The 5-Phase Stepping Driver

PMDPD1S1P01

DC12V
Micro-step (500 x 1 to 80 divisions)

● Applicable motors

□28 □42

Characteristics

● **Small size PM driver**
Exclusive gate array is mounted on this small-size and light-weight driver.

● **Micro-step function available**
Smooth operation without vibration at low speeds can be realized.

● **Flexible**
It can drive various stepping motors of small to large capacities without adjustment for wide range uses.

Built-in function

● **Step angle setting function**
Ten resolutions ranging from 1- to 80-division can be set for the basic step angle of stepping motor by using the rotary switch.

● **Pulse input system selection function**
Either "Pulse and direction" or "2-input mode" can be selected, using a dipswitch. Resolution setting function.

● **Power down function**
The stepping motor power can be turned OFF by the external input signal.

PM driver specifications

Item			PMDPD1S1P01
Standard specification		Input source	DC12V±10%
		Source current	1A
	Environment	Operating ambient temperature	0 to +50˚C
		Conservation temperature	- 20 to + 70˚C
		Operating ambient humidity	35 to 85%RH (no condensation)
		Conservation humidity	10 to 90%RH (no condensation)
		Vibration resistance	4.9m/s^2, Frequency range 10 to 55Hz, Direction: along X, Y and Z axes, for 2 hours each
		Impact resistance	Considering the NDS-C-0110 standard section 3.2.2 division "C", not influenced
		Mass(Weight)	0.035kg(0.081lbs)
Function		Select function	Auto current down, pulse input system, step angle
I/O signals		Command pulse input signal	Photo coupler input method, input resistance 330Ω Input signal voltage, H = 4.0 to 5.5V L = 0 to 0.5V Maximum input frequency 400kpulse/s
		Power down input signal	Photo coupler input method, input resistance 330Ω Input signal voltage, H = 4.0 to 5.5V L = 0 to 0.5V

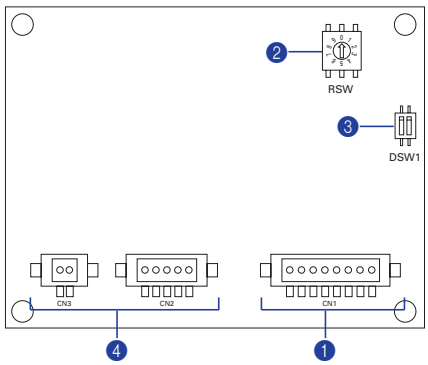
Standard combined stepping motor

Stepping motor dimensions	Stepping motor model number		Holding torque N·m(oz·in)	Rotor inertia ×10^{-4}kg·m^2(oz·in^2)	Mass(Weight) kg(lbs)	Page
	Single shaft	Double shaft				
□28mm	103F3505-3041 103F3515-3041	103F3505-3011 103F3515-3011	0.026(3.68) 0.052(7.36)	0.009(0.05) 0.016(0.09)	0.11(0.24) 0.2(0.44)	page 299
□42mm	103F5505-3041	103F5505-3011	0.127(17.98)	0.03(0.16)	0.23(0.51)	page301

- For the general specifications and dimensions of each stepping motor, refer to the reference pages.

Operation, connection, and function

Each section name of the PM driver



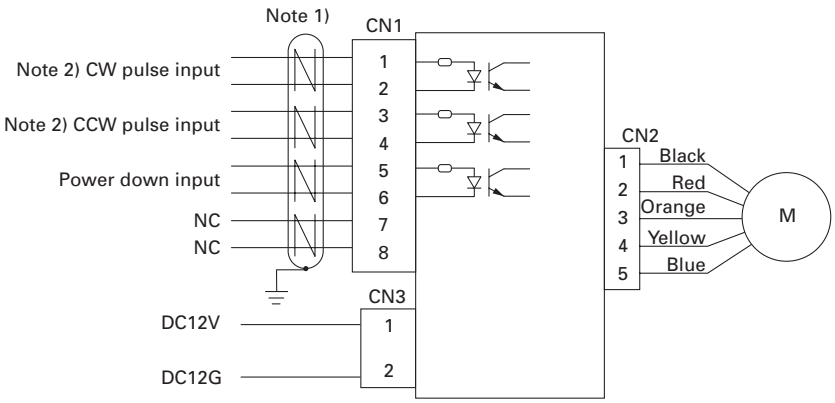
1 Connector (CN1)
..... Connects I/O signals.

2 Step angle selection switch (RSW1)
..... The basic step angle of stepping motor can be divided to maximum 80 divisions.

