.2 pump variable frequency, power frequency control terminals

In the case that all the functions of each terminal are selected, the pump corresponding to the group of terminals is allowed to put into operation. Otherwise, the pump does not work.

38: Disconnection output:

- ◆ When the setting of the input analog quantity of the corresponding analog terminal, P8.14, is not within the range of P8.15~P8.16 and lasts the setting time of P8.17, the corresponding output terminal (38) is effective. Otherwise, it is invalid.

P8.00 Working mode selection	Setting range: 0~4 [0]
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Explanation:

0: Pump stop

1: Single variable pump, with auxiliary pump switch

2: Multiple variable pump, with auxiliary pump switch

3: Single variable pump, with auxiliary pump cutover and change timing

4: Multiple variable pump switch regularly, with auxiliary pump

Explanation:

◆ **0: Pump stop**

When the operation mode is PID, don't start constant pressure water supply control

1: Single variable pump, with auxiliary pump switch

The start sequence of the auxiliary pumps is according to pump number, from low to

high. Stop an auxiliary pump is from high sequence to low sequence.

◆ **2: Multiple variable pumps, with auxiliary pump switch:**

Start current variable pump, the inverter will start P8.01 (adding pump delay) when the running frequency is higher than P8.05 (adding pump frequency), after delaying time, if the frequency is still higher than adding pump frequency, then stop the current variable pump output, switch it to power frequency pump and start another auxiliary pump to variable frequency pump; when the running frequency is lower than P8.06 (removing pump frequency) and after delay time, if the frequency is still lower than removing pump frequency, it will stop auxiliary pump.

◆ **3: Single variable pump, with auxiliary pump switching regularly:**

Two or more than two sets of the auxiliary pumps running at the same time, in meet reducing pump conditions, the first start auxiliary pump stop first. When one auxiliary pump continuous running time higher than P8.18 (regular switching interval), it will stop this auxiliary pump, and run the auxiliary pump which down time longest.

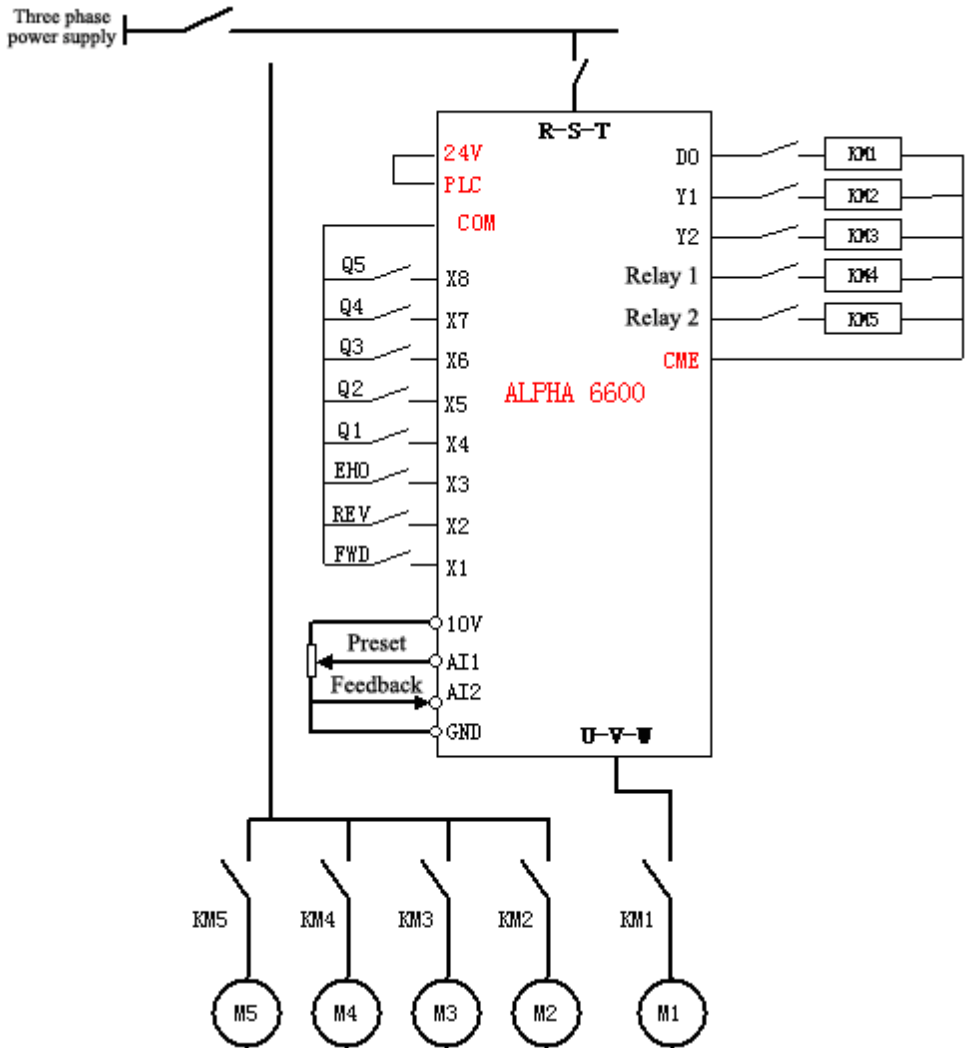
◆ **4: Multiple variable pumps switch regularly, with auxiliary pump:**

