



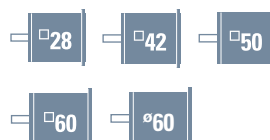
The 5-Phase Stepping Driver

PMDPA1C3P50

DC 24 V

DeviceNet I/F
CONFORMANCE TESTED

● Applicable motors



Characteristics

● **Conformity to DeviceNet**

This driver conforms to DeviceNet specified as the device network for FA.

● **Nonvolatile memory**

A series of block data and any parameters can be stored in the nonvolatile memory.

● **Simple setting**

No complicated setting is necessary as that of servo motors. It can be used as same as the conventional stepping system.

● **Changing target position and speed during the rotation**

The target position and the speed can be changed even during the rotation.

● **Encoder**

Connecting the incremental encoder enables the real position control and the step-out detection.

Built-in function

● **Pulse generation function ***

No pulse input is necessary for the operation using position commands and speed commands via network.

● **Block function**

Calling the block command that is registered beforehand enables the operation without worrying communication loads.

● **I/O function**

The origin sensor input, the limit sensor input, and the brake signal output are equipped to facilitate controls such as the origin recovery, the operation stop at the mechanical equipment limit, etc.

● **Alarm function**

Power source abnormality, nonvolatile memory abnormality and so on cause the output as alarms.

* It is controlled by the half-step drive. When the basic step angle is 0.72°, the basic step of the position and speed commands is 0.36°.

PM driver specifications

Item		PMDPA1C3P20	
Basic specifications	Environment	Input source	DC24V±10%
		Source current	2.5A
		Operating ambient temperature	0 to +50 °C
		Conservation temperature	-20 to +70 °C
		Operating ambient humidity	30 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.
Function		Mass(Weight)	0.5kg(1.10 lbs)
		Protection function	Against source voltage abnormality, nonvolatile memory abnormality, position data overflow, encoder disconnection, and step-out detection
		Selection function	MAC ID selection and transmission speed selection
I/O signals		LED indicator	Module status and network status
		Limit sensor input signal	Photocoupler input system, input resistance 4.7 kΩ
		Origin sensor input signal	Photocoupler input system, input resistance 4.7 kΩ
		External stop input signal	Photocoupler input system, input resistance 4.7 kΩ
		Alarm output signal	Open collector output by photocoupler Output signal standard Vceo: Maximum DC 30 V, Ic: Maximum 50 mA
		Brake output signal	Open collector output by photocoupler Output signal standard Vceo: Maximum DC 30 V, Ic: Maximum 50 mA
		Module status LED signal	Signal for LED (Stanley-make VRPG3312X or equivalent), Do not use it for other than monitors.
		Network status LED signal	Signal for LED (Stanley-make VRPG3312X or equivalent), Do not use it for other than monitors.
		Applicable DeviceNet specification:	Release2.0
		Transmission media	5-wire cable (2-wire signal system, 2-wire power source, and 1-wire shielded line)
Communication specification		Connector type	Shielded-type micro connector
		Physical layer insulation availability	Availabl
		Maximum network current consumption	50mA at11V DC
		Transmission speed	125kbit/s,250kbit/s,500kbit/s
		Transmission distance	Maximum 500 m (125 kbit/s) Maximum 250 m (250 kbit/s) Maximum 200 m (500 kbit/s)
		MAC ID setting	Maximum 64 stations (0 to 63)
		Device profile	Generic(Generic device)
		Message group	Group2 Only Server (Predefined Master/Slave Connection Set)
		Communication method	I/O Message Explicit Message
		Data length	I/O Message
			Input(Request) 8Byte
			Output(Response) 8Byte
			Explicit Message
			Request: Variable length Response: Variable length
		Explicit message division transmission support	Supported without transmission time out
		UCMM support	Not supported

