

Autonics

Motor Driver(5-Phase microstepping driver)

MD5-HD14-2X/3X

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(Nuclear power control, medical equipment, vehicle, train, airplane, combustion apparatus, entertainment or safety device etc), it is required to install fail-safe device.**
It may cause a fire, human injury or give an electric shock.
- 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.
- Please use DC power with reinforced insulating the primary and secondary part for the DC power product.**
It may give an electric shock.
- Please install this unit after consider countplan 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 explosiveness, flammable, corrosive gas, water and frequent 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, give an electric shock or damage to product.
- Please install board type product with protection equipment.**
It may cause a fire.

Caution

- Power input voltage must be used within 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 before supplying the power.**
It may cause a fire or give an electric shock, dam age to product.
- Please turn off the power when power is failed.**
It may cause human injury or damage to product due to sudden movement by recovering from power failure.
- Do not touch during the operation or after a while of operation.**
It may cause a burn due to high temperature in surface.
- The emergency stop should be enabled during the operation.**
It may cause human injury or damage to product.
- Please apply 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 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.
- 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.
- Please stop this unit when mechanical problem is occurred.**
It may cause a fire or human injury.
- Do not touch the terminal when during the insulation dielectric strength test or insulation resistance measurement.**
It may give an electric shock.
- Please observe rated specification.**
It may cause a fire, 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 waste when disuse this unit.**

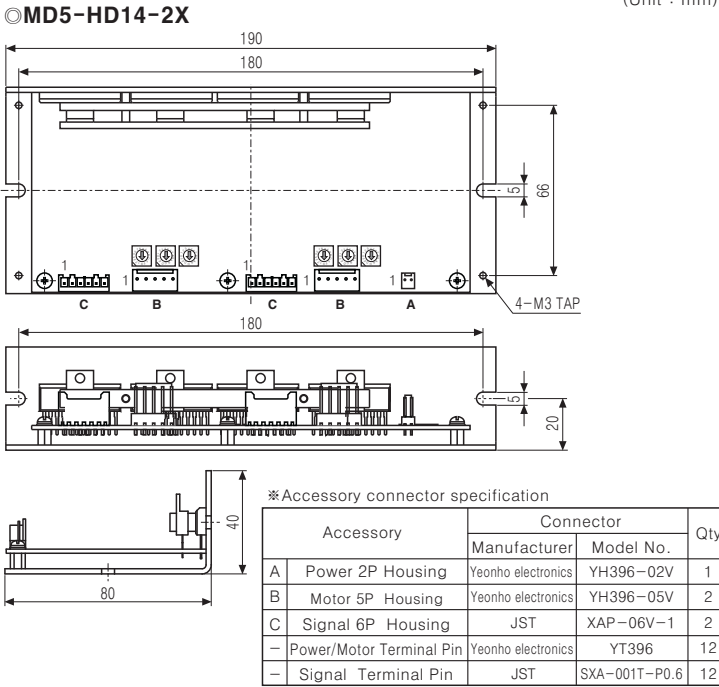
*The above specifications are subject to change without notice.

Specifications

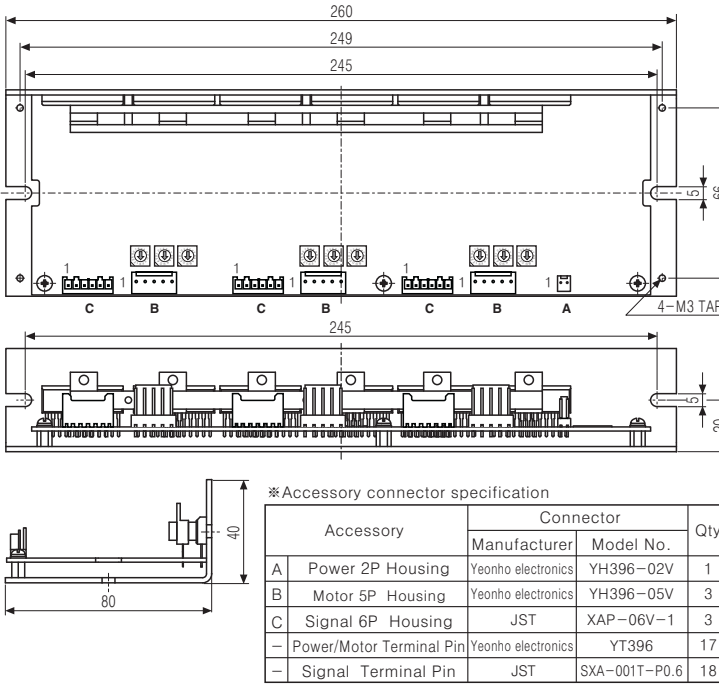
Model	MD5-HD14-2X	MD5-HD14-3X
Power supply*1	20-35VDC 5A MAX. (-10%, +20%)	20-35VDC 7A MAX. (-10%, +20%)
RUN current	0.4~1.4A/Phase	
RUN method	Bipolar constant current pentagon drive	
Resolution	1,2,4,5,8,10,16,20,25,40,50,80, 100,125,200,250 of microstep	
Pulse width	0.5μs	
Pulse DUTY	Max. 50%	
Rising/falling time	Max. 120ns	
Input pulse frequency	Max. 1MHz	
Pulse input voltage	High: 4V-8VDC, Low: 0-0.5VDC	
Input inner resistance	270Ω(CW, CCW), 390Ω(HOLD OFF)	
Environ-ment	Ambient temperature	0 ~ 40℃, Storage: -20 ~ 60℃
	Ambient humidity	30 ~ 85%RH, Storage: 30 ~ 85%RH
Unit weight	Approx. 292g	Approx. 411g

