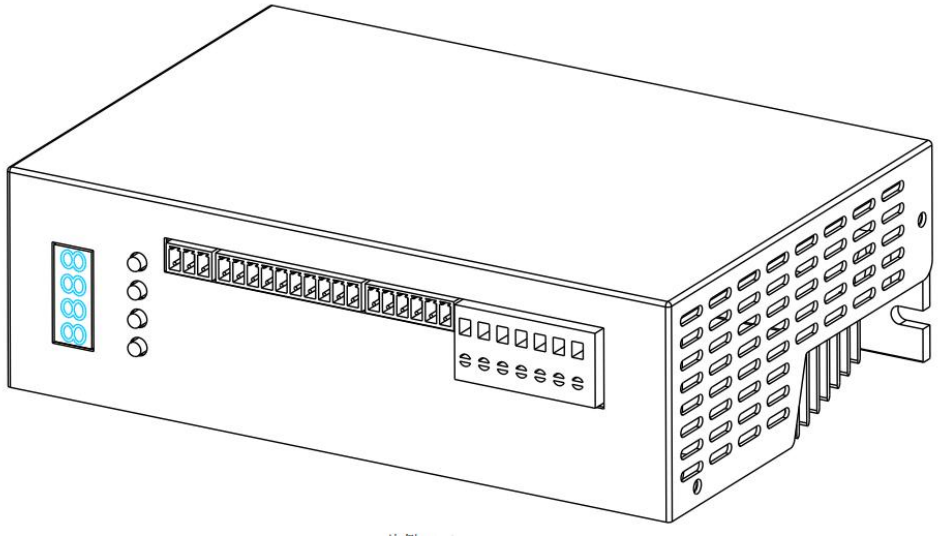
New Step Servo Driver DL2206H

Manual



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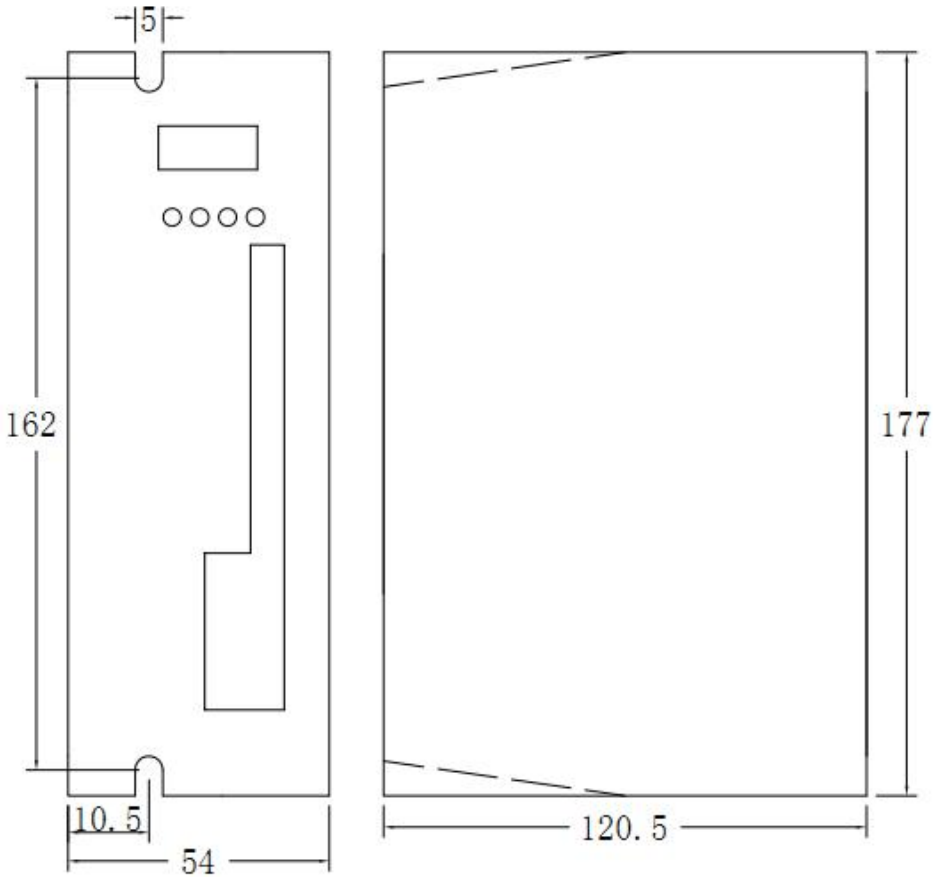
I、Introduction

DL2206H is a new digital step-servo driver, using a vector controlling technology. It can drive 110 series and 130 series 3 phase step-motors.

