<mark>2 Phase Step Motor Driver</mark>

DPYHHDB1200000000

User Manual

【Index】

● If any change in the performance and specification, appearance of products all take as the material object, no separate informs. Respectfully supplicate understanding.

● Products inquiry or if any question in use are welcome to contact us.

Please read and be familiar with the notices of specification and security in the user guide before to use the driver.
Please reserve this user guide for looking up at any time.

1. The summary

SD200 is the appropriative driver which offer bipolar connecting method, it's just for the 2 phase stepper motor. The feature are as follows：

- Excite mega tic method： Full step is 2 phase excite mega tic，each step 1.8 degree. Half step is 1-2 phase excite mega tic, each step 0.9 degree.
- Drive method：Bipolar driving with constant current, there are a lot of merits, as the angle accuracy is better and torque is larger and so on….
- Special function：1P/2P function for option、over heat protection(AHO)、auto-adjustment current (ACD)、external mega tic release (C.OFF)、self-test and zero timing output (ZRO) and so on….
- Output signal：There is over heat and zero timing output, it can auto-control with external circuit.

2. The confirmation of content

The content of package is listed below for confirmation; please check out after taking off a seal, if any damage or lack, please contact us at once.

- The Driver…………………………………………………Unit

- Moveable sockets
  - 5 wire …………………………………………………… 1 piece
  - 12 wire …………………………………………………… 1 piece

- User manual (This book)…………… ……………… … … 1 book

9. Leads of motor connection

	4 leads		6 leads		8 leads	
A	white	red	white	red	red black, white	red
/A	red	red white	red	red White	black red, white	black ,white
B	blue	green	blue	green	green yellow, white	green
/B	yellow	green white	yellow	green white	yellow green, white	yellow, white
			Yellow, white: don't connect and forbid short circuit	Black, white: don't connect and forbid short circuit		Connect red white and black white Connect green white and yellow white Two group of leads: forbid short circuit

NOTE

• Above information is just for reference, if original manufactuere change color of leads, we

won't further inform.

