XINJE

DPL/DP series digital stepper drive

XINJE

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Stepper system

DPL series / DP series

- Digital control mode, accurate and advanced sine current PWM control technology
- More stable performance, excellent noise immunity ability
- High subdivision precision, easy to set the current, pulse frequency up to 200KHz, max idle speed up to 3000rpm
- The configuration panel is easy to operate

DPL series features

Excellent driver technology

DPL series stepper drive is digital two-phase stepper drive. it can set the subdivision from 200 to 40000 and any current less than rated current. The drive uses sine wave current control technology, makes the motor running stable, low noise, is fit for most application cases. Built-in parameter self-study function can automatically produce the best parameters for different motor.

Complete function and performance

- Parameter self-study function
- Low motor running noise
- Control signal is 24V, connect to PLC directly
- Built-in high subdivision, subdivision is dynamic selectable, pulses per circle up to 40000
- Auto-half the current when resting
- Photoelectric differential signal input
- Overvoltage, overcurrent, short circuit protection

simple model selection

Suitable for small and medium-sized device, such as pneumatic marking machine, labeling machine, cutting machine, laser marking machine, plotter, small engraving machine, handling machine. It has good effect for the needs of low vibration, small noise, high precision, high speed.

two-phase stepper drive model list

model	current(A)	voltage (V)		max pulses per circle	matched motor
		range	typical value		
DPL-425	0.7 ~ 3.0	DC: 20 ~ 50	36	40000	42/57
DPL-685	1.9 ~ 5.0	DC: 20 ~ 50	36	40000	57/86
DPL-708A	2.0 ~ 6.0	AC: 20 ~ 80	68	40000	57/86
		DC: 30 ~ 100			

subdivision setting

Pulse/rev	SW2	SW3	SW4	SW5
200	OFF	OFF	OFF	OFF
400	OFF	OFF	OFF	ON
800	OFF	OFF	ON	OFF
1600	OFF	OFF	ON	ON
3200	OFF	ON	OFF	OFF
6400	OFF	ON	OFF	ON
12800	OFF	ON	ON	OFF
25600	OFF	ON	ON	ON
1000	ON	OFF	OFF	OFF
2000	ON	OFF	OFF	ON
4000	ON	OFF	ON	OFF
5000	ON	OFF	ON	ON
8000	ON	ON	OFF	OFF
10000	ON	ON	OFF	ON
20000	ON	ON	ON	OFF
40000	ON	ON	ON	ON

*notes: DPL-425 set subdivision via SW1~SW4 of CN2, DPL-685 and DPL-708A set subdivision via SW5~SW8 of CN1.

Electric features

item	min value	typical value	max value
logic input current (mA)	4	7	16
Stepper pulse frequency (KHz)	0	-	200
Insulation resistor (MΩ)	500	-	-
Environment temperature	0℃ ~ 50℃		
Max working temperature	60℃		
Humidity	40~90% RH (no condensation)		
Vibration	5.9m/s^2 Max		
Storate temperature	-20℃ ~ 65℃		

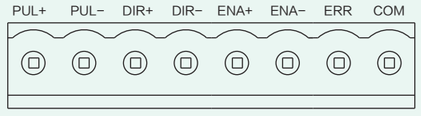
Parameter self-study function

- SW4 of CN1 can set semi-current, full-current, parameter self-study function.
- Parameter self-study function can produce the best parameters according to the motor and maximize the performance of motor.
- If toggle back and forth SW4 of CN1 once in 1 second, drive can auto-indentify the motor parameters and control the parameter self-study. Please do this operate when the power supply voltage or other condition changed, otherwise the motor running will be abnormal. Please note it cannot input pulse, the direction signal cannot change. The self-study time cannot less than 3 seconds
- method 1: SW4 from ON to OFF, then from OFF to ON in one second.
- method 2: SW4 from OFF to ON, then from ON to OFF in one second.

terminal arrangement

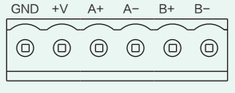
terminal of control circuit

[DPL-425/DPL-685/DPL-708A]

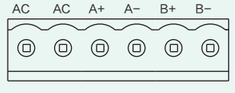


terminal of main circuit

[DPL-425/ DPL-685]