*1: There is torque difference by input power.
*Environment resistance is rated at no freezing or condensation.

Dimensions

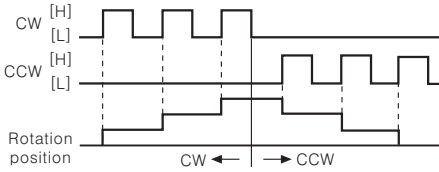


○MD5-HD14-3X

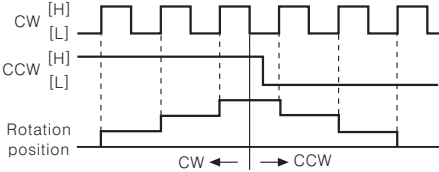


Time charts

○2 Pulse input

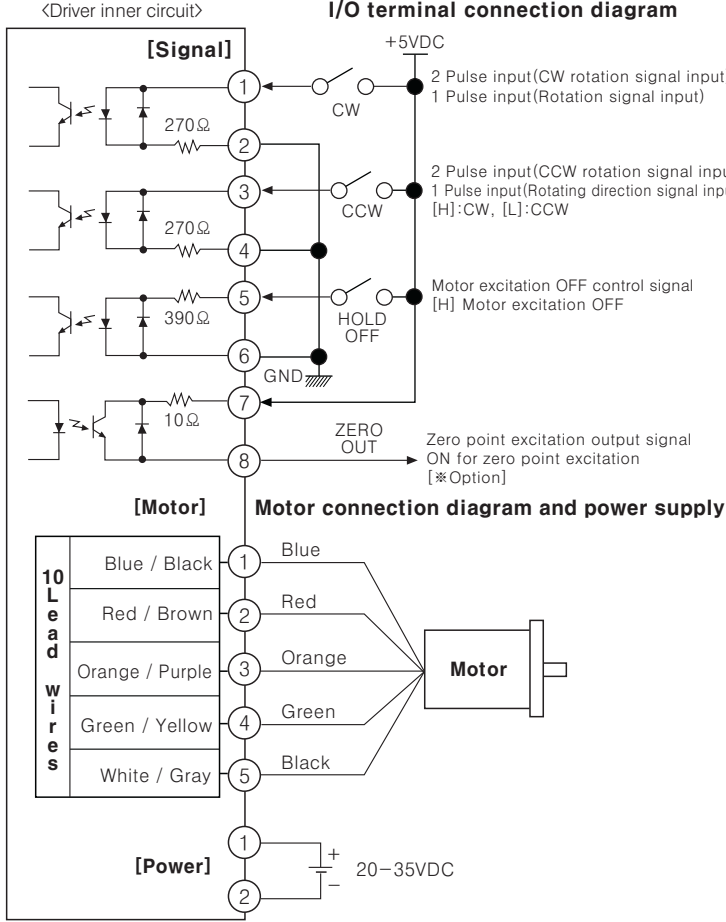


○1 Pulse input



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

Input • Output diagram



Note)Add external resistance when power for pulse from the external of the unit exceeds +5V.

