42 mm sq.

1.8°/step RoHS

Bipolar winding, Connector type

Unipolar winding, Connector type ▶p. 45

Customizing

Shaft length Shaft shape

Varies depending on the model number and quantity. Contact us for details.

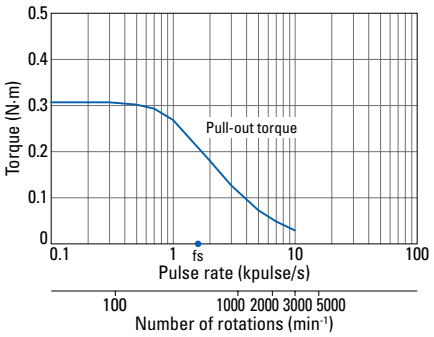
Bipolar winding, Connector type

Model no.		Holding torque at 2-phase energization	Rated current	Wiring resistance	Winding inductance	Rotor inertia	Mass	Motor length (L)
Single shaft	Dual shaft	N·m min.	A/phase	Ω/phase	mH/phase	×10⁻⁴kg·m²	kg	mm
SF2421-10B41	**SF2421-10B11**	0.29	1	3.6	7	0.031	0.23	33±0.5
SF2422-10B41	**SF2422-10B11**	0.43	1	4.6	9.6	0.046	0.3	39±0.5
SF2423-10B41	**SF2423-10B11**	0.56	1	5.3	12.5	0.063	0.38	48±0.5
SF2424-10B41	**SF2424-10B11**	0.8	1	6.5	16	0.094	0.51	59.5±1

Characteristics diagram

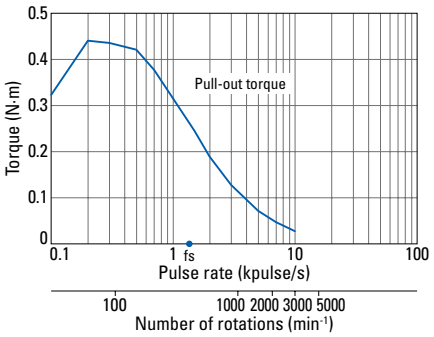
SF2421-10B41 SF2421-10B11

Constant current circuit
Source voltage: 24 VDC
Operating current:
1 A/phase, 2-phase energization (full-step)
Pull-out torque:
J_L=0.94×10⁻⁴kg·m² (use the rubber coupling)
fs: Maximum self-start frequency when not loaded



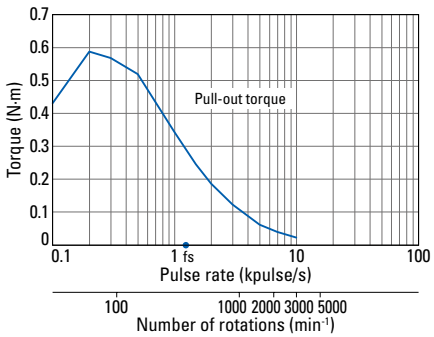
SF2422-10B41 SF2422-10B11

Constant current circuit
Source voltage: 24 VDC
Operating current:
1 A/phase, 2-phase energization (full-step)
Pull-out torque:
J_L=0.94×10⁻⁴kg·m² (use the rubber coupling)
fs: Maximum self-start frequency when not loaded



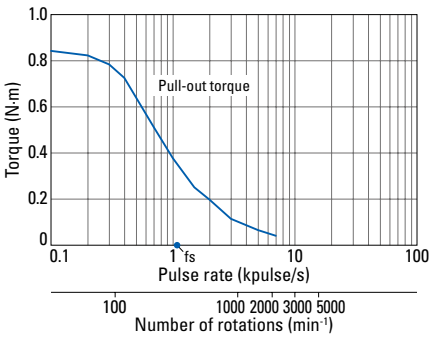
SF2423-10B41 SF2423-10B11

Constant current circuit
Source voltage: 24 VDC
Operating current:
1 A/phase, 2-phase energization (full-step)
Pull-out torque:
J_L=0.94×10⁻⁴kg·m² (use the rubber coupling)
fs: Maximum self-start frequency when not loaded



