

42 mm sq. (1.65 inch sq.)

1.8° /step RoHS

Bipolar winding, Lead wire type Unipolar winding, Connector type p. 61

Customizing

Brake

Hollow Shaft modification

Decelerator Encoder

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

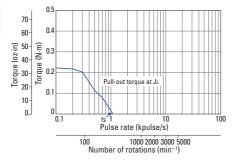
Bipolar winding, Lead wire type

Model number		Holding torque at 2-phase energization	Rated current	Wiring resistance	Winding inductance	Rotor inertia	Mass (Weight)	Motor length (L)
Single shaft	Dual shaft	[N·m (oz·in) min.]	A/phase	Ω /phase	mH/phase	$[\times 10^{-4} \text{kg} \cdot \text{m}^2 (\text{oz} \cdot \text{in}^2)]$	[kg (lbs)]	mm (in)
103H5205-5040	103H5205-5010	0.23 (32.57)	0.25	54	78	0.036 (0.20)	0.23 (0.51)	33 (1.25)
103H5205-5140	103H5205-5110	0.25 (35.40)	0.5	13.4	23.4	0.036 (0.20)	0.23 (0.51)	33 (1.25)
103H5205-5240	103H5205-5210	0.265 (37.53)	1	3.4	6.5	0.036 (0.20)	0.23 (0.51)	33 (1.25)
103H5208-5040	103H5208-5010	0.35 (49.56)	0.25	66	116	0.056 (0.31)	0.29 (0.64)	39 (1.54)
103H5208-5140	103H5208-5110	0.38 (53.81)	0.5	16.5	34	0.056 (0.31)	0.29 (0.64)	39 (1.54)
103H5208-5240	103H5208-5210	0.39 (55.23)	1	4.1	9.5	0.056 (0.31)	0.29 (0.64)	39 (1.54)
103H5209-5040	103H5209-5010	0.38 (53.81)	0.25	71.4	133	0.062 (0.34)	0.31 (0.68)	41 (1.61)
103H5209-5140	103H5209-5110	0.41 (58.06)	0.5	18.2	39	0.062 (0.34)	0.31 (0.68)	41 (1.61)
103H5209-5240	103H5209-5210	0.425 (60.18)	1	4.4	11	0.062 (0.34)	0.31 (0.68)	41 (1.61)
103H5210-5040	103H5210-5010	0.465 (65.85)	0.25	80	123.3	0.074 (0.40)	0.37 (0.82)	48 (1.89)
103H5210-5140	103H5210-5110	0.49 (69.39)	0.5	20	35	0.074 (0.40)	0.37 (0.82)	48 (1.89)
103H5210-5240	103H5210-5210	0.51 (72.22)	1	4.8	9.5	0.074 (0.40)	0.37 (0.82)	48 (1.89)

■ Characteristics diagram

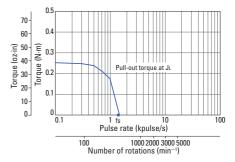
103H5205-5040 103H5205-5010

Constant current circuit Source voltage: 24 VDC Operating current: 0.25 A/phase, 2-phase energization (full-step) Ji=[0.94 × 10-4kg-m² (5.14 oz-in²) use the rubber coupling] fs: Maximum self-start frequency when not loaded



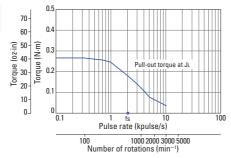
103H5205-5140 103H5205-5110

Constant current circuit Source voltage: 24 VDC Operating current: 0.5 A/phase, 2-phase energization (full-step) J.=[0.94 × 10-4kg-m² (5.14 oz-in²) use the rubber coupling] fs: Maximum self-start frequency when not loaded



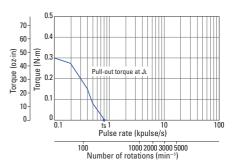
103H5205-5240 103H5205-5210

Constant current circuit Source voltage: 24 VDC Operating current: 1 A/phase, 2-phase energization (full-step) Ji=[0.94 × 10-4kg-m² (5.14 oz-in²) use the rubber coupling] fs: Maximum self-start frequency when not loaded



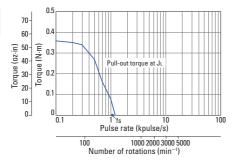
103H5208-5040 103H5208-5010

Constant current circuit Source voltage: 24 VDC Operating current: 0.25 A/phase, 2-phase energization (full-step) Ji=[0.94 × 10-4kg-m² (5.14 oz:n²) use the rubber coupling] fs: Maximum self-start frequency when not loaded