Start current variable pump, the inverter will start P8.01 (adding pump delay) when the running frequency higher than P8.05 (adding pump frequency), after delay time, if the frequency is still higher than adding pump frequency, then start another auxiliary pump. When variable pump continuous running for a period of time and do not need to start auxiliary pump, if this time higher than P8.18 (switching time), then stop this variable pump, and run the auxiliary pump as variable pump.

Single variable pump mode:

When the operation mode is PID, constant pressure water supply control starts.

In this mode, always use the same variable pump (the pump connected with No.36 functional terminal). It is always controlled by the frequency inverter. Other auxiliary pumps are power frequency operation. It could support up to 4 auxiliary pumps. The reference control wiring is as below:



Reference of related function parameters setting are as follows:

- 1、 **Operation mode:** P0.01=9 (PID); P7.00=1(AI1), P7.01=1(AI2) (Specify pressure preset and feedback channels)
- 2、 **Working mode selection:** P8.00=1 (Single variable pump);
- 3、 **The setting of pump operation state:**
 - Terminal control** - P3.04=52, P3.05=53, P3.06=54, P3.07=55, P3.08=56
 - Program control** - P8.09~P8.13=1
- 4、 **Control terminal selection:** P3.13=36, P3.14=32, P3.15=33, P3.16=34, P3.17=35

