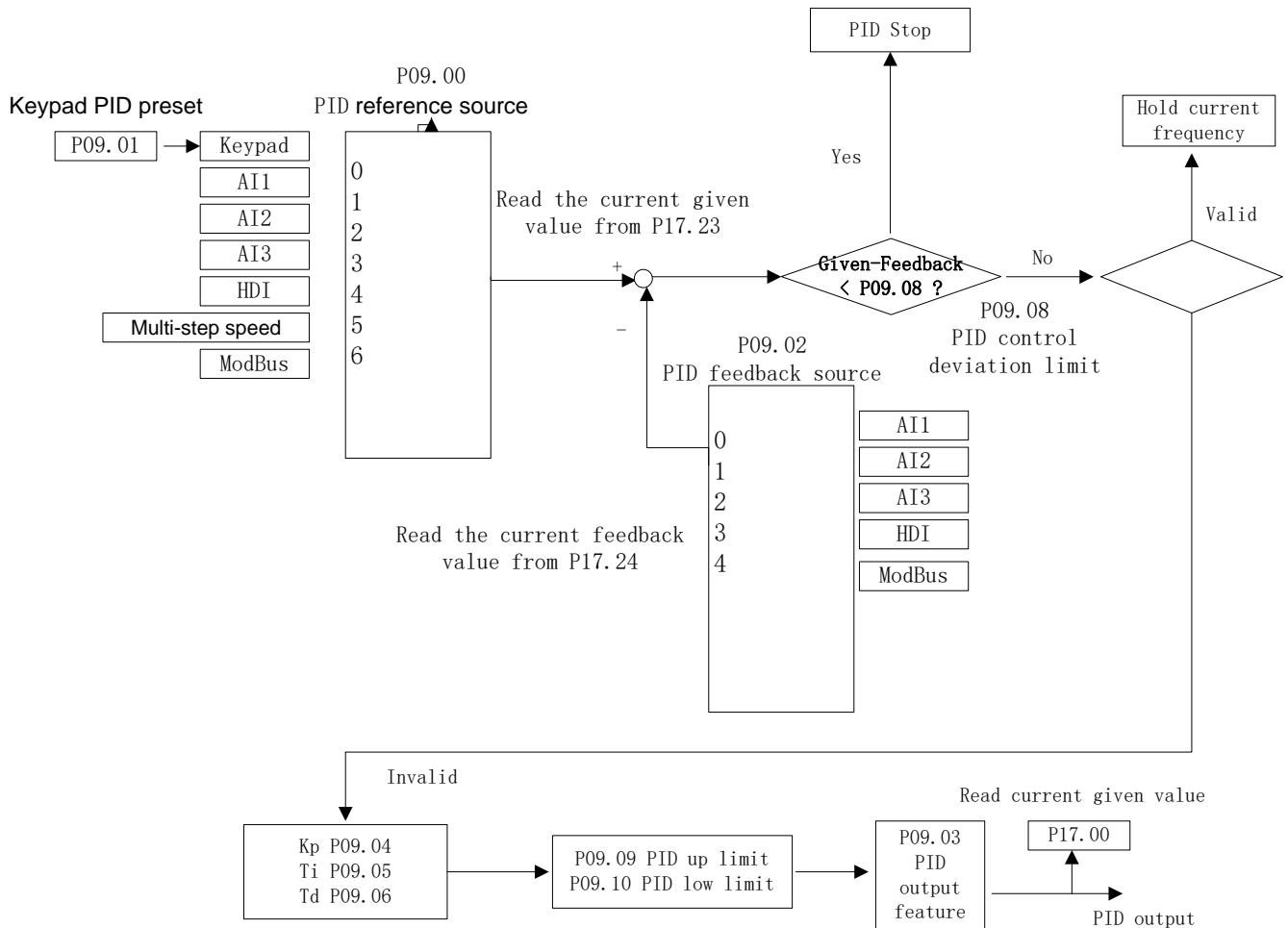


PID Commissioning conclusion

PID control : Adjust inverter output frequency according to proportional、integral、 differential arithmetic of residual quantity between controlled variable and feedback signal ,with the purpose of keep the controlled variable above target quantity stably. Be suited to pressure control temperature control and etc.

