

High Performance  
2 Phase Step Motor Driver

**DPYHHAB2400000000**  
**DPYHHAB2600000000**

# User Manual

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● 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

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The driver is the appropriate driver which offers bipolar connecting method, it's just for the 2 phase stepper motor. Utilize CPLD component design to reduce internal components to enhance confidentiality, SMT component design has a lot of merits, as scaling bulk and stable quality; unique drive technique and protection function enhance the speed of motor, acceleration and torque output. The features are as follows:

- Excite mega tick method : Full step is 2 phase excite mega tick, each step 1.8 degree. Half step is 1-2 phase excite mega tick, 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(OVH), auto-adjustment current (ACD), external mega tick 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

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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.....   | 1 unit  |
| • Moveable sockets ( It had be inserted in driver)<br>10 holes..... | 1 piece |
| • Accessories<br>Pan Head cross M3 screw .....                      | 2 piece |
| • User guide (This book).....                                       | 1 book  |

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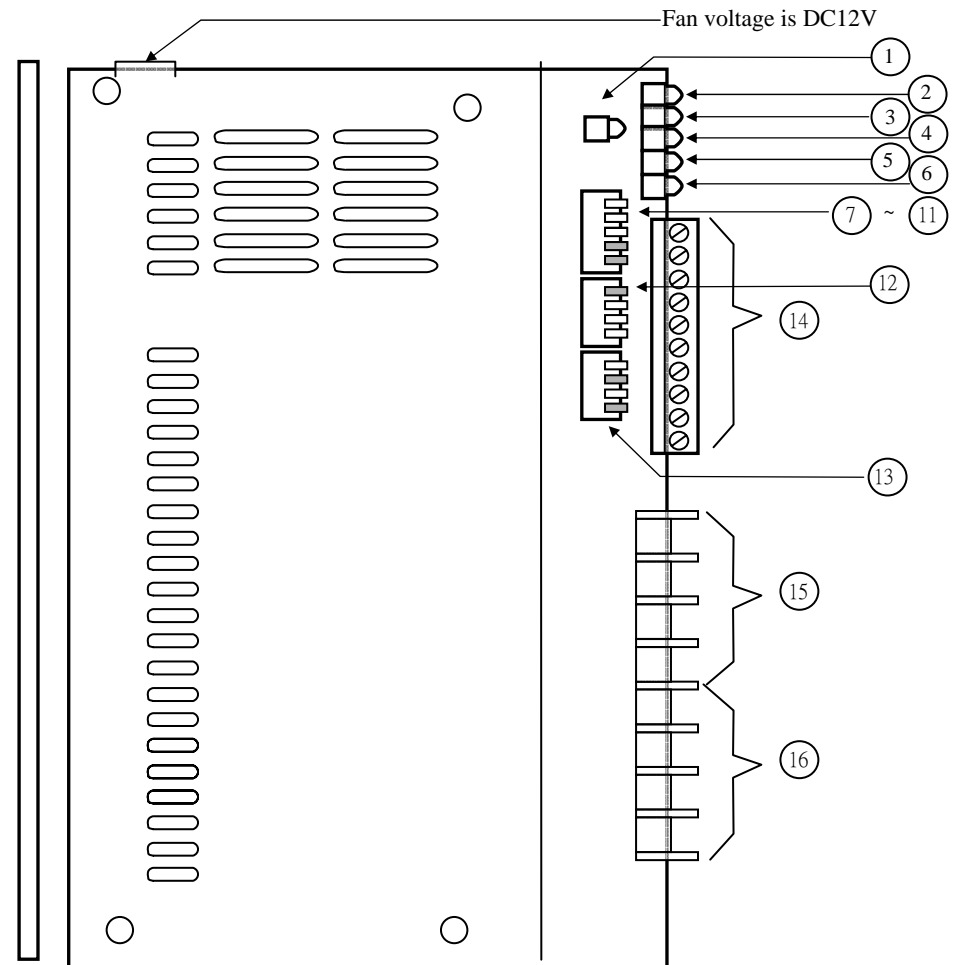
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## 9. Leads of motor connection

		A	/A	B	/B	
TECO	4 leads	black	green	red	blue	----
	6 leads	black	green	red	blue	Yellow, white: don't connect and forbid short circuit
	6 leads	Red	red white	green	green white	Black, white: don't connect and forbid short circuit
	8 leads (Series)	red	black	green	yellow	Connect red white and black white Connect green white and yellow white Two group of leads: forbid short circuit
	Series connection: double impedance, quadri- inductive reactance, it is suitable for low speed runing.					
	8 leads (Parallel)	Red \ black white	black \ red white	green \ yellow white	yellow \ green white	----
Parallel connection: halve impedance, inductive reactance constant, it is suitable for high speed runing.						
VEXTA	6 leads	black	green	red	blue	Yellow, white: don't connect and forbid short circuit

Above information is just for reference, if original manufactuere change color of leads, we won't further inform.

