



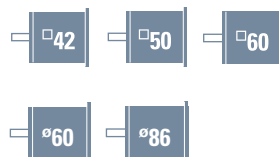
The 5-Phase Stepping Driver

PMDPC1S3P01

DC24V

Micro-step (500 x 1 to 80 divisions)

● Applicable motors



Characteristics

● Small size PM driver

This small-size and light-weight driver realizes 50% volumetric rate reduction from our conventional product.

● 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.

● Downsizing

Dedicated HIC is mounted to improve parts consolidation and reliability.

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 mode" 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.

● Operation current switchover function

Stepping motor operation current ranging from the rated one to 55% can be set by using the rotary switch.

PM driver specifications

Item		PMDPC1S3P01	
Basic specification	Environment	Input source	DC24V±10%
		Source current	2A
		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 500 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)	0.12kg(0.26 lbs)
Function	Select function	Automatic current reduction, pulse input system, and step angle operation current	
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	

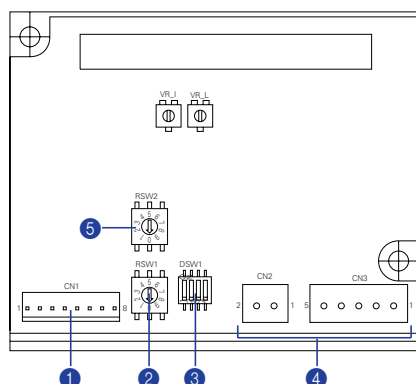
Standard combined stepping motor

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				
□42mm	103H5508-7040	103H5508-7010	0.176(24.92)	0.053(0.29)	0.28(0.62)	page 301
	103H5510-7040	103H5510-7010	0.255(36.11)	0.065(0.36)	0.37(0.82)	
□50mm	103H6500-7041	103H6500-7011	0.235(33.28)	0.057(0.31)	0.38(0.84)	page 303
	103H6501-7041	103H6501-7011	0.39(55.23)	0.105(0.57)	0.44(0.97)	
□60mm	103H7851-7051	103H7851-7021	0.65(92.0)	0.275(1.50)	0.6(1.32)	page 305
	103H7852-7051	103H7852-7021	0.98(138.8)	0.4(2.19)	0.78(1.72)	
□60mm	103H7853-7051	103H7853-7021	1.86(263.4)	0.84(4.59)	1.36(3.00)	page 307
	103H7521-7051	103H7521-7021	0.461(65.3)	0.148(0.81)	0.51(1.12)	
□60mm	103H7522-7051	103H7522-7021	0.735(104.1)	0.18(0.98)	0.6(1.32)	page 309
	103H7523-7051	103H7523-7021	1.568(222.0)	0.423(2.31)	1.1(2.43)	
□86mm	103H8581-7041	103H8581-7011	2.06(291.7)	1.45(7.93)	1.5(3.31)	page 309
	103H8582-7041	103H8582-7011	4.02(569.3)	2.9(15.86)	2.5(5.51)	
□86mm	103H8583-7041	103H8583-7011	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.

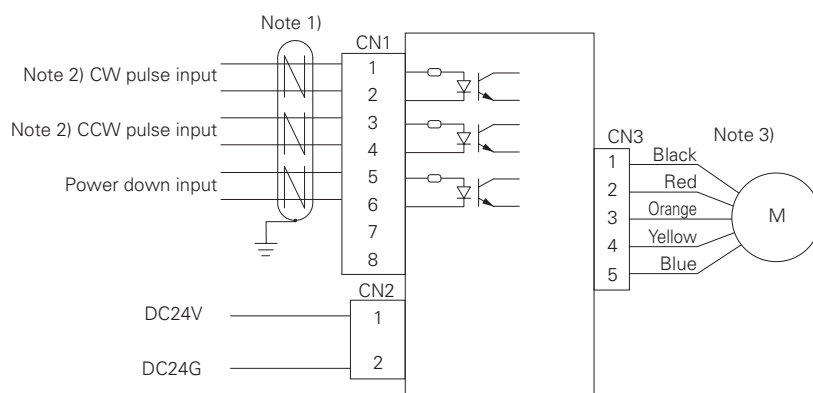
Operation, connection, and function

● Each section name of the PM driver



- ① Connector (CN1) Connects 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 Functions can be selected according to specifications.
(ACD, EDGE, F/R, and SP)
- ④ Connector (CN2 and CN3) Connects the DC power source and the stepping motor power cable.
- ⑤ Operation current selection switch Stepping motor current value during operation can be selected.
(RSW2)

