

STEPPING SYSTEMS



Stepping Systems



SANYO DENKI



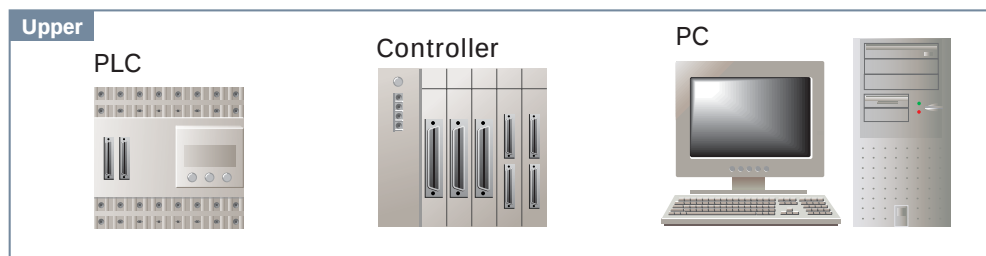
ENGLISH
Release 1.0



STEPPING SYSTEM

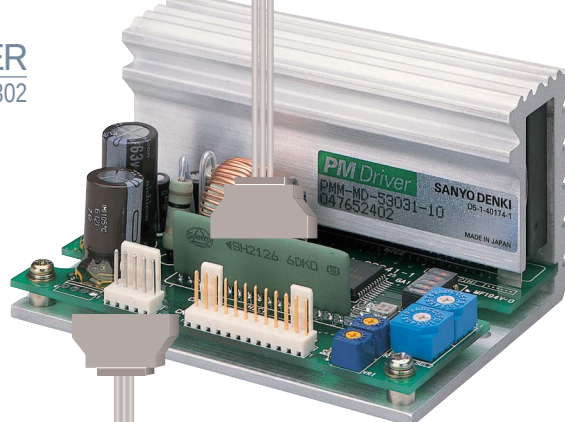
The 5-phase Stepping Set

Stepping system configuration chart



5-phase stepping set

DRIVER
P129 to P302



MOTOR
"STEPSYN F" series
"STEPSYN M" series



Accessories

- Instruction Manual
- Metal Fittings*
- Terminal Base Cover*
- Cable*

For accessories marked with asterisks** refer to the pages of relevant set.

The 5-phase stepping set includes
"PM driver, stepping motor,
and accessories" packed in a box.



With encoder With harmonic gear With electromagnetic brake



Damper

Set list

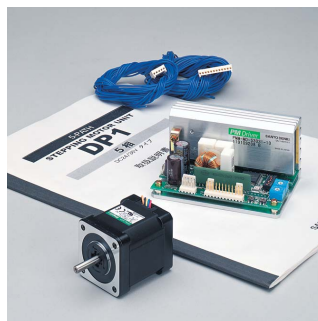


AP1 AC200V/230V

PMPA
1S6A01

□86 □106

P11~P22



DP1 DC24V/36V

PMM-MD-53030

□28 □42 □60

P79~P94



BP1 AC100V/115V

PMM-BA
5603

PMM-BA
5604

□42 □60

□86 □106

P23~P40



DP2 DC24V/36V

PMM-BD-53130

□28 □42 □60

P95~P110



BP2 AC100V/115V

PMPA
1S6B01

□60 □86 □106

P41~P52



DP3 DC24V

PMDPB1S6P01

□60 □86

P111~P122



WP1 AC100V~230V

PMM-MA
50034

PMM-MA
50064

□42 □60

□86 □106

P53~P78



DP4 DC24V

PMDPC1S3P01

□42 □60

P123~P128

Explanation of set model number

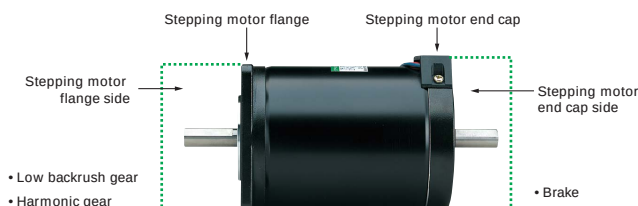
A P 1 3 F 78 1 S - G B 3.6

- ① Set series name
② Set series classification
③ Standard set model number
④ Set model number with the system (gear, electromagnetic brake, and encoder) included

⑩ System specifications

I (Flange side)	II (End cap side)	III	System contents
G			Spar gear
C			Low back-rush gear
H			Harmonic gear
×			None on flange side
	B		Electromagnetic brake
	(E)		(Encoder)
	×		None on end cap side
		3.6 to 100	Gear deceleration ratio (Example) 3.6 : 1: 3.6

• Please contact us regarding the encoder



⑨ Partition

⑧ Stepping motor shaft specification

S : Single-axis shaft D : Dual-axis shaft

⑦ Total length of stepping motor (indicated by the lowest one digit of motor type except for 28 square and 42 square)

	Motor type				
	□28	□42	□60	ø86	ø106
1	3505	5505	7851	8581	89581
2	—	5508	7852	8582	89582
3	—	5509	7853	8583	89583
4	—	5510	—	—	—
6	3515	—	—	—	—

“—” indicates unavailability of motor types. The larger type number indicates the longer total length of motor.

⑥ Stepping motor dimensions (indicated by the upper two digits)

35 : □28 85 : ø86
55 : □42 89 : ø106
78 : □60

(Example) Stepping motor model number : 103F7851-8041

Indicates the motor type (4 to 5 digits).

⑤ Stepping motor series name

M: Stepping motors conforming to UL Standards and CE Marking “STEPSYN M” series
F: Standard stepping motor for set (for general industrial machines) “STEPSYN F” series

④ Rated current specification

(1: 0.35A/phase, 2: 0.75A/phase, 3: 1.5A/phase)

③ Serial numbers for PM driver model number

Set series name	Driver model number
AP1	PMAA1S6A01 (1.5A/phase)
BP1	PMM-BA-5603-1 (0.75A/phase)
	PMM-BA-5604-1 (1.5A/phase)
BP2	PMAA1S6B01 (1.5A/phase)
WP1	PMM-MA-50034-10 (0.75A/phase)
	PMM-MA-50064-10 (1.5A/phase)
DP1	PMM-MD-53030-10 (0.75A/phase)
DP2	PMM-BD-53130-10 (0.75A/phase)
DP3	PMDPB1S6P01 (1.5A/phase)
DP4	PMDPC1S3P01 (0.75A/phase)

② Connection specification

P: 5-phase pentagon connection

① Power specification

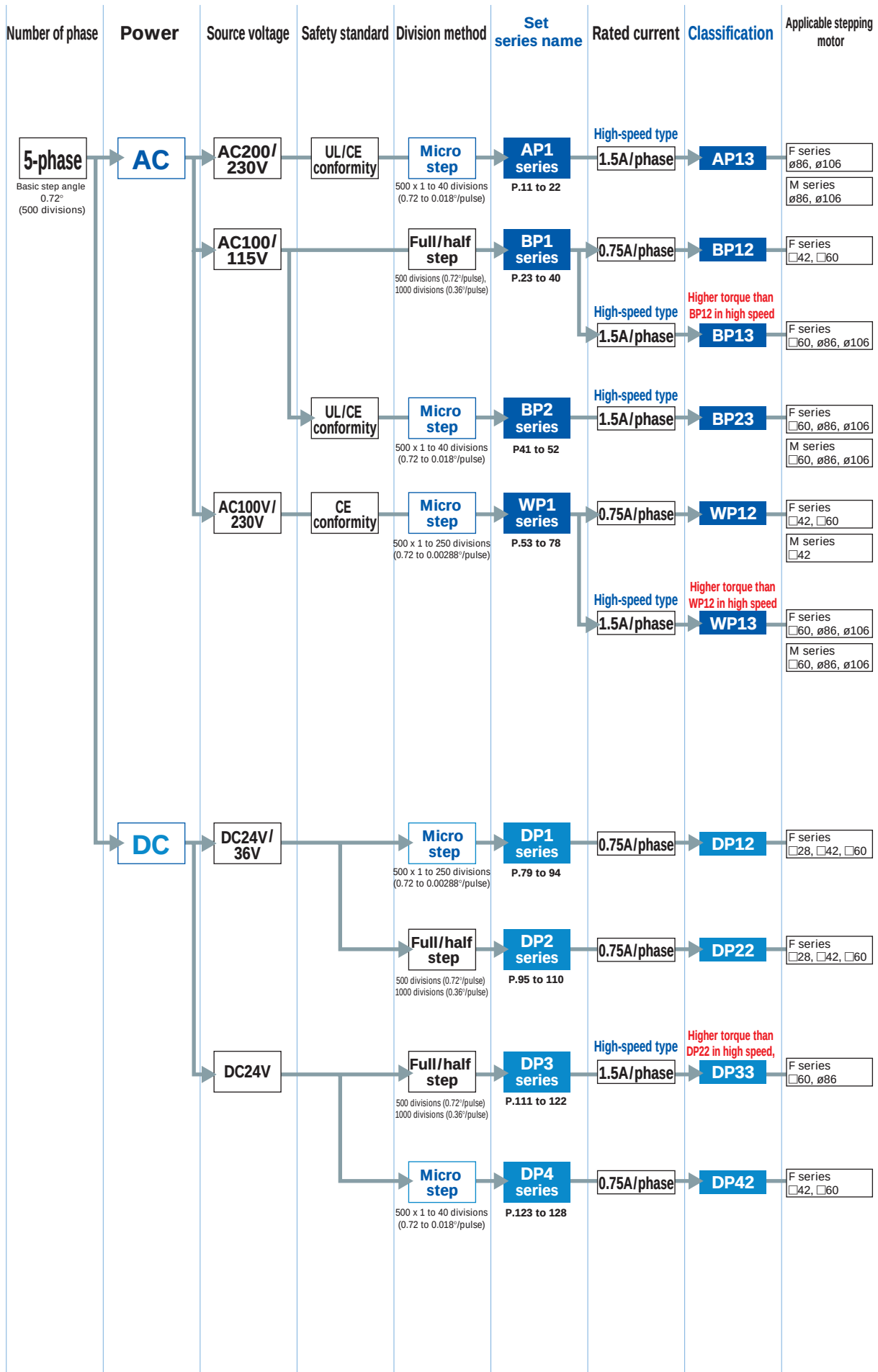
A: AC200V/230V B: AC100V/115V
W: AC100V to 230V D: DC

Set series name

(composed of ①+②+③)

This example indicates “AP1 series”.

Flowchart for the set selection



■ Set products combination (AC input type)

Set series name						WP1 series		AP1 series	BP2 series	BP1 series	
Combination	Driver				Model number	WP12 ···	WP13 ···	AP13 ···	BP23 ···	BP12 ···	BP13 ···
					Power source	PMM-MA-50034	PMM-MA-50064	PMAPA1S6A01	PMAPA1S6B01	PMM-BA-5603	PMM-BA-5604
	Specification				AC100~230V 0.75 A/phase	AC100~230V 1.5 A/phase	AC200/230V 1.5 A/phase	AC100/115V 1.5 A/phase	AC100/115V 0.75 A/phase	AC100/115V 1.5 A/phase	
	Dimensions, mm	Motor number	Rated current A/phase	Holding torque N·m (at 5-phase excitation)	Rotor inertia × 10 ⁻⁴ kg·m ²	Micro-step (1 to 250 divisions)	Micro-step (1 to 250 divisions)	Micro-step (1 to 40 divisions)	Micro-step (1 to 40 divisions)	Full step/half step (1 division/2 divisions)	Full step/half step (1 division/2 divisions)
STEPSPYN F (Standard motor)	□ 28	103F3505-7041(7011)	0.75	0.036	0.009	—	—	—	—	—	—
		103F3515-7041(7011)	0.75	0.065	0.016	—	—	—	—	—	—
	□ 42	103F5505-7041(7011)	0.75	0.13	0.03	WP12F551S(D)	—	—	—	BP12F551S(D)	—
		103F5508-7041(7011)	0.75	0.18	0.053	WP12F552S(D)	—	—	—	BP12F552S(D)	—
		103F5510-7041(7011)	0.75	0.26	0.065	WP12F554S(D)	—	—	—	BP12F554S(D)	—
	□ 60	103F7851-7041(7011)	0.75	0.6	0.275	WP12F781S(D)	—	—	—	BP12F781S(D)	—
		103F7852-7041(7011)	0.75	0.98	0.4	WP12F782S(D)	—	—	—	BP12F782S(D)	—
		103F7853-7041(7011)	0.75	1.79	0.84	WP12F783S(D)	—	—	—	BP12F783S(D)	—
	ø 86	103F7851-8041(8011)	1.5	0.6	0.275	—	WP13F781S(D)	—	—	—	BP13F781S(D)
		103F7852-8041(8011)	1.5	0.98	0.4	—	WP13F782S(D)	—	BP23F782S(D)	—	BP13F782S(D)
		103F7853-8041(8011)	1.5	1.79	0.84	—	WP13F783S(D)	—	BP23F783S(D)	—	BP13F783S(D)
		103F8581-8041(8011)	1.5	2.06	1.45	—	WP13F851S(D)	AP13F851S(D)	BP23F851S(D)	—	BP13F851S(D)
	ø 106	103F8582-8041(8011)	1.5	4.02	2.9	—	WP13F852S(D)	AP13F852S(D)	BP23F852S(D)	—	BP13F852S(D)
		103F8583-8041(8011)	1.5	6.17	4.4	—	WP13F853S(D)	AP13F853S(D)	BP23F853S(D)	—	BP13F853S(D)
		103F89582-8041(8011)	1.5	10.8	14.6	—	WP13F892S(D)	AP13F892S(D)	BP23F892S(D)	—	BP13F892S(D)
		103F89583-8041(8011)	1.5	16	22	—	WP13F893S(D)	AP13F893S(D)	BP23F893S(D)	—	BP13F893S(D)
STEPSPYN M (Conforms to UL, CE)	□ 42	103M5505-7041(7011)	0.75	0.13	0.03	WP12M551S(D)	—	—	—	—	—
		103M5508-7041(7011)	0.75	0.18	0.053	WP12M552S(D)	—	—	—	—	—
		103M5510-7041(7011)	0.75	0.26	0.065	WP12M554S(D)	—	—	—	—	—
	□ 60	103M7851-8041(8011)	1.5	0.6	0.275	—	WP13M781S(D)	—	—	—	—
		103M7852-8041(8011)	1.5	0.98	0.4	—	WP13M782S(D)	—	BP23M782S(D)	—	—
		103M7853-8041(8011)	1.5	1.79	0.84	—	WP13M783S(D)	—	BP23M783S(D)	—	—
	ø 86	103M8581-8041(8011)	1.5	2.1	1.45	—	WP13M851S(D)	AP13M851S(D)	BP23M851S(D)	—	—
		103M8582-8041(8011)	1.5	4.02	2.9	—	WP13M852S(D)	AP13M852S(D)	BP23M852S(D)	—	—
		103M8583-8041(8011)	1.5	6.17	4.4	—	WP13M853S(D)	AP13M853S(D)	BP23M853S(D)	—	—
	ø 106	103M89582-8041(8011)	1.5	10.8	14.6	—	WP13M892S(D)	AP13M892S(D)	BP23M892S(D)	—	—
		103M89583-8041(8011)	1.5	16	22	—	WP13M893S(D)	AP13M893S(D)	BP23M893S(D)	—	—
	For set products, refer:						P53~	P53~	P11~	P41~	P23~

■ Set products option combination (AC input type)

Set series name						WP1 series		AP1 series	BP2 series	BP1 series	
Combination	Driver				Model number	WP12 . . .	WP13 . . .	AP13 . . .	BP23 . . .	BP12 . . .	BP13 . . .
						PMM-MA-50034	PMM-MA-50064	PMAPA1S6A01	PMAPA1S6B01	PMM-BA-5603	PMM-BA-5604
	STEPSYN F				Power source	AC100~230V	AC100~230V	AC200/230V	AC100/115V	AC100/115V	AC100/115V
					Specification	0.75 A/phase	1.5 A/phase	1.5 A/phase	1.5 A/phase	0.75 A/phase	1.5 A/phase
	Dimensions, mm	Model number	Rated current A/phase	Allowable torque N•m	Deceleration ratio	Micro-step (1 to 250 divisions)	Micro-step (1 to 250 divisions)	Micro-step (1 to 40 divisions)	Micro-step (1 to 40 divisions)	Full step/half step (1 division/2 divisions)	Full step/half step (1 division/2 divisions)
Spur gear (G)	□ 28	103F3505-70GXA4(GXA1)	0.75	0.1	1/ 3.6	—	—	—	—	—	—
		103F3505-70GXB4(GXB1)	0.75	0.15	1/ 7.2	—	—	—	—	—	—
		103F3505-70GXE4(GXE1)	0.75	0.2	1/ 10	—	—	—	—	—	—
		103F3505-70GXG4(GXG1)	0.75	0.35	1/ 20	—	—	—	—	—	—
		103F3505-70GXJ4(GXJ1)	0.75	0.5	1/ 30	—	—	—	—	—	—
		103F3505-70GXL4(GXL1)	0.75	0.5	1/ 50	—	—	—	—	—	—
Low back-rush gear (C)	□ 42	103F5505-70CXA4(CXA1)	0.75	0.35	1/ 3.6	WP12F551S(D)-CX3.6	—	—	—	BP12F551S(D)-CX3.6	—
		103F5505-70CXB4(CXB1)	0.75	0.7	1/ 7.2	WP12F551S(D)-CX7.2	—	—	—	BP12F551S(D)-CX7.2	—
		103F5505-70CXE4(CXE1)	0.75	1	1/ 10	WP12F551S(D)-CX10	—	—	—	BP12F551S(D)-CX10	—
		103F5505-70CXG4(CXG1)	0.75	1.5	1/ 20	WP12F551S(D)-CX20	—	—	—	BP12F551S(D)-CX20	—
		103F5505-70CXJ4(CXJ1)	0.75	1.5	1/ 30	WP12F551S(D)-CX30	—	—	—	BP12F551S(D)-CX30	—
		103F5505-70CXC4(CXC1)	0.75	1.5	1/ 36	WP12F551S(D)-CX36	—	—	—	BP12F551S(D)-CX36	—
	□ 60	103F7851-80CXA4(CXA1)	1.5	1.25	1/ 3.6	—	WP13F781S(D)-CX3.6	—	—	—	BP13F781S(D)-CX3.6
		103F7851-80CXB4(CXB1)	1.5	2.5	1/ 7.2	—	WP13F781S(D)-CX7.2	—	—	—	BP13F781S(D)-CX7.2
		103F7851-80CXE4(CXE1)	1.5	3	1/ 10	—	WP13F781S(D)-CX10	—	—	—	BP13F781S(D)-CX10
		103F7851-80CXG4(CXG1)	1.5	3.5	1/ 20	—	WP13F781S(D)-CX20	—	—	—	BP13F781S(D)-CX20
		103F7851-80CXJ4(CXJ1)	1.5	4	1/ 30	—	WP13F781S(D)-CX30	—	—	—	BP13F781S(D)-CX30
		103F7851-80CXC4(CXC1)	1.5	4	1/ 36	—	WP13F781S(D)-CX36	—	—	—	BP13F781S(D)-CX36
	ø 86	103F8581-80CXA4(CXA1)	1.5	4.5	1/ 3.6	—	WP13F851S(D)-CX3.6	AP13F851S(D)-CX3.6	BP23F851S(D)-CX3.6	—	BP13F851S(D)-CX3.6
		103F8581-80CXB4(CXB1)	1.5	9	1/ 7.2	—	WP13F851S(D)-CX7.2	AP13F851S(D)-CX7.2	BP23F851S(D)-CX7.2	—	BP13F851S(D)-CX7.2
		103F8581-80CXE4(CXE1)	1.5	9	1/ 10	—	WP13F851S(D)-CX10	AP13F851S(D)-CX10	BP23F851S(D)-CX10	—	BP13F851S(D)-CX10
		103F8581-80CXG4(CXG1)	1.5	12	1/ 20	—	WP13F851S(D)-CX20	AP13F851S(D)-CX20	BP23F851S(D)-CX20	—	BP13F851S(D)-CX20
		103F8581-80CXJ4(CXJ1)	1.5	12	1/ 30	—	WP13F851S(D)-CX30	AP13F851S(D)-CX30	BP23F851S(D)-CX30	—	BP13F851S(D)-CX30
		103F8581-80CXC4(CXC1)	1.5	12	1/ 36	—	WP13F851S(D)-CX36	AP13F851S(D)-CX36	BP23F851S(D)-CX36	—	BP13F851S(D)-CX36
Harmonic gear (H)	□ 28	103F3505-70HXL4(HXL1)	0.75	2.7	1/ 50	—	—	—	—	—	—
		103F3505-70HXM4(HXM1)	0.75	3.6	1/ 100	—	—	—	—	—	—
	□ 42	103F5505-70HXL4(HXL1)	0.75	5	1/ 50	WP12F551S(D)-HX50	—	—	—	BP12F551S(D)-HX50	—
		103F5505-70HXM4(HXM1)	0.75	8	1/ 100	WP12F551S(D)-HX100	—	—	—	BP12F551S(D)-HX100	—
	□ 60	103F7851-80HXL4(HXL1)	1.5	14	1/ 50	—	WP13F781S(D)-HX50	—	—	—	BP13F781S(D)-HX50
		103F7851-80HXM4(HXM1)	1.5	20	1/ 100	—	WP13F781S(D)-HX100	—	—	—	BP13F781S(D)-HX100
	ø 86	103F8581-80HXL4(HXL1)	1.5	70	1/ 50	—	WP13F851S(D)-HX50	AP13F851S(D)-HX50	BP23F851S(D)-HX50	—	BP13F851S(D)-HX50
		103F8581-80HXM4(HXM1)	1.5	110	1/ 100	—	WP13F851S(D)-HX100	AP13F851S(D)-HX100	BP23F851S(D)-HX100	—	BP13F851S(D)-HX100
Electromagnetic brake (B)	□ 42	103F5505-70XB41	0.75	—	—	WP12F551S-XB	—	—	—	BP12F551S-XB	—
		103F5508-70XB41	0.75	—	—	WP12F552S-XB	—	—	—	BP12F552S-XB	—
		103F5510-70XB41	0.75	—	—	WP12F554S-XB	—	—	—	BP12F554S-XB	—
	□ 60	103F7851-80XB41	1.5	—	—	—	WP13F781S-XB	—	—	—	BP13F781S-XB
		103F7852-80XB41	1.5	—	—	—	WP13F782S-XB	—	BP23F782S-XB	—	BP13F782S-XB
		103F7853-80XB41	1.5	—	—	—	WP13F783S-XB	—	BP23F783S-XB	—	BP13F783S-XB
	ø 86	103F8581-80XB41	1.5	—	—	—	WP13F851S-XB	AP13F851S-XB	BP23F851S-XB	—	BP13F851S-XB
		103F8582-80XB41	1.5	—	—	—	WP13F852S-XB	AP13F852S-XB	BP23F852S-XB	—	BP13F852S-XB
		103F8583-80XB41	1.5	—	—	—	WP13F853S-XB	AP13F853S-XB	BP23F853S-XB	—	BP13F853S-XB
For set products, refer:					P53~	P53~	P11~	P41~	P23~	P23~	

<Note> ① Number enclosed by parentheses in motor model number represents a dual-axis shaft type. ③ Optional products for the set are compatible to the STEPSPYN F type only.
② (D) in the above table represents a dual-axis shaft type. ④ Contact our sales department to order an encoder.

■ Set products combination (DC input type)

Set series name						DP1 series	DP2 series	DP3 series	DP4 series	
						DP12 ···	DP22 ···	DP33 ···	DP42 ···	
Combination	Driver				Model number	PMM-MD-53030	PMM-BD-53130	PMPDB1S6P01	PMDPC1S3P01	
					Power source	DC24V/36V	DC24V/36V	DC24V	DC24V	
	Specification	0.75 A/phase	0.75 A/phase	1.5 A/phase	0.75 A/phase					
	Dimensions, mm	Model number	Rated current, A/phase	Holding torque N·m (at 5-phase excitation)	Rotor inertia ×10 ⁻⁴ kg·m ²	Micro-step (1 to 250 divisions)	Full step/half step (1 division/2 divisions)	Full step/half step (1 division/2 divisions)	Micro-step (1 to 80 divisions)	
STEPSYN F (Standard motor)	□ 28	103F3505-7041(7011)	0.75	0.036	0.009	DP12F351S(D)	DP22F351S(D)	—	—	
		103F3515-7041(7011)	0.75	0.065	0.016	DP12F356S(D)	DP22F356S(D)	—	—	
	□ 42	103F5505-7041(7011)	0.75	0.13	0.03	DP12F551S(D)	DP22F551S(D)	—	—	
		103F5508-7041(7011)	0.75	0.18	0.053	DP12F552S(D)	DP22F552S(D)	—	DP42F552S(D)	
	□ 60	103F5510-7041(7011)	0.75	0.26	0.065	DP12F554S(D)	DP22F554S(D)	—	DP42F554S(D)	
		103F7851-7041(7011)	0.75	0.6	0.275	DP12F781S(D)	DP22F781S(D)	—	DP42F781S(D)	
		103F7852-7041(7011)	0.75	0.98	0.4	DP12F782S(D)	DP22F782S(D)	—	DP42F782S(D)	
		103F7853-7041(7011)	0.75	1.79	0.84	DP12F783S(D)	DP22F783S(D)	—	DP42F783S(D)	
	□ 86	103F7851-8041(8011)	1.5	0.6	0.275	—	—	DP33F781S(D)	—	
		103F7852-8041(8011)	1.5	0.98	0.4	—	—	DP33F782S(D)	—	
		103F7853-8041(8011)	1.5	1.79	0.84	—	—	DP33F783S(D)	—	
		103F8581-8041(8011)	1.5	2.06	1.45	—	—	DP33F851S(D)	—	
	□ 106	103F8582-8041(8011)	1.5	4.02	2.9	—	—	DP33F852S(D)	—	
		103F8583-8041(8011)	1.5	6.17	4.4	—	—	DP33F853S(D)	—	
	STEPSYN M (Conforms to UL, CE)	□ 42	103F89582-8041(8011)	1.5	10.8	14.6	—	—	—	—
			103F89583-8041(8011)	1.5	16	22	—	—	—	—
103M5505-7041(7011)			0.75	0.13	0.03					
□ 60		103M5508-7041(7011)	0.75	0.18	0.053					
		103M5510-7041(7011)	0.75	0.26	0.065					
		103M7851-8041(8011)	1.5	0.6	0.275					
□ 86		103M7852-8041(8011)	1.5	0.98	0.4					
		103M7853-8041(8011)	1.5	1.79	0.84					
		103M8581-8041(8011)	1.5	2.1	1.45					
□ 106		103M8582-8041(8011)	1.5	4.02	2.9					
	103M8583-8041(8011)	1.5	6.17	4.4						
	103M89582-8041(8011)	1.5	10.8	14.6						
For set products, refer:						P79~	P95~	P111~	P123~	

■ Set products option combination (DC input type)

Set series name						DP1 series	DP2 series	DP3 series	DP4 series
						DP12 ···	DP22 ···	DP33 ···	DP42 ···
Combination	Driver				Model number	PMM-MD-53030	PMM-BD-53130	PMDPB1S6P01	PMDPC1S3P01
					Power source	DC24V/36V	DC24V/36V	DC24V	DC24V
	STEPSSYN F				Specification	0.75 A/phase	0.75 A/phase	1.5 A/phase	0.75 A/phase
	Dimensions, mm	Model number	Rated current A/phase	Allowable torque N·m	Deceleration ratio	Micro-step (1 to 250 divisions)	Full step/half step (1 division/2 divisions)	Full step/half step (1 division/2 divisions)	Micro-step (1 to 80 divisions)
Spur gear (G)	□ 28	103F3505-70GXA4(GXA1)	0.75	0.1	1/ 3.6	DP12F351S(D)-GX3.6	DP22F351S(D)-GX3.6	—	—
		103F3505-70GXB4(GXB1)	0.75	0.15	1/ 7.2	DP12F351S(D)-GX7.2	DP22F351S(D)-GX7.2	—	—
		103F3505-70GXE4(GXE1)	0.75	0.2	1/ 10	DP12F351S(D)-GX10	DP22F351S(D)-GX10	—	—
		103F3505-70GXG4(GXG1)	0.75	0.35	1/ 20	DP12F351S(D)-GX20	DP22F351S(D)-GX20	—	—
		103F3505-70GXJ4(GXJ1)	0.75	0.5	1/ 30	DP12F351S(D)-GX30	DP22F351S(D)-GX30	—	—
		103F3505-70GXL4(GXL1)	0.75	0.5	1/ 50	DP12F351S(D)-GX50	DP22F351S(D)-GX50	—	—
Low back-rush gear (C)	□ 42	103F5505-70CXA4(CXA1)	0.75	0.35	1/ 3.6	DP12F551S(D)-CX3.6	DP22F551S(D)-CX3.6	—	—
		103F5505-70CXB4(CXB1)	0.75	0.7	1/ 7.2	DP12F551S(D)-CX7.2	DP22F551S(D)-CX7.2	—	—
		103F5505-70CXE4(CXE1)	0.75	1	1/ 10	DP12F551S(D)-CX10	DP22F551S(D)-CX10	—	—
		103F5505-70CXG4(CXG1)	0.75	1.5	1/ 20	DP12F551S(D)-CX20	DP22F551S(D)-CX20	—	—
		103F5505-70CXJ4(CXJ1)	0.75	1.5	1/ 30	DP12F551S(D)-CX30	DP22F551S(D)-CX30	—	—
		103F5505-70CXK4(CXK1)	0.75	1.5	1/ 36	DP12F551S(D)-CX36	DP22F551S(D)-CX36	—	—
	□ 60	103F7851-80CXA4(CXA1)	1.5	1.25	1/ 3.6	—	—	DP33F781S(D)-CX3.6	—
		103F7851-80CXB4(CXB1)	1.5	2.5	1/ 7.2	—	—	DP33F781S(D)-CX7.2	—
		103F7851-80CXE4(CXE1)	1.5	3	1/ 10	—	—	DP33F781S(D)-CX10	—
		103F7851-80CXG4(CXG1)	1.5	3.5	1/ 20	—	—	DP33F781S(D)-CX20	—
		103F7851-80CXJ4(CXJ1)	1.5	4	1/ 30	—	—	DP33F781S(D)-CX30	—
		103F7851-80CXK4(CXK1)	1.5	4	1/ 36	—	—	DP33F781S(D)-CX36	—
	ø 86	103F8581-80CXA4(CXA1)	1.5	4.5	1/ 3.6	—	—	DP33F851S(D)-CX3.6	—
		103F8581-80CXB4(CXB1)	1.5	9	1/ 7.2	—	—	DP33F851S(D)-CX7.2	—
		103F8581-80CXE4(CXE1)	1.5	9	1/ 10	—	—	DP33F851S(D)-CX10	—
		103F8581-80CXG4(CXG1)	1.5	12	1/ 20	—	—	DP33F851S(D)-CX20	—
		103F8581-80CXJ4(CXJ1)	1.5	12	1/ 30	—	—	DP33F851S(D)-CX30	—
		103F8581-80CXK4(CXK1)	1.5	12	1/ 36	—	—	DP33F851S(D)-CX36	—
Harmonic gear (H)	□ 28	103F3505-70HXL4(HXL1)	0.75	2.7	1/ 50	DP12F351S(D)-HX50	DP22F351S(D)-HX50	—	—
		103F3505-70HXM4(HXM1)	0.75	3.6	1/ 100	DP12F351S(D)-HX100	DP22F351S(D)-HX100	—	—
	□ 42	103F5505-70HXL4(HXL1)	0.75	5	1/ 50	DP12F551S(D)-HX50	DP22F551S(D)-HX50	—	—
		103F5505-70HXM4(HXM1)	0.75	8	1/ 100	DP12F551S(D)-HX100	DP22F551S(D)-HX100	—	—
	□ 60	103F7851-80HXL4(HXL1)	1.5	14	1/ 50	—	—	DP33F781S(D)-HX50	—
		103F7851-80HXM4(HXM1)	1.5	20	1/ 100	—	—	DP33F781S(D)-HX100	—
	ø 86	103F8581-80HXL4(HXL1)	1.5	70	1/ 50	—	—	DP33F851S(D)-HX50	—
		103F8581-80HXM4(HXM1)	1.5	110	1/ 100	—	—	DP33F851S(D)-HX100	—
Electromagnetic brake (B)	□ 42	103F5505-70XB41	0.75	—	—	DP12F551S-XB	DP22F551S-XB	—	—
		103F5508-70XB41	0.75	—	—	DP12F552S-XB	DP22F552S-XB	—	DP42F552S-XB
		103F5510-70XB41	0.75	—	—	DP12F554S-XB	DP22F554S-XB	—	DP42F554S-XB
	□ 60	103F7851-80XB41	1.5	—	—	—	—	DP33F781S-XB	—
		103F7852-80XB41	1.5	—	—	—	—	DP33F782S-XB	—
		103F7853-80XB41	1.5	—	—	—	—	DP33F783S-XB	—
	ø 86	103F8581-80XB41	1.5	—	—	—	—	DP33F851S-XB	—
		103F8582-80XB41	1.5	—	—	—	—	DP33F852S-XB	—
103F8583-80XB41		1.5	—	—	—	—	DP33F853S-XB	—	
For set products, refer:						P79~	P95~	P111~	P123~

<Note> ① Number enclosed by parentheses in motor model number represents a dual-axis shaft type. ② (D) in the above table represents a dual-axis shaft type. ③ Optional products for the set are compatible to the STEPSYN F type only. ④ Contact our sales department to order an encoder.



The standard combination of the 5-phase stepping Set AP1 series lineup applies two types stepping motors of STEPSYN M series and STEPSYN F series.

The 5-phase stepping Set

AP1 series

AC200V/230V

Micro-step (500 x 1 to 40 divisions)



Configuration of the 5-phase Stepping Motor Set, AP1 Series

Name	Quantity
AP1 series instruction manual	1 pc.
PM driver	1 pc.
Stepping motor	1 pc.
Interface connector (CN1)	1 set
Power supply connector (CN2)	1 set
Stepping motor power line connector (CN3)	1 set
PM driver front surface metal fittings (1 pair)	1 set

Stepping Motor Type	Characteristics
STEPSYN M Series	Conforms to UL Standards and CE Marking
STEPSYN F Series	Standard stepping motor for the set

Various sizes of stepping motor are available according to applications and purposes.

Characteristics

- Conformity to UL Standards and CE Marking**
 The product conforms to UL Standards and CE Marking.
- Micro-step function available**
 Smooth operation without vibration at low speeds can be realized.
- Rush current prevention circuit**
 The built-in rush current prevention circuit in the power circuit section enables stabilized operation even during switching on.
- Connector method for PM driver I/O cable**
 The connector method is adopted for the high voltage section terminal, where the terminal base was conventionally used. This method facilitates PM driver installation and maintenance.
- Alarm output signal logic selectable**
 Logic of signal output during alarm circuit operation can be selected.

Built-in function

- Auto micro function**
 Even setting division of resolution to a rough one or two divisions, operation can be as smooth and with as low vibration as for micro-step drive. However, this function and the micro-step function cannot be adopted at the same time.
- Micro-step function**
 By manipulating the rotary switch that sets resolution, the micro-step drive can be used. However, this function and the auto micro function cannot be adopted at the same time.
- Pulse input method selection function**
 Either single input system or double input system can be selected, using a dipswitch.
- Resolution setting function**
 Nine types of resolution, ranging from one to 40 divisions, can be set for a basic stepping motor step angle by using rotary switches.
- Operation current switch function**
 Operation current of the stepping motor can be set in the range from rated current to 55% of rated current by using rotary switches.
- Current adjustment function during operation halt**
 When operation is halted, operation current for the stepping motor can be set at 40 to 70% of specified operation current by using a selection switch.

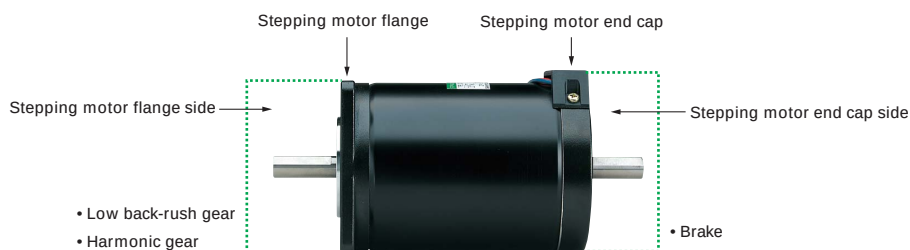
Explanation of set model number

① System on the stepping motor flange side

Code	Deceleration Ratio
C	Low back rush gear 1 / 3.6, 1 / 7.2, 1 / 10, 1 / 20, 1 / 30, 1 / 36
H	Harmonic gear 1 / 50, 1 / 100
X	None on flange side

② System on the stepping motor end cap side

Code	Function
B	Brake Electromagnetic brake
E	Encoder Please contact us regarding the encoder
X	None on end cap side



③ Deceleration ratio of gear system

Example: deceleration ratio 1 / 3.6 → 3.6

Explanation for model number in the combined case:

The set model number of the PMAPA1S6A01 and 103F8581 type stepping motor is as follows when equipped with the system of harmonic gear (1/100) and brake:

AP13F851D – H B 100

Standard set model number

③ Gear deceleration ratio (1/100)
② Brake
① Harmonic gear

How to order:

Please order by using the "Set model number" in the list, Standard combined stepping motors for 5-phase stepping set "AP1" series.

When gear, brake, and/or encoder are necessary for the stepping motor STEPSYN F, select codes of your preferences from the above ①, ②, and ③ to describe them following to "Set model number".

PM Driver Specification

Model number		Standard specification
Standard specification	Input source	Single phase AC200 / 230V+10, -15% 50 / 60Hz
	Source current	6A
	Protection class	Class I
	Operating environment	Installation category (overvoltage category) : II, pollution level : 2
	Applied standards	EN50178, UL508C
	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)
	Operating altitude	max. 1000m above sea level
	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
	Withstand voltage	Not influenced when AC1500V is applied between power input terminal and cabinet for one minute
	Insulation resistance	10MΩ or more when measured with DC500V megohmmeter between input terminal and cabinet.
Function	Weight	1.5kg
	Protection function	Against PM driver overheat, main circuit power supply error, and over-current
	Selection function	Input method, auto current down, power down, auto micro, alarm output logic, step angle, operating current, non-operating current
I/O signals	LED indicator	Power supply monitor, phase origin monitor, pulse monitor, alarm indicator
	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: 200kpulse/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
	Step angle selection input signal	Photo coupler input method, input resistance = 330Ω Input signal voltage: H = 4.0 to 5.5V, L = 0 to 0.5V
	FULL/HALF selection input signal	Photo coupler input method, input resistance = 330Ω Input signal voltage: H = 4.0 to 5.5V, L = 0 to 0.5V
	Phase origin monitor output signal	Open collector output by photo coupler Output signal standard, V _{ceo} = 30V or less, I _c = 5mA or less
	Alarm output signal	Open collector output by photo coupler Output signal standard, V _{ceo} = 30V or less, I _c = 20mA or less

• Refer to pages 133 and after for operation, connection, function, and dimensions of the PM driver.

Stepping motor specifications

Stepping motor type	STEPSYN M	STEPSYN F
Model name	103M858 □ / 103M8958 □	103F858 □ / 103F8958 □
Type	S1 (Continuous rating)	-----
Insulation class	Class B (130°C)[105°C for UL class A]	Class B (130°C)
Protection class	Class 1	-----
Operating environment	Pollution level: 2	-----
Withstand voltage	AC1600V, 50/60Hz, 1 minute	AC1000V, 50/60Hz, 1 minute
Insulation resistance	Min. 100MΩ against DC500V	-----
Protection grade	IP40	-----
Vibration resistance	Amplitude 1.52mm (P-P), frequency range 10 to 55Hz, 5 minutes sweep time, along X, Y, and Z axes, for 2 hours	
Impact resistance	Conditions: 98m/S ² acceleration, 11 minutes duration, half-wave/sine wave, three times each along X, Y, and Z axes, 18 times in total	
Operating ambient temperature	-10 to +50°C (0 to 40°C for the one with harmonic gear)	
Operating ambient humidity	20 to 90%(no condensation)	

□ ... variable suffixes

Standard combined stepping motors for 5-phase stepping set “AP1” series

PM driver model number : PMAPA1S6A01

Combination model number for the STEPSYN M series (conforming to UL Standards and CE Marking)

System support	Dimensions of stepping motor	Single-axis shaft		Dual-axis shaft	
		Set model number	Standard combined stepping motor number	Set model number	Standard combined stepping motor number
Standard type	ø 86mm	AP13M851S	103M8581-8041	AP13M851D	103M8581-8011
		AP13M852S	103M8582-8041	AP13M852D	103M8582-8011
		AP13M853S	103M8583-8041	AP13M853D	103M8583-8011
	ø 106mm	AP13M892S	103M89582-8041	AP13M892D	103M89582-8011
		AP13M893S	103M89583-8041	AP13M893D	103M89583-8011

Combination model number for the STEPSYN F series (Motor for a set)

System support	Dimensions of stepping motor	Single-axis Shaft		Dual-axis shaft	
		Set Model Number	Standard combined stepping motor number	Set model number	Standard combined stepping motor number
Standard type	ø 86mm	AP13F851S	103F8581-8041	AP13F851D	103F8581-8011
		AP13F852S	103F8582-8041	AP13F852D	103F8582-8011
		AP13F853S	103F8583-8041	AP13F853D	103F8583-8011
	ø 106mm	AP13F892S	103F89582-8041	AP13F892D	103F89582-8011
		AP13F893S	103F89583-8041	AP13F893D	103F89583-8011
Low back-rush gear	ø 86mm	AP13F851S-CX3.6	103F8581-80CXA4	AP13F851D-CX3.6	103F8581-80CXA1
		AP13F851S-CX7.2	103F8581-80CXB4	AP13F851D-CX7.2	103F8581-80CXB1
		AP13F851S-CX10	103F8581-80CXE4	AP13F851D-CX10	103F8581-80CXE1
		AP13F851S-CX20	103F8581-80CXG4	AP13F851D-CX20	103F8581-80CXG1
		AP13F851S-CX30	103F8581-80CXJ4	AP13F851D-CX30	103F8581-80CXJ1
		AP13F851S-CX36	103F8581-80CCK4	AP13F851D-CX36	103F8581-80CCK1
Harmonic gear	ø 86mm	AP13F851S-HX50	103F8581-80HXL4	AP13F851D-HX50	103F8581-80HXL1
		AP13F851S-HX100	103F8581-80HXM4	AP13F851D-HX100	103F8581-80HXM1
Electromagnetic brake	ø 86mm	AP13F851S-XB	103F8581-80XB41		
		AP13F852S-XB	103F8582-80XB41		
		AP13F853S-XB	103F8583-80XB41		

Note) Contact our sales department to order the system with encoder and gear and brake.

Stepping motor data sheet

STEPSYN M series (conforming to UL Standards and CE Marking)

Set model number	Single-axis shaft	AP13M851S	AP13M852S	AP13M853S	AP13M892S	AP13M893S
	Dual-axis shaft	AP13M851D	AP13M852D	AP13M853D	AP13M892D	AP13M893D
Holding torque	N•m	2.06	4.02	6.17	10.8	16
Rotor inertia	$\times 10^{-4} \text{kg} \cdot \text{m}^2$	1.45	2.9	4.4	14.6	22
Weight	kg	1.5	2.5	3.5	7.5	10.5
Allowable thrust load	N	60	60	60	100	100
Allowable radial load	N	220	220	220	360	360

STEPSYN F series (Standard)

Set model number	Single-axis shaft	AP13F851S	AP13F852S	AP13F853S	AP13F892S	AP13F893S
	Dual-axis shaft	AP13F851D	AP13F852D	AP13F853D	AP13F892D	AP13F893D
Holding torque	N•m	2.06	4.02	6.17	10.8	16
Rotor inertia	$\times 10^{-4} \text{kg} \cdot \text{m}^2$	1.45	2.9	4.4	14.6	22
Weight	kg	1.5	2.5	3.5	7.5	10.5
Allowable thrust load	N	60	60	60	100	100
Allowable radial load	N	220	220	220	360	360

STEPSYN F series (with low back-rush gear)

Set model number	Single-axis shaft	AP13F851S-CX3.6	AP13F851S-CX7.2	AP13F851S-CX10	AP13F851S-CX20	AP13F851S-CX30	AP13F851S-CX36
	Dual-axis shaft	AP13F851D-CX3.6	AP13F851D-CX7.2	AP13F851D-CX10	AP13F851D-CX20	AP13F851D-CX30	AP13F851D-CX36
Allowable torque	N•m	4.5	9	9	12	12	12
Rotor inertia	$\times 10^{-4} \text{kg} \cdot \text{m}^2$	1.45					
Basic step angle	°	0.2	0.1	0.072	0.036	0.024	0.02
Deceleration ratio		1 : 3.6	1 : 7.2	1 : 10	1 : 20	1 : 30	1 : 36
Back-rush	°	0.4	0.25	0.25	0.17	0.17	0.15
Allowable number of rotations	min ⁻¹	500	250	180	90	60	50
Weight	kg	2.7					
Allowable thrust load	N	60					
Allowable radial load	N	300					

* The direction of motor rotate and the gear output shaft is as follows: when deceleration ratio is 1:3.6 or 1:7.2, both motor and shaft rotate in the same direction, and for 1:10, 1:20, or 1:30 type, the motor and the shaft rotate in opposite direction.

STEPSYN F series (with harmonic gear)

Set model number	Single-axis shaft	AP13F851S-HX50	AP13F851S-HX100
	Dual-axis shaft	AP13F851D-HX50	AP13F851D-HX100
Allowable torque	N•m	25	41
Rotor inertia	$\times 10^{-4} \text{kg} \cdot \text{m}^2$	1.65	
Basic step angle	°	0.0144	0.0072
Deceleration ratio		1 : 50	1 : 100
Lost motion	Minute	0.4~3 ($\pm 1 \text{ N} \cdot \text{m}$)	0.4~3 ($\pm 1.2 \text{ N} \cdot \text{m}$)
Allowable number of rotations	min ⁻¹	500	250
Weight	kg	3.3	
Allowable thrust load	N	1400	
Allowable radial load	N	1400	

* The gear output shaft rotates in the opposite direction of the motor.

STEPSYN F series (with electromagnetic brake)

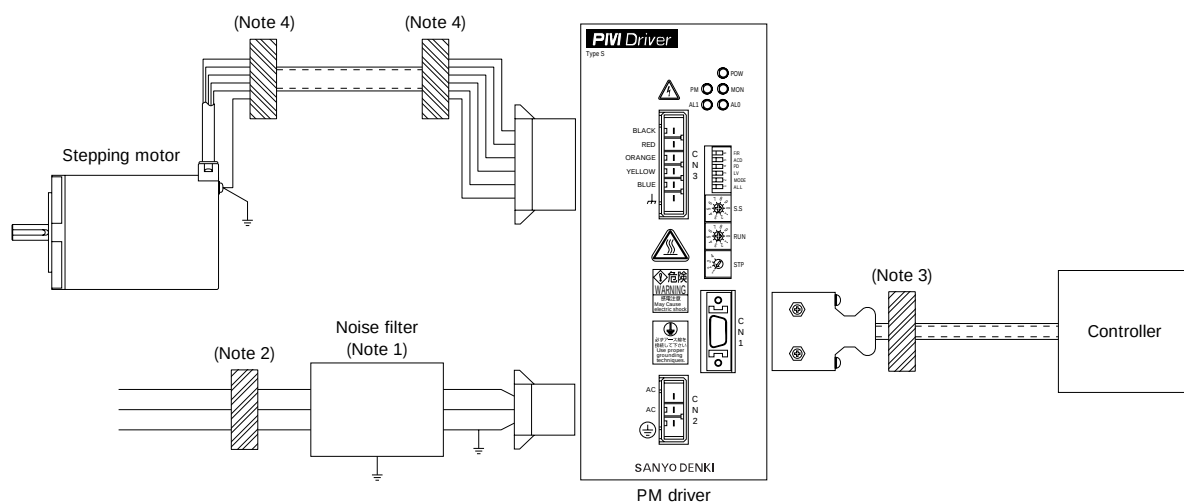
Set model number	Single-axis shaft	AP13F851S-XB	AP13F852S-XB	AP13F853S-XB
	Dual-axis shaft	AP13F851D-XB	AP13F852D-XB	AP13F853D-XB
Holding torque	N•m	2.06	4.02	6.17
Rotor inertia	$\times 10^{-4} \text{kg} \cdot \text{m}^2$	2.24	3.69	5.19
Weight	kg	3.5	4.5	5.5
Allowable thrust load	N	60	60	60
Allowable radial load	N	220	220	220
Brake operation system		Non-energization operation system		
Source voltage	V	DC 24 $\pm$ 5%		
Exciting current	A	0.42		
Electric power consumption	W	10		
Static friction torque	N•m	4		
Brake operating time	ms	50		
Brake release time	ms	20		

UL Standards and CE Marking

Product	UL Standards		CE Marking		
	Applied standards	File no.	Applied standards		
			Low voltage directive	EMC Directive	
PM driver	UL508C	E179775	EN50178	EN50081-2 (Class A)	EN50082-2 (Class A)
Stepping motor	UL1004 UL2111	E208878	EN60034-1 IEC34-5 (EN60034-5)		

- The UL standards and CE Marking of the stepping motor are applied to the "Type M stepping motor".
 - The EMC Directive conformity is to be confirmed under the installation environment shown in Figure 1.
- Because the EMC Directive varies depending on the structure of user's control panel, the combination of the product with other devices, and the wiring, to which the PM driver and stepping motor are incorporated, conformity can not be assured for the products in the user's operating environment.
- Therefore, the user should finally confirm EMC conformity of the machine and the whole system.

● EMC conformity confirmation



Recommended parts for EMC conformity

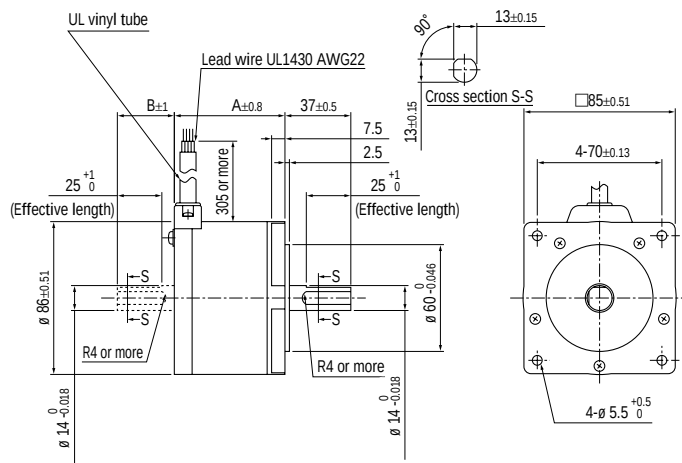
No.	Part name	Model	Specifications and size	Manufacturer
Note 1	Noise filter	RF3020-DLC	Rated voltage : Line-Line 440-550V Rated current : 20A	RASMI ELECTRONICS LTD. ,
Note 2	Toroidal Core	T60 × 20 × 36	Core outer diameter : 60mm Core inner diameter : 36mm	TDK
Note 3	Toroidal Core	TRCN-40-27-15	Core outer diameter : 40mm Core inner diameter : 27mm	Kitagawa Industry
Note 4	Toroidal Core	TRCN-40-27-15	Core outer diameter : 40mm Core inner diameter : 27mm	Kitagawa Industry

Dimensions (Unit: mm)

STEPSYN M

AP13M85□□

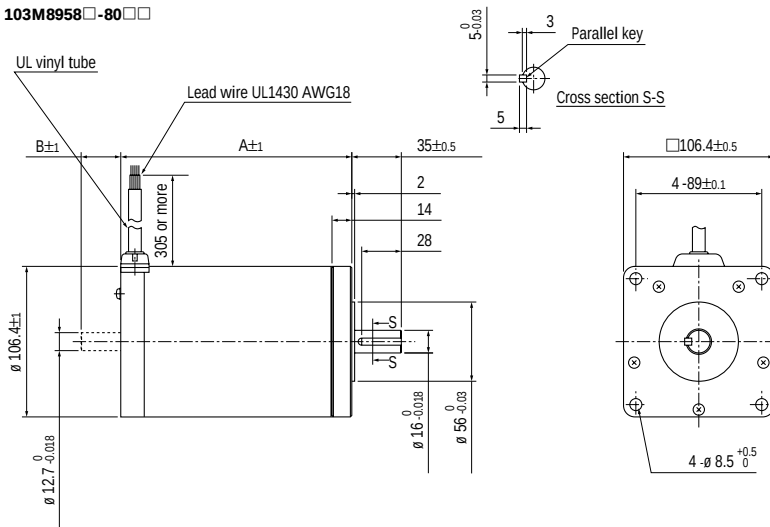
103M858□-80□□



Model name	A	B
AP13M851S (103M8581-8041)	62.15	—
AP13M851D (103M8581-8011)	62.15	32
AP13M852S (103M8582-8041)	92.2	—
AP13M852D (103M8582-8011)	92.2	32
AP13M853S (103M8583-8041)	125.85	—
AP13M853D (103M8583-8011)	125.85	32

AP13M89□□

103M8958□-80□□

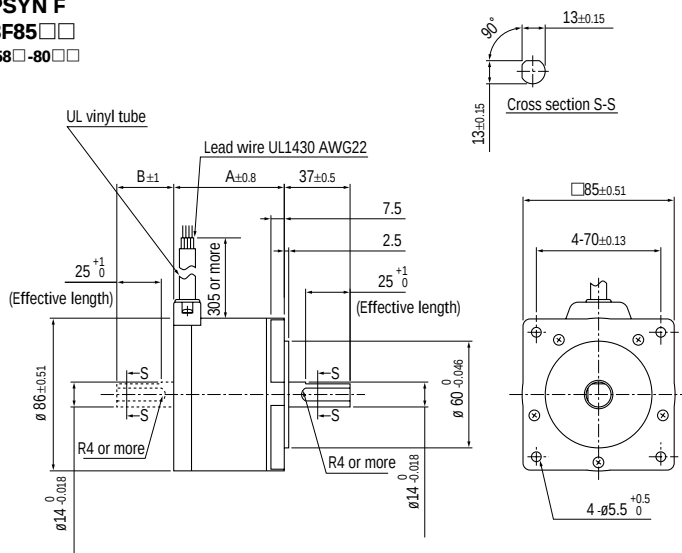


Model name	A	B
AP13M892S (103M89582-8041)	163.3	—
AP13M892D (103M89582-8011)	163.3	28
AP13M893S (103M89583-8041)	221.3	—
AP13M893D (103M89583-8011)	221.3	28

STEPSYN F

AP13F85□□

103F858□-80□□



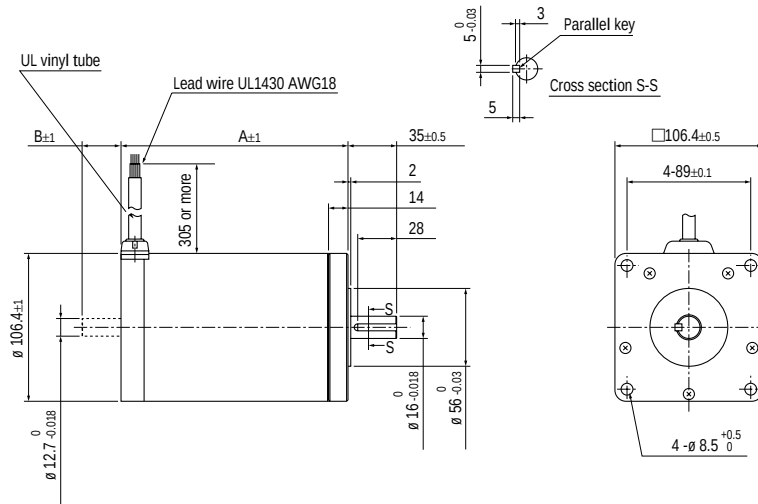
Model name	A	B
AP13F851S (103F8581-8041)	62.15	—
AP13F851D (103F8581-8011)	62.15	32
AP13F852S (103F8582-8041)	92.2	—
AP13F852D (103F8582-8011)	92.2	32
AP13F853S (103F8583-8041)	125.85	—
AP13F853D (103F8583-8011)	125.85	32

Dimensions (Unit: mm)

STEPSYN F

AP13F89□□

103F8958□-80□□

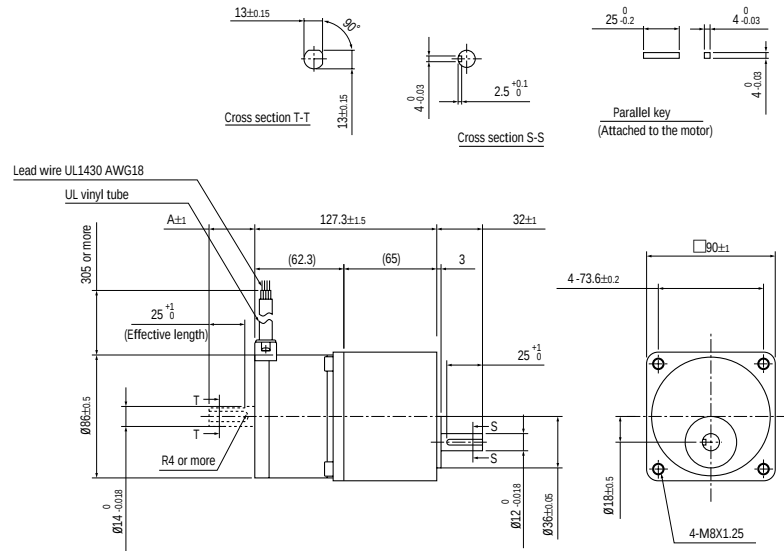


Model name	A	B
AP13F892S (103F89582-8041)	163.3	—
AP13F892D (103F89582-8011)	163.3	28
AP13F893S (103F89583-8041)	221.3	—
AP13F893D (103F89583-8011)	221.3	28

STEPSYN F with low back-rush gear

AP13F851S-CX□□

103F8581-80CX□□



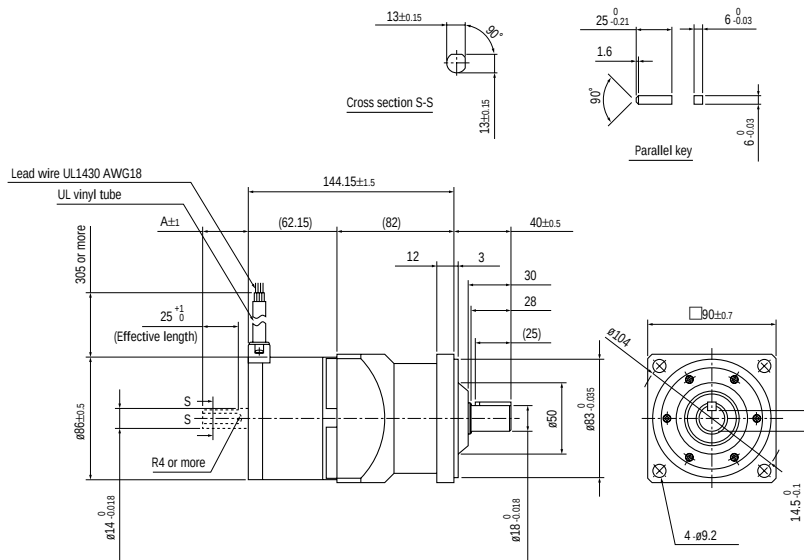
Model name	A
AP13F851S-CX3.6 (103F8581-80CXA4)	—
AP13F851D-CX3.6 (103F8581-80CXA1)	32
AP13F851S-CX7.2 (103F8581-80CXB4)	—
AP13F851D-CX7.2 (103F8581-80CXB1)	32
AP13F851S-CX10 (103F8581-80CXE4)	—
AP13F851D-CX10 (103F8581-80CXE1)	32
AP13F851S-CX20 (103F8581-80CXG4)	—
AP13F851D-CX20 (103F8581-80CXG1)	32
AP13F851S-CX30 (103F8581-80CXJ4)	—
AP13F851D-CX30 (103F8581-80CXJ1)	32
AP13F851S-CX36 (103F8581-80CXK4)	—
AP13F851D-CX36 (103F8581-80CXK1)	32

Dimensions (Unit: mm)

STEPSYN F with harmonic gear

AP13F851 ☐ -HX ☐ ☐

103F8581-80HX□□

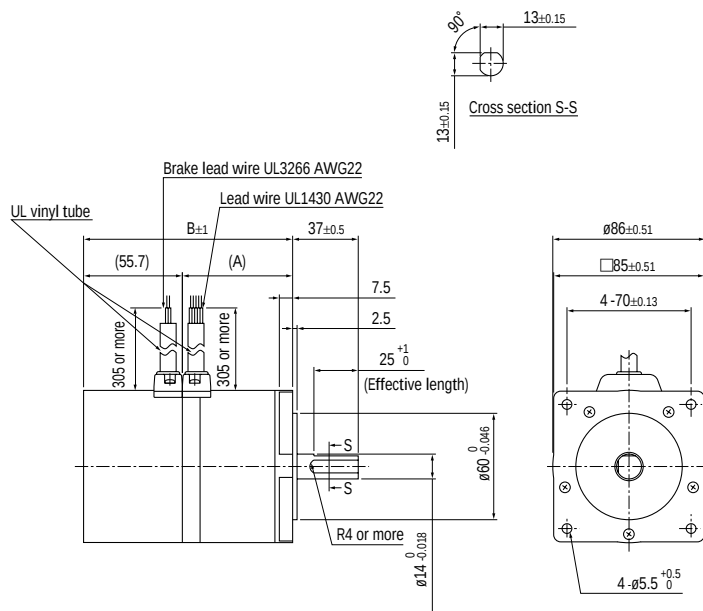


Model name	A
AP13F851S-HX50 (103F8581-80HXL4)	—
AP13F851D-HX50 (103F8581-80HXL1)	32
AP13F851S-HX100 (103F8581-80HXM4)	—
AP13F851D-HX100 (103F8581-80HXM1)	32

STEPSYN F with electromagnetic brake

AP13F85□ S-XB

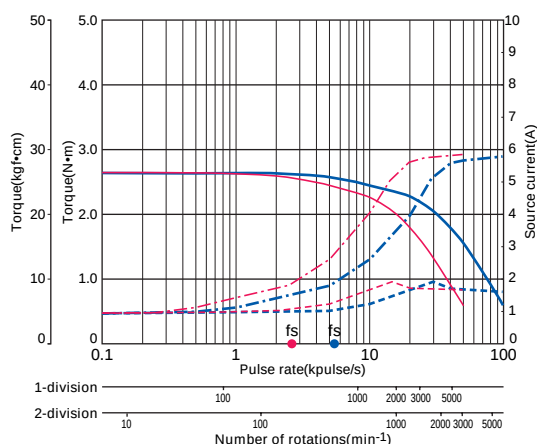
103F858-80XB41



Model name	A	B
AP13F851S-XB (103F8581-80XB41)	61	116.7
AP13F852S-XB (103F8582-80XB41)	91.1	146.8
AP13F853S-XB (103F8583-80XB41)	124.7	180.4

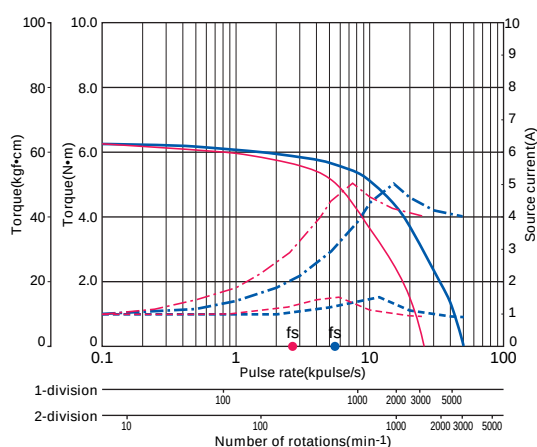
Pulse rate-torque characteristics/pulse rate-source current characteristics

● AP13M851□ / AP13F851□ / AP13F851S-XB : 200V



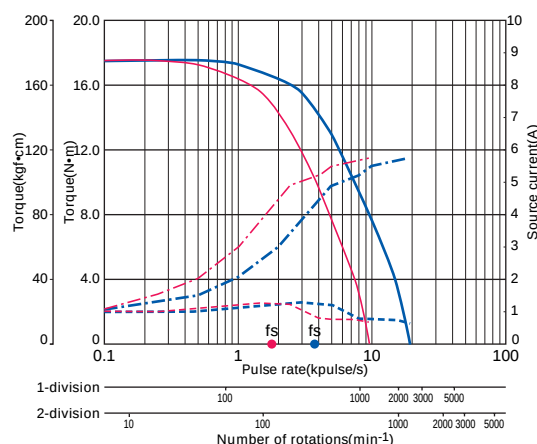
103M8581-80□□/103F8581-80□□/103F8581-80XB41
Source voltage : AC200V•Winding current : 1.5A/phase
— Getaway torque($J_{L1}=7.4 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current($T_L=\text{MAX}$) --- Source current($T_L=0$)
fs : Maximum self-start frequency when not loaded
■ 1-division is specified ■ 2-division is specified

● AP13M853□ / AP13F853□ / AP13F853S-XB : 200V



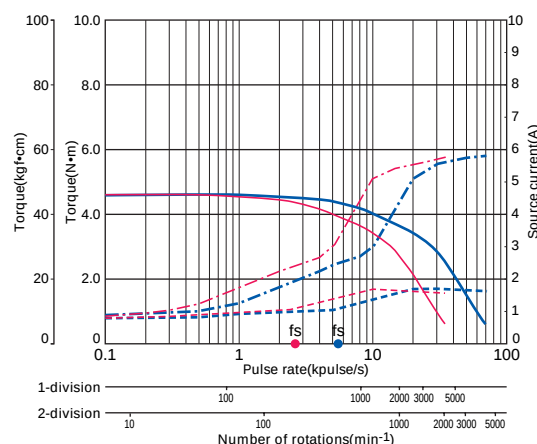
103M8583-80□□/103F8583-80□□/103F8583-80XB41
Source voltage : AC200V•Winding current : 1.5A/phase
— Getaway torque($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current($T_L=\text{MAX}$) --- Source current($T_L=0$)
fs : Maximum self-start frequency when not loaded
■ 1-division is specified ■ 2-division is specified

● AP13M893□ / AP13F893□ : 200V



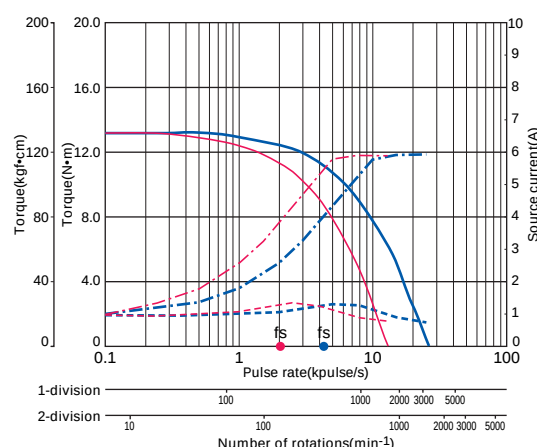
103M89583-80□□/103F89583-80□□
Source voltage : AC200V•Winding current : 1.5A/phase
— Getaway torque($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current($T_L=\text{MAX}$) --- Source current($T_L=0$)
fs : Maximum self-start frequency when not loaded
■ 1-division is specified ■ 2-division is specified

● AP13M852□ / AP13F852□ / AP13F852S-XB : 200V



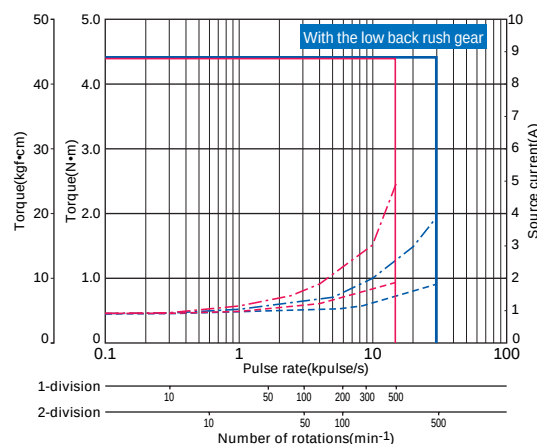
103M8582-80□□/103F8582-80□□/103F8582-80XB41
Source voltage : AC200V•Winding current : 1.5A/phase
— Getaway torque($J_{L1}=15.1 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current($T_L=\text{MAX}$) --- Source current($T_L=0$)
fs : Maximum self-start frequency when not loaded
■ 1-division is specified ■ 2-division is specified

● AP13M892□ / AP13F892□ : 200V



103M89582-80□□/103F89582-80□□
Source voltage : AC200V•Winding current : 1.5A/phase
— Getaway torque($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current($T_L=\text{MAX}$) --- Source current($T_L=0$)
fs : Maximum self-start frequency when not loaded
■ 1-division is specified ■ 2-division is specified

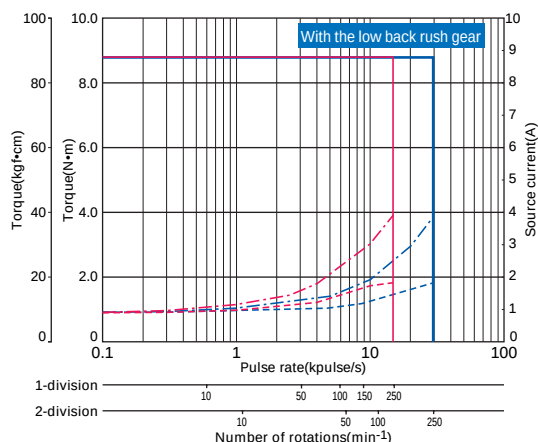
● AP13F851□-CX3.6 : 200V



103F8581-80CXA□
Source voltage : AC200V•Winding current : 1.5A/phase
— Allowable torque($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current($T_L=\text{MAX}$) --- Source current($T_L=0$)
■ 1-division is specified ■ 2-division is specified

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

● AP13F851□-CX7.2 : 200V



103F8581-80CXB□

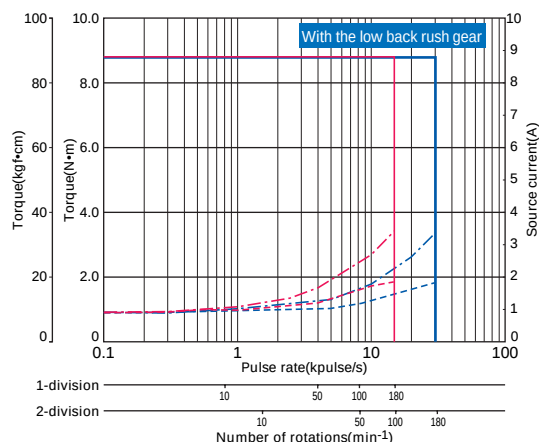
Source voltage : AC200V·Winding current : 1.5A/phase

— Allowable torque($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ 1-division is specified ■ 2-division is specified

● AP13F851□-CX10 : 200V



103F8581-80CXE□

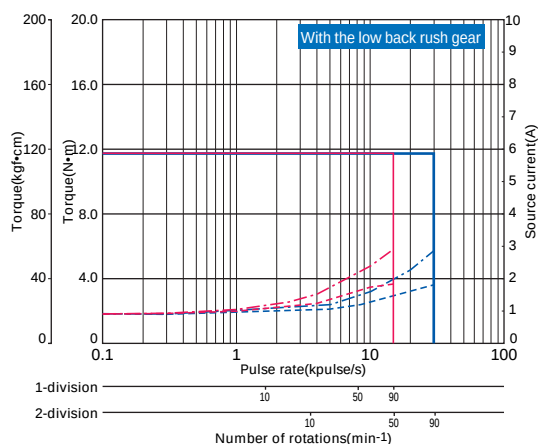
Source voltage : AC200V·Winding current : 1.5A/phase

— Allowable torque($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ 1-division is specified ■ 2-division is specified

● AP13F851□-CX20 : 200V



103F8581-80CXG□

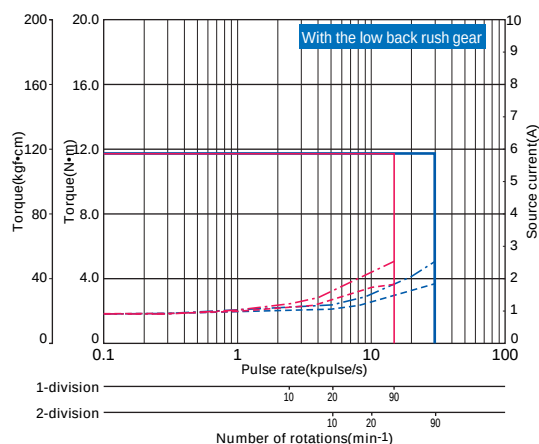
Source voltage : AC200V·Winding current : 1.5A/phase

— Allowable torque($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ 1-division is specified ■ 2-division is specified

● AP13F851□-CX30 : 200V



103F8581-80CXJ□

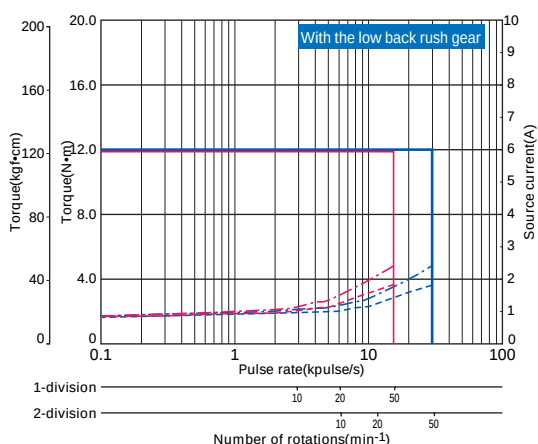
Source voltage : AC200V·Winding current : 1.5A/phase

— Allowable torque($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ 1-division is specified ■ 2-division is specified

● AP13F851□-CX36 : 200V



103F8581-80CXK□

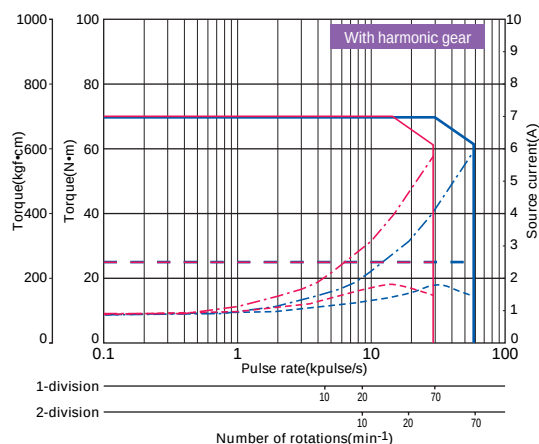
Source voltage : AC200V·Winding current : 1.5A/phase

— Allowable torque($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ 1-division is specified ■ 2-division is specified

● AP13F851□-HX50 : 200V



103F8581-80HXL□

Source voltage : AC200V·Winding current : 1.5A/phase

— Instantaneous allowable torque($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

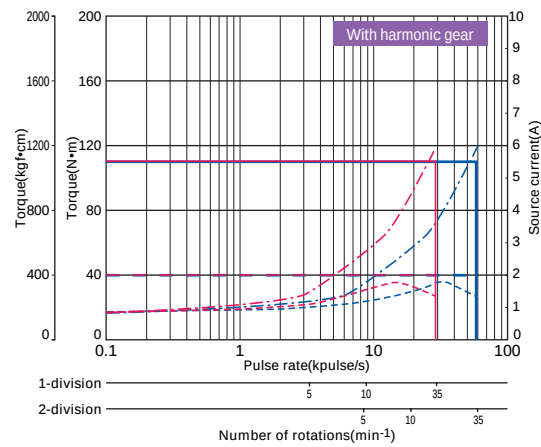
--- Allowable torque($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ 1-division is specified ■ 2-division is specified

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

● AP13F851□-HX100 : 200V



103F8581-80HXM□

Source voltage : AC200V•Winding current : 1.5A/phase

— Instantaneous allowable torque($JL1=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

- - Allowable torque($JL1=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

- · - Source current($T_L=MAX$) - - - Source current($T_L=0$)

■ 1-division is specified ■ 2-division is specified

API

BP1

BP2

WP1

DP1

DP2

DP3

DP4



The 5-phase Stepping Set

BP1 series

AC100V/115V

Full-step/half-step

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

Configuration of the 5-phase stepping set "BP1 series"

Name	Quantity
BP1 series instruction manual	1 pc.
PM driver	1 pc.
Stepping motor	1 pc.
Terminal Base Cover	1 pc.

Two types of PM driver can be selected for the 5-phase stepping set "BP1 series".

Classification	Type	PM driver Model	Rated Current of Applicable Stepping motor
BP12	Normal	PMM-BA-5603	0.75 A/phase
BP13	High-speed	PMM-BA-5604	1.5 A/phase type

Characteristics

- **Flexible**

This stepping system can drive wide variety of stepping motors from small capacity to large capacity without adjustment, resulting in wide applications.

- **Compact and high torque**

Mounting dedicated ICs, which are highly integrated and have higher reliability, realizes the compact and high-torque system.

Built-in function

- **Low vibration mode**

Our dedicated control system realizes a low vibration and smooth operation.

- **Pulse input system selection function**

Either single input system or double input system can be selected, using a dipswitch.

- **Operation current switch function**

Operation current of the stepping motor ranging from rated current to 40% of rated current can be set by using rotary switches.

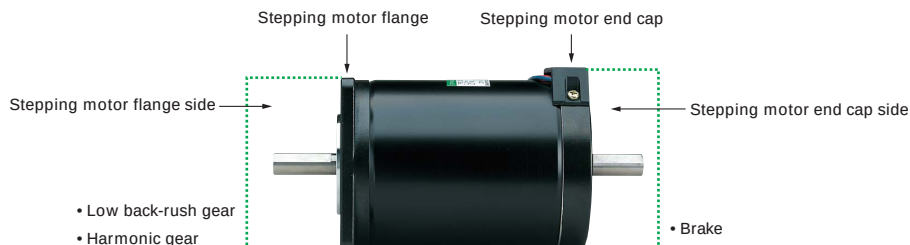
Explanation of set model number

① System on the stepping motor flange side

Code	Flange side	Deceleration ratio
C	Low back-rush gear	1 / 3.6, 1 / 7.2, 1 / 10, 1 / 20, 1 / 30, 1 / 36
H	Harmonic gear	1 / 50, 1 / 100
X	None	

② System on the stepping motor end cap side

Code	End cap side	Function
B	Brake	Electromagnetic brake
E	Encoder	Please contact us regarding the encoder.
X	None	



③ Deceleration ratio of gear system

Example: deceleration ratio 1 / 3.6 → 3.6

Explanation for model number in the combined case

The set model number of the stepping motor is as follows when PMM-BA-5603-1 and 103F7851 type are combined and equipped with the system of harmonic gear (1/100) and brake:

BP12F781D – H B 100

Standard set model number

③ Gear deceleration ratio (1/100)
② Brake
① Harmonic gear

How to order:

Please order by using the "Set model number" in the list, Standard combined stepping motors for 5-phase stepping set "BP1" series.

When gear, brake, and/or encoder are necessary for the stepping motor "STEPSYN F", select codes of your preferences from the above ①, ②, and ③ to continuously describe them after "Set model number".

PM driver specifications

Model number		PMM-BA-5603-1	PMM-BA-5604-1
Standard specification	Input source	Single phase AC100V/115V+10, -15% 50/60Hz	
	Source current	4A	8A
	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, 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	
	Withstand voltage	Not influenced when AC1500V is applied between power input terminal and cabinet for one minute	
	Insulation resistance	10MΩ or more when measured with DC500V megohmmeter between input terminal and cabinet.	
Function	Weight	1.2kg	1.9kg
	Protect function	Against PM driver overheat	
	Select function	Auto current down, energization mode, input pulse mode, stepping motor current, low vibration	
	LED display	Power supply monitor, phase origin monitor, pulse monitor, alarm display	
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 100kpulse/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	
	Alarm output signal	Relay terminal output (normally open) Terminal capacity: DC24V 1A or less, or AC120V 0.5A or less	

* Refer to pages 189/203 and after for operation, connection, function, and dimensions of the PM driver.

Stepping motor Common specifications

Item	Combined stepping motors of BP12 (Applicable to PMM-BA-5603-1)	Combined stepping motors of BP13 (Applicable to PMM-BA-5604-1)
Insulation class	Class B (+130°C)	
Withstand voltage	AC1500V, 50/60 Hz, one minute	
Insulation resistance	100MΩ against DC500V	
Vibration resistance	Amplitude 1.52mm (P-P), frequency range 10 to 55Hz, 5 minutes sweep time, along X, Y, and Z axes, for 2 hours	
Impact resistance	Conditions: 98 m/s ² acceleration, 11 minutes duration, half-wave/sine wave, three times each along X, Y, and Z axes, 18 times in total	
Operating ambient temperature	-10 to +50°C (0 to +40°C for the one with harmonic gear)	
Operating ambient humidity	20 to 90% (no condensation)	

Standard combined stepping motors for 5-phase stepping set “BP1” series

Combination model number for BP12

PM driver model number: PMM-BA-5603-1

Combination model number for STEPSYN F series

System support	Dimensions of stepping motor	Single-axis shaft		Dual-axis shaft	
		Set model number	Standard combined stepping motor number	Set model number	Standard combined stepping motor number
Standard type	ø 42mm	BP12F551S	103F5505-7041	BP12F551D	103F5505-7011
		BP12F552S	103F5508-7041	BP12F552D	103F5508-7011
		BP12F554S	103F5510-7041	BP12F553D	103F5510-7011
	ø 60mm	BP12F781S	103F7851-7041	BP12F781D	103F7851-7011
		BP12F782S	103F7852-7041	BP12F782D	103F7852-7011
		BP12F783S	103F7853-7041	BP12F783D	103F7853-7011
Low back-rush gear	ø 42mm	BP12F551S-CX3.6	103F5505-70CXA4	BP12F551D-CX3.6	103F5505-70CXA1
		BP12F551S-CX7.2	103F5505-70CXB4	BP12F551D-CX7.2	103F5505-70CXB1
		BP12F551S-CX10	103F5505-70CXE4	BP12F551D-CX10	103F5505-70CXE1
		BP12F551S-CX20	103F5505-70CXG4	BP12F551D-CX20	103F5505-70CXG1
		BP12F551S-CX30	103F5505-70CXJ4	BP12F551D-CX30	103F5505-70CXJ1
		BP12F551S-CX36	103F5505-70CXA4	BP12F551D-CX36	103F5505-70CXA1
Harmonic gear	ø 42mm	BP12F551S-HX50	103F5505-70HXL4	BP12F551D-HX50	103F5505-70HXL1
		BP12F551S-HX100	103F5505-70HXM4	BP12F551D-HX100	103F5505-70HXM1
Electromagnetic brake	ø 42mm	BP12F551S-XB	103F5505-70XB41		
		BP12F552S-XB	103F5508-70XB41		
		BP12F554S-XB	103F5510-70XB41		

Combination model number for BP13

PM driver model number: PMM-BA-5604-1

Combination model number for STEPSYN F series

System support	Dimensions of stepping motor	Single-axis shaft		Dual-axis shaft	
		Set model number	Standard combined stepping motor	Set model number	Standard combined stepping motor
Standard type	ø 60mm	BP13F781S	103F7851-8041	BP13F781D	103F7851-8011
		BP13F782S	103F7852-8041	BP13F782D	103F7852-8011
		BP13F783S	103F7853-8041	BP13F783D	103F7853-8011
	ø 86mm	BP13F851S	103F8581-8041	BP13F851D	103F8581-8011
		BP13F852S	103F8582-8041	BP13F852D	103F8582-8011
		BP13F853S	103F8583-8041	BP13F853D	103F8583-8011
	ø 106mm	BP13F892S	103F89582-8041	BP13F892D	103F89582-8011
		BP13F893S	103F89583-8041	BP13F893D	103F89583-8011
Low back-rush gear	ø 60mm	BP13F781S-CX3.6	103F7851-80CXA4	BP13F781D-CX3.6	103F7851-80CXA1
		BP13F781S-CX7.2	103F7851-80CXB4	BP13F781D-CX7.2	103F7851-80CXB1
		BP13F781S-CX10	103F7851-80CXE4	BP13F781D-CX10	103F7851-80CXE1
		BP13F781S-CX20	103F7851-80CXG4	BP13F781D-CX20	103F7851-80CXG1
		BP13F781S-CX30	103F7851-80CXJ4	BP13F781D-CX30	103F7851-80CXJ1
		BP13F781S-CX36	103F7851-80CXA4	BP13F781D-CX36	103F7851-80CXA1
	ø 86mm	BP13F851S-CX3.6	103F8581-80CXA4	BP13F851D-CX3.6	103F8581-80CXA1
		BP13F851S-CX7.2	103F8581-80CXB4	BP13F851D-CX7.2	103F8581-80CXB1
		BP13F851S-CX10	103F8581-80CXE4	BP13F851D-CX10	103F8581-80CXE1
		BP13F851S-CX20	103F8581-80CXG4	BP13F851D-CX20	103F8581-80CXG1
		BP13F851S-CX30	103F8581-80CXJ4	BP13F851D-CX30	103F8581-80CXJ1
		BP13F851S-CX36	103F8581-80CXA4	BP13F851D-CX36	103F8581-80CXA1
Harmonic gear	ø 60mm	BP13F781S-HX50	103F7851-80HXL4	BP13F781D-HX50	103F7851-80HXL1
		BP13F781S-HX100	103F7851-80HXM4	BP13F781D-HX100	103F7851-80HXM1
	ø 86mm	BP13F851S-HX50	103F8581-80HXL4	BP13F851D-HX50	103F8581-80HXL1
Electromagnetic brake	ø 60mm	BP13F851S-HX100	103F8581-80HXM4	BP13F851D-HX100	103F8581-80HXM1
		BP13F781S-XB	103F7851-80XB41		
		BP13F782S-XB	103F7852-80XB41		
	ø 86mm	BP13F783S-XB	103F7853-80XB41		
		BP13F851S-XB	103F8581-80XB41		
		BP13F852S-XB	103F8582-80XB41		
		BP13F853S-XB	103F8583-80XB41		

Note) Contact our sales department to order the system with an encoder and/or gear and brake.

Stepping motor data sheet

Combination of BP12

STEPSYN F Series (Standard)

Set model number	Single-axis shaft	BP12F551S	BP12F552S	BP12F554S	BP12F781S	BP12F782S	BP12F783S
	Dual-axis shaft	BP12F551D	BP12F552D	BP12F554D	BP12F781D	BP12F782D	BP12F783D
Holding torque	N•m	0.13	0.18	0.26	0.6	0.93	1.79
Rotor inertia	$\times 10^{-4} \text{kg} \cdot \text{m}^2$	0.03	0.053	0.065	0.275	0.4	0.84
Weight	kg	0.23	0.28	0.37	0.6	0.78	1.36
Allowable thrust load	N	10	10	10	20	20	20
Allowable radial load	N	35	35	35	80	80	80

STEPSYN F Series (with low back rush gear)

Set model number	Single-axis shaft	BP12F551S-CX3.6	BP12F551S-CX7.2	BP12F551S-CX10	BP12F551S-CX20	BP12F551S-CX30	BP12F551S-CX36
	Dual-axis shaft	BP12F551D-CX3.6	BP12F551D-CX7.2	BP12F551D-CX10	BP12F551D-CX20	BP12F551D-CX30	BP12F551D-CX36
Allowable torque	N•m	0.35	0.7	1	1.5	1.5	1.5
Rotor inertia	$\times 10^{-4} \text{kg} \cdot \text{m}^2$	0.03					
Basic step angle	°	0.2	0.1	0.072	0.036	0.024	0.02
Deceleration ratio		1 : 3.6	1 : 7.2	1 : 10	1 : 20	1 : 30	1 : 36
Back rush	°	0.6	0.4	0.35	0.25	0.25	0.25
Allowable number of rotations	min ⁻¹	500	250	180	90	60	50
Weight	kg	0.36					
Allowable thrust load	N	15					
Allowable radial load	N	20					

* The rotation direction of the motor and the gear output shaft is as follows: when deceleration ratio is 1:3.6, 1:7.2, or 1:10, both motor and shaft rotate in the same direction, and for 1:20 or 1:30 type, the motor and the shaft rotate in opposite direction.

STEPSYN F Series (with harmonic gear)

Set model number	Single-axis shaft	BP12F551S-HX50	BP12F551S-HX100
	Dual-axis shaft	BP12F551D-HX50	BP12F551D-HX100
Allowable torque	N•m	2.5	4
Rotor inertia	$\times 10^{-4} \text{kg} \cdot \text{m}^2$	0.042	
Basic step angle	°	0.0144	0.0072
Deceleration ratio		1 : 50	1 : 100
Lost motion	Minute	0.4~3 ($\pm 0.16 \text{N} \cdot \text{m}$)	0.4~3 ($\pm 0.2 \text{N} \cdot \text{m}$)
Allowable number of rotations	min ⁻¹	500	250
Weight	kg	0.52	
Allowable thrust load	N	200	
Allowable radial load	N	250	

* The gear output shaft rotates in the opposite direction of the motor.

STEPSYN F Series (With electromagnetic brake)

Set model number	Single-axis shaft	BP12F551S-XB	BP12F552S-XB	BP12F554S-XB
	Dual-axis shaft			
Holding torque	N•m	0.13	0.18	0.26
Rotor inertia	$\times 10^{-4} \text{kg} \cdot \text{m}^2$	0.045	0.068	0.08
Weight	kg	0.38	0.43	0.52
Allowable thrust load	N	10	10	10
Allowable radial load	N	35	35	35
Electromagnetic brake specification	Brake operation system	Non-excitation operation system		
	Source voltage	DC 24 $\pm$ 5%		
	Exciting current	0.08		
	Electric power consumption	2		
	Static friction torque	0.22		
	Brake operating time	30		
	Brake release time	20		

Stepping motor data sheet

Combination of BP13

STEPSYN F Series (Standard)

Set model number	Single-axis shaft	BP13F781S	BP13F782S	BP13F783S
	Dual-axis shaft	BP13F781D	BP13F782D	BP13F783D
Holding torque	N•m	0.6	0.93	1.79
Rotor inertia	$\times 10^{-4} \text{kg} \cdot \text{m}^2$	0.275	0.4	0.84
Weight	kg	0.6	0.78	1.36
Allowable thrust load	N	20	20	20
Allowable radial load	N	80	80	80

Set model number	Single-axis shaft	BP13F851S	BP13F852S	BP13F853S	BP13F892S	BP13F893S
	Dual-axis shaft	BP13F851D	BP13F852D	BP13F853D	BP13F892D	BP13F893D
Holding torque	N•m	2.06	4.02	6.17	10.8	16
Rotor inertia	$\times 10^{-4} \text{kg} \cdot \text{m}^2$	1.45	2.9	4.4	14.6	22
Weight	kg	1.5	2.5	3.5	7.5	10.5
Allowable thrust load	N	60	60	60	100	100
Allowable radial load	N	220	220	220	360	360

STEPSYN F Series (With low back rush gear)

Set model number	Single-axis shaft	BP13F781S-CX3.6	BP13F781S-CX7.2	BP13F781S-CX10	BP13F781S-CX20	BP13F781S-CX30	BP13F781S-CX36
	Dual-axis shaft	BP13F781D-CX3.6	BP13F781D-CX7.2	BP13F781D-CX10	BP13F781D-CX20	BP13F781D-CX30	BP13F781D-CX36
Allowable torque	N•m	1.25	2.5	3	3.5	4	4
Rotor inertia	$\times 10^{-4} \text{kg} \cdot \text{m}^2$	0.275					
Basic step angle	°	0.2	0.1	0.072	0.036	0.024	0.02
Deceleration ratio		1 : 3.6	1 : 7.2	1 : 10	1 : 20	1 : 30	1 : 36
Back rush	°	0.55	0.25	0.25	0.17	0.17	0.17
Allowable number of rotations	min^{-1}	500	250	180	90	60	50
Weight	kg	0.97					
Allowable thrust load	N	30					
Allowable radial load	N	100					

* The rotation direction of the motor and the gear output shaft is as follows: when deceleration ratio is 1:3.6 or 1:7.2, both motor and shaft rotate in the same direction, and for 1:10, 1:20, or 1:30 type, the motor and the shaft rotate in opposite direction.

Set model numbe	Single-axis shaft	BP13F851S-CX3.6	BP13F851S-CX7.2	BP13F851S-CX10	BP13F851S-CX20	BP13F851S-CX30	BP13F851S-CX36
	Dual-axis shaft	BP13F851D-CX3.6	BP13F851D-CX7.2	BP13F851D-CX10	BP13F851D-CX20	BP13F851D-CX30	BP13F851D-CX36
Allowable torque	N•m	4.5	9	9	12	12	12
Rotor inertia	$\times 10^{-4} \text{kg} \cdot \text{m}^2$	1.45					
Basic step angle	°	0.2	0.1	0.072	0.036	0.024	0.02
Deceleration ratio		1 : 3.6	1 : 7.2	1 : 10	1 : 20	1 : 30	1 : 36
Back rush	°	0.4	0.25	0.25	0.17	0.17	0.15
Allowable number of rotations	min^{-1}	500	250	180	90	60	50
Weight	kg	2.7					
Allowable thrust load	N	60					
Allowable radial load	N	300					

* The rotation direction of the motor and the gear output shaft is as follows: when deceleration ratio is 1:3.6 or 1:7.2, both motor and shaft rotate in the same direction, and for 1:10, 1:20, or 1:30 type, the motor and the shaft rotate in opposite direction.

Stepping motor data sheet

STEPSYN F Series (With harmonic gear)

Set model number	Single-axis shaft	BP13F781S-HX50	BP13F781S-HX100
	Dual-axis shaft	BP13F781D-HX50	BP13F781D-HX100
Allowable torque	N•m	5.5	8
Rotor inertia	$\times 10^{-4} \text{kg} \cdot \text{m}^2$	0.31	
Basic step angle	°	0.0144	0.0072
Deceleration ratio		1 : 50	1 : 100
Lost motion	Minute	0.4~3 ($\pm 0.28 \text{N} \cdot \text{m}$)	0.4~1.5 ($\pm 0.4 \text{N} \cdot \text{m}$)
Allowable number of rotations	min^{-1}	70	35
Weight	kg	1.2	
Allowable thrust load	N	400	
Allowable radial load	N	400	

* The gear output shaft rotates in the opposite direction of the motor.

Set model number	Single-axis shaft	BP13F851S-HX50	BP13F851S-HX100
	Dual-axis shaft	BP13F851D-HX50	BP13F851D-HX100
Allowable torque	N•m	25	41
Rotor inertia	$\times 10^{-4} \text{kg} \cdot \text{m}^2$	1.65	
Basic step angle	°	0.0144	0.0072
Deceleration ratio		1 : 50	1 : 100
Lost motion	Minute	0.4~3 ($\pm 1.0 \text{N} \cdot \text{m}$)	0.4~3 ($\pm 1.2 \text{N} \cdot \text{m}$)
Allowable number of rotations	min^{-1}	500	250
Weight	kg	3.3	
Allowable thrust load	N	1400	
Allowable radial load	N	1400	

* The gear output shaft rotates in the opposite direction of the motor.

STEPSYN F Series (with electromagnetic brake)

Set model number	Single-axis shaft	BP13F781S-XB	BP13F782S-XB	BP13F783S-XB
	Dual-axis shaft			
Holding torque	N•m	0.6	0.93	1.79
Rotor inertia	$\times 10^{-4} \text{kg} \cdot \text{m}^2$	0.43	0.56	1
Weight	kg	0.94	1.12	1.7
Allowable thrust load	N	20	20	20
Allowable radial load	N	80	80	80
Electromagnetic brake specification	Brake operation system	Non-excitation operation system		
	Source voltage	DC 24 $\pm$ 5%		
	Exciting current	0.25		
	Electric power consumption	6		
	Static friction torque	0.8		
	Brake operating time	30		
	Brake release time	20		

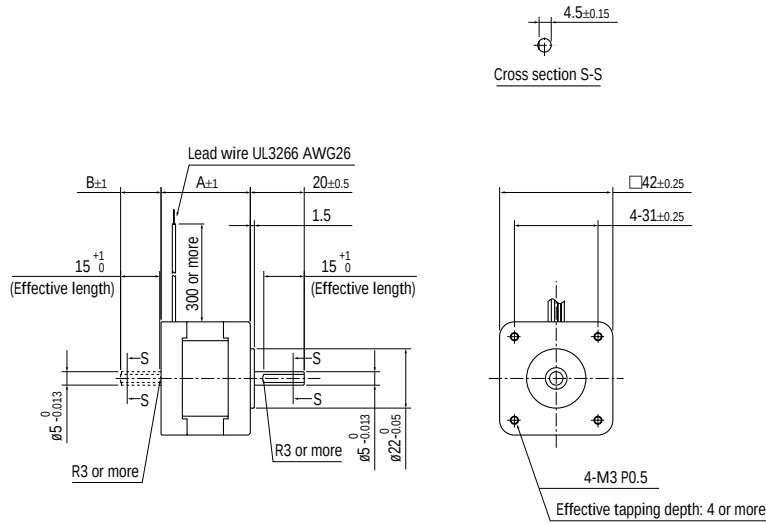
Set model number	Single-axis shaft	BP13F851S-XB	BP13F852S-XB	BP13F853S-XB
	Dual-axis shaft			
Holding torque	N•m	2.06	4.02	6.17
Rotor inertia	$\times 10^{-4} \text{kg} \cdot \text{m}^2$	2.24	3.69	5.19
Weight	kg	3.5	4.5	5.5
Allowable thrust load	N	60	60	60
Allowable radial load	N	220	220	220
Electromagnetic brake specification	Brake operation system	Non-excitation operation system		
	Source voltage	DC 24 $\pm$ 5%		
	Exciting current	0.42		
	Electric power consumption	10		
	Static friction torque	4		
	Brake operating time	50		
	Brake release time	20		

Dimensions (Unit: mm)

STEPSYN F

BP12F55□□

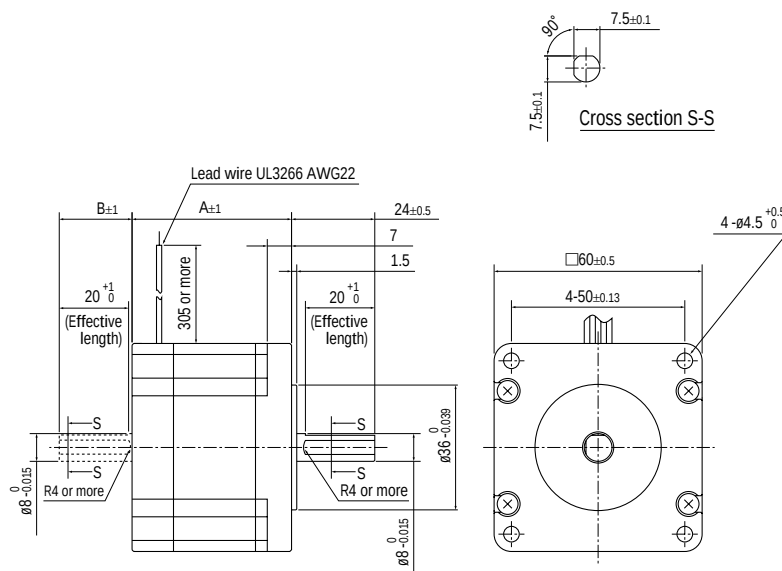
103F55□□-70□□



Model name	A	B
BP12F551S (103F5505-7041)	34	—
BP12F551D (103F5505-7011)	34	15
BP12F552S (103F5508-7041)	40	—
BP12F552D (103F5508-7011)	40	15
BP12F554S (103F5510-7041)	49	—
BP12F554D (103F5510-7011)	49	15

BP12F78□□ / BP13F78□□

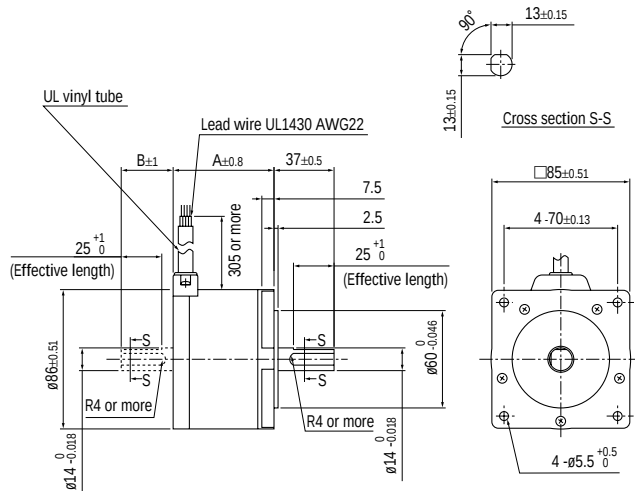
103F785□-70□□ / 103F785□-80□□



Model name	A	B
BP12F781S (103F7851-7041)	46.5	—
BP12F781D (103F7851-7011)	46.5	21
BP12F782S (103F7852-7041)	55	—
BP12F782D (103F7852-7011)	55	21
BP12F783S (103F7853-7041)	87.5	—
BP12F783D (103F7853-7011)	87.5	21
BP13F781S (103F7851-8041)	46.5	—
BP13F781D (103F7851-8011)	46.5	21
BP13F782S (103F7852-8041)	55	—
BP13F782D (103F7852-8011)	55	21
BP13F783S (103F7853-8041)	87.5	—
BP13F783D (103F7853-8011)	87.5	21

BP13F85□□

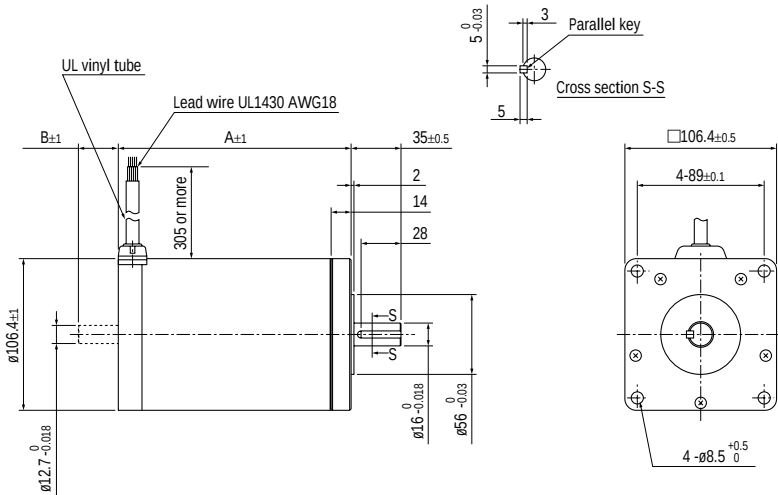
103F858□-80□□



Model name	A	B
BP13F851S (103F8581-8041)	62.15	—
BP13F851D (103F8581-8011)	62.15	32
BP13F852S (103F8582-8041)	92.2	—
BP13F852D (103F8582-8011)	92.2	32
BP13F853S (103F8583-8041)	125.85	—
BP13F853D (103F8583-8011)	125.85	32

Dimensions (Unit: mm)

BP13F89□S
103F8958□-80□



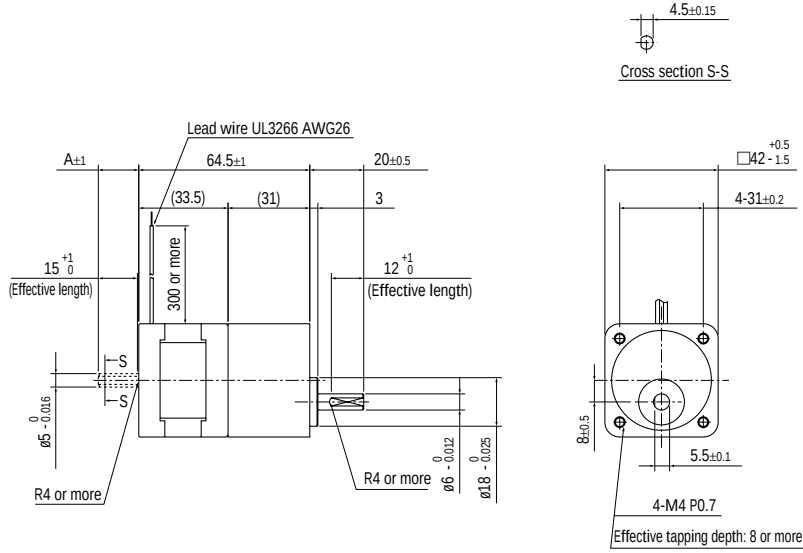
Model name	A	B
BP13F892S (103F89582-8041)	163.3	—
BP13F892D (103F89582-8011)	163.3	28
BP13F893S (103F89583-8041)	221.3	—
BP13F893D (103F89583-8011)	221.3	28

Dimensions (Unit: mm)

STEPSYN F with Low Back Rush Gear

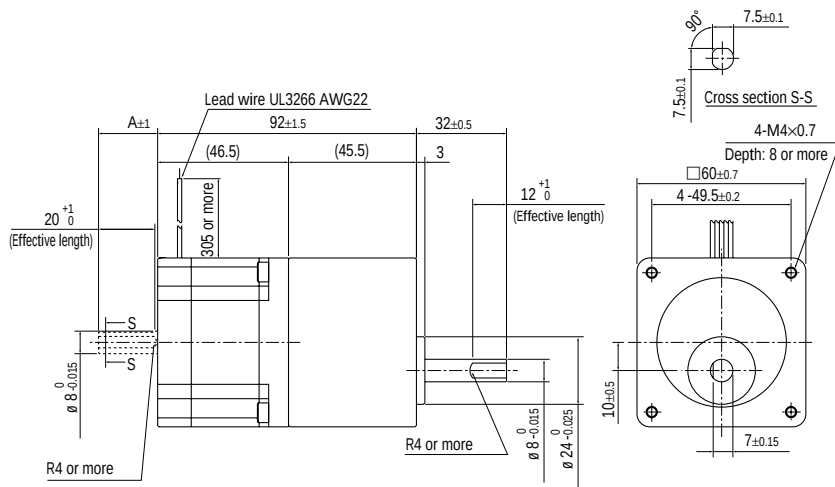
BP12F551S-CX□□

103F5505-70CX□□



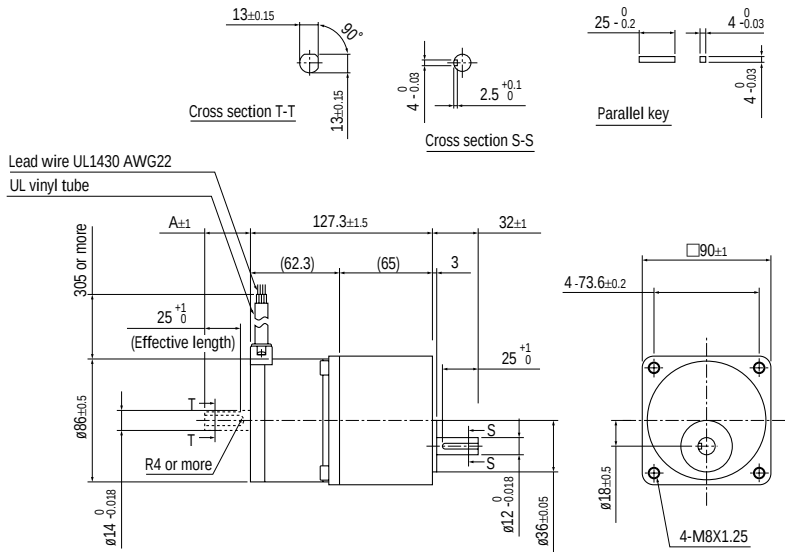
BP13F781□-CX□□

103F7851-80CX□□



BP13F851□-CX□□

103F8581-80CX□□



Model name	A
BP12F551S-CX3.6 (103F5505-70CXA4)	—
BP12F551D-CX3.6 (103F5505-70CXA1)	15
BP12F551S-CX7.2 (103F5505-70CXB4)	—
BP12F551D-CX7.2 (103F5505-70CXB1)	15
BP12F551S-CX10 (103F5505-70CXE4)	—
BP12F551D-CX10 (103F5505-70CXE1)	15
BP12F551S-CX20 (103F5505-70CXG4)	—
BP12F551D-CX20 (103F5505-70CXG1)	15
BP12F551S-CX30 (103F5505-70CXJ4)	—
BP12F551D-CX30 (103F5505-70CXJ1)	15
BP12F551S-CX36 (103F5505-70CKK4)	—
BP12F551D-CX36 (103F5505-70CKK1)	15

Model name	A
BP13F781S-CX3.6 (103F7851-80CXA4)	—
BP13F781D-CX3.6 (103F7851-80CXA1)	21
BP13F781S-CX7.2 (103F7851-80CXB4)	—
BP13F781D-CX7.2 (103F7851-80CXB1)	21
BP13F781S-CX10 (103F7851-80CXE4)	—
BP13F781D-CX10 (103F7851-80CXE1)	21
BP13F781S-CX20 (103F7851-80CXG4)	—
BP13F781D-CX20 (103F7851-80CXG1)	21
BP13F781S-CX30 (103F7851-80CXJ4)	—
BP13F781D-CX30 (103F7851-80CXJ1)	21
BP13F781S-CX36 (103F7851-80CKK4)	—
BP13F781D-CX36 (103F7851-80CKK1)	21

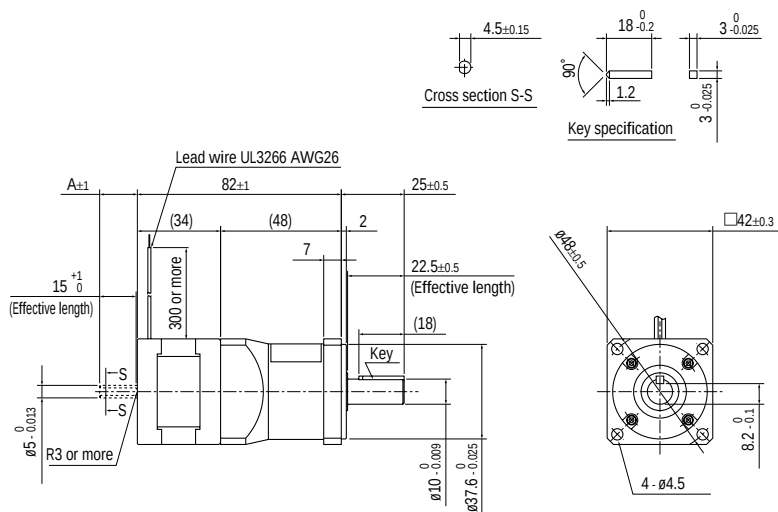
Model name	A
BP13F851S-CX3.6 (103F8581-80CXA4)	—
BP13F851D-CX3.6 (103F8581-80CXA1)	32
BP13F851S-CX7.2 (103F8581-80CXB4)	—
BP13F851D-CX7.2 (103F8581-80CXB1)	32
BP13F851S-CX10 (103F8581-80CXE4)	—
BP13F851D-CX10 (103F8581-80CXE1)	32
BP13F851S-CX20 (103F8581-80CXG4)	—
BP13F851D-CX20 (103F8581-80CXG1)	32
BP13F851S-CX30 (103F8581-80CXJ4)	—
BP13F851D-CX30 (103F8581-80CXJ1)	32
BP13F851S-CX36 (103F8581-80CKK4)	—
BP13F851D-CX36 (103F8581-80CKK1)	32

Dimensions (Unit: mm)

STEPSYN F with Harmonic Gear

BP12F551□-HX□□

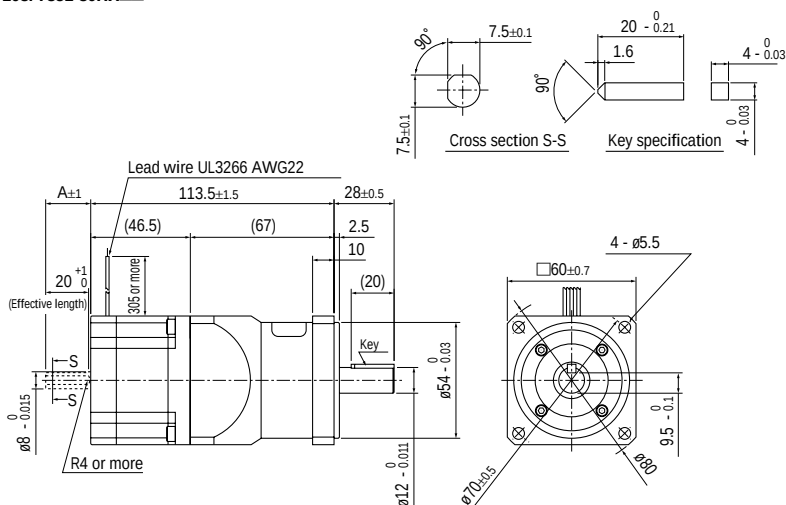
103F5505-70HX□□



Model name	A
BP12F551S-HX50 (103F5505-70HXL4)	—
BP12F551D-HX50 (103F5505-70HXL1)	15
BP12F551S-HX100 (103F5505-70HXM4)	—
BP12F551D-HX100 (103F5505-70HXM1)	15

BP13F781□-HX□□

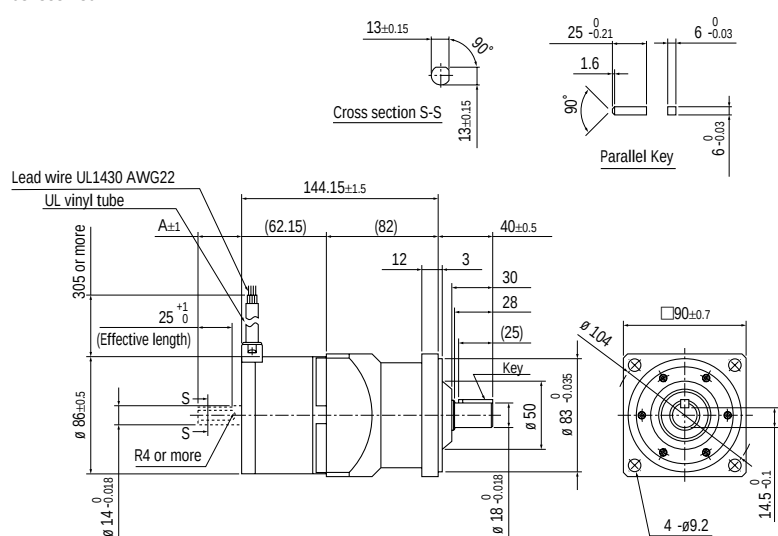
103F7851-80HX□□



Model name	A
BP13F781S-HX50 (103F7851-80HXL4)	—
BP13F781D-HX50 (103F7851-80HXL1)	21
BP13F781S-HX100 (103F7851-80HXM4)	—
BP13F781D-HX100 (103F7851-80HXM1)	21

BP13F851□-HX□□

103F8581-80HX□□



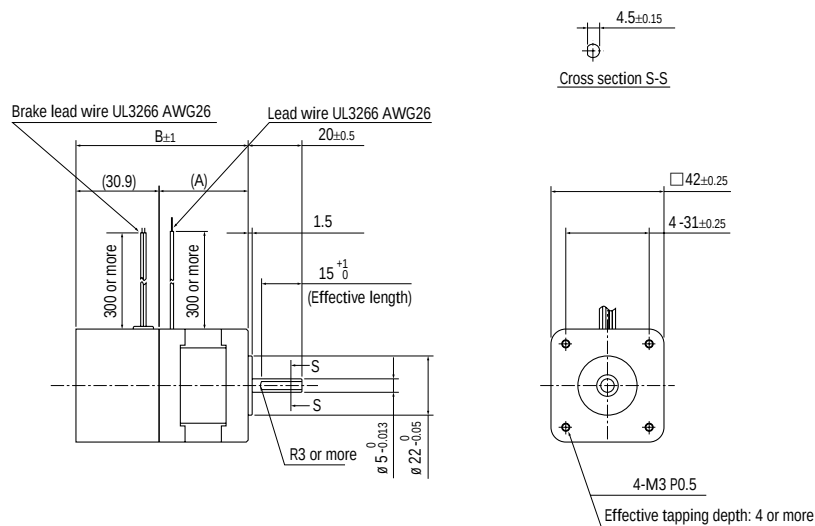
Model name	A
BP13F851S-HX50 (103F8581-80HXL4)	—
BP13F851D-HX50 (103F8581-80HXL1)	32
BP13F851S-HX100 (103F8581-80HXM4)	—
BP13F851D-HX100 (103F8581-80HXM1)	32

Dimensions (Unit: mm)

STEPSYN F with Electromagnetic Brake

BP12F55□S-XB

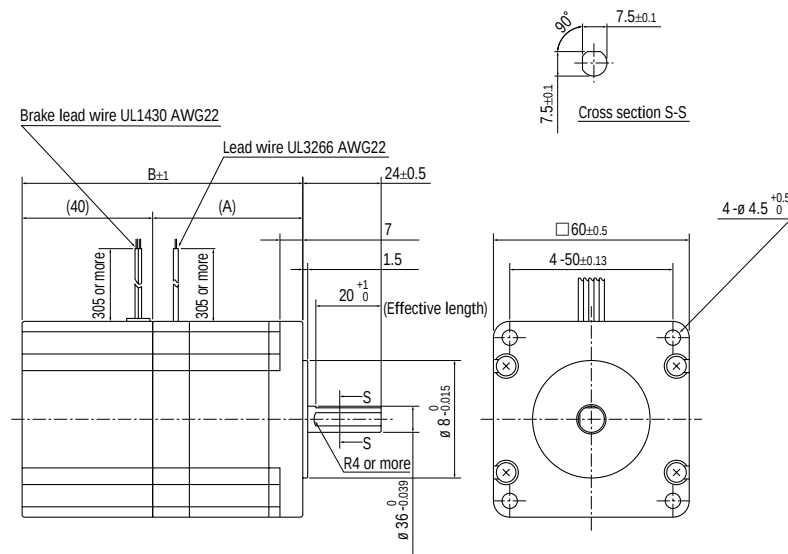
103F55□-70XB41



Model name	A	B
BP12F551S-XB (103F5505-70XB41)	33.6	64.5
BP12F552S-XB (103F5508-70XB41)	39.6	70.5
BP12F554S-XB (103F5510-70XB41)	48.6	79.5

BP13F78□S-XB

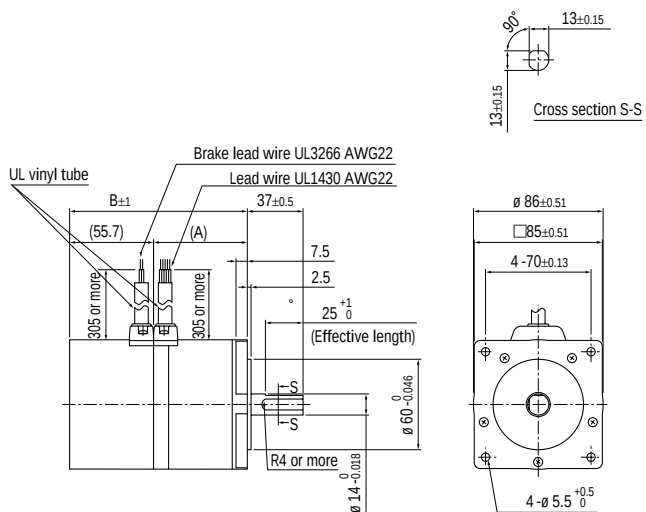
103F785□-80XB41



Model name	A	B
BP13F781S-XB (103F7851-80XB41)	45.8	85.8
BP13F782S-XB (103F7852-80XB41)	54.5	94.5
BP13F783S-XB (103F7853-80XB41)	86.7	126.7

BP13F85□S-XB

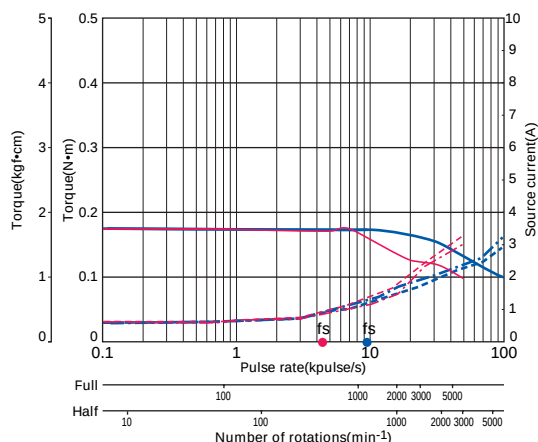
103F858□-80XB41



Model name	A	B
BP13F851S-XB (103F8581-80XB41)	61.0	116.7
BP13F852S-XB (103F8582-80XB41)	91.1	146.8
BP13F853S-XB (103F8583-80XB41)	124.7	180.4

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

● BP12F551□ / BP12F551S-XB : 100V



103F5505-70□□/103F5505-70XB41

Source voltage : AC100V·Winding current : 0.75A/phase

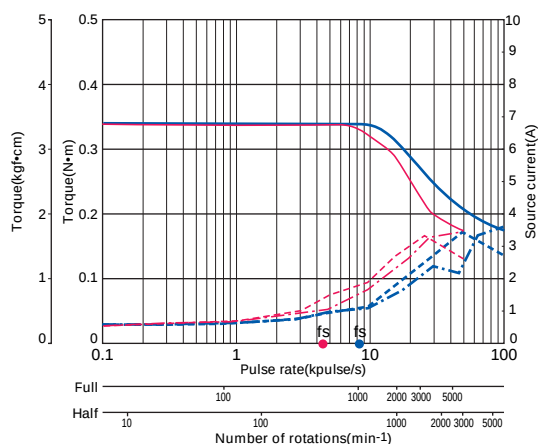
— Getaway torque($J_{L1}=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

fs : Maximum self-start frequency when not load

■ Full-step ■ Half-step

● BP12F554□ / BP12F554S-XB : 100V



103F5510-70□□/103F5510-70XB41

Source voltage : AC100V·Winding current : 0.75A/phase

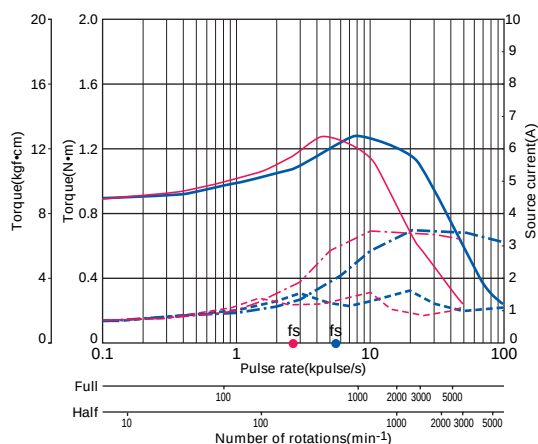
— Getaway torque($J_{L1}=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

fs : Maximum self-start frequency when not load

■ Full-step ■ Half-step

● BP12F782□ : 100V



103F7852-70□□

Source voltage : AC100V·Winding current : 0.75A/phase

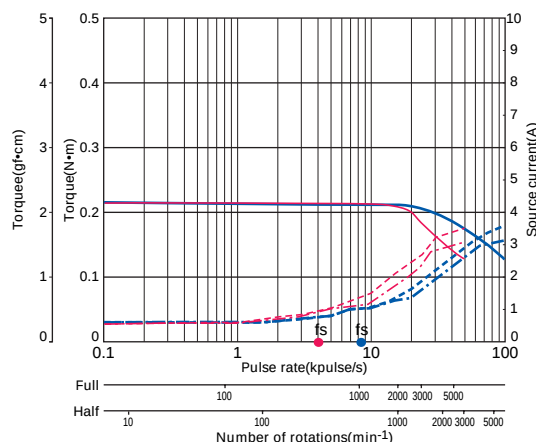
— Getaway torque($J_{L1}=2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

fs : Maximum self-start frequency when not load

■ Full-step ■ Half-step

● BP12F552□ / BP12F552S-XB : 100V



103F5508-70□□/103F5508-70XB41

Source voltage : AC100V·Winding current : 0.75A/phase

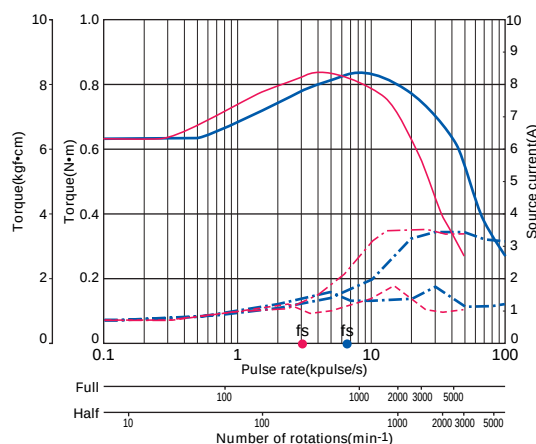
— Getaway torque($J_{L1}=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

fs : Maximum self-start frequency when not load

■ Full-step ■ Half-step

● BP12F781□ : 100V



103F7851-70□□

Source voltage : AC100V·Winding current : 0.75A/phase

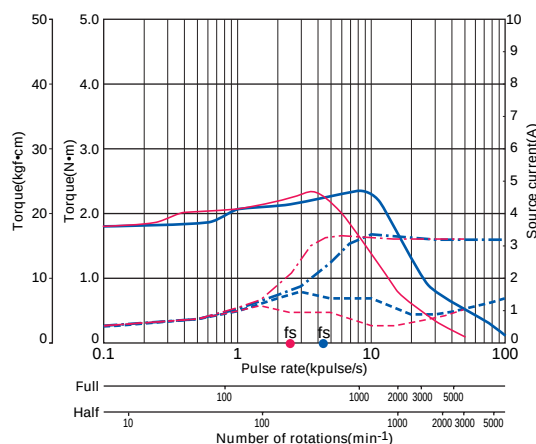
— Getaway torque($J_{L1}=2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

fs : Maximum self-start frequency when not load

■ Full-step ■ Half-step

● BP12F783□ : 100V



103F7853-70□□

Source voltage : AC100V·Winding current : 0.75A/phase

— Getaway torque($J_{L1}=7.4 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

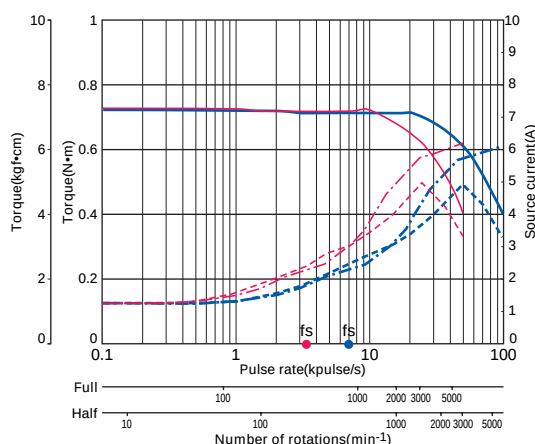
--- Source current($T_L=\text{MAX}$) --- Source current($T_L=0$)

fs : Maximum self-start frequency when not load

■ Full-step ■ Half-step

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

● BP13F781□ / BP13F781S-XB : 100V



103F7851-80□□/103F7851-80XB41

Source voltage : AC100V•Winding current : 1.5A/phase

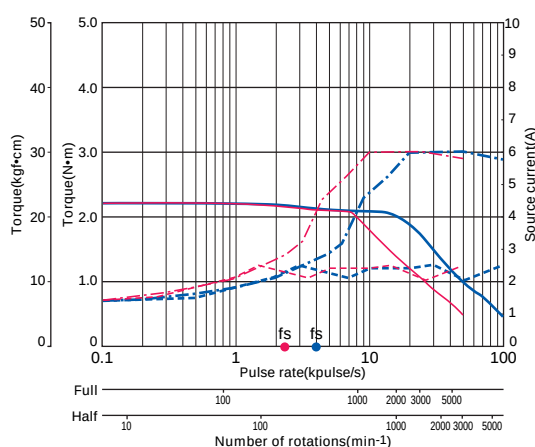
— Getaway torque($J_{L1}=2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

--- Source current(TL=MAX) --- Source current(TL=0)

fs : Maximum self-start frequency when not load

■ Full-step ■ Half-step

● BP13F783□ / BP13F783S-XB : 100V



103F7853-80□□/103F7853-80XB41

Source voltage : AC100V•Winding current : 1.5A/phase

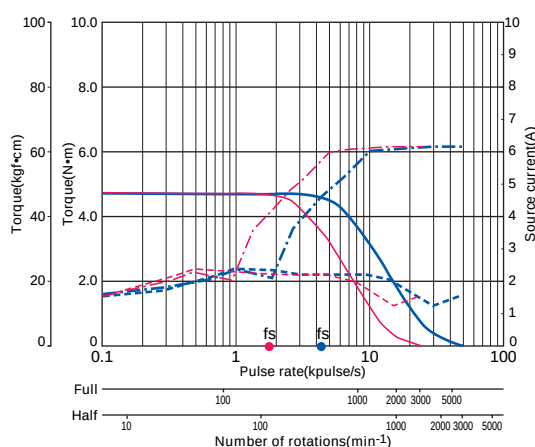
— Getaway torque($J_{L1}=7.4 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

--- Source current(TL=MAX) --- Source current(TL=0)

fs : Maximum self-start frequency when not load

■ Full-step ■ Half-step

● BP13F852□ / BP13F852S-XB : 100V



103F8582-80□□/103F8582-80XB41

Source voltage : AC100V•Winding current : 1.5A/phase

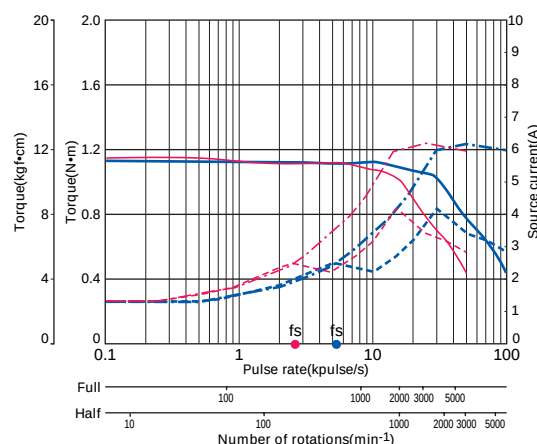
— Getaway torque($J_{L1}=15.1 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

--- Source current(TL=MAX) --- Source current(TL=0)

fs : Maximum self-start frequency when not load

■ Full-step ■ Half-step

● BP13F782□ / BP13F782S-XB : 100V



103F7852-80□□/103F7852-80XB41

Source voltage : AC100V•Winding current : 1.5A/phase

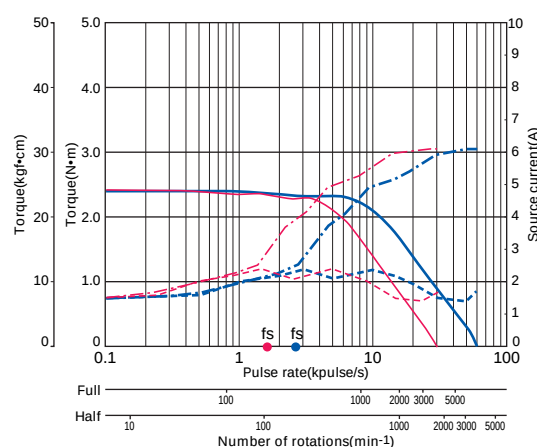
— Getaway torque($J_{L1}=2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

--- Source current(TL=MAX) --- Source current(TL=0)

fs : Maximum self-start frequency when not load

■ Full-step ■ Half-step

● BP13F851□ / BP13F851S-XB : 100V



103F8581-80□□/103F8581-80XB41

Source voltage : AC100V•Winding current : 1.5A/phase

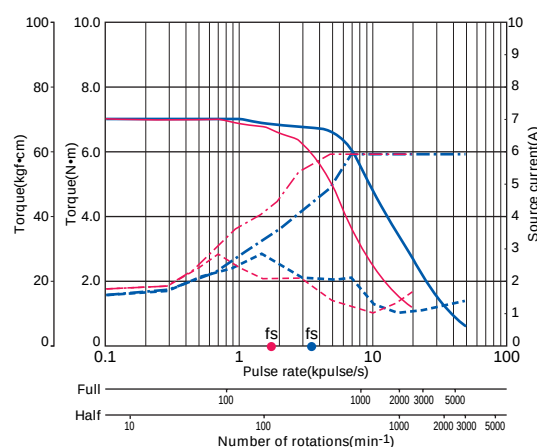
— Getaway torque($J_{L1}=7.4 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

--- Source current(TL=MAX) --- Source current(TL=0)

fs : Maximum self-start frequency when not load

■ Full-step ■ Half-step

● BP13F853□ / BP13F853S-XB : 100V



103F8583-80□□/103F8583-80XB41

Source voltage : AC100V•Winding current : 1.5A/phase

— Getaway torque($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

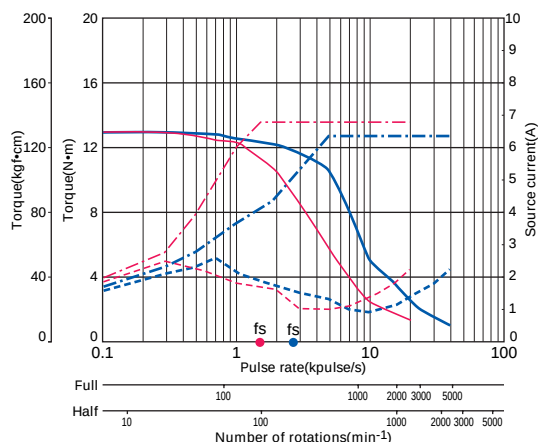
--- Source current(TL=MAX) --- Source current(TL=0)

fs : Maximum self-start frequency when not load

■ Full-step ■ Half-step

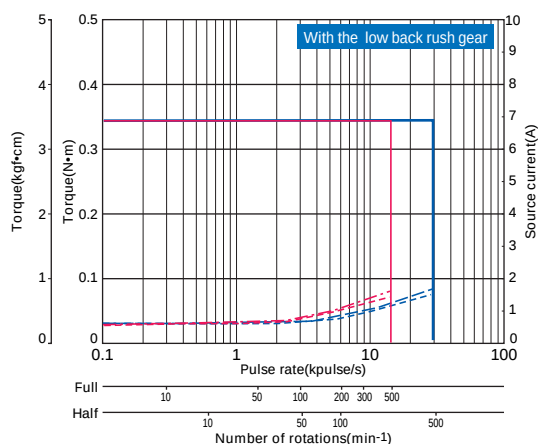
Pulse rate-torque characteristics/pulse rate-source current characteristics

● BP13F892 □ : 100V



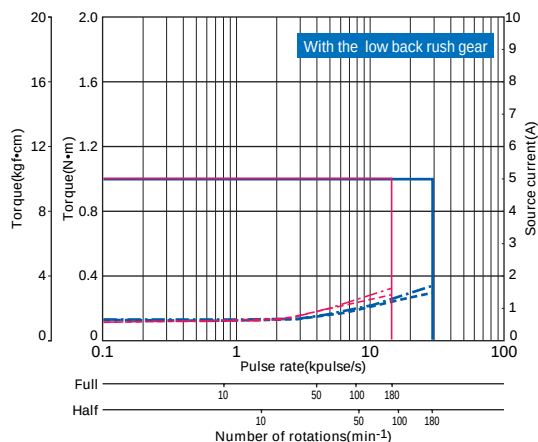
103F89582-80 □ □
Source voltage : AC100V • Winding current : 1.5A/phase
— Getaway torque ($J_{L1}=44 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current (TL=MAX) --- Source current (TL=0)
fs : Maximum self-start frequency when not load
■ Full-step ■ Half-step

● BP12F551 □-CX3.6 : 100V



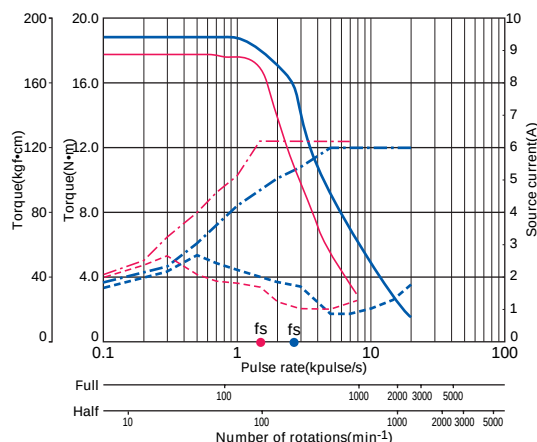
103F5505-70CXA □ □
Source voltage : AC100V • Winding current : 0.75A/phase
— Allowable torque ($J_{L1}=0.94 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current (TL=MAX) --- Source current (TL=0)
■ Full-step ■ Half-step

● BP12F551 □-CX10 : 100V



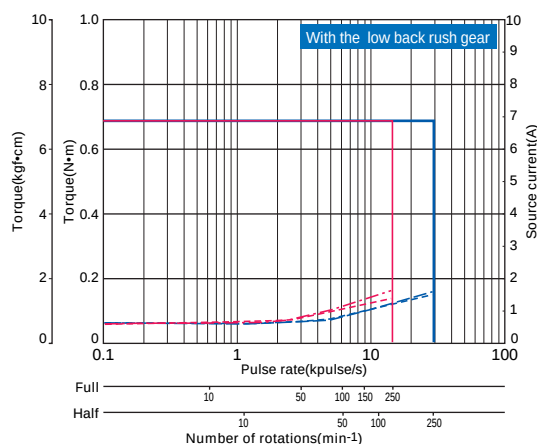
103F5505-70CXE □ □
Source voltage : AC100V • Winding current : 0.75A/phase
— Allowable torque ($J_{L1}=2.6 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current (TL=MAX) --- Source current (TL=0)
■ Full-step ■ Half-step

● BP13F893 □ : 100V



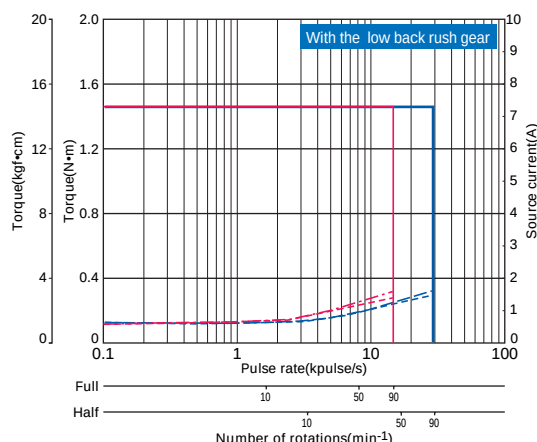
103F89583-80 □ □
Source voltage : AC100V • Winding current : 1.5A/phase
— Getaway torque ($J_{L1}=44 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current (TL=MAX) --- Source current (TL=0)
fs : Maximum self-start frequency when not load
■ Full-step ■ Half-step

● BP12F551 □-CX7.2 : 100V



103F5505-70CXB □ □
Source voltage : AC100V • Winding current : 0.75A/phase
— Allowable torque ($J_{L1}=0.94 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current (TL=MAX) --- Source current (TL=0)
■ Full-step ■ Half-step

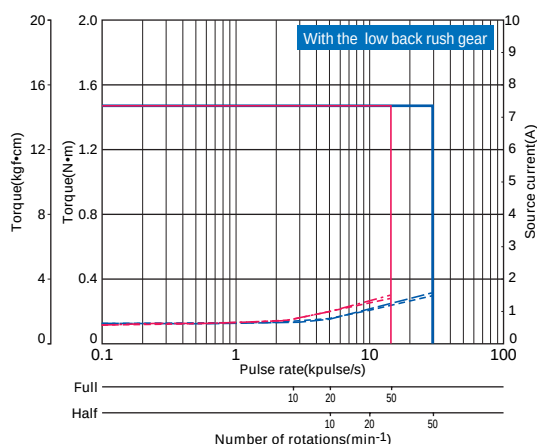
● BP12F551 □-CX20 : 100V



103F5505-70CXG □ □
Source voltage : AC100V • Winding current : 0.75A/phase
— Allowable torque ($J_{L1}=2.6 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current (TL=MAX) --- Source current (TL=0)
■ Full-step ■ Half-step

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

● BP12F551□-CX30 : 100V



103F5505-70CXJ□

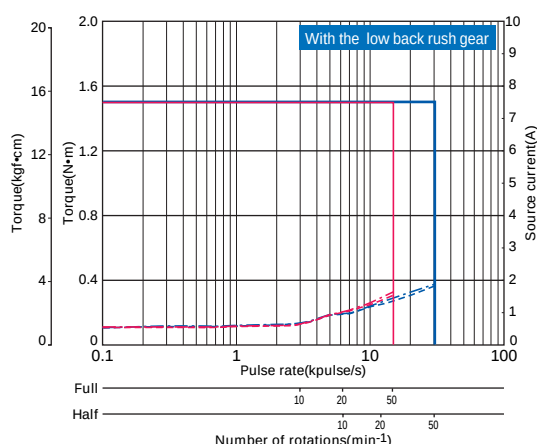
Source voltage : AC100V•Winding current : 0.75A/phase

— Allowable torque($JL1=2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

--- Source current($TL=MAX$) --- Source current($TL=0$)

■ Full-step ■ Half-step

● BP12F551□-CX36 : 100V



103F5505-70CXK□

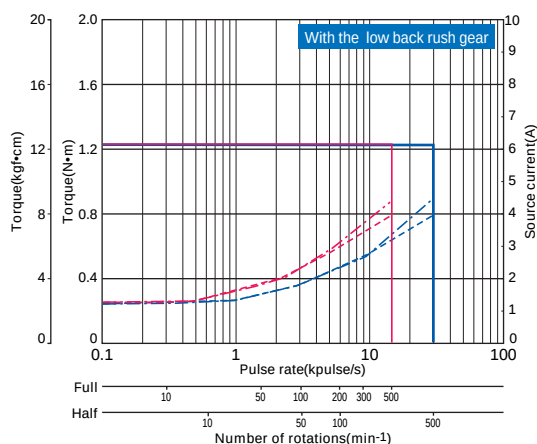
Source voltage : AC100V•Winding current : 0.75A/phase

— Allowable torque($JL1=2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

--- Source current($TL=MAX$) --- Source current($TL=0$)

■ Full-step ■ Half-step

● BP13F781□-CX3.6 : 100V



103F7851-80CXA□

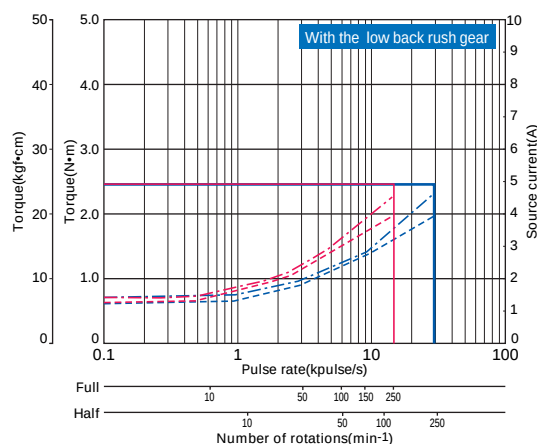
Source voltage : AC100V•Winding current : 1.5A/phase

— Allowable torque($JL1=2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

--- Source current($TL=MAX$) --- Source current($TL=0$)

■ Full-step ■ Half-step

● BP13F781□-CX7.2 : 100V



103F7851-80CXB□

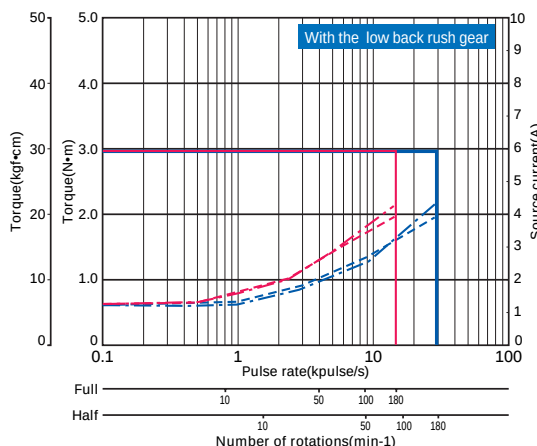
Source voltage : AC100V•Winding current : 1.5A/phase

— Allowable torque($JL1=7.2 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

--- Source current($TL=MAX$) --- Source current($TL=0$)

■ Full-step ■ Half-step

● BP13F781□-CX10 : 100V



103F7851-80CXE□

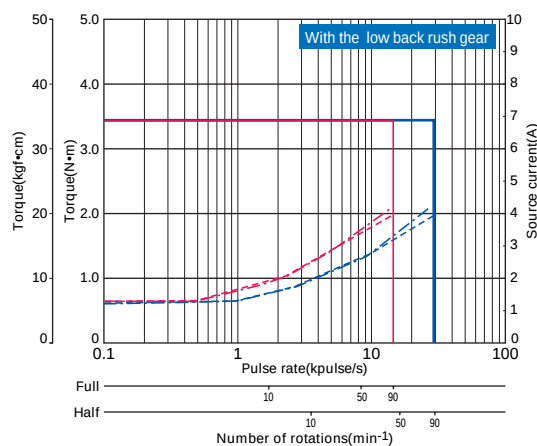
Source voltage : AC100V•Winding current : 1.5A/phase

— Allowable torque($JL1=2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

--- Source current($TL=MAX$) --- Source current($TL=0$)

■ Full-step ■ Half-step

● BP13F781□-CX20 : 100V



103F7851-80CXG□

Source voltage : AC100V•Winding current : 1.5A/phase

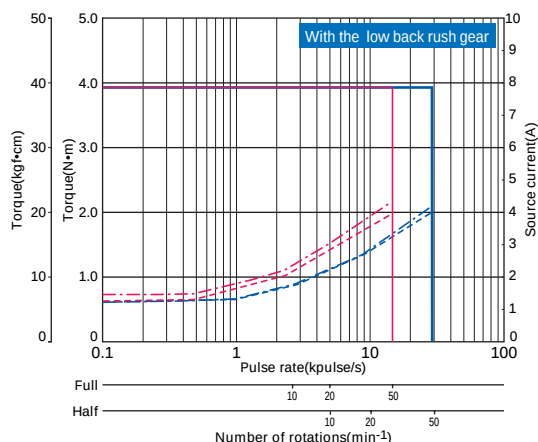
— Allowable torque($JL1=15.1 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

--- Source current($TL=MAX$) --- Source current($TL=0$)

■ Full-step ■ Half-step

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

● BP13F781□-CX30 : 100V



103F7851-80CXJ□

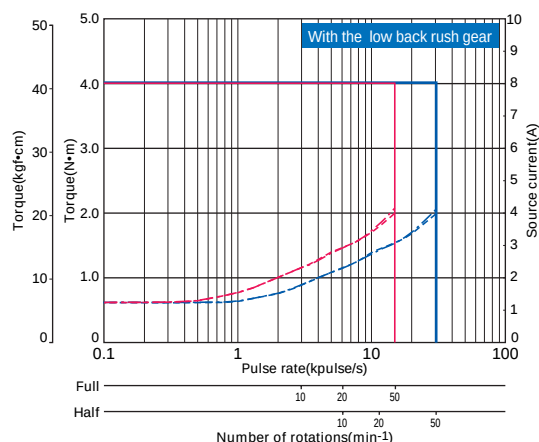
Source voltage : AC100V•Winding current : 1.5A/phase

— Allowable torque($J_{L1}=15.1 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ Full-step ■ Half-step

● BP13F781□-CX36 : 100V



103F7851-80CXK□

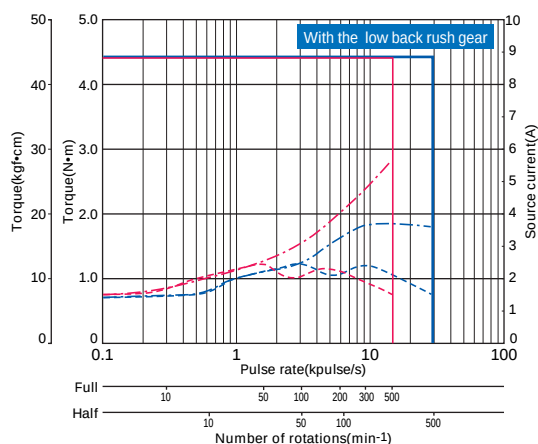
Source voltage : AC100V•Winding current : 1.5A/phase

— Allowable torque($J_{L1}=15.1 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ Full-step ■ Half-step

● BP13F851□-CX3.6 : 100V



103F8581-80CXA□

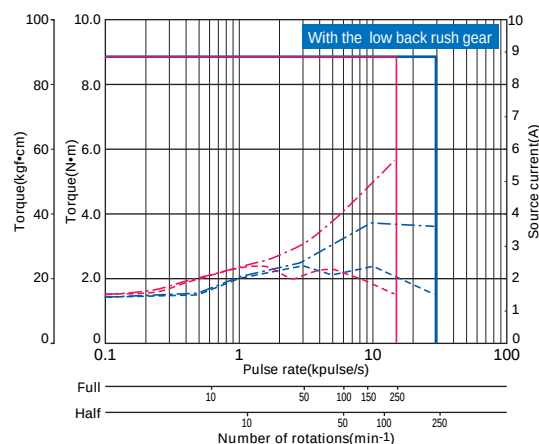
Source voltage : AC100V•Winding current : 1.5A/phase

— Allowable torque($J_{L1}=15.1 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ Full-step ■ Half-step

● BP13F851□-CX7.2 : 100V



103F8581-80CXB□

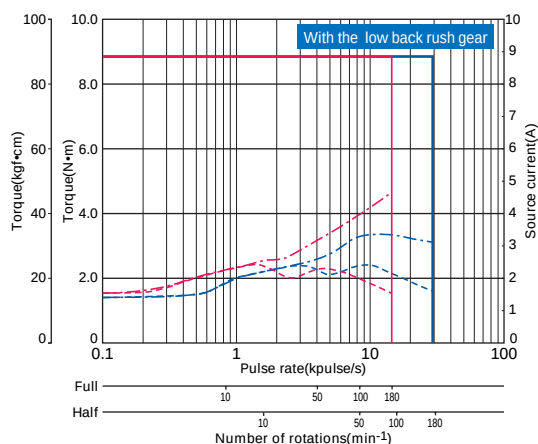
Source voltage : AC100V•Winding current : 1.5A/phase

— Allowable torque($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ Full-step ■ Half-step

● BP13F851□-CX10 : 100V



103F8581-80CXE□

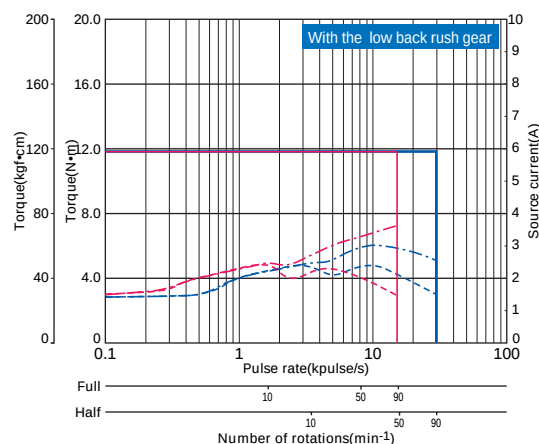
Source voltage : AC100V•Winding current : 1.5A/phase

— Allowable torque($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ Full-step ■ Half-step

● BP13F851□-CX20 : 100V



103F8581-80CXG□

Source voltage : AC100V•Winding current : 1.5A/phase

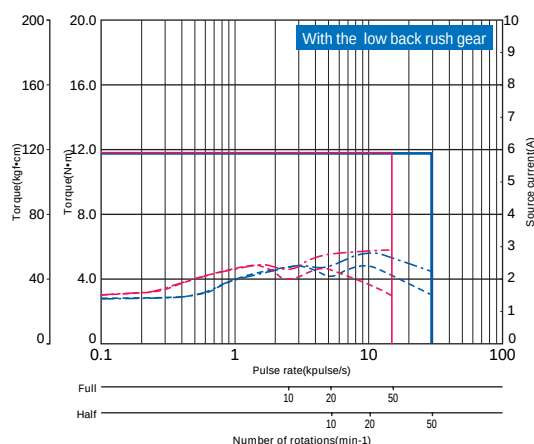
— Allowable torque($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ Full-step ■ Half-step

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

● BP13F851□-CX30 : 100V



103F8581-80CXJ□

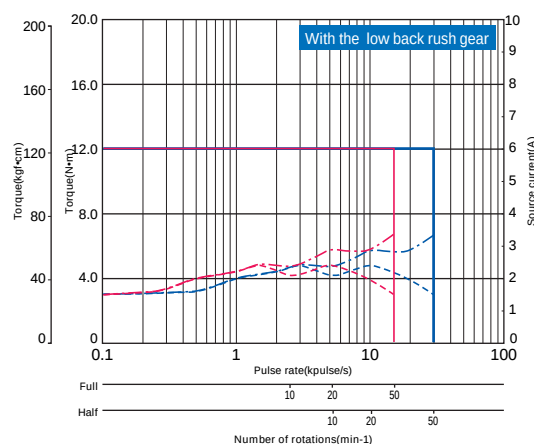
Source voltage : AC100V•Winding current : 1.5A/phase

— Allowable torque($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ Full-step ■ Half-step

● BP13F851□-CX36 : 100V



103F8581-80CXK□

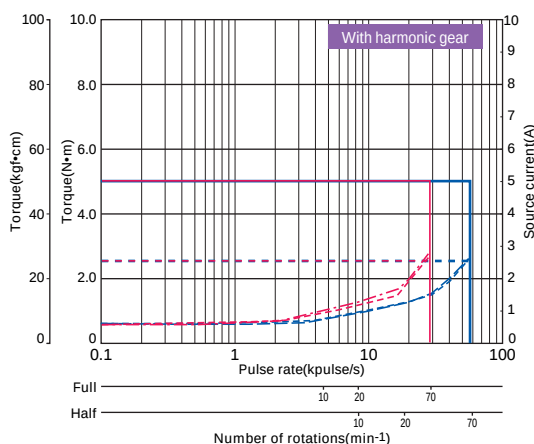
Source voltage : AC100V•Winding current : 1.5A/phase

— Allowable torque($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ Full-step ■ Half-step

● BBP12F551□-HX50 : 100V



103F5505-70HXL□ ■ Full-step ■ Half-step

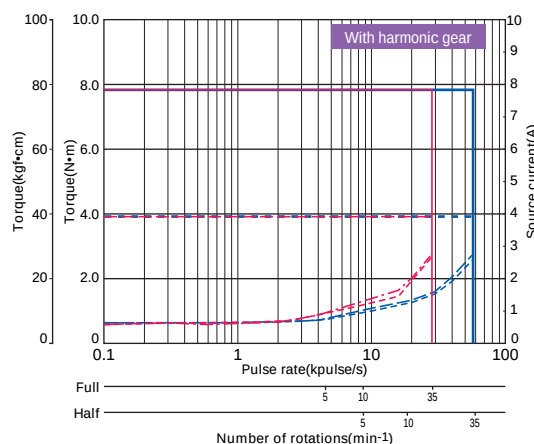
Source voltage : AC100V•Winding current : 1.5A/phase

— Instantaneous allowable torque($J_{L1}=15.1 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

--- Allowable torque($J_{L1}=15.1 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

● BP12F551□-HX100 : 100V



103F5505-70HXM□ ■ Full-step ■ Half-step

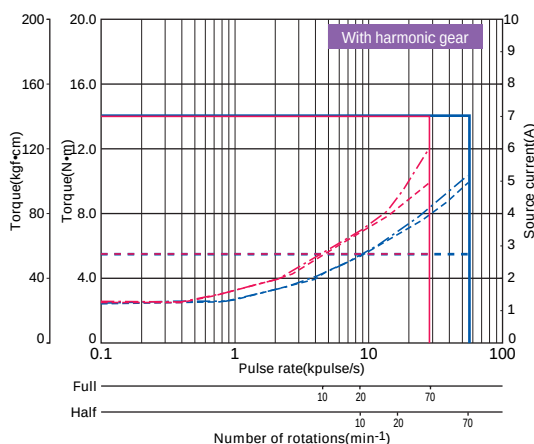
Source voltage : AC100V•Winding current : 1.5A/phase

— Instantaneous allowable torque($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

--- Allowable torque($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

● BP13F781□-HX50 : 100V



103F7851-80HXL□ ■ Full-step ■ Half-step

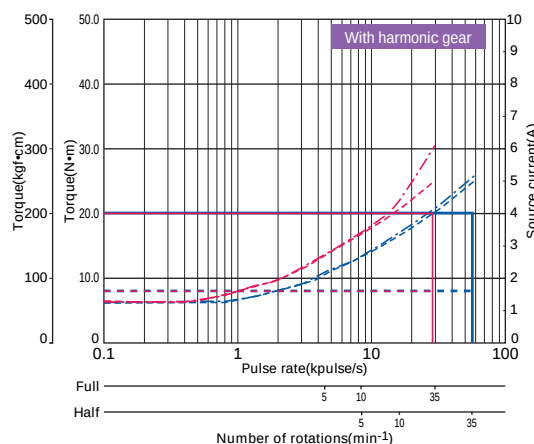
Source voltage : AC100V•Winding current : 1.5A/phase

— Instantaneous allowable torque($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

--- Allowable torque($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

● BP13F781□-HX100 : 100V



103F7851-80HXM□ ■ Full-step ■ Half-step

Source voltage : AC100V•Winding current : 1.5A/phase

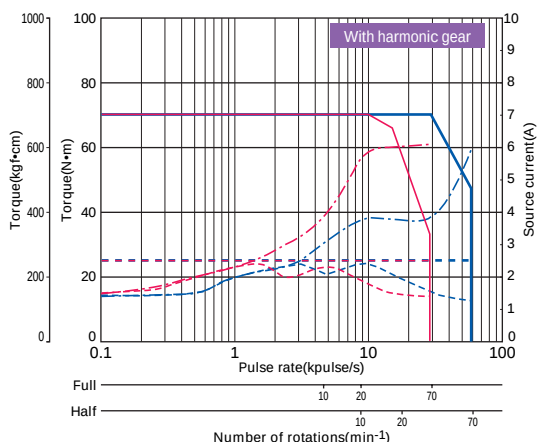
— Instantaneous allowable torque($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

--- Allowable torque($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

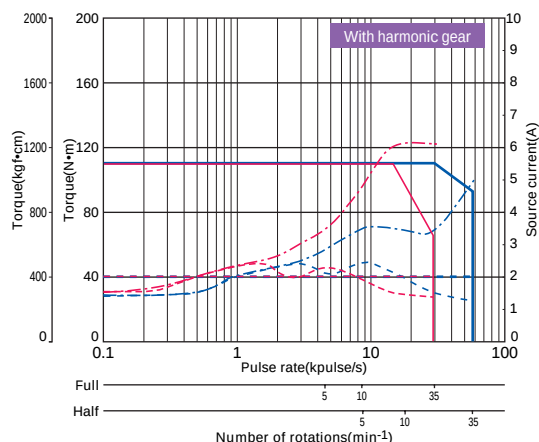
Pulse rate-torque characteristics/pulse rate-source current characteristics

● BP13F851□-HX50 : 100V



103F8581-80HX□ ■ Full-step ■ Half-step
Source voltage : AC100V•Winding current : 1.5A/phase
— Instantaneous allowable torque($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling) — Allowable torque($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling) - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)

● BP13F851□-HX100 : 100V



103F8581-80HXM□ ■ Full-step ■ Half-step
Source voltage : AC100V•Winding current : 1.5A/phase
— Instantaneous allowable torque($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling) — Allowable torque($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling) - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)



The standard combination of the 5-phase Stepping Set, BP2 Series lineup applies either STEPSYN M Series stepping motor or STEPSYN F Series stepping motor.