SF2424-10B41 SF2424-10B11

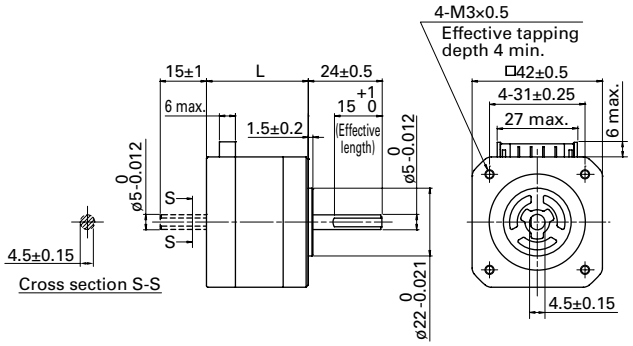
Constant current circuit
Source voltage: 24 VDC
Operating current:
1 A/phase, 2-phase energization (full-step)
Pull-out torque:
J_L=2.6×10⁻⁴kg·m² (use the rubber coupling)
fs: Maximum self-start frequency when not loaded



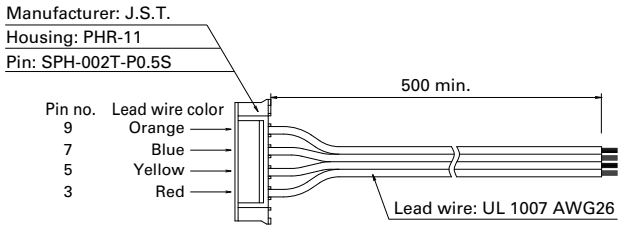
Allowable Load ▶p. 71 Rotation Direction ▶p. 72 General Specifications ▶p. 73

Data is measured under the trial conditions of SANYO DENKI. Driving torque may vary according to actual machine precision.

Dimensions (Unit: mm)

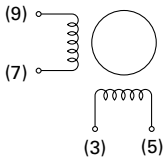


Option (sold separately): Motor cable model no. 4835775-1



This motor cable is for model no. SF242□-10B□1.

Internal wiring ( ) connector pin number



Compatible drivers

Model no.: BS1D200P10

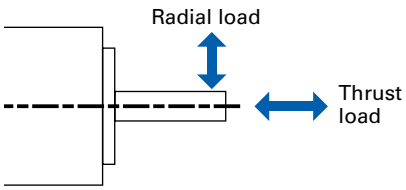
Operating current select switch setting: A

The characteristics diagram shown above is from our experimental circuit.

Allowable Load ▶ p. 71 Rotation Direction ▶ p. 72 General Specifications ▶ p. 73

Data is measured under the trial conditions of SANYO DENKI. Driving torque may vary according to actual machine precision.

Allowable Radial/Thrust Load



Motor size	Model no.	Distance from end of shaft: mm				Thrust load N
		0	5	10	15	
		Radial load: N				
14 mm sq.	SH214 ☐	10	11	13	—	0.7
28 mm sq.	SH228 ☐	42	48	56	66	3
35 mm sq.	SH353 ☐	40	50	67	98	10
42 mm sq.	SF242 ☐	20	29	49	68	10
	SH142 ☐	22	26	33	46	
	SS242 ☐	10	—	—	—	4.9
50 mm sq.	103H670 ☐	71	87	115	167	15
	SS250 ☐	8.5	—	—	—	4.9
56 mm sq.	103H712 ☐	52	65	85	123	15
	103H7128	85	105	138	200	15
60 mm sq.	103H782 ☐	70	87	114	165	20
	SH160 ☐					15
86 mm sq.	SM286 ☐ SH286 ☐	167	193	229	280	60
ø86 mm	103H822 ☐	191	234	301	421	60
ø106 mm	103H8922 ☐	321	356	401	457	100

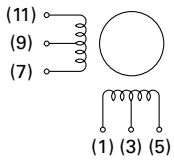
Internal Wiring and Rotation Direction

Unipolar winding

Connector type model no.: SF242 □

Internal wire connection

( ) connector pin number



Direction of motor rotation

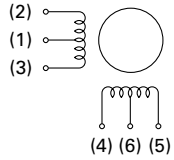
When excited by a direct current in the order shown below, the direction of rotation is clockwise as viewed from the output shaft side.

