MD2U Series 2-Phase Unipolar Stepper Motor Driver

Compact And High-Performance Of 2-Phase Stepper Motor Driver

■ Features

- Unipolar constant current drive type
- Enable to brake when it stops by STOP current adjustment
- Low speed and precise control with microstep (MD2U-MD20)
- Insulate using photocoupler to minimize the influence by external noise
- Power supply: 24-35VDC

Please read "Caution for your safety" in operation manual before using.

MD2U-MD20

MD2U-ID20

■ Ordering Information

MD	2	U	–	M	D	20

RUN current	20	2A/Phase
Power supply	D	24-35VDC
Step method (resolution)	M	Micro Step (20-division)
	I	Intelligent type
Drive method	U	Unipolar drive
Motor phase	2	2-Phase
Item	MD	Motor Driver

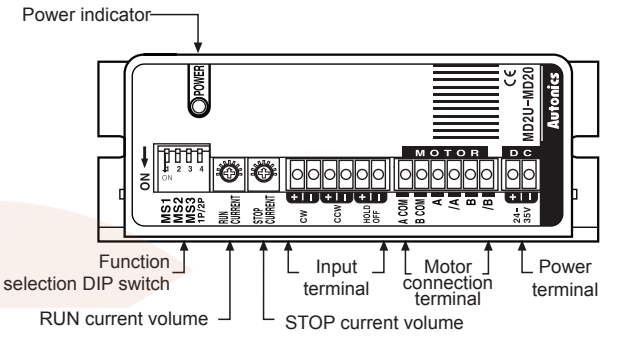
■ Specifications

Model		MD2U-MD20	MD2U-ID20
Power supply※1		24-35VDC	
Allowable voltage range		90 to 110% of the rated voltage	
Max. current consumption※2		3A	
RUN current※3		0.5 to 2A / Phase	
STOP current		20 to 70% of RUN current (set by STOP current volume)	
Drive method		Unipolar constant current drive type	
Basic step angle		1.8˚/Step	
Resolution		1, 2, 4, 5, 8, 10, 16, 20-division (1.8˚to 0.09˚/Step)	
Input pulse spec.	Input pulse width	Min. 10μs(CW, CCW), 1ms(HOLD OFF)	—
	Duty rate	50%(CW, CCW)	
	Rising/Falling time	Max. 0.5μs(CW, CCW)	
	Pulse input voltage	[H] 4-8VDC, [L] 0-0.5VDC	
	Max. input current	4mA(CW, CCW), 10mA(HOLD OFF)	
	Max. input pulse frequency※4	Max. 50kHz (CW, CCW)	
Input resistance		300Ω(CW, CCW), 390Ω(HOLD OFF)	3.3kΩ (CW/CCW, RUN/STOP, HOLD OFF)
Insulation resistance		Min. 200MΩ (at 500VDC megger, between all terminals and case)	
Dielectric strength		1000VAC 50/60Hz for 1 minute (between all terminals and case)	
Noise resistance		±500V the square wave noise (pulse width: 1μs) by the noise simulator	
Vibration		1.5mm amplitude at frequency of 10 to 55Hz (for 1 min.) in each X, Y, Z direction for 2 hours	
Shock	Vibration	300m/s² (approx. 30G) in each X, Y, Z direction for 3 times	
Environment	Ambient temperature	0 to 50℃, storage: -10 to 60℃	
	Ambient humidity	35 to 85%RH, storage: 35 to 85%RH	
Approval		CE	
Weight※5		Approx. 295g (approx. 180g)	Approx. 303g (approx. 190g)

※1: When using over 30VDC power supply, torque characteristics are improved but the driver temperature raise. The unit should be installed at the well ventilation environment.
※2: Based on ambient temperature 25℃, ambient humidity 55%RH.
※3: RUN current varies depending on the input RUN frequency and max. RUN current at the moment also varies depending on the load.
※4: Max. input pulse frequency is max. frequency to be input and is not same as max. pull-out frequency or max. slewing frequency.
※5: The weight includes packaging. The weight in parentheses is for unit only.
※Environment resistance is rated at no freezing or condensation.

2-Phase Micro Stepper Driver [MD2U-MD20]

▣ Unit Descriptions



◎ Function selection DIP switch

● Microstep, pulse input method setting

	No.	Name	Function	Switch position	
				ON	OFF
ON 1 2 3 4	1	MS1	Microstep setting	(see table below)	
	2	MS2			
	3	MS3			
	4	1P/2P	Pulse input method	1-pulse input method	2-pulse input method

MS1	MS2	MS3	Resolution
ON	ON	ON	1 (Full-step)
ON	ON	OFF	2-division
ON	OFF	ON	4-division
ON	OFF	OFF	5-division
OFF	ON	ON	8-division
OFF	ON	OFF	10-division
OFF	OFF	ON	16-division
OFF	OFF	OFF	20-division

● Resolution setting (MS1/ MS2/ MS3)

- Select the step angle (motor rotation angle per 1 pulse).
- The set step angle is dividing basic step angle(1.8°) of 2-phase stepping motor by setting value.

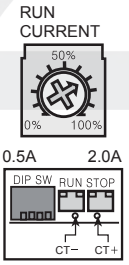
$$\text{E.g.) Set step angle} = \frac{\text{Basic angle (1.8°)}}{\text{Resolution}}$$

※Must stop the motor before changing the resolution.

● 1P/2P

- The switch is to select pulse input method.
- 1-pulse input method: CW → operating rotation signal input, CCW → rotation direction signal input ([H]: CW, [L]: CCW)
- 2-pulse input method: CW → CW rotation signal input, CCW → CCW rotation signal input.