## 3. Introduction of panel



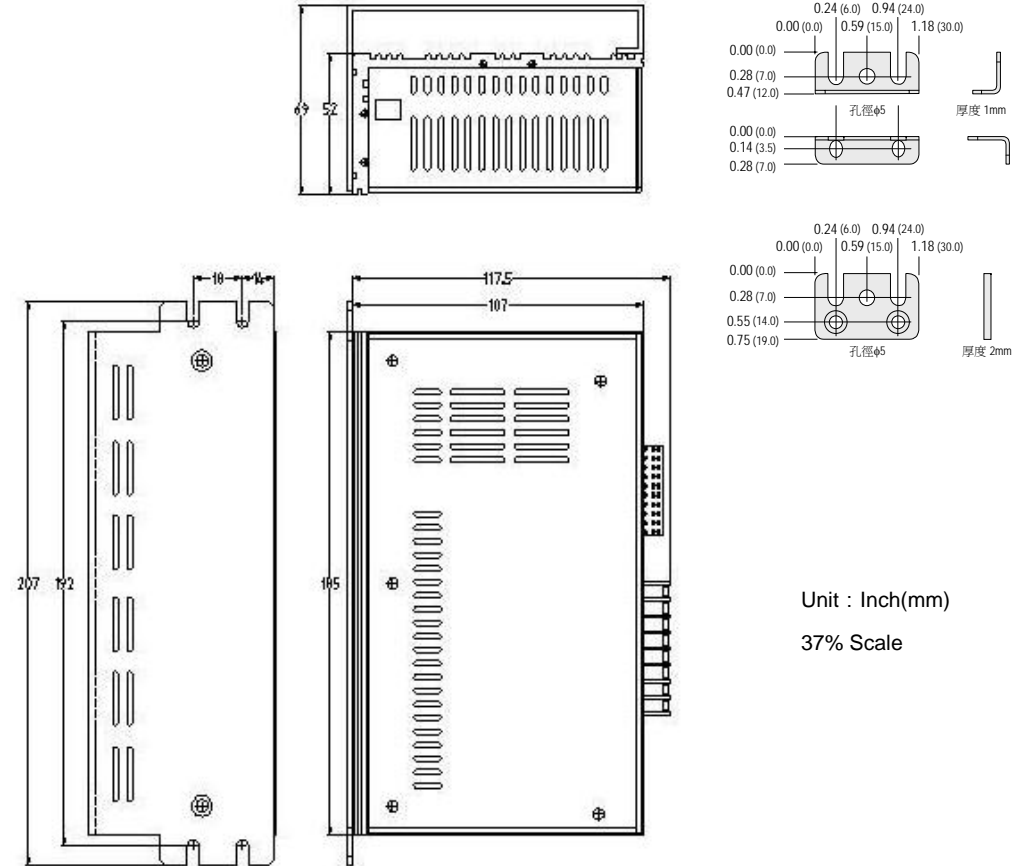
### 3.1 Introduction of LED

LED	Name	Color	Description	
①	PWR	Power light	Green	When the driver accept AC11, PWR will be light.
②	CW	Clock-wise light	Green	When the driver receive pulse signal, CW will blink once each pulse signal.
③	CCW	Count clock-wise light	Green	When the driver receive pulse signal, CCW will blink once each pulse signal.
④	COF	Excite mega tic release light	Red	When the driver receive external excite mega tic release signal, COF will be light.
⑤	ZRO	Zero timing light	Green	When full step, ZRO will blink once each 4 pulse signals. When half step, ZRO will blink once each 8 pulse signals.
⑥	OVH	Over heat light	Red	When the temperature of driver is over 85°C, OVH will be light.