3 Function selection dipswitches (ACD and F/R)
..... Functions can be selected according to specifications.

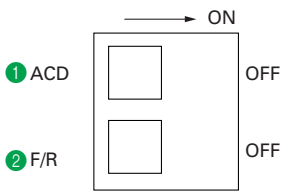
4 Connector (CN2 and CN3)
..... Connects the DC power source and the stepping motor power cable.

External wiring diagram



Note 1) Use shielded twisted-pair cables.
Note 2) Either "2-input mode (CW and CCW)" or "Pulse and directiom mode (CK and U/D)" can be selected by using the function selection switch F/R

Function selection dipswitch ---3



1 ACD (auto current down selection)
This switch is not used.
Do not turn it ON.

2 F/R (pulse input system selection)
A pulse input system is selected.

F/R	Pulse input system
ON	Pulse and direction mode (CK and U/D)
OFF	2-input mode (CW and CCW)

- Settings at the shipment are shown above.
- Turn OFF the PM driver power before changing switch settings to change the function selection dipswitch settings.

Operation, connection, and function

● Step angle selection switch (RSW1) ---❷

Number of basic step angle divisions of stepping motor can be selected.

Scale	0	1	2	3	4	5	6	7	8	9
Number of divisions	1	2	2.5	4	5	8	10	20	40	80

- "1" is set at the shipment.

● I/O signal function ---❶

Signal name	Abbreviation	Pin number	Function
CW pulse input	CW+	1	When using "2-input mode"
	CW–	2	Inputs drive pulse for counterclockwise rotation.
Pulse column input	CK+	1	When using "Pulse and direction mode"
	CK–	2	Inputs drive pulse column for the stepping motor rotation.
CCW pulse input	CCW+	3	When using "2-input mode"
	CW–	4	Inputs drive pulse for counterclockwise rotation.
Rotation direction input	U/D+	3	The rotation direction signal of stepping motor is input for the "Pulse and direction mode".
	U/D–	4	The internal photo coupler is ON ····· clockwise direction The internal photo coupler is OFF ····· counterclockwise direction
Power down input	PD+	5	PD signal input cuts off the stepping motor current (turns off the power).
	PD–	6	PD input signal is ON (the internal photo coupler is ON) ····· PD function is valid. PD input signal is OFF (the internal photo coupler is OFF) ····· PD function is not valid.

- The clockwise (CW) rotation direction of stepping motor is viewed from the output shaft (flange side) of stepping motor. The counterclockwise (CCW) rotation direction is also viewed from the output shaft (flange side) of stepping motor.
- The power down input resets the energization position of stepping motor. Therefore, the stepping motor shaft displaces before and after the reset (maximum displacement is a half basic step angle of stepping motor).

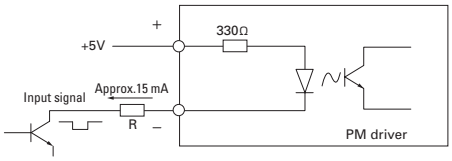
● Connectors to be used

PM driver side		Applicable connector model number	Manufacturer
Used for	Model number		
I/O signals (CN1)	DF3-8P-2V (50)	Applicable connector:DF3-8S-2C Applicable terminal:DF3-248SCC	Hirose Electric Co., Ltd.
DC power source (CN2)	DF3-2P-2V (20)	Applicable connector:DF3-2S-2C Applicable terminal:DF3-2428SC	Hirose Electric Co., Ltd.
Stepping motor (CN3)	DF3-5P-2V (20)	Applicable connector:DF3-5S-2C Applicable terminal:DF3-2428SC	Hirose Electric Co., Ltd.

- The applicable connectors should be either prepared by the user or ordered from the optional connector set or connector cables (refer to Option in page 280).

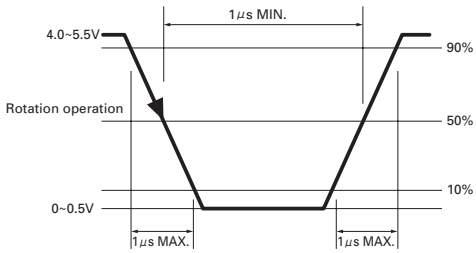
Operation, connection, and function

Input circuit (CW, CCW)



- When the peak value of the input signal is 5V, the external limit resistance R is 0Ω. If the peak value exceeds 5V, set the input current to approx. 15mA using the external limit resistance R.

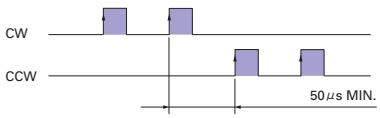
Input signal specifications



- Pulse duty is 50% MAX.

