The 5-Phase Stepping Driver

PMDPB1S6P01
DC24V
Full-step/Half-step

(500 x 1 divisions)　(500 x 2 divisions)

● Applicable motors

□50　□60　ø60　ø86

Characteristics

● **High-speed type**

This driver is a high-speed type of PMM-BD-5313□-10. Stepping motors can be used even in the high-speed range.

● **Flexible**

The drivers can drive various stepping motors of small to large capacities without adjustment for wide range uses.

● **Small size**

Exclusive ICs are mounted to improve parts consolidation and reliability.

Built-in function

● **Excitation system selection function**

Full-step and half-step excitation systems can be selected by the external input signal.

● **Power down function**

The stepping motor power can be turned OFF by the external input signal.

PM driver specifications

Item			PMDPB1S6P01
Standard specification	Input source	For main power	DC24V/±10%
	Source current	For main power	3.5A
	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	Tested under the following conditions: Frequency range: 10 to 55 Hz, 0.5 G along the X, Y, and Z axes for 2 hours
		Impact resistance	No abnormality for the NDS-C-0110 Standard, Section 3.2.2, Division "C".
		Withstand voltage	No abnormality against an AC 1500 V application between the power input terminal and the cabinet for one minute.
		Insulation resistance	Minimum 10 MΩ when applying the DC 500 V Megger between the power input terminal and the cabinet.
	Mass(Weight)		0.4kg(0.88 lbs)
Function	Select function		Pulse input system (option)
I/O signals	Command pulse input signal		Photocoupler input system, input resistance 330 Ω Input signal voltage: "H" level: 4.0 to 5.5 V "L" level: 0 to 0.5 V Maximum input frequency: 400 kpulses/s
	Power down input signal		Photocoupler input system, input resistance 330 Ω Input signal voltage: "H" level: 4.0 to 5.5 V "L" level: 0 to 0.5 V
	Energization system selection input signal		Photocoupler input system, input resistance 330 Ω Input signal voltage: "H" level: 4.0 to 5.5 V "L" level: 0 to 0.5 V

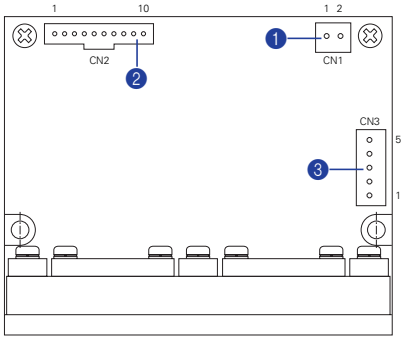
Standard combined stepping motor

Stepping motor dimensions	Stepping motor model number		Holding torque	Rotor inertia	Mass(Weight)	Page
	Single shaft	Double shaft	N·m(oz·in)	×10^{-4}kg·m^2(oz·in^2)	kg(lbs)	
□50mm	103H6500-8041	103H6500-8011	0.225(31.86)	0.057(0.31)	0.38(0.84)	Page 303
	103H6501-8041	103H6501-8011	0.39(55.23)	0.105(0.57)	0.44(0.97)	
□60mm	103H7851-8051	103H7851-8021	0.65(92.0)	0.275(1.50)	0.6(1.32)	Page 305
	103H7852-8051	103H7852-8021	0.98(138.8)	0.4(2.19)	0.78(1.72)	
	103H7853-8051	103H7853-8021	1.86(263.4)	0.84(4.59)	1.36(3.00)	
ø60mm	103H7521-8051	103H7521-8021	0.461(65.3)	0.148(0.81)	0.51(1.12)	Page 307
	103H7522-8051	103H7522-8021	0.735(104.1)	0.18(0.98)	0.6(1.32)	
	103H7523-8051	103H7523-8021	1.568(222.0)	0.423(2.31)	1.1(2.43)	
ø86mm	103H8581-8041	103H8581-8011	2.06(291.7)	1.45(7.93)	1.5(3.31)	Page 309
	103H8582-8041	103H8582-8011	4.02(569.3)	2.9(15.86)	2.5(5.51)	
	103H8583-8041	103H8583-8011	6.17(873.7)	4.4(24.06)	3.5(7.72)	