● External wiring diagram



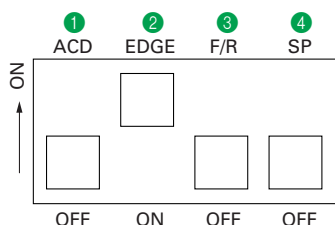
Note 1) Use shielded twisted-pair cables.

Note 2) Either "2-input mode (CW and CCW)" or "Pulse and direction mode (CK and U/D)" can be selected by using the function selection switch F/R

Note 3) Refer to the following table when connecting the 103H785 □ type stepping motor:

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

● Function selection dipswitch ---③



- ① ACD (automatic current reduction selection)
Automatic current reduction function is selected.

ACD	Automatic current reduction
ON	100% of current rating when stopped
OFF	Approx. 50% of current rating when stopped

- ② EDGE (Note)
This switch is not used.
Do not turn it OFF.

- ③ F/R (pulse input system selection)
A pulse input system is selected.

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

- ④ SP (Note)
This switch is not used.
Do not turn it OFF.

• Settings at the shipment are shown above.

• Turn OFF the PM driver power before changing switch settings to change the function selection dipswitch settings.

*1) The temperature increase in the motor driver can be controlled by setting ACD to Off (approx. 50% of the rated current).

*2) The output torque when ACD is Off (approx. 50% of the rated current) is approx. 50% of that when ACD is On (100% of the rated current).

Operation, connection, and function

● Step angle selection switch (RSW1) ---②

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

- "0" is set at the shipment.

● Current value selection rotary switch (RSW2) ---⑤

Operation current value of stepping motor can be selected.

Scale	0	1	2	3	4	5	6	7	8	9
Stepping motor current (%)	100 (rated)	95	90	85	80	75	70	65	60	55

- "0" is set at the shipment.

● I/O signal function ---①

Signal name	Abbreviation	Pin number	Function
CW pulse input	CW+	1	When using "2-input mode"
	CW-	2	Drive pulse for the CW direction rotation is input.
Pulse column input	CK+	1	When using "Pulse and direction mode"
	CK-	2	Drive pulse train for the stepping motor rotation is input.
CCW pulse input	CCW+	3	When using "2-input mode"
	CCW-	4	Drive pulse for the CCW direction rotation is input.
Rotation direction input	U/D+	3	The rotation direction signal of stepping motor is input for the "Pulse and direction mode".
	U/D-	4	Internal photocoupler ON CW direction Internal photocoupler OFF CCW direction
Power down input	PD+	5	Inputting the PD signal cuts OFF the current flowing through the stepping motor (turns OFF the power).
	PD-	6	PD input signal ON (internal photocoupler ON) PD function enabled PD input signal OFF (internal photocoupler OFF) . PD function disabled

- 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).
- The power down input resets the excitation 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).

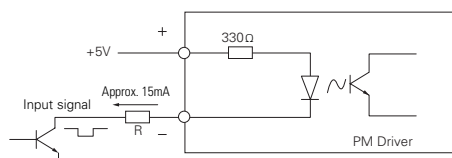
● Connectors to be used

PM driver side		Applicable connector model number	Manufacturer
Used for	Model number		
I/O signals (CN1)	5045-08AG	Applicable housing:5051-08 Applicable contact:2759PBGL	Molex Japan
DC power source (CN2)	53258-0210	Applicable housing:51067-0200 Applicable contact:50217-8100	Molex Japan
Stepping motor (CN3)	53258-0510	Applicable housing:51067-0500 Applicable contact:50217-8100	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 235).

