

Autonics

Motor Driver(5-Phase stepping motor driver)

MD5-ND14

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

- In case of using this unit with machinery(Ex: nuclear power control, medical equipment, ship, vehicle, train, airplane, combustion apparatus, safety device, crime/disaster prevention equipment, etc) which may cause damages to human life or property, it is required to install fail-safe device.**
It may cause a fire, human injury or damage to property.
- Installation, connection, operation, control, maintenance should be executed by person who has been qualified.**
It may cause a fire or human injury, give an electric shock.
- Please use reinforced insulation DC power for DC type input product.**
It may give an electric shock.
- 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.
- Do not use this unit outdoors or place where there are flammable, corrosive gas, water, big vibration etc.**
It may cause a fire or give an electric shock.
- 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.
- Please install protection equipment for board type unit.**
It may cause a fire.

Caution

- Power input voltage must be used within the rated specification and power line should be over than AWG 18(0.75mm²).**
It may cause a fire or give an electric shock.
- Please check the connection with diagram before supplying the power.**
It may cause a fire or give an electric shock, damage to product.
- Please turn off power when power is failed.**
It may cause human injury or damage to product due to sudden movement when recovering power failure.
- Do not touch this unit while it is operating or after stopping.**
It may cause a burn due to high temperature in surface.
- The emergency stop should be available during operating.**
It may cause human injury or damage to product.
- Please supply power after checking control input signal.**
It may cause human injury or damage to product by sudden movement.
- 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.
- Please install a safety device when requiring to maintain the vertical position after turn off the power.**
It may cause human injury or damage to product by releasing holding torque of motor.
- 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.
- Stop with emergency this unit when mechanical trouble occurred.**
It may cause a fire or human injury.
- Do not touch the terminal when measuring insulation resistance and testing insulation dielectric strength.**
It may give an electric shock.
- Please observe rated specification.**
It may cause human injury give an electric shock or damage to product.
- In cleaning the unit, do not use water or an oil-based detergent.**
It may cause a fire or give an electric shock.
- Please separate as industrial scrapped material when disuse this unit.**

※The above specifications are subject to change without notice.

Features

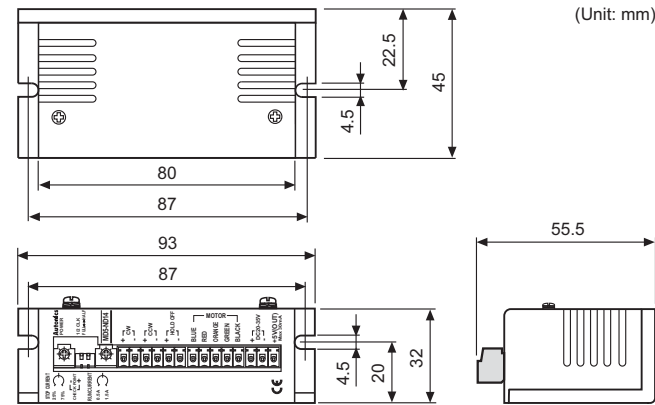
- Full/Half step function.
- Bipolar constant current pentagon drive method.
- Built-in stop/run current adjustment function.
- Photo coupler input insulation method to minimize the effects from external noise.
- Available 20-35VDC of power supply range.

Specifications

Model	MD5-ND14
Power supply	20-35VDC
Allowable voltage fluctuation range	-10%, +20% of power voltage
Consumption current ^{※1}	3A(Max.)
Run current ^{※2}	0.5 to 1.5A/Phase
Drive method	Bipolar constant current pentagon drive
Resolution(Rotating angle)	1 division(0.72°), 2 division(0.36°)
Pulse width	Min. 10μs
Pulse Duty	Max. 50%
Rising/Falling time	Max. 120ns
Max. input pulse frequency ^{※3}	50kHz
Pulse input voltage	High: 4-8VDC, Low: 0-0.5VDC
Input resistor	390Ω (CW, CCW, HOLD OFF)
Environ-ment	Ambient temperature 0 to 40°C, Storage: -20 to 60°C
Ambient humidity	35 to 85%RH, Storage: -10 to 90%RH
Approval	CE
Unit weight	Approx. 120g

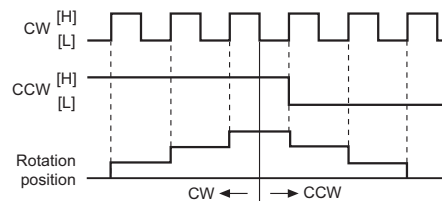
- ※1: This is for when ambient temperature is 25°C, ambient humidity is 55%.
 ※2: Maximum of run current is RMS reference value based on run frequency of run motor and the maximum moment is different depending on loads.
 ※3: It is maximum input frequency of driver. Max. pull out frequency and max. slewing frequency are different depending on resolutions or loads.
 ※Please mount the product in ventilative place due to too much heat of driver when using over 30VDC.
 ※Environment resistance is rated at no freezing or condensation.