The 5-phase Stepping Set

BP2 series

AC100V/115V

Micro-step (500 x 1 to 40 divisions)



Configuration of the 5-phase Stepping Motor Set, BP2 Series

Name	Quantity
BP2 Series Instruction Manual	1 pc.
PM Driver	1 pc.
Stepping Motor	1 pc.
Interface Connector (CN1)	1 set
Power Connector (CN2)	1 set
Stepping Motor Power Line Connector (CN3)	1 set
PM Driver Front Surface Metal Fittings	1 set

Stepping motor type	Characteristics
STEPSYN M Series	Conforms to UL Standards and CE Marking
STEPSYN F Series	Standard stepping motor for unit

Various sizes of stepping motor are available according to applications and purposes.

Characteristics

- Conformity to UL Standards and CE Marking**
 The product conforms to UL Standards and CE Marking.
- Micro-step function available**
 Smooth operation without vibration at low speeds can be realized.
- Rush current prevention circuit**
 Thanks to the built-in rush current prevention circuit in the power circuit section, stabilized operation is ensured even during switching on.
- Connector method for PM driver I/O cable**
 The connector method is adopted for the high voltage section terminal, where the terminal base was conventionally used. This method facilitates PM driver installation and maintenance.
- Alarm output signal logic selectable**
 Logic of signal output during alarm circuit operation can be selected.

Built-in function

- Auto micro function**
 Even setting division of resolution to a rough one or two divisions, operation can be as smooth and with as low vibration as for micro-step drive. However, the low vibration mode and the micro-step function cannot be adopted at the same time.
- Micro-step function**
 By manipulating the rotary switch that sets resolution, the micro-step drive may be used. However, the low vibration mode and the micro-step function cannot be adopted at the same time.
- Pulse input system selection function**
 Either single input system or double input system can be selected, using a dipswitch.
- Resolution setting function**
 Nine types of resolution, ranging from one to 40 divisions, can be set for a standard stepping motor step angle by using rotary switches.
- Operation current switchover function**
 Regarding operation current of the stepping motor, currents ranging from rated current to 55% of rated current can be set using rotary switches.
- Current adjustment function during operation halt**
 When operation is halted, operation current for the stepping motor can be set at 40 to 70% of specified operation current by using selection switch.

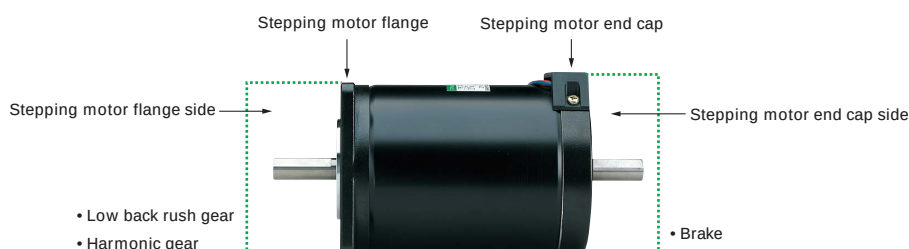
Explanation of set model number

① System on the stepping motor flange side

Code	Flange side	Deceleration ratio
C	Low back rush gear	1 / 3.6, 1 / 7.2, 1 / 10, 1 / 20, 1 / 30, 1 / 36
H	Harmonic gear	1 / 50, 1 / 100
X	None on flange side	

② System on the stepping motor end cap side

Code	End cap side	Function
B	Brake	Electromagnetic brake
E	Encoder	Please contact us regarding the encoder.
X	None on end cap side	



③ Deceleration ratio of gear system

Example: deceleration ratio 1 / 3.6 → 3.6

Explanation for model number in the combined case:

The set model number of the PMAPA1S6B01 and 103F8581 type stepping motor is as follows when equipped with the system of harmonic gear (1/100) and brake:

BP23F851D – H B 100

Standard set model number

③ Gear deceleration ratio (1/100)
 ② Brake
 ① Harmonic gear

How to order

Please use the "Set Model Number" in the List of Combined Stepping Motor Model Number for the 5-phase Stepping Set, BP2 Series.

To order gear, brake, and encoder, put the product code number after the set number according to the "Explanation of combination numbering" ①, ②, and ③.

PM driver specifications

Model number		PMAPA1S6B01
Standard specification	Input source	Single-phase AC100/115V+10, -15% 50/60Hz
	Source current	6A
	Protection class	Class I
	Operating environment	Installation category (overvoltage category): III, pollution level: 2
	Applied standards	EN50178, UL508C
	Operating ambient temperature	0 ~ +50°C
	Conservation temperature	-20 ~ +70°C
	Operating ambient humidity	35 ~ 85%RH (no condensation)
	Conservation humidity	10 ~ 90%RH (no condensation)
	Operating altitude	max. 1000m above sea level
	Vibration resistance	0.5G Tested under the following conditions, frequency range: 10 to 55Hz, direction: along the X, Y, and Z axes, for 2 hours
	Impact resistance	Considering the NDS-C-0110 standard section 3.2.2 division "C", not influenced.
	Withstand voltage	Not influenced when applying AC1500V between the power input terminal and cabinet for one minute.
	Insulation resistance	10 MΩ or more when applying DC500V between the power input terminal and cabinet.
Function	Weight	0.95kg
	Protection function	Against PM driver overheat, main circuit power supply error, overcurrent
	Selection function	Input system, auto current down, power down, low vibration mode, alarm output logic, step angle, operating current, non-operating current
I/O signals	LED indicator	Power supply monitor, phase origin monitor, pulse monitor, alarm display
	Command pulse input signal	Photo coupler input method, input resistance 330Ω Input signal voltage "H" level: 4.0 to 5.5V, "L" level: 0 to 0.5V Maximum input frequency 200 kpulse/s
	Power down input signal	Photo coupler input method, input resistance 330Ω Input signal voltage "H" level: 4.0 to 5.5V, "L" level: 0 to 0.5V
	Step angle selection input signal	Photo coupler input method, input resistance 330Ω Input signal voltage "H" level: 4.0 to 5.5V, "L" level: 0 to 0.5V
	FULL/HALF selection input signal	Photo coupler input method, input resistance 330Ω Input signal voltage "H" level: 4.0 to 5.5V, "L" level: 0 to 0.5V
	Phase origin monitor output signal	Open collector output by photo coupler Output signal standard, V _{ceo} : 30V or less, I _c : 5 mA or less
	Alarm output signal	Open collector output by photo coupler Output signal standard, V _{ceo} : 30V or less, I _c : 20 mA or less

* Refer to pages 120 and after for operation, connection, function, and dimensions of the PM driver.

Stepping motor specifications

Stepping motor type	STEPSYN M		STEPSYN F	
Model name	103M785□	103M858□ / 103M8958□	103F785□	103F858□ / 103F8958□
Type	S1 (Continuous rating)		-----	
Insulation class	Class B (+130°C) [105°C for UL class A]		Class B (+130°C)	
Protection class	Class 1		-----	
Operating environment	Pollution level: 2		-----	
Withstand voltage	Conditions: AC1500V, 50/60 Hz, and for one minute			
Insulation resistance	100 MΩ or more against DC500V			
Protection grade	IP40		-----	
Vibration resistance	Conditions: amplitude 1.52 mm (P-P), frequency range 10 to 55 Hz, 5 minutes sweep time, along X, Y, and Z axes, for 2 hours			
Impact resistance	Conditions: 98 m/S ² acceleration, 11 minutes duration, half-wave / sine wave,three times each along X, Y, and Z axes, 18times in total			
Operating ambient temperature	-10~+50°C (0 to +40°C for the one with harmonic gear)			
Operating ambient humidity	20~90%(no condensation)			

□ ... variable suffixes

Standard combined stepping motors for 5-phase stepping set “BP2” series

PM driver model number : PMAPA1S6B01

Combination Model Number for the STEPSYN M Series (conforming to UL Standards and CE Marking)

System support	Dimensions of stepping motor	Single-axis shaft		Dual-axis shaft	
		Set model number	Standard combined stepping motor number	Set model number	Standard combined stepping motor number
Standard type	□ 60mm	BP23M782S	103M7852-8041	BP23M782D	103M7852-8011
		BP23M783S	103M7853-8041	BP23M783D	103M7853-8011
		BP23M851S	103M8581-8041	BP23M851D	103M8581-8011
	ø 86mm	BP23M852S	103M8582-8041	BP23M852D	103M8582-8011
		BP23M853S	103M8583-8041	BP23M853D	103M8583-8011
		BP23M892S	103M89582-8041	BP23M892D	103M89582-8011
	ø 106mm	BP23M893S	103M89583-8041	BP23M893D	103M89583-8011

Combination Model Number for the STEPSYN F Series (Motor for a set)

System support	Dimensions of stepping motor	Single-axis shaft		Dual-axis shaft	
		Set model number	Standard combined stepping motor number	Set model number	Standard combined stepping motor number
Standard type	□ 60mm	BP23F782S	103F7852-8041	BP23F782D	103F7852-8011
		BP23F783S	103F7853-8041	BP23F783D	103F7853-8011
		BP23F851S	103F8581-8041	BP23F851D	103F8581-8011
	ø 86mm	BP23F852S	103F8582-8041	BP23F852D	103F8582-8011
		BP23F853S	103F8583-8041	BP23F853D	103F8583-8011
		BP23F892S	103F89582-8041	BP23F892D	103F89582-8011
	ø 106mm	BP23F893S	103F89583-8041	BP23F893D	103F89583-8011
Low back-rush gear	ø 86mm	BP23F851S-CX3.6	103F8581-80CXA4	BP23F851D-CX3.6	103F8581-80CXA1
		BP23F851S-CX7.2	103F8581-80CXB4	BP23F851D-CX7.2	103F8581-80CXB1
		BP23F851S-CX10	103F8581-80CXE4	BP23F851D-CX10	103F8581-80CXE1
		BP23F851S-CX20	103F8581-80CXG4	BP23F851D-CX20	103F8581-80CXG1
		BP23F851S-CX30	103F8581-80CXJ4	BP23F851D-CX30	103F8581-80CXJ1
		BP23F851S-CX36	103F8581-80CXK4	BP23F851D-CX36	103F8581-80CXK1
Harmonic gear	ø 86mm	BP23F851S-HX50	103F8581-80HXL4	BP23F851D-HX50	103F8581-80HXL1
		BP23F851S-HX100	103F8581-80HXM4	BP23F851D-HX100	103F8581-80HXM1
Electromagnetic brake	□ 60mm	BP23F782S-XB	103F7852-80XB41		
		BP23F783S-XB	103F7853-80XB41		
	ø 86mm	BP23F851S-XB	103F8581-80XB41		
		BP23F852S-XB	103F8582-80XB41		
		BP23F853S-XB	103F8583-80XB41		

(Note) Contact our sales department to order the system with an encoder and/or gear and brake.

Stepping motor data sheet

STEPSYN M Series (Conforming to the UL Standards and CE Marking)

Set model number	Single-axis shaft	BP23M782S	BP23M783S	BP23M851S	BP23M852S	BP23M853S	BP23M892S	BP23M893S
	Dual-axis shaft	BP23M782D	BP23M783D	BP23M851D	BP23M852D	BP23M853D	BP23M892D	BP23M893D
Holding torque	N•m	0.93	1.79	2.06	4.02	6.17	10.8	16
Rotor inertia	$\times 10^{-4} \text{kg} \cdot \text{m}^2$	0.4	0.84	1.45	2.9	4.4	14.6	22
Weight	kg	0.78	1.36	1.5	2.5	3.5	7.5	10.5
Allowable thrust load	N	20	20	60	60	60	100	100
Allowable radial load	N	80	80	220	220	220	360	360

STEPSYN F Series (Standard)

Set model number	Single-axis shaft	BP23F782S	BP23F783S	BP23F851S	BP23F852S	BP23F853S	BP23F892S	BP23F893S
	Dual-axis shaft	BP23F782D	BP23F783D	BP23F851D	BP23F852D	BP23F853D	BP23F892D	BP23F893D
Holding torque	N•m	0.93	1.79	2.06	4.02	6.17	10.8	16
Rotor inertia	$\times 10^{-4} \text{kg} \cdot \text{m}^2$	0.4	0.84	1.45	2.9	4.4	14.6	22
Weight	kg	0.78	1.36	1.5	2.5	3.5	7.5	10.5
Allowable thrust load	N	20	20	60	60	60	100	100
Allowable radial load	N	80	80	220	220	220	360	360

STEPSYN F Series (with low back rush gear)

Set model number	Single-axis shaft	BP23F851S-CX3.6	BP23F851S-CX7.2	BP23F851S-CX10	BP23F851S-CX20	BP23F851S-CX30	BP23F851S-CX36
	Dual-axis shaft	BP23F851D-CX3.6	BP23F851D-CX7.2	BP23F851D-CX10	BP23F851D-CX20	BP23F851D-CX30	BP23F851D-CX36
Allowable torque	N•m	4.5	9	9	12	12	12
Rotor inertia	$\times 10^{-4} \text{kg} \cdot \text{m}^2$	1.45					
Basic step angle	°	0.2	0.1	0.072	0.036	0.024	0.02
Deceleration ratio		1 : 3.6	1 : 7.2	1 : 10	1 : 20	1 : 30	1 : 36
Back-rush	°	0.4	0.25	0.25	0.17	0.17	0.15
Allowable number of rotations	min ⁻¹	500	250	180	90	60	50
Weight	kg	2.7					
Allowable thrust load	N	60					
Allowable radial load	N	300					

* The rotation direction of the motor and the gear output shaft is as follows: when deceleration ratio is 1:3.6 or 1:7.2, both motor and shaft rotate in the same direction, and for 1:10, 1:20, or 1:30 type, the motor and the shaft rotate in opposite direction.

STEPSYN F Series (With harmonic gear)

Set model number	Single-axis shaft	BP23F851S-HX50	BP23F851S-HX100
	Dual-axis shaft	BP23F851D-HX50	BP23F851D-HX100
Allowable torque	N•m	25	41
Rotor inertia	$\times 10^{-4} \text{kg} \cdot \text{m}^2$	1.65	
Basic step angle	°	0.0144	0.0072
Deceleration ratio		1 : 50	1 : 100
Lost motion	°	0.4~3 ($\pm 1 \text{ N} \cdot \text{m}$)	0.4~3 ($\pm 1.2 \text{ N} \cdot \text{m}$)
Allowable number of rotations	min ⁻¹	500	250
Weight	kg	3.3	
Allowable thrust load	N	1400	
Allowable radial load	N	1400	

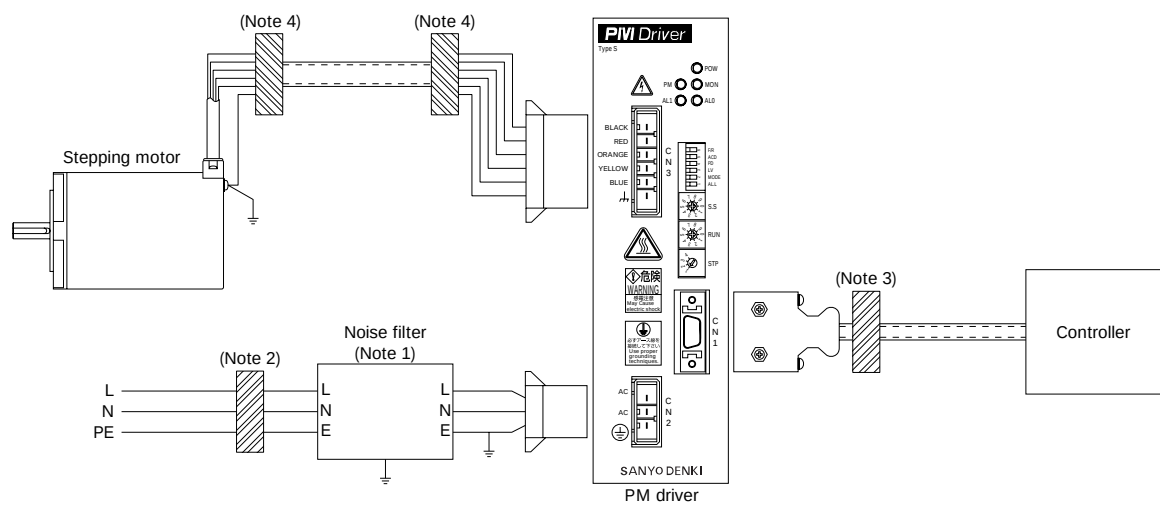
* The gear output shaft rotates in the opposite direction of the motor.

STEPSYN F Series (With electromagnetic brake)

Set model number	Single-axis shaft	BP23F782S-XB	BP23F783S-XB	BP23F851S-XB	BP23F852S-XB	BP23F853S-XB
	Dual-axis shaft					
Holding torque	N•m	0.93	1.79	2.06	4.02	6.17
Rotor inertia	$\times 10^{-4} \text{kg} \cdot \text{m}^2$	0.56	1	2.24	3.69	5.19
Weight	kg	1.12	1.7	3.5	4.5	5.5
Allowable thrust load	N	20	20	60	60	60
Allowable radial load	N	80	80	220	220	220
Electromagnetic brake specifications	Brake operation system	Non-excitation operation system		Non-excitation operation system		
	Source voltage	DC 24 $\pm$ 5%		DC 24 $\pm$ 5%		
	Exciting current	0.25		0.42		
	Electric power consumption	6		10		
	Static friction torque	0.8		4		
	Brake operating time	30		50		
	Brake release time	20		20		

UL Standards and CE Marking

●How to install the products to conform to the EMC Directive



Recommended Component for EMC Conformity

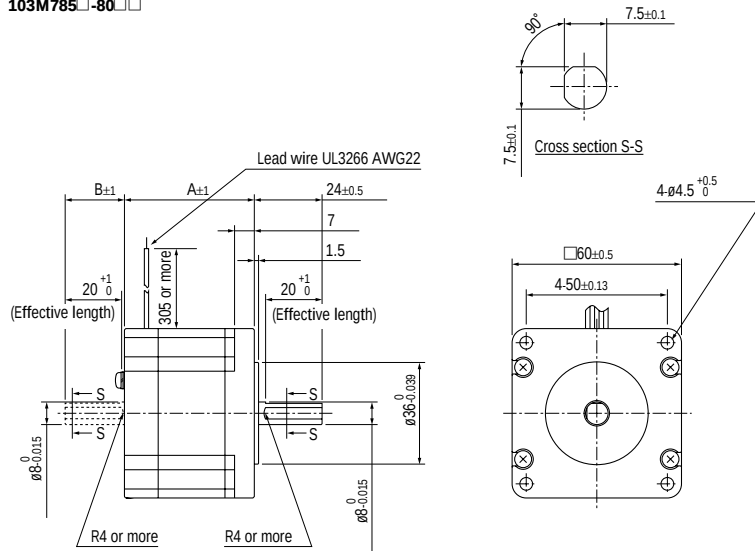
No.	Part Name	Model	Specifications and size	Manufacturer
Note 1	Noise Filter	RF3020-DLC	Rated voltage : Line-Line 440-550V Rated current : 20A	RASMI ELECTRONICS LTD. ,
Note 2	Toroidal core	T60 × 20 × 36	Core outer diameter : 60mm Core inner diameter : 36mm	TDK
Note 3	Toroidal core	TRCN-40-27-15	Core outer diameter : 40mm Core inner diameter : 27mm	Kitagawa Industry
Note 4	Toroidal core	TRCN-40-27-15	Core outer diameter : 40mm Core inner diameter : 27mm	Kitagawa Industry

Dimensions (Unit: mm)

STEPSYN M

BP23M78□□

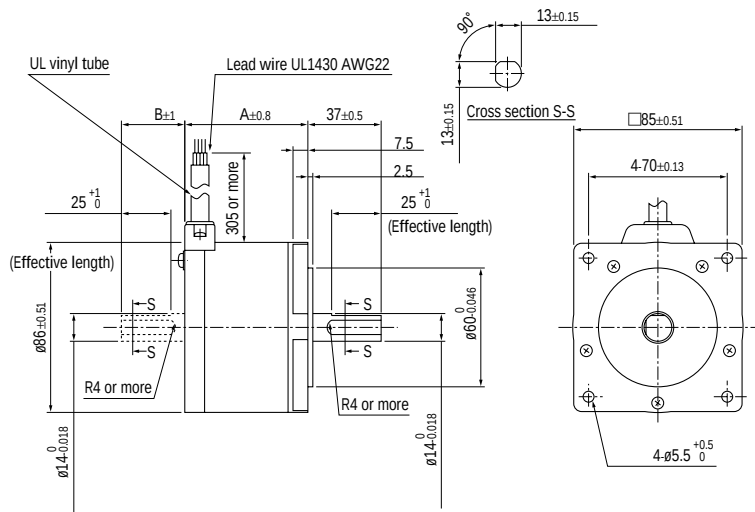
103M785-80



Model name	A	B
BP23M782S (103M7852-8041)	55	—
BP23M782D (103M7852-8011)	55	21
BP23M783S (103M7853-8041)	87	—
BP23M783D (103M7853-8011)	87	21

BP23M85□□

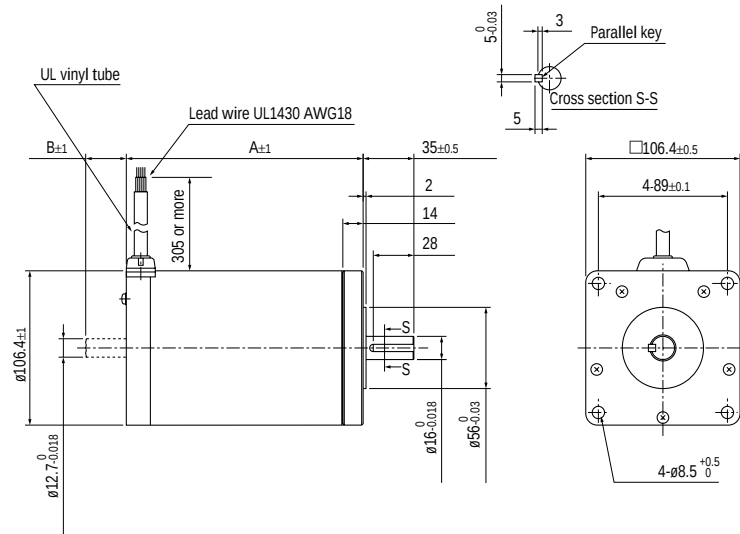
103M858□-80□□



Model name	A	B
BP23M851S (103M8581-8041)	62.15	—
BP23M851D (103M8581-8011)	62.15	32
BP23M852S (103M8582-8041)	92.2	—
BP23M852D (103M8582-8011)	92.2	32
BP23M853S (103M8583-8041)	125.85	—
BP23M853D (103M8583-8011)	125.85	32

BP23M89□□

103M8958 -80



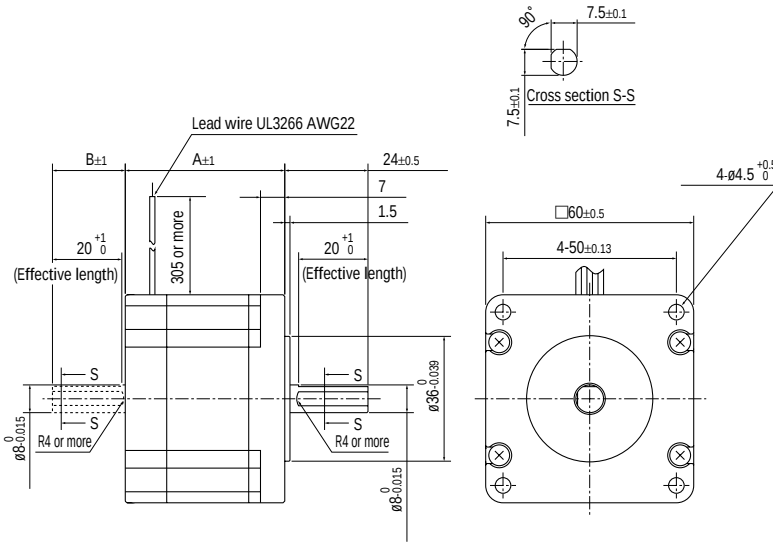
Model name	A	B
BP23M892S (103M89582-8041)	163.3	—
BP23M892D (103M89582-8011)	163.3	28
BP23M893S (103M89583-8041)	221.3	—
BP23M893D (103M89583-8011)	221.3	28

Dimensions (Unit: mm)

STEPSYN F

BP23F78□□

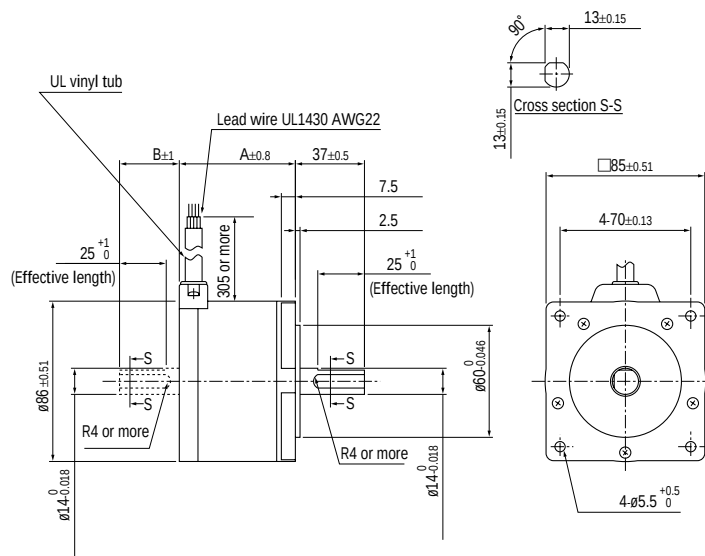
103F785□-80□□



Model name	A	B
BP23F782S (103F7852-8041)	55	—
BP23F782D (103F7852-8011)	55	21
BP23F783S (103F7853-8041)	87.5	—
BP23F783D (103F7853-8011)	87.5	21

BP23F85□□

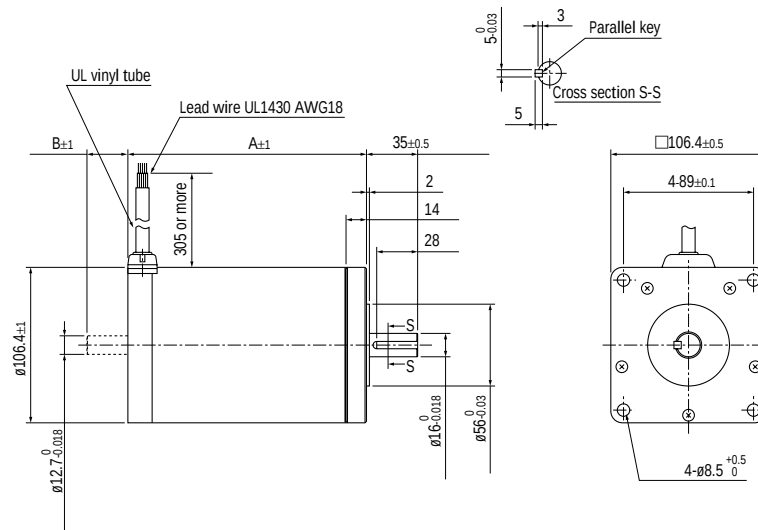
103F858□-80□□



Model name	A	B
BP23F851S (103F8581-8041)	62.15	—
BP23F851D (103F8581-8011)	62.15	32
BP23F852S (103F8582-8041)	92.2	—
BP23F852D (103F8582-8011)	92.2	32
BP23F853S (103F8583-8041)	125.85	—
BP23F853D (103F8583-8011)	125.85	32

BP23F89□□

103F8958□-80□□

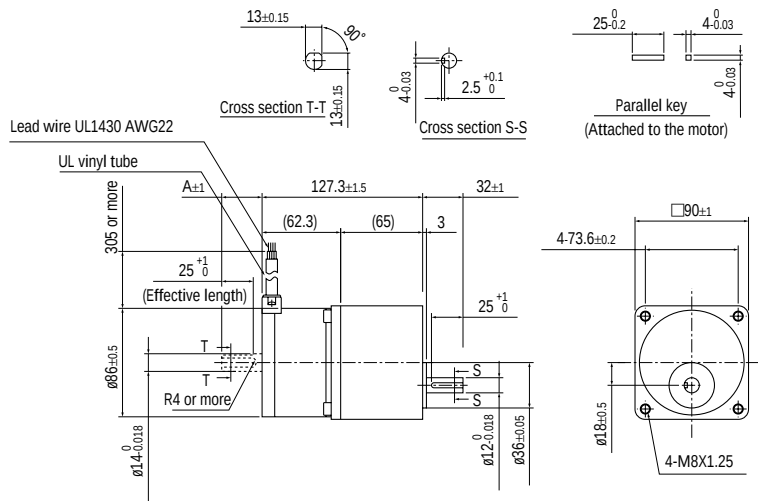


Model name	A	B
BP23F892S (103F89582-8041)	163.3	—
BP23F892D (103F89582-8011)	163.3	28
BP23F893S (103F89583-8041)	221.3	—
BP23F893D (103F89583-8011)	221.3	28

Dimensions (Unit: mm)

STEPSYN F with low back rush gear

BP23F851□CX□□

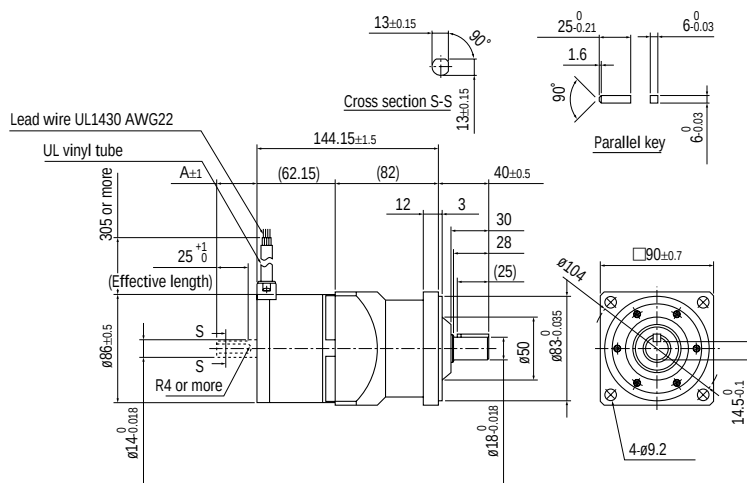
103F8581-80CX ☐ ☐

Model name	A
BP23F851S-CX3.6 (103F8581-80CXA4)	—
BP23F851D-CX3.6 (103F8581-80CXA1)	32
BP23F851S-CX7.2 (103F8581-80CXB4)	—
BP23F851D-CX7.2 (103F8581-80CXB1)	32
BP23F851S-CX10 (103F8581-80CXE4)	—
BP23F851D-CX10 (103F8581-80CXE1)	32
BP23F851S-CX20 (103F8581-80CXG4)	—
BP23F851D-CX20 (103F8581-80CXG1)	32
BP23F851S-CX30 (103F8581-80CXJ4)	—
BP23F851D-CX30 (103F8581-80CXJ1)	32
BP23F851S-CX36 (103F8581-80CXK4)	—
BP23F851D-CX36 (103F8581-80CXK1)	32

STEPSYN F with harmonic gear

BP23F851□-HX□□

103F8581-80HX□□

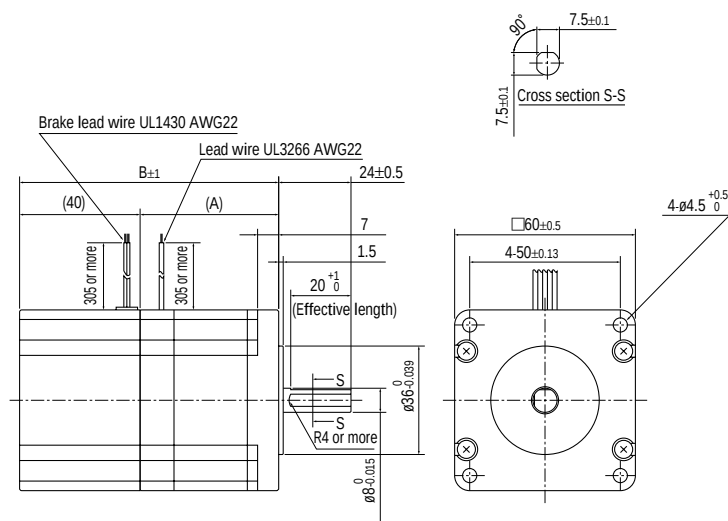


Model name	A
BP23F851S-HX50 (103F8581-80HXL4)	—
BP23F851D-HX50 (103F8581-80HXL1)	32
BP23F851S-HX100 (103F8581-80HXM4)	—
BP23F851D-HX100 (103F8581-80HXM1)	32

STEPSYN F with electromagnetic brake

BP23F78□S-XB

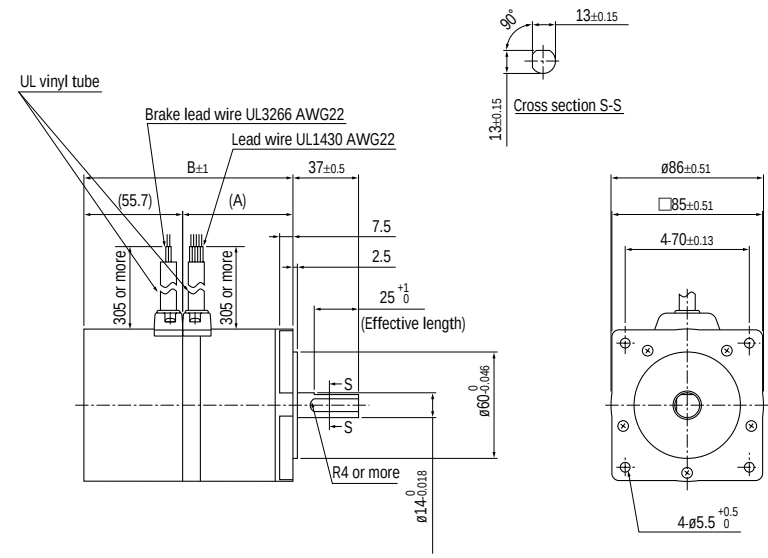
103F785-80XB41



Model name	A	B
BP23F782S-XB (103F7852-80XB41)	54.5	94.5
BP23F783S-XB (103F7853-80XB41)	86.7	126.7

Dimensions (Unit: mm)

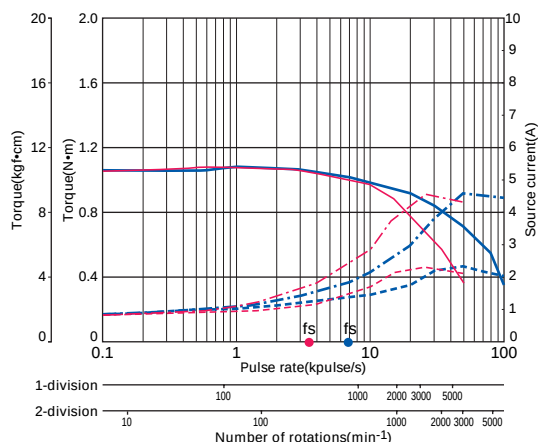
STEPSYN F with electromagnetic brake
BP23F85□S-XB
103F858□-80XB41



Model name	A	B
BP23F851S-XB (103F8581-80XB41)	61	116.7
BP23F852S-XB (103F8582-80XB41)	91.1	146.8
BP23F853S-XB (103F8583-80XB41)	124.7	180.4

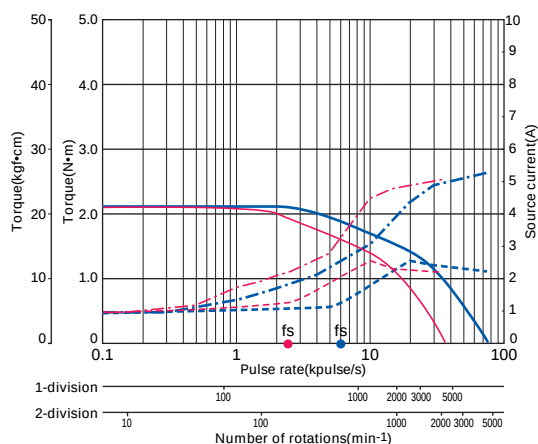
Pulse rate-torque characteristics/pulse rate-source current characteristics

● BP23M782□ / BP23F782□ / BP23F782S-XB : 100V



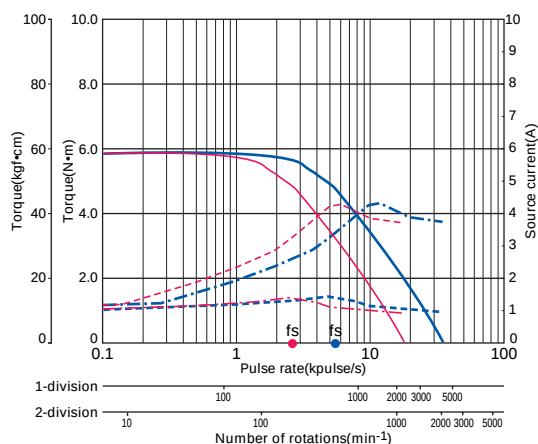
103M7852-80□□ / 103F7852-80□□ / 103F7852-80XB41
Source voltage : AC100V·Winding current : 1.5A/phase
— Getaway torque($JL1=2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current($T_L=MAX$) --- Source current($T_L=0$)
fs : Maximum self-start frequency when not loaded
■ 1-division is specified ■ 2-division is specified

● BP23M851□ / BP23F851□ / BP23F851S-XB : 100V



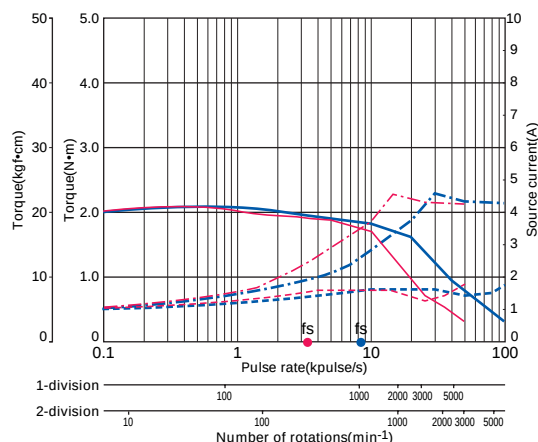
103M8581-80□□ / 103F8581-80□□ / 103F8581-80XB41□□
Source voltage : AC100V·Winding current : 1.5A/phase
— Getaway torque($JL1=7.4 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current($T_L=MAX$) --- Source current($T_L=0$)
fs : Maximum self-start frequency when not loaded
■ 1-division is specified ■ 2-division is specified

● BP23M853□ / BP23F853□ / BP23F853S-XB : 100V



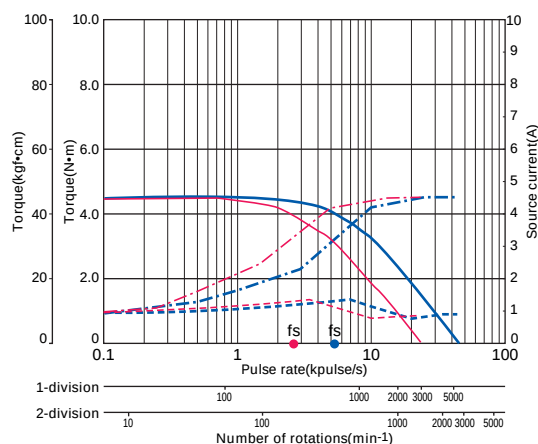
103M8583-80□□ / 103F8583-80□□ / 103F8583-80XB41□□
Source voltage : AC100V·Winding current : 1.5A/phase
— Getaway torque($JL1=4.4 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current($T_L=MAX$) --- Source current($T_L=0$)
fs : Maximum self-start frequency when not loaded
■ 1-division is specified ■ 2-division is specified

● BP23M783□ / BP23F783□ / BP23F783S-XB : 100V



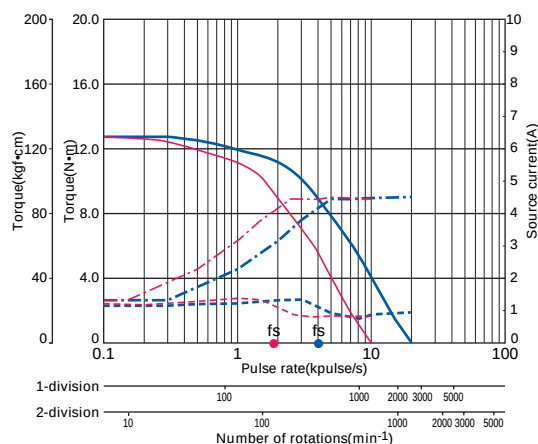
103M7853-80□□ / 103F7853-80□□ / 103F7853-80XB41
Source voltage : AC100V·Winding current : 1.5A/phase
— Getaway torque($JL1=7.4 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current($T_L=MAX$) --- Source current($T_L=0$)
fs : Maximum self-start frequency when not loaded
■ 1-division is specified ■ 2-division is specified

● BP23M852□ / BP23F852□ / BP23F852S-XB : 100V



103M8582-80□□ / 103F8582-80□□ / 103F8582-80XB41
Source voltage : AC100V·Winding current : 0.75A/phase
— Getaway torque($JL1=15.1 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current($T_L=MAX$) --- Source current($T_L=0$)
fs : Maximum self-start frequency when not loaded
■ 1-division is specified ■ 2-division is specified

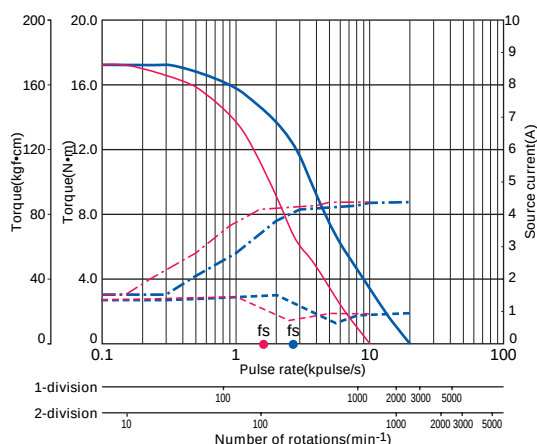
● BP23M892□ / BP23F892□ : 100V



103M89582-80□□ / 103F89582-80□□
Source voltage : AC100V·Winding current : 1.5A/phase
— Getaway torque($JL1=4.4 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current($T_L=MAX$) --- Source current($T_L=0$)
fs : Maximum self-start frequency when not loaded
■ 1-division is specified ■ 2-division is specified

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

● BP23M893□ / BP23F893□ : 100V



103M89583-80□□ / 103F89583-80□□

Source voltage : AC100V•Winding current : 1.5A/phase

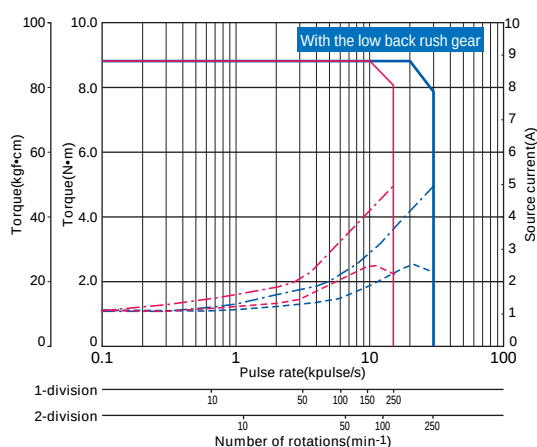
— Allowable torque($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

--- Source current(TL=MAX) --- Source current(TL=0)

fs : Maximum self-start frequency when not loaded

■ 1-division is specified ■ 2-division is specified

● BP23M851□-CX7.2 : 100V



103F8581-80CXB□

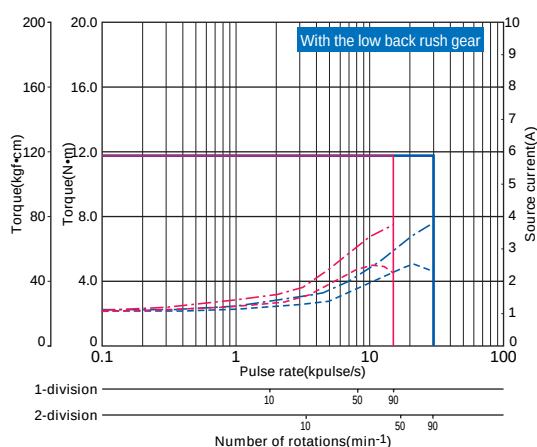
Source voltage : AC100V•Winding current : 1.5A/phase

— Allowable torque($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

--- Source current(TL=MAX) --- Source current(TL=0)

■ 1-division is specified ■ 2-division is specified

● BP23F851□-CX20 : 100V



103F8581-80CXG□

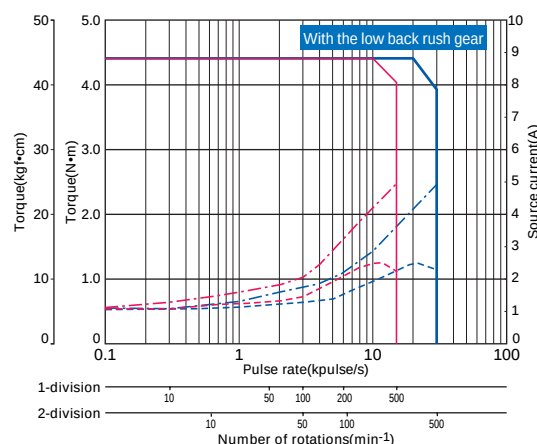
Source voltage : AC100V•Winding current : 1.5A/phase

— Allowable torque($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

--- Source current(TL=MAX) --- Source current(TL=0)

■ 1-division is specified ■ 2-division is specified

● BP23F851□-CX3.6 : 100V



103F8581-80CXA□

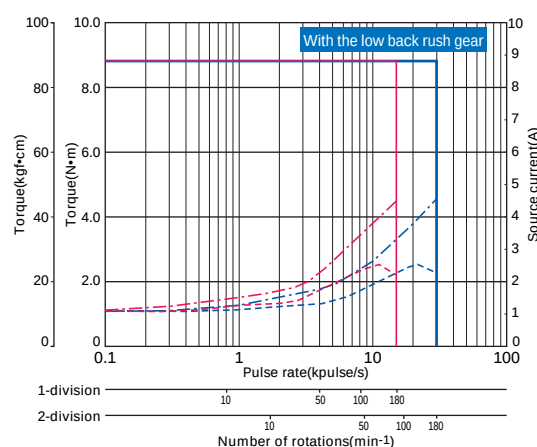
Source voltage : AC100V•Winding current : 1.5A/phase

— Allowable torque($J_{L1}=15.3 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

--- Source current(TL=MAX) --- Source current(TL=0)

■ 1-division is specified ■ 2-division is specified

● BP23F851□-CX10 : 100V



103F8581-80CXE□

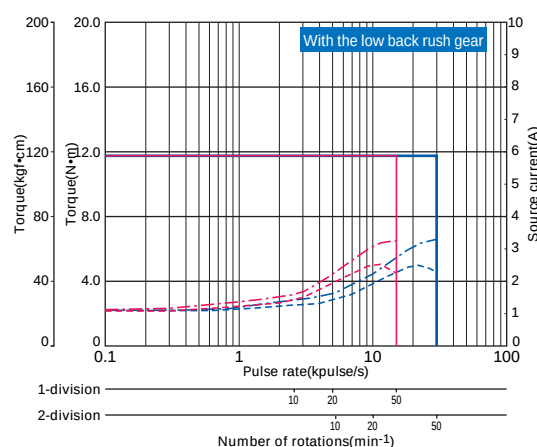
Source voltage : AC100V•Winding current : 1.5A/phase

— Allowable torque($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

--- Source current(TL=MAX) --- Source current(TL=0)

■ 1-division is specified ■ 2-division is specified

● BP23F851□-CX30 : 100V



103F8581-80CXJ□

Source voltage : AC100V•Winding current : 1.5A/phase

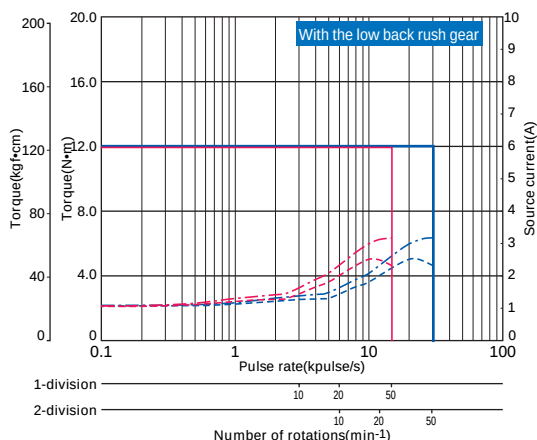
— Allowable torque($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

--- Source current(TL=MAX) --- Source current(TL=0)

■ 1-division is specified ■ 2-division is specified

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

● BP23F851-□-CX36 : 100V



103F8581-80CXK□

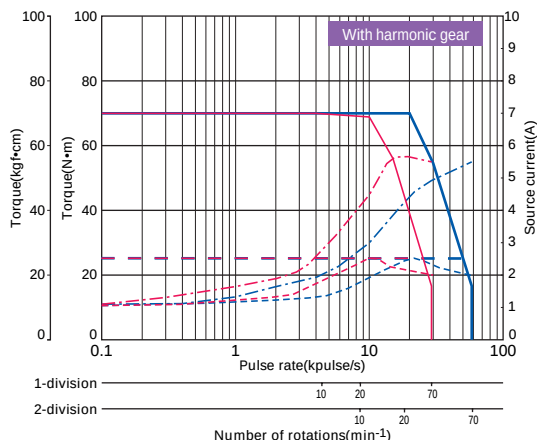
Source voltage : AC100V•Winding current : 1.5A/phase

— Allowable torque($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ 1-division is specified ■ 2-division is specified

● BP23F851-□-HX50 : 100V



103F8581-80HXL□ ■ 1-division is specified ■ 2-division is specified

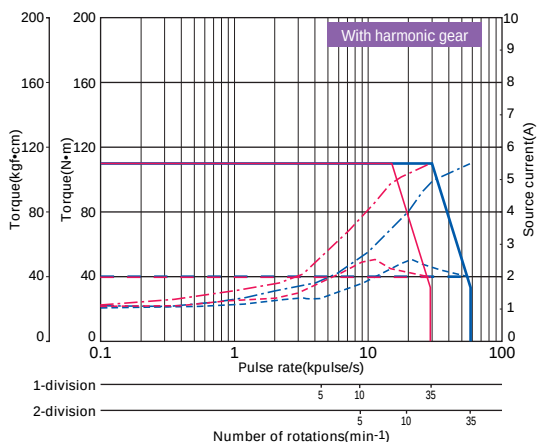
Source voltage : AC100V•Winding current : 1.5A/phase

— Instantaneous allowable torque($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

--- Allowable torque ($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

● BP23F851-□-HX100 : 100V



103F8581-80HXM□ ■ 1-division is specified ■ 2-division is specified

Source voltage : AC100V•Winding current : 1.5A/phase

— Instantaneous allowable torque($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

--- Allowable torque ($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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



The standard combination of the 5-phase Stepping Set, WP1 Series lineup applies either “STEPSYN M” Series stepping motor or “STEPSYN F” Series stepping motor.

Two types of PM driver can be selected for the 5-phase Stepping Set, WP1 Series.

The 5-phase Stepping Set

WP1 series

AC100V/230V

Micro-step (500 x 1 to 250 divisions)



Configuration of the 5-phase Stepping Motor Set, WP1 Series

Name	Quantity
WP1 Series Instruction Manual	1 pc.
PM Driver	1 pc.
Stepping Motor	1 pc.
Interface Connector (CN1)	1 set
Metal Fittings (two)	1 set

Stepping motor type	Characteristics
STEPSYN M Series	Conforms to UL Standards and CE Marking
STEPSYN F Series	Standard stepping motor for unit

Various sizes of stepping motor are available according to applications and purposes.

Classification	Type	PM driver model number	Rated current of stepping motor
WP12	Normal	PMM-MA-50034	0.75 A / phase type
WP13	Fast-operation	PMM-MA-50064	1.5 A / phase type

Characteristics

- **Conformity to CE Marking**
The product conforms to the CE Marking.
- **Wide ranges of input power**
Users can use wide ranges of input power from AC100 to 230V.
- **Micro-step function available**
Smooth operation without vibration at low speeds can be realized.

Built-in function

- **Auto micro function**
Even setting division of resolution to a rough one or two divisions, operation can be as smooth and with as low vibration as for micro-step drive.
- **Micro-step function**
By manipulating the rotary switch that sets resolution, the micro-step drive may be used. However, the low vibration mode and the micro-step function cannot be adopted at the same time.
- **Resolution setting function**
16 types of resolution, ranging from one to 250 divisions, can be set for a standard stepping motor step angle by using rotary switches.
- **Pulse input system selection function**
Either single input system or double input system can be selected, using a dipswitch.
- **Two types of stepping motor**
The standard combination of the PM driver PMM-MA-50034-10 lineup applies the CE Marking compliant “STEPSYN H” Series and the standard “STEPSYN H” Series. Combined with a CE Marking compliant “STEPSYN H” Series stepping motor, this system conforms to the EMC Directive.

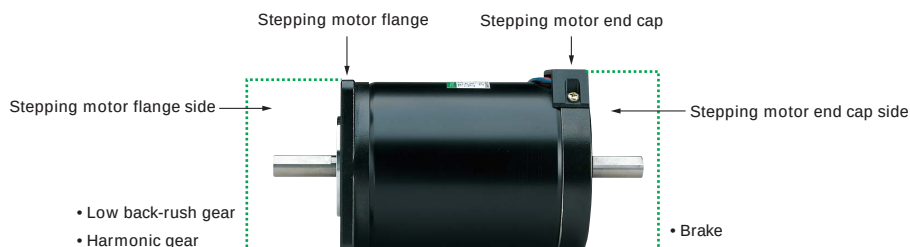
Explanation of Set model number

① System on the stepping motor flange side

Code	Flange side	Deceleration ratio
C	Low back rush gear	1 / 3.6, 1 / 7.2, 1 / 10, 1 / 20, 1 / 30, 1 / 36
H	Harmonic gear	1 / 50, 1 / 100
X	None	

② System on the stepping motor end cap side

Code	End cap side	Function
B	Brake	Electromagnetic brake
E	Encoder	Please contact us regarding the encoder.
X	None	



③ Deceleration ratio of gear system

Example: deceleration ratio 1 / 3.6 → 3.6

Explanation for model number in the combined case:

The set model number of the PMM-MA-50034-10 and 103F5505 type stepping motor is as follows when equipped with the system of harmonic gear (1/100) and brake:

WP12F551D—H B 100

Standard set model number

③ Deceleration ratio of gear (1/100)
② Brake
① Harmonic gear

How to order

Please use the "Set Model Number" in the List of Combined Stepping Motor Model Number for the 5-phase Stepping Set, WP1 Series.

To order gear, brake, and encoder, put the product code number after the set number according to the "Explanation of combination numbering" ①, ②, and ③.

PM driver specifications

Model number		PMM-MA-50034-10	PMM-MA-50064-10
Standard specification	Input source	Single phase AC100 - 230V+10, -15% 50 / 60Hz	
	Source current	4A (at AC100V) 2A (at AC200V)	8A (at AC100V) 4A (at AC200V)
	Protection class	Class I	
	Operating environment	Installation category (overvoltage category): II, pollution level: 2	
	Applied standards	EN61010-1	
	Operating ambient temperature	0 ~ +50°C	
	Conservation temperature	-20 ~ +70°C	
	Operating ambient humidity	35 ~ 85%RH (No condensation)	
	Conservation humidity	10 ~ 90%RH (No condensation)	
	Operating altitude	Max. 1000m above sea level	
	Vibration resistance	0.5G Tested under the following conditions, frequency range: 10 to 55Hz, direction: along the X, Y, and Z axes, for 2 hours	
	Impact resistance	Considering the NDS-C-0110 standard section 3.2.2 division "C", not influenced.	
	Withstand voltage	Not influenced when applying AC1500V between the power input terminal and cabinet for one minute.	
	Insulation resistance	10 MΩ or more when applying DC500V between the power input terminal and cabinet.	
	Weight	1.0kg	1.3kg
Function	Protection function	Against PM driver overheat	
	Selection function	Auto current down, excitation mode, input pulse mode, drive mode, step angle, stepping motor current	
	LED indicator	Power supply monitor, phase origin monitor, pulse monitor, alarm monitor	
I/O signals	Command pulse input signal	Photo coupler input method, input resistance 330Ω Input signal voltage "H" level: 4.0 to 5.5V, "L" level: 0 to 0.5V Maximum input frequency; Micro step mode: 100 kpulse/s, Auto micro mode: 25 kpulse/s	
	Power down input signal	Photo coupler input method, input resistance 330Ω Input signal voltage "H" level: 4.0 to 5.5V, "L" level: 0 to 0.5V	
	Phase origin monitor output signal	Open collector output by photo coupler Output signal standard, Vceo: 30V or less, Ic: 5 mA or less	
	Alarm output signal	Open collector output by photo coupler Output signal standard, Vceo: 30V or less, Ic: 5 mA or less	
	Ready output signal	Open collector output by photo coupler Output signal standard, Vceo: 30V or less, Ic: 5 mA or less	

* Refer to pages 157 and 173 and after for operation, connection, function, and dimensions of the PM driver.

Stepping motor specifications

Stepping motor type	STEPSYN M	STEPSYN F
Model	103M55□□ / 103M785□ / 103M858□ / 103M8958□	103F55□□ / 103F785□ / 103F858□ / 103F8958□
Specification type	S1 (continuous rating)	-----
Insulation class	Class B (+130°C) [105°C for UL class A]	Class B (+130°C)
Protection class	Class 1	-----
Operating environment	Pollution level: 2	-----
Withstand voltage	Conditions : AC1500V, 50/60 Hz, and for one minute	
Insulation resistance	100 MΩ or more against DC500V	-----
Protection grade	IP40	-----
Vibration resistance	Conditions: amplitude 1.52 mm (P-P), frequency range 10 to 55 Hz, 5 minutes sweep time, along X, Y, and Z axes, for 2 hours	
Impact resistance	Conditions: 98 m/s ² acceleration, 11 minutes duration, half-wave/sine wave, three times each along X, Y, and Z axes, 18 times in total	
Operating ambient temperature	-10 ~ +50°C (0 to +40°C for the one with harmonic gear)	
Operating ambient humidity	20 ~ 90%(no condensation)	

□ ... variable suffixes

Standard combined stepping motors for 5-phase stepping set “WP1” series

Combination Model Number for WP12

PM driver model number : PMM-MA-50034-10

Combination Model Number for STEPSYN M Series (Conforming to the UL Standards and CE Marking)

System support	Dimensions of stepping motor	Single-axis shaft		Dual-axis shaft	
		Set model number	Standard combined stepping motor number	Set model number	Standard combined stepping motor number
Standard type	□ 42mm	WP12M551S	103M5505-7041	WP12M551D	103M5505-7011
		WP12M552S	103M5508-7041	WP12M552D	103M5508-7011
		WP12M554S	103M5510-7041	WP12M554D	103M5510-7011

Combination Model Number for STEPSYN F Series (Motor for a set)

System support	Dimensions of stepping motor	Single-axis shaft		Dual-axis shaft	
		Set model number	Standard combined stepping motor number	Set model number	Standard combined stepping motor number
Standard type	□ 42mm	WP12F551S	103F5505-7041	WP12F551D	103F5505-7011
		WP12F552S	103F5508-7041	WP12F552D	103F5508-7011
		WP12F554S	103F5510-7041	WP12F554D	103F5510-7011
	□ 60mm	WP12F781S	103F7851-7041	WP12F781D	103F7851-7011
		WP12F782S	103F7852-7041	WP12F782D	103F7852-7011
		WP12F783S	103F7853-7041	WP12F783D	103F7853-7011
Low back-rush gear	□ 42mm	WP12F551S-CX3.6	103F5505-70CXA4	WP12F551D-CX3.6	103F5505-70CXA1
		WP12F551S-CX7.2	103F5505-70CXB4	WP12F551D-CX7.2	103F5505-70CXB1
		WP12F551S-CX10	103F5505-70CXE4	WP12F551D-CX10	103F5505-70CXE1
		WP12F551S-CX20	103F5505-70CXG4	WP12F551D-CX20	103F5505-70CXG1
		WP12F551S-CX30	103F5505-70CXJ4	WP12F551D-CX30	103F5505-70CXJ1
		WP12F551S-CX36	103F5505-70CXX4	WP12F551D-CX36	103F5505-70CXX1
Harmonic gear	□ 42mm	WP12F551S-HX50	103F5505-70HXL4	WP12F551D-HX50	103F5505-70HXL1
		WP12F551S-HX100	103F5505-70HXM4	WP12F551D-HX100	103F5505-70HXM1
Electromagnetic brake	□ 42mm	WP12F551S-XB	103F5505-70XB41		
		WP12F552S-XB	103F5508-70XB41		
		WP12F554S-XB	103F5510-70XB41		

Note) Contact our sales department to order the system with an encoder and/or gear and brake.

Standard combined stepping motors for 5-phase stepping set “WP1” series

Combination Model Number for WP13

PM driver model number: PMM-MA-50064-10

Combination Model Number for STEPSYN M Series (Conforming to the UL Standards and CE Marking)

System support	Dimensions of stepping motor	Single-axis shaft		Dual-axis shaft	
		Set model number	Standard combined stepping motor number	Set model number	Standard combined stepping motor number
Standard type	□ 60mm	WP13M781S	103M7851-8041	WP13M781D	103M7851-8011
		WP13M782S	103M7852-8041	WP13M782D	103M7852-8011
		WP13M783S	103M7853-8041	WP13M783D	103M7853-8011
	ø 86mm	WP13M851S	103M8581-8041	WP13M851D	103M8581-8011
		WP13M852S	103M8582-8041	WP13M852D	103M8582-8011
		WP13M853S	103M8583-8041	WP13M853D	103M8583-8011
	ø 106mm	WP13M892S	103M89582-8041	WP13M892D	103M89582-8011
		WP13M893S	103M89583-8041	WP13M893D	103M89583-8011

Combination Model Number for STEPSYN F Series (Motor for a set)

System support	Dimensions of stepping motor	Single-axis shaft		Dual-axis shaft	
		Set model number	Standard combined stepping motor number	Set model number	Standard combined stepping motor number
Standard type	□ 60mm	WP13F781S	103F7851-8041	WP13F781D	103F7851-8011
		WP13F782S	103F7852-8041	WP13F782D	103F7852-8011
		WP13F783S	103F7853-8041	WP13F783D	103F7853-8011
	ø 86mm	WP13F851S	103F8581-8041	WP13F851D	103F8581-8011
		WP13F852S	103F8582-8041	WP13F852D	103F8582-8011
		WP13F853S	103F8583-8041	WP13F853D	103F8583-8011
	ø 106mm	WP13F892S	103F89582-8041	WP13F892D	103F89582-8011
		WP13F893S	103F89583-8041	WP13F893D	103F89583-8011
Low back-rush gear	□ 60mm	WP13F781S-CX3.6	103F7851-80CXA4	WP13F781D-CX3.6	103F7851-80CXA1
		WP13F781S-CX7.2	103F7851-80CXB4	WP13F781D-CX7.2	103F7851-80CXB1
		WP13F781S-CX10	103F7851-80CXE4	WP13F781D-CX10	103F7851-80CXE1
		WP13F781S-CX20	103F7851-80CXG4	WP13F781D-CX20	103F7851-80CXG1
		WP13F781S-CX30	103F7851-80CXJ4	WP13F781D-CX30	103F7851-80CXJ1
		WP13F781S-CX36	103F7851-80CXX4	WP13F781D-CX36	103F7851-80CXX1
	ø 86mm	WP13F851S-CX3.6	103F8581-80CXA4	WP13F851D-CX3.6	103F8581-80CXA1
		WP13F851S-CX7.2	103F8581-80CXB4	WP13F851D-CX7.2	103F8581-80CXB1
		WP13F851S-CX10	103F8581-80CXE4	WP13F851D-CX10	103F8581-80CXE1
		WP13F851S-CX20	103F8581-80CXG4	WP13F851D-CX20	103F8581-80CXG1
		WP13F851S-CX30	103F8581-80CXJ4	WP13F851D-CX30	103F8581-80CXJ1
		WP13F851S-CX36	103F8581-80CXX4	WP13F851D-CX36	103F8581-80CXX1
Harmonic gear	□ 60mm	WP13F781S-HX50	103F7851-80HXL4	WP13F781D-HX50	103F7851-80HXL1
		WP13F781S-HX100	103F7851-80HXM4	WP13F781D-HX100	103F7851-80HXM1
	ø 86mm	WP13F851S-HX50	103F8581-80HXL4	WP13F851D-HX50	103F8581-80HXL1
		WP13F851S-HX100	103F8581-80HXM4	WP13F851D-HX100	103F8581-80HXM1
Electromagnetic brake	□ 60mm	WP13F781S-XB	103F7851-80XB41		
		WP13F782S-XB	103F7852-80XB41		
		WP13F783S-XB	103F7853-80XB41		
	ø 86mm	WP13F851S-XB	103F8581-80XB41		
		WP13F852S-XB	103F8582-80XB41		
		WP13F853S-XB	103F8583-80XB41		

Note) Contact our sales department to order the system with an encoder and/or gear and brake.

Stepping motor data sheet

Combination of WP12

STEPSYN M Series (Conforming to the UL Standards and CE Marking)

Set model number	Single-axis shaft	WP12M551S	WP12M552S	WP12M554S
	Dual-axis shaft	WP12M551D	WP12M552D	WP12M554D
Holding torque	N•m	0.13	0.18	0.26
Rotor inertia	$\times 10^{-4} \text{kg} \cdot \text{m}^2$	0.03	0.053	0.065
Weight	kg	0.23	0.28	0.37
Allowable thrust load	N	10	10	10
Allowable radial load	N	35	35	35

STEPSYN F Series (Standard)

Set model number	Single-axis shaft	WP12F551S	WP12F552S	WP12F554S	WP12F781S	WP12F782S	WP12F783S
	Dual-axis shaft	WP12F551D	WP12F552D	WP12F554D	WP12F781D	WP12F782D	WP12F783D
Holding torque	N•m	0.13	0.18	0.26	0.6	0.93	1.79
Rotor inertia	$\times 10^{-4} \text{kg} \cdot \text{m}^2$	0.03	0.053	0.065	0.275	0.4	0.84
Weight	kg	0.23	0.28	0.37	0.6	0.78	1.36
Allowable thrust load	N	10	10	10	20	20	20
Allowable radial load	N	35	35	35	80	80	80

STEPSYN F Series (With low back rush gear)

Set model number	Single-axis shaft	WP12F551S-CX3.6	WP12F551S-CX7.2	WP12F551S-CX10	WP12F551S-CX20	WP12F551S-CX30	WP12F551S-CX36
	Dual-axis shaft	WP12F551D-CX3.6	WP12F551D-CX7.2	WP12F551D-CX10	WP12F551D-CX20	WP12F551D-CX30	WP12F551D-CX36
Allowable torque	N•m	0.35	0.7	1	1.5	1.5	1.5
Rotor inertia	$\times 10^{-4} \text{kg} \cdot \text{m}^2$	0.03					
Basic step angle	°	0.2	0.1	0.072	0.036	0.024	0.02
Deceleration ratio		1 : 3.6	1 : 7.2	1 : 10	1 : 20	1 : 30	1 : 36
Back-rush	°	0.6	0.4	0.35	0.25	0.25	0.25
Allowable number of rotations	min ⁻¹	500	250	180	90	60	50
Weight	kg	0.36					
Allowable thrust load	N	15					
Allowable radial load	N	20					

* The rotation direction of the motor and the gear output shaft is as follows: when deceleration ratio is 1:3.6, 1:7.2, or 1:10, both motor and shaft rotate in the same direction, and for 1:20 or 1:30 type, the motor and the shaft rotate in opposite direction.

STEPSYN F Series (With harmonic gear)

Set model number	Single-axis shaft	WP12F551S-HX50	WP12F551S-HX100
	Dual-axis shaft	WP12F551D-HX50	WP12F551D-HX100
Allowable torque	N•m	2.5	4
Rotor inertia	$\times 10^{-4} \text{kg} \cdot \text{m}^2$	0.042	
Basic step angle	°	0.0144	0.0072
Deceleration ratio		1 : 50	1 : 100
Lost motion	Minute	0.4~3 ($\pm 0.16 \text{N} \cdot \text{m}$)	0.4~3 ($\pm 0.2 \text{N} \cdot \text{m}$)
Allowable number of rotations	min ⁻¹	500	250
Weight	kg	0.52	
Allowable thrust load	N	200	
Allowable radial load	N	250	

* The gear output shaft rotates in the opposite direction of the motor.

STEPSYN F Series (With electromagnetic brake)

Set model number	Single-axis shaft	WP12F551S-XB	WP12F552S-XB	WP12F554S-XB
	Dual-axis shaft			
Holding torque	N•m	0.13	0.18	0.26
Rotor inertia	$\times 10^{-4} \text{kg} \cdot \text{m}^2$	0.045	0.068	0.08
Weight	kg	0.38	0.43	0.52
Allowable thrust load	N	10	10	10
Allowable radial load	N	35	35	35
Electromagnetic brake specifications	Brake operation system	Non-excitation operation system		
	Source voltage	DC 24 $\pm$ 5%		
	Exciting current	0.08		
	Electric power consumption	2		
	Static friction torque	0.22		
	Brake operating time	30		
	Brake release time	20		

Stepping motor data sheet

Combination of WP13

STEPSYN M Series (Conforming to the UL Standards and CE Marking)

Set model number	Single-axis shaft	WP13M781S	WP13M782S	WP13M783S
	Dual-axis shaft	WP13M781D	WP13M782D	WP13M783D
Holding torque	N•m	0.6	0.93	1.79
Rotor inertia	$\times 10^{-4} \text{kg} \cdot \text{m}^2$	0.275	0.4	0.84
Weight	kg	0.6	0.78	1.36
Allowable thrust load	N	20	20	20
Allowable radial load	N	80	80	80

Set model number	Single-axis shaft	WP13M851S	WP13M852S	WP13M853S	WP13M892S	WP13M893S
	Dual-axis shaft	WP13M851D	WP13M852D	WP13M853D	WP13M892D	WP13M893D
Holding torque	N•m	2.06	4.02	6.17	10.8	16
Rotor inertia	$\times 10^{-4} \text{kg} \cdot \text{m}^2$	1.45	2.9	4.4	14.6	22
Weight	kg	1.5	2.5	3.5	7.5	10.5
Allowable thrust load	N	60	60	60	100	100
Allowable radial load	N	220	220	220	360	360

STEPSYN F Series (Standard)

Set model number	Single-axis shaft	WP13F781S	WP13F782S	WP13F783S
	Dual-axis shaft	WP13F781D	WP13F782D	WP13F783D
Holding torque	N•m	0.6	0.93	1.79
Rotor inertia	$\times 10^{-4} \text{kg} \cdot \text{m}^2$	0.275	0.4	0.84
Weight	kg	0.6	0.78	1.36
Allowable thrust load	N	20	20	20
Allowable radial load	N	80	80	80

Set model number	Single-axis shaft	WP13F851S	WP13F852S	WP13F853S	WP13F892S	WP13F893S
	Dual-axis shaft	WP13F851D	WP13F852D	WP13F853D	WP13F892D	WP13F893D
Holding torque	N•m	2.06	4.02	6.17	10.8	16
Rotor inertia	$\times 10^{-4} \text{kg} \cdot \text{m}^2$	1.45	2.9	4.4	14.6	22
Weight	kg	1.5	2.5	3.5	7.5	10.5
Allowable thrust load	N	60	60	60	100	100
Allowable radial load	N	220	220	220	360	360

STEPSYN F Series (With low back rush gear)

Set model number	Single-axis shaft	WP13F781S-CX3.6	WP13F781S-CX7.2	WP13F781S-CX10	WP13F781S-CX20	WP13F781S-CX30	WP13F781S-CX36
	Dual-axis shaft	WP13F781D-CX3.6	WP13F781D-CX7.2	WP13F781D-CX10	WP13F781D-CX20	WP13F781D-CX30	WP13F781D-CX36
Allowable torque	N•m	1.25	2.5	3	3.5	4	4
Rotor inertia	$\times 10^{-4} \text{kg} \cdot \text{m}^2$	0.275					
Basic step angle	°	0.2	0.1	0.072	0.036	0.024	0.02
Deceleration ratio		1 : 3.6	1 : 7.2	1 : 10	1 : 20	1 : 30	1 : 36
Back-rush	°	0.55	0.25	0.25	0.17	0.17	0.17
Allowable number of rotations	min ⁻¹	500	250	180	90	60	50
Weight	kg	0.97					
Allowable thrust load	N	30					
Allowable radial load	N	100					

* The rotation direction of the motor and the gear output shaft is as follows: when deceleration ratio is 1:3.6 or 1:7.2, both motor and shaft rotate in the same direction, and for 1:10, 1:20, or 1:30 type, the motor and the shaft rotate in opposite direction.

Set model number	Single-axis shaft	WP13F851S-CX3.6	WP13F851S-CX7.2	WP13F851S-CX10	WP13F851S-CX20	WP13F851S-CX30	WP13F851S-CX36
	Dual-axis shaft	WP13F851D-CX3.6	WP13F851D-CX7.2	WP13F851D-CX10	WP13F851D-CX20	WP13F851D-CX30	WP13F851D-CX36
Allowable torque	N•m	4.5	9	9	12	12	12
Rotor inertia	$\times 10^{-4} \text{kg} \cdot \text{m}^2$	1.45					
Basic step angle	°	0.2	0.1	0.072	0.036	0.024	0.02
Deceleration ratio		1 : 3.6	1 : 7.2	1 : 10	1 : 20	1 : 30	1 : 36
Back-rush	°	0.4	0.25	0.25	0.17	0.17	0.15
Allowable number of rotations	min ⁻¹	500	250	180	90	60	50
Weight	kg	2.7					
Allowable thrust load	N	60					
Allowable radial load	N	300					

* The rotation direction of the motor and the gear output shaft is as follows: when deceleration ratio is 1:3.6 or 1:7.2, both motor and shaft rotate in the same direction, and for 1:10, 1:20, or 1:30 type, the motor and the shaft rotate in opposite direction.

Stepping motor data sheet

STEPSYN F Series (With harmonic gear)

Set model number	Single-axis shaft	WP13F781S-HX50	WP13F781S-HX100
	Dual-axis shaft	WP13F781D-HX50	WP13F781D-HX100
Allowable torque	N•m	5.5	8
Rotor inertia	$\times 10^{-4}$ kg•m ²	0.31	
Basic step angle	°	0.0144	0.0072
Deceleration ratio		1 : 50	1 : 100
Lost motion	Minute	0.4~3 (± 0.28 N•m)	0.4~1.5 (± 0.4 N•m)
Allowable number of rotations	min ⁻¹	70	35
Weight	kg	1.2	
Allowable thrust load	N	400	
Allowable radial load	N	400	

* The gear output shaft rotates in the opposite direction of the motor.

Set model number	Single-axis shaft	WP13F851S-HX50	WP13F851S-HX100
	Dual-axis shaft	WP13F851D-HX50	WP13F851D-HX100
Allowable torque	N•m	25	41
Rotor inertia	$\times 10^{-4}$ kg•m ²	1.65	
Basic step angle	°	0.0144	0.0072
Deceleration ratio		1 : 50	1 : 100
Lost motion	Minute	0.4~3 (± 1.0 N•m)	0.4~3 (± 1.2 N•m)
Allowable number of rotations	min ⁻¹	500	250
Weight	kg	3.3	
Allowable thrust load	N	1400	
Allowable radial load	N	1400	

* The gear output shaft rotates in the opposite direction of the motor.

STEPSYN F Series (with electromagnetic brake)

Set model number	Single-axis shaft	WP13F781S-XB	WP13F782S-XB	WP13F783S-XB
	Dual-axis shaft			
Holding torque	N•m	0.6	0.93	1.79
Rotor inertia	$\times 10^{-4}$ kg•m ²	0.43	0.56	1
Weight	kg	0.94	1.12	1.7
Allowable thrust load	N	20	20	20
Allowable radial load	N	80	80	80
Electromagnetic brake specifications	Brake operation system	Non-excitation operation system		
	Source voltage	DC 24 $\pm$ 5%		
	Exciting current	0.25		
	Electric power consumption	6		
	Static friction torque	0.8		
	Brake operating time	30		
	Brake release time	20		

Set model number	Single-axis shaft	WP13F851S-XB	WP13F852S-XB	WP13F853S-XB
	Dual-axis shaft			
Holding torque	N•m	2.06	4.02	6.17
Rotor inertia	$\times 10^{-4}$ kg•m ²	2.24	3.69	5.19
Weight	kg	3.5	4.5	5.5
Allowable thrust load	N	60	60	60
Allowable radial load	N	220	220	220
Electromagnetic brake specifications	Brake operation system	Non-excitation operation system		
	Source voltage	DC 24 $\pm$ 5%		
	Exciting current	0.42		
	Electric power consumption	10		
	Static friction torque	4		
	Brake operating time	50		
	Brake release time	20		

UL Standards and CE Marking

Product	UL Standards		CE Marking
	Applied Standards	File NO.	Low Voltage Directive
PM driver	—	—	EN61010-1
Stepping motor	UL1004 UL2111	E208878	EN60034-1 EC34-5 (EN60034-5)

- The stepping motor STEPSYN M Series conforms to the UL Standards and CE Marking.
- The PM driver conforms to only the Low Voltage Directive (CE Marking).
- If there is a need to conform to the EMC Directive, use a CE Marking compliant STEPSYN H Series.
- For compatibility of the CE Marking compliant STEPSYN H Series, refer to the PM driver PMM-MA-50034-10 (Page 157) and PMM-MA-50064-10 (Page 173).
- Some sizes of stepping motors do not meet the standards.

AP1

BP1

BP2

WP1

DP1

DP2

DP3

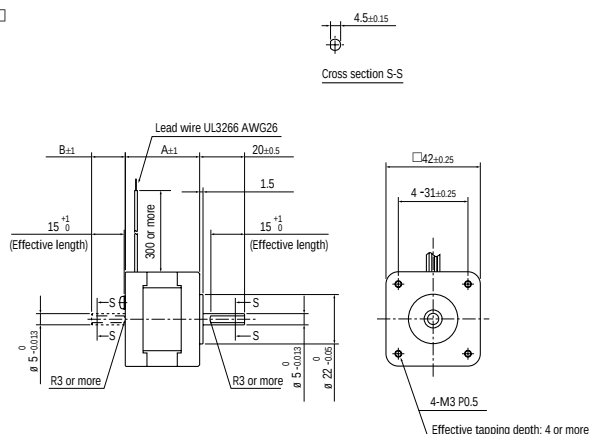
DP4

Dimensions (Unit: mm)

STEPSYN M

WP12M55 ☐ ☐

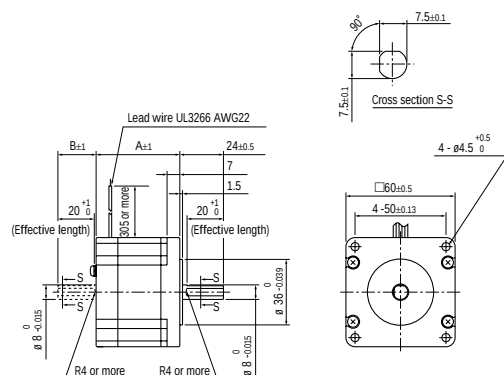
103M55-70



Model name	A	B
WP12M551S (103M5505-7041)	34	—
WP12M551D (103M5505-7011)	34	15
WP12M552S (103M5508-7041)	40	—
WP12M552D (103M5508-7011)	40	15
WP12M554S (103M5510-7041)	49	—
WP12M554D (103M5510-7011)	49	15

WP13M78□□

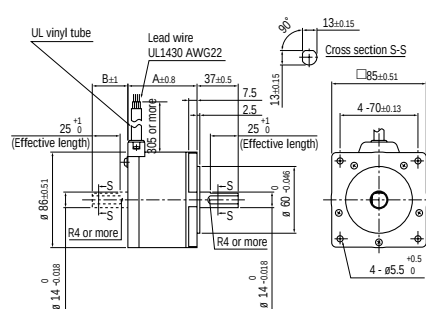
103M785-80



Model name	A	B
WP13M781S (103M7851-8041)	46	—
WP13M781D (103M7851-8011)	46	21
WP13M782S (103M7852-8041)	55	—
WP13M782D (103M7852-8011)	55	21
WP13M783S (103M7853-8041)	87	—
WP13M783D (103M7853-8011)	87	21

WP13M85☐☐

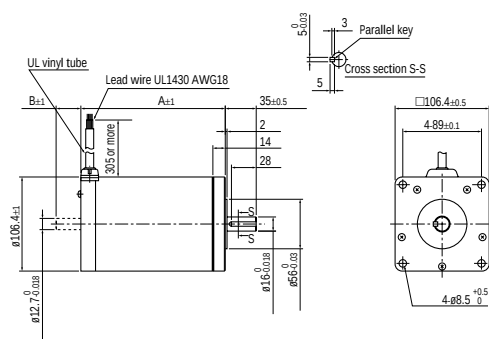
103F858-80



Model name	A	B
WP13M851S (103M8581-8041)	62.15	—
WP13M851D (103M8581-8011)	62.15	32
WP13M852S (103M8582-8041)	92.2	—
WP13M852D (103M8582-8011)	92.2	32
WP13M853S (103M8583-8041)	125.85	—
WP13M853D (103M8583-8011)	125.85	32

WP13M89□□

103M8958-80



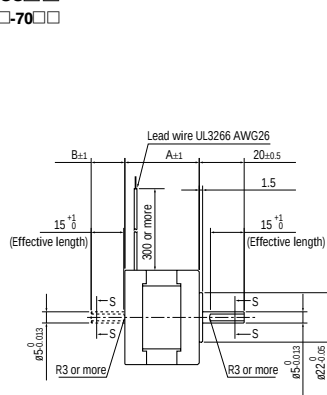
Model name	A	B
WP13M892S (103M89582-8041)	163.3	—
WP13M892D (103M89582-8011)	163.3	28
WP13M893S (103M89583-8041)	221.3	—
WP13M893D (103M89583-8011)	221.3	28

Dimensions (Unit: mm)

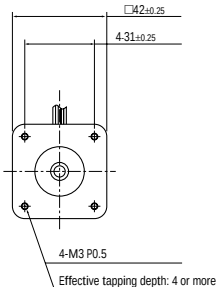
STEPSYN F

WP12F55□□

103F55□□-70□□



Cross section S-S

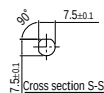
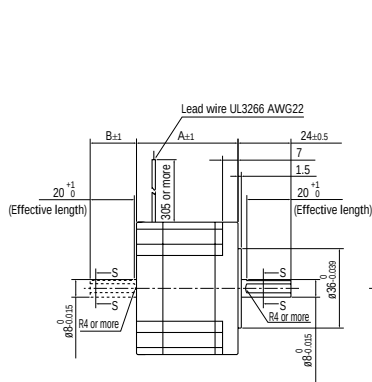


Model name	A	B
WP12F551S (103F5505-7041)	34	—
WP12F551D (103F5505-7011)	34	15
WP12F552S (103F5508-7041)	40	—
WP12F552D (103F5508-7011)	40	15
WP12F554S (103F5510-7041)	49	—
WP12F554D (103F5510-7011)	49	15

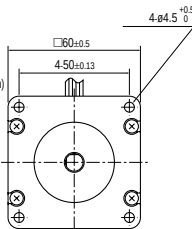
WP12F78□□ / WP13F78□□

103F785□□-70□□

103F785□□-80□□



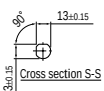
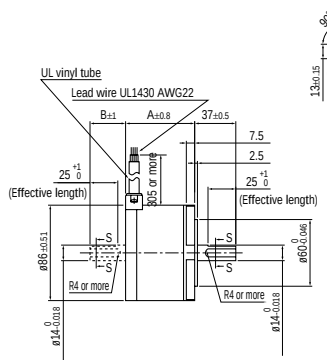
Cross section S-S



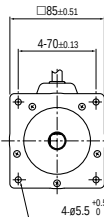
Model name	A	B
WP12F781S (103F7851-7041)	46.5	—
WP12F781D (103F7851-7011)	46.5	21
WP12F782S (103F7852-7041)	55	—
WP12F782D (103F7852-7011)	55	21
WP12F783S (103F7853-7041)	87.5	—
WP12F783D (103F7853-7011)	87.5	21
WP13F781S (103F7851-8041)	46.5	—
WP13F781D (103F7851-8011)	46.5	21
WP13F782S (103F7852-8041)	55	—
WP13F782D (103F7852-8011)	55	21
WP13F783S (103F7853-8041)	87.5	—
WP13F783D (103F7853-8011)	87.5	21

WP13F85□□

103F858□□-80□□



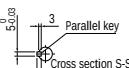
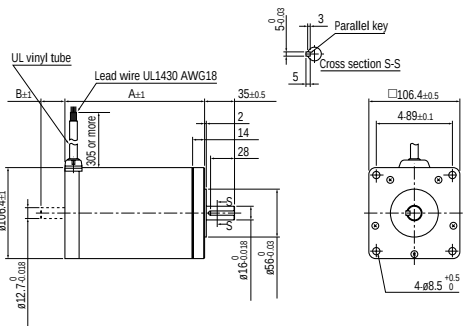
Cross section S-S



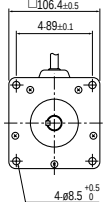
Model name	A	B
WP13F851S (103F8581-8041)	62.15	—
WP13F851D (103F8581-8011)	62.15	32
WP13F852S (103F8582-8041)	92.2	—
WP13F852D (103F8582-8011)	92.2	32
WP13F853S (103F8583-8041)	125.85	—
WP13F853D (103F8583-8011)	125.85	32

WP13F89□□

103F8958□□-80□□



Cross section S-S

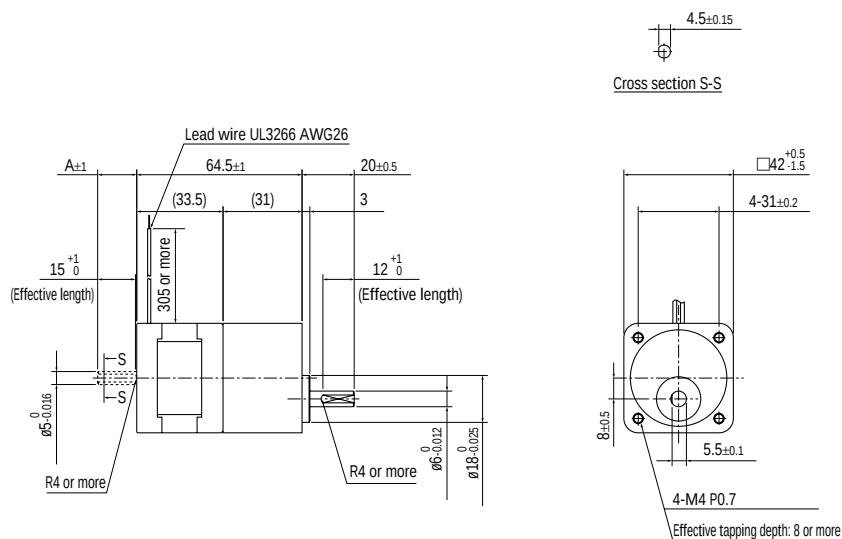


Model name	A	B
WP13F892S (103F89582-8041)	163.3	—
WP13F892D (103F89582-8011)	163.3	28
WP13F893S (103F89583-8041)	221.3	—
WP13F893D (103F89583-8011)	221.3	28

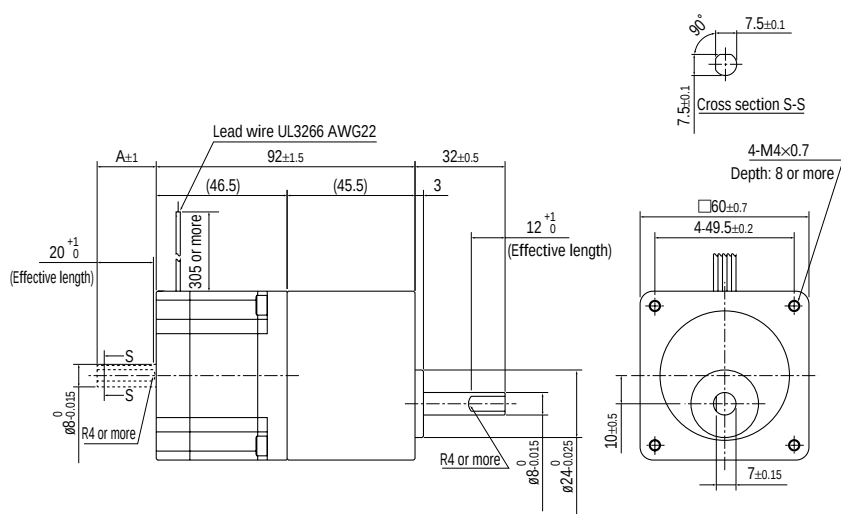
Dimensions (Unit: mm)

STEPSYN F with low back rush gear

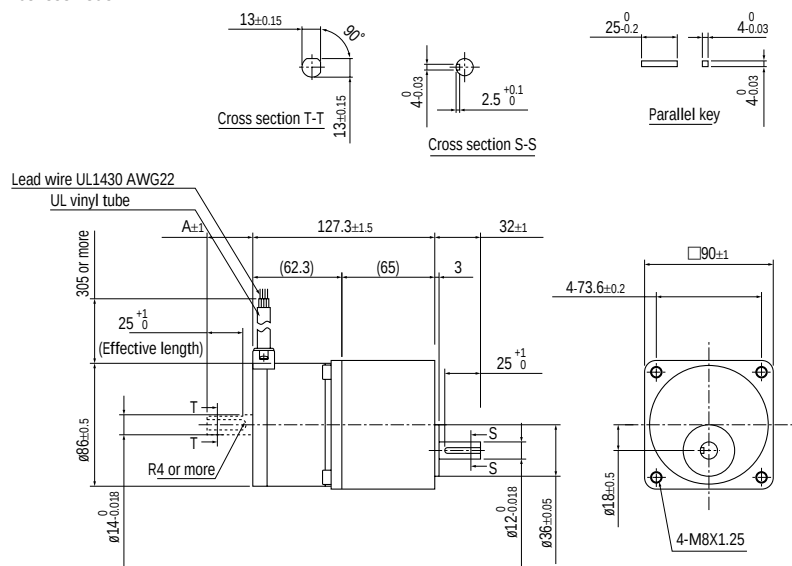
WP12F551□-CX□□

103F5505-70CX ☐ ☐

WP13F781-CX

103F7851-80CX ☐ ☐

WP13F851-CX

103F8581-80CX ☐ ☐

Model name	A
WP12F551S-CX3.6 (103F5505-70CXA4)	—
WP12F551D-CX3.6 (103F5505-70CXA1)	15
WP12F551S-CX7.2 (103F5505-70CXB4)	—
WP12F551D-CX7.2 (103F5505-70CXB1)	15
WP12F551S-CX10 (103F5505-70CXE4)	—
WP12F551D-CX10 (103F5505-70CXE1)	15
WP12F551S-CX20 (103F5505-70CXG4)	—
WP12F551D-CX20 (103F5505-70CXG1)	15
WP12F551S-CX30 (103F5505-70CXJ4)	—
WP12F551D-CX30 (103F5505-70CXJ1)	15
WP12F551S-CX36 (103F5505-70CXK4)	—
WP12F551D-CX36 (103F5505-70CXK1)	15

Model name	A
WP13F781S-CX3.6 (103F7851-80CXAA)	—
WP13F781D-CX3.6 (103F7851-80CXA1)	21
WP13F781S-CX7.2 (103F7851-80CXB4)	—
WP13F781D-CX7.2 (103F7851-80CXB1)	21
WP13F781S-CX10 (103F7851-80CXE4)	—
WP13F781D-CX10 (103F7851-80CXE1)	21
WP13F781S-CX20 (103F7851-80CXG4)	—
WP13F781D-CX20 (103F7851-80CXG1)	21
WP13F781S-CX30 (103F7851-80CXJ4)	—
WP13F781D-CX30 (103F7851-80CXJ1)	21
WP13F781S-CX36 (103F7851-80CXX4)	—
WP13F781D-CX36 (103F7851-80CXX1)	21

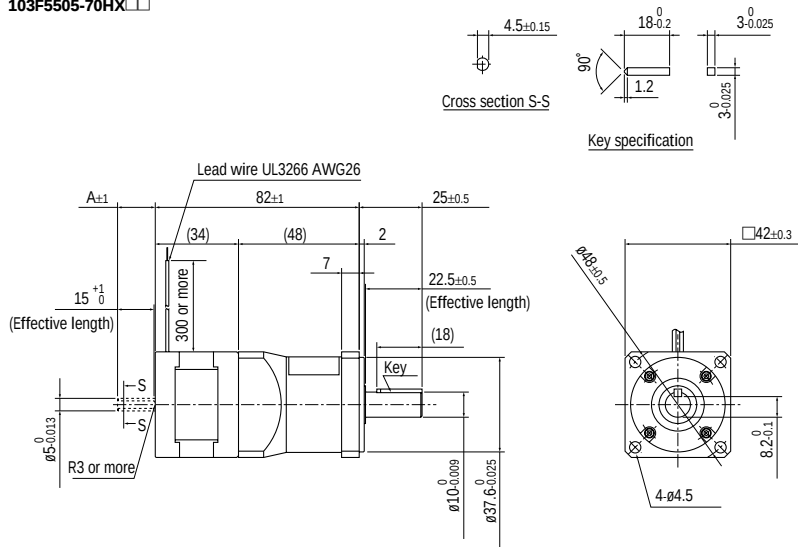
Model name	A
WP13F851S-CX3.6 (103F8581-80CXA4)	—
WP13F851D-CX3.6 (103F8581-80CXA1)	32
WP13F851S-CX7.2 (103F8581-80CXB4)	—
WP13F851D-CX7.2 (103F8581-80CXB1)	32
WP13F851S-CX10 (103F8581-80CXE4)	—
WP13F851D-CX10 (103F8581-80CXE1)	32
WP13F851S-CX20 (103F8581-80CXG4)	—
WP13F851D-CX20 (103F8581-80CXG1)	32
WP13F851S-CX30 (103F8581-80CXJ4)	—
WP13F851D-CX30 (103F8581-80CXJ1)	32
WP13F851S-CX36 (103F8581-80CKK4)	—
WP13F851D-CX36 (103F8581-80CKK1)	32

Dimensions (Unit: mm)

STEPSYN F with harmonic gear

WP12F551□-HX□□

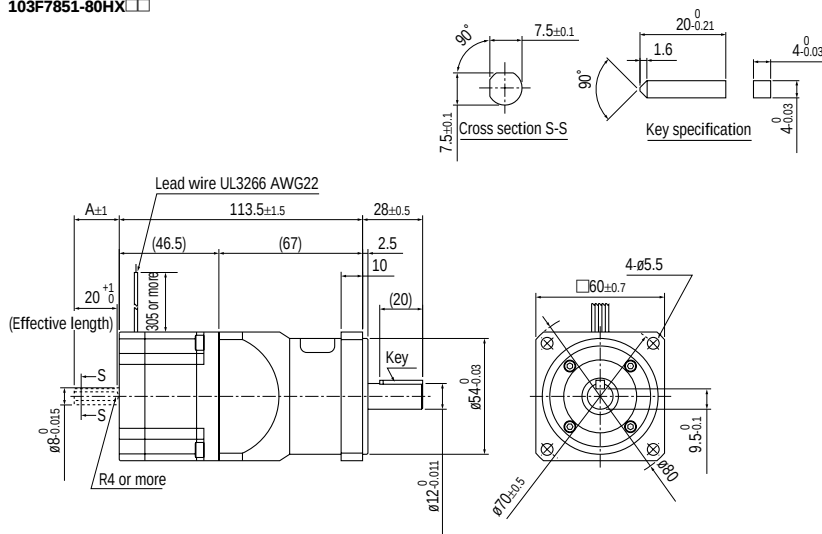
103F5505-70HX□□



Model name	A
WP12F551S-HX50 (103F5505-70HXL4)	—
WP12F551D-HX50 (103F5505-70HXL1)	15
WP12F551S-HX100 (103F5505-70HXM4)	—
WP12F551D-HX100 (103F5505-70HXM1)	15

WP13F781□-HX□□

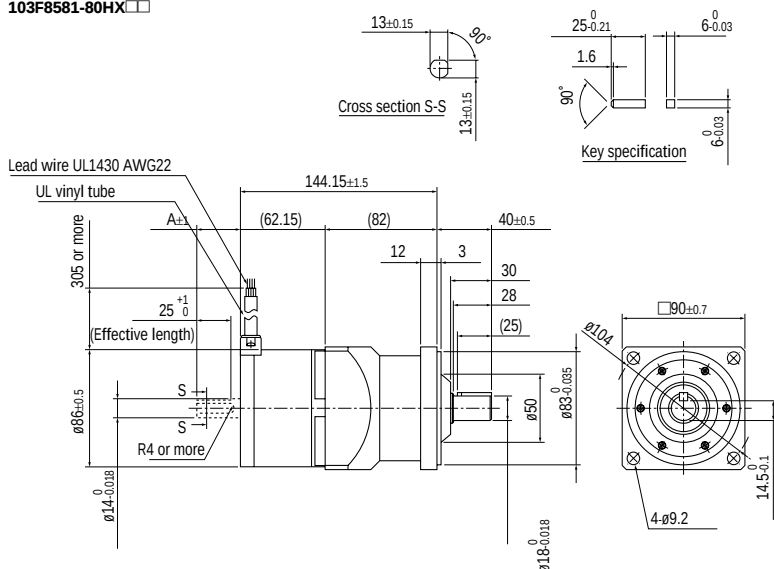
103F7851-80HX□□



Model name	A
WP13F781S-HX50 (103F7851-80HXL4)	—
WP13F781D-HX50 (103F7851-80HXL1)	21
WP13F781S-HX100 (103F7851-80HXM4)	—
WP13F781D-HX100 (103F7851-80HXM1)	21

WP13F851□-HX□□

103F8581-80HX□□



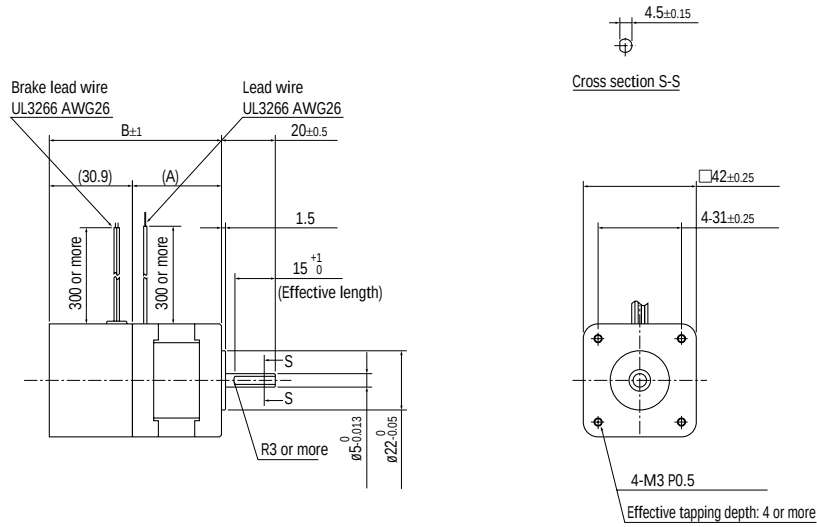
Model name	A
WP13F851S-HX50 (103F8581-80HXL4)	—
WP13F851D-HX50 (103F8581-80HXL1)	32
WP13F851S-HX100 (103F8581-80HXM4)	—
WP13F851D-HX100 (103F8581-80HXM1)	32

Dimensions (Unit: mm)

STEPSYN F with electromagnetic brake

WP12F55 S-XB

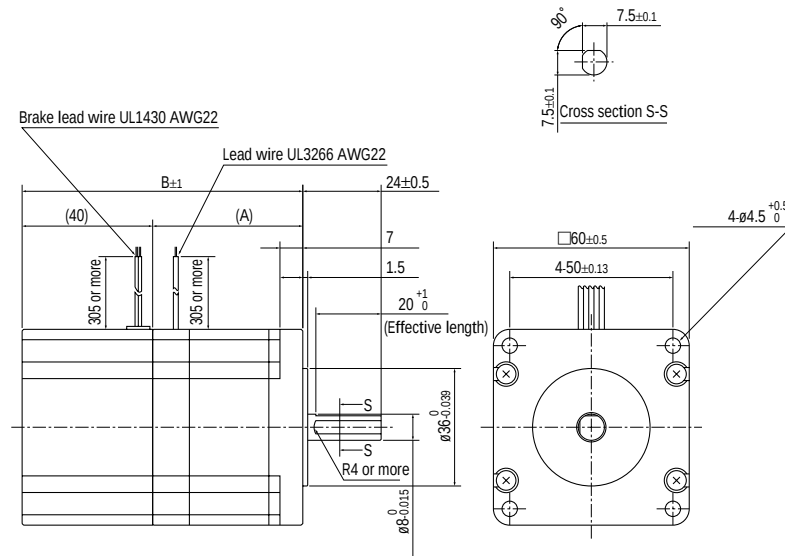
103F55 70XB41



Model name	A	B
WP12F551S-XB (103F5505-70XB41)	33.6	64.5
WP12F552S-XB (103F5508-70XB41)	39.6	70.5
WP12F554S-XB (103F5510-70XB41)	48.6	79.5

WP13F78 S-XB

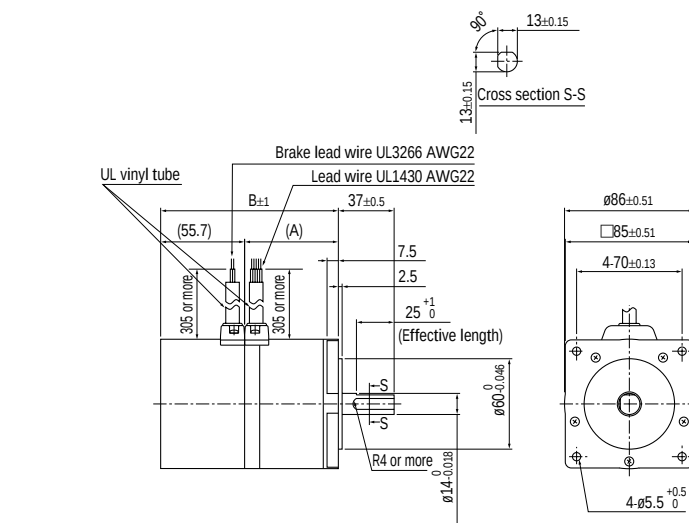
103F785 80XB41



Model name	A	B
WP13F781S-XB (103F7851-80XB41)	45.8	85.8
WP13F782S-XB (103F7852-80XB41)	54.5	94.5
WP13F783S-XB (103F7853-80XB41)	86.7	126.7

WP13F85 S-XB

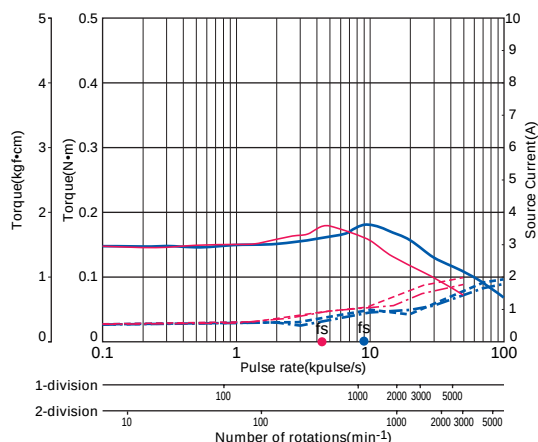
103F858 80XB41



Model name	A	B
WP13F851S-XB (103F8581-80XB41)	61.0	116.7
WP13F852S-XB (103F8582-80XB41)	91.1	146.8
WP13F853S-XB (103F8583-80XB41)	124.7	180.4

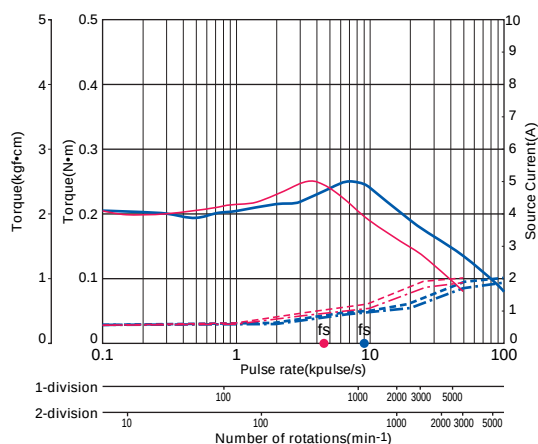
Pulse rate-torque characteristics/pulse rate-source current characteristics

● WP12M551□ / WP12F551□ / WP12F551S-XB : 100V



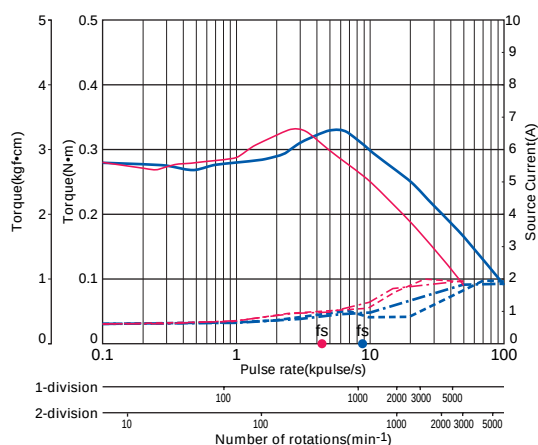
103M5505-70□□/103F5505-70□□/103F5505-70XB41
Source voltage : AC100V•Winding current : 0.75A/phase
— Getaway torque($J_{L1}=0.94 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current($T_L=\text{MAX}$) --- Source current($T_L=0$)
fs : Maximum self-start frequency when not loaded
■ 1-division is specified ■ 2-division is specified

● WP12M552□ / WP12F552□ / WP12F552S-XB : 100V



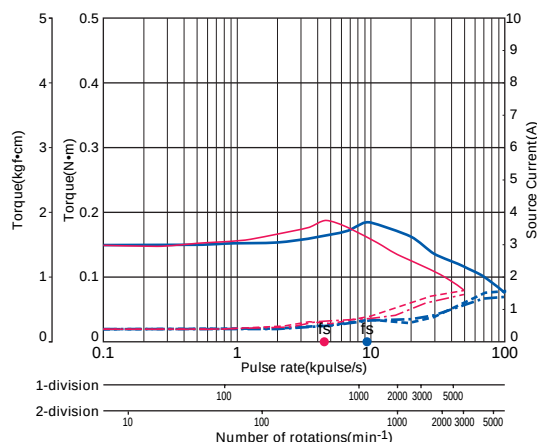
103M5508-70□□/103F5508-70□□/103F5508-70XB41
Source voltage : AC100V•Winding current : 0.75A/phase
— Getaway torque($J_{L1}=0.94 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current($T_L=\text{MAX}$) --- Source current($T_L=0$)
fs : Maximum self-start frequency when not loaded
■ 1-division is specified ■ 2-division is specified

● WP12M554□ / WP12F554□ / WP12F554S-XB : 100V



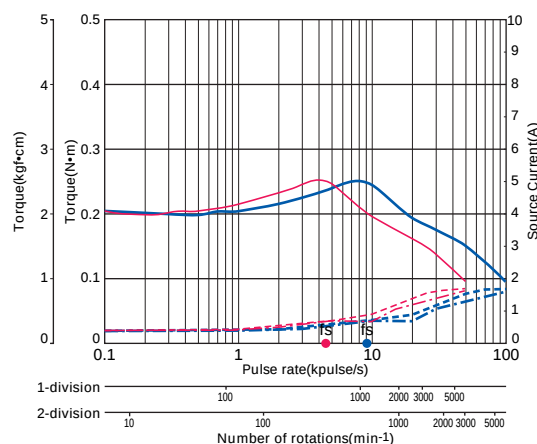
103M5510-70□□/103F5510-70□□/103F5510-70XB41
Source voltage : AC100V•Winding current : 0.75A/phase
— Getaway torque($J_{L1}=0.94 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current($T_L=\text{MAX}$) --- Source current($T_L=0$)
fs : Maximum self-start frequency when not loaded
■ 1-division is specified ■ 2-division is specified

● WP12M551□ / WP12F551□ / WP12F551S-XB : 200V



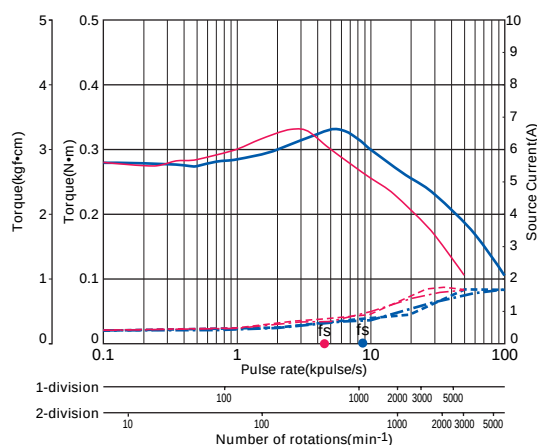
103M5505-70□□/103F5505-70□□/103F5505-70XB41
Source voltage : AC200V•Winding current : 0.75A/phase
— Getaway torque($J_{L1}=0.94 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current($T_L=\text{MAX}$) --- Source current($T_L=0$)
fs : Maximum self-start frequency when not loaded
■ 1-division is specified ■ 2-division is specified

● WP12M552□ / WP12F552□ / WP12F552S-XB : 200V



103M5508-70□□/103F5508-70□□/103F5508-70XB41
Source voltage : AC200V•Winding current : 0.75A/phase
— Getaway torque($J_{L1}=0.94 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current($T_L=\text{MAX}$) --- Source current($T_L=0$)
fs : Maximum self-start frequency when not loaded
■ 1-division is specified ■ 2-division is specified

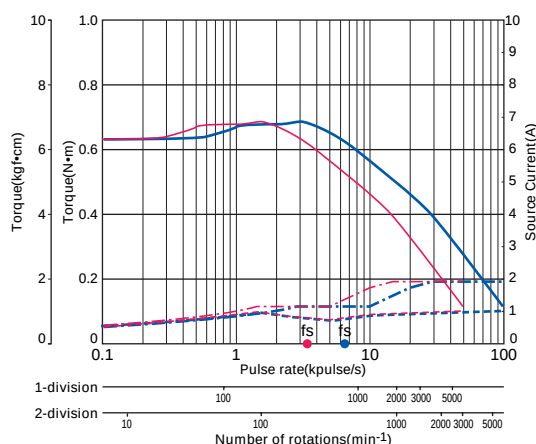
● WP12M554□ / WP12F554□ / WP12F554S-XB : 200V



103M5510-70□□/103F5510-70□□/103F5510-70XB41
Source voltage : AC200V•Winding current : 0.75A/phase
— Getaway torque($J_{L1}=0.94 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current($T_L=\text{MAX}$) --- Source current($T_L=0$)
fs : Maximum self-start frequency when not loaded
■ 1-division is specified ■ 2-division is specified

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

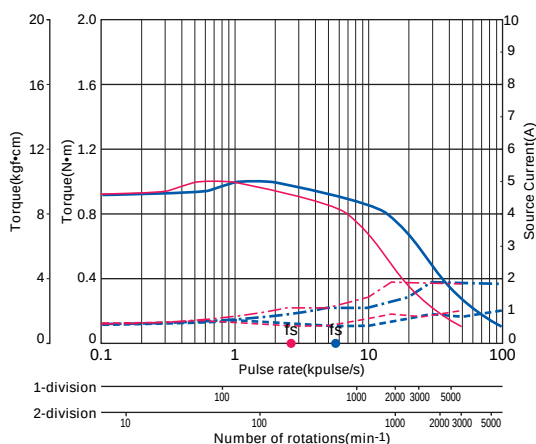
● WP12F781□ : 100V



103F7851-70□□

Source voltage : AC100V•Winding current : 0.75A/phase
 — Getaway torque($J_{L1}=2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
 - - - Source current(TL=MAX) - - - Source current(TL=0)
 fs : Maximum self-start frequency when not loaded
 ■ 1-division is specified ■ 2-division is specified

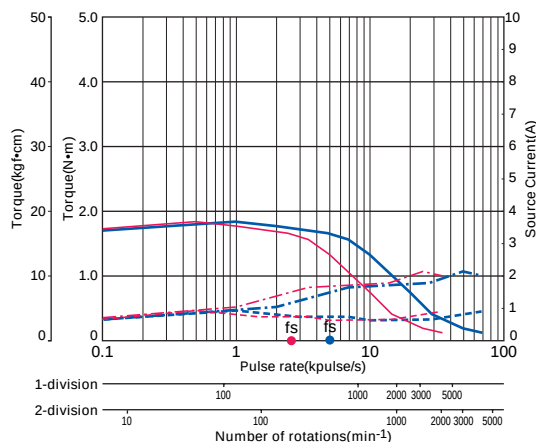
● WP12F782□ : 100V



103F7852-70□□

Source voltage : AC100V•Winding current : 0.75A/phase
 — Getaway torque($J_{L1}=2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
 - - - Source current(TL=MAX) - - - Source current(TL=0)
 fs : Maximum self-start frequency when not loaded
 ■ 1-division is specified ■ 2-division is specified

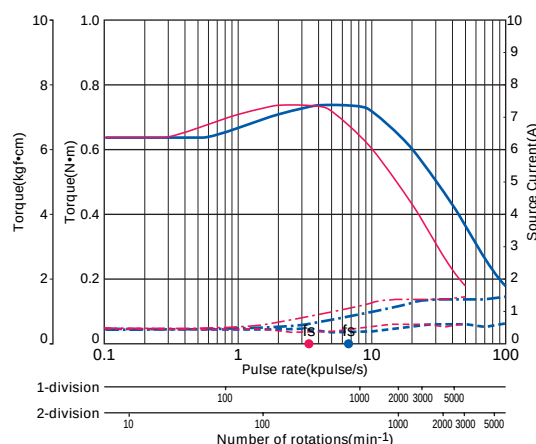
● WP12F783□ : 100V



103F7853-70□□

Source voltage : AC100V•Winding current : 0.75A/phase
 — Getaway torque($J_{L1}=7.4 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
 - - - Source current(TL=MAX) - - - Source current(TL=0)
 fs : Maximum self-start frequency when not loaded
 ■ 1-division is specified ■ 2-division is specified

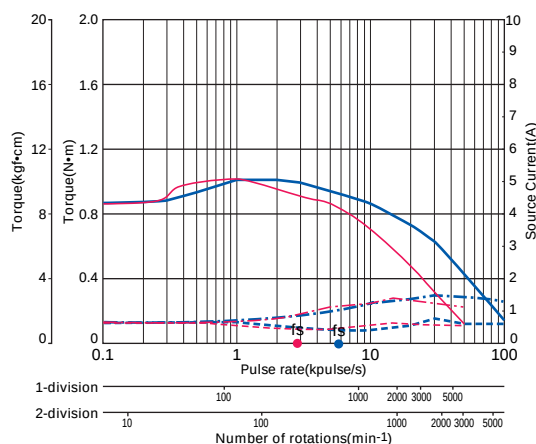
● WP12F781□ : 200V



103F7851-70□□

Source voltage : AC200V•Winding current : 0.75A/phase
 — Getaway torque($J_{L1}=2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
 - - - Source current(TL=MAX) - - - Source current(TL=0)
 fs : Maximum self-start frequency when not loaded
 ■ 1-division is specified ■ 2-division is specified

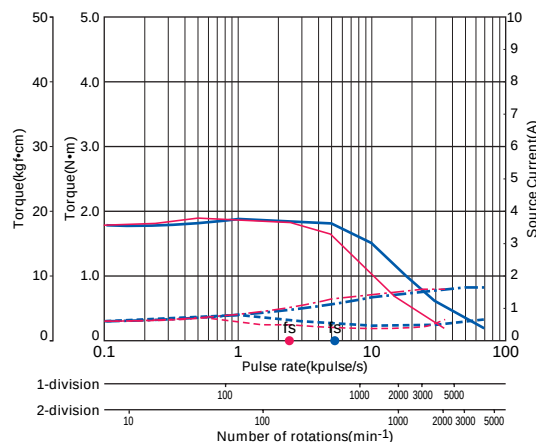
● WP12F782□ : 200V



103F7852-70□□

Source voltage : AC200V•Winding current : 0.75A/phase
 — Getaway torque($J_{L1}=2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
 - - - Source current(TL=MAX) - - - Source current(TL=0)
 fs : Maximum self-start frequency when not loaded
 ■ 1-division is specified ■ 2-division is specified

● WP12F783□ : 200V

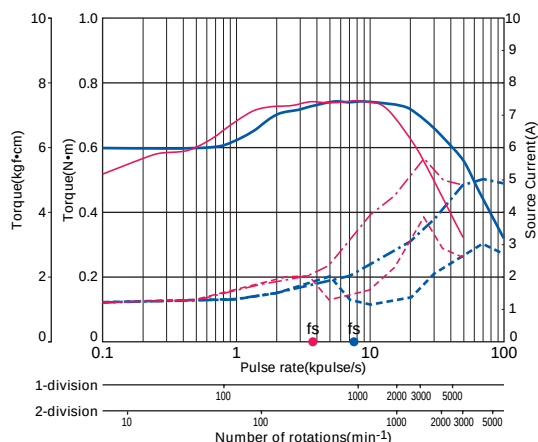


103F7853-70□□

Source voltage : AC200V•Winding current : 0.75A/phase
 — Getaway torque($J_{L1}=7.4 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
 - - - Source current(TL=MAX) - - - Source current(TL=0)
 fs : Maximum self-start frequency when not loaded
 ■ 1-division is specified ■ 2-division is specified

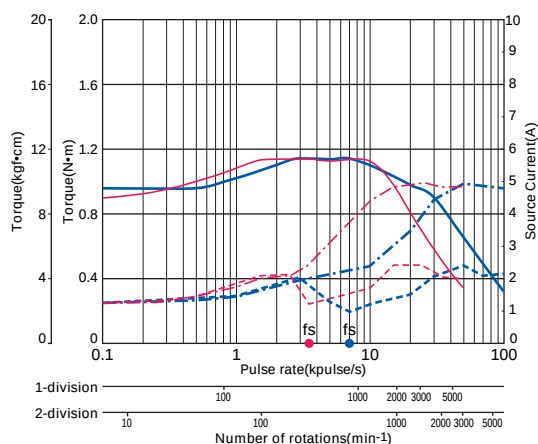
Pulse rate-torque characteristics/pulse rate-source current characteristics

● WP13M781□ / WP13F781□ / WP13F781S-XB : 100V



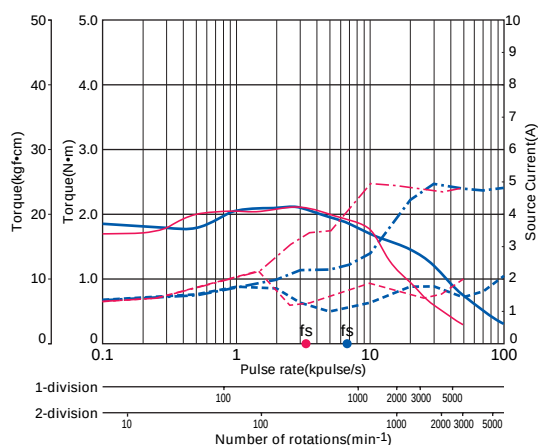
103M7851-80□□/103F7851-80□□/103F7851-80XB41
Source voltage : AC100V•Winding current : 1.5A/phase
— Getaway torque($J_{L1}=2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current($T_L=\text{MAX}$) --- Source current($T_L=0$)
fs : Maximum self-start frequency when not loaded
■ 1-division is specified ■ 2-division is specified

● WP13M782□ / WP13F782□ / WP13F782S-XB : 100V



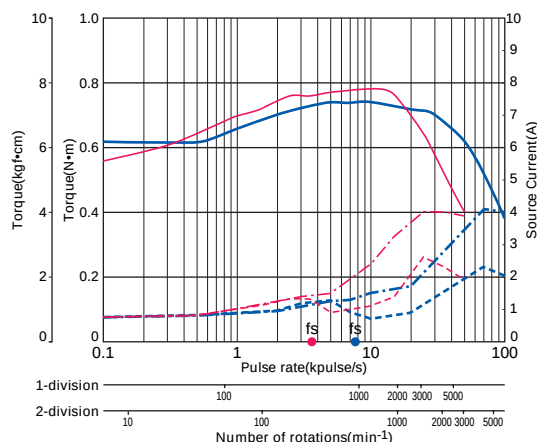
103M7852-80□□/103F7852-80□□/103F7852-80XB41
Source voltage : AC100V•Winding current : 1.5A/phase
— Getaway torque($J_{L1}=2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current($T_L=\text{MAX}$) --- Source current($T_L=0$)
fs : Maximum self-start frequency when not loaded
■ 1-division is specified ■ 2-division is specified

● WP13M783□ / WP13F783□ / WP13F783S-XB : 100V



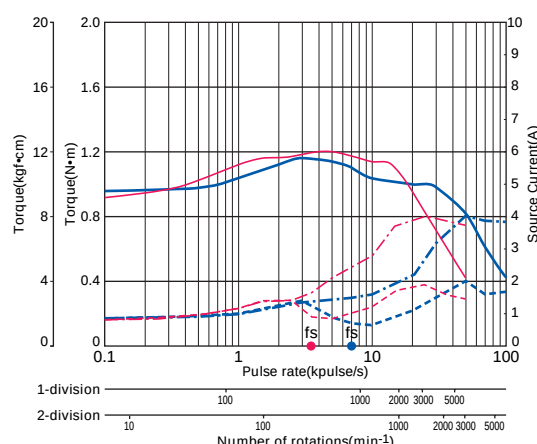
103M7853-80□□/103F7853-80□□/103F7853-80XB41
Source voltage : AC100V•Winding current : 1.5A/phase
— Getaway torque($J_{L1}=7.4 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current($T_L=\text{MAX}$) --- Source current($T_L=0$)
fs : Maximum self-start frequency when not loaded
■ 1-division is specified ■ 2-division is specified

● WP13M781□ / WP13F781□ / WP13F781S-XB : 200V



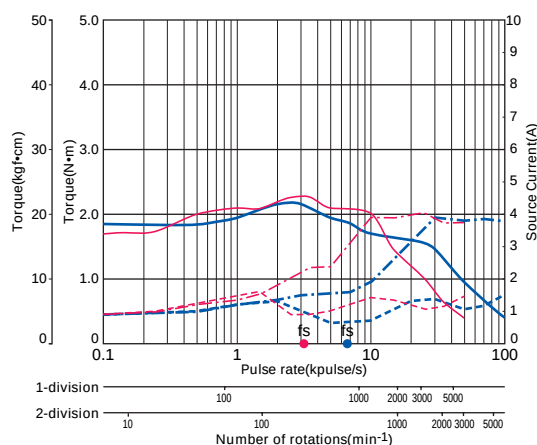
103M7851-80□□/103F7851-80□□/103F7851-80XB41
Source voltage : AC200V•Winding current : 1.5A/phase
— Getaway torque($J_{L1}=2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current($T_L=\text{MAX}$) --- Source current($T_L=0$)
fs : Maximum self-start frequency when not loaded
■ 1-division is specified ■ 2-division is specified

● WP13M782□ / WP13F782□ / WP13F782S-XB : 200V



103M7852-80□□/103F7852-80□□/103F7852-80XB41
Source voltage : AC200V•Winding current : 1.5A/phase
— Getaway torque($J_{L1}=2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current($T_L=\text{MAX}$) --- Source current($T_L=0$)
fs : Maximum self-start frequency when not loaded
■ 1-division is specified ■ 2-division is specified

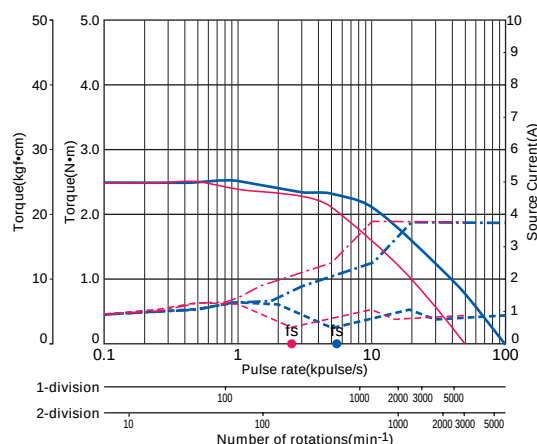
● WP13M783□ / WP13F783□ / WP13F783S-XB : 200V



103M7853-80□□/103F7853-80□□/103F7853-80XB41
Source voltage : AC200V•Winding current : 1.5A/phase
— Getaway torque($J_{L1}=7.4 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current($T_L=\text{MAX}$) --- Source current($T_L=0$)
fs : Maximum self-start frequency when not loaded
■ 1-division is specified ■ 2-division is specified

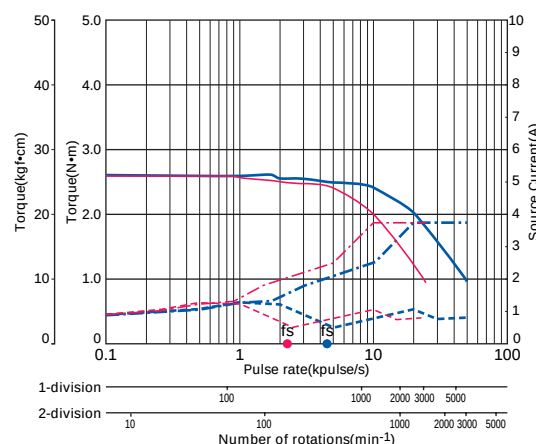
Pulse rate-torque characteristics/pulse rate-source current characteristics

● WP13M851 / WP13F851 / WP13F851S-XB : 100V



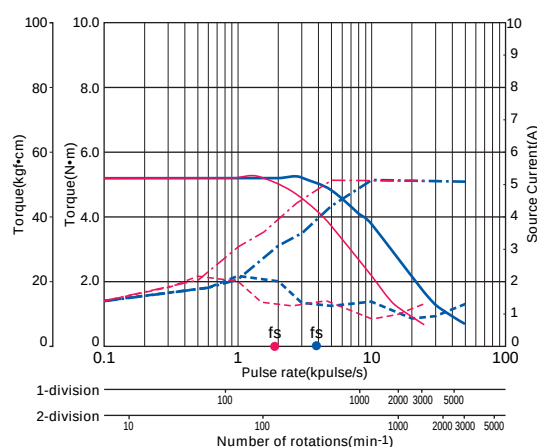
103M8581-80 / 103F8581-80 / 103F8581-80XB41
Source voltage : AC100V • Winding current : 1.5A/phase
— Getaway torque ($J_{L1}=7.4 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
- - - Source current (TL=MAX) - - - Source current (TL=0)
fs : Maximum self-start frequency when not loaded
■ 1-division is specified ■ 2-division is specified

● WP13M851 / WP13F851 / WP13F851S-XB : 200V



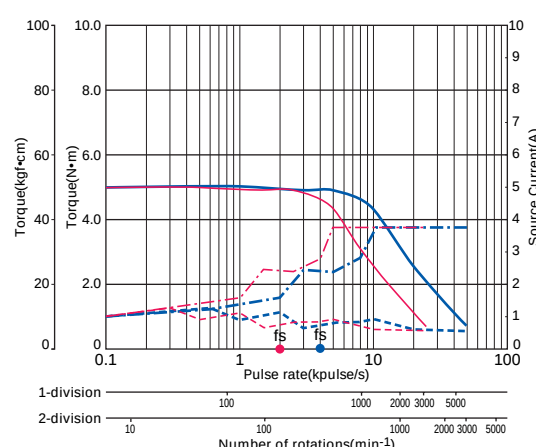
103M8581-80 / 103F8581-80 / 103F8581-80XB41
Source voltage : AC200V • Winding current : 1.5A/phase
— Getaway torque ($J_{L1}=7.4 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
- - - Source current (TL=MAX) - - - Source current (TL=0)
fs : Maximum self-start frequency when not loaded
■ 1-division is specified ■ 2-division is specified

● WP13M852 / WP13F852 / WP13F852S-XB : 100V



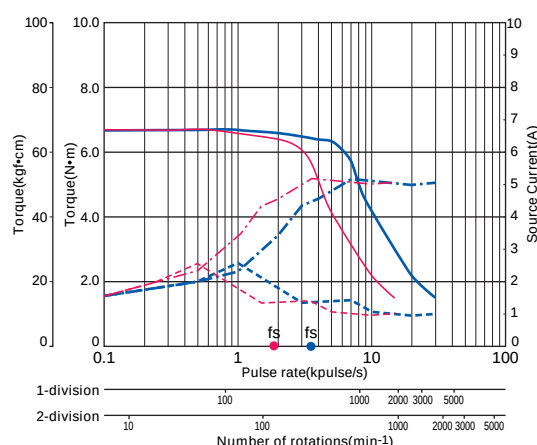
103M8582-80 / 103F8582-80 / 103F8582-80XB41
Source voltage : AC100V • Winding current : 1.5A/phase
— Getaway torque ($J_{L1}=15.1 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
- - - Source current (TL=MAX) - - - Source current (TL=0)
fs : Maximum self-start frequency when not loaded
■ 1-division is specified ■ 2-division is specified

● WP13M852 / WP13F852 / WP13F852S-XB : 200V



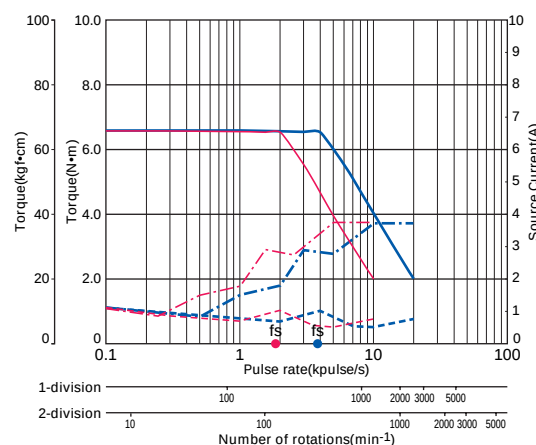
103M8582-80 / 103F8582-80 / 103F8582-80XB41
Source voltage : AC200V • Winding current : 1.5A/phase
— Getaway torque ($J_{L1}=15.1 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
- - - Source current (TL=MAX) - - - Source current (TL=0)
fs : Maximum self-start frequency when not loaded
■ 1-division is specified ■ 2-division is specified

● WP13M853 / WP13F853 / WP13F853S-XB : 100V



103M8583-80 / 103F8583-80 / 103F8583-80XB41
Source voltage : AC100V • Winding current : 1.5A/phase
— Getaway torque ($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
- - - Source current (TL=MAX) - - - Source current (TL=0)
fs : Maximum self-start frequency when not loaded
■ 1-division is specified ■ 2-division is specified

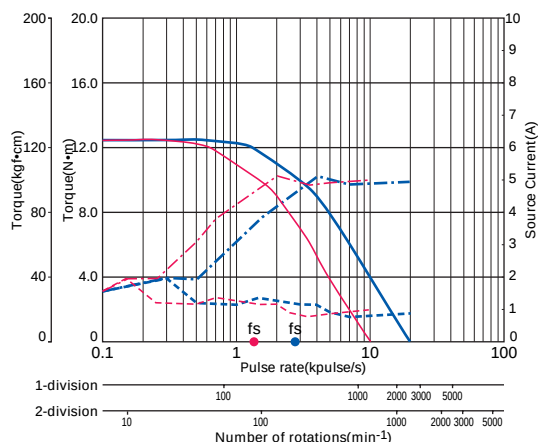
● WP13M853 / WP13F853 / WP13F853S-XB : 200V



103M8583-80 / 103F8583-80 / 103F8583-80XB41
Source voltage : AC200V • Winding current : 1.5A/phase
— Getaway torque ($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
- - - Source current (TL=MAX) - - - Source current (TL=0)
fs : Maximum self-start frequency when not loaded
■ 1-division is specified ■ 2-division is specified

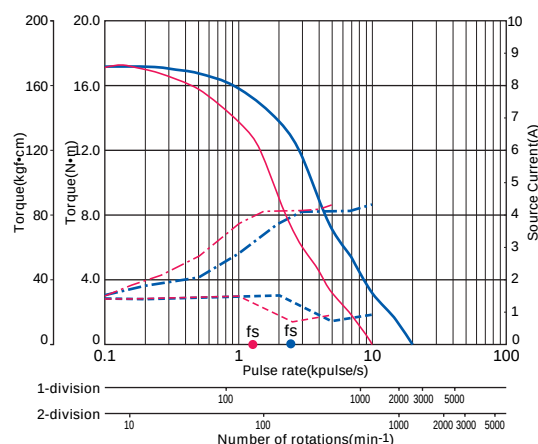
Pulse rate-torque characteristics/pulse rate-source current characteristics

● WP13M892 / WP13F892 : 100V



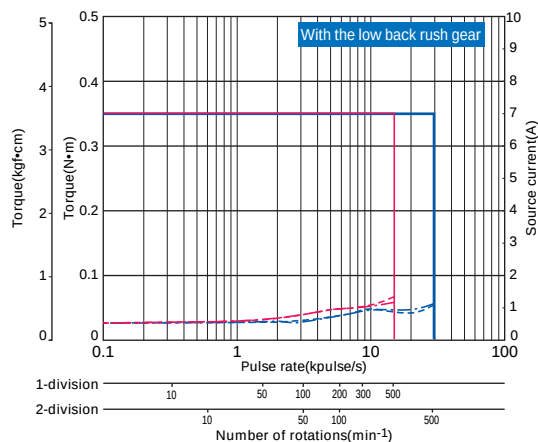
103M89582-80□□/103F89582-80□□
Source voltage : AC100V•Winding current : 1.5A/phase
— Getaway torque($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current($T_L=\text{MAX}$) --- Source current($T_L=0$)
fs : Maximum self-start frequency when not loaded
■ 1-division is specified ■ 2-division is specified

● WP13M893 / WP13F893 : 100V



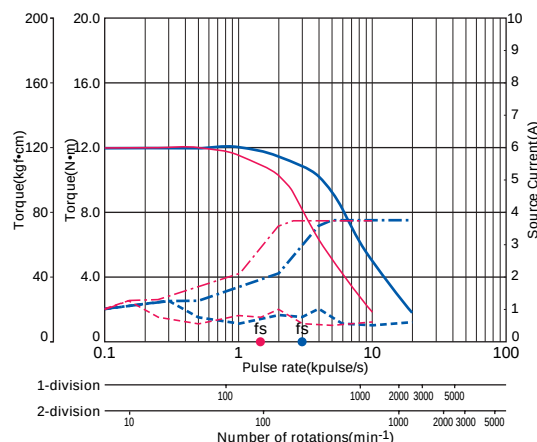
103M89583-80□□/103F89583-80□□
Source voltage : AC100V•Winding current : 1.5A/phase
— Getaway torque($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current($T_L=\text{MAX}$) --- Source current($T_L=0$)
fs : Maximum self-start frequency when not loaded
■ 1-division is specified ■ 2-division is specified

● WP12F551 -CX3.6 : 100V



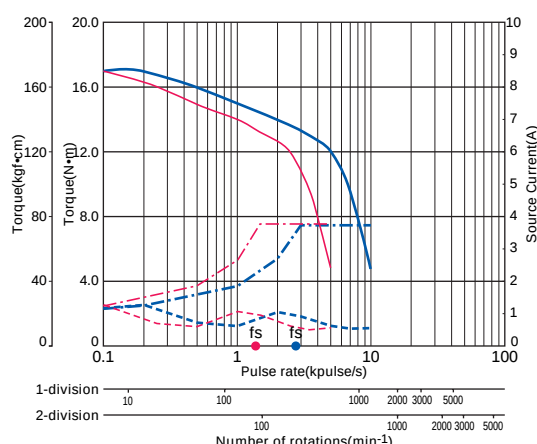
103F5505-70CXA□
Source voltage : AC100V•Winding current : 0.75A/phase
— Allowable torque($J_{L1}=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current($T_L=\text{MAX}$) --- Source current($T_L=0$)
■ 1-division is specified ■ 2-division is specified

● WP13M892 / WP13F892 : 200V



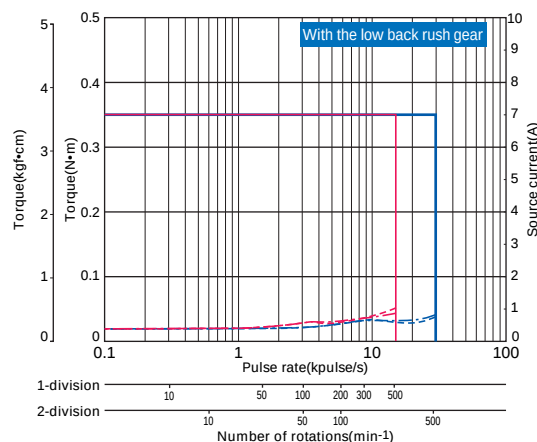
103M89582-80□□/103F89582-80□□
Source voltage : AC200V•Winding current : 1.5A/phase
— Getaway torque($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current($T_L=\text{MAX}$) --- Source current($T_L=0$)
fs : Maximum self-start frequency when not loaded
■ 1-division is specified ■ 2-division is specified

● WP13M893 / WP13F893 : 200V



103M89583-80□□/103F89583-80□□
Source voltage : AC200V•Winding current : 1.5A/phase
— Getaway torque($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current($T_L=\text{MAX}$) --- Source current($T_L=0$)
fs : Maximum self-start frequency when not loaded
■ 1-division is specified ■ 2-division is specified

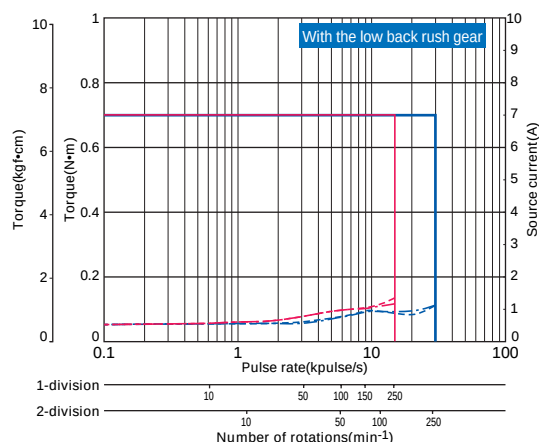
● WP12F551 -CX3.6 : 200V



103F5505-70CXA□
Source voltage : AC200V•Winding current : 0.75A/phase
— Allowable torque($J_{L1}=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current($T_L=\text{MAX}$) --- Source current($T_L=0$)
■ 1-division is specified ■ 2-division is specified

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

● WP12F551□-CX7.2 : 100V



103F5505-70CXB□

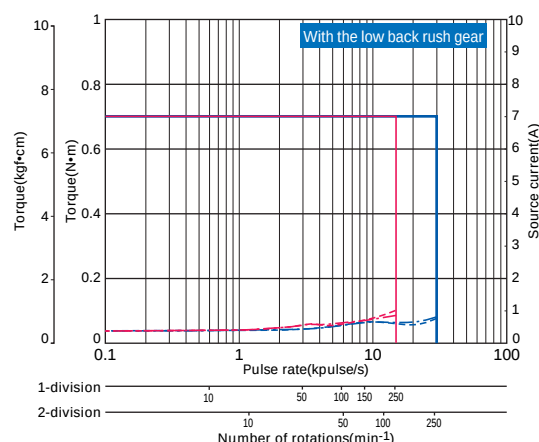
Source voltage : AC100V•Winding current : 0.75A/phase

— Allowable torque($J_{L1}=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ 1-division is specified ■ 2-division is specified

● WP12F551□-CX7.2 : 200V



103F5505-70CXA□

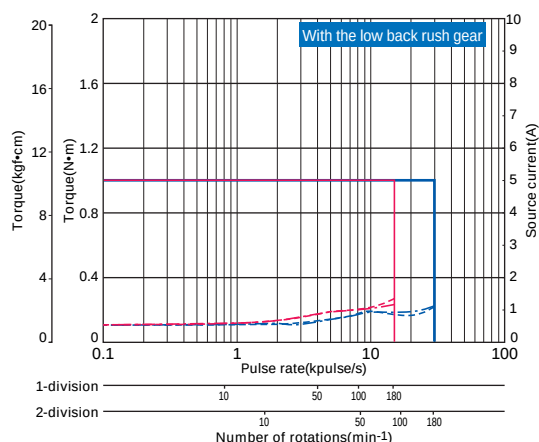
Source voltage : AC200V•Winding current : 0.75A/phase

— Allowable torque($J_{L1}=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ 1-division is specified ■ 2-division is specified

● WP12F551□-CX10 : 100V



103F5505-70CXE□

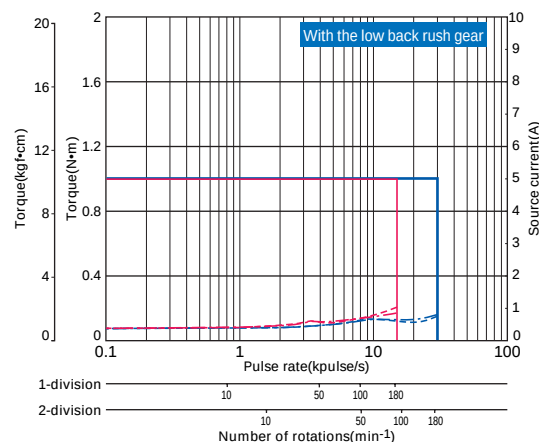
Source voltage : AC100V•Winding current : 0.75A/phase

— Allowable torque($J_{L1}=2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ 1-division is specified ■ 2-division is specified

● WP12F551□-CX10 : 200V



103F5505-70CXE□

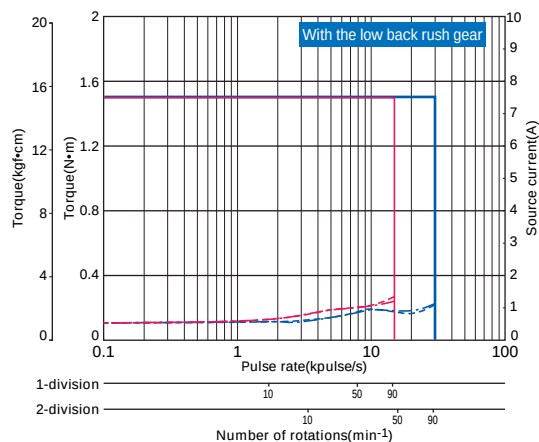
Source voltage : AC200V•Winding current : 0.75A/phase

— Allowable torque($J_{L1}=2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ 1-division is specified ■ 2-division is specified

● WP12F551□-CX20 : 100V



103F5505-70CXG□

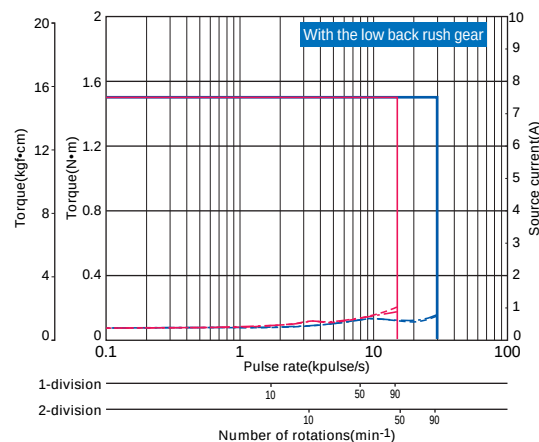
Source voltage : AC100V•Winding current : 0.75A/phase

— Allowable torque($J_{L1}=2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ 1-division is specified ■ 2-division is specified

● WP12F551□-CX20 : 200V



103F5505-70CXG□

Source voltage : AC200V•Winding current : 0.75A/phase

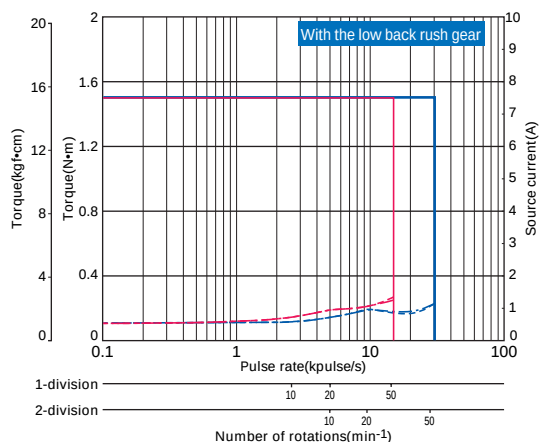
— Allowable torque($J_{L1}=2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ 1-division is specified ■ 2-division is specified

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

● WP12F551□-CX30 : 100V



103F5505-70CXJ□

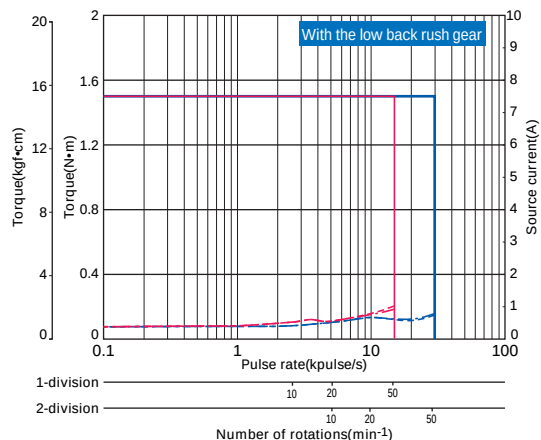
Source voltage : AC100V·Winding current : 0.75A/phase

— Allowable torque($J_{L1}=2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ 1-division is specified ■ 2-division is specified

● WP12F551□-CX30 : 200V



103F5505-70CXJ□

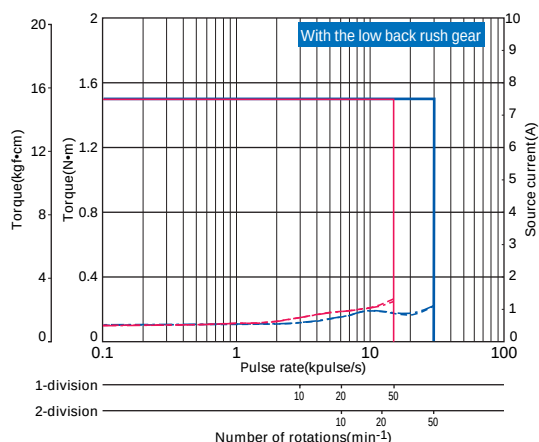
Source voltage : AC200V·Winding current : 0.75A/phase

— Allowable torque($J_{L1}=2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ 1-division is specified ■ 2-division is specified

● WP12F551□-CX36 : 100V



103F5505-70CXK□

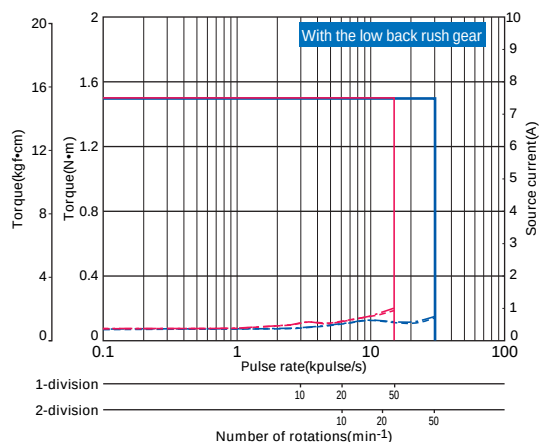
Source voltage : AC100V·Winding current : 0.75A/phase

— Allowable torque($J_{L1}=2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ 1-division is specified ■ 2-division is specified

● WP12F551□-CX36 : 200V



103F5505-70CXK□

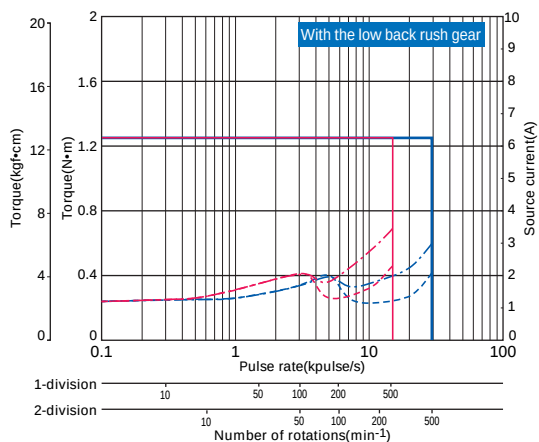
Source voltage : AC200V·Winding current : 0.75A/phase

— Allowable torque($J_{L1}=2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ 1-division is specified ■ 2-division is specified

● WP13F781□-CX3.6 : 100V



103F7851-80CXA□

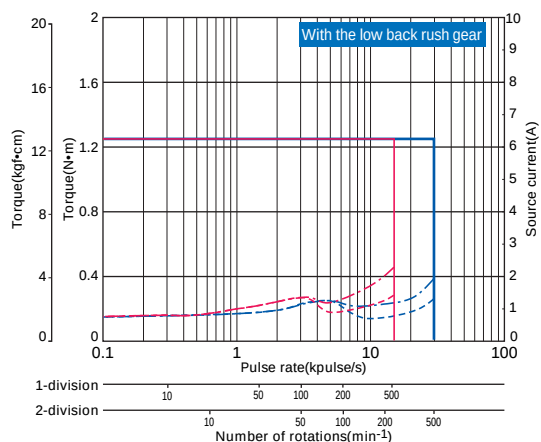
Source voltage : AC100V·Winding current : 1.5A/phase

— Allowable torque($J_{L1}=2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ 1-division is specified ■ 2-division is specified

● WP13F781□-CX3.6 : 200V



103F7851-80CXA□

Source voltage : AC200V·Winding current : 1.5A/phase

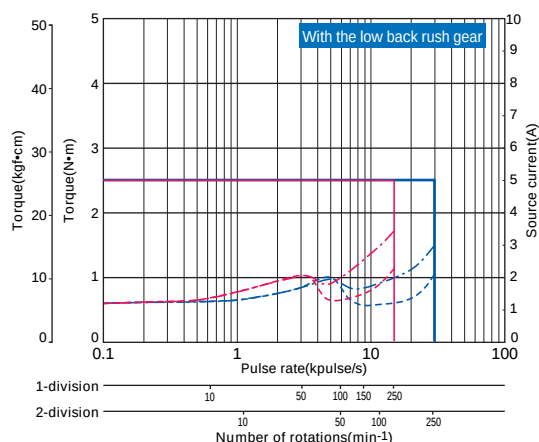
— Allowable torque($J_{L1}=3.6 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ 1-division is specified ■ 2-division is specified

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

● WP13F781□-CX7.2 : 100V



103F7851-80CXB□

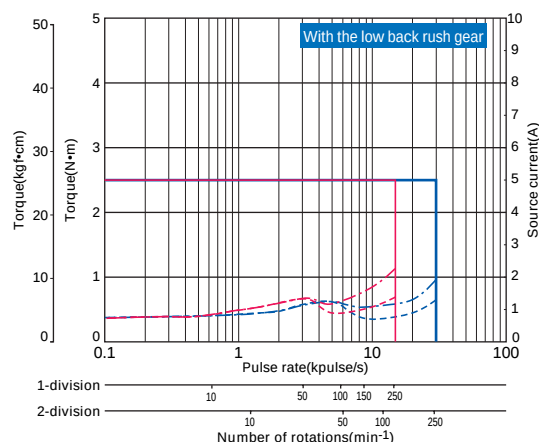
Source voltage : AC100V•Winding current : 1.5A/phase

— Allowable torque($J_{L1}=7.2 \times 10^{-4} \text{kg} \cdot \text{m}^2$) Uses rubber coupling)

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

■ 1-division is specified ■ 2-division is specified

● WP13F781□-CX7.2 : 200V



103F7851-80CXB□

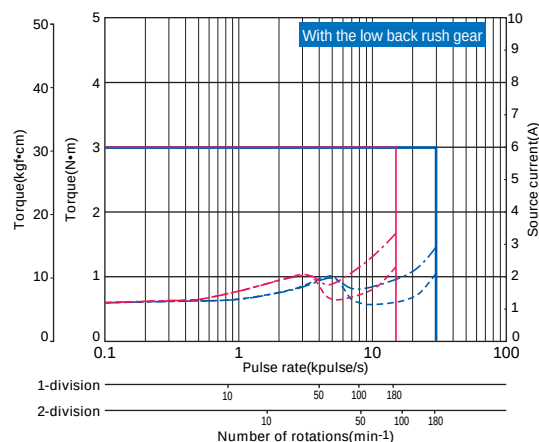
Source voltage : AC200V•Winding current : 1.5A/phase

— Allowable torque($J_{L1}=7.2 \times 10^{-4} \text{kg} \cdot \text{m}^2$) Uses rubber coupling)

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

■ 1-division is specified ■ 2-division is specified

● WP13F781□-CX10 : 100V



103F7851-80CXE□

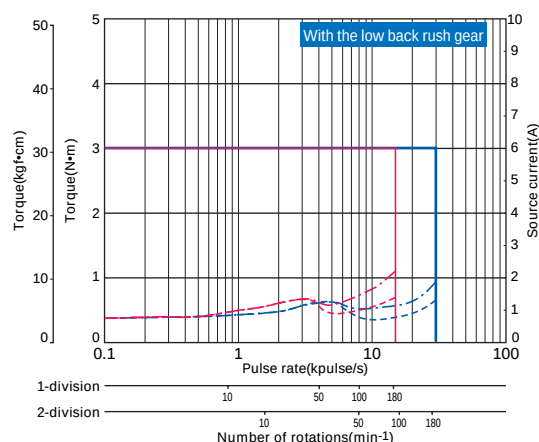
Source voltage : AC100V•Winding current : 1.5A/phase