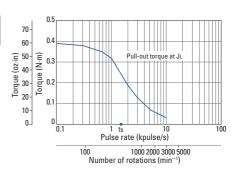
103H5208-5140 103H5208-5110

Constant current circuit Source voltage: 24 VDC Operating current: 0.5 A/phase, 2-phase energization (full-step) J.=[0.94 × 10⁻²kg·m² (5.14 oz·n²) use the rubber coupling] fs: Maximum self-start frequency when not loaded



103H5208-5240 103H5208-5210

Constant current circuit Source voltage: 24 VDC Operating current: 1 A/phase, 2-phase energization (full-step) J.=[0.94 × 10²kg·m² (5.14 oz·in²) use the rubber coupling] fs: Maximum self-start frequency when not loaded

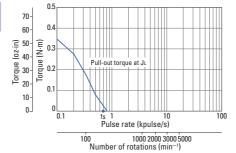


■ Characteristics diagram

103H5209-5040 103H5209-5010

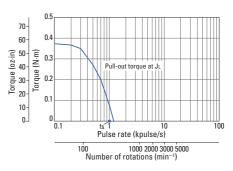
Constant current circuit Source voltage: 24 VDC Operating current: 0.25 A/phase, 2-phase energization (full-step) J_E[0.94 × 10-4kg·m² (5.14 oz-in²) use the rubber coupling] fs: Maximum self-start frequency when not

loaded



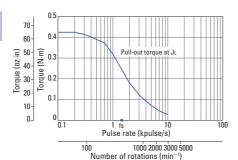
103H5209-5140 103H5209-5110

Constant current circuit Source voltage: 24 VDC Operating current: 0.5 A/phase, 2-phase energization (full-step) J.=[0.94 × 10*kg-m² (5.14 oz·in²) use the rubber coupling] fs: Maximum self-start frequency when not loaded



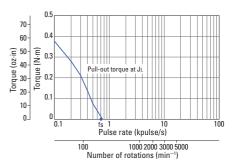
103H5209-5240 103H5209-5210

Constant current circuit Source voltage: 24 VDC Operating current: 1 A/phase, 2-phase energization (full-step) Ji=[0.94 × 10*4kg-m² (5.14 oz·in²) use the rubber coupling] fs: Maximum self-start frequency when not loaded



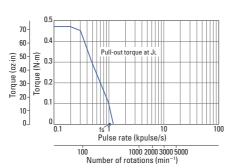
103H5210-5040 103H5210-5010

Constant current circuit Source voltage: 24 VDC Operating current: 0.25 A/phase, 2-phase energization (full-step) Ji=[0.94 × 10-4kg·m² (5.14 oz·in²) use the rubber coupling] fs: Maximum self-start frequency when not loaded



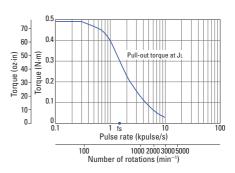
103H5210-5140 103H5210-5110

Constant current circuit Source voltage: 24 VDC Operating current: 0.5 A/phase, 2-phase energization (full-step) Ji=[0.94 × 10-4kg·m² (5.14 oz·in²) use the rubber coupling] fs: Maximum self-start frequency when not loaded

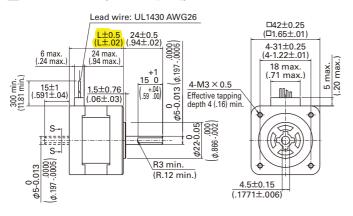


103H5210-5240 103H5210-5210

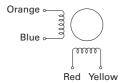
Constant current circuit Source voltage: 24 VDC Operating current: 1 A/phase, 2-phase energization (full-step) J₂=[0.94 × 10*kg-m² (5.14 oz·n²) use the rubber coupling] fs: Maximum self-start frequency when not loaded



■ Dimensions [Unit: mm (inch)] •



Internal wiring



Compatible drivers =

Driver is not included.

For motor model number 103H52 □□ -50 □ 0 (0.25 A/phase), 103H52 □□ -51 □□ (0.5 A/phase)

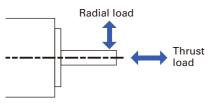
If you require assistance finding a driver, contact us for details.

