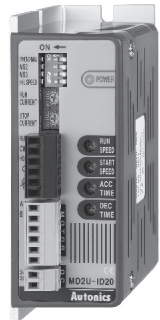


# Autonics Motor Driver (2-Phase intelligent stepping motor driver) MD2U-ID20

M A N U A L



Thank you very much for selecting Autonics products.  
For your safety, please read the following before using.

## Caution for your safety

※Please keep these instructions and review them before using this unit.

※Please observe the cautions that follow;

**Warning** Serious injury may result if instructions are not followed.

**Caution** Product may be damaged, or injury may result if instructions are not followed.

※The following is an explanation of the symbols used in the operation manual.

**Caution:**Injury or danger may occur under special conditions.

## Warning

1. In case of using this unit with machinery(Ex: Nuclear power control, medical equipment, vehicle, train, airplane, combustion apparatus, entertainment or safety device etc), it is required to install fail-safe device. (or contact us for information on type required.) It may cause serious human injury or a fire and damage to product.

2. Installation, connection, operation, control, maintenance should be carried out by person who has been qualified. It may cause a fire, electric shock or human injury.

3. Please use DC power with reinforced insulating the primary and secondary part for the DC power product. It may give an electric shock.

4. Please install this unit after considering counterplan against power failure. It may cause human injury or damage to product by releasing holding torque of motor.

5. Do not use this unit outdoors or place where there are flammable, corrosive gas, water and too much vibration etc. It may cause a fire or give an electric shock.

6. Do not put finger or any object into this product. It may cause a fire or give an electric shock.

7. Do not disassemble and modify this unit, when it is required, please contact us. It may cause a fire or give an electric shock, damage to product.

8. Please use the adjuster with insulated screw driver. It may give an electric shock.

## Caution

1. Do not move, install, connect or inspect during the operation. It may give an electric shock.

2. Power input voltage must be used within rated specification and power line should be over than AWG 18(0.75mm<sup>2</sup>). It may cause a fire or give an electric shock.

3. Please check the connection before supplying the power. It may cause a fire or give an electric shock, damage to product.

4. When connecting the unit with power, please install current breaker. It may cause a fire.

5. Please turn off the power when power is failed. It may cause human injury or damage to product due to sudden movement when recovering power failure.

6. Please supply power after checking control input signal. It may cause a burn due to high temperature in surface.

7. The emergency stop is needed during the operation. It may cause human injury or damage to product.

8. Please apply power after checking control input signal. It may cause human injury or damage to product by releasing holding torque of motor.

9. Do not turn on the HOLD OFF signal input while it is maintaining vertical position. It may cause human injury or damage to product by releasing holding torque of motor.

10. Please install a safety device when it is required to remain the vertical position after turning off the power. It may cause human injury or damage to product by releasing holding torque of motor.

11. Please check if HOLD OFF signal input is ON when it is required to set the output manually. It may cause human injury by sudden movement.

12. Please stop this unit when mechanical problem occurred. It may cause a fire or human injury.

13. Do not touch the terminal when measuring insulation resistance and testing insulation dielectric strength. It may give an electric shock.

※The above specifications are subject to change and some models may be discontinued without notice.

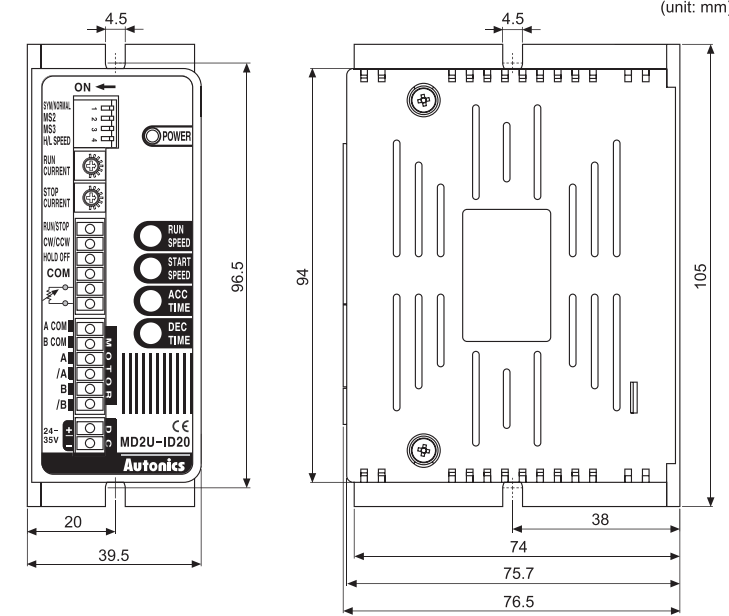
14. Please observe rated specification. It may cause human injury, electric shock or damage to product.
15. In cleaning the unit, do not use water or an oil-based detergent. It may cause a fire or give an electric shock.
16. Please separate as industrial waste when disusing this unit.
17. Please use the designated 2-phase stepping motor in output part. It may cause a fire or damage to product.