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

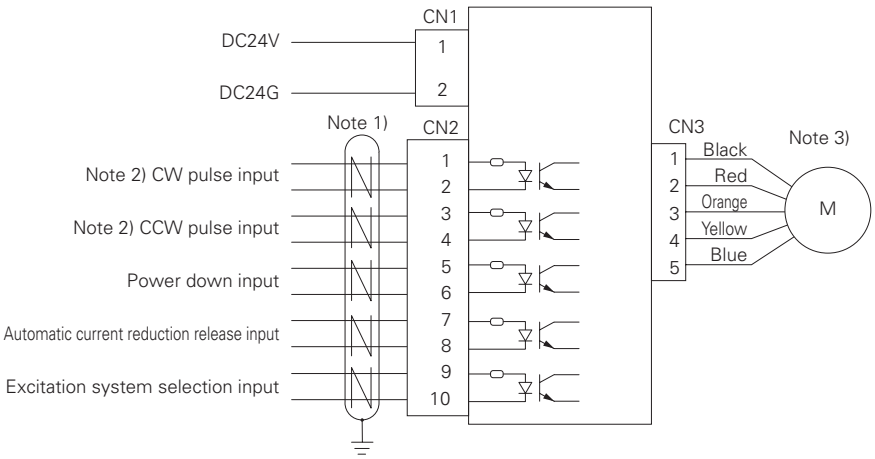
Operation, connection, and function

Each section name of the PM driver



1 Connector (CN1)..... Connects the DC power.
2 Connector (CN2)..... Connects I/O signals.
3 Connector (CN3)..... Connects the stepping motor power cable.

External wiring diagram



Note 1)Use shielded twisted-pair cables.
Note 2)The switchover from "2-input mode (CW and CCW)" to "Pulse and direction mode (CK and U/D)" is optional Contact us.
Note 3)Refer to the following table when connecting the 103H785 ☐ type stepping motor:

Product	Connector pin number				
PM driver (CN3)	1	2	3	4	5
Stepping motor connector	1	4	3	2	5

Operation, connection, and function

● I/O signal function

Signal name	Abbreviation	Pin number	Function
CW pulse input	CW+ CW-	1 2	Drive pulse for the CW direction rotation is input.
CCW pulse input	CCW+ CCW-	3 4	Drive pulse for the CCW direction rotation is input.
Power down input	PD+ PD-	5 6	Inputting the PD signal cuts OFF the current flowing through the stepping motor (turns OFF the power). PD input signal ON (internal photocoupler ON)····PD function enabled PD input signal OFF (internal photocoupler OFF)··PD function disabled
Auto current down release input	ACD+ ACD-	7 8	The function is held to automatically reduce the stepping motor current Approx. to the half inside the equipment during stopping the motor (about 100 ms after the last pulse application). ADD input signal ON (internal photocoupler ON)····ACD function disabled ACD input signal OFF (internal photocoupler OFF)···ACD function enabled
Energization system selection input	EX+ EX-	9 10	The full-step or the half-step can be selected by inputting the EX signal. EX input signal ON (internal photocoupler ON)····Half-step EX input signal OFF (internal photocoupler OFF)···Full-step

- The CW direction of stepping motor means the clockwise direction rotation as viewed from the output shaft side (flange side).
  The CCW direction means the counterclockwise direction rotation as viewed from the output shaft side (flange side).

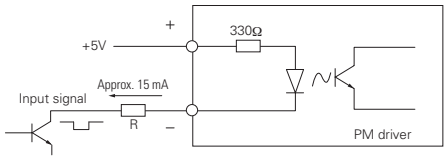
● Connectors to be used

PM driver side		Applicable connector model number	Manufacturer
Used for	Model number		
DC power source (CN1)	53258-0210	Housing:51067-0200 Contact:50217-8000	Molex Japan
I/O signals (CN2)	52135-1020	Housing:51030-1030 Contact:50084-8160	Molex Japan
Stepping motor (CN3)	53258-0510	Housing:51067-0500 Contact:50217-8000	Molex Japan

- 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 225).

