

**Single axis micro-driver (AC100-230V) MC-S7514PCL**



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## A. Features

- A micro-step driver which conforms to AC 100 to 230 V input UL standards and CE Marking safety standards.
- Micro-Stepping Adjustment (16 positions up to 250 divisions).
- Low vibration, quiet operation.
- Driving current : 0.35A/phase to 1.4A/phase.

## B. Specifications

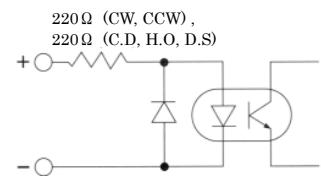
Driving Motor	Five phase stepping motor
Driving method	Bipolar pentagon micro-step drive
Driving current	0.35 A/phase to 1.4A/phase
Input voltage	AC100 to 230V 50/60Hz 3.5A
Max. Response Frequency	500kpps
Excitation method	Micro-step (sixteen increments from 1 to 250, adjustment by switch)
Input signals	Photo coupler input Pulse voltage: [H] 3 V 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, C.D,H.O,D.S: 220Ω
Output signals	Open-collector output (Maximum use conditions DC30V 50mA)
Weight	Approx.750g
Operating temperature range	0 to 40 degrees
Operating humidity range	20 to 80%RH (no condensation)
Indoor use only	
Accessories	Power connector : 3P MSTB2.5HC/3-STF-5.08 (Phoenix Contact) Motor connector : 5P MSTB2.5/5-ST-5.08 (Phoenix Contact) Signal connector : 12P MC1.5/12-ST-3.81 (Phoenix Contact)

## C. Connections and Signals

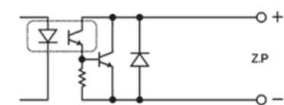
Marking	Terminal name	Name	Functional outline
SIGNAL	CW+ CW -	CW pulse/pulse signal input terminal	Input terminal for CW direction operation-instructing pulse for a two-pulse system; also, input terminal for operation-instructing pulse for a one-pulse system
	CCW+ CCW -	CCW pulse/pulse signal input terminal	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.
	C.D+ C.D -	Current reduction OFF	Reset switch for disabling motor drive (current reduction) when motor stops.
	H.O+ H.O -	Hold OFF	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.
	D.S+ D.S -	Division Selection Signal.	Signal input terminal for selecting division ON: M1 selection OFF: M2 selection
	Z.P+ Z.P -	Mechanical Motor Origin Output Signal	This Z.P signal is ON, when the rotor of Motor is positioned in mechanical origin.
MOTOR	1 2 3 4 5	Motor connection terminal	5 Lead: Blue , 10 Lead: Blue + Black 5 Lead: Red , 10 Lead: Red + Brown 5 Lead: Orange , 10 Lead: Orange + Purple 5 Lead: Green , 10 Lead: Green + Yellow 5 Lead: Black , 10 Lead: Black + Gray
POWER	L	Power input line side	Connected to 100–230 VAC line side.
	N	Power input neutral point side	Connected to 100–230 VAC neutral point side.
	F.G	Ground connection terminal	Connected to grounding terminal.

Note) • Provide an external resistor R1 if CW, CCW input voltage (V1) exceeds 5 V.  
Select R1 so that  $R1 = (V1 - 2.2) / 0.008 - 220$ .  
Provide an external resistor R2 if C.D, H.O, or D.S input voltage (V2) exceeds 5 V.  
Select R2 so that  $R2 = (V2 - 1.5) / 0.008 - 220$ .  
When inserting resistors into the circuit, use those with resistance in the  $\pm 20\%$  range for both R1 and R2.

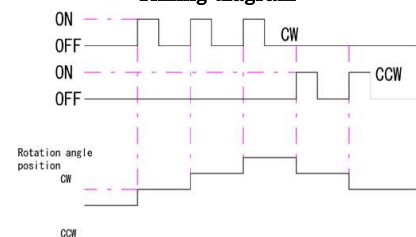
Input circuit



Output circuit



Timing diagram



- Be sure that pulse voltage is between 3 V and 5 V at high level and between -3 V and 0.5 V at low level, pulse width is 0.5  $\mu$ s or more, pulse intervals are 0.5  $\mu$ s or more and rise/fall time is 1  $\mu$ s or less. (Pulse rising edge represents the moment when current begins to flow into the photo coupler circuit.)
- Use AWG20 or larger wires for power and AWG16 or larger wires for grounding.
- To avoid injury or electric shock, always ground the FG terminal.

#### (1) Current reduction OFF input (C.D)

Does not reduce the current when the motor stops if C.D is ON.

The current reduction circuit is activated 150 ms after pulse signal stops.

**Exercise caution when current reduction is disabled as this will cause the motor to heat up.**

#### (2) Division Selection signal (D.S)

Select Division by M1 and M2 switch. D.S signal is OFF: M1. D.S signal is ON: M2.