[DPL-708A]



current setting

CON1 of DPL-425

Peak	RMS	SW1	SW2	SW3
1.0	0.7	OFF	OFF	OFF
1.7	1.2	OFF	OFF	ON
2.0	1.4	OFF	ON	OFF
2.4	1.7	OFF	ON	ON
2.8	2.0	ON	OFF	OFF
3.4	2.4	ON	OFF	ON
4.0	2.8	ON	ON	OFF
4.2	3.0	ON	ON	ON

CON1 of DPL-685

Peak	RMS	SW1	SW2	SW3
2.7	1.9	OFF	OFF	OFF
3.4	2.4	OFF	OFF	ON
4.0	2.8	OFF	ON	OFF
4.2	3.0	OFF	ON	ON
5.1	3.6	ON	OFF	OFF
6.0	4.2	ON	OFF	ON
6.5	4.6	ON	ON	OFF
7.0	5.0	ON	ON	ON

CON1 of DPL-708A

REF Current	PK Current	SW1	SW2	SW3
2.00	2.40	OFF	OFF	OFF
2.57	3.08	OFF	OFF	ON
3.14	3.77	OFF	ON	OFF
3.71	4.45	OFF	ON	ON
4.28	5.14	ON	OFF	OFF
4.86	5.83	ON	OFF	ON
5.43	6.52	ON	ON	OFF
6.00	7.20	ON	ON	ON

DP series features

excellent drive technology

DP series stepper drive used digital control and sine wave current PWM control technology to form current close-loop and position open loop. This control method can real-time correct the position error and has stable performance, stronger anti-interference ability. The stepper drive can match 4, 6, 8 wires mixed type two phases stepper motor and 3 wires mixed type 3-phase stepper motor. The drive has small size and high cost performance.

Stable performance

DP series stepper drive has high input voltage and output current, improved the motor output torque at high-speed, controled the positioning precision at low speed, solved the problem of large noise, vibration, serious heating when motor is running, makes the motor running more stable.

complete protection function

Overvoltage, overcurrent, short circuit, under voltage protection, the protection circuit will cut off the PWM output if there is error, the alarm indicator will show related message, the error signal will output from ERRO, COM.

high subdivision precision, easy to set current

The performance was improved significantly by using advanced current control technology. The max input pulse frequency is 200KHz, it enabled to output large torque at high speed.

rich models for choice

there are many stepper drive models for choice, it is suitable for small automation equipment of low noise, high precision, low vibration, such as cutting machine, CNC machine.

two phases stepper drive

model	type	current(A)	voltage (V)		max pulses per circle	matched motor
			range	typical value		
DP-153	2-phase subdivision type	0 ~ 1.5	DC +12 ~ +30	DC 24V	25600	42
DP-304		0 ~ 2.5	DC +12 ~ +40	DC 36V	12800	42,57
DP-308D		0 ~ 3.0	DC +20 ~ +80	DC 48V	40000	42,57
DP-504		0 ~ 5.0	DC +20 ~ +40	DC 36V	40000	57,86
DP-508		0 ~ 5.0	DC +20 ~ +80	DC 48V	40000	86
DP-508D		0 ~ 5.0	DC +35 ~ +80	DC 48V	40000	86

*note: DP-308D has the function of overvoltage, overcurrent and short circuit protection. DP-508D was added short circuit protection compared to DP-508.

Three phases stepper drive

model	type	current(A)	voltage (V)		max pulses per circle	matched motor
			range	typical value		
DP-7022	3-phase subdivision type	0 ~ 7.0	AC200 ~ 240	AC220V	40000	86,110,130

Naming rule (take DP-504-L as an example)

*note: default model pulse voltage is +24V, -L model pulse voltage is +5V.

electric features

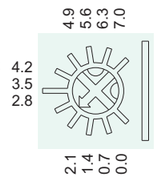
item	min value	typical value	max value
logic input current (mA)	4	7	16
Stepper pulse frequency (KHz)	0	-	200
Insulation resistor (MΩ)	500	-	-
Environment temperature	0℃ ~ 50℃		
Max working temperature	60℃		
Humidity	40~90% RH (no condensation)		
Vibration	5.9m/s^2 Max		
Storate temperature	-20℃ ~ 65℃		

Current setting

Lap potentiometer can set the current

It can set any current levels less than max output current through lap potentiometer. The full-current and semi-current mode can be set through Sw1.

*Note: DP-153, DP-304 have auto semi-current function, no need SW1 to set the full-current or semi-current mode.



DIP switch to set the current

Set the current through SW1 to SW3 of CN1, the range is 0~5.0A. SW4 can set the semi-current and full-current.