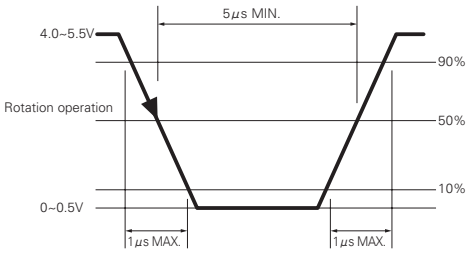
Operation, connection, and function

Input circuit configuration (CW and CCW)

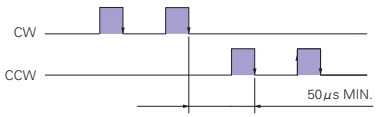


- Pulse duty is 50 % MAX.
- When the peak value of the input signal is 5V, the external limit resistance R is 0 Ω If the peak value exceeds 5V, set the input current to approx. 15mA using the external limit resistance R.

Input signal specifications

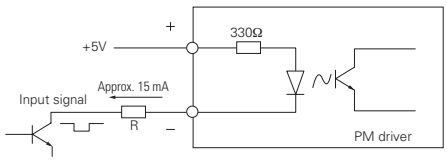


Timing of the command pulse



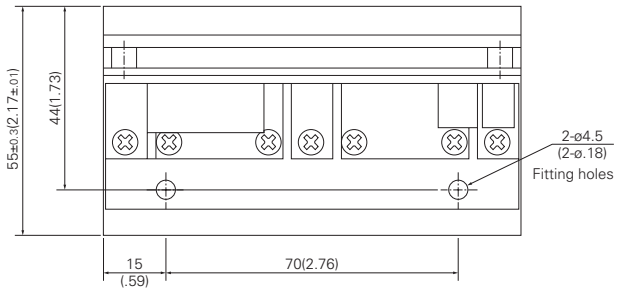
- The internal photocoupler turns ON at ■, and the internal circuit (stepping motor) operates at the rear edge of the photocoupler "ON".
- When applying the pulse to CW, set the internal photocoupler on the CCW side to "OFF".
- When applying the pulse to CCW, set the internal photocoupler on the CW side to "OFF".

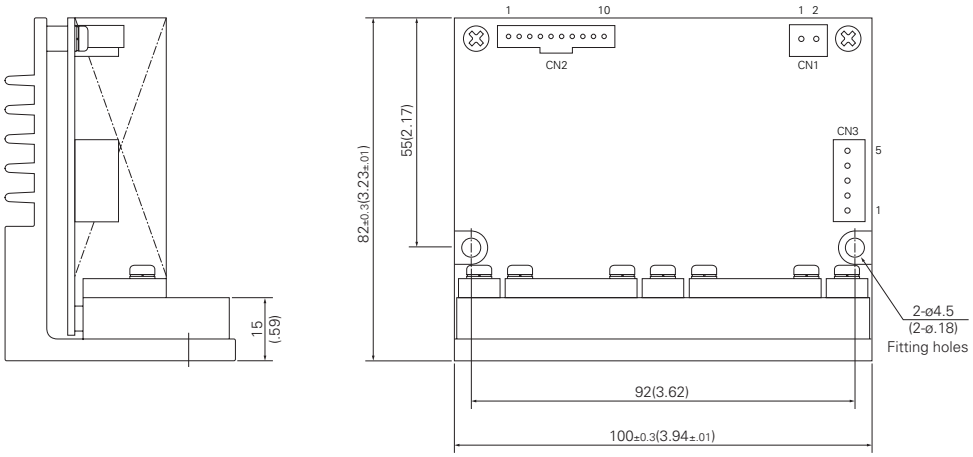
Input circuit configuration (PD, ACD, and EX)



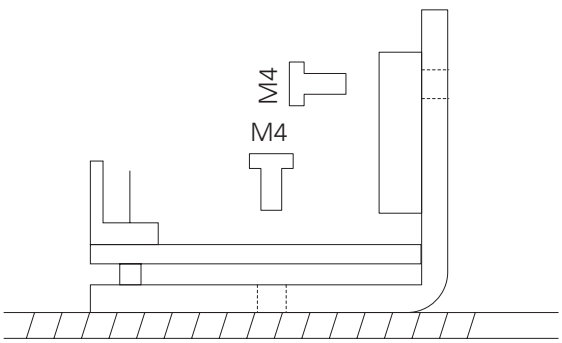
- When the peak value of the input signal is 5V, the external limit resistance R is 0 Ω If the peak value exceeds 5V, set the input current to approx. 15mA using the external limit resistance R.