For model number 103H52 ——-52 —— (1 A/phase)
Model number: BS1D200P10 (DC input)

Operating current select switch setting: A

The characteristics diagram shown above is from our experimental circuit.

Allowable Radial/Thrust Load



	N 4l - l	Distance f	Thrust lood				
Flange size	Model number	0	5	10	15	Thrust load - N (lbs)	
	Hullibel	Radial load	(sdl) N : b			- 14 (105)	
14 mm sq. (0.55 in sq.)	SH2141	10 (2.25)	11 (2.47)	13 (2.92)	-	0.7 (0.16)	
28 mm sq. (1.10 in sq.)	SH228 🗌	42 (9)	48 (10)	56 (12)	66 (14)	3 (0.67)	
35 mm sq. (1.38 in sq.)	SH353 🗌	40 (8)	50 (11)	67 (15)	98 (22)	10 (2.25)	
42 mm sq. (1.65 in sq.)	103H52 □□	22 (4)	26 (5)	33 (7)	46 (10)	10 (2.25)	
42 mm sq. (1.03 m sq.)	SH142 🗆 22 (4)	22 (4)			40 (10)	10 (2.23)	
50 mm sq. (1.97 in sq.)	103H670 🗌	71 (15)	87 (19)	115 (25)	167 (37)	15 (3.37)	
56 mm sq. (2.20 in sq.)	103H712 🗌	52 (11)	65 (14)	85 (19)	123 (27)	15 (3.37)	
30 IIIII sq. (2.20 III sq.)	103H7128	85 (19)	105 (23)	138 (31)	200 (44)	15 (3.37)	
60 mm sq. (2.36 in sq.)	103H782 🗌	70 (15)	87 (19)	114 (25)	165 (37)	20 (4.50)	
00 IIIII sq. (2.50 III sq.)	SH160 □	70 (15)	07 (13)	114 (23)	105 (37)	15 (3.37)	
86 mm sq. (3.39 in sq.)	SM286 □	167 (37)	193 (43)	229 (51)	280 (62)	60 (13.488)	
00 mm 3q. (0.00 m 3q.)	SH286 🗌	107 (07)	100 (40)	220 (01)	200 (02)	00 (10.400)	
86 mm sq. (3.39 in sq.)	103H822 🗌	191 (43)	234 (53)	301 (68)	421 (95)	60 (13.488)	
¢ 106 mm (¢ 4.17 in)	103H8922 🗌	321 (72)	356 (79)	401 (90)	457 (101)	100 (22.48)	

Internal Wiring and Rotation Direction

Unipolar winding

Connector type Model number: 103H52

Internal wire connection

() connector pin number



Connector type Model number: 103H782

Internal wire connection

() connector pin number



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

			pin numbe	er		
		(1.6)	(5)	(3)	(4)	(2)
	1	+	_	-		
Exciting order	2	+		-	-	
order	3	+			_	-
	4	+	-			-

Direction of motor rotation

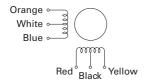
Direction of motor rotation

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 number						
		(1.6)	(4)	(3)	(5)	(2)		
	1	+	-	_				
Exciting order	2	+		_	_			
order	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
	1	+	-	-		
Exciting	2	+		_	_	
order	3	+			-	-
	4	+	_			_

Bipolar winding

Connector type

Internal wire connection

() connector pin number, terminal block number



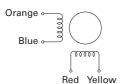
Direction of motor rotation

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 number,	terminal blo	ck number
			(3)	(2)	(4)	(1)
		1	_	_	+	+
	Exciting order	2	+	_	_	+
	order	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		
	1	_	_	+	+		
Exciting order	2	+	_	_	+		
order	3	+	+	_	_		
	4	_	+	+	_		