### 3.2 Switch setting 、 knob adjustment

Switch & Knob	Name	Original setting	Description
⑦	GO/TST	Self-test switch	GO In normal running, to set the switch GO. When self-test, to set the switch TST.
⑧	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 .
⑨	FL/HF	Option switch for angle of step	FL If have motor to run 1.8° each pulse, please use FL( full step) . If have motor to run 0.9° each pulse, please use HF(half step) .
⑩	OF/ACD	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.
⑪	OF/AHO	Function switch for over heat output	AHO When the driver is over heat(>85°C), if want to have the motor stop, to set the switch AHO . If to set the switch OF; it will only output signal, but the motor wouldn't stop.
⑫	RUN	Knob for adjustment of running current	8 To set 16 step of the drive current, when the motor run. (1.0~4.0A,MSD2204,(1.5A~6.0A,MSD2206)
⑬	STOP	Knob for adjustment of stop current	8 To set percentage of current down, when the motor stop. (15%~100%16 step · 16 step setting)

### 8. Dimension



Unit : Inch(mm)  
37% 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 Name	2 phase step motor driver
Drive method	Bipolar Driving with Constant Current
Drive current	1.0A~4.0A DPYHHAB2400000000 1.5A~6.0A DPYHHAB2600000000
Drive mode	Full Step : 1.8°/step Half Step : 0.9°/step
Input Signal Specification	Input Resistance: 220Ω · Input Current under 20mA Voltage : +4~+10V · L : 0~+0.5V
PLS/CW signal input	Negative Lever Excite, Pulse Width above 5 u Sec 2P:clockwise pulse input 1P:pulse input.
DIR/CCW signal input	Negative Lever Excite, Pulse Width above 5 u Sec 2P: counterclockwise pulse input 1P: direction input (OFF→CCW · ON→CW)
Noise isolation	Use of Open Coupler
Function switch setting	Pulse input method, Step angle(resolution), Auto current down function, Auto overheat signal output selection.
LED indication	PWR LED, CLK LED, ZRO LED, COF LED, OVH LED
Cooling method	Heatsinks
Temperature	0 ~ 40°C
Moiture	< 85%RH
Power	AC85V~265V , 50/60Hz
Dimension (mm)	185(L) x 107(W) x 52(H) DPYHHAB2400000000 207(L) x 109(W) x 69(H) DPYHHAB2600000000
Weight	1020g (DPYHHAB2400000000) 1280g (DPYHHAB2600000000)

## 3.3 Connection Terminal

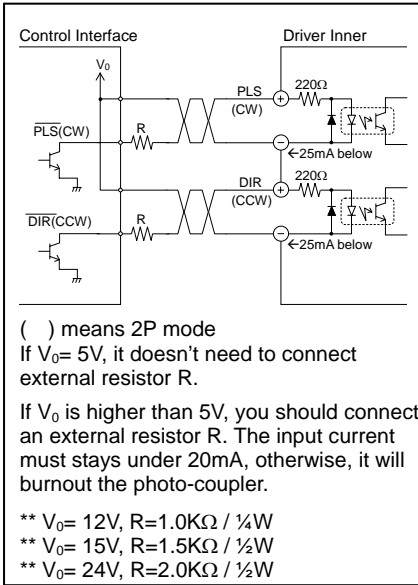
Code	Name	Description	Page	
⑭	CW+	CW pulse input terminal / Pulse signal input terminal	<ul style="list-style-type: none"> <li>• 2P drive method                             <ul style="list-style-type: none"> <li>- The pulse input terminals which have the motor CW.</li> </ul> </li> <li>• 1P drive method                             <ul style="list-style-type: none"> <li>- The pulse input terminals which have the motor running.</li> </ul> </li> </ul>	P.5
	CW-			
	CCW+	CCW pulse input terminals /gyro-direction pulse input terminal	<ul style="list-style-type: none"> <li>• 2P drive method                             <ul style="list-style-type: none"> <li>- The pulse input terminals which have motor CCW.</li> </ul> </li> <li>• 1P drive method                             <ul style="list-style-type: none"> <li>- The pulse input terminals which control the running direction of the motor. ("L"→CCW, "H"→CW)</li> </ul> </li> </ul>	P.5
	CCW-			
	COF+	Excite mega tic release signal input terminals	<ul style="list-style-type: none"> <li>• 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.</li> </ul>	P.6
	COF-			
	ZRO+	Excite mega tic zero timing signal input terminal	<ul style="list-style-type: none"> <li>• When full step (1.8°/step) · the driver receive each 4 pulses, this point will output a signal.</li> <li>• When full step (0.9°/ step), the driver receive each 8 pulses, this point will output a signal.</li> </ul>	P.7
	ZRO-			
	OVH+	Over heat input terminal	<ul style="list-style-type: none"> <li>• When the temperature of driver is over 85°C, this point will be active at once °</li> </ul>	P.7
	OVH-			
⑮	A	Motor wiring terminal	<ul style="list-style-type: none"> <li>• Motor A phase °</li> <li>• Motor /A phase °</li> <li>• Motor B phase °</li> <li>• Motor /B phase °</li> </ul>	P.8
	/A			
	B			
	/B			
⑯	FG	Ground terminal	<ul style="list-style-type: none"> <li>• Ground of AC input (connected to case)</li> </ul>	P.8
	FG			
	AC110V	Power input terminal	<ul style="list-style-type: none"> <li>• Single phase AC85V~AC265V ± 10% · 50/60Hz</li> </ul>	
	AC110V			