3. Introdution of panel
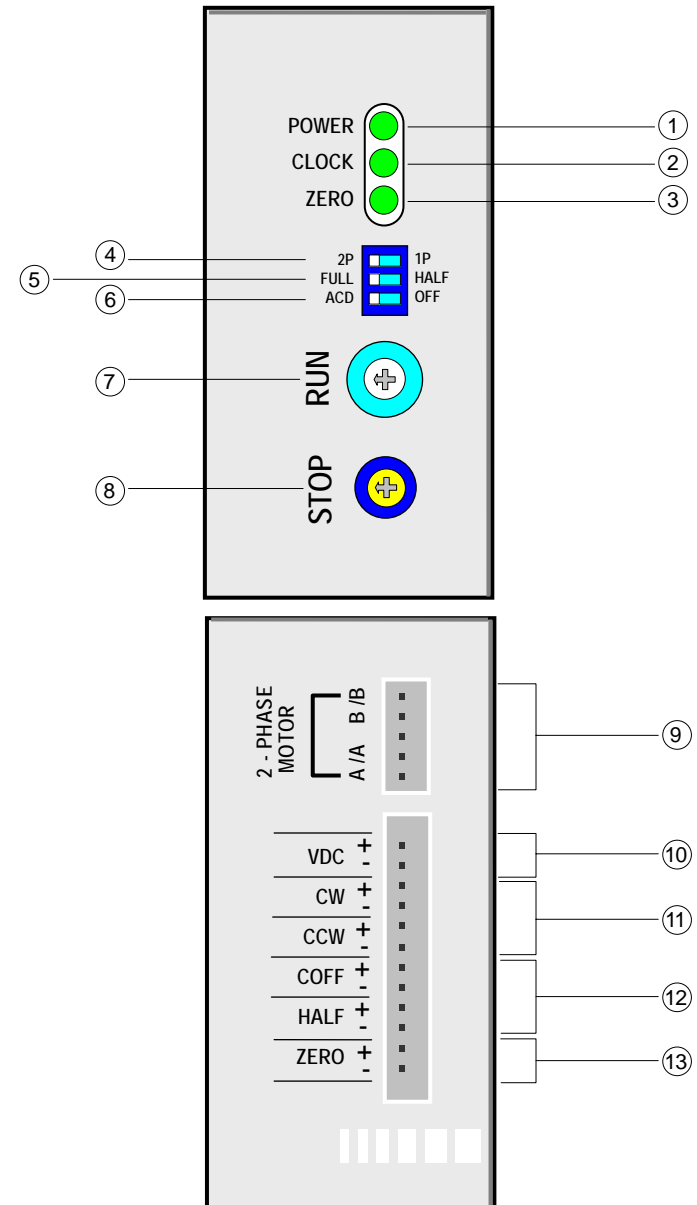
3.1 **Introduction of LED**

LED	Name	Color	Description
① POWER	Power light	green	When the driver accept DC 24V, PWR will be light.
② CLOCK	Pulse light	green	When driver accept one pulse, CLOCK will be light.
③ ZERO	Zero timing light	green	When driver reach to zero point, the ZERO will be light.

3.2 Switch setting、knob adjustment

Switch & Knob	Name	Original setting	Description
④ 2P/1P	Option switch for pulse control method	2P	If use CW pulse and CCW pulse to control the running direction of motor, to set the switch 2P. If just only input a group of pulse, another signal control the running direction of motor, to set the switch 1P。
⑤ FULL /HALF	Option switch for angle of step	FULL	If have motor to run1.8° each pulse, please use FL(full step)。 If have motor to run 0.9° each pulse, please use HF(half step)。
⑥ ACD /OFF	Function switch for auto-current down	ACD	When motor stop, if want to have the drive current auto-down, to set the switch ACD。 When motor stop, if want to maintain fixed drive current, to set the switch OF.
⑦ RUN	Knob for adjustment of running current	7	Setting the drive current when motor revolving.
⑧ STOP	Knob for adjustment of stop current	80%	To set percentage of current down, when the motor stop. (70%~90%)。

8. Dimension

Unit：mm

40%Scale
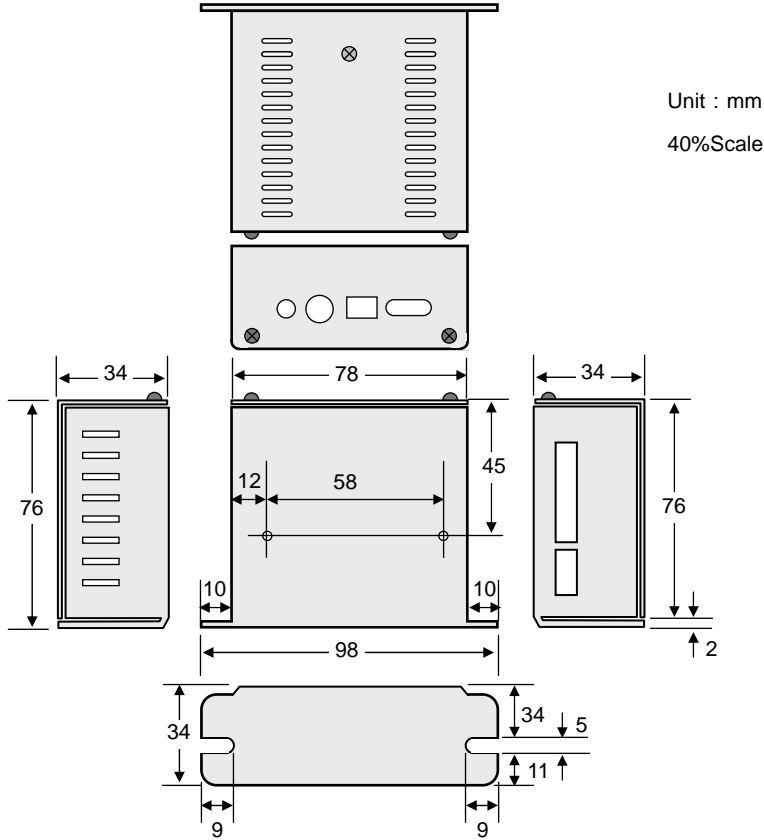
1. The screws size is M3＊0.5 ㎜ and dimension are as above.
2. If the driver needs to run for a long time or high current, it is better to mount the driver in a place decreasing heat easily.
3. When mounting two or more drivers, separate them by a space at least 20mm.
4. Don't expose to continuous vibration or excessive impact。
5. Don't expose to dust, water or oil.

