Compact 2-Phase stepper motor driver

NEW

▣ Features

- Easy installation with compact size(W85×H21×D64mm)
- Bipolar constant current drive type
- Current decay mode decreases vibration and resonance which come from high-speed rotate of motor
- Insulate using photocoupler to minimize the influence by external noise

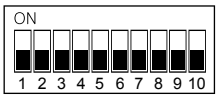
Please read "Caution for your safety" in operation manual before using.

▣ Specifications

Model		MD2B-GD30
Power supply		24VDC
Allowable voltage range		90 to 110% of the rating voltage
Drive method		Bipolar constant current drive type
Current power※1		Max. 100W
Drive consumption※2		0.6A, 1.5A, 2.25A, 3A/Phase
Stop Current		0.6A, 1.5A, 2.25A, 3A/Phase
Resolution		1, 2, 8, 16 division(1.8˚~0.1125˚)
Pulse input metod		1/2 pulse
Input pulse characteristics	Input pulse width	Min. 25μs
	Input pulse width	50%
	Rising/falling time	Max. 20ns
	Pulse input voltage	[H] 4-8VDC, [L] 0-0.5VDC
	Max. input pulse frequency※3	80kHz
	Inner resistance	CW/CCW: 270Ω
		HOLD OFF: 300Ω
Dielectric strength		1000VAC 60Hz for 1 minute
Insulation resistance		Min. 100MΩ(atn 500VDC megger)
Vibration		1.5mm amplitude or 300m/s^2 at frequency of 5 to 60Hz(for 1 min.) in each of X, Y, Z directions for 2 hours
Shock		600m/s²(approx. 60G) in each of X, Y, Z directions for 3 times
Environment	Ambient temperature※4	0 to 50℃, storage : -10 to 60℃
	Ambient humidity	35 to 85%RH, storage: 35 to 85%RH
Accessory		Input/Output connector(Installed)
Approval		CE
Weight※5		Approx. 150g(approx. 100g)

※1: Ambient temperature is 25℃ and ambient humidity is 55%RH.
※2: Run current is varied by input RUN current to driver and max. value of run current moment is varied by load change.
※3: Max. input pulse frequency is varied by max. pull-out frequency, max. run frequency area, decay mode and resolution.
※4: When running this unit below 10℃, test running for first 3 sec. is required before using.
※5: The weight with packaging and the weight in parentheses is only unit weight.
※Environment resistance is rated at no freezing or condensation.

▣ Function



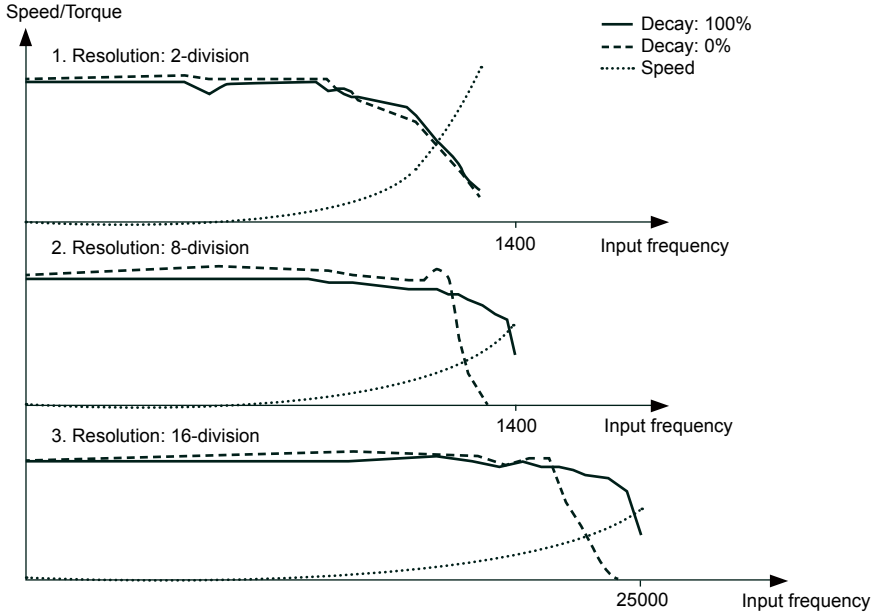
Function is set by function set switches.

※All switches are OFF as factory default: Run mode: 1-pulse method, Resolution: 1, RUN current: 0.6 A, STOP current: 0.6 A, Decay mode: 0%.