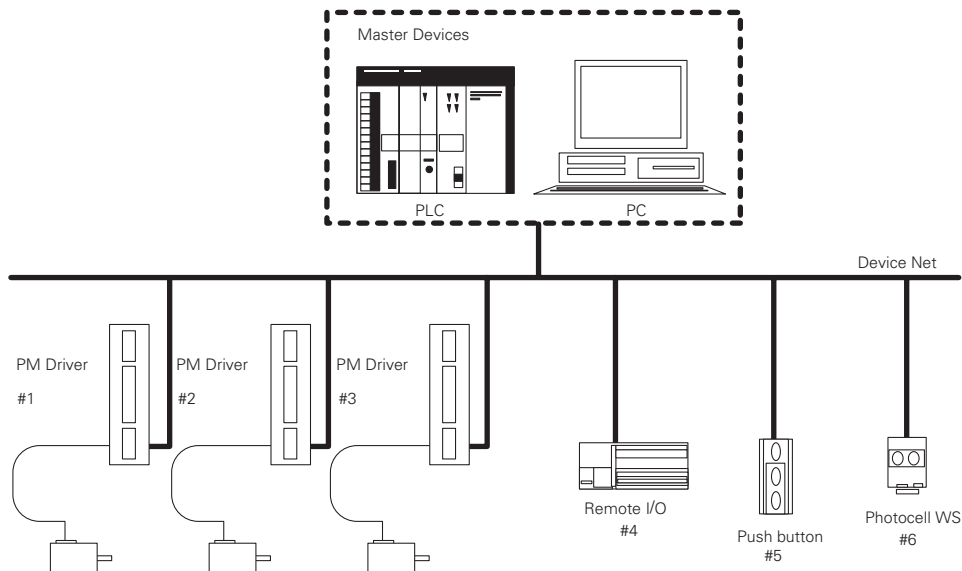
Standard combined stepping motor

Stepping motor dimensions	Stepping motor model number		Holding torque N·m(oz·in)	Rotor inertia x10 ⁻⁴ kg·m ² (oz·in ²)	Mass(Weight) kg(lbs)	Page
	Single shaft	Double shaft				
□28mm	103H3505-7040	103H3505-7010	0.026(3.68)	0.009(0.05)	0.11(0.24)	Page 299
	103H3515-7040	103H3515-7010	0.052(7.36)	0.016(0.09)	0.2(0.44)	
□42mm	103H5505-7040	103H5505-7010	0.127(17.98)	0.03(0.16)	0.23(0.51)	Page 301
	103H5508-7040	103H5508-7010	0.176(24.92)	0.053(0.29)	0.28(0.62)	
	103H5510-7040	103H5510-7010	0.225(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
ø60mm	103H7521-7051	103H7521-7021	0.461(65.3)	0.148(0.81)	0.51(1.12)	Page 307
	103H7522-7051	103H7522-7021	0.735(104.1)	0.18(0.98)	0.6(1.32)	
	103H7523-7051	103H7523-7021	1.568(222.0)	0.423(2.31)	1.1(2.43)	
□60mm	103H7851-7051	103H7851-7011	0.65(92.0)	0.275(1.50)	0.6(1.32)	Page 305
	103H7852-7051	103H7852-7011	0.98(138.8)	0.4(2.19)	0.78(1.72)	
	103H7853-7051	103H7853-7011	1.86(263.4)	0.84(4.59)	1.36(3.00)	

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

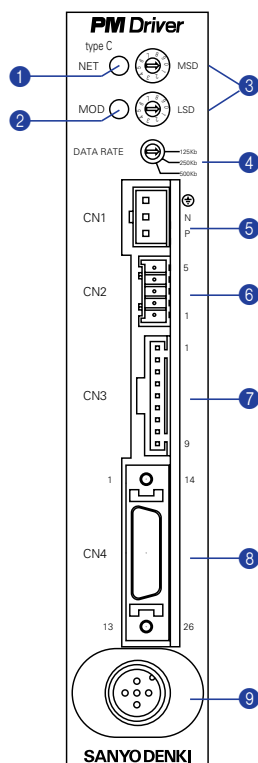
Operation, connection, and function

● DeviceNet system block diagram



- This PM driver in maximum 31 units can be connected on a same network as the DeviceNet slave device. In addition, it can be connected by mixing with other devices that conform to DeviceNet.