7. Specification

Model Number	2 Phase Step Motor Driver SD200
Drive Method	Constant current bipolar method
Driver Current	0.8A/phase ~ 1.5A/phase
excite mega tic method	Full-Step：1.8°/step Half-Step：0.9°/step
Input signal spec	Input impedance 220Ω、Input current under 20mA Signal voltage H：+4~+5V、L：0~+0.5V
CW pulse input (pulse input)	Negative Lever Excite Input、pulse width 5μSec (above) When 2P, it is CW pulse input. When 1P, it is pulse input.
CCW pulse input (direction input)	Negative Lever Excite Input、pulse width 5μSec(above) When 2P, it is CCW pulse input. When 1P, it is direction signal (OFF→CCW，ON→CW)
Excite mega tic release signal input COF	When ON，the driver will release drive current to the motor When OFF, the driver will drive motor according to the setting of drive current.
Output signal spec	Open Collector Condition: under DC24V、under 10mA
Excite mega tic zero timing signal output	When full step, output a signal each 4 pulses. When half step, output a signal each 8 pulses.
Noise insulation	Photo Coupler
Function switch setting	Pulse input method, Step angle option, Auto-current down function option
LED light	Power input light, Pulse input light, excite mega tic release input light
Cooling mothed	By heat sink alloy
Work temperature	0 ~ 40°C
Work humidity	< 85%RH
Power	DC24V ~ 42V , Current>2A
Dimension	75(L) x 98(W) x 34(H) Unit: mm
Weight	160g

3.3 Connection Terminal

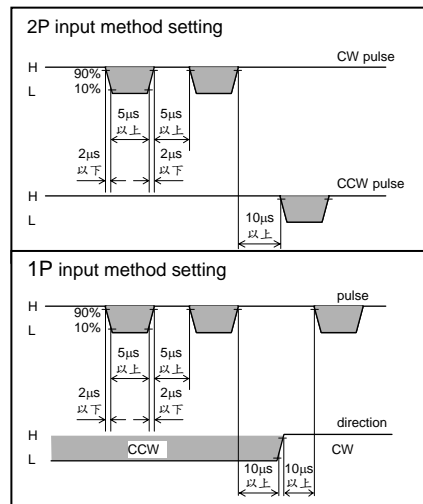| Indicator	Name		Description	Page
⑨	/B	Motor wiring terminal	• Motor /B phase	P.8
	B		• Motor B phase	
	-----		• Empty, Not use	
	/A		• Motor /A phase	
	A		• Motor A phase	
⑩	VDC＋	Poser input terminal	• DC24~42V positive input	P.8
	VDC－		• DC24~42V negative input	

⑪	CW＋	CW pulse input terminals／Pulse signal input terminals	• 2P drive method
			   − The pulse input terminals which have the motor CW.
			• 1P drive method
			   − The pulse input terminals which have the motor running.
				P.5

	CW－			

⑫	CCW＋	CCW pulse input terminals／gyro-direction pulse input terminals	• 2P drive method
			   − The pulse input terminals which have motor CCW.
			• 1P drive method
			   − The pulse input terminals which control the running direction of the motor.
			     ("L"→CCW, "H"→CW)
				P.5