DL2206H can fit various automation equipments and instruments with below technical features:

- Use of 32 bit motor control DSP
- Use of vector servo control technology
- Easy Operation with four LED Segment Displays and keyX4
- Wide range of drive current drive current from 0.4 to 8.0A/phase
- Can drive 110 series and 130 series hybrid step-motors
- Opto-isolated signal input/output
- Highest response frequency: 200Kpps
- Provide 16 channels micro steps ,highest micro step: 51200 ppr
- Provide Electronic Gear Ratio
- Protection circuit： Over heat; Over current; Over voltage; Over-speed and position deviation
- Two control method:Position,Speed
- Net Weight:1450g

II、Dimensions(unit:mm)



Picture 1

Caution:

（1） When the Driver temperature exceeds 40°C,the fan will start to work. When the Driver temperature exceeds 70°C, the current will be cut off automatically and the Driver will not work till the temperature drops to 40°C. In case this happens, please install ventilation equipment.

III、Port definition and Drive connection

3.1 Port definition

A、 Step-motor and Power definition

Terminal Number	Mark	Function	Motor wire color
1	U	U phase	Red
2	V	V phase	Yellow
3	W	W phase	Green
4	NC	Null Connection	
4	PE	Ground	Yellow-Green
5	L	AC Power input	AC220V,50/60Hz
6	N		

B、 Encoder definition

Terminal Assignment	Mark	Function	Wire color
1	EB＋	Encoder B phase +	Yellow
2	EB－	Encoder B phase -	Green
3	EA＋	Encoder A phase +	Black
4	EA－	Encoder A phase -	Blue
5	VCC	Encoder power +5V	Red
6	EGND	Encoder power GND	White

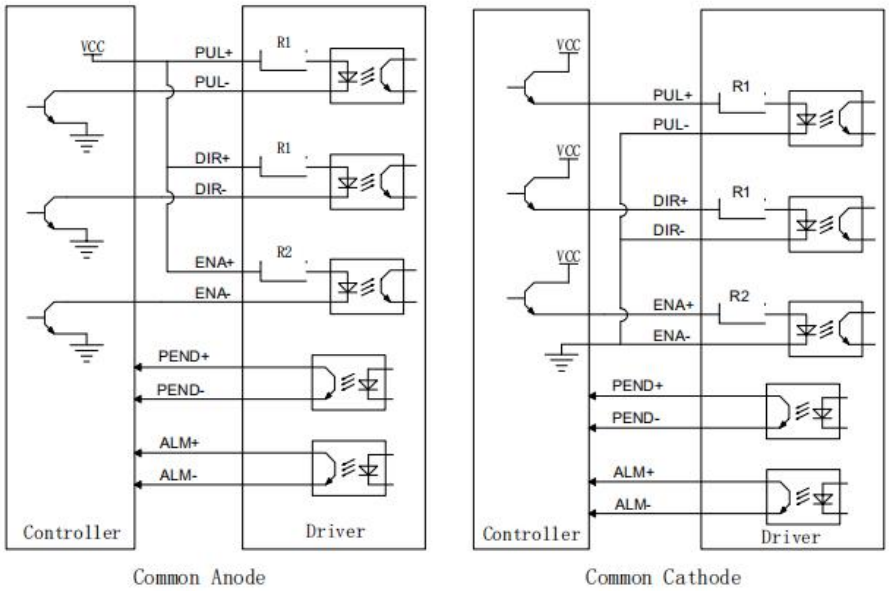
C、 Control signal

Terminal Assignment	Mark	Function	Instruction
1	PUL＋	Pulse signal positive side	Input voltage range from＋5 to +24V
2	PUL－	Pulse signal negative side	
3	DIR＋	Direction signal positive side	Input voltage range from＋5 to +24V
4	DIR－	Direction signal negative side	
5	ENA＋	Motor free signal positive side	When effects, the drive cut off motor current and set the motor free
6	ENA－	Motor free signal negative side	
7	Pend＋	In-position signal positive side	When step-motor is in-position, the drive will give a signal to the PC
8	Pend－	In-position signal negative side	
9	ALM＋	Warning signal positive output	When drive break down ,it will output ALM signal to the PC
10	ALM－	Warning signal negative output	