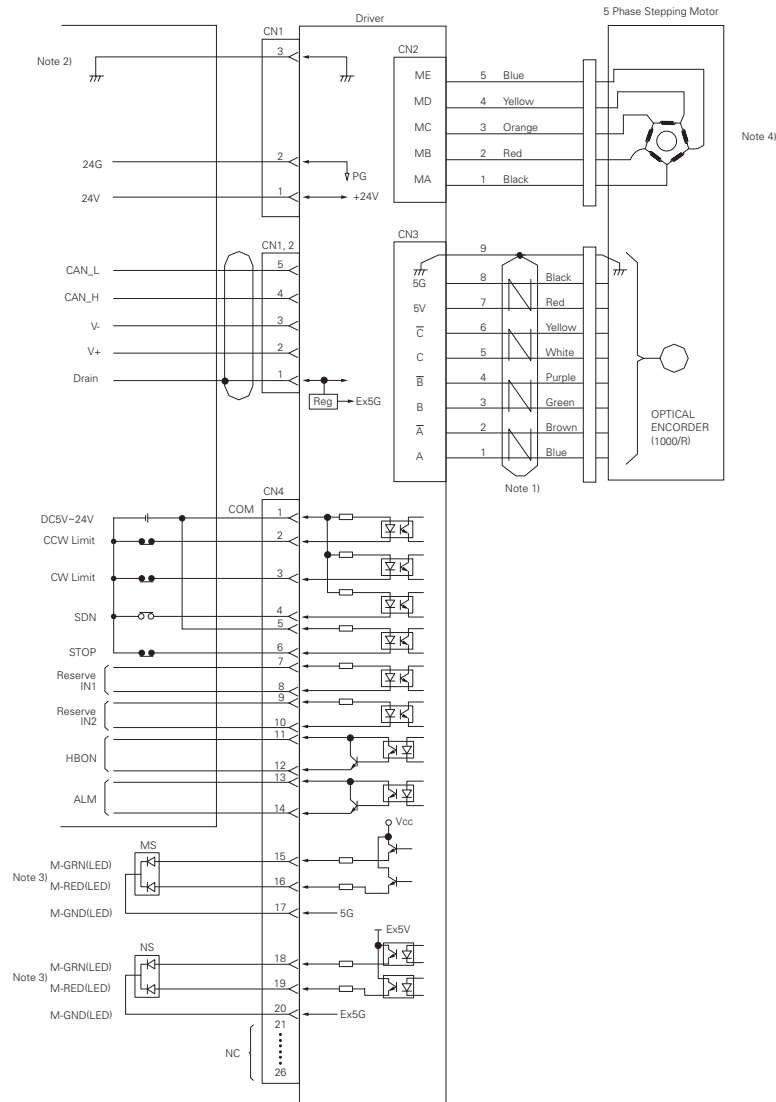
● Each section name of the PM driver



- 1 Network status LED (NET)Indicates the network status using 2-color LEDs.
- 2 Module status LED (MOD)Indicates the PM driver status using 2-color LEDs.
- 3 MAC ID setting switch (MSD,LSD)····It is the switch to set the slave station number (MAC ID).
- 4 Transmission baud rate setting switch (DATA RATE)··DeviceNet baud rate is set.
- 5 Power input connector (CN1)······Connects DC 24 V.
- 6 Stepping motor connector (CN2)····Connects the stepping motor power cable.
- 7 Encoder connector (CN3)Optional encoder can be connected.
- 8 Connector for I/O signal (CN4)Connects I/O signals.
- 9 Communication connector········It is the connector for the DeviceNet communication.

Operation, connection, and function

External wiring diagram



Note 1) Use shielded twisted-pair cables.

Note 2) Ground the stepping motor flange section and the stepping motor fastening screw by fixing them together.
In addition, use a single point grounding.

Note 3) LED output signals of MS and NS can be checked outside of the PM driver.
However, do not use it for other use than the LED drive.

Note 4) Refer to the following table when connecting the 103H35 or 103H785 type stepping motor:

Product	Connector pin number				
PM driver (CN2)	1	2	3	4	5
Stepping motor connector	1	4	3	2	5

PMAP1S8A01

PMAP1S8B01

PMM-MA-50034

PMM-MA-50064

PMM-BA-5603-5643

PMM-BA-5604-5644

PMDPB1SP01

PMDPC1SP01

PMM-MD-53030-53031

PMM-BD-53130-53131

PMDPD1SP01

PMDPATC3P50

Operation, connection, and function

● I/O signal function

Signal name (Abbreviation)	Pin number(CN4)	Function
CW limit input (CCWL)	2	The limit signal is input to disable the CW direction operation. Parameters such as enable/disable, input logic and so on can be set via communications.
CCW limit input (CWL)	3	The limit signal is input to disable the CCW direction operation. Parameters such as enable/disable, input logic and so on can be set via communications.
Origin sensor input (SDN)	4	The origin sensor signal is input. The input logic can be set via communications.
External stop input (STOP)	5 6	External stop signal is input. Parameters such as enable/disable, input logic and so on can be set via communications.
Brake timing output (HBON)	11 12	The timing signal of holding brake is output.
Alarm output (ALM)	13 14	The signal is externally output when one of several alarm occurs in the PM driver. At this time, the stepping motor is in the unexcited state. The output logic can be set via communications.
Module status output (MS)	15 16 17	It is the output to drive the LED for external indication to show the PM driver status. The output signal is as same as the MOD LED installed on the front panel.
Network status output (NS)	18 19 20	It is the output to drive the LED for external indication to show the network status. The output signal is as same as the NET LED installed on the front panel.