— Allowable torque($J_{L1}=7.2 \times 10^{-4} \text{kg} \cdot \text{m}^2$) Uses rubber coupling)

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

■ 1-division is specified ■ 2-division is specified

● WP13F781□-CX10 : 200V



103F7851-80CXE□

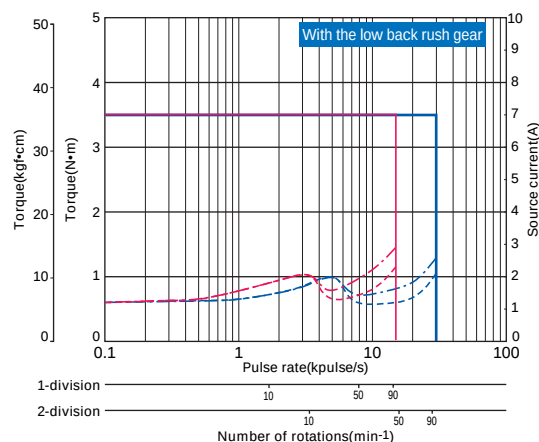
Source voltage : AC200V•Winding current : 1.5A/phase

— Allowable torque($J_{L1}=7.2 \times 10^{-4} \text{kg} \cdot \text{m}^2$) Uses rubber coupling)

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

■ 1-division is specified ■ 2-division is specified

● WP13F781□-CX20 : 100V



103F7851-80CXG□

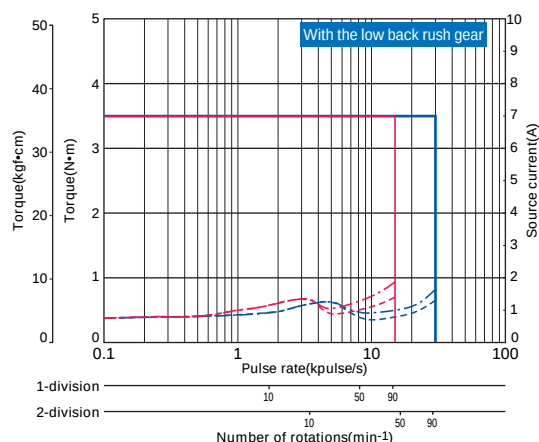
Source voltage : AC100V•Winding current : 1.5A/phase

— Allowable torque($J_{L1}=15.1 \times 10^{-4} \text{kg} \cdot \text{m}^2$) Uses rubber coupling)

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

■ 1-division is specified ■ 2-division is specified

● WP13F781□-CX20 : 200V



103F7851-80CXG□

Source voltage : AC200V•Winding current : 1.5A/phase

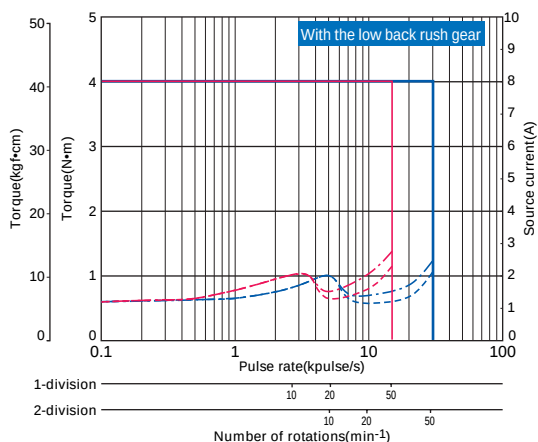
— Allowable torque($J_{L1}=15.1 \times 10^{-4} \text{kg} \cdot \text{m}^2$) Uses rubber coupling)

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

■ 1-division is specified ■ 2-division is specified

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

● WP13F781-CX30 : 100V



103F7851-80CXJ

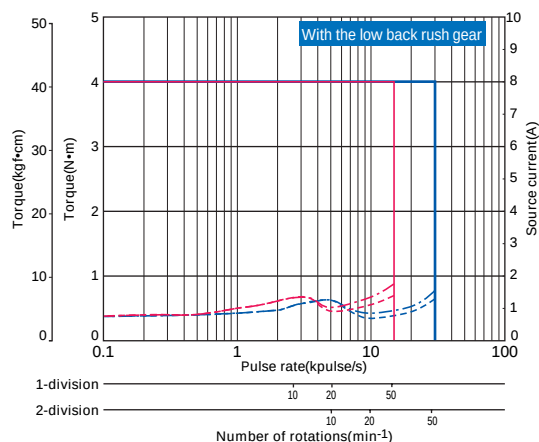
Source voltage : AC100V·Winding current : 1.5A/phase

— Allowable torque($J_{L1}=15.1 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ 1-division is specified ■ 2-division is specified

● WP13F781-CX30 : 200V



103F7851-80CXJ

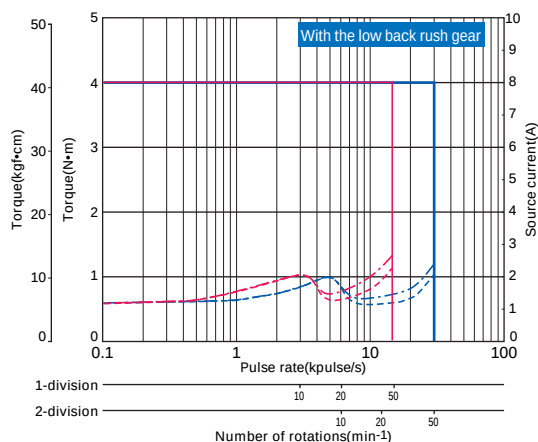
Source voltage : AC200V·Winding current : 1.5A/phase

— Allowable torque($J_{L1}=15.1 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ 1-division is specified ■ 2-division is specified

● WP13F781-CX36 : 100V



103F7851-80CXK

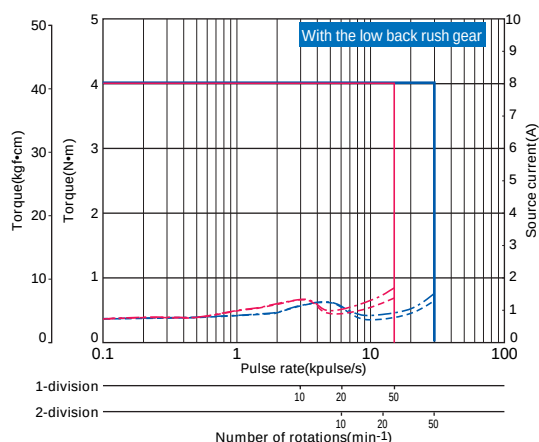
Source voltage : AC100V·Winding current : 1.5A/phase

— Allowable torque($J_{L1}=15.1 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ 1-division is specified ■ 2-division is specified

● WP13F781-CX36 : 200V



103F7851-80CXK

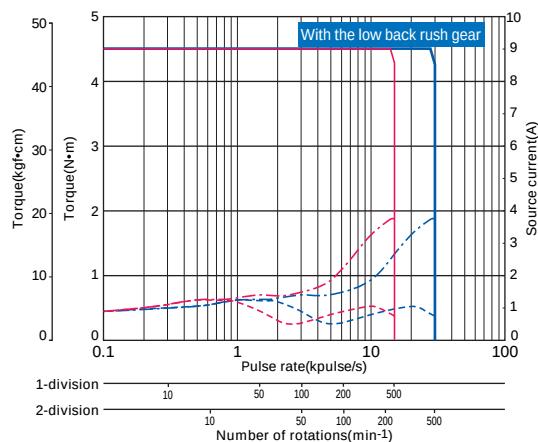
Source voltage : AC200V·Winding current : 1.5A/phase

— Allowable torque($J_{L1}=15.1 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ 1-division is specified ■ 2-division is specified

● WP13F851-CX3.6 : 100V



103F8581-80CXA

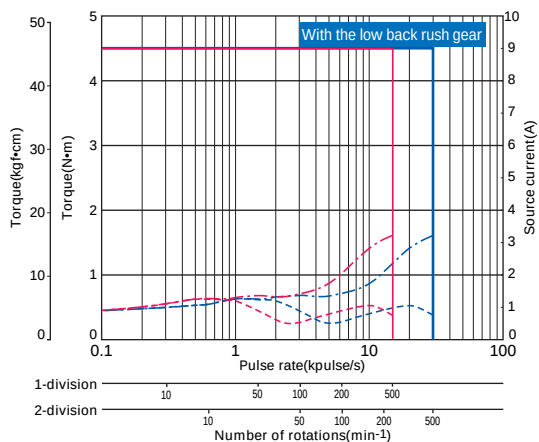
Source voltage : AC100V·Winding current : 1.5A/phase

— Allowable torque($J_{L1}=15.1 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ 1-division is specified ■ 2-division is specified

● WP13F851-CX3.6 : 200V



103F8581-80CXA

Source voltage : AC200V·Winding current : 1.5A/phase

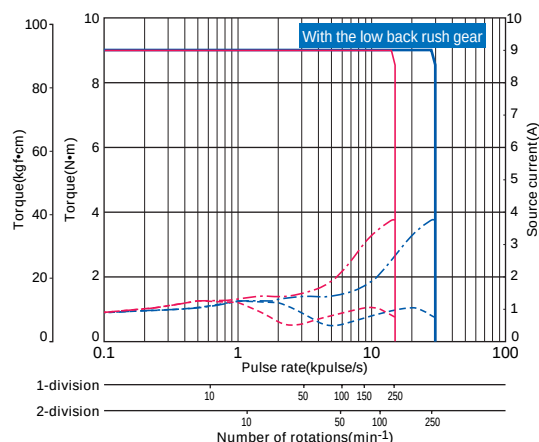
— Allowable torque($J_{L1}=15.1 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ 1-division is specified ■ 2-division is specified

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

● WP13F851□-CX7.2 : 100V



103F8581-80CX8□

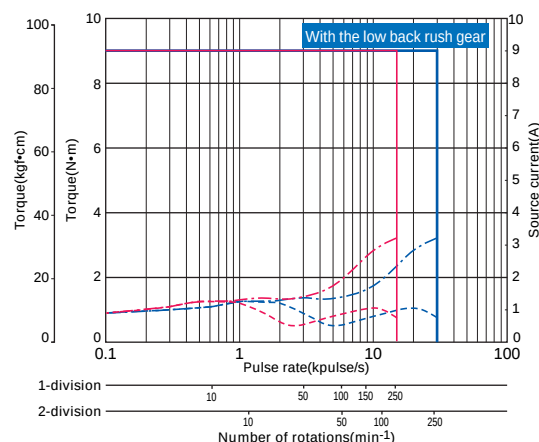
Source voltage : AC100V•Winding current : 1.5A/phase

— Allowable torque($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ 1-division is specified ■ 2-division is specified

● WP13F851□-CX7.2 : 200V



103F8581-80CX8□

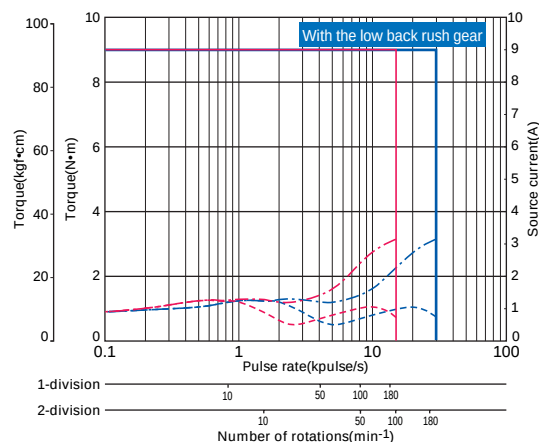
Source voltage : AC200V•Winding current : 1.5A/phase

— Allowable torque($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ 1-division is specified ■ 2-division is specified

● WP13F851□-CX10 : 100V



103F8581-80CX8□

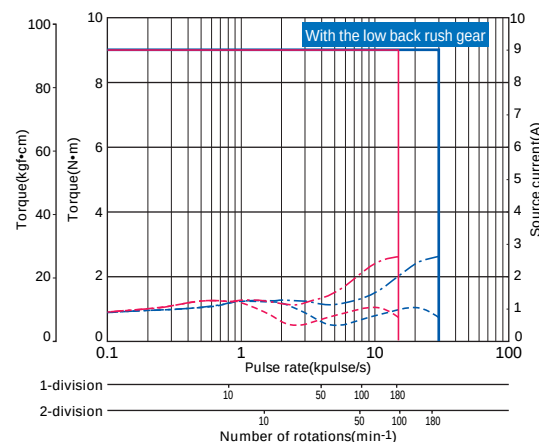
Source voltage : AC100V•Winding current : 1.5A/phase

— Allowable torque($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ 1-division is specified ■ 2-division is specified

● WP13F851□-CX10 : 200V



103F8581-80CX8□

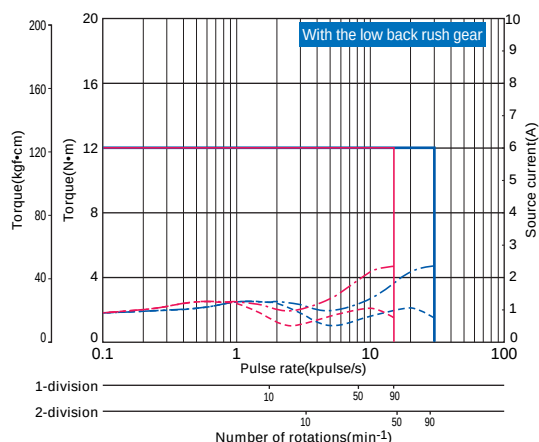
Source voltage : AC200V•Winding current : 1.5A/phase

— Allowable torque($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ 1-division is specified ■ 2-division is specified

● WP13F851□-CX20 : 100V



103F8581-80CXG□

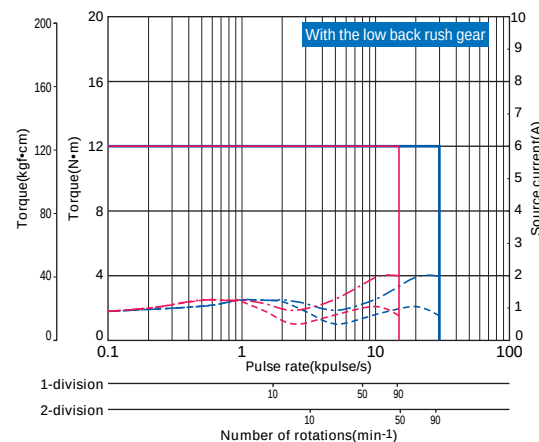
Source voltage : AC100V•Winding current : 1.5A/phase

— Allowable torque($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ 1-division is specified ■ 2-division is specified

● WP13F851□-CX20 : 200V



103F8581-80CXG□

Source voltage : AC200V•Winding current : 1.5A/phase

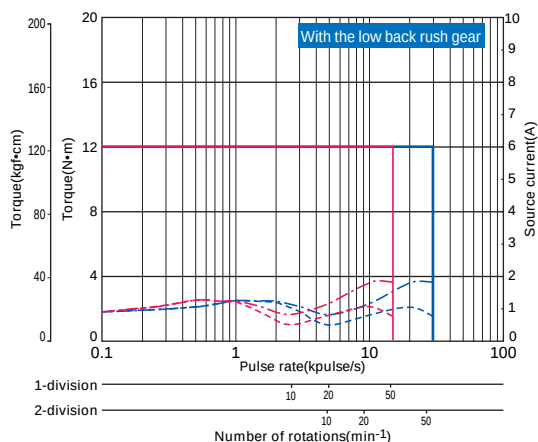
— Allowable torque($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ 1-division is specified ■ 2-division is specified

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

● WP13F851□-CX30 : 100V



103F8581-80CXJ□

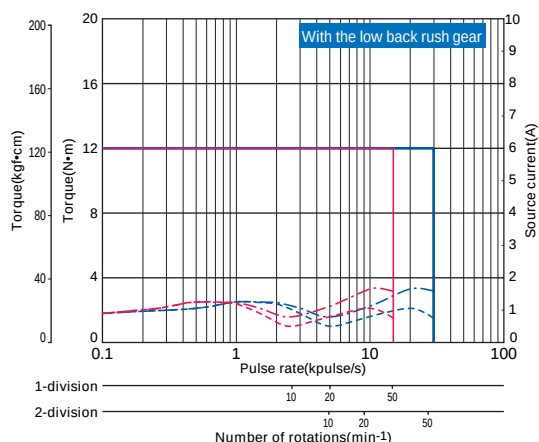
Source voltage : AC100V•Winding current : 1.5A/phase

— Allowable torque ($JL1=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

--- Source current ($TL=MAX$) --- Source current ($TL=0$)

■ 1-division is specified ■ 2-division is specified

● WP13F851□-CX30 : 200V



103F8581-80CXJ□

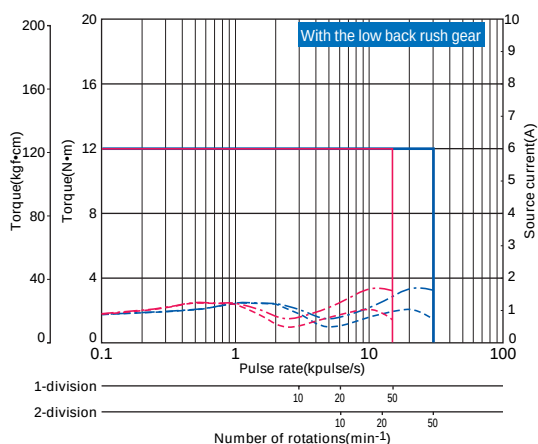
Source voltage : AC200V•Winding current : 1.5A/phase

— Allowable torque ($JL1=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

--- Source current ($TL=MAX$) --- Source current ($TL=0$)

■ 1-division is specified ■ 2-division is specified

● WP13F851□-CX36 : 100V



103F8581-80CXK□

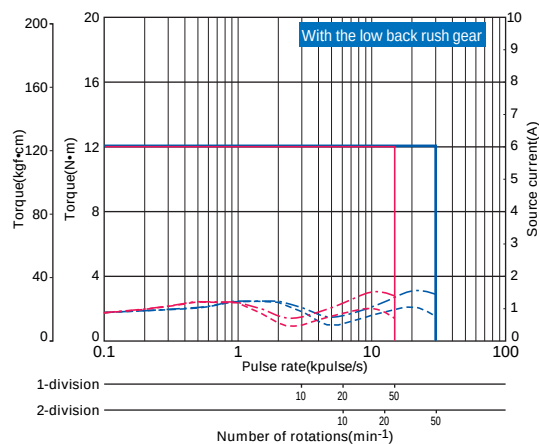
Source voltage : AC100V•Winding current : 1.5A/phase

— Allowable torque ($JL1=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

--- Source current ($TL=MAX$) --- Source current ($TL=0$)

■ 1-division is specified ■ 2-division is specified

● WP13F851□-CX36 : 200V



103F8581-80CXK□

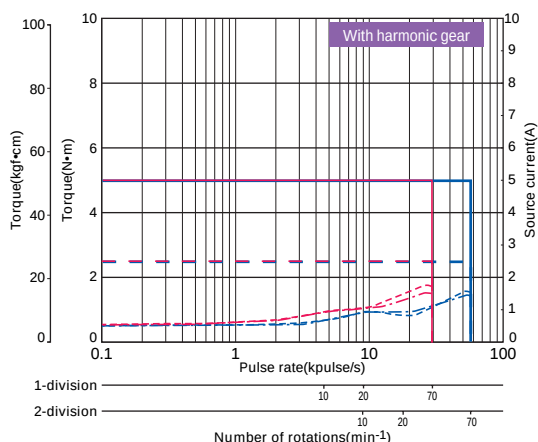
Source voltage : AC200V•Winding current : 1.5A/phase

— Allowable torque ($JL1=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

--- Source current ($TL=MAX$) --- Source current ($TL=0$)

■ 1-division is specified ■ 2-division is specified

● WP12F551□-HX50 : 100V



103F5505-70HXL□ ■ 1-division is specified ■ 2-division is specified

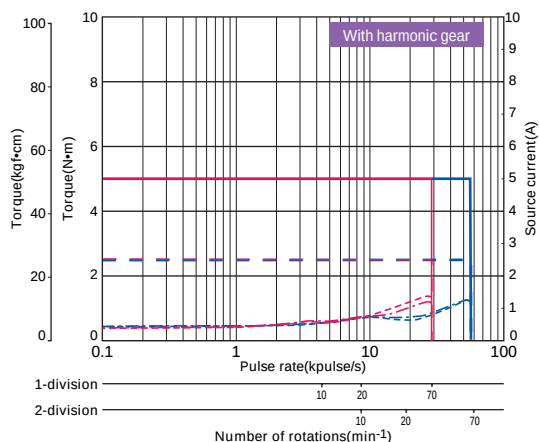
Source voltage : AC100V•Winding current : 0.75A/phase

— Instantaneous allowable torque ($JL1=15.1 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

--- Allowable torque ($JL1=15.1 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

--- Source current ($TL=MAX$) --- Source current ($TL=0$)

● WP12F551□-HX50 : 200V



103F5505-70HXL□ ■ 1-division is specified ■ 2-division is specified

Source voltage : AC200V•Winding current : 0.75A/phase

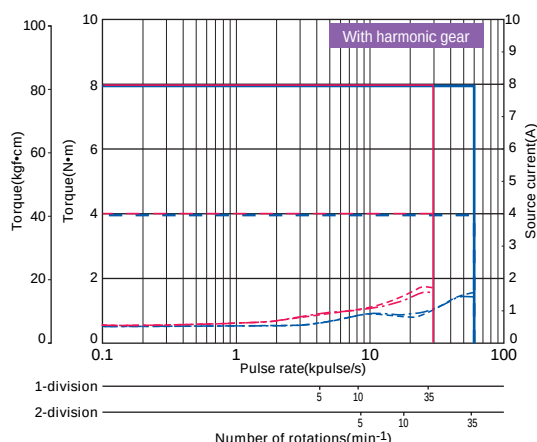
— Instantaneous allowable torque ($JL1=15.1 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

--- Allowable torque ($JL1=15.1 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

--- Source current ($TL=MAX$) --- Source current ($TL=0$)

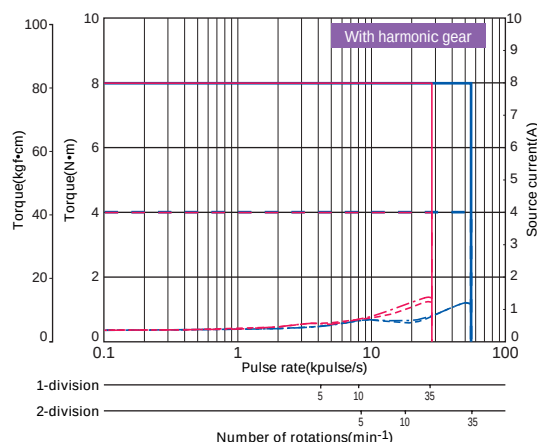
Pulse rate-torque characteristics/pulse rate-source current characteristics

● WP12F551□-HX100 : 100V



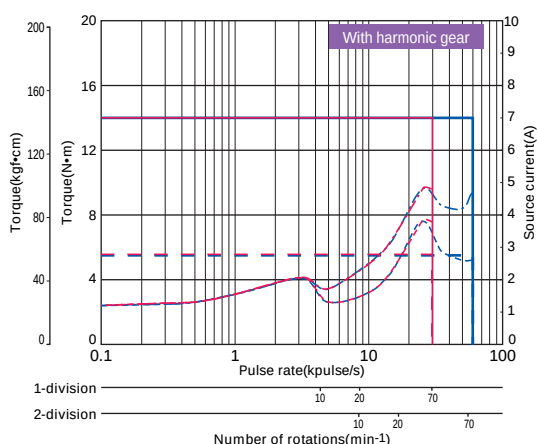
103F5505-70HXM□ ■ 1-division is specified ■ 2-division is specified
Source voltage : AC100V•Winding current : 0.75A/phase
— Instantaneous allowable torque ($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
-- Allowable torque ($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current (TL=MAX) --- Source current (TL=0)

● WP12F551□-HX100 : 200V



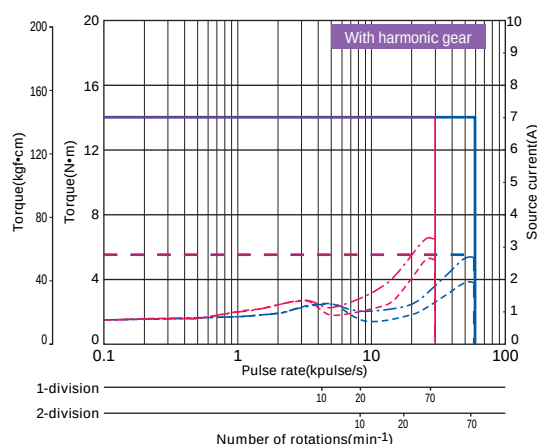
103F5505-70HXM□ ■ 1-division is specified ■ 2-division is specified
Source voltage : AC200V•Winding current : 0.75A/phase
— Instantaneous allowable torque ($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
-- Allowable torque ($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current (TL=MAX) --- Source current (TL=0)

● WP13F781□-HX50 : 100V



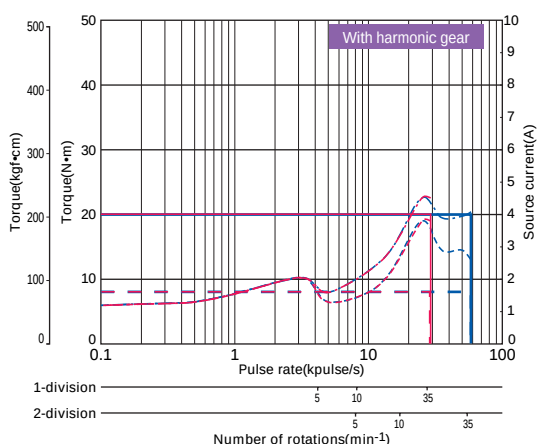
103F7851-80HXL□ ■ 1-division is specified ■ 2-division is specified
Source voltage : AC100V•Winding current : 1.5A/phase
— Instantaneous allowable torque ($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
-- Allowable torque ($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current (TL=MAX) --- Source current (TL=0)

● WP13F781□-HX50 : 200V



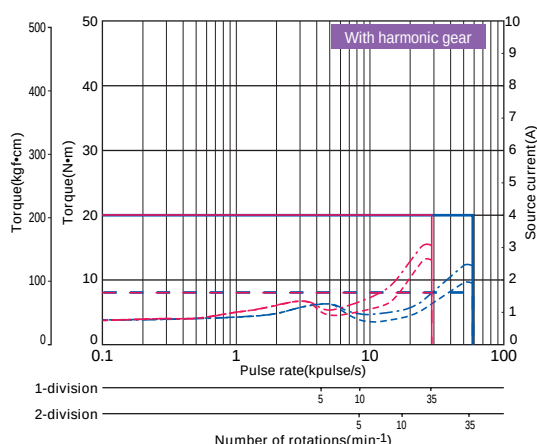
103F7851-80HXL□ ■ 1-division is specified ■ 2-division is specified
Source voltage : AC200V•Winding current : 1.5A/phase
— Instantaneous allowable torque ($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
-- Allowable torque ($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current (TL=MAX) --- Source current (TL=0)

● WP13F781□-HX100 : 100V



103F7851-80HXM□ ■ 1-division is specified ■ 2-division is specified
Source voltage : AC100V•Winding current : 1.5A/phase
— Instantaneous allowable torque ($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
-- Allowable torque ($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current (TL=MAX) --- Source current (TL=0)

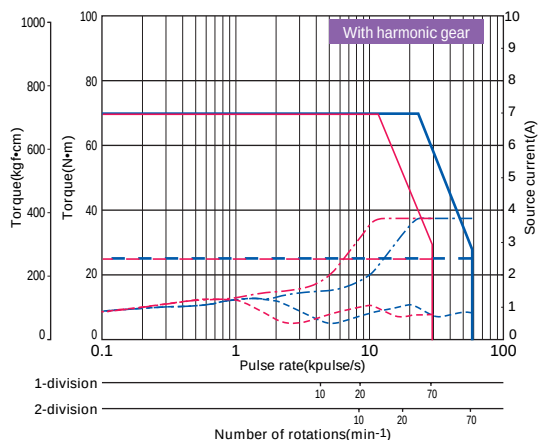
● WP13F781□-HX100 : 200V



103F7851-80HXM□ ■ 1-division is specified ■ 2-division is specified
Source voltage : AC200V•Winding current : 1.5A/phase
— Instantaneous allowable torque ($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
-- Allowable torque ($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current (TL=MAX) --- Source current (TL=0)

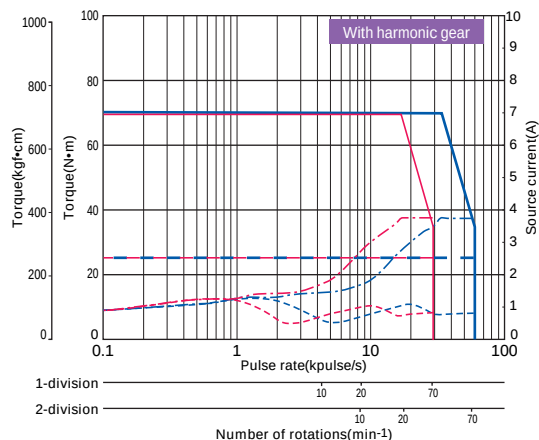
Pulse rate-torque characteristics/pulse rate-source current characteristics

● WP13F851□-HX50 : 100V



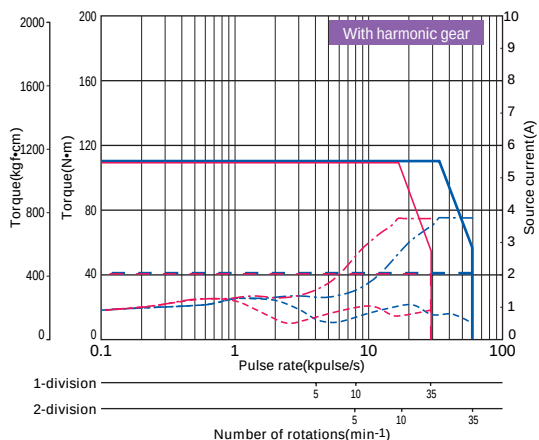
103F8581-80HX□ ■ 1-division is specified ■ 2-division is specified
Source voltage : AC100V•Winding current : 1.5A/phase
— Instantaneous allowable torque($JL1=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
-- Allowable torque ($JL1=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current(TL=MAX) --- Source current(TL=0)

● WP13F851□-HX50 : 200V



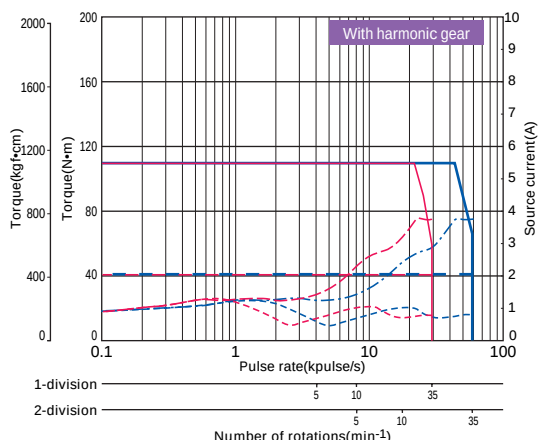
103F8581-80HX□ ■ 1-division is specified ■ 2-division is specified
Source voltage : AC200V•Winding current : 1.5A/phase
— Instantaneous allowable torque($JL1=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
-- Allowable torque ($JL1=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current(TL=MAX) --- Source current(TL=0)

● WP13F851□-HX100 : 100V

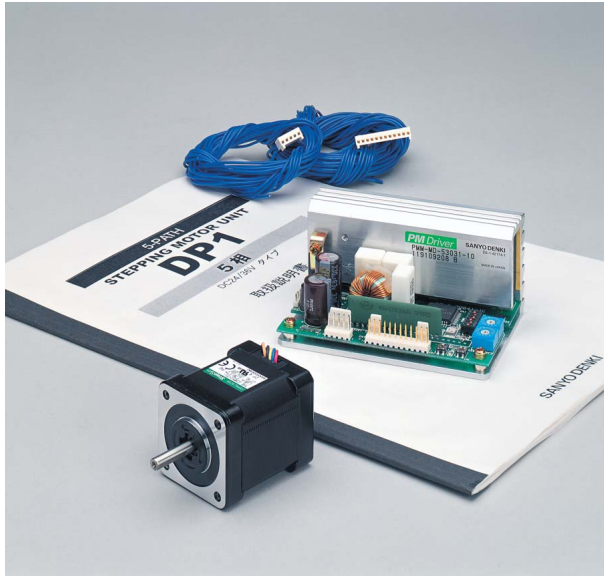


103F8581-80HXM□ ■ 1-division is specified ■ 2-division is specified
Source voltage : AC100V•Winding current : 1.5A/phase
— Instantaneous allowable torque($JL1=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
-- Allowable torque ($JL1=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current(TL=MAX) --- Source current(TL=0)

● WP13F851□-HX100 : 200V



103F8581-80HXM□ ■ 1-division is specified ■ 2-division is specified
Source voltage : AC200V•Winding current : 1.5A/phase
— Instantaneous allowable torque($JL1=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
-- Allowable torque ($JL1=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current(TL=MAX) --- Source current(TL=0)



The 5-phase Stepping Set

DP1 series

DC24V/36V

Micro-step (500 x 1 to 250 divisions)

Configuration of the 5-phase Stepping Motor Set, DP1 Series

Name	Quantity
DP1 Series Instruction Manual	1 pc.
PM Driver	1 pc.
Stepping Motor	1 pc.
Signal Cable (CN1A)	1 pc.
Power Connector (CN2)	1 pc.
Stepping Motor Power Line Connector (CN3)	1 pc.

Characteristics

- Micro-step function available**
 Smooth operation without vibration at low speeds can be realized.
- Flexible**
 This stepping system is able to drive wide variety of stepping motors from small capacity to large capacity without adjustment, resulting in wide applications.
- Compact**
 Mounting dedicated HIC realizes highly integrated and higher reliable system.

Built-in function

- Resolution setting function**
 16 types of resolution, ranging from one to 250 divisions, can be set for a standard stepping motor step angle by using rotary switches.
- Step angle selectable**
 Two types of micro step resolution can be selected through an external input signal.
- Pulse input system selection function**
 Either single input system or double input system can be selected, using a dipswitch.
- Power down function**
 Stepping motor current can be turned off through an external input signal.

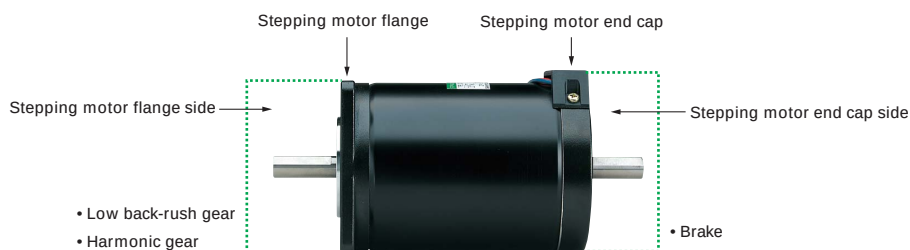
Explanation of set model number

① System on the stepping motor flange side

Code	Flange side	Deceleration ratio
G	Spur gear	1 / 3.6, 1 / 7.2, 1 / 10, 1 / 20, 1 / 30, 1 / 50
C	Low back-rush gear	1 / 3.6, 1 / 7.2, 1 / 10, 1 / 20, 1 / 30, 1 / 36
H	Harmonic gear	1 / 50, 1 / 100
X	None	

② System on the stepping motor end cap side

Code	End cap side	Function
B	Brake	Electromagnetic brake
E	Encoder	Please contact us regarding the encoder
X	None	



③ Deceleration ratio of gear system

Example: deceleration ratio 1 / 3.6 → 3.6

Explanation for model number in the combined case

The set model number of the stepping motor is as follows when PMM-MD-53030-10 and 103F5505 type are combined and equipped with the system of harmonic gear (1/100) and brake:

DP12F551D—H B 100

Standard set model number

③ Gear deceleration ratio (1/100)
 ② Brake
 ① Harmonic gear

How to order

Please use the "Set Model Number" in the List of Combined Stepping Motor Model Number for the 5-phase Stepping Set, DP1 Series.

To order gear, brake, and encoder, put the product code number after the set number according to the "Explanation of combination numbering" ①, ②, and ③.

PM driver specifications

Model number		PMM-MD-53030-10
Standard specification	Input source	DC24V / 36V±10%
	Source current	3A
	Operating ambient temperature	0 ~ +50°C
	Conservation temperature	-20 ~ +70°C
	Operating ambient humidity	35 ~ 85%RH (no condensation)
	Conservation humidity	10 ~ 90%RH (no condensation)
	Vibration resistance	0.5G Tested under the following conditions, frequency range: 10 to 55Hz, direction: along the X, Y, and Z axes, for 2 hours
	Impact resistance	Considering the NDS-C-0110 standard section 3.2.2 division "C", not influenced.
	Withstand voltage	Not influenced when applying AC500V between the power input terminal and cabinet for one minute.
	Insulation resistance	10 MΩ or more when applying DC500V between the power input terminal and cabinet.
Function	Weight	0.25kg
	Select function	Auto current down, pulse input system, step angle, power specification
	Command pulse input signal	Photo coupler input method, input resistance 330Ω Input signal voltage "H" level: 4.0 to 5.5V, "L" level: 0 to 0.5V Maximum input frequency 400 kpulse/s
	Power down input signal	Photo coupler input method, input resistance 330Ω Input signal voltage "H" level: 4.0 to 5.5V, "L" level: 0 to 0.5V
	Step angle selection	Photo coupler input method, input resistance 330Ω Input signal voltage "H" level: 4.0 to 5.5V, "L" level: 0 to 0.5V
I/O signals	Phase origin monitor output signal	Open collector output by photo coupler (ON when phase origin) Output signal standard, Vce0: 30V or less, Ic: 5 mA or less

* Refer to pages 237 and after for operation, connection, function, and dimensions of the PM driver.

Stepping motor specifications

Item	Combined stepping motors of "DP1" series
Insulation class	Class B (+130°C)
Withstand voltage	Conditions: AC1000V, 50/60 Hz, and for one minute
Insulation resistance	100 MΩ or more against DC500V
Vibration resistance	Conditions: amplitude 1.52 mm (P-P), frequency range 10 to 55 Hz, 5 minutes sweep time, along X, Y, and Z axes, for 2 hours
Impact resistance	Conditions: 98 m/s ² acceleration, 11 minutes duration, half-wave/sine wave, three times each along X, Y, and Z axes, 18 times in total
Operating ambient temperature	-10~+50°C
Operating ambient humidity	20~90%(no condensation)

Standard combined stepping motors for 5-phase stepping set "DP1" series

PM driver model numbers : PMM-MD-53030-10

Combination Model Number for STEPSYN F Series

System support	Dimensions of stepping motor	Single-axis shaft		Dual-axis shaft	
		Set model number	Standard combined stepping motor number	Set model number	Standard combined stepping motor number
Standard type	□ 28mm	DP12F351S	103F3505-7041	DP12F351D	103F3505-7011
		DP12F356S	103F3515-7041	DP12F356D	103F3515-7011
		DP12F551S	103F5505-7041	DP12F551D	103F5505-7011
	□ 42mm	DP12F552S	103F5508-7041	DP12F552D	103F5508-7011
		DP12F554S	103F5510-7041	DP12F554D	103F5510-7011
		DP12F781S	103F7851-7041	DP12F781D	103F7851-7011
	□ 60mm	DP12F782S	103F7852-7041	DP12F782D	103F7852-7011
		DP12F783S	103F7853-7041	DP12F783D	103F7853-7011
		DP12F551S-CX3.6	103F5505-70CXA4	DP12F551D-CX3.6	103F5505-70CXA1
Low back-rush gear	□ 42mm	DP12F551S-CX7.2	103F5505-70CXB4	DP12F551D-CX7.2	103F5505-70CXB1
		DP12F551S-CX10	103F5505-70CXE4	DP12F551D-CX10	103F5505-70CXE1
		DP12F551S-CX20	103F5505-70CXG4	DP12F551D-CX20	103F5505-70CXG1
		DP12F551S-CX30	103F5505-70CXJ4	DP12F551D-CX30	103F5505-70CXJ1
		DP12F551S-CX36	103F5505-70CXX4	DP12F551D-CX36	103F5505-70CXX1
		DP12F351S-HX50	103F3505-70HXL4	DP12F351D-HX50	103F3505-70HXL1
Harmonic gear	□ 28mm	DP12F351S-HX100	103F3505-70HXM4	DP12F351D-HX100	103F3505-70HXM1
		DP12F551S-HX50	103F5505-70HXL4	DP12F551D-HX50	103F5505-70HXL1
	□ 42mm	DP12F551S-HX100	103F5505-70HXM4	DP12F551D-HX100	103F5505-70HXM1
		DP12F351S-GX3.6	103F3505-70GXA4	DP12F351D-GX3.6	103F3505-70GXA1
Spur gear	□ 28mm	DP12F351S-GX7.2	103F3505-70GXB4	DP12F351D-GX7.2	103F3505-70GXB1
		DP12F351S-GX10	103F3505-70GXE4	DP12F351D-GX10	103F3505-70GXE1
		DP12F351S-GX20	103F3505-70GXG4	DP12F351D-GX20	103F3505-70GXG1
		DP12F351S-GX30	103F3505-70GXJ4	DP12F351D-GX30	103F3505-70GXJ1
		DP12F351S-GX50	103F3505-70GXL4	DP12F351D-GX50	103F3505-70GXL1
		DP12F551S-XB	103F5505-70XB41		
Electromagnetic brake	□ 42mm	DP12F552S-XB	103F5508-70XB41		
		DP12F554S-XB	103F5510-70XB41		

Note) Contact our sales department to order the system with an encoder and/or gear and brake.

Stepping motor data sheet

STEPSYN F Series (Standard)

Set model number	Single-axis shaft	DP12F351S	DP12F356S	DP12F551S	DP12F552S	DP12F554S
	Dual-axis shaft	DP12F351D	DP12F356D	DP12F551D	DP12F552D	DP12F554D
Holding torque	N•m	0.036	0.065	0.13	0.18	0.26
Rotor inertia	×10 ⁻⁴ kg•m ²	0.009	0.016	0.03	0.053	0.065
Weight	kg	0.11	0.2	0.23	0.28	0.37
Allowable thrust load	N	3	3	10	10	10
Allowable radial load	N	34	34	35	35	35

Set model number	Single-axis shaft	DP12F781S	DP12F782S	DP12F783S
	Dual-axis shaft	DP12F781D	DP12F782D	DP12F783D
Holding torque	N•m	0.6	0.93	1.79
Rotor inertia	×10 ⁻⁴ kg•m ²	0.275	0.4	0.84
Weight	kg	0.6	0.78	1.36
Allowable thrust load	N	20	20	20
Allowable radial load	N	80	80	80

Stepping motor data sheet

STEPSYN F Series (with low back rush gear)

Set model number	Single-axis shaft	DP12F551S-CX3.6	DP12F551S-CX7.2	DP12F551S-CX10	DP12F551S-CX20	DP12F551S-CX30	DP12F551S-CX36
	Dual-axis shaft	DP12F551D-CX3.6	DP12F551D-CX7.2	DP12F551D-CX10	DP12F551D-CX20	DP12F551D-CX30	DP12F551D-CX36
Allowable torque	N•m	0.35	0.7	1	1.5	1.5	1.5
Rotor inertia	$\times 10^{-4} \text{kg} \cdot \text{m}^2$	0.03					
Basic step angle	°	0.2	0.1	0.072	0.036	0.024	0.02
Deceleration ratio		1 : 3.6	1 : 7.2	1 : 10	1 : 20	1 : 30	1 : 36
Back rush	°	0.6	0.4	0.35	0.25	0.25	0.25
Allowable number of rotations	min^{-1}	500	250	180	90	60	50
Weight	kg	0.36					
Allowable thrust load	N	15					
Allowable radial load	N	20					

* The rotation direction of the motor and the gear output shaft is as follows: when deceleration ratio is 1:3.6, 1:7.2, or 1:10, both motor and shaft rotate in the same direction, and for 1:20 or 1:30 type, the motor and the shaft rotate in opposite direction.

STEPSYN F Series (With harmonic gear)

Set model number	Single-axis shaft	DP12F351S-HX50	DP12F351S-HX100
	Dual-axis shaft	DP12F351D-HX50	DP12F351D-HX100
Allowable torque	N•m	1.5	2
Rotor inertia	$\times 10^{-4} \text{kg} \cdot \text{m}^2$	0.012	
Basic step angle	°	0.0144	0.0072
Deceleration ratio		1 : 50	1 : 100
Lost motion	Minute	0.4~3 ($\pm 0.06 \text{ N} \cdot \text{m}$)	0.4~3 ($\pm 0.08 \text{ N} \cdot \text{m}$)
Allowable number of rotations	min^{-1}	500	250
Weight	kg	0.22	
Allowable thrust load	N	100	
Allowable radial load	N	200	

* The gear output shaft rotates in the opposite direction of the motor.

Set model number	Single-axis shaft	DP12F551S-HX50	DP12F551S-HX100
	Dual-axis shaft	DP12F551D-HX50	DP12F551D-HX100
Allowable torque	N•m	2.5	4
Rotor inertia	$\times 10^{-4} \text{kg} \cdot \text{m}^2$	0.042	
Basic step angle	°	0.0144	0.0072
Deceleration ratio		1 : 50	1 : 100
Lost motion	Minute	0.4~3 ($\pm 0.16 \text{ N} \cdot \text{m}$)	0.4~3 ($\pm 0.2 \text{ N} \cdot \text{m}$)
Allowable number of rotations	min^{-1}	500	250
Weight	kg	0.52	
Allowable thrust load	N	200	
Allowable radial load	N	250	

* The gear output shaft rotates in the opposite direction of the motor.

STEPSYN F Series (With spur gear)

Set model number	Single-axis shaft	DP12F351S-CX3.6	DP12F351S-CX7.2	DP12F351S-CX10	DP12F351S-CX20	DP12F351S-CX30	DP12F351S-CX50
	Dual-axis shaft	DP12F351D-CX3.6	DP12F351D-CX7.2	DP12F351D-CX10	DP12F351D-CX20	DP12F351D-CX30	DP12F351D-CX50
Allowable torque	N•m	0.1	0.15	0.2	0.35	0.5	0.5
Rotor inertia	$\times 10^{-4} \text{kg} \cdot \text{m}^2$	0.009					
Basic step angle	°	0.2	0.1	0.072	0.036	0.024	0.0144
Deceleration ratio		1 : 3.6	1 : 7.2	1 : 10	1 : 20	1 : 30	1 : 50
Back rush	Minute	2	2	2	1.5	1.5	1.5
Allowable number of rotations	min^{-1}	800	400	300	150	100	60
Weight	kg	0.17					
Allowable thrust load	N	10					
Allowable radial load	N	15					

* The rotation direction of the motor and the gear output shaft is as follows: when deceleration ratio is 1:3.6, 1:7.2, 1:20, 1:30, or 1:50, both motor and shaft rotate in the same direction, and for 1:10 type, the motor and the shaft rotate in opposite direction.

STEPSYN F Series (With electromagnetic brake)

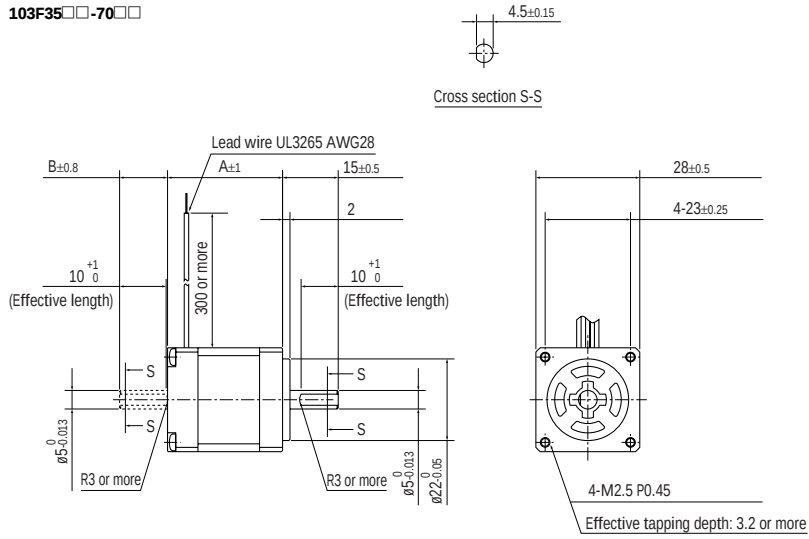
Set model number	Single-axis shaft	DP12F551S-XB	DP12F552S-XB	DP12F554S-XB
	Dual-axis shaft			
Holding torque	N•m	0.13	0.18	0.26
Rotor inertia	$\times 10^{-4} \text{kg} \cdot \text{m}^2$	0.045	0.068	0.08
Weight	kg	0.38	0.43	0.52
Allowable thrust load	N	10	10	10
Allowable radial load	N	35	35	35
Electromagnetic brake specification	Brake operation system	Non-excitation operation system		
	Source voltage	DC 24 $\pm$ 5%		
	Exciting current	0.08		
	Electric power consumption	2		
	Static friction torque	0.22		
	Brake operating time	30		
	Brake release time	20		

Dimensions (Unit: mm)

STEPSPYN F

DP12F35□□

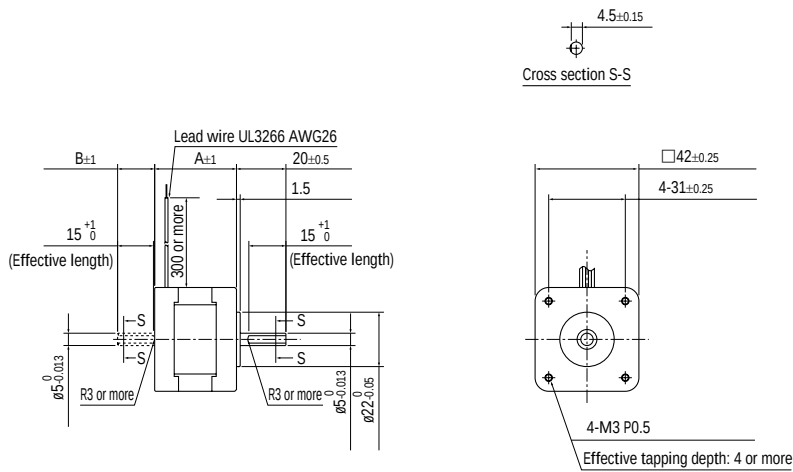
103F35□□-70□□



Model name	A	B
DP12F351S (103F3505-7041)	31.0	—
DP12F351D (103F3505-7011)	31.0	10
DP12F356S (103F3515-7041)	50.5	—
DP12F356D (103F3515-7011)	50.5	10

DP12F55□□

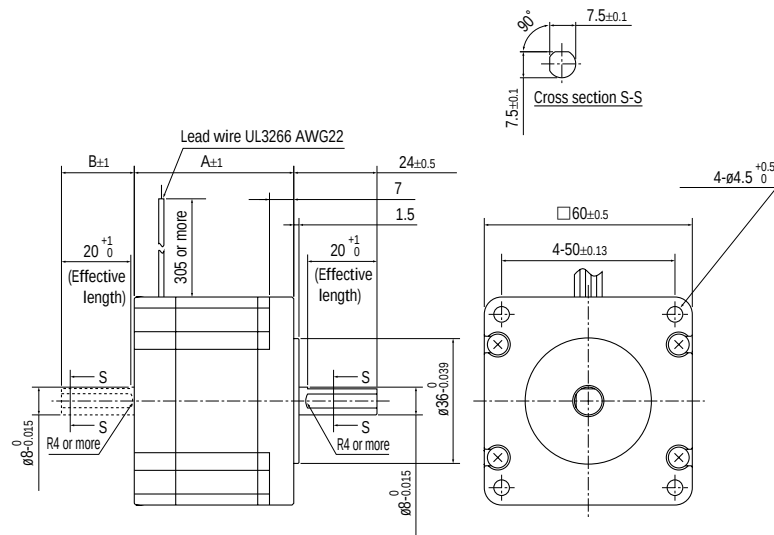
103F55□□-70□□



Model name	A	B
DP12F551S (103F5505-7041)	34	—
DP12F551D (103F5505-7011)	34	15
DP12F552S (103F5508-7041)	40	—
DP12F552D (103F5508-7011)	40	15
DP12F554S (103F5510-7041)	49	—
DP12F554D (103F5510-7011)	49	15

DP12F78□□

103F785□□-70□□



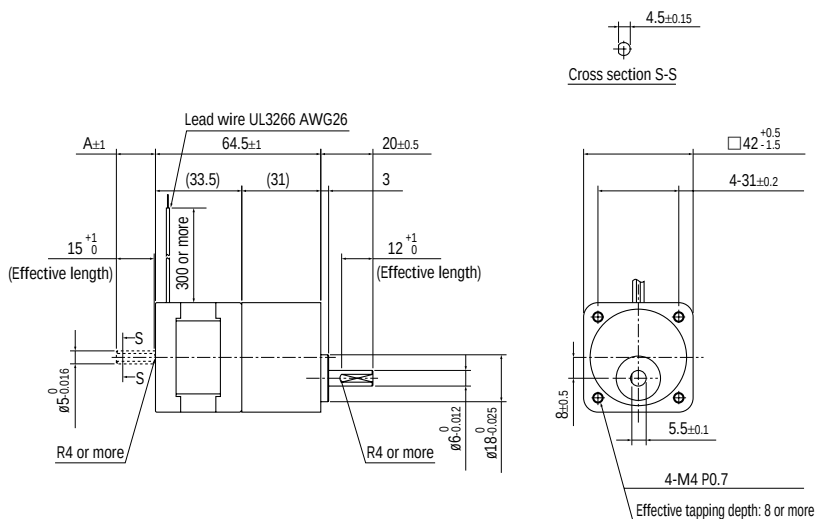
Model name	A	B
DP12F781S (103F7851-7041)	46.5	—
DP12F781D (103F7851-7011)	46.5	21
DP12F782S (103F7852-7041)	55	—
DP12F782D (103F7852-7011)	55	21
DP12F783S (103F7853-7041)	87.5	—
DP12F781D (103F7853-7011)	87.5	21

Dimensions (Unit: mm)

STEPSYN F with low back rush gear

DP12F551□-CX□□

103F5505-70CX□□

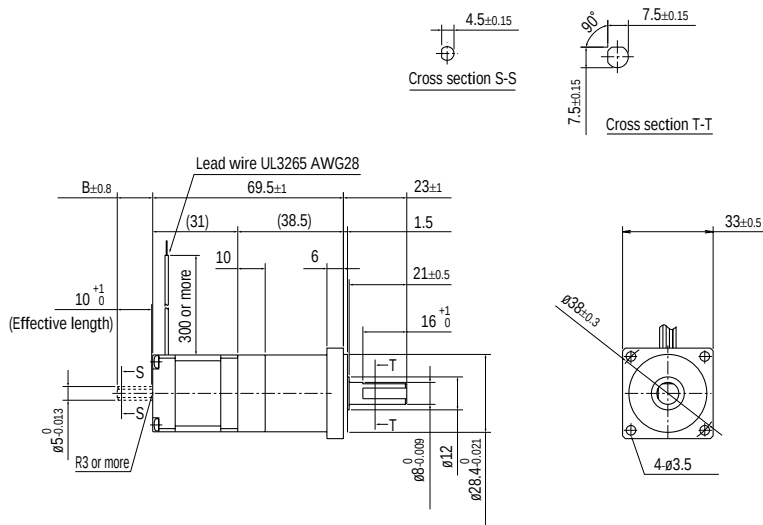


Model name	A
DP12F551S-CX3.6 (103F5505-70CXA4)	—
DP12F551D-CX3.6 (103F5505-70CXA1)	15
DP12F551S-CX7.2 (103F5505-70CXB4)	—
DP12F551D-CX7.2 (103F5505-70CXB1)	15
DP12F551S-CX10 (103F5505-70CXE4)	—
DP12F551D-CX10 (103F5505-70CXE1)	15
DP12F551S-CX20 (103F5505-70CXG4)	—
DP12F551D-CX20 (103F5505-70CXG1)	15
DP12F551S-CX30 (103F5505-70CXJ4)	—
DP12F551D-CX30 (103F5505-70CXJ1)	15
DP12F551S-CX36 (103F5505-70CXK4)	—
DP12F551D-CX36 (103F5505-70CXK1)	15

STEPSYN F with harmonic gear

DP12F351□-HX□□

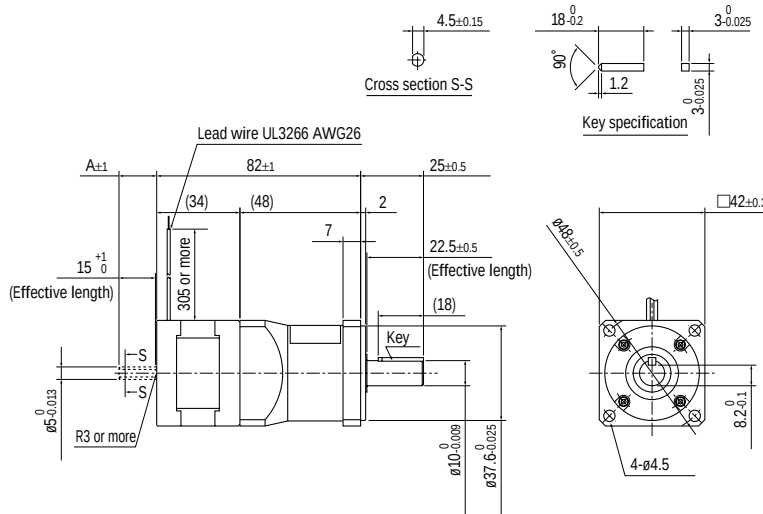
103F3505-70HX□□



Model name	A
DP12F351S-HX50 (103F3505-70HXL4)	—
DP12F351D-HX50 (103F3505-70HXL1)	10
DP12F351S-HX100 (103F3505-70HXM4)	—
DP12F351D-HX100 (103F3505-70HXM1)	10

DP12F551□-HX□□

103F5505□-70HX□□



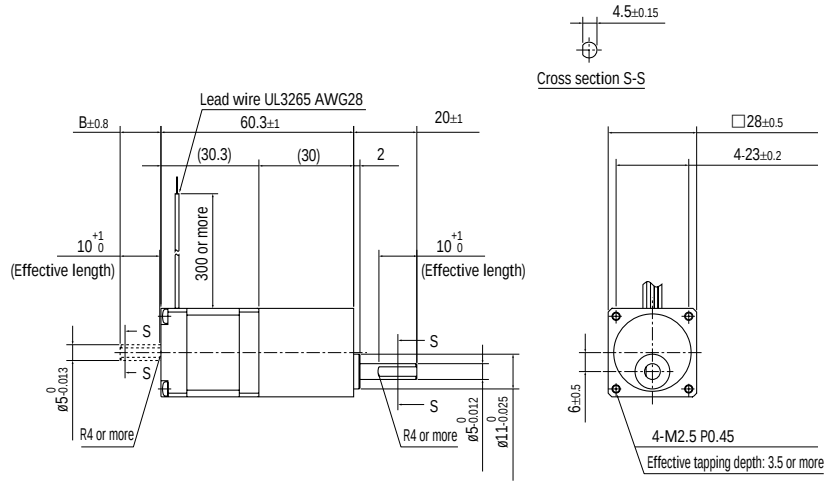
Model name	A
DP12F551S-HX50 (103F5505-70HXL4)	—
DP12F551D-HX50 (103F5505-70HXL1)	15
DP12F551S-HX100 (103F5505-70HXM4)	—
DP12F551D-HX100 (103F5505-70HXM1)	15

Dimensions (Unit: mm)

STEPSYN F with spur gear

DP12F351□-GX□□

103F3505-70GX□□

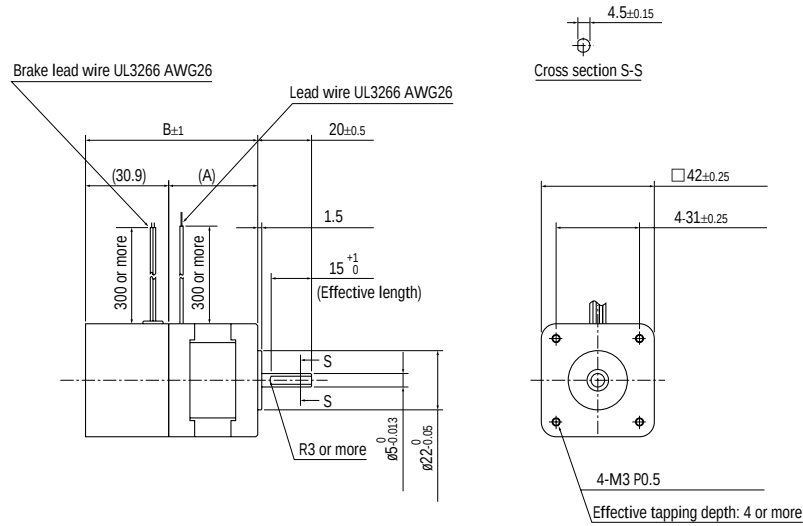


Model name	A
DP12F351S-GX3.6 (103F3505-70GXA4)	—
DP12F351D-GX3.6 (103F3505-70GXA1)	10
DP12F351S-GX7.2 (103F3505-70GXB4)	—
DP12F351D-GX7.2 (103F3505-70GXB1)	10
DP12F351S-GX10 (103F3505-70GXE4)	—
DP12F351D-GX10 (103F3505-70GXE1)	10
DP12F351S-GX20 (103F3505-70GXG4)	—
DP12F351D-GX20 (103F3505-70GXG1)	10
DP12F351S-GX30 (103F3505-70GXJ4)	—
DP12F351D-GX30 (103F3505-70GXJ1)	10
DP12F351S-GX50 (103F3505-70GXL4)	—
DP12F351D-GX50 (103F3505-70GXL1)	10

STEPSYN F with electromagnetic brake

DP12F55□S-XB

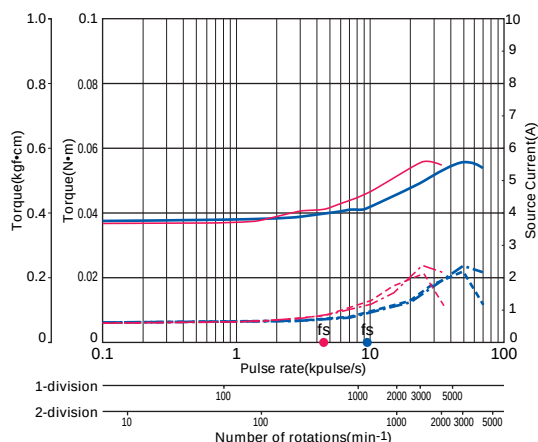
103F55□□-70XB□□



Model name	A	B
DP12F551S-XB (103F5505-70XB41)	33.6	64.5
DP12F552S-XB (103F5508-70XB41)	39.6	70.5
DP12F553S-XB (103F5510-70XB41)	48.6	79.5

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

● DP12F351 : 24V



103F3505-70

Source voltage : DC24V•Winding current : 0.75A/phase

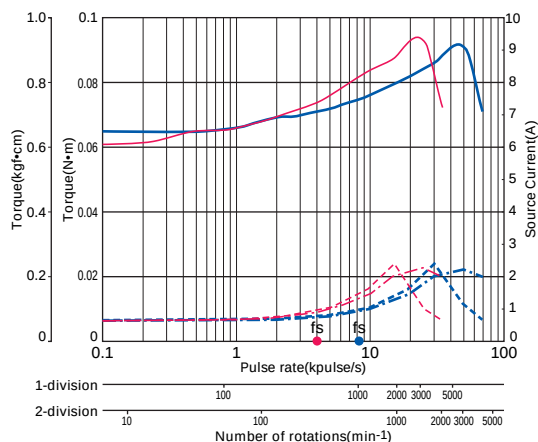
— Getaway torque($J_{L1}=0.33 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

--- Source current(TL=MAX) --- Source current(TL=0)

fs : Maximum self-start frequency when not loaded

■ 1-division is specified ■ 2-division is specified

● DP12F356 : 24V



103F3515-70

Source voltage : DC24V•Winding current : 0.75A/phase

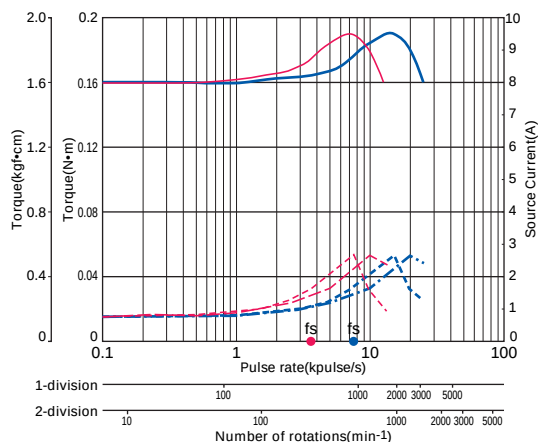
— Getaway torque($J_{L1}=0.33 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

--- Source current(TL=MAX) --- Source current(TL=0)

fs : Maximum self-start frequency when not loaded

■ 1-division is specified ■ 2-division is specified

● DP12F551 / DP12F551S-XB : 24V



103F5505-70/103F5505-70XB41

Source voltage : DC24V•Winding current : 0.75A/phase

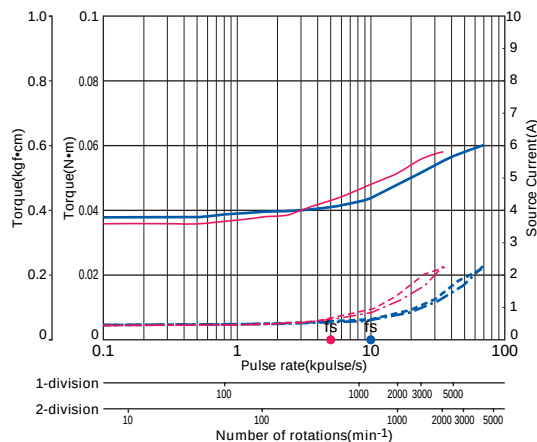
— Getaway torque($J_{L1}=0.33 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

--- Source current(TL=MAX) --- Source current(TL=0)

fs : Maximum self-start frequency when not loaded

■ 1-division is specified ■ 2-division is specified

● DP12F351 : 36V



103F3505-70

Source voltage : DC36V•Winding current : 0.75A/phase

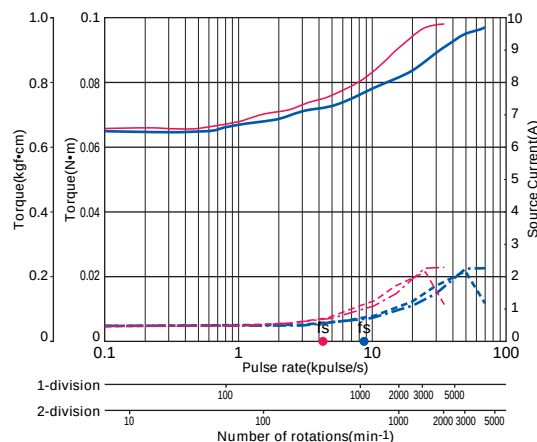
— Getaway torque($J_{L1}=0.33 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

--- Source current(TL=MAX) --- Source current(TL=0)

fs : Maximum self-start frequency when not loaded

■ 1-division is specified ■ 2-division is specified

● DP12F356 : 36V



103F3515-70

Source voltage : DC36V•Winding current : 0.75A/phase

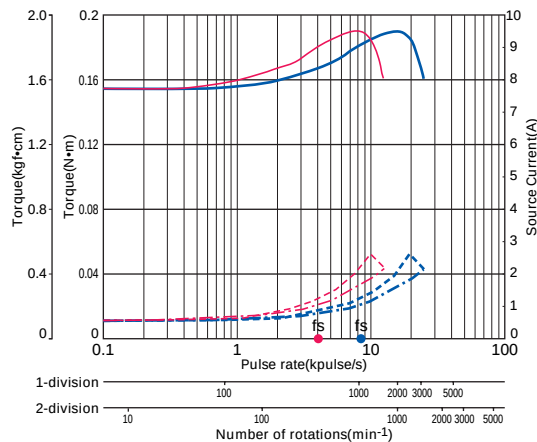
— Getaway torque($J_{L1}=0.33 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

--- Source current(TL=MAX) --- Source current(TL=0)

fs : Maximum self-start frequency when not loaded

■ 1-division is specified ■ 2-division is specified

● DP12F551 / DP12F551S-XB : 36V



103F5505-70/103F5505-70XB41

Source voltage : DC36V•Winding current : 0.75A/phase

— Getaway torque($J_{L1}=0.33 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

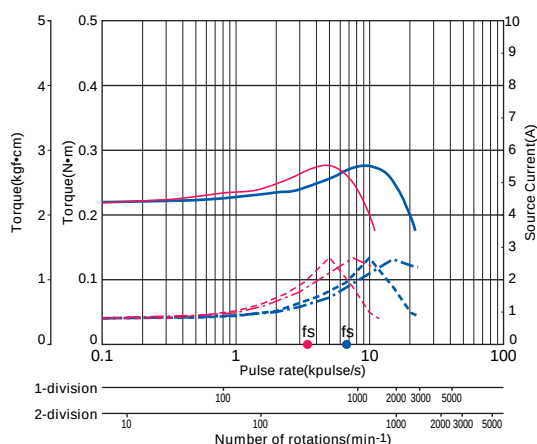
--- Source current(TL=MAX) --- Source current(TL=0)

fs : Maximum self-start frequency when not loaded

■ 1-division is specified ■ 2-division is specified

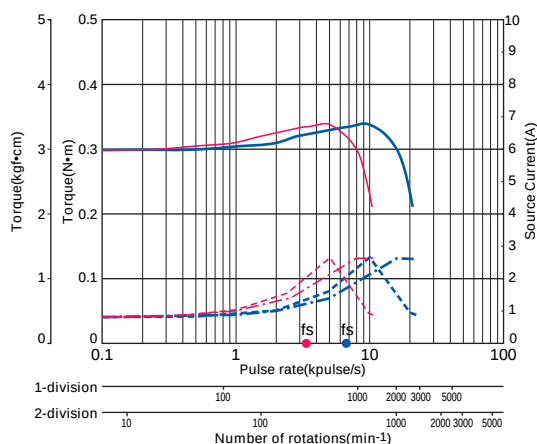
Pulse rate-torque characteristics/pulse rate-source current characteristics

● DP12F552□ / DP12F552S-XB : 24V



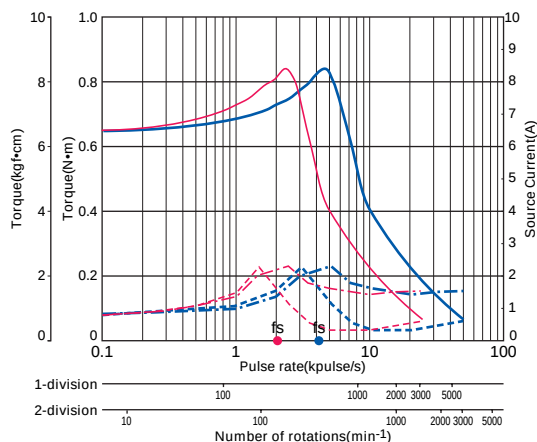
103F5508-70□□/103F5508-70XB41
Source voltage : DC24V•Winding current : 0.75A/phase
—Getaway torque($J_{L1}=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
- - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
fs : Maximum self-start frequency when not loaded
■ 1-division is specified ■ 2-division is specified

● DP12F554□ / DP12F554S-XB : 24V



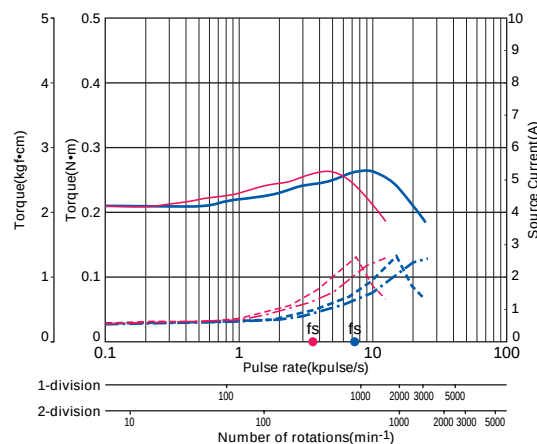
103F5510-70□□/103F5510-70XB41
Source voltage : DC24V•Winding current : 0.75A/phase
—Getaway torque($J_{L1}=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
- - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
fs : Maximum self-start frequency when not loaded
■ 1-division is specified ■ 2-division is specified

● DP12F781□ : 24V



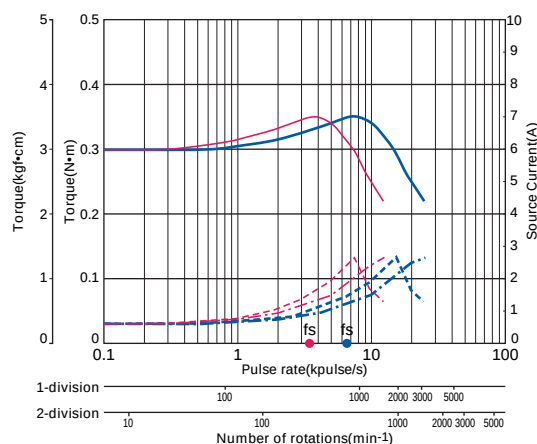
103F7851-70□□
Source voltage : DC24V•Winding current : 0.75A/phase
—Getaway torque($J_{L1}=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
- - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
fs : Maximum self-start frequency when not loaded
■ 1-division is specified ■ 2-division is specified

● DP12F552□ / DP12F552S-XB : 36V



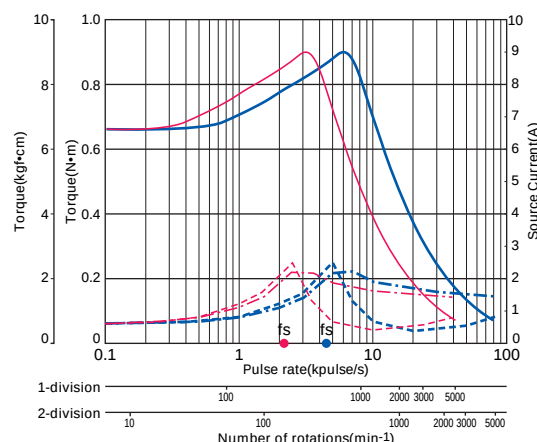
103F5508-70□□/103F5508-70XB41
Source voltage : DC36V•Winding current : 0.75A/phase
—Getaway torque($J_{L1}=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
- - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
fs : Maximum self-start frequency when not loaded
■ 1-division is specified ■ 2-division is specified

● DP12F554□ / DP12F554S-XB : 36V



103F5510-70□□/103F5510-70XB41
Source voltage : DC36V•Winding current : 0.75A/phase
—Getaway torque($J_{L1}=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
- - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
fs : Maximum self-start frequency when not loaded
■ 1-division is specified ■ 2-division is specified

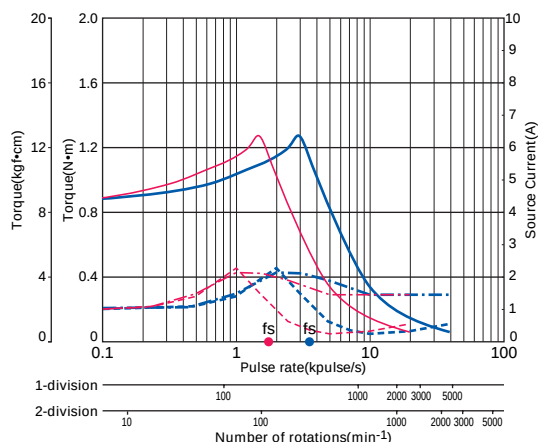
● DP12F781□ : 36V



103F7851-70□□
Source voltage : DC36V•Winding current : 0.75A/phase
—Getaway torque($J_{L1}=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
- - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
fs : Maximum self-start frequency when not loaded
■ 1-division is specified ■ 2-division is specified

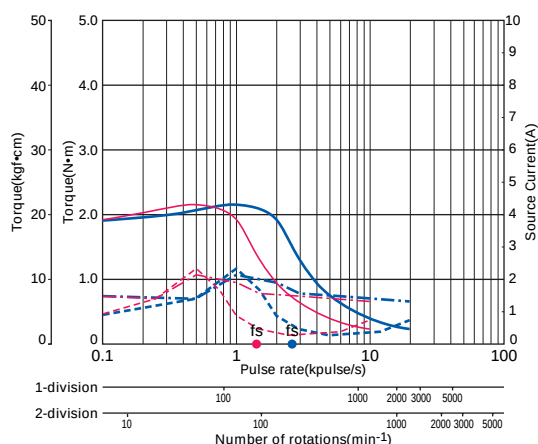
Pulse rate-torque characteristics/pulse rate-source current characteristics

● DP12F782 : 24V



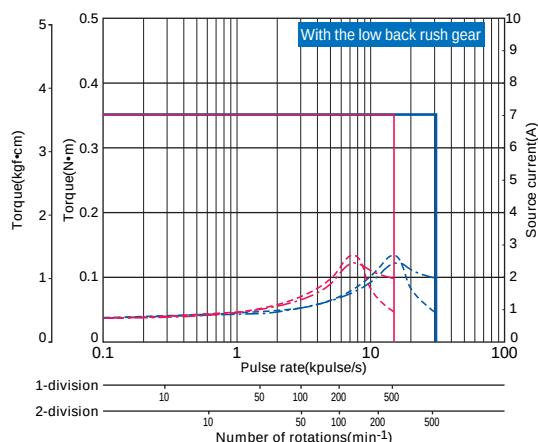
103F7852-70□□
Source voltage : DC24V•Winding current : 0.75A/phase
— Getaway torque($J_{L1}=2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current($T_L=\text{MAX}$) --- Source current($T_L=0$)
fs : Maximum self-start frequency when not loaded
■ 1-division is specified ■ 2-division is specified

● DP12F783 : 24V



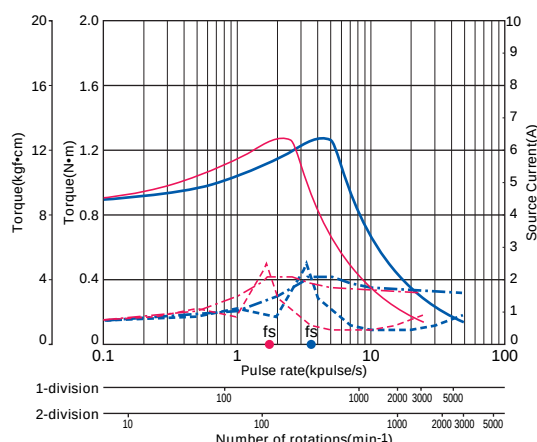
103F7853-70□□
Source voltage : DC24V•Winding current : 0.75A/phase
— Getaway torque($J_{L1}=7.4 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current($T_L=\text{MAX}$) --- Source current($T_L=0$)
fs : Maximum self-start frequency when not loaded
■ 1-division is specified ■ 2-division is specified

● DP12F551-CX3.6 : 24V



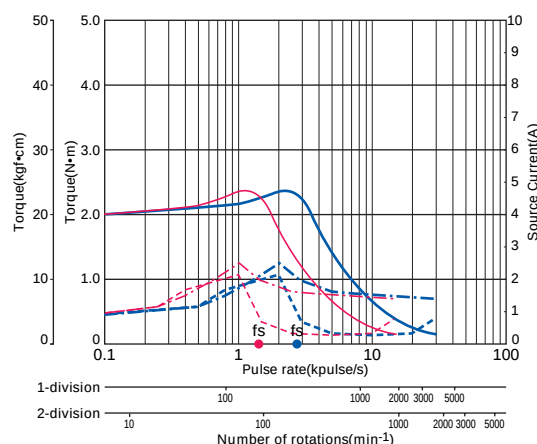
103F5505-70CXA□
Source voltage : DC24V•Winding current : 0.75A/phase
— Allowable torque($J_{L1}=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current($T_L=\text{MAX}$) --- Source current($T_L=0$)
■ 1-division is specified ■ 2-division is specified

● DP12F782 : 36V



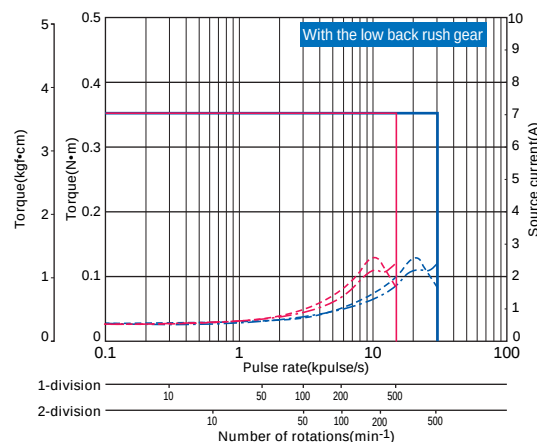
103F7852-70□□
Source voltage : DC36V•Winding current : 0.75A/phase
— Getaway torque($J_{L1}=2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current($T_L=\text{MAX}$) --- Source current($T_L=0$)
fs : Maximum self-start frequency when not loaded
■ 1-division is specified ■ 2-division is specified

● DP12F783 : 36V



103F7853-70□□
Source voltage : DC36V•Winding current : 0.75A/phase
— Getaway torque($J_{L1}=7.4 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current($T_L=\text{MAX}$) --- Source current($T_L=0$)
fs : Maximum self-start frequency when not loaded
■ 1-division is specified ■ 2-division is specified

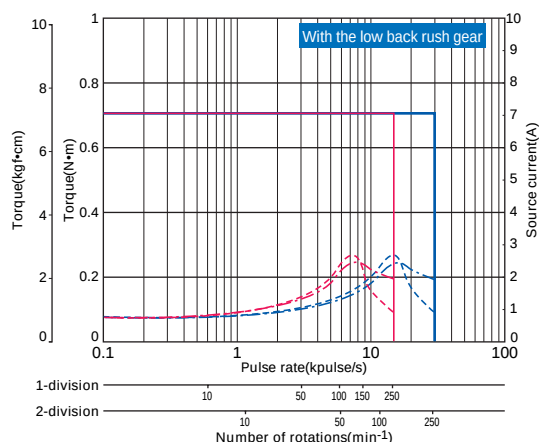
● DP12F551-CX3.6 : 36V



103F5505-70CXA□
Source voltage : DC36V•Winding current : 0.75A/phase
— Allowable torque($J_{L1}=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current($T_L=\text{MAX}$) --- Source current($T_L=0$)
■ 1-division is specified ■ 2-division is specified

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

● DP12F551□-CX7.2 : 24V



103F5505-70CXB□

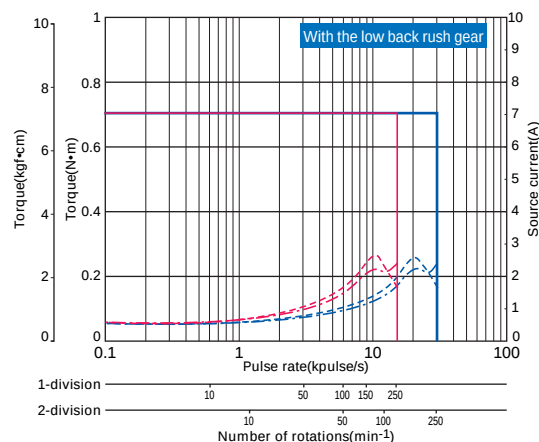
Source voltage : DC24V•Winding current : 0.75A/phase

— Allowable torque($JL_1=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

--- Source current($TL=MAX$) --- Source current($TL=0$)

■ 1-division is specified ■ 2-division is specified

● DP12F551□-CX7.2 : 36V



103F5505-70CXB□

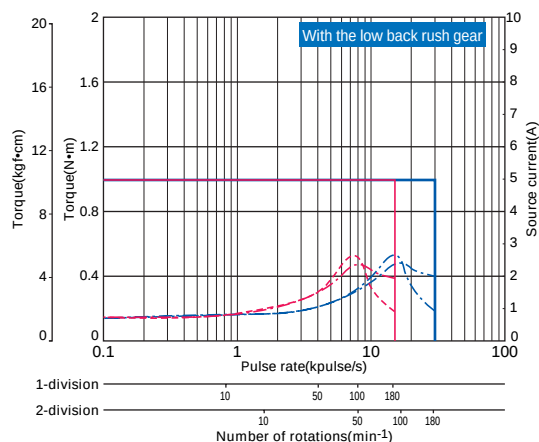
Source voltage : DC36V•Winding current : 0.75A/phase

— Allowable torque($JL_1=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

--- Source current($TL=MAX$) --- Source current($TL=0$)

■ 1-division is specified ■ 2-division is specified

● DP12F551□-CX10 : 24V



103F5505-70CXE□

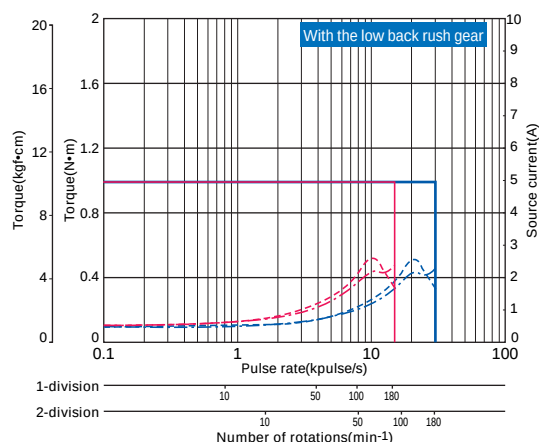
Source voltage : DC24V•Winding current : 0.75A/phase

— Allowable torque($JL_1=2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

--- Source current($TL=MAX$) --- Source current($TL=0$)

■ 1-division is specified ■ 2-division is specified

● DP12F551□-CX10 : 36V



103F5505-70CXE□

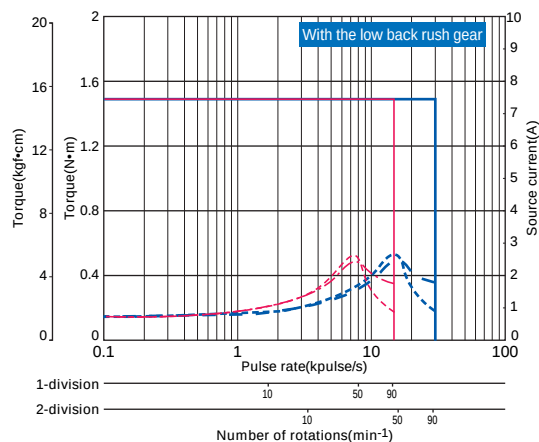
Source voltage : DC36V•Winding current : 0.75A/phase

— Allowable torque($JL_1=2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

--- Source current($TL=MAX$) --- Source current($TL=0$)

■ 1-division is specified ■ 2-division is specified

● DP12F551□-CX20 : 24V



103F5505-70CXG□

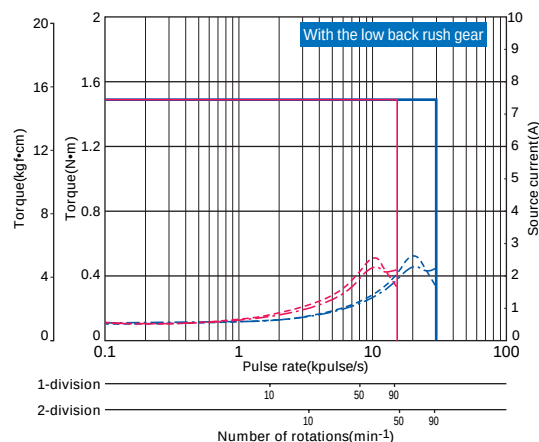
Source voltage : DC24V•Winding current : 0.75A/phase

— Allowable torque($JL_1=2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

--- Source current($TL=MAX$) --- Source current($TL=0$)

■ 1-division is specified ■ 2-division is specified

● DP12F551□-CX20 : 36V



103F5505-70CXG□

Source voltage : DC36V•Winding current : 0.75A/phase

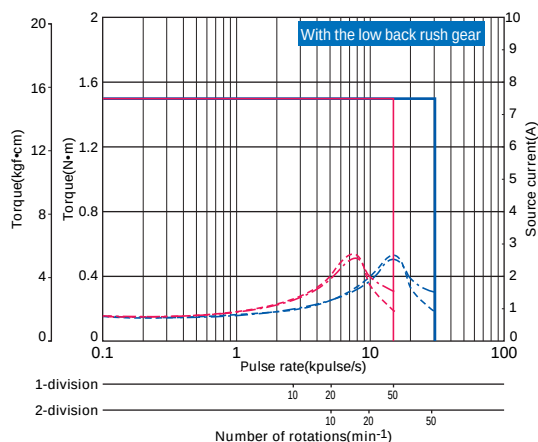
— Allowable torque($JL_1=2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

--- Source current($TL=MAX$) --- Source current($TL=0$)

■ 1-division is specified ■ 2-division is specified

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

● DP12F551□-CX30 : 24V



103F5505-70CXJ□

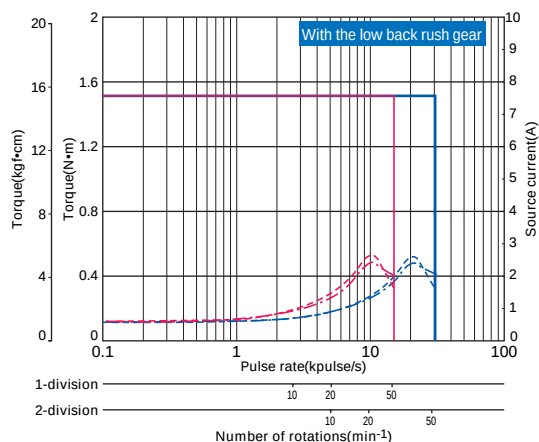
Source voltage : DC24V•Winding current : 0.75A/phase

— Allowable torque($J_{L1}=2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ 1-division is specified ■ 2-division is specified

● DP12F551□-CX30 : 36V



103F5505-70CXJ□

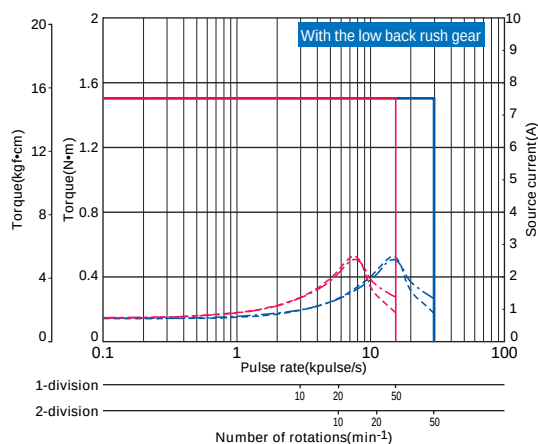
Source voltage : DC36V•Winding current : 0.75A/phase

— Allowable torque($J_{L1}=2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ 1-division is specified ■ 2-division is specified

● DP12F551□-CX36 : 24V



103F5505-70CXK□

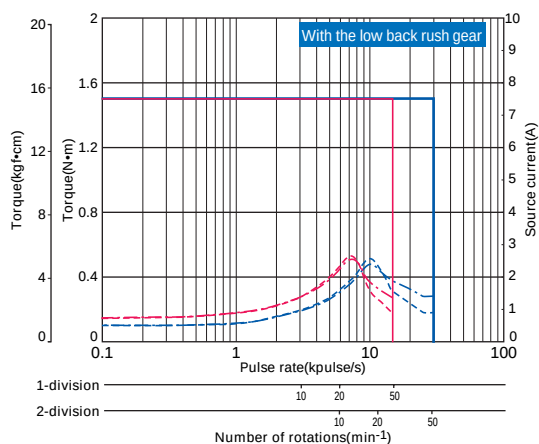
Source voltage : DC24V•Winding current : 0.75A/phase

— Allowable torque($J_{L1}=2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ 1-division is specified ■ 2-division is specified

● DP12F551□-CX36 : 36V



103F5505-70CXK□

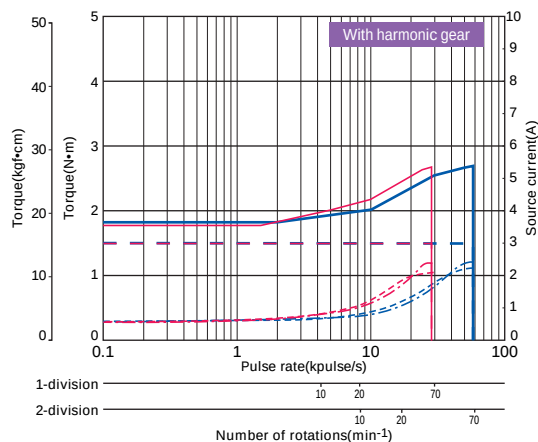
Source voltage : DC36V•Winding current : 0.75A/phase

— Allowable torque($J_{L1}=2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ 1-division is specified ■ 2-division is specified

● DP12F351□-HX50 : 24V



103F3505-70HXL□ ■ 1-division is specified ■ 2-division is specified

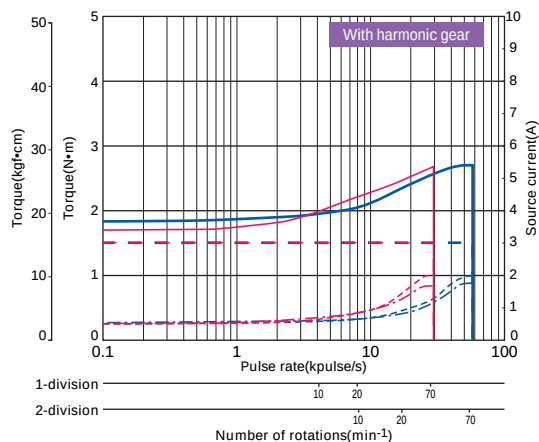
Source voltage : DC24V•Winding current : 0.75A/phase

— Instantaneous allowable torque($J_{L1}=7.4 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

--- Allowable torque ($J_{L1}=7.4 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

● DP12F351□-HX50 : 36V



103F3505-70HXL□ ■ 1-division is specified ■ 2-division is specified

Source voltage : DC36V•Winding current : 0.75A/phase

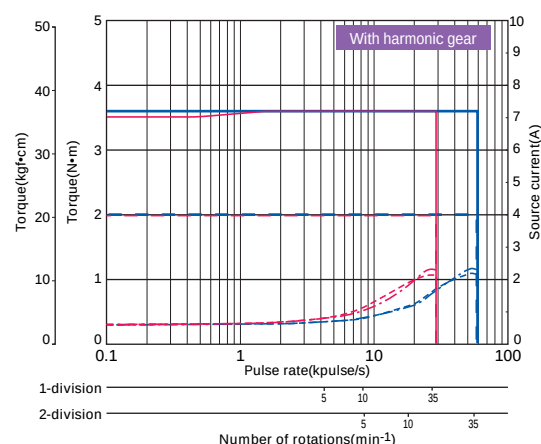
— Instantaneous allowable torque($J_{L1}=7.4 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

--- Allowable torque ($J_{L1}=7.4 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

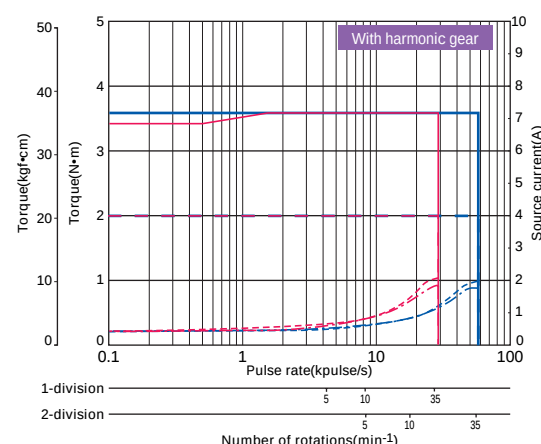
Pulse rate-torque characteristics/pulse rate-source current characteristics

● DP12F351□-HX100 : 24V



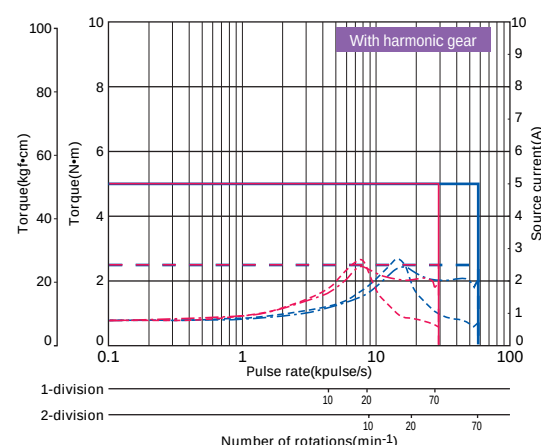
103F3505-70HXM□ ■ 1-division is specified ■ 2-division is specified
Source voltage : DC24V•Winding current : 0.75A/phase
— Instantaneous allowable torque ($JL1=15.3 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
- - Allowable torque ($JL1=15.3 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
- - - Source current (TL=MAX) - - - Source current (TL=0)

● DP12F351□-HX100 : 36V



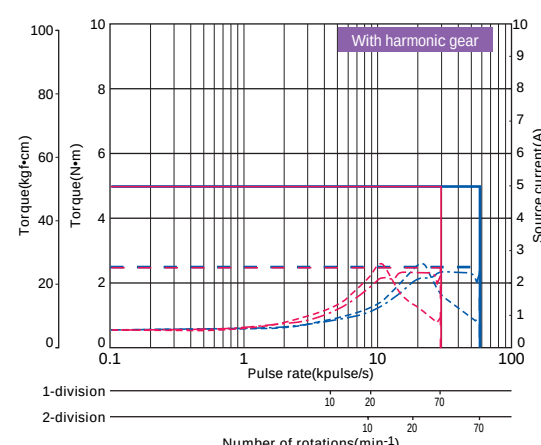
103F3505-70CXM□ ■ 1-division is specified ■ 2-division is specified
Source voltage : DC36V•Winding current : 0.75A/phase
— Instantaneous allowable torque ($JL1=15.3 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
- - Allowable torque ($JL1=15.3 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
- - - Source current (TL=MAX) - - - Source current (TL=0)

● DP12F551□-HX50 : 24V



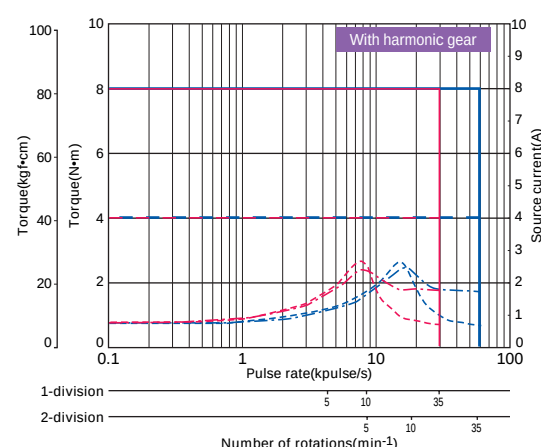
103F5505-70HXL□ ■ 1-division is specified ■ 2-division is specified
Source voltage : DC24V•Winding current : 0.75A/phase
— Instantaneous allowable torque ($JL1=15.1 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
- - Allowable torque ($JL1=15.1 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
- - - Source current (TL=MAX) - - - Source current (TL=0)

● DP12F551□-HX50 : 36V



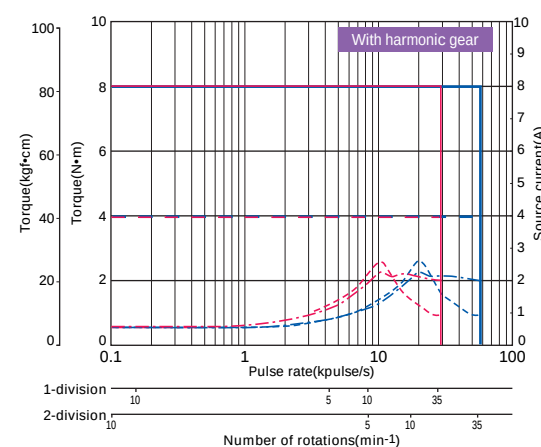
103F5505-70CXL□ ■ 1-division is specified ■ 2-division is specified
Source voltage : DC36V•Winding current : 0.75A/phase
— Instantaneous allowable torque ($JL1=15.1 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
- - Allowable torque ($JL1=15.1 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
- - - Source current (TL=MAX) - - - Source current (TL=0)

● DP12F551□-HX100 : 24V



103F5505-70HXM□ ■ 1-division is specified ■ 2-division is specified
Source voltage : DC24V•Winding current : 0.75A/phase
— Instantaneous allowable torque ($JL1=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
- - Allowable torque ($JL1=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
- - - Source current (TL=MAX) - - - Source current (TL=0)

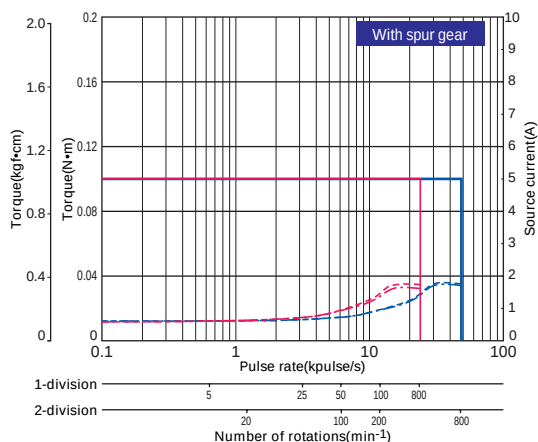
● DP12F551□-HX100 : 36V



103F5505-70HXM□ ■ 1-division is specified ■ 2-division is specified
Source voltage : DC36V•Winding current : 0.75A/phase
— Instantaneous allowable torque ($JL1=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
- - Allowable torque ($JL1=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
- - - Source current (TL=MAX) - - - Source current (TL=0)

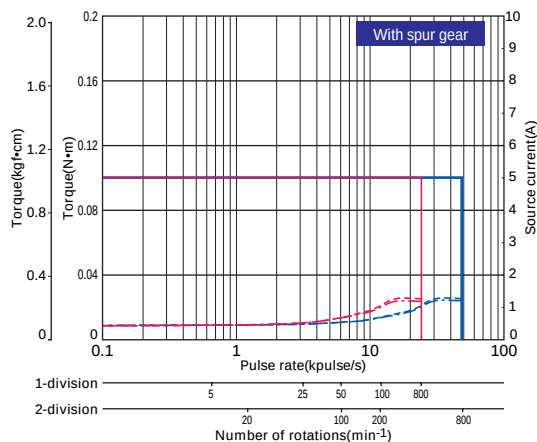
Pulse rate-torque characteristics/pulse rate-source current characteristics

● DP12F351□-GX3.6 : 24V



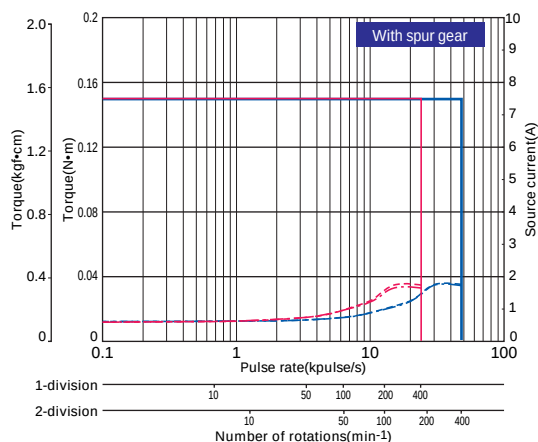
103F3505-70GXA□
Source voltage : DC24V•Winding current : 0.75A/phase
— Allowable torque($J_{L1}=0.33 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current($T_L=\text{MAX}$) --- Source current($T_L=0$)
■ 1-division is specified ■ 2-division is specified

● DP12F351□-GX3.6 : 36V



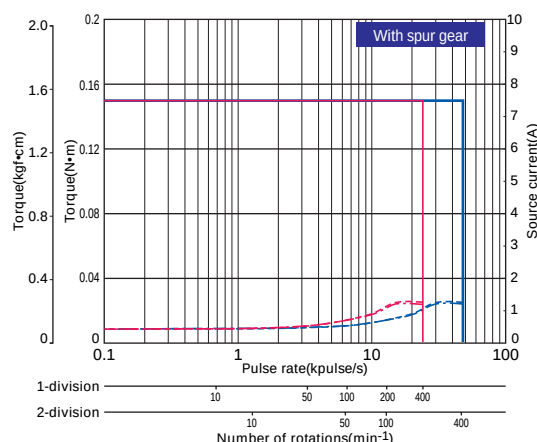
103F3505-70GXA□
Source voltage : DC36V•Winding current : 0.75A/phase
— Allowable torque($J_{L1}=0.33 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current($T_L=\text{MAX}$) --- Source current($T_L=0$)
■ 1-division is specified ■ 2-division is specified

● DP12F351□-GX7.2 : 24V



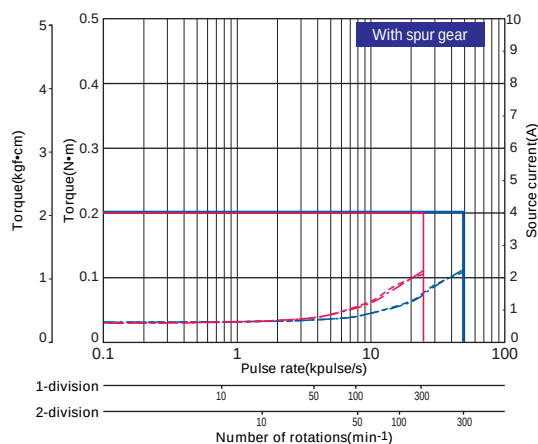
103F3505-70GXB□
Source voltage : DC24V•Winding current : 0.75A/phase
— Allowable torque($J_{L1}=0.33 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current($T_L=\text{MAX}$) --- Source current($T_L=0$)
■ 1-division is specified ■ 2-division is specified

● DP12F351□-GX7.2 : 36V



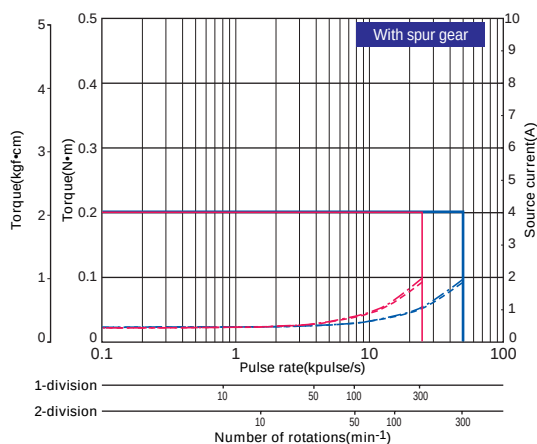
103F3505-70GXB□
Source voltage : DC36V•Winding current : 0.75A/phase
— Allowable torque($J_{L1}=0.33 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current($T_L=\text{MAX}$) --- Source current($T_L=0$)
■ 1-division is specified ■ 2-division is specified

● DP12F351□-GX10 : 24V



103F3505-70GXE□
Source voltage : DC24V•Winding current : 0.75A/phase
— Allowable torque($J_{L1}=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current($T_L=\text{MAX}$) --- Source current($T_L=0$)
■ 1-division is specified ■ 2-division is specified

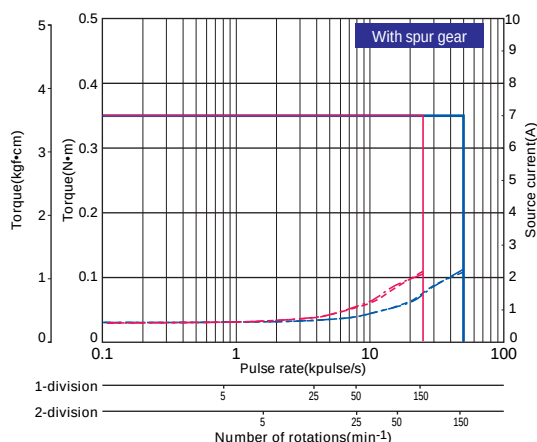
● DP12F351□-GX10 : 36V



103F3505-70GXE□
Source voltage : DC36V•Winding current : 0.75A/phase
— Allowable torque($J_{L1}=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current($T_L=\text{MAX}$) --- Source current($T_L=0$)
■ 1-division is specified ■ 2-division is specified

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

● DP12F351□-GX20 : 24V



103F3505-70GXG□

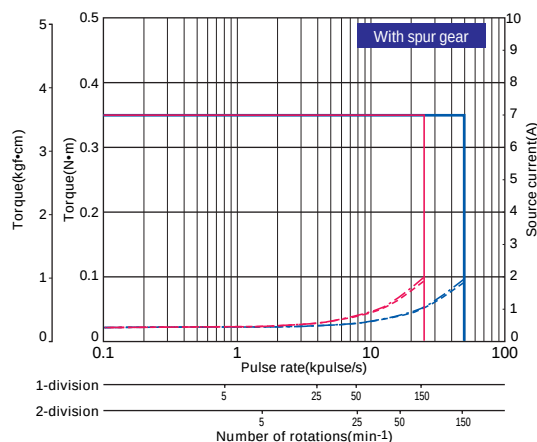
Source voltage : DC24V•Winding current : 0.75A/phase

— Allowable torque($J_{L1}=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ 1-division is specified ■ 2-division is specified

● DP12F351□-GX20 : 36V



103F3505-70GXG□

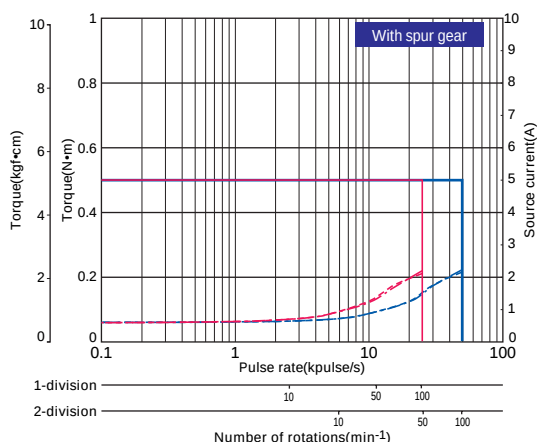
Source voltage : DC36V•Winding current : 0.75A/phase

— Allowable torque($J_{L1}=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ 1-division is specified ■ 2-division is specified

● DP12F351□-GX30 : 24V



103F3505-70GXJ□

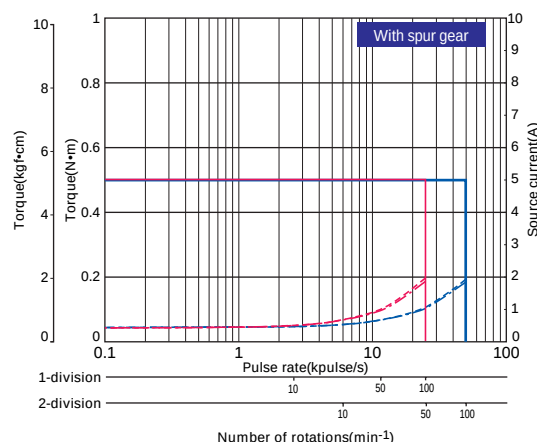
Source voltage : DC24V•Winding current : 0.75A/phase

— Allowable torque($J_{L1}=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ 1-division is specified ■ 2-division is specified

● DP12F351□-GX30 : 36V



103F3505-70GXJ□

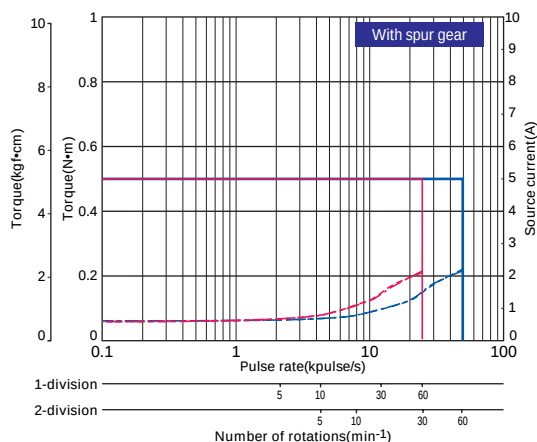
Source voltage : DC36V•Winding current : 0.75A/phase

— Allowable torque($J_{L1}=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ 1-division is specified ■ 2-division is specified

● DP12F351□-GX50 : 24V



103F3505-70GXL□

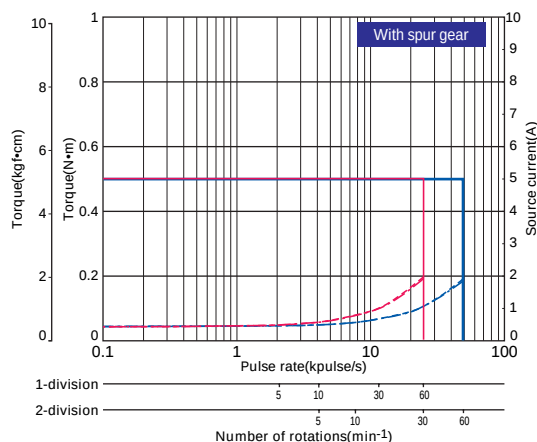
Source voltage : DC24V•Winding current : 0.75A/phase

— Allowable torque($J_{L1}=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ 1-division is specified ■ 2-division is specified

● DP12F351□-GX50 : 36V



103F3505-70GXL□

Source voltage : DC36V•Winding current : 0.75A/phase

— Allowable torque($J_{L1}=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ 1-division is specified ■ 2-division is specified

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API

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BP1

...

BP2

...

WP1

...

DP1

...

DP2

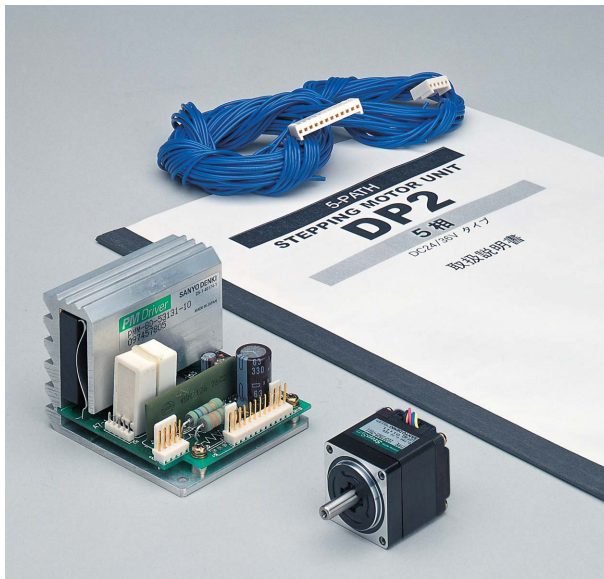
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DP3

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DP4

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The 5-phase Stepping Set

DP2 series

DC24V/36V

Full-step/half-step

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

Configuration of the 5-phase Stepping Motor Set, DP2 Series

Name	Quantity
DP2 Series Instruction Manual	1 pc.
PM Driver	1 pc.
Stepping Motor	1 pc.
Power Cable, Signal Cable (CN1)	1 pc.
Stepping Motor Cable (CN2)	1 pc.

Characteristics

● Flexible

This stepping system is able to drive wide variety of stepping motors from small capacity to large capacity without adjustment, resulting in wide applications.

● Compact

Mounting dedicated HIC realizes highly integrated and higher reliable system.

Built-in function

● Excitation system selectable

Full-step or half-step can be selected through an external input signal.

● Pulse input system selection function

Either single input system or double input system can be selected, using a dipswitch.

● Power down function

Stepping motor current can be turned off through an external input signal.

Stepping motor Common specifications

Item	Combined stepping motors of DP2 series
Insulation class	Class B (+130°C)
Withstand voltage	Conditions: AC1000V, 50/60 Hz, and for one minute
Insulation resistance	100MΩ or more against DC500V
Vibration resistance	Conditions: amplitude 1.52 mm (P-P), frequency range 10 to 55 Hz, 5 minutes sweep time, along X, Y, and Z axes, for 2 hours
Impact resistance	Conditions: 98 m/s ² acceleration, 11 minutes duration, half-wave/sine wave, three times each along X, Y, and Z axes, 18 times in total
Operating ambient temperature	-10~+50°C
Operating ambient humidity	20~90%(no condensation)

Standard combined stepping motors for 5-phase stepping set “DP2” series

PM driver model numbers : PMM-BD-53130-10

Combination Model Number for STEPSYN F Series (Motor for a set)

System support	Dimensions of stepping motor	Single-axis shaft		Dual-axis shaft	
		Set model number	Standard combined stepping motor number	Set model number	Standard combined stepping motor number
Standard type	□ 28mm	DP22F351S	103F3505-7041	DP22F351D	103F3505-7011
		DP22F356S	103F3515-7041	DP22F356D	103F3515-7011
	□ 42mm	DP22F551S	103F5505-7041	DP22F551D	103F5505-7011
		DP22F552S	103F5508-7041	DP22F552D	103F5508-7011
		DP22F554S	103F5510-7041	DP22F554D	103F5510-7011
	□ 60mm	DP22F781S	103F7851-7041	DP22F781D	103F7851-7011
		DP22F782S	103F7852-7041	DP22F782D	103F7852-7011
		DP22F783S	103F7853-7041	DP22F783D	103F7853-7011
Low back-rush gear	□ 42mm	DP22F551S-CX3.6	103F5505-70CXA4	DP22F551D-CX3.6	103F5505-70CXA1
		DP22F551S-CX7.2	103F5505-70CXB4	DP22F551D-CX7.2	103F5505-70CXB1
		DP22F551S-CX10	103F5505-70CXE4	DP22F551D-CX10	103F5505-70CXE1
		DP22F551S-CX20	103F5505-70CXG4	DP22F551D-CX20	103F5505-70CXG1
		DP22F551S-CX30	103F5505-70CXJ4	DP22F551D-CX30	103F5505-70CXJ1
		DP22F551S-CX36	103F5505-70CXX4	DP22F551D-CX36	103F5505-70CXX1
Harmonic gear	□ 28mm	DP22F351S-HX50	103F3505-70HXL4	DP22F351D-HX50	103F3505-70HXL1
		DP22F351S-HX100	103F3505-70HXM4	DP22F351D-HX100	103F3505-70HXM1
	□ 42mm	DP22F551S-HX50	103F5505-70HXL4	DP22F551D-HX50	103F5505-70HXL1
		DP22F551S-HX100	103F5505-70HXM4	DP22F551D-HX100	103F5505-70HXM1
Spur gear	□ 28mm	DP22F351S-GX3.6	103F3505-70GXA4	DP22F351D-GX3.6	103F3505-70GXA1
		DP22F351S-GX7.2	103F3505-70GXB4	DP22F351D-GX7.2	103F3505-70GXB1
		DP22F351S-GX10	103F3505-70GXE4	DP22F351D-GX10	103F3505-70GXE1
		DP22F351S-GX20	103F3505-70GXG4	DP22F351D-GX20	103F3505-70GXG1
		DP22F351S-GX30	103F3505-70GXJ4	DP22F351D-GX30	103F3505-70GXJ1
		DP22F351S-GX50	103F3505-70GXL4	DP22F351D-GX50	103F3505-70GXL1
Electromagnetic brake	□ 42mm	DP22F551S-XB	103F5505-70XB41		
		DP22F552S-XB	103F5508-70XB41		
		DP22F554S-XB	103F5510-70XB41		

Note) Contact our sales department to order the system with an encoder and/or gear and brake.

Stepping motor data sheet

STEPSYN F Series (Standard)

Set model number	Single-axis shaft	DP22F351S	DP22F356S	DP22F551S	DP22F552S	DP22F554S
	Dual-axis shaft	DP22F351D	DP22F356D	DP22F551D	DP22F552D	DP22F554D
Holding torque	N•m	0.036	0.065	0.13	0.18	0.26
Rotor inertia	$\times 10^{-4} \text{kg} \cdot \text{m}^2$	0.009	0.016	0.03	0.053	0.065
Weight	kg	0.11	0.2	0.23	0.28	0.37
Allowable thrust load	N	3	3	10	10	10
Allowable radial load	N	34	34	35	35	35

Set model number	Single-axis shaft	DP22F781S	DP22F782S	DP22F783S
	Dual-axis shaft	DP22F781D	DP22F782D	DP22F783D
Holding torque	N•m	0.6	0.93	1.79
Rotor inertia	$\times 10^{-4} \text{kg} \cdot \text{m}^2$	0.275	0.4	0.84
Weight	kg	0.6	0.78	1.36
Allowable thrust load	N	20	20	20
Allowable radial load	N	80	80	80

STEPSYN F Series (with low back rush gear)

Set model number	Single-axis shaft	DP22F551S-CX3.6	DP22F551S-CX7.2	DP22F551S-CX10	DP22F551S-CX20	DP22F551S-CX30	DP22F551S-CX36
	Dual-axis shaft	DP22F551D-CX3.6	DP22F551D-CX7.2	DP22F551D-CX10	DP22F551D-CX20	DP22F551D-CX30	DP22F551D-CX36
Allowable torque	N•m	0.35	0.7	1	1.5	1.5	1.5
Rotor inertia	$\times 10^{-4} \text{kg} \cdot \text{m}^2$	0.03					
Basic step angle	°	0.2	0.1	0.072	0.036	0.024	0.02
Deceleration ratio		1 : 3.6	1 : 7.2	1 : 10	1 : 20	1 : 30	1 : 36
Back rush	°	0.6	0.4	0.35	0.25	0.25	0.25
Allowable number of rotations	min ⁻¹	500	250	180	90	60	50
Weight	kg	0.36					
Allowable thrust load	N	15					
Allowable radial load	N	20					

* The rotation direction of the motor and the gear output shaft is as follows: when deceleration ratio is 1:3.6, 1:7.2, or 1:10, both motor and shaft rotate in the same direction, and for 1:20 or 1:30 type, the motor and the shaft rotate in opposite direction.

STEPSYN F Series (With harmonic gear)

Set model number	Single-axis shaft	DP22F351S-HX50	DP22F351S-HX100
	Dual-axis shaft	DP22F351D-HX50	DP22F351D-HX100
Allowable torque	N•m	1.5	2
Rotor inertia	$\times 10^{-4} \text{kg} \cdot \text{m}^2$	0.012	
Basic step angle	°	0.0144	0.0072
Deceleration ratio		1 : 50	1 : 100
Lost motion	Minute	0.4~3 ($\pm 0.06 \text{ N} \cdot \text{m}$)	0.4~3 ($\pm 0.08 \text{ N} \cdot \text{m}$)
Allowable number of rotations	min ⁻¹	500	250
Weight	kg	0.22	
Allowable thrust load	N	100	
Allowable radial load	N	200	

* The gear output shaft rotates in the opposite direction of the motor.

Set model number	Single-axis shaft	DP22F551S-HX50	DP22F551S-HX100
	Dual-axis shaft	DP22F551D-HX50	DP22F551D-HX100
Allowable torque	N•m	2.5	4
Rotor inertia	$\times 10^{-4} \text{kg} \cdot \text{m}^2$	0.042	
Basic step angle	°	0.0144	0.0072
Deceleration ratio		1 : 50	1 : 100
Lost motion	Minute	0.4~3 ($\pm 0.06 \text{ N} \cdot \text{m}$)	0.4~3 ($\pm 0.2 \text{ N} \cdot \text{m}$)
Allowable number of rotations	min ⁻¹	500	250
Weight	kg	0.52	
Allowable thrust load	N	200	
Allowable radial load	N	250	

* The gear output shaft rotates in the opposite direction of the motor.

STEPSYN F Series (With spur gear)

Set model number	Single-axis shaft	DP22F351S-GX3.6	DP22F351S-GX7.2	DP22F351S-GX10	DP22F351S-GX20	DP22F351S-GX30	DP22F351S-GX50
	Dual-axis shaft	DP22F351D-GX3.6	DP22F351D-GX7.2	DP22F351D-GX10	DP22F351D-GX20	DP22F351D-GX30	DP22F351D-GX50
Allowable torque	N•m	0.1	0.15	0.2	0.35	0.5	0.5
Rotor inertia	$\times 10^{-4} \text{kg} \cdot \text{m}^2$	0.009					
Basic step angle	°	0.2	0.1	0.072	0.036	0.024	0.0144
Deceleration ratio		1 : 3.6	1 : 7.2	1 : 10	1 : 20	1 : 30	1 : 50
Back rush	°	2	2	2	1.5	1.5	1.5
Allowable number of rotations	min ⁻¹	800	400	300	150	100	60
Weight	kg	0.17					
Allowable thrust load	N	10					
Allowable radial load	N	15					

* The rotation direction of the motor and the gear output shaft is as follows: when deceleration ratio is 1:3.6, 1:7.2, 1:20, 1:30, or 1:50, both motor and shaft rotate in the same direction, and for 1:10 type, the motor and the shaft rotate in opposite direction.

Stepping motor data sheet

STEPSYN F Series (With electromagnetic brake)

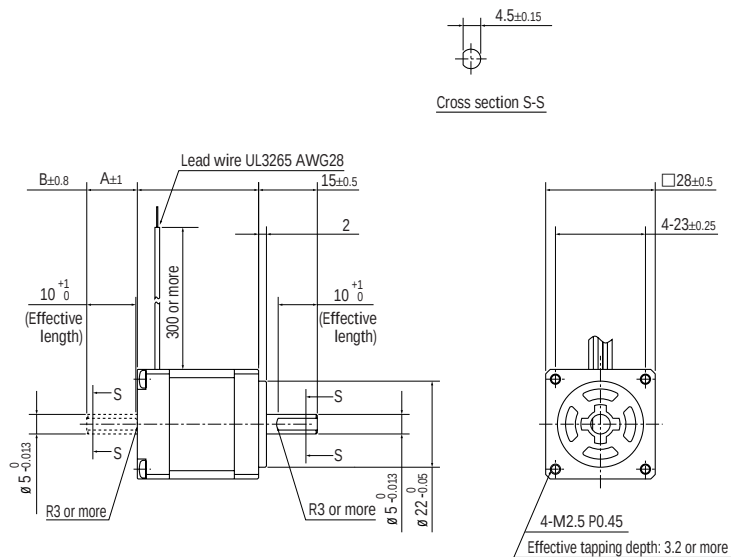
Set model number		Single-axis shaft	DP22F551S-XB	DP22F552S-XB	DP22F554S-XB
		Dual-axis shaft			
Holding torque	N•m		0.13	0.18	0.26
Rotor inertia	$\times 10^{-4} \text{kg} \cdot \text{m}^2$		0.045	0.068	0.08
Weight	kg		0.38	0.43	0.52
Allowable thrust load	N		10	10	10
Allowable radial load	N		35	35	35
Electromagnetic brake specification	Brake operation system		Non-excitation operation system		
	Source voltage	V	DC 24 $\pm$ 5%		
	Exciting current	A	0.08		
	Electric power consumption	W	2		
	Static friction torque	N•m	0.22		
	Brake operating time	ms	30		
	Brake release time	ms	20		

Dimensions (Unit: mm)

STEPSYN F

DP22F35□□

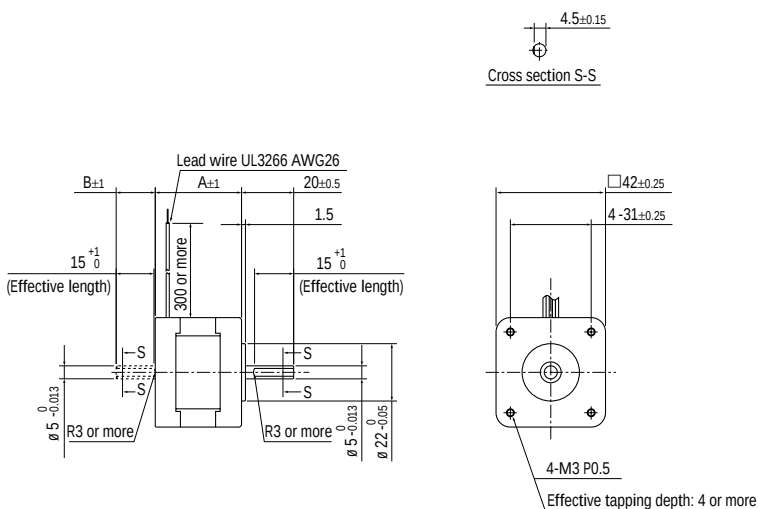
103F35□□-70□□



Model name	A	B
DP22F351S (103F3505-7041)	31	—
DP22F351D (103F3505-7011)	31	10
DP22F356S (103F3515-7041)	50.5	—
DP22F356D (103F3515-7011)	50.5	10

DP22F55□□

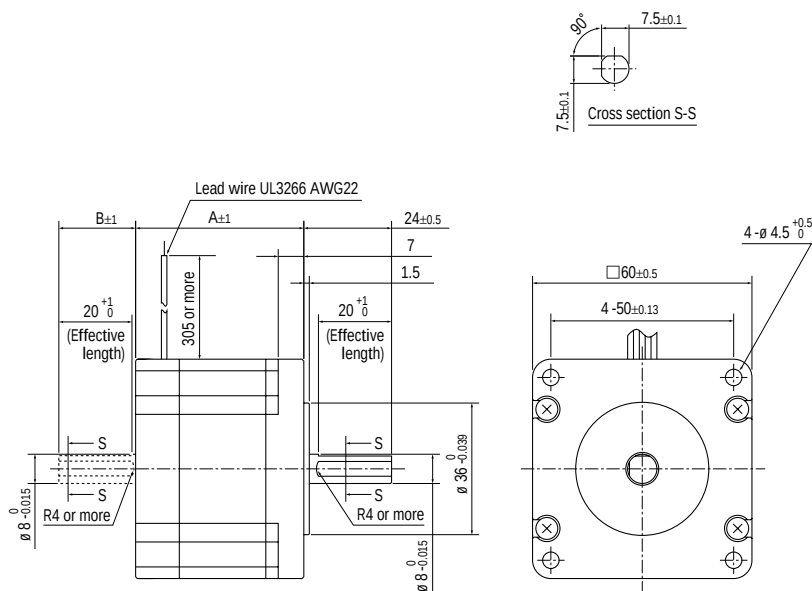
103F55□□-70□□



Model name	A	B
DP22F551S (103F5505-7041)	34	—
DP22F551D (103F5505-7011)	34	15
DP22F552S (103F5508-7041)	40	—
DP22F552D (103F5508-7011)	40	15
DP22F554S (103F5510-7041)	49	—
DP22F554D (103F5510-7011)	49	15

DP22F78□□

103F785□□-70□□



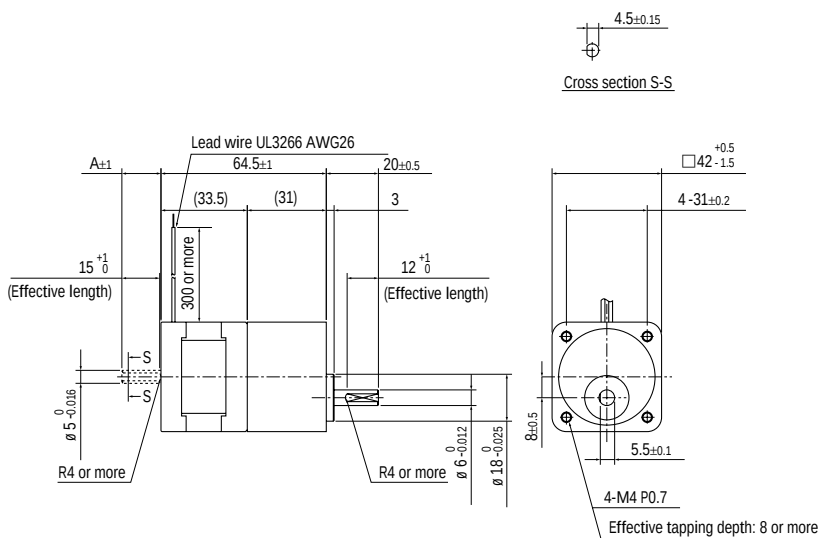
Model name	A	B
DP22F781S (103F7851-7041)	46.5	—
DP22F781D (103F7851-7011)	46.5	21
DP22F782S (103F7852-7041)	55	—
DP22F782D (103F7852-7011)	55	21
DP22F783S (103F7853-7041)	87.5	—
DP22F783D (103F7853-7011)	87.5	21

Dimensions (Unit: mm)

STEPSYN F with low back rush gear

DP22F551□-CX□□

103F5505-70CX□□

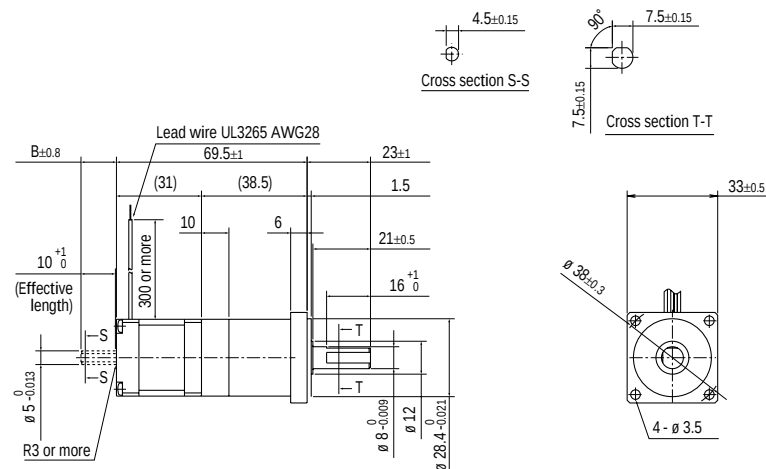


Model name	A
DP22F551S-CX3.6 (103F5505-70CXA4)	—
DP22F551D-CX3.6 (103F5505-70CXA1)	15
DP22F551S-CX7.2 (103F5505-70CXB4)	—
DP22F551D-CX7.2 (103F5505-70CXB1)	15
DP22F551S-CX10 (103F5505-70CXE4)	—
DP22F551D-CX10 (103F5505-70CXE1)	15
DP22F551S-CX20 (103F5505-70CXG4)	—
DP22F551D-CX20 (103F5505-70CXG1)	15
DP22F551S-CX30 (103F5505-70CXJ4)	—
DP22F551D-CX30 (103F5505-70CXJ1)	15
DP22F551S-CX36 (103F5505-70CXK4)	—
DP22F551D-CX36 (103F5505-70CXK1)	15

STEPSYN F with harmonic gear

DP22F351 ☐ -HX ☐ ☐

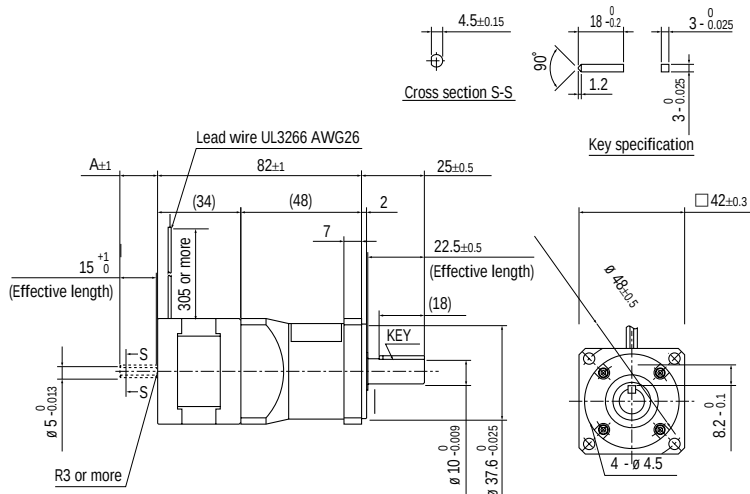
103F3505-70HX□□



Model name	A
DP22F351S-HX50 (103F3505-70HXL4)	—
DP22F351D-HX50 (103F3505-70HXL1)	10
DP22F351S-HX100 (103F3505-70HXM4)	—
DP22F351D-HX100 (103F3505-70HXM1)	10

DP22F551□-HX□□

103F5505-70HX□□



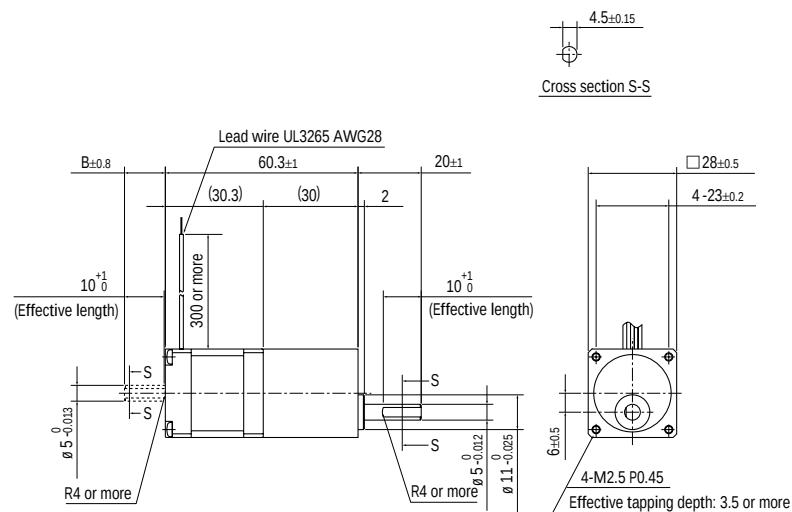
Model name	A
DP22F551S-HX50 (103F5505-70HXL4)	—
DP22F551D-HX50 (103F5505-70HXL1)	15
DP22F551S-HX100 (103F5505-70HXM4)	—
DP22F551D-HX100 (103F5505-70HXM1)	15

Dimensions (Unit: mm)

STEPSYN F with spur gear

DP22F351□-GX□□

103F3505-70GX□□

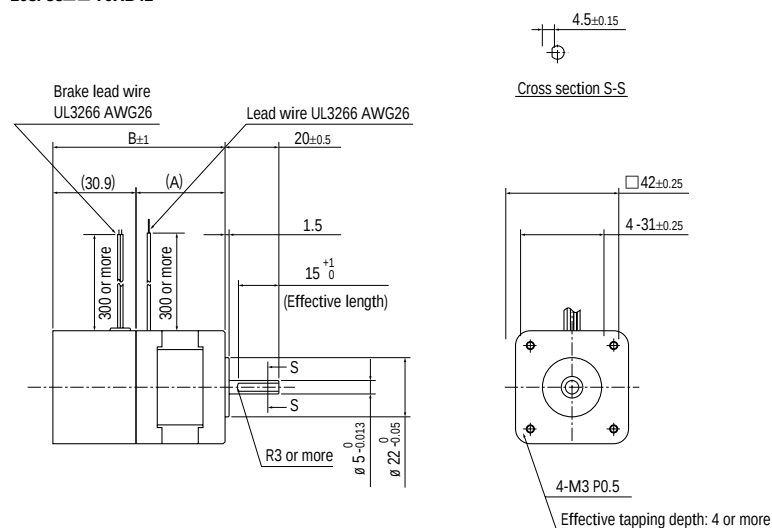


Model name	A
DP22F351S-GX3.6 (103F3505-70GX44)	—
DP22F351D-GX3.6 (103F3505-70GX41)	10
DP22F351S-GX7.2 (103F3505-70GX84)	—
DP22F351D-GX7.2 (103F3505-70GX81)	10
DP22F351S-GX10 (103F3505-70GX84)	—
DP22F351D-GX10 (103F3505-70GX81)	10
DP22F351S-GX20 (103F3505-70GX84)	—
DP22F351D-GX20 (103F3505-70GX81)	10
DP22F351S-GX30 (103F3505-70GX84)	—
DP22F351D-GX30 (103F3505-70GX81)	10
DP22F351S-GX50 (103F3505-70GX84)	—
DP22F351D-GX50 (103F3505-70GX81)	10
DP22F351S-GX50 (103F3505-70GX84)	—
DP22F351D-GX50 (103F3505-70GX81)	10

STEPSYN F with electromagnetic brake

DP22F55□ S-XB

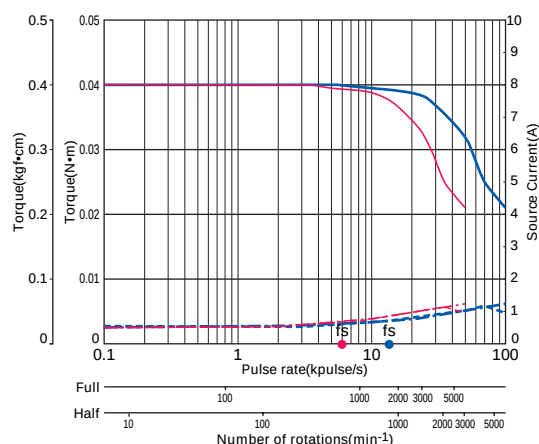
103F55-70XB41



Model name	A	B
DP22F551S-XB (103F5505-70XB41)	33.6	64.5
DP22F552S-XB (103F5508-70XB41)	39.6	70.5
DP22F553S-XB (103F5510-70XB41)	48.6	79.5

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

● DP22F351□ : 24V



103F3505-70□□

Source voltage : DC24V•Winding current : 0.75A/phase

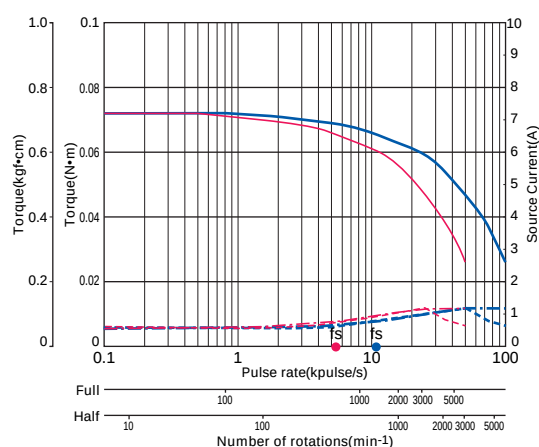
— Getaway torque($J_{L1}=0.33 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

fs : Maximum self-start frequency when not load

■ Full-step ■ Half-step

● DP22F356□ : 24V



103F3515-70□□

Source voltage : DC24V•Winding current : 0.75A/phase

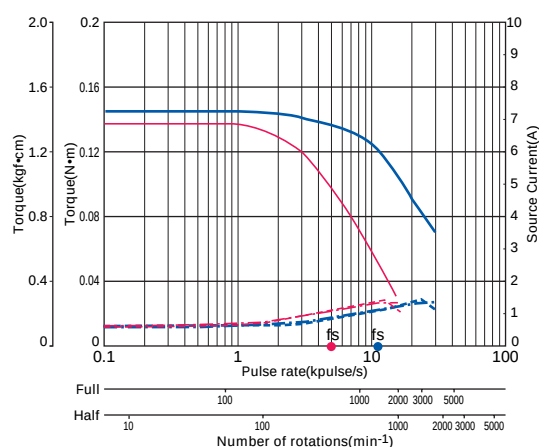
— Getaway torque($J_{L1}=0.33 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

fs : Maximum self-start frequency when not load

■ Full-step ■ Half-step

● DP22F551□ / DP22F551S-XB : 24V



103F5505-70□□/103F5505-70XB41

Source voltage : DC24V•Winding current : 0.75A/phase

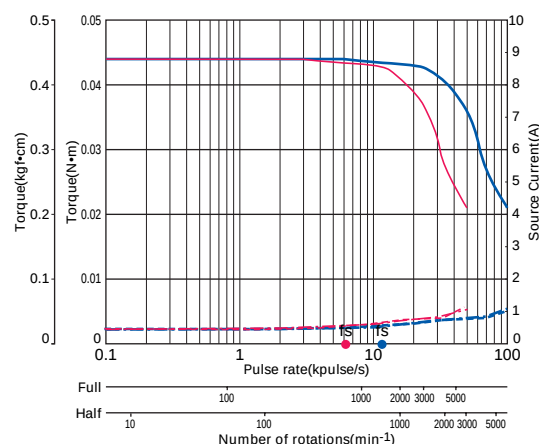
— Getaway torque($J_{L1}=0.33 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

fs : Maximum self-start frequency when not load

■ Full-step ■ Half-step

● DP22F351□ : 36V



103F3505-70□□

Source voltage : DC36V•Winding current : 0.75A/phase

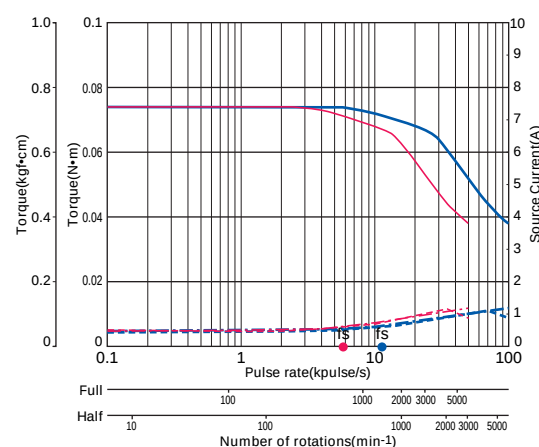
— Getaway torque($J_{L1}=0.33 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

fs : Maximum self-start frequency when not load

■ Full-step ■ Half-step

● DP22F356□ : 36V



103F3515-70□□

Source voltage : DC36V•Winding current : 0.75A/phase

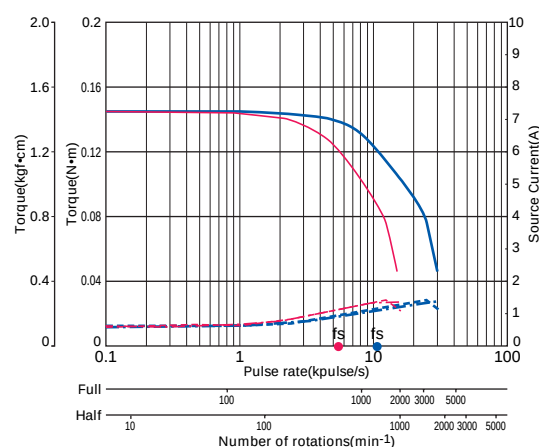
— Getaway torque($J_{L1}=0.33 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

fs : Maximum self-start frequency when not load

■ Full-step ■ Half-step

● DP22F551□ / DP22F551S-XB : 36V



103F5505-70□□/103F5505-70XB41

Source voltage : DC36V•Winding current : 0.75A/phase

— Getaway torque($J_{L1}=0.33 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

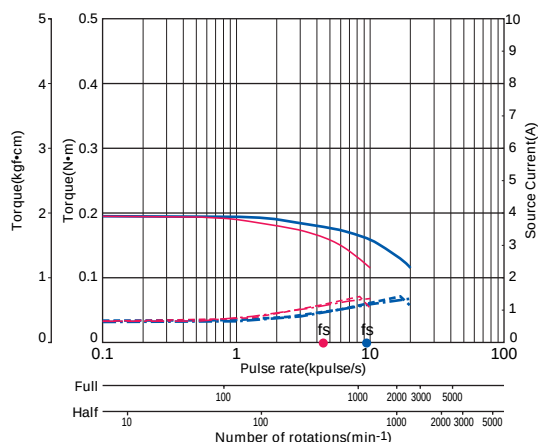
- - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)

fs : Maximum self-start frequency when not load

■ Full-step ■ Half-step

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

● DP22F552□ / DP22F552S-XB : 24V



103F5508-70□□/103F5508-70XB41

Source voltage : DC24V•Winding current : 0.75A/phase

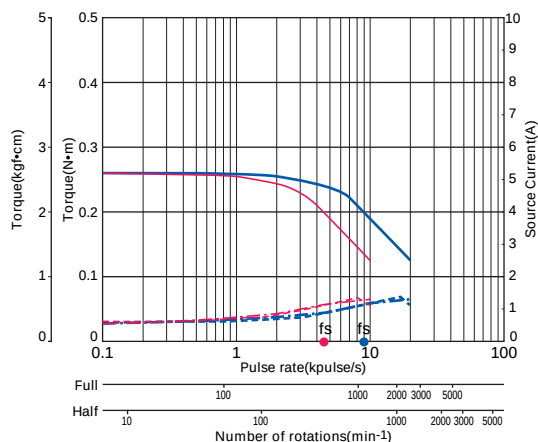
— Getaway torque($J_{L1}=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

fs : Maximum self-start frequency when not load

■ Full-step ■ Half-step

● DP22F554□ / DP22F554S-XB : 24V



103F5510-70□□/103F5510-70XB41

Source voltage : DC24V•Winding current : 0.75A/phase

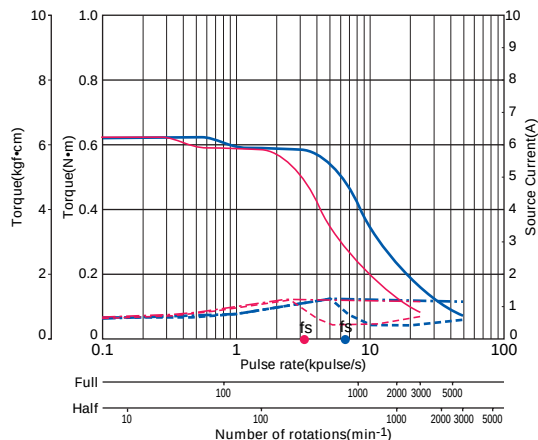
— Getaway torque($J_{L1}=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

fs : Maximum self-start frequency when not load

■ Full-step ■ Half-step

● DP22F781□ : 24V



103F7851-70□□

Source voltage : DC24V•Winding current : 0.75A/phase

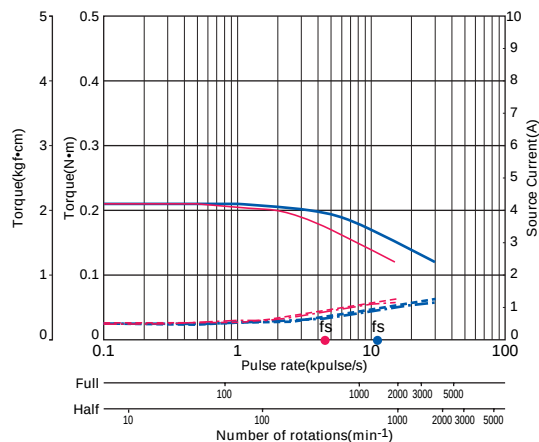
— Getaway torque($J_{L1}=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

fs : Maximum self-start frequency when not load

■ Full-step ■ Half-step

● DP22F552□ / DP22F552S-XB : 36V



103F5508-70□□/103F5508-70XB41

Source voltage : DC36V•Winding current : 0.75A/phase

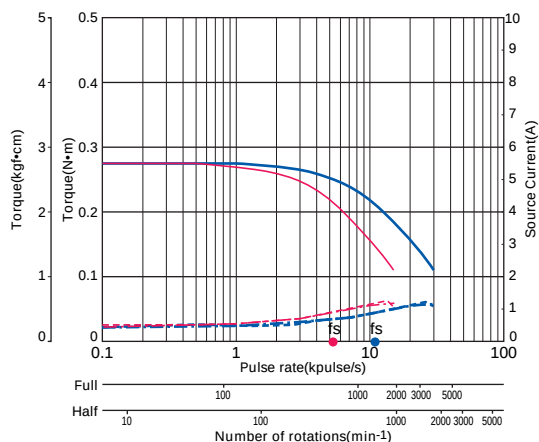
— Getaway torque($J_{L1}=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

fs : Maximum self-start frequency when not load

■ Full-step ■ Half-step

● DP22F554□ / DP22F554S-XB : 36V



103F5510-70□□/103F5510-70XB41

Source voltage : DC36V•Winding current : 0.75A/phase

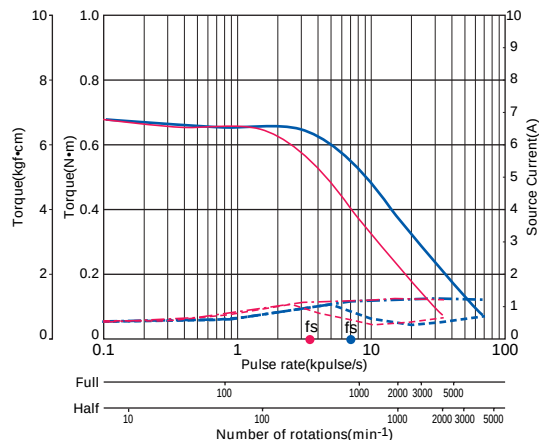
— Getaway torque($J_{L1}=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

fs : Maximum self-start frequency when not load

■ Full-step ■ Half-step

● DP22F781□ : 36V



103F7851-70□□

Source voltage : DC36V•Winding current : 0.75A/phase

— Getaway torque($J_{L1}=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

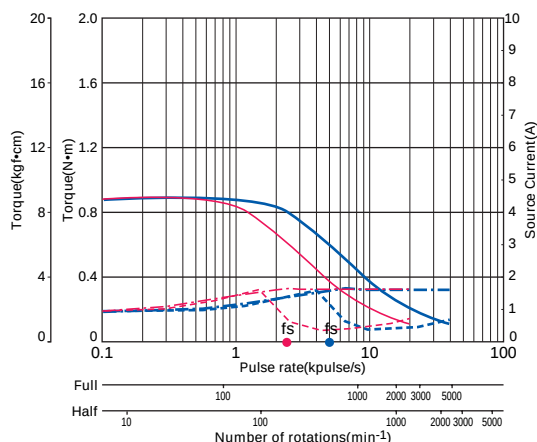
--- Source current($T_L=\text{MAX}$) --- Source current($T_L=0$)

fs : Maximum self-start frequency when not load

■ Full-step ■ Half-step

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

● DP22F782 □ : 24V



103F7852-70 □ □

Source voltage : DC24V • Winding current : 0.75A/phase

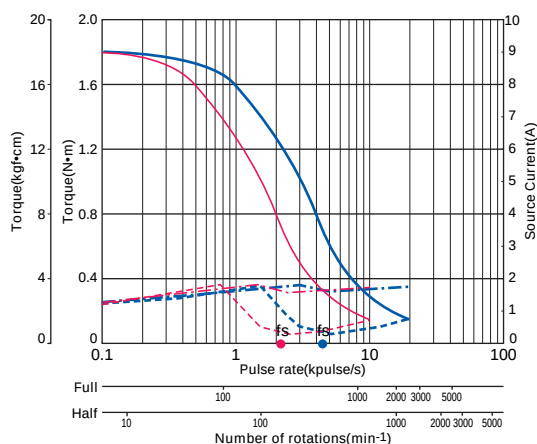
— Getaway torque ($J_{L1}=2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

- - - Source current (TL=MAX) - - - Source current (TL=0)

fs : Maximum self-start frequency when not load

■ Full-step ■ Half-step

● DP22F783 □ : 24V



103F7853-70 □ □

Source voltage : DC24V • Winding current : 0.75A/phase

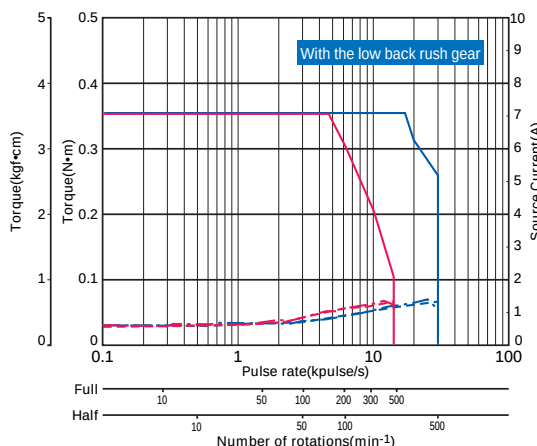
— Getaway torque ($J_{L1}=7.4 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

- - - Source current (TL=MAX) - - - Source current (TL=0)

fs : Maximum self-start frequency when not load

■ Full-step ■ Half-step

● DP22F551 □ -CX3.6 : 24V



103F5505-70CX □ □

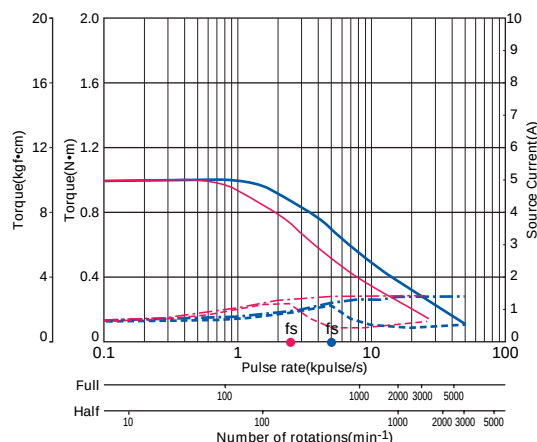
Source voltage : DC24V • Winding current : 0.75A/phase