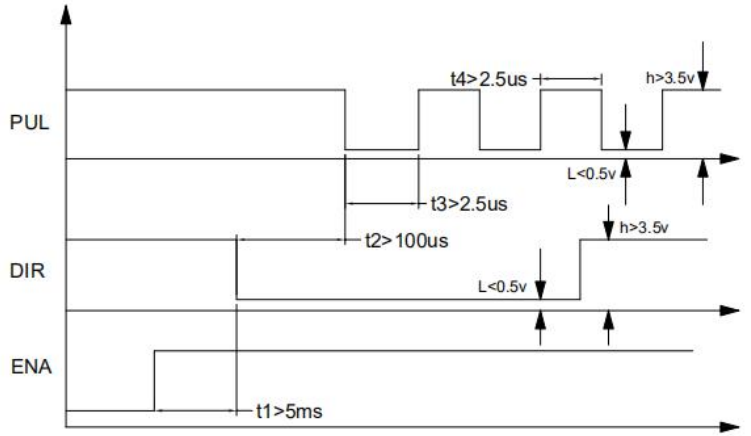
D、 Communication definition

Terminal Assignment	Mark	Function
1	CAN_H/485＋	CAN terminal/RS485 communication Signal
2	CAN_L/485－	
3	DGND	Digital Ground

3.2 Control signal circuit



Picture 2(a) Control signal Interface Connection Diagram



Picture 2(b) Input Signal Oscillogram

IV、Parameter setting

DL2206H have four LED Segment Displays and four keys : ↩、↓、↑ and ↵.

Key function

Key	Instruction
↩	back，cancel；return to the previous menu, cancel the operation
↓	PgDn、adjust data when value is modified
↑	PgUp、shift data when value is modified
↵	Enter the parameter setting model(press the key for 3 seconds)

When the drive start to work, it displays the driver version first, then it displays the state of driver after 3 seconds. when the step-motor start to work, it displays the speed of step-motor(r/min).Once the step-motor reverses, the top byte of speed value flashes.

4.1 Parameter function instruction

4.1.1 parameter function table

Parameter	Function	Value	Factory Setting	Instruction
P000	Control parameter	～	0000	Read 4.1.2 Function of P000
P001	Micro step setting	SEt, 2～256	10	17 channels
P002	Set direction of step-motor rotation	0、1	0	Set the motor rotate direction
P003	Select the motor type	12、16、20	12	motor torque
P004	Setting Position Deviation	1～9999	4000	Set alarming range of detection of over travel
P005	Standby Current Ratio	0～100%	50	
P006	Electronic Gear Ratio(Numerator)		1	
P007	Electronic Gear Ratio (Denominator)		1	
P020	Low-4-bit of Input pulse	～		Display the value of input pulse
P021	High-4-bit of Input pulse	～		
P100	Running Current Ratio	10～120%	100	*
P101	Current Loop Gain	1～1000	115	Modify is forbidden
P102	Current Loop Integral Time Constant	1～1000	45	Modify is forbidden
P103	Current Loop Damping Factor	1～1000	830	Modify is forbidden
P104	Speed Loop Gain	1～1000	65 (P200=0)	The value is bigger, the gain is higher and rigidity is stronger
P105	Speed Loop Integral Time Constant	1～1000	85	The value is smaller, the integral speed is faster and the ability of system in resisting deviation is stronger

P106	Position Loop Gain	1～1000	50 (P200=0)	The value is smaller, the gain is higher and its rigidity is stronger
P107	Speed Loop Feed-forward	1～100	95	The value is bigger, the gain is higher and rigidity is stronger
P108	Enable	0、1	1	*
P109	Speed Loop Damping Factor	1～100	15	*
P110	Setting I/O Level signal	～	0000	Setting level signal of ENA, Pend and ALM
P111	positioning accuracy	1～50	1	±1 pulse.The bigger the value, the bigger the positioning error; When the load is too heavy, the resonance can be suppressed。
P112	resonance coefficient	1～12	6	Under the same inflexibility, the smaller the value, the shorter the positioning time, the more easily resonance occurs

P200	Control Mode	0、1、2	0	0: position control mode (Mode A); 1: speed control mode 2:position control mode (Mode B)
P201	Speed setting in speed mode	1～3000	60	Self-inspection pulse (rev/min)
P202	acceleration time in speed mode		100	ms
P203	The delay time of brake on(__ms)		0	Read 4.1.3 Function of P000
P204	Control mode after Alarm	0、1、2	0	Read 4.1.4 Function of P000

NOTE:

◆ Default value of **P110** is 0000,

$$\textbf{P110}=\frac{0}{A}\ \frac{0}{B}\ \frac{0}{C}\ \frac{0}{D}$$

D=0, When malfunction occurs, **ALM** output is low impedance;

D=1, When malfunction occurs, **ALM** output is high impedance;

C=0, When step-motor is in-position, **Pend** output is low impedance;

C=1, When step-motor is in-position, **Pend** output is high impedance;

B=0 ,Pulse+Direction,the falling edge is effective;

B=1 ,Pulse+Direction,the rising edge is effective;

B=2,CCW pulse/CW pulse,the falling edge is effective;

B=3,CCW pulse/CW pulse,the rising edge is effective;

A=0,when **ENA** input signal is low – level, the drive cut off motor current and set the motor free.