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

● Connectors to be used

Driver side		Applicable connector model number	Manufacturer
Used for	Model number		
DC power source (CN1)	53259-0310	Applicable housing:51067-0300 Applicable contact:50217-8100	Molex Japan
Stepping motor (CN2)	53426-0510	Applicable housing:51103-0500 Applicable contact:50351-8100	Molex Japan
Encoder (CN3)	53103-0920	Applicable housing:51030-0930 Applicable contact:50083-8060	J.S.T. Mfg Co., Ltd.
I/O signals (CN4)	10226-52A2JL	Plug:10126-3000VE Shell kit:10326-52A0-008	Sumitomo 3M
DeviceNet communication	WFS4,5-PCB	Connection cable:WK4.5T-2(2m)	TURK Inc.

- The connector cable for CN1 and the plug and shell kit for CN4 are attached to the main unit (refer to page 291 for Attachments).
The user is requested to prepare the other applicable connectors.
- The connection cable for DeviceNet communication is the manufacturer standard cable product.
The last digit of model number specifies the length of 2-m, 4-m, and 6-m products available. For the details, refer to the manufacturer's catalog.

Operation, connection, and function

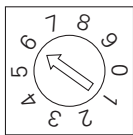
Module status indication

Indication	Explanation
Dark	Main power is not supplied to the PM driver.
Green lighting	The PM driver normally operates.
Red blinking	It is in the recoverable alarm status.
Red lighting	It is in the unrecoverable alarm status.

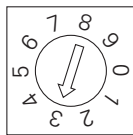
Network status indication

Indication	Explanation
Dark	The network power is not supplied. It is in the offline status.
Green blinking	It is in the online status despite no connection established.
Green lighting	There is a connection in the established condition.
Red blinking	A recoverable failure occurs.
Red lighting	The switch setting of MAC ID and communication baud rate is abnormal. It is in the unrecoverable status.

MAC ID setting rotary switch



MSD

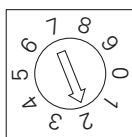


LSD

MSD	LSD	MAC ID
0	0	0
0	1	1
:	:	:
6	3	63
7~9	—	Setting impossible

- Left drawing indicates the setting at the shipment.
- The switch setting is enabled when the PM driver power is turned ON.

Transmission speed setting rotary switch



DATA RATE

125Kb

250Kb

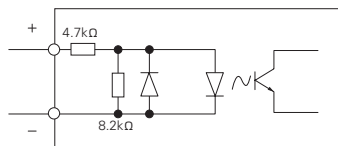
500Kb

DATA RATE	Transmission speed
0	125kbit/s
1	250kbit/s
2	500kbit/s
3~9	Setting impossible

- Left drawing indicates the setting at the shipment.
- The switch setting is enabled when the PM driver power is turned ON.

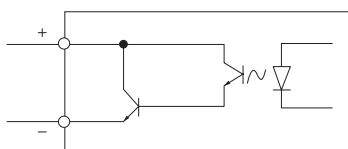
Operation, connection, and function

● Input circuit configuration (CWL, CCWL, SDN, STOP)



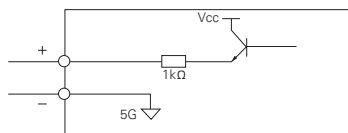
- Input voltage: DC 5 V to 24 V $\pm$ 10%
- Input logic (initial state): CWL, CCWL, and STOP: Normal close
SDN: Normal open

● Output circuit configuration (ALM, HBON)



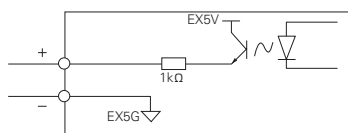
- Input voltage: Maximum 30 V
- Input current: Maximum 50 mA
- Input logic (initial state): ALM: Normal close
HBON: Normal open

● Output circuit configuration (MS)