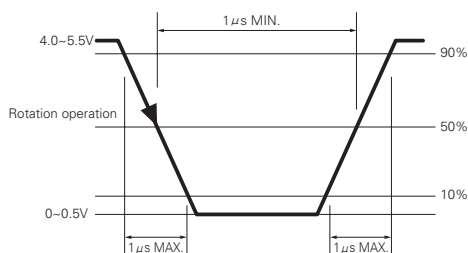
Operation, connection, and function

● Input circuit configuration (CW and CCW)



- 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.

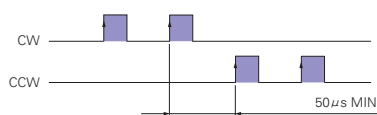
Input signal specifications



- Pulse duty is 50% MAX.

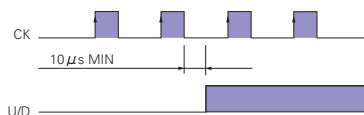
Timing of the command pulse

● 2-input mode (CW and CCW)



- The internal photocoupler turns ON at the leading edge of the photocoupler "ON".
- When applying no pulse, fix the internal photocoupler to "ON" or "OFF".

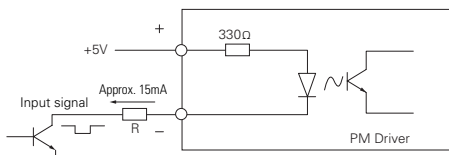
● Pulse and direction mode (CK and U/D)



- The internal photocoupler turns ON at the leading edge of the photocoupler "ON".
- Perform the U/D input signal switchover when the CK-side internal photocoupler is set to "OFF".

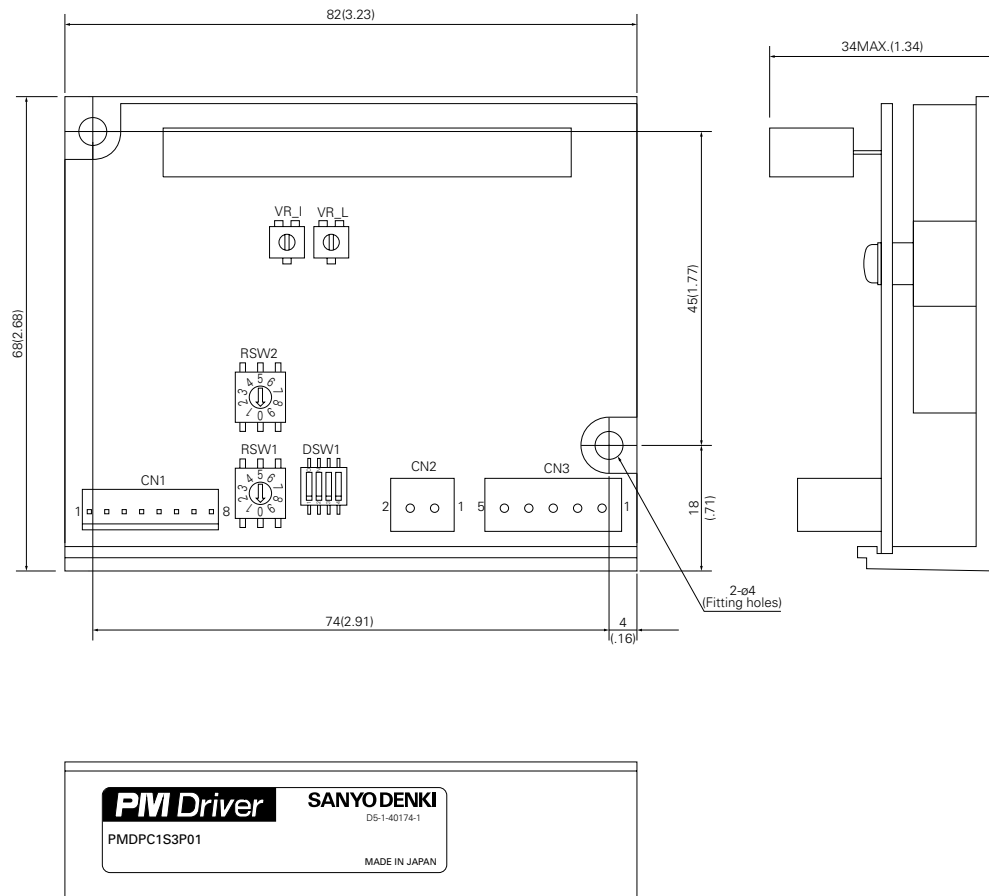
- The internal photocoupler turns ON at the leading edge of the photocoupler "ON".
- Perform the U/D input signal switchover when the CK-side internal photocoupler is set to "OFF".