— Allowable torque ($J_{L1}=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

- - - Source current (TL=MAX) - - - Source current (TL=0)

■ Full-step ■ Half-step

● DP22F782 □ : 36V



103F7852-70 □ □

Source voltage : DC36V • Winding current : 0.75A/phase

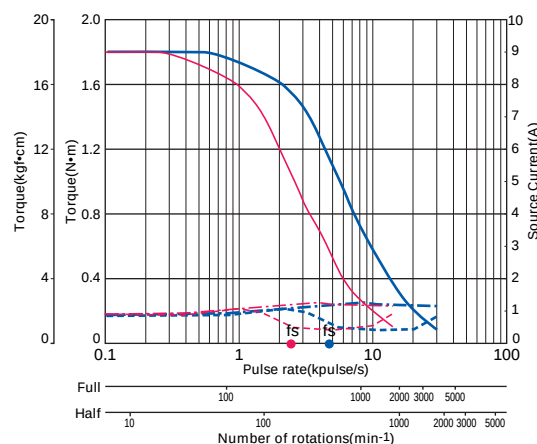
— Getaway torque ($J_{L1}=2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

- - - Source current (TL=MAX) - - - Source current (TL=0)

fs : Maximum self-start frequency when not load

■ Full-step ■ Half-step

● DP22F783 □ : 36V



103F7853-70 □ □

Source voltage : DC36V • Winding current : 0.75A/phase

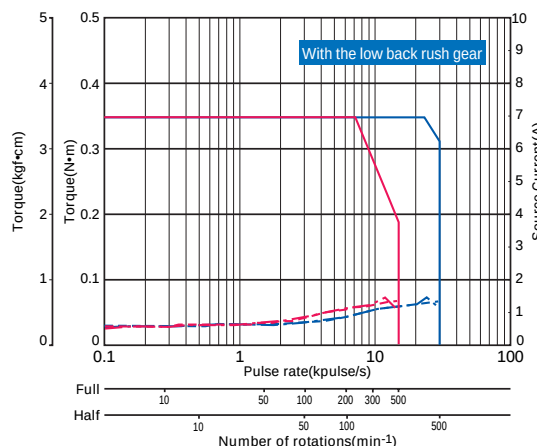
— Getaway torque ($J_{L1}=7.4 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

- - - Source current (TL=MAX) - - - Source current (TL=0)

fs : Maximum self-start frequency when not load

■ Full-step ■ Half-step

● DP22F551 □ -CX3.6 : 36V



103F5505-70CX □ □

Source voltage : DC36V • Winding current : 0.75A/phase

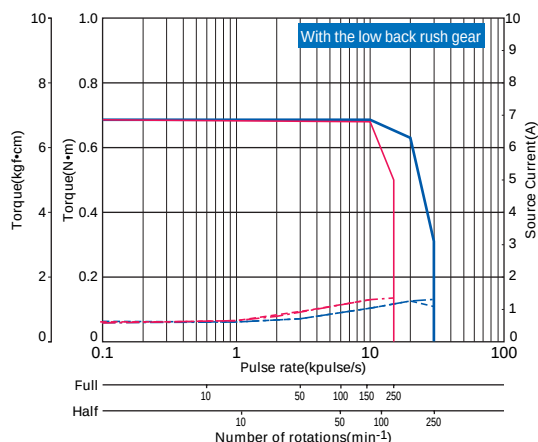
— Allowable torque ($J_{L1}=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

- - - Source current (TL=MAX) - - - Source current (TL=0)

■ Full-step ■ Half-step

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

● DP22F551□-CX7.2 : 24V



103F5505-70CXB□

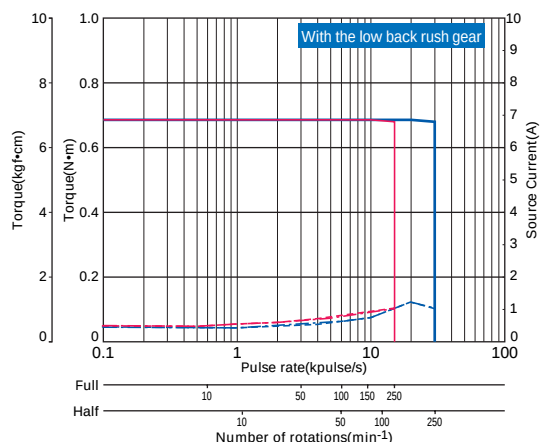
Source voltage : DC24V•Winding current : 0.75A/phase

— Allowable torque($J_{L1}=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ Full-step ■ Half-step

● DP22F551□-CX7.2 : 36V



103F5505-70CXB□

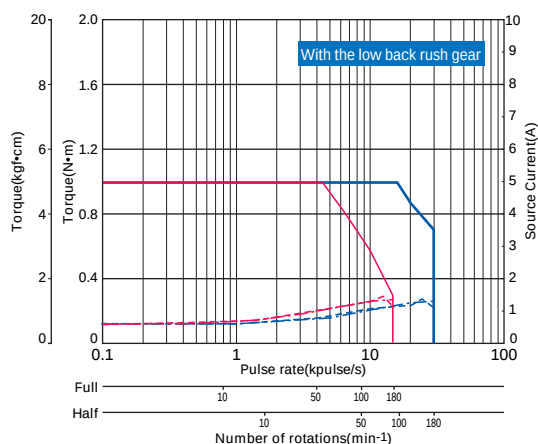
Source voltage : DC36V•Winding current : 0.75A/phase

— Allowable torque($J_{L1}=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ Full-step ■ Half-step

● DP22F551□-CX10 : 24V



103F5505-70CXE□

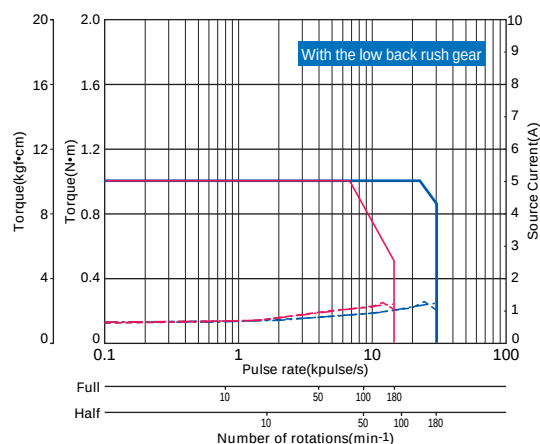
Source voltage : DC24V•Winding current : 0.75A/phase

— Allowable torque($J_{L1}=2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ Full-step ■ Half-step

● DP22F551□-CX10 : 36V



103F5505-70CXE□

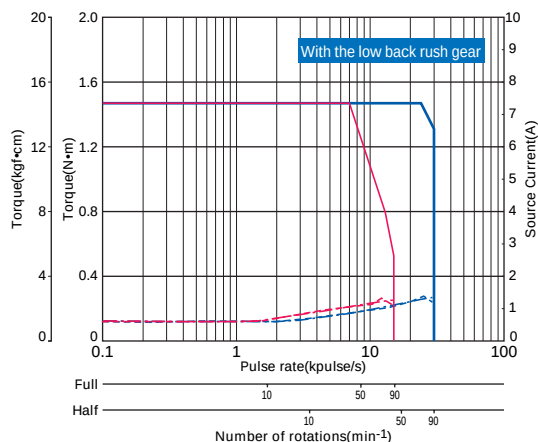
Source voltage : DC36V•Winding current : 0.75A/phase

— Allowable torque($J_{L1}=2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ Full-step ■ Half-step

● DP22F551□-CX20 : 24V



103F5505-70CXG□

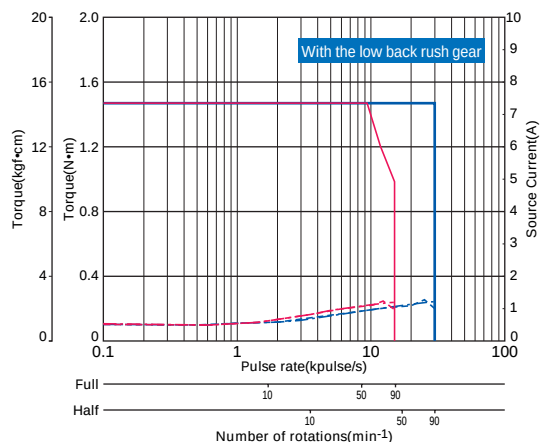
Source voltage : DC24V•Winding current : 0.75A/phase

— Allowable torque($J_{L1}=2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ Full-step ■ Half-step

● DP22F551□-CX20 : 36V



103F5505-70CXG□

Source voltage : DC36V•Winding current : 0.75A/phase

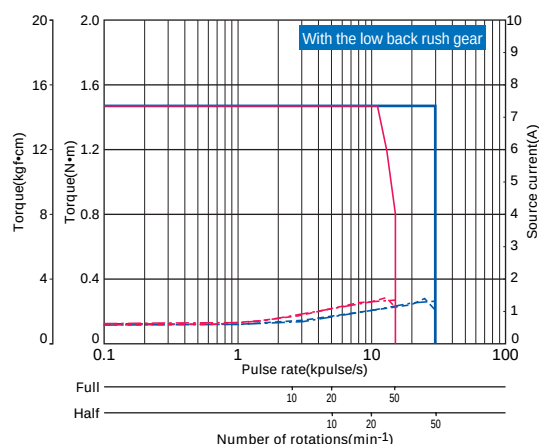
— Allowable torque($J_{L1}=2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ Full-step ■ Half-step

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

● DP22F551 □ CX30 : 24V



103F5505-70CXJ □

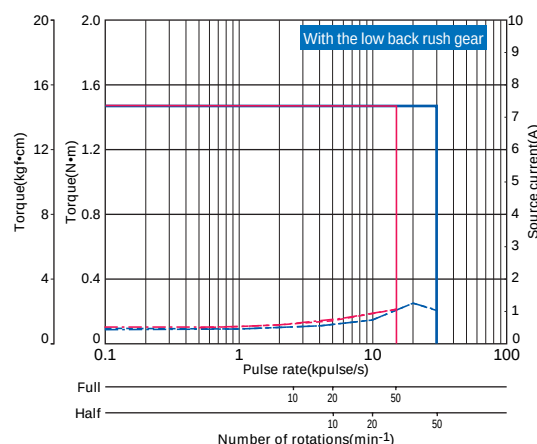
Source voltage : DC24V • Winding current : 0.75A/phase

— Allowable torque ($J_{L1}=2.6 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ Full-step ■ Half-step

● DP22F551 □ CX30 : 36V



103F5505-70CXJ □

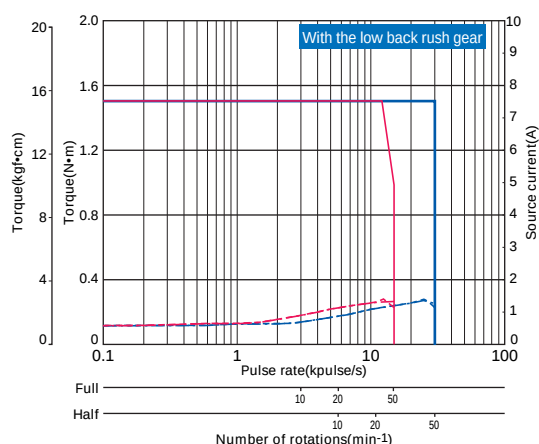
Source voltage : DC36V • Winding current : 0.75A/phase

— Allowable torque ($J_{L1}=2.6 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ Full-step ■ Half-step

● DP22F551 □ CX36 : 24V



103F5505-70CXK □

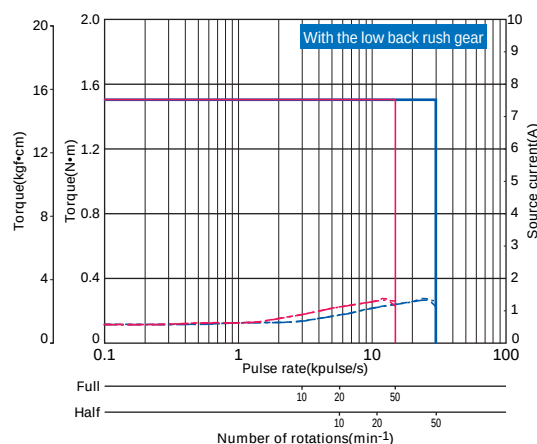
Source voltage : DC24V • Winding current : 0.75A/phase

— Allowable torque ($J_{L1}=2.6 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ Full-step ■ Half-step

● DP22F551 □ CX36 : 36V



103F5505-70CXK □

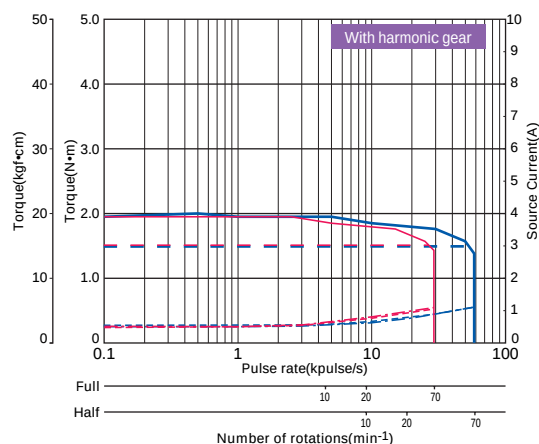
Source voltage : DC36V • Winding current : 0.75A/phase

— Allowable torque ($J_{L1}=2.6 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ Full-step ■ Half-step

● DP22F351 □ HX50 : 24V



103F3505-70HXL □ ■ Full-step ■ Half-step

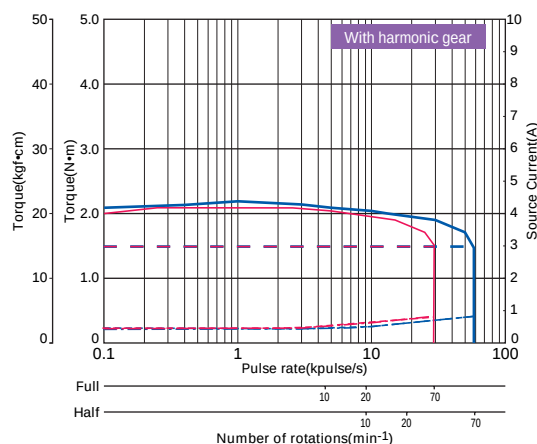
Source voltage : DC24V • Winding current : 0.75A/phase

— Instantaneous allowable torque ($J_{L1}=0.33 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ Uses rubber coupling)

- - - Allowable torque ($J_{L1}=0.33 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ Uses rubber coupling)

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

● DP22F351 □ HX50 : 36V



103F3505-70HXL □ ■ Full-step ■ Half-step

Source voltage : DC36V • Winding current : 0.75A/phase

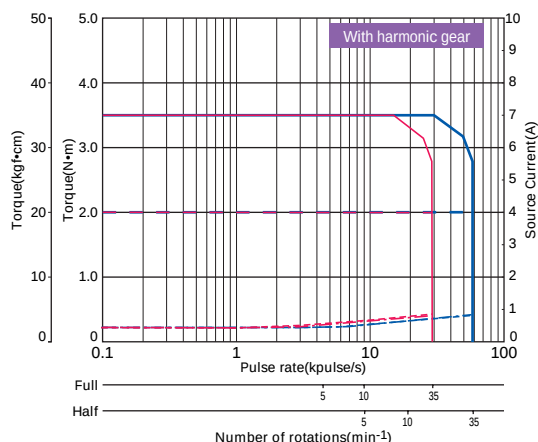
— Instantaneous allowable torque ($J_{L1}=0.33 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ Uses rubber coupling)

- - - Allowable torque ($J_{L1}=0.33 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ Uses rubber coupling)

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

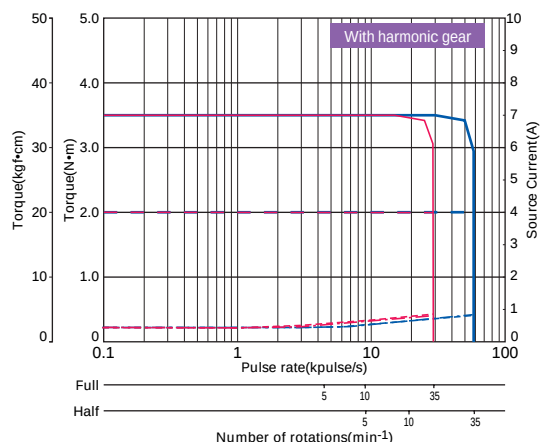
Pulse rate-torque characteristics/pulse rate-source current characteristics

● DP22F351□-HX100 : 24V



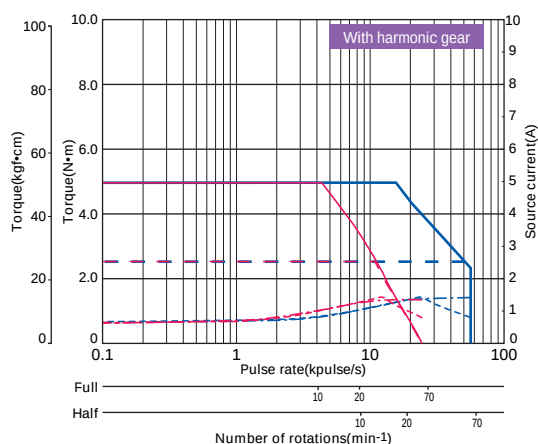
103F3505-70HXM□ ■ Full-step ■ Half-step
Source voltage : DC24V•Winding current : 0.75A/phase
— Instantaneous allowable torque($J_{L1}=7.4 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
-- Allowable torque($J_{L1}=7.4 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current($T_L=\text{MAX}$) --- Source current($T_L=0$)

● DP22F351□-HX100 : 36V



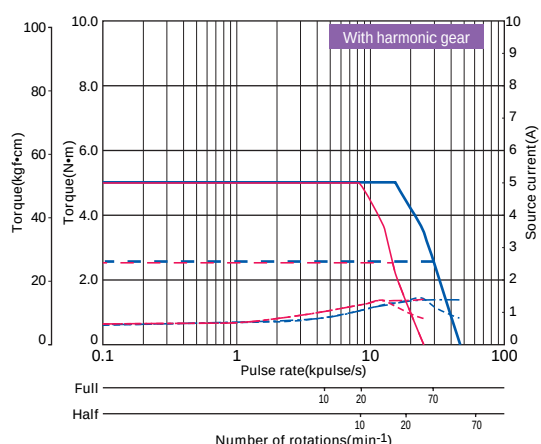
103F3505-70HXM□ ■ Full-step ■ Half-step
Source voltage : DC36V•Winding current : 0.75A/phase
— Instantaneous allowable torque($J_{L1}=7.4 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
-- Allowable torque($J_{L1}=7.4 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current($T_L=\text{MAX}$) --- Source current($T_L=0$)

● DP22F551□-HX50 : 24V



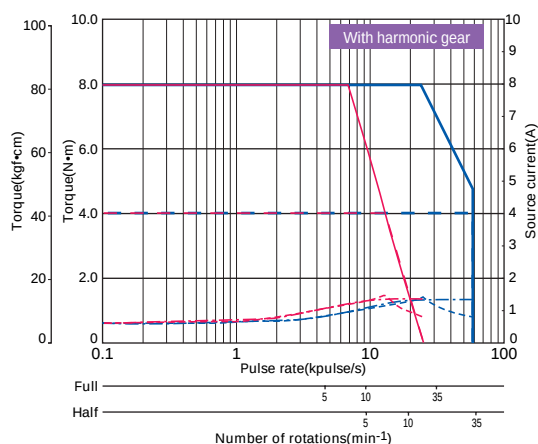
103F5505-70HXL□ ■ Full-step ■ Half-step
Source voltage : DC24V•Winding current : 0.75A/phase
— Instantaneous allowable torque($J_{L1}=15.1 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
-- Allowable torque($J_{L1}=15.1 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current($T_L=\text{MAX}$) --- Source current($T_L=0$)

● DP22F551□-HX50 : 36V



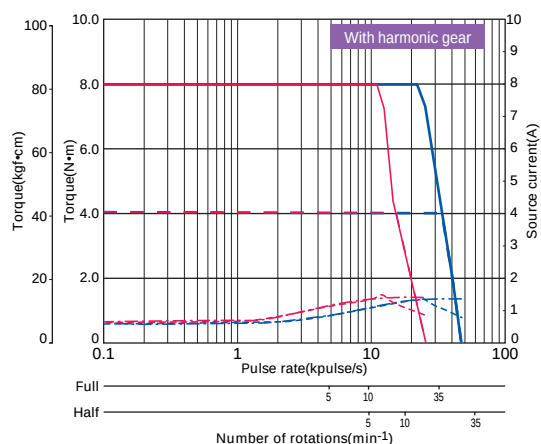
103F5505-70HXL□ ■ Full-step ■ Half-step
Source voltage : DC36V•Winding current : 0.75A/phase
— Instantaneous allowable torque($J_{L1}=15.1 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
-- Allowable torque($J_{L1}=15.1 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current($T_L=\text{MAX}$) --- Source current($T_L=0$)

● DP22F551□-HX100 : 24V



103F5505-70HXM□ ■ Full-step ■ Half-step
Source voltage : DC24V•Winding current : 0.75A/phase
— Instantaneous allowable torque($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
-- Allowable torque($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current($T_L=\text{MAX}$) --- Source current($T_L=0$)

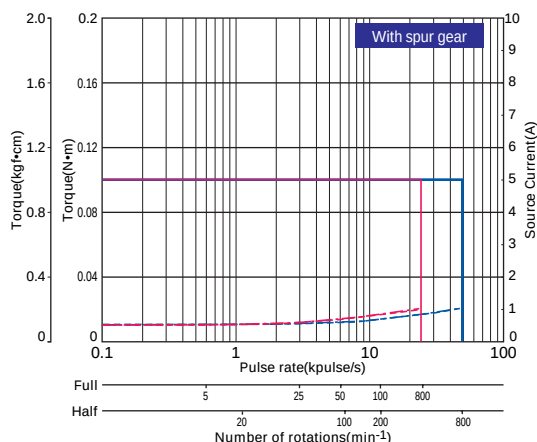
● DP22F551□-HX100 : 36V



103F5505-70HXM□ ■ Full-step ■ Half-step
Source voltage : DC36V•Winding current : 0.75A/phase
— Instantaneous allowable torque($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
-- Allowable torque($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current($T_L=\text{MAX}$) --- Source current($T_L=0$)

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

● DP22F351□-GX3.6 : 24V



103F3505-70GXA□□

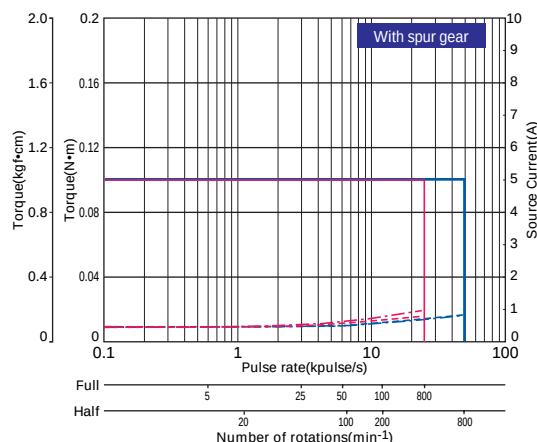
Source voltage : DC24V•Winding current : 0.75A/phase

— Allowable torque($JL1=0.33 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

--- Source current($TL=MAX$) --- Source current($TL=0$)

■ Full-step ■ Half-step

● DP22F351□-GX3.6 : 36V



103F3505-70GXA□□

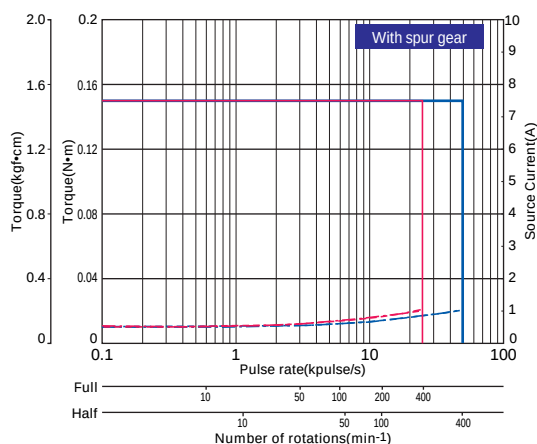
Source voltage : DC36V•Winding current : 0.75A/phase

— Allowable torque($JL1=0.33 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

--- Source current($TL=MAX$) --- Source current($TL=0$)

■ Full-step ■ Half-step

● DP22F351□-GX7.2 : 24V



103F3505-70GXB□□

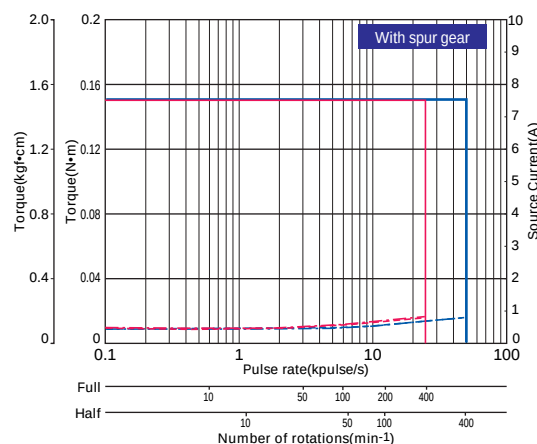
Source voltage : DC24V•Winding current : 0.75A/phase

— Allowable torque($JL1=0.33 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

--- Source current($TL=MAX$) --- Source current($TL=0$)

■ Full-step ■ Half-step

● DP22F351□-GX7.2 : 36V



103F3505-70GXB□□

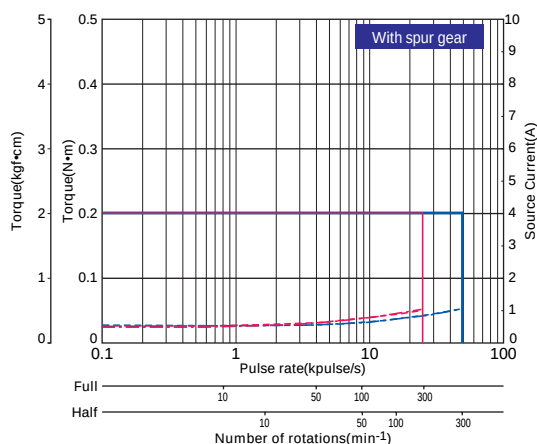
Source voltage : DC36V•Winding current : 0.75A/phase

— Allowable torque($JL1=0.33 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

--- Source current($TL=MAX$) --- Source current($TL=0$)

■ Full-step ■ Half-step

● DP22F351□-GX10 : 24V



103F3505-70GXE□□

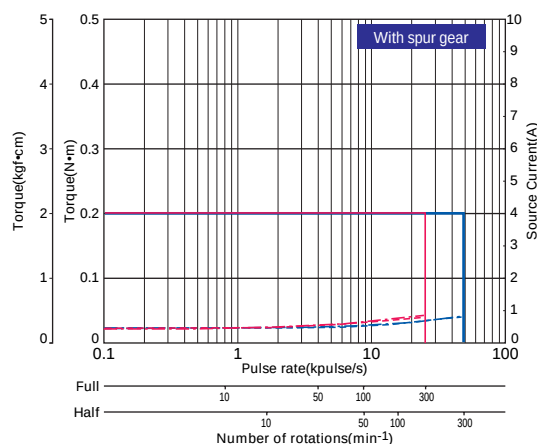
Source voltage : DC24V•Winding current : 0.75A/phase

— Allowable torque($JL1=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

--- Source current($TL=MAX$) --- Source current($TL=0$)

■ Full-step ■ Half-step

● DP22F351□-GX10 : 36V



103F3505-70GXE□□

Source voltage : DC36V•Winding current : 0.75A/phase

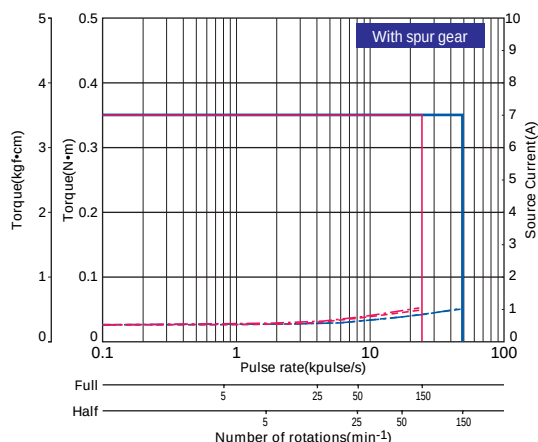
— Allowable torque($JL1=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

--- Source current($TL=MAX$) --- Source current($TL=0$)

■ Full-step ■ Half-step

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

● DP22F351□-GX20 : 24V



103F3505-70GXG□

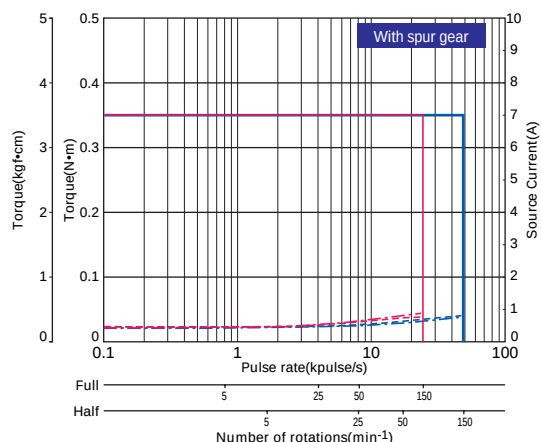
Source voltage : DC24V•Winding current : 0.75A/phase

— Allowable torque($J_{L1}=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ Full-step ■ Half-step

● DP22F351□-GX20 : 36V



103F3505-70GXG□

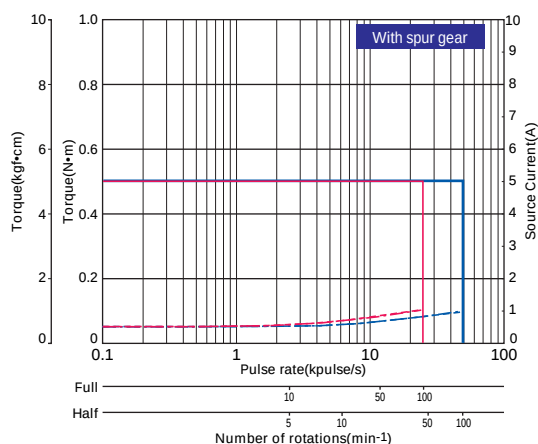
Source voltage : DC36V•Winding current : 0.75A/phase

— Allowable torque($J_{L1}=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ Full-step ■ Half-step

● DP22F351□-GX30 : 24V



103F3505-70GXJ□

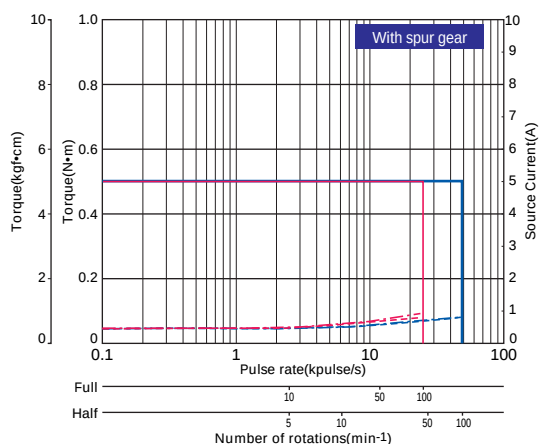
Source voltage : DC24V•Winding current : 0.75A/phase

— Allowable torque($J_{L1}=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ Full-step ■ Half-step

● DP22F351□-GX30 : 36V



103F3505-70GXJ□

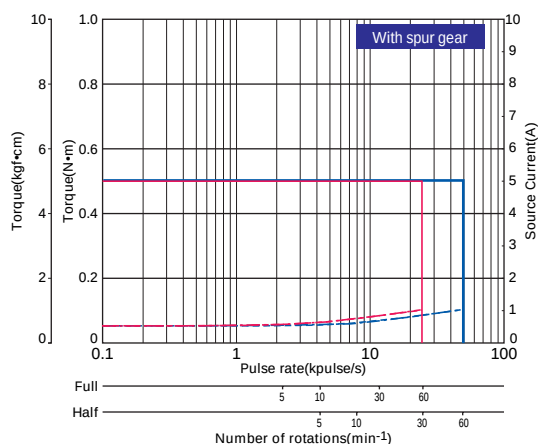
Source voltage : DC36V•Winding current : 0.75A/phase

— Allowable torque($J_{L1}=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ Full-step ■ Half-step

● DP22F351□-GX50 : 24V



103F3505-70GXL□

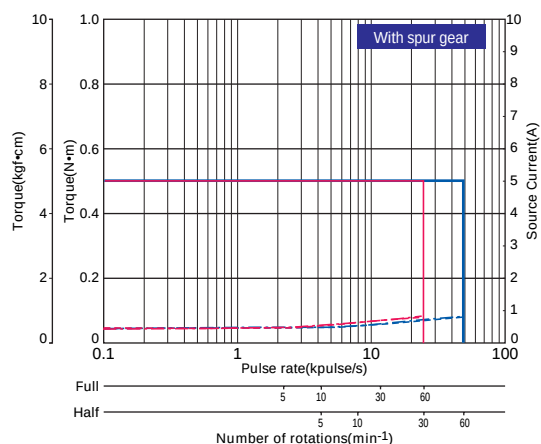
Source voltage : DC24V•Winding current : 0.75A/phase

— Allowable torque($J_{L1}=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ Full-step ■ Half-step

● DP22F351□-GX50 : 36V



103F3505-70GXL□

Source voltage : DC36V•Winding current : 0.75A/phase

— Allowable torque($J_{L1}=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ Full-step ■ Half-step



The 5-phase Stepping Set

DP3 series

DC24V

Full-step/half-step

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

Configuration of the 5-phase Stepping Motor Set, DP3 Series

Name	Quantity
DP3 Series Instruction Manual	1 pc.
PM Driver	1 pc.
Stepping Motor	1 pc.
Power Cable (CN1)	1 pc.
Input Cable (CN2)	1 pc.
Stepping Motor Cable (CN3)	1 pc.

Characteristics

- **Fast operation**
This product is a fast operation version of the DP2 series.
- **Flexible**
This stepping system is able to drive wide variety of stepping motors from small capacity to large capacity without adjustment, resulting in wide applications.
- **Compact**
Mounting dedicated gate arrays realizes highly integrated and higher reliable system.

Built-in function

- **Excitation system selectable**
Full-step or half-step can be selected through an external input signal.
- **Power down function**
Stepping motor current can be turned off through an external input signal.

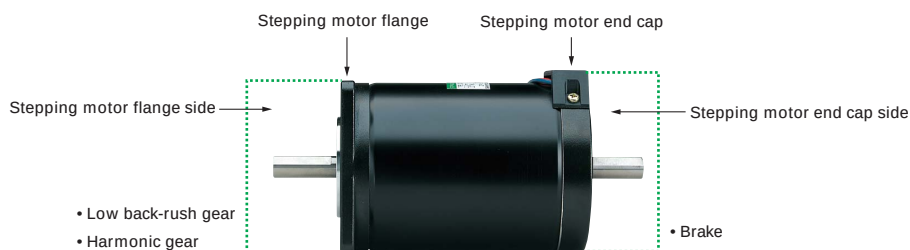
Explanation of set model number

① System on the stepping motor flange side

Code	Flange side	Deceleration ratio
C	Low back-rush gear	1 / 3.6, 1 / 7.2, 1 / 10, 1 / 20, 1 / 30, 1 / 36
H	Harmonic gear	1 / 50, 1 / 100
X	None	

② System on the stepping motor end cap side

Code	End cap side	Function
B	Brake	Electromagnetic brake
E	Encoder	Please contact us regarding the encoder
X	None	



③ Deceleration ratio of gear system

Example: deceleration ratio 1 / 3.6 → 3.6

Explanation for model number in the combined case

The set model number of the stepping motor is as follows when PMDP1S6P01 and 103F7853 type are combined and equipped with the system of harmonic gear (1/100) and brake:

DP33F783D—H B 100

Standard set model number

③ Gear deceleration ratio (1/100)
 ② Brake
 ① Harmonic gear

How to order

Please use the "Set Model Number" in the List of Combined Stepping Motor Model Number for the 5-phase Stepping Set, DP3 Series.

To order gear, brake, and encoder, put the product code number after the set number according to the "Explanation of combination numbering" ①, ②, and ③.

PM driver specifications

Model number			PMDPB1S6P01
Standard specification	Input source	For main power	DC24V±10%
		Source current	3.5A
	Environment	Operating ambient temperature	0 ~ +50°C
		Conservation temperature	-20 ~ +70°C
		Operating ambient humidity	35 ~ 85%RH (no condensation)
		Conservation humidity	10 ~ 90%RH (no condensation)
		Vibration resistance	0.5G Tested under the following conditions, frequency range: 10 to 55Hz, direction: along the X, Y, and Z axes, for 2 hours
		Impact resistance	Considering the NDS-C-0110 standard section 3.2.2 division "C", not influenced.
		Withstand voltage	Not influenced when applying AC500V between the power input terminal and cabinet for one minute.
		Insulation resistance	10MΩ or more when applying DC500V between the power input terminal and cabinet.
		Weight	0.4kg
I/O signals	Function		Select function
			Pulse input system (option)
	Command pulse input signal		Photo coupler input method, input resistance 330Ω Input signal voltage "H" level: 4.0 to 5.5V, "L" level: 0 to 0.5V Maximum input frequency 400 kpulse/s
	Power down input signal		Photo coupler input method, input resistance 330Ω Input signal voltage "H" level: 4.0 to 5.5V, "L" level: 0 to 0.5V
Energization system selection input signal			Photo coupler input method, input resistance 330Ω Input signal voltage "H" level: 4.0 to 5.5V, "L" level: 0 to 0.5V

* For information about the operation, connection, function, and dimensions of the PM driver, refer to pages 217 and after.

Stepping motor common specifications

Item	Combined stepping motors of DP3 series
Insulation class	Class B (+130°C)
Withstand voltage	Conditions: AC1000V, 50/60 Hz, and for one minute
Insulation resistance	100MΩ or more against DC500V
Vibration resistance	Conditions: amplitude 1.52 mm (P-P), frequency range 10 to 55 Hz, 5 minutes sweep time, along X, Y, and Z axes, for 2 hours
Impact resistance	Conditions: 98 m/s ² acceleration, 11 minutes duration, half-wave/sine wave, three times each along X, Y, and Z axes, 18 times in total
Operating ambient temperature	-10~+50°C
Operating ambient humidity	20~90%(no condensation)

Standard combined stepping motors for 5-phase stepping set “DP3” series

PM driver model number : PMDPB1S6P01

Combination Model Number for STEPSYN F Series

System support	Dimensions of stepping motor	Single-axis shaft		Dual-axis shaft	
		Set model number	Standard combined stepping motor number	Set model number	Standard combined stepping motor number
Standard type	□ 60mm	DP33F781S	103F7851-8041	DP33F781D	103F7851-8011
		DP33F782S	103F7852-8041	DP33F782D	103F7852-8011
		DP33F783S	103F7853-8041	DP33F783D	103F7853-8011
	ø 86mm	DP33F851S	103F8581-8041	DP33F851D	103F8581-8011
		DP33F852S	103F8582-8041	DP33F852D	103F8582-8011
		DP33F853S	103F8583-8041	DP33F853D	103F8583-8011
Low back-rush gear	□ 60mm	DP33F781S-CX3.6	103F7851-80CXA4	DP33F781D-CX3.6	103F7851-80CXA1
		DP33F781S-CX7.2	103F7851-80CXB4	DP33F781D-CX7.2	103F7851-80CXB1
		DP33F781S-CX10	103F7851-80CXE4	DP33F781D-CX10	103F7851-80CXE1
		DP33F781S-CX20	103F7851-80CXG4	DP33F781D-CX20	103F7851-80CXG1
		DP33F781S-CX30	103F7851-80CXJ4	DP33F781D-CX30	103F7851-80CXJ1
		DP33F781S-CX36	103F7851-80CCK4	DP33F781D-CX36	103F7851-80CCK1
	ø 86mm	DP33F851S-CX3.6	103F8581-80CXA4	DP33F851D-CX3.6	103F8581-80CXA1
		DP33F851S-CX7.2	103F8581-80CXB4	DP33F851D-CX7.2	103F8581-80CXB1
		DP33F851S-CX10	103F8581-80CXE4	DP33F851D-CX10	103F8581-80CXE1
		DP33F851S-CX20	103F8581-80CXG4	DP33F851D-CX20	103F8581-80CXG1
		DP33F851S-CX30	103F8581-80CXJ4	DP33F851D-CX30	103F8581-80CXJ1
		DP33F851S-CX36	103F8581-80CCK4	DP33F851D-CX36	103F8581-80CCK1
Harmonic gear	□ 60mm	DP33F781S-HX50	103F7851-80HXL4	DP33F781D-HX50	103F7851-80HXL1
		DP33F781S-HX100	103F7851-80HXM4	DP33F781D-HX100	103F7851-80HXM1
	ø 86mm	DP33F851S-HX50	103F8581-80HXL4	DP33F851D-HX50	103F8581-80HXL1
		DP33F851S-HX100	103F8581-80HXM4	DP33F851D-HX100	103F8581-80HXM1
Electromagnetic brake	□ 60mm	DP33F781S-XB	103F7851-80XB41		
		DP33F782S-XB	103F7852-80XB41		
		DP33F783S-XB	103F7853-80XB41		
	ø 86mm	DP33F851S-XB	103F8581-80XB41		
		DP33F852S-XB	103F8582-80XB41		
		DP33F853S-XB	103F8583-80XB41		

Note) Contact our sales department to order the system with an encoder and/or gear and brake.

Stepping motor data sheet

STEPSYN F Series (Standard)

Set model number	Single-axis shaft	DP33F781S	DP33F782S	DP33F783S
	Dual-axis shaft	DP33F781D	DP33F782D	DP33F783D
Holding torque	N•m	0.6	0.93	1.79
Rotor inertia	$\times 10^{-4} \text{kg} \cdot \text{m}^2$	0.275	0.4	0.84
Weight	kg	0.6	0.78	1.36
Allowable thrust load	N	20	20	20
Allowable radial load	N	80	80	80

Set model number	Single-axis shaft	DP33F851S	DP33F852S	DP33F853S
	Dual-axis shaft	DP33F851D	DP33F852D	DP33F853D
Holding torque	N•m	2.06	4.02	6.17
Rotor inertia	$\times 10^{-4} \text{kg} \cdot \text{m}^2$	1.45	2.9	4.4
Weight	kg	1.5	2.5	3.5
Allowable thrust load	N	60	60	60
Allowable radial load	N	220	220	220

STEPSYN F Series (With low back rush gear)

Set model number	Single-axis shaft	DP33F781S-CX3.6	DP33F781S-CX7.2	DP33F781S-CX10	DP33F781S-CX20	DP33F781S-CX30	DP33F781S-CX36
	Dual-axis shaft	DP33F781D-CX3.6	DP33F781D-CX7.2	DP33F781D-CX10	DP33F781D-CX20	DP33F781D-CX30	DP33F781D-CX36
Allowable torque	N•m	1.25	2.5	3	3.5	4	4
Rotor inertia	$\times 10^{-4} \text{kg} \cdot \text{m}^2$	0.275					
Basic step angle	°	0.2	0.1	0.072	0.036	0.024	0.02
Deceleration ratio		1 : 3.6	1 : 7.2	1 : 10	1 : 20	1 : 30	1 : 36
Back rush	°	0.55	0.25	0.25	0.17	0.17	0.17
Allowable number of rotations	min ⁻¹	500	250	180	90	60	50
Weight	kg	0.97					
Allowable thrust load	N	30					
Allowable radial load	N	100					

* The rotation direction of the motor and the gear output shaft is as follows: when deceleration ratio is 1:3.6 or 1:7.2, both motor and shaft rotate in the same direction, and for 1:10, 1:20, or 1:30 type, the motor and the shaft rotate in opposite direction.

Set model number	Single-axis shaft	DP33F851S-CX3.6	DP33F851S-CX7.2	DP33F851S-CX10	DP33F851S-CX20	DP33F851S-CX30	DP33F851S-CX36
	Dual-axis shaft	DP33F851D-CX3.6	DP33F851D-CX7.2	DP33F851D-CX10	DP33F851D-CX20	DP33F851D-CX30	DP33F851D-CX36
Allowable torque	N•m	4.5	9	9	12	12	12
Rotor inertia	$\times 10^{-4} \text{kg} \cdot \text{m}^2$	1.45					
Basic step angle	°	0.2	0.1	0.072	0.036	0.024	0.02
Deceleration ratio		1 : 3.6	1 : 7.2	1 : 10	1 : 20	1 : 30	1 : 36
Back rush	°	0.4	0.25	0.25	0.17	0.17	0.15
Allowable number of rotations	min ⁻¹	500	250	180	90	60	50
Weight	kg	2.7					
Allowable thrust load	N	60					
Allowable radial load	N	300					

* The rotation direction of the motor and the gear output shaft is as follows: when deceleration ratio is 1:3.6 or 1:7.2, both motor and shaft rotate in the same direction, and for 1:10, 1:20, or 1:30 type, the motor and the shaft rotate in opposite direction.

Stepping motor data sheet

STEPSYN F Series (With harmonic gear)

Set model number	Single-axis shaft	DP33F781S-HX50	DP33F781S-HX100
	Dual-axis shaft	DP33F781D-HX50	DP33F781D-HX100
Allowable torque	N•m	5.5	8
Rotor inertia	$\times 10^{-4} \text{kg} \cdot \text{m}^2$	0.31	
Basic step angle	°	0.0144	0.0072
Deceleration ratio		1 : 50	1 : 100
Lost motion	Minute	0.4~3 ($\pm 0.28 \text{ N} \cdot \text{m}$)	0.4~1.5 ($\pm 0.4 \text{ N} \cdot \text{m}$)
Allowable number of rotations	min^{-1}	70	35
Weight	kg	1.2	
Allowable thrust load	N	400	
Allowable radial load	N	400	

* The gear output shaft rotates in the opposite direction of the motor.

Set model number	Single-axis shaft	DP33F851S-HX50	DP33F851S-HX100
	Dual-axis shaft	DP33F851D-HX50	DP33F851D-HX100
Allowable torque	N•m	25	41
Rotor inertia	$\times 10^{-4} \text{kg} \cdot \text{m}^2$	1.65	
Basic step angle	°	0.0144	0.0072
Deceleration ratio		1 : 50	1 : 100
Lost motion	Minute	0.4~3 ($\pm 1.0 \text{ N} \cdot \text{m}$)	0.4~3 ($\pm 1.2 \text{ N} \cdot \text{m}$)
Allowable number of rotations	min^{-1}	500	250
Weight	kg	3.3	
Allowable thrust load	N	1400	
Allowable radial load	N	1400	

* The gear output shaft rotates in the opposite direction of the motor.

STEPSYN F Series (With electromagnetic brake)

Set model number	Single-axis shaft	DP33F781S-XB	DP33F782S-XB	DP33F783S-XB
	Dual-axis shaft			
Holding torque	N•m	0.6	0.93	1.79
Rotor inertia	$\times 10^{-4} \text{kg} \cdot \text{m}^2$	0.43	0.56	1
Weight	kg	0.94	1.12	1.7
Allowable thrust load	N	20	20	20
Allowable radial load	N	80	80	80
Electromagnetic brake specification	Brake operation system	Non-excitation operation system		
	Source voltage	DC 24 $\pm$ 5%		
	Exciting current	0.25		
	Electric power consumption	6		
	Static friction torque	0.8		
	Brake operating time	30		
	Brake release time	20		

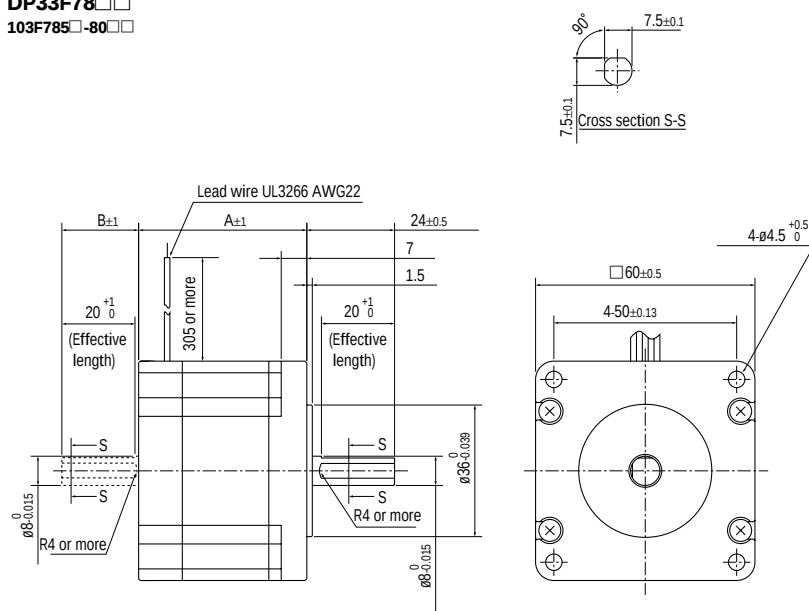
Set model number	Single-axis shaft	DP33F851S-XB	DP33F852S-XB	DP33F853S-XB
	Dual-axis shaft			
Holding torque	N•m	2.06	4.02	6.17
Rotor inertia	$\times 10^{-4} \text{kg} \cdot \text{m}^2$	2.24	3.69	5.19
Weight	kg	3.5	4.5	5.5
Allowable thrust load	N	60	60	60
Allowable radial load	N	220	220	220
Electromagnetic brake specification	Brake operation system	Non-excitation operation system		
	Source voltage	DC 24 $\pm$ 5%		
	Exciting current	0.42		
	Electric power consumption	10		
	Static friction torque	4		
	Brake operating time	50		
	Brake release time	20		

Dimensions (Unit: mm)

STEPSYN F

DP33F78□□

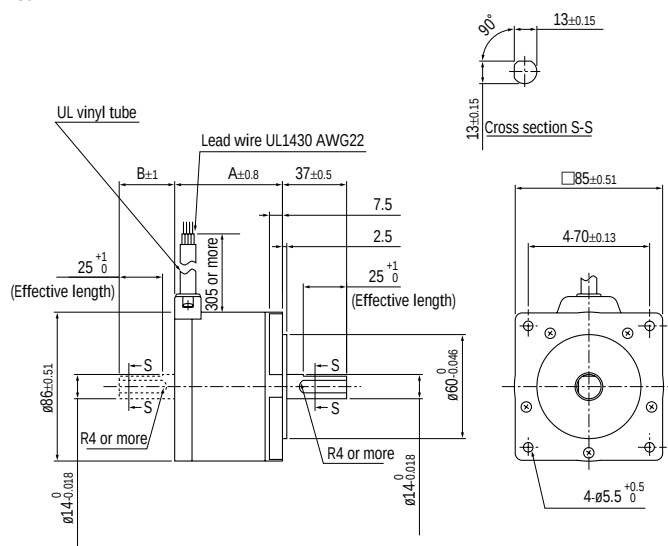
103F785□-80□□



Model name	A	B
DP33F781S (103F7851-8041)	46.5	—
DP33F781D (103F7851-8011)	46.5	21
DP33F782S (103F7852-8041)	55	—
DP33F782D (103F7852-8011)	55	21
DP33F783S (103F7853-8041)	87.5	—
DP33F783D (103F7853-8011)	87.5	21

DP33F85□□

103F858□-80□□

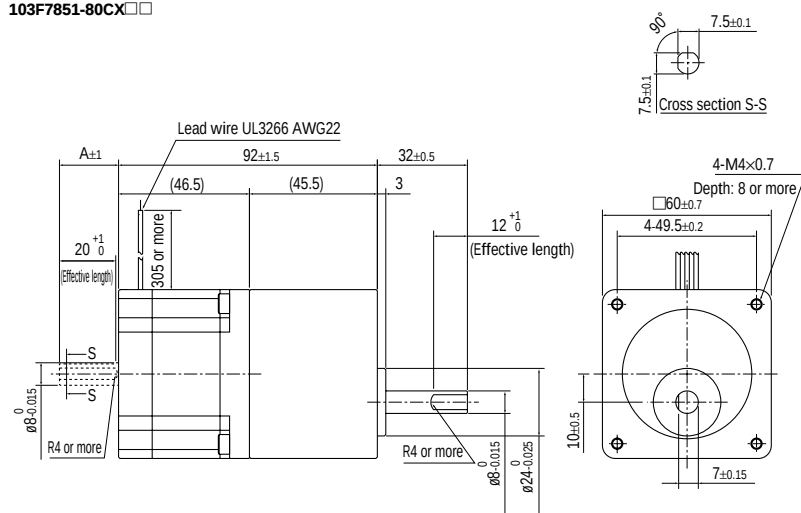


Model name	A	B
DP33F851S (103F8581-8041)	62.15	—
DP33F851D (103F8581-8011)	62.15	32
DP33F852S (103F8582-8041)	92.2	—
DP33F852D (103F8582-8011)	92.2	32
DP33F853S (103F8583-8041)	125.85	—
DP33F853D (103F8583-8011)	125.85	32

Dimensions (Unit: mm)

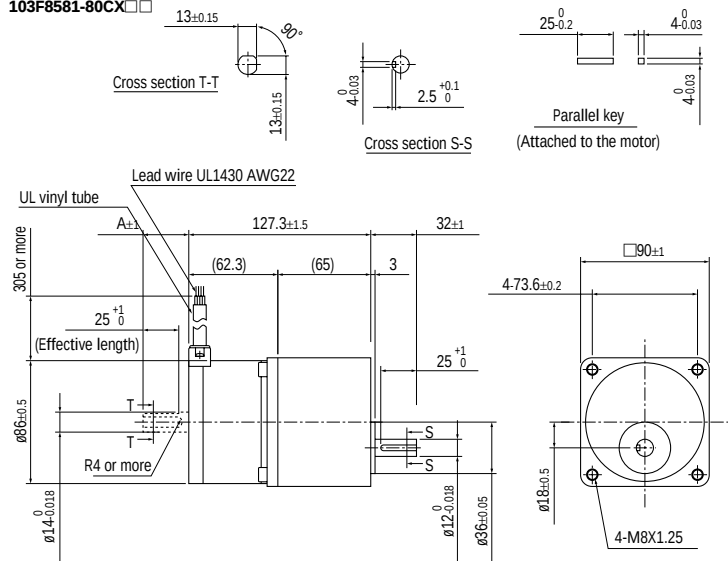
STEPSYN F with low back rush gear

DP33F781☐-CX☐☐

103F7851-80CX ☐ ☐

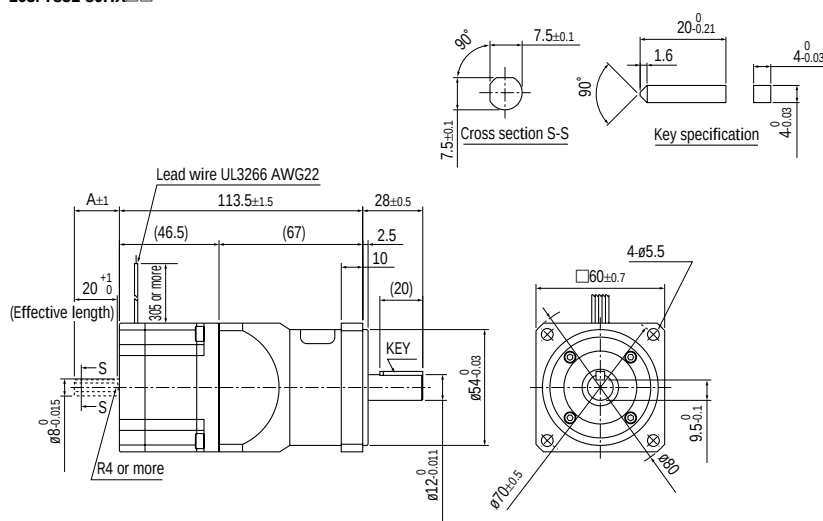
DP33F851☐-CX☐☐

103F8581-80CX ☐ ☐



STEPSYN F with harmonic gear

DP33F781□-HX□□

103F7851-80HX ☐ ☐

Model name	A
DP33F781S-CX3.6 (103F7851-80CXA4)	—
DP33F781D-CX3.6 (103F7851-80CXA1)	21
DP33F781S-CX7.2 (103F7851-80CXB4)	—
DP33F781D-CX7.2 (103F7851-80CXB1)	21
DP33F781S-CX10 (103F7851-80CXE4)	—
DP33F781D-CX10 (103F7851-80CXE1)	21
DP33F781S-CX20 (103F7851-80CXG4)	—
DP33F781D-CX20 (103F7851-80CXG1)	21
DP33F781S-CX30 (103F7851-80CXJ4)	—
DP33F781D-CX30 (103F7851-80CXJ1)	21
DP33F781S-CX36 (103F7851-80CXK4)	—
DP33F781D-CX36 (103F7851-80CXK1)	21

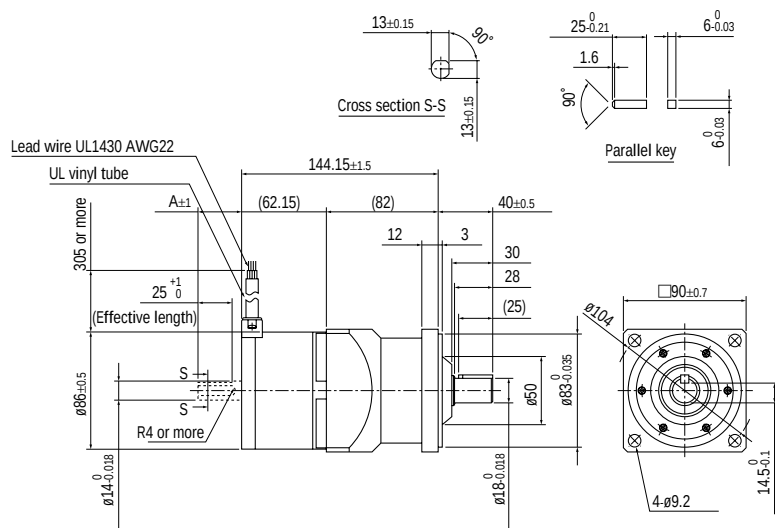
Model name	A
DP33F851S-CX3.6 (103F8581-80CXAA)	—
DP33F851D-CX3.6 (103F8581-80CXA1)	32
DP33F851S-CX7.2 (103F8581-80CXB4)	—
DP33F851D-CX7.2 (103F8581-80CXB1)	32
DP33F851S-CX10 (103F8581-80CXE4)	—
DP33F851D-CX10 (103F8581-80CXE1)	32
DP33F851S-CX20 (103F8581-80CXG4)	—
DP33F851D-CX20 (103F8581-80CXG1)	32
DP33F851S-CX30 (103F8581-80CXJ4)	—
DP33F851D-CX30 (103F8581-80CXJ1)	32
DP33F851S-CX36 (103F8581-80CXK4)	—
DP33F851D-CX36 (103F8581-80CXK1)	32

Model name	A
DP33F781S-HX50 (103F7851-80HXL4)	—
DP33F781D-HX50 (103F7851-80HXL1)	21
DP33F781S-HX100 (103F7851-80HXM4)	—
DP33F781D-HX100 (103F7851-80HXM1)	21

Dimensions (Unit: mm)

STEPSYN F with harmonic gear

DP33F851☐-HX☐☐

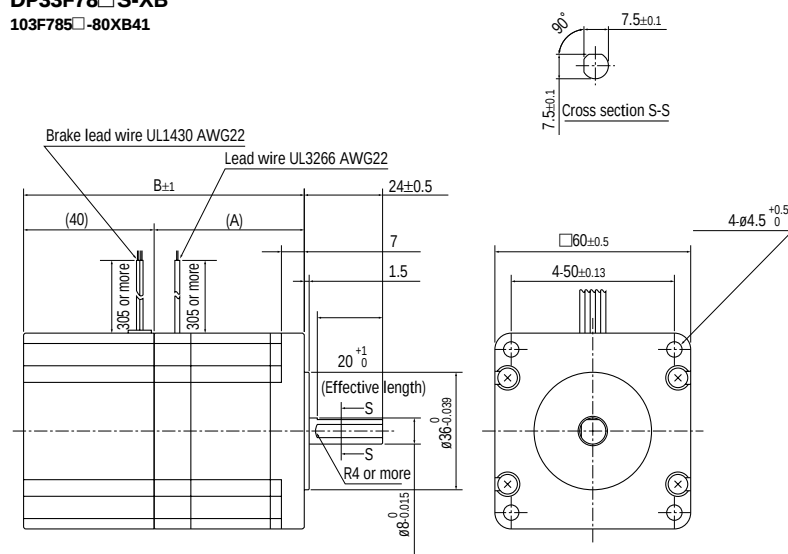
103F8581-80HX ☐ ☐

Model name	A
DP33F851S-HX50 (103F8581-80HXL4)	—
DP33F851D-HX50 (103F8581-80HXL1)	32
DP33F851S-HX100 (103F8581-80HXM4)	—
DP33F851D-HX100 (103F8581-80HXM1)	32

STEPSYN F with electromagnetic brake

DP33F78□ S-XB

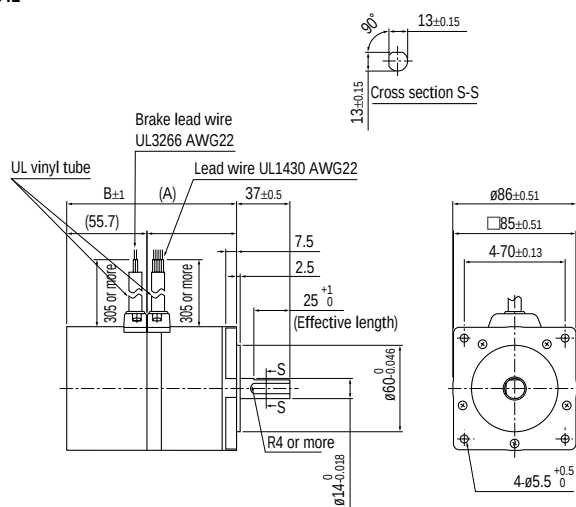
103F785-80XB41



Model name	A	B
DP33F781S-XB (103F7851-80XB41)	45.8	85.8
DP33F782S-XB (103F7852-80XB41)	54.5	94.5
DP33F783S-XB (103F7853-80XB41)	86.7	126.7

DP33F85 S-XB

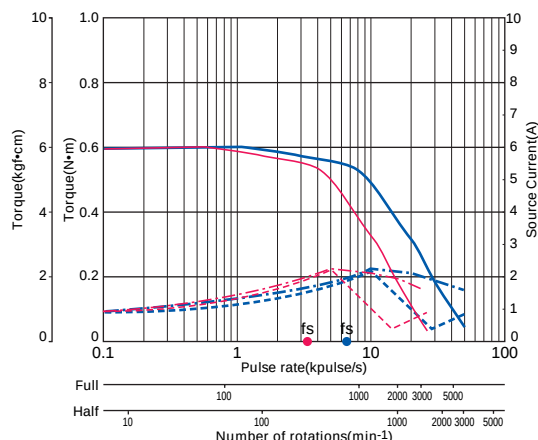
103F858-80XB41



Model name	A	B
DP33F851S-XB (103F8581-80XB41)	61.0	116.7
DP33F852S-XB (103F8582-80XB41)	91.1	146.8
DP33F853S-XB (103F8583-80XB41)	124.7	180.4

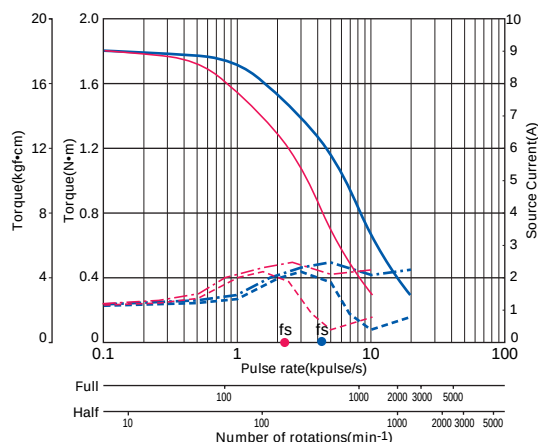
Pulse Rate-Torque Characteristics/Pulse Rate-Source Current Characteristics

● DP33F781□ / DP33F781S-XB : 24V



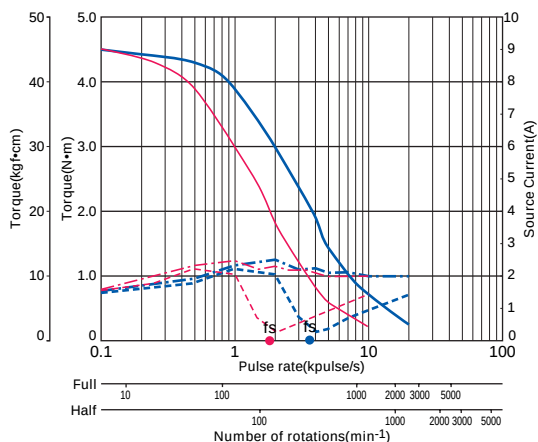
103F7851-80□□/103F7851-80XB41
Source voltage : DC24V•Winding current : 1.5A/phase
— Getaway torque($J_{L1}=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current($T_L=\text{MAX}$) --- Source current($T_L=0$)
fs : Maximum self-start frequency when not load
■ Full-step ■ Half-step

● DP33F783□ / DP33F783S-XB : 24V



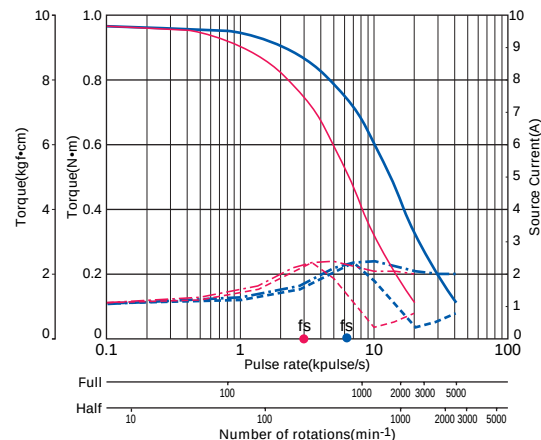
103F7853-80□□/103F7853-80XB41
Source voltage : DC24V•Winding current : 1.5A/phase
— Getaway torque($J_{L1}=7.4 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current($T_L=\text{MAX}$) --- Source current($T_L=0$)
fs : Maximum self-start frequency when not load
■ Full-step ■ Half-step

● DP33F852□ / DP33F852S-XB : 24V



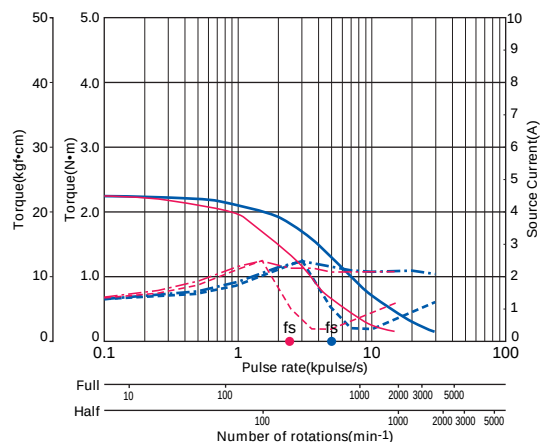
103F8582-80□□/103F8582-80XB41
Source voltage : DC24V•Winding current : 1.5A/phase
— Getaway torque($J_{L1}=7.4 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current($T_L=\text{MAX}$) --- Source current($T_L=0$)
fs : Maximum self-start frequency when not load
■ Full-step ■ Half-step

● DP33F782□ / DP33F782S-XB : 24V



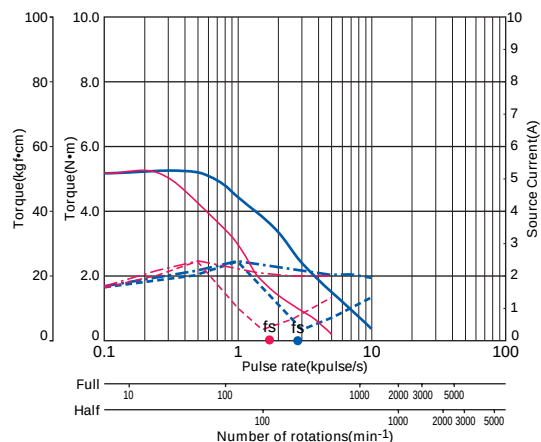
103F7852-80□□/103F7852-80XB41
Source voltage : DC24V•Winding current : 1.5A/phase
— Getaway torque($J_{L1}=2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current($T_L=\text{MAX}$) --- Source current($T_L=0$)
fs : Maximum self-start frequency when not load
■ Full-step ■ Half-step

● DP33F851□ / DP33F851S-XB : 24V



103F8581-80□□/103F8581-80XB41
Source voltage : DC24V•Winding current : 1.5A/phase
— Getaway torque($J_{L1}=7.4 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current($T_L=\text{MAX}$) --- Source current($T_L=0$)
fs : Maximum self-start frequency when not load
■ Full-step ■ Half-step

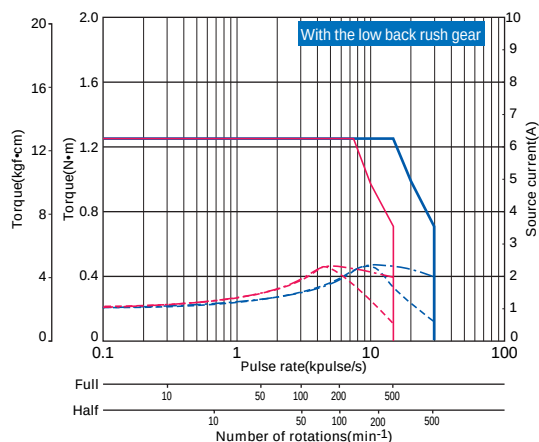
● DP33F853□ / DP33F853S-XB : 24V



103F8583-80□□/103F8583-80XB41
Source voltage : DC24V•Winding current : 1.5A/phase
— Getaway torque($J_{L1}=15.1 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current($T_L=\text{MAX}$) --- Source current($T_L=0$)
fs : Maximum self-start frequency when not load
■ Full-step ■ Half-step

Pulse Rate-Torque Characteristics/Pulse Rate-Source Current Characteristics

● DP33F781□-CX3.6 : 24V



103F7851-80CXA□

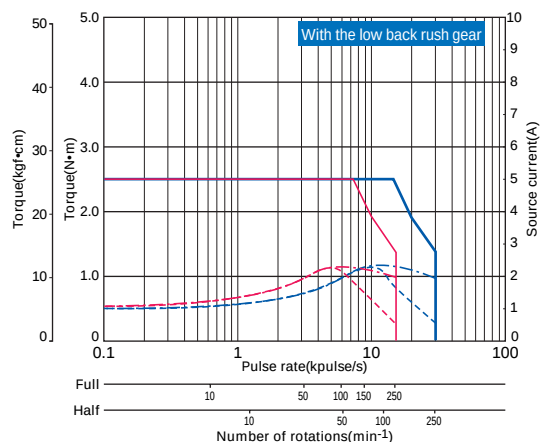
Source voltage : DC24V•Winding current : 1.5A/phase

— Allowable torque($J_{L1}=2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ Full-step ■ Half-step

● DP33F781□-CX7.2 : 24V



103F7851-80CXB□

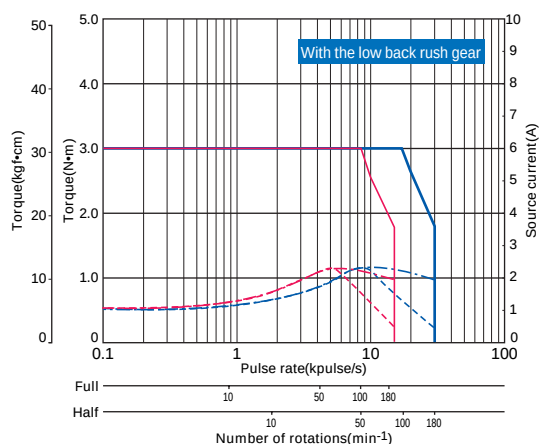
Source voltage : DC24V•Winding current : 1.5A/phase

— Allowable torque($J_{L1}=7.2 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ Full-step ■ Half-step

● DP33F781□-CX10 : 24V



103F7851-80CXEE□

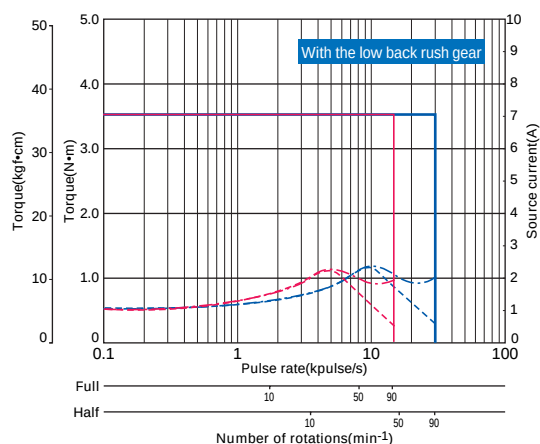
Source voltage : DC24V•Winding current : 1.5A/phase

— Allowable torque($J_{L1}=7.2 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ Full-step ■ Half-step

● DP33F781□-CX20 : 24V



103F7851-80CXG□

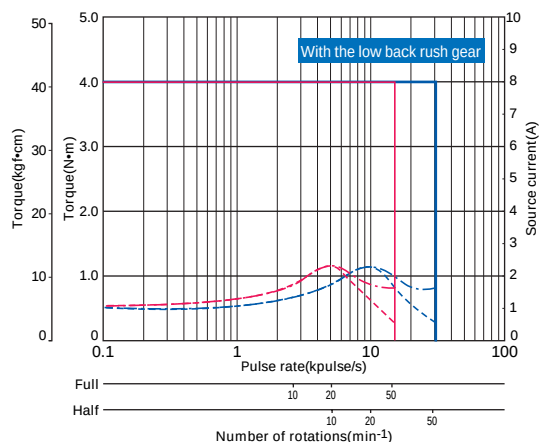
Source voltage : DC24V•Winding current : 1.5A/phase

— Allowable torque($J_{L1}=15.1 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ Full-step ■ Half-step

● DP33F781□-CX30 : 24V



103F7851-80CXJ□

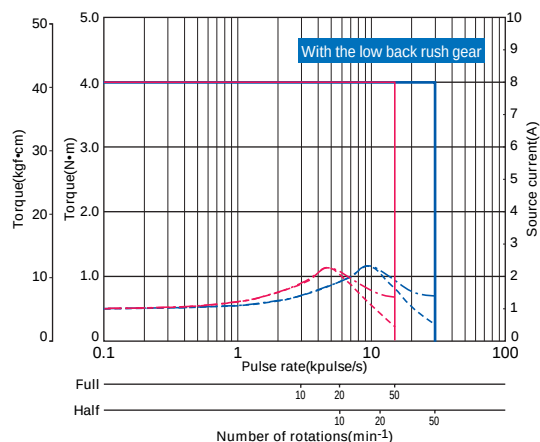
Source voltage : DC24V•Winding current : 1.5A/phase

— Allowable torque($J_{L1}=15.1 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ Full-step ■ Half-step

● DP33F781□-CX36 : 24V



103F5505-70CXB□

Source voltage : DC24V•Winding current : 1.5A/phase

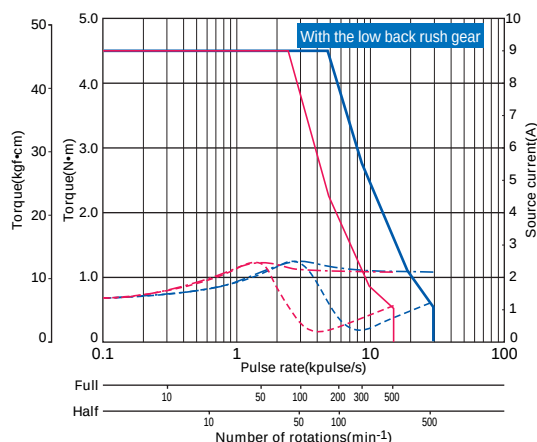
— Allowable torque($J_{L1}=15.1 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

■ Full-step ■ Half-step

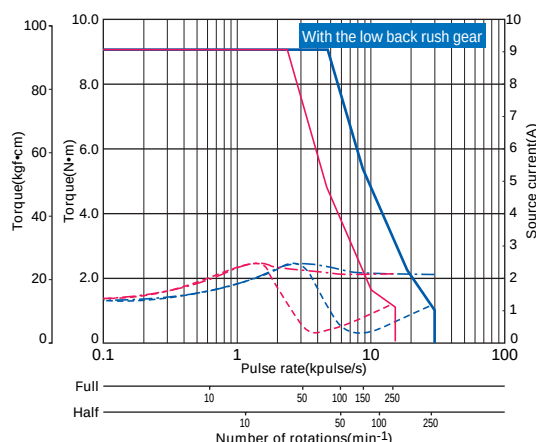
Pulse Rate-Torque Characteristics/Pulse Rate-Source Current Characteristics

● DP33F851□-CX3.6 : 24V



Source voltage : DC24V-Winding current : 1.5A/phase
 — Allowable torque ($J_{L1}=15.1 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
 --- Source current ($T_L = \text{MAX}$) --- Source current ($T_L = 0$)
 ■ Full-step ■ Half-step

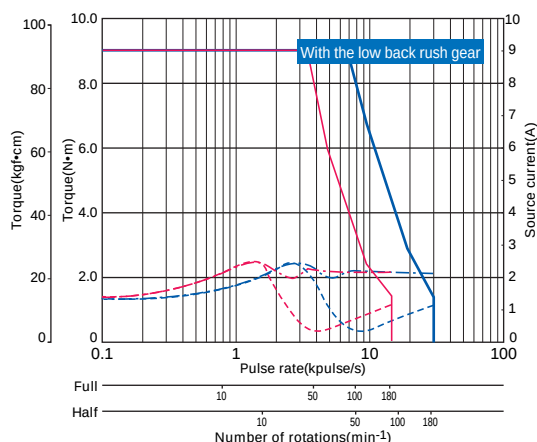
● DP33F851□-CX7.2 : 24V



103F8581-80CXB

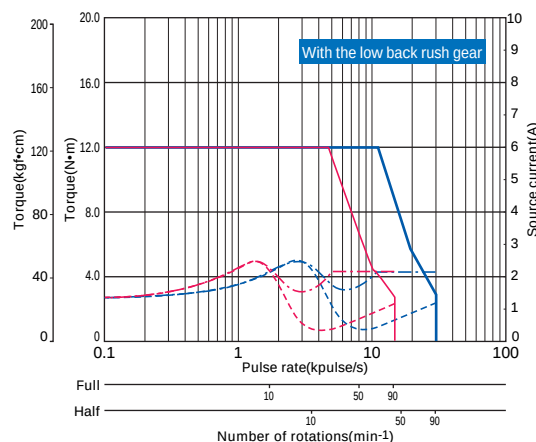
Source voltage : DC24V・Winding current : 1.5A/phase
 — Allowable torque($J_L=44 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ Uses rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 ■ Full-step ■ Half-step

● DP33F851□-CX10 : 24V



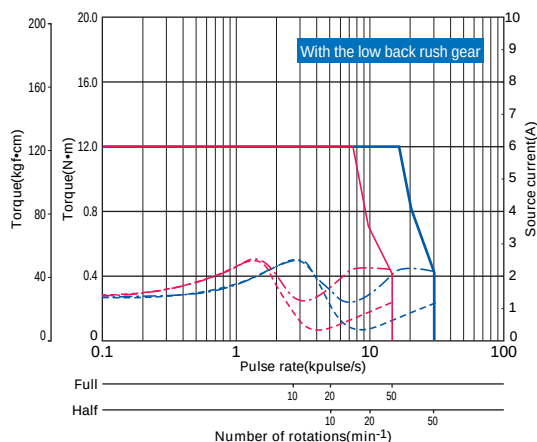
103F8581-80CXE□
Source voltage : DC24V•Winding current : 1.5A/phase
— Allowable torque($J_L=44\times10^{-4}\text{kg}\cdot\text{m}^2$ Uses rubber coupling)
--- Source current($T_L=\text{MAX}$) --- Source current($T_L=0$)
■ Full-step ■ Half-step

● DP33F851□-CX20 : 24V



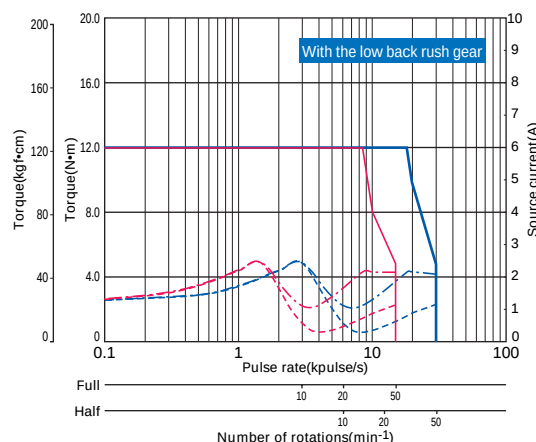
103F8581-80CXG□
Source voltage : DC24V•Winding current : 1.5A/phase
—— Allowable torque($J_L=44\times10^{-4}\text{kg}\cdot\text{m}^2$ Uses rubber coupling)
— — Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
■ Full-step ■ Half-step

● DP33F851□-CX30 : 24V



103F8581-80CXJ□
Source voltage : DC24V•Winding current : 1.5A/phase
— Allowable torque($J_L=44 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ Uses rubber coupling)
--- Source current($T_L=\text{MAX}$) --- Source current($T_L=0$)
■ Full-step ■ Half-step

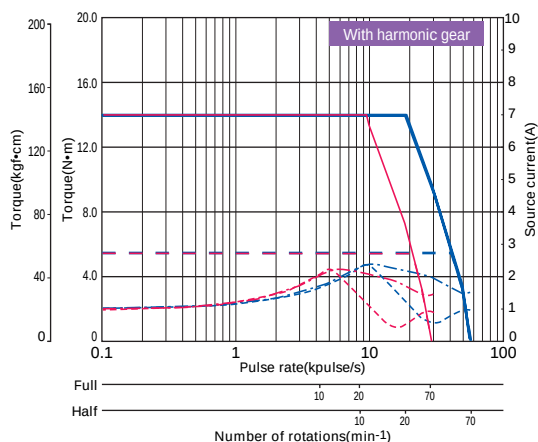
● DP33F851□-CX36 : 24V



103F8581-80CXX□
Source voltage : DC24V•Winding current : 1.5A/phase
— Allowable torque($J_L=44\times10^{-4}\text{kg}\cdot\text{m}^2$ Uses rubber coupling)
- - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
■ Full-step ■ Half-step

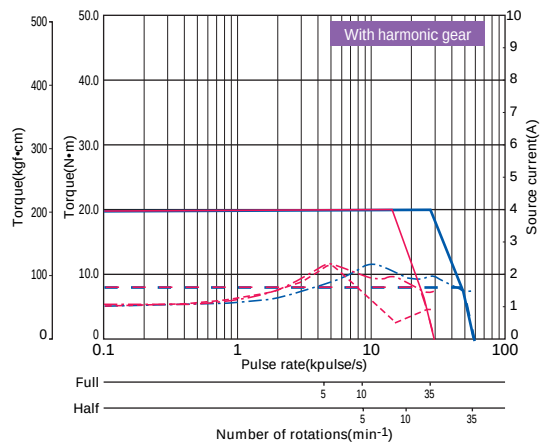
Pulse Rate-Torque Characteristics/Pulse Rate-Source Current Characteristics

● DP33F351□-HX50 : 24V



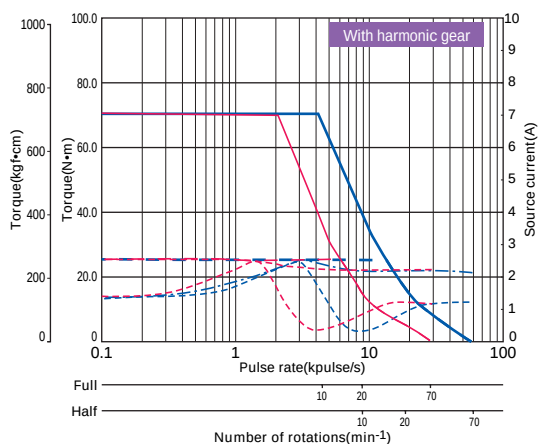
103F7851-80HXL□ ■ Full-step ■ Half-step
Source voltage : DC24V•Winding current : 1.5A/phase
— Instantaneous allowable torque($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
- - Allowable torque($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
- - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)

● DP22F351□-HX100 : 24V



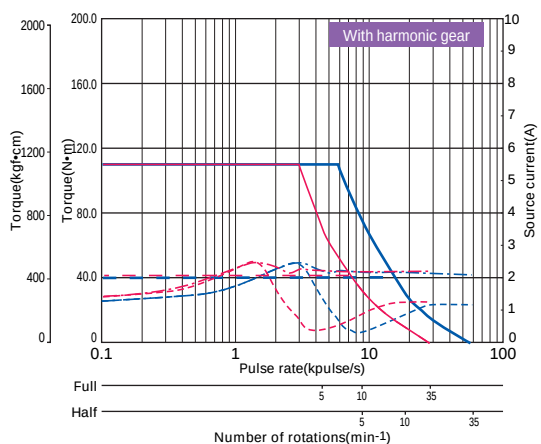
103F7851-80HXM□ ■ Full-step ■ Half-step
Source voltage : DC24V•Winding current : 1.5A/phase
— Instantaneous allowable torque($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
- - Allowable torque($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
- - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)

● DP33F851□-HX50 : 24V



103F8581-80HXL□ ■ Full-step ■ Half-step
Source voltage : DC24V•Winding current : 1.5A/phase
— Instantaneous allowable torque($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
- - Allowable torque($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
- - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)

● DP33F851□-HX100 : 24V



103F8581-80HXM□ ■ Full-step ■ Half-step
Source voltage : DC24V•Winding current : 1.5A/phase
— Instantaneous allowable torque($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
- - Allowable torque($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)
- - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)



The 5-phase Stepping Set

DP4 series

DC24V

Micro-step (500 x 1 to 80 divisions)

Configuration of the 5-phase Stepping Motor Set, DP4 Series

Name	Quantity
DP4 Series Instruction Manual	1 pc.
PM Driver	1 pc.
Stepping Motor	1 pc.
Signal Cable (CN1)	1 pc.
Power Cable (CN2)	1 pc.
Stepping Motor Cable (CN3)	1 pc.

Characteristics

● Compact PM driver

This product is a compact and lightweight driver with 50% reduction in volume compared to the conventional products.

● Micro-step function available

Smooth operation without vibration at low speeds can be realized.

● Flexible

This stepping system is able to drive wide variety of stepping motors from small capacity to large capacity without adjustment, resulting in wide applications.

● Compact

Mounting dedicated HIC realizes highly integrated and higher reliable system.

Built-in function

● Resolution setting function

10 types of resolution, ranging from one to 80 divisions, can be set for a standard stepping motor step angle by using rotary switches.

● Pulse input system selection function

Either single input system or double input system can be selected, using a dipswitch.

● Power down function

Stepping motor current can be turned off through an external input signal.

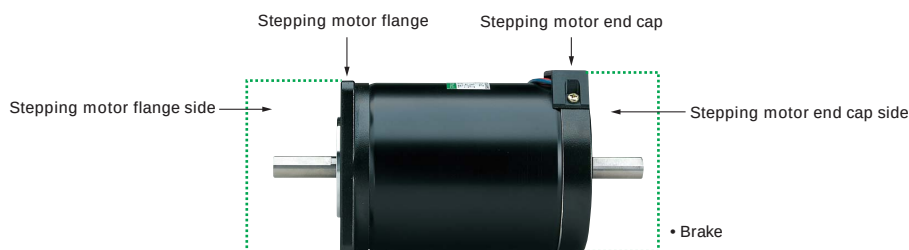
● Operation current switchover function

Regarding operation current of the stepping motor, currents ranging from rated current to 55% of rated current can be set using rotary switches.

Explanation of set model number

System on the stepping motor end cap side

Code	End cap side	Function
B	Brake	Electromagnetic brake
E	Encoder	Please contact us regarding the encoder.
X	None	



Explanation for model number in the combined case

The set model number of the stepping motor is as follows when PMDPC1S3P01 and 103F7853 type are combined and equipped with the system of harmonic gear (1/100) and brake:

DP42F783D—X B

Standard set model number Brake
None

How to order

Please use the "Set Model Number" in the List of Combined Stepping Motor Model Number for the 5-phase Stepping Set, DP4 Series.

To order brake, put the product code number after the set number according to the "Explanation of combination numbering".

PM driver specifications

Model number		PMDPC1S3P01
Standard specification	Input source	DC24V±10%
	Source current	3A
	Operating ambient temperature	0 ~ +50°C
	Conservation temperature	-20 ~ +70°C
	Operating ambient humidity	35 ~ 85%RH (no condensation)
	Conservation humidity	10 ~ 90%RH (no condensation)
	Vibration resistance	0.5G Tested under the following conditions, frequency range: 10 to 55Hz, direction: along the X, Y, and Z axes, for 2 hours
	Impact resistance	Considering the NDS-C-0110 standard section 3.2.2 division "C", not influenced.
	Withstand voltage	Not influenced when applying AC500V between the power input terminal and cabinet for one minute.
	Insulation resistance	10 MΩ or more when applying DC500V between the power input terminal and cabinet.
Function	Weight	0.25kg
	Select function	Auto current down, pulse input system, step angle, power specification
I/O signals	Command pulse input signal	Photo coupler input method, input resistance 330Ω Input signal voltage "H" level: 4.0 to 5.5V, "L" level: 0 to 0.5V Maximum input frequency 400 kpulse/s
	Power down input signal	Photo coupler input method, input resistance 330Ω Input signal voltage "H" level: 4.0 to 5.5V, "L" level: 0 to 0.5V

* For information about the operation, connection, function, and dimensions of the PM driver, refer to pages 227 and after.

Stepping motor common specifications

Item	Combined stepping motors of DP4 series
Insulation class	Class B (+130°C)
Withstand voltage	Conditions: AC1000V, 50/60 Hz, and for one minute
Insulation resistance	100MΩ or more against DC500V
Vibration resistance	Conditions: amplitude 1.52 mm (P-P), frequency range 10 to 55 Hz, 5 minutes sweep time, along X, Y, and Z axes, for 2 hours
Impact resistance	Conditions: 98 m/s ² acceleration, 11 minutes duration, half-wave/sine wave, three times each along X, Y, and Z axes, 18 times in total
Operating ambient temperature	-10~+50°C
Operating ambient humidity	20~90%(no condensation)

Standard combined stepping motors for 5-phase stepping set "DP4" series

PM driver model number : PMDPC1S3P01

Combination Model Number for STEPSYN F Series

System support	Dimensions of stepping motor	Single-axis shaft		Dual-axis shaft	
		Set model number	Standard combined stepping motor number	Set model number	Standard combined stepping motor number
Standard type	□ 42mm	DP42F552S	103F5508-7041	DP42F552D	103F5508-7011
		DP42F554S	103F5510-7041	DP42F554D	103F5510-7011
	□ 60mm	DP42F781S	103F7851-7041	DP42F781D	103F7851-7011
		DP42F782S	103F7852-7041	DP42F782D	103F7852-7011
		DP42F783S	103F7853-7041	DP42F783D	103F7853-7011
Electromagnetic brake	□ 42mm	DP42F551S-XB	103F5505-70XB41		
		DP42F552S-XB	103F5508-70XB41		

Note) Contact our sales department to order the system with an encoder and/or gear and brake.

Stepping motor data sheet

STEPSYN F Series (Standard)

Set model number	Single-axis shaft	DP42F552S	DP42F554S
	Dual-axis shaft	DP42F552D	DP42F554D
Holding torque	N•m	0.18	0.26
Rotor inertia	×10 ⁻⁴ kg•m ²	0.053	0.065
Weight	kg	0.28	0.37
Allowable thrust load	N	10	10
Allowable radial load	N	35	35

Set model number	Single-axis shaft	DP42F781S	DP42F782S	DP42F783S
	Dual-axis shaft	DP42F781D	DP42F782D	DP42F783D
Holding torque	N•m	0.6	0.93	1.79
Rotor inertia	×10 ⁻⁴ kg•m ²	0.275	0.4	0.84
Weight	kg	0.6	0.78	1.36
Allowable thrust load	N	20	20	20
Allowable radial load	N	80	80	80

STEPSYN F Series (With electromagnetic brake)

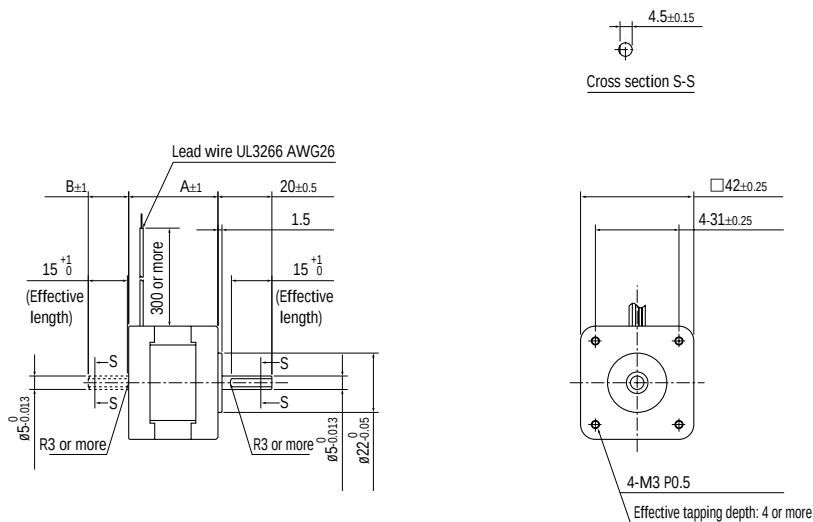
Set model number	Single-axis shaft	DP42F552S-XB	DP42F554S-XB
	Dual-axis shaft		
Holding torque	N•m	0.18	0.26
Rotor inertia	×10 ⁻⁴ kg•m ²	0.068	0.08
Weight	kg	0.43	0.52
Allowable thrust load	N	10	10
Allowable radial load	N	35	35
Electromagnetic brake specification	Brake operation system	Non-excitation operation system	
	Source voltage	DC 24 ± 5%	
	Exciting current	0.08	
	Electric power consumption	2	
	Static friction torque	0.22	
	Brake operating time	30	
	Brake release time	20	

Dimensions (Unit: mm)

STEPSYN F

DP42F55□□

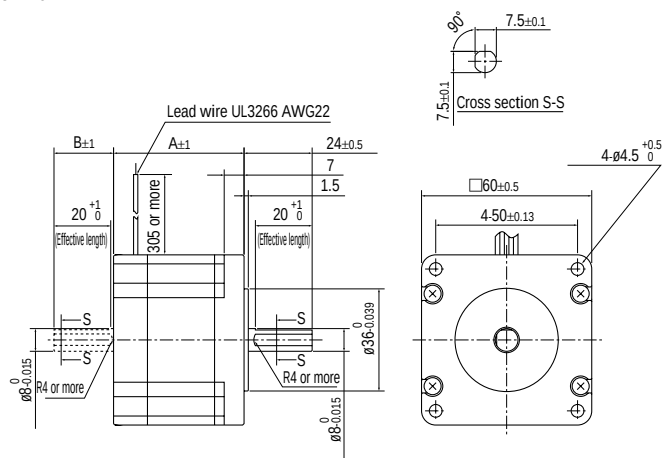
103F55□□-70□□



Model name	A	B
DP42F552S (103F5508-7041)	40	—
DP42F552D (103F5508-7011)	40	15
DP42F554S (103F5510-7041)	49	—
DP42F554D (103F5510-7011)	49	15

DP42F78□□

103F785□-70□□

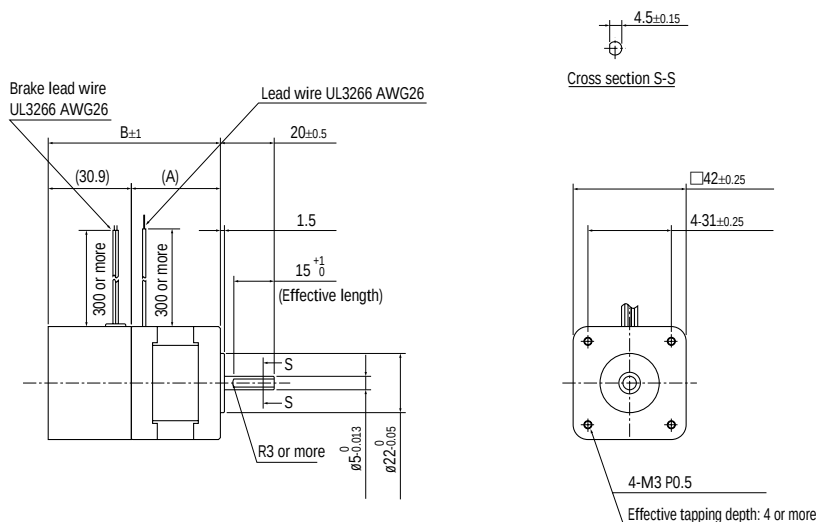


Model name	A	B
DP42F781S (103F7851-7041)	46.5	—
DP42F781D (103F7851-7011)	46.5	21
DP42F782S (103F7852-7041)	55	—
DP42F782D (103F7852-7011)	55	21
DP42F783S (103F7853-7041)	87.5	—
DP42F783D (103F7853-7011)	87.5	21

STEPSYN F with electromagnetic brake

DP42F55□ S-XB

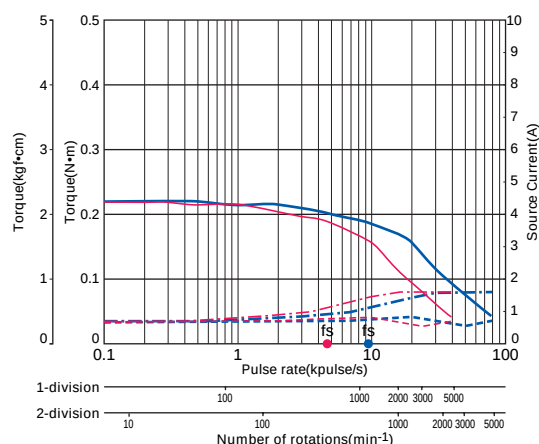
103F55□□-70□□



Model name	A	B
DP42F552S-XB (103F5508-70XB41)	39.6	70.5
DP42F553S-XB (103F5510-70XB41)	48.6	79.5

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

● DP42F552□ / DP42F552S-XB : 24V



103F5508-70□□

Source voltage : DC24V•Winding current : 0.75A/phase

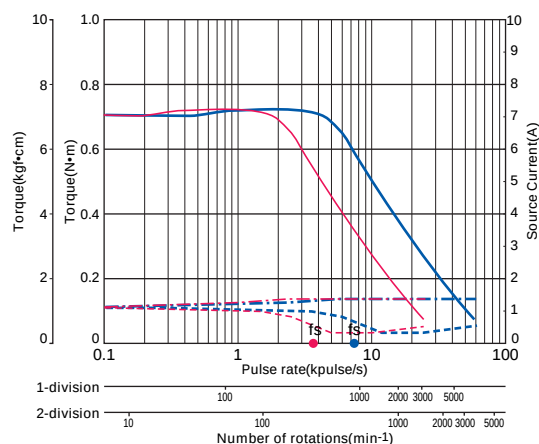
— Getaway torque($J_L=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

fs : Maximum self-start frequency when not load

■ 1-division is specified. ■ 2-division is specified.

● DP42F781□ : 24V



103F7851-70□□

Source voltage : DC24V•Winding current : 0.75A/phase

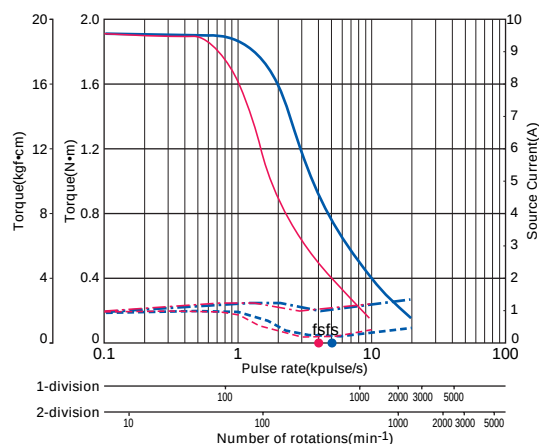
— Getaway torque($J_L=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

fs : Maximum self-start frequency when not load

■ 1-division is specified. ■ 2-division is specified.

● DP42F783□ : 24V



103F7853-70□□

Source voltage : DC24V•Winding current : 0.75A/phase

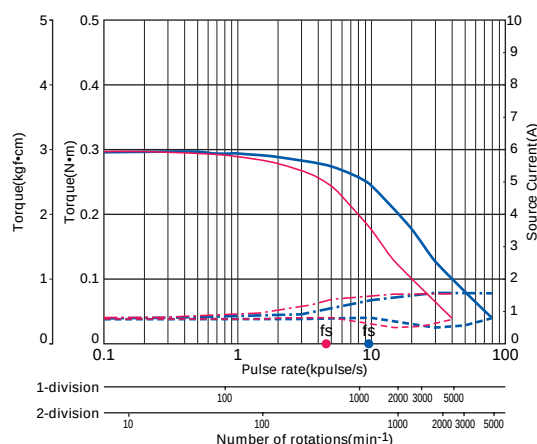
— Getaway torque($J_L=7.4 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

fs : Maximum self-start frequency when not load

■ 1-division is specified. ■ 2-division is specified.

● DP42F554□ / DP42F554S-XB : 24V



103F5510-70□□

Source voltage : DC24V•Winding current : 0.75A/phase

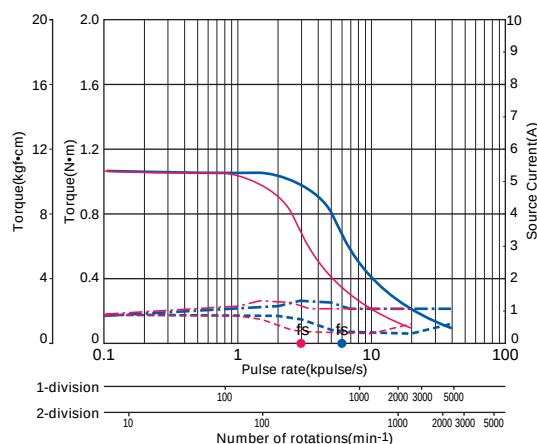
— Getaway torque($J_L=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

fs : Maximum self-start frequency when not load

■ 1-division is specified. ■ 2-division is specified.

● DP42F782□ : 24V



103F7852-70□□

Source voltage : DC24V•Winding current : 0.75A/phase

— Getaway torque($J_L=2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2$ Uses rubber coupling)

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

fs : Maximum self-start frequency when not load

■ 1-division is specified. ■ 2-division is specified.

AP1

BP1

BP2

WP1

DP1

DP2

DP3

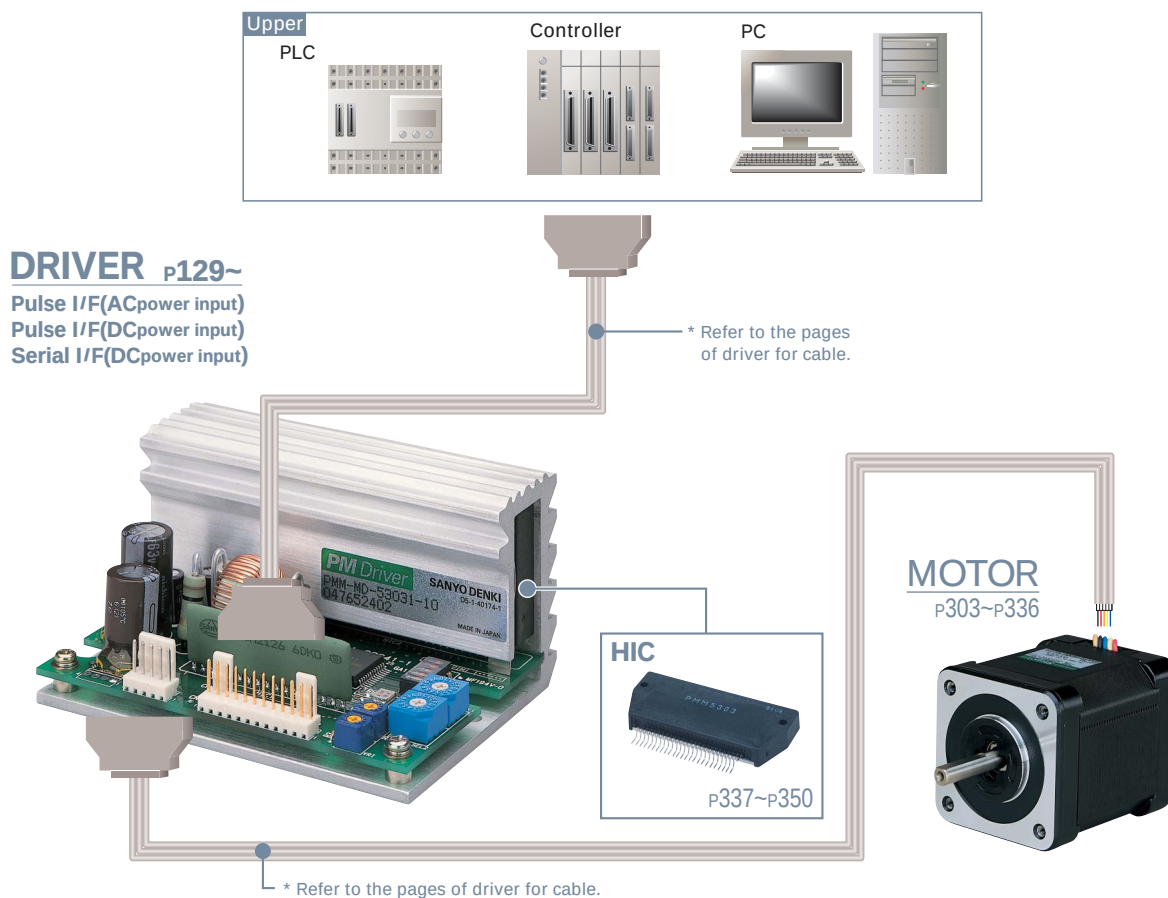
DP4



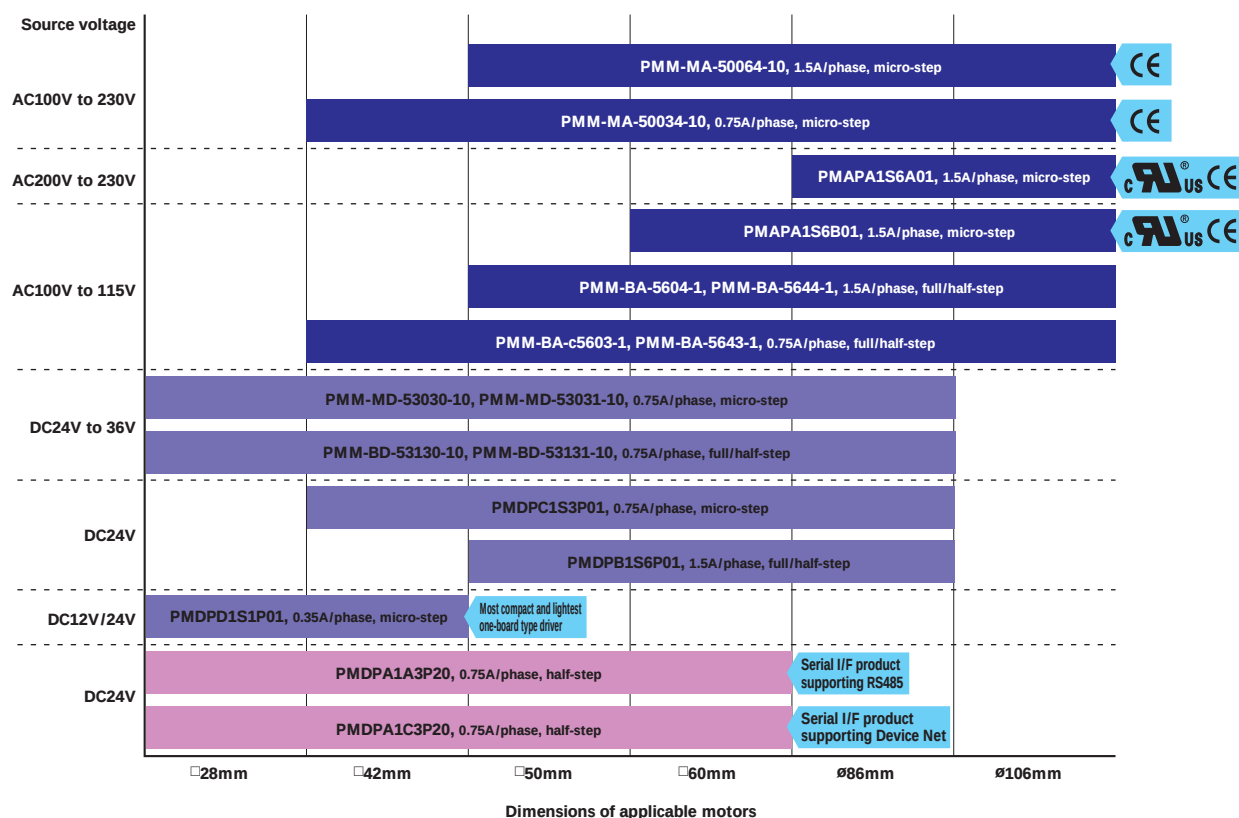
STEPPING DRIVER

The 5-Phase Stepping Driver

Stepping System Configuration



5-Phase Driver Area Chart



AC driver

PMPA1S6A01 type S



Applicable motors

□86 □106

Power input
AC200V/230V
Micro-step specifications

UL[®] CE
P133~P144

PMPA1S6B01 type S



Applicable motors

□60 □60
□86 □106

Power input
AC100V/115V
Micro-step specifications

UL[®] CE
P145~P156

PMM-MA-50034-10



Applicable motors

□42 □50
□60 □60
□86 □106

Power input
AC100V/230V
Micro-step specifications

CE
P157~P172

PMM-MA-50064



Applicable motors

□50 □60
□60 □86
□106

Power input
AC100V/230V
Micro-step specifications

CE
P173~P188

PMM-BA-5603 PMM-BA-5643



Applicable motors

□42 □50
□60 □60
□86 □106

Power input
AC100V/115V
Micro-step specifications

P189~P202

PMM-BA-5604 PMM-BA-5644



Applicable motors

□50 □60
□60 □86
□106

Power input
AC100V/115V
Micro-step specifications

P203~P216

DC driver

PMDPB1S6P01



Applicable motors

□50 □60
□60 □86

Power input
DC24V
Full/half-step specifications

P217~P226

PMDPC1S3P01



Applicable motors

□42 □50
□60 □60
□86

Power input
DC24V
Micro-step specifications

P227~P236

PMM-MD-53030-10 PMM-MD-53031-10



Applicable motors

□28 □42
□50 □60
□60 □86

Power input
DC24V/36V
Micro-step specifications

P237~P254

PMM-BD-53130-10 PMM-BD-53131-10



Applicable motors

□28 □42
□50 □60
□60 □86

Power input
DC24V/36V
Full/half-step specifications

P255~P272

PMDPD1S1P01



Applicable motors

□28 □42

Power input
DC12V/24V
Micro-step specifications

P273~P280

PMDPA1A3P20



Applicable motors

□28 □42
□50 □60
□60

Power input
DC24V/RS-485 compliant
Half-step specifications

P281~P290

PMDPA1C3P20



Applicable motors

□28 □42
□50 □60
□60

Power input
DC24V/DeviceNet compliant
Half-step specifications

P291~P302

List of single product sales combination (AC input type)

Combination	Driver				Model number	PMM-MA-50034	PMM-MA-50064	PMAPA1S6A01	PMAPA1S6B01	PMM-BA-5603	PMM-BA-5604	For motors, refer:	
	Motor				Power source Specification	AC100 to 230V 0.75 A/phase	AC100 to 230V 1.5 A/phase	AC200 to 230V 1.5 A/phase	AC100 to 115V 1.5 A/phase	AC100 to 115V 0.75 A/phase	AC100 to 115V 1.5 A/phase		
STEPSYN H (Conventional motor)	Dimensions, mm	Model number	Rated current A/phase	Holding torque N·m (at 5-phase excitation)	Rotor inertia ×10 ⁻³ kg·m ²	Micro-step (1 to 250 divisions)	Micro-step (1 to 250 divisions)	Micro-step (1 to 40 divisions)	Micro-step (1 to 40 divisions)	Full step/half step (1 division/2 divisions)	Full step/half step (1 division/2 divisions)		
	28 square	103H3505-7040(7010)	0.75	0.026	0.009	—	—	—	—	—	—	P309 and after	
		103H3515-7040(7010)	0.75	0.052	0.016	—	—	—	—	—	—		
	42 square	103H5505-7040(7010)	0.75	0.127	0.03	○	—	—	—	○	—	P311 and after	
		103H5508-7040(7010)	0.75	0.176	0.053	○	—	—	—	○	—		
	50 square	103H5510-7040(7010)	0.75	0.255	0.065	○	—	—	—	○	—		
		103H6500-7041(7011)	0.75	0.235	0.057	○	—	—	—	○	—	P313 and after	
		103H6501-7041(7011)	0.75	0.39	0.105	○	—	—	—	○	—		
		103H6500-8041(8011)	1.5	0.225	0.57	—	○	—	—	—	○		
		103H6501-8041(8011)	1.5	0.39	0.105	—	○	—	—	—	○		
		103H7521-7051(7021)	0.75	0.461	0.148	○	—	—	—	○	—	P317 and after	
		103H7522-7051(7021)	0.75	0.735	0.18	○	—	—	—	○	—		
		103H7523-7051(7021)	0.75	1.568	0.423	○	—	—	—	○	—		
		103H7521-8051(8021)	1.5	0.461	0.148	—	○	—	—	—	○		
		103H7522-8051(8021)	1.5	0.735	0.18	—	○	—	○	—	○		
		103H7523-8051(8021)	1.5	1.568	0.423	—	○	—	○	—	○		
	60 square	103H7851-7051(7021)	0.75	0.65	0.275	○	—	—	—	○	—	P315 and after	
		103H7852-7051(7021)	0.75	0.98	0.4	○	—	—	—	○	—		
		103H7853-7051(7021)	0.75	1.86	0.84	○	—	—	—	○	—		
		103H7851-8051(8021)	1.5	0.65	0.275	—	○	—	—	—	○		
		103H7852-8051(8021)	1.5	0.98	0.4	—	○	—	○	—	○		
		103H7853-8051(8021)	1.5	1.86	0.84	—	○	—	○	—	○		
	ø 86	103H8581-7041(7011)	0.75	2.06	1.45	○	—	—	—	○	—	P319 and after	
		103H8582-7041(7011)	0.75	4.02	2.9	○	—	—	—	○	—		
		103H8583-7041(7011)	0.75	6.17	4.4	○	—	—	—	○	—		
		103H8581-8041(8011)	1.5	2.06	1.45	—	○	○	○	—	○		
		103H8582-8041(8011)	1.5	4.02	2.9	—	○	○	○	—	○		
		103H8583-8041(8011)	1.5	6.17	4.4	—	○	○	○	—	○		
	ø 106	103H89582-7041(7011)	0.75	10.8	14.6	○	—	—	—	○	—	P321 and after	
		103H89583-7041(7011)	0.75	16	22	○	—	—	—	○	—		
		103H89582-8041(8011)	1.5	10.8	14.6	—	○	○	○	—	○		
		103H89583-8041(8011)	1.5	16	22	—	○	○	○	—	○		
STEPSYN H (Conforms to IP43 and CE)	ø 60	103H7521-6050(6020)	0.75	0.461	0.148	○	—					P323 and after	
		103H7522-6050(6020)	0.75	0.735	0.18	○	—						
		103H7523-6050(6020)	0.75	1.568	0.423	○	—						
		103H7521-6250(6220)	1.5	0.461	0.148	—	○						
		103H7522-6250(6220)	1.5	0.735	0.18	—	○						
		103H7523-6250(6220)	1.5	1.568	0.423	—	○						
		ø 86	103H8581-6050(6020)	0.75	2.06	1.45	○	—					P325 and after
			103H8582-6050(6020)	0.75	4.02	2.9	○	—					
	103H8583-6050(6020)		0.75	6.17	4.4	○	—						
	103H8581-6250(6220)		1.5	2.06	1.45	—	○						
		103H8582-6250(6220)	1.5	4.02	2.9	—	○						
		103H8583-6250(6220)	1.5	6.17	4.4	—	○						
		ø 106	103H89582-6050(6020)	0.75	10.8	14.6	○	—					P327 and after
			103H89583-6050(6020)	0.75	16	22	○	—					
	103H89582-6250(6220)		1.5	10.8	14.6	—	○						
	103H89583-6250(6220)		1.5	16	22	—	○						
For drivers, refer:						P157 and after	P173 and after	P133 and after	P145 and after	P189 and after	P203 and after		

<Notes> ① Number enclosed by parentheses in motor model number represents a dual-axis shaft type.
 ② in the above table represents a standard combination.
 ③ Contact our sales department for options.
 ④ Contact our sales department to order an encoder.

■ List of single product sales combination (DC input type)

Combination	Driver					Model number	PMM-MD-53030	PMM-BD-53130	PMDPB1S6P01	PMDPC1S3P01	PMDPD1S1P01	PMDPA1A3P20	PMDPA1C3P20	For motors, refer:
						Power source	DC24V/36V	DC24V/36V	DC24V	DC24V	DC12/24V	DC24V	DC24V	
	Motor					Specification	0.75 A/phase	0.75 A/phase	1.5 A/phase	0.75 A/phase	0.35 A/phase	0.75 A/phase	0.75 A/phase	
STEPSYN H (Conventional motor)	Dimensions, mm	Model number	Rated current A/phase	Holding torque N·m	Rotor inertia ×10 ⁻⁴ kg·m ²	Micro-step (1 to 250 divisions)	Full step/half step (1 division/2 divisions)	Full step/half step (1 division/2 divisions)	Micro-step (1 to 80 divisions)	Micro-step (1 to 80 divisions)	RS-485 specifications	Device Net specifications		
	28 square	103H3505-3041(3011)	0.35	0.026	0.009	—	—	—	—	○	—	—	P309 and after	
		103H3515-3041(3011)	0.35	0.052	0.016	—	—	—	—	○	—	—		
		103H3505-7040(7010)	0.75	0.026	0.009	○	○	—	—	—	○	○		
		103H3515-7040(7010)	0.75	0.052	0.016	○	○	—	—	—	○	○		
	42 square	103H5505-3041(3011)	0.35	0.127	0.03	—	—	—	—	○	—	—	P311 and after	
		103H5505-7040(7010)	0.75	0.127	0.03	○	○	—	—	—	○	○		
		103H5508-7040(7010)	0.75	0.176	0.053	○	○	—	○	—	○	○		
		103H5510-7040(7010)	0.75	0.255	0.065	○	○	—	○	—	○	○		
	50 square	103H6500-7041(7011)	0.75	0.235	0.057	○	○	—	○	—	○	○	P313 and after	
		103H6501-7041(7011)	0.75	0.39	0.105	○	○	—	○	—	—	—		
		103H6500-8041(8011)	1.5	0.225	0.57	—	—	○	—	—	—	—		
		103H6501-8041(8011)	1.5	0.39	0.105	—	—	○	—	—	—	—		
	ø 60	103H7521-7051(7021)	0.75	0.461	0.148	○	○	—	○	—	○	○	P317 and after	
		103H7522-7051(7021)	0.75	0.735	0.18	○	○	—	○	—	○	○		
		103H7523-7051(7021)	0.75	1.568	0.423	○	○	—	○	—	○	○		
		103H7521-8051(8021)	1.5	0.461	0.148	—	—	○	—	—	—	—		
		103H7522-8051(8021)	1.5	0.735	0.18	—	—	○	—	—	—	—		
		103H7523-8051(8021)	1.5	1.568	0.423	—	—	○	—	—	—	—		
	60 square	103H7851-7051(7021)	0.75	0.65	0.275	○	○	—	○	—	○	○	P315 and after	
		103H7852-7051(7021)	0.75	0.98	0.4	○	○	—	○	—	○	○		
		103H7853-7051(7021)	0.75	1.86	0.84	○	○	—	○	—	○	○		
		103H7851-8051(8021)	1.5	0.65	0.275	—	—	○	—	—	—	—		
		103H7852-8051(8021)	1.5	0.98	0.4	—	—	○	—	—	—	—		
		103H7853-8051(8021)	1.5	1.86	0.84	—	—	○	—	—	—	—		
	ø 86	103H8581-7041(7011)	0.75	2.06	1.45	○	○	—	○	—	—	—	P319 and after	
		103H8582-7041(7011)	0.75	4.02	2.9	○	○	—	○	—	—	—		
		103H8583-7041(7011)	0.75	6.17	4.4	○	○	—	○	—	—	—		
		103H8581-8041(8011)	1.5	2.06	1.45	—	—	○	—	—	—	—		
		103H8582-8041(8011)	1.5	4.02	2.9	—	—	○	—	—	—	—		
		103H8583-8041(8011)	1.5	6.17	4.4	—	—	○	—	—	—	—		
	ø 106	103H89582-7041(7011)	0.75	10.8	14.6	—	—	—	—	—	—	—	P321 and after	
103H89583-7041(7011)		0.75	16	22	—	—	—	—	—	—	—			
103H89582-8041(8011)		1.5	10.8	14.6	—	—	—	—	—	—	—			
103H89583-8041(8011)		1.5	16	22	—	—	—	—	—	—	—			
STEPSYN H (Conforms to IP43 and CE)	ø 60	103H7521-6050(6020)	0.75	0.461	0.148								P323 and after	
		103H7522-6050(6020)	0.75	0.735	0.18									
		103H7523-6050(6020)	0.75	1.568	0.423									
		103H7521-6250(6220)	1.5	0.461	0.148									
		103H7522-6250(6220)	1.5	0.735	0.18									
		103H7523-6250(6220)	1.5	1.568	0.423									
	ø 86	103H8581-6050(6020)	0.75	2.06	1.45								P325 and after	
		103H8582-6050(6020)	0.75	4.02	2.9									
		103H8583-6050(6020)	0.75	6.17	4.4									
		103H8581-6250(6220)	1.5	2.06	1.45									
		103H8582-6250(6220)	1.5	4.02	2.9									
		103H8583-6250(6220)	1.5	6.17	4.4									
	ø 106	103H89582-6050(6020)	0.75	10.8	14.6								P327 and after	
		103H89583-6050(6020)	0.75	16	22									
		103H89582-6250(6220)	1.5	10.8	14.6									
		103H89583-6250(6220)	1.5	16	22									
Reference pages						P237 and after	P255 and after	P217 and after	P227 and after	P273 and after	P281 and after	P291 and after		

<Notes>
 ① Number enclosed by parentheses in motor model number represents a dual-axis shaft type.
 ② in the above table represents a standard combination.
 ③ Contact our sales department for options.
 ④ Contact our sales department to order an encoder.



The 5-Phase Stepping Driver

PMAPA1S6A01 type S

AC200V/230V

Micro-Step (500 x 1 to 40 divisions)



● Applicable motor



Characteristics

● Conformity to UL Standards and CE Marking

The system conforms to UL Standards and CE Marking.

● Micro-step function available

Smooth operation without vibration at low speeds can be realized.

● Rush current prevention circuit

Thanks to the built-in rush current prevention circuit in the power circuit section, stabilized operation is ensured even during switching on.

● Connector method for PM driver I/O cable

The connector method is adopted for the high voltage section terminal, where the terminal base was conventionally used. This method facilitates PM driver installation and maintenance.

● Alarm output signal logic selectable

Logic of signal output during alarm circuit operation can be selected

Built-in function

● Low vibration mode

Even setting division of resolution to a rough one or two divisions, operation can be as smooth and with as low vibration as for micro-step drive. However, the low vibration mode and the micro-step function cannot be adopted at the same time.

● Micro-step function

By manipulating the rotary switch that sets resolution, the micro-step drive may be used. However, the low vibration mode and the micro-step function cannot be adopted at the same time.

● Pulse input system selection function

Either single input system or double input system can be selected, using a dipswitch. Resolution setting function.

● Resolution setting function

Nine types of resolution, ranging from one to 40 divisions, can be set for a basic stepping motor step angle by using rotary switches.

● Operating current switch function

Regarding operation current of the stepping motor, currents ranging from rated current to 55% of rated current can be set using rotary switches.

● Current adjustment function during operation halt

When operation is halted, operation current for the stepping motor can be set at 40 to 70% of specified operation current by using selection switch.



PM driver specifications

Item		PMPA1S6A01
Standard specifications	Environment	Input source
		Single phase AC200V/230V+10,-15% 50/60Hz
		Source current
		6A
		Protection class
		Class I *1
		Operating environment
		Installation category (overvoltage category): II, pollution level:2 *2
		Operating ambient temperature
		0~+50°C
		Conservation temperature
		-20~+70°C
		Operating ambient humidity
		35~85%RH(no condensation)
Function	I/O signals	Conservation humidity
		10~90%RH(no condensation)
		Operating altitude
		max. 1000m above sea level
		Vibration resistance
		0.5G Tested under the following conditions, frequency range: 10 to 55Hz, direction: along the X, Y, and Z axes, for 2 hours
		Impact resistance
		Considering the NDS-C-0110 standard section 3.2.2 division "C", not influenced
		Withstand voltage
		Not influenced when AC1500V is applied between power input terminal and cabinet for one minute
		Insulation resistance
		10MΩ or more when DC500V is applied between power input terminal and cabinet
		Weight
		1.5kg
I/O signals	Function	Protection function
		Against PM driver overheat, main circuit power supply error, and overvoltage
		Selection function
		Pulse input method, automatic current reduction, power down, low vibration mode, alarm output logic, step angle, operating current, and non-operating current
		LED indicator
		Power supply monitor, phase origin monitor, pulse monitor, alarm monitor
		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 Max input frequency: 200kpulse/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
		Step angle selection input signal
		Photo coupler input method, input resistance = 330Ω Input signal voltage, H = 4.0 to 5.5V, L = 0 to 0.5V
		FULL/HALF selection input signal
		Photo coupler input method, input resistance = 330Ω Input signal voltage, H = 4.0 to 5.5V, L = 0 to 0.5V
		Phase origin monitor output signal
		Open collector output by photo coupler Output signal standard, Vceo = 30V or less, Ic = 5mA or less
		Alarm output signal
		Open collector output by photo coupler Output signal standard, Vceo = 30V or less, Ic = 20mA or less

For *1 and *2, refer to page 335 of Appendix.

UL Standard and CE Marking

Product	UL standards		CE Marking		
	Applied standards	File NO.	Low Voltage Directive	EMC Directive	
				Emission	Immunity
PM driver	UL508C	E179775	EN50178	EN50081-2 (Class A)	EN50082-2 (Class A)

- The "STEPSYN H" series does not conform to the UL standards and CE Marking. Use the "STEPSYN M" series if conformity is required.
- For the conformity of the "STEPSYN M" series, refer to 5-phase stepping motor unit, "AP1" series (page 11).

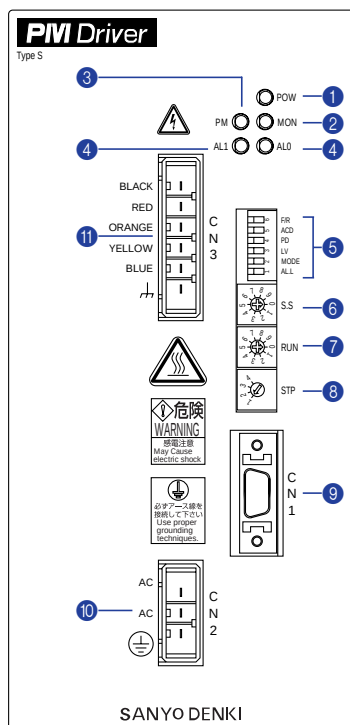
Standard Combination of the stepping motor

Stepping motor dimensions	Stepping motor model number		Holding torque [N·m]	Rotor inertia [x10 ⁻⁴ kg·m ²]	Weight [kg]	Page
	Single-axis shaft	Dual-axis shaft				
ø86mm	103H8581-8041	103H8581-8011	2.06	1.45	1.5	P319
	103H8582-8041	103H8582-8011	4.02	2.9	2.5	
	103H8583-8041	103H8583-8011	6.17	4.4	3.5	
ø106mm	103H89582-8041	103H89582-8011	10.8	14.6	7	P321
	103H89583-8041	103H89583-8011	16	22	10.4	

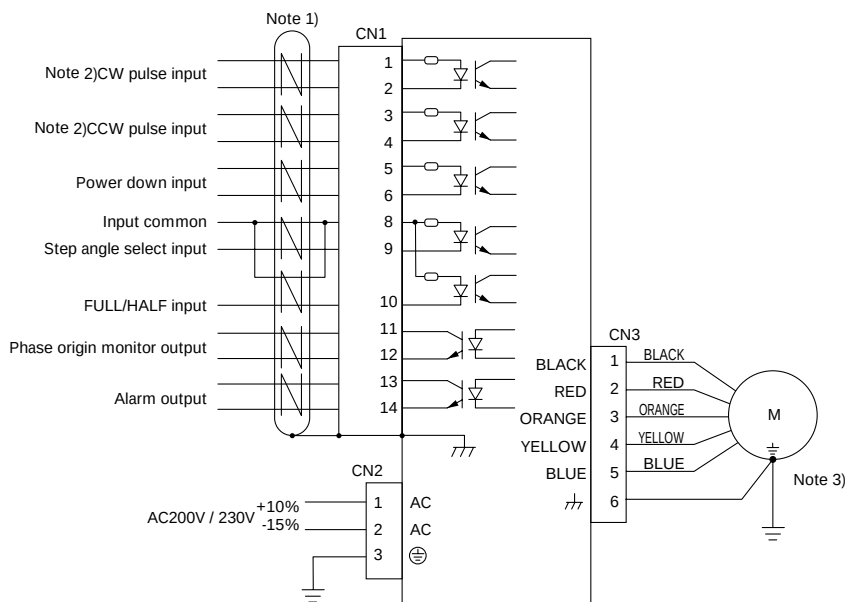
- Refer to the relevant pages for the general specifications and external dimensions of each stepping motor.

Operation, connection, and function

● Name of the PM Driver components



● External wiring



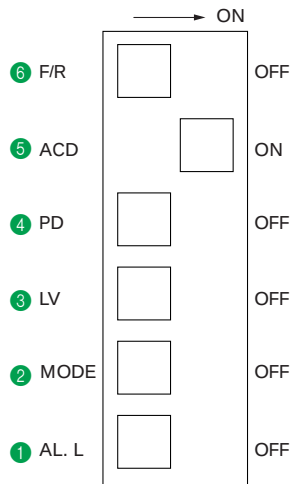
Note 1) Use a shielded twisted-pair cable.

Note 2) Either "double input system (CW pulse and CCW pulse)" or "single input system (CK+U/D)" can be selected by using the function selection switch F/R.

Note 3) From the stepping motor flange, ground with the stepping motor installation screw. Ground by single-point grounding.

Operation, connection, and function

● Function Select Dipswitch ---5



- The setting shown above is the ex-factory setting.
- Turn off the power of the PM driver when changing the setting of the function selection dipswitch.

1 AL. L (Alarm output logic selection)
The alarm output logic of the I/O signal connector (CN1) can be selected.

AL. L	Output logic
ON	On when alarm is on
OFF	Off when alarm is off

2 MODE (Mode selection)
This switch is not used.
Do not set to ON.

3 LV (Low vibration mode selection)
Although the resolution is set to a rough one or two divisions, operation can be smooth and with low vibration.

LV	Operation
ON	Low vibration operation
OFF	Micro-step operation

4 PD (Power down selection)
Selects the stepping motor current at the time of power down signal input.

PD	Stepping motor winding current
ON	Current specified by the selection switch STP (Power low)
OFF	0A (Power off)

5 ACD (Automatic current reduction selection)
This switch is not used. Do not set to OFF.

6 F/R (Pulse input method selection)
Selects the pulse input method.

F/R	Pulse input method
ON	Single input system(CK,U/D)
OFF	Double input system(CW,CCW)

● Step Angle Selection Switch(S.S) ---6

Specifies the number of divisions for the basic step angle during micro-step operation.

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

- This switch is set to "1" at factory.

● Operating Current Selection Switch(RUN)---7

Selects the operating current value of the stepping motor.

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

- This switch is set to "0" at factory.

● Non-Operating Current Selection Switch(STP)---8

Selects the stepping motor current value for non-operating mode (automatic count reduction mode) and power down input signal ON mode (power low function selected by dipswitch).

Scale	1	2	3	4
Stepping motor current(%)	70	60	50	40

- The ratio is based on the operating current selected by RUN.
- This switch is set to "3" at factory.

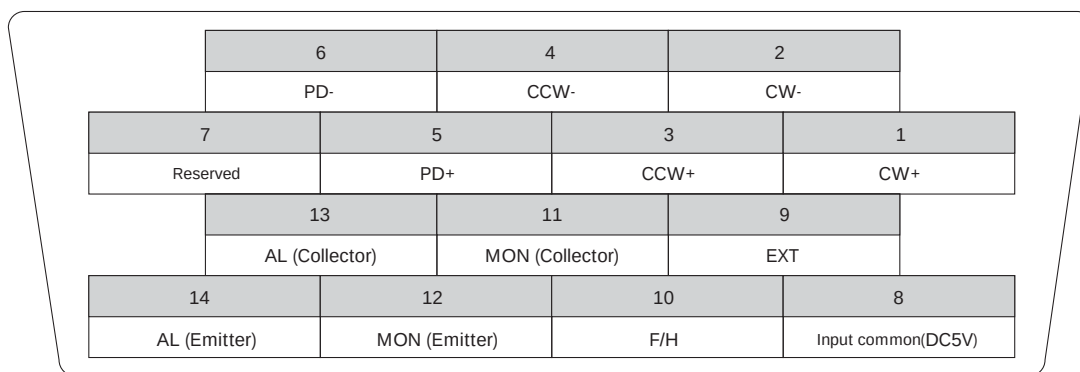
Operation, connection, and function

● I/O Signal Function (CN1)---9

Signal Name	Abbreviation	Pin Number	Function
CW pulse input (Standard)	CW+	1	When using the double input system Inputs drive pulse for clockwise rotation
	CW-	2	
Pulse column input	CK+	1	When using the single input system Inputs drive pulse column for the stepping motor rotation.
	CK-	2	
CCW pulse input (Standard)	CCW+	3	When using the double input system Inputs drive pulse for counterclockwise rotation.
	CCW-	4	
Rotation direction input	U/D+	3	Inputs signal for the stepping motor rotation direction when using the single input system. The internal photo coupler is ON clockwise direction The internal photo coupler is OFF counterclockwise direction
	U/D-	4	
Power down input	PD+	5	PD signal input cuts off the stepping motor current (turns off the power). (Power down mode can be changed to the power low mode using the dipswitch.) 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.
	PD-	6	
Step angle selection input	EXT	8	EXT signal input makes the FULL/HALF selection input valid. EXT input signal is ON (the internal photo coupler is ON) External input signal F/H is valid. EXT input signal is OFF (the internal photo coupler is OFF) The main unit rotary switch S.S is valid.
		9	
FULL/HALF selection input	F/H	8	When the EXT input signal is on (the internal photo coupler is ON) F/H input signal is ON (the internal photo coupler is ON) 2-division setting. F/H input signal is OFF (the internal photo coupler is OFF) 1-division setting
		10	
Phase origin monitor output	MON (Collector)	11	When excitation phase is at the origin (that is when the power is turned on), this signal is output. When 1-division is specified, the signal is output every 10 pulses. When 2-division is specified, the signal is output every 20 pulses.
	MON (Emitter)	12	
Alarm output	AL (Collector)	13	Outputs signal externally when an alarm circuit is activated in the PM driver. The stepping motor becomes unexcited state.
	AL (Emitter)	14	

- The clockwise (CW) rotation mentioned above is clockwise rotation when viewed from the output shaft (flange side).
The counterclockwise (CCW) rotation is counterclockwise rotation when viewed from the output shaft (flange side).

● Arrangement of the connector terminals (CN1)



Arrangement of the CN1 Connector Terminals

*The chart shown above is viewed from the connection section of the connector plug.

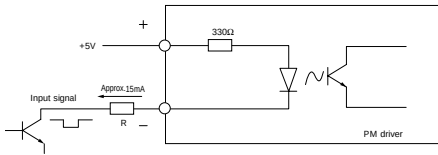
● Connectors

PM driver side		Applicable Connector model number	Manufacturer
Used for	Model number		
I/O signal (CN1)	10214-52A2JL	Applicable plug:10114-3000VE Applicable shell:10314-52A0-008	Sumitomo 3M
AC power (CN2)	1-178138-3	Applicable housing:1-178128-3 Applicable contact:1-175218-3	Japan AMP
Stepping motor (CN3)	1-316131-3	Applicable housing:1-178128-6 Applicable contact:1-175217-3	Japan AMP

- Regarding 103H8958□ type stepping motor, the applicable terminal model number for CN3 is "1-175218-3".
- Either the applicable connectors should be prepared by the user or the optional connector set should be ordered in accordance with the stepping motor (refer to options in page 142).

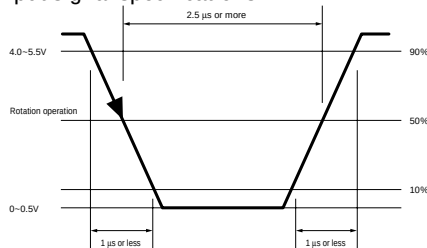
Operation, connection, and function

● Input Circuit (CW, CCW)



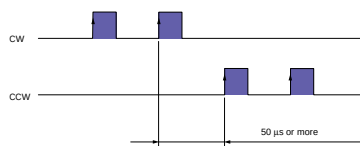
- Pulse duty is 50 % or less
- When the peak value of the input signal is 5V, the external limit resistance R is 0 Ω. If the peak value exceeds 5V, set the input current to approximately 15mA using the external limit resistance R.

Input signal specifications



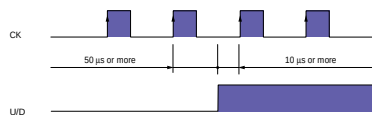
Timing of the command pulse

• Double input system (CW, CCW)



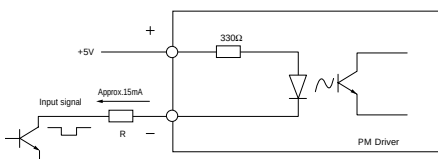
- The internal photo coupler turns ON at the leading edge of the photo coupler "ON".
- When applying the pulse to CW, set the internal photo coupler on the CCW side to "OFF".
- When applying the pulse to CCW, set the internal photo coupler on the CW side to "OFF".

• Single input system (CK, U/D)



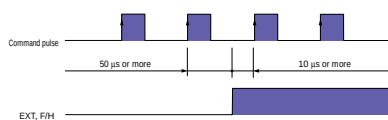
- The internal photo coupler turns ON at the leading edge of the CK photo coupler "ON".
- Before switching to the U/D input signal, turn OFF the internal photo coupler on the CK side.

● Input Circuit (PD, EXT, F/H)



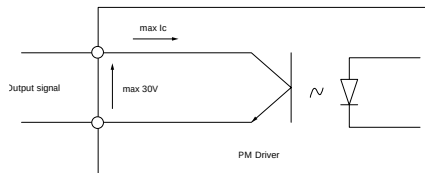
- When the peak value of the input signal is 5V, the external limit resistance R is 0 Ω. If the peak value exceeds 5V, set the input current to approximately 15mA using the external limit resistance R.

Timing of the command pulse, step angle selection, and FULL/HALF selection input signal



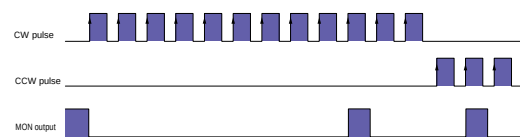
Operation, connection, and function

● Output Circuit (MON, AL)



- MON, AL output signal
Contact type: Open collector output by the photo coupler
Contact capacity: DC30V
max I_c current
MON output: 5mA
AL output: 20mA

MON, AL output signal

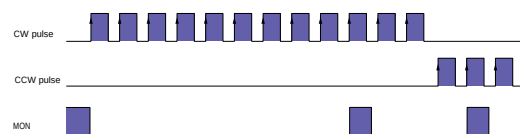


- The internal photo coupler turns "ON" at .

● State Indication (LED)

Indication	Color	Explanation
POW turns on.	Green	Internal power has been established.
MON turns on.	Green	Excitation phase is at the origin (the power is turned on). When 1-division is specified, turns on once in 10 pulses. When 2-division is specified, turns on once in 20 pulses.
PM turns on.	Green	Command pulse is being input. Turns on for approximately 100ms for every one pulse input.

● Timing of MON lighting (1-division setting)



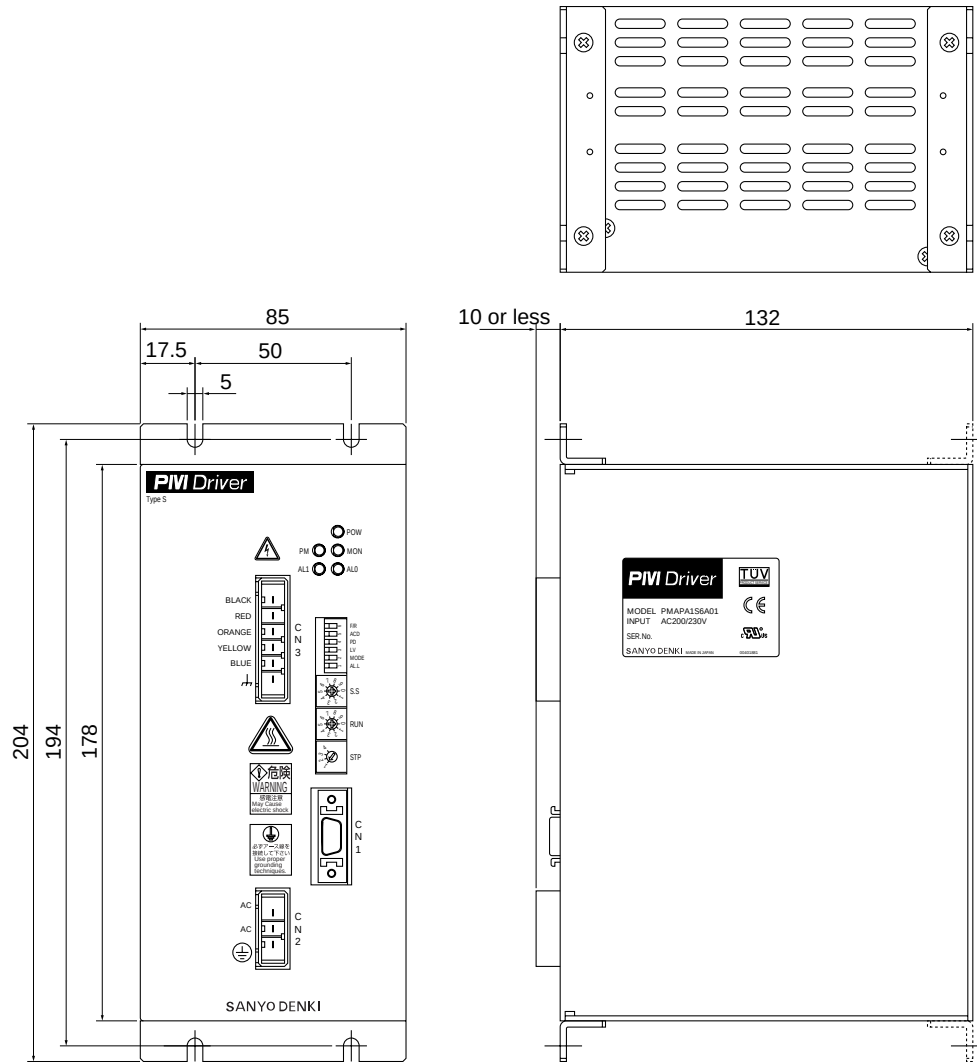
- The internal photo coupler turns "ON" at , and MON turns on.

● Alarm Indication (LED)

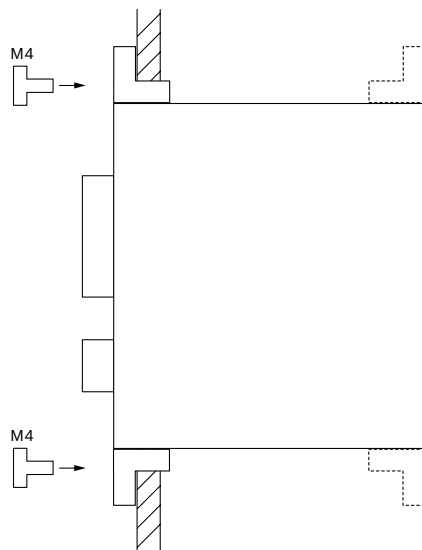
Indication	Color	Explanation
AL0 turns on.	Red	The main source voltage monitoring alarm circuit is operating.
		Source voltage specifications
		Undervoltage (U.V)
		Overvoltage (O.V)
AL1 turns on.	Red	The overheat protection alarm circuit of the internal device is operating. The circuit operates when both the internal temperature of the PM driver and the ambient temperature exceed 80°C.
AL0 and AL1 turn on.	Red	The internal element error alarm is operating. The alarm operates if overcurrent or abnormal overheating of the power device in the PM driver occurs.

- Each alarm circuit operation turns on alarm LED and cuts off the current of the stepping motor to cause unexcited state.
Simultaneously signal is output externally from the alarm output terminal (AL) of the I/O signal connector (CN1).
Once an alarm circuit operates, the state is maintained, and the alarm state is reset by restarting.
Correct the error before restart.

Dimensions (Unit: mm)



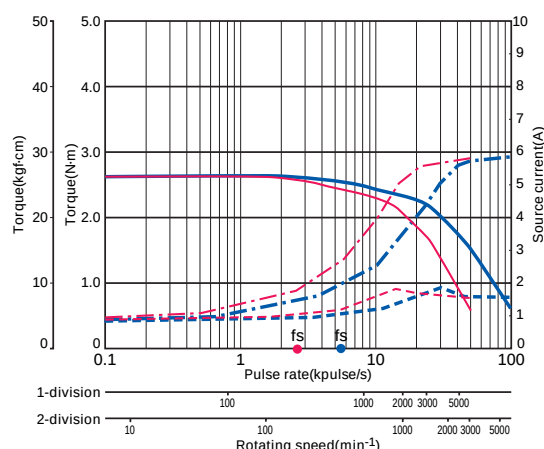
Installation Direction and the Position to be Installed



- Install the PM driver vertically.
- As shown in the figure, fix the PM driver, using the M4 screws through the holes in the fitting metals on the front side of the driver.
- The fitting metals on the front can be removed (fixed onto the PM driver by screws) so that they are used on the back of the driver.

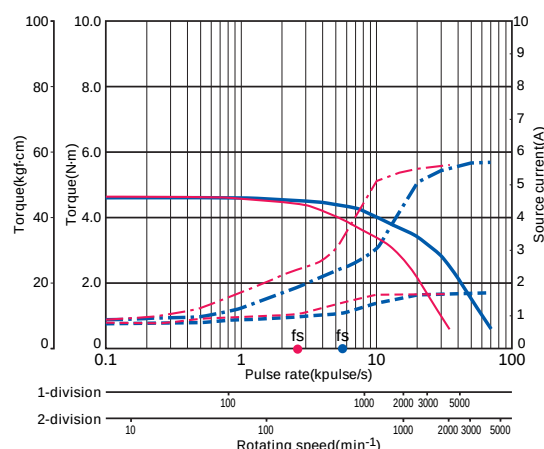
Pulse rate-torque characteristics/pulse rate-source current characteristics

● 103H8581-80 □□ :200V



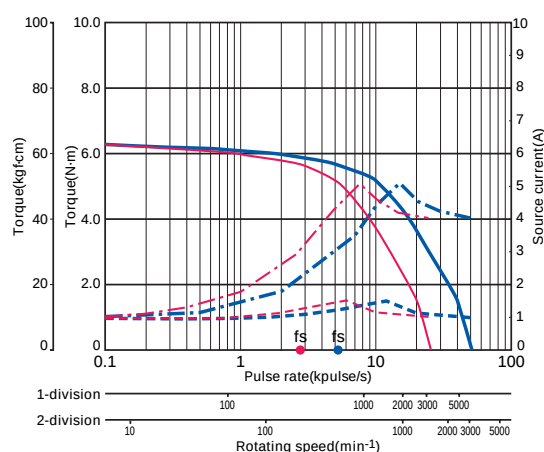
Source voltage: AC200V-Winding current: 1.5 A/phase
 — Getaway torque ($J_{L1}=7.4 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current ($T_L = \text{MAX}$) - - - Source current ($T_L = 0$)
 fs: Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

● 103H8582-80 □□ :200V



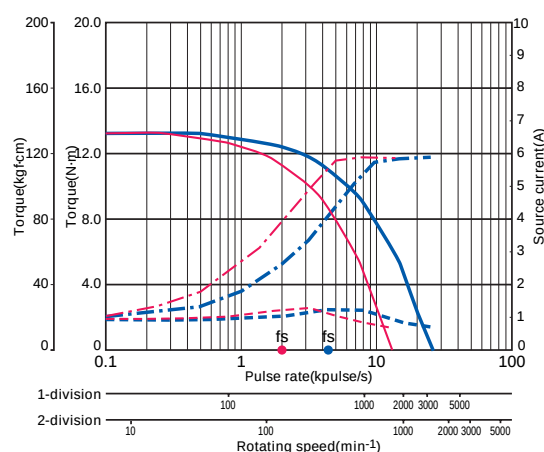
Source voltage: AC200V-Winding current: 1.5 A/phase
 — Getaway torque ($J_{L1}=15.1 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current ($T_L = \text{MAX}$) - - - Source current ($T_L = 0$)
 fs: Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

● 103H8583-80 □□ :200V



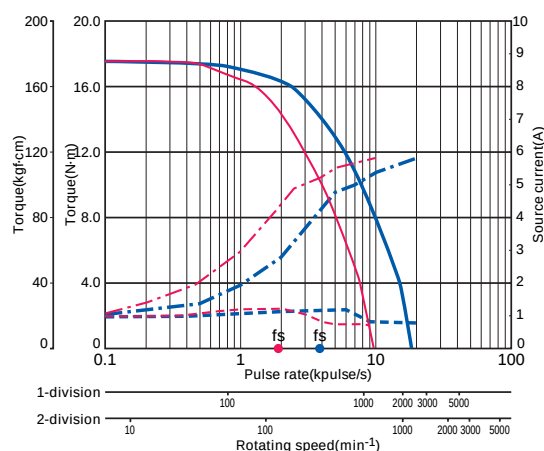
Source voltage: AC200V-Winding current: 1.5 A/phase
 — Getaway torque ($J_{L1}=44 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current ($T_L = \text{MAX}$) - - - Source current ($T_L = 0$)
 fs: Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

● 103H89582-80 □□ :200V



Source voltage: AC200V-Winding current: 1.5 A/phase
 — Getaway torque ($J_{L1}=44 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current ($T_L = \text{MAX}$) - - - Source current ($T_L = 0$)
 fs: Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

● 103H89583-80 □□ :200V



Source voltage: AC200V-Winding current: 1.5 A/phase
 — Getaway torque ($J_{L1}=44 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current ($T_L = \text{MAX}$) - - - Source current ($T_L = 0$)
 fs: Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified



Option

● Connector Set

Model Number	Components of the Connector Set		Stepping motors to be Combined
PM-AP-023	For signal (CN1)	Applicable plug:10114-3000VE Applicable shell:10314-52A0-008	Type 103H8958 □
	For AC power (CN2)	Applicable housing1-178128-3 Applicable contact1-175218-3	
	For stepping motor(CN3)	Applicable housing1-178128-6 Applicable contact1-175218-3	
PM-AP-024	For signal (CN1)	Applicable plug10114-3000VE Applicable shell10314-52A0-008	Type 103H858 □
	For AC power (CN2)	Applicable housing1-178128-3 Applicable contact1-175218-3	
	For stepping motor(CN3)	Applicable housing1-178128-6 Applicable contact1-175217-3	

□ :Serial number

- The connector set consists of the contacts and housings for the I/O signal, AC power, and stepping motor required for one shaft.
- The model number of the connector set differs depending on the combined stepping motor. Before ordering the connector set, check the combined stepping motor model number.

● Connector cable

Model Number	Application
PM-C14S0100-01	Connector cable for I/O signals (CN1)
PM-C03P0100-01	Connector cable for AC power source (CN2)
PM-C06M0100-□□	Connector cable for stepping motors (CN3)

□□ are spaces to be filled by the serial number 09 or 10 (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)

	Model Number
09	103H8581-80□□
	103H8582-80□□
	103H8583-80□□
10	103H89582-80□□
	103H89583-80□□

PMAPALS6A01

PMAPALS6B01

PMM-MA-50034

PMM-MA-50064

PMM-BA-5603-5643

PMM-BA-5604-5644

PMDPB1S6P01

PMDPC1S3P01

PMM-MD-53030-53031

PMM-BD-53130-53131

PMDPA1A3P20

PMDPA1C3P20

Option

● Cable 1 (power cable)

Pin number	Color
1	White
2	Black
3	Green

Driver side

UL1430AWG18
300V, 105°C

1m

Cable model number	Length
PM-C03P0100-01	1m

● Cable 2 (I/O signal cable)

Pin number	Color
1	Red
2	Red*
3	Black
4	Black*
5	Green
6	Green*
7	
8	Yellow/Orange
9	Yellow
10	Orange
11	Blue
12	Blue*
13	Brown
14	Brown*

Driver side

V-B7P-25A

1m

The pin marked with  has no connection.
*: White spiral

Cable model number	Length
PM-C14S0100-01	1m

● Cable 3 (stepping motor extension cable 1)

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

Driver side

1 to 5 pins: UL1430AWG22
6 pin : UL1430AWG18
300V, 105°C

1m

Cable model number	Length
PM-C06M0100-09	1m

Applicable stepping motors	
103H8581-80	☐
103H8582-80	☐
103H8583-80	☐

● Cable 4 (stepping motor extension cable 2)

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

Driver side

UL1430AWG18
300V, 105°C

1m

Cable model number	Length
PM-C06M0100-10	1m

Applicable stepping motors	
103H89582-80	☐
103H89583-80	☐



PMAPA1S6A01

PMAPA1S6B01

PMM-MA-50034

PMM-MA-50064

PMM-BA-5603
-5643PMM-BA-5604
-5611

PMDPB1S6P01

PMDPC1S3P01

PMM-MD-53030
-53031PMM-BD-53130
-53131

PMDPA1A3P20

PMDPA1C3P20



The 5-Phase Stepping Driver

PMA1S6B01 type S

AC100V/115V

Micro-step (500 x 1 to 40 divisions)



● Applicable motors



Characteristics

● Conformity to UL Standards and CE Marking

This driver conforms to UL Standards and CE Marking.

● Micro-step function available

Smooth operation without vibration at low speeds can be realized.

● Rush current prevention circuit

Rush current prevention circuit built in the power circuit section improves the operation reliability when turning ON the power.

● Connectors used for the PM driver I/O cable

Connectors are employed for the high voltage section terminal in place of our conventional model terminal block. Resulting operability is improved for the PM driver installation, maintenance, etc.

● Alarm output signal logic selectable

Signal logic output during the alarm circuit operation can be selected.

Built-in function

● Low vibration mode

Resolutions set to a rough 1- or 2-division enable smooth and low-vibration operations as same as one using the micro-step function. However, the low vibration mode and the micro-step function cannot be used simultaneously.

● Micro-step function

Resolutions set by using the rotary switch enable the micro-step drive. However, the low vibration mode and the micro-step function cannot be used simultaneously.

● Pulse input system selection function

Either single or double input system can be selected by using dipswitches.