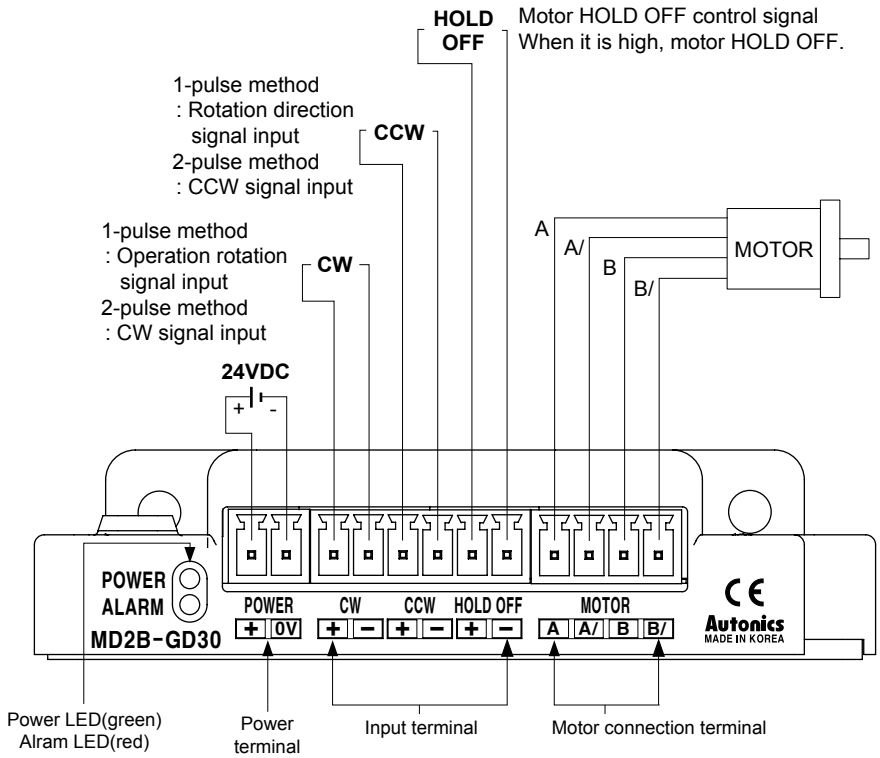
<table>
<tr><th rowspan="2">No</th><th rowspan="2">Function</th><th rowspan="2">Description</th><th colspan="2">Switch</th></tr>
<tr><th>ON</th><th>OFF</th></tr>
<tr><td>1</td><td>TEST MODE</td><td>When setting this switch as ON and supplying the power,
it ignores external input signal and operates with input frequency 60 rpm.</td><td>Test Mode
ON</td><td>Test mode
OFF</td></tr>
<tr><td>2</td><td>1/2 PULSE</td><td>Sets run mode (1/2 pulse method).</td><td>2-pulse method</td><td>1-pulse method</td></tr>
<tr><td>3
4</td><td>RESOLUTION</td><td>Sets micro step resolution.
Setting range is 1/2/8/16-division.</td><td colspan="2"><table><tr><th>3</th><th>4</th><th>Resoution(step angle)</th></tr><tr><td>OFF</td><td>OFF</td><td>1(1.8˚)</td></tr><tr><td>ON</td><td>OFF</td><td>2(0.9˚)</td></tr><tr><td>ON</td><td>ON</td><td>8(0.225˚)</td></tr><tr><td>OFF</td><td>ON</td><td>16(0.1125˚)</td></tr></table></td></tr>
<tr><td>5
6</td><td>RUN
CURRENT</td><td>Sets run current of driver.
This phase current is supplied when running 2-phase stepper motor.
It should be lower than the rated current of the motor.
If not, there may be motor heating, step out and loss of torque.
Setting range is 0.6/1.5/2.25/3 A.</td><td colspan="2"><table><tr><th>5</th><th>6</th><th>Run Current</th></tr><tr><td>OFF</td><td>OFF</td><td>0.6A(20%)</td></tr><tr><td>ON</td><td>OFF</td><td>1.5A(50%)</td></tr><tr><td>OFF</td><td>ON</td><td>2.25A(75%)</td></tr><tr><td>ON</td><td>ON</td><td>3A(100%)</td></tr></table></td></tr>
<tr><td>7
8</td><td>STOP
CURRENT</td><td>Sets stop current of driver.
This phase current is supplied when stopping 2-phase stepper motor.
Depending on the motor, inner coil impedance is different.
When HOLD OFF signal is [L], it operates. When HOLD OFF signal is [H], supplied current to each phase is cut off and it does not operate.
Setting range is 0.6/1.5/2.25/3 A.</td><td colspan="2"><table><tr><th>7</th><th>8</th><th>Stop Current</th></tr><tr><td>OFF</td><td>OFF</td><td>0.6A(20%)</td></tr><tr><td>ON</td><td>OFF</td><td>1.5A(50%)</td></tr><tr><td>OFF</td><td>ON</td><td>2.25A(75%)</td></tr><tr><td>ON</td><td>ON</td><td>3A(100%)</td></tr></table></td></tr>
<tr><td>9
10</td><td>DECAY MODE</td><td>Sets current decay mode.
This mode decreases vibration and resonance generated when motor rotates with high speed.
Use this mode to reduce resonance phenomena due to irregular micro step operation or reduced motor phase current.
When using the motor which has high resolution or low inductance, use this mode and effective operation is available.
Setting range is 0/25/50/100%.</td><td colspan="2"><table><tr><th>9</th><th>10</th><th>Decay mode</th></tr><tr><td>OFF</td><td>OFF</td><td>0%</td></tr><tr><td>ON</td><td>OFF</td><td>25%</td></tr><tr><td>OFF</td><td>ON</td><td>50%</td></tr><tr><td>ON</td><td>ON</td><td>100%</td></tr></table></td></tr>
</table>