● Input circuit configuration (PD)

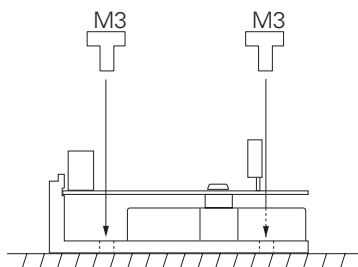


- When the peak value of the input signal is 5V, the external limit resistance R is 0 Ω . If the peak value exceeds 5V, set the input current to approx. 15mA using the external limit resistance R.

Dimensions [Unit:mm(inch)]



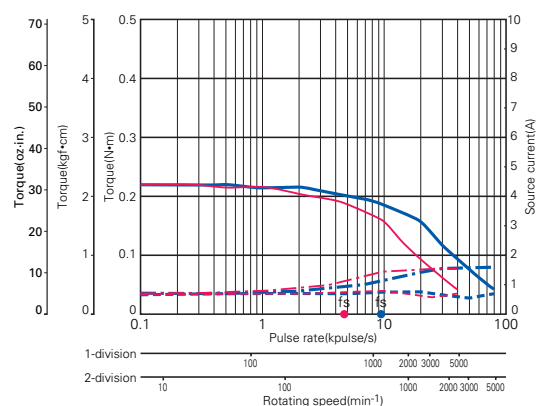
Installation direction and position



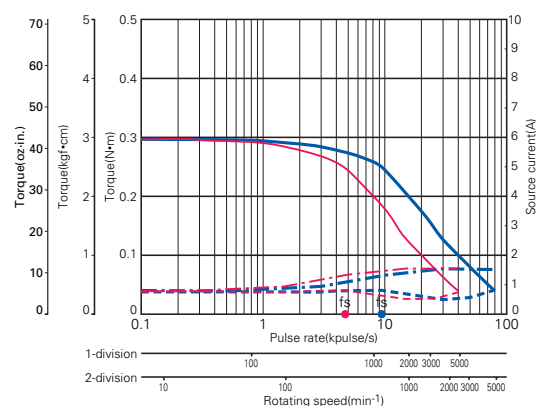
- Install the PM driver vertically.
- As shown in the figure, fix the PM driver by using the M3 screws through two fitting holes (2-φ4) on the bottom surface of PM driver (no fitting metals are necessary).