Dimensions

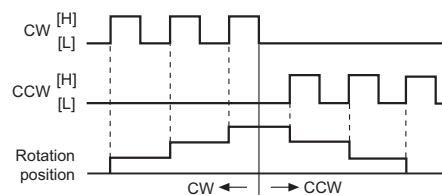


Time charts

1 Pulse input method



2 Pulse input method



Note) Do not input CW, CCW signal at the same time in 2Pulse input type.
: It may not work properly if another direction signal is inputted when one of CW or CCW is ON.

Function Switch

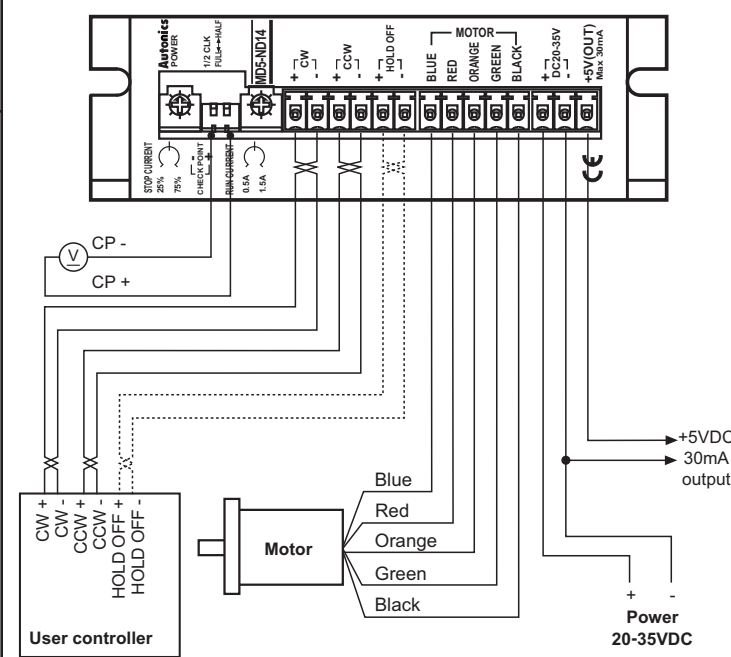
Select input method

OFF	1	1 Pulse input method
ON	2	2 Pulse input method

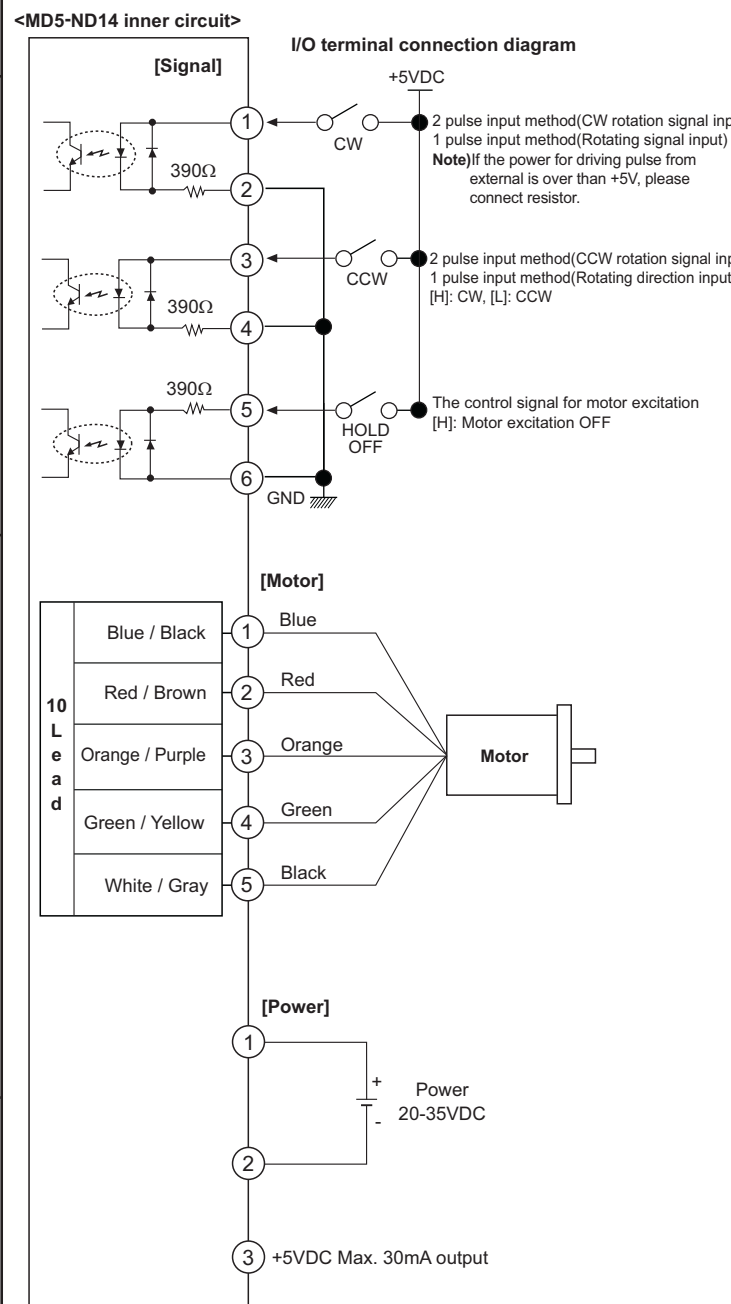
Select resolution(rotation angle)