- Over current protection function: When it detects over current (over twice of run current, 3 A×2=6 A), alarm LED flashes and drive operation stops. Remove alarm factors and re-supply the power to operate it normally.
- Over heat function: When drive is overheating, alarm LED flashes and drive operation stops. Remove alarm factors and re-supply the power to operate it normally.

※Comparison graph by decay mode setting (Run Current: 3A)

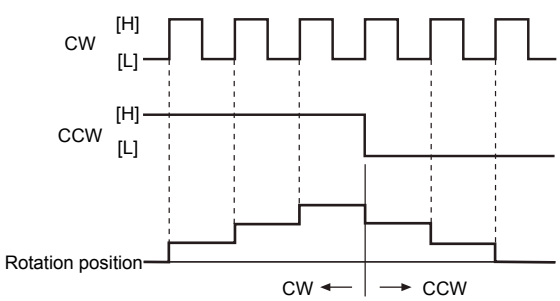


▣ Input·Output diagram

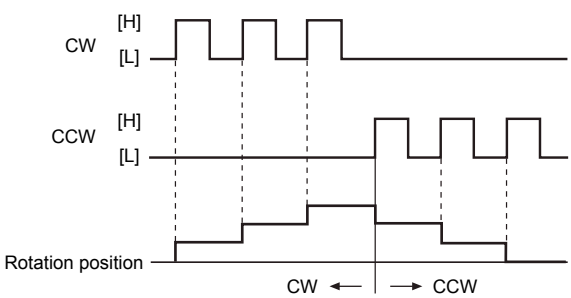


▣ Time chart

• 1 Pulse input

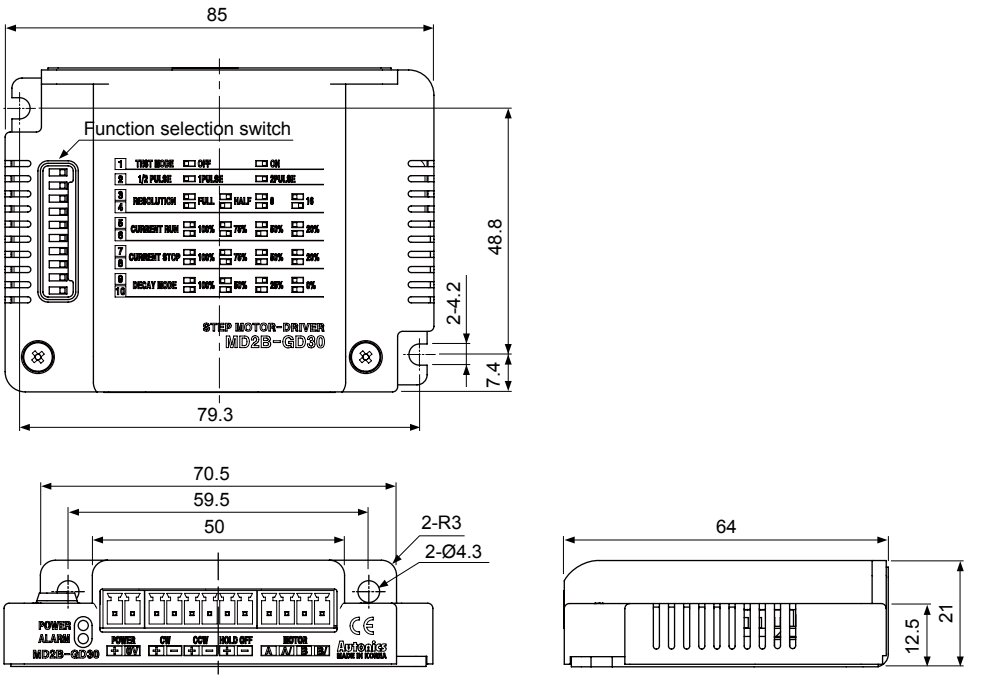


• 2 Pulse input



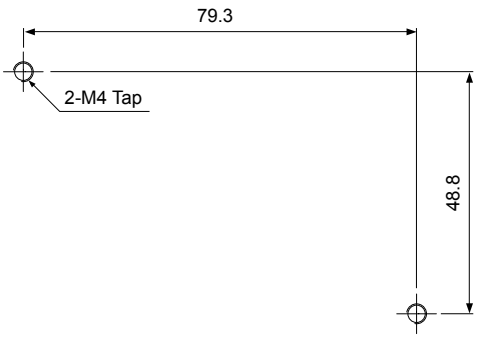
▣ Dimensions

(unit: mm)

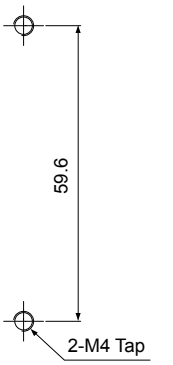


● Panel cut-out

● Horizontal mounting



● Vertical mounting



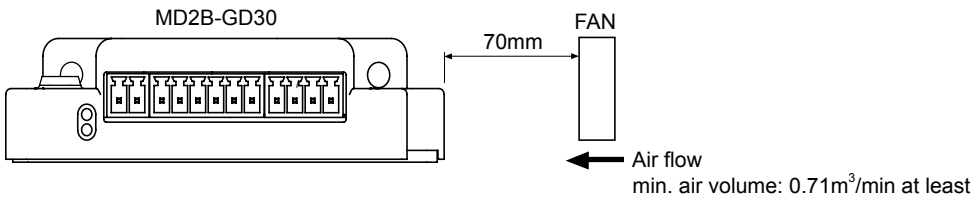
▣ Proper usage

◎ Failure diagnosis and management

- Check the connection of controller and driver, if motor does not rotate.
- Check the DIR input of driver, if motor rotates as a reverse direction, it is CW for [ON] and CCW for [OFF].
- If motor does not work properly,
  - Check the connection of driver and motor.
  - Check driver output current and RUN current of motor depending on current adjuster are correct.

◎ Caution for using

- Caution for signal input
  When pulse input voltage is bigger than the rated voltage, connect the additional resistance to the outside.
  (When supplying 24V, connect 3kΩ resistance.)
- Caution for wiring
  - Use twisted pair cable (over 0.2mm^2) within 2m length for signal cable.
  - When extending motor cable, use the cable which is thicker than of motor lead cable.
  - When must be space between signal cable and power cable over 10cm.
- Caution for mounting
  - Must install a heat sink when using over 75% of RUN and STOP current.
  - Must install this unit on the heat sink which has high heat conduction effect and is flat.
    (material: aluminium, approx. 200×200×4mm).
  - Re-check the ventilation conditions when ambient temperature around a driver is over 50 ℃.
  - Install a fan when using this unit to the one direction continuously with 100% RUN current, it may cause over heat.
  - When installing over 2 drivers or this unit with other devices, the distance for horizontal/vertical direction over 50 ℃ is required.
  - Install a fan for driver heat dissipation as the below figure.



- At the particular frequency range, motor may cause vibration and noise by characteristics of motor.
  - If changing installing method of motor or attaching a damper, vibration and noise may be decreased.
  - If vibration and noise occurs by changing motor RUN speed, do not use this unit at this particular frequency range.

- Installation environment
  - It shall be used indoor
  - Altitude Max. 2000m
  - Pollution Degree 2
  - Installation Category II