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

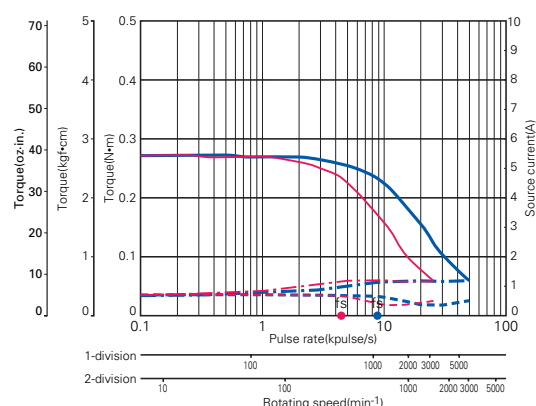
●103H5508-70 □□:24V



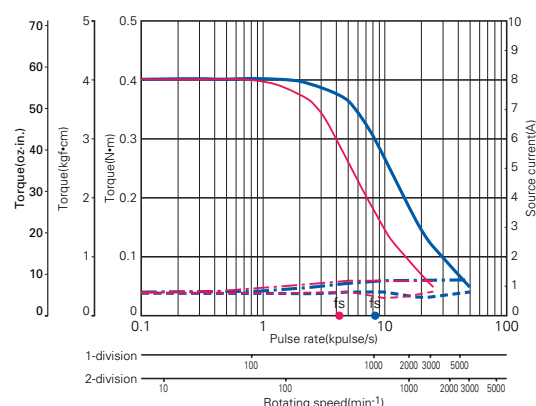
●103H5510-70 □□:24V



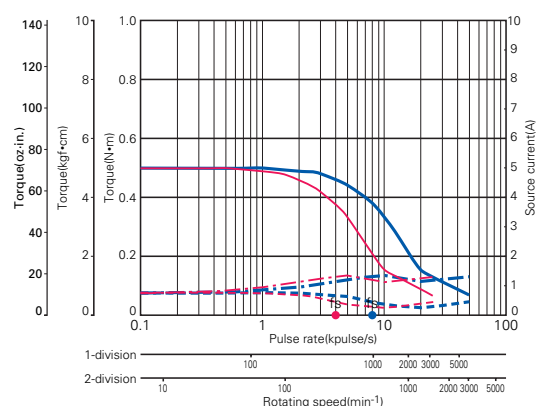
●103H6500-70 □□:24V



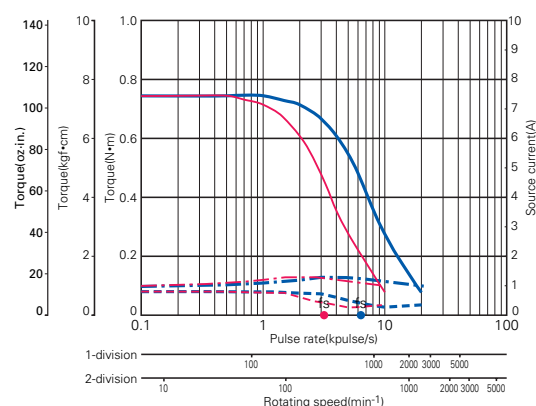
●103H6501-70 □□:24V



●103H7521-70 □□:24V

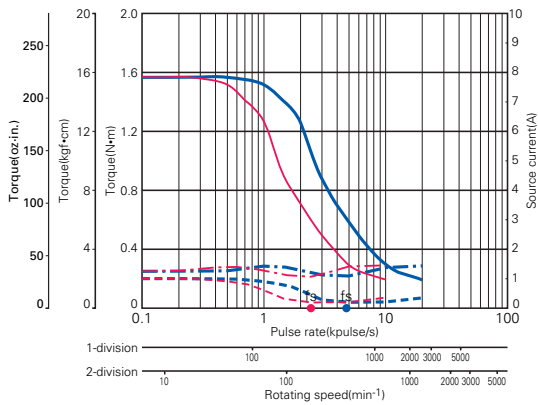


●103H7522-70 □□:24V



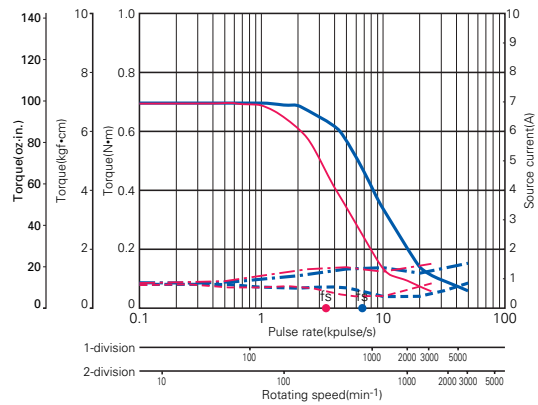
Pulse rate-torque characteristics/pulse rate-source current characteristics