General Specifications

Motor model number	SH2141	SH228 🗌	SH353 🗌	SS242 🗌	SH142 🗌	103H52 □□	SS250	103H67 □□	103H712 🗌
Туре	_								
Operating ambient temperature	- 10°C to +	50℃							
Conversation temperature	- 20°C to +	65℃							
Operating ambient humidity	20 to 90% R	20 to 90% RH (no condensation)							
Conversation humidity	5 to 95% RH	5 to 95% RH (no condensation)							
Operation altitude	1000 m (328	1 feet) max.	above sea le	vel					
Vibration resistance		Fibration frequency 10 to 500 Hz, total amplitude 1.52 mm (10 to 70 Hz), vibration acceleration 150 m/s² (70 to 500							
				eps in each X					
Impact resistance		_	r 11 ms with	half-sine wave	applying the	ee times for X	, Y, and Z axe	s each, 18 tim	nes in total.
Insulation class	Class B (+13	30°C)						T	
Withstandable voltage		emperature a veen motor v			ith 500 VAC	@50/60 Hz ap	plied for one	@50/60 Hz appl	lerature and lure with 1000 VAC ied for one minute winding and frame.
Insulation resistance	At normal to	emperature a	nd humidity,	, not less thar	n 100 MΩ be	tween windir	ng and frame	by 500 VDC	megger.
Protection grade	IP40								
Winding temperature rise	80 K max. (E	Based on San	iyo Denki sta	ndard)					
Static angle error	± 0.09°				± 0.054°	± 0.09°			
	0.075 mm	0.075 mm	0.075 mm	0.075 mm	0.075 mm	0.075 mm	0.075 mm	0.075 mm	0.075 mm
Thurst place*1	(0.003 in)	(0.003 in)	(0.003 in)	(0.003 in)	(0.003 in)	(0.003 in)	(0.003 in)	(0.003 in)	(0.003 in)
Thrust play *1	max. (load: 0.35 N	max. (load: 1.5 N	max. (load: 5 N	max. (load: 4 N	max. (load: 5 N	(load: 5 N	max. (load: 4 N	(load: 10 N	(load: 10 N
	(0.08 lbs))	(0.34 lbs))	(1.12 lbs))	(0.9 lbs))	(1.12 lbs))	(1.12 lbs))	(0.9 lbs))	(2.25 lbs))	(2.25 lbs))
Radial play *2	0.025 mm (0).001 in) max	. (load: 5 N (
Shaft runout	0.025 mm (0	0.001 in)							
Concentricity of mounting	φ 0.05 mm	φ 0.05 mm	φ 0.075 mm	φ 0.075 mm	φ 0.05 mm	φ 0.05 mm	φ 0.075 mm	φ 0.075 mm	φ 0.075 mm
pilot relative to shaft		(φ 0.002 in)		(φ 0.003 in)	(φ 0.002 in)	,	(φ 0.003 in)	(φ 0.003 in)	_ ' ' _ '
Squareness of mounting		0.1 mm	0.1 mm	0.1 mm	0.1 mm	0.1 mm	0.1 mm	0.075 mm	0.075 mm
surface relative to shaft		(0.004 in)	(0.004 in)	(0.004 in)	(0.004 in)	(0.004 in)	(0.004 in)	(0.003 in)	(0.003 in)
	Can be freely mounted vertically or horizontally								
Direction of motor mounting	Can be need	y mounted v	ertically or h	orizontally					
Motor model number		103H78 🗆	SH286	103H8922		103H712 - 6 CE Model	CE Mod		3H8922
Motor model number Type	SH160 □ -	103H78 🗆	1		S1 (contin	CE Model uous operation	CE Mod		
Motor model number Type Operating ambient temperature	SH160 □ - - 10°C to +	103H78 □□ 50°C	1		S1 (contin	CE Model uous operation + 40°C	CE Mod		
Motor model number Type Operating ambient temperature Conversation temperature	SH160 □ - - 10°C to + - 20°C to +	103H78 □□ 50°C 65°C	SH286 🗆		S1 (contin - 10°C to - 20°C to	CE Model uous operation + 40°C + 60°C	CE Mode	el CE	
Motor model number Type Operating ambient temperature Conversation temperature Operating ambient humidity	SH160 □ 10°C to + - 20°C to + 20 to 90% R	103H78 □□ 50°C 65°C H (no conder	SH286 nsation)		S1 (contin - 10°C to - 20°C to 95% max.	Uous operation + 40°C + 60°C + 40°C max., 5	CE Mode on) 7% max.: 50°C	C max.,	
Motor model number Type Operating ambient temperature Conversation temperature Operating ambient humidity Conversation humidity	SH160 □ - - 10°C to + - 20°C to + 20 to 90% R 5 to 95% RH	103H78 \(\text{\text{\$1}}\) 50°C 65°C H (no condens)	SH286 nsation) sation)	103H8922 □	S1 (contin - 10°C to - 20°C to 95% max.	CE Model uous operation + 40°C + 60°C	CE Mode on) 7% max.: 50°C	C max.,	
