

**Motor Driver(5-Phase microstepping driver)**

**KR-A55MC**

**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.
- ⚠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, or contact us for information on type required.**  
It may cause serious human injury or a fire, property.
- 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.
- 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 or modify this unit. Please contact us if it required.**  
It may cause a fire, give an electric shock or damage to product.

**Caution**

- Power input voltage must be used within rating specification and power line should be over than AWG NO. 18(0.75mm<sup>2</sup>).**  
It may cause a fire or give an electric shock.
- Please check the connection before power.**  
It may cause a fire or give an electric shock.
- 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.
- 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 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.
- Please check if HOLD OFF signal input is ON when need 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 rating 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 changeable at anytime without notice.

**Features**

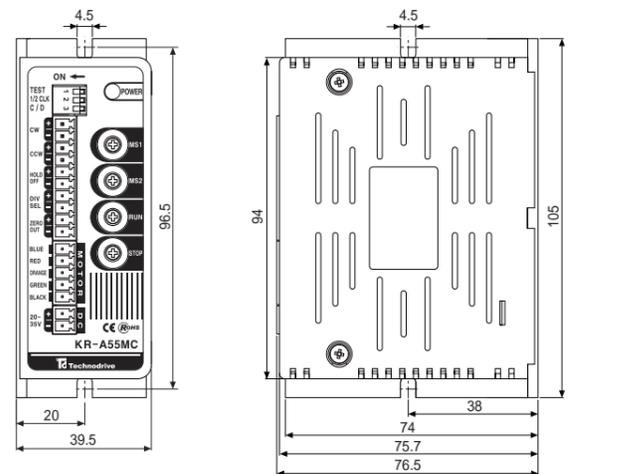
- Microstep operation for silent and low vibration of rotation.
- Wide range of step angle can be applied by switching signal.
- It can be divided up to 250 of microstep and 5-phase stepping motor with 0.72° of basic step is rotated as 0.00288° per 1 pulse and it is required to input 125,000 pulse for 1 rotation of motor.
- Includes auto current down, self-diagnosis function.
- Small, light weight and advanced quality by custom IC and surface mounted circuit.
- Photocoupler input insulation method to minimize the effects from external noise.

**Specifications**

Model	<b>KR - A55MC</b>	
Power supply	20 - 35VDC 3A[Max.]( -10%, +20%)	
RUN current	0.4 - 1.4A/Phase	
Drive method	Bipolar constant current pentagon drive	
Resolution(Rotating angle)	1, 2, 4, 5, 8, 10, 16, 20, 25, 40, 50, 80, 100, 125, 200, 250 division	
CW/CCW Input pulse	Pulse width	Min. 0.25μs
	Pulse interval	Min. 0.25μs
	Rising/Falling time	Max. 1μs
	Frequency	Max. 500kpps
Voltage	High: 4 - 8VDC, Low: 0 - 0.5VDC	
	Current	10 - 20mA
Ambient temperature	0 - 40°C(at non-freezing status)	
Ambient humidity	35 - 85%RH(at non-dew status)	
Unit weight	Approx. 220g	

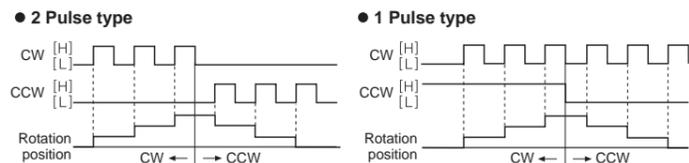
※ There is torque difference by input power.