## Specifications

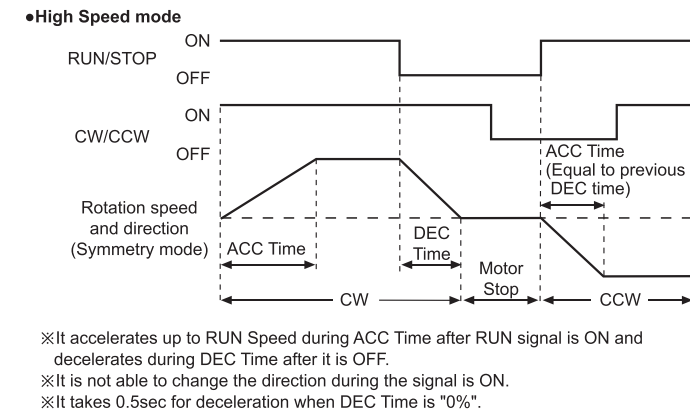
Model	MD2U-ID20
Power supply*1	24-35VDC
Allowable voltage range	80 to 120% of rating voltage
RUN current*2	0.5 to 2A/Phase
RUN method	Unipolar constant current drive
Current consumption*3	Max. 3A
Maximum speed	1500rpm
Input resistance	3.3kΩ(CW/CCW, RUN/STOP, HOLD OFF)
Insulation resistance	Min. 200MΩ(based on 500VDC of electrification and non-electrification parts)
Dielectric strength	1000VAC 60Hz for 1 minute (between electrification and non-electrification parts)
Noise resistance	±500V the square wave noise(pulse width:1μs) by the noise simulator
Vibration	1.5mm amplitude or 300m/s <sup>2</sup> at frequency of 10-55Hz in each of X, Y, Z directions for 2 hours
Shock	300m/s <sup>2</sup> (approx. 30G) in X, Y, Z directions for 3 times
Environment	Ambient temperature 0 to 50°C, Storage: -20 to 60°C
	Ambient humidity 35 to 85%RH, Storage: 35 to 85%RH
Approval	CE
Weight*4	Approx. 303g(approx. 190g)

- ※1: When using over 30VDC, it should be mounted at a well-ventilated place due to increasing heat.  
 ※2: The max. value of RUN current is based on RMS value in accordance with frequency of running motor, peak power can be changed by load fluctuation.  
 ※3: Ambient temperature is 25°C and ambient humidity is 55%RH.  
 ※4: The weight with packaging and the weight in parentheses is only unit weight.  
 ※Environment resistance is rated at no freezing or condensation.

## Dimensions

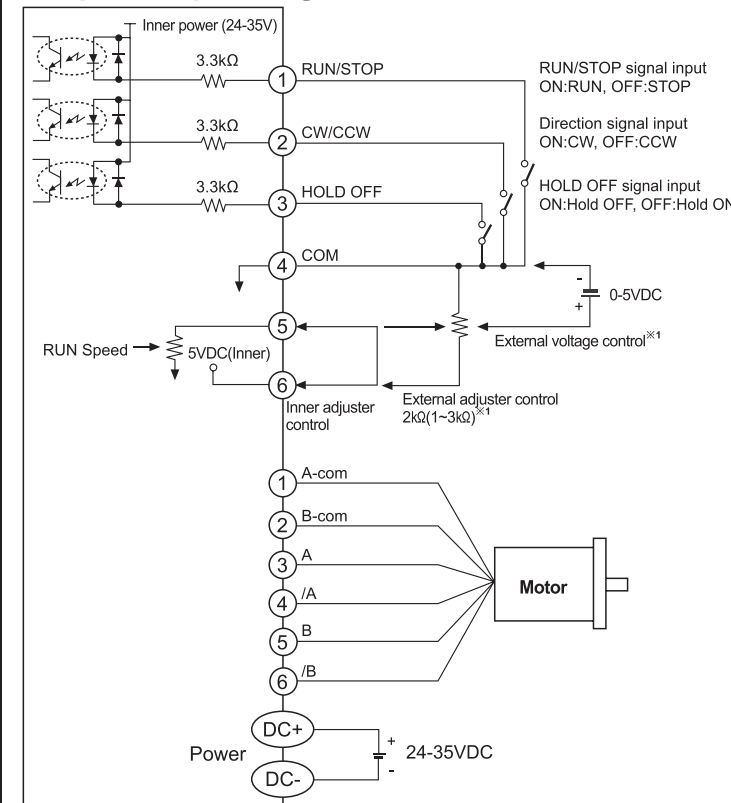


## Time charts



●Low Speed mode  
 Max. RUN speed is 150 rpm and there is no ACC Time / DCC Time section. RUN/STOP and CW/CCW switching can be made in the same way in High Speed mode.