Motor model number Type Operating ambient temperature Conversation temperature Operating ambient humidity	SH160 □ - - 10°C to + - 20°C to + 20 to 90% R 5 to 95% RH 1000 m (328)	103H78 \(\text{\tint{\text{\tinit}\\ \text{\texi}\text{\text{\text{\text{\text{\text{\text{\text{\texi}\text{\text{\texi}\text{\text{\text{\text{\text{\text{\text{\texi}\text{\texit{\text{\ti	SH286 nsation) sation) above sea le	103H8922	S1 (contin - 10°C to - 20°C to 95% max. 35% max.	CE Model uous operation + 40°C + 60°C : 40°C max., 5 : 60°C max. (n	CE Mode on) 7% max.: 50℃ o condensati	el Cr	E Model
Motor model number Type Operating ambient temperature Conversation temperature Operating ambient humidity Conversation humidity Operation altitude Vibration resistance	SH160 □ - 10°C to + - 20°C to + 20 to 90% R 5 to 95% RH 1000 m (328 Vibration fre 500 Hz), swe	103H78 D 50°C 65°C H (no conders (no condens to feet) max.	sH286 nsation) sation) above sea leto 500 Hz, tota nin/cycle, 12	103H8922 Uvel	S1 (contin - 10°C to - 20°C to 95% max. 35% max. 1.52 mm (10 ch X, Y and	CE Model uous operation + 40°C + 60°C 40°C max., 5 60°C max. (n to 70 Hz), vib Z direction.	CE Mode on) 7% max.: 50°C o condensati	c max., on)	E Model
Motor model number Type Operating ambient temperature Conversation temperature Operating ambient humidity Conversation humidity Operation altitude	SH160 □ - 10°C to + - 20°C to + 20 to 90% R 5 to 95% RH 1000 m (328 Vibration fre 500 Hz), swe	103H78 D 50°C 65°C H (no conders (no condens to feet) max.	sH286 nsation) sation) above sea leto 500 Hz, tota nin/cycle, 12	103H8922 Uvel	S1 (contin - 10°C to - 20°C to 95% max. 35% max. 1.52 mm (10 ch X, Y and ve applying	CE Model uous operation + 40°C + 60°C 40°C max., 5 60°C max. (n to 70 Hz), vib Z direction.	CE Mode on) 7% max.: 50°C o condensati	c max., on)	E Model
Motor model number Type Operating ambient temperature Conversation temperature Operating ambient humidity Conversation humidity Operation altitude Vibration resistance	SH160 — - 10°C to + - 20°C to + 20 to 90% R 5 to 95% RH 1000 m (328 Vibration fre 500 Hz), swe 500 m/s² of a	103H78 D 50°C 65°C H (no condens 0 feet) max. equency 10 to epe time 15 n acceleration for	SH286 sation) sation) above sea leto 500 Hz, tota nin/cycle, 12 or 11 ms with	vel al amplitude 1 sweeps in ea	S1 (contin - 10°C to - 20°C to 95% max. 35% max. 1.52 mm (10 ch X, Y and ve applying Class F (+155°C)	CE Model uous operation + 40°C + 60°C : 40°C max., 5 : 60°C max. (n) to 70 Hz), vib Z direction. three times for Class B (+)	7% max.: 50°C o condensati	C max., on) ration 150 m.	/s² (70 to
Motor model number Type Operating ambient temperature Conversation temperature Operating ambient humidity Conversation humidity Operation altitude Vibration resistance Impact resistance	SH160 □ - 10°C to + - 20°C to + 20 to 90% R 5 to 95% RH 1000 m (328 Vibration fre 500 Hz), swe 500 m/s² of a Class B (+13 At normal tem ure with 1000°	103H78 D 50°C 65°C H (no condens 0 feet) max. equency 10 to epe time 15 n acceleration for	sH286 sation) sation) above sea leto 500 Hz, tota nin/cycle, 12 or 11 ms with umidity, no fail-tapplied for one	vel al amplitude 1 sweeps in ea	S1 (contin - 10°C to - 20°C to 95% max. 35% max. 1.52 mm (10 ch X, Y and ve applying Class F (+155°C)	CE Model uous operation + 40°C + 60°C : 40°C max., 5 : 60°C max. (n to 70 Hz), vib Z direction. three times for	CE Mode on) 7% max.: 50°C o condensation acceler or X, Y and Z at 130°C)	C max., on) ration 150 m. axes each, 18	/s² (70 to
