

Motor Driver(5-Phase microstepping driver)

KR-A535MT

M A N U A L



Thank you very much for selecting Technodrive 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.
- Warning**

 1. 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, or contact us for information on type required. It may cause serious human injury or a fire, property.
 2. Installation, connection, operation, control, maintenance should be carried out by person who has been qualified. It may cause a fire, human injury or give an electric shock.
 3. It should be installed and earth independently and grounding wire should be over than AWG No.18(0.75mm²). It may give an electric shock.
 4. 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.
 5. 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.
 6. Do not touch this unit or connection terminal of condenser within 30sec after turn off the power. It may give an electric shock by residual voltage.
 7. Do not put finger or any object in to this product. It may cause a fire or give an electric shock.
 8. Do not disassemble or modify this unit. Please contact us if it required. It may cause a fire, give an electric shock or damage to product.
 9. Please adjust the volume switch with insulated screw driver. It may give an electric shock.
 10. It should be insulated not to expose the conductor, because connecting party has a dangerous voltage when join to connector.

- Caution**
1. Do not move, install or maintain during it is operating. It may give an electric shock.
 2. Power input voltage must be used within rating specification and power line should be over than AWG NO. 18(0.75mm²). It may cause a fire or give an electric shock.
 3. Please check the connection before power. It may cause a fire or give an electric shock.
 4. When you connect to power, please install current breaker. It may cause a fire.
 5. Please turn off when power failure occurred. It may cause human injury or damage to product due to sudden movement by recovering from power failure.
 6. Do not touch during the operation or after a while of operation. It may cause a burn due to high temperature in surface.
 7. The emergency stop should be enabled 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 sudden movement.
 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 need to remain the vertical position after turn 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 need to set the output manually. It may cause human injury by sudden movement.
 12. Please stop this unit when mechanical problem is occurred. It may cause a fire or human injury.
 13. Do not touch the terminal when during the insulation dielectric strength test or insulation resistance measurement. It may give an electric shock.
 14. Please observe rating specification. It may cause a fire, give an 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 disuse this unit.
 17. Use the specified 5-phase stepping motor in motor output terminal. It may cause a fire or damage to product.

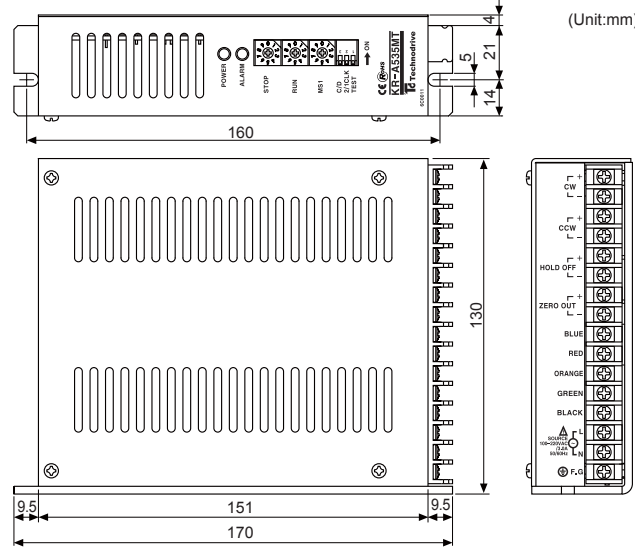
※ The above specifications are changeable at anytime without notice.