## Input-Output diagram and connection



※1: Inner adjuster is correlated to external adjuster control and external voltage control. Make sure that inner adjuster must be set to maximum in order to set maximum Run speed using external adjuster and external voltage.

## Functions

### Function DIP Switch

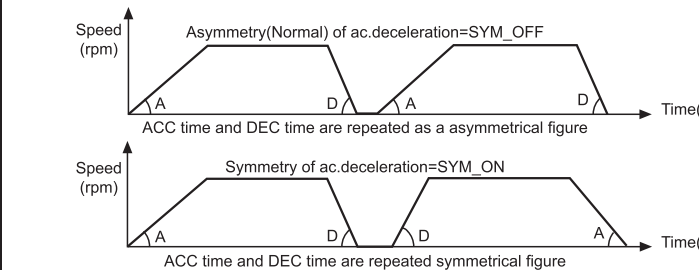
※Reset the power when changing Dip switch.

Switch No.	1	2	3	4	Max. speed (rpm)
Name	SYM/ASYM (Normal)	MS2	MS3	H/L SPEED	
Switch	ON: Symmetry (Normal) OFF: Asymmetry (Normal) D*1	ON OFF	ON OFF	ON : High speed OFF : Low speed	1500 1350 1000 500

- ※1: D=Don't care  
 ※Reset the power after changing function selection switch operations.

### Selection of Symmetry/Asymmetry

①A function to make the ACC/DEC time of run-speed as asymmetry or symmetry using Dip switch No.1.



### Selection of max. speed (MS2, MS3)

- ①A function to select the maximum speed of motors.
- ②The max. speed of stepping motor is changed by MS2/MS3 and H/L/low speed.
- ③The features of run and vibration are able to change depending on MS2, MS3.
- ④Lower the maximum speed to run a motor smoothly.

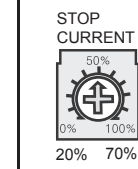
### Selection of H/L SPEED

- ①H/L SPEED switch : Ac.Deceleration control is not available in LS mode since all sections are included in Pull-in range
- ②Low speed mode : It is able to drive a motor up to 150rpm of max.drive speed.
- ③High speed mode : It is able to drive a motor up to 1500rpm of max.drive speed.

### RUN current Setting

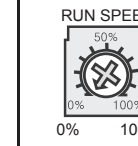
- ①RUN current is phase current provided to 2-phase stepping motor.
- ②Be sure to set RUN current at the rated current or below. If not, it may cause heat generation, loss of torque or step-out.
- ③RUN current setting range : 0.5 to 2.0A
- ④RUN current setting : Measure the voltage by connecting a DC voltage meter to both CT+ and CT- terminals while the motor is running (Max. 150rpm). Ex) Input Voltage(3V) × 2 / 3 = 2A(Motor's excitation current)
- ⑤Adjust the RUN current in case severe heat generation occurs. Be sure that torque decreasing may occur when adjusting the current.
- ⑥RUN current setting value may have some deviation depending on motor's running frequency. Note)Be sure to adjust RUN current while motor is running.

### Stop Current Setting



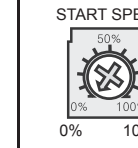
- ①Stop current is a phase current provided to 2-phase stepping motor at standstill.
- ②A function to reduce the current in order to suppress the heat generation at motor standstill / Use variable resistance ratio within 0-100% of RUN current to set STOP current (Actual setting range is 20-70% of RUN current). Ex) If RUN current setting value is 2A and STOP current setting value is 0%, STOP current will be set to 0.4A.
- ③STOP current setting value may have some deviation depending on resistance impedance of motor.
- ④Auto current down function will be activated when HOLD OFF signal is [L]. When HOLD OFF signal is [H], the function is not activated since the current provided to each phase is cut off. Note) Be sure to adjust STOP current while motor is at standstill.