● Resolution setting function

Nine resolutions ranging from 1- to 40-division can be set for the basic step angle of stepping motor by using the rotary switch.

● Operation current switchover function

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

● Stopping current adjustment function

Operation current when stopping the stepping motor can be set at 70% to 40% of specified operation current by using the selection switch.

PM driver specifications

Item		PMA1S6B01
Standard specifications	Environment	Input source
		Single phase AC100V/115V+10,-15% 50/60Hz
		Source current
		6A
		Protection class
		Class I
		Operating environment
		Installation category (overvoltage category): III, Pollution level: 2
		Operating ambient temperature
		0~+50°C
		Conservation temperature
		-20~+70°C
		Operating ambient humidity
		35~85%RH (no condensation)
Function	I/O signal	Conservation humidity
		10~90%RH (no condensation)
		Operating altitude
		Maximum 1000 m above sea level
		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.
		Weight
		0.95kg
Function	I/O signal	Protection function
		Against PM driver overheat, main circuit power abnormality, and over current.
		Selection function
		Pulse input system, automatic current reduction, power down, low-vibration mode, step angle, operation current, and stopping current.
		LED indicator
		Power supply monitor, phase origin monitor, pulse monitor, and alarm indication
		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
		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
		Step angle 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
		FULL/HALF 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
Function	I/O signal	Phase origin monitor output signal
		Open collector output by photocoupler Output signal standard V _{ceo} : Maximum 30 V, I _c : Maximum 5 mA
		Alarm output signal
		Open collector output by photocoupler Output signal standard V _{ceo} : Maximum 30 V, I _c : Maximum 5 mA

UL Standard and CE Marking

Product	UL standard		CE Marking		
	Applied standard	File No.	Low Voltage Directive	EMC Directive	
				Emission	Immunity
PM driver	UL508C	E179775	EN50178	EN50081-2 (Class A)	EN50082-2 (Class A)

- The "STEPSYN H" series do not conform to UL Standard and CE Marking. Use the "STEPSYN M" series when the conformity is required.
- For the "STEPSYN M" series conformity, refer to the 5-Phase Stepping Motor Unit "BP2" Series (page 41 and after)

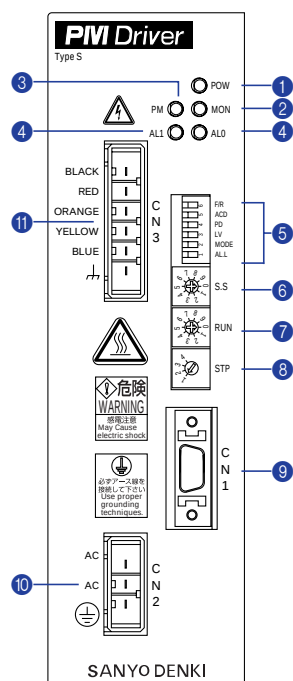
Standard Combination of the stepping motor

Stepping motor dimensions	Stepping motor model number		Holding torque [N·m]	Rotor inertia [×10 ⁻⁴ kg·m ²]	Weight [kg]	page
	Single-axis shaft	Dual-axis shaft				
□60mm	103H7852-8051	103H7852-8021	0.98	0.4	0.78	page 315
	103H7853-8051	103H7853-8021	1.86	0.84	1.36	
φ60mm	103H7522-8051	103H7522-8021	0.735	0.18	0.6	page 317
	103H7523-8051	103H7523-8021	1.568	0.423	1.1	
φ86mm	103H8581-8041	103H8581-8011	2.06	1.45	1.5	page 319
	103H8582-8041	103H8582-8011	4.02	2.9	2.5	
	103H8583-8041	103H8583-8011	6.17	4.4	3.5	
φ106mm	103H89582-8041	103H89582-8011	10.8	14.6	7	page 321
	103H89583-8041	103H89583-8011	16	22	10.4	

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

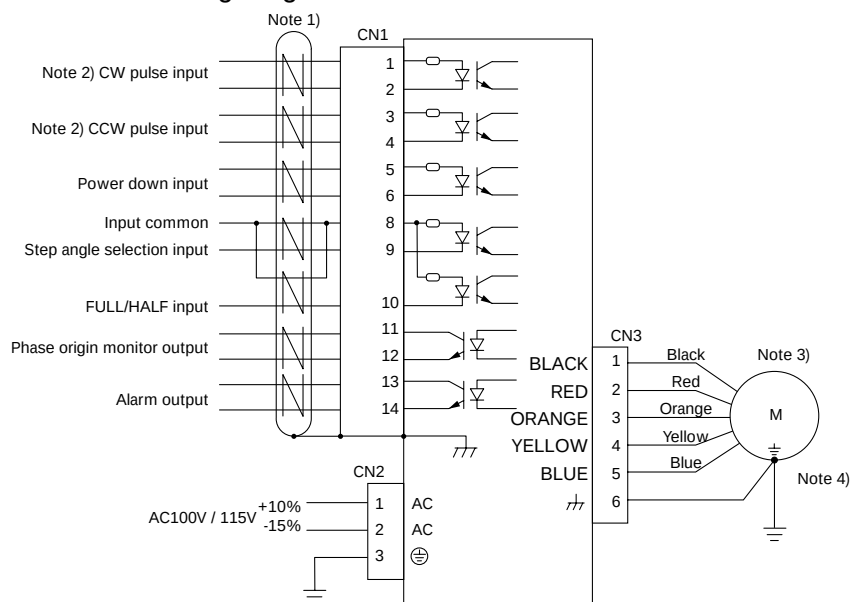
Operation, connection, and function

● Each section name of the PM driver



- ① Internal power establishment (POW) Indicates that the internal power is established.
- ② Phase origin monitor (MON) Indicates that the excitation phase is at the origin (in the state when the power is turned ON)
- ③ Input pulse monitor (PM) Indicates that the input pulse is applied
- ④ Alarm monitor (AL0 and AL1) Turns ON when the internal alarm circuit operates.
- ⑤ Function selection dipswitch Functions can be selected according to the specification. (F/R, ACD, PD, LV, MODE, AL.L)
- ⑥ Step angle selection switch (S.S) Basic step angle of stepping motor can be divided into maximum 40 divisions.
- ⑦ Operation current selection switch (RUN) Stepping motor current value during operation can be selected.
- ⑧ Stopping current selection switch (STP) The current to stop the stepping motor can be selected in the range from 70% to 40% when the automatic current reduction function is operated.
- ⑨ Connector for I/O signal (CN1) ... The I/O signal is connected.
- ⑩ Power input connector (CN2) Single-phase AC power is connected.
- ⑪ Motor output connector (CN3) The stepping motor power line is connected.

● External wiring diagram



Note 1) Use shielded twisted-pair cables

Note 2) Either "double input system (CW pulse and CCW pulse)" or "single input system (CK + U/D)" can be selected by using the function selection switch F/R

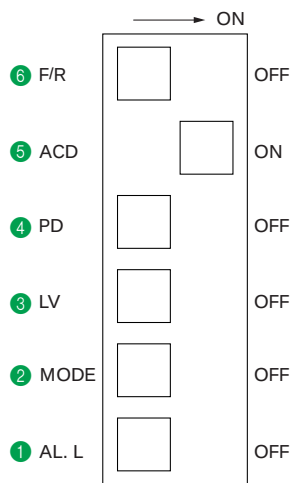
Note 3) Refer to the following table when connecting the 103H785 " type stepping motor:

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

Note 4) Ground the stepping motor flange section and the stepping motor fastening screw by fixing them together. In addition, use a single point grounding

Operation, connection, and function

● Function selection dipswitch ---⑥



- 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 AL. L (alarm output logic selection)
The alarm output logic of I/O signal connector (CN1) can be selected.

AL. L	Output logic
ON	Alarm is ON.
OFF	Alarm is OFF.

② MODE (mode selection)
This switch is not used.
Do not turn ON this switch.

③ LV (low vibration mode selection)
Smooth operation with low vibration is enabled even when a rough resolution (1-, 2-division, etc) is set.

LV	Operation
ON	Low-vibration operation
OFF	Micro-step operation

④ PD (power down selection)
The stepping motor current value at the power down signal input is selected.

PD	Stepping motor windings current
ON	Current value of the selection switch STP (power low)
OFF	OA (power OFF)

⑤ ACD (automatic current reduction selection)
This switch is not used. Do not turn OFF this switch.

⑥ F/R (pulse input system selection)
A pulse input system is selected.

F/R	Pulse input method
ON	Single input system (CK and U/D)
OFF	Double input system (CW and CCW)

● Step angle selection switch (S. S) ---⑥

Number of basic step angle divisions during the micro-step drive is set.

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

- "1" is set at the shipment.

● Operation current selection switch (RUN) ---⑦

The 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.

● Stopping current selection switch (STP) ---⑧

The stepping motor current value when the motor stops (at the automatic current reduction) and when the power down input signal is set to ON (the power low function is selected by dipswitches) can be selected.

Scale	1	2	3	4
Stepping motor current (%)	70	60	50	40

- Percentages are for the operation current value selected by RUN.
- "3" is set at the shipment.

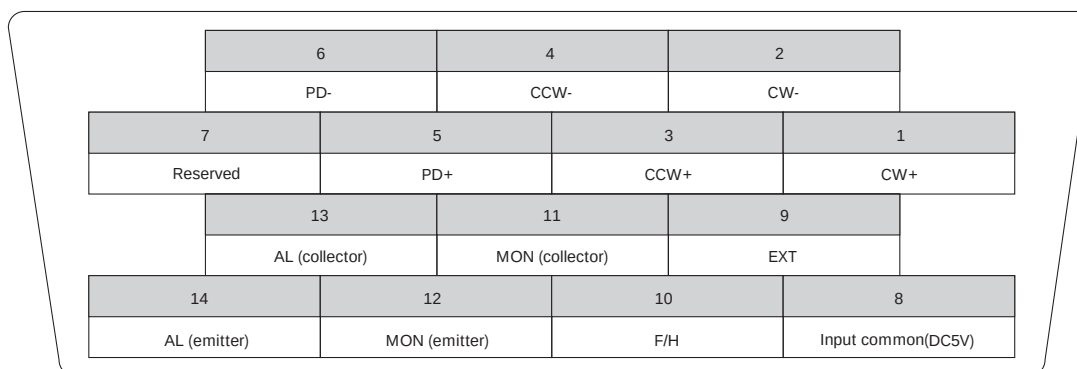
Operation, connection, and function

● I/O signal function (CN1) ---9

Signal name	Abbreviation	Pin number	Function
CW pulse input (standard)	CW+	1	When using double input system
	CW-	2	Drive pulse for the CW direction rotation is input.
Pulse column input	CK+	1	When using single input system
	CK-	2	Drive pulse train for the stepping motor rotation is input.
CCW pulse input (standard)	CCW+	3	When using double input system
	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 single input system.
	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	(The power down input can be changed to the power low function by selecting dipswitches.) PD input signal ON (internal photocoupler ON) PD function enabled PD input signal OFF (internal photocoupler OFF) PD function disabled
Step angle selection input	EXT	8	Inputting the EXT signal enables the FULL/HALF selection input.
		9	EXT input signal ON (internal photocoupler ON) External input signal F/H enabled EXT input signal OFF (internal photocoupler OFF) Main unit rotary switch S. S enabled
FULL/HALF selection input	F/H	8	When the EXT input signal is ON (internal photocoupler ON).
		10	F/H input signal ON (internal photocoupler ON) 2-division setting F/H input signal OFF (internal photocoupler OFF) ... 1-division setting
Phase origin monitor output	MON (collector)	11	It is turned ON when the excitation phase is at the origin (in the state when the power is turned ON)
	MON (emitter)	12	It is turned ON once per 10 pulses when setting to 2-division. It is turned ON once per 20 pulses when setting to 1-division.
Alarm output	AL (collector)	13	The signal is externally output when one of several alarm circuits operates in the PM driver.
	AL (emitter)	14	At this time, the stepping motor is in the unexcited state.

- 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).

● Arrangement of the connector terminals (CN1)



Arrangement of the CN1 connector terminals

* The chart shown above is viewed from the connection section of the connector plug.

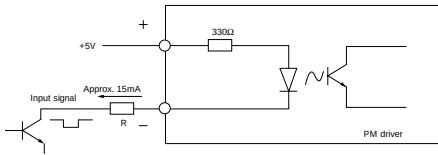
● Connectors to be used

PM driver side		Applicable connector model number	Manufacturer
Used for	Model number		
I/O signals (CN1)	10214-52A2JL	Applicable plug:10114-3000VE Applicable shell:10314-52A0-008	Sumitomo 3M
AC power (CN2)	1-178138-3	Applicable housing:1-178128-3 Applicable contact:1-175218-3	Japan AMP
Stepping motor (CN3)	1-316131-3	Applicable housing:1-178128-6 Applicable contact:1-175217-3	Japan AMP

- Regarding 103H8958 type stepping motor, the applicable contact model number for CN3 is 1-175218-3.
- The applicable connectors should be either prepared by a user or ordered from the optional connector set for the specific stepping motor. (Refer to Option page 119.)

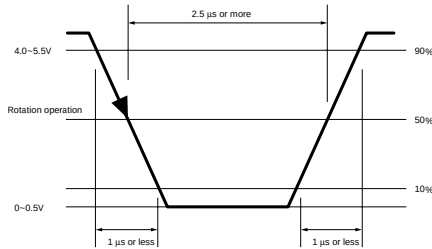
Operation, connection, and function

Input circuit configuration (CW and CCW)



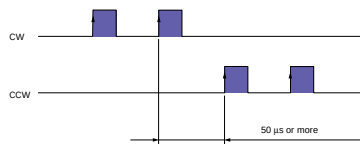
- Pulse duty is 50 % or less.
- When the peak value of the input signal is 5V, the external limit resistance R is 0 Ω. If the peak value exceeds 5V, set the input current to approx. 15mA using the external limit resistance R.

Input signal specifications



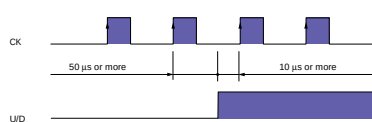
Timing of the command pulse

• Double input system (CW and CCW)



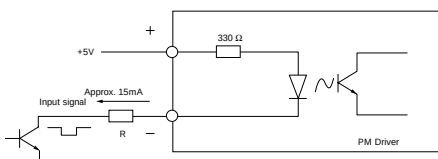
- The internal photocoupler turns ON at the leading edge of the CK photocoupler "ON".
- When applying the pulse to CW, set the internal photocoupler on the CCW side to "OFF".
- When applying the pulse to CCW, set the internal photocoupler on the CW side to "OFF".

• Single input system (CK and U/D)



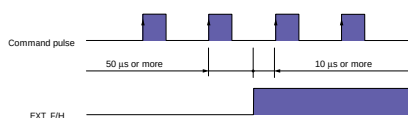
- The internal photocoupler turns ON at the leading edge of the CK photocoupler "ON".
- Before switching the U/D input signals, turn OFF the internal photocoupler on the CK side.

Input circuit configuration (PD, EXT, F/H)



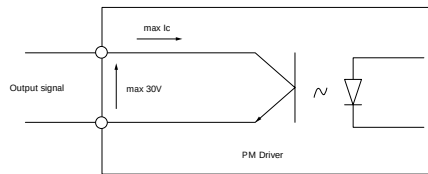
- When the peak value of the input signal is 5V, the external limit resistance R is 0 Ω. If the peak value exceeds 5V, set the input current to approx. 15mA using the external limit resistance R.

Timing of the command pulse, the step angle selection, and the FULL/HALF selection input signal



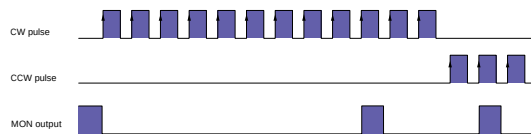
Operation, connection, and function

● Output Circuit Configuration (MON, AL)



- MON, AL output signal
Contact type: Open collector output by the photocoupler
Contact capacity: DC30V
max Ic current
MON output: 5mA
AL output: 20mA

Timing of the MON output (when 1-division is specified)

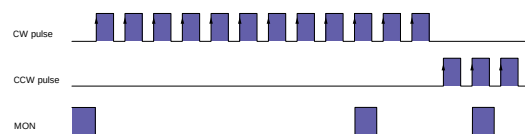


- The internal photocoupler turns "ON" at .

● State Indication (LED)

Indication	Color	Explanation
POW turns ON.	Green	Internal power has been established.
MON turns ON.	Green	Excitation phase is at the origin (the power is turned on). When 1-division is specified, turns on once in 10 pulses. When 2-division is specified, turns on once in 20 pulses. Command pulse is input.
PM turns ON.	Green	Turns on for Approx. 100ms for every one pulse input.

● Timing of MON illumination (1-division setting)



- The internal photocoupler turns "ON" at , and MON illuminates.

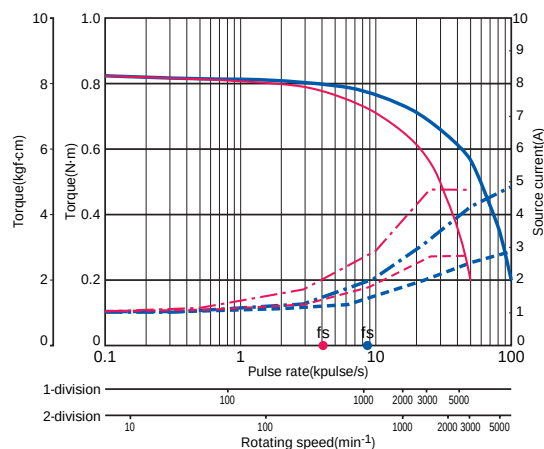
● Alarm Indication (LED)

Indication	Color	Explanation
AL0 turns on.	Red	The main source voltage monitoring alarm circuit operates.
		Source voltage specifications
		Undervoltage (U.V)
		Overvoltage (O.V)
		AC100V/230V Less than AC 85 V AC 127 V or higher The circuit operates under either of the conditions mentioned above.
AL1 turns on.	Red	The overheat protection alarm circuit of the internal device operates. The circuit operates when both the internal temperature of the PM driver and the ambient temperature become 80°C or more.
AL0 and AL1 turn on	Red	The internal device abnormality alarm operates. The alarm operates if an overcurrent or an abnormal overheating of the power device in the PM driver occurs.

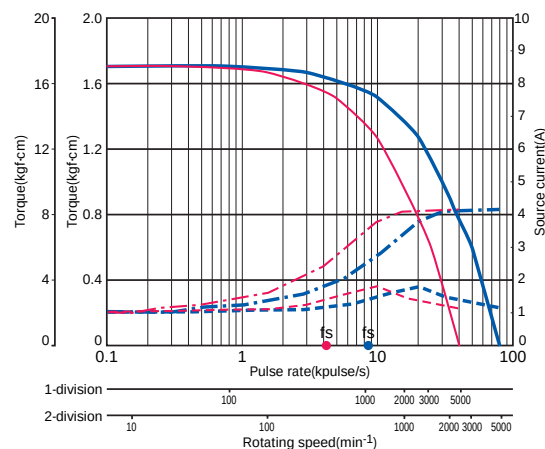
- Each alarm circuit operation turns on the alarm LED and cuts off the stepping motor current to result in the unexcited state.
At the same time, the signal is output externally from the alarm output terminal (AL) of I/O signal connector (CN1).
Once the alarm circuit operates, the state is maintained until the alarm state is reset by restarting.
Correct the error before restarting when an alarm occurs.

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

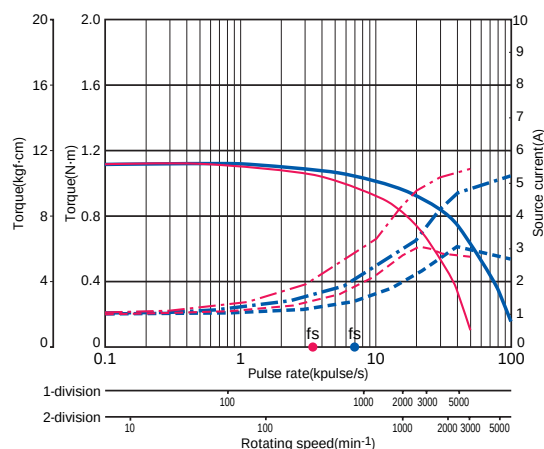
●103H7522-80 □□:100V



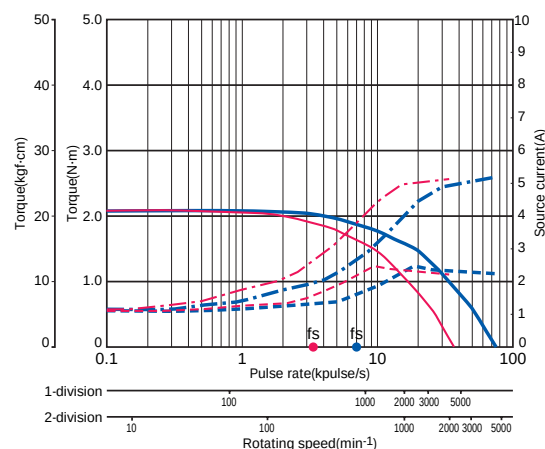
●103H7523-80 □□:100V



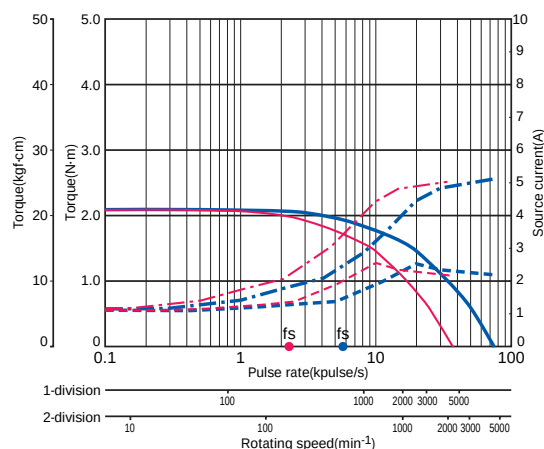
●103H7852-80 □□:100V



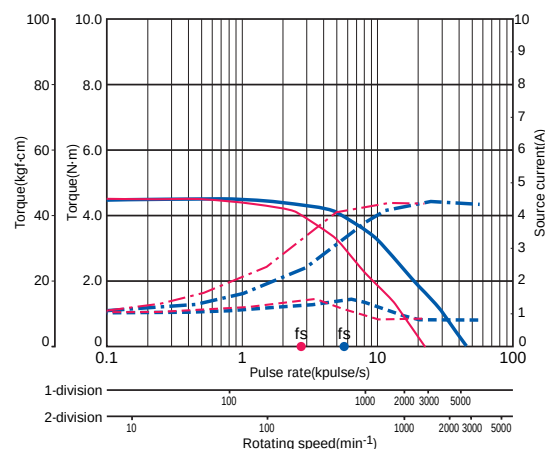
●103H7853-80 □□:100V



●103H8581-80 □□:100V



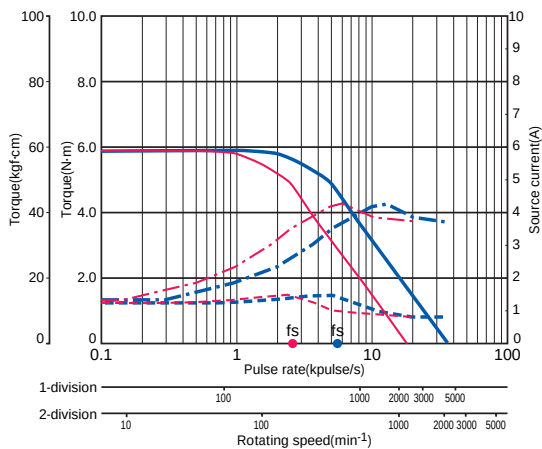
●103H8582-80 □□:100V





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

●103H8583-80 □□ :100V



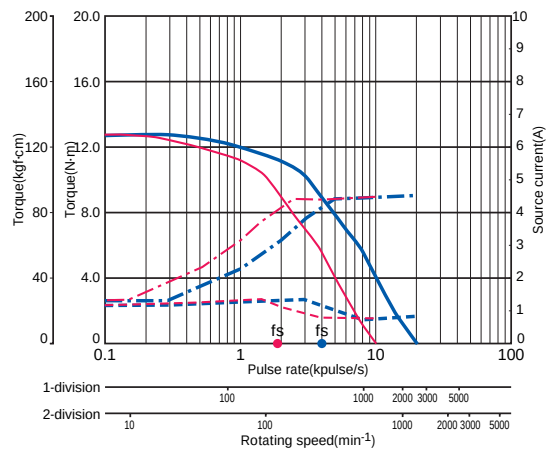
Source voltage:AC100V-Winding current: 1.5 A/phase

— Getaway torque($J_L1=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ using the rubber coupling)

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

fs:Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103H89582-80 □□ :100V



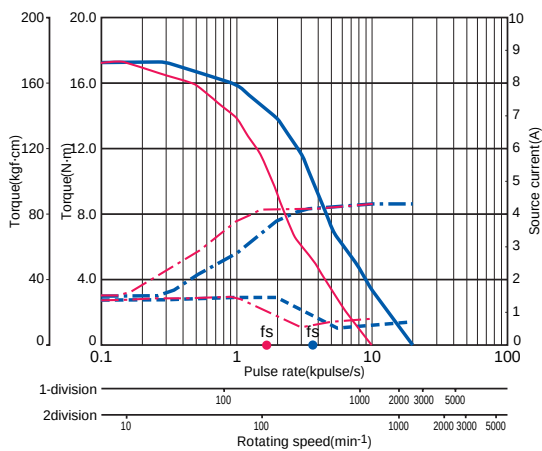
Source voltage:AC100V-Winding current: 1.5 A/phase

— Getaway torque($J_L1=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ using the rubber coupling)

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

fs:Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103H89583-80 □□ :100V



Source voltage:AC100V-Winding current: 1.5 A/phase

— Getaway torque($J_L1=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ using the rubber coupling)

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

fs:Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

PMAP1S6A01

PMAP1S6B01

PMM-MA-50034

PMM-MA-50064

PMM-BA-5603-5643

PMM-BA-5604-5644

PMDP1S6P01

PMDP1S6P01

PMM-MD-53030-53031

PMM-BD-53130-53131

PMDP1A3P20

PMDP1A3P20

Option

● Connector set

Model number	Connector set configuration		Stepping motor combination
PM-AP-023	For signal (CN1)	Applicable plug:10114-3000VE Applicable shell:0314-52A0-008	Type 103H8958 ☐
	For AC power (CN2)	Applicable housing:1-178128-3 Applicable contact:1-175218-3	
	For stepping motor (CN3)	Applicable housing:1-178128-6 Applicable contact:1-175218-3	
PM-AP-024	For signal (CN1)	Applicable plug:10114-3000VE Applicable shell:10314-52A0-008	Type 103H858 ☐ 103H785 ☐ 103H752 ☐
	For AC power (CN2)	Applicable housing:1-178128-3 Applicable contact:1-175218-3	
	For stepping motor (CN3)	Applicable housing:1-178128-6 Applicable contact:1-175217-3	

☐ : Serial number

- The connector set consists of the contacts and housings for the I/O signal, AC power, and stepping motor required for one shaft.
- The model number of the connector set differs depending on the combined stepping motor. Before ordering the connector set, check the combined stepping motor model number.

● Fitting metals

Model number	Quantity
PM-AP-022	One set

● Connector cable

Model number	Application
PM-C14S0100-01	Connector cable for I/O signals (CN1)
PM-C03P0100-01	Connector cable for AC power source (CN2)
PM-C06M0100- ☐ ☐	Connector cable for stepping motors (CN3)

☐☐ are spaces to be filled by the serial number 09 or 10 (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)

	Stepping motor model number
09	103H7852-80 ☐ ☐
	103H7853-80 ☐ ☐
	103H7522-80 ☐ ☐
	103H7523-80 ☐ ☐
	103H8581-80 ☐ ☐
	103H8582-80 ☐ ☐
	103H8583-80 ☐ ☐
10	103H89582-80 ☐ ☐
	103H89583-80 ☐ ☐

Option

● Cable 1 (power cable)

Pin number	Color
1	White
2	Black
3	Green

UL1430AWG18
300V, 105°C

1m

Cable model number	Length
PM-C03P0100-01	1m

● Cable 2 (I/O signal cable)

Pin number	Color
1	Red
2	Red*
3	Black
4	Black*
5	Green
6	Green*
7	
8	Yellow/Orange
9	Yellow
10	Orange
11	Blue
12	Blue*
13	Brown
14	Brown*

V-B7P-25A

1m

The pin marked with  has no connection.
*: White spiral

Cable model number	Length
PM-C14S0100-01	1m

● Cable 3 (stepping motor extension cable 1)

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

1 to 5 pins: UL1430AWG22
6 pin : UL1430AWG18
300V, 105°C

1m

Cable model number	Length
PM-C06M0100-09	1m

Applicable stepping motors
103H7852-80 ☐
103H7853-80 ☐
103H7522-80 ☐
103H7523-80 ☐
103H8581-80 ☐
103H8582-80 ☐
103H8583-80 ☐

● Cable 4 (stepping motor extension cable 2)

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

UL1430AWG18
300V, 105°C

1m

Cable model number	Length
PM-C06M0100-10	1m

Applicable stepping motors
103H89582-80 ☐
103H89583-80 ☐



The 5-Phase Stepping Driver

PMM-MA-50034-10

AC100V to 230V

Micro-step (500 x 1 to 250 divisions)



● Applicable motors



Characteristics

● Conformity to CE Marking

This driver conforms to CE Marking.

● Wide-range input power specifications

Input source power can be used in wide range from AC 100 to 230 V.

● Micro-step function available

Smooth operation without vibration at low speeds can be realized.

Built-in function

● Automatic micro function

Divisions set to 1- or 2-division enable smooth and low-vibration operations as same as one using the micro-step function.

● Micro-step function

Resolutions set by using the rotary switch enable the micro-step drive. However, this function and the automatic micro function cannot be used simultaneously.

● Resolution setting function

16 resolutions ranging from 1- to 250-division can be set for the basic step angle of stepping motor by using the rotary switch.

● Pulse input system selection function

Either single or double input system can be selected by using dipswitches.

● 2 types of stepping motor

The PM driver "PMM-MA-50034-10" lineup as the standard combination consists of two types the "STEPSYN H" series that conform to CE Marking and the standard "STEPSYN H" series. Combining with the "STEPSYN H" series that conform to CE Marking provides the conformity to the EMC Directive.

PM driver specifications

Item		PMM-MA-50034-10	
Standard specifications	Input source	Single phase AC100V~230V+10,-15% 50/60Hz	
	Source current	4 A (at AC 100 V) 2 A (at AC 200 V)	
	Environment	Protection class	Class I
		Operating environment	Installation category (overvoltage category): II , Pollution level: 2
		Operating ambient temperature	0~+50℃
		Conservation temperature	-20~+70℃
		Operating ambient humidity	35~85%RH (no condensation)
		Conservation humidity	10~90%RH (no condensation)
		Operating altitude	Maximum 1000 m above sea level
		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.
		Weight	1.0kg
	Function	Protection function	Against PM driver overheat
Selection function		Automatic current reduction, excitation mode, pulse input system, drive mode, step angle, and operation current	
LED indicator		Power supply monitor, phase origin monitor, pulse monitor, and alarm monitor.	
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 micro mode: 100 kpulses/s, Automatic micro mode: 25 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	
	Phase origin monitor output signal	Open collector output by photocoupler Output signal standard Vceo: Maximum 30 V, Ic: Maximum 5 mA	
	Alarm output signal	Open collector output by photocoupler Output signal standard Vceo: Maximum 30 V, Ic: Maximum 5 mA	
	Ready output signal	Open collector output by photocoupler Output signal standard Vceo: Maximum 30 V, Ic: Maximum 5 mA	

CE Marking

Product	Applied standard		
	Low-Voltage Directive	EMC Directive	
		Emission	Immunity
PM driver	EN61010-1	EN50081-2	EN50082-2
Stepping motor	—	(Class A)	(Class A)

- The stepping motor CE Marking is applied for the "STEPSYN H" series that conforms to CE Marking.
- The conformity to the EMC Directive is checked under the installation environment shown in Figure 1. However, the conformity to the EMC Directive cannot be checked in the installation environment used for the user's equipment that varies depending on the user's control panel configuration in which PM drivers and stepping motor are built and the relation to other devices, locations, and wiring. Therefore, the user is required to finally check the entire machine and equipment conformity to the EMC Directive

Standard combined stepping motor

● "STEPSYN H" series that conform to CE Marking

Stepping motor dimensions	Stepping motor model number		Holding torque [N·m]	Rotor inertia [$\times 10^{-4} \text{kg} \cdot \text{m}^2$]	Weight [kg]	Page
	One-axis shaft	Dual-axis shaft				
ø60mm	103H7521-6050	103H7521-6020	0.46	0.148	0.51	323 page
	103H7522-6050	103H7522-6020	0.735	0.18	0.6	
	103H7523-6050	103H7523-6020	1.568	0.423	1.1	
ø86mm	103H8581-6050	103H8581-6020	2.06	1.45	1.5	325 page
	103H8582-6050	103H8582-6020	4.02	2.9	2.5	
	103H8583-6050	103H8583-6020	6.17	4.4	3.5	
ø106mm	103H89582-6050	103H89582-6020	10.8	14.6	7	327 page
	103H89583-6050	103H89583-6020	16	22	10.4	

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

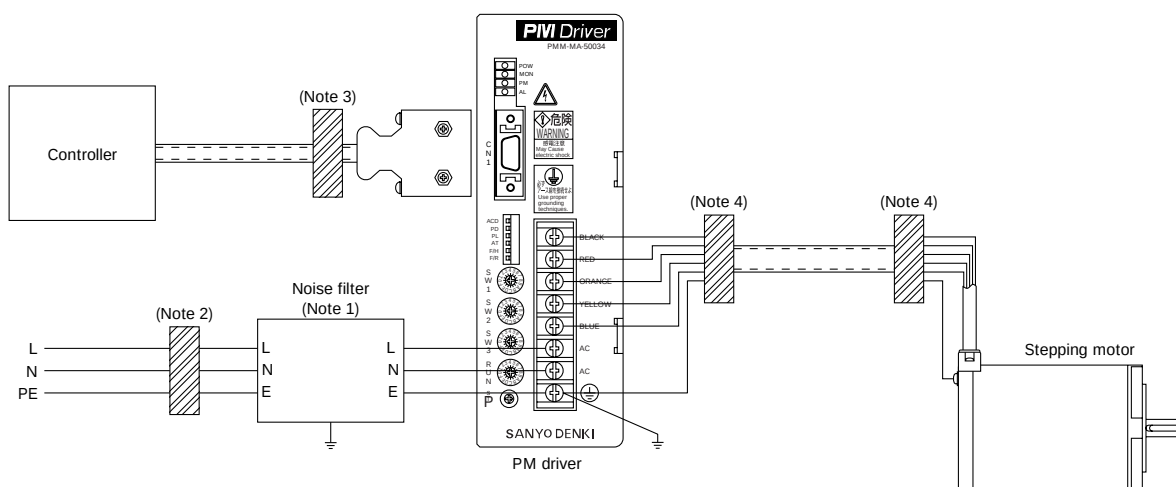
● Standard "STEPSYN H" series

Stepping motor dimensions	Stepping motor model number		Holding torque [N·m]	Rotor inertia [$\times 10^{-4} \text{kg} \cdot \text{m}^2$]	Weight [kg]	Page
	One-axis shaft	Dual-axis shaft				
□42mm	103H5505-7040	103H5505-7010	0.127	0.03	0.23	311 page
	103H5508-7040	103H5508-7010	0.176	0.053	0.28	
	103H5510-7040	103H5510-7010	0.255	0.065	0.37	
□50mm	103H6500-7041	103H6500-7011	0.235	0.057	0.38	313 page
	103H6501-7041	103H6501-7011	0.39	0.105	0.44	
□60mm	103H7851-7051	103H7851-7021	0.65	0.275	0.6	315 page
	103H7852-7051	103H7852-7021	0.98	0.4	0.78	
	103H7853-7051	103H7853-7021	1.86	0.84	1.36	
ø60mm	103H7521-7051	103H7521-7021	0.46	0.148	0.51	317 page
	103H7522-7051	103H7522-7021	0.735	0.18	0.6	
	103H7523-7051	103H7523-7021	1.568	0.423	1.1	
ø86mm	103H8581-7041	103H8581-7011	2.06	1.45	1.5	319 page
	103H8582-7041	103H8582-7011	4.02	2.9	2.5	
	103H8583-7041	103H8583-7011	6.17	4.4	3.5	
ø106mm	103H89582-7041	103H89582-7011	10.8	14.6	7	321 page
	103H89583-7041	103H89583-7011	16	22	10.4	

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

Parts Recommended for the EMC Directive Conformity

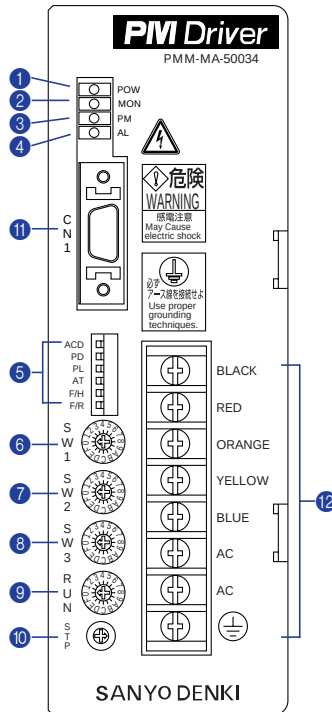
No.	Part name	Model	Specifications and dimensions	Manufacturer
Note 1	Noise filter	RF3020-DLC	Rated voltage: Line-Line 440-550 V, Rated current: 20 A	RASMIELECTRONICS LTD.,
Note 2	Toroidal core	T60×20×36	Outer core diameter: 60 mm, Inner core diameter: 36 mm	TDK
Note 3	Toroidal core	TRCN-40-27-15	Outer core diameter: 40 mm, Inner core diameter: 27 mm	Kitagawa Industries Co., Ltd.
Note 4	Toroidal core	TRCN-40-27-15	Outer core diameter: 40 mm, Inner core diameter: 27 mm	Kitagawa Industries Co., Ltd.



Installation environment diagram

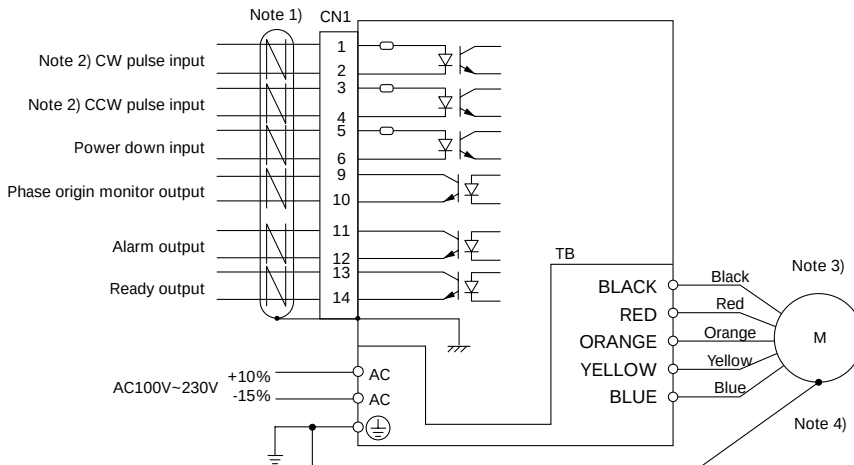
Operation, connection, and function

Each section name of the PM driver



- ① Internal power establishment (POW) Indicates that the internal power is established.
- ② Phase origin monitor (MON)..... Indicates that the excitation phase is at the origin (in the state when the power is turned ON).
- ③ Input pulse monitor (PM) Indicates that the input pulse is applied.
- ④ Alarm monitor(AL) Turns ON when the internal alarm circuit operates.
- ⑤ Function selection dipswitch Functions can be selected according to the specification. (ACD,PD,PL,AT,F/H,F/R)
- ⑥ SW1 (reserved) Not used.
- ⑦ Pulse interval setting switch (SW2) Interval of pulses to start operation is set when the automatic micro function is enabled.
- ⑧ Half-step angle correction/ he stopping angle of the half-step system is corrected or the number of divisions of the micro-step drive is set.
Step angle selection switch (SW3)
- ⑨ Operation current selection switch (RUN)....Stepping motor current value during operation can be selected.
- ⑩ Stopping current adjustment control (STP)....The stepping motor current when stopping is adjusted when the automatic current reduction function is operated.
- ⑪ Connector for I/O signal (CN1) ..The I/O signal is connected.
- ⑫ Terminal block (TB)..... I/O signals, the single-phase AC power source, and the stepping motor power cable are connected.

External wiring diagram



Note 1) Use shielded twisted-pair cables.

Note 2) Either "double input system (CW and CCW)" or "single input system (CK and U/D)" can be selected by using the function selection switch F/R

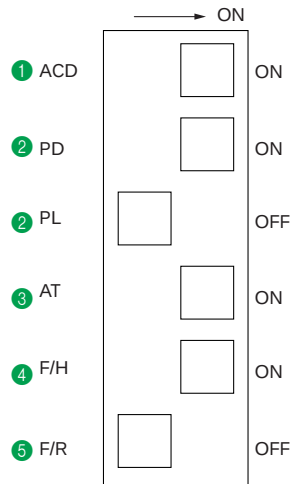
Note3) Refer to the following table when connecting the 103H785□type stepping motor:

Note 4) Ground the stepping motor flange section and the stepping motor fastening screw by fixing them together when using the standard "STEPSYN H" series. Use the grounding terminal when using the "STEPSYN H" series that conform to CE Marking. Use a single point grounding.

Product	Terminal block silk/stepping motor connector pin number				
PM driver (TB)	BLACK	RED	ORANGE	YELLOW	BLUE
Stepping motor connector	1	4	3	2	5

Operation, connection, and function

● Function selection dipswitch ---⑤



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

ACD	Auto current down
ON	Operates
OFF	Does not operate

② PD and PL (power down and power low selection)
The stepping motor windings current value at the power down signal input is selected.

PD	PL	Stepping motor current
ON	OFF	OA (power OFF)
OFF	ON	Adjustment value of the stopping adjustment control STP (power low)

③ AT (automatic micro selection)
The automatic micro function and the micro-step function are selected.

AT	Operation
ON	Automatic micro function
OFF	Micro-step function

④ F/H (excitation system selection)
Excitation mode is selected when the automatic micro selection (AT) is set to "ON".

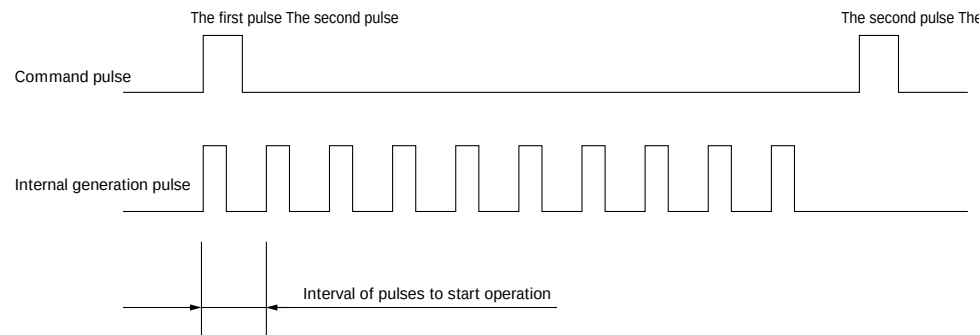
F/H	Energization system
ON	1-division setting (full step)
OFF	2-division setting (half step)

⑤ F/R (pulse input system selection)
A pulse input system is selected.

F/R	Pulse input system
ON	Single input system (CK and U/D)
OFF	Double input system (CW and CCW)

● Pulse interval setting switch (SW2) ---⑦

Interval of pulses to start operation is set when the automatic micro function is enabled.



Scale	0	1	2	3	4	5	6	7
Pulses interval(ms)	10	5	3.3	2.5	2	1.6	1.4	1.25
Scale	8	9	A	B	C	D	E	F
Pulses interval(ms)	1.1	1	0.5	0.33	0.25	0.2	0.17	0.14

- "F" is set at the shipment.

Operation, connection, and function

● Half-step angle correction/Step angle selection switch (SW3)---⑧

① The stopping angle can be corrected by manipulating the number of internal generation pulses when the automatic micro selection is set to ON (automatic micro function) and the excitation system selection is set to OFF (half step).

Scale	0	1	2	3	4	5	6	7
Distribution ratio	9 : 1	8 : 2	7 : 3	6 : 4	5 : 5	4 : 6	3 : 7	2 : 8
Scale	8	9	A	B	C	D	E	F
Distribution ratio	1 : 9	1 : 9	1 : 9	1 : 9	1 : 9	1 : 9	1 : 9	1 : 9

• "0" is set at the shipment.

② Number of basic step angle divisions of stepping motor (0.72 °c) is set when the automatic micro selection is set to OFF (micro-step function).

Scale	0	1	2	3	4	5	6	7
Number of divisions	1	2	2.5	4	5	8	10	20
Scale	8	9	A	B	C	D	E	F
Number of divisions	25	40	50	80	100	125	200	250

• "4" is set at the shipment (distribution ratio "5:5" or number of divisions "5").

● Operation current selection switch (RUN)---⑨

Operation current of stepping motor can be selected.

Scale	0	1	2	3	4	5	6	7
Stepping motor current (A total)	3.0	2.9	2.8	2.6	2.5	2.4	2.3	2.2
Scale	8	9	A	B	C	D	E	F
Stepping motor current (A total)	2.1	1.9	1.8	1.7	1.6	1.5	1.3	1.2

• "0" is set at the shipment.
• 0.75 A/phase is set at scale 0.

● SW1 (reserved)---⑥

This rotary switch is not used.

● Stopping current adjustment control (STP)---⑩

The stepping motor current value is adjusted for the stopping operation in the automatic current reduction function and when the power down input signal is set to "ON" (power low function is selected by dipswitches).

• Approx. a half operation current value selected by RUN is set at the shipment.
• For the STP adjustment, refer to the separate PMM-MA-50034-10 operations manual.

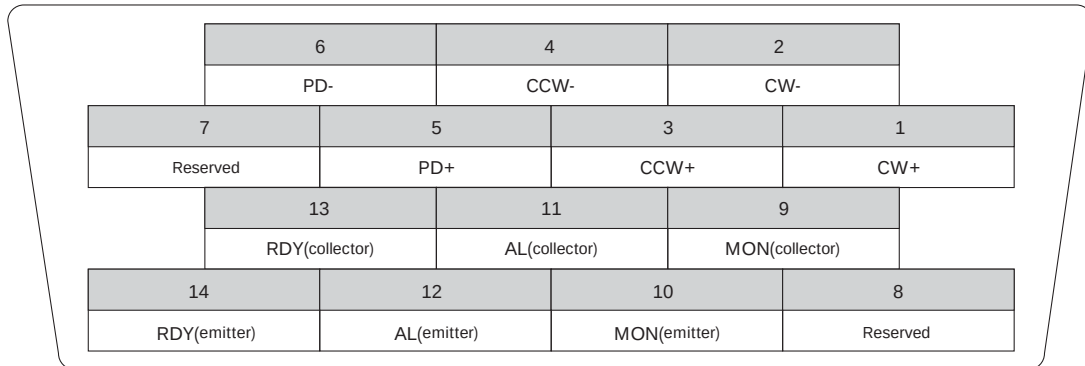
● I/O signal function (CN1)---⑪

Signal name	Abbreviation	Pin Number	Function
CW pulse input (standard)	CW+	1	When using double input system
	CW-	2	Drive pulse for the CW direction rotation is input.
Pulse column input	CK+	1	When using single input system
	CK-	2	Drive pulse train for the stepping motor rotation is input.
CCW pulse input (standard)	CCW+	3	When using double input system
	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 single input system.
	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). (The power down input can be changed to the power low function by selecting dipswitches.)
	PD-	6	PD input signal ON (internal photocoupler ON) PD function enabled PD input signal OFF (internal photocoupler OFF) .. PD function disabled
Phase origin monitor output	MON (collector)	9	It is turned ON when the excitation phase is at the origin (in the state when the power is turned ON).
	MON (emitter)	10	It is turned ON once per 10 pulses when setting to 2-division (full step). It is turned ON once per 20 pulses when setting to 1-division (half step).
Alarm output	AL (collector)	11	The signal is externally output when one of several alarm circuits operates in the PM driver.
	AL (emitter)	12	At this time, the stepping motor is in the unexcited state.
Ready output	RDY (collector)	13	It is turned ON and OFF when the stepping motor is in the excitation state and the unexcited state, respectively.
	RDY (emitter)	14	

• 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).

Operation, connection, and function

● Arrangement of the connector terminals (CN1)



Arrangement of the CN1 connector terminals

* The chart shown above is viewed from the connection section of the connector plug.

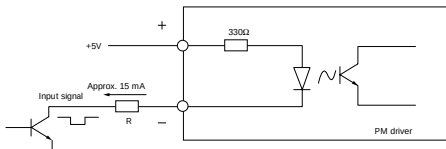
● Connectors to be used

PM driver side		Applicable connector model number	Manufacturer
Used for	Model number		
I/O signal (CN1)	10214-52A2JL	Applicable plug:10114-3000VE- Applicable shell:10314-52A0-008	Sumitomo 3M

- The applicable connectors are attached.

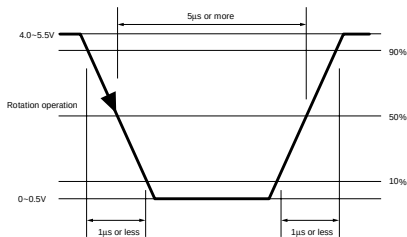
Operation, connection, and function

Input circuit configuration (CW and CCW)



- Pulse duty is 50 % or less.
- 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.

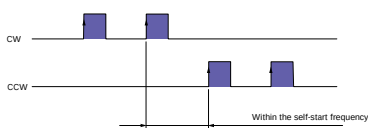
Input signal specifications



- Set the pulse width to 20μs or more when the automatic micro is set.

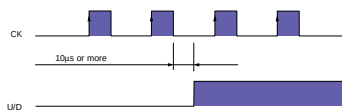
Timing of the command pulse

• Double input system (CW and CCW)



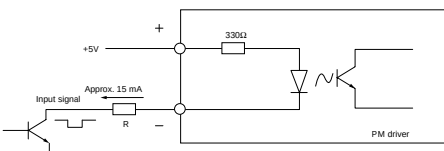
- The internal photocoupler turns ON at [blue square], and the internal circuit (stepping motor) operates at the leading edge of the photocoupler "ON".
- When applying the pulse to CW, set the internal photocoupler on the CCW side to "OFF".
- When applying the pulse to CCW, set the internal photocoupler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

• Single input system (CK and U/D)



- The internal photocoupler turns ON at [blue square], and the internal circuit (stepping motor) operates at the leading edge of the CK photocoupler "ON".
- Before switching the U/D input signals, turn OFF the internal photocoupler on the CK side.

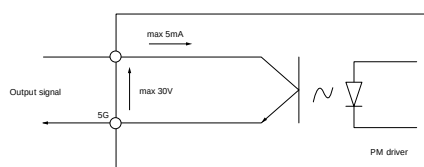
Input circuit configuration (PD)



- 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.

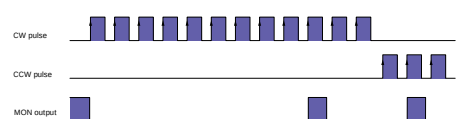
Operation, connection, and function

● Output circuit configuration (MON, AL, RDY)



- MON, AL, RDY output signal
- Contact type: Open collector output by the photocopier
- Contact capacity: DC 30 V, 5 mA or less

Timing of the MON output (when 1-division is specified)



- The internal photocoupler turns "ON" at .

● State Indication (LED)

Indication	Color	Explanation
POW turns ON.	Green	Internal power has been established.
MON turns ON.	Green	Excitation phase is at the origin (the power is turned on). When 1-division is specified (full step), turns on once in 10 pulses. When 2-division is specified (half step), turns on once in 20 pulses. Command pulse is input.
PM turns ON.	Green	Turns on for Approx. 100ms for every one pulse input. Timing of MON illumination (1-division setting)

Timing of MON illumination (1-division setting)

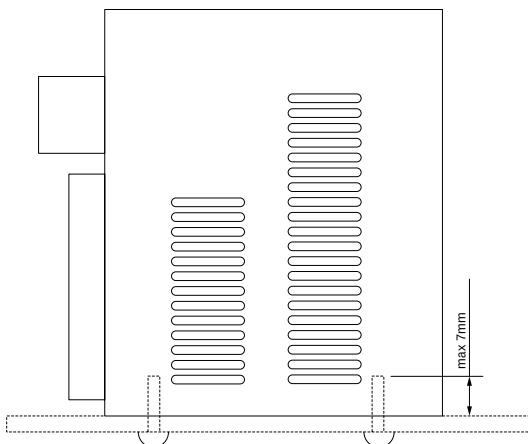


- The internal photocoupler turns "ON" at .

● Alarm Indication (LED)

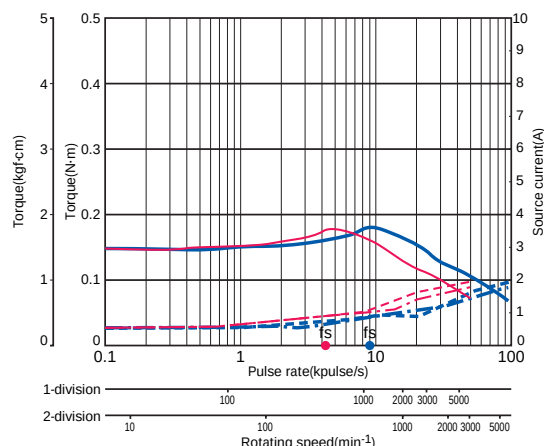
Indication	Color	Explanation
AL turns on.	Red	The overheat protection alarm circuit of the internal device operates. The circuit operates when both the internal temperature of the PM driver and the ambient temperature become 80°C or more.

- Each alarm circuit operation turns on the alarm LED and cuts off the stepping motor current to result in the unexcited state.
At the same time, the alarm output circuit photocoupler of I/O signal connector (CN1) turns ON and the signal is output externally. The alarm automatically stops to turn ON the stepping motor current when the internal semiconductor temperature becomes 80°C or less. Turn OFF the main power and try to radiate the generated heat by the forced-air-cooling of PM driver cabinet and so on before the automatic recovery from the alarm state when an alarm occurs.



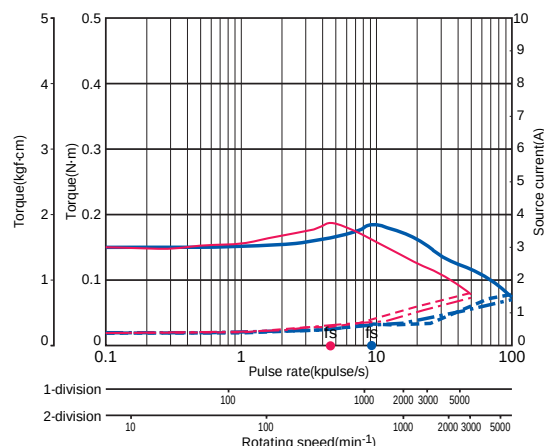
Pulse rate-torque characteristics/pulse rate-source current characteristics

●103H5505-70 □□:100V



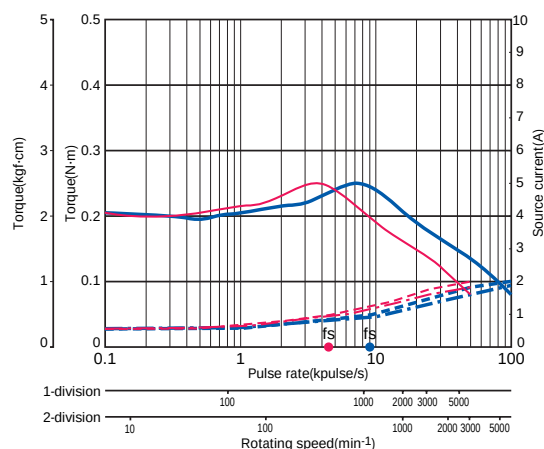
Source voltage: AC100V-Winding current: 0.75A/phase
 — Getaway torque(JL1=0.94×10⁻⁴kg·m² using the rubber coupling)
 - - - Source current(T_L=MAX) - - - Source current(T_L=0)
 fs: Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103H5505-70 □□:200V



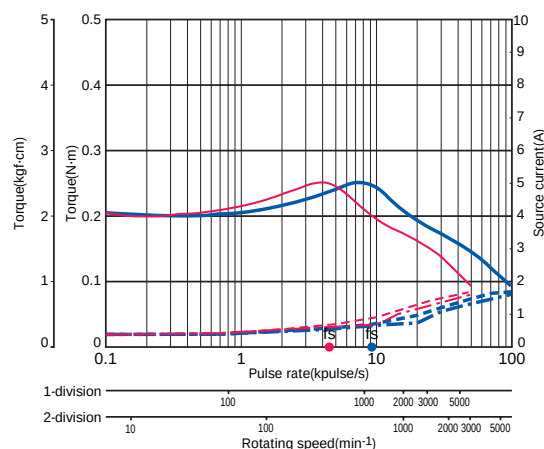
Source voltage: AC200V-Winding current: 0.75 A/phase
 — Getaway torque(JL1=0.94×10⁻⁴kg·m² using the rubber coupling)
 - - - Source current(T_L=MAX) - - - Source current(T_L=0)
 fs: Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103H5508-70 □□:100V



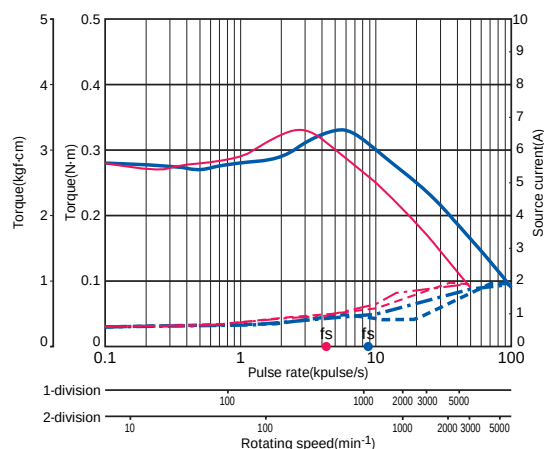
Source voltage: AC100V-Winding current: 0.75 A/phase
 — Getaway torque(JL1=0.94×10⁻⁴kg·m² using the rubber coupling)
 - - - Source current(T_L=MAX) - - - Source current(T_L=0)
 fs: Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103H5508-70 □□:200V



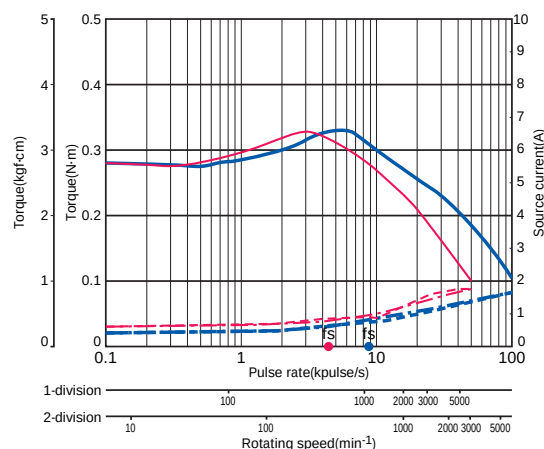
Source voltage: AC200V-Winding current: 0.75 A/phase
 — Getaway torque(JL1=0.94×10⁻⁴kg·m² using the rubber coupling)
 - - - Source current(T_L=MAX) - - - Source current(T_L=0)
 fs: Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103H5510-70 □□:100V



Source voltage: AC100V-Winding current: 0.75 A/phase
 — Getaway torque(JL1=0.94×10⁻⁴kg·m² using the rubber coupling)
 - - - Source current(T_L=MAX) - - - Source current(T_L=0)
 fs: Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

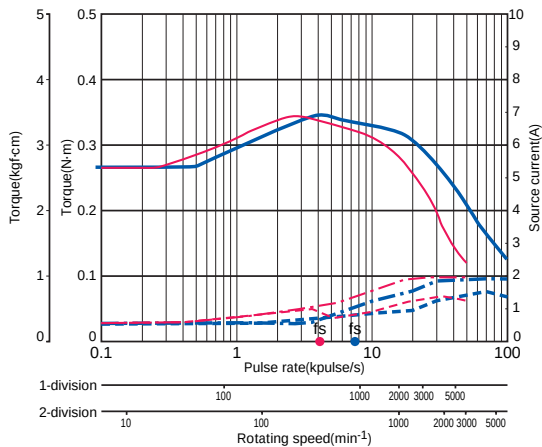
●103H5510-70 □□:200V



Source voltage: AC200V-Winding current: 0.75 A/phase
 — Getaway torque(JL1=0.94×10⁻⁴kg·m² using the rubber coupling)
 - - - Source current(T_L=MAX) - - - Source current(T_L=0)
 fs: Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

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

●103H6500-70 □□:100V



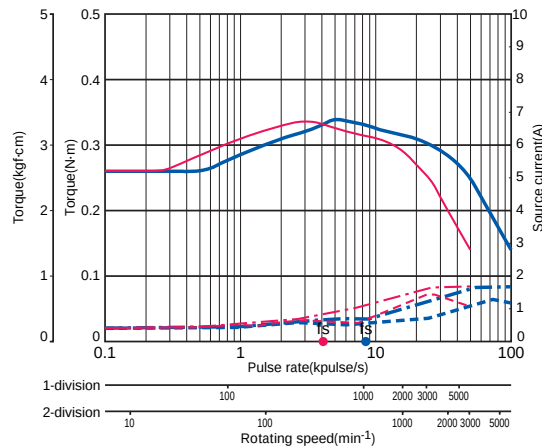
Source voltage: AC100V-Winding current: 0.75 A/phase

— Getaway torque(JL1=0.94×10⁻⁴kg·m² using the rubber coupling)

- - - Source current(T_L=MAX) - - - Source current(T_L=0)

fs: Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103H6500-70 □□:200V



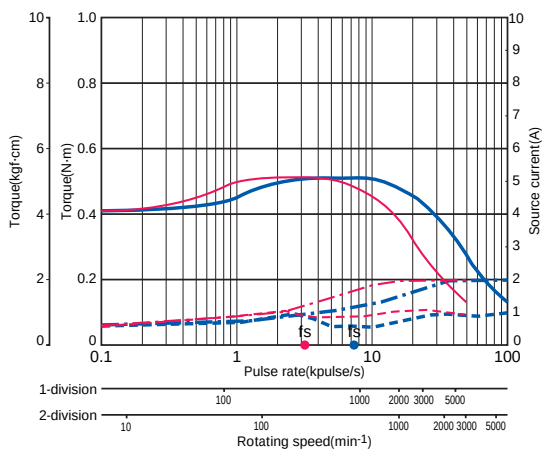
Source voltage: AC200V-Winding current: 0.75 A/phase

— Getaway torque(JL1=0.94×10⁻⁴kg·m² using the rubber coupling)

- - - Source current(T_L=MAX) - - - Source current(T_L=0)

fs: Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103H6501-70 □□:100V



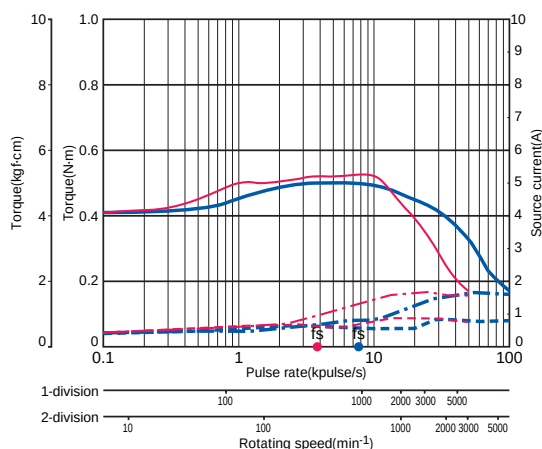
Source voltage: AC100V-Winding current: 0.75 A/phase

— Getaway torque(JL1=0.94×10⁻⁴kg·m² using the rubber coupling)

- - - Source current(T_L=MAX) - - - Source current(T_L=0)

fs: Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103H6501-70 □□:200V



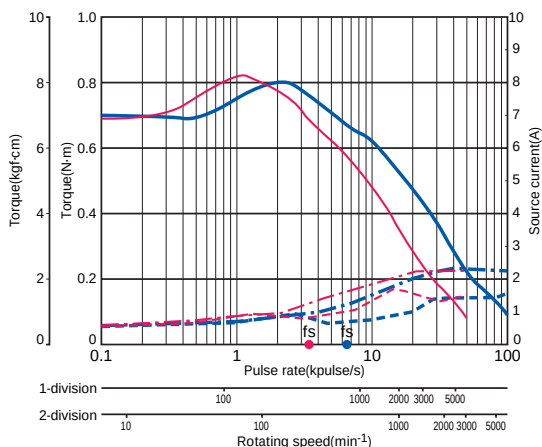
Source voltage: AC200V-Winding current: 0.75 A/phase

— Getaway torque(JL1=0.94×10⁻⁴kg·m² using the rubber coupling)

- - - Source current(T_L=MAX) - - - Source current(T_L=0)

fs: Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103H7851-70 □□:100V



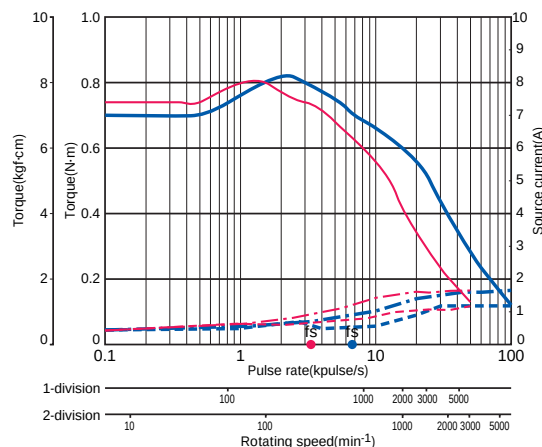
Source voltage: AC100V-Winding current: 0.75 A/phase

— Getaway torque(JL1=2.6×10⁻⁴kg·m² using the rubber coupling)

- - - Source current(T_L=MAX) - - - Source current(T_L=0)

fs: Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103H7851-70 □□:200V



Source voltage: AC200V-Winding current: 0.75 A/phase

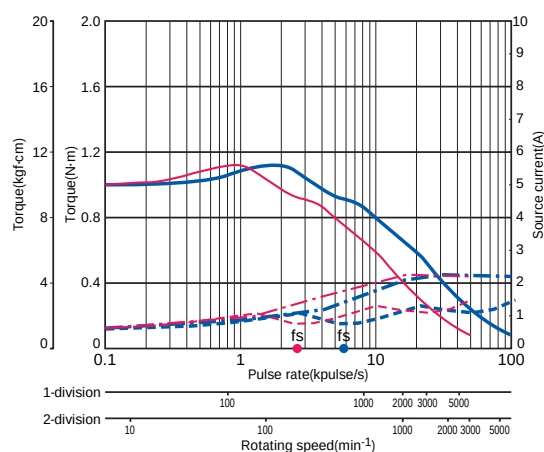
— Getaway torque(JL1=2.6×10⁻⁴kg·m² using the rubber coupling)

- - - Source current(T_L=MAX) - - - Source current(T_L=0)

fs: Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

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

●103H7852-70 □□ :100V



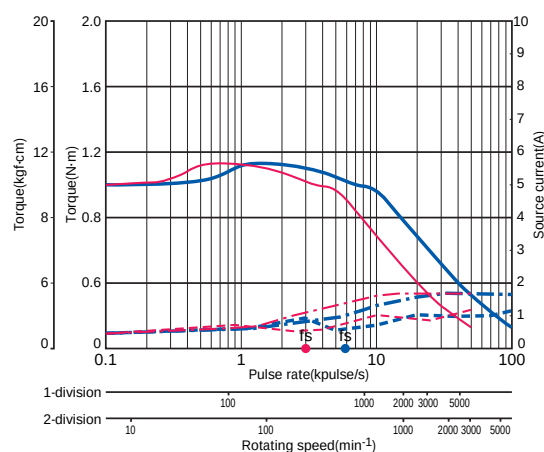
Source voltage: AC100V-Winding current: 0.75 A/phase

— Getaway torque ($JL1=2.6 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)

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

fs: Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103H7852-70 □□ :200V



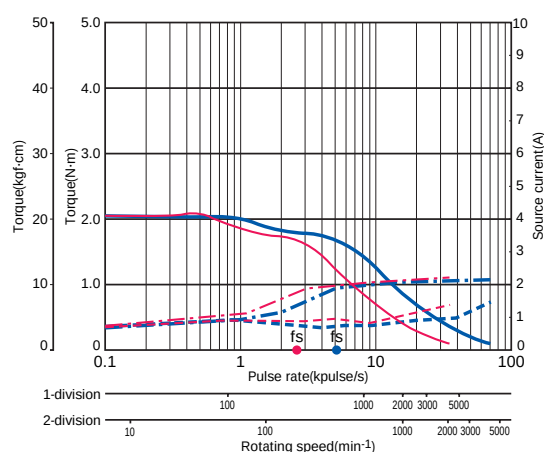
Source voltage: AC200V-Winding current: 0.75 A/phase

— Getaway torque ($JL1=2.6 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)

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

fs: Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103H7853-70 □□ :100V



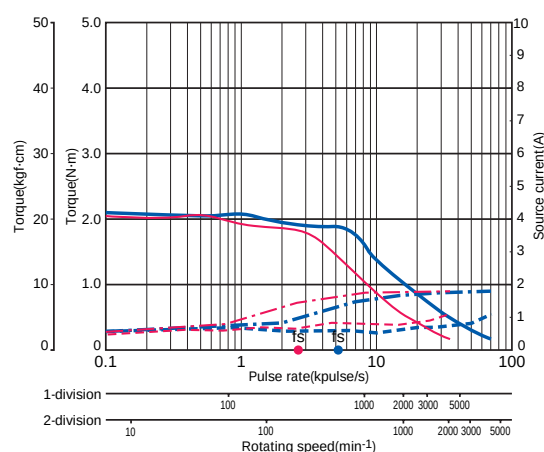
Source voltage: AC100V-Winding current: 0.75 A/phase

— Getaway torque ($JL1=7.4 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)

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

fs: Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103H7853-70 □□ :200V



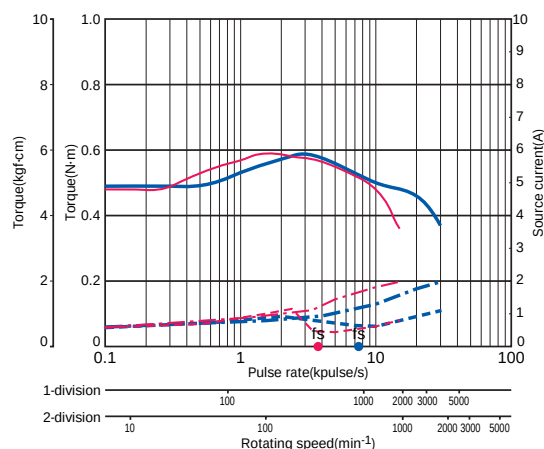
Source voltage: AC200V-Winding current: 0.75 A/phase

— Getaway torque ($JL1=7.4 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)

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

fs: Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103H7521-60 □□ /103H7521-70 □□ :100V



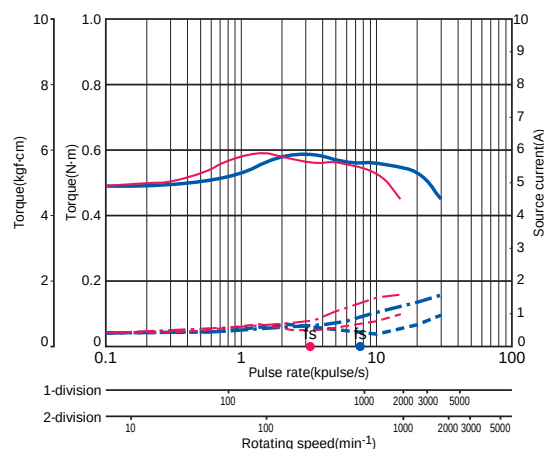
Source voltage: AC100V-Winding current: 0.75 A/phase

— Getaway torque ($JL1=0.74 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)

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

fs: Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103H7521-60 □□ /103H7521-70 □□ :200V



Source voltage: AC200V-Winding current: 0.75 A/phase

— Getaway torque ($JL1=0.94 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)

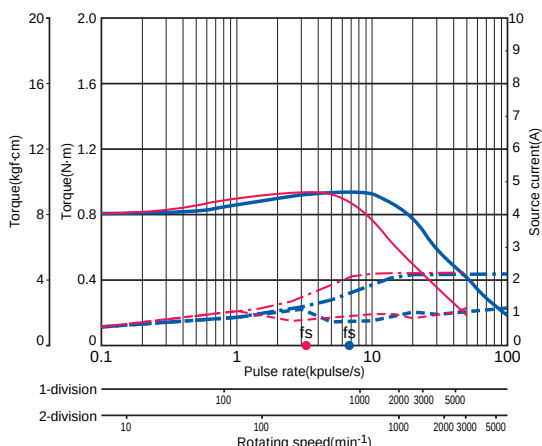
- - - Source current ($T_L = \text{MAX}$) - - - Source current ($T_L = 0$)

fs: Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified



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

●103H7522-60 □□ /103H7522-70 □□ :100V



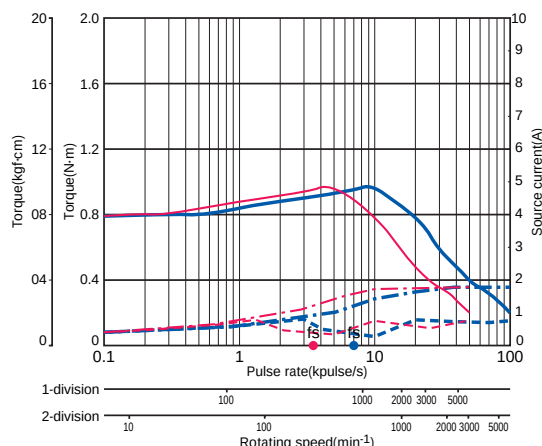
Source voltage:AC100V-Winding current: 0.75 A/phase

— Getaway torque(JL1=2.6×10⁻⁴kg·m² using the rubber coupling)

- - - Source current(T_L=MAX) - - - Source current(T_L=0)

fs:Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103H7522-60 □□ /103H7522-70 □□ :200V



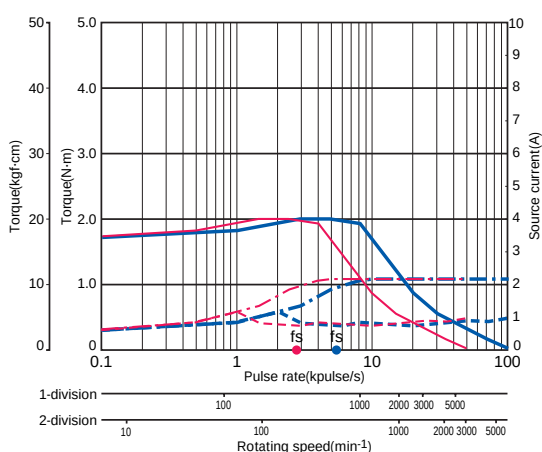
Source voltage:AC200V-Winding current: 0.75 A/phase

— Getaway torque(JL1=2.6×10⁻⁴kg·m² using the rubber coupling)

- - - Source current(T_L=MAX) - - - Source current(T_L=0)

fs:Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103H7523-60 □□ /103H7523-70 □□ :100V



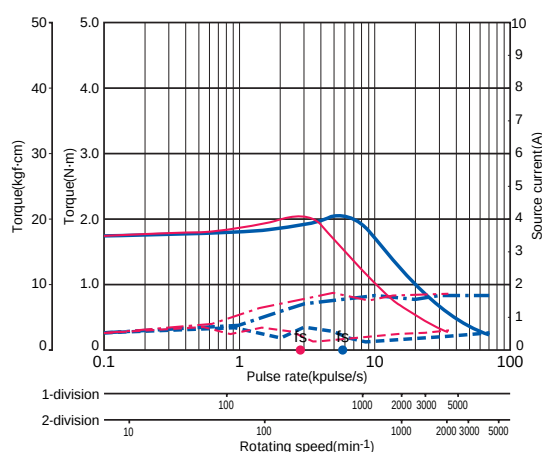
Source voltage:AC100V-Winding current: 0.75 A/phase

— Getaway torque(JL1=7.4×10⁻⁴kg·m² using the rubber coupling)

- - - Source current(T_L=MAX) - - - Source current(T_L=0)

fs:Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103H7523-60 □□ /103H7523-70 □□ :200V



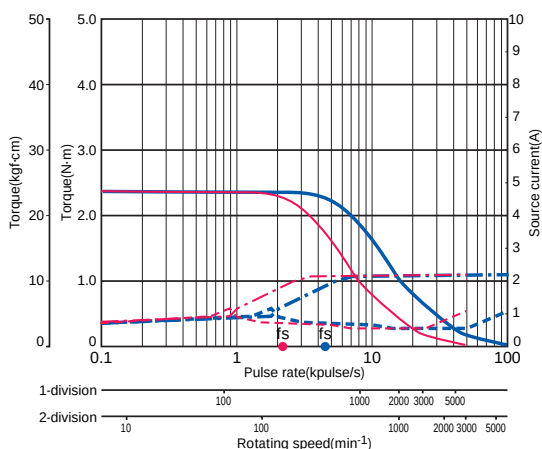
Source voltage:AC200V-Winding current: 0.75 A/phase

— Getaway torque(JL1=7.4×10⁻⁴kg·m² using the rubber coupling)

- - - Source current(T_L=MAX) - - - Source current(T_L=0)

fs:Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103H8581-60 □□ /103H8581-70 □□ :100V



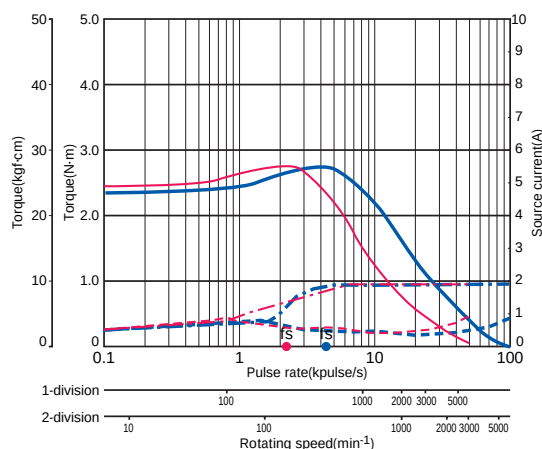
Source voltage:AC100V-Winding current: 0.75 A/phase

— Getaway torque(JL1=7.4×10⁻⁴kg·m² using the rubber coupling)

- - - Source current(T_L=MAX) - - - Source current(T_L=0)

fs:Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103H8581-60 □□ /103H8581-70 □□ :200V



Source voltage:AC200V-Winding current: 0.75 A/phase

— Getaway torque(JL1=7.4×10⁻⁴kg·m² using the rubber coupling)

- - - Source current(T_L=MAX) - - - Source current(T_L=0)

fs:Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

PMAP1S6A01

PMAP1S6B01

PMIV-MA-50034

PMM-MA-50064

PMM-BA-5603-5643

PMM-BA-5604-5644

PMDPB1S6P01

PMDPC1S3P01

PMM-MD-53030-53031

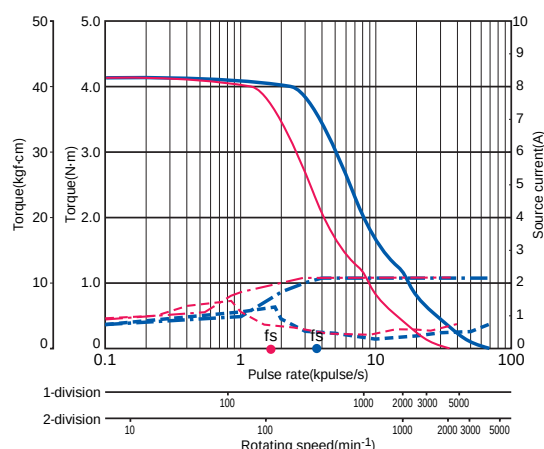
PMM-BD-53130-53131

PMDPA1A3P20

PMDPA1C3P20

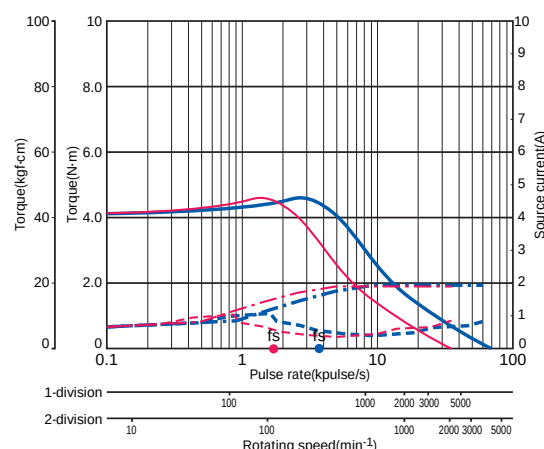
Pulse rate-torque characteristics/pulse rate-source current characteristics

●103H8582-60 □□/103H8582-70 □□:100V



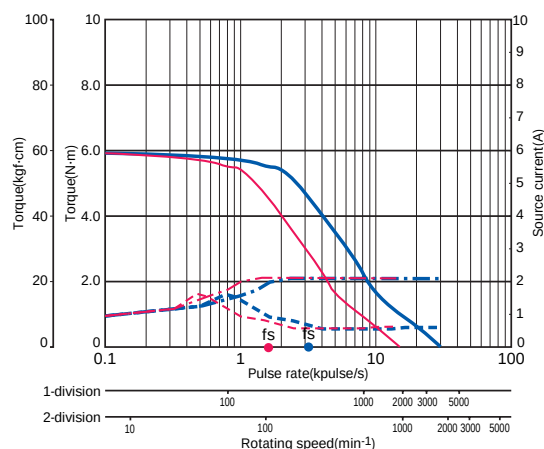
Source voltage: AC100V-Winding current: 0.75 A/phase
 — Getaway torque ($JL1=15.1 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current ($T_L = \text{MAX}$) - - - Source current ($T_L = 0$)
 fs: Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103H8582-60 □□/103H8582-70 □□:200V



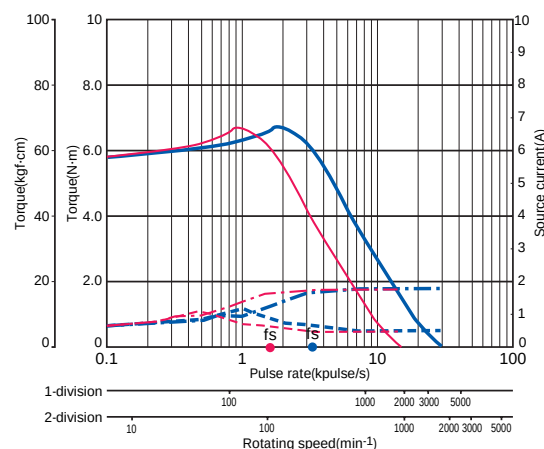
Source voltage: AC200V-Winding current: 0.75 A/phase
 — Getaway torque ($JL1=15.1 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current ($T_L = \text{MAX}$) - - - Source current ($T_L = 0$)
 fs: Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103H8583-60 □□/103H8583-70 □□:100V



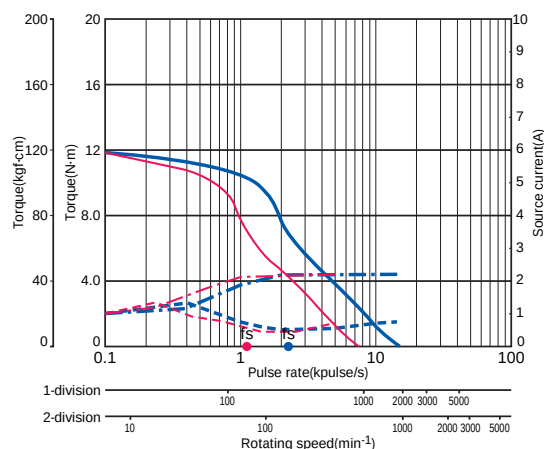
Source voltage: AC100V-Winding current: 0.75 A/phase
 — Getaway torque ($JL1=44 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current ($T_L = \text{MAX}$) - - - Source current ($T_L = 0$)
 fs: Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103H8583-60 □□/103H8583-70 □□:200V



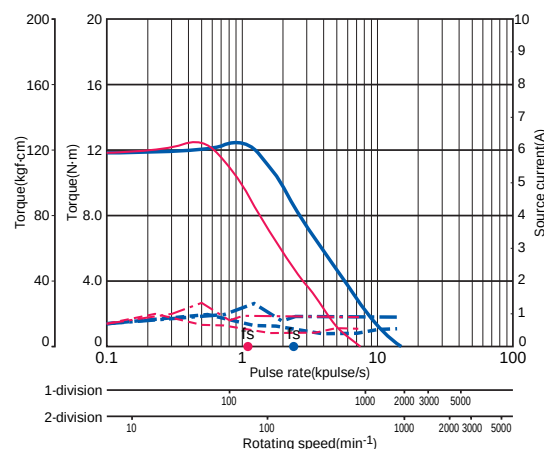
Source voltage: AC200V-Winding current: 0.75 A/phase
 — Getaway torque ($JL1=44 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current ($T_L = \text{MAX}$) - - - Source current ($T_L = 0$)
 fs: Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103H89582-60 □□/103H89582-70 □□:100V



Source voltage: AC100V-Winding current: 0.75 A/phase
 — Getaway torque ($JL1=44 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current ($T_L = \text{MAX}$) - - - Source current ($T_L = 0$)
 fs: Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

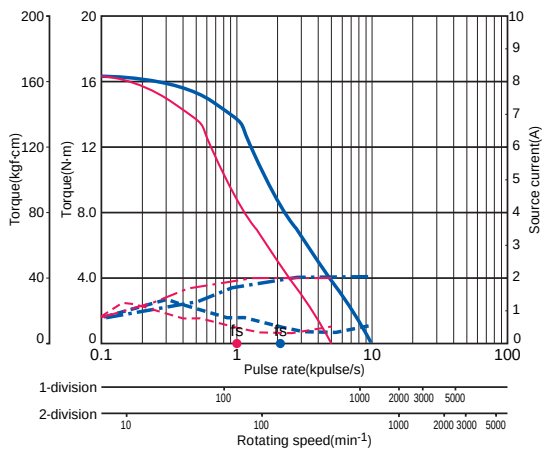
●103H89582-60 □□/103H89582-70 □□:200V



Source voltage: AC200V-Winding current: 0.75 A/phase
 — Getaway torque ($JL1=44 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current ($T_L = \text{MAX}$) - - - Source current ($T_L = 0$)
 fs: Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

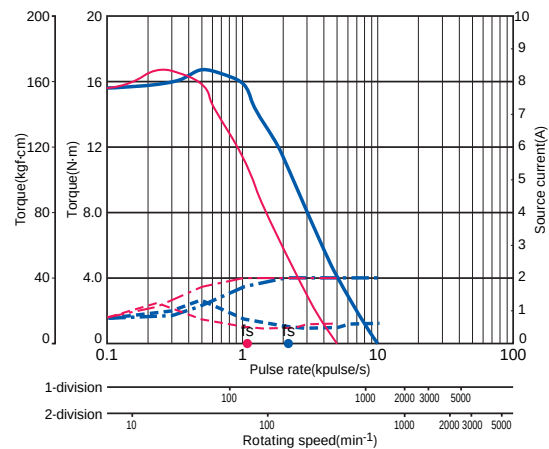
Pulse rate-torque characteristics/pulse rate-source current characteristics

●103H89583-60 □□/103H89583-70 □□:100V



Source voltage: AC100V-Winding current: 0.75 A/phase
 — Getaway torque ($JL1=44 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current ($T_L = \text{MAX}$) - - - Source current ($T_L = 0$)
 fs: Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103H89583-60 □□/103H89583-70 □□:200V



Source voltage: AC200V-Winding current: 0.75 A/phase
 — Getaway torque ($JL1=44 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current ($T_L = \text{MAX}$) - - - Source current ($T_L = 0$)
 fs: Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

Option

● Fitting metals

Model number	Quantity
PM-AP-001	One set

- The fitting metal can be commonly used for either front or back surface.

● Terminal block cover

Model number	Quantity
PM-AP-015	One

● Connector cable

Model number	Application
PM-C14S0100-02	Connector cable for I/O signals (CN1)

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

● Cable 1 (I/O signal cable)

Driver side	
Pin number	Color
1	Red
2	Red*
3	Black
4	Black*
5	Green
6	Green*
7	Orange
8	Orange*
9	Blue
10	Blue*
11	Brown
12	Brown*
13	Yellow
14	Yellow*

*: White spiral

Cable model number	Length
PM-C14S0100-02	1m



The 5-Phase Stepping Driver

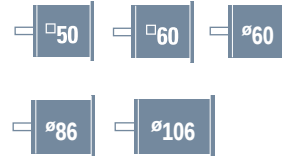
PMM-MA-50064-10

AC 100 V to 230 V

Micro-step (500 x 1 to 250 divisions)



● Applicable motors



Characteristics

● Conformity to CE Marking

This driver conforms to CE Marking.

● Wide-range input power specifications

Input source power can be used in wide range from AC 100 to 230 V.

● Micro-step function available

Smooth operation without vibration at low speeds can be realized.

Built-in function

● Automatic micro function

Divisions set to 1- or 2-division enable smooth and low-vibration operations as same as one using the micro-step function.

● Micro-step function

Resolutions set by using the rotary switch enable the micro-step drive. However, this function and the automatic micro function cannot be used simultaneously.

● Resolution setting function

16 resolutions ranging from 1- to 250-division can be set for the basic step angle of stepping motor by using the rotary switch.

● Pulse input system selection function

Either single or double input system can be selected by using dipswitches.

● 2 types of stepping motor

The PM driver "PMM-MA-50064-10" lineup as the standard combination consists of two types the "STEPSYN H" series that conform to CE Marking and the standard "STEPSYN H" series. Combining with the "STEPSYN H" series that conform to CE Marking provides the conformity to the EMC Directive.

PM driver specifications

Item		PMM-MA-50064-10
Standard specifications	Input source	Single phase AC100~230V+10,-15% 50/60Hz
	Source current	8A (at AC 100 V) 4 A (at AC 200 V)
	Protection class	Class I
	Operating environment	Installation category (overvoltage category): II, Pollution level: 2
	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)
	Operating altitude	Maximum 1000 m above sea level
	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.
	Weight	1.3kg
	Protection function	Against PM driver overheat
	Selection function	Automatic current reduction, excitation mode, pulse input system, drive mode, step angle, and operation current
	LED indicator	Power supply monitor, phase origin monitor, pulse monitor, and alarm monitor.
	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 micro-step mode: 100 kpulses/s, Automatic micro mode: 25 kpulses/s
I/O signals	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
	Phase origin monitor output signal	Open collector output by photocoupler Output signal standard V _{ceo} : Maximum 30 V, I _c : Maximum 5 mA
	Alarm output signal	Open collector output by photocoupler Output signal standard V _{ceo} : Maximum 30 V, I _c : Maximum 5 mA
	Ready output signal	Open collector output by photocoupler Output signal standard V _{ceo} : Maximum 30 V, I _c : Maximum 5 mA

CE Marking

Product	Applied standard		
	Low Voltage Directive	EMC Directive	
		Emission	Immunity
PM driver	EN61010-1	EN50081-2	EN50082-2
Stepping motor	—	(Class A)	(Class A)

- The stepping motor CE Marking is applied for the "STEPSYN H" series that conforms to CE Marking.

- The conformity to the EMC Directive is checked under the installation environment shown in Figure 1.

However, the conformity to the EMC Directive cannot be checked in the installation environment used for the user's equipment that varies depending on the user's control panel configuration in which PM drivers and stepping motor are built and the relation to other devices, locations, and wiring. Therefore, the user is required to finally check the entire machine and equipment conformity to the EMC Directive

Standard combined stepping motor

● "STEPSYN H" series that conform to CE Marking

Stepping motor dimensions	Stepping motor model number		Holding torque [N•m]	Rotor inertia [$\times 10^{-4} \text{kg} \cdot \text{m}^2$]	Weight [kg]	Page
	Single-axis shaft	Dual-axis shaft				
ø60mm	103H7521-6250	103H7521-6220	0.46	0.148	0.51	Page 323
	103H7522-6250	103H7522-6220	0.735	0.18	0.6	
	103H7523-6250	103H7523-6220	1.586	0.423	1.1	
ø86mm	103H8581-6250	103H8581-6220	2.06	1.45	1.5	Page 325
	103H8582-6250	103H8582-6220	4.02	2.9	2.5	
	103H8583-6250	103H8583-6220	6.17	4.4	3.5	
ø106mm	103H89582-6250	103H89582-6220	10.8	14.6	7	Page 327
	103H89583-6250	103H89583-6220	16	22	10.4	

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

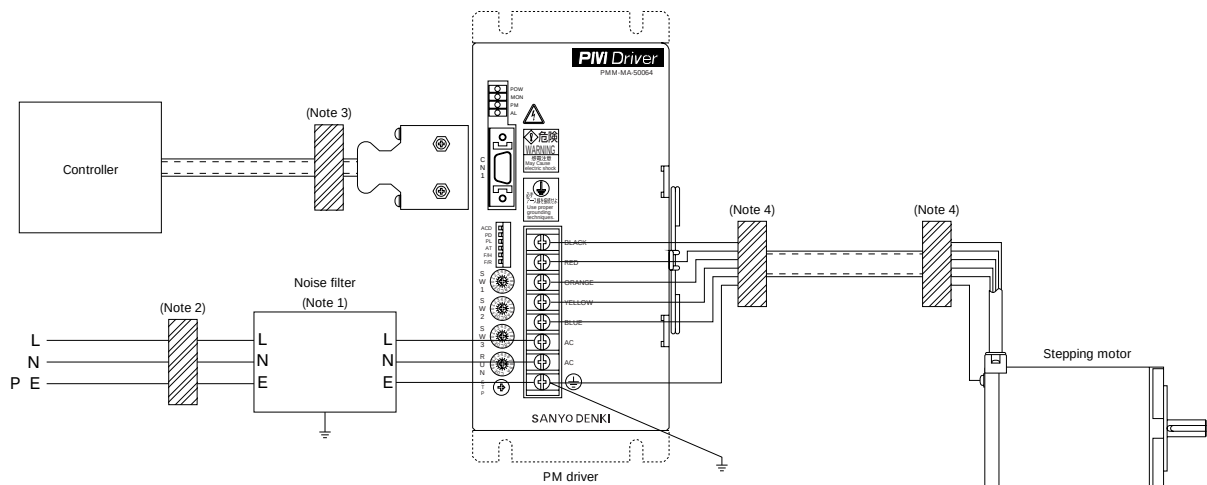
● "Standard "STEPSYN H" seriesMarking

Stepping motor dimensions	Stepping motor model number		Holding torque [N•m]	Rotor inertia [$\times 10^{-4} \text{kg} \cdot \text{m}^2$]	Weight [kg]	Page
	Single-axis shaft	Dual-axis shaft				
□50mm	103H6500-8041	103H6500-8011	0.225	0.058	0.38	Page 313
	103H6501-8041	103H6501-8011	0.39	0.105	0.44	
□60mm	103H7851-8051	103H7851-8021	0.65	0.275	0.6	Page 315
	103H7852-8051	103H7852-8021	0.98	0.4	0.78	
	103H7853-8051	103H7853-8021	1.86	0.84	1.36	
ø60mm	103H7521-8051	103H7521-8021	0.46	0.148	0.51	Page 317
	103H7522-8051	103H7522-8021	0.735	0.18	0.6	
	103H7523-8051	103H7523-8021	1.568	0.423	1.1	
ø86mm	103H8581-8041	103H8581-8011	2.06	1.45	1.5	Page 319
	103H8582-8041	103H8582-8011	4.02	2.9	2.5	
	103H8583-8041	103H8583-8011	6.17	4.4	3.5	
ø106mm	103H89582-8041	103H89582-8011	10.8	14.6	7	Page 321
	103H89583-8041	103H89583-8011	16	22	10.4	

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

Recommended Parts for EMC Conformity

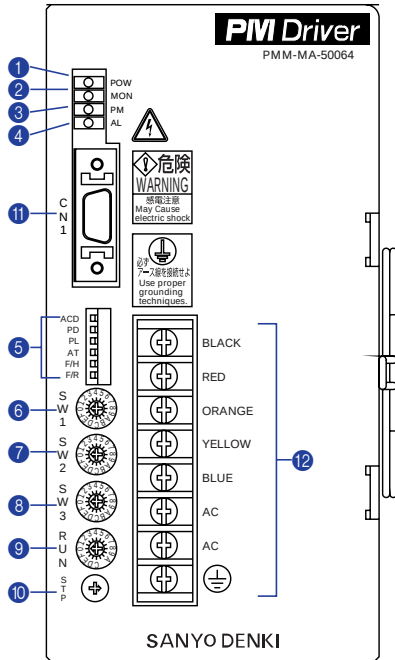
No.	Part name	Model	Specifications and size	Manufacturer
Note1	Noise filter	RF3020-DLC	Rated voltage: Line-Line 440-550 V, Rated current: 20 A	RASMIELECTRONICS LTD.,
Note2	Toroidal core	T60×20×36	Outer core diameter: 60 mm, Inner core diameter: 36 mm	TDK
Note3	Toroidal core	TRCN-40-27-15	Outer core diameter: 40 mm, Inner core diameter: 27 mm	Kitagawa Industries Co., Ltd.
Note4	Toroidal core	TRCN-40-27-15	Outer core diameter: 40 mm, Inner core diameter: 27 mm	Kitagawa Industries Co., Ltd.



Installation environment diagram

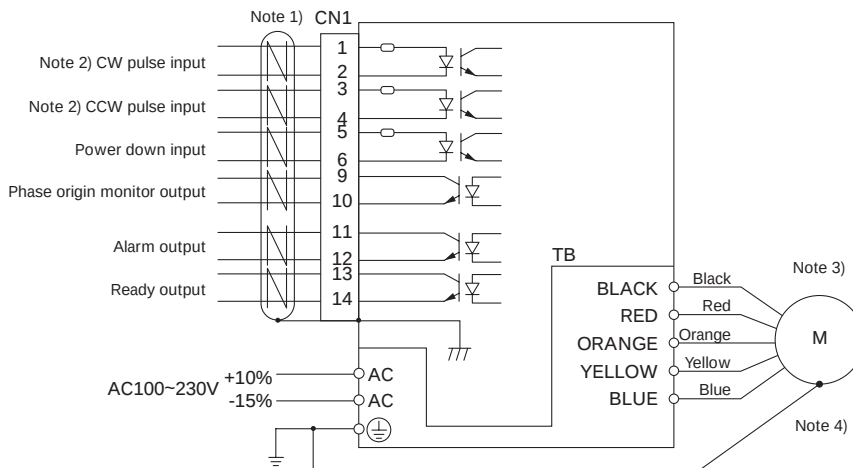
Operation, connection, and function

Each section name of the PM driver



- ① Internal power establishment (POW) Indicates that the internal power is established.
- ② Phase origin monitor (MON) Indicates that the excitation phase is at the origin (in the state when the power is turned ON).
- ③ Input pulse monitor (PM) Indicates that the input pulse is applied.
- ④ Alarm monitor (AL) Turns ON when the internal alarm circuit operates.
- ⑤ Function selection dipswitch Functions can be selected according to the specification.
- ⑥ SW1 (reserved) Not used.
- ⑦ Pulse interval setting switch (SW2) Interval of pulses to start operation is set when the automatic micro function is enabled.
- ⑧ Half-step angle correction/ Step angle selection switch (SW3) The stopping angle of the half-step system is corrected or the number of divisions of the micro-step drive is set.
- ⑨ Operation current selection switch (RUN) Stepping motor current value during operation can be selected.
- ⑩ Stopping current adjustment control (STP) The stepping motor current when stopping is adjusted when the automatic current reduction function is operated.
- ⑪ Connector for I/O signal (CN1) The I/O signal is connected.
- ⑫ Terminal block (TB) I/O signals, the single-phase AC power source, and the stepping motor power cable are connected.

External wiring diagram



Note 1) Use shielded twisted-pair cables.

Note 2) Either "double input system (CW and CCW)" or "single input system (CK and U/D)" can be selected by using the function selection switch F/R.

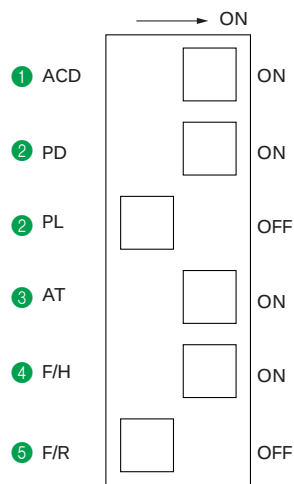
Note 3) Refer to the following table when connecting the 103H785 □ type stepping motor:

Product	Terminal block silk/stepping motor connector pin number				
PM driver (TB)	BLACK	RED	ORANGE	YELLOW	BLUE
Stepping motor connector	1	4	3	2	5

Note 4) Ground the stepping motor flange section and the stepping motor fastening screw by fixing them together when using the standard "STEPSYN H" series. Use the grounding terminal when using the "STEPSYN H" series that conform to CE Marking. Use a single point grounding.

Operation, connection, and function

● Function selection dipswitch ---5



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

ACD	Auto current down
ON	Operates.
OFF	Does not operate.

② PD and PL (power down and power low selection)
The stepping motor windings current value at the power down signal input is selected.

PD	PL	Stepping motor current
ON	OFF	OA (power OFF)
OFF	ON	Adjustment value of the stopping voltage adjustment control STP (power low)

③ AT (automatic micro selection)
The automatic micro function and the micro-step function are selected.

AT	Operation
ON	Automatic micro function
OFF	Micro-step function

④ F/H (excitation system selection)
Excitation mode is selected when the automatic micro selection (AT) is set to "ON".

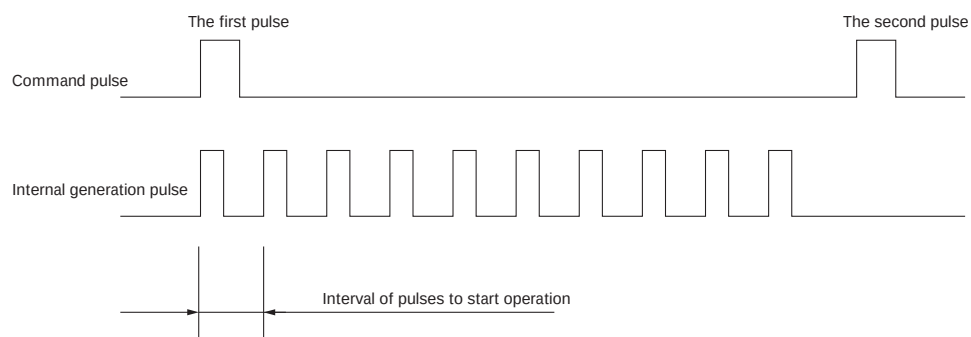
F/H	Energization system
ON	1-division setting (full step)
OFF	2-division setting (half step)

⑤ F/R (pulse input system selection)
A pulse input system is selected.

F/R	Pulse input system
ON	Single input system (CK and U/D)
OFF	Double input system (CW and CCW)

● Pulse interval setting switch (SW2)

Interval of pulses to start operation is set when the automatic micro function is enabled.



Scale	0	1	2	3	4	5	6	7
Pulses interval (ms)	10	5	3.3	2.5	2	1.6	1.4	1.25
Scale	8	9	A	B	C	D	E	F
Pulses interval (ms)	1.1	1	0.5	0.33	0.25	0.2	0.17	0.14

- "F" is set at the shipment.

Operation, connection, and function

● Half-step angle correction/Step angle selection switch (SW3) ---8

① The stopping angle can be corrected by manipulating the number of internal generation pulses when the automatic micro selection is set to ON (automatic micro function) and the excitation system selection is set to OFF (half step).

Scale	0	1	2	3	4	5	6	7
Distribution ratio	9:1	8:2	7:3	6:4	5:5	4:6	3:7	2:8
Scale	8	9	A	B	C	D	E	F
Distribution ratio	1:9	1:9	1:9	1:9	1:9	1:9	1:9	1:9

• "0" is set at the shipment.

② Number of basic step angle divisions of stepping motor (0.72°) is set when the automatic micro selection is set to OFF (micro-step function).

Scale	0	1	2	3	4	5	6	7
Number of divisions	1	2	2.5	4	5	8	10	20
Scale	8	9	A	B	C	D	E	F
Number of divisions	25	40	50	80	100	125	200	250

• "4" is set at the shipment (distribution ratio "5:5" or number of divisions "5").

● Operation current selection switch (RUN) ---9

Operation current of stepping motor can be selected.

Scale	0	1	2	3	4	5	6	7
Stepping motor current (A total)	6.0	5.8	5.6	5.2	5.0	4.8	4.6	4.4
Scale	8	9	A	B	C	D	E	F
Stepping motor current (A total)	4.2	3.8	3.6	3.4	3.2	3.0	2.6	2.4

• "0" is set at the shipment.
• 1.5 A/phase is set at scale 0.

● SW1 (reserved) ---6

This rotary switch is not used.

● Stopping current adjustment control (STP) ---10

The stepping motor current value is adjusted for the stopping operation in the automatic current reduction function and when the power down input signal is set to "ON" (power low function is selected by dipswitches).

• Approx. a half operation current value selected by RUN is set at the shipment.
• For the STP adjustment, refer to the separate PMM-MA-50064-10 operations manual.

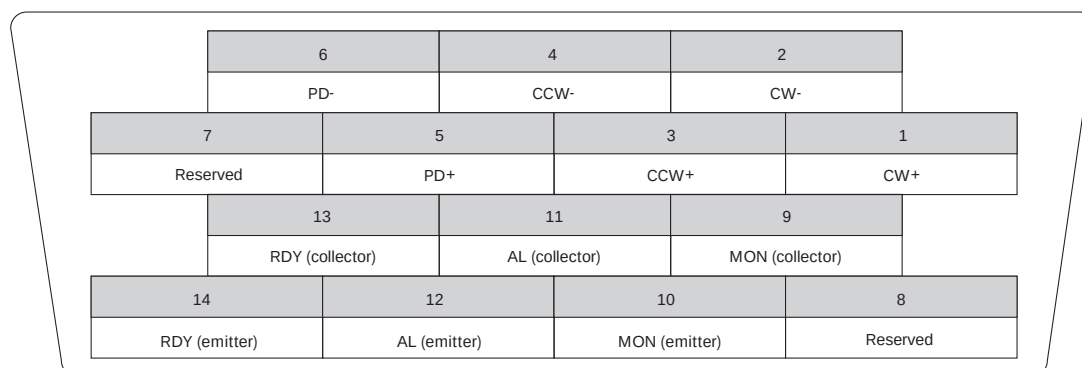
● I/O signal function (CN1) ---11

Signal name	Abbreviation	Pin Number	Function
CW pulse input (Standard)	CW+	1	When using double input system
	CW-	2	Drive pulse for the CW direction rotation is input.
Pulse column input	CK+	1	When using single input system
	CK-	2	Drive pulse train for the stepping motor rotation is input.
CCW pulse input (Standard)	CCW+	3	When using double input system
	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 single input system. Internal photocoupler ON CW direction
	U/D-	4	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). (The power down input can be changed to the power low function by selecting dipswitches.)
	PD-	6	PD input signal ON (internal photocoupler ON) PD function enabled PD input signal OFF (internal photocoupler OFF) ... PD function disabled
Phase origin monitor output	MON (collector)	9	It is turned ON when the excitation phase is at the origin (in the state when the power is turned ON)
	MON (emitter)	10	It is turned ON once per 10 pulses when setting to 2-division (full step). It is turned ON once per 20 pulses when setting to 1-division (half step).
Alarm output	AL (collector)	11	The signal is externally output when one of several alarm circuits operates in the PM driver.
	AL (emitter)	12	At this time, the stepping motor is in the unexcited state.
Ready output	RDY (collector)	13	It is turned ON and OFF when the stepping motor is in the excitation state and the unexcited state, respectively.
	RDY (emitter)	14	

• 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).

Operation, connection, and function

● Arrangement of the connector terminals (CN1)



Arrangement of the CN1 connector terminals

* The chart shown above is viewed from the connection section of the connector plug.

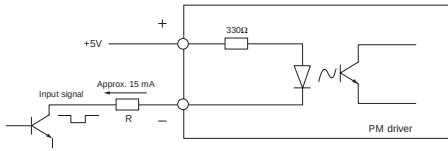
● Connectors to be used

PM driver side		Applicable Connector model number	Manufacturer
Used for	Model number		
I/O signals (CN1)	10214-52A2JL	Applicable plug:10114-3000VE Applicable shell:10314-52A0-008	Sumitomo 3M

- The applicable connectors are attached.

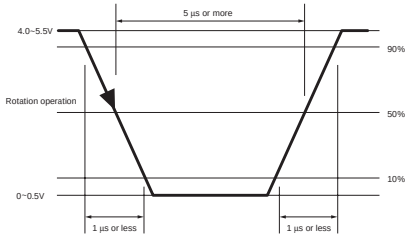
Operation, connection, and function

Input circuit configuration (CW and CCW)



- Pulse duty is 50 % or less.
- 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.

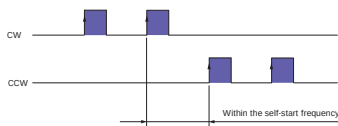
Input signal specifications



- Set the pulse width to 20 μs or more when the automatic micro is set.

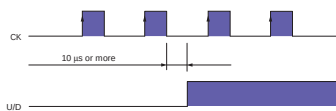
Timing of the command pulse

- Double input system (CW and CCW)



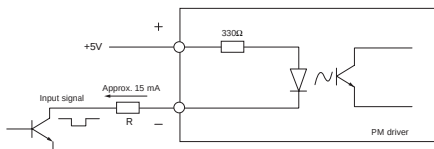
- The internal photocoupler turns ON at ■, and the internal circuit (stepping motor) operates at the leading edge of the photocoupler "ON".
- When applying the pulse to CW, set the internal photocoupler on the CCW side to "OFF".
- When applying the pulse to CCW, set the internal photocoupler on the CW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

- Single input system (CK and U/D)



- The internal photocoupler turns ON at ■, and the internal circuit (stepping motor) operates at the leading edge of the CK photocoupler "ON".
- Before switching the U/D input signals, turn OFF the internal photocoupler on the CK side.

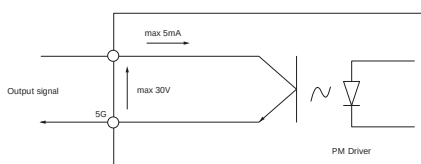
Input circuit configuration (PD)



- 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.

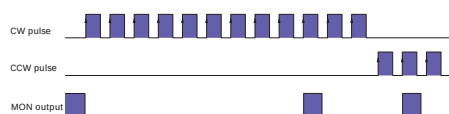
Operation, connection, and function

● Output circuit configuration (MON, AL, and RDY)



- MON, AL, and RDY output signals
Contact type: Open collector output by the photocoupler
Contact capacity: DC 30 V, 5 mA or less

Timing of the MON output (when 1-division is specified)



- The internal photocoupler turns "ON" at ■.

● State Indication (LED)

Indication	Color	Explanation
POW turns ON.	Green	Internal power has been established.
MON turns ON.	Green	Excitation phase is at the origin (the power is turned on). When 1-division is specified (full step), turns on once in 10 pulses. When 2-division is specified (half step), turns on once in 20 pulses.
PM turns ON.	Green	Command pulse is input. Turns on for Approx. 100ms for every one pulse input.

Timing of MON illumination (1-division setting)



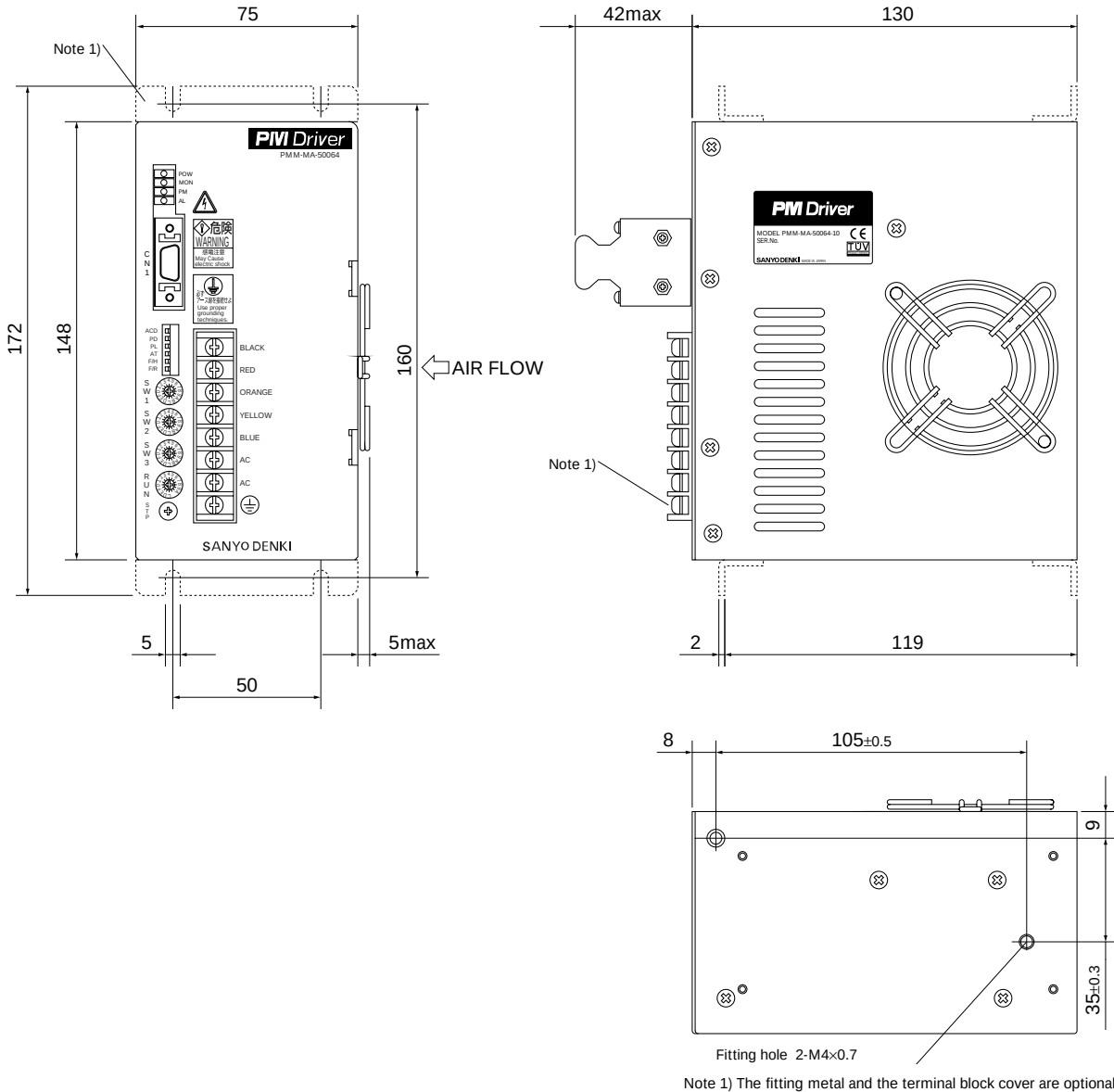
- The internal photocoupler turns "ON" at ■.

● Alarm Indication (LED)

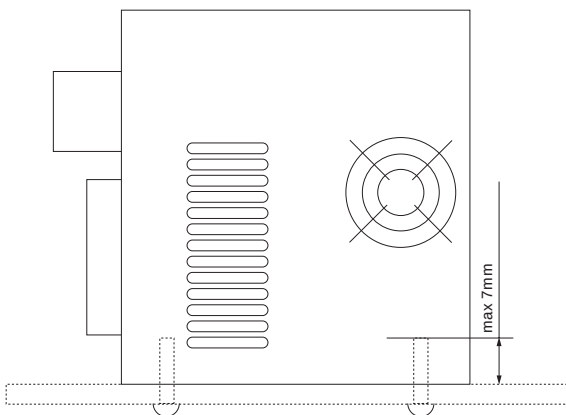
Indication	Color	Explanation
AL turns on.	Red	The overheat protection alarm circuit of the internal device operates. The circuit operates when both the internal temperature of the PM driver and the ambient temperature become 80°C or more.

- Each alarm circuit operation turns on the alarm LED and cuts off the stepping motor current to result in the unexcited state. At the same time, the alarm output circuit photocoupler of I/O signal connector (CN1) turns ON and the signal is output externally. The alarm automatically stops to turn ON the stepping motor current when the internal semiconductor temperature becomes 80°C or less. Turn OFF the main power and try to radiate the generated heat by the forced-air-cooling of PM driver cabinet and so on before the automatic recovery from the alarm state when an alarm occurs.

Dimensions (Unit: mm)



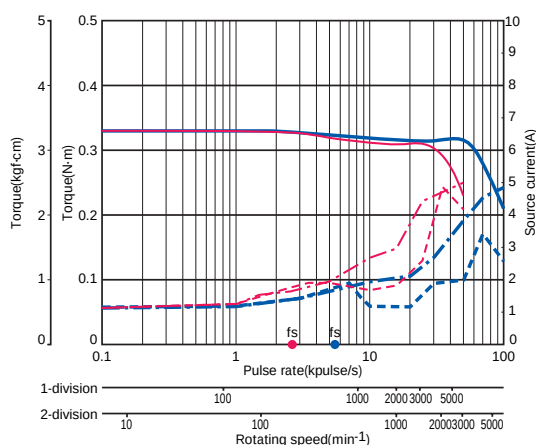
Installation direction and position



- Install the PM driver vertically.
- As shown in the figure, fix the PM driver by using the M4 screws through fitting holes on the bottom surface of PM driver (no fitting metals are necessary).
- Use such screws that enter inside the drive equipment for maximum 7 mm.
- The PM driver also can be installed on the front or back surface by using optional fitting metals.

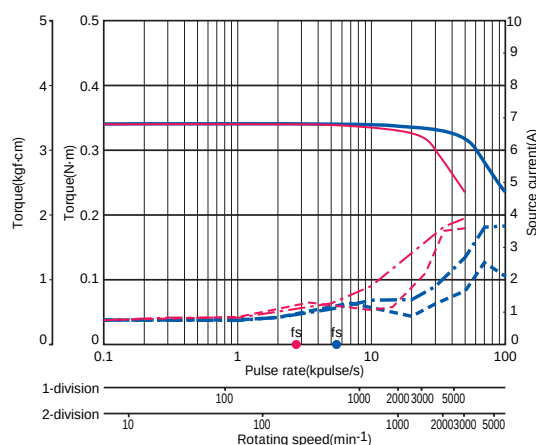
Pulse rate-torque characteristics/pulse rate-source current characteristics

●103H6500-80 □□ :100V



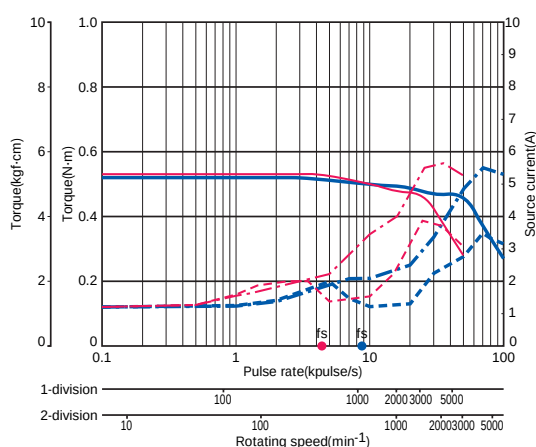
Source voltage: AC100V-Winding current: 1.5 A/phase
 — Getaway torque($J_L1=0.94 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=MAX$) - - - Source current($T_L=0$)
 fs: Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103H6500-80 □□ :200V



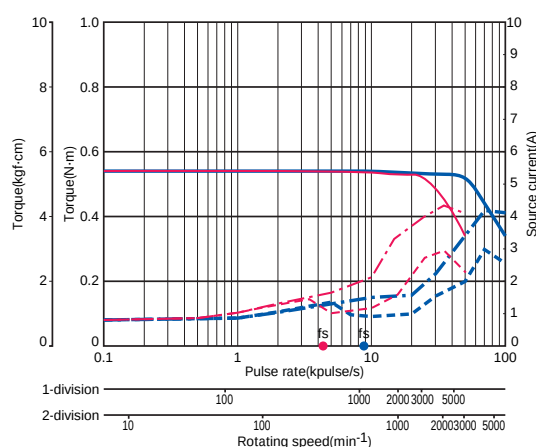
Source voltage: AC200V-Winding current: 1.5 A/phase
 — Getaway torque($J_L1=0.94 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=MAX$) - - - Source current($T_L=0$)
 fs: Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103H6501-80 □□ :100V



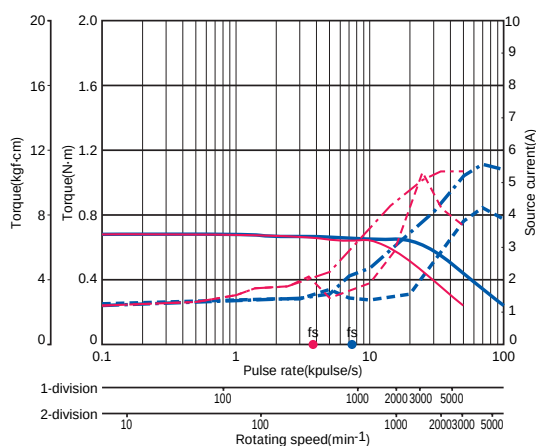
Source voltage: AC100V-Winding current: 1.5 A/phase
 — Getaway torque($J_L1=0.94 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=MAX$) - - - Source current($T_L=0$)
 fs: Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103H6501-80 □□ :200V



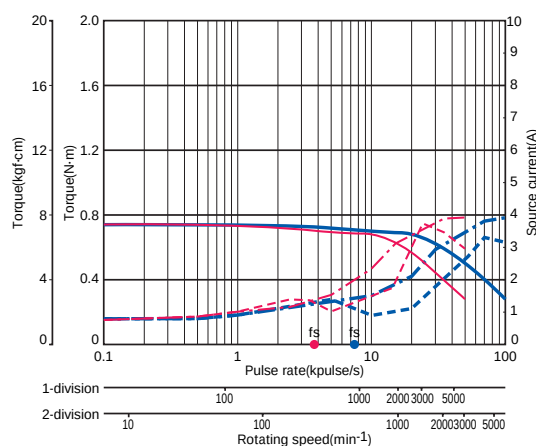
Source voltage: AC200V-Winding current: 1.5 A/phase
 — Getaway torque($J_L1=0.94 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=MAX$) - - - Source current($T_L=0$)
 fs: Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103H7851-80 □□ :100V



Source voltage: AC100V-Winding current: 1.5 A/phase
 — Getaway torque($J_L1=2.6 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=MAX$) - - - Source current($T_L=0$)
 fs: Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

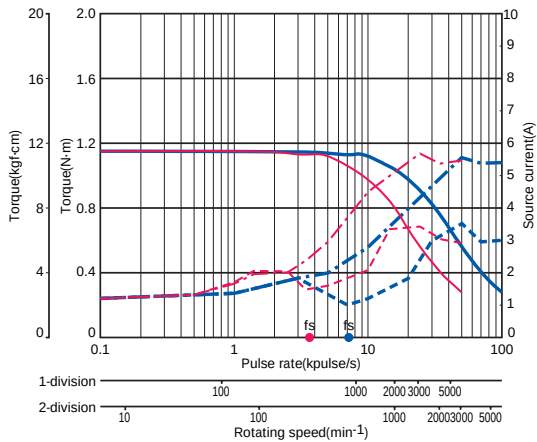
●103H7851-80 □□ :200V



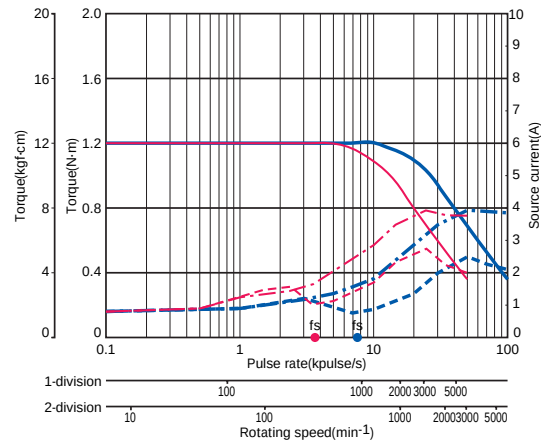
Source voltage: AC200V-Winding current: 1.5 A/phase
 — Getaway torque($J_L1=2.6 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=MAX$) - - - Source current($T_L=0$)
 fs: Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

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

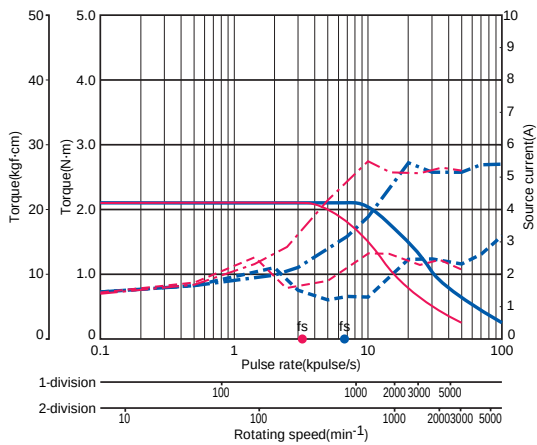
●103H7852-80 □□ :100V



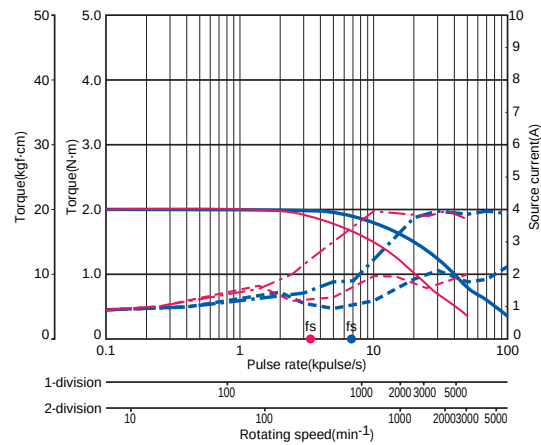
●103H7852-80 □□ :200V



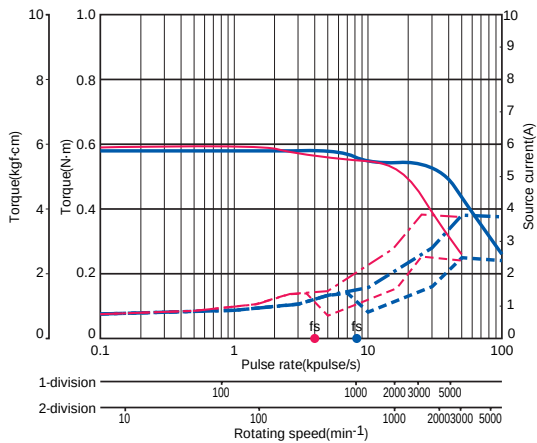
●103H7853-80 □□ :100V



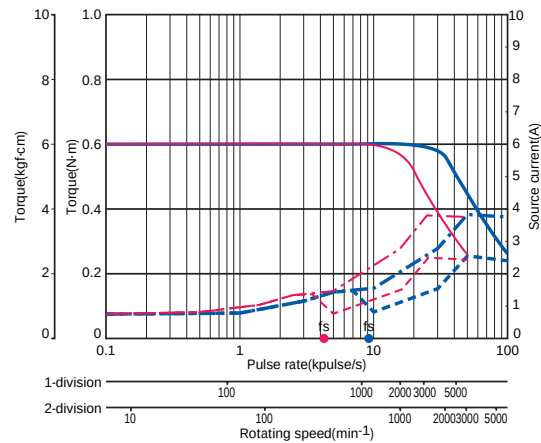
●103H7853-80 □□ :200V



●103H7521-62 □□ /103H7521-80 □□ :100V



●103H7521-62 □□ /103H7521-80 □□ :200V



PMAP1S6A01

PMAP1S6B01

PMM-MA-50034

PMM-MA-50064

PMM-BA-5603

PMM-BA-5604

PMDPB1S6P01

PMDPC1S3P01

PMM-MD-53030

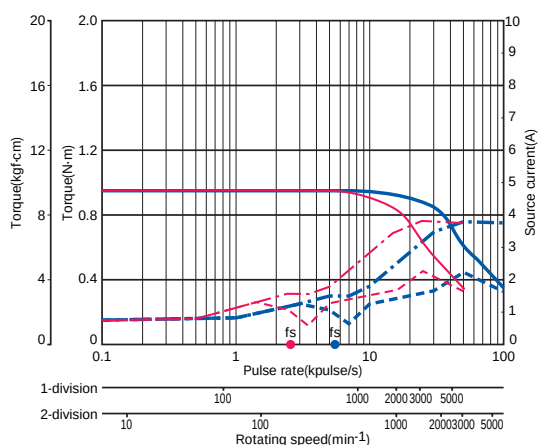
PMM-BD-53130

PMDP1A3P20

PMDP1C3P20

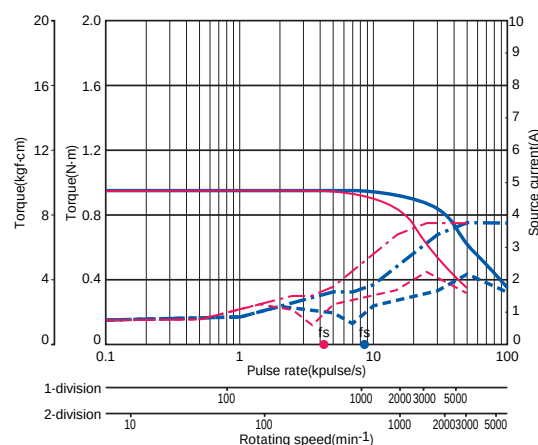
Pulse rate-torque characteristics/pulse rate-source current characteristics

●103H7522-62 □□ /103H7522-80 □□ :100V



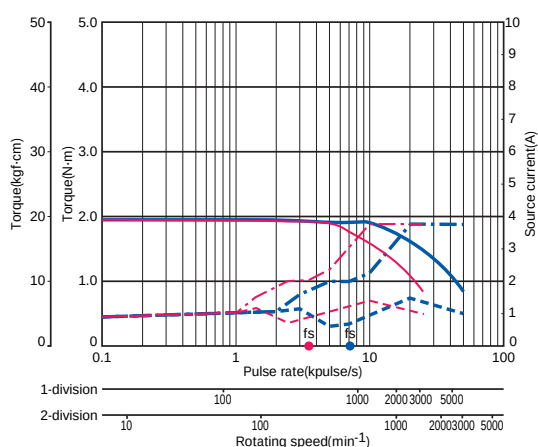
Source voltage:AC100V-Winding current: 1.5 A/phase
 — Getaway torque($J_{L1}=2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103H7522-62 □□ /103H7522-80 □□ :200V



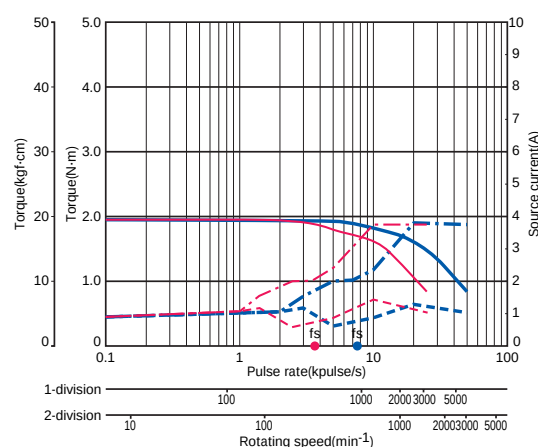
Source voltage:AC200V-Winding current: 1.5 A/phase
 — Getaway torque($J_{L1}=2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103H7523-62 □□ /103H7523-80 □□ :100V



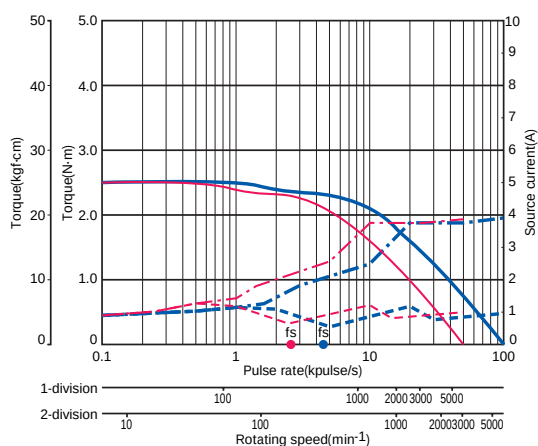
Source voltage:AC100V-Winding current: 1.5 A/phase
 — Getaway torque($J_{L1}=7.4 \times 10^{-4} \text{kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103H7523-62 □□ /103H7523-80 □□ :200V



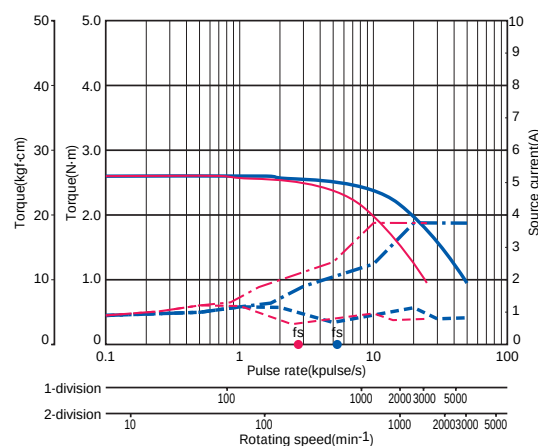
Source voltage:AC200V-Winding current: 1.5 A/phase
 — Getaway torque($J_{L1}=7.4 \times 10^{-4} \text{kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103H8581-62 □□ /103H8581-80 □□ :100V



Source voltage:AC100V-Winding current: 1.5 A/phase
 — Getaway torque($J_{L1}=7.4 \times 10^{-4} \text{kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

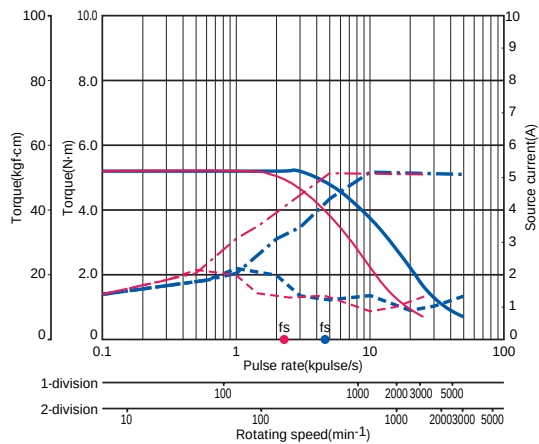
●103H8581-62 □□ /103H8581-80 □□ :200V



Source voltage:AC200V-Winding current: 1.5 A/phase
 — Getaway torque($J_{L1}=7.4 \times 10^{-4} \text{kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

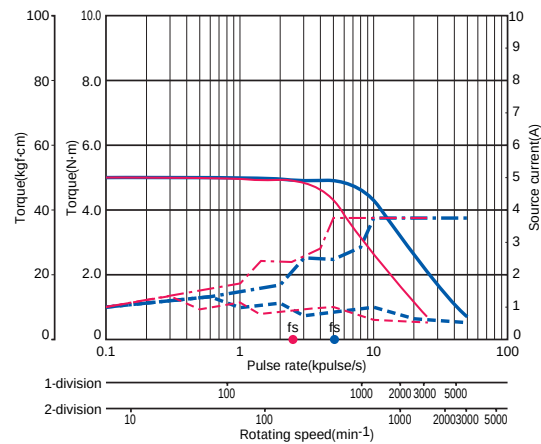
Pulse rate-torque characteristics/pulse rate-source current characteristics

●103H8582-62 □□ /103H8582-80 □□ :100V



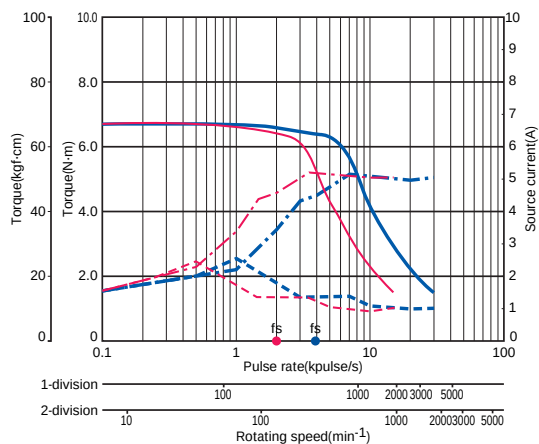
Source voltage:AC100V-Winding current: 1.5 A/phase
 — Getaway torque($J_L=15.1 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103H8582-62 □□ /103H8582-80 □□ :200V



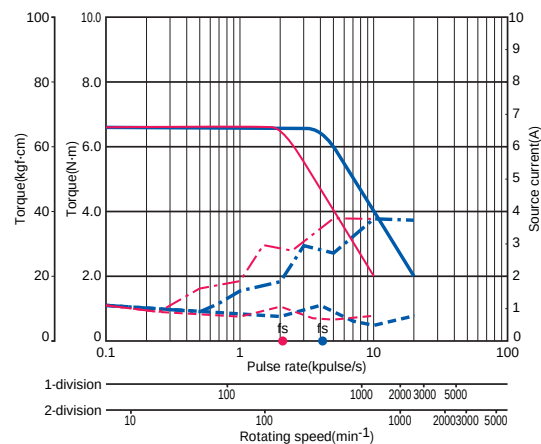
Source voltage:AC200V-Winding current: 1.5 A/phase
 — Getaway torque($J_L=15.1 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103H8583-62 □□ /103H8583-80 □□ :100V



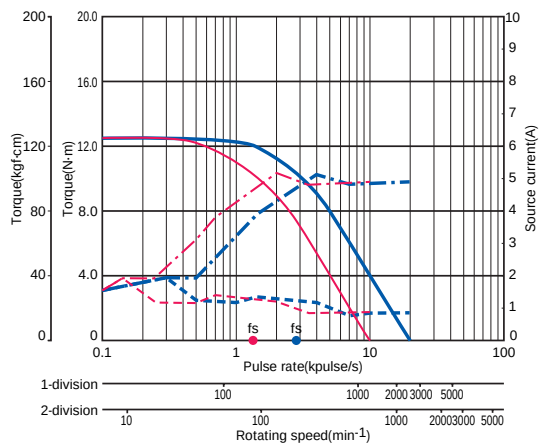
Source voltage:AC100V-Winding current: 1.5 A/phase
 — Getaway torque($J_L=44 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103H8583-62 □□ /103H8583-80 □□ :200V



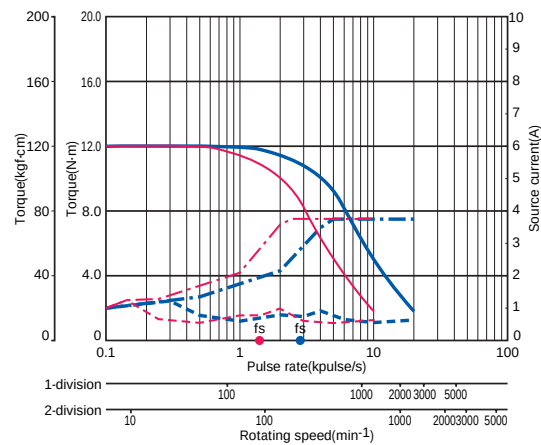
Source voltage:AC200V-Winding current: 1.5 A/phase
 — Getaway torque($J_L=44 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103H89582-62 □□ /103H89582-80 □□ :100V



Source voltage:AC100V-Winding current: 1.5 A/phase
 — Getaway torque($J_L=44 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103H89582-62 □□ /103H89582-80 □□ :200V



Source voltage:AC200V-Winding current: 1.5 A/phase
 — Getaway torque($J_L=44 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

PMAP1S6A01

PMAP1S6B01

PMM-MA-50034

PMM-MA-50064

PMM-BA-5603-5643

PMM-BA-5604-5644

PMDPB1S6P01

PMDPC1S3P01

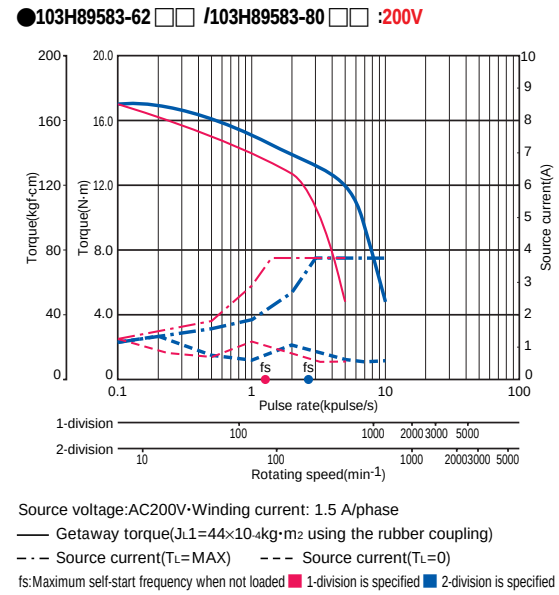
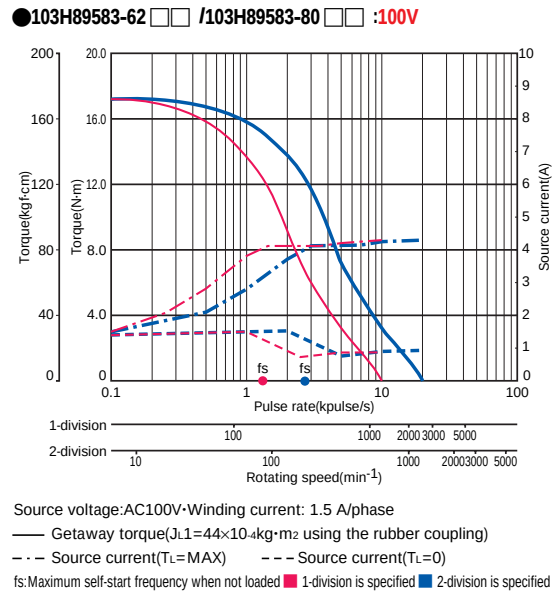
PMM-MD-53030-53031

PMM-BD-53130-53131

PMDPALA3P20

PMDPALC3P20

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



Option

● Fitting metal

Model number	Quantity
PM-AP-002	One set

- The fitting metal can be commonly used for either front or back surface.

● Terminal block cover

Model number	Quantity
PM-AP-015	One

● Connector cable

Model number	Application
PM-C14S0100-02	Connector cable for I/O signals (CN1)

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



The 5-Phase Stepping Driver

PMM-BA-5603-1
PMM-BA-5643-1

AC100V/115V

Full-step/half-step
(500 x 1 division) (500 x 2 divisions)

● Applicable motor



Characteristics

● Flexible

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

● Small size and high torque

Dedicated ICs are mounted to realize the small size and high torque as a result of parts consolidation and high reliability.

● Two types interface

Two lineup types are:

Terminal block type :PMM-BA-5603-1

Connector type :PMM-BA-5643-1

Built-in function

● Low-vibration control

Our original control system employment enables a smooth and low-vibration operation.

● Pulse input system selection function

Either single or double input system can be selected by using dipswitches.

● Operation current switchover function

Stepping motor operation current ranging from the rated one to 40% can be set by using the rotary switch.

PM driver specifications

Item		PMM-BA-5603-1	PMM-BA-5643-1
Standard specifications	Input source	Single phase AC100/115V+10, -15% 50/60Hz	
	Source current	4A	
	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	0.5G 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.	
Function	Weight	1.2kg	
	Protection function	Against PM driver overheat	
	Selection function	Automatic current reduction, excitation mode, pulse input system, operation current, and low vibration	
I/O signals	LED indicator	Power supply monitor, phase origin monitor, pulse monitor, and alarm monitor.	
	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: 100 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	
	Phase origin monitor output signal		Open collector output by photocoupler Output signal standard Vce0: Maximum 30 V, Ic: Maximum 5 mA
	Alarm output signal	Relay contact output (normal open) Contact capacity: Maximum 1 A at DC 24 V or maximum 0.5 A at AC 120 V	

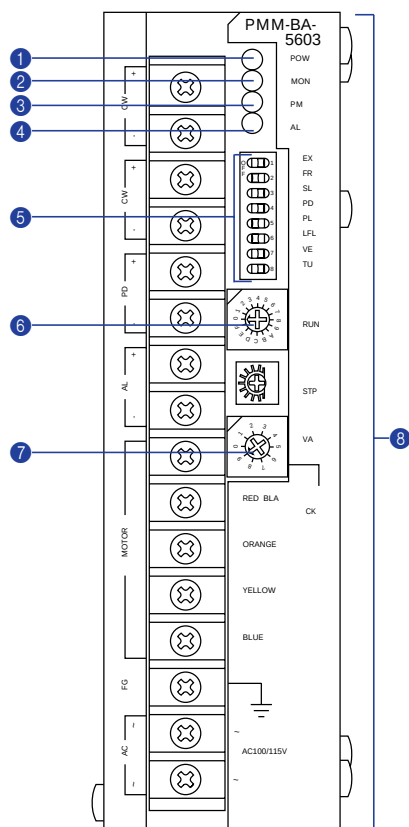
Standard combined stepping motor

Stepping motor dimensions	Stepping motor model number		Holding torque [N·m]	Rotor inertia [$\times 10^{-4}$ kg·m ²]	Weight [kg]	Page
	Single-axis shaft	Dual-axis shaft				
□42mm	103H5505-7040	103H5505-7010	0.127	0.03	0.23	Page 311
	103H5508-7040	103H5508-7010	0.176	0.053	0.28	
	103H5510-7040	103H5510-7010	0.255	0.065	0.37	
□50mm	103H6500-7041	103H6500-7011	0.235	0.057	0.38	Page 313
	103H6501-7041	103H6501-7011	0.39	0.105	0.44	
□60mm	103H7851-7051	103H7851-7021	0.65	0.275	0.6	Page 315
	103H7852-7051	103H7852-7021	0.98	0.4	0.78	
	103H7853-7051	103H7853-7021	1.86	0.84	1.36	
∅60mm	103H7521-7051	103H7521-7021	0.46	0.148	0.51	Page 317
	103H7522-7051	103H7522-7021	0.735	0.18	0.6	
	103H7523-7051	103H7523-7021	1.568	0.423	1.1	
∅86mm	103H8581-7041	103H8581-7011	2.06	1.45	1.5	Page 319
	103H8582-7041	103H8582-7011	4.02	2.9	2.5	
	103H8583-7041	103H8583-7011	6.17	4.4	3.5	
∅106mm	103H89582-7041	103H89582-7011	10.8	14.6	7	Page 321
	103H89583-7041	103H89583-7011	16	22	10.4	

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

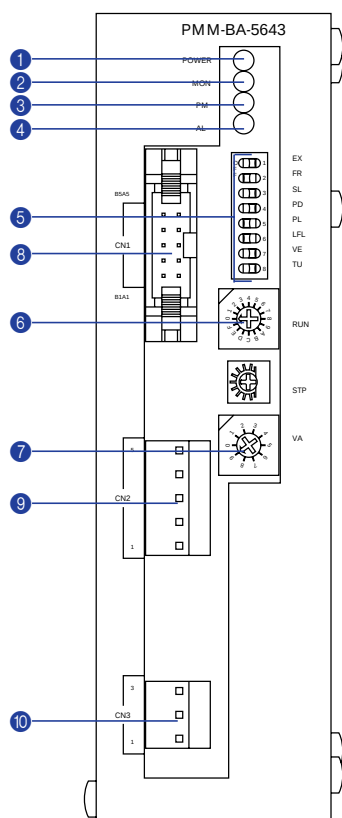
Operation, connection, and function

- Each section name of the PM driver
PMM-BA-5603-1



- ① Internal power establishment (POW)..... Indicates that the internal power is established.
- ② Phase origin monitor (MON) Indicates that the excitation phase is at the origin (in the state when the power is turned ON).
- ③ Input pulse monitor (PM) Indicates that the input pulse is applied.
- ④ Alarm monitor (AL) Turns ON when the internal alarm circuit operates.
- ⑤ Function selection dipswitch Functions can be selected according to the specification.
(EX,F/R,SL,PD,PL,LFL,VE,TU)
- ⑥ Operation current selection switch (RUN) Stepping motor current value during operation can be selected.
- ⑦ Selection switch for low vibration (VA) Low-vibration operation and the stepping motor heat generation reduction can be performed.
- ⑧ Terminal block (TB) I/O signals, the single-phase AC power source, and the stepping motor power cable are connected.

PMM-BA-5643-1

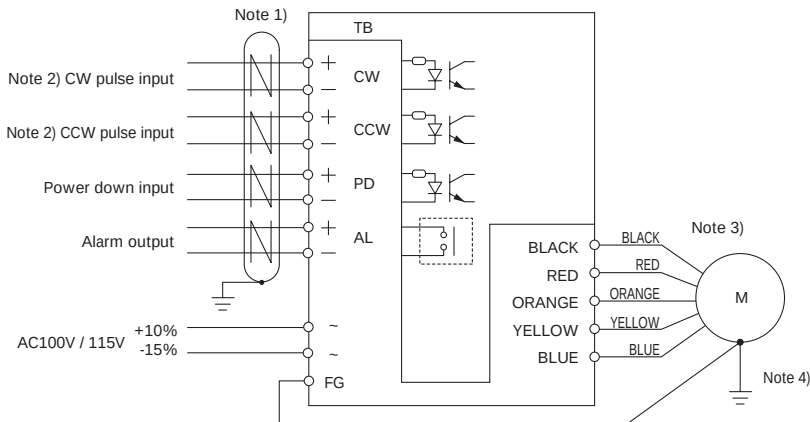


- ① Internal power establishment (POWER)..... Indicates that the internal power is established.
- ② Phase origin monitor (MON) Indicates that the excitation phase is at the origin (in the state when the power is turned ON).
- ③ Input pulse monitor (PM) Indicates that the input pulse is applied.
- ④ Alarm monitor (AL) Turns ON when the internal alarm circuit operates.
- ⑤ Function selection dipswitch Functions can be selected according to the specification.
(EX,F/R,SL,PD,PL,LFL,VE,TU)
- ⑥ Operation current selection switch (RUN) ... Stepping motor current value during operation can be selected.
- ⑦ Selection switch for low vibration (VA) Low-vibration operation and the stepping motor heat generation reduction can be performed.
- ⑧ Connectors for I/O signal I/O signals are connected.
- ⑨ Stepping output connector (CN2) The stepping motor power cable is connected.
- ⑩ Power source input connector (CN3) Single-phase AC power source is connected.

Operation, connection, and function

External wiring diagram

PMM-BA-5603-1



Note 1) Use shielded twisted-pair cables.

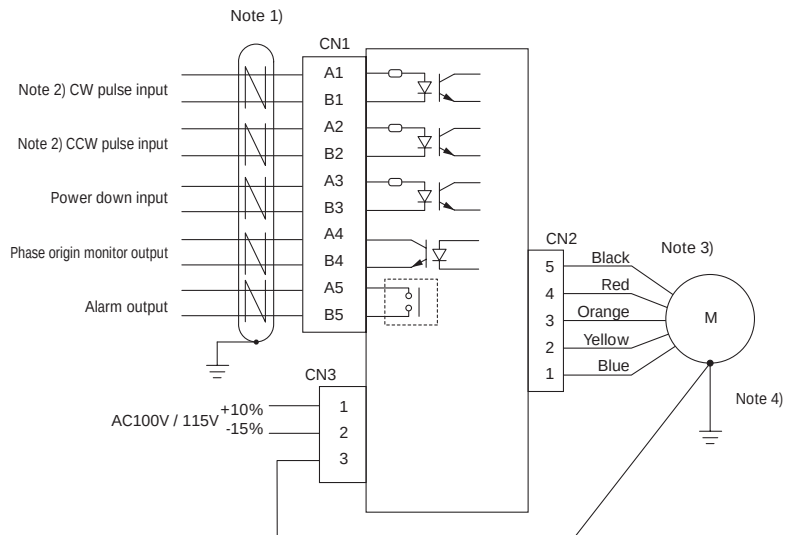
Note 2) Either "double input system (CW and CCW)" or "single input system (CK and U/D)" can be selected by using the function selection switch F/R

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

Product	Terminal block silk/stepping motor connector pin number				
PM driver (TB)	BLACK	RED	ORANGE	YELLOW	BLUE
Stepping motor connector	1	4	3	2	5

Note 4) Ground the stepping motor flange section and the stepping motor fastening screw by fixing them together. Use a single point grounding.

PMM-BA-5643-1



Note 1) Use shielded twisted-pair cables.

Note 2) Either "double input system (CW and CCW)" or "single input system (CK and U/D)" can be selected by using the function selection switch F/R

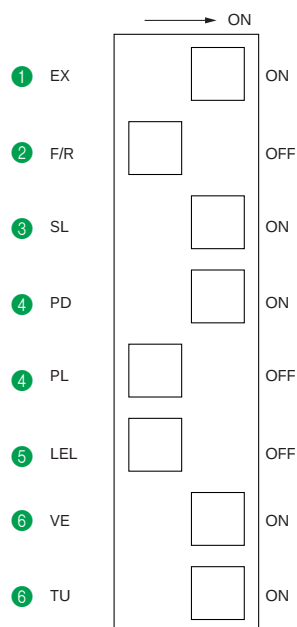
Note 3) Refer to the following table when connecting the 103H785 □ type stepping motor:

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

Note 4) Ground the stepping motor flange section and the stepping motor fastening screw by fixing them together. Use a single point grounding.

Operation, connection, and function

● Function selection dipswitch ---⑤



- 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 EX (excitation system selection)

Excitation mode is selected.

EX	Energization system
ON	Half step (0.36°/pulse)
OFF	Full step (0.72°/pulse)

② F/R (pulse input system selection)

A pulse input system is selected.

F/R	Pulse input system
ON	Single input system (CK and U/D)
OFF	Double input system (CW and CCW)

③ SL (automatic current reduction selection)

Automatic current reduction function is selected.

SL	Automatic current reduction
ON	Operates.
OFF	Does not operate.

④ PD and PL (power down and power low selection)

The stepping motor windings current value at the power down signal input is selected.

PD	PL	Stepping motor current
ON	OFF	OA(power OFF)
OFF	ON	The current value (power low) using the stopping current adjustment control (STP)

⑤ LEL selection (Note)

This switch is not used.
Do not turn it ON.

⑥ VE and TU selection (Note)

This switch is not used.
Do not turn it OFF.

● Operation current selection switch (RUN) ---⑥

The operation current value of stepping motor can be selected.

Scale	0	1	2	3	4	5	6	7
Stepping motor current (A total)	3.0	2.9	2.8	2.6	2.5	2.4	2.3	2.2
Scale	8	9	A	B	C	D	E	F
Stepping motor current (A total)	2.1	1.9	1.8	1.7	1.6	1.5	1.3	1.2

- "0" is set at the shipment.
- 0.75 A/phase is set at scale 0.

● Low-vibration selection switch (VA) ---⑦

The vibration and the stepping motor heat generation can be reduced.

Scale	Function
9	↓ Standard Vibration reduction Motor heat generation reduction
3	
2	
1	
0	

- "9" is set at the shipment. Settings from 0 to 3 are valid.
- Sometimes the high-speed torque may decrease.

Operation, connection, and function

● I/O signal function ---8

Signal name (Abbreviation)	Silk print/Pin Number		Function
	Terminal block type	Connector type	
CW pulse input (CW)	CW+	A1	When using double input system
	CW-	B1	Drive pulse for the CW direction rotation is input.
Pulse column input (CK)	CK+	A1	When using single input system
	CK-	B1	Drive pulse train for the stepping motor rotation is input.
CCW pulse input (CCW)	CCW+	A2	When using double input system
	CCW-	B2	Drive pulse for the CCW direction rotation is input.
Rotation direction input (U/D)	U/D+	A2	The rotation direction signal of stepping motor is input for the single input system.
	U/D-	B2	Internal photocoupler ON CW direction Internal photocoupler OFF CCW direction
Power down input (PD)	PD+	A3	Inputting the PD signal cuts OFF the current flowing through the stepping motor (turns OFF the power).
	PD-	B3	(The power down input can be changed to the power low function by selecting dipswitches.) PD input signal ON (internal photocoupler ON) PD function enabled PD input signal OFF (internal photocoupler OFF) PD function disabled
Phase origin monitor output (MON)	-	A4	It is turned ON when the excitation phase is at the origin (in the state when the power is turned ON)
		B4	It is turned ON once per 10 pulses when setting to 2-division (full step). It is turned ON once per 20 pulses when setting to 1-division (half step).
Alarm output (AL)	AL1	A5	The signal is externally output when one of several alarm circuits operates in the PM driver.
	AL2	B5	At this time, the stepping motor is in the unexcited state.