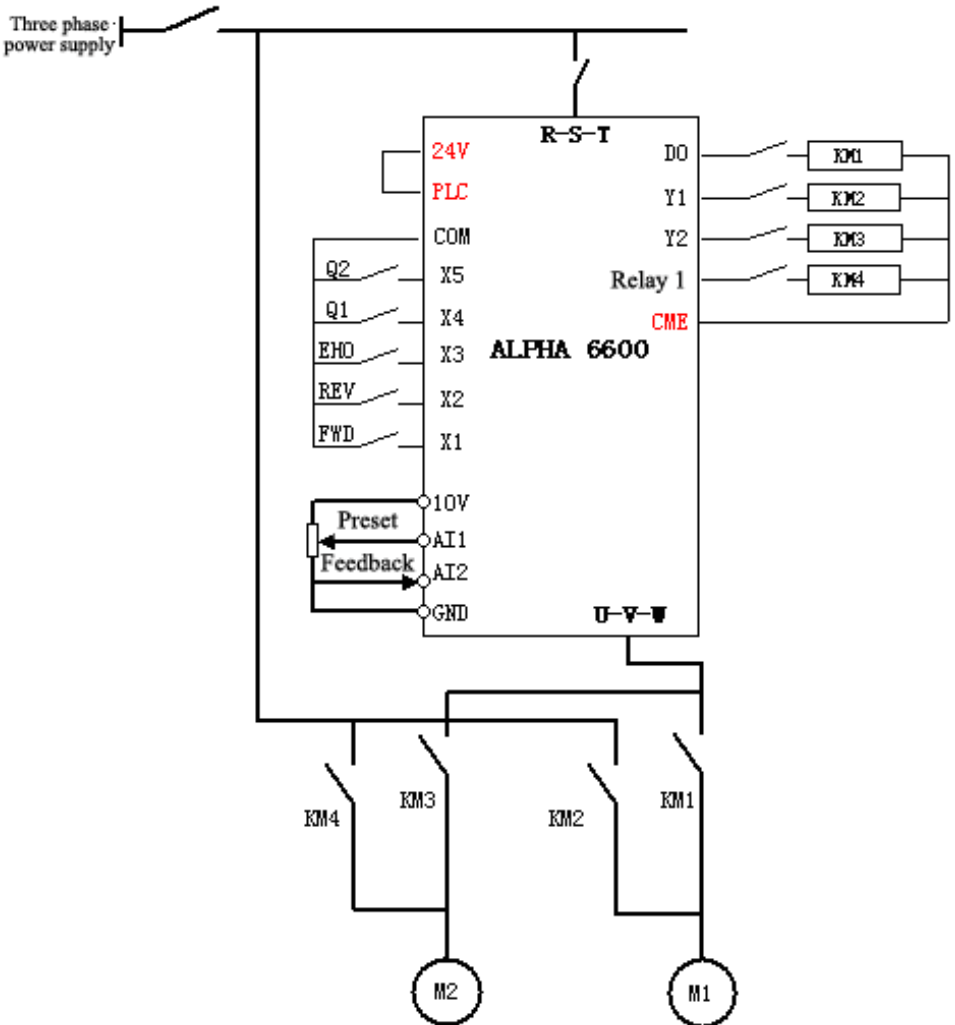
📖 Tips:

Both terminal control and program control can be set as the pump operation state. The pump is available when one of them is effective, so you can select either one.

Multiple variables pump mode:

When the operation mode is PID, constant pressure water supply control starts.

In this mode, all pumps can be used as variable pump (one set each time). Total pumps it could support are two sets. When a new pump starts, the previous variable pump switches to power frequency operation. The newly added pump will be a new variable pump. The reference control wiring is as below:



Reference of related function parameters setting are as follows:

1、 Operation mode: P0.01=9; P7.00=1, P7.01=1 (Specify pressure preset and feedback channels);


2、 Working mode selection: P8.00=2 (Multi variable pump)

3、 The setting of pump operation state:

Terminal control - P3.04=52, P3.05=53;

Program control - P8.09~P8.10=1;

4、 Control terminal selection: P3.13=36, P3.14=31, P3.15=37, P3.16=32 (connected to variable frequency and power frequency terminals of variable pump)

 Tips:

Both terminal control and program control can be set as the pump operation state. The pump is available when one of them is effective, so you can select either one.

P8.01 Adding pump delay	Setting range: 0.1~999.9s [0.1s]
P8.02 Removing pump delay	Setting range: 0.1~999.9s [0.1s]
P8.03 Adding pump speed reaches delay	Setting range: 0.1~999.9s [0.1s]
P8.04 Removing pump stop complete delay	Setting range: 0.1~999.9s [0.1s]
P8.05 Adding pump frequency	Setting range: 0.00~50.00Hz [50.00Hz]
P8.06 Removing pump frequency	Setting range: 0.00~50.00Hz [0.00Hz]

Explanation:

◆ Adding pump delay, Removing pump delay

To avoid the influence of the instantaneous flow fluctuations, which could results in frequent start and stop of pumps.