Specification

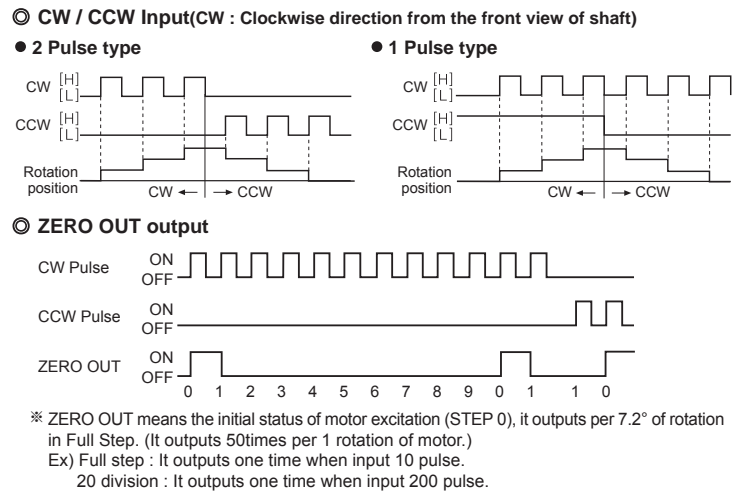
Model	KR-A535MT
Power supply	100-220VAC±10% 50/60Hz
Power consumption (1)	3A(Max.)
RUN current (2)	0.4~1.4A/Phase
Drive method	Bipolar constant current pentagon drive
Resolution	1, 2, 4, 5, 8, 10, 16, 20, 25, 40, 50, 80, 100, 125, 200, 250 division
Pulse width	Min. 0.25μs(Duty max. 50%)
CW/CCW Pulse interval	Min. 0.25μs(Duty max. 50%)
Rising/falling time	Max. 1μs
Input Voltage	High: 4-8VDC, Low: 0-0.5VDC
Current	10-20mA
Frequency(3)	Max. 500kpps
Ambient temperature	0~50°C(at non-freezing status)
Ambient humidity	35~85%RH(at non-dew status)
Unit weight	Approx. 660g

※ (1) Ambient temperature is 25°C and ambient humidity is 55%RH.
 ※ (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) Variable depending on resolution and motor's load.

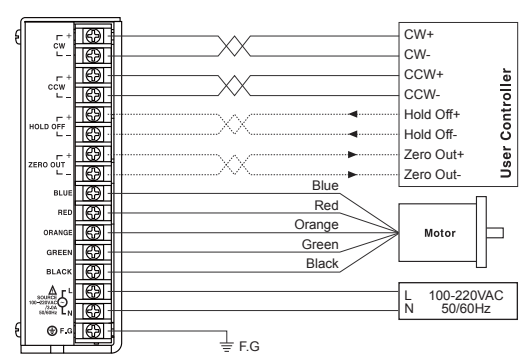
Dimensions



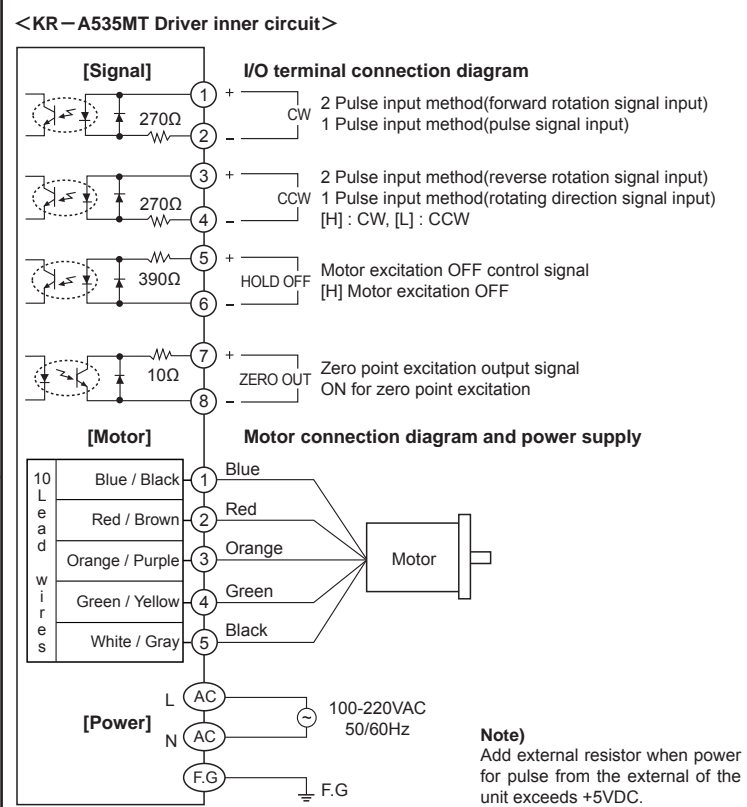
Time charts



Connections



Input-Output diagram



Function

◎ Selectable function switch

No	Name	Function	Switch position	
			ON	OFF
1	TEST	Self diagnosis function	250pps rotation	Normal
2	2/1 CLK	Pulse input method	1 Pulse input	2 Pulse input
3	C/D	Auto Current Down	No use	Use

- TEST
 - ※ It rotates at a speed of 250pps 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.
- 2/1 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
 - ※ It is 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 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 for 5 phase stepping motor.
- There can be an error in RUN current setting value by driving frequency.
- RUN current should be used within the rated current of motor, or it may cause overheating, step-out and loss of torque.