		Connector pin no.				
		(3, 9)	(1)	(7)	(5)	(11)
Exciting order	1	+	−	−		
	2	+		−	−	
	3	+			−	−
	4	+	−			−

Connector type model no.: 103H782 □□

Internal wire connection

( ) connector pin number



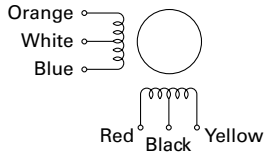
Direction of motor rotation

When excited by a direct current in the order shown below, the direction of rotation is clockwise as viewed from the output shaft side.

		Connector pin no.				
		(1, 6)	(4)	(3)	(5)	(2)
Exciting order	1	+	−	−		
	2	+		−	−	
	3	+			−	−
	4	+	−			−

Lead wire type

Internal wire connection



Direction of motor rotation

When excited by a direct current in the order shown below, the direction of rotation is clockwise as viewed from the output shaft side.

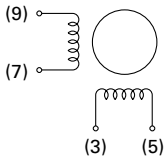
		Lead wire color				
		White, black	Red	Blue	Yellow	Orange
Exciting order	1	+	−	−		
	2	+		−	−	
	3	+			−	−
	4	+	−			−

Bipolar winding

Connector type model no.: SF242 □

Internal wire connection

( ) connector pin number



Direction of motor rotation

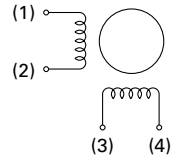
When excited by a direct current in the order shown below, the direction of rotation is clockwise as viewed from the output shaft side.

		Connector pin no.			
		(3)	(7)	(5)	(9)
Exciting order	1	−	−	+	+
	2	+	−	−	+
	3	+	+	−	−
	4	−	+	+	−

Connector type model no.: 103H782 □

Internal wire connection

( ) connector pin number



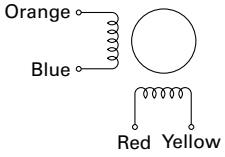
Direction of motor rotation

When excited by a direct current in the order shown below, the direction of rotation is clockwise as viewed from the output shaft side.

		Connector pin no.			
		(3)	(2)	(4)	(1)
Exciting order	1	−	−	+	+
	2	+	−	−	+
	3	+	+	−	−
	4	−	+	+	−

Lead wire type

Internal wire connection



Direction of motor rotation

When excited by a direct current in the order shown below, the direction of rotation is clockwise as viewed from the output shaft side.

		Lead wire color			
		Red	Blue	Yellow	Orange
Exciting order	1	−	−	+	+
	2	+	−	−	+
	3	+	+	−	−
	4	−	+	+	−

General Specifications

Motor model no.	SH214 □	SH228 □	SH353 □	SS242 □	SH142 □	SF242 □	SS250 □	103H670 □	103H712 □
Type	—								
Operating ambient temperature	-10 to +50°C								
Storage temperature	-20 to +65°C								
Operating ambient humidity	20 to 90% RH (no condensation)								
Storage humidity	5 to 95% RH (no condensation)								
Operation altitude	1000 m max. above sea level								
Vibration resistance	Vibration frequency 10 to 500 Hz, total amplitude 1.52 mm (10 to 70 Hz), vibration acceleration 150 m/s² (70 to 500 Hz), sweep time 15 min/cycle, 12 sweeps in each X, Y and Z direction.								
Impact resistance	500 m/s² of acceleration for 11 ms with half-sine wave applying three times for X, Y, and Z axes each, 18 times in total.								
Thermal class	Class B (+130°C)								
Withstandable voltage	At normal temperature and humidity, no failure with 500 VAC @50/60 Hz applied for one minute between motor winding and frame.							At normal temperature and humidity, no failure with 1000 VAC @50/60 Hz applied for one minute between motor winding and frame.	
Insulation resistance	At normal temperature and humidity, not less than 100 MΩ between winding and frame by 500 VDC megger.								
Protection grade	—								
Winding temperature rise	80 K max. (Based on SANYO DENKI standard)								
Static angle error	±0.09°				±0.054°	±0.09°			±0.054°
Thrust play *1	0.075 mm max. (load: 0.35 N)	0.075 mm max. (load: 1.5 N)	0.075 mm max. (load: 5 N)	0.075 mm max. (load: 4 N)	0.075 mm max. (load: 5 N)	0.075 mm (load: 5 N)	0.075 mm max. (load: 4 N)	0.075 mm (load: 10 N)	0.075 mm (load: 10 N)
Radial play *2	0.025 mm max. (load: 5 N)								
Shaft runout	0.025 mm								
Concentricity of mounting pilot relative to shaft	ø0.05 mm	ø0.05 mm	ø0.075 mm	ø0.075 mm	ø0.05 mm	ø0.05 mm	ø0.075 mm	ø0.075 mm	ø0.075 mm
Squareness of mounting surface relative to shaft	0.1 mm	0.1 mm	0.1 mm	0.1 mm	0.1 mm	0.1 mm	0.1 mm	0.075 mm	0.075 mm
Direction of motor mounting	Can be freely mounted vertically or horizontally								