Dimensions [Unit:mm(inch)]





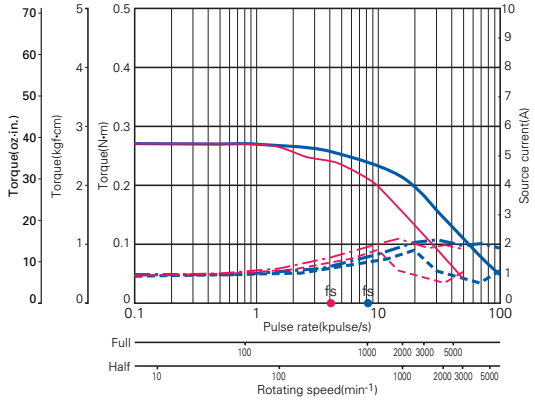
Installation direction and position



- Install the PM driver vertically.
- As shown in the figure, fix the PM driver by using the M4 screws through two fitting holes (2-ø4.5) on the bottom surface of PM driver (no fitting metals are necessary).

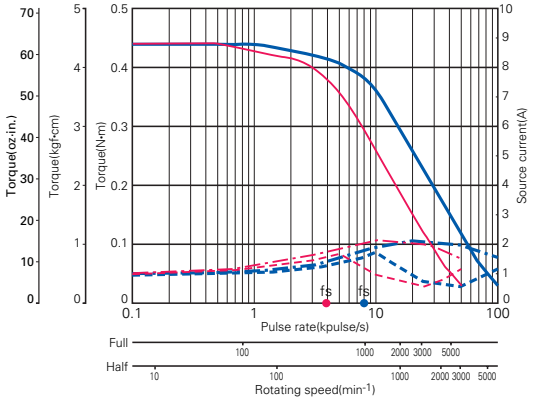
Pulse rate-torque characteristics/pulse rate-source current characteristics

●103H6500-80 □□ :24V



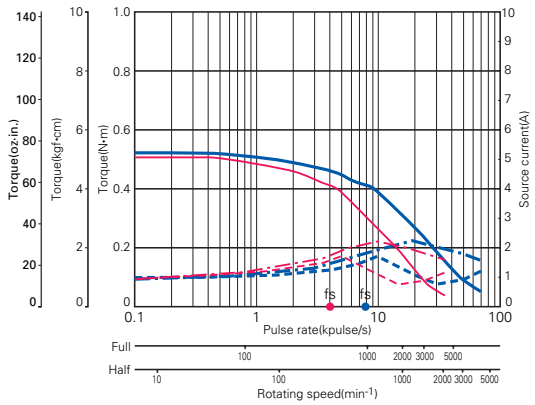
Source voltage:DC24V·Operating current: 1.5A/phase
—— Pull-out torque(J_{L1}=0.94×10^{-4}kg·m^2 [5.14 oz·in^2] Use the rubber coupling)
–·– Source current(T_L=MAX) – – – Source current(T_L=0)
fs:No load maximum starting pluse rate
■Full step ■Half step

●103H6501-80 □□ :24V



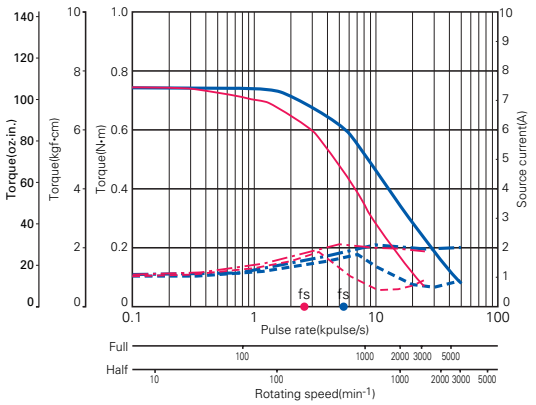
Source voltage:DC24V·Operating current: 1.5A/phase
—— Pull-out torque(J_{L1}=0.94×10^{-4}kg·m^2 [5.14 oz·in^2] Use the rubber coupling)
–·– Source current(T_L=MAX) – – – Source current(T_L=0)
fs:No load maximum starting pluse rate
■Full step ■Half step