Function

○Selectable function switch

	No	Name	Function	Switch position	
				ON	OFF
	1	TEST	Self diagnosis function	30rpm rotation	Normal
	2	1/2 CLK	Pulse input method	1 Pulse input	2 Pulse input
	3	CURRENT DOWN	Auto Current Down	Not use	Use

●TEST

- It rotates at a speed of 30rpm in Full Step and it is changed depending on resolution.
- It rotates to CCW in 1 Pulse input method and CW in 2 Pulse input method.

●1/2 CLK

- Pulse input method selection
- 1 Pulse method : Input pulse signal input in CW and rotating direction signal in CCW. It rotates to CCW when [L] and CW for [H].
- 2 Pulse method : Motor is rotated to CW when input pulse in CW and to CCW when input pulse in CCW.

●CURRENT DOWN

- A function to reduce RUN current according to the setting rate of STOP current switch when motor stops in order to reduce motor's heat generation.
- Current is reduced from approx.500[ms] after the last pulse input.

○Setting of RUN current

Switch No	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Current (A/Phase)	0.4	0.5	0.57	0.63	0.71	0.77	0.84	0.9	0.96	1.02	1.09	1.15	1.22	1.27	1.33	1.4

- RUN current is phase current provided to 5-phase stepping motor.
- RUN current is set under the rated current, or, it may cause loss of torque.
- Torque is increased as raise RUN current, but, motor emits heat too much, select depending on the load.

○Setting of STOP current

Switch No	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
%	27	31	36	40	45	50	54	58	62	66	70	74	78	82	86	90

- It sets current when motor is at standstill.
- Set STOP current is percentage of RUN current.
- It is operated when HOLD OFF is [L]. Current supplied to each phase is cut in [H], auto CURRENT DOWN function does not work.

○Zero point excitation output signal(ZERO OUT)[*Option]

- It indicates the initial step of excitation status of stepping motor and rotation position of motor axis from previously set zero.
- ZERO OUT means the initial status of motor excitation(STEP 0), it outputs per 7.2° of rotation in Full Step.(It outputs 50times per 1 rotation of motor.)
Ex) Full step : It outputs one time when input 10 pulse.
20 division : It outputs one time when input 200 pulse.

○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.
- Input H/L means ON/OFF of photocoupler in a circuit.

○Setting microstep(Microstep : Resolution)

Switch No	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Resolution	1	2	4	5	8	10	16	20	25	40	50	80	100	125	200	250

●Setting resolution

- *It drives a motor dividing basic step angle(0.72°) by setting value of 5-phase stepping motor.
- *The calculation formula of divided step angle is as below.
$$\text{Rotation angle of 5-phase stepping motor} = \frac{\text{Basic step angle}(0.72^\circ)}{\text{Resolution}}$$
- When resolution is changed during the operation of motor, it may cause a step-out of motor.

Caution for using

- Caution for signal input
 - ①Do not input CW, CCW signal at the same time in 2 Pulse input type. It may not work properly if another direction signal is supplied when one of them is ON.
 - ②Current value of power supply in specifications is max.input of driver.
 - ③Use power enough to supply RUN current for power input.
- Caution for wiring
 - ①Use Twist pair(Over 0.2mm²) for the signal wire should be shorter than 2m.
 - ②Use electric wire of AWG 18(0.75mm²) for motor (when extend) and power connection.
 - ③Check the power polarity before the operation.
- Caution for installation
 - ①In order to increase heat protection efficiency, keep the heat sink as close as possible to metal panel and keep it well-ventilated.
 - ②Excessive heat generation may occur on Driver. Keep the heat sink under 80℃ when installing the unit. (In case it is over 80℃, forcible cooling shall be required.)
- Caution for using function switches
 - ①Self-diagnosis function is enable to test motor and driver when 250Hz pulse is outputted in [ON] status.
 - ②Check self-diagnosis switch is [OFF] before power ON, or, it may start to drive instantly when it is ON.
 - ③Auto CURRENT DOWN function is used to reduce RUN current when motor is at standstill to lower the heat generation automatically.
- 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

- Proximity sensors
- Area sensors
- Door/Door side sensors
- Rotary encoders
- Switching power supply
- Temperature controllers
- Temperature/Humidity transducers
- Power controllers
- Recorders
- Tachometer/Pulse(Rate) meters
- Panel meters
- Indicators
- Signal converters
- Counters
- Timers
- Display units
- Graphic/Logic panel
- Stepping Motors & Drivers & Motion controllers
- Photoelectric sensors
- Fiber optic sensors
- Pressure sensors
- Sensor controllers

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