High performance
2 phase stepper motor driver

DPYHHAU1200000000

User Guide

【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

DPYHHAU1200000000 is the appropriative driver which offer unipolar connecting method, Utilize CPLD and SMD component design to scale bulk and enhance the quality stable; protect function。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 phases excite mega tic, each step 0.9 degree.

- Drive method：Unipolar 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 cut-off control (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………………………………………………………………………   1unit

- Moveable sockets (It had be inserted in driver)
  10 holes……………………………………………………………………   1piece

- European standards terminal
  8 holes …………………………………………………………………   1 piece

- Accessories
  L form fixed socket…………………………………………………… 2 pieces
  — form fixed socket…………………………………………………… 2 pieces
  Crew cut cross M3 screw …………………………………………… 4 pieces
  Knob cross M3 screw ………………………………………………… 4 pieces
- User guide (This book)………………………………………………… … 1 book

9. Leads of motor connection

	A	/AB	/B	C	O	M
TECO	6 leads	Red	White	Blue	Yellow	2 leads brown
	6 leads	Red	Red White	green	Green White	Black and white
	8 leads	Red	Black	green	Yellow	4 leads colorful
VEXTA	6 leads	Black	Green	Red	Blue	Yellow and white

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

further inform.

3. Introdution of panel
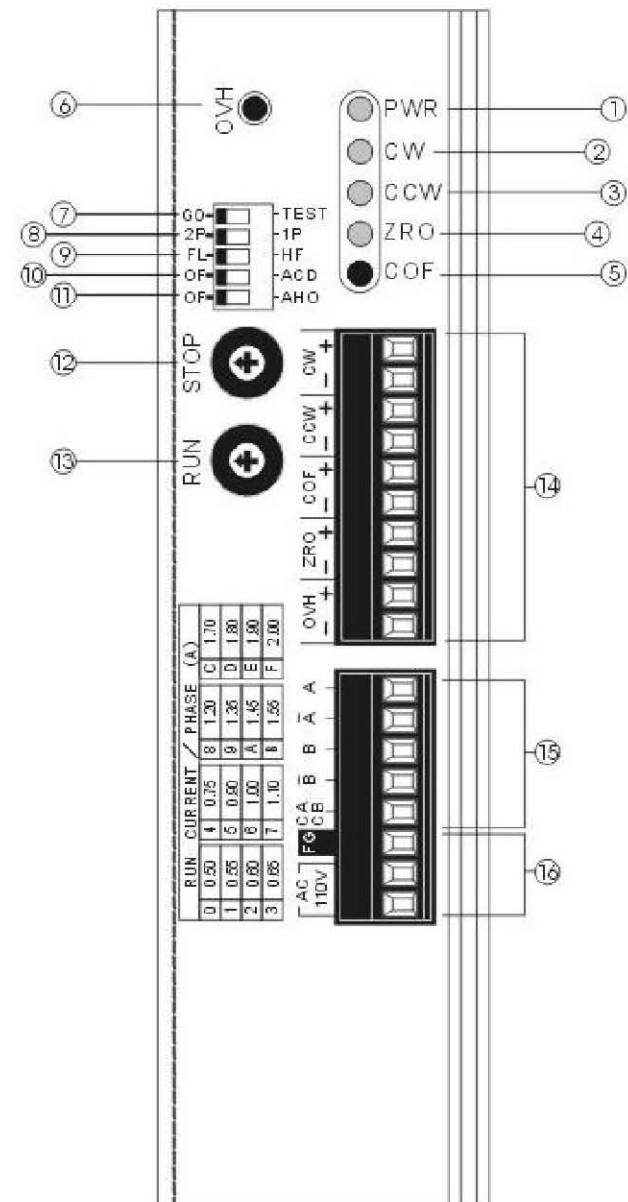
3.1 Introduction of LED

LED		Name	Color	Description
①	PWR	Power light	Green	When the driver accept AC110, 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 run1.8° 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. (0.5~2.0A，16 step setting)
⑬	STOP	Knob for adjustment of stop current	8	To set percentage of current down, when the motor stop. (20%~80%16 step，16 step setting)

8. Dimensions

Unit：Inch(mm)