- The terminal block type indicates "PMM-BA-5603-1" and the connector type indicates "PMM-BA-5643-1" in the table.
- 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

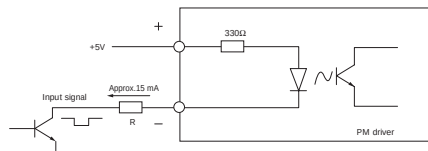
PMM-BA-5643-1

PM driver side		Applicable connector model number	Manufacturer
Used for	Model number		
I/O signals (CN1)	HIF3BD-10PA-2.54DS	Applicable socket :HIF3BD-10DA-2.54R	Hirose Electric Co., Ltd.
Stepping motor (CN2)	5274-05A	Applicable housing:5195-05 Applicable contact:5194PBT	Molex Japan
AC power source (CN3)	5274-03A	Applicable housing:5195-03 Applicable contact:5194PBT	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 201).
- PMM-BA-5603-1 using the terminal block interface does not require connectors.

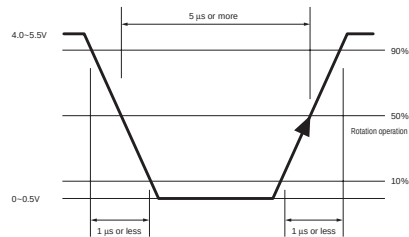
Operation, connection, and function

● Input circuit configuration (CW and CCW)



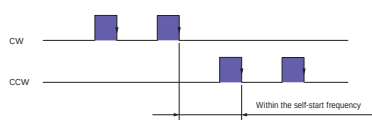
- Pulse duty is 50 % or less.
- When the peak value of the input signal is 5V, the external limit resistance R is 0 Ω .
If the peak value exceeds 5V, set the input current to approx. 15mA using the external limit resistance R.

Input signal specifications



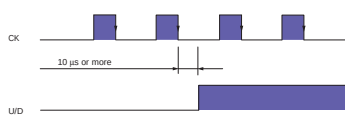
Timing of the command pulse

• Double input system (CW and CCW)



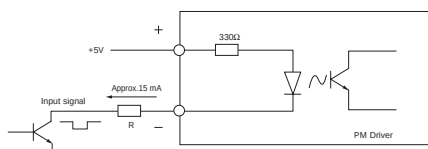
- The internal photocoupler turns ON at , and the internal circuit (stepping motor) operates at the leading edge of the photocoupler "ON".
- When applying the pulse to CW, set the internal photocoupler on the CCW side to "OFF".
- When applying the pulse to CCW, set the internal photocoupler on the CW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

• Single input system (CK and U/D)



- The internal photocoupler turns ON at , and the internal circuit (stepping motor) operates at the leading edge of the CK photocoupler "ON".
- Before switching the U/D input signals, turn OFF the internal photocoupler on the CK side.

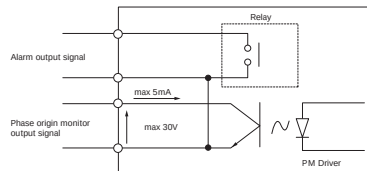
● Input circuit configuration (PD)



- 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.

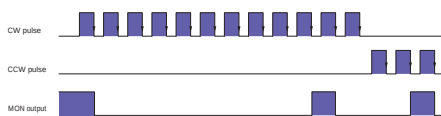
Operation, connection, and function

Output circuit configuration (MON and AL)



- Alarm output signal
Contact type: Relay contact output (normal open)
Contact capacity: Maximum 1 A at DC 24 V or maximum 0.5 A at AC 120 V
- Phase origin monitor output signal
Contact type: For open collector output by photocoupler
Contact capacity: Maximum 5 mA at DC 30 V
- Phase origin monitor output signal is compatible with PMM-BA-5643-1.
(There is no phase origin monitor output signal for PMM-BA-5603-1.)
- I/O connectors B4 and B5 of PMM-BA-5643-1 are common inside.

Timing of the MON output (at full step)

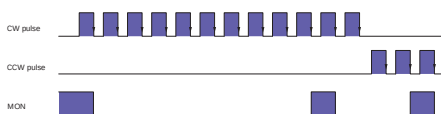


- The internal photocoupler turns "ON" at ■.

State Indication (LED)

Indication	Color	Explanation
POW turns on.	Green	Internal power has been established.
MON turns on.	Green	Excitation phase is at the origin (the power is turned on). When 1-division is specified (full step), turns on once in 10 pulses. When 2-division is specified (half step), turns on once in 20 pulses.
PM turns on.	Green	Command pulse is input. Turns on for Approx. 100ms for every one pulse input.

Timing of MON illumination (at full step)



- The internal photocoupler turns "ON" at ■ and MON illuminates.

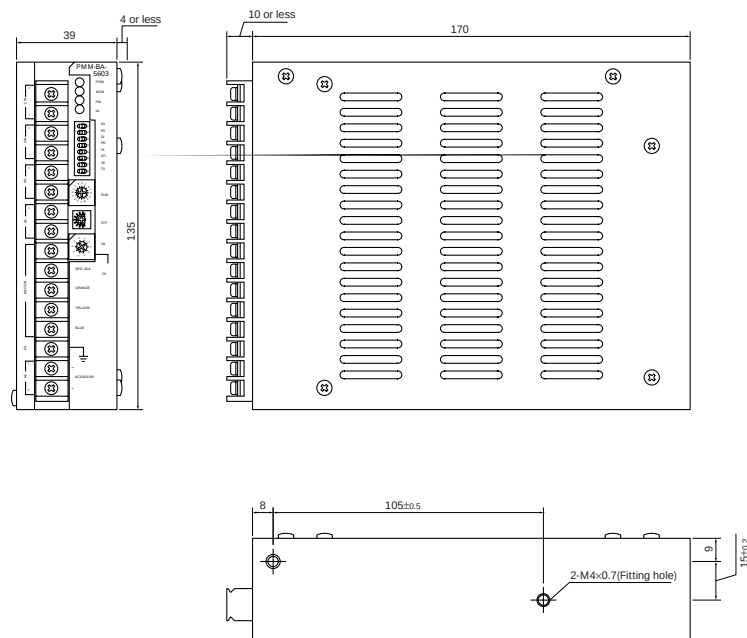
Alarm Indication (LED)

Indication	Color	Explanation
AL turns on.	Red	The overheat protection alarm circuit of the internal device operates. The circuit operates when both the internal temperature of the PM driver and the ambient temperature become 80°C or more.

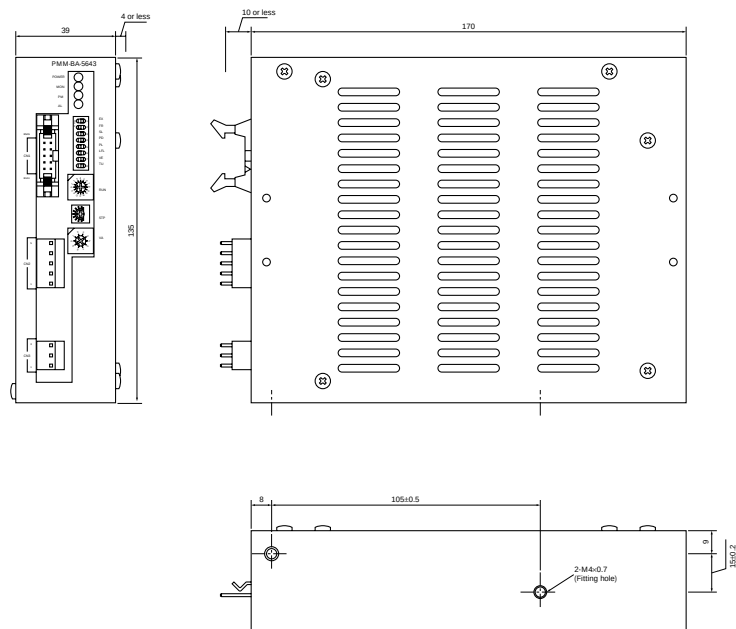
- Each alarm circuit operation turns on the alarm LED and cuts off the stepping motor current to result in the unexcited state. At the same time, the alarm output circuit photocoupler of I/O signal connector (CN1) turns ON and the signal is output externally. The alarm automatically stops to turn ON the stepping motor current when the internal semiconductor temperature becomes 80°C or less. Turn OFF the main power and try to radiate the generated heat by the forced-air-cooling of PM driver cabinet and so on before the automatic recovery from the alarm state when an alarm occurs.

Dimensions (Unit: mm)

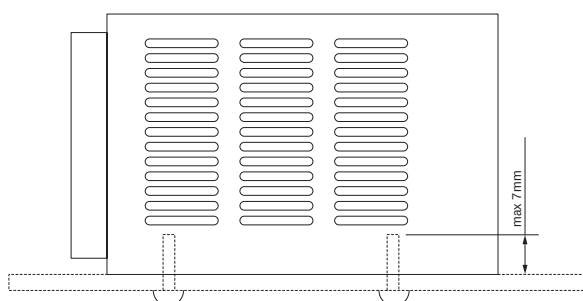
PMM-BA-5603-1



PMM-BA-5643-1



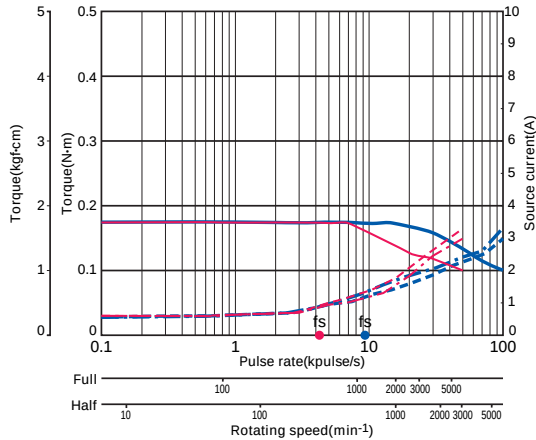
Installation direction and position



- Install the PM driver vertically.
- As shown in the figure, fix the PM driver by using the M4 screws through fitting holes on the bottom surface of PM driver (no fitting metals are necessary).
- Use such screws that enter inside the drive equipment for maximum 7 mm.

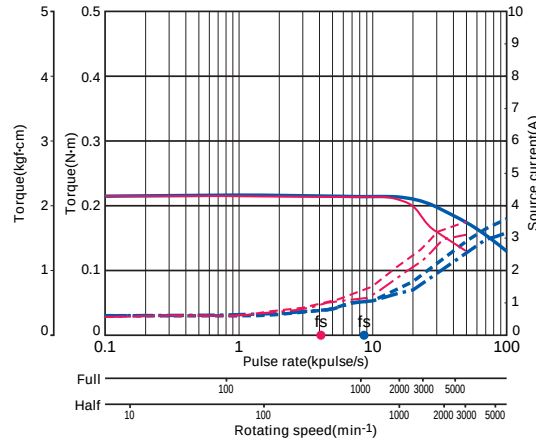
Pulse rate-torque characteristics/pulse rate-source current characteristics

●103H5505-70 □□ :100V



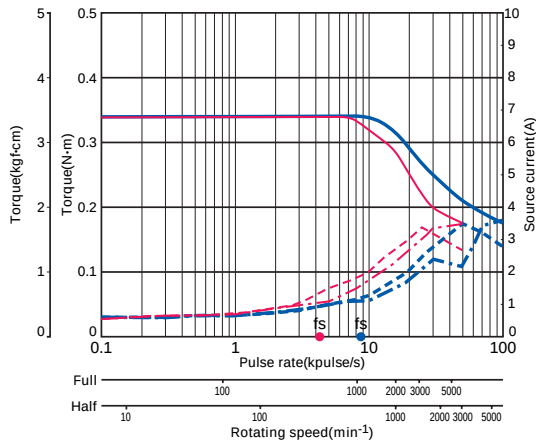
Source voltage: AC100V-Winding current: 0.75 A/phase
 — Getaway torque ($J_{L1}=0.94 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current ($T_L=\text{MAX}$) - - - Source current ($T_L=0$)
 fs: Maximum self-start frequency when not loaded ■ Full step ■ Half step

●103H5508-70 □□ :100V



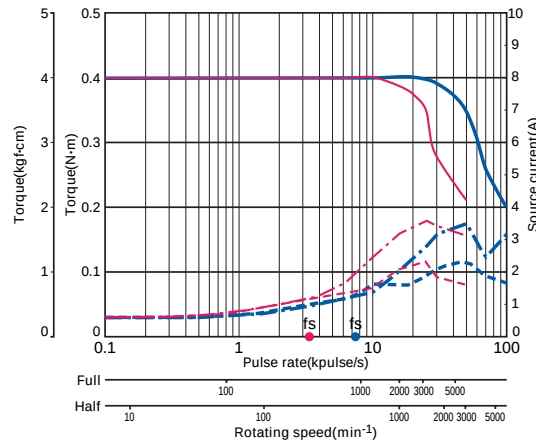
Source voltage: AC100V-Winding current: 0.75 A/phase
 — Getaway torque ($J_{L1}=0.94 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current ($T_L=\text{MAX}$) - - - Source current ($T_L=0$)
 fs: Maximum self-start frequency when not loaded ■ Full step ■ Half step

●103H5510-70 □□ :100V



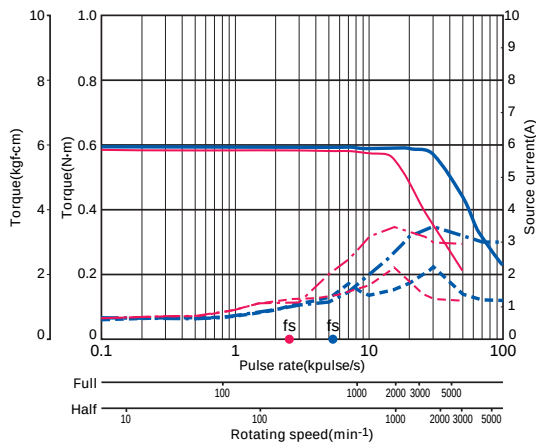
Source voltage: AC100V-Winding current: 0.75 A/phase
 — Getaway torque ($J_{L1}=0.94 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current ($T_L=\text{MAX}$) - - - Source current ($T_L=0$)
 fs: Maximum self-start frequency when not loaded ■ Full step ■ Half step

●103H6500-70 □□ :100V



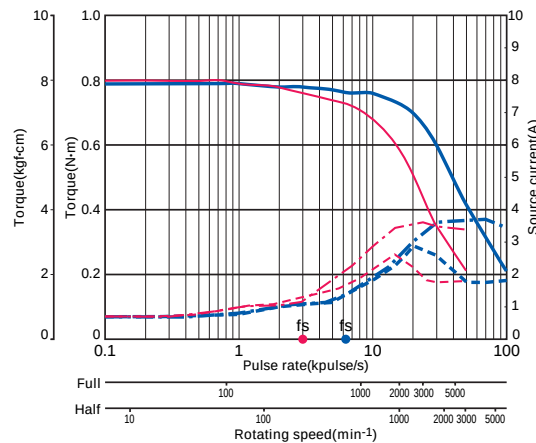
Source voltage: AC100V-Winding current: 0.75 A/phase
 — Getaway torque ($J_{L1}=0.94 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current ($T_L=\text{MAX}$) - - - Source current ($T_L=0$)
 fs: Maximum self-start frequency when not loaded ■ Full step ■ Half step

●103H6501-70 □□ :100V



Source voltage: AC100V-Winding current: 0.75 A/phase
 — Getaway torque ($J_{L1}=0.94 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current ($T_L=\text{MAX}$) - - - Source current ($T_L=0$)
 fs: Maximum self-start frequency when not loaded ■ Full step ■ Half step

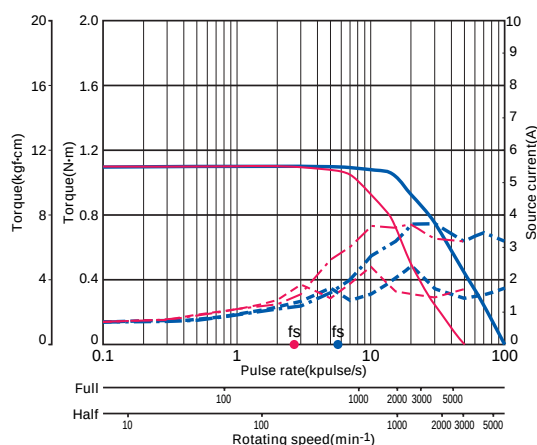
●103H7851-70 □□ :100V



Source voltage: AC100V-Winding current: 0.75 A/phase
 — Getaway torque ($J_{L1}=2.6 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current ($T_L=\text{MAX}$) - - - Source current ($T_L=0$)
 fs: Maximum self-start frequency when not loaded ■ Full step ■ Half step

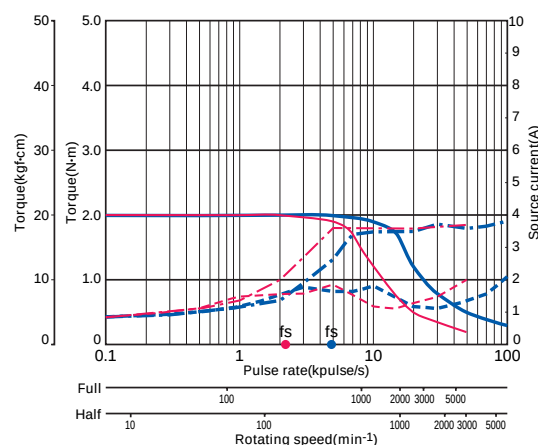
Pulse rate-torque characteristics/pulse rate-source current characteristics

●103H7852-70 □□ :100V



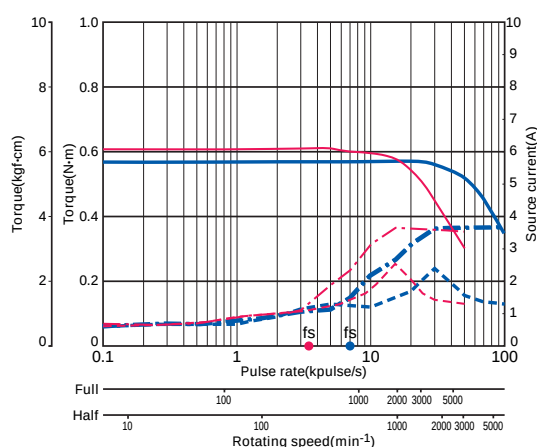
Source voltage: AC100V-Winding current: 0.75 A/phase
 — Getaway torque ($J_{L1}=2.6 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current ($T_L=\text{MAX}$) - - - Source current ($T_L=0$)
 fs: Maximum self-start frequency when not loaded ■ Full step ■ Half step

●103H7853-70 □□ :100V



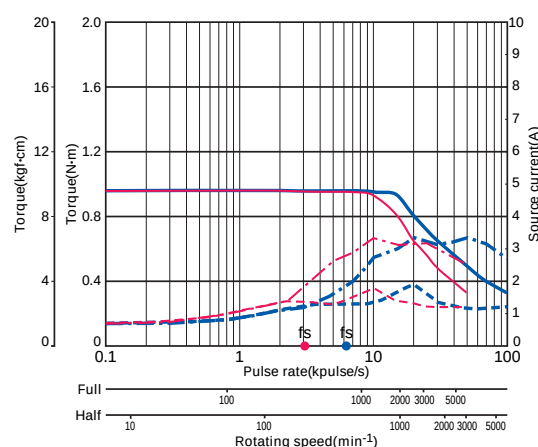
Source voltage: AC100V-Winding current: 0.75 A/phase
 — Getaway torque ($J_{L1}=7.4 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current ($T_L=\text{MAX}$) - - - Source current ($T_L=0$)
 fs: Maximum self-start frequency when not loaded ■ Full step ■ Half step

●103H7521-70 □□ :100V



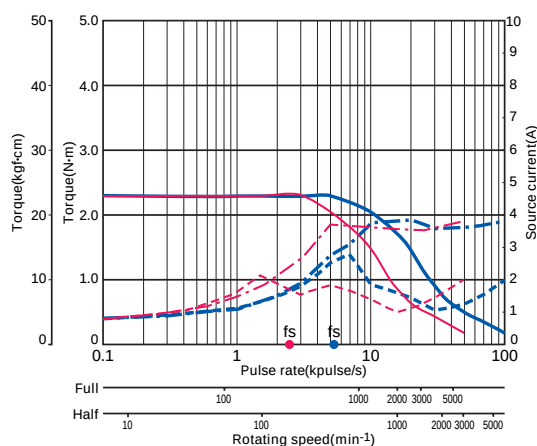
Source voltage: AC100V-Winding current: 0.75 A/phase
 — Getaway torque ($J_{L1}=0.94 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current ($T_L=\text{MAX}$) - - - Source current ($T_L=0$)
 fs: Maximum self-start frequency when not loaded ■ Full step ■ Half step

●103H7522-70 □□ :100V



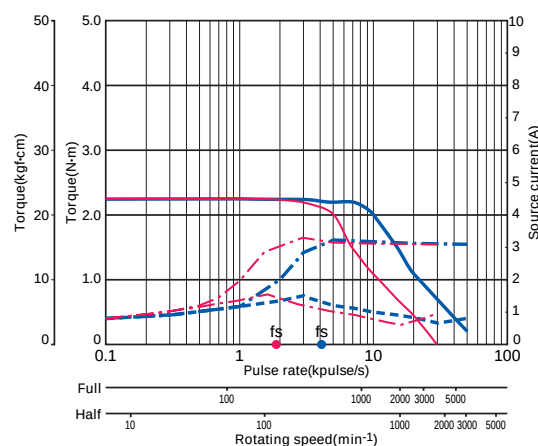
Source voltage: AC100V-Winding current: 0.75 A/phase
 — Getaway torque ($J_{L1}=2.6 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current ($T_L=\text{MAX}$) - - - Source current ($T_L=0$)
 fs: Maximum self-start frequency when not loaded ■ Full step ■ Half step

●103H7523-70 □□ :100V



Source voltage: AC100V-Winding current: 0.75 A/phase
 — Getaway torque ($J_{L1}=7.4 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current ($T_L=\text{MAX}$) - - - Source current ($T_L=0$)
 fs: Maximum self-start frequency when not loaded ■ Full step ■ Half step

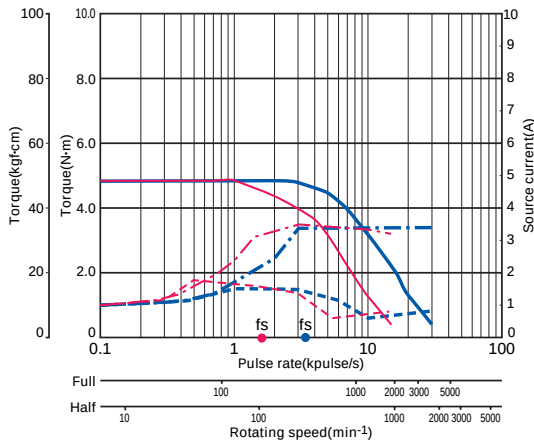
●103H8581-70 □□ :100V



Source voltage: AC100V-Winding current: 0.75 A/phase
 — Getaway torque ($J_{L1}=7.4 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current ($T_L=\text{MAX}$) - - - Source current ($T_L=0$)
 fs: Maximum self-start frequency when not loaded ■ Full step ■ Half step

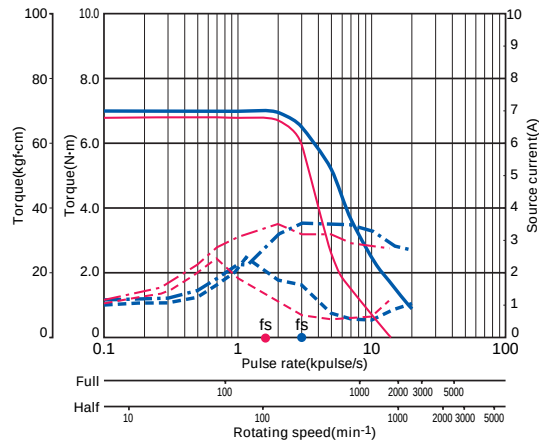
Pulse rate-torque characteristics/pulse rate-source current characteristics

●103H8582-70 □□ :100V



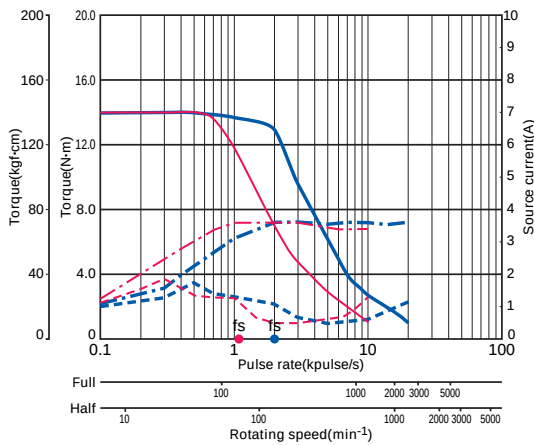
Source voltage:AC100V-Winding current:0.75 A/phase
 — Getaway torque(JL1=15.1×10⁻⁴kg·m² using the rubber coupling)
 - - - Source current(T_L=MAX) - - - Source current(T_L=0)
 fs:Maximum self-start frequency when not loaded ■ Full step ■ Half step

●103H8583-70 □□ :100V



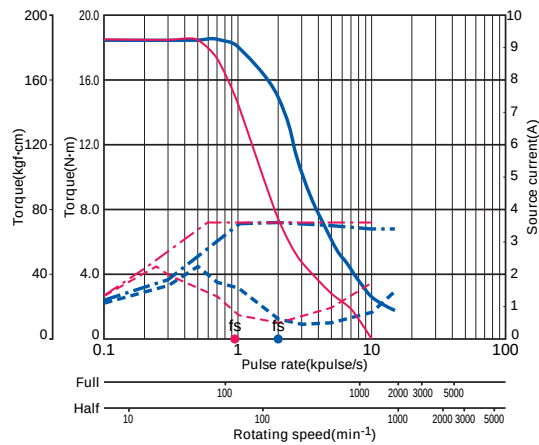
Source voltage:AC100V-Winding current:0.75 A/phase
 — Getaway torque(JL1=44×10⁻⁴kg·m² using the rubber coupling)
 - - - Source current(T_L=MAX) - - - Source current(T_L=0)
 fs:Maximum self-start frequency when not loaded ■ Full step ■ Half step

●103H89582-70 □□ :100V



Source voltage:AC100V-Winding current:0.75 A/phase
 — Getaway torque(JL1=44×10⁻⁴kg·m² using the rubber coupling)
 - - - Source current(T_L=MAX) - - - Source current(T_L=0)
 fs:Maximum self-start frequency when not loaded ■ Full step ■ Half step

●103H89583-70 □□ :100V



Source voltage:AC100V-Winding current:0.75 A/phase
 — Getaway torque(JL1=44×10⁻⁴kg·m² using the rubber coupling)
 - - - Source current(T_L=MAX) - - - Source current(T_L=0)
 fs:Maximum self-start frequency when not loaded ■ Full step ■ Half step

Option

PMM-BA-5643-1

● Connector set

Model number	Used for	Set content	Combination stepping motor model number
PM-AP-049	I/O signal (CN1)	Applicable socket:HIF3BA-10DA-2.54R	Type 103H785 □
	Power source (CN3)	Applicable housing:5195-03 Applicable contact:5194PBT	
	Stepping motor (CN2)	Applicable housing:5195-05 Applicable contact:5194PBT Applicable housing:VHR-5N Applicable contact:SVH-21T-P1.1	
PM-AP-035	I/O signal (CN1)	Applicable socket:HIF3BA-10DA-2.54R	Type 103H55 □□ 103H650 □ 103H752 □ 103H858 □ 103H8958 □
	Power source (CN3)	Applicable housing:5195-03 Applicable contact:5194PBT	
	Stepping motor (CN2)	Applicable housing:5195-05 Applicable contact:5194PBT	

● Connector cable

Model number	Application
PM-C10S0100-03	Connector cable for I/O signals (CN1)
PM-C05M0100-□□	Connector cable for stepping motors (CN2)
PM-C03P0100-01	Connector cable for AC power source (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.

Applicable connector cable		
CN1	CN2	CN3
Cable 2	Cable 3 or 4	Cable 1

PMM-BA-5603-1

● Terminal block cover

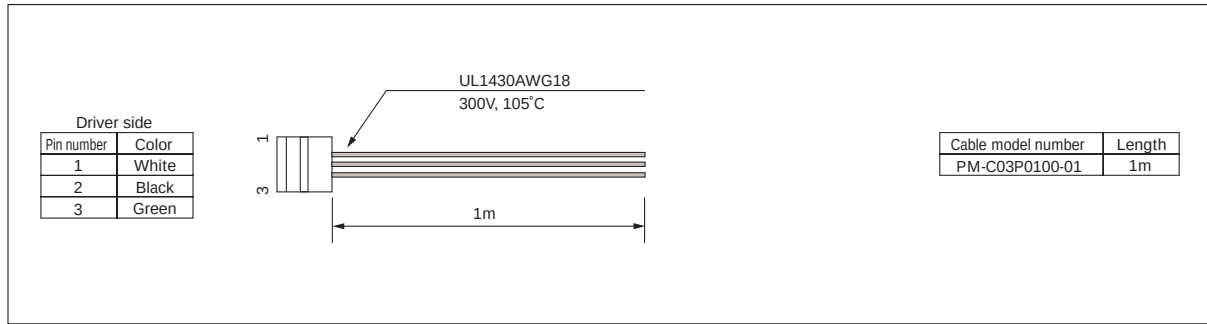
Model number	Quantity
PM-AP-020	One

Stepping motor cable model number (Supplement table 1)

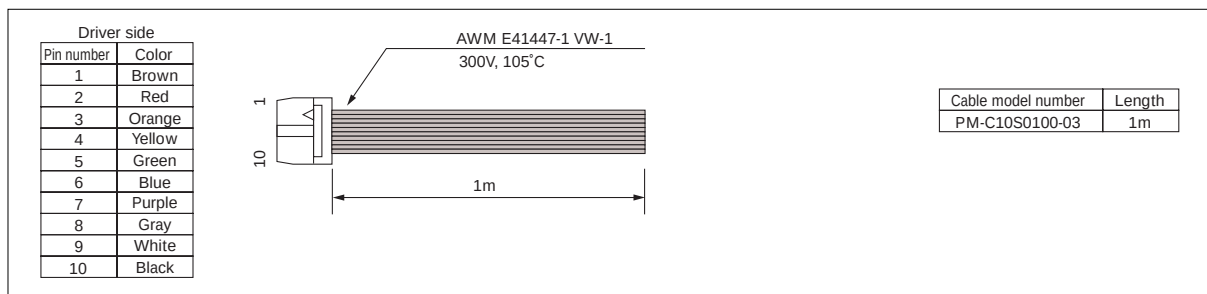
Serial No.	Stepping motor model number
05	103H5505-70 □□
	103H5508-70 □□
	103H5510-70 □□
	103H6500-70 □□
	103H6501-70 □□
	103H7521-70 □□
	103H7522-70 □□
	103H7523-70 □□
	103H8581-70 □□
	103H8582-70 □□
	103H8583-70 □□
	103H89582-70 □□
	103H89583-70 □□
	103H7851-70 □□
06	103H7852-70 □□
	103H7853-70 □□

Option

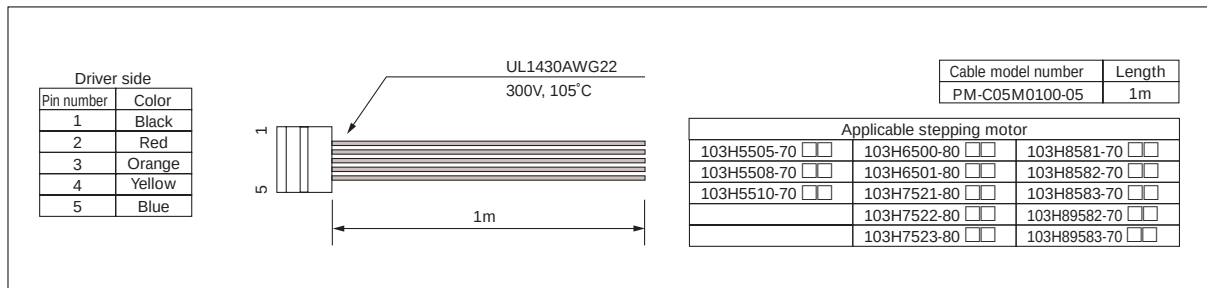
● Cable 1 (power source cable CN3)



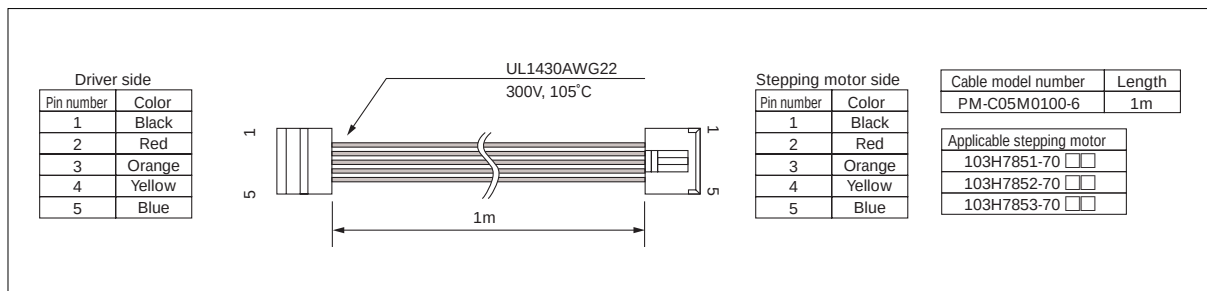
● Cable 2 (I/O signal cable CN1)



● Cable 3 (stepping motor extension cable 1 CN2)



● Cable 4 (stepping motor extension cable 2 CN2)





The 5-Phase Stepping Driver

PMM-BA-5604-1

PMM-BA-5644-1

AC 100 V/115 V

Full-step/half-step

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

● Applicable motors



Characteristics

● High-speed type

These drivers are high-speed types of PMM-BA-56 □ 3-1. 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 and high torque

Dedicated ICs are mounted to realize the small size and high torque as a result of parts consolidation and high reliability.

● Two types interface

Two lineup types are:

Terminal block type :PMM-BA-5604-1

Connector type :PMM-BA-5644-1

Built-in function

● Low-vibration control

Our original control system employment enables a smooth and low-vibration operation.

● Pulse input system selection function

Either single or double input system can be selected by using dipswitches.

● Operation current switchover function

Stepping motor operation current ranging from the rated one to 40% can be set by using the rotary switch.

PM driver specifications

Item		PMM-BA-5604-1	PMM-BA-5644-1
Basic specifications	Input source	Single phase AC100/115V+10,-15% 50/60Hz	
	Source current	8A	
	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.	
Function	Weight	1.9kg	
	Protection function	Against PM driver overheat	
	Selection function	Automatic current reduction, excitation mode, pulse input system, operation current, and low vibration	
I/O signals	LED indicator	Power supply monitor, phase origin monitor, pulse monitor, and alarm monitor.	
	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: 100 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	
	Phase origin monitor output signal		Open collector output by photocoupler Output signal standard V _{ceo} : Maximum 30 V, I _c : Maximum 5 mA
	Alarm output signal	Relay contact output (normal open) Contact capacity: Maximum 1 A at DC 24 V or maximum 0.5 A at AC 120 V	

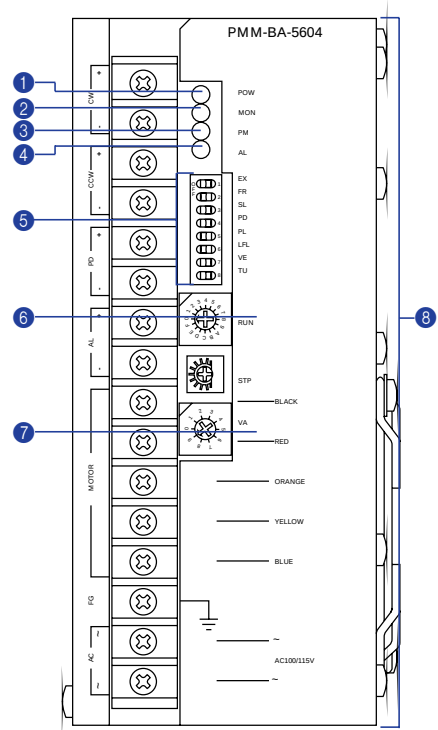
Standard combined stepping motor

Stepping motor dimensions	Stepping motor model number		Holding torque [N·m]	Rotor inertia [×10 ⁻⁴ kg·m ²]	Weight [kg]	Page
	Single-axis shaft	Dual-axis shaft				
□50mm	103H6500-8041	103H6500-8011	0.225	0.057	0.38	Page 313
	103H6501-8041	103H6501-8011	0.39	0.105	0.44	
□60mm	103H7851-8051	103H7851-8021	0.65	0.275	0.6	Page 315
	103H7852-8051	103H7852-8021	0.98	0.4	0.78	
	103H7853-8051	103H7853-8021	1.86	0.84	1.36	
ø60mm	103H7521-8051	103H7521-8021	0.46	0.148	0.51	Page 317
	103H7522-8051	103H7522-8021	0.735	0.18	0.6	
	103H7523-8051	103H7523-8021	1.568	0.423	1.1	
ø86mm	103H8581-8041	103H8581-8011	2.06	1.45	1.5	Page 319
	103H8582-8041	103H8582-8011	4.02	2.9	2.5	
	103H8583-8041	103H8583-8011	6.17	4.4	3.5	
ø106mm	103H89582-8041	103H89582-8011	10.8	14.6	7	Page 321
	103H89583-8041	103H89583-8011	16	22	10.4	

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

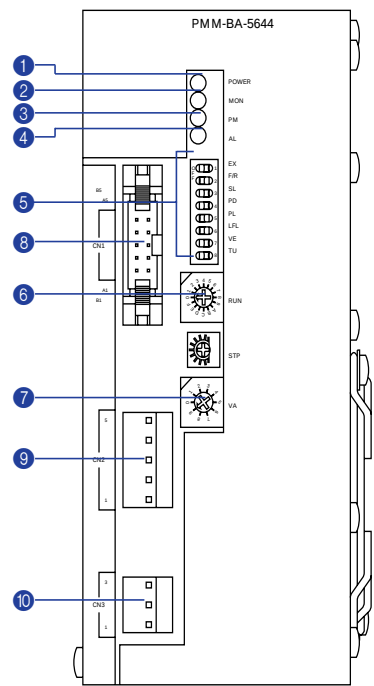
Operation, connection, and function

● Each section name of the PM driver conform to CE Marking
PMM-BA-5604-1



- 1 Internal power establishment (POW) Indicates that the internal power is established.
- 2 Phase origin monitor (MON) Indicates that the excitation phase is at the origin (in the state when the power is turned ON).
- 3 Input pulse monitor (PM) Indicates that the input pulse is applied.
- 4 Alarm monitor (AL) Turns ON when the internal alarm circuit operates.
- 5 Function selection dipswitch Functions can be selected according to the specification.
(EX, F/R, SL, PD, PL, LFL, VE, TU)
- 6 Operation current selection switch (RUN) Stepping motor current value during operation can be selected.
- 7 Selection switch for low vibration (VA) Low-vibration operation and the stepping motor heat generation reduction can be performed.
- 8 Terminal block (TB) I/O signals, the single-phase AC power source, and the stepping motor power cable are connected.

PMM-BA-5644-1

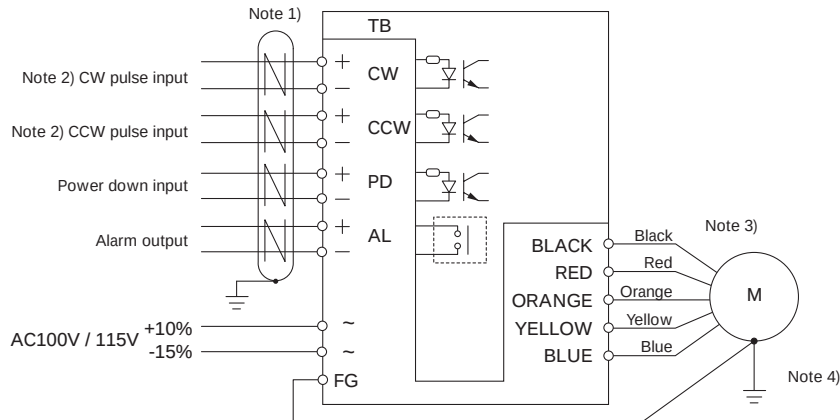


- 1 Internal power establishment (POWER) Indicates that the internal power is established.
- 2 Phase origin monitor (MON) Indicates that the excitation phase is at the origin (in the state when the power is turned ON).
- 3 Input pulse monitor (PM) Indicates that the input pulse is applied.
- 4 Alarm monitor (AL) Turns ON when the internal alarm circuit operates.
- 5 Function selection dipswitch Functions can be selected according to the specification.
(EX, F/R, SL, PD, PL, LFL, VE, TU)
- 6 Operation current selection switch (RUN) Stepping motor current value during operation can be selected.
- 7 Selection switch for low vibration (VA) Low-vibration operation and the stepping motor heat generation reduction can be performed.
- 8 Connectors for I/O signal I/O signals are connected.
- 9 Stepping output connector (CN2) The stepping motor power cable is connected.
- 10 Power source input connector (CN3) Single-phase AC power source is connected.

Operation, connection, and function

External wiring diagram

PMM-BA-5604-1



Note 1) Use shielded twisted-pair cables.

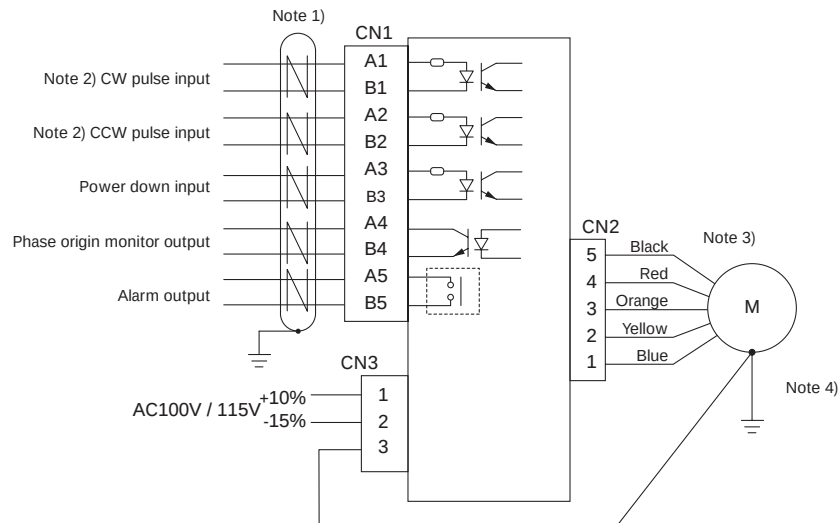
Note 2) Either "double input system (CW and CCW)" or "single input system (CK and U/D)" can be selected by using the function selection switch F/R

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

Product	Terminal block silk screen print/stepping motor connector pin number				
PM driver (TB)	BLACK	RED	ORANGE	YELLOW	BLUE
Stepping motor connector	1	4	3	2	5

Note 4) Ground the stepping motor flange section and the stepping motor fastening screw by fixing them together. Use a single point grounding.

PMM-BA-5644-1



Note 1) Use shielded twisted-pair cables.

Note 2) Either "double input system (CW and CCW)" or "single input system (CK and U/D)" can be selected by using the function selection switch F/R

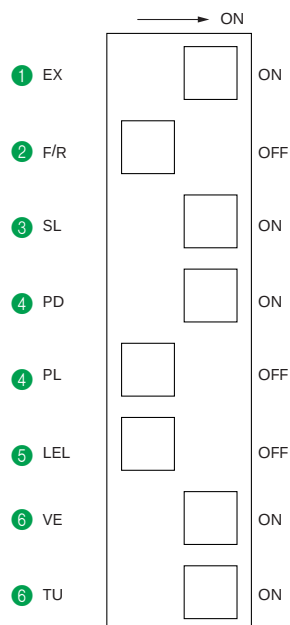
Note 3) Refer to the following table when connecting the 103H785 □ type stepping motor:

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

Note 4) Ground the stepping motor flange section and the stepping motor fastening screw by fixing them together. Use a single point grounding.

Operation, connection, and function

● Function selection dipswitch ---5



- 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 EX (excitation system selection) Excitation mode is selected.

EX	Energization system
ON	Half step (0.36°/pulse)
OFF	Full step (0.72°/pulse)

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

F/R	Pulse input system
ON	Single input system (CK and U/D)
OFF	Double input system (CW and CCW)

③ SL (automatic current reduction selection) Automatic current reduction function is selected.

SL	Auto current down
ON	Operates.
OFF	Does not operate.

④ PD and PL (power down and power low selection) The stepping motor windings current value at the power down signal input is selected.

PD	PL	Stepping motor current
ON	OFF	OA (power OFF)
OFF	ON	The current value (power low) using the stopping current adjustment control (STP)

⑤ LEL selection (Note) This switch is not used. Do not turn it ON.

⑥ VE and TU selection (Note) This switch is not used. Do not turn it OFF.

● Operation current selection switch (RUN) ---6

The operation current value of stepping motor can be selected.

Scale	0	1	2	3	4	5	6	7
Stepping motor current (A total)	6.0	5.8	5.6	5.2	5.0	4.8	4.6	4.4
Scale	8	9	A	B	C	D	E	F
Stepping motor current (A total)	4.2	3.8	3.6	3.4	3.2	3.0	2.6	2.4

- "0" is set at the shipment.
- 1.5 A/phase is set at scale 0.

● Low-vibration selection switch (VA) ---7

The vibration and the stepping motor heat generation can be reduced.

Scale	Function
9	Standard
3	 Vibration reduction Motor heat generation reduction
2	
1	
0	

- "9" is set at the shipment.
- Settings from 0 to 3 are valid.
- Sometimes the high-speed torque may decrease.

Operation, connection, and function

● I/O signal function ---8

Signal name (Abbreviation)	Silk print/Pin Number		Function
	Terminal block type	Connector type	
CW pulse input (CW)	CW+	A1	When using double input system
	CW-	B1	Drive pulse for the CW direction rotation is input.
Pulse column input (CK)	CK+	A1	When using single input system
	CK-	B1	Drive pulse train for the stepping motor rotation is input.
CCW pulse input (CCW)	CCW+	A2	When using double input system
	CCW-	B2	Drive pulse for the CCW direction rotation is input.
Rotation direction input (U/D)	U/D+	A2	The rotation direction signal of stepping motor is input for the single input system.
	U/D-	B2	Internal photocoupler ON CW direction Internal photocoupler OFF CCW direction
Power down input (PD)	PD+	A3	Inputting the PD signal cuts OFF the current flowing through the stepping motor (turns OFF the power).
	PD-	B3	(The power down input can be changed to the power low function by selecting dipswitches.) PD input signal ON (internal photocoupler ON) PD function enabled PD input signal OFF (internal photocoupler OFF) PD function disabled
Phase origin monitor output (MON)	-	A4	It is turned ON when the excitation phase is at the origin (in the state when the power is turned ON)
		B4	It is turned ON once per 10 pulses when setting to 2-division (full step). It is turned ON once per 20 pulses when setting to 1-division (half step).
Alarm output (AL)	AL1	A5	The signal is externally output when one of several alarm circuits operates in the PM driver.
	AL2	B5	At this time, the stepping motor is in the unexcited state.

- The terminal block type indicates "PMM-BA-5604-1" and the connector type indicates "PMM-BA-5644-1" in the table.
- 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

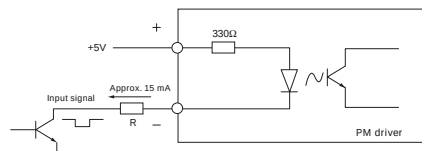
PMM-BA-5644-1

PM driver side		Applicable connector model number	Manufacturer
Used for	Model number		
I/O signals (CN1)	HIF3BD-10PA-2.54DS	Applicable socket :HIF3BD-10DA-2.54R	Hirose Electric Co., Ltd.
Stepping motor (CN2)	5274-05A	Applicable housing:5195-05 Applicable contact:5194PBTL	Molex Japan
AC power source (CN3)	5274-03A	Applicable housing:5195-03 Applicable contact:5194PBTL	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 215).
- PMM-BA-5604-1 using the terminal block interface does not require connectors.

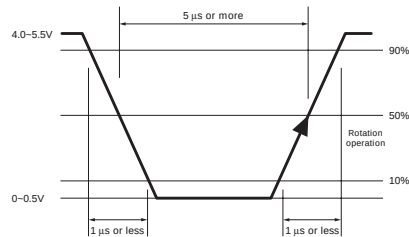
Operation, connection, and function

● Input circuit configuration (CW and CCW)



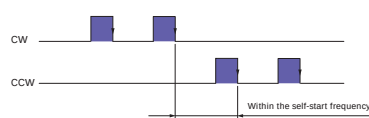
- Pulse duty is 50 % or less.
- When the peak value of the input signal is 5V, the external limit resistance R is 0 Ω. If the peak value exceeds 5V, set the input current to approx. 15mA using the external limit resistance R.

Input signal specifications



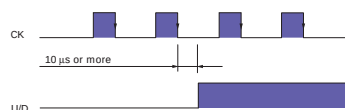
Timing of the command pulse

- Double input system (CW and CCW)



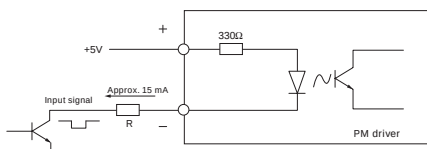
- The internal photocoupler turns ON at the leading edge of the photocoupler "ON".
- When applying the pulse to CW, set the internal photocoupler on the CCW side to "OFF".
- When applying the pulse to CCW, set the internal photocoupler on the CW side to "OFF".

- Single input system (CK and U/D)



- The internal photocoupler turns ON at the leading edge of the CK photocoupler "ON".
- Before switching the U/D input signals, turn OFF the internal photocoupler on the CK side.

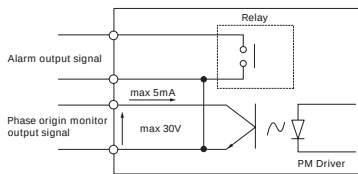
● Input circuit configuration (PD)



- 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.

Operation, connection, and function

Output circuit configuration (MON and AL)



- Alarm output signal
Contact type: Relay contact output (normal open)
Contact capacity: Maximum 1 A at DC 24 V or maximum 0.5 A at AC 120 V
- Phase origin monitor output signal
Contact type: For open collector output by photocoupler
Contact capacity: Maximum 5 mA at DC 30 V
- Phase origin monitor output signal is compatible with PMM-BA-5644-1.
(There is no phase origin monitor output signal for PMM-BA-5604-1.)
- I/O connectors B4 and B5 of PMM-BA-5644-1 are common inside.

Timing of the MON output (at full step)

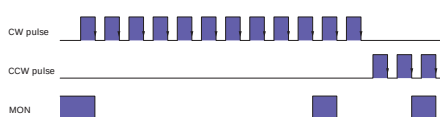


- The internal photocoupler turns "ON" at ■.

State Indication (LED)

Indication	Color	Explanation
POW turns on.	Green	Internal power has been established.
MON turns on.	Green	Excitation phase is at the origin (the power is turned on). When 1-division is specified (full step), turns on once in 10 pulses. When 2-division is specified (half step), turns on once in 20 pulses.
PM turns on.	Green	Command pulse is input. Turns on for Approx. 100ms for every one pulse input.

Timing of MON illumination (at full step)



- The internal photocoupler turns "ON" at ■ and MON illuminates.

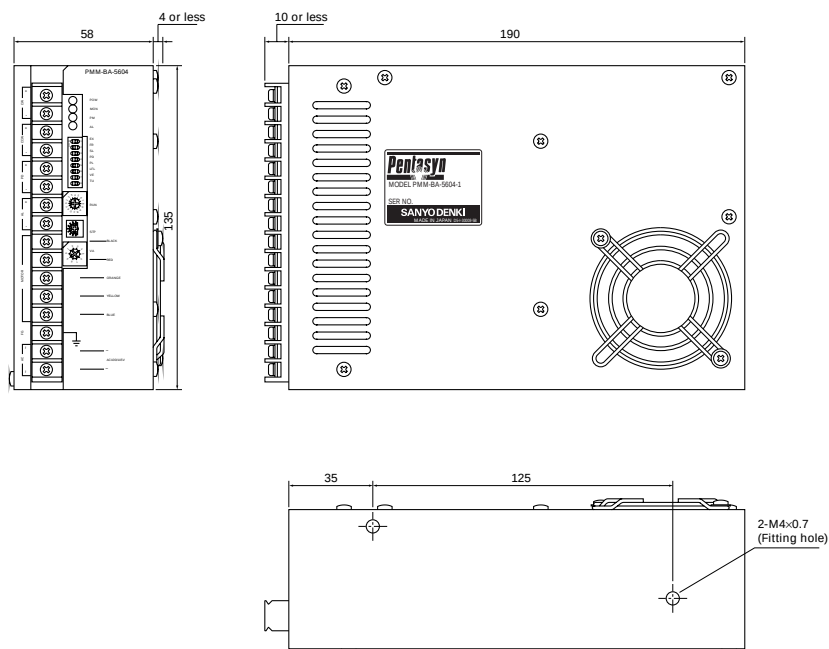
Alarm Indication (LED)

Indication	Color	Explanation
AL turns on.	Red	The overheat protection alarm circuit of the internal device operates. The circuit operates when both the internal temperature of the PM driver and the ambient temperature become 80°C or more.

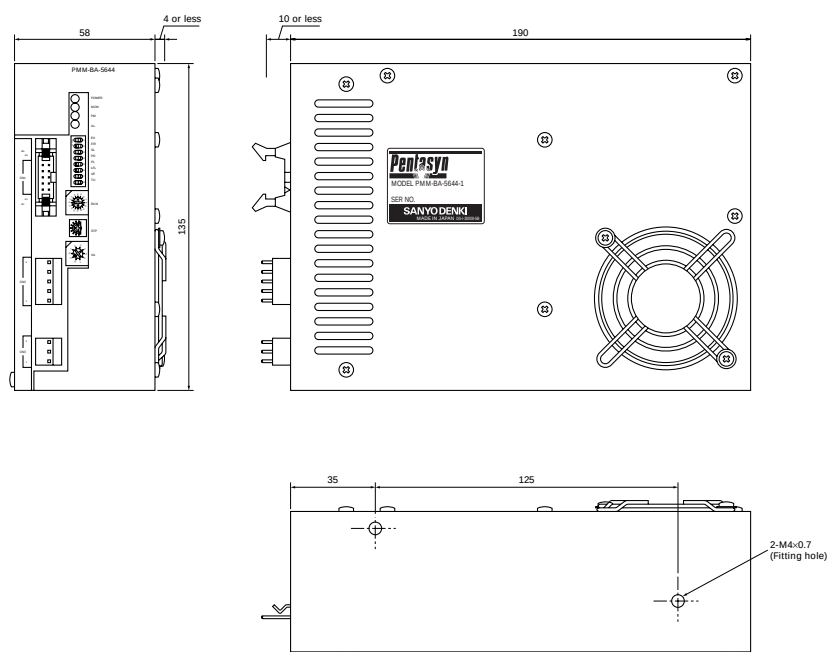
- Each alarm circuit operation turns on the alarm LED and cuts off the stepping motor current to result in the unexcited state. At the same time, the alarm output circuit photocoupler of I/O signal connector (CN1) turns ON and the signal is output externally. The alarm automatically stops to turn ON the stepping motor current when the internal semiconductor temperature becomes 80°C or less. Turn OFF the main power and try to radiate the generated heat by the forced-air-cooling of PM driver cabinet and so on before the automatic recovery from the alarm state when an alarm occurs.

Dimensions (Unit: mm)

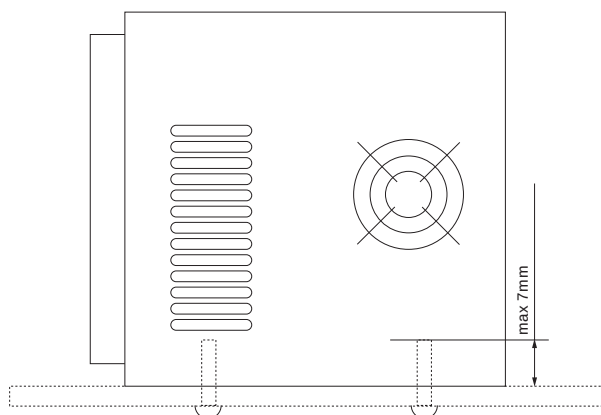
PMM-BA-5604-1



PMM-BA-5644-1



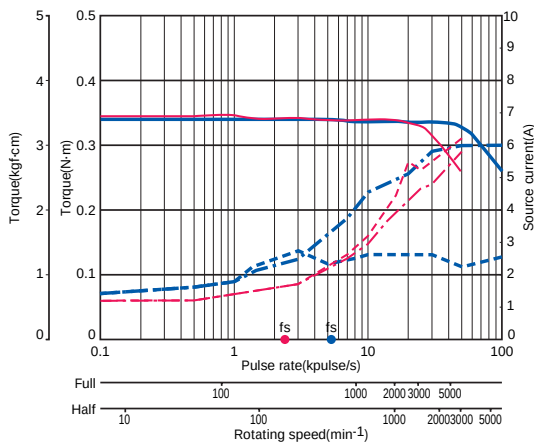
Installation direction and position



- Install the PM driver vertically.
- As shown in the figure, fix the PM driver by using the M4 screws through fitting holes on the bottom surface of PM driver (no fitting metals are necessary).
- Use such screws that enter inside the drive equipment for maximum 7 mm.

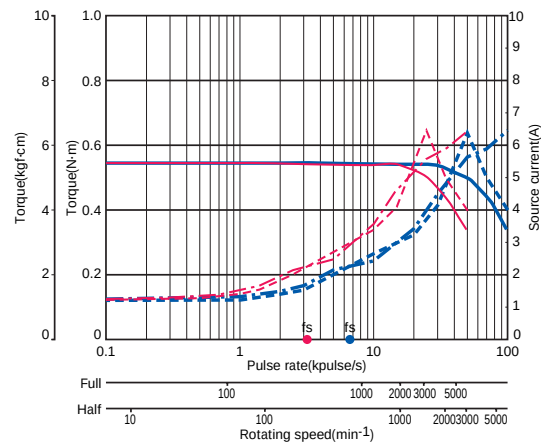
Pulse rate-torque characteristics/pulse rate-source current characteristics

●103H6500-80 □□ :100V



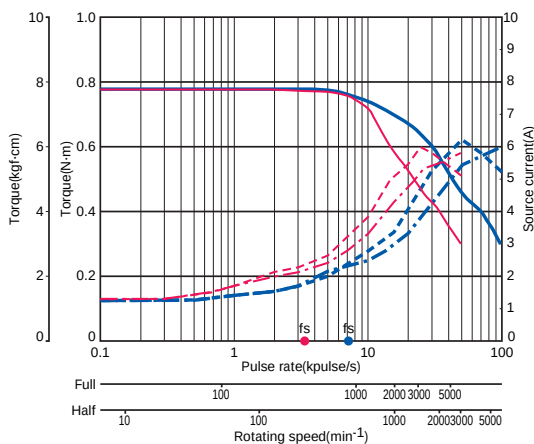
Source voltage:AC100V-Winding current: 1.5 A/phase
 — Getaway torque($J_L=0.94 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ Full step ■ Half step

●103H6501-80 □□ :100V



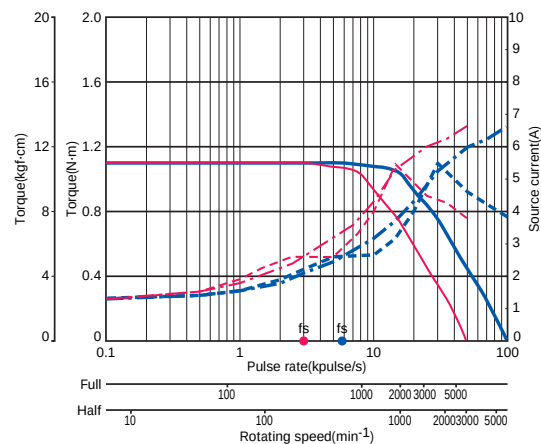
Source voltage:AC100V-Winding current: 1.5 A/phase
 — Getaway torque($J_L=0.94 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ Full step ■ Half step

●103H7851-80 □□ :100V



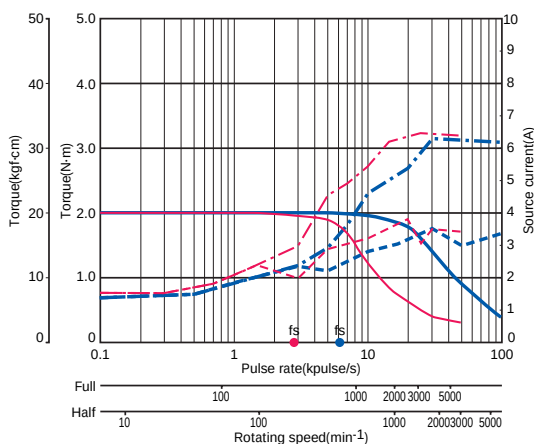
Source voltage:AC100V-Winding current: 1.5 A/phase
 — Getaway torque($J_L=2.6 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ Full step ■ Half step

●103H7852-80 □□ :100V



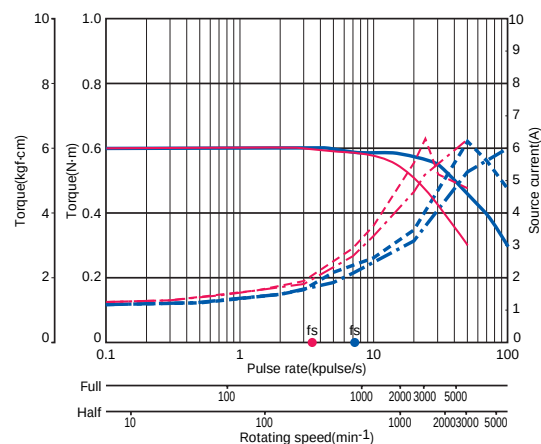
Source voltage:AC100V-Winding current: 1.5 A/phase
 — Getaway torque($J_L=2.6 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ Full step ■ Half step

●103H7853-80 □□ :100V



Source voltage:AC100V-Winding current: 1.5 A/phase
 — Getaway torque($J_L=7.4 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ Full step ■ Half step

●103H7521-80 □□ :100V



Source voltage:AC100V-Winding current: 1.5 A/phase
 — Getaway torque($J_L=0.94 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ Full step ■ Half step

PMAP1S6A01

PMAP1S6B01

PMM-MA-50034

PMM-MA-50064

PMM-BA-5603

PMM-BA-5604

PMDP1S6P01

PMDPC1S3P01

PMM-MD-53030

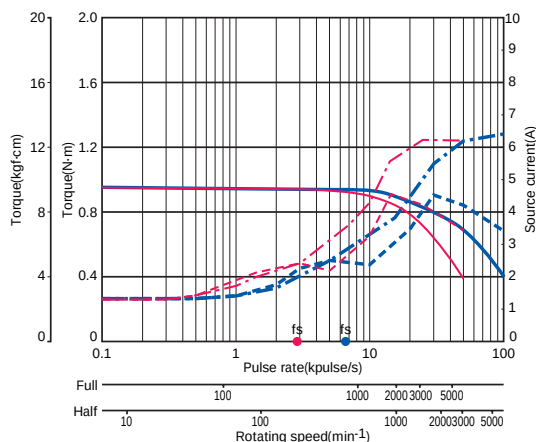
PMM-BD-53130

PMDP1A3P20

PMDP1C3P20

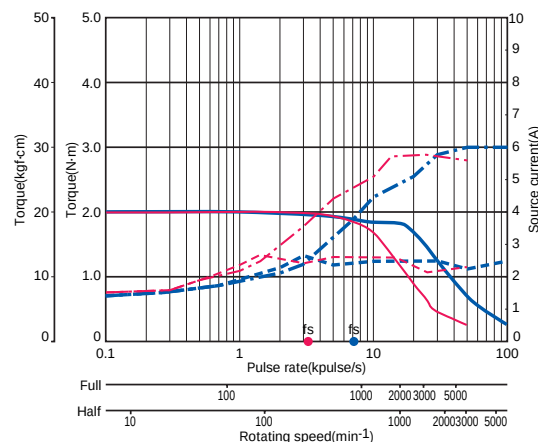
Pulse rate-torque characteristics/pulse rate-source current characteristics

●103H7522-80 □□ :100V



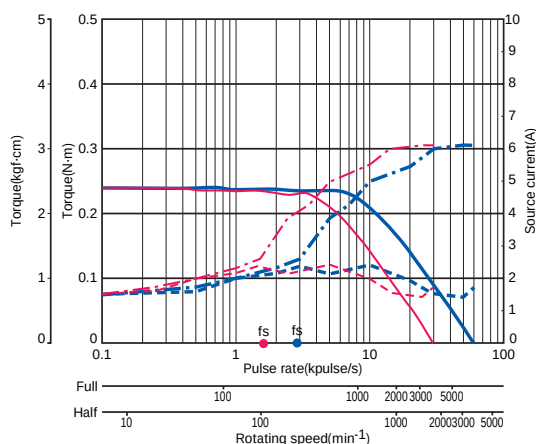
Source voltage: AC100V-Winding current: 1.5 A/phase
 — Getaway torque ($J_L=2.6 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current ($T_L=MAX$) - - - Source current ($T_L=0$)
 fs: Maximum self-start frequency when not loaded ■ Full step ■ Half step

●103H7523-80 □□ :100V



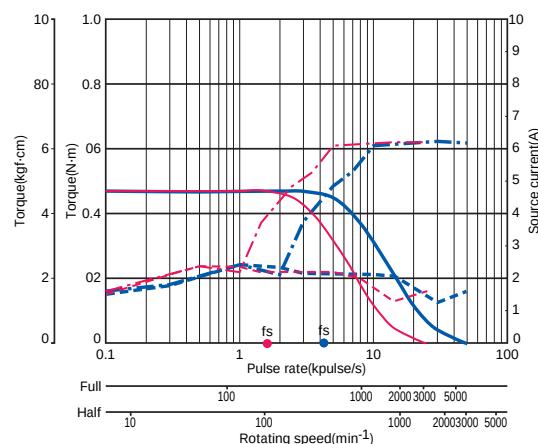
Source voltage: AC100V-Winding current: 1.5 A/phase
 — Getaway torque ($J_L=7.4 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current ($T_L=MAX$) - - - Source current ($T_L=0$)
 fs: Maximum self-start frequency when not loaded ■ Full step ■ Half step

●103H8581-80 □□ :100V



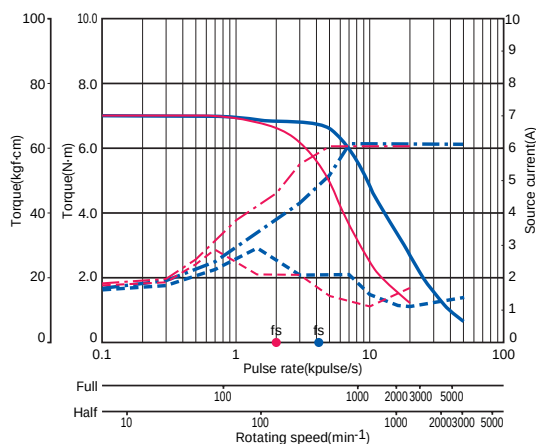
Source voltage: AC100V-Winding current: 1.5 A/phase
 — Getaway torque ($J_L=7.4 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current ($T_L=MAX$) - - - Source current ($T_L=0$)
 fs: Maximum self-start frequency when not loaded ■ Full step ■ Half step

●103H8582-80 □□ :100V



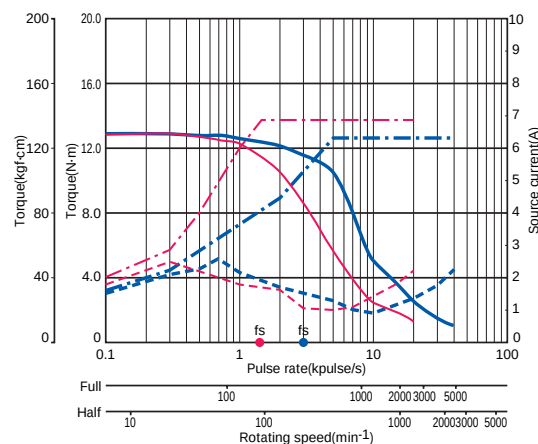
Source voltage: AC100V-Winding current: 1.5 A/phase
 — Getaway torque ($J_L=15.1 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current ($T_L=MAX$) - - - Source current ($T_L=0$)
 fs: Maximum self-start frequency when not loaded ■ Full step ■ Half step

●103H8583-80 □□ :100V



Source voltage: AC100V-Winding current: 1.5 A/phase
 — Getaway torque ($J_L=44 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current ($T_L=MAX$) - - - Source current ($T_L=0$)
 fs: Maximum self-start frequency when not loaded ■ Full step ■ Half step

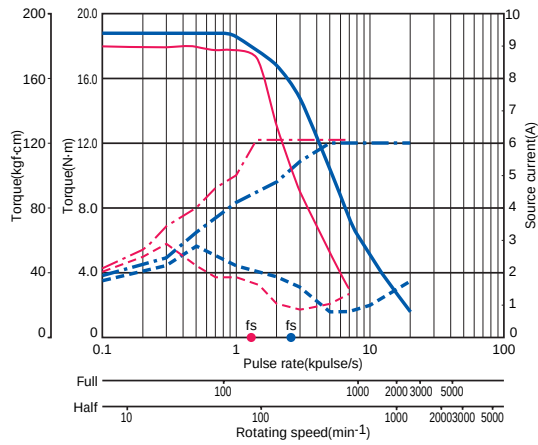
●103H89582-80 □□ :100V



Source voltage: AC100V-Winding current: 1.5 A/phase
 — Getaway torque ($J_L=44 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current ($T_L=MAX$) - - - Source current ($T_L=0$)
 fs: Maximum self-start frequency when not loaded ■ Full step ■ Half step

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

●103H89583-80 □ □ :100V



Source voltage: AC100V · Winding current: 1.5 A/phase

— Getaway torque ($J: 1=44 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)

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

fs: Maximum self-start frequency when not loaded ■ Full step ■ 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

PMDPA1A3P20

PMDPALC3P20

Option

PMM-BA-5644-1

● Connector set

Model number	Used for	Set content	Combination stepping motor model number
PM-AP-049	I/O signal (CN1)	Applicable socket:HIF3BA-10DA-2.54R	Type 103H785□□
	Power source (CN3)	Applicable housing:5195-03 Applicable contact:5194PBT	
	Stepping motor (CN2)	Applicable housing:5195-05 Applicable contact:5194PBT Applicable housing:VHR-5N Applicable contact:SVH-21T-PL1.1	
PM-AP-035	I/O signal (CN1)	Applicable socket:HIF3BA-10DA-2.54R	Type 103H650□□ 103H752□□ 103H858□□ 103H8958□□
	Power source (CN3)	Applicable housing:5195-03 Applicable contact:5194PBT	
	Stepping motor (CN2)	Applicable housing:5195-05 Applicable contact:5194PBT	

● Connector cable

Model number	Application
PM-C10S0100-03	Connector cable for I/O signals (CN1)
PM-C05M0100-□□	Connector cable for stepping motors (CN2)
PM-C03P0100-01	Connector cable for AC power source (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.

Applicable connector cable		
CN1	CN2	CN3
Cable 2	Cable 3 or 4	Cable 1

PMM-BA-5604-1

● Terminal block cover

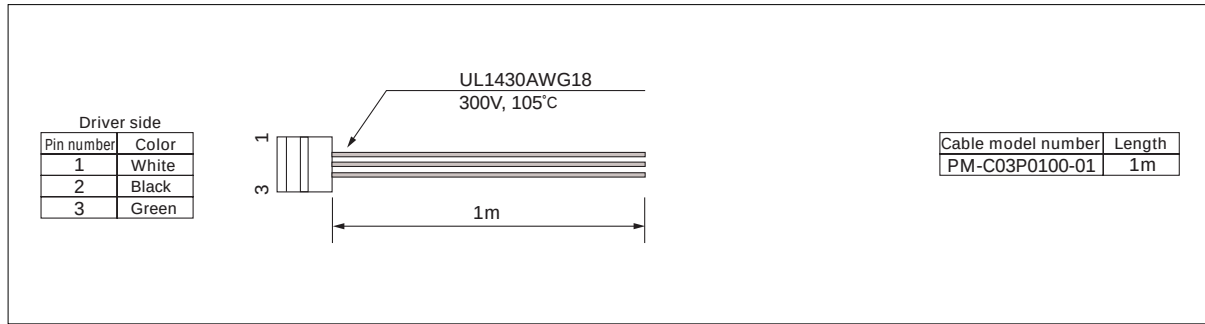
Model number	Quantity
PM-AP-020	One

Stepping motor cable model number (Supplement table 1)

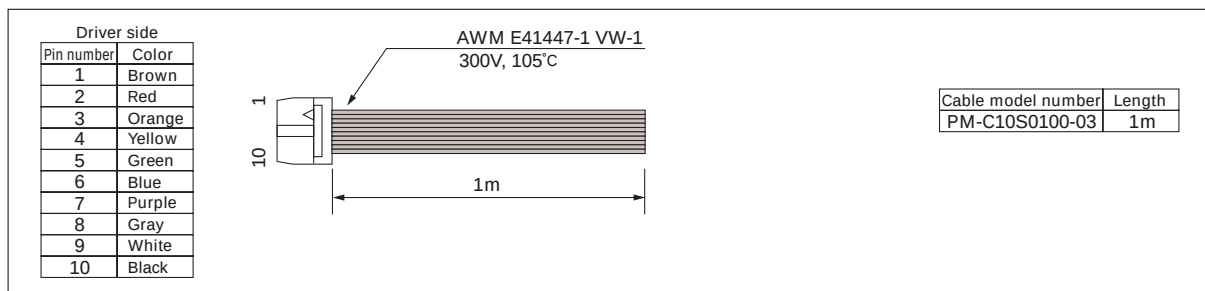
Serial No.	Stepping motor model number
05	103H6500-80 □□
	103H6501-80 □□
	103H7521-80 □□
	103H7522-80 □□
	103H7523-80 □□
	103H8581-80 □□
	103H8582-80 □□
	103H8583-80 □□
	103H89582-80 □□
	103H89583-80 □□
06	103H7851-80 □□
	103H7852-80 □□
	103H7853-80 □□

Option

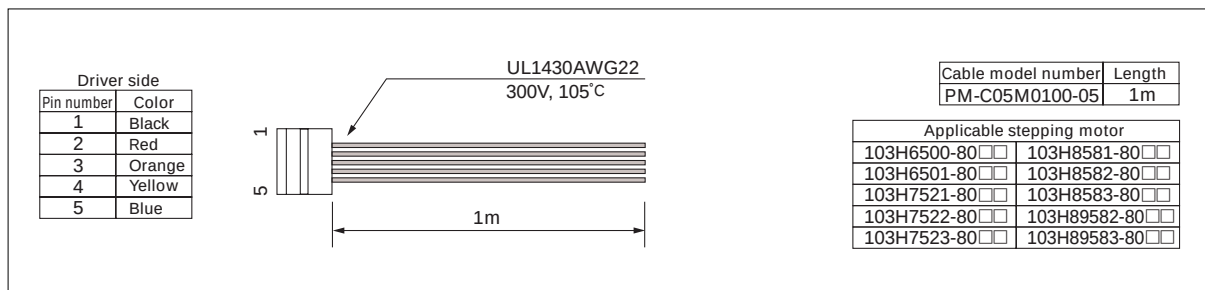
● Cable 1 (power source cable CN3)



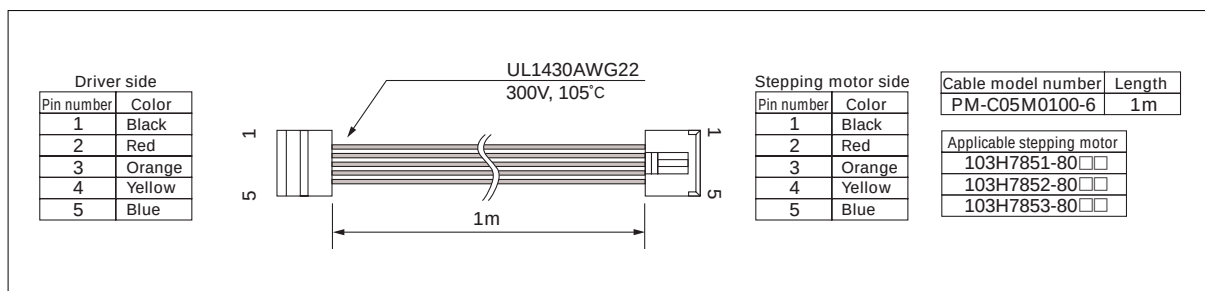
● Cable 2 (I/O signal cable CN1)



● Cable 3 (stepping motor extension cable 1 CN2)



● Cable 4 (stepping motor extension cable 2 CN2)





The 5-Phase Stepping Driver

PMDPB1S6P01

DC24V

Full-step/half-step

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

● Applicable motors



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.
	Weight		0.4kg
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

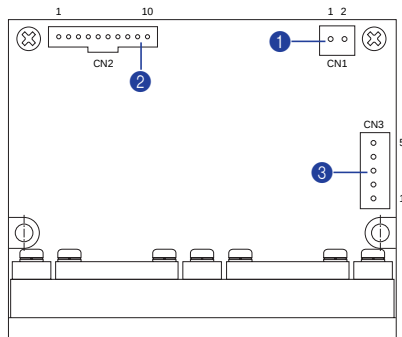
Standard combined stepping motor

Stepping motor dimensions	Stepping motor model number		Holding torque [N·m]	Rotor inertia [$\times 10^{-4}$ kg·m ²]	Weight [kg]	Page
	Single-axis shaft	Dual-axis shaft				
□50mm	103H6500-8041	103H6500-8011	0.225	0.057	0.38	Page 313
	103H6501-8041	103H6501-8011	0.39	0.105	0.44	
ø60mm	103H7521-8051	103H7521-8021	0.46	0.148	0.51	Page 317
	103H7522-8051	103H7522-8021	0.735	0.18	0.6	
	103H7523-8051	103H7523-8021	1.568	0.423	1.1	
□60mm	103H7851-8051	103H7851-8021	0.65	0.275	0.6	Page 315
	103H7852-8051	103H7852-8021	0.98	0.4	0.78	
	103H7853-8051	103H7853-8021	1.86	0.84	1.36	
ø86mm	103H8581-8041	103H8581-8011	2.06	1.45	1.5	Page 319
	103H8582-8041	103H8582-8011	4.02	2.9	2.5	
	103H8583-8041	103H8583-8011	6.17	4.4	3.5	

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

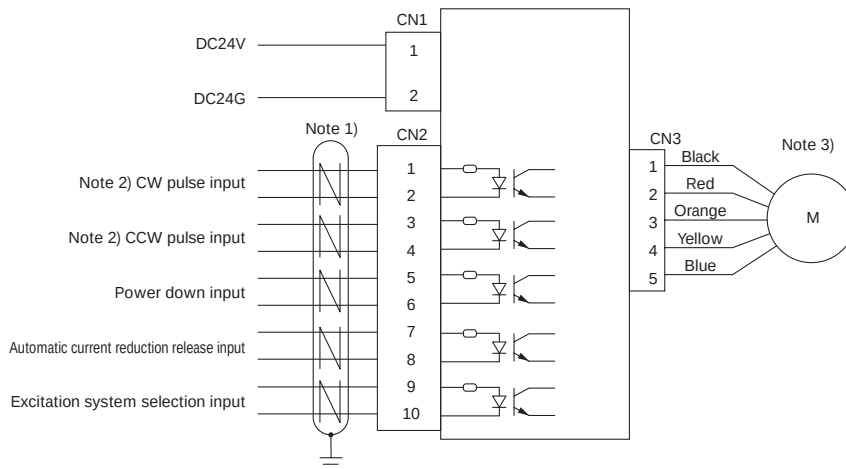
Operation, connection, and function

● 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 "double input system (CW and CCW)" to "single input system (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+	1	Drive pulse for the CW direction rotation is input.
	CW-	2	
CCW pulse input	CCW+	3	Drive pulse for the CCW direction rotation is input.
	CCW-	4	
Power down input	PD+	5	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
	PD-	6	
Auto current down release input	ACD+	7	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 enabled ACD input signal OFF (internal photocoupler OFF) ... ACD function disabled
	ACD-	8	
Energization system selection input	EX+	9	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
	EX-	10	

- 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).

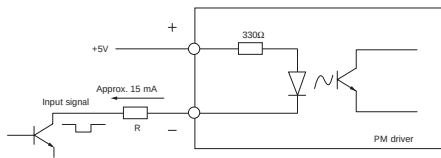
● Connectors to be used

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).

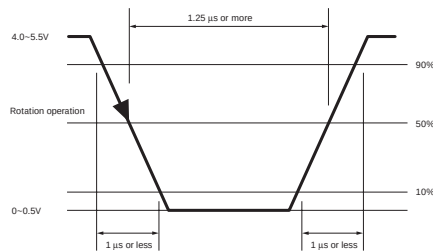
Operation, connection, and function

● Input circuit configuration (CW and CCW)

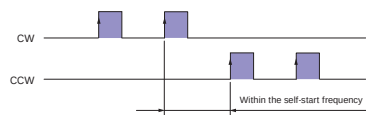


- Pulse duty is 50 % or less.
- When the peak value of the input signal is 5V, the external limit resistance R is 0 Ω . If the peak value exceeds 5V, set the input current to approx. 15mA using the external limit resistance R.

Input signal specifications

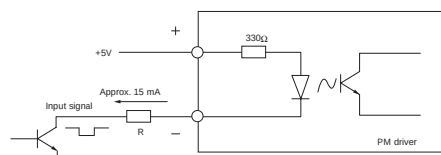


Timing of the command pulse



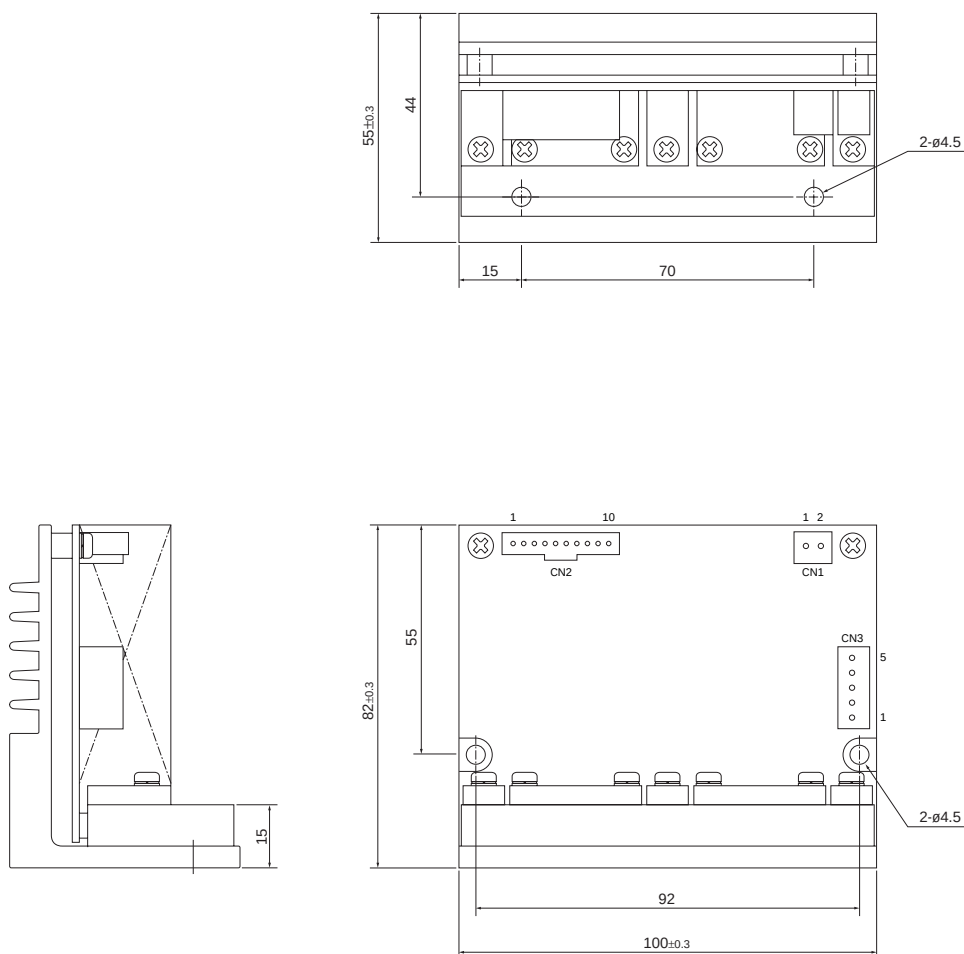
- The internal photocoupler turns ON at the leading edge of the photocoupler "ON".
- When applying the pulse to CW, set the internal photocoupler on the CCW side to "OFF".
- When applying the pulse to CCW, set the internal photocoupler on the CW side to "OFF".

● Input circuit configuration (PD, ACD, and EX)



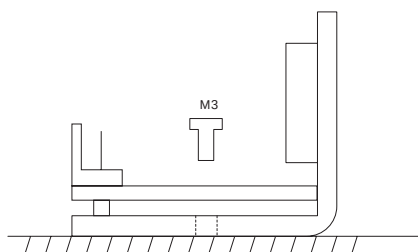
- When the peak value of the input signal is 5V, the external limit resistance R is 0 Ω . If the peak value exceeds 5V, set the input current to approx. 15mA using the external limit resistance R.

Dimensions (Unit: mm)



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 ($\phi 4$) on the bottom surface of PM driver (no fitting metals are necessary).



PMPA1S6A01

PMPA1S6B01

PMM-MA-50034

PMM-MA-50064

PMM-BA-5603-5643

PMM-BA-5604-5644

PMDP1S6P01

PMDPC1S3P01

PMM-MD-53030-53031

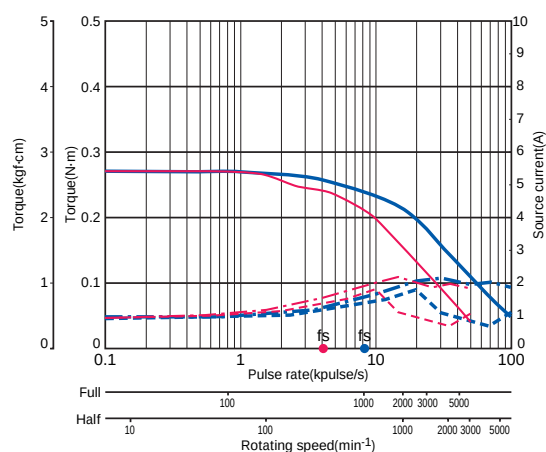
PMM-BD-53130-53131

PMDPA1A3P20

PMDPA1C3P20

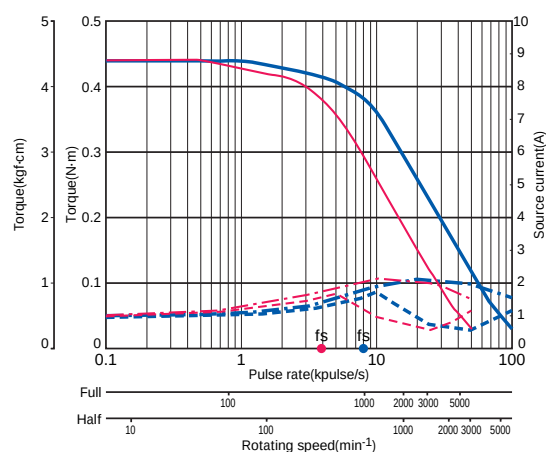
Pulse rate-torque characteristics/pulse rate-source current characteristics

●103H6500-80 □□:24V



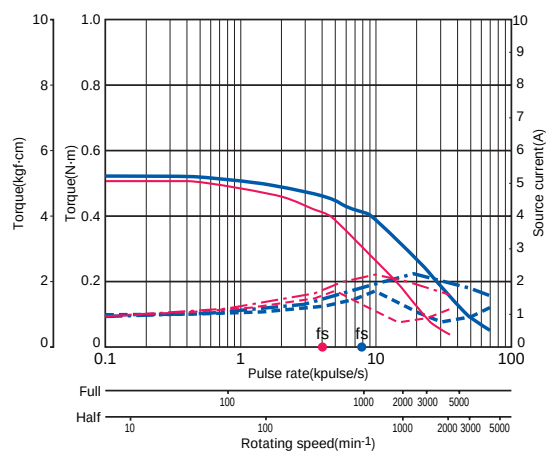
Source voltage: AC24V-Winding current: 1.5 A/phase
 — Getaway torque ($J_L=0.94 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current ($T_L=\text{MAX}$) - - - Source current ($T_L=0$)
 fs: Maximum self-start frequency when not loaded ■ Full step ■ Half step

●103H6501-80 □□:24V



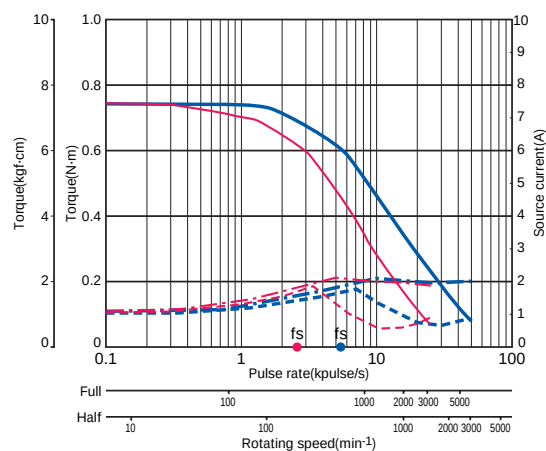
Source voltage: AC24V-Winding current: 1.5 A/phase
 — Getaway torque ($J_L=0.94 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current ($T_L=\text{MAX}$) - - - Source current ($T_L=0$)
 fs: Maximum self-start frequency when not loaded ■ Full step ■ Half step

●103H7521-80 □□:24V



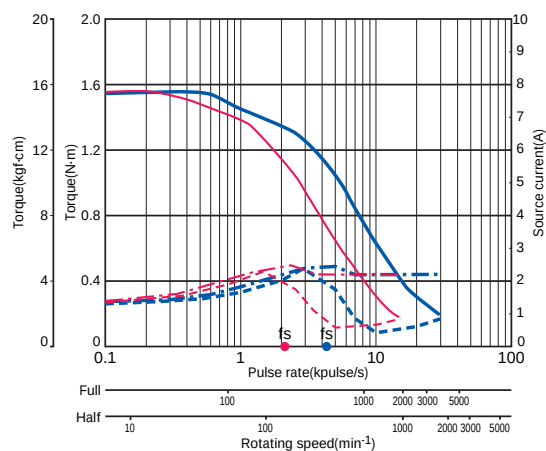
Source voltage: AC24V-Winding current: 1.5 A/phase
 — Getaway torque ($J_L=0.94 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current ($T_L=\text{MAX}$) - - - Source current ($T_L=0$)
 fs: Maximum self-start frequency when not loaded ■ Full step ■ Half step

●103H7522-80 □□:24V



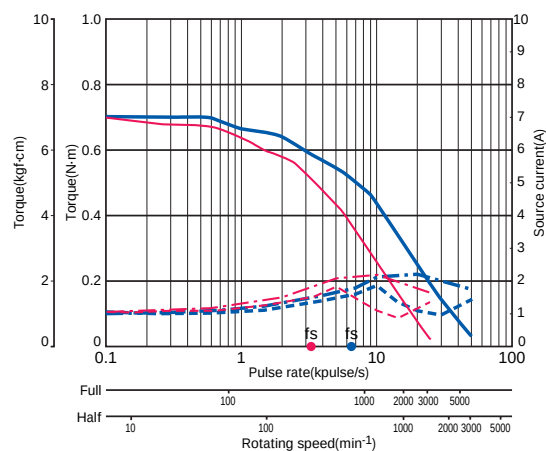
Source voltage: AC24V-Winding current: 1.5 A/phase
 — Getaway torque ($J_L=2.6 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current ($T_L=\text{MAX}$) - - - Source current ($T_L=0$)
 fs: Maximum self-start frequency when not loaded ■ Full step ■ Half step

●103H7523-80 □□:24V



Source voltage: AC24V-Winding current: 1.5 A/phase
 — Getaway torque ($J_L=7.4 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current ($T_L=\text{MAX}$) - - - Source current ($T_L=0$)
 fs: Maximum self-start frequency when not loaded ■ Full step ■ Half step

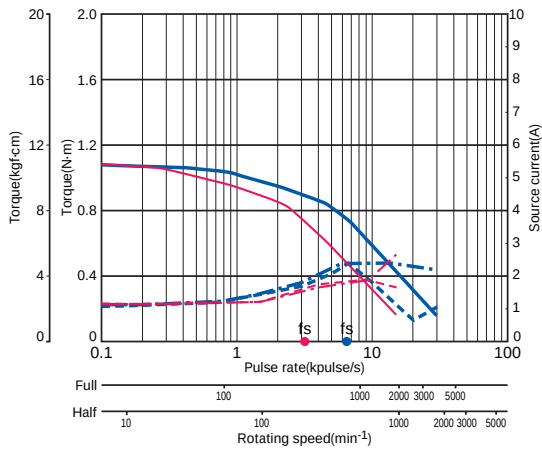
●103H7851-80 □□:24V



Source voltage: AC24V-Winding current: 1.5 A/phase
 — Getaway torque ($J_L=0.94 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current ($T_L=\text{MAX}$) - - - Source current ($T_L=0$)
 fs: Maximum self-start frequency when not loaded ■ Full step ■ Half step

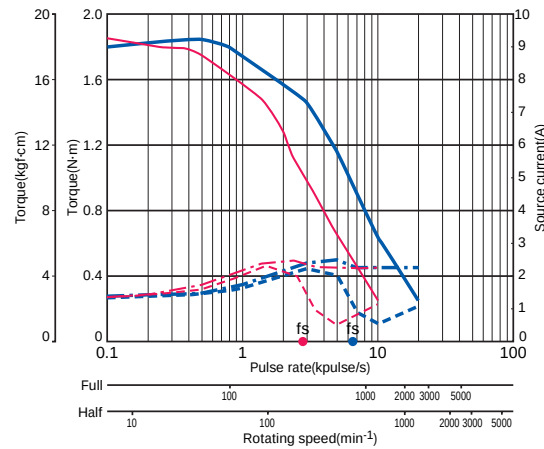
Pulse rate-torque characteristics/pulse rate-source current characteristics

●103H7852-80 □□ :24V



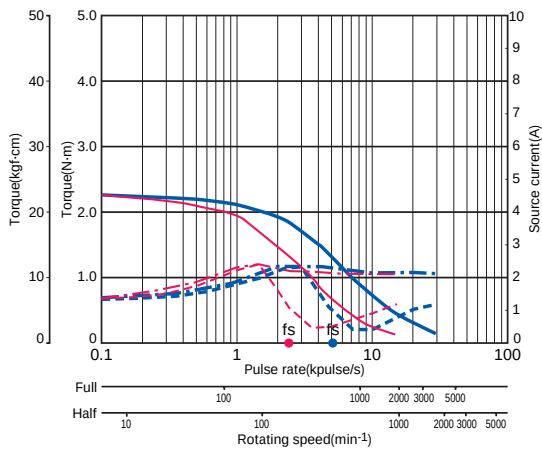
Source voltage:AC24V-Winding current: 1.5 A/phase
 — Getaway torque($J_L1=2.6 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=MAX$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ Full step ■ Half step

●103H7853-80 □□ :24V



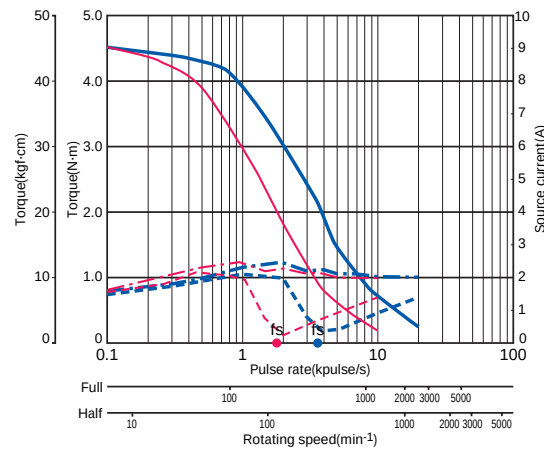
Source voltage:AC24V-Winding current: 1.5 A/phase
 — Getaway torque($J_L1=7.4 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=MAX$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ Full step ■ Half step

●103H8581-80 □□ :24V



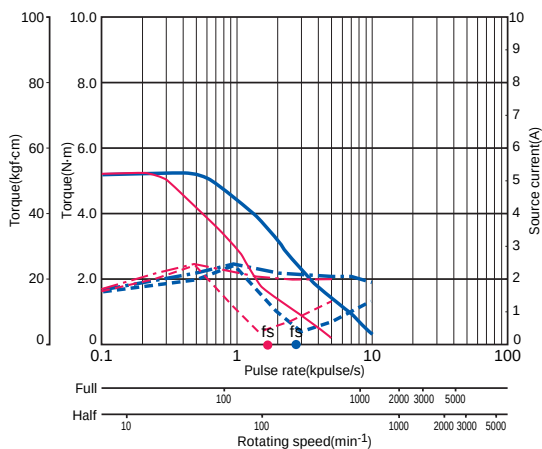
Source voltage:AC24V-Winding current: 1.5 A/phase
 — Getaway torque($J_L1=7.4 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=MAX$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ Full step ■ Half step

●103H8582-80 □□ :24V



Source voltage:AC24V-Winding current: 1.5 A/phase
 — Getaway torque($J_L1=15.1 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=MAX$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ Full step ■ Half step

●103H8583-80 □□ :24V



Source voltage:AC24V-Winding current: 1.5 A/phase
 — Getaway torque($J_L1=44 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=MAX$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ Full step ■ Half step

PMAP1S6A01

PMAP1S6B01

PMM-MA-50034

PMM-MA-50064

PMM-BA-5603

PMM-BA-5604

PMDPB1S6P01

PMDPC1S3P01

PMM-MD-53030

PMM-BD-53130

PMDPA1A3P20

PMDPA1C3P20

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-21TP1.1	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).

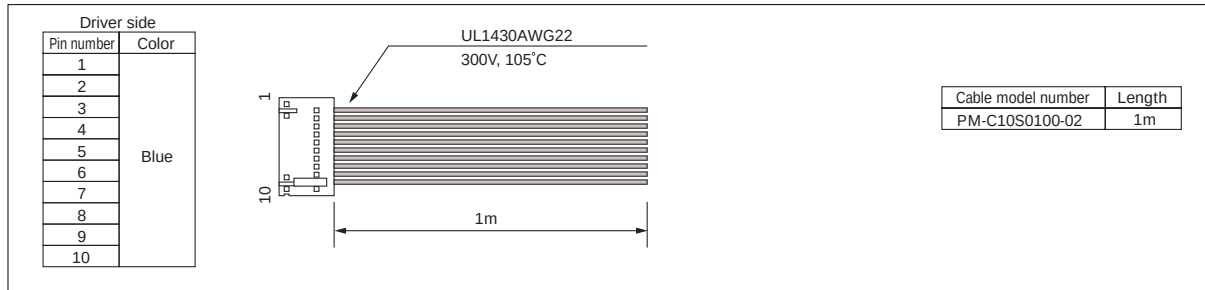
- The connector cable is a 1-meter cable assembled with the connector.

Stepping motor cable model number (Supplement table 1)

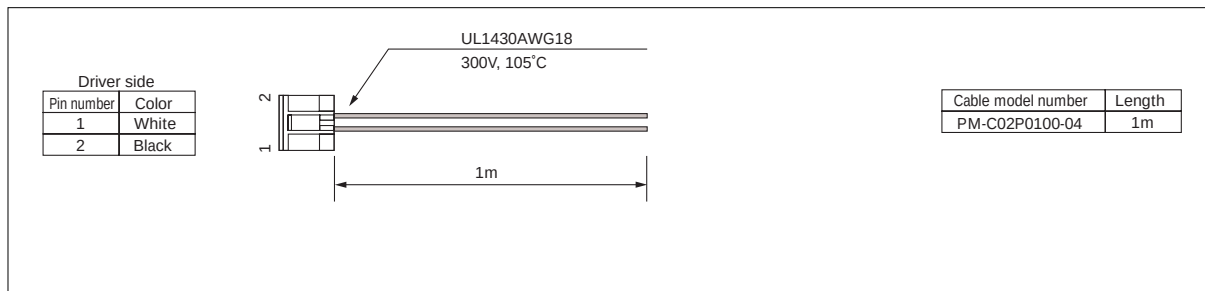
Serial No.	Stepping motor model number
02	103H6500-80 □□
	103H6501-80 □□
	103H7521-80 □□
	103H7522-80 □□
	103H7523-80 □□
	103H8581-80 □□
	103H8582-80 □□
	103H8583-80 □□
08	103H7851-80 □□
	103H7852-80 □□
	103H7853-80 □□

Option

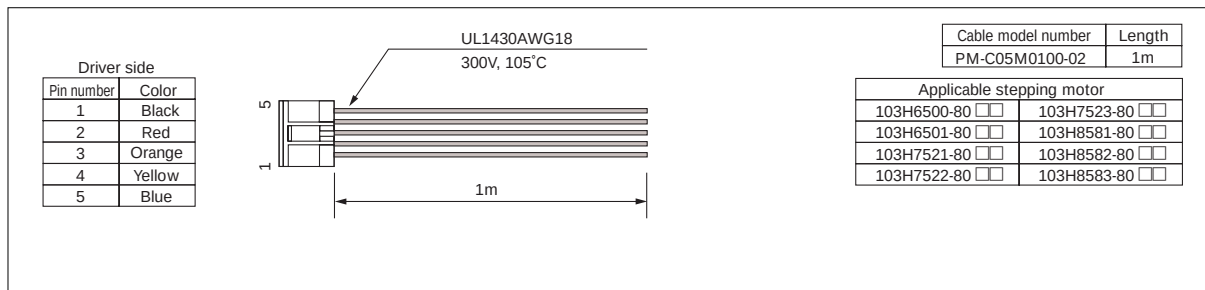
● Cable 1 (I/O signal cable 1)



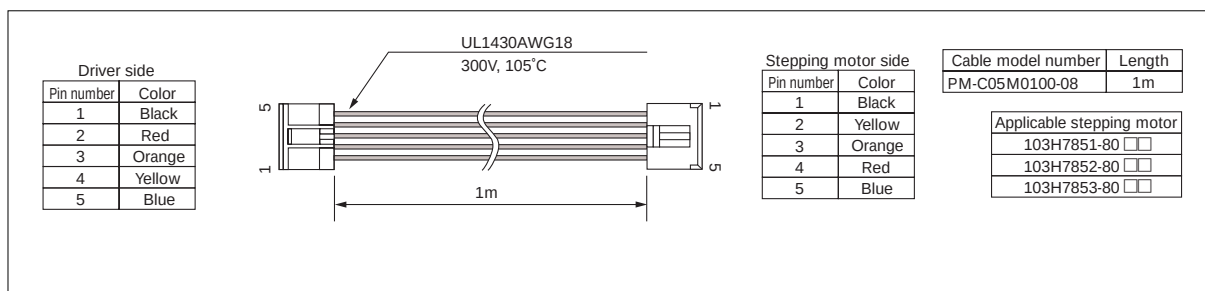
● Cable 2 (power source cable 1)

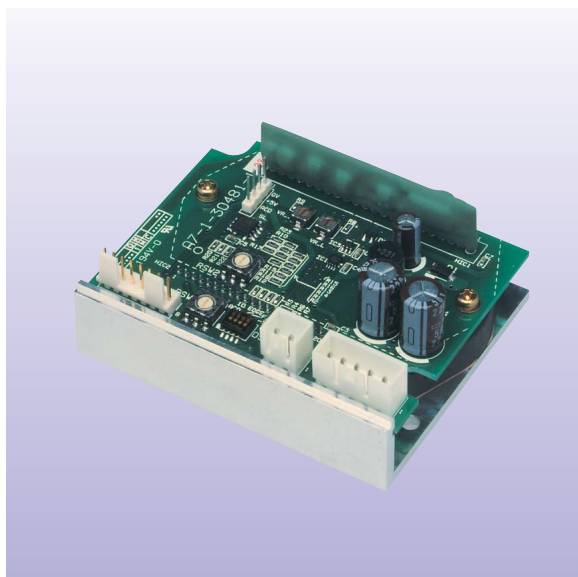


● Cable 3 (stepping motor extension cable 1)



● Cable 4 (stepping motor extension cable 2)





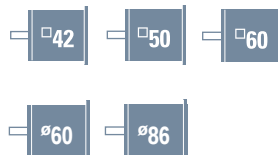
The 5-Phase Stepping Driver

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 single or double input system can be selected by using dipswitches.

● 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.
	Weight	0.12kg	
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	

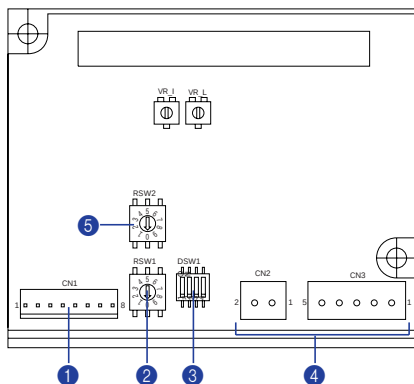
Standard combined stepping motor

Stepping motor dimensions	Stepping motor model number		Holding torque [N·m]	Rotor inertia [$\times 10^{-4}$ kg·m ²]	Weight [kg]	Page
	Single-axis shaft	Dual-axis shaft				
□42mm	103H5508-7040	103H5508-7010	0.176	0.053	0.28	page
	103H5510-7040	103H5510-7010	0.255	0.065	0.37	311
□50mm	103H6500-7041	103H6500-7011	0.235	0.057	0.38	page
	103H6501-7041	103H6501-7011	0.39	0.105	0.44	313
ø60mm	103H7521-7051	103H7521-7021	0.46	0.148	0.51	page
	103H7522-7051	103H7522-7021	0.735	0.18	0.6	317
	103H7523-7051	103H7523-7021	1.568	0.423	1.1	
□60mm	103H7851-7051	103H7851-7021	0.65	0.275	0.6	page
	103H7852-7051	103H7852-7021	0.98	0.4	0.78	315
	103H7853-7051	103H7853-7021	1.86	0.84	1.36	
ø86mm	103H8581-7041	103H8581-7011	2.06	1.45	1.5	page
	103H8582-7041	103H8582-7011	4.02	2.9	2.5	319
	103H8583-7041	103H8583-7011	6.17	4.4	3.5	

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

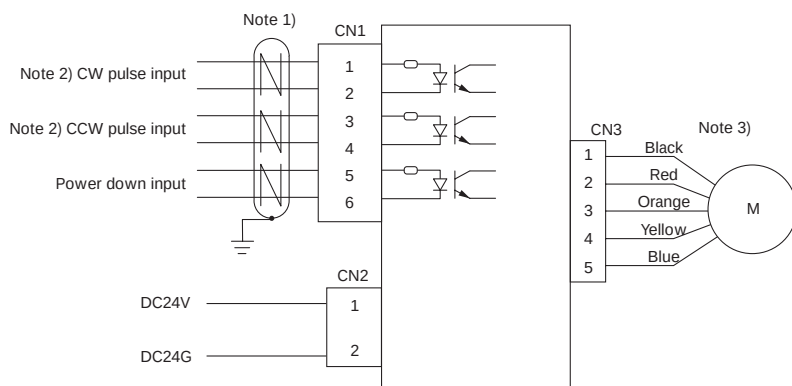
Operation, connection, and function

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.
- 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.

External wiring diagram



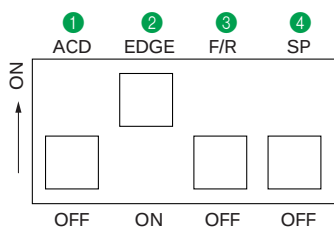
Note 1) Use shielded twisted-pair cables.

Note 2) Either "double input system (CW and CCW)" or "single input system (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



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

ACD	Automatic current reduction
ON	Does not operate.
OFF	Operates.

- 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	Single input system (CK + U/D)
OFF	Double input system (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.

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 double input system
	CW-	2	Drive pulse for the CW direction rotation is input.
Pulse column input	CK+	1	When using single input system
	CK-	2	Drive pulse train for the stepping motor rotation is input.
CCW pulse input	CCW+	3	When using double input system
	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 single input system.
	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).

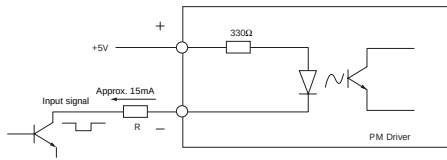
● Connectors to be used

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 211).

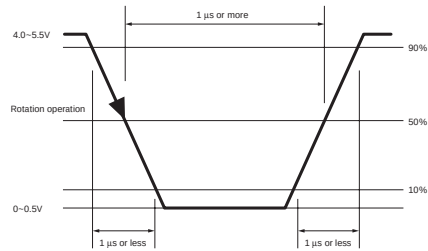
Operation, connection, and function

● 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.

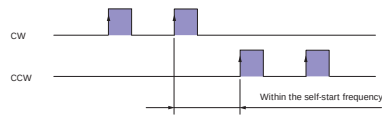
Input signal specifications



- Pulse duty is 50% or less.

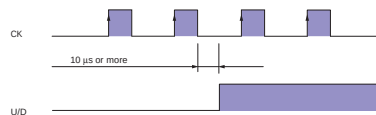
Timing of the command pulse

• Double input system (CW and CCW)



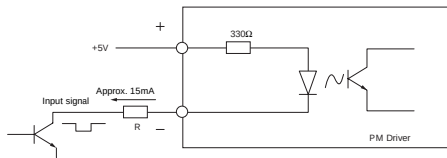
- The internal photocoupler turns ON at [blue square], and the internal circuit (stepping motor) operates at the leading edge of the photocoupler "ON".
- When applying no pulse, fix the internal photocoupler to "ON" or "OFF".

• Single input system (CK and U/D)



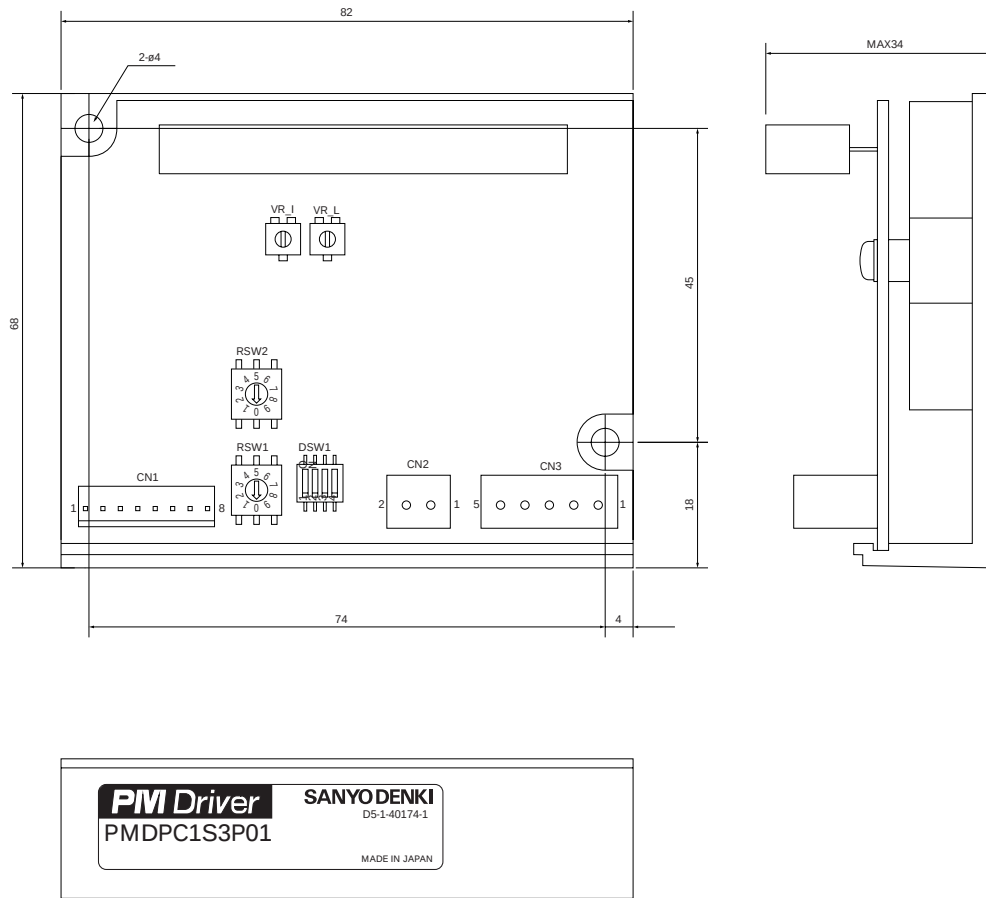
- The internal photocoupler turns ON at [blue square], and the internal circuit (stepping motor) operates at the leading edge of the photocoupler "ON".
- Perform the U/D input signal switchover when the CK-side internal photocoupler is set to "OFF".

● Input circuit configuration (PD)

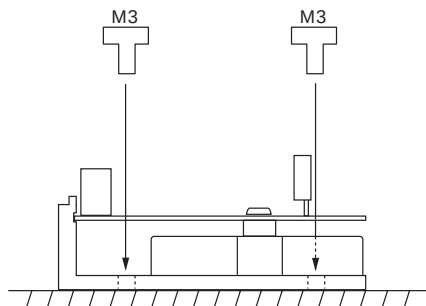


- When the peak value of the input signal is 5V, the external limit resistance R is 0 Ω. If the peak value exceeds 5V, set the input current to approx. 15mA using the external limit resistance R.

Dimensions (Unit: mm)



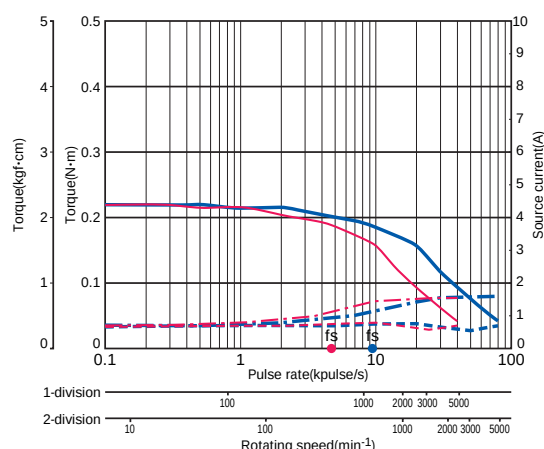
Installation direction and position



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

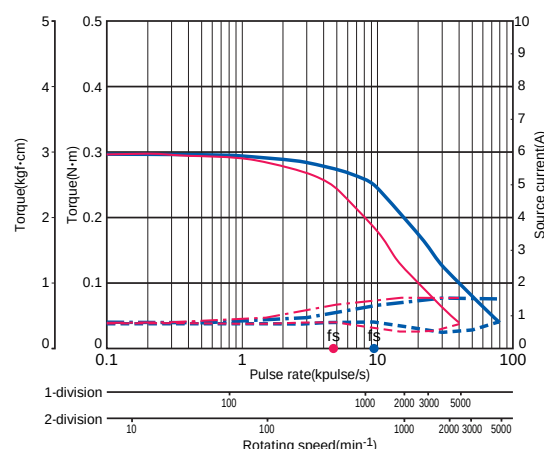
Pulse rate-torque characteristics/pulse rate-source current characteristics

●103H5508-70 □□ :24V



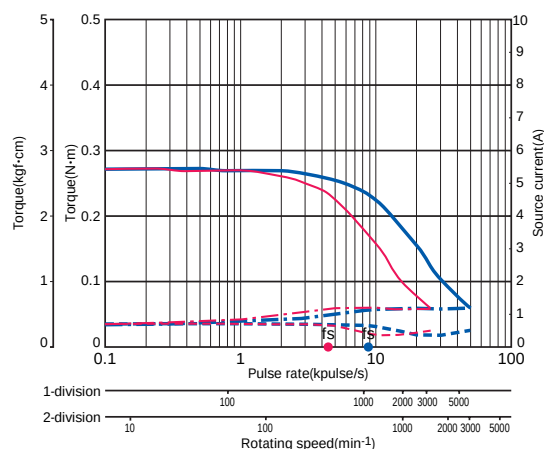
Source voltage:DC24V-Winding current: 0.75 A/phase
 — Getaway torque($JL1=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L = \text{MAX}$) - - - Source current($T_L = 0$)
 fs: Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103H5510-70 □□ :24V



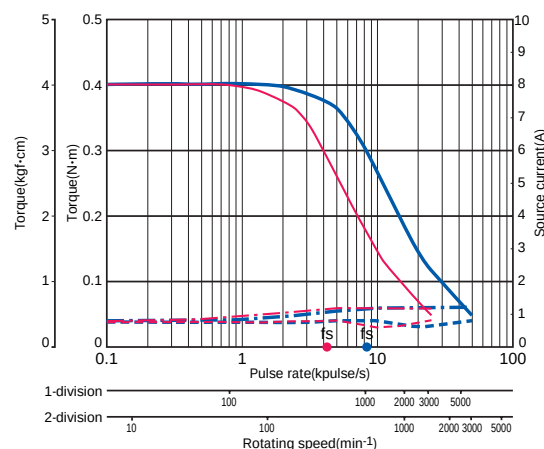
Source voltage:DC24V-Winding current: 0.75 A/phase
 — Getaway torque($JL1=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L = \text{MAX}$) - - - Source current($T_L = 0$)
 fs: Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103H6500-70 □□ :24V



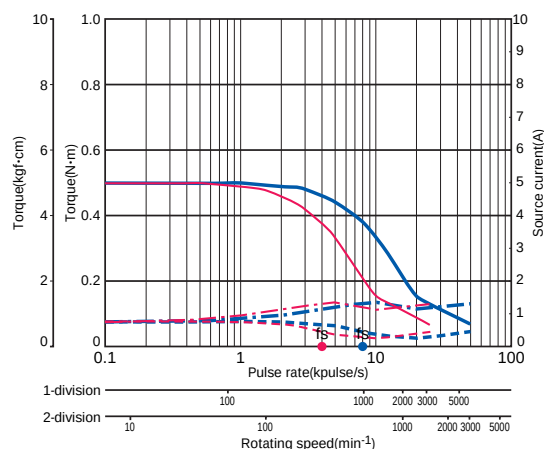
Source voltage:DC24V-Winding current: 0.75 A/phase
 — Getaway torque($JL1=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L = \text{MAX}$) - - - Source current($T_L = 0$)
 fs: Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103H6501-70 □□ :24V



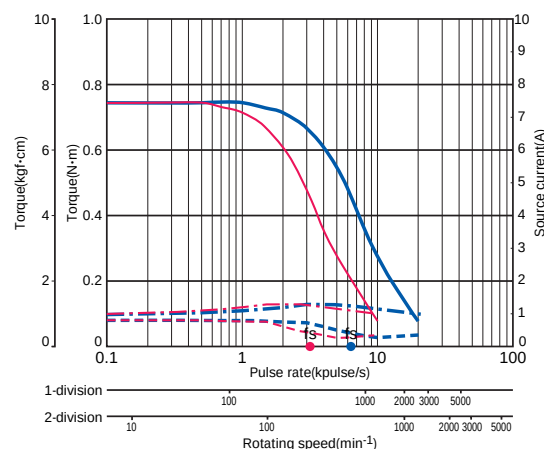
Source voltage:DC24V-Winding current: 0.75 A/phase
 — Getaway torque($JL1=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L = \text{MAX}$) - - - Source current($T_L = 0$)
 fs: Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103H7521-70 □□ :24V



Source voltage:DC24V-Winding current: 0.75 A/phase
 — Getaway torque($JL1=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L = \text{MAX}$) - - - Source current($T_L = 0$)
 fs: Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

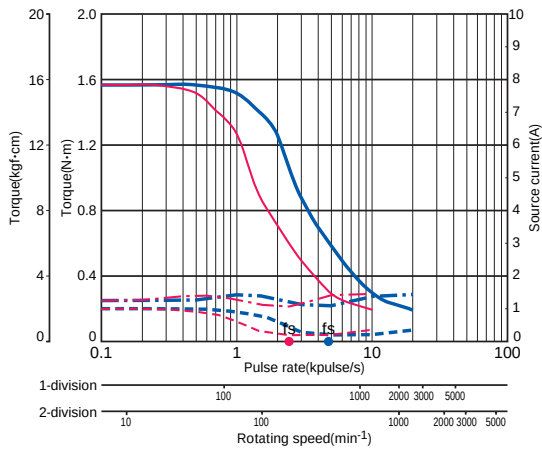
●103H7522-70 □□ :24V



Source voltage:DC24V-Winding current: 0.75 A/phase
 — Getaway torque($JL1=2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L = \text{MAX}$) - - - Source current($T_L = 0$)
 fs: Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

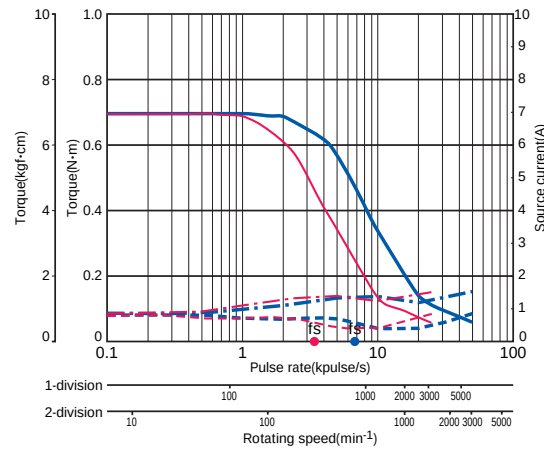
Pulse rate-torque characteristics/pulse rate-source current characteristics

103H7523-70 □□ :24V



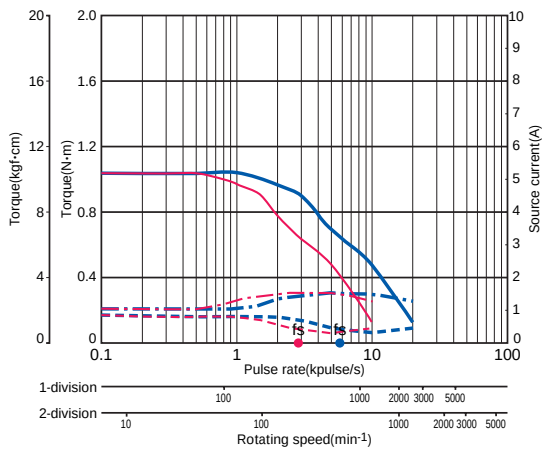
Source voltage:DC24V·Winding current: 0.75 A/phase
 — Getaway torque($J_L=7.4 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

103H7851-70 □□ :24V



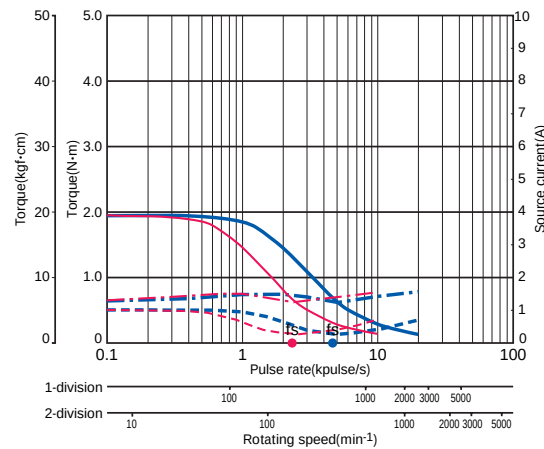
Source voltage:DC24V·Winding current: 0.75 A/phase
 — Getaway torque($J_L=0.94 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

103H7852-70 □□ :24V



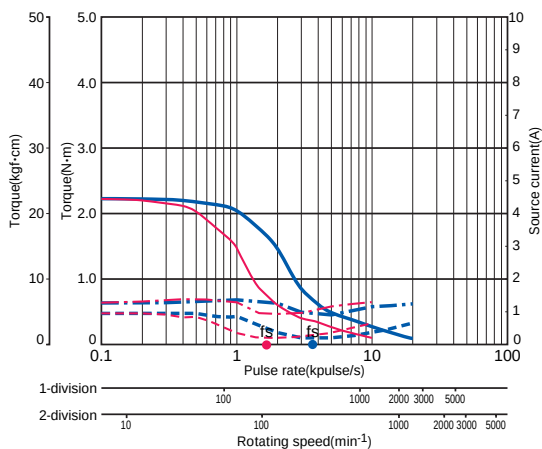
Source voltage:DC24V·Winding current: 0.75 A/phase
 — Getaway torque($J_L=2.6 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

103H7853-70 □□ :24V



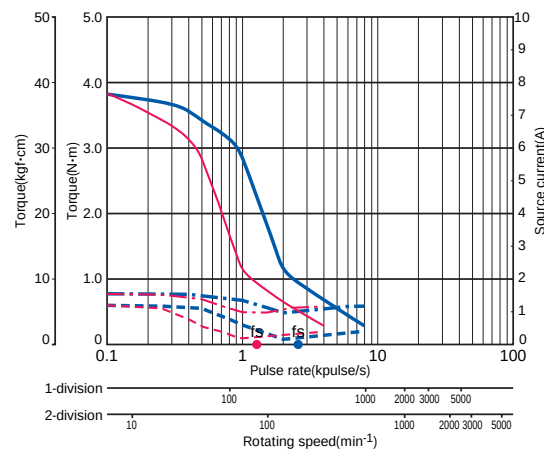
Source voltage:DC24V·Winding current: 0.75 A/phase
 — Getaway torque($J_L=7.4 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

103H8581-70 □□ :24V



Source voltage:DC24V·Winding current: 0.75 A/phase
 — Getaway torque($J_L=7.4 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

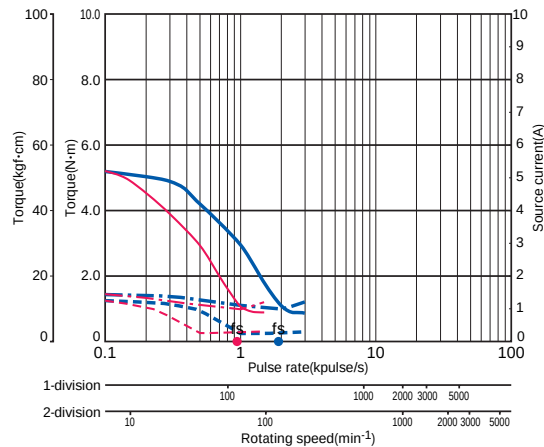
103H8582-70 □□ :24V



Source voltage:DC24V·Winding current: 0.75 A/phase
 — Getaway torque($J_L=15.1 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

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

●103H8583-70 □□ :24V



Source voltage:DC24V·Winding current: 0.75 A/phase

— Getaway torque($J_L=44 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)

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

fs:Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

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	



The 5-Phase Stepping Driver

PMM-MD-53030-10

PMM-MD-53031-10

DC 24 V/36 V

Micro-step (500 x 1 to 250 divisions)

● Applicable motors



Characteristics

● Micro-step function available

Smooth operation without vibration at low speeds can be realized.

● Flexible

Various stepping motors of small to large capacities can be driven without adjustment for wide range uses.

● Downsizing

Dedicated HIC is mounted to improve parts consolidation and reliability.

● The 2-type interface circuit specifications

PM drivers can be selected according to the controller in use:

Photocoupler input type : PMM-MD-53030-10

C-MOS input type : PMM-MD-53031-10

Built-in function

● Step angle setting function

Sixteen resolutions ranging from 1- to 250-division can be set for the basic step angle of stepping motor by using the rotary switch.

● Step angle selection function

The 2-type micro-step resolutions can be selected using the external input signal.

● Pulse input system selection function

Either single or double input system can be selected by using dipswitches.

● Power down function

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

PM driver specifications

Item		PMM-MD-53030-10	PMM-MD-53031-10
Basic specifications	Input source	For main power source	DC24V/36V±10%
		For control power source	-
	Source current	For main power source	3A
		For control power source	-
	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 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.
	Weight		0.25kg
Function	Selection function		Automatic current reduction, pulse input system, step angle, and power source specifications
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
	Step angle 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
	Phase origin monitor output signal		Open collector output by photocoupler (turns ON at the phase origin) Output standard Vceo: Maximum 30 V, Ic: Maximum 5 mA

Standard combined stepping motor

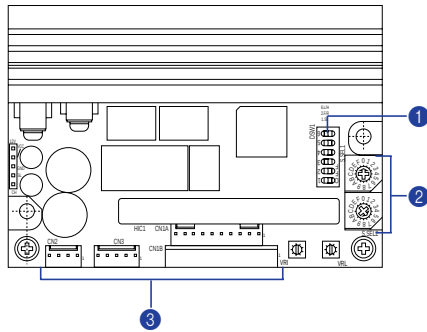
Stepping motor dimensions	Stepping motor model number		Holding torque [N·m]	Rotor inertia [×10 ⁻⁴ kg·m ²]	Weight [kg]	Page
	Single-axis shaft	Dual-axis shaft				
□28mm	103H3505-7040	103H3505-7010	0.026	0.009	0.11	Page 309
	103H3515-7040	103H3515-7010	0.052	0.016	0.2	
□42mm	103H5505-7040	103H5505-7010	0.127	0.03	0.23	Page 311
	103H5508-7040	103H5508-7010	0.176	0.053	0.28	
	103H5510-7040	103H5510-7010	0.255	0.065	0.37	
□50mm	103H6500-7041	103H6500-7011	0.235	0.057	0.38	Page 313
	103H6501-7041	103H6501-7011	0.39	0.105	0.44	
□60mm	103H7851-7051	103H7851-7021	0.65	0.275	0.6	Page 315
	103H7852-7051	103H7852-7021	0.98	0.4	0.78	
	103H7853-7051	103H7853-7021	1.86	0.84	1.36	
ø60mm	103H7521-7051	103H7521-7021	0.46	0.148	0.51	Page 317
	103H7522-7051	103H7522-7021	0.735	0.18	0.6	
	103H7523-7051	103H7523-7021	1.568	0.423	1.1	
ø86mm	103H8581-7041	103H8581-7011	2.06	1.45	1.5	Page 319
	103H8582-7041	103H8582-7011	4.02	2.9	2.5	
	103H8583-7041	103H8583-7011	6.17	4.4	3.5	

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

Operation, connection, and function

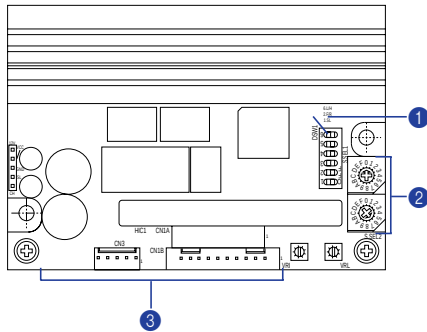
● Each section name of the PM driver

PMM-MD-53030-10 (photo coupler input system)



- ① Function selection dipswitches (SL, F/R, and L/H)
..... Functions can be selected according to specifications.
- ② Step angle selection rotary switch (S. SEL1 and S. SEL2)
..... The basic step angle of stepping motor can be divided to maximum 250 divisions.
- ③ Connector (CN1A, CN2 and CN3)
..... Connects the I/O signal, the DC power source, and the stepping motor power cable.

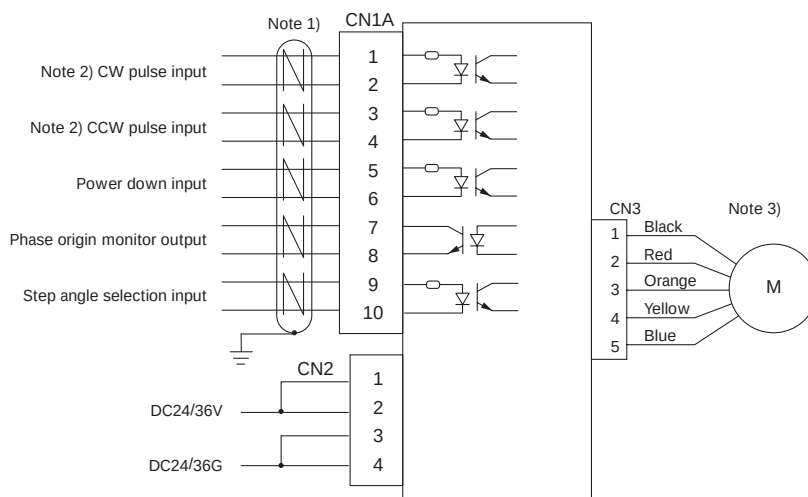
PMM-MD-53031-10 (CMOS input system)



- ① Function selection dipswitches (SL, F/R, and L/H)
..... Functions can be selected according to specifications.
- ② Step angle selection rotary switch (S. SEL1 and S. SEL2)
..... The basic step angle of stepping motor can be divided to maximum 250 divisions.
- ③ Connector (CN1B and CN3)
..... Connects the I/O signal, the DC power source, and the stepping motor power cable.

● External wiring diagram

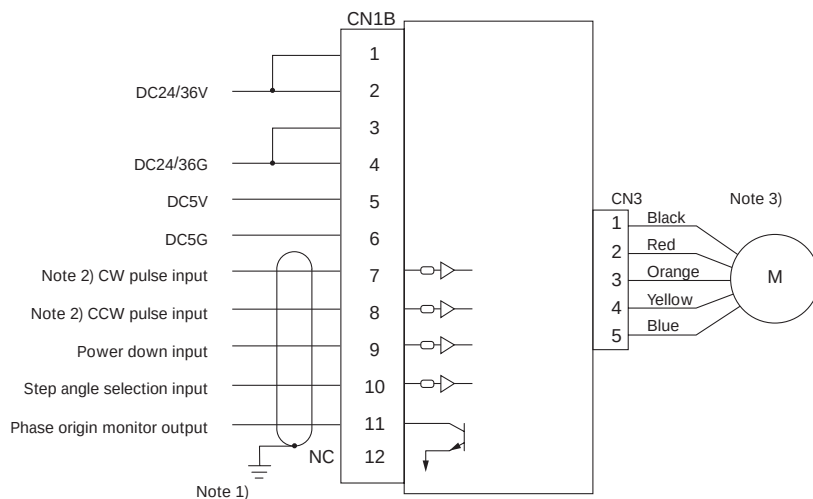
PMM-MD-53030-10 (photo coupler input system)



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

Operation, connection, and function

PMM-MD-53031-10 (CMOS input system)



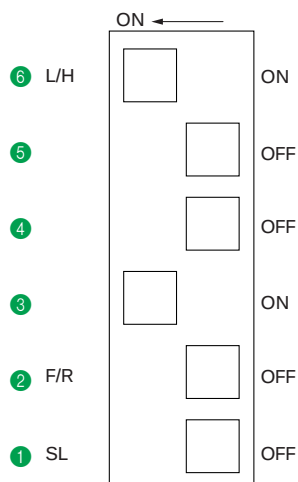
Note 1) Use a shielded cable.

Note 2) Either "double input system (CW and CCW)" or "single input system (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 103H35 □ 5 or 103H785 □ type stepping motor:

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

● Function selection dipswitch ①



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

SL	Automatic current reduction
ON	Operates.
OFF	Does not operate.

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

F/R	Pulse input system
ON	Single input system (CK and U/D)
OFF	Double input system (CW and CCW)

③ ④ ⑤ Do not change the third, fourth, and fifth dipswitch settings (Note).

⑥ L/H (power specification selection)
The specification is changed from DC 24 V to DC 36 V.

L/H	Power specification
ON	DC 24 V specified
OFF	DC 36 V specified

- The function selection dipswitches specifications are common for PMM-MD-53030-10 and PMM-MD-53031-10.
- 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 (S. SEL1 and S. SEL2) ---②

Operation current value of stepping motor can be selected.

Scale	0	1	2	3	4	5	6	7
Number of divisions	1	2	2.5	4	5	8	10	20
Scale	8	9	A	B	C	D	E	F
Number of divisions	25	40	50	80	100	125	200	250

- "0" and "6" are set for S. SEL1 and S. SEL2 at the shipment, respectively.

● I/O signal function ---③

Signal name (Abbreviation)	Pin number(CN1)		Function
	Photo coupler input system	CMOS input system	
Pulse input (CW)	1	7	When using double input system
	2		Drive pulse for the CW direction rotation is input.
Pulse column input (CK)	1	7	When using single input system
	2		Drive pulse train for the stepping motor rotation is input.
Pulse input (CCW)	3	8	When using double input system
	4		Drive pulse for the CCW direction rotation is input.
Rotation direction input (U/D)	3	8	The rotation direction signal of stepping motor is input for the single input system.
	4		Internal photocoupler ON ("H" level for the C-MOS type) CW direction Internal photocoupler OFF ("L" level for the C-MOS type) CCW direction
Power down input (PD)	5	9	Inputting the PD signal cuts OFF the current flowing through the stepping motor (turns OFF the power).
	6		PC type: Internal photocoupler (ON) PD function enabled C-MOS type: "L" level input PD function enabled
Step angle selection input (S.SEL)	9	10	Resolution setting function (S. SEL1 and S. SEL2) can be selected by the S. SEL input signal.
	10		Internal photocoupler ON ("H" level for the C-MOS type) S. SEL1 setting enabled Internal photocoupler OFF ("L" level for the C-MOS type) S. SEL2 setting enabled
Phase origin monitor output (MON)	7	11	It is turned ON when the excitation phase is at the origin (in the state when the power is turned ON)
	8		It is turned ON once per 10 pulses during the full-step. It is turned ON once per 20 pulses during the half-step.

- The PC type and the C-MOS type in the table indicate "PMM-MD-53030-10" and "PMM-MD-53031-10", respectively.
- 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

PMM-MD-53030-10 (Photo coupler input system)

PM driver side		Applicable connector model number	Manufacturer
Used for	Model number		
I/O signals (CN1)	5045-10AG	Applicable housing:5051-10 Applicable contact:2759PBGL	Molex Japan
DC power source (CN2)	5045-04A	Applicable housing:5051-04 Applicable contact:5159PBTL	Molex Japan
Stepping motor (CN3)	5045-05A	Applicable housing:5051-05 Applicable contact:5159PBTL	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 288).

PMM-MD-53031-10 (CMOS input system)

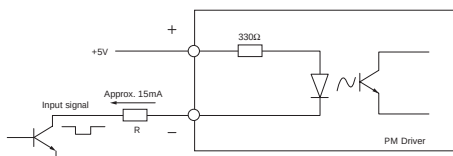
PM driver side		Applicable connector model number	Manufacturer
Used for	Model number		
I/O signal and DC power source (CN1B)	5045-12AG	Applicable housing:5051-12 Applicable contact:2759PBGL	Molex Japan
Stepping motor (CN3)	5045-05A	Applicable housing:5051-05 Applicable contact:5159PBTL	Molex Japan

- 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 289).

Operation, connection, and function

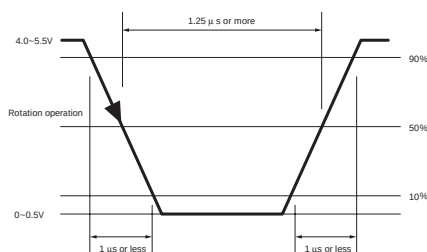
PMM-MD-53030-10 (Photo coupler input system)

● Input circuit configuration (CW and CCW)



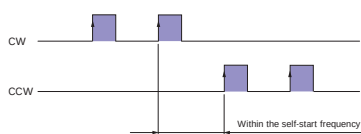
- Pulse duty is 50% or less.
- When the peak value of the input signal is 5V, the external limit resistance R is 0 Ω. If the peak value exceeds 5V, set the input current to approx. 15mA using the external limit resistance R.

Input signal specifications



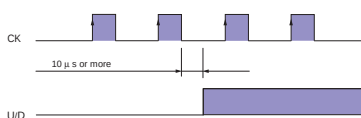
Timing of the command pulse

• Double input system (CW and CCW)



- The internal photocoupler turns ON at , and the internal circuit (stepping motor) operates at the leading 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".

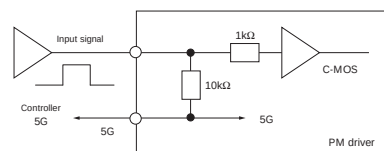
• Single input system (CK and U/D)



- The internal photocoupler turns ON at , and the internal circuit (stepping motor) operates 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".

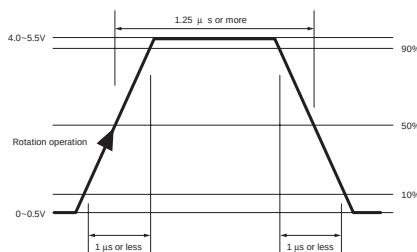
PMM-MD-53031-10 (CMOS input system)

● Input circuit configuration (CW and CCW)



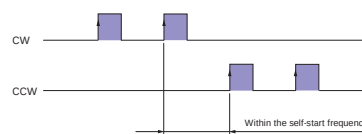
- Pulse duty is 50% or less.

Input signal specifications



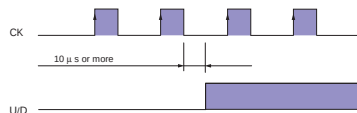
Timing of the command pulse

• Double input system (CW and CCW)



- The "H" level input is set at , and the internal circuit (stepping motor) operates at the leading edge of the "H" level.
- When applying the pulse to CW, set the CCW side input level to the "L" level.
- When applying the pulse to CCW, set the CW side input level to the "L" level.

• Single input system (CK and U/D)

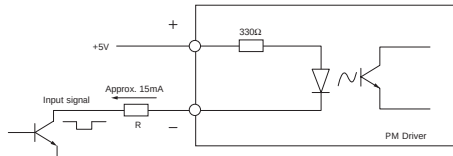


- The "H" level input is set at , and the internal circuit (stepping motor) operates at the leading edge of the "H" level of the CK-side input pulse.
- Perform the U/D input signal switchover when the CK-side input level is at the "L" level.

Operation, connection, and function

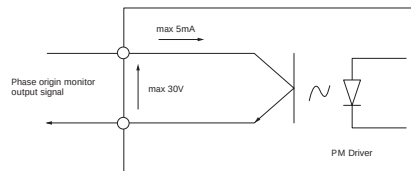
PMM-MD-53030-10 (Photo coupler input system)

● Input circuit configuration (PD and S. SEL)



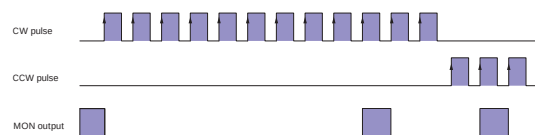
- When the peak value of the input signal is 5V, the external limit resistance R is 0 Ω. If the peak value exceeds 5V, set the input current to approx. 15mA using the external limit resistance R.

● Output circuit configuration (MON)



- Phase origin monitor output signal
Contact type : Open collector output by the photocoupler
Contact capacity : DC 30 V, 5 mA or less

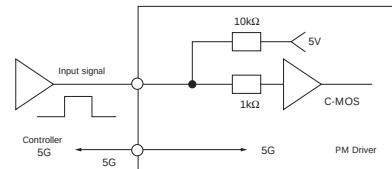
Timing of the MON output (when 1-division is specified)



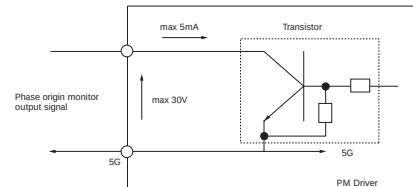
- The internal photocoupler or the transistor turns "ON" at .

PMM-MD-53031-10 (CMOS input system)

● Input circuit configuration (PD and S. SEL)

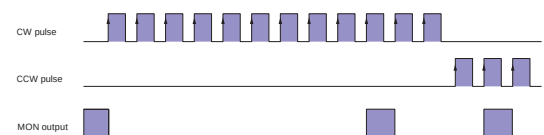


● Output circuit configuration (MON)



- Phase origin monitor output signal
Contact type : Open collector output by the transistor
Contact capacity : DC 30 V, 5 mA or less

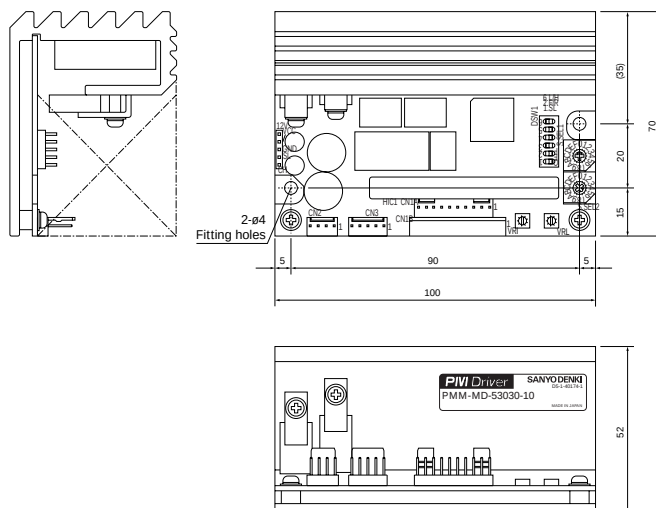
Timing of the MON output (when 1-division is specified)



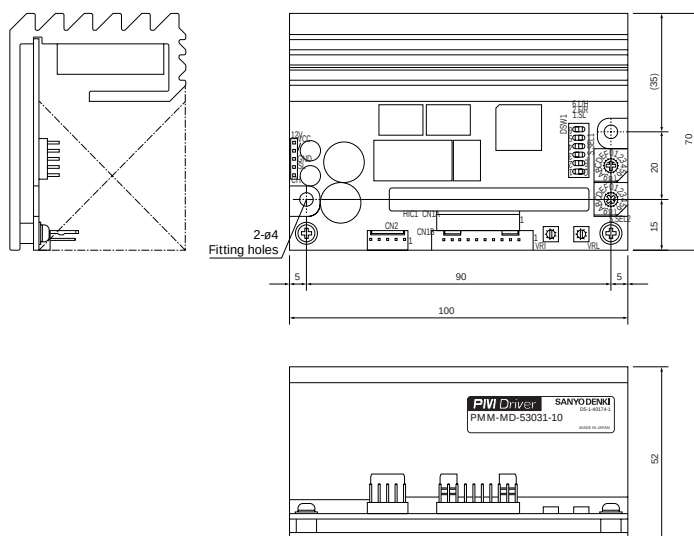
- The internal photocoupler or the transistor turns "ON" at .

Dimensions (Unit: mm)

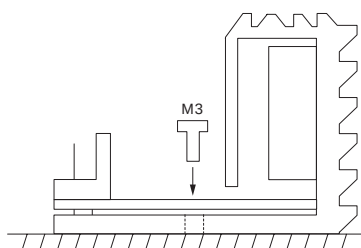
PMM-MD-53030-10 (Photo coupler input system)



PMM-MD-53031-10 (CMOS input system)



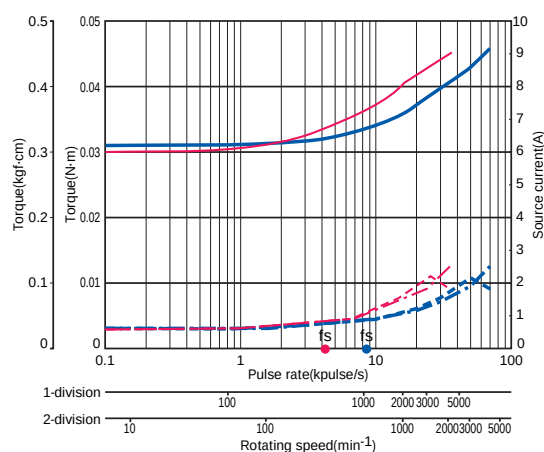
Installation direction and position



- Install the PM driver vertically.
- As shown in the figure, fix the PM driver by using the M3 screws through two fitting holes (ø4) on the bottom surface of PM driver (no fitting metals are necessary).
- For the fitting holes, refer to the outline drawing.