A=1,when **ENA** input signal is high – level, the drive cut off motor current and set

the motor free.

◆ **P200：Position control mode instruction**

P200	Function
0	Mode A:Closed loop(include position loop,current loop and speed loop)
2	Mode B:Phasor control(include position loop and current loop)

P200=2 (Mode B)

Parameter	Function	Factory Setting	Instruction
P104	Speed Loop	10	The value is smaller, the gain is higher and its rigidity is stronger
P106	Position Loop	25	The value is smaller, the gain is higher and its rigidity is stronger

◆ **P200：Speed Mode Setting(Self-inspection pulse)**

PUL- point signal input level	DIR- point signal input level	Function
0	0	Motor stopped
0	1	Clockwise(Self-inspection pulse)
1	0	Counter clockwise(Self-inspection pulse)
1	1	Motor stopped

NOTE:

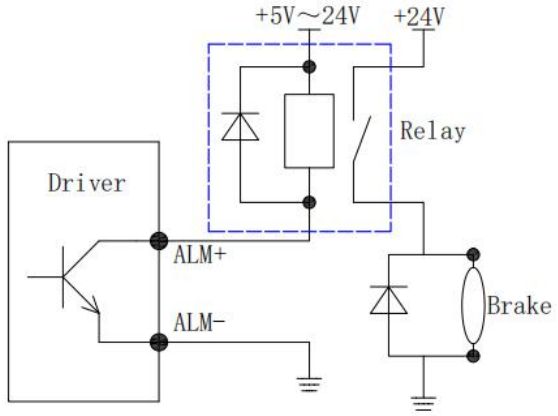
When P000 is "0200", the internal drive will run at 60 rev / min. In this mode, pressing ↓ down the speed of motor, pressing ↑ raise the speed of motor, speed ranging from-300 to +300,pressing ⮌ cancel this mode.

4.1.2 Function of P000

P000	Function
1111	Reset to Factory Defaults
0100	soft-start up the fan
0101	Display the speed of motor
0102	Display the value of DC bus voltage
0103	Display the temperature value of Drive
0104	Display position error
0105	Display ex-factory date
0106	History fault
0200	Self-inspection pulse

4.1.3 Function of P203

P203	Function
0	Define alarm signal output
200ms	This parameter defines the delay time from the motor energized until the action(alarm output) BRK is ON (for example 200ms)



4.1.4 Function of P204

P204	Alarm signal is on
0	PWM is closed immediately
1	PWM is closed slowly after 3 second
2	PWM keeping on 3 second,then Driver clear alarm signal,and restart.When clearing alarm signal twice,the alarm signal is keeping-on still,the Driver doesn't restart again.

4.1.5 Subdivision Table

Micro step	SEt	2	4	5	8	10	16	20	25
Micro step	32	40	50	64	100	128	200	256	Null

Servo Response:

1.Higher the speed loop gain(**P104**) or smaller the speed loop integral time constant(**P105**), faster the speed control response will be. But due to machine feature, machine vibration may result due to excessive speed loop gain.

2.Higher the position loop gain(**P106**), faster the position control response will be with fewer errors. But due to machine feature, machine vibration may result due to excessive position loop gain. The position loop gain is enabled in the zero-position fixed mode.

3.Speed feed-forward(**P107**) reference is the function that reduces the positioning time by feed-forward compensation in position control. The max value is 100.

【***Terminology***】 Feed-forward Control: It indicates the necessary corrective action that

is performed prior to external interference in the control system. Once it is activated, servo gain will rise and the response performance will be improved.

NOTE：

1、 Provides 16 kinds of micro step selection, upmost micro step can be set to 200x.

2、 When the step-motor rotation direction and the system direction given by the controller are opposite, please change the value of parameter **P002.**

3、 When you select SEt (the value of P001),the micro step of Servo Drive is Electronic Gear Ratio.

If the deceleration ratio of the servomotor and the load shaft is given as ***n/m*** where ***m*** is the rotation of the servomotor and ***n*** is the rotation of the load shaft, the electronic gear ratio is calculated as below：

$$\text{Electronic gear ratio} = \frac{P006}{P007}$$

$$= \frac{Encoder.resolution.ratio}{Displacement.per.load.shaft.revolution(reference.units)} \times \frac{m}{n}$$

Note that: $\frac{1}{20} \le$ Gear Ratio ≤ 20

Encoder resolution ratio indicates the count of pulses output by the encoder during one motor rotation.