Motor model number Type Operating ambient temperature Conversation temperature Operating ambient humidity Conversation humidity Operation altitude Vibration resistance Impact resistance Insulation class Withstandable	SH160 □ - 10°C to + - 20°C to + 20 to 90% R 5 to 95% RH 1000 m (328 Vibration fre 500 Hz), swe 500 m/s² of a Class B (+13 At normal tem ure with 1000 minute between	103H78 D 50°C 65°C H (no condens to feet) max. to generate 15 n acceleration for 60°C) sperature and head to generate 15 n acceleration for 60°C) sperature and head to generate 15 n acceleration for 60°C acceleration	sH286 sation) sation) above sea leto 500 Hz, totanin/cycle, 12 or 11 ms with umidity, no fail- applied for one ng and frame.	vel al amplitude 1 sweeps in ea h half-sine wa	S1 (contin - 10°C to - 20°C to 95% max. 35% max. 1.52 mm (10 ch X, Y and ve applying Class F (+155°C) temperature one minute	CE Model uous operation + 40°C + 60°C : 40°C max., 5 : 60°C max. (n to 70 Hz), vib Z direction. three times for Class B (+) and humidity	7% max.: 50°C o condensation acceler or X, Y and Z at 130°C)	C max., on) ration 150 m. axes each, 18 vith 1500 VA	/s² (70 to s times in total.
Motor model number Type Operating ambient temperature Conversation temperature Operating ambient humidity Conversation humidity Operation altitude Vibration resistance Impact resistance Insulation class Withstandable voltage	SH160 □ - 10°C to + - 20°C to + 20 to 90% R 5 to 95% RH 1000 m (328 Vibration fre 500 Hz), swe 500 m/s² of a Class B (+13 At normal tem ure with 1000 minute between	103H78 D 50°C 65°C H (no condens to feet) max. to generate 15 n acceleration for 60°C) sperature and head to generate 15 n acceleration for 60°C) sperature and head to generate 15 n acceleration for 60°C acceleration	sH286 sation) sation) above sea leto 500 Hz, totanin/cycle, 12 or 11 ms with umidity, no fail- applied for one ng and frame.	vel al amplitude 1 sweeps in ea h half-sine wa	S1 (contin - 10°C to - 20°C to 95% max. 35% max. 1.52 mm (10 ch X, Y and ve applying Class F (+155°C) temperature one minute	CE Model uous operation + 40°C + 60°C 40°C max., 5 60°C max. (n to 70 Hz), vib Z direction. three times for Class B (+ and humidity between model	7% max.: 50°C o condensation acceler or X, Y and Z at 130°C)	C max., on) ration 150 m. axes each, 18 vith 1500 VA	/s² (70 to s times in total.
Motor model number Type Operating ambient temperature Conversation temperature Operating ambient humidity Conversation humidity Operation altitude Vibration resistance Impact resistance Insulation class Withstandable voltage Insulation resistance	SH160 □ - 10°C to + - 20°C to + 20 to 90% R 5 to 95% RH 1000 m (328 Vibration fre 500 Hz), swe 500 m/s² of a Class B (+13 At normal tem ure with 1000 minute betwee At normal te	103H78 D 50°C 65°C H (no condens 0 feet) max. equency 10 to epe time 15 n acceleration for 0°C) sperature and h VAC @50/60 Hz en motor winding emperature a	sH286 sation) sation) above sea leto 500 Hz, tota nin/cycle, 12 or 11 ms with umidity, no fail applied for one ng and frame.	vel al amplitude 1 sweeps in ea n half-sine wa At normal 1 applied for	S1 (contin - 10°C to - 20°C to 95% max. 35% max. 1.52 mm (10 ch X, Y and ve applying Class F (+155°C) temperature one minute	CE Model uous operation + 40°C + 60°C 40°C max., 5 60°C max. (n to 70 Hz), vib Z direction. three times for Class B (+ and humidity between model	7% max.: 50°C o condensation acceler or X, Y and Z at 130°C)	C max., on) ration 150 m. axes each, 18 vith 1500 VA	/s² (70 to s times in total.