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

●103H3505-70 □□:24V



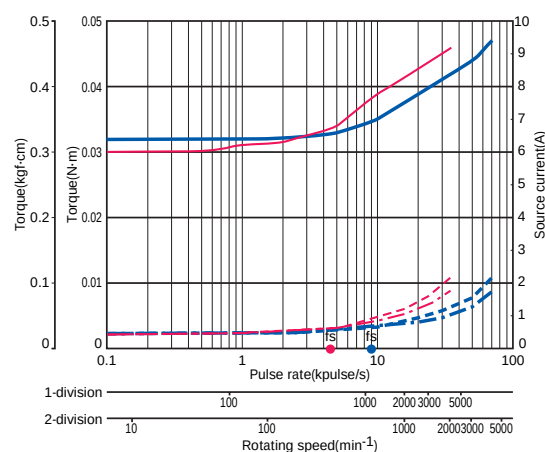
Source voltage:DC24V-Winding current: 0.75 A/phase

— Getaway torque(J_L1=0.33×10⁻⁴kg-m² using the rubber coupling)

- - - Source current(T_L=MAX) - - - Source current(T_L=0)

fs:Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103H3505-70 □□:36V



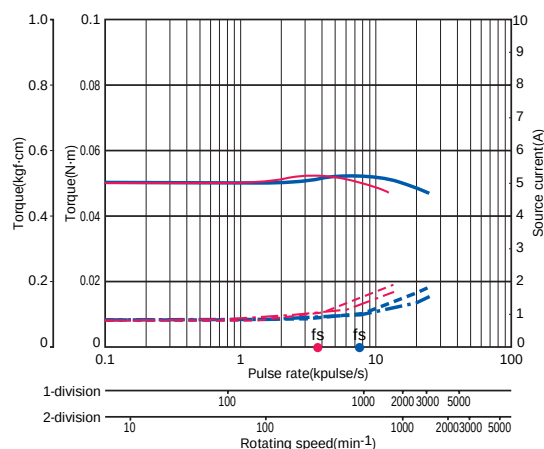
Source voltage:DC36V-Winding current: 0.75 A/phase

— Getaway torque(J_L1=0.33×10⁻⁴kg-m² using the rubber coupling)

- - - Source current(T_L=MAX) - - - Source current(T_L=0)

fs:Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103H3515-70 □□:24V



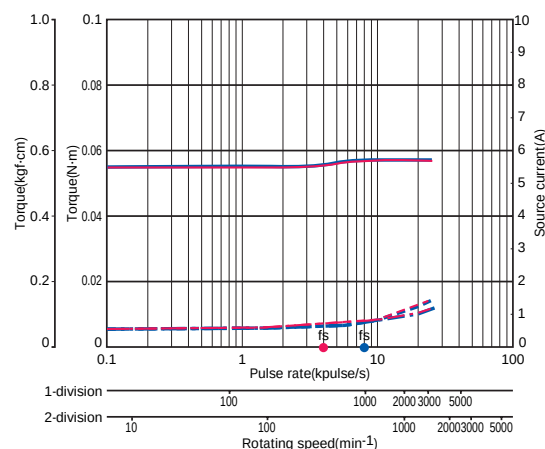
Source voltage:DC24V-Winding current: 0.75 A/phase

— Getaway torque(J_L1=0.33×10⁻⁴kg-m² using the rubber coupling)

- - - Source current(T_L=MAX) - - - Source current(T_L=0)

fs:Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103H3515-70 □□:36V



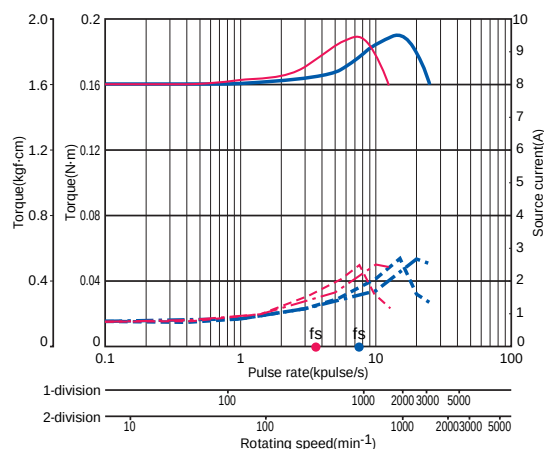
Source voltage:DC36V-Winding current: 0.75 A/phase

— Getaway torque(J_L1=0.33×10⁻⁴kg-m² using the rubber coupling)

- - - Source current(T_L=MAX) - - - Source current(T_L=0)

fs:Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103H5505-70 □□:24V



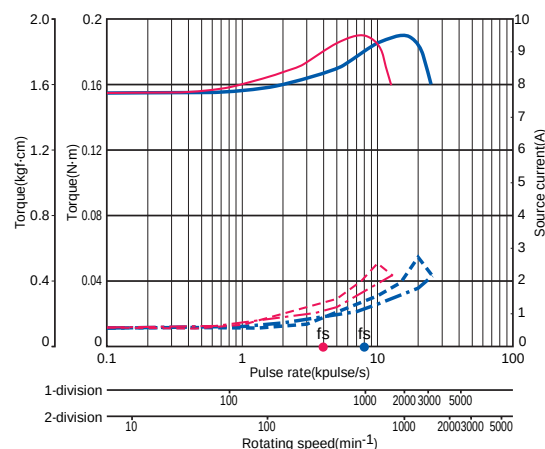
Source voltage:DC24V-Winding current: 0.75 A/phase

— Getaway torque(J_L1=0.33×10⁻⁴kg-m² using the rubber coupling)

- - - Source current(T_L=MAX) - - - Source current(T_L=0)

fs:Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103H5505-70 □□:36V



Source voltage:DC36V-Winding current: 0.75 A/phase

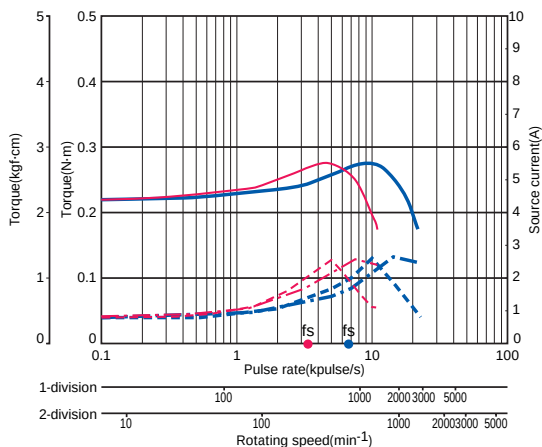
— Getaway torque(J_L1=0.33×10⁻⁴kg-m² using the rubber coupling)

- - - Source current(T_L=MAX) - - - Source current(T_L=0)

fs:Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

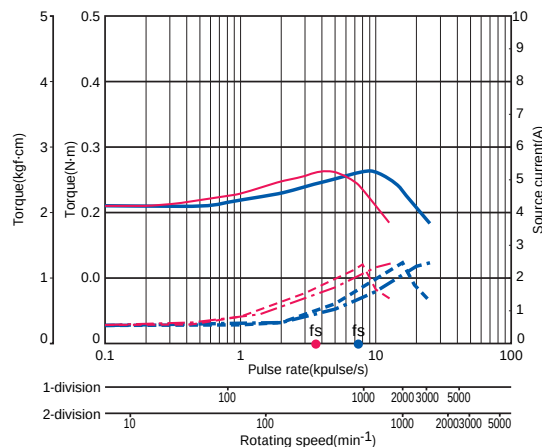
Pulse rate-torque characteristics/pulse rate-source current characteristics

103H5508-70 □□ :24V



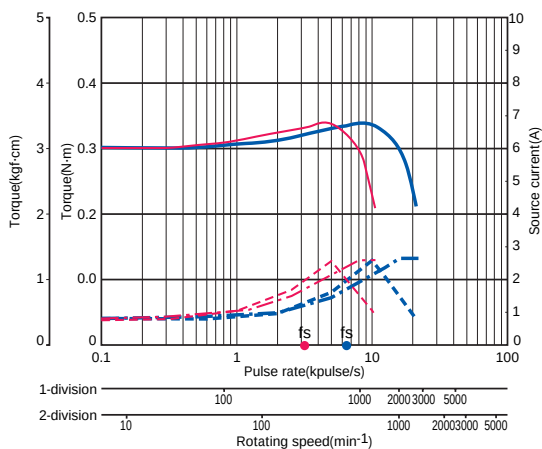
Source voltage:DC24V-Winding current: 0.75 A/phase
 — Getaway torque($J_L1=0.94 \times 10^{-4} \text{kg-m}^2$ using the rubber coupling)
 - - - Source current($T_L=MAX$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

103H5508-70 □□ :36V



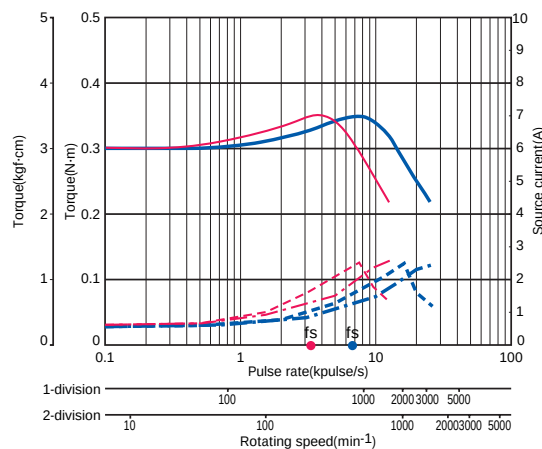
Source voltage:DC36V-Winding current: 0.75 A/phase
 — Getaway torque($J_L1=0.94 \times 10^{-4} \text{kg-m}^2$ using the rubber coupling)
 - - - Source current($T_L=MAX$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

103H5510-70 □□ :24V



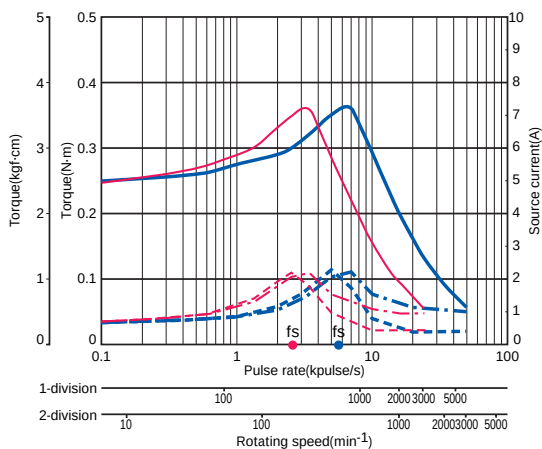
Source voltage:DC24V-Winding current: 0.75 A/phase
 — Getaway torque($J_L1=0.94 \times 10^{-4} \text{kg-m}^2$ using the rubber coupling)
 - - - Source current($T_L=MAX$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

103H5510-70 □□ :36V



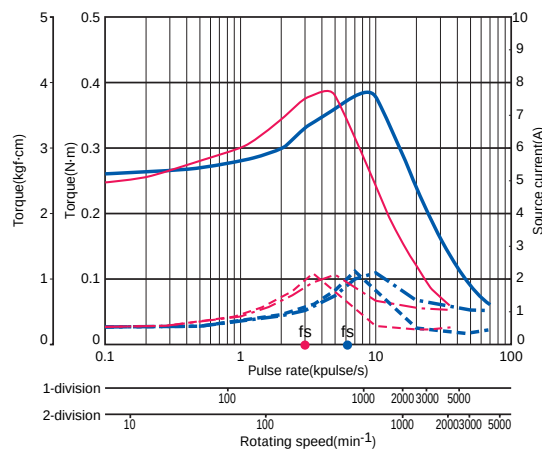
Source voltage:DC36V-Winding current: 0.75 A/phase
 — Getaway torque($J_L1=0.94 \times 10^{-4} \text{kg-m}^2$ using the rubber coupling)
 - - - Source current($T_L=MAX$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

103H6500-70 □□ :24V



Source voltage:DC24V-Winding current: 0.75 A/phase
 — Getaway torque($J_L1=0.94 \times 10^{-4} \text{kg-m}^2$ using the rubber coupling)
 - - - Source current($T_L=MAX$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

103H6500-70 □□ :36V



Source voltage:DC36V-Winding current: 0.75 A/phase
 — Getaway torque($J_L1=0.94 \times 10^{-4} \text{kg-m}^2$ using the rubber coupling)
 - - - Source current($T_L=MAX$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

PMAP1S6A01

PMAP1S6B01

PMM-MA-50034

PMM-MA-50064

PMM-BA-5603-5643

PMM-BA-5604-5644

PMDPB1S6P01

PMDPC1S3P01

PMM-MD-50030-50031

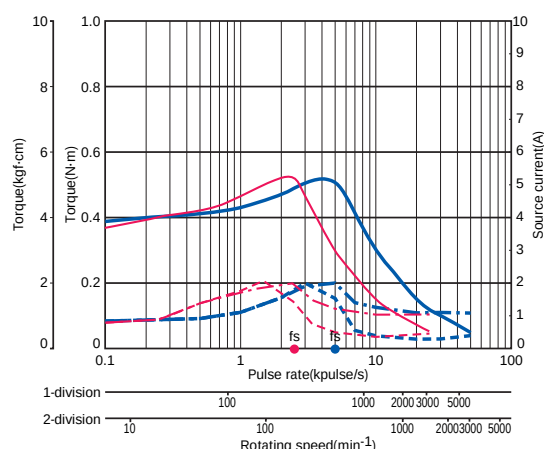
PMM-BD-53130-53131

PMDPA1A3P20

PMDPA1C3P20

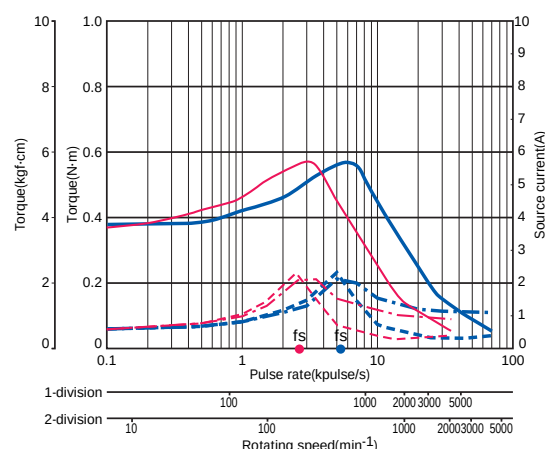
Pulse rate-torque characteristics/pulse rate-source current characteristics

●103H6501-70 □□:24V



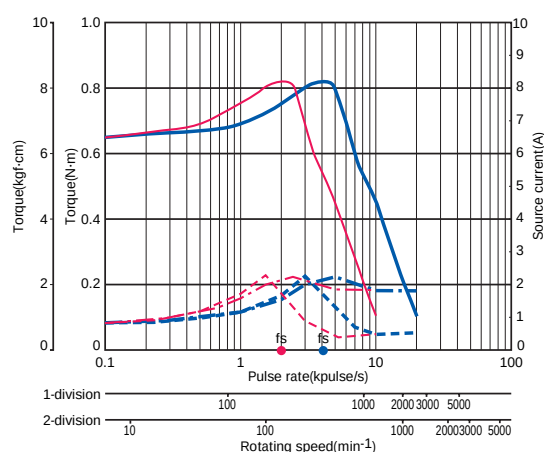
Source voltage:DC24V-Winding current: 0.75 A/phase
 — Getaway torque($J_L1=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=MAX$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103H6501-70 □□:36V



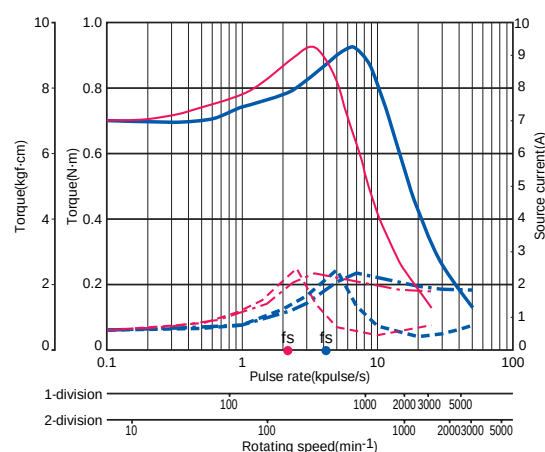
Source voltage:DC36V-Winding current: 0.75 A/phase
 — Getaway torque($J_L1=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=MAX$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103H7851-70 □□:24V



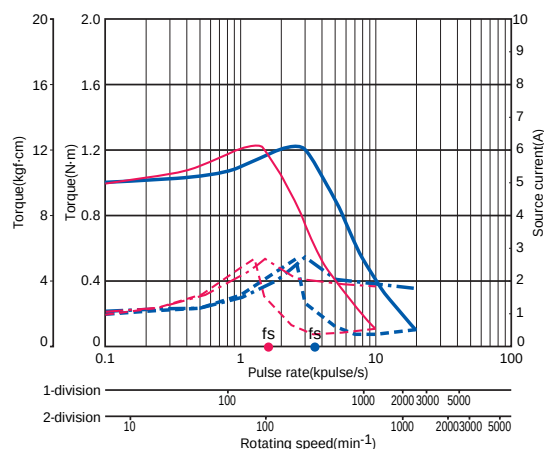
Source voltage:DC24V-Winding current: 0.75 A/phase
 — Getaway torque($J_L1=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=MAX$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103H7851-70 □□:36V



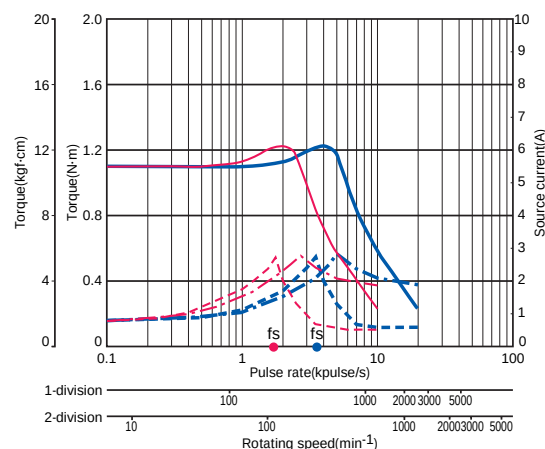
Source voltage:DC36V-Winding current: 0.75 A/phase
 — Getaway torque($J_L1=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=MAX$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103H7852-70 □□:24V



Source voltage:DC24V-Winding current: 0.75 A/phase
 — Getaway torque($J_L1=2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=MAX$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

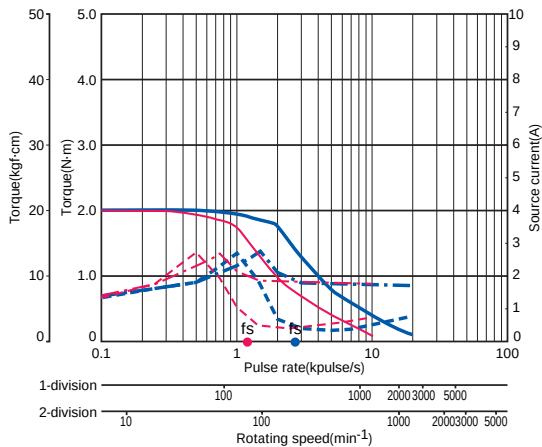
●103H7852-70 □□:36V



Source voltage:DC36V-Winding current: 0.75 A/phase
 — Getaway torque($J_L1=2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=MAX$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

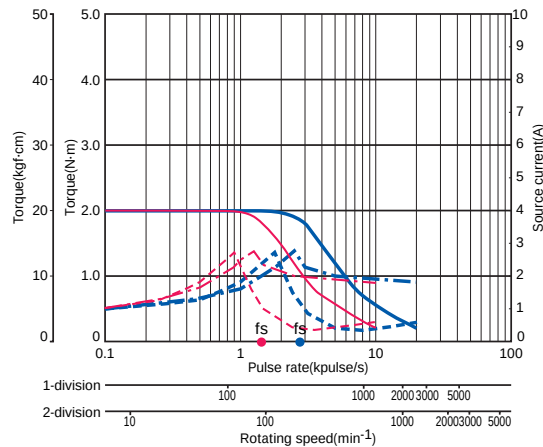
Pulse rate-torque characteristics/pulse rate-source current characteristics

●103H7853-70 □□:24V



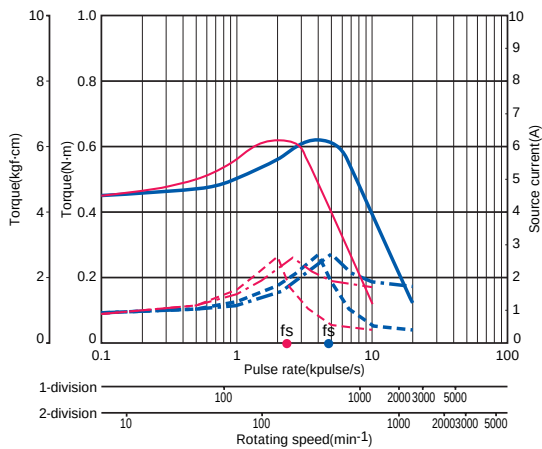
Source voltage:DC24V-Winding current: 0.75 A/phase
 — Getaway torque($J_L1=7.4 \times 10^{-4} \text{kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=MAX$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103H7853-70 □□:36V



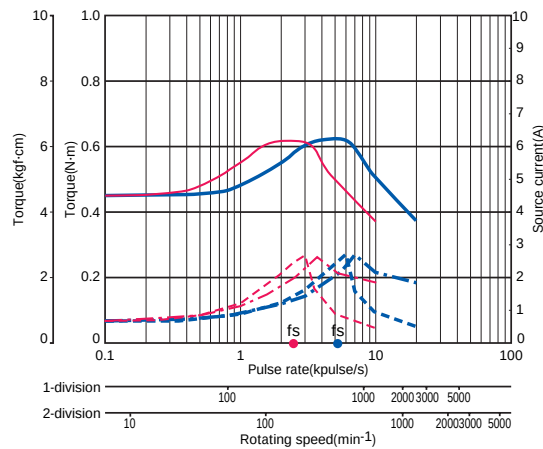
Source voltage:DC36V-Winding current: 0.75 A/phase
 — Getaway torque($J_L1=7.4 \times 10^{-4} \text{kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=MAX$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103H7521-70 □□:24V



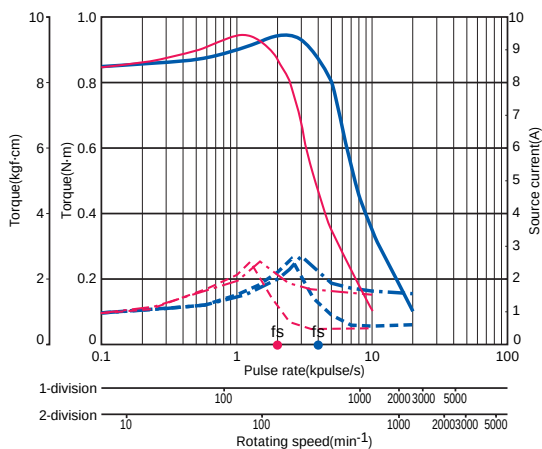
Source voltage:DC24V-Winding current: 0.75 A/phase
 — Getaway torque($J_L1=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=MAX$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103H7521-70 □□:36V



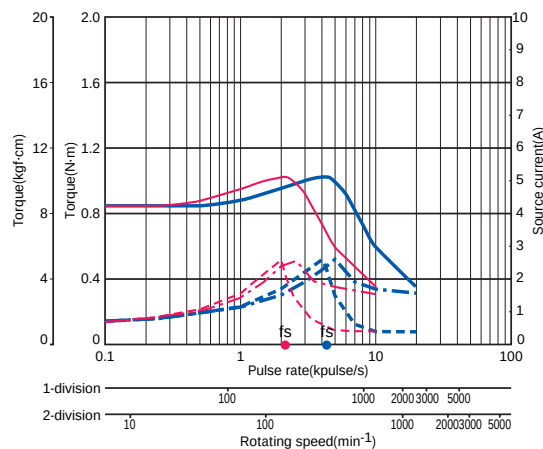
Source voltage:DC36V-Winding current: 0.75 A/phase
 — Getaway torque($J_L1=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=MAX$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103H7522-70 □□:24V



Source voltage:DC24V-Winding current: 0.75 A/phase
 — Getaway torque($J_L1=2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=MAX$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103H7522-70 □□:36V



Source voltage:DC36V-Winding current: 0.75 A/phase
 — Getaway torque($J_L1=2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=MAX$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

PMAP1S6A01

PMAP1S6B01

PMM-MA-50034

PMM-MA-50064

PMM-BA-5603

PMM-BA-5604

PMDPB1S6P01

PMDPC1S3P01

PMM-MD-50030

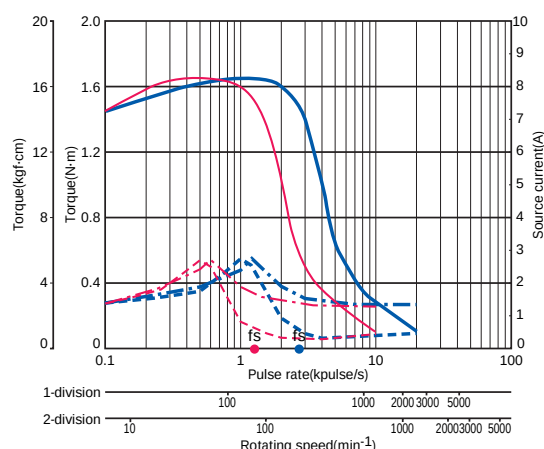
PMM-BD-53130

PMDPA1A3P20

PMDPA1C3P20

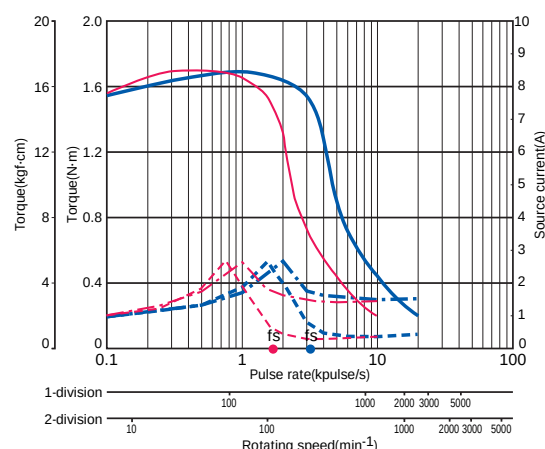
Pulse rate-torque characteristics/pulse rate-source current characteristics

●103H7523-70 □□:24V



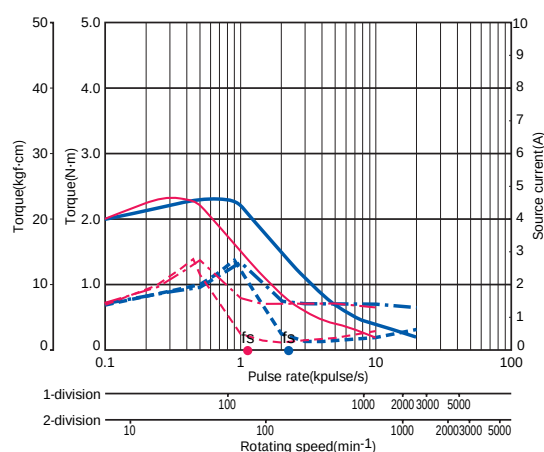
Source voltage:DC24V-Winding current: 0.75 A/phase
 — Getaway torque($J_L1=7.4\times10^{-4}\text{kg}\cdot\text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103H7523-70 □□:36V



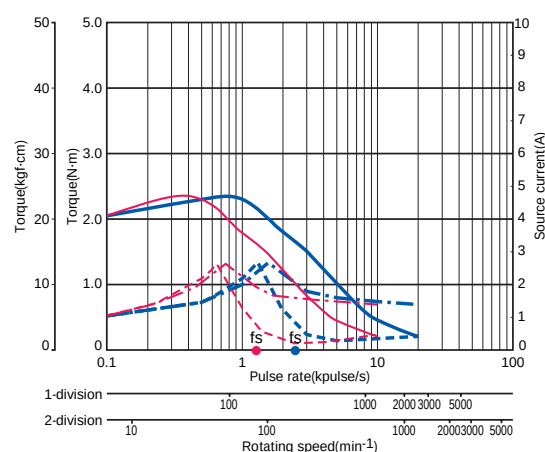
Source voltage:DC36V-Winding current: 0.75 A/phase
 — Getaway torque($J_L1=7.4\times10^{-4}\text{kg}\cdot\text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103H8581-70 □□:24V



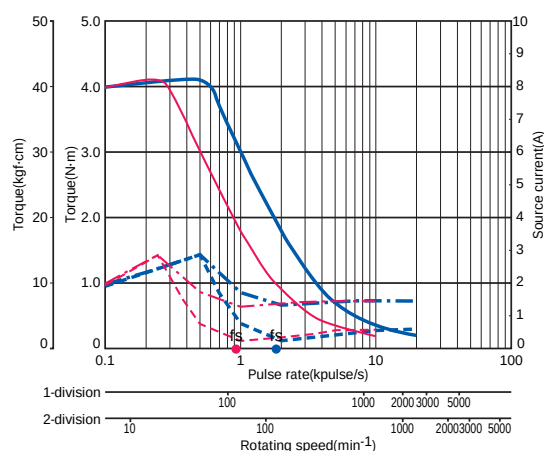
Source voltage:DC24V-Winding current: 0.75 A/phase
 — Getaway torque($J_L1=7.4\times10^{-4}\text{kg}\cdot\text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103H8581-70 □□:36V



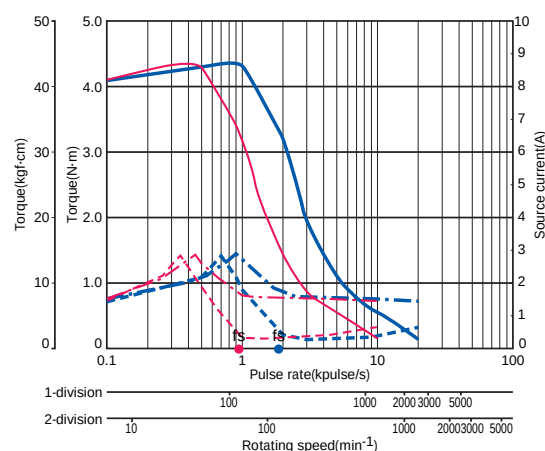
Source voltage:DC36V-Winding current: 0.75 A/phase
 — Getaway torque($J_L1=7.4\times10^{-4}\text{kg}\cdot\text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103H8582-70 □□:24V



Source voltage:DC24V-Winding current: 0.75 A/phase
 — Getaway torque($J_L1=15.1\times10^{-4}\text{kg}\cdot\text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

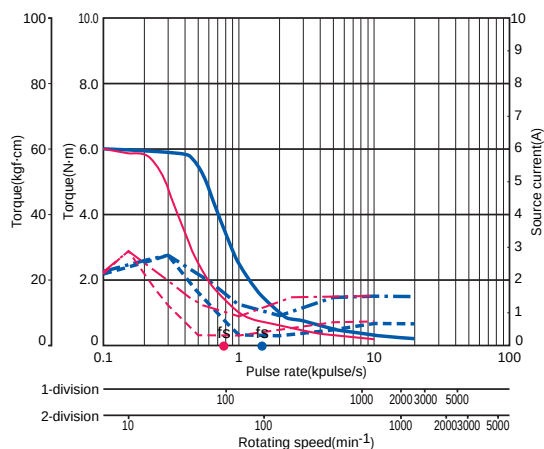
●103H8582-70 □□:36V



Source voltage:DC36V-Winding current: 0.75 A/phase
 — Getaway torque($J_L1=15.1\times10^{-4}\text{kg}\cdot\text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

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

●103H8583-70 □□:24V



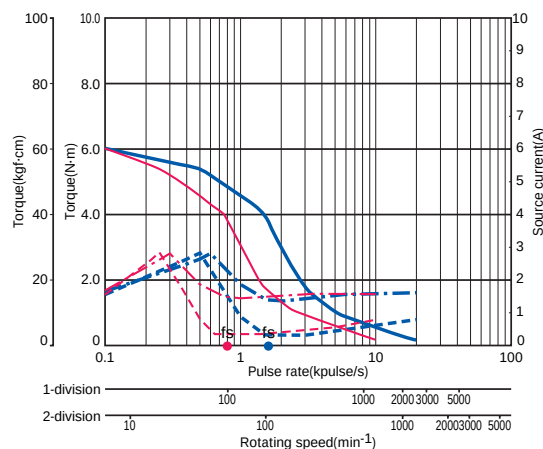
Source voltage:DC24V·Winding current: 0.75 A/phase

— Getaway torque($J_L=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ using the rubber coupling)

--- Source current($T_L=MAX$) --- Source current($T_L=0$)

fs:Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103H8583-70 □□:36V



Source voltage:DC36V·Winding current: 0.75 A/phase

— Getaway torque($J_L=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ using the rubber coupling)

--- Source current($T_L=MAX$) --- Source current($T_L=0$)

fs:Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

PMAP1S6A01

PMAP1S6B01

PMM-MA-50034

PMM-MA-50064

PMM-BA-5603-5643

PMM-BA-5604-5644

PMDPB1S6P01

PMDPC1S3P01

PMM-MD-50030-53031

PMM-BD-53130-53131

PMDPA1A3P20

PMDPA1C3P20

Option

PMM-MD-53030-10 (Photo coupler input system)

● Connector set

Model number	Used for	Set content	Quantity	Manufacturer name	Applicable cable size	Crimping tool model number
PM-AP-010	I/O signals (CN1A)	Applicable housing:5051-10	1	Molex Japan	AWG22~28	JHTR2262A JHTR2262J
		Applicable contact:2759PBGL	10			
PM-AP-006	DC power source (CN2)	Applicable housing:5051-04	1	Molex Japan	AWG22~28	JHTR2262A JHTR2262J
		Applicable contact:5159P8TL	4			
PM-AP-045 (Type H785 □□)	Stepping motor (CN3)	Applicable housing:5051-05	1	Molex Japan	AWG22	JHTR2262A
		Applicable contact:5159P8TL	5			
		Applicable housing:VHR-5N	1	J.S.T. Mfg Co., Ltd.		YC-160R
		Applicable contact:SVH-21T-P1.1	5			
PM-AP-046 (Type H35 □□□)		Applicable housing:5051-05	1	Molex Japan	AWG24~28	JHTR2262A JHTR2262J
		Applicable contact:5159P8TL	5			
		Applicable housing:PHR-5	1	J.S.T. Mfg Co., Ltd.		YRM-240
		Applicable contact:SPH-002T-PO.5S	5			
PM-AP-007 (Types other than above)		Applicable housing:5051-05	1	Molex Japan	AWG22~28	JHTR2262A JHTR2262J
		Applicable contact:5159P8TL	5			

● Connector cable

Model number	Application
PM-C10S0100-01	Connector cable for I/O signal (CN1A)
PM-C04P0100-01	Connector cable for DC power source (CN2)
PM-C05M0100-□□	Connector cable for stepping motors (CN3)

□□ is a space to be filled by the serial number 01, 03, or 04 (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
01	103H5505-70 □□
	103H5508-70 □□
	103H5510-70 □□
	103H6500-70 □□
	103H6501-70 □□
	103H7521-70 □□
	103H7522-70 □□
	103H7523-70 □□
	103H8581-70 □□
	103H8582-70 □□
	103H8583-70 □□

Serial No.	Stepping motor model number
03	103H3505-70 □□
	103H3515-70 □□
04	103H7851-70 □□
	103H7852-70 □□
	103H7853-70 □□

Option

PMM-MD-53031-10 (CMOS input system)

● Connector set

Model number	Used for	Set content	Quantity	Manufacturer name	Applicable cable size	Crimping tool model number
PM-AP-011	I/O signal and DCpower source(CN1B)	Applicable housing : 5051-12	1	Molex Japan	AWG22~28	JHTR2262A JHTR2262J
		Applicable contact : 2759PBGL	12			
PM-AP-045 (Type H785 □□)	Stepping motor (CN3)	Applicable housing : 5051-05	1	Molex Japan	AWG22	JHTR2262A
		Applicable contact : 5159PBTB	5			
		Applicable housing : VHR-5N	1	J.S.T. Mfg Co., Ltd.		YC-160R
		Applicable contact : SVH-21T-P1.1	5			
PM-AP-046 (Type H35 □)		Applicable housing : 5051-05	1	Molex Japan	AWG24~28	JHTR2262A JHTR2262J
		Applicable contact : 5159PBTB	5			
		Applicable housing : PHR-5	1	J.S.T. Mfg Co., Ltd.		YRM-240
		Applicable contact : SPH-002T-P0.5S	5			
PM-AP-007 (Types other than above)		Applicable housing : 5051-05	1	Molex Japan	AWG22~28	JHTR2262A JHTR2262J
		Applicable contact : 5159PBTB	5			

● Connector cable

Model number	Application
PM-C12T0100-01	Connector cable for I/O signal and DC power source (CN1B)
PM-C05M0100-□□	Connector cable for stepping motors (CN3)

□□ is a space to be filled by the serial number 01, 03, or 04 (refer to Supplement table 1).

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

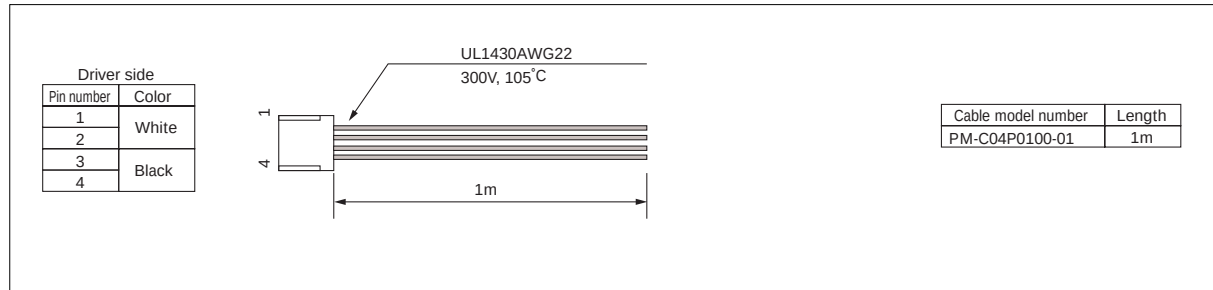
Stepping motor cable model number (Supplement table 1)

Serial No.	Stepping motor model number
01	103H5505-70 □□
	103H5508-70 □□
	103H5510-70 □□
	103H6500-70 □□
	103H6501-70 □□
	103H7521-70 □□
	103H7522-70 □□
	103H7523-70 □□
	103H8581-70 □□
	103H8582-70 □□
	103H8583-70 □□

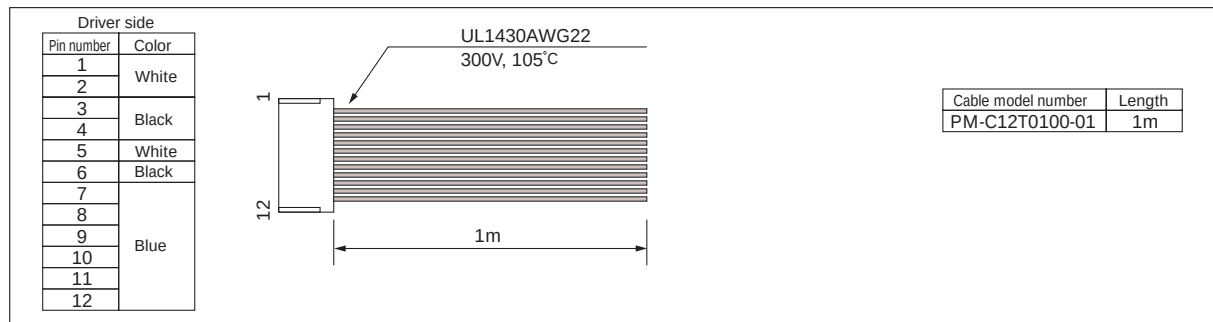
Serial No.	Stepping motor model number
03	103H3505-70 □□
	103H3515-70 □□
04	103H7851-70 □□
	103H7852-70 □□
	103H7853-70 □□

Option

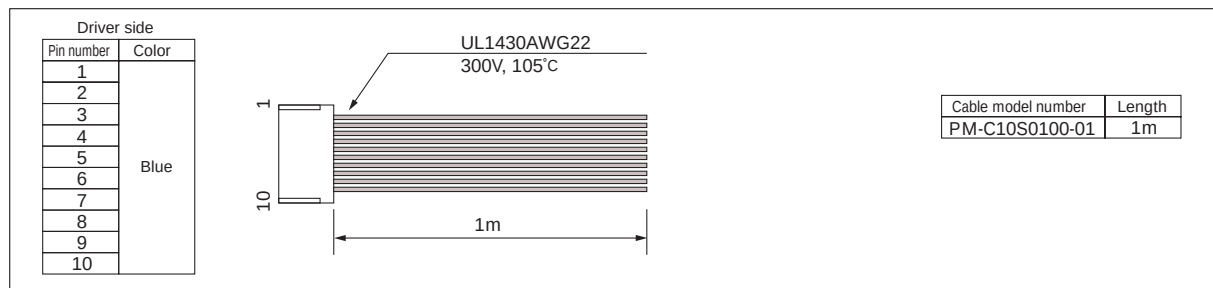
● Cable 1 (power source cable)



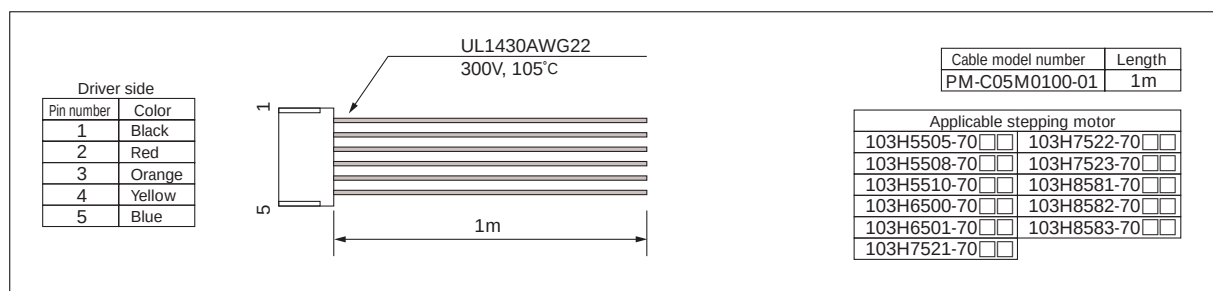
● Cable 2 (power source and I/O signal cable)



● Cable 3 (I/O signal cable)



● Cable 4 (stepping motor extension cable 1)



Option

● Cable 5 (stepping motor extension cable 2)

Driver side

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

UL1430AWG22
300V, 105°C

1m

Stepping motor side

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

Cable model number	Length
PM-C05M0100-4	1m

Applicable stepping motor	
103H7851-70	☐
103H7852-70	☐
103H7853-70	☐

● Cable 6 (stepping motor extension cable 3)

Driver side

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

UL1430AWG24
300V, 105°C

1m

Stepping motor side

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

Cable model number	Length
PM-C05M0100-3	1m

Applicable stepping motor	
103H3505-70	☐
103H3515-70	☐

PMAPAI56A01

PMAPAI56B01

PMM-MA-50034

PMM-MA-50064

PMM-BA-5603
-5643

PMM-BA-5604
-5644

PMDPB1S6P01

PMDPC1S3P01

PMM-MD-50030
-53031

PMM-BD-53130
-53131

PMDPA1A3P20

PMDPA1C3P20



The 5-Phase Stepping Driver

PMM-BD-53130-10
PMM-BD-53131-10

DC24V/36V
Full-step/half-step
 (500 x 1 divisions) (500 x 2 divisions)

● Applicable motors



Characteristics

● Flexible

Various stepping motors of small to large capacities can be driven without adjustment for wide range uses.

● Downsizing

Dedicated HIC is mounted to improve parts consolidation and reliability.

● The 2-type interface circuit specifications

PM drivers can be selected according to the controller in use:

Photocoupler input type :PMM-BD-53130-10

C-MOS input type :PMM-BD-53131-10

Built-in function

● Excitation system selection function

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

● Pulse input system selection function

Either single or double input system can be selected by using dipswitches.

● Power down function

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

PM driver specifications

Item		PMM-BD-53130-10	PMM-BD-53131-10
Basic specifications	Input source	For main power source	DC24V/36V±10%
		For control power source	DC5V±5%
	Source current	For main power source	2.5A
		For control power source	0.15A
	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 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.
	Weight		0.15kg
Function	Selection function		Pulse input system and power source specifications
I/O signals	Command pulse input signal		Photocoupler input system, input resistance 330Ω Input signal voltage: "H" level: 4.0 to 5.5 V "L" level: 0 to 0.5 V Maximum input frequency: 400 kpulses/s C-MOS input Input 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 330Ω Input signal voltage: "H" level: 4.0 to 5.5 V "L" level: 0 to 0.5 V C-MOS input Input voltage: "H" level: 4.0 to 5.5 V "L" level: 0 to 0.5 V
	Step angle selection input signal		Photocoupler input system, input resistance 330Ω Input signal voltage: "H" level: 4.0 to 5.5 V "L" level: 0 to 0.5 V C-MOS input Input voltage: "H" level: 4.0 to 5.5 V "L" level: 0 to 0.5 V
	Phase origin monitor output signal		Open collector output by photocoupler (turns ON at the phase origin) Output standard Vceo: Maximum 30 V, Ic: Maximum 5 mA Open collector output by transistor (turns ON at the phase origin) Output standard Vceo: Maximum 30 V, Ic: Maximum 5 mA

Standard combined stepping motor

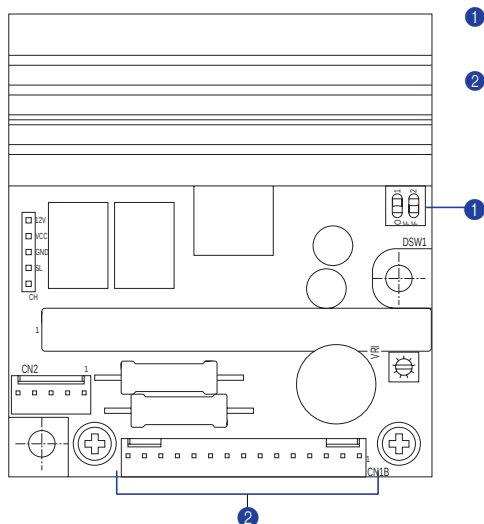
Stepping motor dimensions	Stepping motor model number		Holding torque [N·m]	Rotor inertia [×10 ⁻⁴ kg·m ²]	Weight [kg]	Page
	Single-axis shaft	Dual-axis shaft				
□28mm	103H3505-7040	103H3505-7010	0.026	0.009	0.11	Page 309
	103H3515-7040	103H3515-7010	0.052	0.016	0.2	
□42mm	103H5505-7040	103H5505-7010	0.127	0.03	0.23	Page 311
	103H5508-7040	103H5508-7010	0.176	0.053	0.28	
	103H5510-7040	103H5510-7010	0.255	0.065	0.37	
□50mm	103H6500-7041	103H6500-7011	0.235	0.057	0.38	Page 313
	103H6501-7041	103H6501-7011	0.39	0.105	0.44	
□60mm	103H7851-7051	103H7851-7021	0.65	0.275	0.6	Page 315
	103H7852-7051	103H7852-7021	0.98	0.4	0.78	
	103H7853-7051	103H7853-7021	1.86	0.84	1.36	
ø60mm	103H7521-7051	103H7521-7021	0.46	0.148	0.51	Page 317
	103H7522-7051	103H7522-7021	0.735	0.18	0.6	
	103H7523-7051	103H7523-7021	1.568	0.423	1.1	
ø86mm	103H8581-7041	103H8581-7011	2.06	1.45	1.5	Page 319
	103H8582-7041	103H8582-7011	4.02	2.9	2.5	
	103H8583-7041	103H8583-7011	6.17	4.4	3.5	

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

Operation, connection, and function

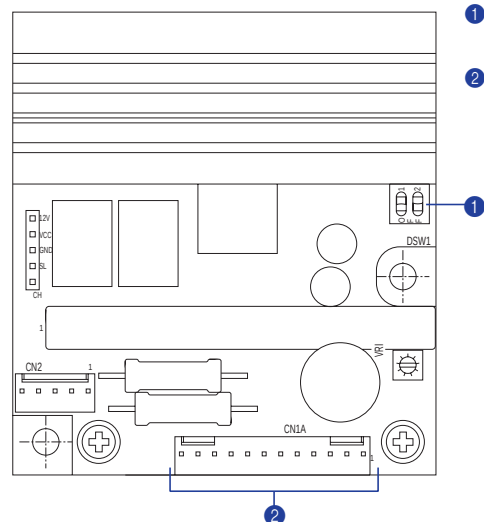
- Each section name of the PM driver

PMM-BD-53130-10 (Photo coupler input system)



- ① Function selection dipswitches Functions can be selected according to specifications.
(F/R and L/H)
- ② Connector (CN1B and CN2) Connects the I/O signal, the DC power source, and the stepping motor power cable.

PMM-BD-53131-10 (CMOS input system)

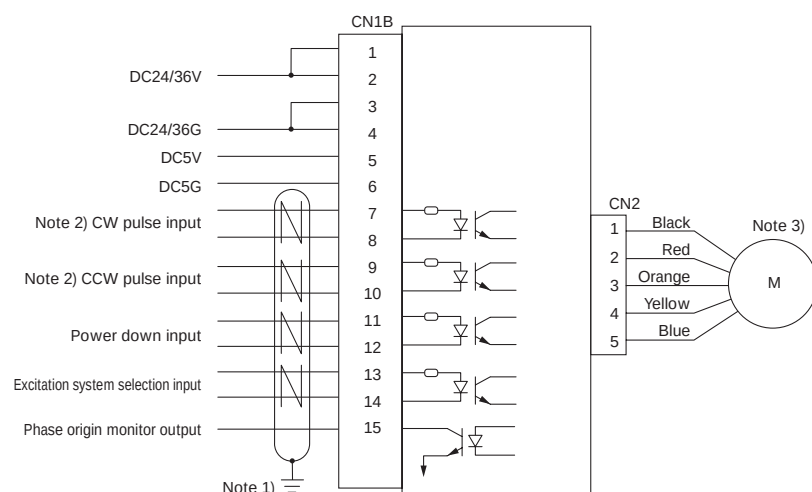


- ① Function selection dipswitches Functions can be selected according to specifications.
(F/R and L/H)
- ② Connector (CN1A and CN2) Connects the I/O signal, the DC power source, and the stepping motor power cable.

Operation, connection, and function

External wiring diagram

PMM-BD-53130-10 (Photo coupler input system)



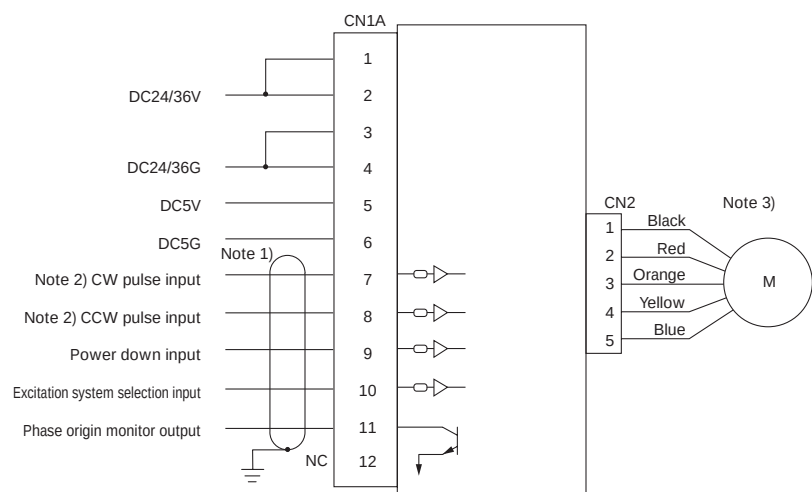
Note 1) Use shielded twisted-pair cables.

Note 2) Either "double input system (CW and CCW)" or "single input system (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 103H35 □ 5 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

PMM-BD-53131-10 (CMOS input system)



Note 1) Use shielded twisted-pair cables.

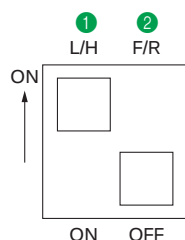
Note 2) Either "double input system (CW and CCW)" or "single input system (CK and U/D)" can be selected by using the function selection switch F/R

Note 3) Refer to the following table when connecting the 103H35 □ 5 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

Operation, connection, and function

● Function selection dipswitch ①



- 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 L/H (power specification selection)

The specification is changed from DC 24 V to DC 36 V.

L/H	Power specification
ON	DC 24 V specified
OFF	DC 36 V specified

② F/R (pulse input system selection)

A pulse input system is selected.

F/R	Pulse input system
ON	Single input system (CK and U/D)
OFF	Double input system (CW and CCW)

● I/O signal function

Signal name (Abbreviation)	Pin number(CN1)		Function
	Photo coupler input system	C-MOS input system	
CW pulse input (CW)	7 8	7	When using double input system Drive pulse for the CW direction rotation is input.
Pulse column input (CK)	7 8	7	When using single input system Drive pulse train for the stepping motor rotation is input.
CCW pulse input (CCW)	9 10	8	When using double input system Drive pulse for the CCW direction rotation is input.
Rotation direction input (U/D)	9 10	8	The rotation direction signal of stepping motor is input for the single input system. Internal photocoupler ON ("H" level for the C-MOS type) CW direction Internal photocoupler OFF ("L" level for the C-MOS type) CCW direction
Power down input (PD)	11 12	9	Inputting the PD signal cuts OFF the current flowing through the stepping motor (turns OFF the power). PC type: Internal photocoupler (ON) PD function enabled C-MOS type: "L" level input PD function enabled
Energization system selection input (EX)	13 14	10	The full-step or the half-step can be selected by inputting EX. Internal photocoupler ON ("H" level for the C-MOS type) Full-step Internal photocoupler OFF ("L" level for the C-MOS type) Half-step
Phase origin monitor output (MON)	15	11	It is turned ON when the excitation phase is at the origin (in the state when the power is turned ON) It is turned ON once per 10 pulses during the full-step. It is turned ON once per 20 pulses during the half-step.

- The PC type and the C-MOS type in the table indicate "PMM-BD-53130-10" and "PMM-BD-53131-10", respectively.
- 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

PMM-BD-53130-10 (Photo coupler input system)

PM driver side		Applicable connector model number	Manufacturer
Used for	Model number		
I/O signal and DC power source (CN1B)	5045-15AG	Applicable housing:5051-15 Applicable contact:2759PBGL	Molex Japan
Stepping motor (CN2)	5045-05A	Applicable housing:5051-05 Applicable contact:5159PBTL	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 246).

PMM-BD-53131-10 (CMOS input system)

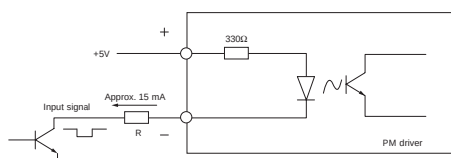
PM driver side		Applicable connector model number	Manufacturer
Used for	Model number		
I/O signal and DC power source (CN1A)	5045-12AG	Applicable housing:5051-12 Applicable contact:2759PBGL	Molex Japan
Stepping motor (CN2)	5045-05A	Applicable housing:5051-05 Applicable contact:5159PBTL	Molex Japan

- 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 247).

Operation, connection, and function

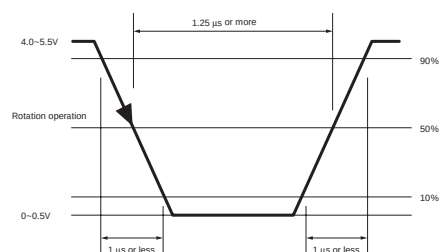
PMM-BD-53130-10 (Photo coupler input system)

Input circuit configuration (CW and CCW)



- Pulse duty is 50% or less.
- 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



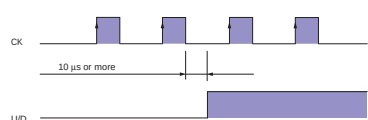
Timing of the command pulse

• Double input system (CW and CCW)



- The internal photocoupler turns ON at the leading 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".

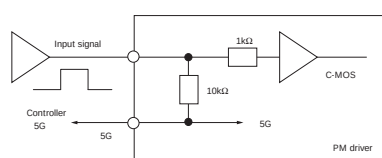
• Single input system (CK and U/D)



- 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".

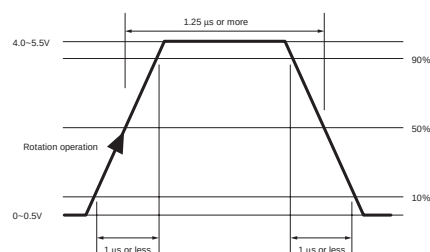
PMM-BD-53131-10 (CMOS input system)

Input circuit configuration (CW and CCW)



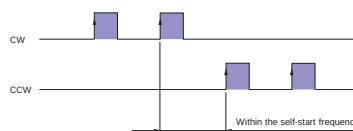
- Pulse duty is 50% or less.

Input signal specifications



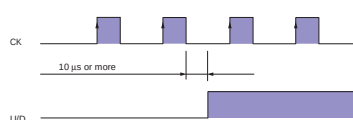
Timing of the command pulse

• Double input system (CW and CCW)



- The "H" level input is set at the leading edge of the "H" level.
- When applying the pulse to CW, set the CCW side input level to the "L" level.
- When applying the pulse to CCW, set the CW side input level to the "L" level.

• Single input system (CK and U/D)

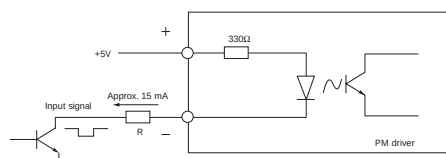


- The "H" level input is set at the leading edge of the "H" level of the CK-side input pulse.
- Perform the U/D input signal switchover when the CK-side input level is at the "L" level.

Operation, connection, and function

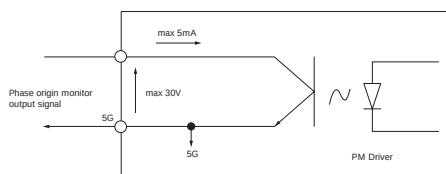
PMM-BD-53130-10 (Photo coupler input system)

● Input circuit configuration (PD and EX)



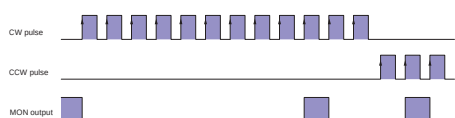
- When the peak value of the input signal is 5V, the external limit resistance R is 0 Ω. If the peak value exceeds 5V, set the input current to approx. 15mA using the external limit resistance R.

● Output circuit configuration (MON)



- Phase origin monitor output signal
Contact type: Open collector output by the photocoupler
Contact capacity: DC 30 V, 5 mA or less

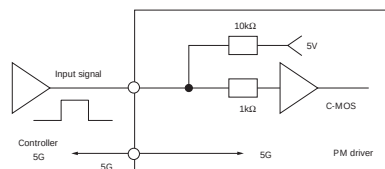
MON output timing (when the full-step is specified)



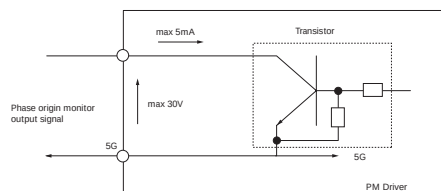
- The internal photocoupler or the transistor turns "ON" at .

PMM-BD-53131-10 (CMOS input system)

● Input circuit configuration (PD and EX)

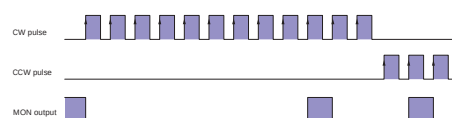


● Output circuit configuration (MON)



- Phase origin monitor output signal
Contact type: Open collector output by the transistor
Contact capacity: DC 30 V, 5 mA or less

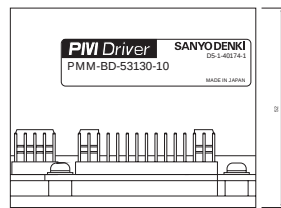
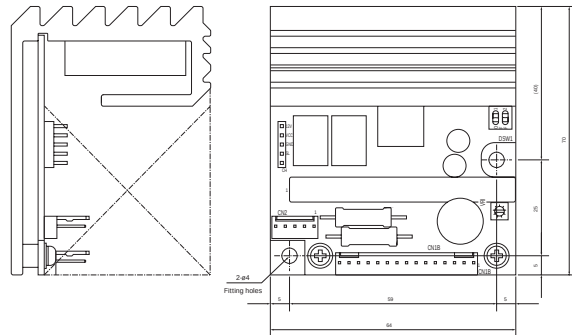
MON output timing (when the full-step is specified)



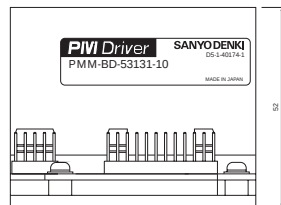
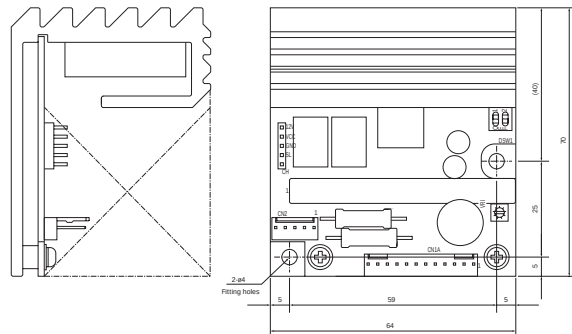
- The internal photocoupler or the transistor turns "ON" at .

Dimensions (Unit: mm)

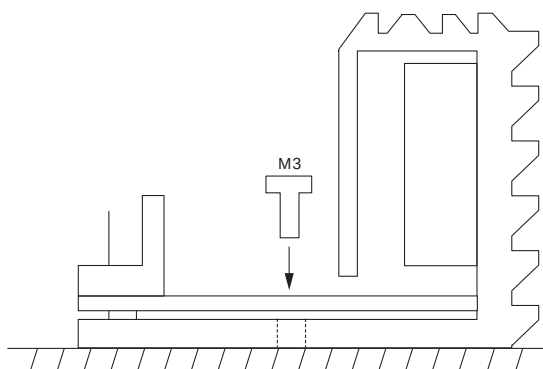
PMM-BD-53130-10 (Photo coupler input system)



PMM-BD-53131-10 (CMOS input system)



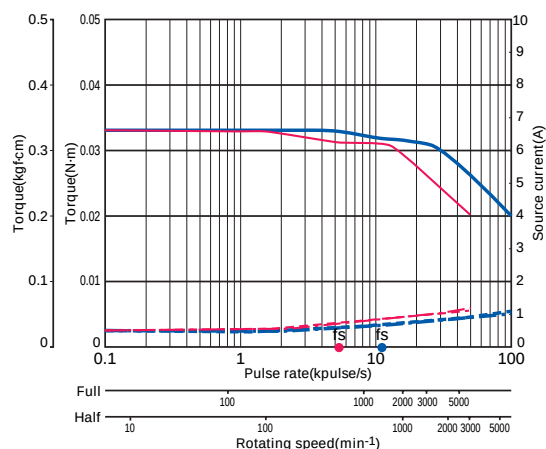
Installation direction and position



- Install the PM driver vertically.
- As shown in the figure, fix the PM driver by using the M3 screws through two fitting holes (ø4) on the bottom surface of PM driver (no fitting metals are necessary).
- For the fitting holes, refer to the outline drawing.

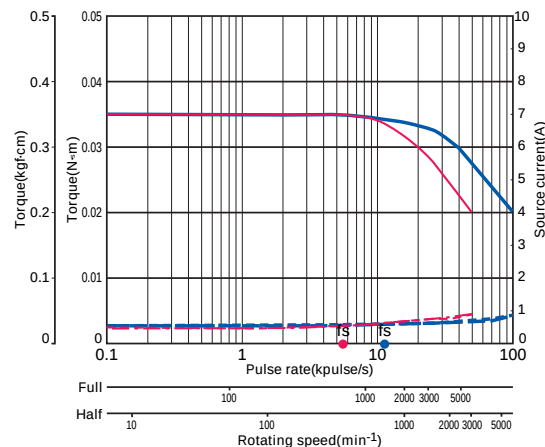
Pulse rate-torque characteristics/pulse rate-source current characteristics

●103H3505-70 □□ :24V



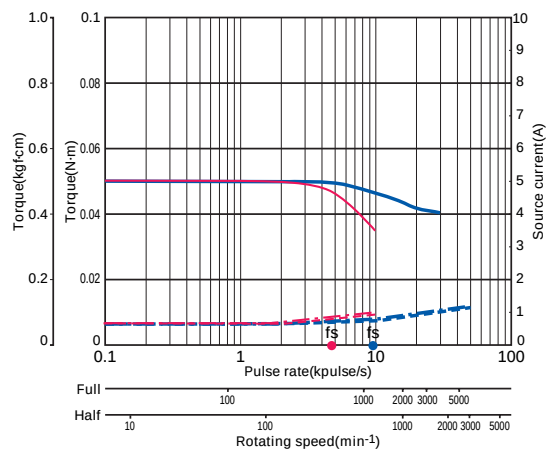
Source voltage:DC24V-Winding current:0.75A/phase
 — Getaway torque($J_{L1}=0.33 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ Full-step ■ Half-step

●103H3505-70 □□ :36V



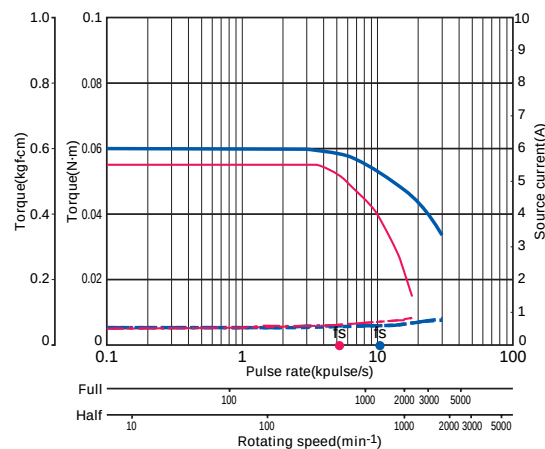
Source voltage:DC36V-Winding current:0.75A/phase
 — Getaway torque($J_{L1}=0.33 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ Full-step ■ Half-step

●103H3515-70 □□ :24V



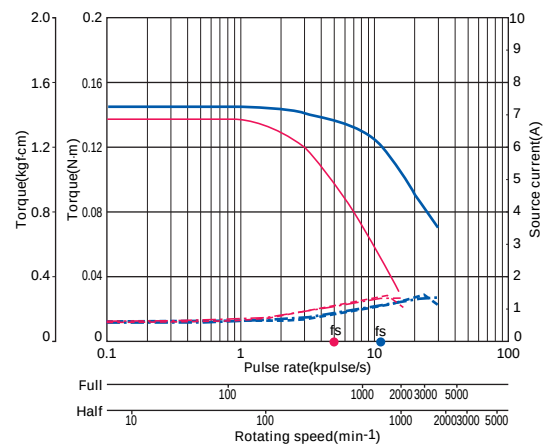
Source voltage:DC24V-Winding current:0.75A/phase
 — Getaway torque($J_{L1}=0.33 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ Full-step ■ Half-step

●103H3515-70 □□ :36V



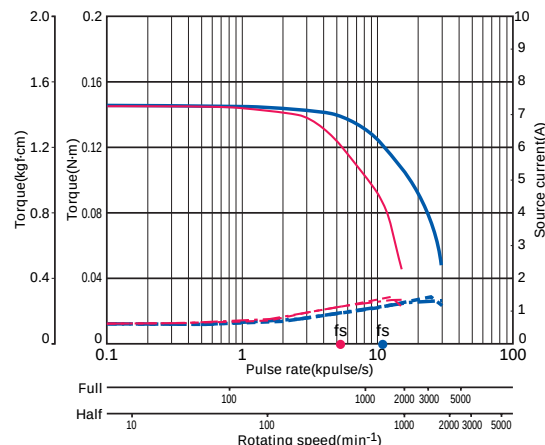
Source voltage:DC36V-Winding current:0.75A/phase
 — Getaway torque($J_{L1}=0.33 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ Full-step ■ Half-step

●103H5505-70 □□ :24V



Source voltage:DC24V-Winding current:0.75A/phase
 — Getaway torque($J_{L1}=0.33 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ Full-step ■ Half-step

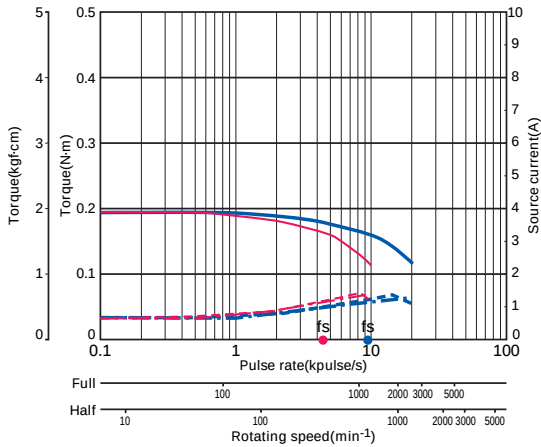
●103H5505-70 □□ :36V



Source voltage:DC36V-Winding current:0.75A/phase
 — Getaway torque($J_{L1}=0.33 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ Full-step ■ Half-step

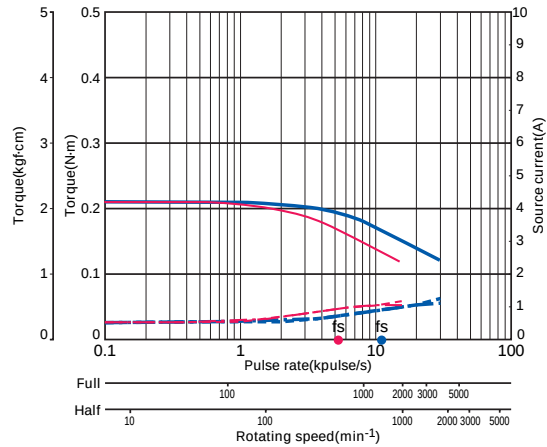
Pulse rate-torque characteristics/pulse rate-source current characteristics

●103H5508-70 □□:24V



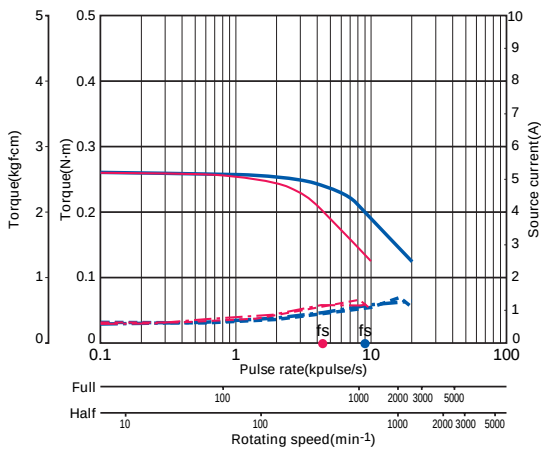
Source voltage:DC24V-Winding current:0.75A/phase
 — Getaway torque($J_{L1}=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ Full-step ■ Half-step

●103H5508-70 □□:36V



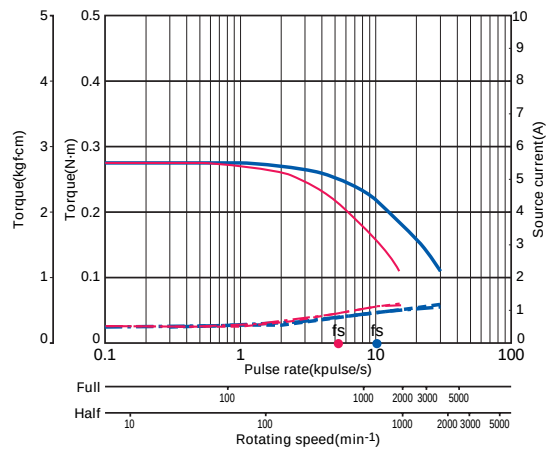
Source voltage:DC36V-Winding current:0.75A/phase
 — Getaway torque($J_{L1}=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ Full-step ■ Half-step

●103H5510-70 □□:24V



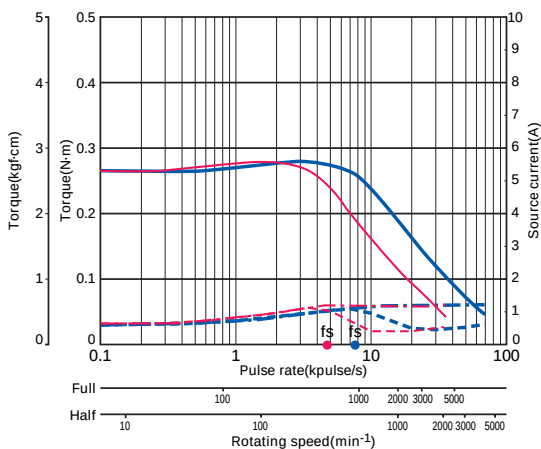
Source voltage:DC24V-Winding current:0.75A/phase
 — Getaway torque($J_{L1}=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ Full-step ■ Half-step

●103H5510-70 □□:36V



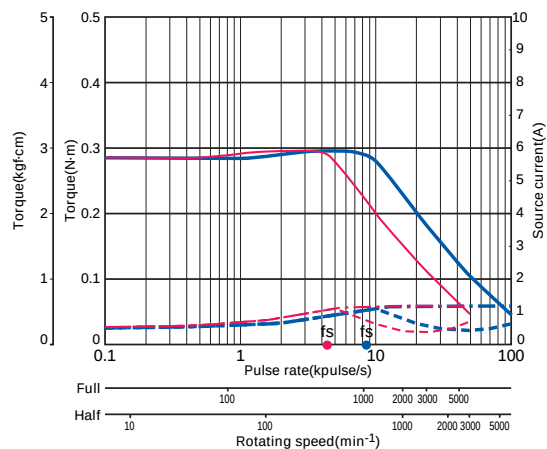
Source voltage:DC36V-Winding current:0.75A/phase
 — Getaway torque($J_{L1}=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ Full-step ■ Half-step

●103H6500-70 □□:24V



Source voltage:DC24V-Winding current:0.75A/phase
 — Getaway torque($J_{L1}=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ Full-step ■ Half-step

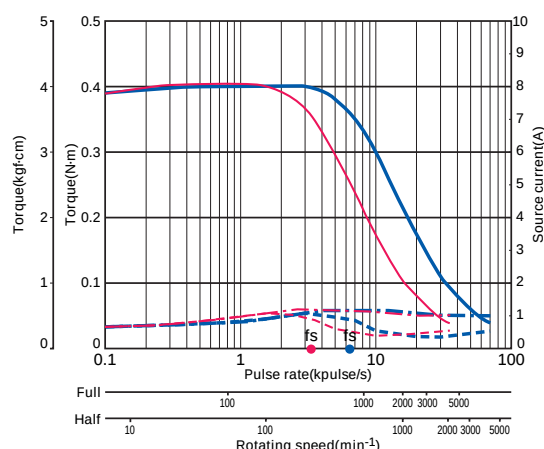
●103H6500-70 □□:36V



Source voltage:DC36V-Winding current:0.75A/phase
 — Getaway torque($J_{L1}=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ Full-step ■ Half-step

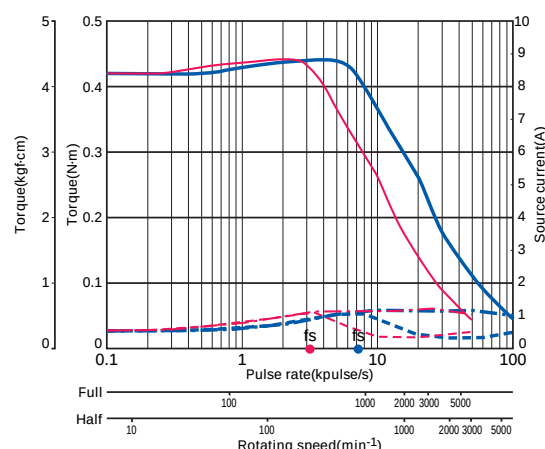
Pulse rate-torque characteristics/pulse rate-source current characteristics

●103H6501-70 □□ :24V



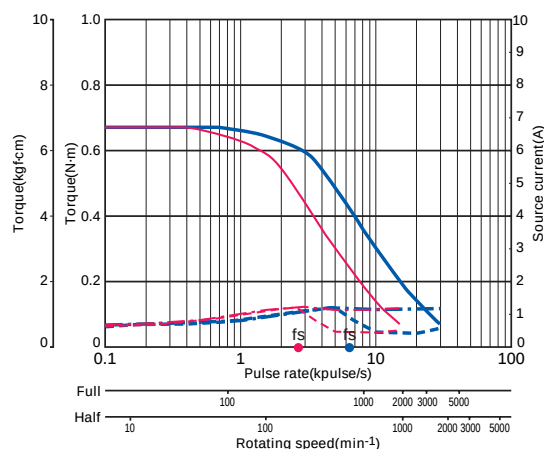
Source voltage:DC24V-Winding current:0.75A/phase
 — Getaway torque($J_{L1}=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ Full-step ■ Half-step

●103H6501-70 □□ :36V



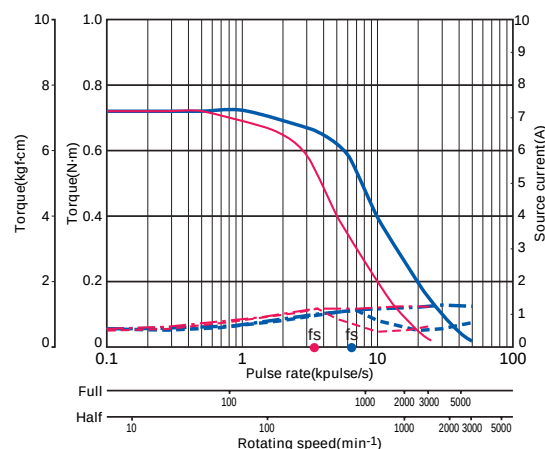
Source voltage:DC36V-Winding current:0.75A/phase
 — Getaway torque($J_{L1}=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ Full-step ■ Half-step

●103H7851-70 □□ :24V



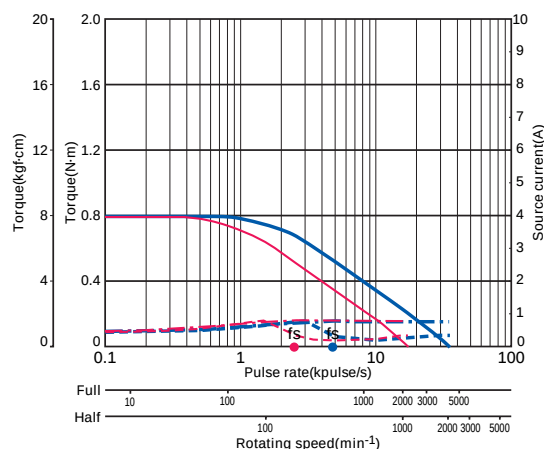
Source voltage:DC24V-Winding current:0.75A/phase
 — Getaway torque($J_{L1}=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ Full-step ■ Half-step

●103H7851-70 □□ :36V



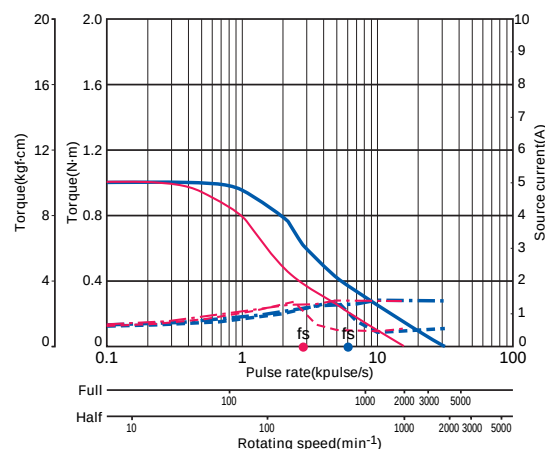
Source voltage:DC36V-Winding current:0.75A/phase
 — Getaway torque($J_{L1}=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ Full-step ■ Half-step

●103H7852-70 □□ :24V



Source voltage:DC24V-Winding current:0.75A/phase
 — Getaway torque($J_{L1}=2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ Full-step ■ Half-step

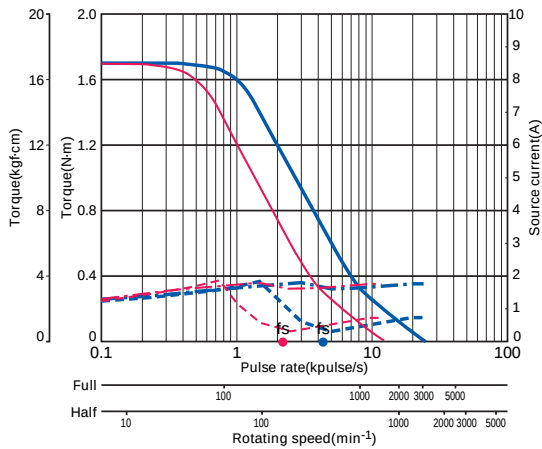
●103H7852-70 □□ :36V



Source voltage:DC36V-Winding current:0.75A/phase
 — Getaway torque($J_{L1}=2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ Full-step ■ Half-step

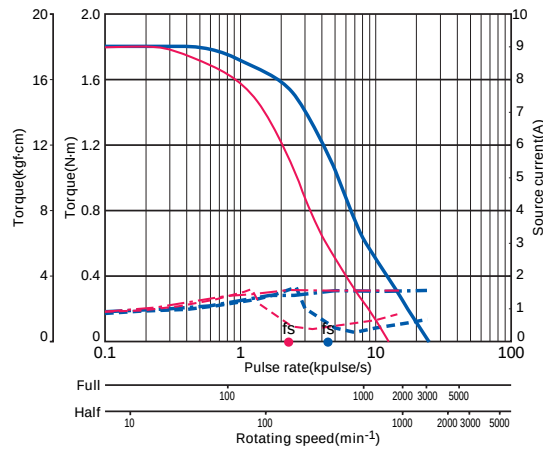
Pulse rate-torque characteristics/pulse rate-source current characteristics

●103H7853-70 □□ :24V



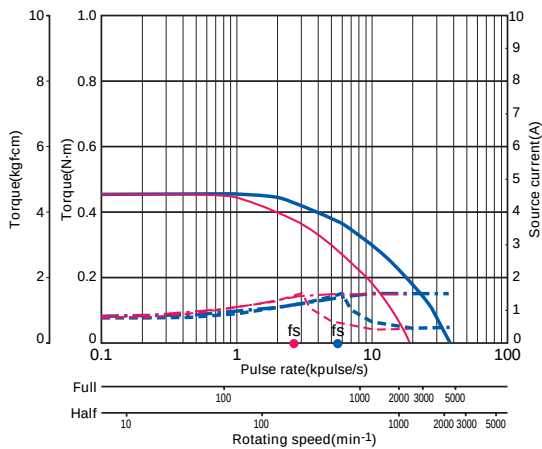
Source voltage:DC24V-Winding current:0.75A/phase
 — Getaway torque($J_{L1}=7.4 \times 10^{-4} \text{kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not load ■ Full-step ■ Half-step

●103H7853-70 □□ :36V



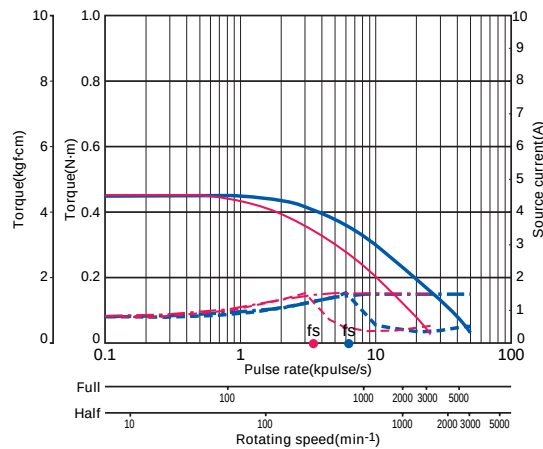
Source voltage:DC36V-Winding current:0.75A/phase
 — Getaway torque($J_{L1}=7.4 \times 10^{-4} \text{kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not load ■ Full-step ■ Half-step

●103H7521-70 □□ :24V



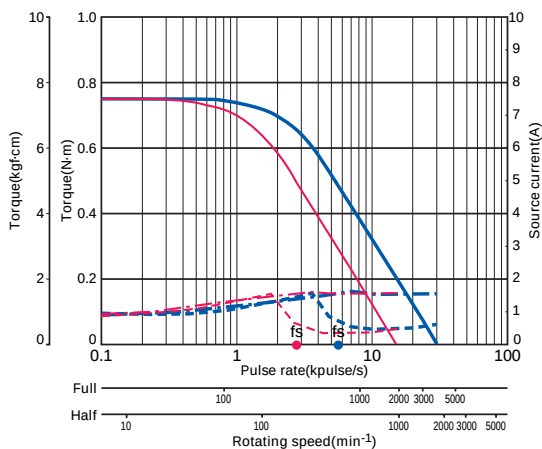
Source voltage:DC24V-Winding current:0.75A/phase
 — Getaway torque($J_{L1}=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not load ■ Full-step ■ Half-step

●103H7521-70 □□ :36V



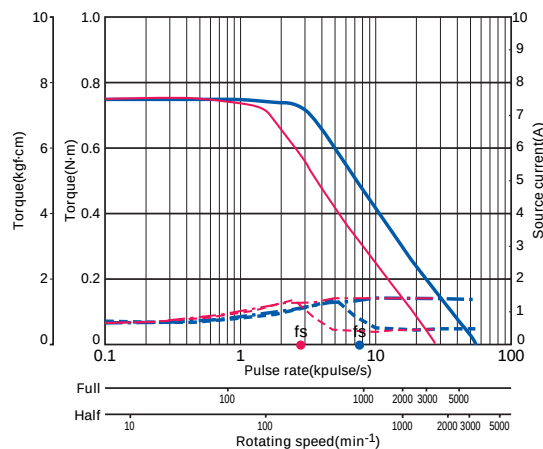
Source voltage:DC36V-Winding current:0.75A/phase
 — Getaway torque($J_{L1}=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not load ■ Full-step ■ Half-step

●103H7522-70 □□ :24V



Source voltage:DC24V-Winding current:0.75A/phase
 — Getaway torque($J_{L1}=2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not load ■ Full-step ■ Half-step

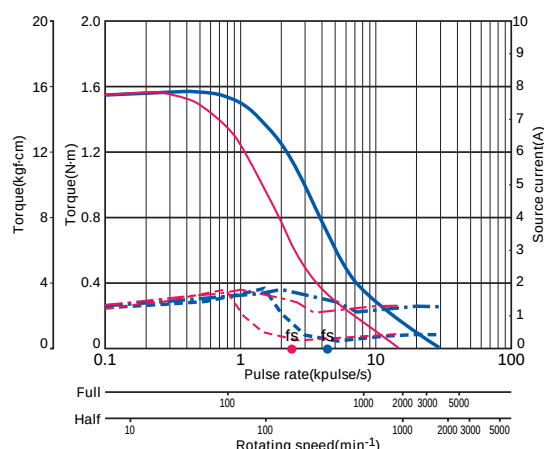
●103H7522-70 □□ :36V



Source voltage:DC36V-Winding current:0.75A/phase
 — Getaway torque($J_{L1}=2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not load ■ Full-step ■ Half-step

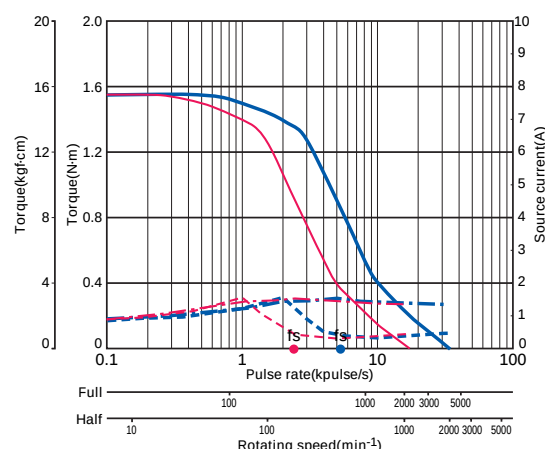
Pulse rate-torque characteristics/pulse rate-source current characteristics

●103H7523-70 □□ :24V



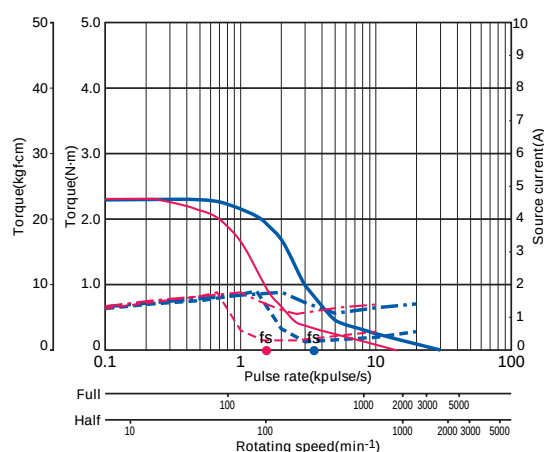
Source voltage:DC24V-Winding current:0.75A/phase
 — Getaway torque($J_{L1}=7.4 \times 10^{-4} \text{kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ Full-step ■ Half-step

●103H7523-70 □□ :36V



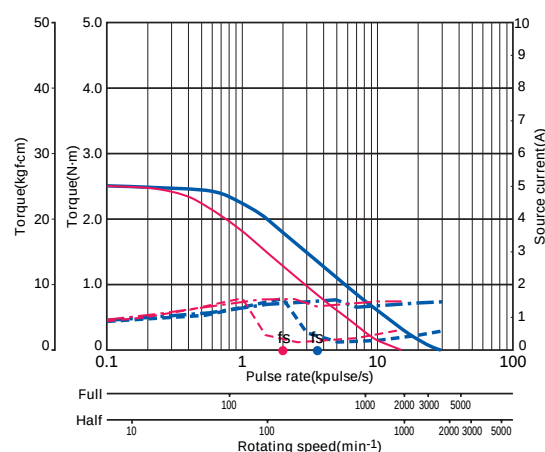
Source voltage:DC36V-Winding current:0.75A/phase
 — Getaway torque($J_{L1}=7.4 \times 10^{-4} \text{kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ Full-step ■ Half-step

●103H8581-70 □□ :24V



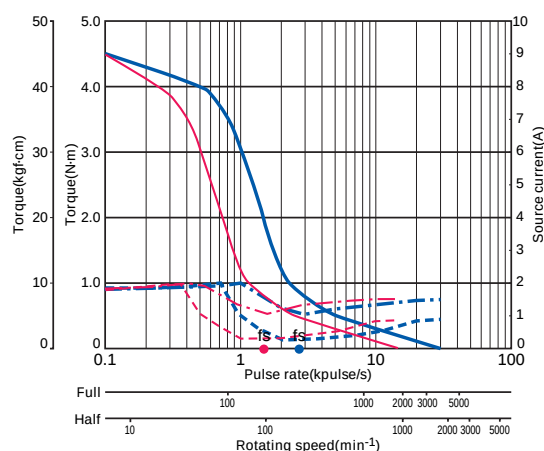
Source voltage:DC24V-Winding current:0.75A/phase
 — Getaway torque($J_{L1}=7.4 \times 10^{-4} \text{kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ Full-step ■ Half-step

●103H8581-70 □□ :36V



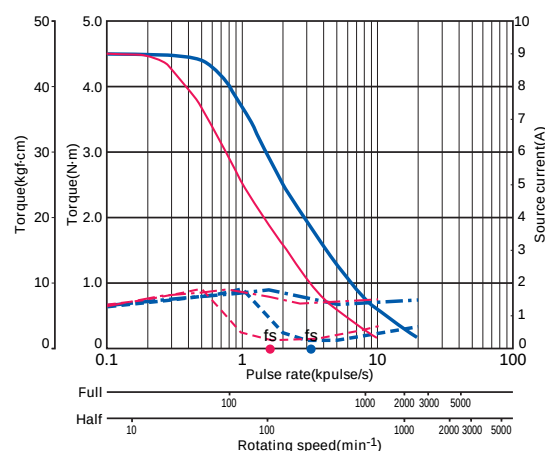
Source voltage:DC36V-Winding current:0.75A/phase
 — Getaway torque($J_{L1}=7.4 \times 10^{-4} \text{kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ Full-step ■ Half-step

●103H8582-70 □□ :24V



Source voltage:DC24V-Winding current:0.75A/phase
 — Getaway torque($J_{L1}=15.1 \times 10^{-4} \text{kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ Full-step ■ Half-step

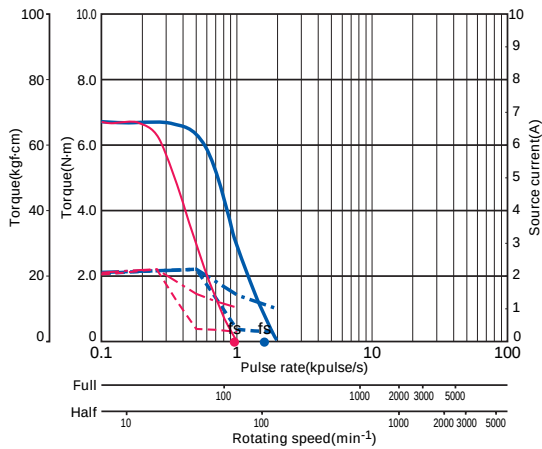
●103H8582-70 □□ :36V



Source voltage:DC36V-Winding current:0.75A/phase
 — Getaway torque($J_{L1}=15.1 \times 10^{-4} \text{kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ Full-step ■ Half-step

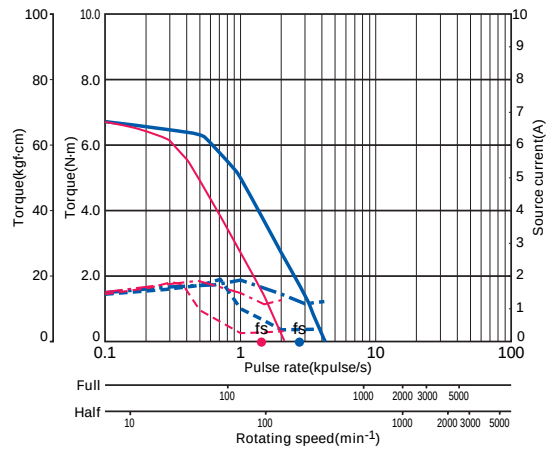
Pulse rate-torque characteristics/pulse rate-source current characteristics

●103H8583-70 □□:24V



Source voltage:DC24V-Winding current:0.75A/phase
 — Getaway torque($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ Full-step ■ Half-step

●103H8583-70 □□:36V



Source voltage:DC36V-Winding current:0.75A/phase
 — Getaway torque($J_{L1}=44 \times 10^{-4} \text{kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ Full-step ■ Half-step

PMAP1S6A01

PMAP1S6B01

PMM-MA-50034

PMM-MA-50064

PMM-BA-5603-5643

PMM-BA-5604-5644

PMDP81S6P01

PMDPC1S3P01

PMM-MD-53030-53031

PMM-BD-53130-53131

PMDPA1A3P20

PMDPA1C3P20

Option

PMM-BD-53130-10 (Photo coupler input system)

● Connector set

Model number	Used for	Set content	Quantity	Manufacturer name	Applicable cable size	Crimping tool model number
PM-AP-012	I/O signal and DC power source (CN1B)	Applicable housing:5051-15	1	Molex Japan	AWG22~28	JHTR2262A
		Applicable contact:2759PBGL	15			JHTR2262J
PM-AP-045 (Type H785 □)	Stepping motor (CN2)	Applicable housing:5051-05	1	Molex Japan	AWG22	JHTR2262A
		Applicable contact:5159PBTL	5			
		Applicable housing:VHR-5N	1	J.S.T. Mfg Co., Ltd.		YC-160R
		Applicable contact:SVH-21T-P1.1	5			
PM-AP-046 (Type H35 □ 5)		Applicable housing:5051-05	1	Molex Japan	AWG24~28	JHTR2262A
		Applicable contact:5159PBTL	5			JHTR2262J
		Applicable housing:PHR-5	1	J.S.T. Mfg Co., Ltd.		YRM-240
		Applicable contact:SPH-002T-P0.5S	5			
PM-AP-007 (Types other than above)		Applicable housing:5051-05	1	Molex Japan	AWG22~28	JHTR2262A
		Applicable contact:5159PBTL	5			JHTR2262J

- Place the order of a set or sets of two model numbers CN1B and CN2 when ordering.

● Connector cable

Model number	Application
PM-C15T0100-01	Connector cable for I/O signal and DC power source (CN1B)
PM-C05M0100-□□	Connector cable for stepping motors (CN2)

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

□□ are spaces to be filled by the serial number 01, 03, or 04 (refer to Supplement table 1).

Stepping motor cable model number (Supplement table 1)

Serial No.	Stepping motor model number
01	103H5505-70 □□
	103H5508-70 □□
	103H5510-70 □□
	103H6500-70 □□
	103H6501-70 □□
	103H7521-70 □□
	103H7522-70 □□
	103H7523-70 □□
	103H8581-70 □□
	103H8582-70 □□
	103H8583-70 □□
03	103H3505-70 □□
	103H3515-70 □□
04	103H7851-70 □□
	103H7852-70 □□
	103H7853-70 □□

Option

PMM-BD-53131-10 (CMOS input system)

● Connector set

Model number	Used for	Set content	Quantity	Manufacturer name	Applicable cable size	Crimping tool model number
PM-AP-011	I/O signal and DC power source (CN1A)	Applicable housing:5051-12	1	Molex Japan	AWG22~28	JHTR2262A
		Applicable contact:2759PBGL	12			JHTR2262J
PM-AP-045 (Type H785 □)	Stepping motor (CN2)	Applicable housing:5051-05	1	Molex Japan	AWG22	JHTR2262A
		Applicable contact:5159PBTL	5			YC-160R
		Applicable housing:VHR-5N	1	J.S.T. Mfg Co., Ltd.		
		Applicable contact:SVH-21TP1.1	5			
PM-AP-046 (Type H35 □ 5)		Applicable housing:5051-05	1	Molex Japan	AWG24~28	JHTR2262A
		Applicable contact:5159PBTL	5			JHTR2262J
		Applicable housing:PHR-5	1	J.S.T. Mfg Co., Ltd.		YRM-240
		Applicable contact:SPH-002T-P0.5S	5			
PM-AP-007 (Types other than above)		Applicable housing:5051-05	1	Molex Japan	AWG22~28	JHTR2262A
		Applicable contact:5159PBTL	5			JHTR2262J

- Place the order of a set or sets of two model numbers CN1B and CN2 when ordering.

● Connector cable

Model number	Application
PM-C12T0100-01	Connector cable for I/O signal and DC power source (CN1A)
PM-C05M0100-□□	Connector cable for stepping motors (CN2)

□□ are spaces to be filled by the serial number 01, 03, or 04 (refer to Supplement table 1).

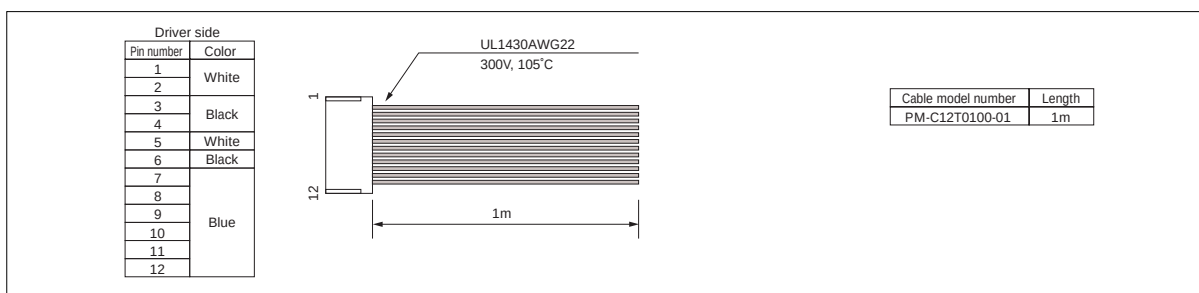
- The connector cable is a 1-meter cable assembled with the connector.

Stepping motor cable model number (Supplement table 1)

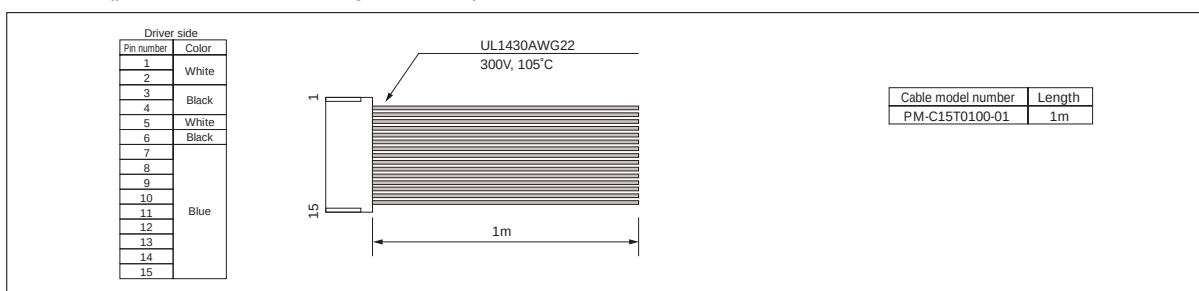
Serial No.	Stepping motor model number
01	103H5505-70 □□
	103H5508-70 □□
	103H5510-70 □□
	103H6500-70 □□
	103H6501-70 □□
	103H7521-70 □□
	103H7522-70 □□
	103H7523-70 □□
	103H8581-70 □□
	103H8582-70 □□
	103H8583-70 □□
03	103H3505-70 □□
	103H3515-70 □□
04	103H7851-70 □□
	103H7852-70 □□
	103H7853-70 □□

Option

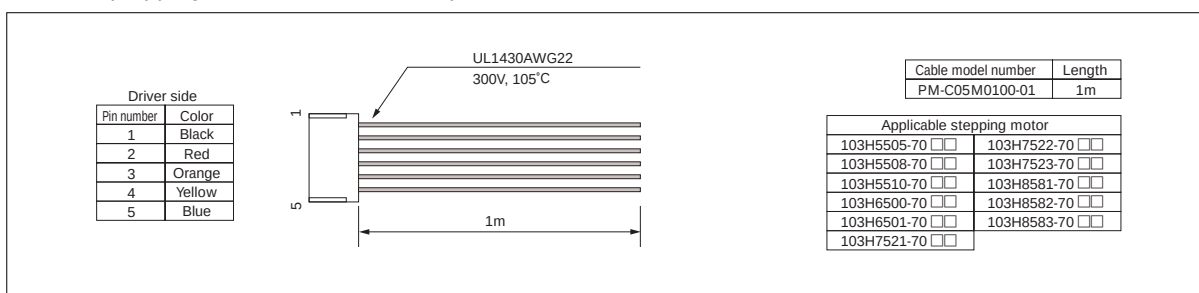
● Cable 1 (power source and I/O signal cable 1)



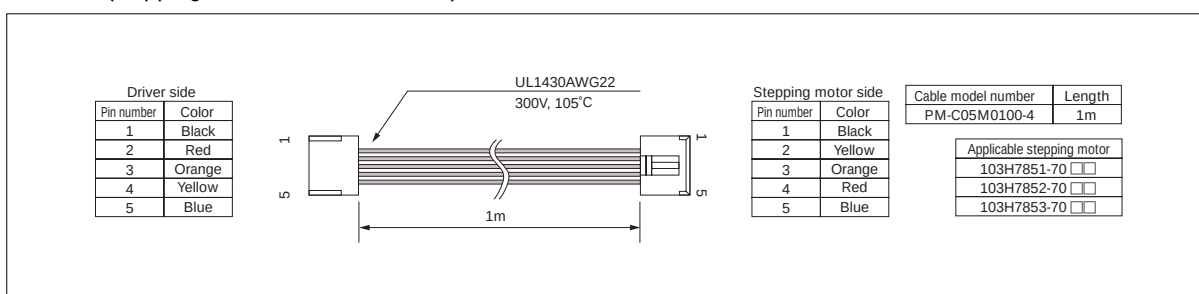
● Cable 2 (power source and I/O signal cable 2)



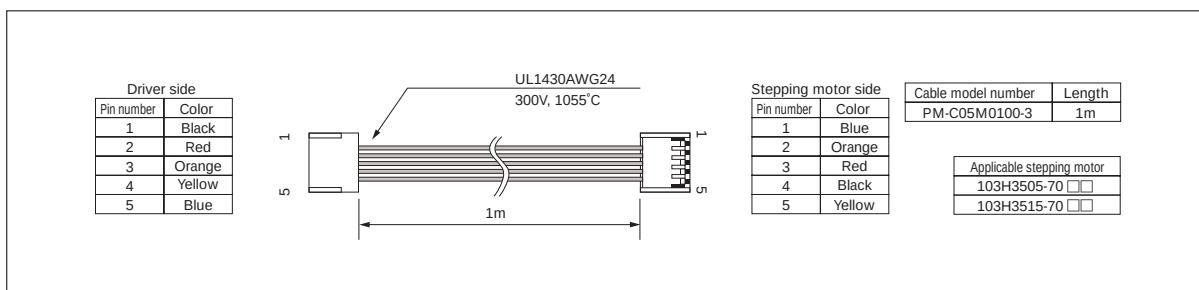
● Cable 3 (stepping motor extension cable 1)



● Cable 4 (stepping motor extension cable 2)



● Cable 5 (stepping motor extension cable 3)



PMAPA1S6A01

PMAPA1S6B01

PMM-MA-50034

PMM-MA-50064

PMM-BA-5603
-5643PMM-BA-5604
-5644

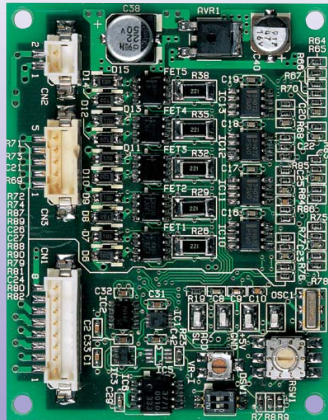
PMDPB1S6P01

PMDPC1S3P01

PMM-MD-53030
-53031PMM-BD-53130
-53131

PMDPA1A3P20

PMDPA1C3P20



The 5-Phase Stepping Driver

PMPD1S1P01

DC12V/24V

Micro-step (500 x 1 to 80 divisions)

● Applicable motors



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 single or double input system can be selected by using dipswitches.

- **Power down function**

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

PM driver specifications

Item		PMDPD1S1P01
Standard specification	Environment	Input source
		DC12V/24V±10%
		Source current
		1A
		Operating ambient temperature
		0 to +50°C
		Conservation temperature
		- 20 to + 70°C
		Operating ambient humidity
		35 to 85%RH (no condensation)
	Function	Conservation humidity
		10 to 90%RH (no condensation)
		Vibration resistance
	I/O signals	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
	I/O signals	Weight
		0.35kg
		Select function
	I/O signals	Auto current down, pulse input system, step angle
		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
	I/O signals	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

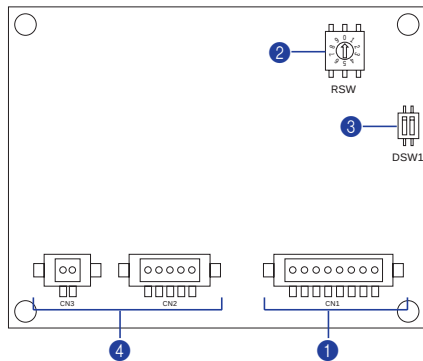
Standard combined stepping motor

Stepping motor dimensions	Stepping motor model number		Holding torque [N·m]	Rotor inertia [×10 ⁻⁴ kg·m ²]	Weight [kg]	Page
	Single-axis shaft	Dual-axis shaft				
□28mm	103F3505-304□	103F3505-301□	0.0265	0.009	0.11	page 309
	103F3515-304□	103F3515-301□	0.0520	0.016	0.20	
□42mm	103F5505-304□	103F5505-301□	0.1270	0.030	0.23	page 311

- 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.

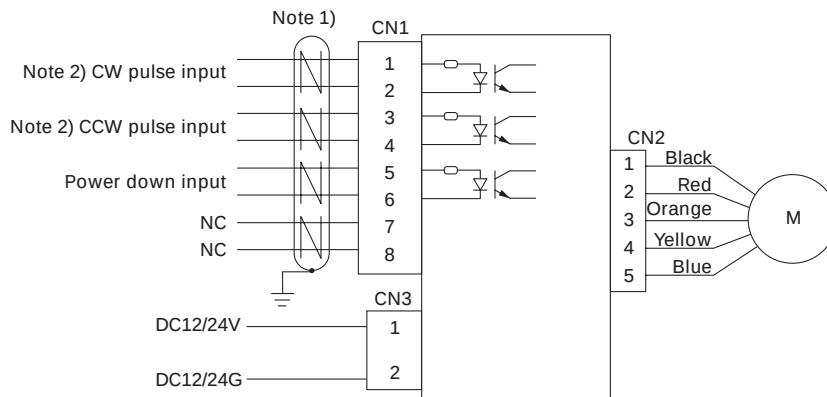
③ Function selection dipswitches (ACD and F/R)

..... Functions can be selected according to specifications.

④ Connector (CN2 and CN3)

..... Connects the DC power source and the stepping motor power cable.

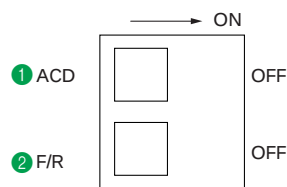
● External wiring diagram



Note 1) Use shielded twisted-pair cables.

Note 2) Either "double input system (CW and CCW)" or "single input system (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)

Auto current down function is selected.

ACD	Auto current down
ON	Does not operate.
OFF	Operates.

② F/R (pulse input system selection)

A pulse input system is selected.

F/R	Pulse input system
ON	Single input system (CK and U/D)
OFF	Double input system (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) ---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

- "1" is set at the shipment.

● I/O signal function ---①

Signal name	Abbreviation	Pin number	Function
CW pulse input	CW+	1	When using double input system
	CW-	2	Inputs drive pulse for counterclockwise rotation.
Pulse column input	CK+	1	When using single input system
	CK-	2	Inputs drive pulse column for the stepping motor rotation.
CCW pulse input	CCW+	3	When using double input system
	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 single input system.
	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).

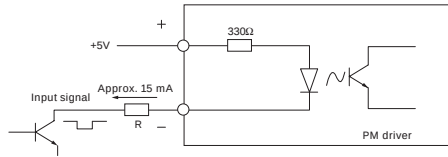
● Connectors to be used

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).

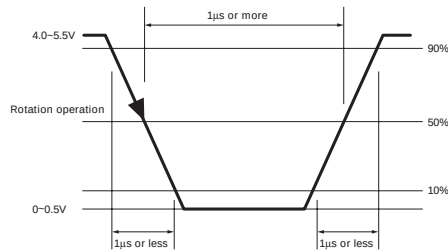
Operation, connection, and function

● 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.

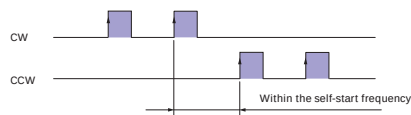
Input signal specifications



- Pulse duty is 50% or less.

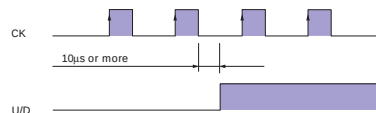
Timing of the command pulse

• Double input system (CW, CCW)



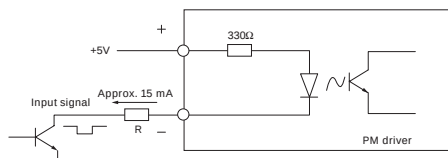
- The internal photo coupler turns ON within the and the internal circuit (stepping motor) is activated at the leading edge of the photo coupler "ON".
- When applying no pulse, fix the internal photo coupler to "ON" or "OFF".

• Single input system (CK, U/D)



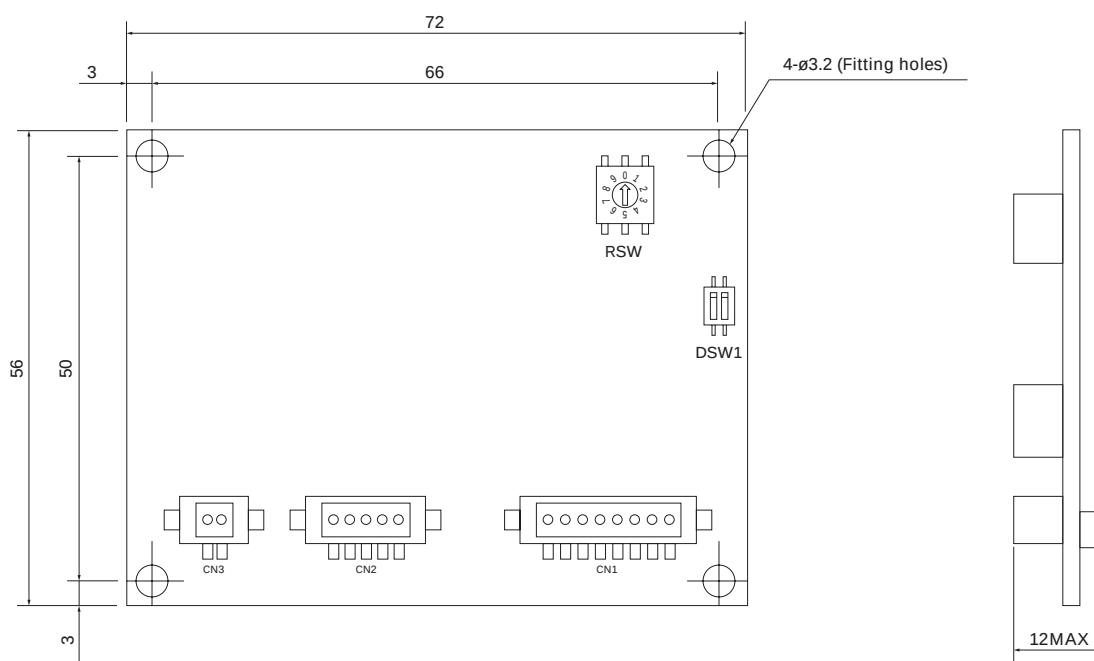
- The internal photo coupler turns ON within the , and the internal circuit (stepping motor) is activated at the leading edge of the photo coupler "ON".
- Perform the U/D input signal switchover when the CK-side internal photo coupler is set to "OFF".

● Input circuit configuration (PD)

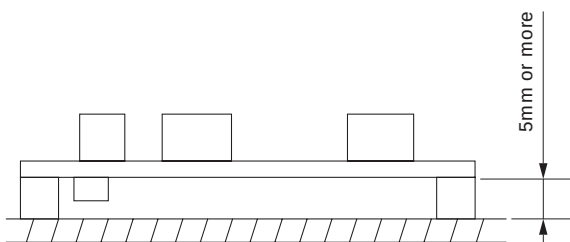


- When the peak value of the input signal is 5V, the external limit resistance R is 0Ω. If the peak value exceeds 5V, set the input current to approx. 15mA using the external limit resistance R.

Dimensions (Unit: mm)



Installation direction and position



- Fix the PM driver by using the spacer of $\phi 6$ or less of which length is 5mm or more.

PMAPALS6A01

PMAPALS8B01

PMM-MA-50034

PMM-MA-50064

PMM-BA-5603-5643

PMM-BA-5604-5644

PMDPBLIS6P01

PMDPCLIS3P01

PMM-MD-53030-53031

PMM-BD-53130-53131

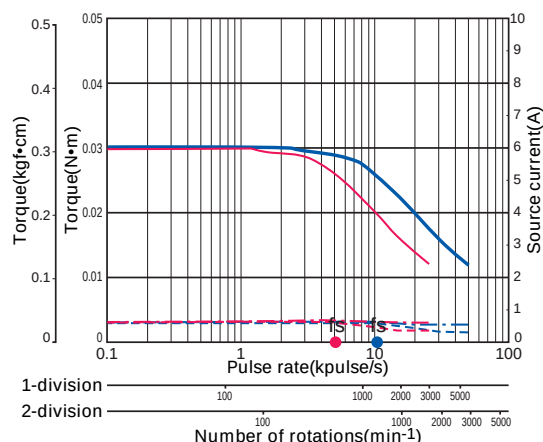
PMDPDLIS1P01

PMDPALA3P20

PMDPALC3P20

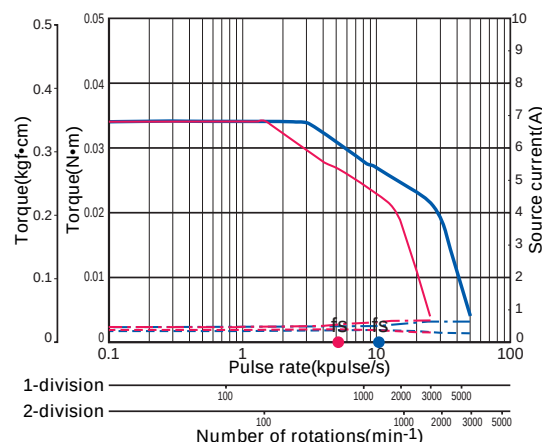
Pulse rate-torque characteristics/pulse rate-source current characteristics

●103F3505-30 □□ :12V



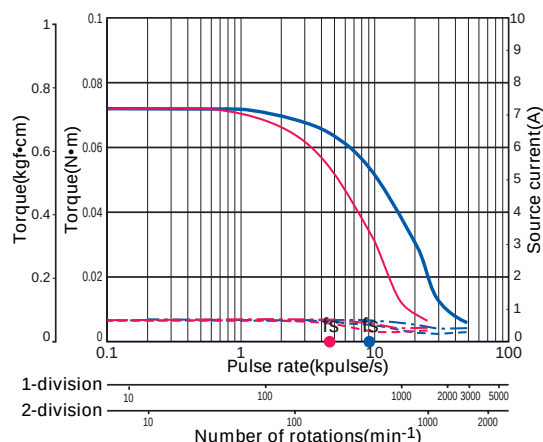
Source voltage:DC12V-Winding current: 0.35 A/phase
 — Getaway torque($J_L1=0.33 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103F3505-30 □□ :24V



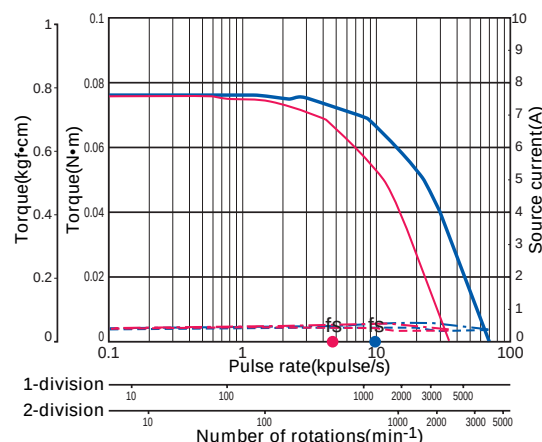
Source voltage:DC24V-Winding current: 0.35 A/phase
 — Getaway torque($J_L1=0.33 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103F3515-30 □□ :12V



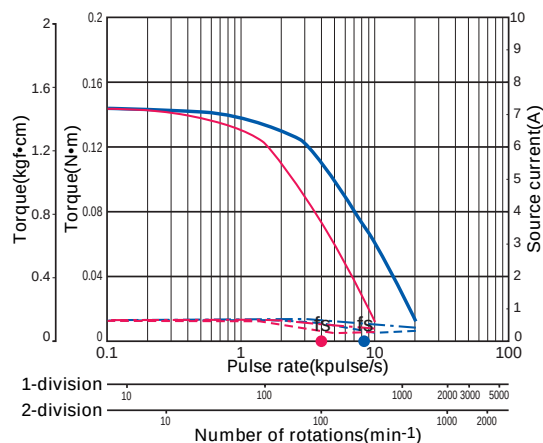
Source voltage:DC12V-Winding current: 0.35 A/phase
 — Getaway torque($J_L1=0.33 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103F3515-30 □□ :24V



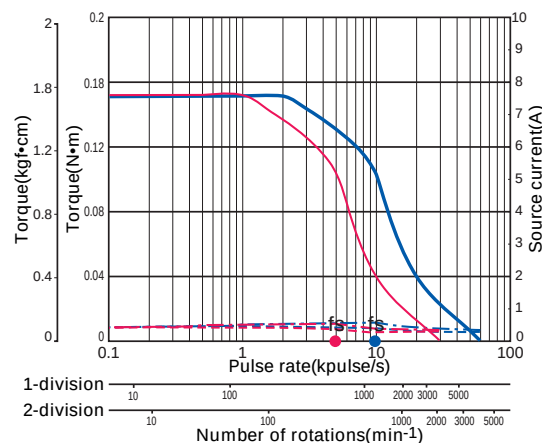
Source voltage:DC24V-Winding current: 0.35 A/phase
 — Getaway torque($J_L1=0.33 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103F5505-30 □□ :12V



Source voltage:DC12V-Winding current: 0.35 A/phase
 — Getaway torque($J_L1=0.33 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

●103F5505-30 □□ :24V



Source voltage:DC24V-Winding current: 0.35 A/phase
 — Getaway torque($J_L1=0.33 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ 1-division is specified ■ 2-division is specified

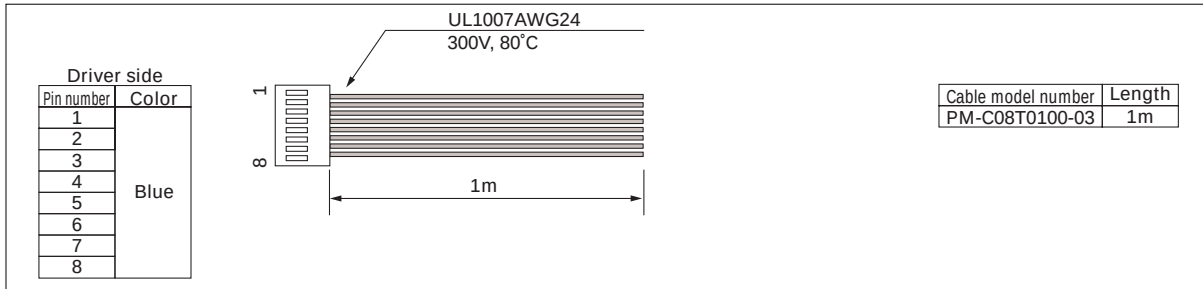
Option

● Connector cable

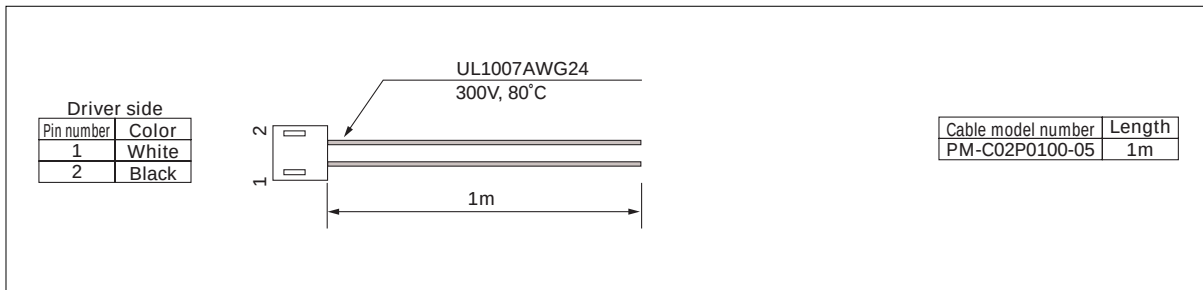
Model number	Application
PM-C08S0100-03	Connector cable for I/O signals (CN1)
PM-C02P0100-05	Connector cable for AC power source (CN3)
PM-C05M0100-10	Connector cable for stepping motors (CN2)

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

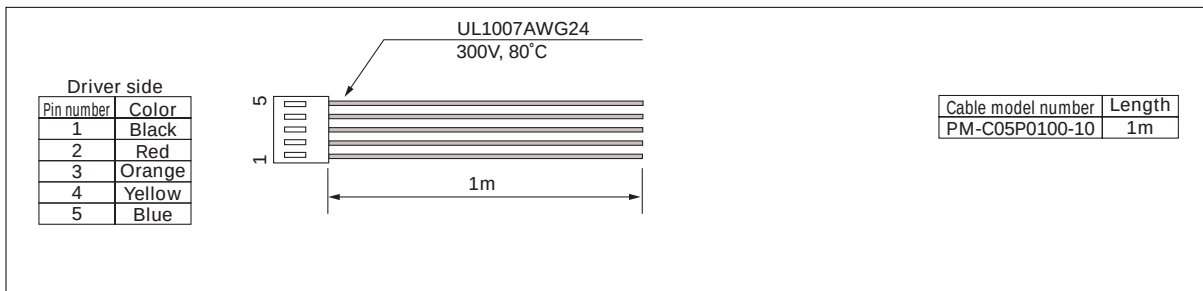
● Cable 1 (I/O signal cable)



● Cable 2 (power source cable)



● Cable 3 (stepping motor cable)





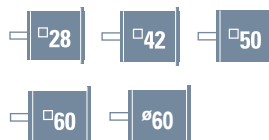
The 5-Phase Stepping Driver

PMDPA1A3P20

DC24V

RS-485 I/F

● Applicable motors



Characteristics

● **Conformity to RS-485**

This driver conforms to the serial communication RS-485.

● **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.

● **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 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		PMDPA1A3P20
Basic specifications	Input source	For main power source
		DC24V±10%
	Source current	For control power source
		DC5V±10%
	Source current	For main power source
		2.5A
	Source current	For control power source
		0.5A
	Environment	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)
Function	Weight	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".
I/O signals	Weight	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.
Communication specification	Weight	Weight
		0.5kg
		Protection function
		Against source voltage abnormality, position data overflow, encoder disconnection, and step-out detection
Communication specification	Weight	Selection function
		Option selection and setting for communication
		LED indicator
		Status indication and driver state
Communication specification	Weight	LLimit sensor input signal
		Photocoupler input system, input resistance 3.3 Ω
		Origin sensor input signal
		Photocoupler input system, input resistance 3.3 Ω
Communication specification	Weight	External stop input signal
		Photocoupler input system, input resistance 3.3 Ω
		Alarm output signal
		Open collector output by photocoupler Output signal standard Vceo: DC 5 to 24 V, Ic: Maximum 50 mA
Communication specification	Weight	Brake output signal
		Open collector output by photocoupler Output signal standard Vceo: DC 5 to 24 V, Ic: Maximum 50 mA
		Applicable specification
		Conformity to RS-485
Communication specification	Weight	Synchronization system
		Start-stop synchronization system
		Transmission speed
		9600bit/s,38400bit/s,153600bit/s,307200bit/s
Communication specification	Weight	Transmission distance
		Maximum 100 m (total length)
		Address setting
		Maximum 31 stations (0 to 63)

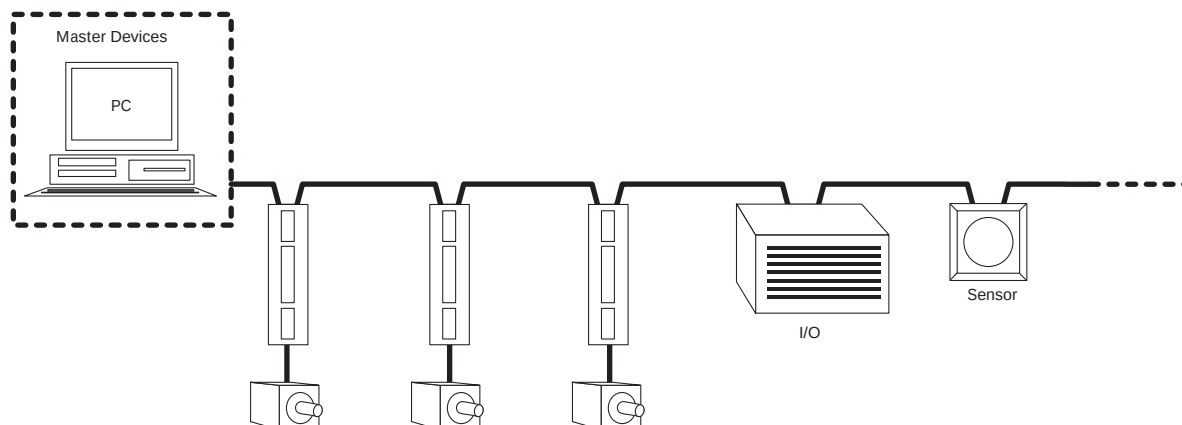
Standard combined stepping motor

Stepping motor dimensions	Stepping motor model number		Holding torque [N·m]	Rotor inertia [×10 ⁻⁴ kg·m ²]	Mass [kg]	Reference page
	Single-axis shaft	Dual-axis shaft				
□28mm	103H3505-7040	103H3505-7010	0.0265	0.009	0.11	Page 309
	103H3515-7040	103H3515-7010	0.052	0.016	0.2	
□42mm	103H5505-7040	103H5505-7010	0.127	0.03	0.23	Page 311
	103H5508-7040	103H5508-7010	0.176	0.053	0.28	
	103H5510-7040	103H5510-7010	0.225	0.065	0.37	
□50mm	103H6500-7041	103H6500-7011	0.225	0.057	0.38	Page 313
ø60mm	103H7521-7051	103H7521-7021	0.46	0.148	0.51	Page 317
	103H7522-7051	103H7522-7021	0.83	0.18	0.6	
	103H7523-7051	103H7523-7021	1.86	0.423	1.1	
□60mm	103H7851-7051	103H7851-7011	0.65	0.275	0.6	Page 315
	103H7852-7051	103H7852-7011	0.98	0.4	0.78	
	103H7853-7051	103H7853-7011	1.86	0.84	1.36	

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

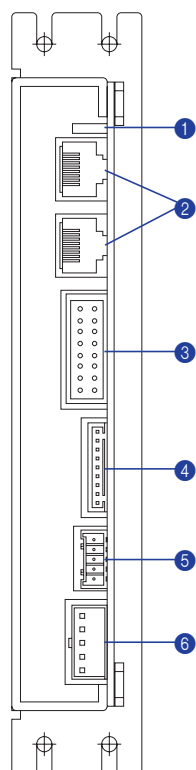
Operation, connection, and function

● RS-485 system block diagram



- This PM driver in maximum 31 units can be connected on a same network as the RS-485 slave device. In addition, it can be connected by mixing with other devices that are compatible to the same RS-485 protocol.

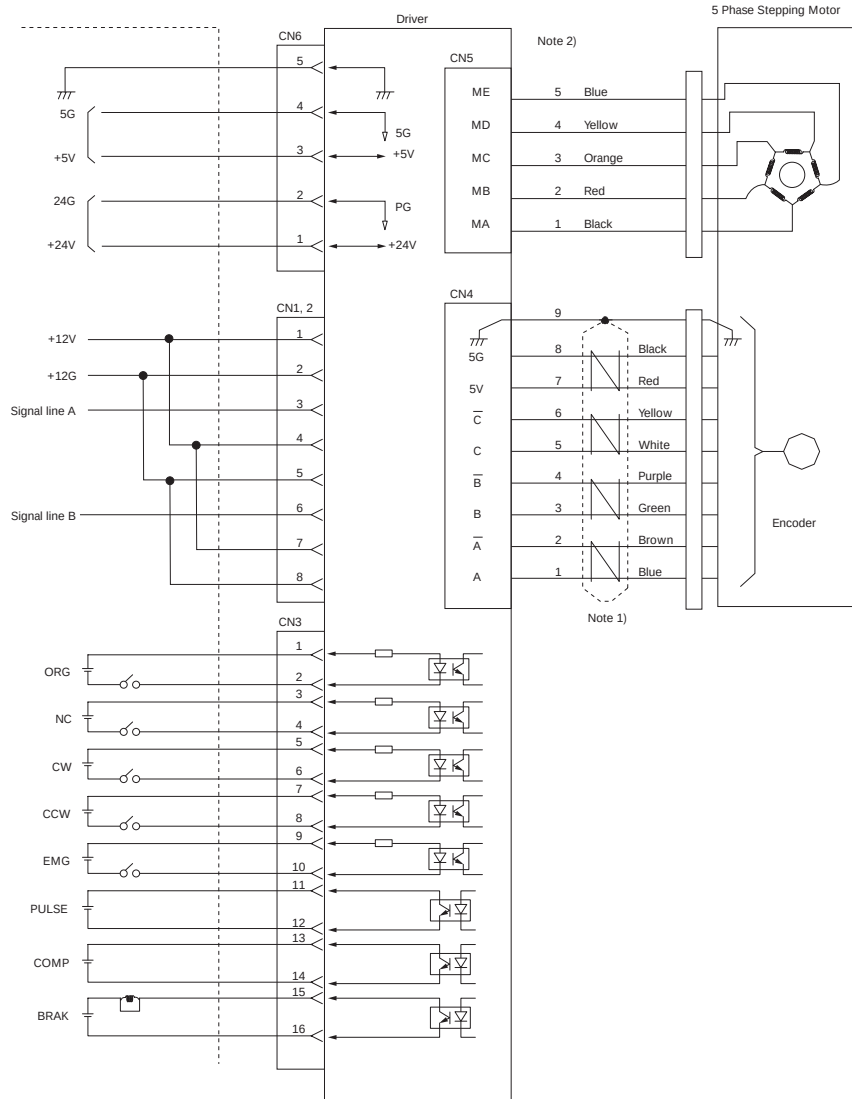
● Each section name of the PM driver



- ① Status LED Indicates the control power source status.
- ② Communication connector It is the connector for the RS-485 communication.
- ③ Connector for I/O signal Connects I/O signals.
- ④ Encoder connector Optional encoder can be connected.
- ⑤ Stepping motor connector Connects the stepping motor power cable.
- ⑥ Power input connector Connects the power source.

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.

I/O signal function

Signal name (Abbreviation)	Pin number (CN2)	Function
CW limit input (CW)	5 6	The limit signal is input to disable the CW direction operation. Enable/disable can be set by the DSW.
CCW limit input (CCW)	7 8	The limit signal is input to disable the CCW direction operation. Enable/disable can be set by the DSW.
Origin sensor input (ORG)	1 2	The origin sensor signal is input.
External stop input (EMG)	9 10	External stop signal is input. The stop operation can be selected by the DSW.
Pulse output (PULSE)	11 12	Pulses are output.
Operation completion signal (COMP)	13 14	The fact of operation completion is output.
Brake output (BRAK)	15 16	The timing signal of holding brake is output.

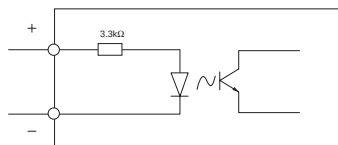
Operation, connection, and function

● Connectors to be used

PM driver side		Applicable connector model number	Manufacturer
Used for	Model number		
RS485 communication (CN1, 2)	TM11R-5LF-88	—	Hirose Electric Co., Ltd.
I/O signals (CN3)	53107-1620	Applicable housing: 51030-0820 Applicable contact: 50083-8060 Shell kit: 51041-1600	Molex Japan
Encoder (CN4)	IL-G-9P-S3L2-SA-1	Applicable housing: IL-G-9S-S3C2 Applicable contact: IL-G-C2-SC-10000	J.S.T. Mfg Co., Ltd.
Stepping motor (CN5)	53426-0510	Applicable housing: 51103-0500 Applicable contact: 50351-8100	Molex Japan
DC power source (CN6)	53259-0510	Applicable housing: 51067-0500 Applicable contact: 50217-8100	Molex Japan

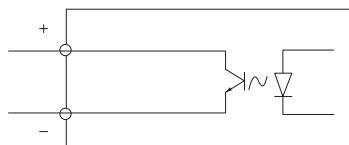
- The applicability for communication differs from that of manufacturer standard cable products. For the details refer to manufacturers' catalogs. Be sure to use shielded cables.

● Input circuit configuration (CWL, CCWL, ORG, EMG)



- Input voltage: DC 5 V to 24 V
- Input logic: CWL, CCWL, and EMG: Normal close
ORG: Normal open

● Output circuit configuration (PULSE, CPM, BRAK)



- Input voltage: DC 5 V to 24 V
- Input logic: Maximum 50 mA

● Status indication

Indication	Explanation
Dark	No control power is supplied to the PM driver.
Green	Control power is supplied to the PM driver.

Operation, connection, and function

● Alarm state indication

Indication	Explanation
Dark	PM driver normally operates.
Green	The status is that the recovery is impossible..

● Setting switch for communication

Indication	Name	OFF	ON
1	Address setting	0	1
2		0	2
3		0	4
4		0	8
5		0	16
6		0	32
7	Transfer speed setting	Described below.	Described below.
8			
9	Termination resistance setting	Described below.	Described below.
10			

● Address setting

Address	Explanation (SW setting)					
	LSB					MSB
	1	2	3	4	5	6
0	—	—	—	—	—	—
1	○	—	—	—	—	—
2	—	○	—	—	—	—
:	:					
:	:					
3E	—	○	○	○	○	○
3F	○	○	○	○	○	○

○ :ON —:OFF

- Slave station addresses are set from 0 to 3F. Maximum 31-station slaves can be connected to a same line.

● Transmission speed setting

Transmission speed bit/sec	SW setting	
	7	8
9,600	—	—
38,400	○	—
153,600	—	○
307,200	○	○

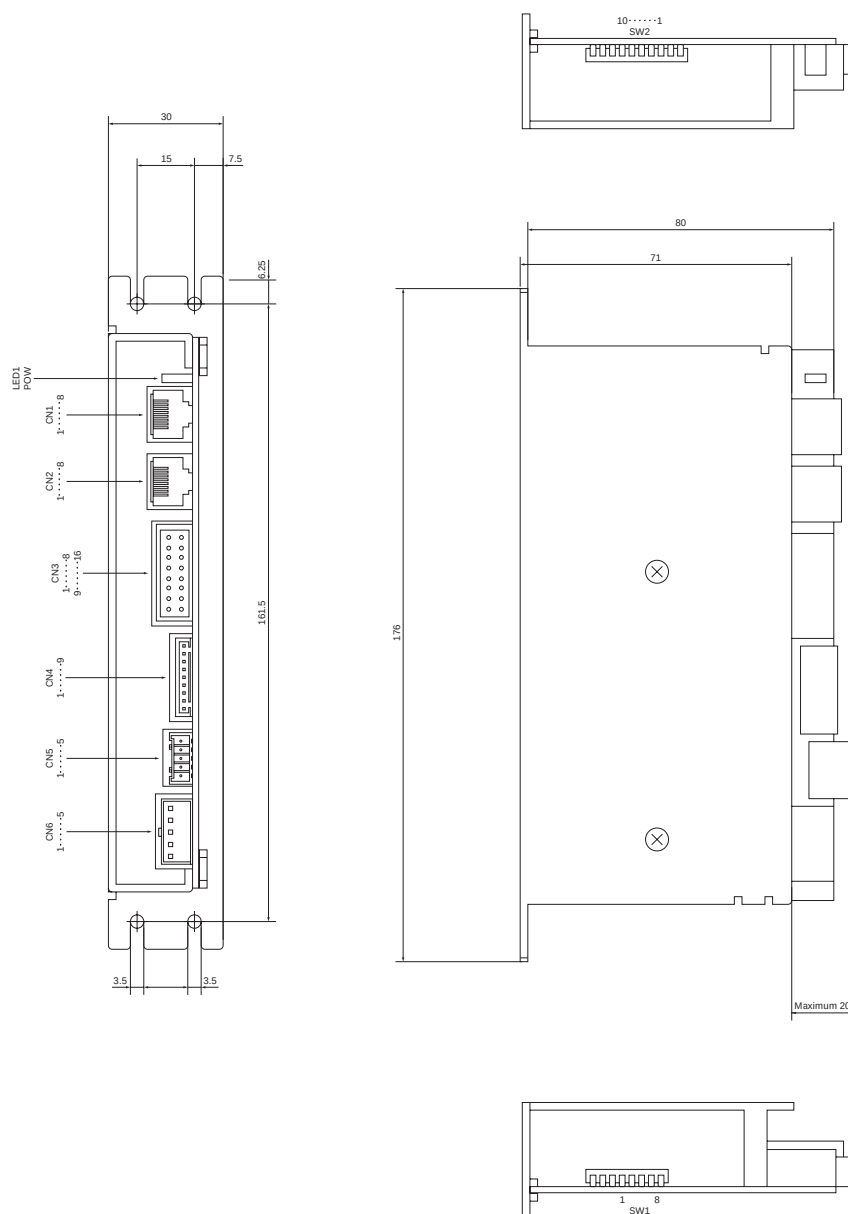
○ :ON —:OFF

● Termination resistance setting

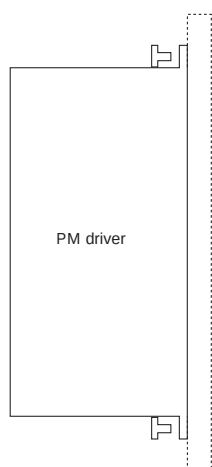
Termination resistance: Connection/release of signal line termination resistance are set.

- Turn ON the switches 9 and 10 when this PM driver is placed at both ends of communication line.
- The switch setting is enabled in the state the PM driver power is turned ON.

Dimensions (unit: mm)



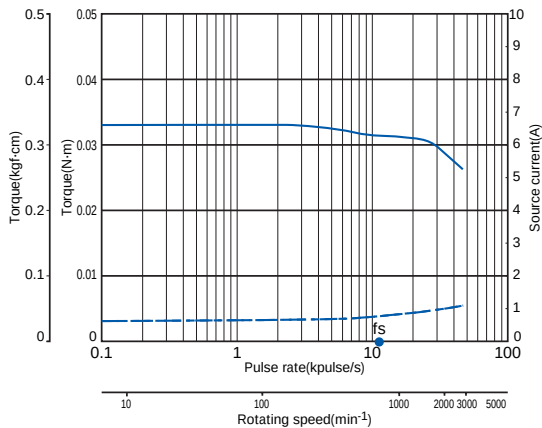
Installation direction and position



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

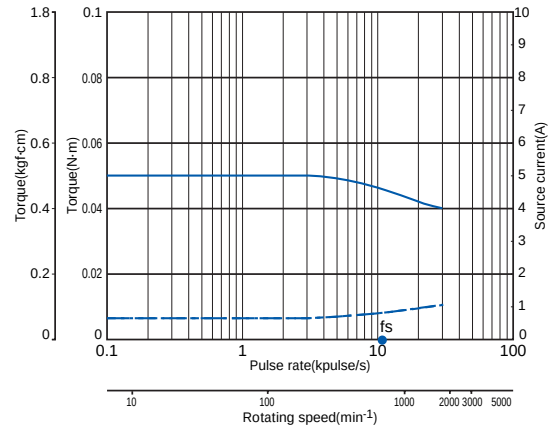
Pulse rate-torque characteristics/pulse rate-source current characteristics

103H3505-70 □□ :24V



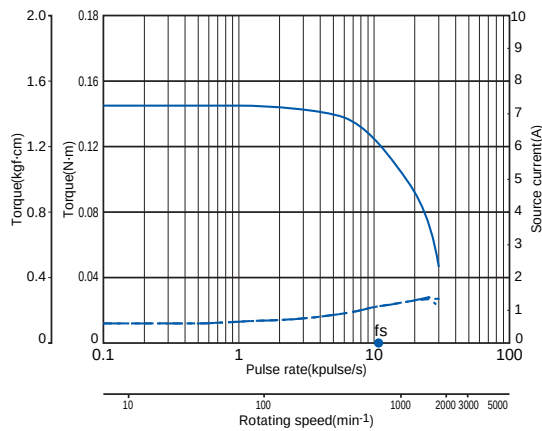
Source voltage:DC24V-Winding current: 0.75 A/phase
 — Getaway torque($J_L1=0.33 \times 10^{-4} \text{kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ Half step

103H3515-70 □□ :24V



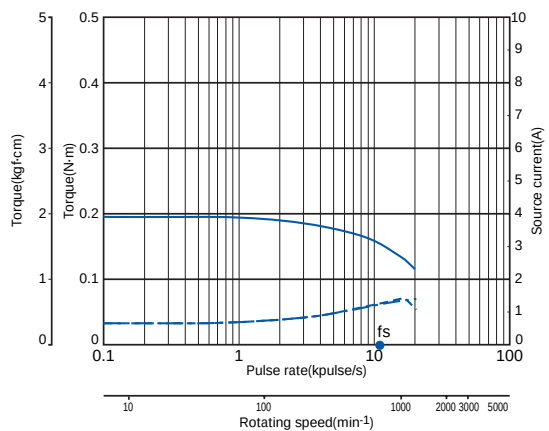
Source voltage:DC24V-Winding current: 0.75 A/phase
 — Getaway torque($J_L1=0.33 \times 10^{-4} \text{kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ Half step

103H5505-70 □□ :24V



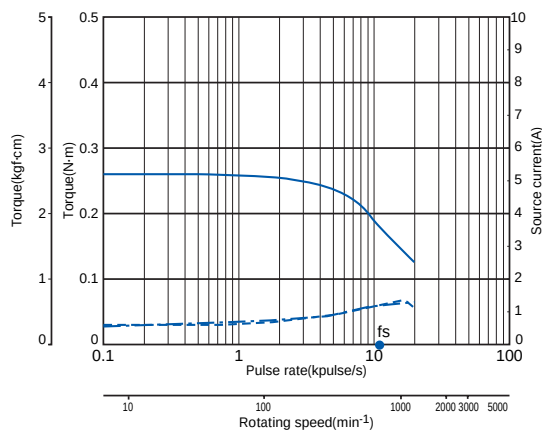
Source voltage:DC24V-Winding current: 0.75 A/phase
 — Getaway torque($J_L1=0.33 \times 10^{-4} \text{kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ Half step

103H5508-70 □□ :24V



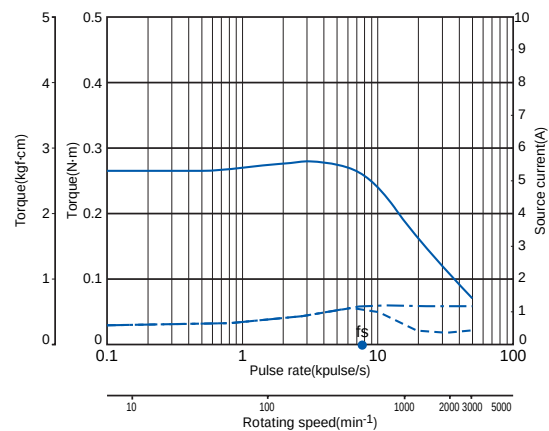
Source voltage:DC24V-Winding current: 0.75 A/phase
 — Getaway torque($J_L1=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ Half step

103H5510-70 □□ :24V



Source voltage:DC24V-Winding current: 0.75 A/phase
 — Getaway torque($J_L1=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ Half step

103H6500-70 □□ :24V

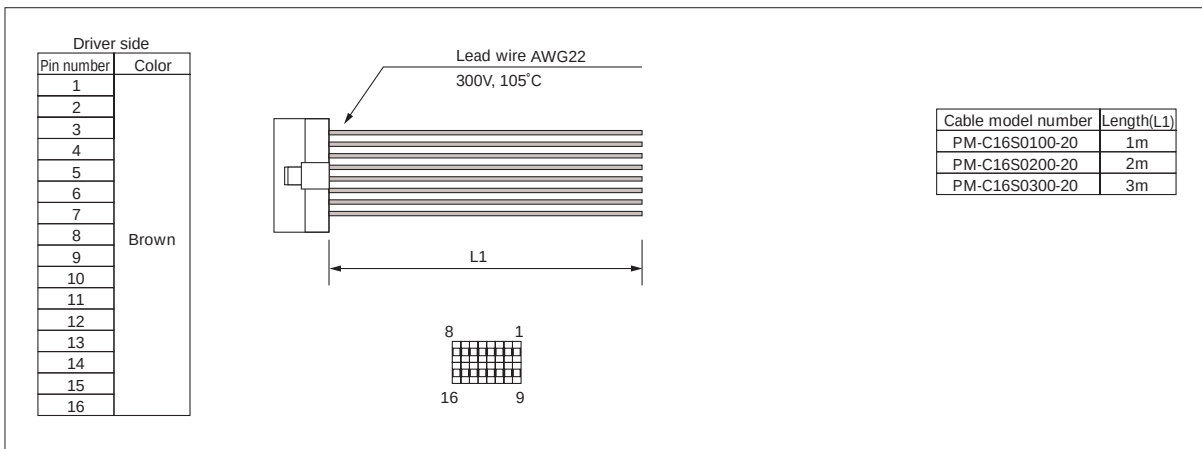
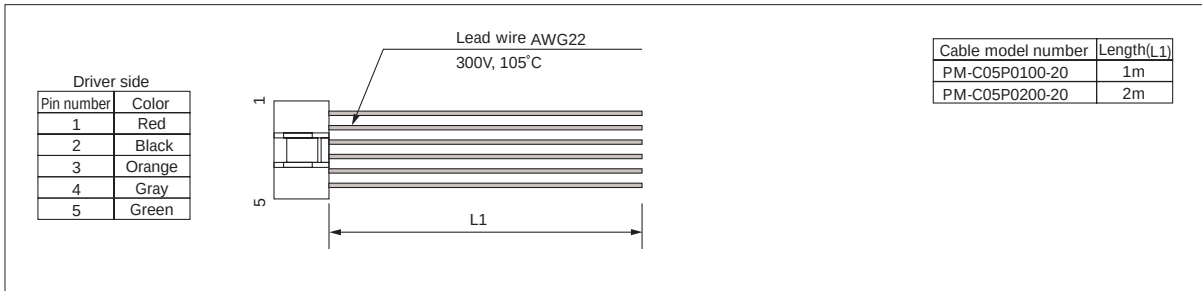


Source voltage:DC24V-Winding current: 0.75 A/phase
 — Getaway torque($J_L1=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum self-start frequency when not loaded ■ Half step

Option

● Connector cable

Model number	Application
PM-C05P0100-20	Connector cable for power source(1m)
PM-C05P0200-20	Connector cable for power source(2m)
PM-C16S0100-20	Connector cable for I/O signal(1m)
PM-C16S0200-20	Connector cable for I/O signal(2m)
PM-C16S0300-20	Connector cable for I/O signal(3m)



PMAPAI56A01

PMAPAI58B01

PMMA-MA-50034

PMMA-MA-50064

PMMA-BA-5603-5643

PMMA-BA-5604-5644

PMDPB1S6P01

PMDPC1S3P01

PMMA-MD-53030-53031

PMMA-BD-53130-53131

PMDDPA1A3P20

PMDDPA1C3P20



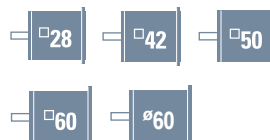
The 5-Phase Stepping Driver

PMDPA1C3P20

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		Weight	0.5kg
		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 Ω
		Origin sensor input signal	Photocoupler input system, input resistance 4.7 Ω
		External stop input signal	Photocoupler input system, input resistance 4.7 Ω
		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.
Communication specification		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)
		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

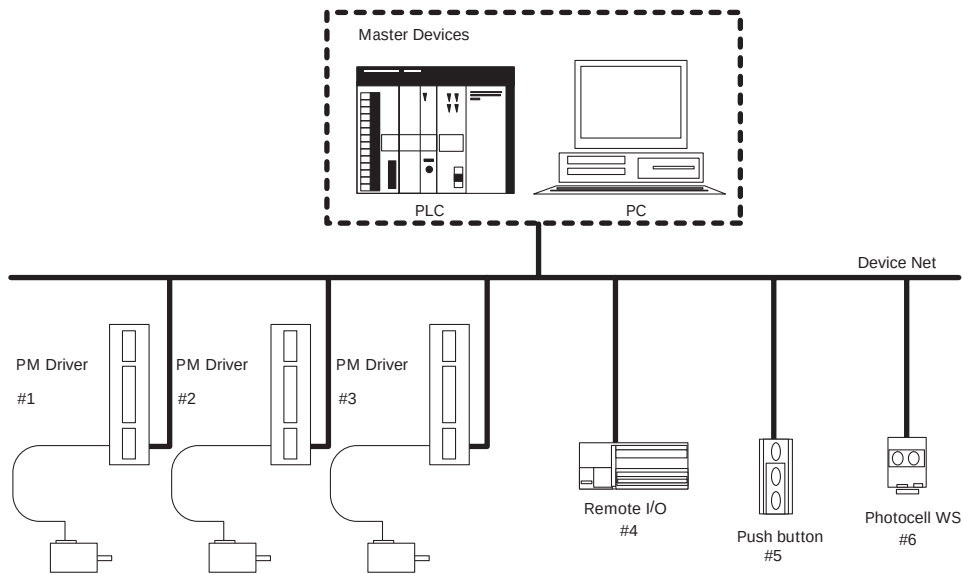
Standard combined stepping motor

Stepping motor dimensions	Stepping motor model number		Holding torque [N·m]	Rotor inertia [x 10 ⁻⁴ kg·m ²]	Weight [kg]	Page
	Single-axis shaft	Dual-axis shaft				
□28mm	103H3505-7040	103H3505-7010	0.0265	0.009	0.11	Page 309
	103H3515-7040	103H3515-7010	0.052	0.016	0.2	
□42mm	103H5505-7040	103H5505-7010	0.127	0.03	0.23	Page 311
	103H5508-7040	103H5508-7010	0.176	0.053	0.28	
	103H5510-7040	103H5510-7010	0.225	0.065	0.37	
□50mm	103H6500-7041	103H6500-7011	0.225	0.057	0.38	Page 313
ø60mm	103H7521-7051	103H7521-7021	0.46	0.148	0.51	Page 317
	103H7522-7051	103H7522-7021	0.83	0.18	0.6	
	103H7523-7051	103H7523-7021	1.86	0.423	1.1	
□60mm	103H7851-7051	103H7851-7011	0.65	0.275	0.6	Page 315
	103H7852-7051	103H7852-7011	0.98	0.4	0.78	
	103H7853-7051	103H7853-7011	1.86	0.84	1.36	

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

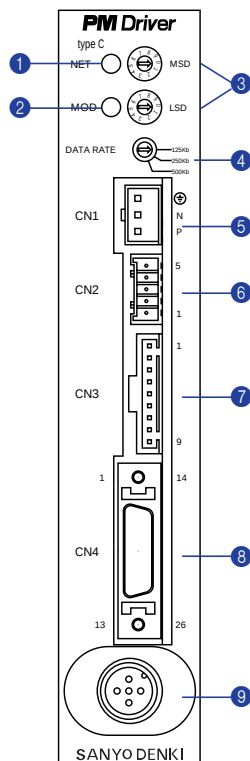
Operation, connection, and function

● 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.

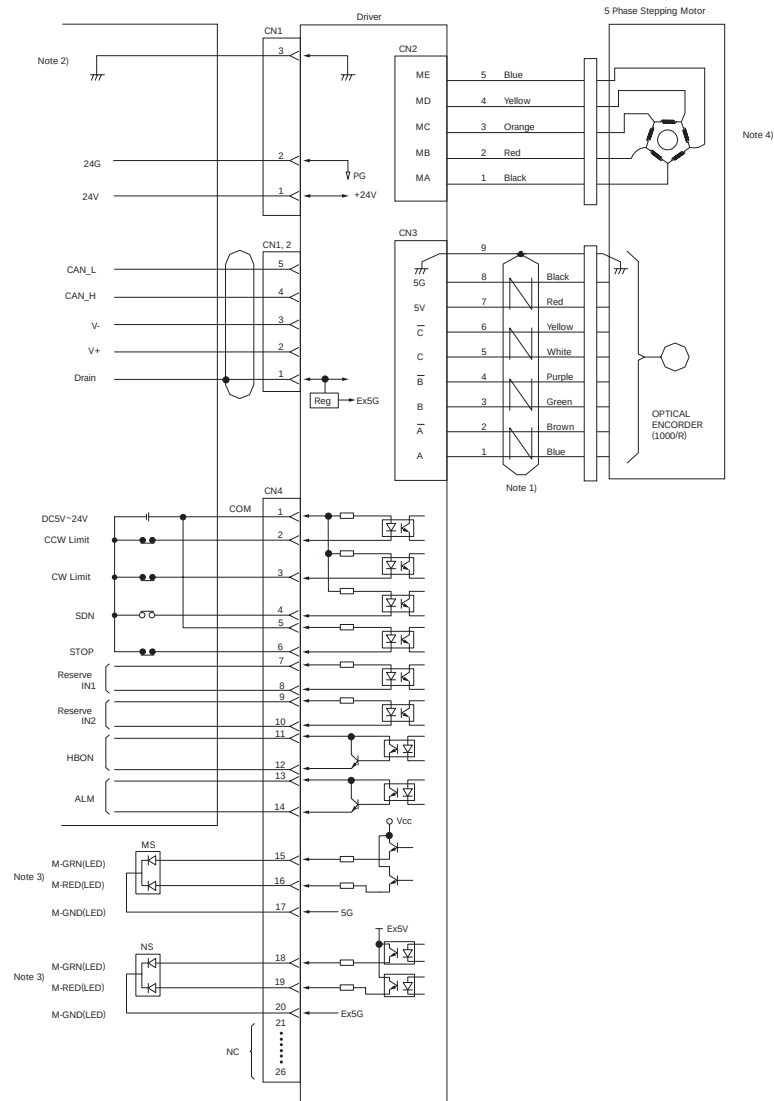
● Each section name of the PM driver



- 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

PMDPA1S6A01

PMDPA1S6B01

PMDPA1S6C01

PMDPA1S6D01

PMDPA1S6E01

PMDPA1S6F01

PMDPA1S6G01

PMDPA1S6H01

PMDPA1S6I01

PMDPA1S6J01

PMDPA1S6K01

PMDPA1S6L01

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 301 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

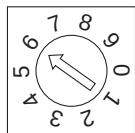
Module status indication

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.

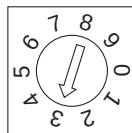
Network status indication

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

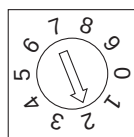


LSD

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

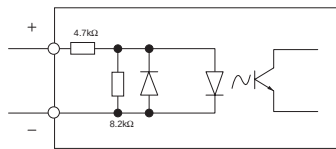
500Kb

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.

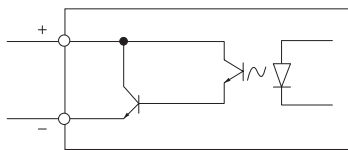
Operation, connection, and function

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



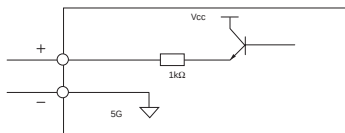
- Input voltage: DC 5 V to 24 V $\pm$ 10%
- Input logic (initial state): CWL, CCWL, and STOP: Normal close
SDN: Normal open

● Output circuit configuration (ALM, HBON)



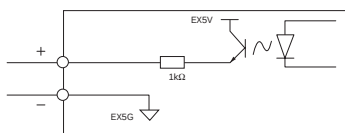
- Input voltage: Maximum 30 V
- Input current: Maximum 50 mA
- Input logic (initial state): ALM: Normal close
HBON: Normal open

● Output circuit configuration (MS)



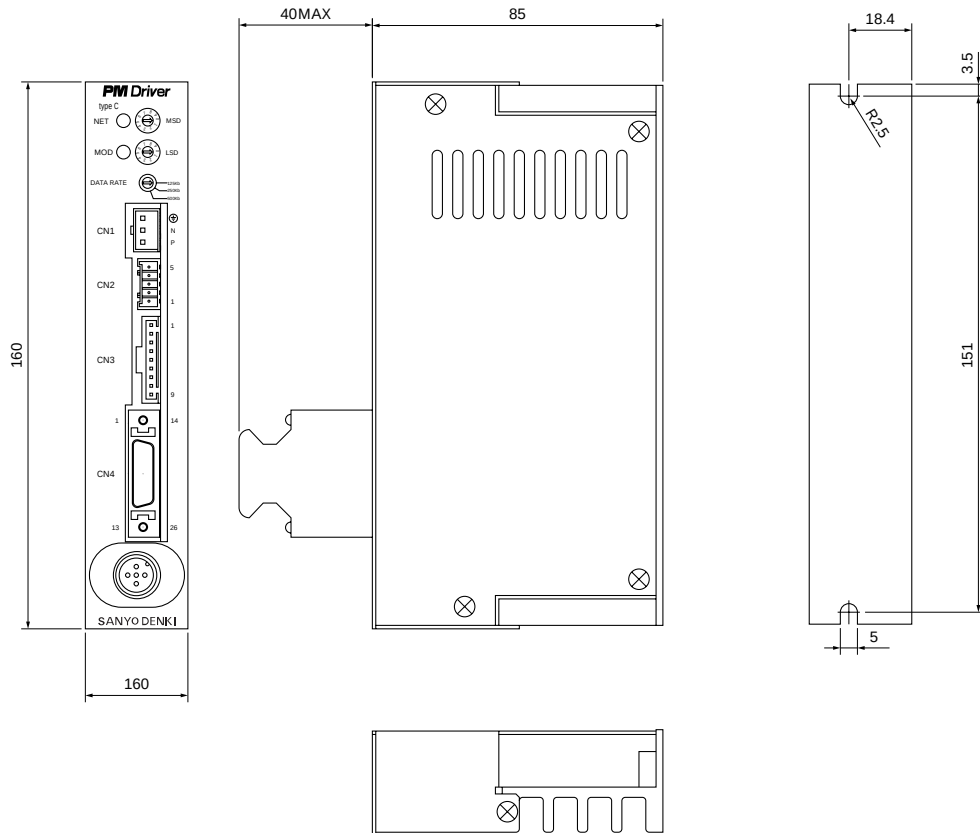
- Drive voltage: Vcc=5V

● Output circuit configuration (NS)

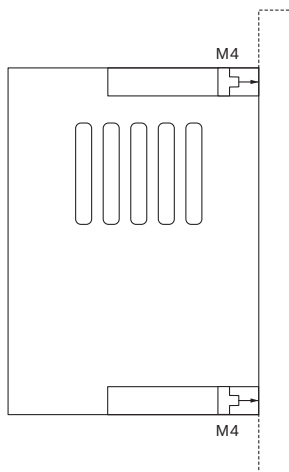


- Drive voltage: EX5V=5V

Dimensions (unit: mm)



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.