## 4. Output/ Input signal specification

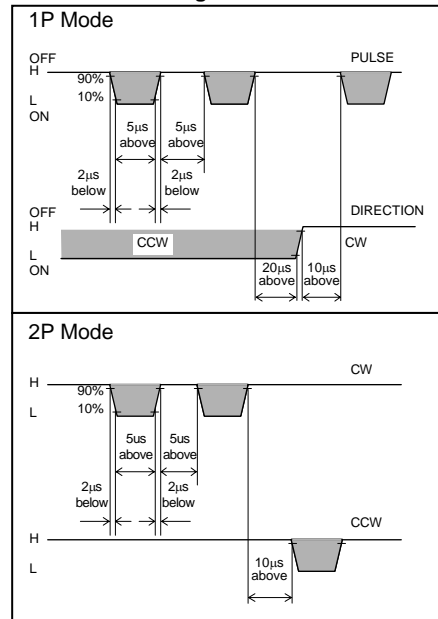
### 4.1 Input Signals

#### 4.1.1 Pulse/CW (PLS/CW)、Direction/CCW (DIR/CCW)

##### • Input Signal Connecting Circuit



##### • Pulse Diagram



##### 2P Mode

##### • CW Pulse Input

When the negative trigger pulse input the CLK terminal, the motor will rotate in clockwise.

##### • CCW Pulse Input

When the negative trigger pulse input the DIR terminal, the motor will rotate in counterclockwise.

##### 1P Mode

##### • Pulse Input

When the negative trigger pulse input the CLK terminal, the motor will rotate, and the direction will depend on the direction signal.

##### • Direction Signal input

When direction signal input DIR terminal, If "L", the motor will rotate in counterclockwise. If "H", the motor will rotate in clockwise.

- Pulse Voltage, H = +4~+10V, L = 0~+0.5V.
- Pulse wide is above 5µs. The alternate time between H and L must be under 2µs.
- The maximum accessible chopping speed is 60KHz.
- The response time between direction signal and pulse signal must be above 10µs.
- Using negative trigger technique is to isolate noise, so before this terminal input pulses, it needs to keep in High status.
- When 2P input, please don't input CW & CCW pulse at the same time.

Note:

If motor rotate oppositely, please exchange connection of A, B phase.

Ex. A → B or /A → /B

## 6.2 Current Setting

### 6.2.1 Running Current (RUN)

- When motor is rotating, driving current could be set by "RUN" non-segments adjustment knob.
- If the driving current of driver is higher than motor's, motor could easily cause heat, even burn out.
- If the driving current of driver is lower than motor's, the torque and speed performance of motor is not so much better than high.
- Driver factory setting at the 8 location, please refer to the suitable output current of motor's specification.

#### DPYHHAB240000000

「RUN」 scale	Running current(A/phase)
0	1.0
1	1.2
2	1.4
3	1.6
4	1.8
5	2.0
6	2.2
7	2.4
8	2.6
9	2.8
A	3.0
B	3.2
C	3.4
D	3.6
E	3.8
F	4.0

#### DPYHHAB260000000

「RUN」 scale	Running current(A/phase)
0	1.5
1	1.8
2	2.1
3	2.4
4	2.7
5	3.0
6	3.3
7	3.6
8	3.9
9	4.2
A	4.5
B	4.8
C	5.1
D	5.4
E	5.7
F	6.0

### 6.2.2 Stopping Current (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 0%~85%.  
 $\text{「RUN」} \times (1 - \text{descendant percentage \%}) = \text{current when stop}$
- Knob scale 0 → 85% · F → 0%
- Original setting value of driver is in the middle (scale 8) · please according to real needs to adjust digressions for the current value, it is helpful to reduce temperature of the motor.