◎ Setting 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

- STOP current is phase current provided to 5-phase of stepping motor to be stopped.
- The switch setting value of STOP current is a percentage of RUN current switch setting current value.
- There can be an error in STOP current by coil impedance of motor.
- This function shall be operated when CURRENT DOWN switch is set to OFF. In case CURRENT DOWN switch is set to ON, RUN CURRENT shall be provided both when a motor stops and when a motor runs.

- ◎ Zero point excitation output signal(ZERO OUT)
 - It indicates the initial step of excitation status of stepping motor and rotation position of motor axis from previously set zero.
- ◎ HOLD OFF function
 - HOLD OFF is [H], the excitation is released, because current provided to each phase is cut off.
 - 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 micro step(Micro-step: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(MS1)
 - ※ It drives a motor dividing basic step angle(0.72°) by setting value of resolution.
 - 1 step 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.

- ◎ Alarm function
- Overheat
 - When base temperature of driver is over 80°C, alarm LED(Red) is lighted and motor will be stop holding the excitation. Reset the power after remove the existing factors of overheat that can be occurred to release the Alarm.
- Overcurrent
 - When overcurrent is applied from breakdown or error to the motor, alarm LED (Red) is Flickered. In case overcurrent occurs, a motor will become HOLD OFF. A driver will resume its normal operation when error causing factors are disappeared.

Failure diagnosis and management

1. If motor does not rotate
 - ① Check the connection status of controller and driver and pulse input specification. (Voltage, width)
 - ② Check the input pulse method and connected method is same.
 - ③ Check pulse and direction signal is connected correctly for 1 pulse input method.
2. If motor rotates as a reverse direction
 - ① Check input pulse connection of CW and CCW is correct for 2 pulse input method.
 - ② In case of 1-pulse method, it is forward rotation when CCW input is [H] and reverse rotation when CCW input is [L].
3. If motor does not work properly
 - ① Check the connection of driver and motor.
 - ② Check the pulse input specification of driver. (Voltage, width)
 - ③ Check output current for current adjuster and current for motor operation as correct.
 - ④ After turning off the power, wait at least 15 seconds before turning the power back on.

Caution for using

1. Caution for signal input
 - ① Do not input CW, CCW signal at the same time in 2 Pulse input method. It may not work properly if another signal is supplied when one of them is ON.
 - ② In case, the signal input supply is higher than rated supply expressed on the specification, please connect the additional resistor to external part.
2. Caution for supplying power
 - ① Use the power enough to supply the run current when turn on the power.
 - ② The current value indicated on power supply is the max. input of driver.
3. Caution for wiring
 - ① Use Twist pair(Over 0.2mm²) for the signal wire should be shorter than 2m.
 - ② Please use an electric wire is thicker than the motor lead when product the motor wire connection.
 - ③ Please leave a space over 10cm between a signal wire connection and power wire.
4. Caution for installation
 - ① In order to increase heat protection efficiency, keep the heat sink as close as possible to metal panel and keep it well-ventilated.
 - ② 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.)
5. Caution for using function switches
 - ① Check the position of self-diagnosis switch before turn on the power. It may be dangerous if turn on the power in [ON] status, due to motor is worked instantly or cause a malfunction.
 - ② When the selection switch of input signal method is changed to 2 Pulse input method during the operation with 1 Pulse input method, it may be danger as the revolution way of the motor is changed conversely. Please do not change the input signal method during the operation.
6. Installation environment
 - ① It shall be used indoor
 - ② Altitude Max. 2000m
 - ③ Pollution Degree 2
 - ④ Installation Category II

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

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