I(A)	SW1	SW2	SW3
1.5	OFF	OFF	OFF
2.0	OFF	OFF	ON
2.5	OFF	ON	OFF
3.0	OFF	ON	ON
3.5	ON	OFF	OFF
4.0	ON	OFF	ON
4.5	ON	ON	OFF
5.0	ON	ON	ON

Subdivision setting

The subdivision can be set through DIP switch

Set the subdivision through SW2, SW3, SW4, Sw5

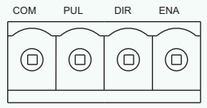
subdivision times	steps/circle (1.8° /step)	SW2	SW3	SW4	SW5
1	200	OFF	OFF	OFF	OFF
2	400	OFF	OFF	OFF	ON
4	800	OFF	OFF	ON	OFF
8	1600	OFF	OFF	ON	ON
16	3200	OFF	ON	OFF	OFF
32	6400	OFF	ON	OFF	ON
64	12800	OFF	ON	ON	OFF
128	25600	OFF	ON	ON	ON
5	1000	ON	OFF	OFF	OFF
10	2000	ON	OFF	OFF	ON
20	4000	ON	OFF	ON	OFF
25	5000	ON	OFF	ON	ON
40	8000	ON	ON	OFF	OFF
50	10000	ON	ON	OFF	ON
100	20000	ON	ON	ON	OFF
200	40000	ON	ON	ON	ON

*Note: DP-153, DP-304 set the subdivision through SW1, SW2, SW3; DP-508 set the subdivision through SW5, SW6, SW7, SW8 of CN1.

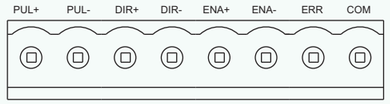
terminal arrangement

The terminals of control circuit

[DP-153]

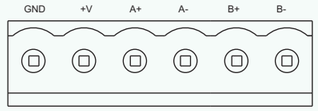


[DP-304/DP-308D/DP-504/DP-508/DP-508D/DP-7022]

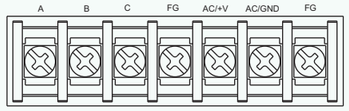


The terminals of main circuit

[DP-153/ DP-304/DP-308D/DP-504/DP-508/DP-508D/]

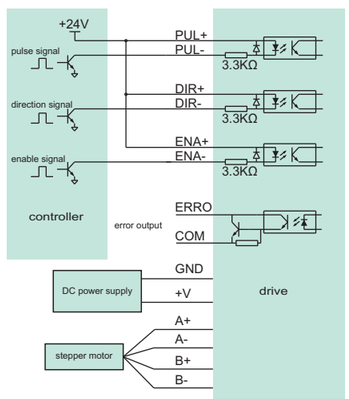


[DP-7022]



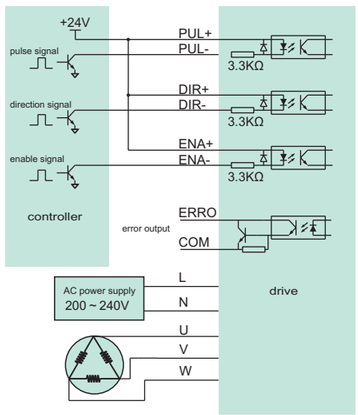
Typical wiring diagram

Two-phase stepper typical wiring diagram



*Note: OPL-708A is AC power supply.

Three-phase stepper typical wiring diagram



Mixed type stepper motor models

matching rules of stepper motor and drive

torque

If the load is large, please choose large torque motor.

motor speed

Please choose large phase current motor for high speed condition to increase the output power. The drive also needs higher power supply voltage.

positioning precision

It is related to the subdivision numbers.

motor current, subdivision and power supply voltage are all conditions of choosing the model.