PMAP1S6A01

PMAP1S6B01

PMM-MA-50034

PMM-MA-50064

PMM-BA-5603
-5643

PMM-BA-5604
-5644

PMDP81S6P01

PMDP81S3P01

PMM-MD-53030
-53031

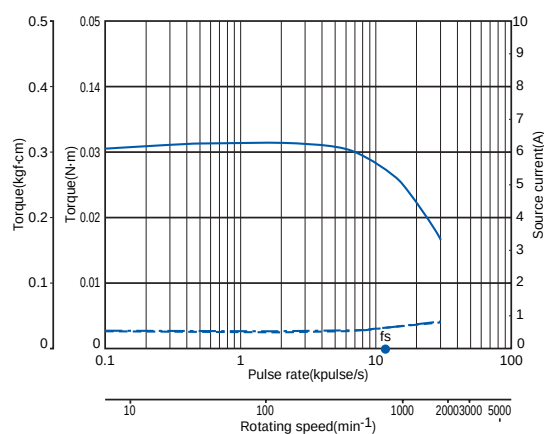
PMM-BD-53130
-53131

PMDPA1A3P20

PMDPALC3P20

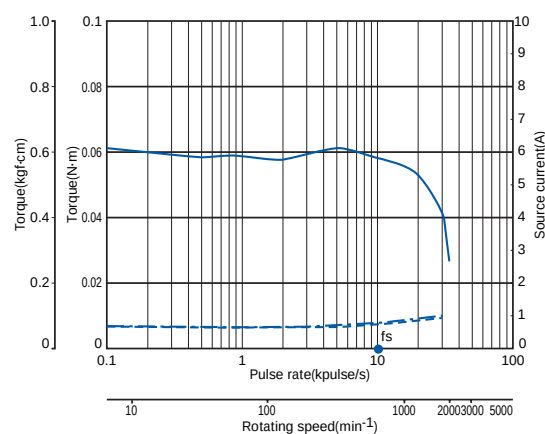
Pulse rate-torque characteristics/pulse rate-source current characteristics

●103H3505-70 □□ :24V



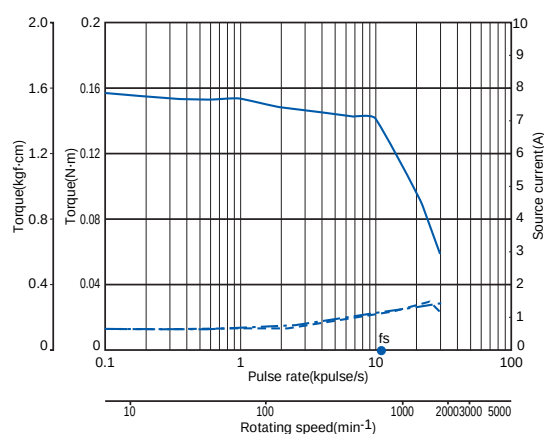
Source voltage:DC24V-Winding current: 0.75 A/phase
 — Getaway torque($J_{L1}=0.33 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum response frequency when not loaded ■ Half-step

●103H3515-70 □□ :24V



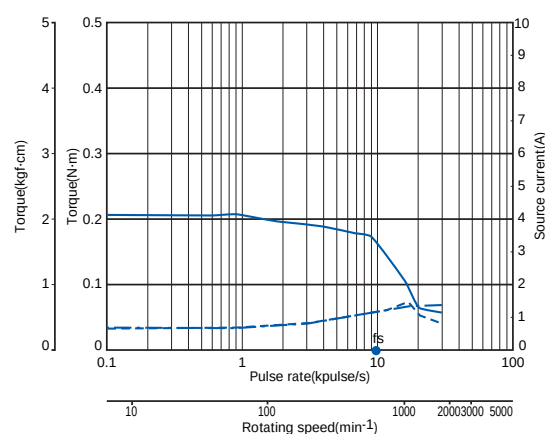
Source voltage:DC24V-Winding current: 0.75 A/phase
 — Getaway torque($J_{L1}=0.33 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum response frequency when not loaded ■ Half-step

●103H5505-70 □□ :24V



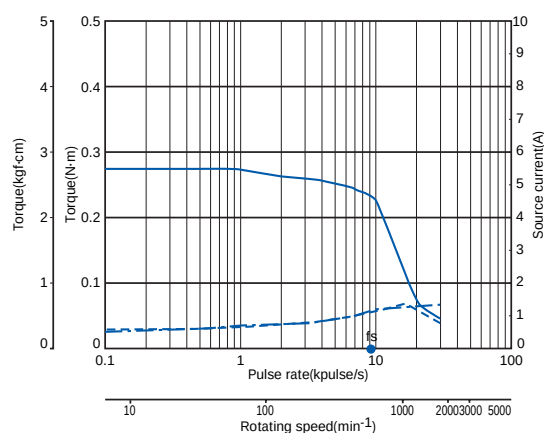
Source voltage:DC24V-Winding current: 0.75 A/phase
 — Getaway torque($J_{L1}=0.33 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum response frequency when not loaded ■ Half-step

●103H5508-70 □□ :24V



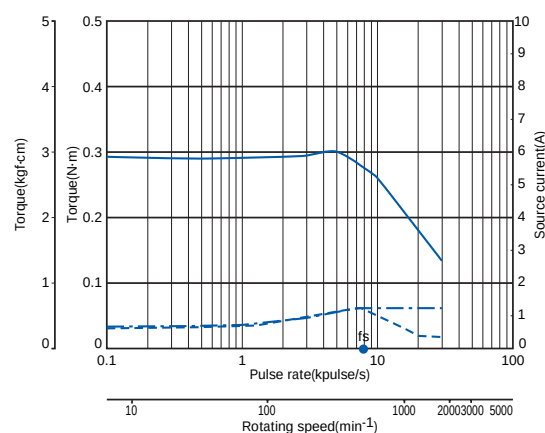
Source voltage:DC24V-Winding current: 0.75 A/phase
 — Getaway torque($J_{L1}=0.94 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum response frequency when not loaded ■ Half-step

●103H5510-70 □□ :24V



Source voltage:DC24V-Winding current: 0.75 A/phase
 — Getaway torque($J_{L1}=0.94 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum response frequency when not loaded ■ Half-step

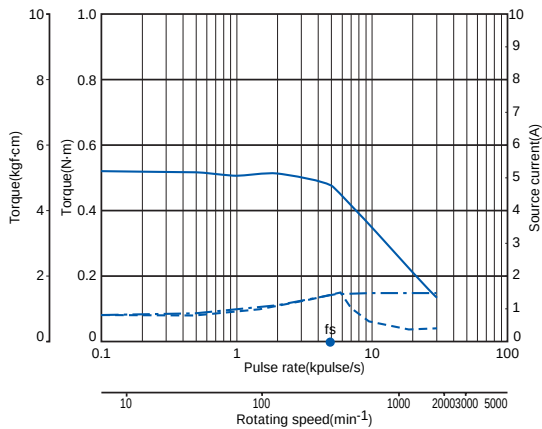
●103H6500-70 □□ :24V



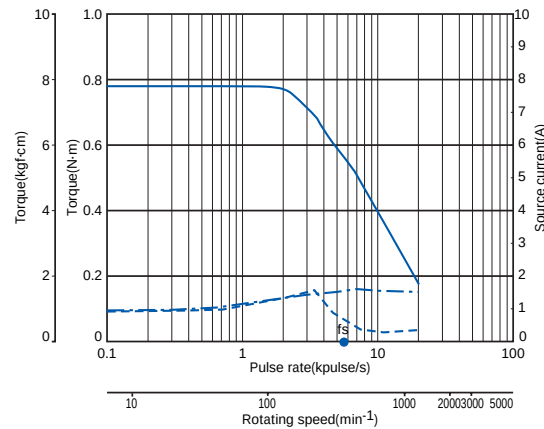
Source voltage:DC24V-Winding current: 0.75 A/phase
 — Getaway torque($J_{L1}=0.94 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ using the rubber coupling)
 - - - Source current($T_L=\text{MAX}$) - - - Source current($T_L=0$)
 fs:Maximum response frequency when not loaded ■ Half-step

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

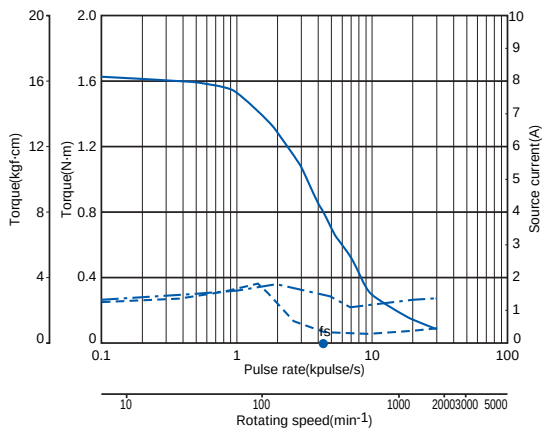
103H7521-70 □□ :24V



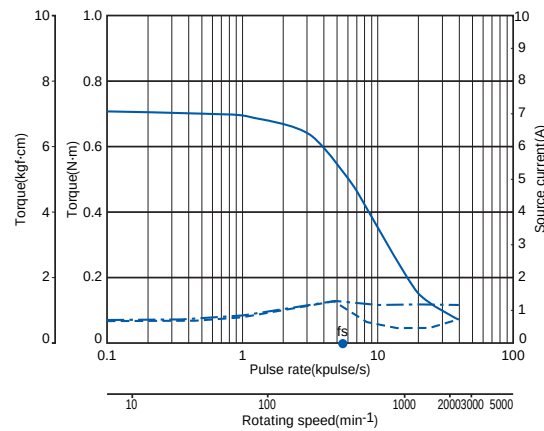
103H7522-70 □□ :24V



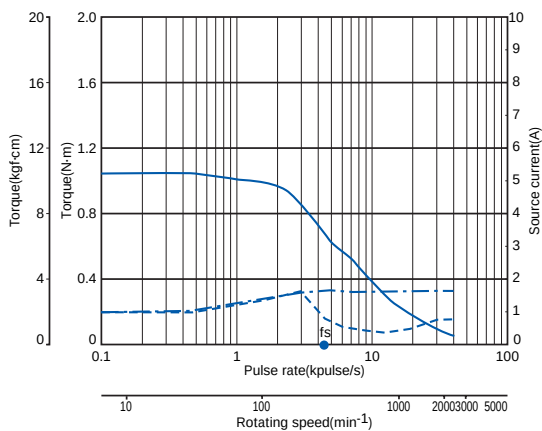
103H7523-70 □□ :24V



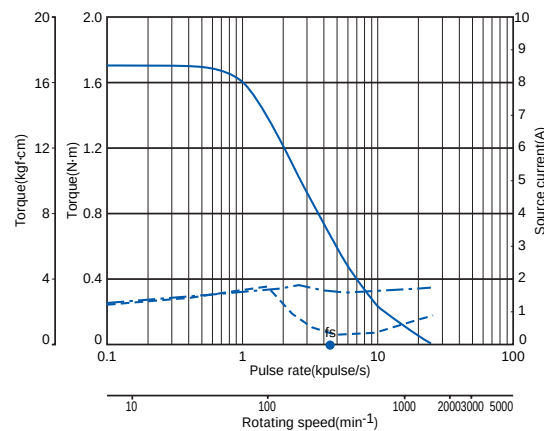
103H7851-70 □□ :24V



103H7852-70 □□ :24V



103H7853-70 □□ :24V



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

PMDPA1A3P20

PMDPA1C3P20

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	Blue
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

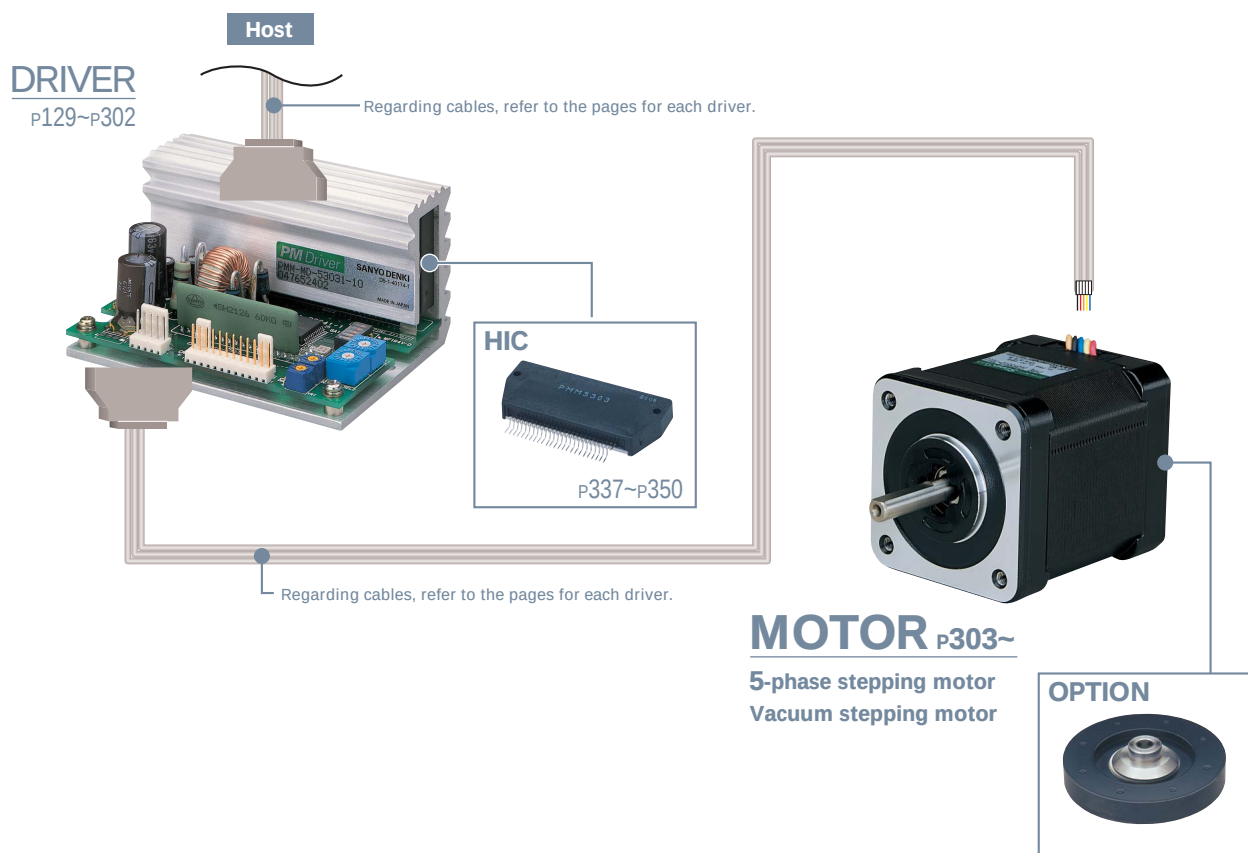
Cable model number	Length(L3)
PM-C09M0100-20	1m
PM-C09M0200-20	2m
PM-C09M0300-20	3m

● Cable 4 (I/O signal cable)

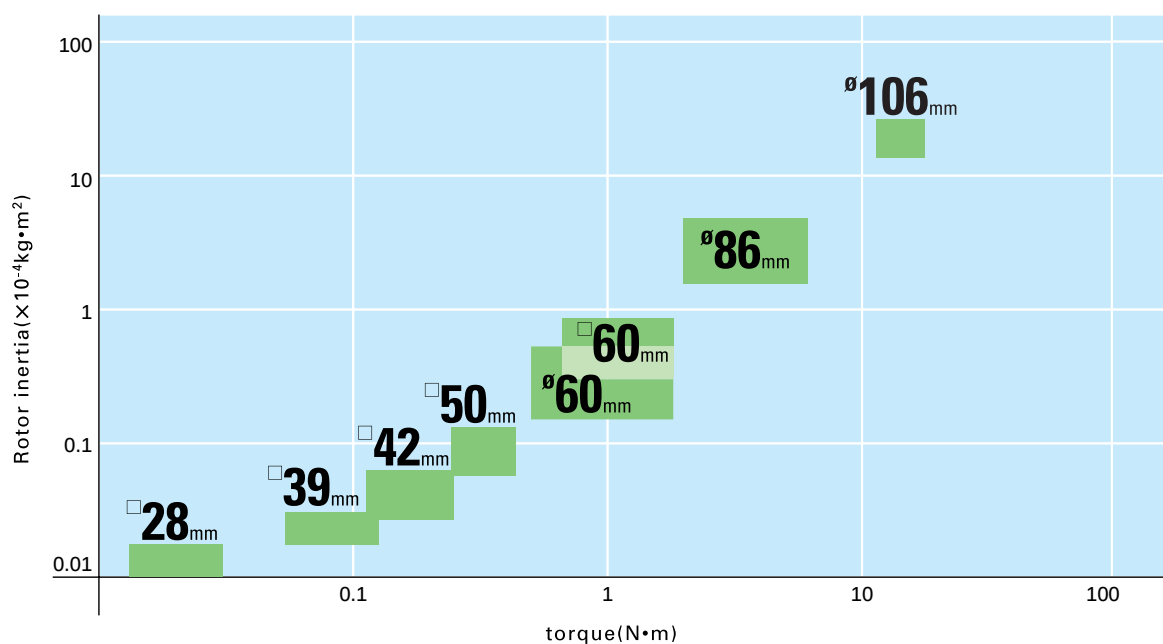
Cable model number	Length(L4)
PM-C26M0100-20	1m
PM-C26M0200-20	2m
PM-C26M0300-20	3m

5 Phase STEPPING MOTOR

Stepping System Configuration Chart



5-Phase Motor Domain Chart





5-phase stepping motor

39mm sq. 103-45□□-70□□
0.36°/step

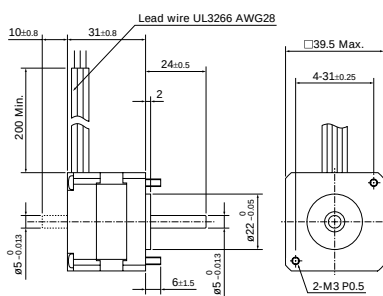
- For detailed information on applicable drivers, contact our Sales Department.

Specifications

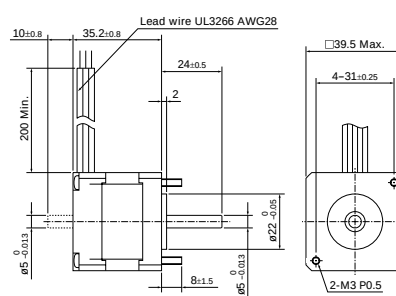
Model number		Holding torque at 5-phase energization	Rated current	Wiring resistance	Wiring inductance	Rotor inertia	Weight
Single-axis	Dual-axis	N.m or more	A/phase	Ω/phase	mH/phase	$\times 10^{-4} \text{kg-m}^2$	kg
103-4505-7040	-7010	0.078	0.75	2	1.97	0.0182	0.17
103-4507-7040	-7010	0.108	0.75	2.35	3.8	0.024	0.2
103-4510-7040	-7010	0.167	0.75	3	6.2	0.036	0.3

Dimensions (unit: mm)

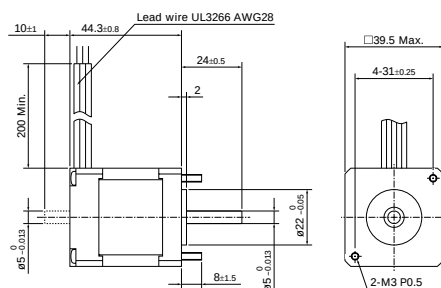
103-4505-7040 (Single shaft)
103-4505-7010 (Double shaft)



103-4507-7040 (Single shaft)
103-4507-7010 (Double shaft)

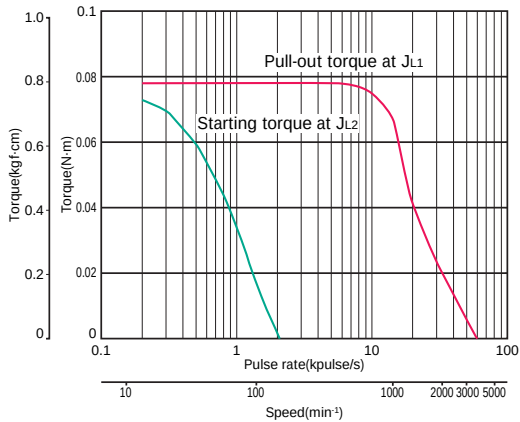


103-4510-7040 (Single shaft)
103-4510-7010 (Double shaft)



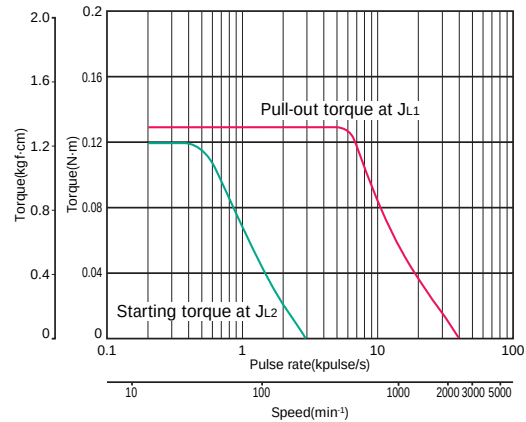
Pulse rate-torque characteristics

●103-4505-7040



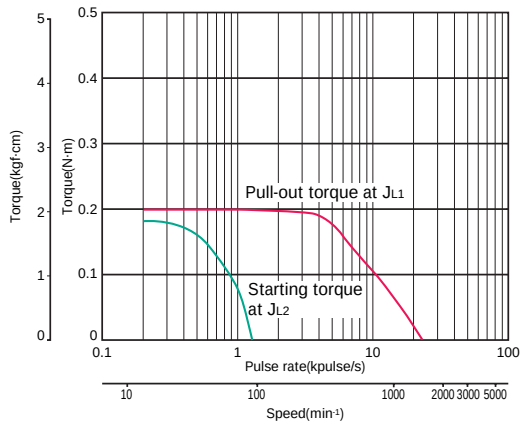
Sanyo constant current circuit
Source voltage : 24V DC • Winding current : 0.75A/phase
5-phase excitation (Full step)
 $J_{L1}=0.33 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ (With rubber coupling)
 $J_{L2}=0.18 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ (With direct-coupled coupling)

●103-4507-7040



Sanyo constant current circuit
Source voltage : 24V DC • Winding current : 0.75A/phase
5-phase excitation (Full step)
 $J_{L1}=0.33 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ (With rubber coupling)
 $J_{L2}=0.18 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ (With direct-coupled coupling)

●103-4510-7040



Sanyo constant current circuit
Source voltage : 24V DC • Winding current : 0.75A/phase
5-phase excitation (Full step)
 $J_{L1}=0.94 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ (With rubber coupling)
 $J_{L2}=0.8 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ (With direct-coupled coupling)

□ 39mm
(0.36")

□ 60mm
(0.45")

□ 28mm
(0.72")

□ 42mm
(0.72")

□ 50mm
(0.72")

□ 60mm
(0.72")

□ 60mm
(0.72")

□ 86mm
(0.72")

□ 106mm
(0.72")

CE marked

Specifications of
5-phase stepping motor

In-vacuum
stepping motor



5-phase stepping motor

60mm cir. 103-7566-70□□
0.45°/step

●For detailed information on applicable drivers,contact our Sales Department.

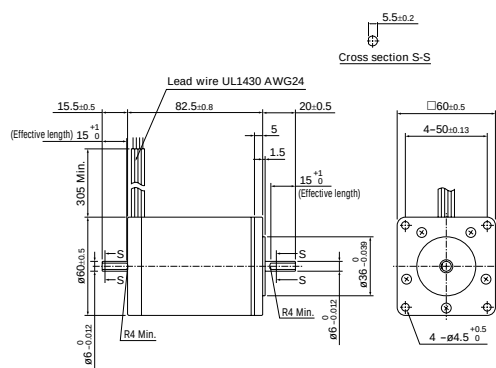
Specifications

Model number		Holding torque at 5-phase energization	Rated current	Wiring resistance	Wiring inductance	Rotor inertia	Weight
Single-axis	Dual-axis	N.m or more	A/phase	Ω/phase	mH/phase	x 10 ⁻⁴ kg-m ²	kg
103-7566-7041	-7011	0.91	0.75	4.8	23	0.235	1.1

Dimensions (unit: mm)

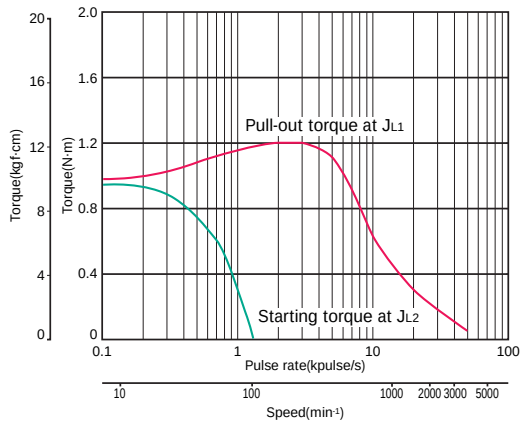
103-7566-7041 (Single shaft)

103-7566-7011 (Double shaft)



Pulse rate-torque characteristics

●103-7566-7041



Sanyo constant current circuit

Source voltage : 100V AC · Winding current : 0.75A/phase

5-phase excitation (Full step)

$J_{L1} = 2.6 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ (With rubber coupling)

$J_{L2} = 2.6 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ (With direct-coupled coupling)

□ 39mm
(0.36")

□ 60mm
(0.45")

□ 28mm
(0.72")

□ 42mm
(0.72")

□ 50mm
(0.72")

□ 60mm
(0.72")

□ 60mm
(0.72")

□ 86mm
(0.72")

□ 106mm
(0.72")

CE marked

Specifications of
5-phase stepping motor

In-vacuum
stepping motor

28mm sq. 103H35□□-70□□
0.72°/step

- Applicable drivers



Motor with leads

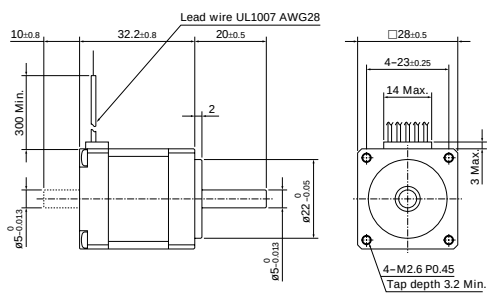
Model number		Holding torque at 5-phase energization	Rated current	Wiring resistance	Wiring inductance	Rotor inertia	Weight
Single-axis	Dual-axis	N.m or more	A/phase	Ω/phase	mH/phase	x 10 ⁻⁴ ·kg·m ²	kg
103H3505-7070	-7020	0.026	0.75	1.2	0.32	0.009	0.11
103H3515-7070	-7020	0.052	0.75	1.5	0.4	0.016	0.2

Motor with connector

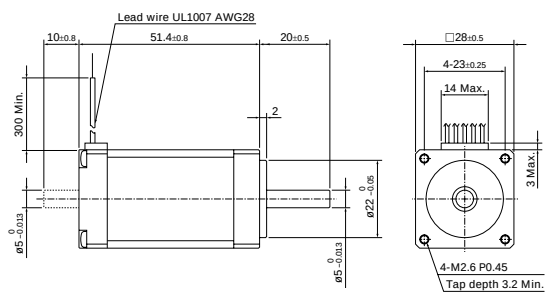
Model number		Holding torque at 5-phase energization	Rated current	Wiring resistance	Wiring inductance	Rotor inertia	Weight
Single-axis	Dual-axis	N.m or more	A/phase	Ω/phase	mH/phase	x 10 ⁻⁴ ·kg·m ²	kg
103H3505-7040	-7010	0.026	0.75	1.1	0.32	0.009	0.11
103H3515-7040	-7010	0.052	0.75	1.4	0.4	0.016	0.2

Motor with leads

103H3505-7070 (Single shaft)
103H3505-7020 (Double shaft)



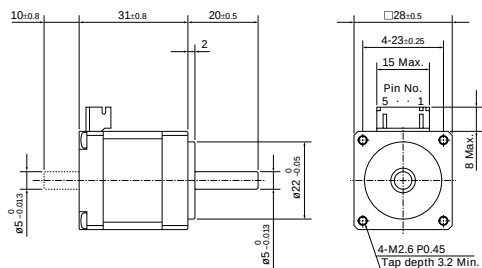
103H3515-7070 (Single shaft)
103H3515-7020 (Double shaft)



Motor with connector

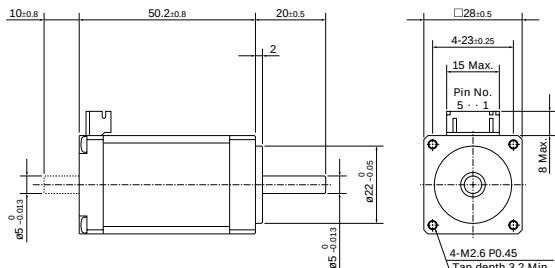
103H3505-7040 (Single shaft)
103H3505-7010 (Double shaft)

Applicable connector
(Japan Solderless Terminals)
Housing : PHR-5
Contact : SPH-002T-P0.5S



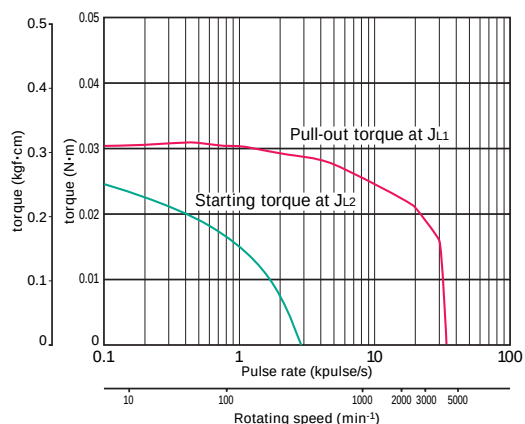
103H3515-7040 (Single shaft)
103H3515-7010 (Double shaft)

Applicable connector
(Japan Solderless Terminals)
Housing : PHR-5
Contact : SPH-002T-P0.5S



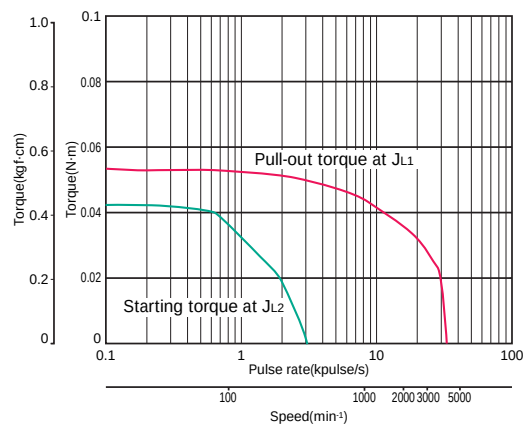
Pulse rate-torque characteristics

●103H3505-7040/103H3505-7070



Sanyo constant current circuit
Source voltage : 24V DC • Winding current : 0.75A/phase
5-phase excitation (Full step)
 $J_{L1}=0.01 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (Pulley balancer system)
 $J_{L2}=0.01 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (Pulley balancer system)

●103H3515-7040/103H3515-7070



Sanyo constant current circuit
Source voltage : 24V DC • Winding current : 0.75A/phase
5-phase excitation (Full step)
 $J_{L1}=0.01 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (Pulley balancer system)
 $J_{L2}=0.01 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (Pulley balancer system)

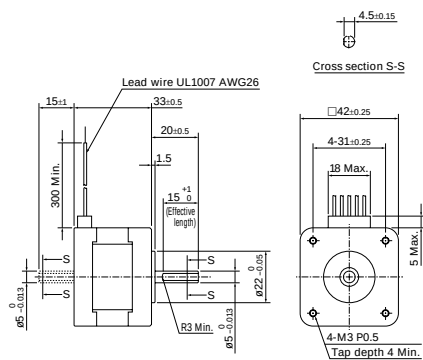
42mm sq. 103H55□□-70□□
0.72°/step

- Applicable drivers

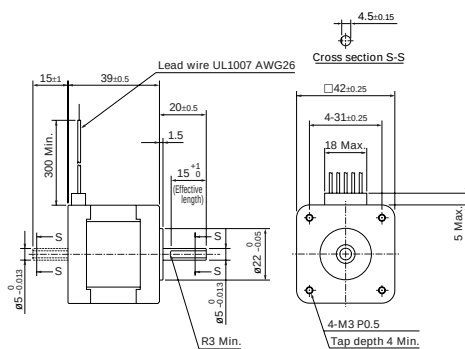


Model number		Holding torque at 5-phase energization	Rated current	Wiring resistance	Wiring inductance	Rotor inertia	Weight
Single-axis	Dual-axis	N.m or more	A/phase	Ω/phase	mH/phase	x 10 ⁻⁴ kg·m ²	kg
103H5505-7040	-7010	0.127	0.75	1.45	1.2	0.03	0.23
103H5508-7040	-7010	0.176	0.75	1.6	1.8	0.053	0.28
103H5510-7040	-7010	0.255	0.75	2.2	2.2	0.065	0.37

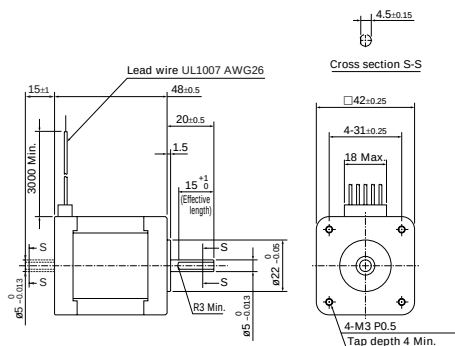
103H5505-7040 (Single shaft)
103H5505-7010 (Double shaft)



103H5508-7040 (Single shaft)
103H5508-7010 (Double shaft)

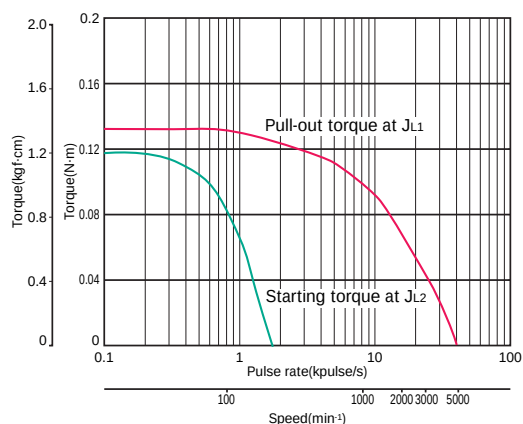


103H5510-7040 (Single shaft)
103H5510-7010 (Double shaft)



Pulse rate-torque characteristics

●103H5505-7040



Sanyo constant current circuit

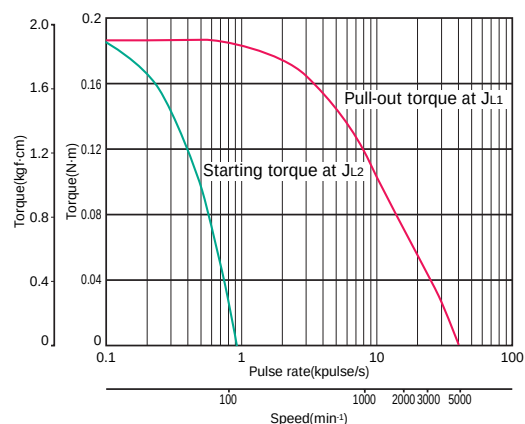
Source voltage : 24V DC • Winding current : 0.75A/phase

5-phase excitation (Full step)

$J_{L1}=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (With rubber coupling)

$J_{L2}=0.8 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (With direct-coupled coupling)

●103H5508-7040



Sanyo constant current circuit

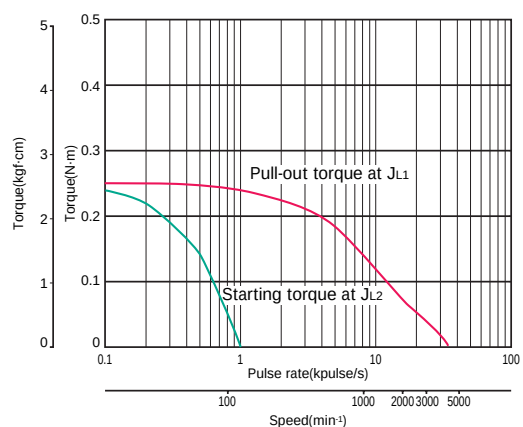
Source voltage : 24V DC • Winding current : 0.75A/phase

5-phase excitation (Full step)

$J_{L1}=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (With rubber coupling)

$J_{L2}=0.8 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (With direct-coupled coupling)

●103H5510-7040



Sanyo constant current circuit

Source voltage : 24V DC • Winding current : 0.75A/phase

5-phase excitation (Full step)

$J_{L1}=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (With rubber coupling)

$J_{L2}=0.8 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (With direct-coupled coupling)

□39mm
(0.36")

□60mm
(0.45")

□28mm
(0.72")

□42mm
(0.72")

□50mm
(0.72")

□60mm
(0.72")

□60mm
(0.72")

□86mm
(0.72")

□106mm
(0.72")

CE marked

Specifications of
5-phase stepping motor

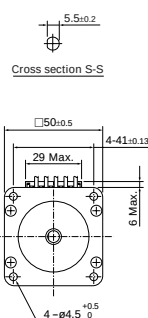
In-vacuum
stepping motor

50mm sq. 103H650□-□□□□
0.72°/step

The diagram illustrates the PMM system architecture. It features several components represented by blue boxes with dashed outlines, indicating they are part of a larger system. The components are arranged in two rows. The top row includes four PMM modules (PMM-MA 50034, PMM-MA 50064, PMM-BA 5603 5643, PMM-BA 5604 5644) and two PMD modules (PMDPB156P01, PMDPC133P01). The bottom row includes four PMM modules (PMM-MD-53030, PMM-BD-53130, PMM-BA-53130, PMM-BA-53131) and two PMD modules (PMDPAL3P20, PMDPAIC3P20). The components are interconnected by a network of lines, representing the system's data flow and control signals.

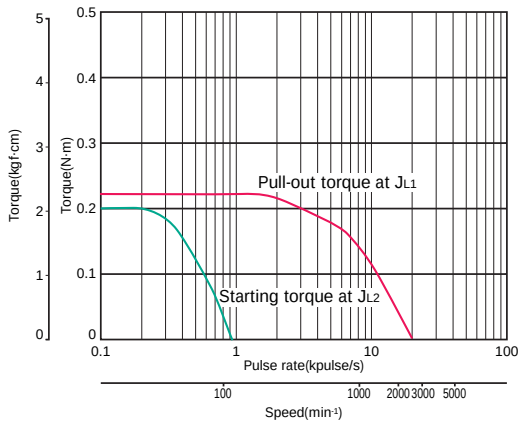
Component	Model Number
PMM-MA	50034
PMM-MA	50064
PMM-BA	5603 5643
PMM-BA	5604 5644
PMDPB156P01	
PMDPC133P01	
PMM-MD-53030	
PMM-BD-53130	
PMM-BA-53130	
PMM-BA-53131	
PMDPAL3P20	
PMDPAIC3P20	

Model number		Holding torque at 5-phase energization	Rated current	Wiring resistance	Wiring inductance	Rotor inertia	Weight
Single-axis	Dual-axis	N.m or more	A/phase	Ω/phase	mH/phase	x 10 ⁻⁴ ·kg·m ²	kg
103H6500-7041	-7011	0.235	0.75	2	4	0.057	0.38
103H6500-8041	-8011	0.225	1.5	0.47	0.85	0.057	0.38
103H6501-7041	-7011	0.39	0.75	2.6	5.6	0.105	0.44
103H6501-8041	-8011	0.39	1.5	0.65	1.45	0.105	0.44

[illegible]

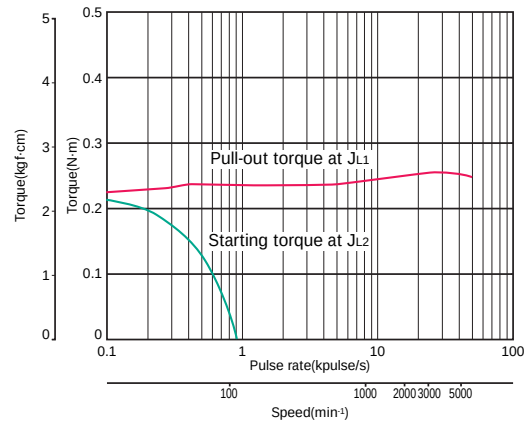
Pulse rate-torque characteristics

●103H6500-7041



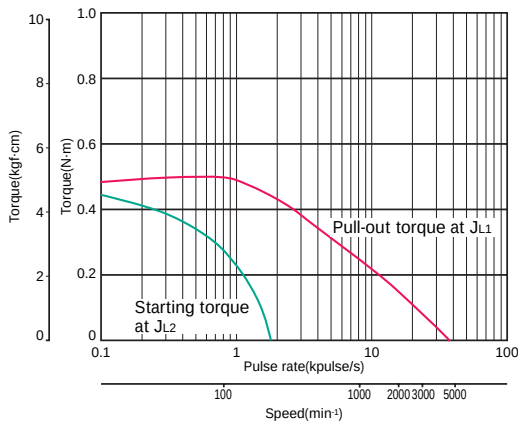
Sanyo constant current circuit
 Source voltage : 24V DC • Winding current : 0.75A/phase
 5-phase excitation (Full step)
 $J_{L1}=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (With rubber coupling)
 $J_{L2}=0.8 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (With direct-coupled coupling)

●103H6500-8041



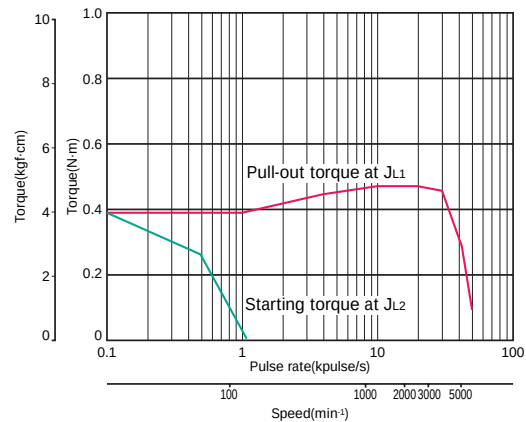
Sanyo constant current circuit
 Source voltage : 100V AC • Winding current : 1.5A/phase
 5-phase excitation (Full step)
 $J_{L1}=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (With rubber coupling)
 $J_{L2}=0.8 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (With direct-coupled coupling)

●103H6501-7041



Sanyo constant current circuit
 Source voltage : 24V DC • Winding current : 0.75A/phase
 5-phase excitation (Full step)
 $J_{L1}=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (With rubber coupling)
 $J_{L2}=0.105 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (Pulley balancer system)

●103H6501-8041



Sanyo constant current circuit
 Source voltage : 100V AC • Winding current : 1.5A/phase
 5-phase excitation (Full step)
 $J_{L1}=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (With rubber coupling)
 $J_{L2}=0.8 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (With direct-coupled coupling)



5-phase stepping motor

60mm sq. 103H785□-□□□□
0.72°/step

- Applicable drivers

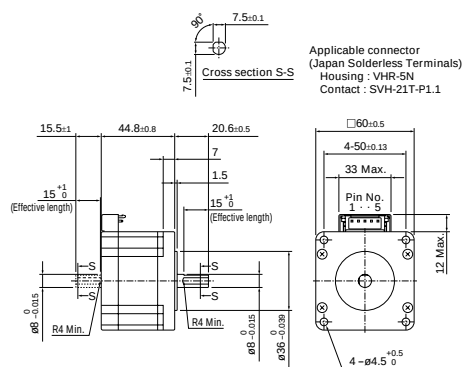


Specifications

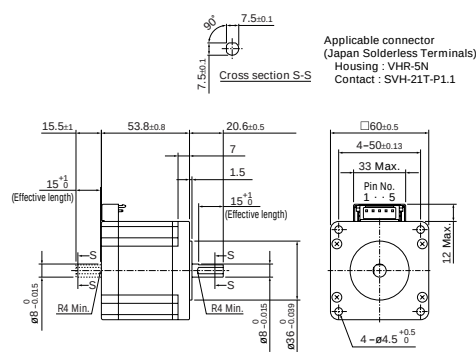
Model number		Holding torque at 5-phase energization	Rated current	Wiring resistance	Wiring inductance	Rotor inertia	Weight
Single-axis	Dual-axis	N.m or more	A/phase	Ω/phase	mH/phase	x 10 ⁻⁴ kg-m ²	kg
103H7851-7051	-7021	0.65	0.75	2.75	4.75	0.275	0.6
103H7851-8051	-8021	0.65	1.5	0.64	1.2	0.275	0.6
103H7852-7051	-7021	0.98	0.75	3.4	7.75	0.4	0.78
103H7852-8051	-8021	0.98	1.5	0.8	2	0.4	0.78
103H7853-7051	-7021	1.86	0.75	5.5	15	0.84	1.36
103H7853-8051	-8021	1.86	1.5	1.28	3.85	0.84	1.36

Dimensions (unit: mm)

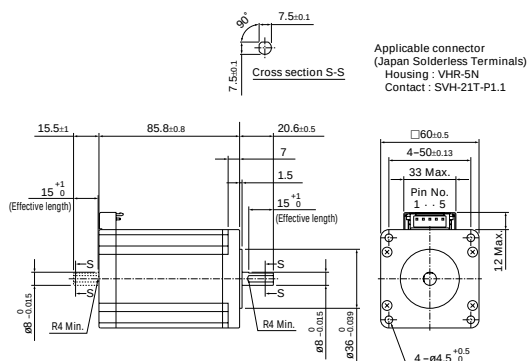
103H7851-7051/8051 (Single shaft)
103H7851-7021/8021 (Double shaft)



103H7852-7051/8051 (Single shaft)
103H7852-7021/8021 (Double shaft)

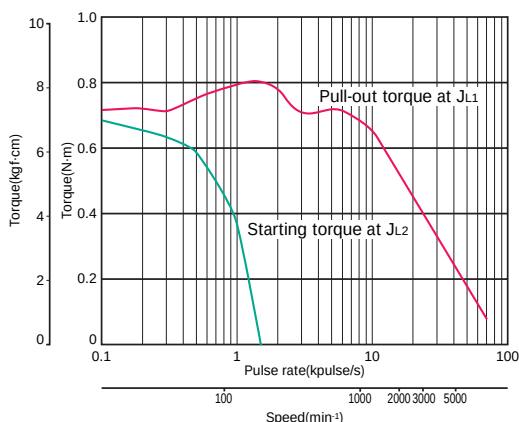


103H7853-7051/8051 (Single shaft)
103H7853-7021/8021 (Double shaft)



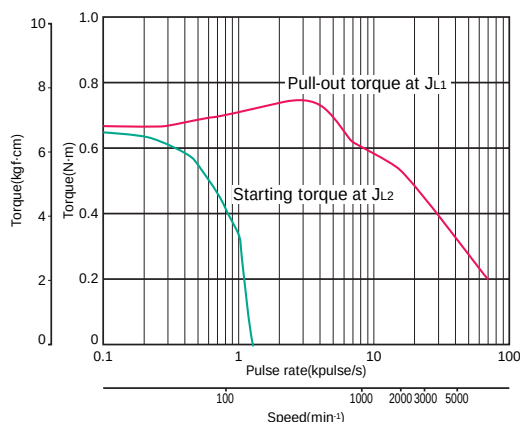
Pulse rate-torque characteristics

●103H7851-7051



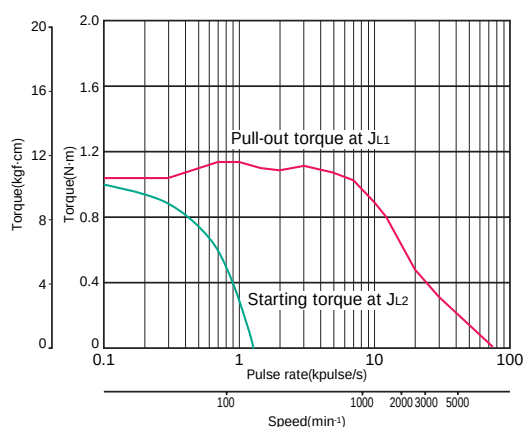
Sanyo constant current circuit
Source voltage : 100V AC · Winding current : 0.75A/phase
5-phase excitation (Full step)
 $J_{L1}=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (With rubber coupling)
 $J_{L2}=0.8 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (With direct-coupled coupling)

●103H7851-8051



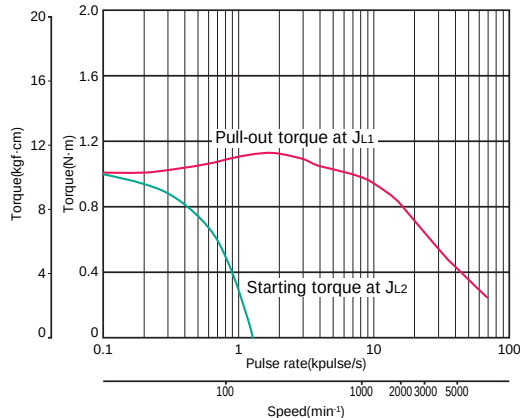
Sanyo constant current circuit
Source voltage : 100V AC · Winding current : 1.5A/phase
5-phase excitation (Full step)
 $J_{L1}=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (With rubber coupling)
 $J_{L2}=0.8 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (With direct-coupled coupling)

●103H7852-7051



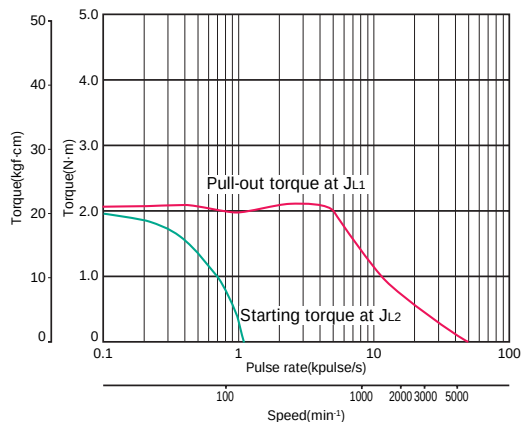
Sanyo constant current circuit
Source voltage : 100V AC · Winding current : 0.75A/phase
5-phase excitation (Full step)
 $J_{L1}=2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (With rubber coupling)
 $J_{L2}=2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (With direct-coupled coupling)

●103H7852-8051



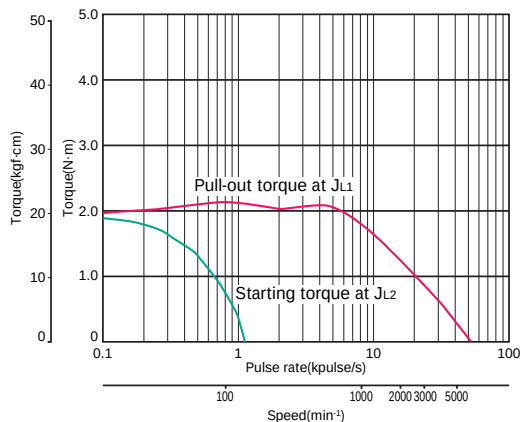
Sanyo constant current circuit
Source voltage : 100V AC · Winding current : 1.5A/phase
5-phase excitation (Full step)
 $J_{L1}=2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (With rubber coupling)
 $J_{L2}=2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (With direct-coupled coupling)

●103H7853-7051



Sanyo constant current circuit
Source voltage : 100V AC · Winding current : 0.75A/phase
5-phase excitation (Full step)
 $J_{L1}=7.4 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (With rubber coupling)
 $J_{L2}=7.4 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (With direct-coupled coupling)

●103H7853-8051



Sanyo constant current circuit
Source voltage : 100V AC · Winding current : 1.5A/phase
5-phase excitation (Full step)
 $J_{L1}=7.4 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (With rubber coupling)
 $J_{L2}=7.4 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (With direct-coupled coupling)

□39mm
(0.36")□60mm
(0.45")□28mm
(0.72")□42mm
(0.72")□50mm
(0.72")□60mm
(0.72")□60mm
(0.72")□86mm
(0.72")□106mm
(0.72")

CE marked

Specifications of
5-phase stepping motorIn-vacuum
stepping motor



5-phase stepping motor

60mm cir. 103H752□-□□□□
0.72°/step

- Applicable drivers

PMMA	PMMA-MA	PMMA-MA	PMMA-BA	PMMA-BA	PMDB
1S6B01	50034	50064	5603 5643	5604 5644	1S6B01

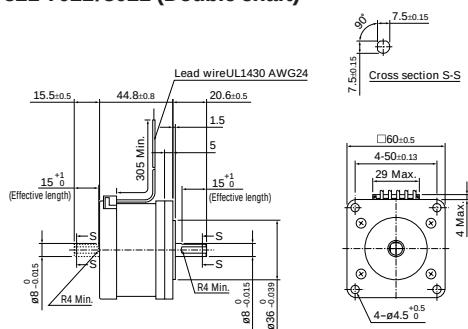
PMDB	PMDB-MA	PMDB-MA	PMDB-BA	PMDB-BA
1S6B01	50034	50064	5603 5643	5604 5644

Specifications

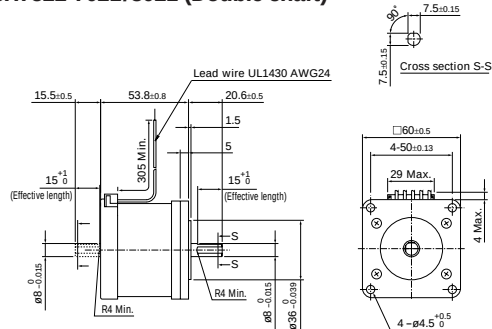
Model number		Holding torque at 5-phase energization	Rated current	Wiring resistance	Wiring inductance	Rotor inertia	Weight
Single-axis	Dual-axis	N.m or more	A/phase	Ω/phase	mH/phase	x 10 ⁻⁴ kg·m ⁻²	kg
103H7521-7051	-7021	0.46	0.75	2.4	4.3	0.148	0.51
103H7521-8051	-8021	0.46	1.5	0.6	1.1	0.148	0.51
103H7522-7051	-7021	0.735	0.75	3.3	7.5	0.18	0.6
103H7522-8051	-8021	0.735	1.5	0.75	2	0.18	0.6
103H7523-7051	-7021	1.568	0.75	5.2	21	0.423	1.1
103H7523-8051	-8021	1.568	1.5	1.4	5.4	0.423	1.1

Dimensions (unit: mm)

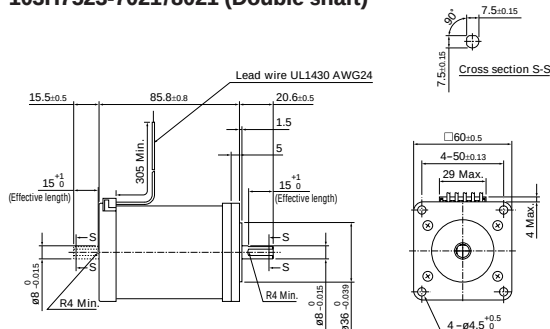
103H7521-7051/8051 (Single shaft)
103H7521-7021/8021 (Double shaft)



103H7522-7051/8051 (Single shaft)
103H7522-7021/8021 (Double shaft)

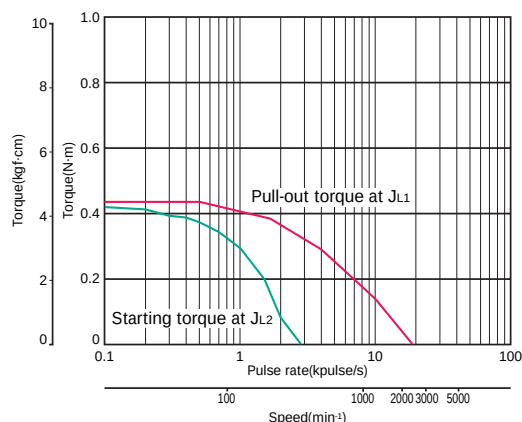


103H7523-7051/8051 (Single shaft)
103H7523-7021/8021 (Double shaft)



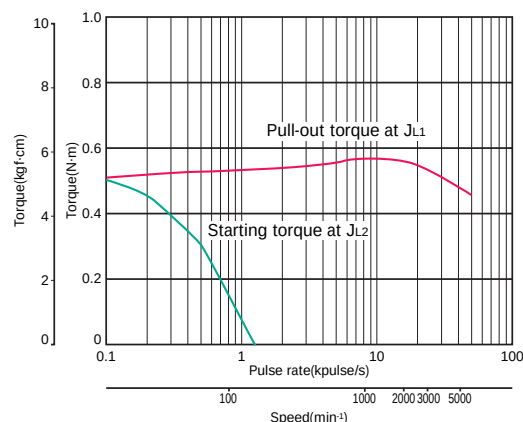
Pulse rate-torque characteristics

●103H7521-7051



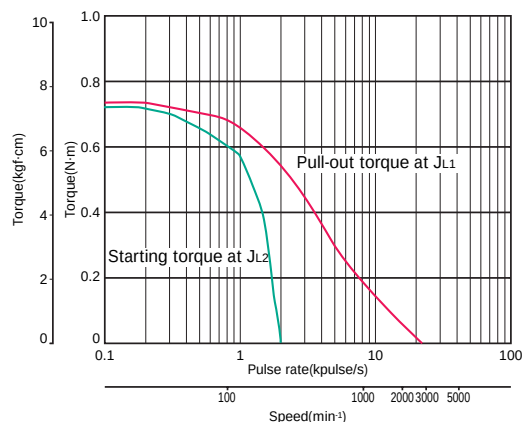
Sanyo constant current circuit
Source voltage : 24V DC · Winding current : 0.75A/phase
5-phase excitation (Full step)
 $J_{L1}=0.94 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ (With rubber coupling)
 $J_{L2}=0.51 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ (Pulley balancer system)

●103H7521-8051



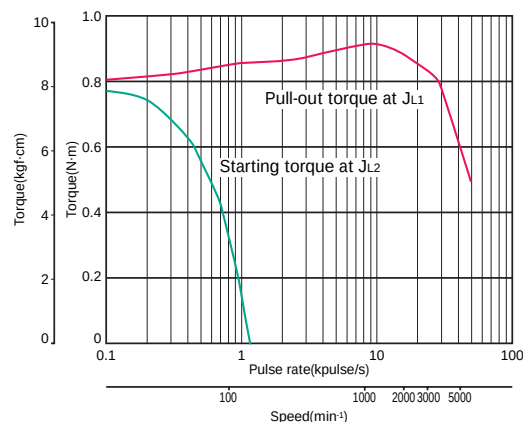
Sanyo constant current circuit
Source voltage : 100V AC · Winding current : 1.5A/phase
5-phase excitation (Full step)
 $J_{L1}=0.94 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ (With rubber coupling)
 $J_{L2}=0.8 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ (With direct-coupled coupling)

●103H7522-7051



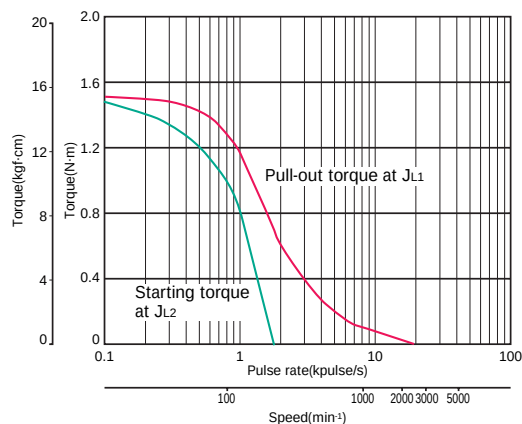
Sanyo constant current circuit
Source voltage : 24V DC · Winding current : 0.75A/phase
5-phase excitation (Full step)
 $J_{L1}=2.6 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ (With rubber coupling)
 $J_{L2}=0.6 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ (Pulley balancer system)

●103H7522-8051



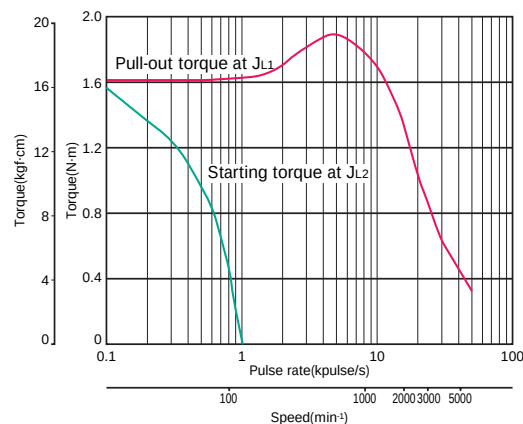
Sanyo constant current circuit
Source voltage : 100V AC · Winding current : 1.5A/phase
5-phase excitation (Full step)
 $J_{L1}=2.6 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ (With rubber coupling)
 $J_{L2}=2.6 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ (With direct-coupled coupling)

●103H7523-7051



Sanyo constant current circuit
Source voltage : 24V DC · Winding current : 0.75A/phase
5-phase excitation (Full step)
 $J_{L1}=7.4 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ (With rubber coupling)
 $J_{L2}=1.1 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ (Pulley balancer system)

●103H7523-8051



Sanyo constant current circuit
Source voltage : 100V AC · Winding current : 1.5A/phase
5-phase excitation (Full step)
 $J_{L1}=7.4 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ (With rubber coupling)
 $J_{L2}=7.4 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ (With direct-coupled coupling)

□39mm
(0.36")□60mm
(0.45")□28mm
(0.72")□42mm
(0.72")□50mm
(0.72")□60mm
(0.72")□86mm
(0.72")□106mm
(0.72")

CE marked

Specifications of
5-phase stepping motorIn-vacuum
stepping motor



5-phase stepping motor

86mm cir. 103H858□-□□□□
0.72°/step

- Applicable drivers

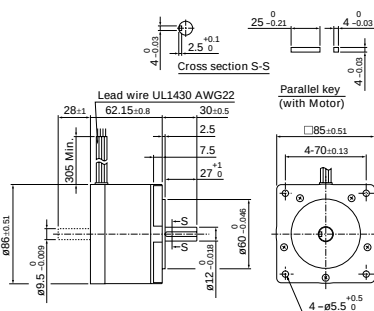
PMAPA 1S6A01	PMAPA 1S6B01	PMM-MA 50034	PMM-MA 50064	PMM-BA 5603 5643	PMM-BA 5604 5644
PMPB1S6P01	PMPD1S3P01	PMM-MD-53300 PMM-BD-53301	PMM-BD-53100 PMM-BD-5311		

Specifications

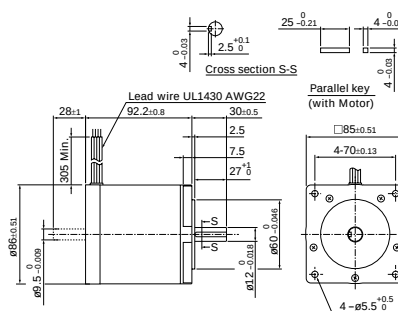
Model number		Holding torque at 5-phase energization	Rated current	Wiring resistance	Wiring inductance	Rotor inertia	Weight
Single-axis	Dual-axis	N.m or more	A/phase	Ω/phase	mH/phase	x 10 ⁻⁴ kg·m ²	kg
103H8581-7041	-7011	2.06	0.75	5.7	25	1.45	1.5
103H8581-8041	-8011	2.06	1.5	1.5	5.6	1.45	1.5
103H8582-7041	-7011	4.02	0.75	8.6	41	2.9	2.5
103H8582-8041	-8011	4.02	1.5	2	10.6	2.9	2.5
103H8583-7041	-7011	6.17	0.75	10.5	59	4.4	3.5
103H8583-8041	-8011	6.17	1.5	2.5	15	4.4	3.5

Dimensions (unit: mm)

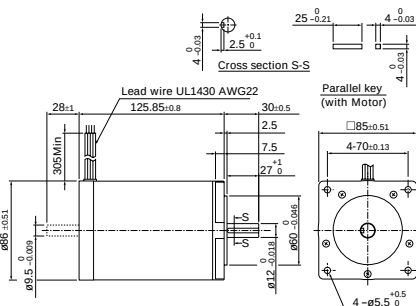
103H8581-7041/8041 (Single shaft)
103H8581-7011/8011 (Double shaft)



103H8582-7041/8041 (Single shaft)
103H8582-7011/8011 (Double shaft)

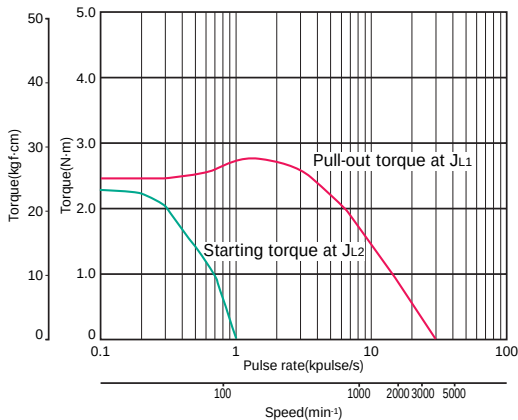


103H8583-7041/8041 (Single shaft)
103H8583-7011/8011 (Double shaft)



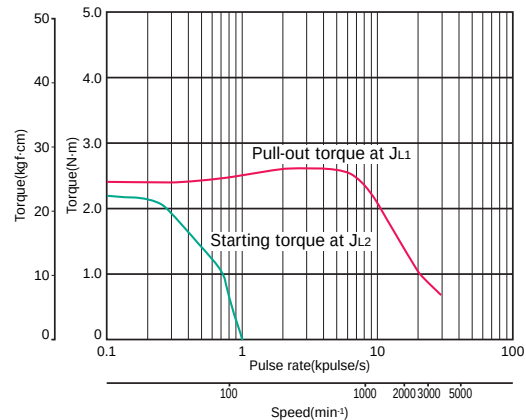
Pulse rate-torque characteristics

●103H8581-7041



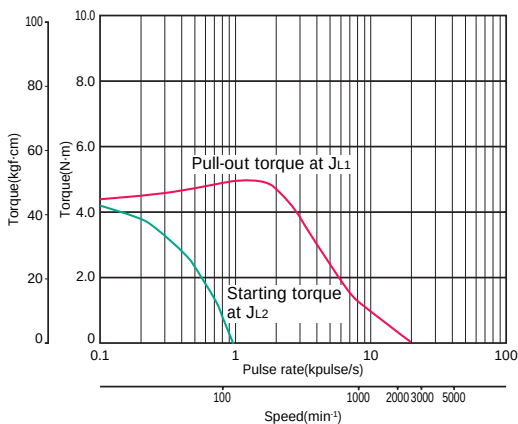
Sanyo constant current circuit
 Source voltage : 100V AC · Winding current : 0.75A/phase
 5-phase excitation (Full step)
 $J_{L1}=7.4 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (With rubber coupling)
 $J_{L2}=1.45 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (Pulley balancer system)

●103H8581-8041



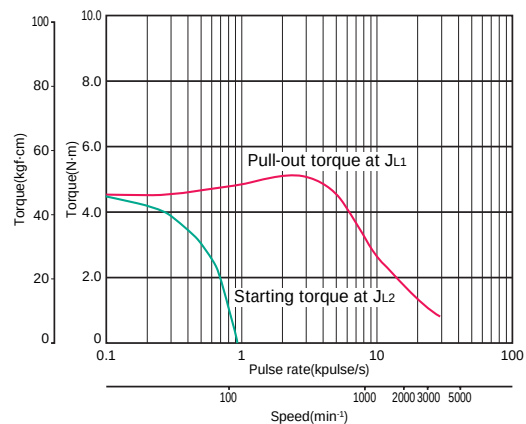
Sanyo constant current circuit
 Source voltage : 100V AC · Winding current : 1.5A/phase
 5-phase excitation (Full step)
 $J_{L1}=7.4 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (With rubber coupling)
 $J_{L2}=1.45 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (Pulley balancer system)

●103H8582-7041



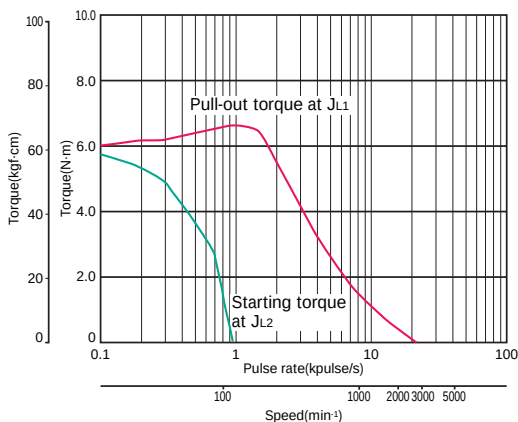
Sanyo constant current circuit
 Source voltage : 100V AC · Winding current : 0.75A/phase
 5-phase excitation (Full step)
 $J_{L1}=15.3 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (With rubber coupling)
 $J_{L2}=2.9 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (Pulley balancer system)

●103H8582-8041



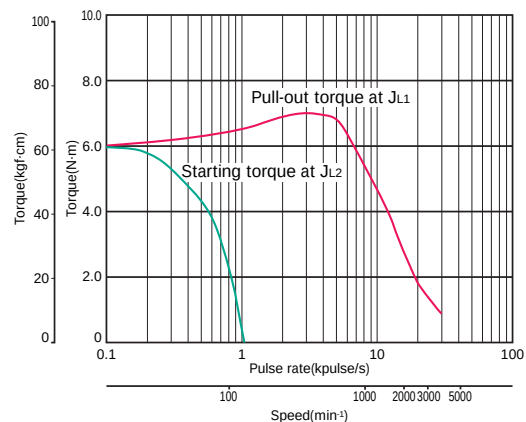
Sanyo constant current circuit
 Source voltage : 100V AC · Winding current : 1.5A/phase
 5-phase excitation (Full step)
 $J_{L1}=15.3 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (With rubber coupling)
 $J_{L2}=2.9 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (Pulley balancer system)

●103H8583-7041



Sanyo constant current circuit
 Source voltage : 100V AC · Winding current : 0.75A/phase
 5-phase excitation (Full step)
 $J_{L1}=43 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (With rubber coupling)
 $J_{L2}=4.4 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (Pulley balancer system)

●103H8583-8041



Sanyo constant current circuit
 Source voltage : 100V AC · Winding current : 1.5A/phase
 5-phase excitation (Full step)
 $J_{L1}=43 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (With rubber coupling)
 $J_{L2}=4.4 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (Pulley balancer system)

□39mm (0.36")
 □60mm (0.45")
 □28mm (0.72")
 □42mm (0.72")
 □50mm (0.72")
 □60mm (0.72")
 □86mm (0.72")
 □106mm (0.72")
 CE marked
 Specifications of
 5-phase stepping motor
 In-vacuum
 stepping motor



5-phase stepping motor

106mm cir. 103H8958□-□□□□
0.72°/step

●Applicable drivers

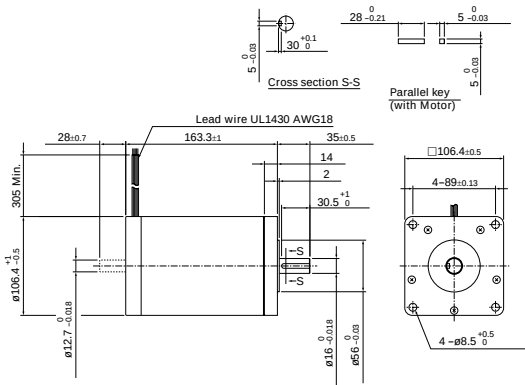
PMAA 1S6A01	PMAA 1S6B01	PMM-MA 50034	PMM-MA 50064	PMM-BA 5603 5643	PMM-BA 5604 5644

Specifications

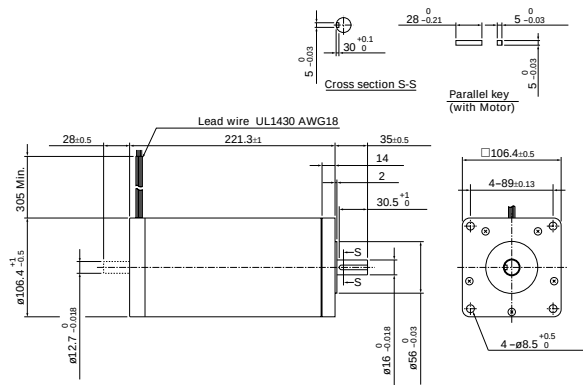
Model number		Holding torque at 5-phase energization	Rated current	Wiring resistance	Wiring inductance	Rotor inertia	Weight
Single-axis	Dual-axis	N.m or more	A/phase	Ω/phase	mH/phase	x 10 ⁻⁴ kg·m ²	kg
103H89582-7041	-7011	10.8	0.75	9	90	14.6	7.5
103H89582-8041	-8011	10.8	1.5	2	26	14.6	7.5
103H89583-7041	-7011	16	0.75	12.5	125	22	10.5
103H89583-8041	-8011	16	1.5	2.9	33.4	22	10.5

Dimensions (unit: mm)

103H89582-7041/8041 (Single shaft)
103H89582-7011/8011 (Double shaft)

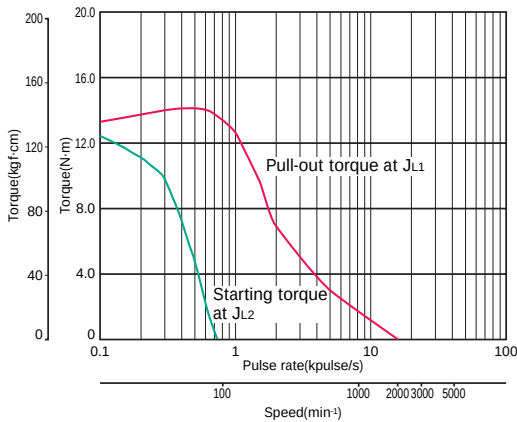


103H89583-7041/8041 (Single shaft)
103H89583-7011/8011 (Double shaft)



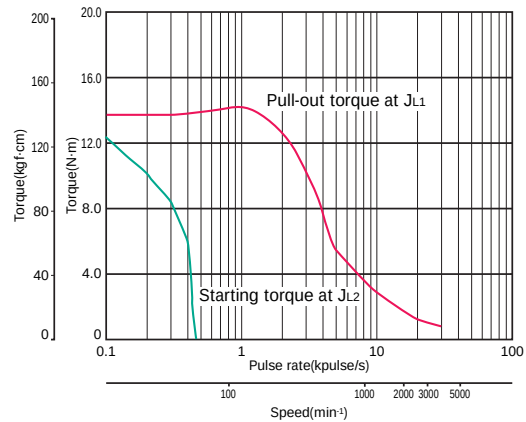
Pulse rate-torque characteristics

●103H89582-7041



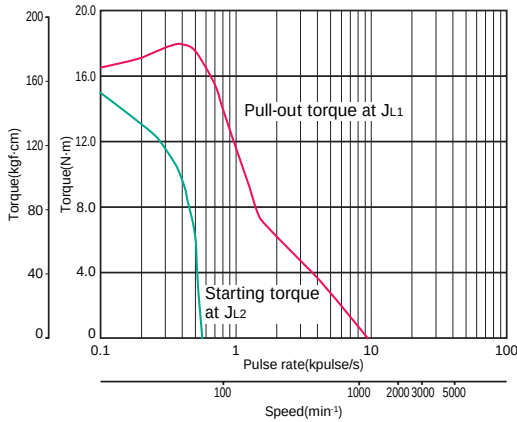
Sanyo constant current circuit
Source voltage : 100V AC · Winding current : 0.75A/phase
5-phase excitation (Full step)
 $J_{L1}=43 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (With rubber coupling)
 $J_{L2}=43 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (With rubber coupling)

●103H89582-8041



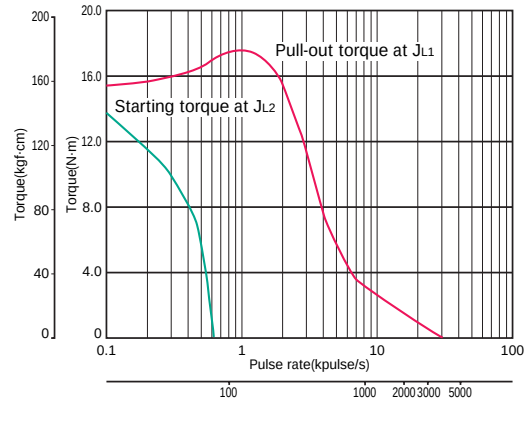
Sanyo constant current circuit
Source voltage : 100V AC · Winding current : 1.5A/phase
5-phase excitation (Full step)
 $J_{L1}=43 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (With rubber coupling)
 $J_{L2}=43 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (With rubber coupling)

●103H89583-7041



Sanyo constant current circuit
Source voltage : 100V AC · Winding current : 0.75A/phase
5-phase excitation (Full step)
 $J_{L1}=43 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (With rubber coupling)
 $J_{L2}=43 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (With rubber coupling)

●103H89583-8041



Sanyo constant current circuit
Source voltage : 100V AC · Winding current : 1.5A/phase
5-phase excitation (Full step)
 $J_{L1}=43 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (With rubber coupling)
 $J_{L2}=43 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (With rubber coupling)

□39mm
(0.36")

□60mm
(0.45")

□28mm
(0.72")

□42mm
(0.72")

□50mm
(0.72")

□60mm
(0.72")

□60mm
(0.72")

□86mm
(0.72")

□106mm
(0.72")

CE marked

Specifications of
5-phase stepping motor

In-vacuum
stepping motor



5-phase stepping motor

60mm cir.

103H752□-6□□□
CE marked
0.72°/step



●Applicable drivers

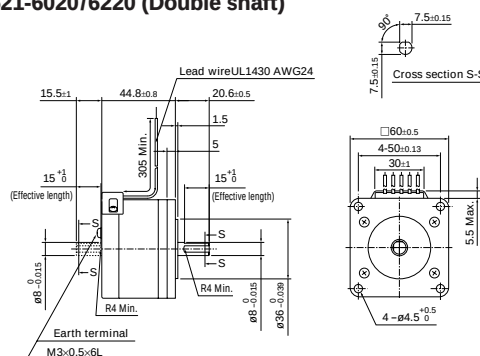


Specifications

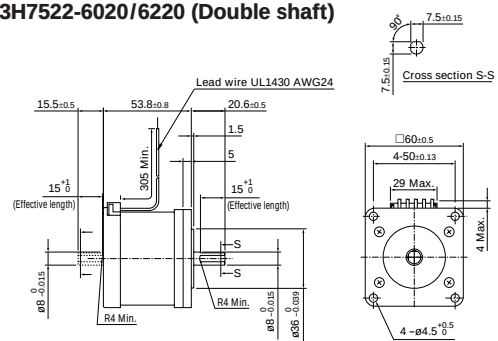
Model number		Holding torque at 5-phase energization	Rated current	Wiring resistance	Wiring inductance	Rotor inertia	Weight
Single-axis	Dual-axis	N.m or more	A/phase	Ω/phase	mH/phase	$\times 10^{-4} \text{kg} \cdot \text{m}^2$	kg
103H7521-6050	-6020	0.46	0.75	2.4	4.3	0.148	0.51
103H7521-6250	-6220	0.46	1.5	0.6	1.1	0.148	0.51
103H7522-6050	-6020	0.735	0.75	3.3	7.5	0.18	0.6
103H7522-6250	-6220	0.735	1.5	0.75	2	0.18	0.6
103H7523-6050	-6020	1.568	0.75	5.2	21	0.423	1.1
103H7523-6250	-6220	1.568	1.5	1.4	5.4	0.423	1.1

Dimensions (unit: mm)

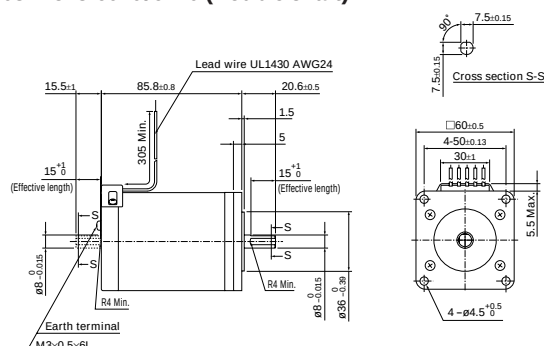
103H7521-6050/6250 (Single shaft) 103H7521-6020/6220 (Double shaft)



103H7522-6050/6020 (Single shaft) 103H7522-6020/6220 (Double shaft)

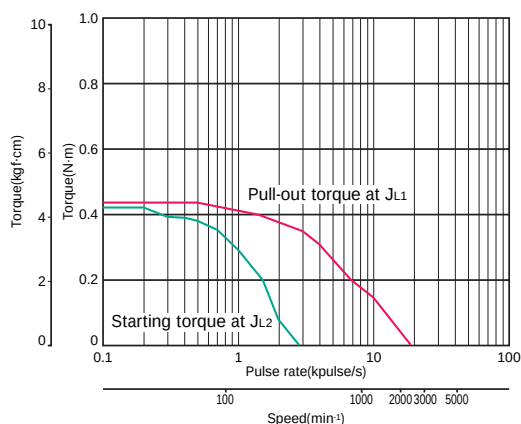


103H7523-6050/6250 (Single shaft) 103H7523-6020/6220 (Double shaft)



Pulse rate-torque characteristics

●103H7521-6050



Sanyo constant current circuit

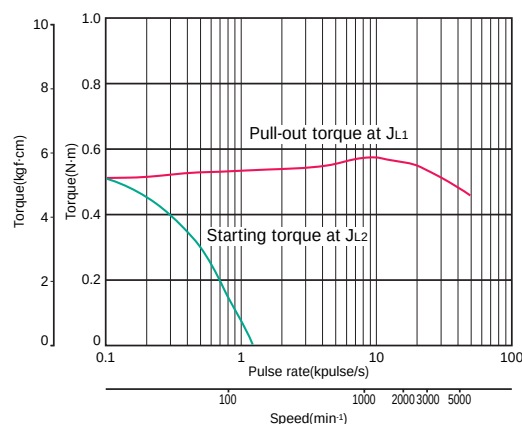
Source voltage : 24V DC · Winding current : 0.75A/phase

5-phase excitation (Full step)

$J_{L1}=0.94 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ (With rubber coupling)

$J_{L2}=0.51 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ (Pulley balancer system)

●103H7521-6250



Sanyo constant current circuit

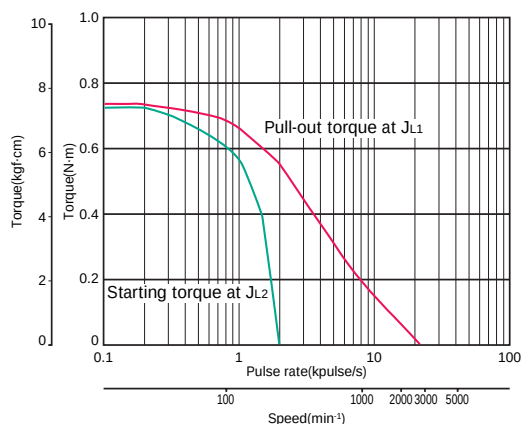
Source voltage : 100V AC · Winding current : 1.5A/phase

5-phase excitation (Full step)

$J_{L1}=0.94 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ (With rubber coupling)

$J_{L2}=0.8 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ (With direct-coupled coupling)

●103H7522-6050



Sanyo constant current circuit

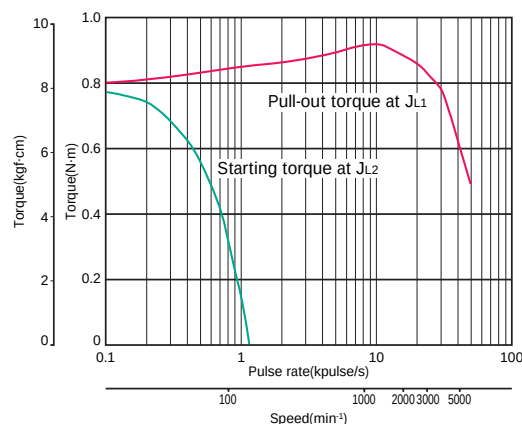
Source voltage : 24V DC · Winding current : 0.75A/phase

5-phase excitation (Full step)

$J_{L1}=2.6 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ (With rubber coupling)

$J_{L2}=0.6 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ (Pulley balancer system)

●103H7522-6250



Sanyo constant current circuit

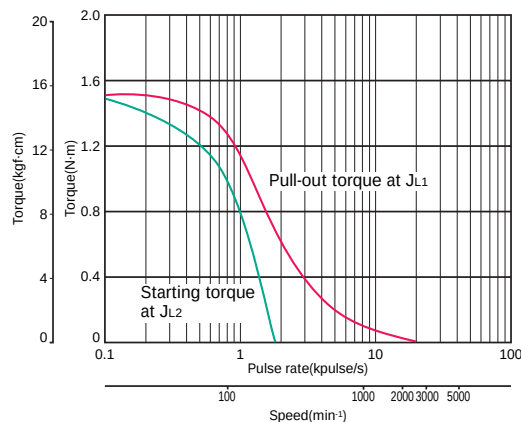
Source voltage : 100V AC · Winding current : 1.5A/phase

5-phase excitation (Full step)

$J_{L1}=2.6 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ (With rubber coupling)

$J_{L2}=2.6 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ (With direct-coupled coupling)

●103H7523-6050



Sanyo constant current circuit

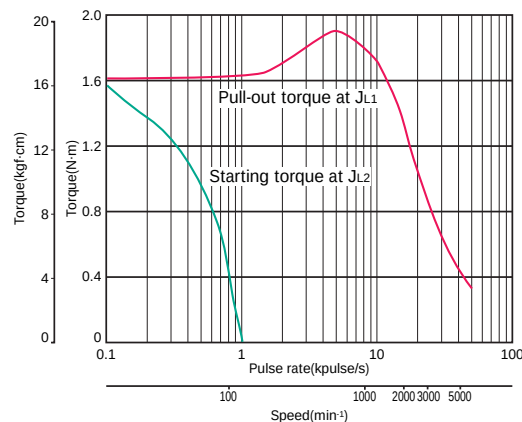
Source voltage : 24V DC · Winding current : 0.75A/phase

5-phase excitation (Full step)

$J_{L1}=7.4 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ (With rubber coupling)

$J_{L2}=1.1 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ (Pulley balancer system)

●103H7523-6250



Sanyo constant current circuit

Source voltage : 100V AC · Winding current : 1.5A/phase

5-phase excitation (Full step)

$J_{L1}=7.4 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ (With rubber coupling)

$J_{L2}=7.4 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ (With direct-coupled coupling)

□39mm
(0.36")

□60mm
(0.45")

□28mm
(0.72")

□42mm
(0.72")

□50mm
(0.72")

□60mm
(0.72")

□60mm
(0.72")

□86mm
(0.72")

□106mm
(0.72")

CE marked

Specifications of
5-phase stepping motor

In-vacuum
stepping motor



5-phase stepping motor

86mm cir.

103H858□-6□□□

CE marked

0.72°/step



●Applicable drivers

PMM-MA
50034

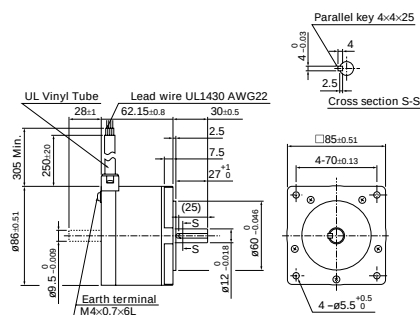
PMM-MA
50064

Specifications

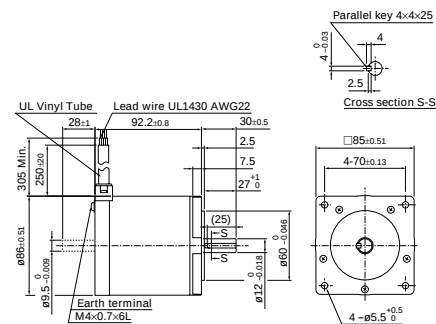
Model number		Holding torque at 5-phase energization	Rated current	Wiring resistance	Wiring inductance	Rotor inertia	Weight
Single-axis	Dual-axis	N.m or more	A/phase	Ω/phase	mH/phase	x 10 ⁻⁴ kg-m ²	kg
103H8581-6050	-6020	2.06	0.75	5.7	25	1.45	1.5
103H8581-6250	-6220	2.06	1.5	1.5	5.6	1.45	1.5
103H8582-6050	-6020	4.02	0.75	8.6	41	2.9	2.5
103H8582-6250	-6220	4.02	1.5	2	10.6	2.9	2.5
103H8583-6050	-6020	6.17	0.75	10.5	59	4.4	3.5
103H8583-6250	-6220	6.17	1.5	2.5	15	4.4	3.5

Dimensions (unit: mm)

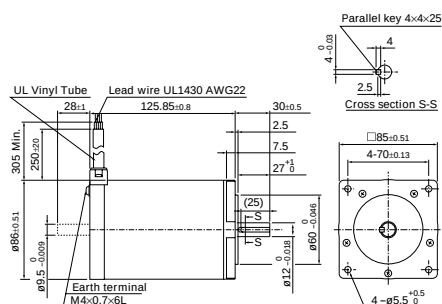
103H8581-6050/6250 (Single shaft)
103H8581-6020/6220 (Double shaft)



103H8582-6050/6250 (Single shaft)
103H8582-6020/6220 (Double shaft)

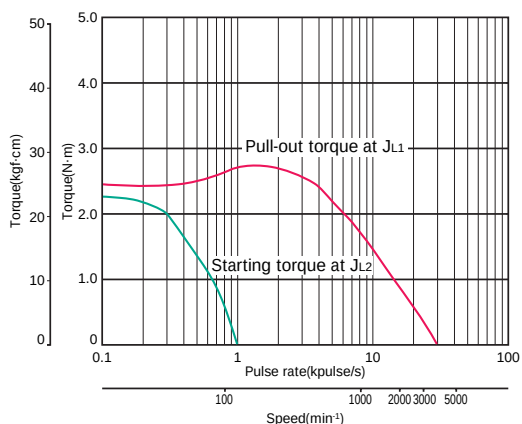


103H8583-6050/6250 (Single shaft)
103H8583-6020/6220 (Double shaft)



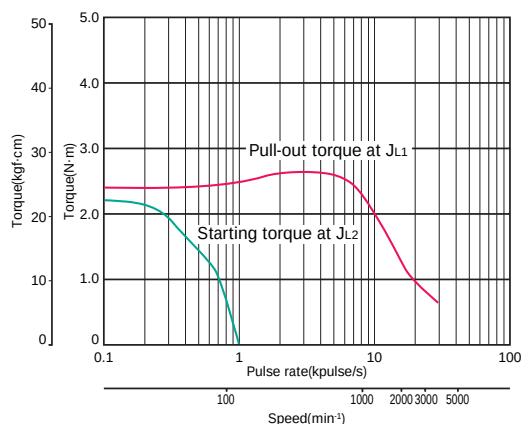
Pulse rate-torque characteristics

●103H8581-6050



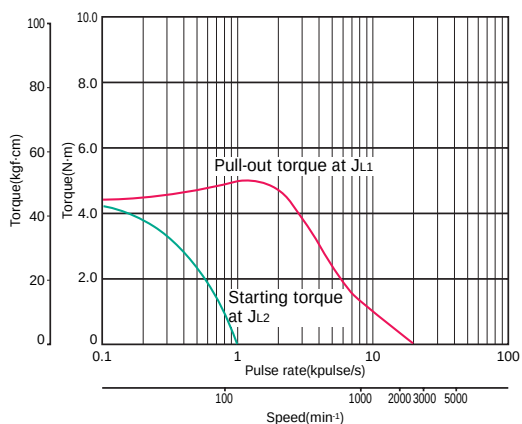
Sanyo constant current circuit
Source voltage : 100V AC · Winding current : 0.75A/phase
5-phase excitation (Full step)
 $J_{L1}=7.4 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (With rubber coupling)
 $J_{L2}=1.45 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (Pulley balancer system)

●103H8581-6250



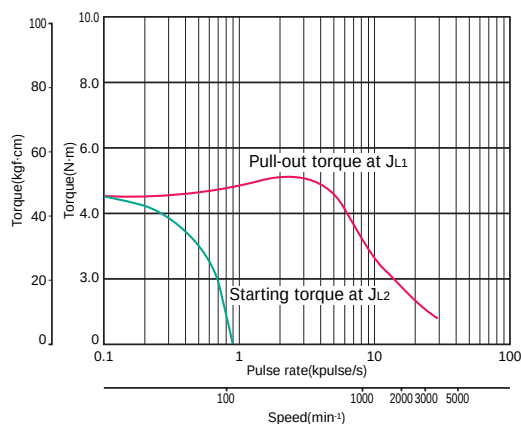
Sanyo constant current circuit
Source voltage : 100V AC · Winding current : 1.5A/phase
5-phase excitation (Full step)
 $J_{L1}=7.4 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (With rubber coupling)
 $J_{L2}=1.45 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (Pulley balancer system)

●103H8582-6050



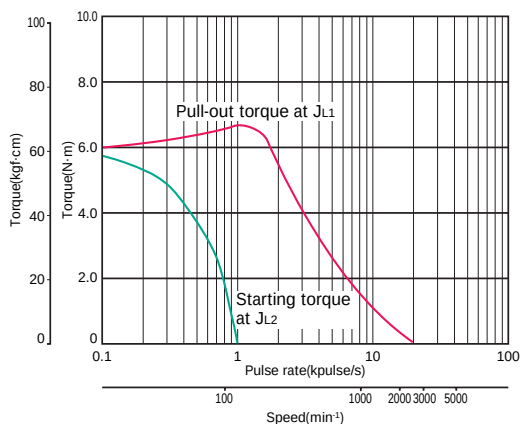
Sanyo constant current circuit
Source voltage : 100V AC · Winding current : 0.75A/phase
5-phase excitation (Full step)
 $J_{L1}=15.3 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (With rubber coupling)
 $J_{L2}=2.9 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (Pulley balancer system)

●103H8582-6250



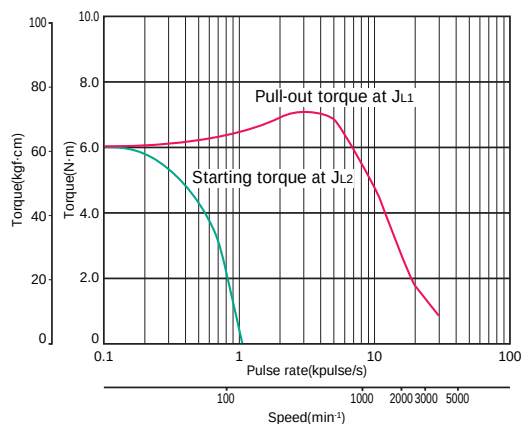
Sanyo constant current circuit
Source voltage : 100V AC · Winding current : 1.5A/phase
5-phase excitation (Full step)
 $J_{L1}=15.3 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (With rubber coupling)
 $J_{L2}=2.9 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (Pulley balancer system)

●103H8583-6050



Sanyo constant current circuit
Source voltage : 100V AC · Winding current : 0.75A/phase
5-phase excitation (Full step)
 $J_{L1}=43 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (With rubber coupling)
 $J_{L2}=4.4 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (Pulley balancer system)

●103H8583-6250



Sanyo constant current circuit
Source voltage : 100V AC · Winding current : 1.5A/phase
5-phase excitation (Full step)
 $J_{L1}=43 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (With rubber coupling)
 $J_{L2}=4.4 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (Pulley balancer system)

□39mm
(0.36")

□60mm
(0.45")

□28mm
(0.72")

□42mm
(0.72")

□50mm
(0.72")

□60mm
(0.72")

□60mm
(0.72")

□86mm
(0.72")

□106mm
(0.72")

CE marked

Specifications of
5-phase stepping motor

In-vacuum
stepping motor



5-phase stepping motor

106mm cir.

103H8958□-6□□□

CE marked

0.72°/step



●Applicable drivers

PMM-MA
50034

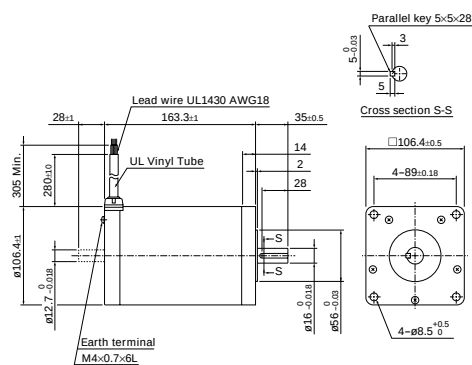
PMM-MA
50064

Specifications

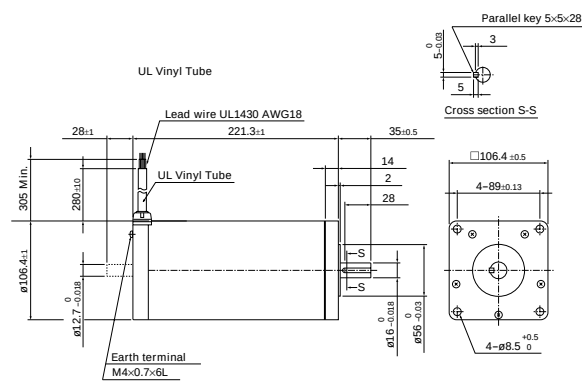
Model number		Holding torque at 5-phase energization	Rated current	Wiring resistance	Wiring inductance	Rotor inertia	Weight
Single-axis	Dual-axis	N.m or more	A/phase	Ω/phase	mH/phase	x 10 ⁻⁴ kg·m ²	kg
103H89582-6050	-6020	10.8	0.75	9	90	14.6	7.5
103H89582-6250	-6220	10.8	1.5	2	26	14.6	7.5
103H89583-6050	-6020	16	0.75	12.5	125	22	10.5
103H89583-6250	-6220	16	1.5	2.9	33.4	22	10.5

Dimensions (unit: mm)

103H89582-6050/6250 (Single shaft)
103H89582-6020/6220 (Double shaft)

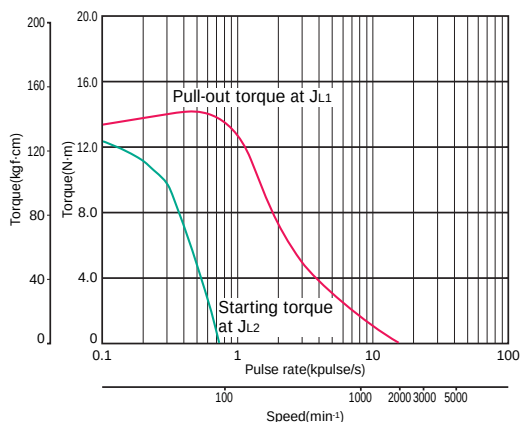


103H89583-6050/6250 (Single shaft)
103H89583-6020/6220 (Double shaft)



Pulse rate-torque characteristics

●103H89582-6050



Sanyo constant current circuit

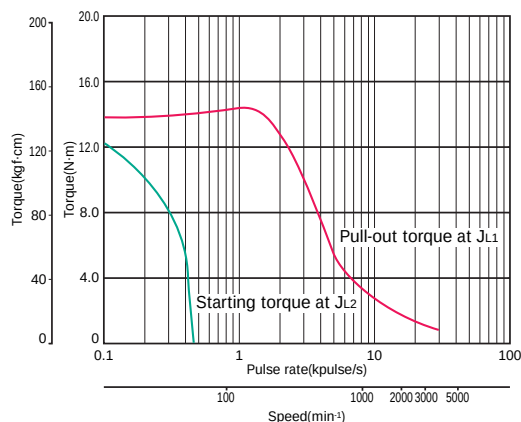
Source voltage : 100V AC · Winding current : 0.75A/phase

5-phase excitation (Full step)

$J_{L1}=43 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ (With rubber coupling)

$J_{L2}=43 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ (With rubber coupling)

●103H89582-6250



Sanyo constant current circuit

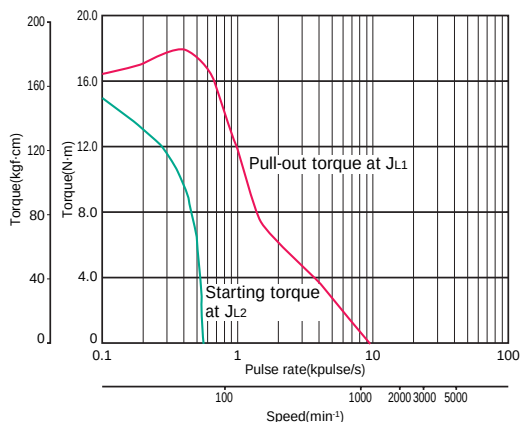
Source voltage : 100V AC · Winding current : 1.5A/phase

5-phase excitation (Full step)

$J_{L1}=43 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ (With rubber coupling)

$J_{L2}=43 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ (With rubber coupling)

●103H89583-6050



Sanyo constant current circuit

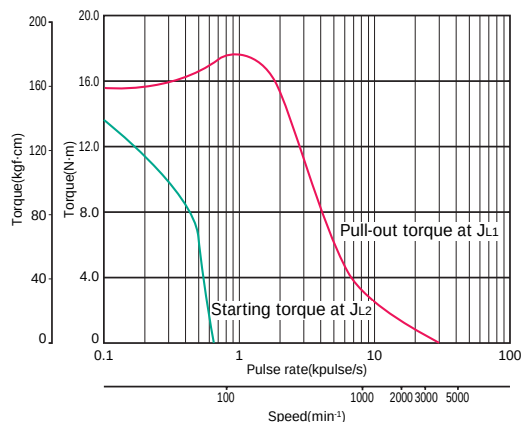
Source voltage : 100V AC · Winding current : 0.75A/phase

5-phase excitation (Full step)

$J_{L1}=43 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ (With rubber coupling)

$J_{L2}=43 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ (With rubber coupling)

●103H89583-6250



Sanyo constant current circuit

Source voltage : 100V AC · Winding current : 1.5A/phase

5-phase excitation (Full step)

$J_{L1}=43 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ (With rubber coupling)

$J_{L2}=43 \times 10^{-4} \text{ kg} \cdot \text{m}^2$ (With rubber coupling)

□39mm
(0.36")

□60mm
(0.45")

□28mm
(0.72")

□42mm
(0.72")

□50mm
(0.72")

□60mm
(0.72")

□60mm
(0.72")

□86mm
(0.72")

□106mm
(0.72")

CE marked

Specifications of
5-phase stepping motor

In-vacuum
stepping motor

5-phase stepping motor specifications

General specifications

	103H35□□	103H55□□	103H650□	103H752□	103H785□
Insulation class	Class B/130°C				
Insulation resistance	Not less than 100MΩ between winding and frame by DC500V megger at normal temperature and humidity.				
Withstand voltage	Without abnormality when applying 50/60Hz,1000V AC (500V AC for 103H35□□ and 103H55□□) for 1 minute (leakage current 1mA) between winding and frame at normal temperature and humidity.				
Operating environment	Ambient temperature -10°C to +50°C				
	Ambient humidity 20% to 90%				
Wiring temperature increase	80K Max. (Based on Sanyo Denki standard)				
Standing angle error	±0.09°	±0.09°	±0.09°	±0.09°	±0.09°
Axial play	0.75mm Max. (Load 4.4N)	0.75mm Max. (Load 4.4N)	0.75mm Max. (Load 9N)	0.75mm Max. (Load 9N)	0.75mm Max. (Load 9N)
Radial play (Note 1)	0.025mm Max. (Load 4.4N)				
Shaft runout	0.025mm				
Inserted part concentricity against shaft	ø0.05mm	ø0.05mm	ø0.075mm	ø0.075mm	ø0.075mm
Fitted surface angularity against shaft	0.1mm	0.1mm	0.075mm	0.075mm	0.075mm
Allowable thrust load	50N	10N	15N	15N	20N
Allowable radial load (Note 1)	34N	35N	85N	115N	80N

	103H858□	103H8958□	103-45□□	103-7556
Insulation class	Class B/130°C			
Insulation resistance	Not less than 100MΩ between winding and frame by DC500V megger at normal temperature and humidity.			
Withstand voltage	Without abnormality when applying 50/60Hz,1000V AC (500V AC for 103-45□□) for 1 minute (leakage current 1mA) between winding and frame at normal temperature and humidity.			
Operating environment	Ambient temperature -10°C to +50°C			
	Ambient humidity 20% to 90%			
Wiring temperature increase	80K Max. (Based on Sanyo Denki standard)			
Standing angle error	±0.09°	±0.09°	±0.04°	±0.09°
Axial play	0.75mm Max. (Load 4.4N)	0.75mm Max. (Load 4.4N)	0.75mm Max. (Load 4.4N)	0.75mm Max. (Load 4.4N)
Radial play (Note 1)	0.025mm Max. (Load 4.4N)			
Shaft runout	0.025mm			
Inserted part concentricity against shaft	ø0.075mm	ø0.075mm	ø0.05mm	ø0.075mm
Fitted surface angularity against shaft	0.075mm	0.075mm	0.1mm	0.075mm
Allowable thrust load	60N	100N	10N	15N
Allowable radial load (Note 1)	220N	360N	30N	80N

(Note1) The load point is at 1/3 from the shaft tip.

General specifications (Models Conforming to CE Marking)

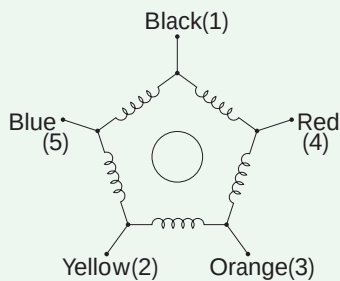
	103H752□	103H858□	103H8958□
Rated voltage:	DC12-200V	DC12-300V	
Specification type	S1(Continuous running duty Type)		
Protection grade	IP43		
Protection class	Class 1		
Operating environment	2		
Insulation class	Class B (130°C)		
Insulation resistance	Not less than 100MΩ between winding and frame by DC500V megger at normal temperature and humidity.		
Withstand voltage	Without abnormality when applying 50/60Hz, 1600V AC (1500kV AC for 103H752□□) for 1 minute(leakage current 10mA) between winding and frame at normal temperature and humidity.		
Operating environment	Ambient temperature -15°C to +60°C		
	Ambient humidity 20% to 90%		
Wiringtemperature increase	80K Max. (Based on Sanyo Denki standard)		
Standing angle error	±0.054°	±0.09°	±0.09°
Axial play	0.75mm Max. (Load 9N)		
Radial play (Note 1)	0.75mm Max.(Load 4.4N)		
Shaft runout	0.025mm		
Inserted part concentricity against shaft	ø0.075mm	ø0.075mm	ø0.075mm
Fitted surface angularity against shaft	0.075mm	0.075mm	0.075mm
Allowable thrust load	15N	60N	100N
Allowable radial load (Note 1)	115N	220N	360N

(Note1) The load point is at 1/3 from the shaft tip.

Internal wire connection and direction of motor rotate

Internal wire connection

Connector pin number in the parentheses



Direction of motor rotate

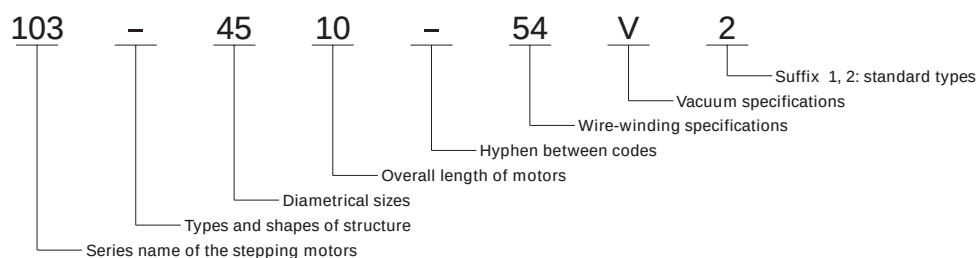
The direction of motor rotate is counterclockwise when viewed from the output shaft side at the direct current energization in the following order:

Type			Exciting order									
			1	2	3	4	5	6	7	8	9	10
Color of leads	Black	Connector pin No.	(1)	-	-	-	-	+	+	+	+	-
	Red		(4)	+	+	+	+	-	-	-	-	+
	Orange		(3)	+	-	-	-	-	+	+	+	-
	Yellow		(2)	-	-	+	+	+	+	-	-	+
	Blue		(5)	+	+	+	-	-	-	-	+	-

Specifications of In-vacuum stepping motor



Explanation of motor model number



Vacuum stepping motor

1. Outline of the In-vacuum stepping motor

In order to support customers' demand for actuators that can be driven in vacuum environment without requiring use of vacuum introducers, SANYO DENKI developed new in-vacuum stepping motors.

Highly accurate control of speed setting and positioning is actualized succeeding the features of SANYO stepping motors and is easily operated by open-loop control.

2. Features

- Ultra-high vacuum type stepping motors work under 10^{-8} Pa vacuum condition.
- Exposure to baking conditions up to 200°C is allowed.
- Many kinds of in-vacuum stepping motors are provided for adaptation to customers' applications.

3. Applications

In-vacuum stepping motors are being used widely for the following applications.

- Robotic devices for artificial satellites (space industry).
- Semi-conductor manufacturing facilities.
- Electron microscopes
- Large scale experimental facilities (accelerator, radiated light analyzer)
- Etc.

General Specifications (for ultra-high vacuum)

	103-4510-54V2	103-7556-50V2	103-7501-52V1	103H7523-56V2
Insulation class	Class C/200°C			
Insulation resistance	Not less than 100MΩ between winding and frame by DC500V megger at normal temperature and humidity.			
Withstand voltage	Without abnormality when applying 50/60Hz,1000V AC (500V AC for 103-4510-54V2 and 103H5510-70V1) for 1 minute (leakage current 1mA) between winding and frame at normal temperature and humidity.			
Environment vacuum	1×10^{-8} Pa (Reference value)			
Standing angle error	±0.045°	±0.09°	±0.09°	±0.09°
Axial play	0.75mm Max. (Load 4.4N)	0.75mm Max. (Load 9N)	0.75mm Max. (Load 9N)	0.75mm Max. (Load 9N)
Radial play (Note 1)	0.025mm Max. (Load 4.4N)			
Shaft run-out	0.025mm			
Inserted part concentricity against shaft	ø0.05mm	ø0.075mm	ø0.075mm	ø0.075mm
Fitted surface angularity against shaft	0.1mm	0.075mm	0.075mm	0.075mm
Allowable thrust load	10N	15N	15N	15N
Allowable radial load (Note 1)	35N	80N	80N	115N

General Specifications (for high vacuum)

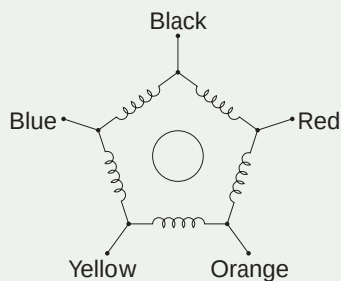
	103H5510-70V1	103H7853-70V1
Insulation class	Class C/200°C	
Insulation resistance	Not less than 1000MΩ between winding and frame by DC500V megger at normal temperature and humidity.	
Withstand voltage	Without abnormality when applying 50/60Hz,1000V AC (500V AC for 103H5510-70V1) for 1 minute (leakage current 1mA) between winding and frame at normal temperature and humidity.	
Environment vacuum	1×10 ⁻⁵ Pa (Reference value)	
Standing angle error	±0.09°	±0.09°
Axial play	0.75mm Max. (Load 4.4N)	0.75mm Max. (Load 9N)
Radial play (Note 1)	0.025mm Max. (Load 4.4N)	
Shaft run-out	0.025mm	
Inserted part concentricity against shaft	ø0.05mm	ø0.075mm
Fitted surface angularity against shaft	0.1mm	0.075mm
Allowable thrust load	10N	20N
Allowable radial load (Note 1)	35N	80N

(Note1) The load point is at 1/3 from the shaft tip.

Internal wire connection and rotation direction

Model No. : 103H5510-70V1 · 103H7853-70V1

Internal wire connection



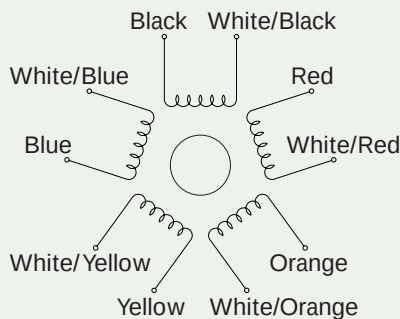
Rotation direction

The rotation direction is counterclockwise when viewed from the output shaft side at the direct current energization in the following order:

		Exciting order									
Color of leads		1	2	3	4	5	6	7	8	9	10
	Black	-	-	-	-		+	+	+	+	
	Red		+	+	+	+		-	-	-	-
	Orange	+		-	-	-	-		+	+	+
	Yellow	-	-		+	+	+	+		-	-
	Blue	+	+	-		-	-	-	-		+

Model No. : 103-4510-54V2 · 103-7556-50V2 · 103-7501-52V1 · 103H7523-56V2

Internal wire connection



Rotation direction

The rotation direction is counterclockwise when viewed from the output shaft side at the direct current energization in the following order:

		Exciting order									
Color of leads		1	2	3	4	5	6	7	8	9	10
	Black	-		+	+	+	+		-	-	-
	White/Black	+		-	-	-	-		+	+	+
	Red	-	-		+	+	+	+		-	-
	White/Red	+	+		-	-	-	-		+	+
	Orange	-	-	-		+	+	+	+		-
	White/Orange	+	+	+		-	-	-	-		+
	Yellow	-	-	-	-		+	+	+	+	
	White/Yellow	+	+	+	+		-	-	-	-	
	Blue		-	-	-	-		+	+	+	+
	White/Blue		+	+	+	+		-	-	-	-



High vacuum stepping motor

For environment in 10^{-5} Pa (For reference).

103H□□□□-70V1

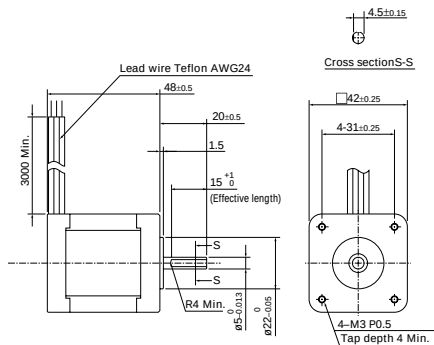
●For detailed information on applicable drivers,contact our Sales Department.

Specifications

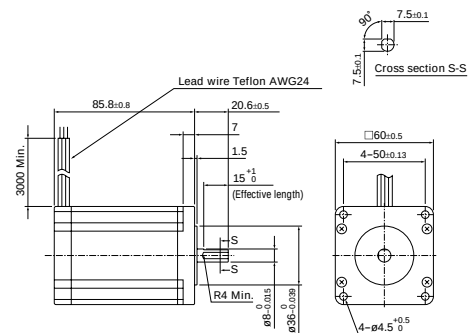
Model Number	Number of phases	Basic step angle	Holding torque	Rated current	Wiring resistance	Wiring inductance	Rotor inertia x 10^{-4} kg-m ²	Weight kg
			N.m or more	A/phase	Ω/phase	mH/phase		
103H5510-70V1	5	0.72°	0.255	0.75	2.7	2.2	0.065	0.4
103H7853-70V1	5	0.72°	1.86	0.75	6	15	0.84	1.4

Dimensions (Unit : mm)

103H5510-70V1

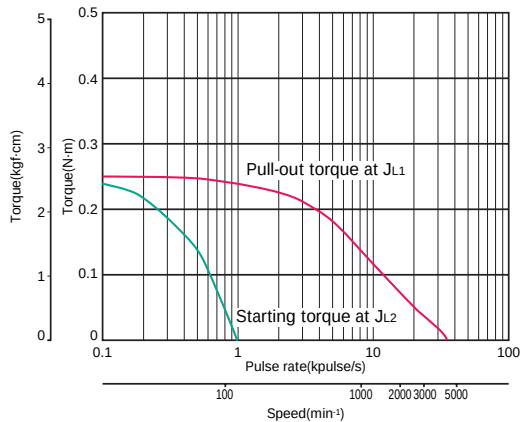


103H7853-70V1



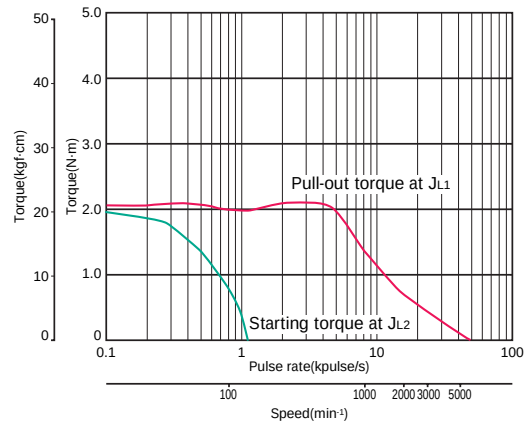
Pulse rate-torque characteristics

●103H5510-70V1



Sanyo constant current circuit
 Source voltage : 24V DC · Winding current : 0.75A/phase
 5-phase excitation (Full step)
 $J_{L1}=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (With rubber coupling)
 $J_{L2}=0.8 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (With direct-coupled coupling)

●103H7853-70V1



Sanyo constant current circuit
 Source voltage : 24V DC · Winding current : 0.75A/phase
 5-phase excitation (Full step)
 $J_{L1}=7.4 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (With rubber coupling)
 $J_{L2}=7.4 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (With direct-coupled coupling)

□39mm
(0.36")

□60mm
(0.45")

□28mm
(0.72")

□42mm
(0.72")

□50mm
(0.72")

□60mm
(0.72")

□60mm
(0.72")

□86mm
(0.72")

□106mm
(0.72")

CE marked

Specifications of
5-phase stepping motor

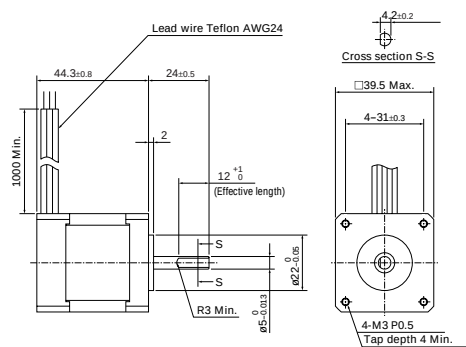
In-vacuum
stepping motor

For environment in 10^{-8}Pa (For reference).

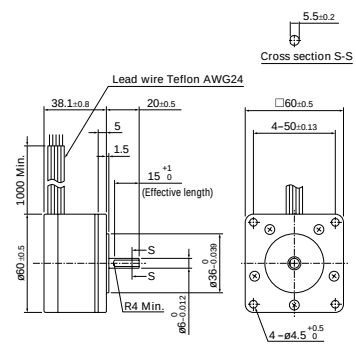
●For detailed information on applicable drivers,contact our Sales Department.

Model Number	Number of phases	Basic step angle	Holding torque	Rated current	Wiring resistance	Wiring inductance	Rotor inertia	Weight
			N.m or more	A/phase	Ω/phase	mH/phase	x 10 ⁻⁴ kg.m ²	kg
103-4510-54V2	5	0.36°	0.14	1.5	0.89	0.87	0.036	0.4
103-7556-50V2	5	0.45°	0.26	0.75	2.5	7	0.057	0.6
103-7501-52V1	5	0.72°	0.39	1.5	0.79	1.5	0.105	0.8
103H7523-56V2	5	0.72°	1.47	1.5	2.1	5.2	0.423	1.2

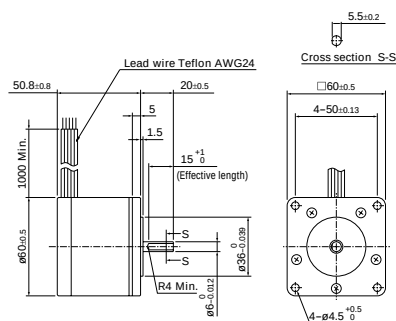
103-4510-54V2



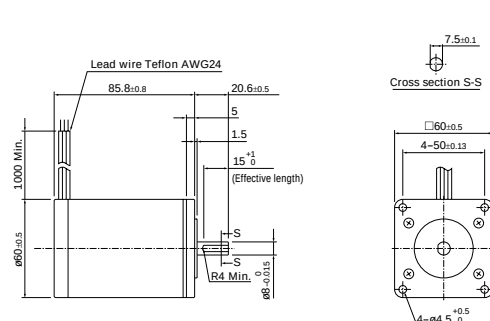
103-7556-50V2



103-7501-52V1

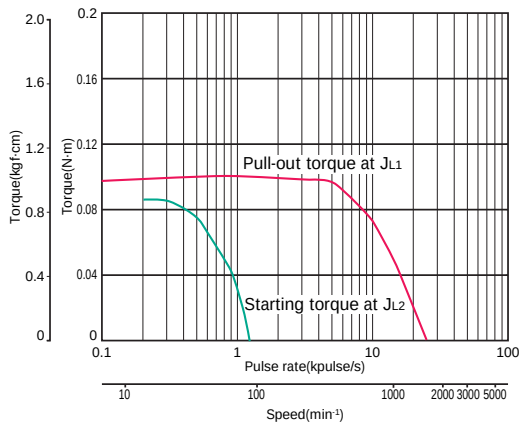


103H7523-56V2



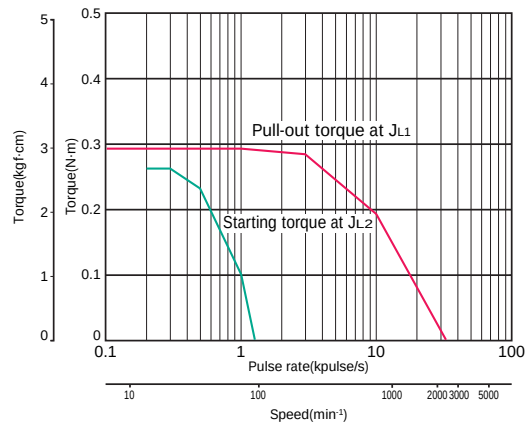
Pulse rate-torque characteristics

●103-4510-54V2



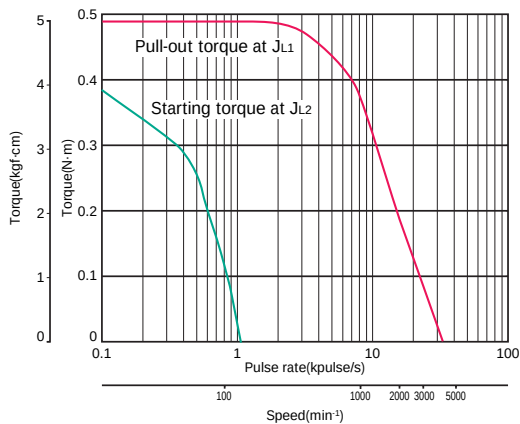
Sanyo constant current circuit
Source voltage : 24V DC • Winding current : 1A/phase
5-phase excitation (Full step)
 $J_{L1}=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (With rubber coupling)
 $J_{L2}=0.8 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (With direct-coupled coupling)

●103-7556-50V2



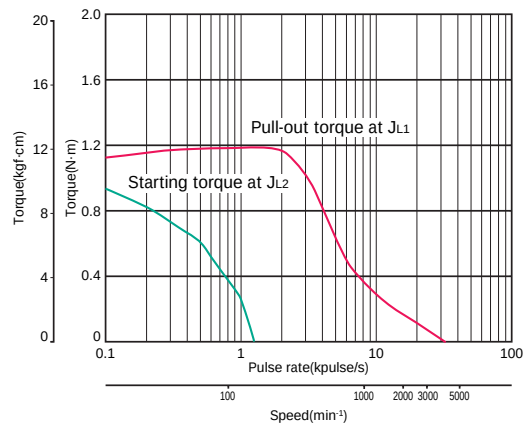
Sanyo constant current circuit
Source voltage : 24V DC • Winding current : 0.75A/phase
5-phase excitation (Full step)
 $J_{L1}=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (With rubber coupling)
 $J_{L2}=0.8 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (With direct-coupled coupling)

●103-7501-52V1



Sanyo constant current circuit
Source voltage : 24V DC • Winding current : 1A/phase
5-phase excitation (Full step)
 $J_{L1}=0.94 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (With rubber coupling)
 $J_{L2}=0.8 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (With direct-coupled coupling)

●103H7523-56V2



Sanyo constant current circuit
Source voltage : 24V DC • Winding current : 1A/phase
5-phase excitation (Full step)
 $J_{L1}=2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (With rubber coupling)
 $J_{L2}=2.6 \times 10^{-4} \text{kg} \cdot \text{m}^2$ (With direct-coupled coupling)

□39mm
(0.36")

□60mm
(0.45")

□28mm
(0.72")

□42mm
(0.72")

□50mm
(0.72")

□60mm
(0.72")

□60mm
(0.72")

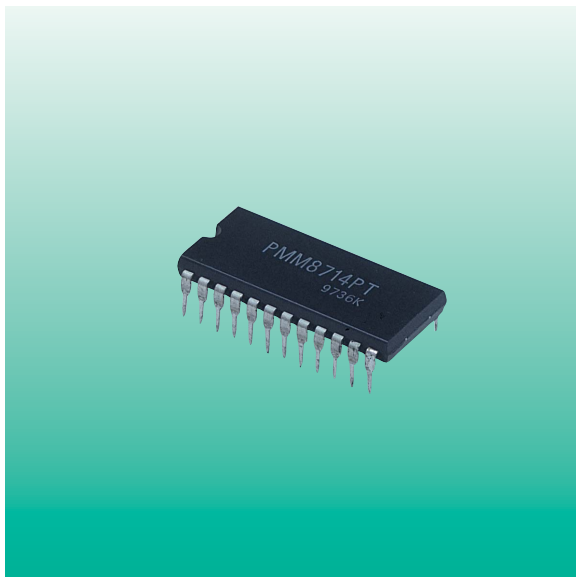
□86mm
(0.72")

□106mm
(0.72")

CE marked

Specifications of
5-phase stepping motor

In-vacuum
stepping motor



5-Phase Stepping Motor Drive IC for Universal Controller PMM8714PT

Outline

"PMM8714PT" is a Bi-CMOS monolithic IC to be used for controlling 5-phase stepping motor.

This IC has been developed for the purpose to further simplify the usage of 5-phase stepping motor. When combined only with the switching elements or a power hybrid IC, this IC can configure a driver device for a 5-phase stepping motor.

Characteristics

- Universal controller : Selection is possible from the following three different excitation modes.
4EX/4-5EX/5EX
- Power voltage: : $V_{CC}=4V\sim 16V$
- High output current: : 20mA min(source)
- High noise margin : Schmitt trigger circuit is integrated for the all input terminals
- two kinds of pulse input : double input system (CW, CCW input mode), single input system (CK,U/D input mode)
- Power-down functions : Makes all the output to "L" level.
- Reset functions : Shifts excitation status to the phase origin.
- Excitation mode preservation functions : Phase output does not change even when excitation mode is switched as follows: 4EX_4-5EX_5EX.
- Phase origin monitor : Outputs at the "H" level at the time of phase origin (the output in reset mode).
- Determination monitor for excitation status : Outputs monitor signal for the status of controller.
- Input pulse monitor : Outputs monitor signal for V_{CC} input pulse.

Maximum Rating (Ta = 25°C)

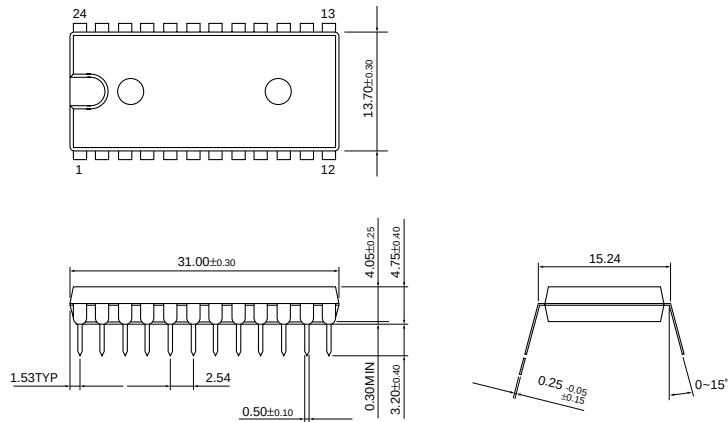
Item	Symbol	Rating	Unit
Power voltage	V_{CC}	-0.5~20	V
Output current I_{OH}	"H" level	-30	mA
	"L" level	2	
Output current I_{OL}	"H" level	-50	μA
	"L" level	2	
Input voltage	V_{IN}	-0.5~ V_{CC}	V
Input current	I_{IN}	± 1	mA
Tolerated loss	P_D	1000	mW
Operating temperature	T_{opr}	-20~85	°C
Storage temperature	T_{stg}	-55~150	°C

Recommended Operating Conditions (Ta = -30 to 85°C)

Item	Symbol	Rating			Unit
		Min.	Standard	Max.	
Power voltage	V_{CC}	4	—	16	V
Output current I_{OH}	"H" level	—	—	-10	mA
	"L" level	—	—	1.6	
Output current I_{OL}	"H" level	—	—	-40	μA
	"L" level	—	—	1.6	
Input voltage	V_{IN}	0	—	V_{CC}	V
Clock frequency	—	0	—	250	kHz

Dimensions (unit: mm)

Pin No.	Name	Function
1.	C _U	Input pulse UP clock input
2.	C _D	Input pulse DOWN clock input
3.	C _K	Input pulse clock input
4.	U/D	Alters rotation direction
5.	E _A	Input to switch excitation mode
6.	E _B	Input to switch excitation mode
7.	E _C	Input to switch excitation mode
8.	P _D	Power down input
9.	Z _O	Phase origin monitor output
10.	C _O	Input pulse monitor output
11.	E _M	Excitation monitor output
12.	GND	0V
13.	$\bar{R}$	Reset input
14.	$\emptyset E$	$\emptyset E$ output
15.	$\emptyset D$	$\emptyset D$ output
16.	$\emptyset C$	$\emptyset C$ output
17.	$\emptyset B$	$\emptyset B$ output
18.	$\emptyset A$	$\emptyset A$ output
19.	$\emptyset E$	$\emptyset E$ output
20.	$\emptyset D$	$\emptyset D$ output
21.	$\emptyset C$	$\emptyset C$ output
22.	$\emptyset B$	$\emptyset B$ output
23.	$\emptyset A$	$\emptyset A$ output
24.	V _{CC}	4~16V



Electrical characteristics

Direct Current Characteristics (Ta=25°C)

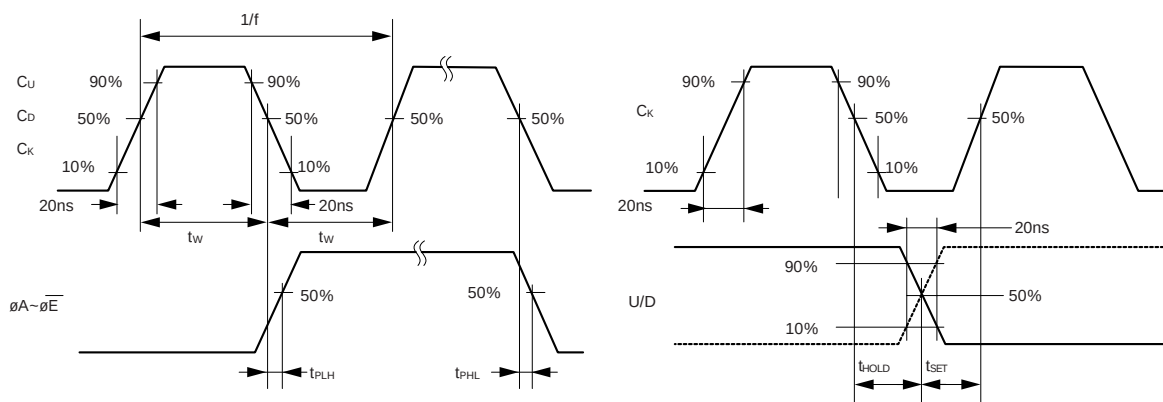
Item		Symbol		Conditions	Standard Value			Unit
			VCC [V]		Min.	Standard	Max.	
Output current $\varnothing A \sim \varnothing \bar{E}$	"H" level	I _{OH}	5	V _O = V _{CC} -2.0	-20	—	—	mA
			10		-20	—	—	
	"L" level	I _{OL}	5	V _O = 0.3V	1.6	—	—	
			10		1.6	—	—	
Output voltage C _O ,E _M ,Z _O	"H" level	V _{OH}	5	I _O = -40μA	3.6	—	—	V
			10		8.6	—	—	
	"L" level	V _{OL}	5	I _O = 1.6mA	—	—	0.4	
			10		—	—	0.6	
Input voltage	"H" level	V _{IH}	5	—————	3.0	2.5	—	V
			10		6.0	5.0	—	
	"L" level	V _{IL}	5	—————	—	2.0	1.5	
			10		—	4.0	3.0	
Input voltage C _U ,C _D ,C _K E _A ,E _B ,E _C	"H" level	I _{IH}	5	V _{IN} = V _{CC} -0.5	—	—	0.4	mA
			10		—	—	0.7	
	"L" level	I _{IL}	5	V _{IN} = 0V	—	—	±10	μA
			10		—	—	±10	
Input voltage U/D,PD,R	"H" level	I _{IH}	5	V _{IN} = V _{CC} -0.5	—	—	-100	μA
			10		—	—	-100	
	"L" level	I _{IL}	5	V _{IN} = 0V	—	—	-0.4	mA
			10		—	—	-0.7	
Static current consumption		I _{CC}	5	All terminals open	—	—	25	mA
			10		—	—	35	

Electrical characteristics

Switching Characteristics (Ta=25°C)

Item	Symbol	VCC [V]	Conditions	Standard Value			Unit
				Min.	Standard	Max.	
Max. clock frequency	f _{MAX}	5		250	300	—	kHz
		10		270	350	—	
Min. clock pulse width	t _w	5		—	300	500	ns
		10		—	300	500	
Min. reset pulse width	t _{WR}	5		—	200	500	ns
		10		—	200	500	
Delay time (ø output from clock input)	t _{PHL}	5		—	2500	3500	ns
	t _{PLH}	10		—	2500	3500	
Delay time (Each monitoring from clock input)	t _{PHL}	5		—	3000	4000	ns
	t _{PLH}	10		—	3000	4000	
Preset time	t _{SET}	5		4000	3000	—	ns
		10		4000	3000	—	
Holding time	t _{HOLD}	5		500	0	—	ns
		10		500	0	—	

Switching Characteristics



Function table

Input mode and rotating direction

Input system	Input				Rotation direction
	Cu	Cd	Ck	U/D	
Double input system (CW, CCW)		L	L	L	CW
	L		L	L	CCW
Single input system (CK, U/D)	L	L		H	CW
	L	L		L	CCW

Excitation mode

Energization system	Input				
	$\overline{R}$	$\overline{P_D}$	E _A	E _B	E _C
4 EX	H	H	L	H	L
4-5EX	H	H	L	L	L
5 EX	H	H	H	L	L

Energization sequence

4EX

Pulse Phase	0 (Reset)	1	2	3	4	5	6	7	8	9	10
$\emptyset A$	1	0	0	0	0	0	0	1	1	1	1
$\emptyset B$	1	1	0	0	0	0	0	0	1	1	1
$\emptyset C$	1	1	1	0	0	0	0	0	0	1	1
$\emptyset D$	1	1	1	1	0	0	0	0	0	0	1
$\emptyset E$	0	1	1	1	1	0	0	0	0	0	0
$\emptyset \bar{A}$	0	0	1	1	1	1	0	0	0	0	0
$\emptyset \bar{B}$	0	0	0	1	1	1	1	0	0	0	0
$\emptyset \bar{C}$	0	0	0	0	1	1	1	1	0	0	0
$\emptyset \bar{D}$	0	0	0	0	0	1	1	1	1	0	0
$\emptyset \bar{E}$	0	0	0	0	0	0	1	1	1	1	0
Z_o	1	0	0	0	0	0	0	0	0	0	1
E_M	0	0	0	0	0	0	0	0	0	0	0
UP	→										
DOWN	←										

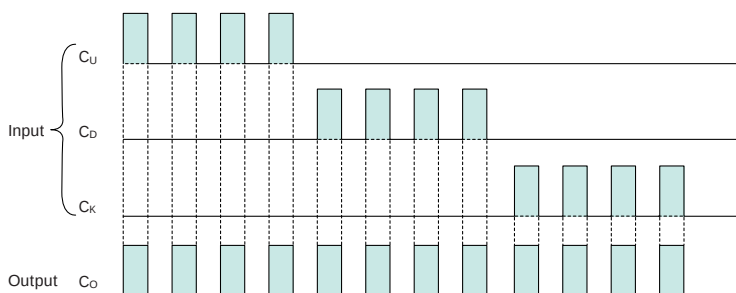
5EX

Pulse Phase	0 (Reset)	1	2	3	4	5	6	7	8	9	10
$\emptyset A$	1	1	0	0	0	0	0	1	1	1	1
$\emptyset B$	1	1	1	0	0	0	0	0	1	1	1
$\emptyset C$	1	1	1	1	0	0	0	0	0	1	1
$\emptyset D$	1	1	1	1	1	0	0	0	0	0	1
$\emptyset E$	0	1	1	1	1	1	0	0	0	0	0
$\emptyset \bar{A}$	0	0	1	1	1	1	1	0	0	0	0
$\emptyset \bar{B}$	0	0	0	1	1	1	1	1	0	0	0
$\emptyset \bar{C}$	0	0	0	0	1	1	1	1	1	0	0
$\emptyset \bar{D}$	0	0	0	0	0	1	1	1	1	1	0
$\emptyset \bar{E}$	1	0	0	0	0	0	1	1	1	1	1
Z_o	1	0	0	0	0	0	0	0	0	0	1
E_M	1	1	1	1	1	1	1	1	1	1	1
UP	→										
DOWN	←										

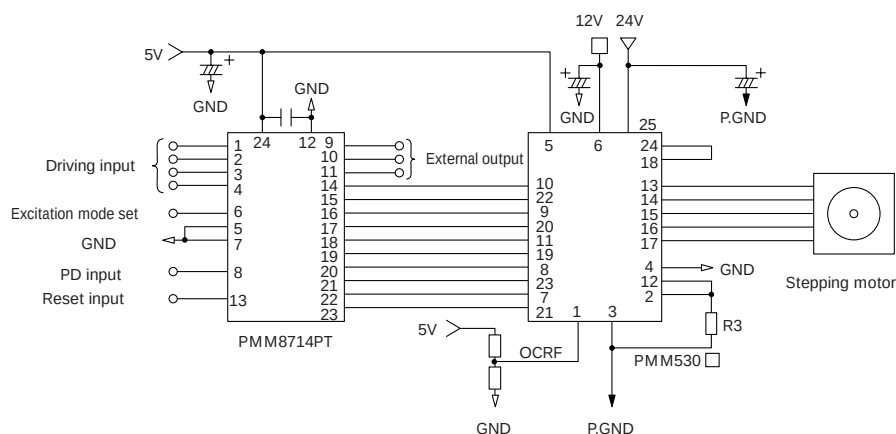
4-5EX

Pulse Phase	0 (Reset)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
$\emptyset A$	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
$\emptyset B$	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1
$\emptyset C$	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1
$\emptyset D$	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	1	1
$\emptyset E$	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0
$\emptyset \bar{A}$	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
$\emptyset \bar{B}$	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
$\emptyset \bar{C}$	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0
$\emptyset \bar{D}$	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0	0	0
$\emptyset \bar{E}$	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	0
Z_o	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
E_M	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0
UP	→																				
DOWN	←																				

Input pulse monitor



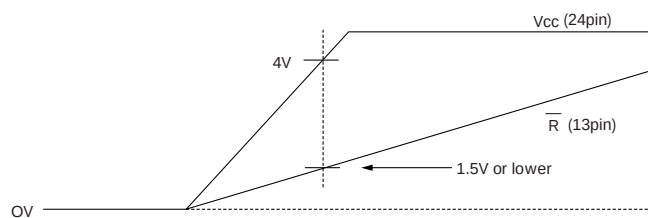
Example application circuit (full step/half step)



Excitation mode set

Pin No.	Terminal symbol	Input level	Motor operation
6	EB	H	Full step
		L	Half step

- When VCC is not stable, such as immediately after the power is on, normal initial reset can not always be performed. In order to perform firm reset, hold R terminal (13pin) at the "L" level until Vcc becomes stable.



- Refer to Page 343 for the specifications of power hybrid IC:PMM530 □.
- Refer to Operation Manual of PMM8714PT for other applications.

PMM8714PT

PMM5301
5303

PMM5310



HIC for 5-Phase Stepping Motor

PMM5301 PMM5303

Outline

PMM530 □ is a single packaged power hybrid IC of the switching elements to be used for driving 5-phase stepping motor. This HIC has been developed for the purpose to further simplify the usage of 5-phase stepping motor. When combined only with the controller IC to generate the excitation mode, this HIC can configure a driver device for a 5-phase stepping motor.

Characteristics

- High speed and high torque rotation by 5-phase pentagon system.
- Constant voltage and constant current PWM driving system (excited by others).
- Power voltage (driving power) : $V_{CC1}=18\sim42V$
- High output current : 4A max. (1A/phase)
- Reduced heat generation by using MOSFET for the power drive element.
- The all-in-one packaging reduces number of parts around peripheral circuits.
- Two package types are available, enabling flexible PCB designing.

Maximum rating ($T_c = 25^\circ C$)

Item	Symbol	Condition	Rated value	Unit
Power voltage-1	$V_{CC1\ max}$	Without signal (25pin terminal)	52	V
Power voltage-2	$V_{CC2\ max}$	Without signal (5pin terminal)	7	V
Power voltage-3	$V_{CC3\ max}$	FET drive power (6pin terminal)	15	V
Phase current	$I_{O\ max}$	1 pulse 100ms, $T_c=25^\circ C$	7	A
Loss-1	$P_{D\ max1}$	Single FET for phase switching, $T_c=25^\circ C$	12.5	W
Loss-2	$P_{D\ max2}$	Single FET for constant current control, $T_c=25^\circ C$	27	W
Operating temperature on PCB	T_c	No-condensing at a low temperature	0~105	$^\circ C$
Temperature at joint	$T_j\ max$	_____	150	$^\circ C$
Storage temperature	T_{stg}	_____	-40~125	$^\circ C$

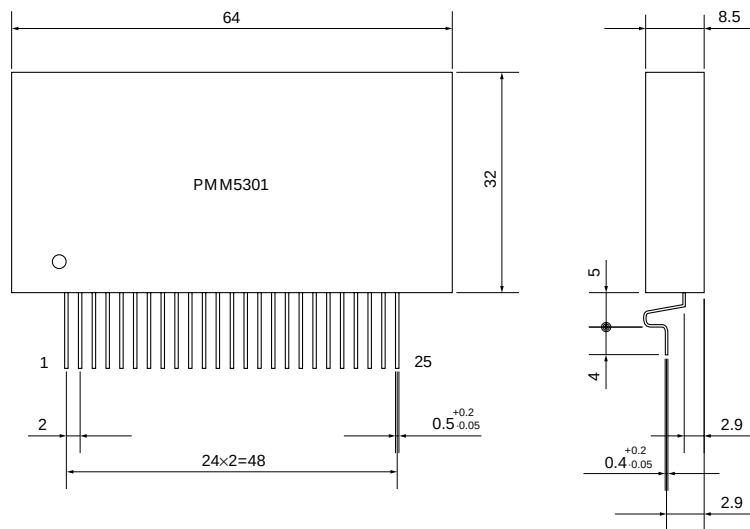
Recommended operation condition ($T_a = 25^\circ C$)

Item	Symbol	Condition	Rated value	Unit
Power voltage-1	V_{CC1}	With signal (25pin terminal)	18~42	V
Power voltage-2	V_{CC2}	With signal (5pin terminal)	5.0 $\pm$ 5%	V
Power voltage-3	V_{CC3}	With signal (6pin terminal)	12.0 $\pm$ 10%	V
Power voltage-4	V_{CCO}	With signal (24pin terminal)	10~42	V
Output current	$I_{O\ max}$	Total current	4	A
Phase driver withstanding voltage	V_{DSS}	$I_D=10mA(TC=25^\circ C)$	60min	V

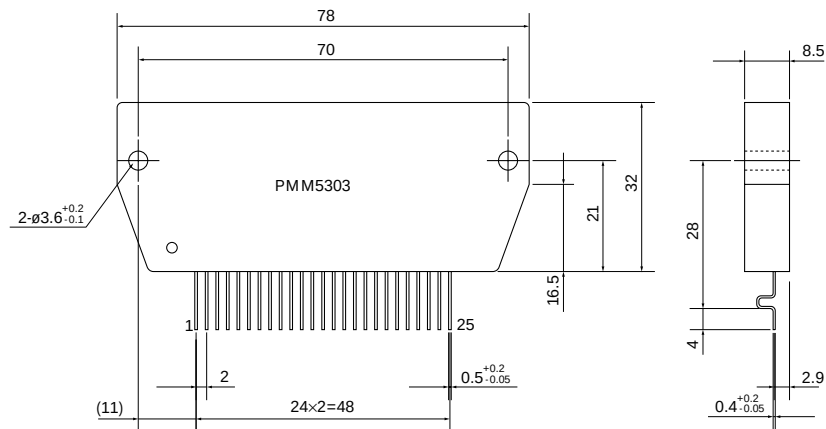
Dimensions (Unit: mm)

Pin No.	Code	Functions
1.	OCRF	Set input for motor current
2.	RS2	Detecting terminal for motor current
3.	GND	0V
4.	RS3	0V
5.	V _{CC2}	5V system power
6.	V _{CC3}	12V system power
7.	NA	Lower arm drive input
8.	ND	Lower arm drive input
9.	NE	Lower arm drive input
10.	NC	Lower arm drive input
11.	NB	Lower arm drive input
12.	RS1	Input voltage applied to motor
13.	AO	Motor output
14.	BO	Motor output
15.	CO	Motor output
16.	DO	Motor output
17.	EO	Motor output
18.	V _M	Input voltage applied to motor
19.	PC	Upper arm drive input
20.	PA	Upper arm drive input
21.	PB	Upper arm drive input
22.	PD	Upper arm drive input
23.	PE	Upper arm drive input
24.	V _{CCO}	Output terminal for power source
25.	V _{CC1}	Power system input

● PMM5301



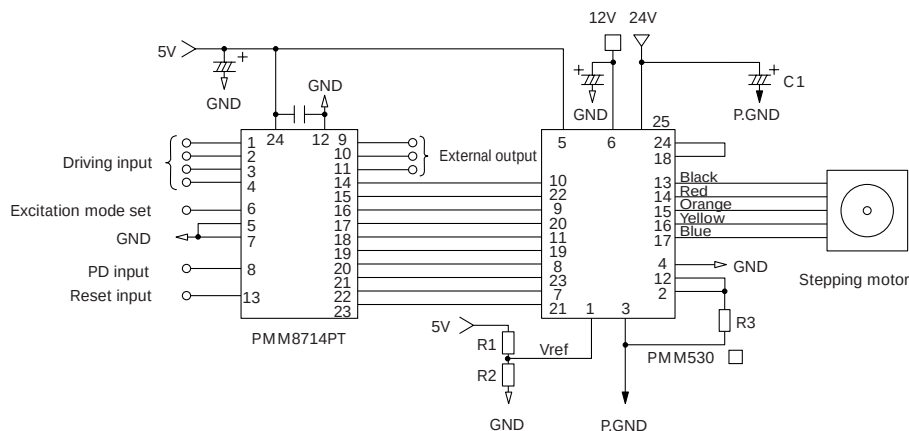
● PMM5303



Electrical characteristics (T_c = 25°C, V_{CC1} = 24V, V_{CC2} = 5V, V_{CC3} = 12V)

Item	Symbol	Condition	Rating			Unit
			Min.	Standard	Max.	
Oscillation frequency	F _c	—	20	25	30	kHz
"H" level input voltage	V _{IH}	NA-NE terminals	2.0	—	—	V
"L" level input voltage	V _{IL}	NA-NE terminals	—	—	0.8	
"H" level input voltage	V _{IH}	PA-PE terminals	3.5	—	—	V
"L" level input voltage	V _{IL}	PA-PE terminals	—	—	1.5	
Input current	I _i	PA-PE terminals V _{IN} =V _{CC2} or GND	—	—	±1	μA
"H" level input current	I _{OH}	NA-NE terminals V _{IN} =2.7V	—	—	20	μA
"L" level input current	I _{OL}	NA-NE terminals V _{IN} =0.4V	—	—	-0.4	mA
V _{CC2} current consumption	I _{CCO2}	5 pin terminal	—	23	45	mA
V _{CC3} current consumption	I _{CCO3}	6 pin terminal	—	15	25	mA

Example application circuit

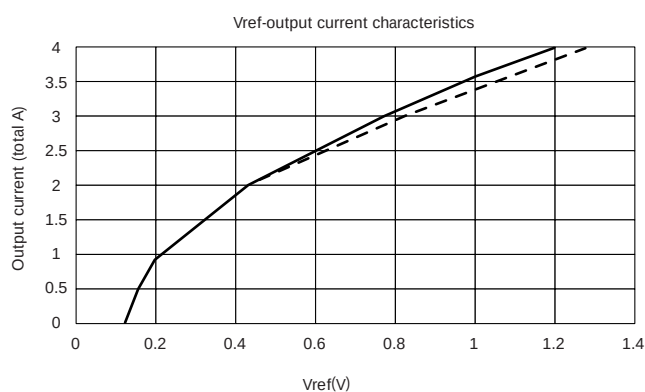


- Make common for the logic system grounding (GDN) and the driving power system grounding on the C1 minus side.
- Refer to Page 337 for the specifications of PMM8714PT.
- Recommended fixed numbers of circuit for PMM530 □ :

Applied for	Constant value
R3	5W 0.5Ω
C1	330 μF

- Select the fixed numbers R1 and R2 referring to the Vref-output current characteristics.
- The value shown in the graph was measured during operation of 103H7521-7051.

The Vref voltage differs according to the combined motor, power voltage and pattern status of PCB.
For protection of the motor and hybrid IC, actual motor current may have to be measured under the using conditions.



PMM8714PT

PMM5301
5303

PMM5310

HIC for 5-Phase Stepping Motor

PMM5310



Outline

PMM5310 is a single packaged all-in-one type power hybrid IC of the power bridge circuit elements to drive 5-phase stepping motor with the controller IC to control excitation mode.

This HIC has been developed for the purpose to further simplify the usage of 5-phase stepping motor, and can configure a micro step driver device for a 5-phase stepping motor.

Characteristics

- High speed and high torque rotation by 5-phase pentagon system.
- Constant voltage and constant current PWM driving system (excited by others).
- Power voltage (driving power) : $V_{CC1}=18\sim42V$
- High output current : 2.7A max. (current peak value/phase)
- Reduced heat generation by using MOSFET for the power drive element.
- The all-in-one packaging reduces considerable number of parts around peripheral circuits.

Maximum rating ($T_C = 25^\circ C$)

Item	Symbol	Conditions	Rated value	Unit
Power voltage-1	$V_{CC1\ max}$	Without signal (23pin terminal)	42	V
Power voltage-2	$V_{CC2\ max}$	Without signal (21pin terminal)	7	V
Phase current	$I_O\ max$	Operating at 12rpm or more	2.7	A
Loss-1	$P_D\ max1$	Single FET for phase switching, $T_C=25^\circ C$	12.5	W
Loss-2	$P_D\ max2$	Single FET for phase switching, $T_C=25^\circ C$	8.5	W
Operating temperature on PCB	T_C	No-condensing at a low temperature	0~85	$^\circ C$
Temperature at joint	$T_J\ max$	—————	150	$^\circ C$
Storage temperature	T_{stg}	—————	-40~+125	$^\circ C$

Recommended operation condition ($T_a = 25^\circ C$)

Item	Symbol	Condition	Rated value	Unit
Power voltage-1	V_{CC1}	With signal (23pin terminal)	18~40	V
Power voltage-2	V_{CC2}	With signal (21pin terminal)	5.0 $\pm$ 5%	V
Output current	$I_O\ max$	Operating at 12rpm or more	2.2	A
Phase driver withstand voltage	V_{BSS}	$I_C=10mA(T_C=25^\circ C)$	60	V

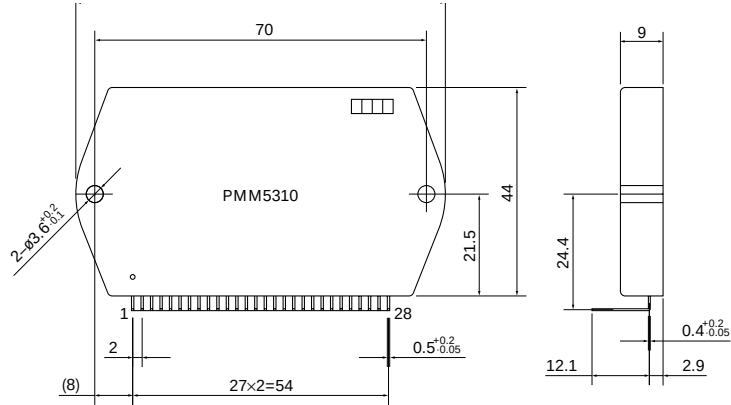
Selecting number of micro step divisions

s_sel3~0	0000	0001	0010	0011	0101	0110	0111	1000	1001	1010
Number of divisions for basic step angle	1	2	2.5	4	5	8	10	20	40	80

● When setting the number of divisions to other than shown above, the number shall be fixed at 80.

Dimensions (Unit: mm)

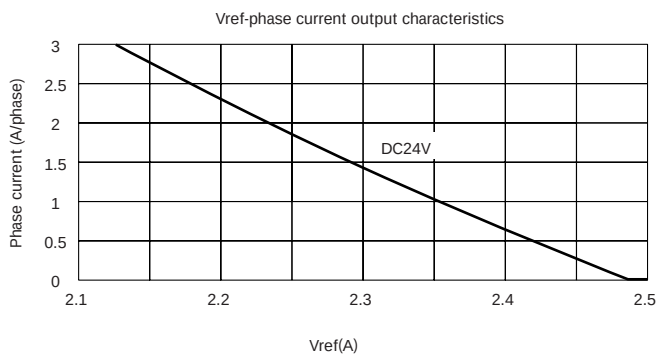
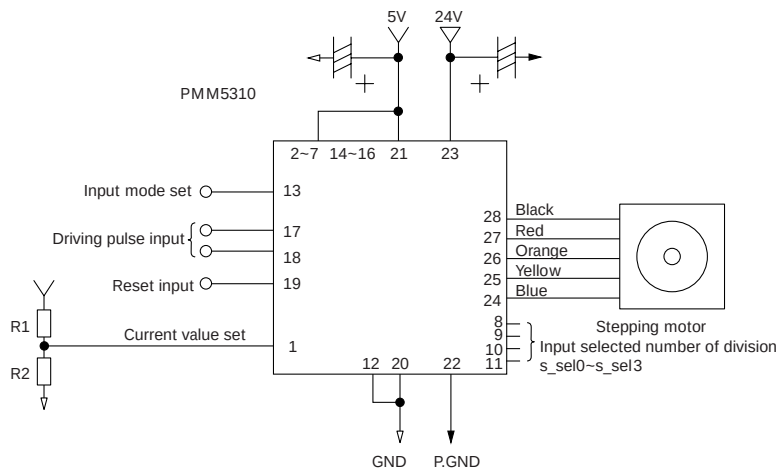
Pin No.	Name or code	Functions
1.	Vref	Voltage input for motor current set
2.	Reserved terminal	(Fixed at high)
3.	Reserved terminal	(Fixed at high)
4.	Reserved terminal	(Fixed at high)
5.	Reserved terminal	(Fixed at high)
6.	Reserved terminal	(Fixed at high)
7.	Reserved terminal	(Fixed at high)
8.	s_sel0	Set number of divisions
9.	s_sel1	Set number of divisions
10.	s_sel2	Set number of divisions
11.	s_sel3	Set number of divisions
12.	Reserved terminal	(Fixed at low)
13.	mode_1	Input mode set
14.	Reserved terminal	(Fixed at high)
15.	Reserved terminal	(Fixed at high)
16.	Reserved terminal	(Fixed at high)
17.	ccw_ud	Pulse command input
18.	cw_ck	Pulse command input
19.	zreset	System reset
20.	SG	Grounding VCC2
21.	Vcc2	Power input for control system (+5V)
22.	P.GND	Power grounding VCC1
23.	Vcc1	Power input for power system (+24V)
24.	E	Motor output
25.	D	Motor output
26.	C	Motor output
27.	B	Motor output
28.	A	Motor output



Electrical characteristics (T_C = 25°C, VCC1 = 24V, VCC2 = 5V)

Item	Symbol	Condition	Rating			Unit
			Min.	Standard	Max.	
Output saturation voltage-1	V _{SAT-1}	I _O =1A, FET1~5		0.5	0.9	V
Output saturation voltage-2	V _{SAT-2}	I _O =1A, FET6~10		0.3	0.7	V
Forward voltage of FET diode	V _{df}	I _f =1.0A		1.1	1.8	V
Oscillation frequency	F _c	—		25		kHz
"H" level input voltage	V _{IH}	V _{in} =VCC2, 2~19pin	4.0	—	—	V
"L" level input voltage	V _{IL}	V _{in} =0V, 2~19pin	—	—	1.0	
"H" level input current	I _{IH}	V _{in} =VCC2, 2~19pin	—	—	10	μA
"L" level input current	I _{IL}	V _{in} =0V, 2~19pin	20	—	100	μA
Pull-up resistor	R _{UP}	2~19pin	60	120	240	kΩ
VCC1 current consumption	I _{CC1}	zreset=L, 23pin terminal	—	16.5	30	mA
VCC2 current consumption	I _{CC2}	zreset=L, 21pin terminal	—	30	45	mA
Vref voltage range	V _{ref}	1pin terminal	0.5		VCC2×1/2	V
Output lead current	I _{OL}	zreset=L, 24-28pin terminals			1	mA

Example applicable circuit



- Make common for the logic system VCC2 grounding (GDN) and the driving power system VCC1 grounding (P.GND) on the minus side of the electrolytic condenser.
- Select the fixed numbers R1 and R2 referring to the Vref-phase current output characteristics.
- The value shown in the graph was measured during operation of 103H7522-7051. The Vref voltage differs according to the combined motor, power voltage and pattern status of PCB. For protection of the motor and hybrid IC, actual motor current may have to be measured under the using conditions.

PMM8714PT

PMM5301
5303

PMM5310

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