### RUN Speed Setting



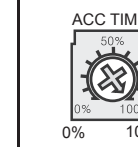
- ①It sets max. RUN speed.
- ②Max. RUN speed can be different depending on max. speed setting (MS2, MS3) and driving mode setting (H/L SPEED).
- ③Consider motor type and its RUN current when setting Max. RUN speed. Missing step could occur due to max. input pulse frequency of motors.
- ④Set the value when the motor stops.

### START Speed Setting



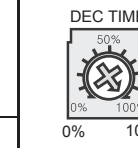
- ①It sets desired START speed.
- ②Max. START speed value is same with RUN speed value.
- ③START speed must be set within maximum starting frequency. It is recommended to set up START speed within 0-50% for stable driving.
- ④Set the value when the motor stops.

### ACC Time Setting



- ①It sets the acceleration time from START speed to maximum driving speed.
- ②AT\_1 operation mode when ACC time is under 33.3%, AT\_2 operation mode when ACC time is under 66.6% and AT\_3 operation mode when ACC time is over 66.6%.
- ③AT\_1 is 0.5 sec. when RUN speed=100%, START speed=0%.
- ④AT\_2 is 1 sec. when RUN speed=100%, START speed=0%.
- ⑤AT\_3 is 2 sec. when RUN speed=100%, START speed=0%.
- ⑥Set the value when the motor stops.

### DEC Time Setting



- ①It sets the deceleration time from maximum RUN speed to STOP.
- ②DT\_1 operation mode when DEC time is under 33.3%, DT\_2 operation mode when DEC time is under 66.6% and DT\_3 operation mode when DEC time is over 66.6%.
- ③DT\_1 is 0.5 sec. when RUN speed=100%, START speed=0%.
- ④DT\_2 is 1 sec. when RUN speed=100%, START speed=0%.
- ⑤DT\_3 is 2 sec. when RUN speed=100%, START speed=0%.
- ⑥Set the value when the motor stops.

※ACC Time and DEC Time are declined in proportion to the setting value of START speed.  
 ※The figures above indicate the factory default for each value.  
 EX) In case of DEC Time, 100% is factory default.

## Failure diagnosis and management

1. If motor does not rotate. Check the connection of controller and driver.
2. If motor rotates as a reverse direction. It is CW rotation when CW/CCW input is [ON] and CCW rotation for [OFF].
3. If motor does not work properly.
  - ①Check the connection of driver and motor.
  - ②Check output current depending on current adjusting switch and current needed to operate motor is correct.

## Caution for using

1. Caution for signal input
  - ①It can not be change the direction during the operation.
  - ②In case, the signal input supply is higher than rated supply in the specification, please connect the additional resistance to external part.
2. Caution for setting the RUN and STOP current. A RUN current must be set under a rated current of the motor because motor emits heat too much when a RUN current is set over a rated current of the motor.
3. Caution for wiring
  - ①Use Twist pair(Over 0.2mm<sup>2</sup>) for the signal wire should be shorter than 2m.
  - ②Please use an electric wire thicker than the motor lead wire when lengthening the motor wire connection.
  - ③Please leave a space over 10cm between a signal wire connection and power wire.
4. Caution for installation
  - ①Keep the heat sink as close as possible to metal panels and place the unit in well-ventilated area in order to increase heat protection efficiency of heat sink.
  - ②Heat generation may occur on drivers depending on installation environments. Place the unit with keeping the heat sink under 80°C.
5. Motor vibration and noise can be occurred in specific frequency period.
  - ①Motor vibration and noise can be lowered by change motor installation or attach damper.
  - ②Use the unit in a range without vibration and noise range by RUN speed adjustment.
6. Installation environment
  - ①It shall be used indoor
  - ②Altitude max. 2000m
  - ③Pollution degree 2
  - ④Installation category II

※It may cause malfunction if above instructions are not followed.

## Major products

- Photoelectric sensors
- Fiber optic sensors
- Door sensors
- Door side sensors
- Area sensors
- Proximity sensors
- Pressure sensors
- Rotary encoders
- Connectors/Sockets
- Switching mode power supplies
- Control switches/Lamps/Buzzers
- I/O Terminal Blocks & Cables
- Stepper motors/drivers/motion controllers
- Graphic/Logic panels
- Field network devices
- Laser marking system(Fiber, CO<sub>2</sub>, Nd:YAG)
- Laser welding/soldering system
- Temperature controllers
- Temperature/Humidity transducers
- Tachometer/Pulse(Rate)meters
- SSR/Power controllers
- Sensor controllers
- Display units
- Panel meters
- Counters
- Timers

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