Two-phase stepper motor models

Drive model	Motor model	Step angle (°)	Length L (mm)	Static torque (N.m)	Phase current (A)	Phase resistor (Ω)	Phase inductance (mH)	Rotor inertia (g.cm²)	Shaft body	Shaft diameter (mm)	Weight (kg)
DPL-425/DP-153/ DP-304/DP−308D	42BYGH038	1.8	38	0.26	1.2	2.0	4.0	53	flat	5.0	0.24
DPL-425/DP-153/ DP-304/DP-308D	42BYGH047	1.8	47	0.32	1.2	2.7	5.2	78	flat	5.0	0.38
DPL-425/DPL-685/DPL-708A/ DP-304/DP-308D/DP-504	57BYGH051	1.8	51	0.72	3	0.75	2.2	228	flat	8	0.62
DPL-425/DPL-685/DPL-708A/ DP-304/DP-308D/DP-504	57BYGH056	1.8	56	0.9	3	0.6	1.8	273	flat	8	0.62
DPL-425/DPL-685/DPL-708A/ DP-304/DP-308D/DP-504	57BYGH076	1.8	76	1.35	3	0.75	2.5	482	flat	8	1.1
DPL-685/DPL-708A/DP-504/ DP-508/DP-508D	86BYGH065	1.8	65	3.3	2.8	1.1	8.0	1468	right angle flat	14	1.7
DPL-685/DPL-708A/ DP-508/DP-508D	86BYGH078	1.8	78	4.5	4.2	0.56	4.8	1170	right angle flat	14	2.3
	86BYGH078-J	1.8	78	4.5	4.2	0.56	4.8	1170	flat key 5*25	14	2.3
DPL-685/DPL-708A/ DP-508/DP-508D	86BYGH114	1.8	114	8.5	4.2	0.85	7.4	3547	right angle flat	14	3.8
	86BYGH114-J	1.8	114	8.5	4.2	0.85	7.4	3547	flat key 5*25	14	3.8
DPL-685/DPL-708A/ DP-508/DP-508D	86BYGH150	1.8	150	12	4.2	1.1	12.8	5318	right angle flat	14	5.1
	86BYGH150-J	1.8	150	12	4.2	1.1	12.8	5318	flat key 5*25	14	5.1

three-phase stepper motor models

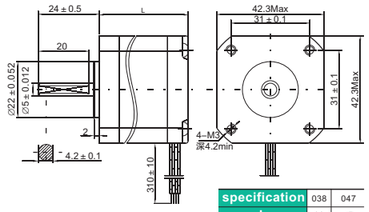
Drive model	Motor model	Step angle (°)	Length L (mm)	Static torque (N.m)	Phase current (A)	Rotor inertia (g.cm²)	Phase resistor (Ω)	Phase inductance (mH)	Shaft diameter (mm)	Shaft body	Weight (kg)
DP-7022	86BYGH3125H	1.2	125	6	5.8	3480	0.9	2.17	12	flat key4*20	4
	86BYGH3125H−1	1.2	125	6	5.8	3480	0.9	2.17	12	flat key5*25	4
	110BYGH3128	1.2	128.5	8	4.3	6000	1.25	4.49	19	flat key6*30	5
	110BYGH3153	1.2	153	12	6	9720	1.89	8.34	19	flat key6*30	6.6
	110BYGH3186	1.2	186.5	16	6.4	13560	1.89	8.73	19	flat key6*30	9
	110BYGH3221	1.2	221	20	6.9	17400	1.859	7.26	19	flat key6*30	11.1
	130BYGH3162	1.2	162	15	6.9	20000	0.88	3.7	24	flat key8*30	11
	130BYGH3191	1.2	191	20	6.9	26700	1.1	4.9	24	flat key8*30	14.1
	130BYGH3223	1.2	223	28	6.9	33970	2.8	17.9	24	flat key8*30	17.2
	130BYGH3255	1.2	255	35	6.9	41240	3.3	21.52	24	flat key8*30	19.8
	130BYGH3319	1.2	319	50	6.9	55780	4.2	28.9	24	flat key8*30	26

Motor dimension drawing (unit: mm)

Motor dimension

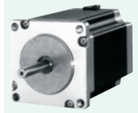
Two-phase motor

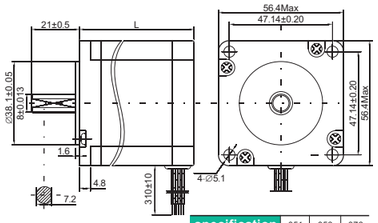
[42BYGH]
wiring diagram
(see diagram A)



specification	038	047
L	38	47

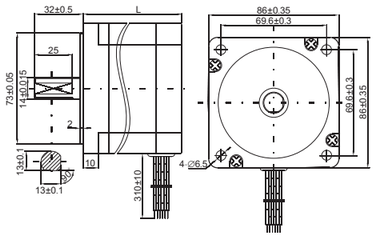
[57BYGH]
wiring diagram
(see diagram A)