	CCW－			
	COFF＋	Excite mega tic release signal input terminals	• When add a High voltage in this point, the current of the driver would down to zero at once, then torque of the motor is released.	P.6
	COFF－			
	HALF＋	Half-step signal input terminal	• When add a high voltage in this point, driver will change to half-step. This point just effective in setting the function on Full-step	P.6
	HALF－			
⑬	ZERO＋	Excite mega tic zero timing signal input terminals	• When full step (1.8°/step)，the driver receive each 4 pulses, this point will output a signal. • When full step (0.9°/ step), the driver receive each 8 pulses, this point will output a signal.	P.7
	ZERO－			

4. Output/ Input signal specification

4.1 Input signal

4.1.1 **CW/ pulse(CW/PLS) signal、CCW/direction (CCW/DIR) signal**

● **Input loop signal connecting diagram**

The words in bracketing, it means 1P input method.

When V0= 5V, No need for external impedance R。

Forbid current input over 20mA to avoid damaging Photo Coupler.

** V0=12V，add 1.0KΩ / ¼W resistor

** V0=15V，add 1.5KΩ / ½W resistor

** V0=24V，add 2.0KΩ / ½W resistor
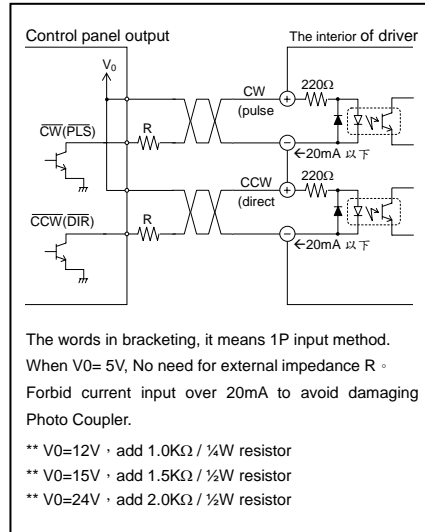
2P When input

● **CW pulses input**

When negative lever excite input CW, the motor run with CW direction.

● **CCW pulses input**

When negative lever excite input CCW, the motor run with CCW direction.

1P When input

● **Pulses input**

When negative lever excite input CW, the running direction of motor is according to direction signal.

● **running direction input**

When running direction signal input CCW terminal,

"L" the motor run with CCW direction.

"H" the motor run with CW direction.

● **Pulse Diagram**

● Pulses voltage value, H = 4~5V，L = 0~0.5V。

● Pulses width above 5μs, the changeover interseptal time of H、L is under 2μs.

● Acceptable maximum accessible chopping speed is up to 70 KHz.

● It needs the echo time for 10μs between the changeover point of CW/CCW direction and starting pulses。

● Utilize negative lever excite to avoid noise, thus it needs maintain in H status before pulses input.

● When use 2P input method，forbid input CW and CCW

6.2 Current Setting

6.2.1 Running Current (RUN)

● When the motor is running, its drive current value can be set by 「RUN」knob of 16 step micro adjustment.

● If the drive current value of driver is higher than the current value of specification of motor; the motor will be over heat and even burn out.

● If the drive current value of driver is lower than the current value of specification of motor, then in toque and speed, it will be getting bad, but the motor will be better in ascendant temperature and percussion noise.

● Original setting value of driver is 「8」. Refer to right table to set a suitable current value according to current value of spec of motor.

「RUN」	Running Current (A/phase)
0	0.88
1	0.94
2	0.99
3	1.03
4	1.08
5	1.12
6	1.16
7	1.20
8	1.24
9	1.28
A	1.32
B	1.36
C	1.40
D	1.43
E	1.47
F	1.50

6.2.2 The current when the motor stop (STOP)

● When the motor stop run, its current value can be set by the 「STOP」of 16 step micro adjustment.