103H7523-70 □□ :24V



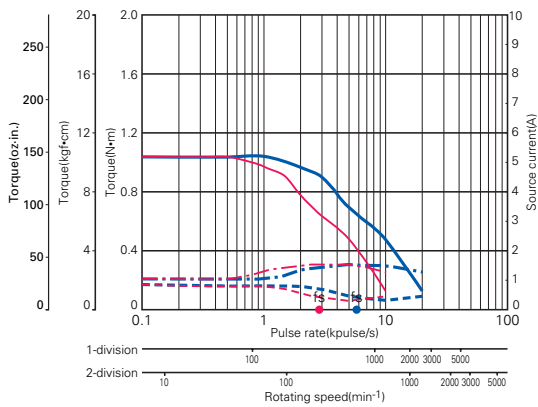
Source voltage:DC24V-Operating current: 0.75A/phase
 — Pull-out torque($J_{L1}=7.4 \times 10^{-4} \text{kg-m}^2$ [40.46 oz-in²] Use the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:No load maximum starting pluse rate
 ■ Full step ■ Half step

103H7851-70 □□ :24V



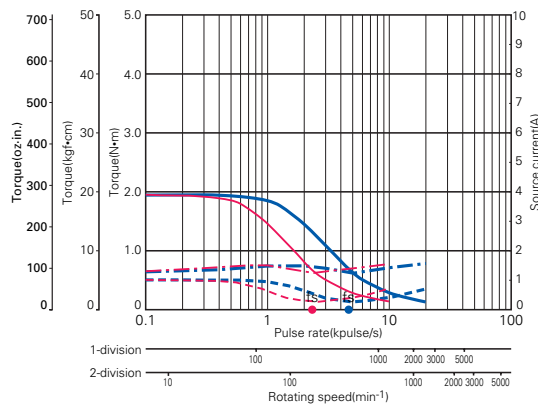
Source voltage:DC24V-Operating current: 0.75A/phase
 — Pull-out torque($J_{L1}=0.94 \times 10^{-4} \text{kg-m}^2$ [5.14 oz-in²] Use the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:No load maximum starting pluse rate
 ■ Full step ■ Half step

103H7852-70 □□ :24V



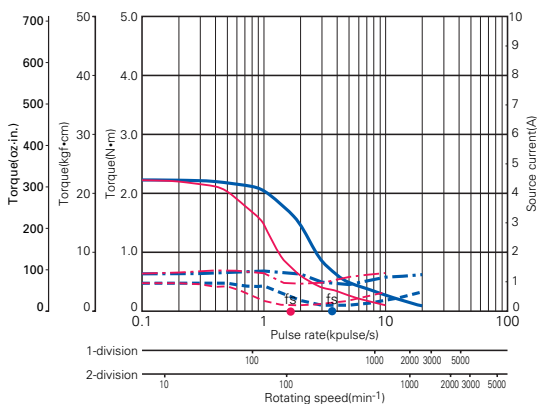
Source voltage:DC24V-Operating current: 0.75A/phase
 — Pull-out torque($J_{L1}=2.6 \times 10^{-4} \text{kg-m}^2$ [14.22 oz-in²] Use the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:No load maximum starting pluse rate
 ■ Full step ■ Half step

103H7853-70 □□ :24V



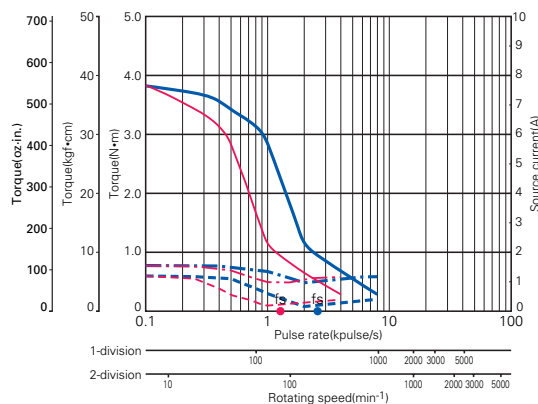
Source voltage:DC24V-Operating current: 0.75A/phase
 — Pull-out torque($J_{L1}=7.4 \times 10^{-4} \text{kg-m}^2$ [40.46 oz-in²] Use the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:No load maximum starting pluse rate
 ■ Full step ■ Half step