37% scale
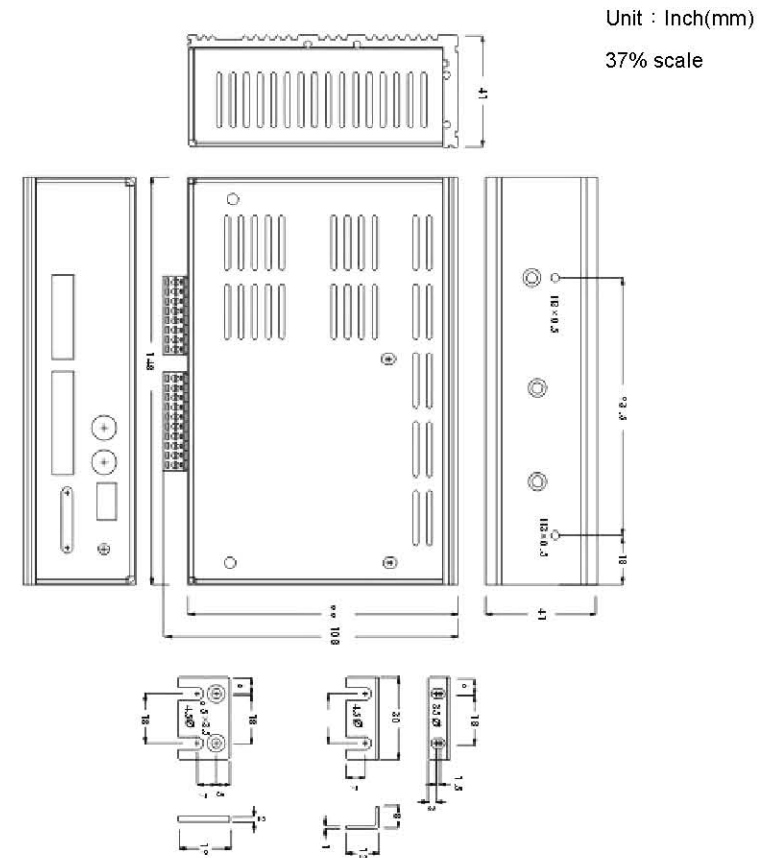
5. Fix hole is for M3＊0.5㎜ of screw，as above dimension。

6. If running in high current for long time, please notice to keep aeration and heat sink of shell (The shell it is better to fix on large metal board)，to avoid over heat cause often break down。

7. If two units put together, it is better there is above 2cms of distance，to ensure heat sink efficiency。

8. Avoid to install in over-shake place。

5. Avoid other tiny things drop into the hole of heat sink to damage the driver。

7. Specification

Model number	2 phase stepper driver DPYHHAU1200000000
Drive method	Bipolar Bridge Rectifier's Driving with Constant Current method
Drive current	0.5A/phase ~ 2.0A/ 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 above 5μSec When 2P, it is CW pulse input. When 1P, it is pulse input.
CCW pulse input (direction input)	Negative Lever Excite Input、pulse width above 5μSec 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.
Over heat signal output	When the driver is over 85°C，the drive current auto-close. It is optional on or off by function switch.
Noise insulation	Photo Coupler
Function switch setting	Pulse input method, Step angle option, Auto-current down function option, Auto-over heat signal output option
LED light	Power input light, Pulse input light, excite mega tic release input light, excite mega tic zero timing output light、over heat alarm output light
Cooling mothed	By heat sink alloy
Work temperature	0 ~ 50°C
Work humidity	< 85%RH
Power	Single phase AC110V±15% , 50/60Hz
Dimension	148(L) x 99(W) x 41(H) Unit: mm
Weight	670g