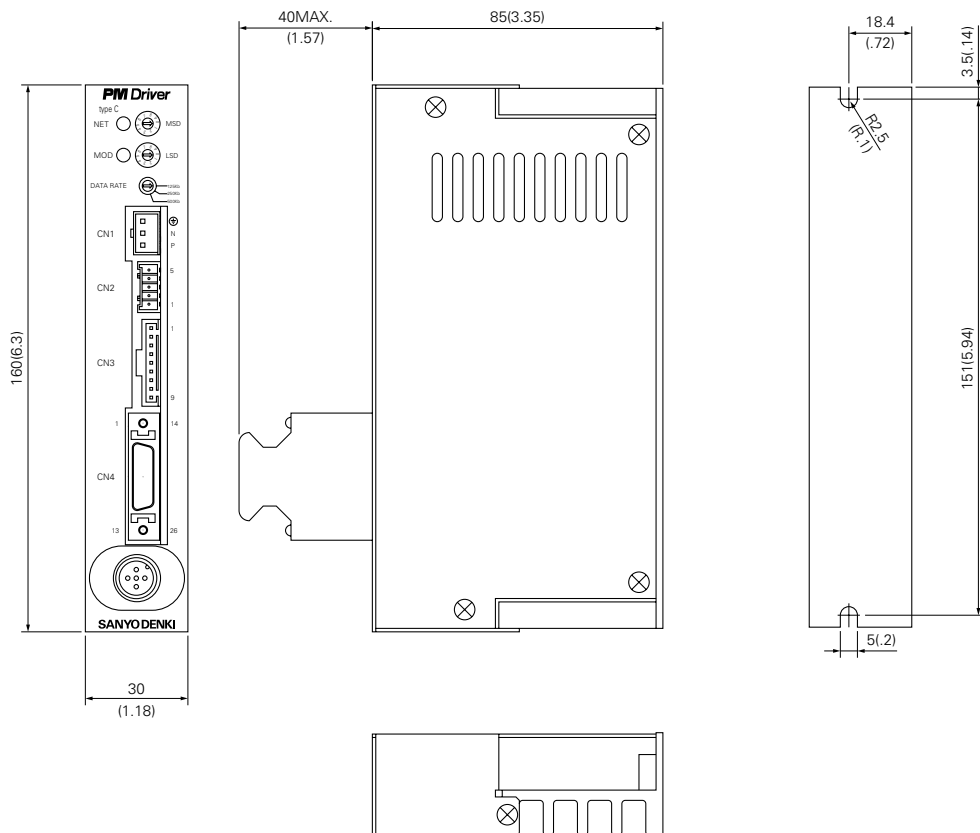
- Drive voltage: Vcc=5V

● Output circuit configuration (NS)

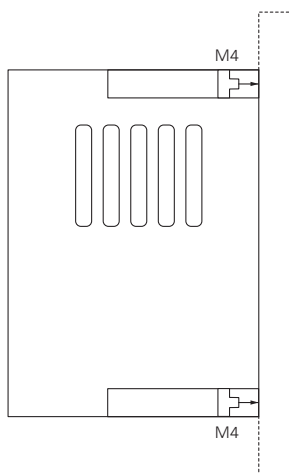


- Drive voltage: EX5V=5V

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 fitting notches on the back surface of PM driver (no fitting metals are necessary).
- Keep minimum 50-mm spaces above the top surface and under the bottom surface of PM driver or keep minimum 10-mm spaces between PM drivers when closely placing them to use.

PMAPA1S8A01

PMAPA1S8B01

PMM-MA-50034

PMM-MA-50064

PMM-BA-5603-5643

PMM-BA-5604-5644

PMDPB1S6P01

PMDPC1S3P01

PMM-MD-53030-53031

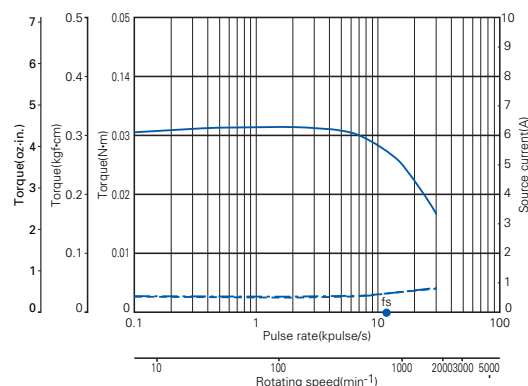
PMM-BD-53130-53131

PMDPD1S1P01

PMDPA1C3P50

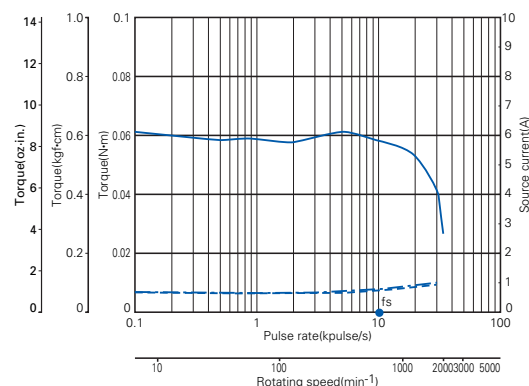
Pulse rate-torque characteristics/pulse rate-source current characteristics