●103H7521-80 □□ :24V



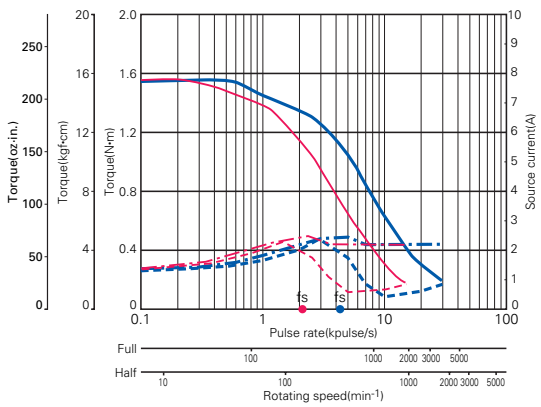
Source voltage:DC24V·Operating current: 1.5A/phase
—— Pull-out torque(J_{L1}=0.94×10^{-4}kg·m^2 [5.14 oz·in^2] Use the rubber coupling)
–·– Source current(T_L=MAX) – – – Source current(T_L=0)
fs:No load maximum starting pluse rate
■Full step ■Half step

●103H7522-80 □□ :24V



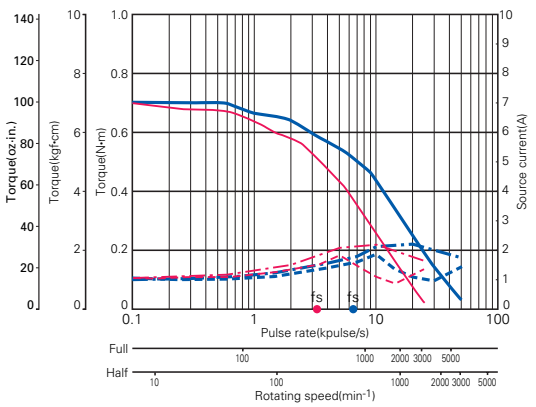
Source voltage:DC24V·Operating current: 1.5A/phase
—— Pull-out torque(J_{L1}=2.6×10^{-4}kg·m^2 [14.22 oz·in^2] Use the rubber coupling)
–·– Source current(T_L=MAX) – – – Source current(T_L=0)
fs:No load maximum starting pluse rate
■Full step ■Half step

●103H7523-80 □□ :24V



Source voltage:DC24V·Operating current: 1.5A/phase
—— Pull-out torque(J_{L1}=7.4×10^{-4}kg·m^2 [40.46 oz·in^2] Use the rubber coupling)
–·– Source current(T_L=MAX) – – – Source current(T_L=0)
fs:No load maximum starting pluse rate
■Full step ■Half step

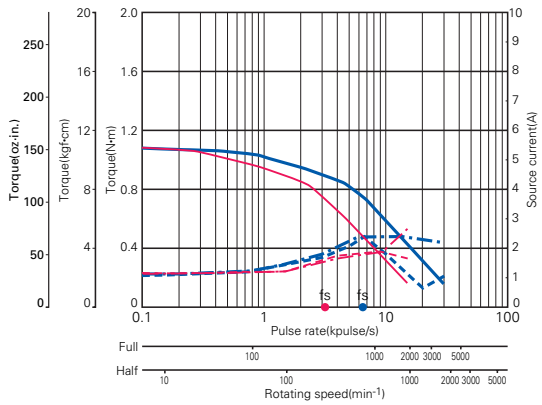
●103H7851-80 □□ :24V



Source voltage:DC24V·Operating current: 1.5A/phase
—— Pull-out torque(J_{L1}=0.94×10^{-4}kg·m^2 [5.14 oz·in^2] Use the rubber coupling)
–·– Source current(T_L=MAX) – – – Source current(T_L=0)
fs:No load maximum starting pluse rate
■Full step ■Half step

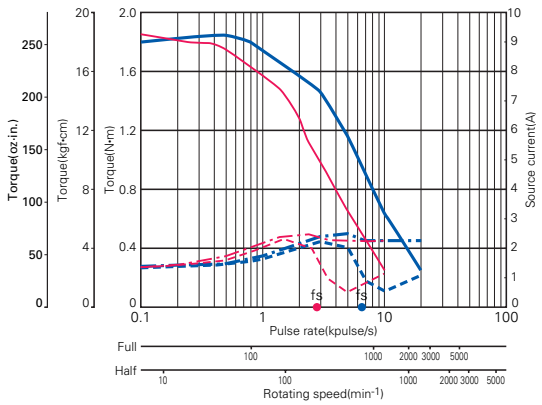
Pulse rate-torque characteristics/pulse rate-source current characteristics

