IO and general parameter setting

1. Electronic gear function

By default, the driver sets the number of pulses required for one revolution of the motor by using the 1 ~ 4 bits of the dial switch.

After the electronic gear function is enabled, the subdivision dial setting is invalid.

The pulse required for one revolution of the motor = (numerator / denominator) * encoder resolution;

2. Pulse input mode

In T60 driver, dial SW7 to set output pulse form: PUL + DIR or CW+CCW. The driver can select QEP orthogonal encoder input through software, at this time, SW7 setting is invalid. When the user sets PUL/ DIR or CW / CCW in the software. Subject to SW7 setting.

3. Effective edge of pulse

Set the effective edge of the response pulse

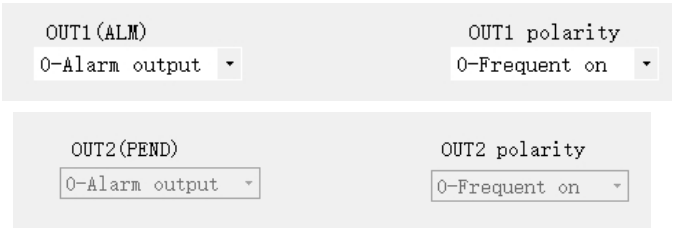
ENA level and function setting: set the level of driver enable response pulse and the action of motor when not enable.

4. output port function

T60 has one output port and T86 has two output ports

Output port out1 of T60, default to fault alarm output (ALM),

T86 one is ALM and the other is pen



Each output port can be set as Alarm output, In place signal output and Holding brake output.

5. operation mode and relevant parameter setting

In ALT + 1, switch to IO setting interface and set control mode. The driver consists of three control modes: Open loop, Servo mode 1 and Servo mode 2. After setting the control mode, the motor can be enabled again by MF signal to make the motor work in the currently set operation mode.

5.1 open loop

At this time, the driver works in open-loop mode. It can be used to test whether the encoder is disturbed or damaged. When the encoder fails, it can also temporarily run in open-loop mode to meet the production requirements.

Related parameters:

Maximum current: The maximum current that the driver can output.

Base current%: Set the peak current (relative to the percentage of the maximum current) during open-loop operation.

5.2 servo mode 1

At this time, the driver works in servo mode one. Servo mode one has the characteristics of fast response, low noise, low vibration, no debugging and stable stop.

Related parameter settings:

Maximum current: The maximum current that the driver can output.

Base current%: Set the running current of the motor at low speed (relative to the percentage of the maximum current), usually 50%. The larger the value is, the better the acceleration and deceleration performance is, the smaller the stop stable time is, but the greater the heating is.

Servo mode 1:

Position S1_ KP: Default 2000

Position S1_ Ki: Default 0

Position S1_ Kd: Default 200

Speed feed forward S1_ Kvff: Default 20

The above default values can better match most of the motors without special debugging. Add S1_ Ki can improve the positioning accuracy when the motor stops.

5.3 servo mode 2

At this time, the driver works in servo mode 2. Servo mode 2 adopts FOC algorithm, which has the characteristics of extremely low heating, low noise and easy debugging.

Related parameter settings:

Maximum current: the maximum current that the driver can output.

Servo mode 2:

Position S2_ Kp: default 3000

Position S2_ Ki: default 10000

Position S2_ Kc: default 256

Speed feedback Kv1: default 0 first order damping

Speed feedback Kv2: default 800 second order damping

Speed feedforward kvff: default 600 feedforward

General parameters:

Speed first filter bandwidth: 200Hz

Speed secondary filter bandwidth: 600Hz

Acceleration filter bandwidth: 1000Hz

Output filter bandwidth of servo mode two position loop: 1000Hz

The larger the load inertia is, the smaller the velocity filtering bandwidth is. Usually set to

Speed secondary filter bandwidth = 3 * speed first filter bandwidth

Acceleration filter bandwidth = 5 * speed first filter bandwidth

Servo mode two position loop output filter bandwidth = acceleration filter bandwidth

Routine:

Debugging a load inertia: motor inertia of 100:1 load SSD closed-loop stepper servo instructions. In the debugging process, please keep KVFF approximately equal to KV1 + KV2. KVFF is slightly smaller than KV1 + KV2 to reduce overshoot.

1. Determine the speed curve to be debugged. Please note that the speed and acceleration should be within the motor driving range. When driving large load inertia, the biggest problem is insufficient torque.
2. Set the position Ki to 0

   Debug without integral phase, and finally add position ki.
3. Reduce FV1, FV2, FA

   Reduce FV1 to 30% by default, set FV2 = 3 *FV1, FA = 5 * FV1.

   Reducing the bandwidth will reduce the high frequency noise of the system. Large bandwidth can improve the response speed, but the noise caused by the encoder is large.
4. Add KV2 and KVFF

   At the same time, increase KV2 and KVFF to the default value 3 times. Test the motion curve, check the tracking error and listen to the running noise.

6. current loop commissioning

By default, the driver can automatically identify the electrical parameters of the motor and calculate the appropriate PI parameters of the current loop according to the voltage and other conditions. Users can verify PI parameters by step response of current loop.

When the driver operates in open-loop and servo mode, the parameter "torque constant" is invalid.

When operating in servo mode 2, "Torque constant" = torque per ampere * 1000.

7. exercise test

Built in ladder instruction for debugging. It can be inched, fixed length and run back and forth.