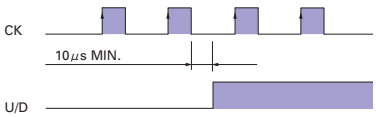
Timing of the command pulse

• 2-input mode (CW, CCW)



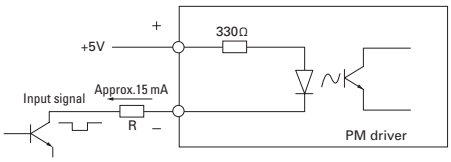
- The internal photo coupler turns ON within the ■ and the internal circuit (stepping motor) is activated at the leading edge of the photo coupler "ON".
- When applying no pulse, fix the internal photo coupler to "ON" or "OFF".

• Pulse and direction mode (CK, U/D)



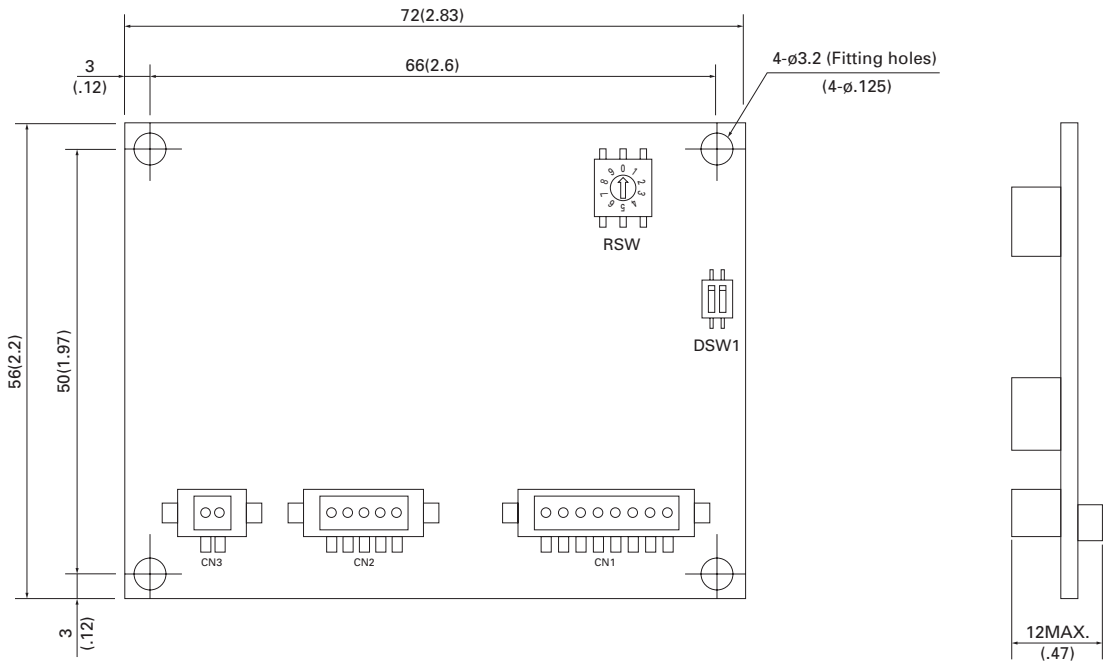
- The internal photo coupler turns ON within the ■, and the internal circuit (stepping motor) is activated at the leading edge of the photo coupler "ON".
- Perform the U/D input signal switchover when the CK-side internal photo coupler is set to "OFF".

Input circuit configuration (PD)

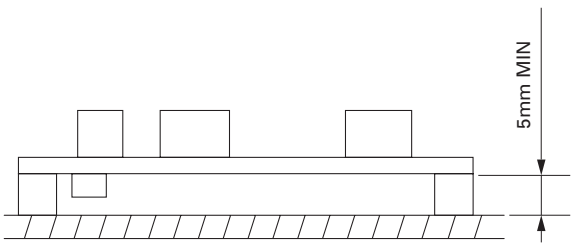


- When the peak value of the input signal is 5V, the external limit resistance R is 0Ω.
  If the peak value exceeds 5V, set the input current to approx. 15mA using the external limit resistance R.

Dimensions [Unit:mm(inch)]



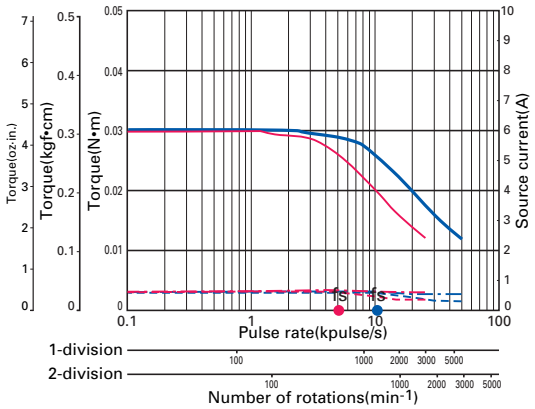
Installation direction and position



- Fix the PM driver by using the spacer of ø6 MAX. of which length is 5mm MIN.