#### (3) 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 switch No.	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Drive current (A)	0.35	0.44	0.53	0.61	0.70	0.75	0.87	0.96	1.05	1.13	1.22	1.3	1.4	1.48	1.57	1.65

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

#### (2) Setting stop current STOP



The STOP switch allows selection of the motor stop current in a range of 27% to 90% of the drive current.

STOP switch No.	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Stop current (%)	28	32	37	41	45	49	53	57	62	66	70	74	78	82	87	91

The switch is factory set to 5 (49%).

#### (3) Setting division ratio M1, M2



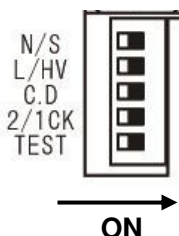
16 division ratios are available for selection in a range of 1 to 250 divisions.

M1, M2 switch 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

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

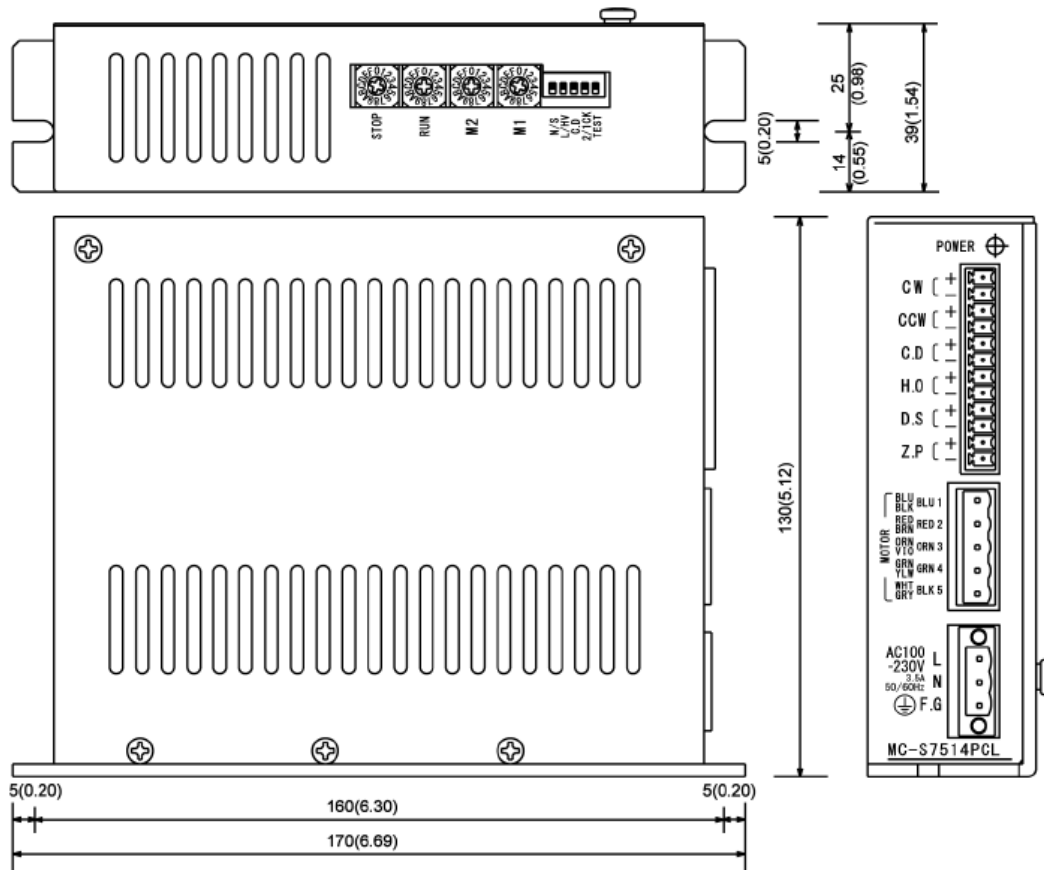
The switch is factory set to M1: 5 (10 division), M2: 0(Basic step).

#### (4) DIP switch settings



No.	Marking	Switch name	Factory setting	
1	TEST	Self-diagnosis	OFF	Runs the motor at 60 pps regardless of division ratio setting when ON. The motor turns in the CW direction when a two-clock system is selected and in the CCW direction when a one-clock system is selected. <b>Leave this switch in the OFF position during normal operation.</b>
2	2/1CK	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.
3	C.D.	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.
4	L/HV	Motor output	OFF	Setting this switch to ON position allows selection of high drive voltage, thus providing high-speed, high-torque motor operation. Setting it to OFF position ensures reduced motor heat generation.
5	N/S	Low vibration	ON	Setting this switch to ON position allows selection of low vibration.

## E. Dimensional Outline Drawing



## F. Installation Precautions

- (1) Install the drive at a well-ventilated location. Provide space of at least 25 mm between each driver surface and other pieces of equipment. (Prepare for forced air cooling as necessary.)
- (2) Install the driver in a place where it will not be exposed to vibration or shock.
- (3) Keep the driver as far away as possible from I/O cables and noise sources (power and high voltage lines).
- (4) Install the driver in a place where it will not be exposed to water, oil, or dust.