Orthogonal incremental encoder resolution ratio = Number of wires * 4

For example:

Displacement per load shaft revolution =6000(pulse)

Number of wires=1000

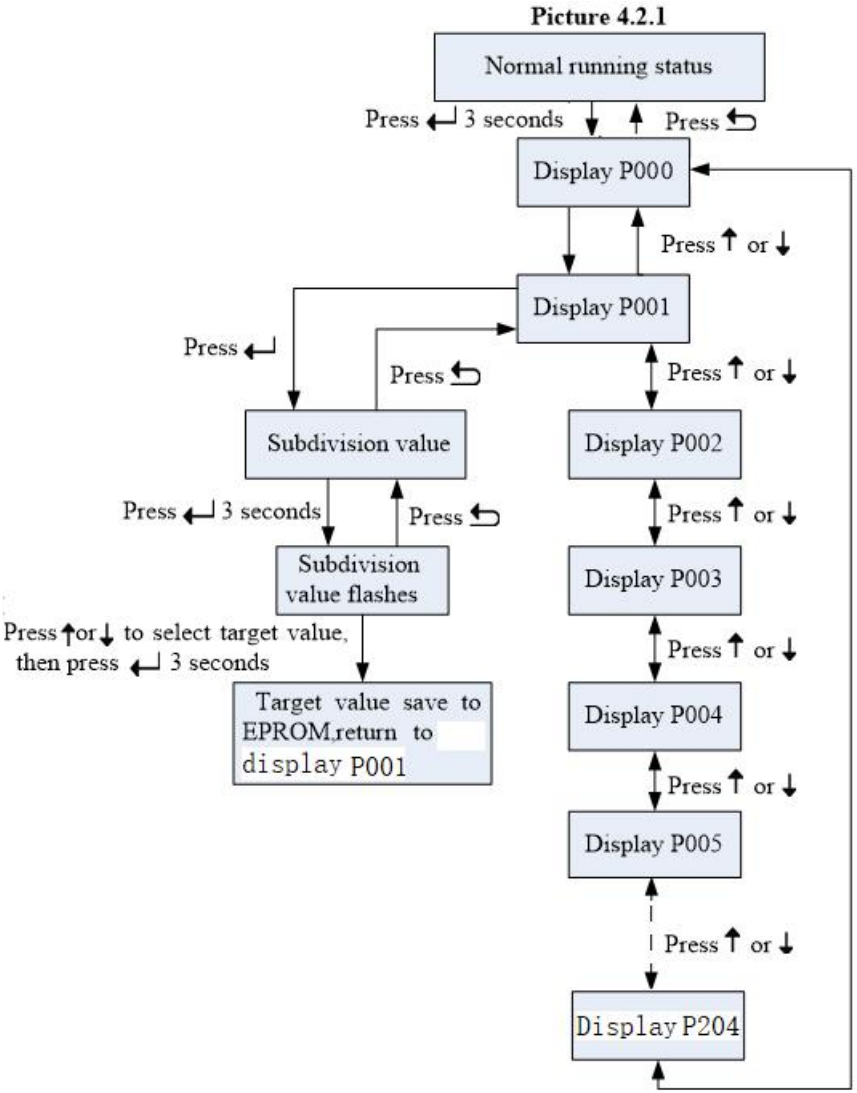
m=1,**n**=1

$$\text{Gear Ratio} = \frac{P006}{P007} = \frac{1000*4}{6000} \times \frac{1}{1} = \frac{2}{3}$$

Calculation as below: P006=2，P007=3

4. 2 How to set parameter

Picture 4.2.1



4.3 Alarm code

When malfunction occurs, the driver will display corresponding alarm code, and more will be shown in turn if more alarm signals。

4.3 Alarm Code

ALM code	Function	Instruction
Er 01	Over current	When current exceeds rated value, the drive will stop running
Er 02	Over-speed	The max speed is 3000r/min
Er 03	Position deviation	When position deviation value exceeds rated value, the driver will stop running
Er 04	Over heat	The max value is over 80℃
Er 05	Over DC voltage	When input voltage exceeds rated value, the driver will stop running, the voltage range from AC18~80V
Er 06	EPROM happen fault	Reading or Writing EPROM is failure
Er 07	Encoder fault	Check up Encoder wire
Er 08	Motor fault	Motor lack phase

V、Warranty Terms

Our company will provide warranty of 1 year from the delivery date and free maintenance under warranty.