●103H7852-80 □□ :24V



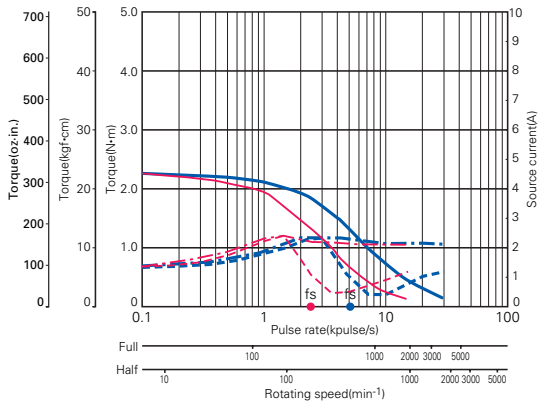
Source voltage:DC24V·Operating current: 1.5A/phase
—— Pull-out torque(J_{L1}=2.6×10^{-4}kg·m^2 [14.22 oz·in^2] Use the rubber coupling)
– · – Source current(T_L=MAX) – – – Source current(T_L=0)
fs:No load maximum starting pluse rate
■Full step ■Half step

●103H7853-80 □□ :24V



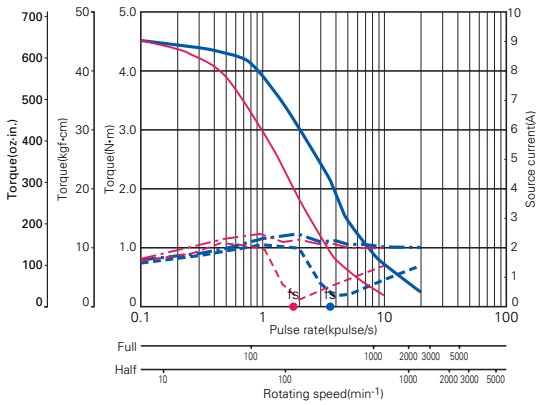
Source voltage:DC24V·Operating current: 1.5A/phase
—— Pull-out torque(J_{L1}=7.4×10^{-4}kg·m^2 [40.46 oz·in^2] Use the rubber coupling)
– · – Source current(T_L=MAX) – – – Source current(T_L=0)
fs:No load maximum starting pluse rate
■Full step ■Half step

●103H8581-80 □□ :24V



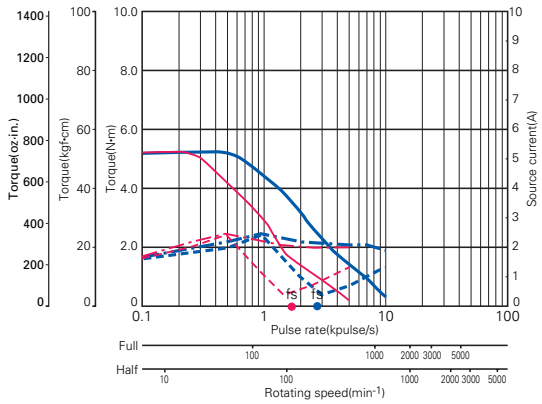
Source voltage:DC24V·Operating current: 1.5A/phase
—— Pull-out torque(J_{L1}=7.4×10^{-4}kg·m^2 [40.46 oz·in^2] Use the rubber coupling)
– · – Source current(T_L=MAX) – – – Source current(T_L=0)
fs:No load maximum starting pluse rate
■Full step ■Half step

●103H8582-80 □□ :24V



Source voltage:DC24V·Operating current: 1.5A/phase
—— Pull-out torque(J_{L1}=15.3×10^{-4}kg·m^2 [83.65 oz·in^2] Use the rubber coupling)
– · – Source current(T_L=MAX) – – – Source current(T_L=0)
fs:No load maximum starting pluse rate
■Full step ■Half step

●103H8583-80 □□ :24V



Source voltage:DC24V·Operating current: 1.5A/phase
—— Pull-out torque(J_{L1}=43×10^{-4}kg·m^2 [235.10 oz·in^2] Use the rubber coupling)
– · – Source current(T_L=MAX) – – – Source current(T_L=0)
fs:No load maximum starting pluse rate
■Full step ■Half step

