Compact Micro-step-Driver

MC-S0514ZU

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A. Features

- A compact-micro-step 5-phase driver which conforms to DC24V input.
- Micro-Stepping Adjustment (16 positions up to MAX: 250 divisions).
- Driving current: 0.35A/phase to 1.4A/phase.
- CE marking.

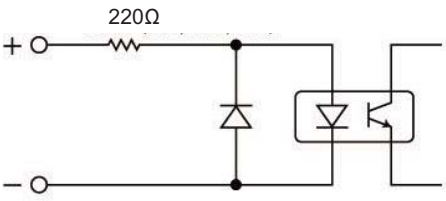
B. Specifications

Driving Motor	Five phase stepping motor
Driving method	Micro-step driving (1 to 250 divisions : 2 series setting). (1 to 240 divisions : 3 series setting)
Driving current	0.35A/phase to 1.4A/phase
Input voltage	DC24V±5% MAX:3A
Max. Response Frequency	500kpps
Input signals	Photo coupler input
	Pulse voltage: ［H］3V to 5 V ［L］ -3 V to 0.5 V
	Pulse width: 0.5μs MIN
	Pulse interval: 0.5μs MIN
	Rise/fall time: 1μs Max
	Internal resistance: CW,CCW: 220Ω、H.O,D.S: 220Ω
Output signals	Open-collector output (Maximum use conditions DC30V 50mA)
Weight	Approx.100g
Operating temperature range	0 to 40 ℃
Operating humidity range	20 to 80%RH (no condensation)
Indoor use only	
Accessories	Power connector : 2P XAP-02V-1（JST） :1 Motor connector : 5P XAP-05V-1（JST） :1 Signal connector : 10P XAP-10V-1（JST） :1 Connector pin : BXA-001T-P0.6（JST） :19

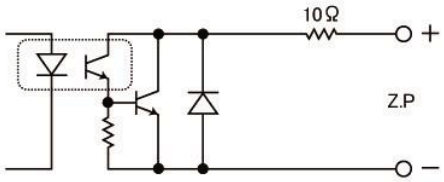
C. Connections and Signals

Connector	No.	Signal	Functional outline
CN1 Power	1	Power	Input DC24V
	2	Power GND	GND
CN2 Signal	1	CW+	Input terminal for CW direction operation-instructing pulse for a two-pulse system; also, input terminal for operation-instructing pulse for a one-pulse system
	2	CW-	
	3	CCW+	Input terminal for CCW direction operation-instructing pulse for a two-pulse system; also, input terminal for rotation direction pulse for a one-pulse system. The motor turns in the CW direction if <ON> is input.
	4	CCW-	
	5	H.O+	Signal terminal to stop current supply to the motor. The motor will not be excited if a signal is input to this terminal. Be sure that this terminal is OFF when running the motor.
	6	H.O-	
	7	D.S+	Signal input terminal for selecting division ON: M2 selection OFF: M1 selection
	8	D.S-	
	9	Z.P+	This Z.P signal is ON, when the rotor of Motor is positioned in mechanical origin.
	10	Z.P-	
CN3 Motor	1	Motor	5 Lead: Blue , 10 Lead: Blue + Black
	2		5 Lead: Red , 10 Lead: Red + Brown
	3		5 Lead: Orange , 10 Lead: Orange + Purple
	4		5 Lead: Green , 10 Lead: Green + Yellow
	5		5 Lead: Black , 10 Lead: White + Gray

Input circuit

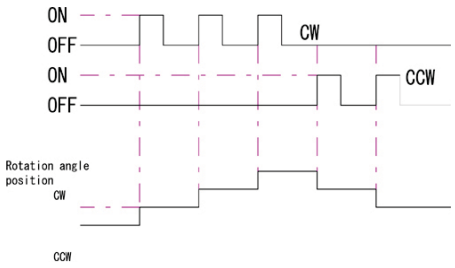


Output circuit



Timing diagram

(2-pulse system)



Note) ・State of the input signal of the photo coupler "ON: Carrying current" or: is shown in the "OFF non-energized" state.

・Provide an external resistor R1 if CW, CCW input voltage (V1) exceeds 5 V.
Select R1 so that R1 = (V1 – 1.6) / 0.008 - 220.
Provide an external resistor R2 if H.O, or D.S input voltage (V2) exceeds 5 V.
Select R2 so that R2 = (V2 - 1.2) / 0.008 - 220.
When inserting resistors into the circuit, use those with resistance in the ±10% range for both R1 and R2.

・Use AWG22 or larger wires for power.

(1) Division Selection signal (D.S)

Select Division by M1 and M2 switch. D.S signal is OFF: M1. D.S signal is ON: M2.
Do not change the DS signal during motor driving. There is a risk of malfunction.

(2) Mechanical Motor Origin Output signal (Z.P)

This signal indicates that the motor excitation sequence is at the (0) position.
The signal is used, for example, to accurately detect the home position by matching the system-side machine home position with the motor excitation home position (Z.P).
Signal is output each time an angle is 10 times the motor's basic step position.
Select external resistor R so that Vo is 30 V or less, and current is 50mA or less.

D. Adjustment Procedure

(1) Setting drive current RUN

The RUN switch allows selection of the motor drive current.

RUN SW No.	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Drive current (A)	0.35	0.44	0.52	0.59	0.67	0.75	0.83	0.9	0.98	1.05	1.12	1.19	1.27	1.34	1.4	1.48

*) The switch is factory-set at E (1.4 A/phase).

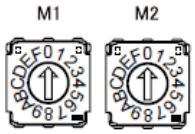
(2) Setting stop current STOP

The STOP switch allows selection of the motor stop current in a range of 25% to 91% of the drive current.

STOP SW No.	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Stop current (%)	25	30	35	41	45	50	55	59	63	67	71	75	79	83	87	91

*) The switch is factory set to 5 (50%).

(3) Setting division ratio M1, M2



16 division ratios are available for selection in a range.

[Case: DIP-SW No.2 : 2 series setting (OFF)]

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

[Case: DIP-SW No.2 : 3 series setting (ON)]

M SW No.	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Division	1	2	3	6	12	18	24	32	36	48	60	72	120	160	180	240

*) M1 and M2 settings are enabled when the DS signal is OFF and ON, respectively.

*) The switch is factory set to M1: 5, M2: 0.

(4) DIP switch settings

No.	Function	Factory setting	Content
1	Input pulse system	OFF	Select the switch position according to the controller's pulse output type. Setting the switch to the OFF position selects two-pulse system, corresponding to CW/CCW pulse signals. Setting the switch to the ON position selects a one-pulse system, corresponding to the pulse/rotation direction signals.
2	2,3 series setting (Division)	OFF	OFF: 2 series division setting. ON: 3 series division setting.
3	Internal function check	OFF	**Be sure to OFF in normal use.**
4	Current reduction	OFF	Setting this switch to the ON position disables auto current reduction. Setting it to the OFF position starts current reduction to the value specified by the STOP switch, approximately 150 ms after pulse input stops. Normally, this switch should be left in the OFF position.

E. Dimensional Outline Drawing