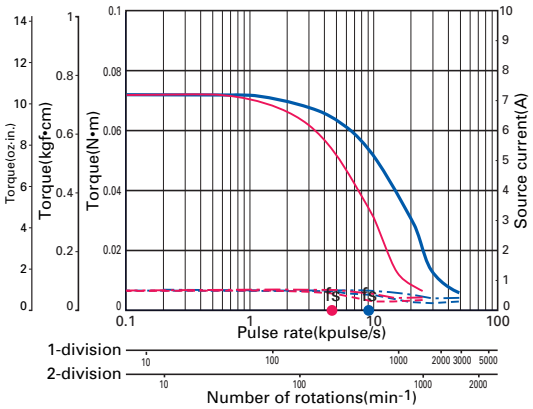
Pulse rate-torque characteristics/pulse rate-source current characteristics

●103F3505-30 □□ :12V



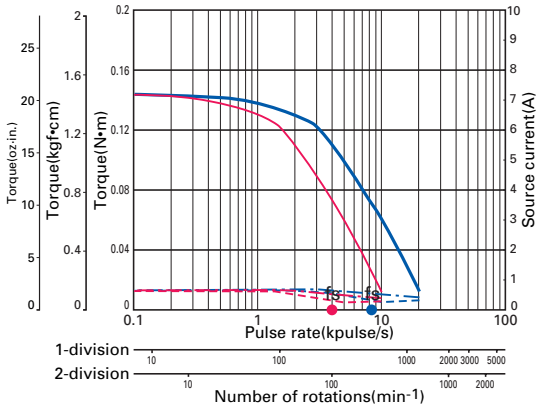
Source voltage:DC12V·Operating current: 0.35A/phase
—— Pull-out torque(J_{L1}=0.33×10^{-4}kg·m^2[1.80 oz·in^2] Use the rubber coupling)
– · – Source current(T_L=MAX) – – – Source current(T_L=0)
fs:No load maximum starting pluse rate
■ 1-division is specified ■ 2-division is specified

●103F3515-30 □□ :12V



Source voltage:DC12V·Operating current: 0.35A/phase
—— Pull-out torque(J_{L1}=0.33×10^{-4}kg·m^2[1.80 oz·in^2] Use the rubber coupling)
– · – Source current(T_L=MAX) – – – Source current(T_L=0)
fs:No load maximum starting pluse rate
■ 1-division is specified ■ 2-division is specified

●103F5505-30 □□ :12V



Source voltage:DC12V·Operating current: 0.35A/phase
—— Pull-out torque(J_{L1}=0.33×10^{-4}kg·m^2[1.80 oz·in^2] Use the rubber coupling)
– · – Source current(T_L=MAX) – – – Source current(T_L=0)
fs:No load maximum starting pluse rate
■ 1-division is specified ■ 2-division is specified

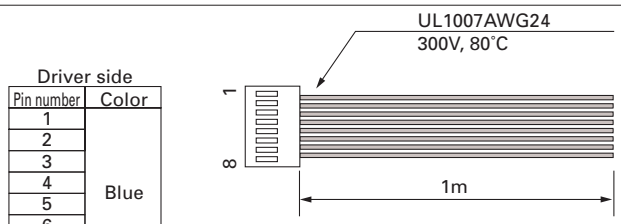
Option

Connector cable

Model number	Application
PM-C08S0100-03	Connector cable for I/O signals (CN1)
PM-C02P0100-05	Connector cable for AC power source (CN3)
PM-C05M0100-10	Connector cable for stepping motors (CN2)

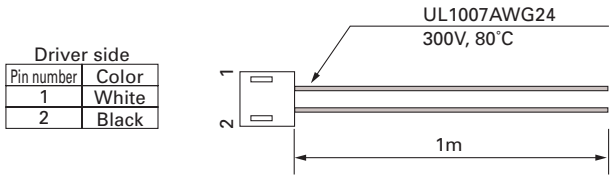
- The connector cable is a 1-meter cable assembled with the connector.

Cable 1 (I/O signal cable)



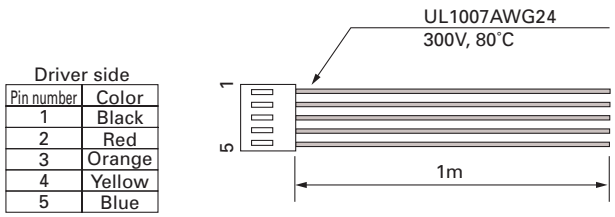
Cable model number	Length
PM-C08S0100-03	1m

Cable 2 (power source cable)



Cable model number	Length
PM-C02P0100-05	1m

Cable 3 (stepping motor cable)



Cable model number	Length
PM-C05M0100-10	1m