Motor model number Type Operating ambient temperature Conversation temperature Operating ambient humidity Conversation humidity Operation altitude Vibration resistance Impact resistance Insulation class Withstandable voltage Insulation resistance Protection grade	SH160 □ - 10°C to + - 20°C to + 20 to 90% R 5 to 95% RH 1000 m (328 Vibration fre 500 Hz), swe 500 m/s² of a Class B (+13 At normal tem ure with 1000 minute betwee At normal te	103H78 D 50°C 65°C H (no condens 0 feet) max. equency 10 to epe time 15 n acceleration for 0°C) sperature and h VAC @50/60 Hz en motor winding emperature a	sH286 sation) sation) above sea leto 500 Hz, tota nin/cycle, 12 or 11 ms with umidity, no fail applied for one ng and frame.	vel al amplitude 1 sweeps in ea n half-sine wa At normal 1 applied for	S1 (contin - 10°C to - 20°C to 95% max. 35% max. 1.52 mm (10 ch X, Y and ve applying Class F (+155°C) temperature one minute	CE Model uous operation + 40°C + 60°C 40°C max., 5 60°C max. (n to 70 Hz), vib Z direction. three times for Class B (+ and humidity between model	7% max.: 50°C o condensation acceler or X, Y and Z at 130°C)	C max., on) ration 150 m. axes each, 18 vith 1500 VA	/s² (70 to s times in total.
Motor model number Type Operating ambient temperature Conversation temperature Operating ambient humidity Conversation humidity Operation altitude Vibration resistance Impact resistance Insulation class Withstandable voltage Insulation resistance Protection grade Winding temperature rise	SH160 □ - 10°C to + - 20°C to + 20 to 90% R 5 to 95% RH 1000 m (328 Vibration fre 500 Hz), swe 500 m/s² of a Class B (+13 At normal tem ure with 1000 minute betwee At normal te IP40 80 K max. (E ± 0.054°	103H78 D 50°C 65°C H (no condens 0 feet) max. equency 10 to epe time 15 n acceleration for 0°C) perature and h VAC @50/60 Hz en motor winding emperature a Based on San	sH286 sation) sation) sation) above sea leto 500 Hz, tota nin/cycle, 12 or 11 ms with umidity, no failed applied for one ng and frame. Ind humidity, no Denki sta	vel al amplitude 1 sweeps in ea a half-sine wa At normal t applied for , not less ther	S1 (contin - 10°C to - 20°C to 95% max. 35% max. 1.52 mm (10 ch X, Y and ve applying Class F (+155°C) temperature one minute	CE Model uous operation + 40°C + 60°C 40°C max., 5 60°C max. (n to 70 Hz), vib Z direction. three times for Class B (+ and humidity between model	7% max.: 50°C o condensation acceler or X, Y and Z at 130°C)	C max., on) ration 150 m. axes each, 18 vith 1500 VA	/s² (70 to s times in total.
Motor model number Type Operating ambient temperature Conversation temperature Operating ambient humidity Conversation humidity Operation altitude Vibration resistance Impact resistance Insulation class Withstandable voltage Insulation resistance Protection grade Winding temperature rise Static angle error	SH160 □ - 10°C to + - 20°C to + 20 to 90% R 5 to 95% RH 1000 m (328 Vibration fre 500 Hz), swe 500 m/s² of a Class B (+13 At normal tem ure with 1000 minute between At normal tem 1P40 80 K max. (E ± 0.054° 0.075 mm (0 0.025 mm (0 0.025 mm (0 0.001 in) (load: 5 N	103H78 □□ 50°C 65°C H (no condens of feet) max. Sequency 10 to experime 15 max. Sequency 10	sH286 sation) sation) sation) above sea leto 500 Hz, tota inin/cycle, 12 or 11 ms with applied for one ing and frame. Ind humidity, in po Denki sta . (load: 10 N 0.025 mm (0.001 in) (load: 5 N	vel al amplitude 1 sweeps in ea a half-sine wa At normal 1 applied for not less ther (2.25 lbs)) 0.025 mm (0.001 in) (load: 10 N	S1 (contin – 10°C to – 20°C to 95% max. 35% max. I.52 mm (10 ch X, Y and ve applying Class F (+155°C) temperature one minute in 100 MΩ be IP43 0.025 mm (0.001 in) (load: 5 N	CE Model uous operation + 40°C + 60°C : 40°C max., 5 : 60°C max. (no to 70 Hz), vib Z direction. three times for Class B (+) and humidity between model etween winding 0.025 mm (0.001 in) (load: 5 N	CE Mode on) 7% max.: 50°C o condensation acceler or X, Y and Z at 130°C) 7, no failure water winding a ang and frame 0.025 i (0.001 (10ad))	c max., on) ration 150 m. axes each, 18 with 1500 VA nd frame. by 500 VDC	/s² (70 to times in total. C @50/60 Hz megger. 025 mm .001 in) oad: 10 N