● If use current auto-drop function, it can be set by the 「OF/ACD」of switch。

● Knob can adjust descendant percentage for range 70%~90%.

「RUN」x (1－descendant percentage %) ＝ current when stop

# 6. Function setting and current adjustment

6.1 Function Setting

6.1.1 Pulse input method

- If move this switch to the place 「2P」, it means to use 2 groups pulses input; one group is CW pulses, another one group is CCW pulses.
- If move this switch to the place 「1P」, it means just only to use a group pulse input (CW), and to control CW/CCW direction of motor by ON/OFF of CCW input terminal.

2P ▢ 1P

6.1.2 Step angle setting
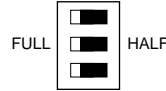
- If move this switch to the place 「FL」, it means the motor will run with full step method, each step is 1.8°, to run a circle need 200 pulses.
- If move this switch to the place 「HL」, it means the motor will run with full step method, each step is 0.9°, to run a circle need 400 pulses.

FULL ▢ HALF

6.1.3 Current auto-down function
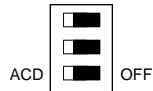
- If move this switch to the place 「ACD」, it means after motor stop about 0.3 sec, the driver will according to the setting of current descendant percentage to auto-drop drive current to avoid motor over heat. (Regarding current descendant percentage, please refer to P.10「current adjustment」)
- If move this switch to the place 「OFF」, it means when the motor stop, the driver still maintains original current, no auto-drop function.

ACD ▢ OFF

● **Input loop signal connecting diagram**
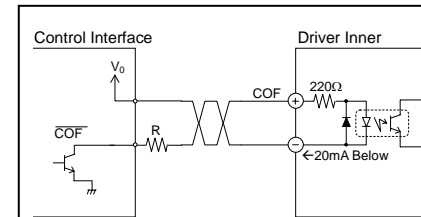
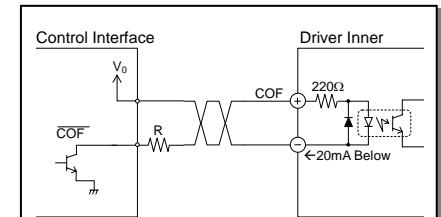If V_0= 5V, it doesn't need to connect external resistor R.

If V_0 is higher than 5V, you should connect an external resistor R. The input current must stays under 20mA, otherwise, it will burnout the photo-coupler.
** V_0= 12V, R=1.0KΩ / ¼W
** V_0= 15V, R=1.5KΩ / ½W
** V0= 24V, R=2.0KΩ / ½W

- When ″COFF″ terminal is active, the driver will release current. Motor now is without torque, it could easily rotate shift by hand.
- The terminal is negative trigger, when it is not active, it remain at H status.
- When COFF is active, and there is external force to rotate the shift. There will have +/-3.6 degree tolerance after COFF release.

● **Input loop signal connecting diagram**

If V_0= 5V, it doesn't need to connect external resistor R.

If V_0 is higher than 5V, you should connect an external resistor R. The input current must stays under 20mA, otherwise, it will burnout the photo-coupler.
** V_0= 12V, R=1.0KΩ / ¼W
** V_0= 15V, R=1.5KΩ / ½W
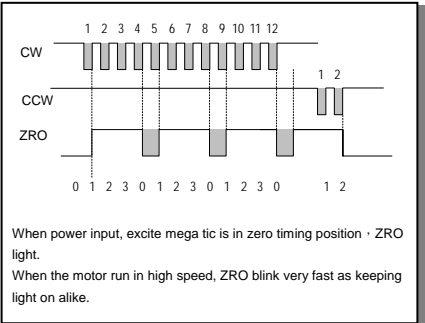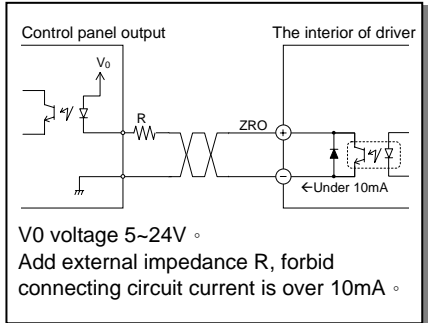** V0= 24V, R=2.0KΩ / ½W