Option

Connector set

Model number	Used forDC power	Set content	Quantity	Manufacturer name	Applicable cable size	Crimping tool model number
PM-AP-042	DC power source (CN1)	Applicable housing:51067-0200	1	Molex Japan	AWG18~24	57189-5000 57190-5000
		Applicable contact:50217-8100	2			
PM-AP-044	I/O signal (CN2)	Applicable housing:51030-1030	1	Molex Japan	AWG22~24	57036-5000
		Applicable contact:50084-8160	10			
PM-AP-051 (Type H785 □)	Stepping motor (CN3)	Applicable housing:51067-0500	1	Molex Japan	AWG18~22	57189-5000 57190-5000
		Applicable contact:50217-8100	5			
		Applicable housing:VHR-5N	1	J.S.T. Mfg Co., Ltd.		YC-160R
		Applicable contact:SVH-21T-P1.1	5			
PM-AP-043 (Types other than above)		Applicable housing:51067-0500	1	Molex Japan	AWG18~24	57189-5000 57190-5000
		Applicable contact:50217-8100	5			

•Place the order of a set or sets of three model numbers CN1, CN2, and CN3 when ordering.

Connector cable

Model number	Application
PM-C02P0100-04	Connector cable for DC power source (CN1)
PM-C10S0100-02	Connector cable for I/O signal (CN2)
PM-C05M0100-□□	Connector cable for stepping motors (CN3)

□□ are spaces to be filled by the serial number 02 or 08
(refer to Supplement table 1).

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

Stepping motor cable model number (Supplement table 1)

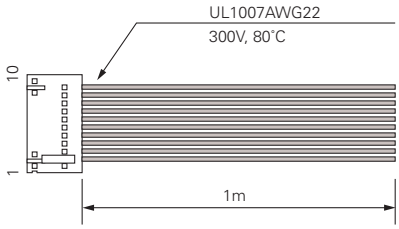
Serial No.	Stepping motor model number
02	103H6500-80 □□
	103H6501-80 □□
	103H7521-80 □□
	103H7522-80 □□
	103H7523-80 □□
	103H8581-80 □□
	103H8582-80 □□
	103H8583-80 □□
08	103H7851-80 □□
	103H7852-80 □□
	103H7853-80 □□

Option

● Cable 1 (I/O signal cable 1)

Driver side

Pin number	Color
1	Blue
2	
3	
4	
5	
6	
7	
8	
9	
10	

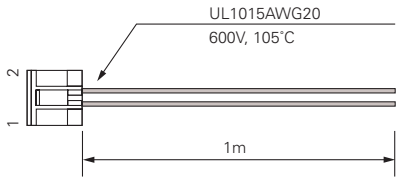


Cable model number	Length
PM-C10S0100-02	1m

● Cable 2 (power source cable 1)

Driver side

Pin number	Color
1	White
2	Black

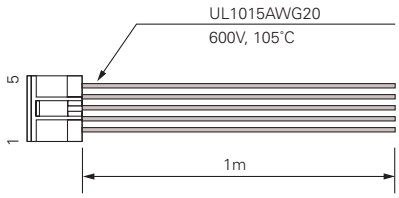


Cable model number	Length
PM-C02P0100-04	1m

● Cable 3 (stepping motor extension cable 1)

Driver side

Pin number	Color
1	Black
2	Red
3	Orange
4	Yellow
5	Blue



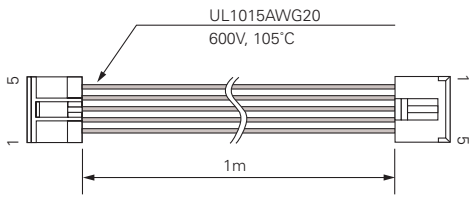
Cable model number	Length
PM-C05M0100-02	1m

Applicable stepping motor	
103H6500-80 □□	103H7523-80 □□
103H6501-80 □□	103H8581-80 □□
103H7521-80 □□	103H8582-80 □□
103H7522-80 □□	103H8583-80 □□

● Cable 4 (stepping motor extension cable 2)

Driver side

Pin number	Color
1	Black
2	Red
3	Orange
4	Yellow
5	Blue



Stepping motor side

Pin number	Color
1	Black
2	Yellow
3	Orange
4	Red
5	Blue

Cable model number	Length
PM-C05M0100-08	1m

Applicable stepping motor
103H7851-80 □□
103H7852-80 □□
103H7853-80 □□