specification	051	056	076
L	51	56	76

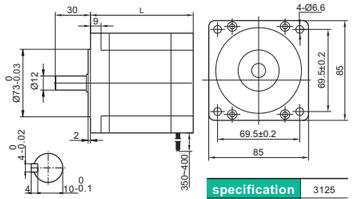
[86BYGH]
wiring diagram
(see diagram A)



specification	065	078	114	150
L	65	78	114	150

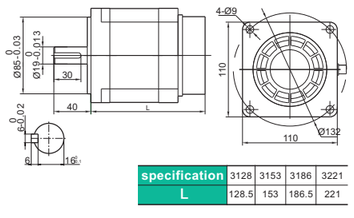
Three-phase motor

[86BYGH]
wiring diagram
(see diagram B)



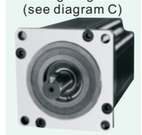
specification	3125
L	125

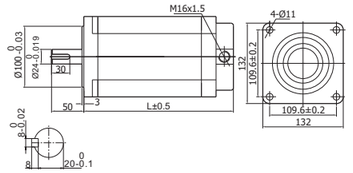
[110BYG]
wiring diagram
(see diagram C)



specification	3128	3153	3186	3221
L	128.5	153	186.5	221

[130BYGH]
wiring diagram
(see diagram C)



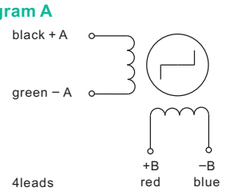


specification	3162	3191	3223	3255	3319
L	162	191	223	255	319

Wiring diagram

Two-phase motor wiring diagram

diagram A



Three-phase motor wiring diagram

diagram B

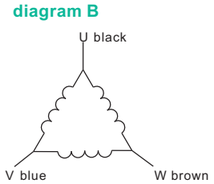
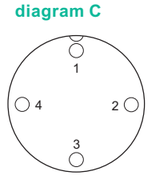


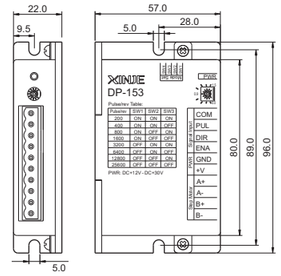
diagram C



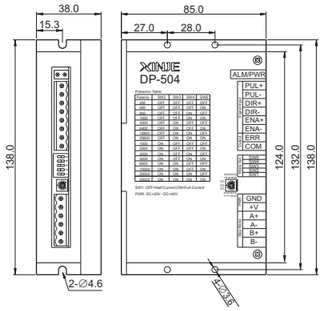
number	1	2	3	4	4 cores
phase order	U	V	W	GND	

Stepper drive installation dimension (unit: mm)

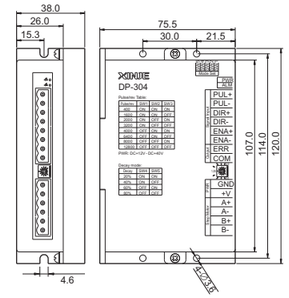
DP-153



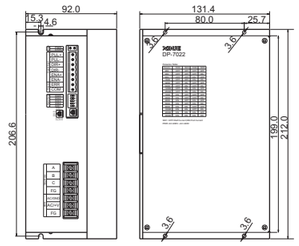
DP-504/DP-508 /DP-508D



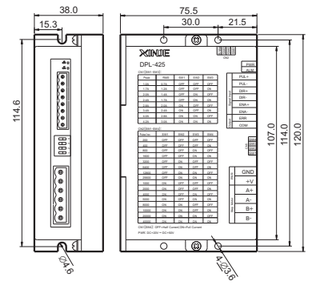
DP-304/ DP-308D



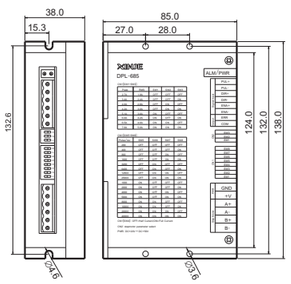
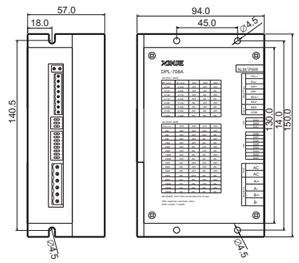
DP-7022



DPL-425



DPL-685



DPL-708A