103H8581-70 □□ :24V



Source voltage:DC24V-Operating current: 0.75A/phase
 — Pull-out torque($J_{L1}=7.4 \times 10^{-4} \text{kg-m}^2$ [40.46 oz-in²] Use the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:No load maximum starting pluse rate
 ■ Full step ■ Half step

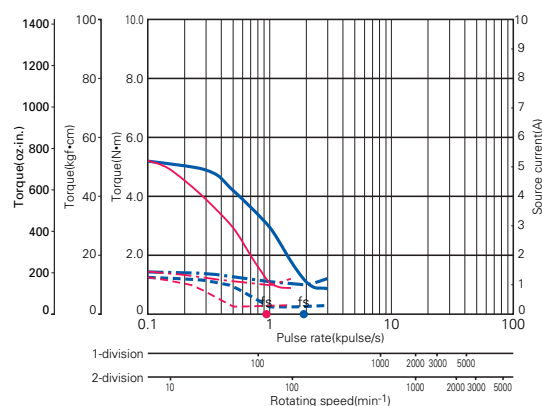
103H8582-70 □□ :24V



Source voltage:DC24V-Operating current: 0.75A/phase
 — Pull-out torque($J_{L1}=15.3 \times 10^{-4} \text{kg-m}^2$ [83.65 oz-in²] Use the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - 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

●103H8583-70 □□ :24V



Source voltage:DC24V:Operating current: 0.75A/phase

— Pull-out torque($J_L=43 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ [235.10 oz-in²]) Use the rubber coupling)

- - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)

fs:No load maximum starting pulse rate

■ Full step ■ Half step

Option

● Connector set

Model number	Used for	Set content	Quantity	Manufacturer name	Applicable cable size	Crimping tool model number
PM-AP-009	I/O signal (CN1)	Applicable housing:5051-08	1	Molex Japan	AWG22~28	JHTR2262A
		Applicable contact:2759PBGL	8			JHTR2262J
PM-AP-042	DC power source (CN2)	Applicable housing:51067-0200	1	Molex Japan	AWG18~24	57189-5000
		Applicable contact:50217-8100	2			57190-5000
PM-AP-051 (Type H785 □)	Stepping motor (CN3)	Applicable housing:51067-0500	1	Molex Japan	AWG18~22	57189-5000
		Applicable contact:50217-8100	5			57190-5000
		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
		Applicable contact:50217-8100	5			57190-5000

● Connector cable

Model number	Application
PM-C08S0100-02	Connector cable for I/O signal (CN1)
PM-C02P0100-04	Connector cable for DC power source (CN2)
PM-C05M0100- □□	Connector cable for stepping motors (CN3)

□□ are spaces to be filled by the serial number 05 or 06 (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	103H5508-70 □□
	103H5510-70 □□
	103H6500-70 □□
	103H6501-70 □□
	103H7521-70 □□
	103H7522-70 □□
	103H7523-70 □□
	103H8581-70 □□
	103H8582-70 □□
	103H8583-70 □□
08	103H7851-70 □□
	103H7852-70 □□
	103H7853-70 □□

Option

● Cable 1 (I/O signal cable)

Driver side	
Pin number	Color
1	Blue
2	
3	
4	
5	
6	
7	
8	

Cable model number	Length
PM-C08S0100-01	1m

● Cable 2 (power source cable)

Driver side	
Pin number	Color
1	White
2	

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			
103H5508-70		103H7522-70	
103H5510-70		103H7523-70	
103H6500-70		103H8581-70	
103H6501-70		103H8582-70	
103H7521-70		103H8583-70	

● 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	
103H7851-70	
103H7852-70	
103H7853-70	