- When HALF terminal is active, the driver will change to 1-2 phase excite mega tic , half-step drive method , each step is 0.9°.
- This point FULL/HALF just effective in setting the function on Full-step
- This point must make sure the motor is stop, no pulse input, otherwise will have ±0.9° degree tolerance.
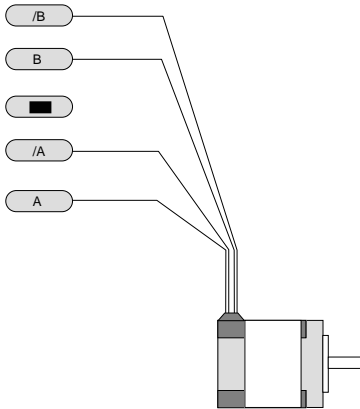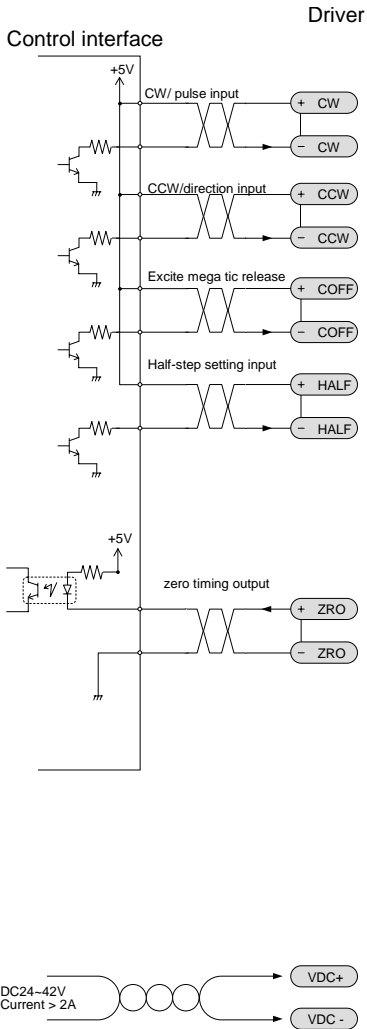
4.2 Output signal

4.2.1 Zero Timing Signal(ZRO)

- **Output Signal Connecting Circuit**

Control panel output — The interior of driver

V₀

R ZRO

←Under 10mA

V0 voltage 5~24V 。
Add external impedance R, forbid
connecting circuit current is over 10mA 。

1 2 3 4 5 6 7 8 9 10 11 12

CW

CCW

ZRO

0 1 2 3 0 1 2 3 0 1 2 3 0   1 2

When power input, excite mega tic is in zero timing position，ZRO light.
When the motor run in high speed, ZRO blink very fast as keeping light on alike.

- There is a Zero-point output when the motor rotated per 7.2°. For example as following:
  When 200s/r(1.8°/s)：Per 4 pulse input, one Zero signal output.
  When 400s/r(0.9°/s)：Per 8 pulse input, one Zero signal output.
  In the mean time, the ZRO LED light on when Zero signal output.
- For best zero timing performance, it is combined with mechanical zero timing together.

5. Connecting Diagram

Driver

Control interface

+5V

CW/ pulse input — + CW / − CW

CCW/direction input — + CCW / − CCW

Excite mega tic release — + COFF / − COFF

Half-step setting input — + HALF / − HALF

+5V

zero timing output — + ZRO / − ZRO

/B
B
■
/A
A

DC24~42V
Current > 2A — VDC+ / VDC -

- Regarding the allocation of motor leads' color of each phase, please refer to P.13 or the user guide of each brand.