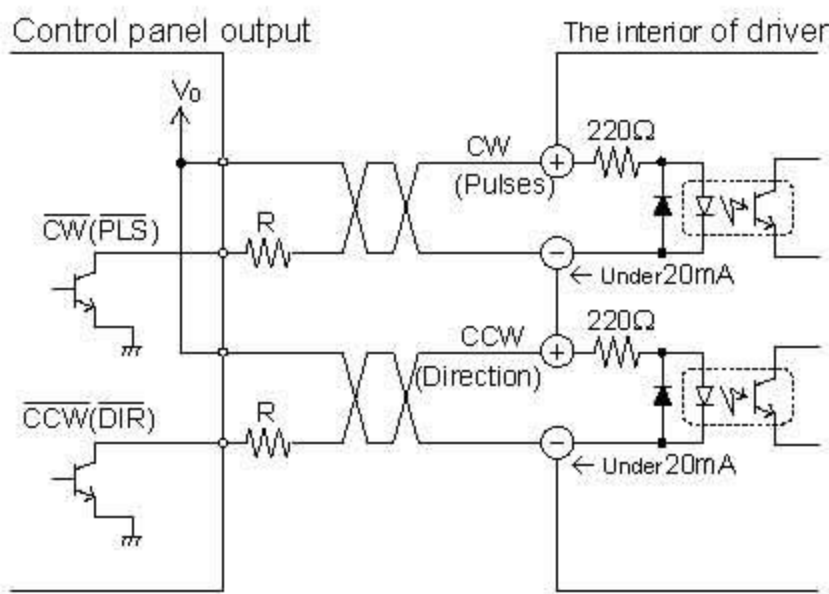## 3.3 connecting terminal

Code		Name	Description	Page
⑭	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−			
	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−			
	COF+	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
	COF−			
	ZRO+	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
	ZRO−			
	OVH+	Over heat input terminals	• When the temperature of driver is over 85°C, this point will be active at once。.	P.7
	OVH−			
⑮	A	Motor wiring terminals	• Motor A phase。	P.8
	/A		• Motor /A phase。	
	B		• Motor B phase。	
	/B		• Motor /B phase。	
⑯	FG	Ground terminals	• Ground of power (connected to case)	P.8
	FG			
	AC110V	Power input terminals	• Single phase AC115V ± 10%，50/60Hz	
	AC110V			

4. Output/ Input signal specification

4.1 Input signal

4.1.1 CW/ clock (CW/PLS) signal、CCW/direction (CCW/DIR) signal

● Input loop signal connecting diagram

Control panel output   The interior of driver

V_0

CW (Pulses)   220Ω

$\overline{CW}$(PLS)   R

← Under20mA

CCW (Direction)   220Ω

$\overline{CCW}$(DIR)   R

← Under20mA

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

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

When V0= 5V, 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.
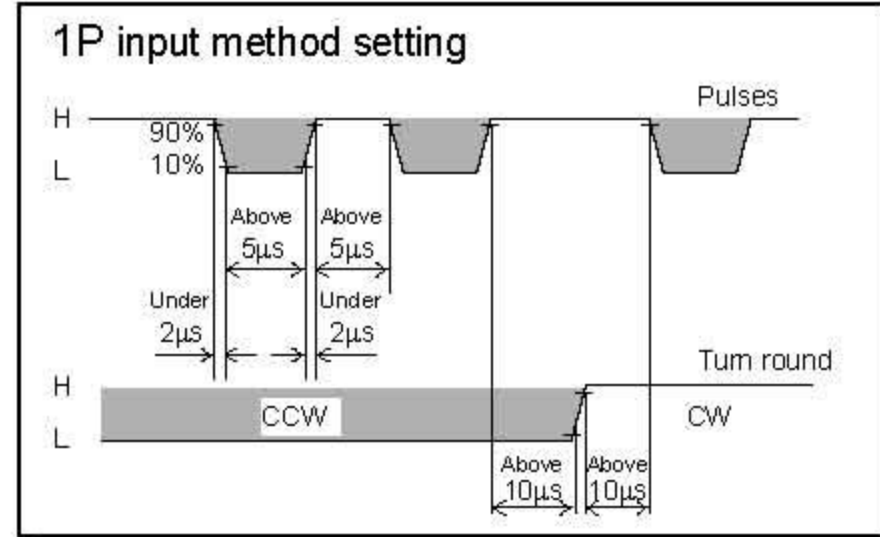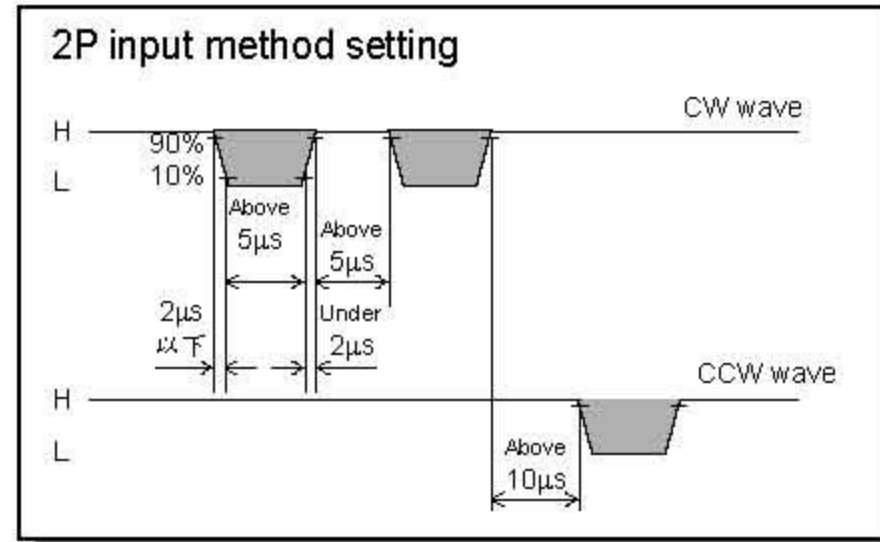
1P When input

● **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 runs with CCW direction.

"H" the motor runs with CW direction.