When the operation frequency exceeds the adding pump frequency (parameter P8.05), you can start the delay period P8.01. If the frequency is still higher than adding pump frequency after the delay period, then:

◆ Adding pump speed reaches delay, removing pump stop complete reaches delay

When adding pump start command is sent, a delay (P8.03 adding pump speed reaches delay parameter) is started to ensure the pump can reach the rated speed before another pump start (to avoid vibration).

When removing pump stop command is sent, a delay (P8.04 removing pump stop complete time delay parameter) is started to ensure the pump actually stop before another pump stops (to avoid vibration).

◆ Adding pump frequency, removing pump frequency

When the operating frequency is higher than setting value P8.05, it will send adding

pump delay command. If the frequency keeps high continuously, it will send adding pump command. You can adjust the adding pump frequency according to the specific situation.

When the operating frequency is lower than setting value P8.06, it will send removing pump delay command. If the frequency keeps low continuously, it will send removing pump command. You can adjust the removing pump frequency according to the specific situation.

P8.07 Pressure head compensation	Setting range: 0.0~10.0 [0.0]
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Explanation:

If P7.00 is set to 0, i.e. PID given quantitative selects PID given digital (P7.02 value), an additional pressure head compensation will be automatically added to P7.02 (PID analog digital given value) when an auxiliary pump starts each time. The pressure head compensation can compensate the pipeline pressure loss (loss of head) for the increasing flow.

Example: If P7.02 is 200 and P8.07 is 10, given values change as follows:

1 set of variable pump + 1 set of auxiliary pump: newly given value is 210;

1 set of variable pump + 2 set of auxiliary pumps: newly given value is 220.

P8.08 Switching delay time	Setting range: 0.1~3.0s [1.0s]
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Explanation:

When the operation of a motor switches from variable frequency to power frequency, the function will set corresponding function code to prevent short-circuit between the frequency inverter and power AC supply, which caused by the contactor action delay.

The minimum setting time shall be longer than the sum of the action time of the relay and action completion time of the contactor. The open time of contactor is longer than close time. Please set the value to the longer one.

P8.14 Disconnection signal detection selection	Setting range: 0~2 [1]
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0: NULL (invalid)

1: AI1

2: AI2

P8.15 Analog signal upper limit	Setting range: P8.16~10.00V [8.00V]
P8.16 Analog signal lower limit	Setting range: 0.00V~P8.15 [2.00V]
P8.17 Disconnection detection delay	Setting range: 0.0~100.0 s [10.0s]

Explanation:

- ◆ P8.14 ~ P8.17 are used to enable the disconnection detection function. You should set P8.14 disconnection detection signal input source. If P8.14 is 0, the disconnection

detection is invalid.

- ◆ During operation, when the setting of input analog quantity of analog terminal, P8.14 setting, is not within the range of P8.15~P8.16 and lasts the setting time P8.17, the corresponding output terminal (38) is effective. Otherwise, it is invalid.

P8.18 Regular switching interval	Setting range: 10~3600 [240]
P8.19 Modification time reference	Setting range: 0: Second 1: minute [1]
P8.20 Quantity of power frequency pump	Setting range: 1~5 [5]

- ◆ P8.18 is regular switching interval setting

Single variable pump mode: When the part of power frequency motor running, the water supply system in relatively stable state, to avoid part of motors running in a long time, we can set switching time to limit the longest running time at a time.

Multiple variable pumps with regular switching: If only the variable pump operation and continuous running time more than P8.18 (switching time), then stop the current pump operation and switch to another variable pump.

- ◆ P8.19: In debugging or testing, for the convenience of checking product real operation after setting up every parameter, we can set the parameter to 0, switch time unit from minute to second. The default value is 1.
- ◆ P8.20: To set up the actual quantity of the working power frequency motors. After starting regular switching, the power frequency pump will stop when the continuous working time reach to the timing time. If we want to limit all the power frequency pumps work without regular switching function to reduce start/stop actions, then set P8.20 parameter to the actual working the quantity of power frequency pumps.