**Dimensions**

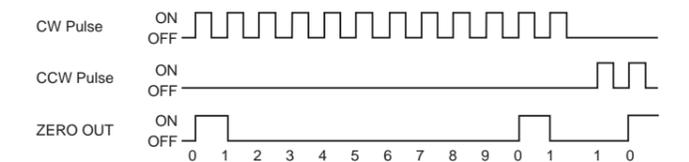


**Time charts**

**CW / CCW Input(CW : Clockwise direction from the front view of shaft)**

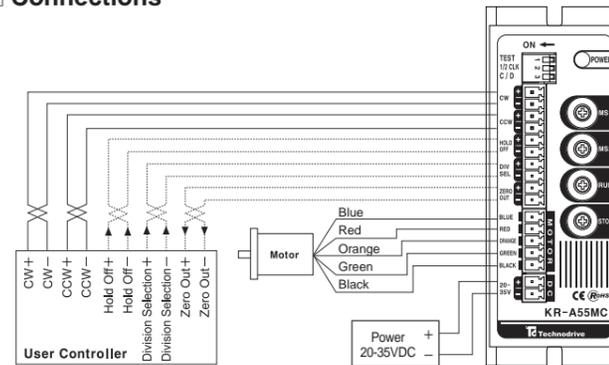


**ZERO OUT output**

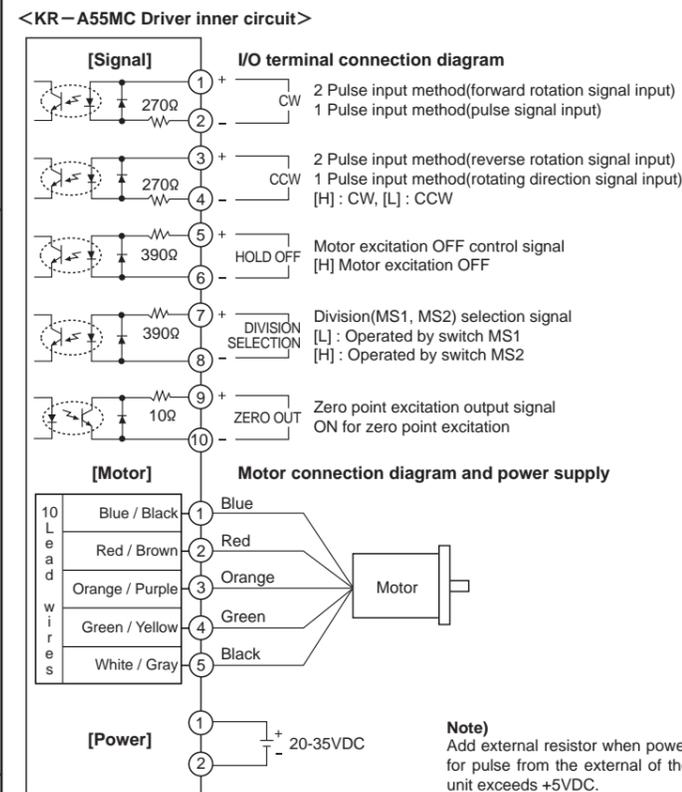


※ ZERO OUT means the initial status of motor excitation (STEP 0), it outputs per 7.2° of rotation in Full Step. (It outputs 50times per 1 rotation of motor.)  
Ex) Full step : It outputs one time when input 10 pulse.  
20 division : It outputs one time when input 200 pulse.

**Connections**



**Input-Output diagram**



**Function**

**Selectable function switch**

No	Name	Function	Switch position	
			ON	OFF
1	TEST	Self diagnosis function	250pps rotation	Normal
2	1/2 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.
- **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.
- **C/D(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(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(Same for MS1, MS2)**

- It drives a motor dividing basic step angle(0.72°) by setting value of resolution.
- The calculation formula of divided step angle is as below.  
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.

**Selectable resolution(Selectable Step angle)**

- Change into the resolution in MS1/MS2 by DIVISION SELECTION input.
- Motor is rotated by resolution in MS1 when DIVISION SELECTION signal is [L] and MS2 for [H].
- Change the resolution after motor is stopped or, it may cause a step-out of motor.
- Input H/L means ON/OFF of photocoupler in a circuit.

**Caution for using**

- Caution for signal input
    - 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.
    - In case, the signal input supply is higher than rated supply expressed on the specification, please connect the additional resistor to external part.
  - Caution 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.**
  - Caution for wiring
    - Use Twist pair(Over 0.2mm<sup>2</sup>) for the signal wire should be shorter than 2m.
    - Please use an electric wire is thicker than the motor lead when product the motor wire connection.
  - Caution 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.)
  - Caution for using function switches
    - 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.
    - 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.
  - Installation environment
    - It shall be used indoor
    - Altitude Max. 2000m
    - Pollution Degree 2
    - Installation Category II
- ※ It may cause malfunction if above instructions are not followed.

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