Motor model no.	SH160 □	103H782 □	SH286 □	103H8922 □	SM286 □	103H712 □ -6 □□ 0 CE Model	103H822 □ -6 □□ 0 CE Model	103H8922 □ -63 □ 1 CE Model
Type	—				S1 (continuous operation)			
Operating ambient temperature	-10 to +50°C				-10 to +40°C			
Storage temperature	-20 to +65°C				-20 to +60°C			
Operating ambient humidity	20 to 90% RH (no condensation)				95% RH max. at 40°C or less (no condensation)			
Storage humidity	5 to 95% RH (no condensation)				95% RH max. at 40°C or less, 57% RH max. at 50°C or less, 35% RH max. at 60°C or less (no condensation)			
Operation altitude	1000 m max. above sea level							
Vibration resistance	Vibration frequency 10 to 500 Hz, total amplitude 1.52 mm (10 to 70 Hz), vibration acceleration 150 m/s² (70 to 500 Hz), sweep time 15 min/cycle, 12 sweeps in each X, Y and Z direction.							
Impact resistance	500 m/s² of acceleration for 11 ms with half-sine wave applying three times for X, Y and Z axes each, 18 times in total.							
Thermal class	Class B (+130°C)				Class F (+155°C)	Class B (+130°C)		
Withstandable voltage	At normal temperature and humidity, no failure with 1000 VAC @50/60 Hz applied for one minute between motor winding and frame.			At normal temperature and humidity, no failure with 1500 VAC @50/60 Hz applied for one minute between motor winding and frame.				
Insulation resistance	At normal temperature and humidity, not less then 100 MΩ between winding and frame by 500 VDC megger.							
Protection grade	—				IP43			
Winding temperature rise	80 K max. (Based on SANYO DENKI standard)							
Static angle error	±0.054°	±0.09°				±0.054°	±0.09°	
Thrust play *1	0.075 mm max. (load: 10 N)							
Radial play *2	0.025 mm (load: 5 N)	0.025 mm (load: 5 N)	0.025 mm (load: 5 N)	0.025 mm (load: 10 N)	0.025 mm (load: 5 N)	0.025 mm (load: 5 N)	0.025 mm (load: 5 N)	0.025 mm (load: 10 N)
Shaft runout	0.025 mm							
Concentricity of mounting pilot relative to shaft	ø0.075 mm							
Squareness of mounting surface relative to shaft	0.1 mm	0.075 mm	0.15 mm	0.1 mm	0.15 mm	0.075 mm	0.1 mm	0.1 mm
Direction of motor mounting	Can be freely mounted vertically or horizontally							

*1 Thrust play: Shaft displacement under axial load.
*2 Radial play: Shaft displacement under radial load applied 1/3rd of the length from the end of the shaft.

Safety standards

Model no.: SM286 □ CE/UL marked models

CE (TÜV)	Standard category		Applicable standard
	Low-voltage directives		EN 60034-1, EN 60034-5
UL	Acquired standards	Applicable standard	File no.
	UL	UL 1004-1, UL 1004-6	E179832
	UL for Canada	CSA C22.2 No.100	

Model no.: 103H712 □ -6 □□ 0, 103H822 □ -6 □□ 0, 103H8922 □ -63 □ 1 CE marked model

CE (TÜV)	Standard category	Applicable standard
	Low-voltage directives	EN 60034-1, EN 60034-5