● **Pulses wave**

2P input method setting

H   90%
L   10%

Above 5μs   Above 5μs

2μs μ下   Under 2μs

CW wave

H
L

Above 10μs

CCW wave

1P input method setting

H   90%
L   10%

Pulses

Above 5μs   Above 5μs

Under 2μs   Under 2μs

H
L

CCW

Turn round

CW

Above 10μs   Above 10μs

● Pulses voltage value, H = 4~10V，L = 0~0.5V。

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

● 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 pulses at the same time to avoid error.

NOTE：

If the running direction of the motor is opposite, the leads of A, B phase of motor can be changed. For example:
A → B and /A → /B
Or A → /A and the connecting of B phase doesn't change
Or B → /B and the connecting of A phase doesn't change

6.2 Current adjustment

6.2.1 The current when the motor run (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.

DPYHHAU1200000000

「RUN」scale	Running current(A/phase)
0	0.50
1	0.55
2	0.60
3	0.65
4	0.75
5	0.90
6	1.00
7	1.10
8	1.20
9	1.35
A	1.45
B	1.55
C	1.70
D	1.80
E	1.90
F	2.00

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 20%~80%.
For example: When the running current F=2.0A
CW up to end, when motor stop, the current is 2.0A
Adjust scale at 8, when motor stop, the current is 1.06A
CCW up to end, when motor stop, the current is 0.3A

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 2Hz 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.
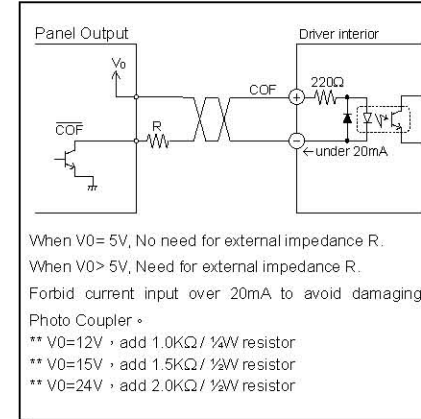
6.1.4 Current auto-drop function

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 V0= 5V, No need for external impedance R.
When V0> 5V, 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/ ¼W resistor
** V0=24V, add 2.0KΩ/ ¼W resistor

- When COF terminal is active, drive current will be released, at the moment the motor is in no torque status, it is easy to move the motor axes by hands.
- This point is negative lever excite, it maintains in H status when workless.
- When COF is active, and move the motor axes with external force, after COF is released, it will has error about ±3.6°.
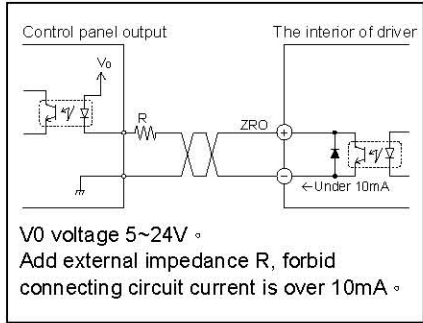
4.2 Output signal
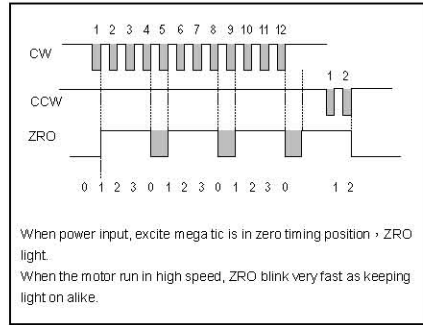
4.2.1 Excite mega tic zero timing (ZRO) signal

● **Input loop signal connecting diagram**　　　　● **Excite timing diagram**

4.2.2 Over heat output (OVH) signal

● **Input loop signal connecting diagram**

Control panel output　　　　The interior of driver

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

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.

● Each input excite mega tic zero timing once, stepper motor axes will be moved for 7.2°, and so forth：

　When full step(1.8°/step), output a zero timing signal each 4 pulses.

　When half step(0.9°/step), output a zero timing signal each 8 pulses.

　When zero timing signal output, the ZRO LED also blink once at the same time.

● When to use this excite mega tic zero timing, it's better to match up the zero timing of machinery for getting the best effect

　of zero timing 檢出.

● Over heat signal is when temperature of the driver is over85°C, it will output a alarm information, OVH LED also light on at the same time to warn, it is for protecting internal components of the driver.

● When function switch OF/AHO set at AHO, except output over heat signal and light on, excite mega tic current of the driver will drop to zero at once, then the motor stop.

● When the motor is running, if output the over heat alarm output, please cut off power at once to check the over heat cause, and restart it after temperature of the driver drop.

5. Connecting diagram

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