●103H3505-70 □□ :24V



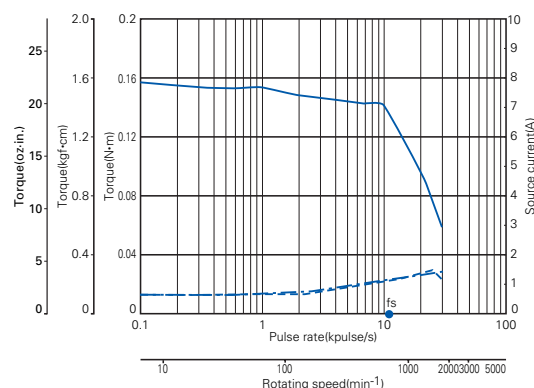
Source voltage:DC24V/Operating current: 0.75A/phase
 — Pull-out torque($J_L=0.33 \times 10^{-4} \text{kg} \cdot \text{m}^2 [1.80 \text{oz} \cdot \text{in}^2]$ Use the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:No load maximum starting pluse rate
 ■ Half-step

●103H3515-70 □□ :24V



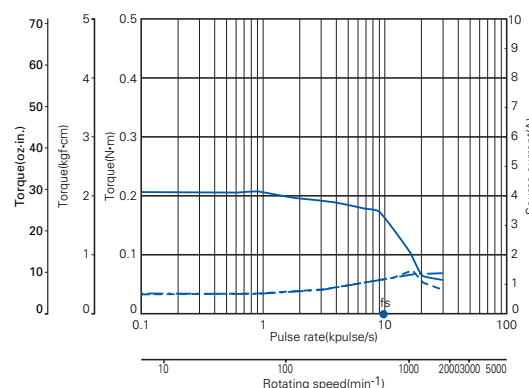
Source voltage:DC24V/Operating current: 0.75A/phase
 — Pull-out torque($J_L=0.33 \times 10^{-4} \text{kg} \cdot \text{m}^2 [1.80 \text{oz} \cdot \text{in}^2]$ Use the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:No load maximum starting pluse rate
 ■ Half-step

●103H5505-70 □□ :24V



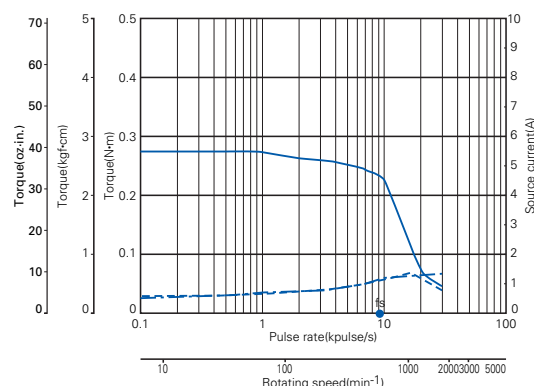
Source voltage:DC24V/Operating current: 0.75A/phase
 — Pull-out torque($J_L=0.33 \times 10^{-4} \text{kg} \cdot \text{m}^2 [1.80 \text{oz} \cdot \text{in}^2]$ Use the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:No load maximum starting pluse rate
 ■ Half-step

●103H5508-70 □□ :24V



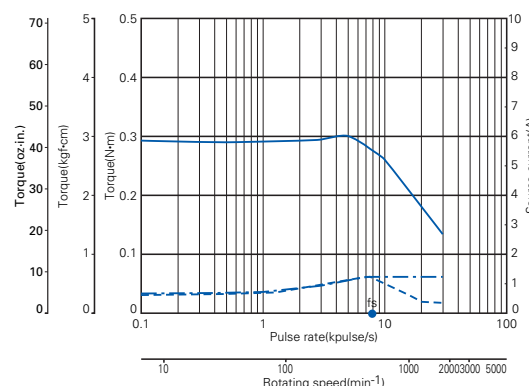
Source voltage:DC24V/Operating current: 0.75A/phase
 — Pull-out torque($J_L=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2 [5.14 \text{oz} \cdot \text{in}^2]$ Use the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:No load maximum starting pluse rate
 ■ Half-step