◎ Setting RUN current



- RUN current setting is for the current provided for motor when the motor runs.

※When RUN current is increased, RUN torque of the motor is also increased.
※When RUN current is set too high, the heat is severe.
※Set RUN current within the range of motor's rated current according to its load.
※RUN current setting range: 0.5 to 2.0A
※RUN current setting method: Measure the voltage by connecting a DC voltage meter to both CT+ and CT- terminals while the motor is running (Max. 150rpm)

$$\text{E.g.) Input voltage (3V)} \times \frac{2}{3} = 2\text{A (motor excitation current)}$$

※Change RUN current only when the motor stops.

◎ Setting STOP current

- STOP current setting is for the current provided for motor when the motor stops for preventing severe motor's heat.
- This function is for reducing the heat by variable resistance ratio setting within 0 to 100% of RUN current setting range (actual setting range: 20 to 70%) .
  E.g.) In case of RUN current setting value is 2A and
  STOP current setting value is 0%(actual setting range: 20%),
  STOP current 0.4A = 2A × 0.2

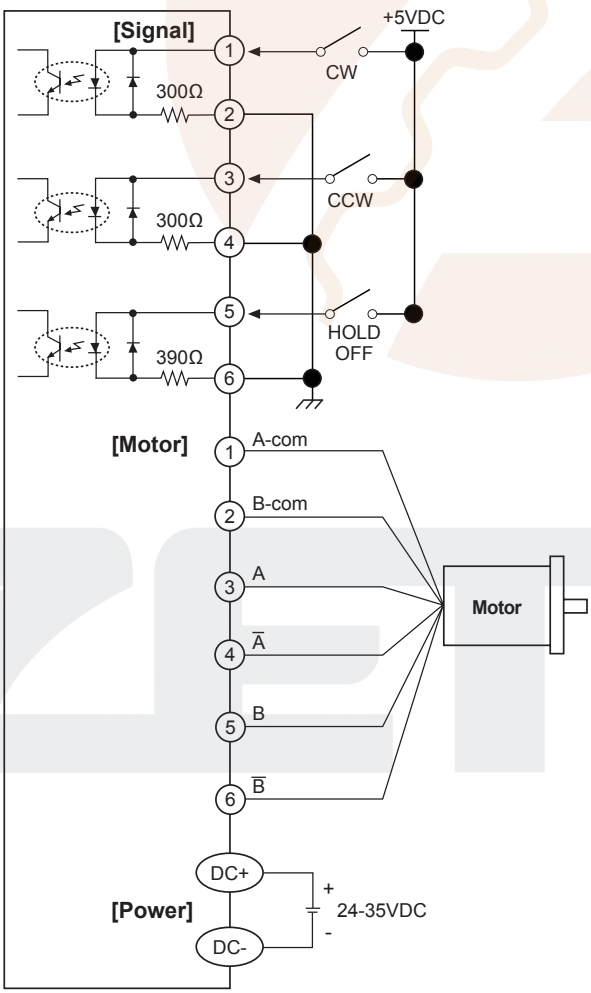
※When STOP current is decreased, STOP torque of the motor is also decreased.
※When STOP current is set too low, the heat is lower.
※Change STOP current only when the motor stops.

◎ HOLD OFF function

- This signal is for rotating motor's axis using external force or used for manual positioning.
- When hold off signal maintains over 1ms as [H], motor excitation is released.
- When hold off signal maintains over 1ms as [L], motor excitation is in a normal status.

※Must stop the motor for using this function.
※Refer to I/O Circuit and Connections.

▣ I/O Circuit and Connections



※CW
2-pulse input method (CW rotation signal input)
1-pulse input method (operating rotation signal input)

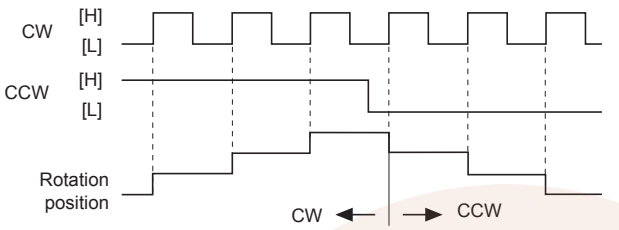
※CCW
2-pulse input method (CCW rotation signal input)
1-pulse input method (rotation direction signal input)
→[H]: CW, [L]: CCW

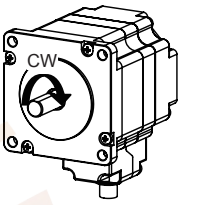
※HOLD OFF
Control signal for motor excitation OFF
→ [H]: Motor excitation OFF

※If the power for driving pulse from external is over than +5VDC, please connect resistor at the outside.
(input power max. 24VDC, input current 10-20mA)

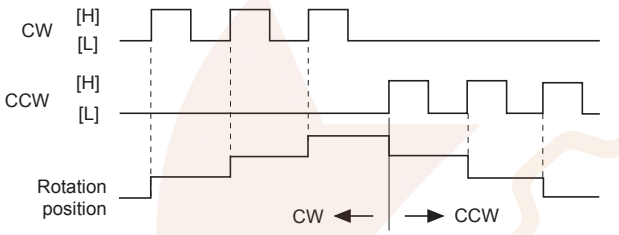
▣ Time Chart

● 1 pulse input method





● 2 pulse input method



※Do not input CW, CCW signals at the same time in 2-pulse input method.
It may not operate properly if another direction signal is inputted when one of CW or CCW is [H].

▣ Dimensions

(unit: mm)