一. PID debug procedure:

1. Basic control theory:



2. Debugging setps:

Take GD10 control board for example. Use keypad to set PID given value, feedback signal is 0-10bar(pressure transmitter) , 4-20mA, terminal control mode):

- a) Set following parameters: P0.01 (Running command channel) =1 (Terminal control mode)
 - P0.06 (A frequency command) =7 (PID control)
 - P5.01 (S1 terminal function) =1 (Forward)
 - P5.02 (S2 terminal function) =6 (Coast to stop)

- b) Connect test accessory equipment terminals: +24、COM、S1、S2 to corresponding terminals of the inverter.
- c) Set following parameters: P9.00 (PID given source) =0 (Keypad setting)

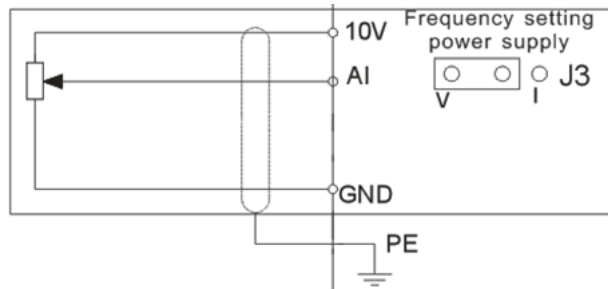
P9.01 (Keypad preset PID) =50%, (25Hz)

P9.02 (PID feedback source) =1 (Analogue AI feedback channel)

P9.03 (PID output characteristic) =0 (PID output is positive characteristic)

P9.08 (PID control deviation limitation) =3% (1.5Hz)

P5.37 (Lower limit of AI) =2



AI voltage and current can be chose: 0~10V/0~20mA; can be shifted by J3.

- d) Connect test accessory equipment terminals: +10V、GND、AI to corresponding terminals of the inverter.
- e) Inverter power on, set P2 group parameters, and then auto-tuning
- f) Switch S1, inverter start.
- g) Come to P17.24 (PID feedback value) parameters, and regulate corresponding AI potentiometer on the inverter, make P17.24 less than 25,
When P9.01 (keypad preset PID value) =50% (25Hz), P9.01 (keypad preset PID value) —P9.02 (PID feedback source option) >3%(1.5Hz), inverter run.
- h) Regulate corresponding AI potentiometer on the test accessory equipment, let P17.14 greater than 50, When P9.01 (keypad preset PID value) =50% (25Hz), P9.02 (PID feedback source option) —P9.01 (Keypad preset PID) >3%(1.5Hz), inverter stop.
- i) At last switch S2, motor stop.

General steps of PID parameters setting:

a. Ensure the gain P

When ensure the gain P, firstly cancel the PID integration and derivation (set $T_i=0$ and $T_d=0$, see the PID parameter setting for detailed information) to make proportional adjustment is the only method to PID. Set the input as 60%~70% of the permitted Max. Value and increase gain P from 0 until the system vibration occurs, vice versa, and record the PID value and set it to 60%~70% of the current value. Then the gain P commission is finished.

b. Ensure the integral time T_i

After ensuring the gain P, set an original value of a bigger integral time and decrease it until the system vibration occurs,

vice versa, until the system vibration disappear. Record the T_i and set the integral time to 150%~180% of the current value. Then integral time commission is finished.

c. Ensure the derivative time T_d

Generally, it is not necessary to set T_d which is 0.

If it needs to be set, set it to 30% of the value without vibration via the same method with P and T_i .

d. Commission the system with and without load and then adjust the PID parameter until it is available.

二. PID debugging conclusion

The PID debugging is very important, for example, in the real pump application, set the PID's output lower limit frequency bigger (P09.10), ensure that "PID's output lower limit frequency (P09.10)" is a little smaller than lower limit frequency(P00.05).

So at this case, it can ensure that output frequency will be smaller than lower limit frequency, to go into dormancy. When wake up, the setting frequency start from PID output lower frequency(P09.10), the running frequency response will be quicker, by the way, please set the acceleration time/deceleration time smaller, around 3~5 seconds.

Set proportional gain not too much, P09.04 not bigger than 3.00.

If need to set the value of interval time, please don't set it too big, P09.05 should smaller than 1.0.