[STOP]scale	current down (percentage%)	[STOP]scale	current down (percentage%)
0	85	8	42
1	80	9	36
2	75	A	30
3	70	B	24
4	65	C	18
5	60	D	12
6	54	E	6
7	60	F	0


## 6. Function setting and current adjustment

### 6.1 Function setting


#### 6.1.1 Self-test switch

- GO  TST
- This switch is for driver self-test.
  - If move this switch to the place 「GO」, it means common running model, the driver accept external control.
  - If move this switch to the place 「TST」, it means self-test model, the driver will bring pulses about 5Hz to drive motor.


#### 6.1.2 Pulse input method

- 2P  1P
- 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.

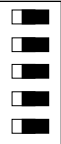
#### 6.1.3 Step angle setting

- FL  HF
- 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.

#### 6.1.4 Current auto-drop function

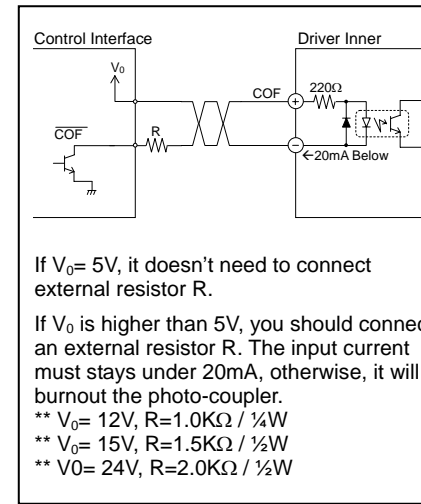
- OF  ACD
- If move this switch to the place 「ACD」, it means after motor stop about 0.3 sec, the driver will according to the setting of current descendant percentage to auto-drop drive current to avoid motor over heat. (Regarding current descendant percentage, please refer to P.10 「current adjustment」)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

#### 6.1.5 Over heat auto-protection input

- OF  AHO
- If move this switch to the place 「AHO」, it means when temperature of the drive is over 85°C, except output alarm signal and auto-release drive current (The motor stop).
  - If move this switch to the place 「OF」, it means temperature of the driver is over heat, just only OVH LED light and output the over heat signal, but the drive current won't be released (The motor keep running).

### 4.1.2 Excite mega tic current release (COF) Signal

#### • Input loop signal connecting diagram

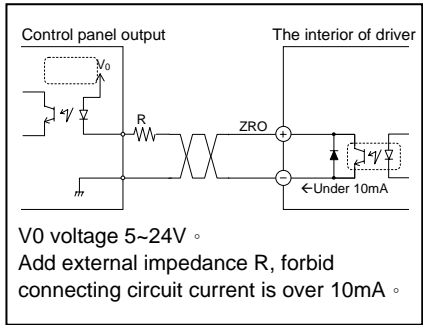


- When "COF" terminal is active, the driver will release current. Motor now is without torque, it could easily rotate shift by hand.
- The terminal is negative trigger, when it is not active, it remain at H status.
- When COF is active, and there is external force to rotate the shift. There will have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

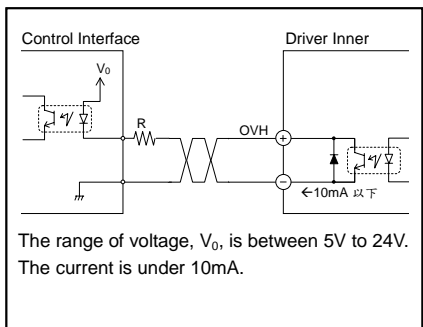
## 4.2 Output signal

### 4.2.1 Zero Timing Signal(ZRO)

#### • Output Signal Connecting Circuit



- 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.



- When temperature is over 85°C, the driver will output an alarm signal. OVH LED light on at the same time. It protects inner components in driver PCB.
- If function switch on OF/AHO, driver not only output overheat signal and light on, but also decrease excite mega tic current, then motor stop.
- In operating status, when alarm signal happened, you should turn off the power immediately. After find out the reason and wait for the driver is cool then restarts it.

## 5. Connecting diagram