OFF	2	1 division(0.72°)
ON	1	2 division(0.36°)

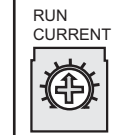
Connections



Input · Output circuit an connection diagram



How to set RUN current

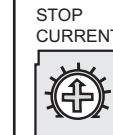


- RUN current is phase current provided for motor when the motor runs.
- Set the RUN current SV within the range of motor's phase current according to its load. (When RUN current SV is higher, it may cause heat stress on the unit. When RUN current SV is lower, it may decrease running torque.)
- In case changing RUN current, use RUN CURRENT VR after connecting CP+ to voltmeter's (+) terminal and CP- to voltmeter's (-) terminal.
- As for RUN current SV, please refer to following equation.

$$\text{Setting current(A)} = \frac{\text{CP measurement voltage(V)}}{2}$$

Note)Run current should be changed during when the motor operates.

How to set STOP current



- STOP current is phase current provided for motor when the motor stops.
- STOP current VR SV is the percentage of RUN current SV. (When STOP current SV is higher, it may cause heat stress on the unit. When STOP current SV is lower, it may decrease stop torque.)
- Ex)After setting 1.0A for Run current then put STOP CURRENT volume at 50%, the Stop current will be 0.5A.

Note)Stop current should be changed during when the motor stops.

HOLD OFF Function

- HOLD OFF is [H], the excitation is released.
- HOLD OFF is [L], the excitation is in a normal status.
- It rotates motor axis by external force or is used for manual positioning.
- HOLD OFF input [H]/[L] means ON/OFF of Photocoupler in a circuit.

Caution for using

- For signal input
 - Do not input CW, CCW signal at the same time in 2Pulse input type. It may not work properly if another direction signal is inputted when one of CW or CCW is ON.
 - When the power for pulse operation is exceeded +5V, please connect resistance and use from the external.
- For supplying power
 - Use the power enough to supply the run current when turn on the power.
 - The current value indicated on power supply is the max. input of driver.
 - Please check the polarity of power before using.
- For cable connection
 - Use Twist pair(Over 0.2mm²) for the signal cable which should be shorter than 2m.
 - Use electric wire of AWG 18(0.75mm²) for motor(for extending) and power connection.
- For installation
 - In order to increase heat protection efficiency, keep the heat sink as close as possible to metal panel and keep it well-ventilated.
 - Excessive heat generation may occur on driver. Keep the heat sink under 80°C when installing the unit. (In case it is over 80°C, forcible cooling shall be required.)
- Installation environment
 - It shall be used indoor
 - Altitude max. 2000m
 - Pollution degree 2
 - Installation categoryII

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

Major products

- Proximity sensors
- Photoelectric sensors
- Area sensors
- Door/Door side sensors
- Rotary encoders
- Power controllers
- Panel meters
- Temperature controllers
- Temperature/Humidity transducers
- Tachometer/Pulse(Rate) meters
- Graphic/Logic panels
- Switching power supply
- Field network device
- Stepping motors/drivers/motion controllers
- Laser marking system(CO₂, Nd:YAG)
- Laser welding/soldering system
- Timers
- Counters
- Fiber optic sensors
- Pressure sensors
- Display units
- Sensor controllers

Autonics Corporation
<http://www.autonics.com>
 Satisfiable Partner For Factory Automation

HEAD QUARTERS :
 41-5, Yongdang-dong, Yangsan-si, Gyeongsang, 626-847, Korea

OVERSEAS SALES :
 Bldg. 402 3rd Fl., Bucheon Techno Park, 193, Yaldae-dong, Wonmi-gu, Bucheon-si, Gyeonggi-do, 420-734, Korea
 TEL:82-32-610-2730 / FAX:82-32-329-0728
 E-mail : sales@autonics.com

The proposal of a product improvement and development : Product@autonics.com