●103H5510-70 □□ :24V



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

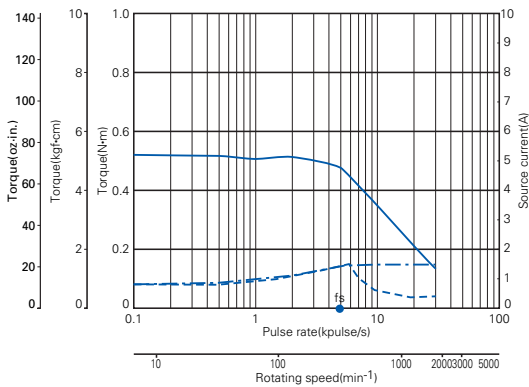
●103H6500-70 □□ :24V



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

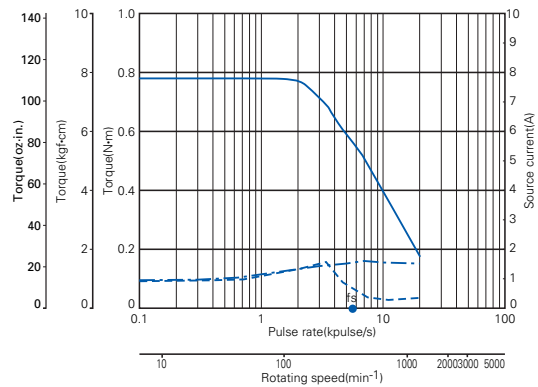
Pulse rate-torque characteristics/pulse rate-source current characteristics

103H7521-70 □□ :24V



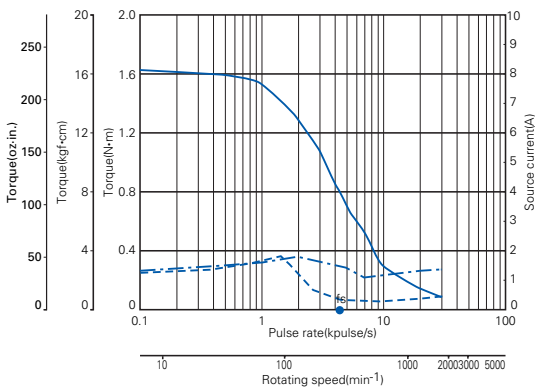
Source voltage:DC24V.Operating current: 0.75A/phase
 — Pull-out torque($J_{L1}=0.94 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ [5.14 oz·in²] Use the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:No load maximum starting pluse rate
 ■ Half-step

103H7522-70 □□ :24V



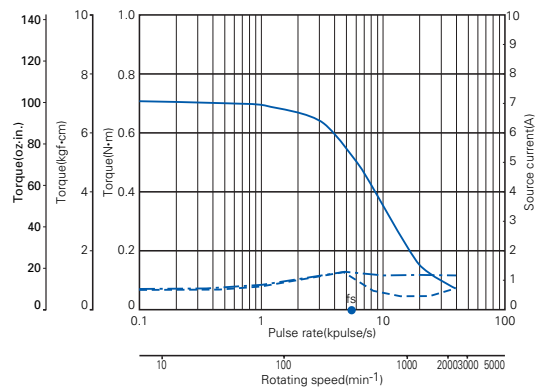
Source voltage:DC24V.Operating current: 0.75A/phase
 — Pull-out torque($J_{L1}=2.6 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ [14.22 oz·in²] Use the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:No load maximum starting pluse rate
 ■ Half-step

103H7523-70 □□ :24V



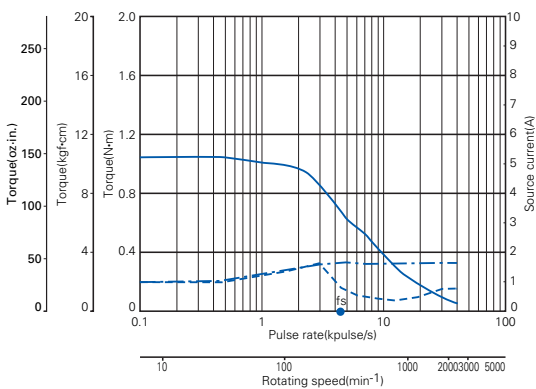
Source voltage:DC24V.Operating current: 0.75A/phase
 — Pull-out torque($J_{L1}=7.4 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ [40.46 oz·in²] Use the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:No load maximum starting pluse rate
 ■ Half-step

103H7851-70 □□ :24V



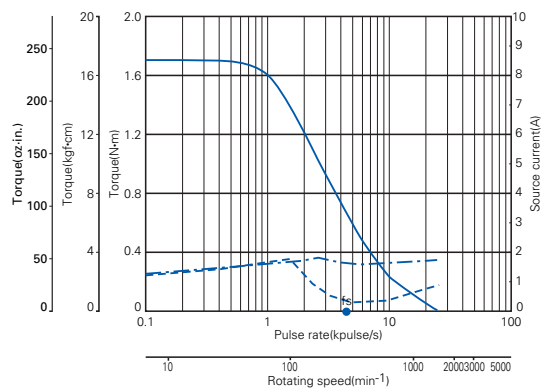
Source voltage:DC24V.Operating current: 0.75A/phase
 — Pull-out torque($J_{L1}=0.94 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ [5.14 oz·in²] Use the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:No load maximum starting pluse rate
 ■ Half-step

103H7852-70 □□ :24V



Source voltage:DC24V.Operating current: 0.75A/phase
 — Pull-out torque($J_{L1}=2.6 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ [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
 ■ Half-step

103H7853-70 □□ :24V



Source voltage:DC24V.Operating current: 0.75A/phase
 — Pull-out torque($J_{L1}=7.4 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ [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
 ■ Half-step

PMAP1S6A01

PMAP1S6B01

PMM-MA-50034

PMM-MA-50064

PMM-BA-5603
-5643

PMM-BA-5604
-5644

PMDPB1S6P01

PMDPC1S3P01

PMM-MD-53030
-53031

PMM-BD-53130
-53131

PMDPD1S1P01

PMDPA1C3P50

Option

● Connector set (attachments)

Configuration	Application
Plug : 10126-3000VE Shell kit : 10326-52A0-008	I/O signal and DC power source(CN4)

● Connector cable (attachments)

Model number	Application
PM-C03P0100-20	Connector cable for power source(1m)

● Connector cable (option)

Model number	Application
PM-C03P0100-20	Connector cable for power source (1m)
PM-C03P0200-20	Connector cable for power source (2m)
PM-C05M0100-20	Stepping motor extension cable (1m)
PM-C05M0200-20	Stepping motor extension cable (2m)
PM-C05M0300-20	Stepping motor extension cable (3m)
PM-C09T0100-20	Encoder extension cable (1m)
PM-C09T0200-20	Encoder extension cable (2m)
PM-C09T0300-20	Encoder extension cable (3m)
PM-C26T0100-20	I/O signal cable (1m)
PM-C26T0200-20	I/O signal cable (2m)
PM-C26T0300-20	I/O signal cable (3m)

- Connector cables are assembled with connectors for each interface.
- For connectors used for stepping motor extension cables and encoder extension cables, refer to Supplement table 1.

Connectors used for extension cables (Supplement table 1)

Connector cable model number	Receiver side connector model number	Applicable connector model number	Manufacturer
PM-C05M0 □ 00-20 (Stepping motor extension cable)	Housing : 51112-0510 Contact : 50398-8000	Applicable housing : 51111-0510 Applicable contact : 50397-8000	Molex Japan
PM-C09T0 □ 00-20 (Encoder extension cable)	Housing : 51029-0910 Contact : 50087-8060	Applicable housing : 51030-0930 Applicable contact : 50083-8060	Molex Japan

Option

Applicable driver model number	Applicable connector cable			
	CN1	CN2	CN3	CN4
PMDPA1C3P20	Cable 1	Cable 2	Cable 3	Cable 4

● Cable 1 (power source cable)

Driver side

Pin number	Color
1	Red
2	Black
3	Green

Cable model number	Length(L1)
PM-C03P0100-20	1m
PM-C03P0200-20	2m

● Cable 2 (stepping motor extension cable)

Driver side

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

Stepping motor side

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

Cable model number	Length(L2)
PM-C05M0100-20	1m
PM-C05M0200-20	2m
PM-C05M0300-20	3m

● Cable 3 (encoder extension cable)

Driver side

Pin number	Color
1	Blue
2	Brown
3	Green
4	Purple
5	White
6	Yellow
7	Red
8	Black
9	Black

Stepping motor side

Pin number	Color
1	Blue
2	Brown
3	Green
4	Purple
5	White
6	Yellow
7	Red
8	Black
9	Black

Cable model number	Length(L3)
PM-C09T0100-20	1m
PM-C09T0200-20	2m
PM-C09T0300-20	3m

● Cable 4 (I/O signal cable)

Cable model number	Length(L4)
PM-C26T0100-20	1m
PM-C26T0200-20	2m
PM-C26T0300-20	3m