Motor model number Type Operating ambient temperature Conversation temperature Operating ambient humidity Conversation humidity Operation altitude Vibration resistance Impact resistance Insulation class Withstandable voltage Insulation resistance Protection grade Winding temperature rise Static angle error Thrust play *1 Radial play *2	SH160 □ - 10°C to + - 20°C to + 20 to 90% R 5 to 95% RH 1000 m (328 Vibration fre 500 Hz), swe 500 m/s² of a Class B (+13 At normal tem ure with 1000 minute between At normal te 1P40 80 K max. (E ± 0.054° 0.075 mm (0 0.025 mm (0 0.025 mm (0 0.001 in) (load: 5 N (1.12 lbs))	103H78 \(\begin{align*} 50°C \\ 65°C \\ H (no condensity of the c	sH286 sation) sation) sation) above sea le of 500 Hz, tota nin/cycle, 12 or 11 ms with umidity, no fail- applied for one ng and frame. und humidity, nyo Denki sta . (load: 10 N	vel al amplitude 1 sweeps in ea an half-sine wa At normal 1 applied for not less ther ndard) (2.25 lbs)) 0.025 mm (0.001 in)	S1 (contin – 10°C to – 20°C to 95% max. 35% max. I.52 mm (10 ch X, Y and ve applying Class F (+155°C) temperature one minute in 100 MΩ be IP43	CE Model uous operation + 40°C + 60°C 40°C max., 5 60°C max. (n to 70 Hz), vib Z direction. three times for Class B (+) and humidity between model etween windir 0.025 mm (0.001 in)	7% max.: 50°C o condensati ration acceler or X, Y and Z a 130°C) //, no failure w tor winding a ng and frame	c max., on) ration 150 m. axes each, 18 with 1500 VA nd frame. by 500 VDC	/s² (70 to times in total. C @50/60 Hz megger. 025 mm
Motor model number Type Operating ambient temperature Conversation temperature Operating ambient humidity Conversation humidity Operation altitude Vibration resistance Impact resistance Insulation class Withstandable voltage Insulation resistance Protection grade Winding temperature rise Static angle error Thrust play *1 Radial play *2 Shaft runout	SH160 □ - 10°C to + - 20°C to + 20 to 90% R 5 to 95% RH 1000 m (328 Vibration fre 500 Hz), swe 500 m/s² of a Class B (+13 At normal tem ure with 1000 minute between At normal tem 1P40 80 K max. (E ± 0.054° 0.075 mm (0 0.025 mm (0 0.025 mm (0 0.001 in) (load: 5 N	103H78 \(\begin{align*} 50°C \\ 65°C \\ H (no condensity of the c	sH286 sation) sation) sation) above sea leto 500 Hz, tota inin/cycle, 12 or 11 ms with applied for one ing and frame. Ind humidity, in po Denki sta . (load: 10 N 0.025 mm (0.001 in) (load: 5 N	vel al amplitude 1 sweeps in ea a half-sine wa At normal 1 applied for not less ther (2.25 lbs)) 0.025 mm (0.001 in) (load: 10 N	S1 (contin – 10°C to – 20°C to 95% max. 35% max. I.52 mm (10 ch X, Y and ve applying Class F (+155°C) temperature one minute in 100 MΩ be IP43 0.025 mm (0.001 in) (load: 5 N	CE Model uous operation + 40°C + 60°C : 40°C max., 5 : 60°C max. (no to 70 Hz), vib Z direction. three times for Class B (+) and humidity between model etween winding 0.025 mm (0.001 in) (load: 5 N	CE Mode on) 7% max.: 50°C o condensation acceler or X, Y and Z at 130°C) 7, no failure water winding a ang and frame 0.025 i (0.001 (10ad))	c max., on) ration 150 m. axes each, 18 with 1500 VA nd frame. by 500 VDC	/s² (70 to times in total. C @50/60 Hz megger. 025 mm .001 in) oad: 10 N
Motor model number Type Operating ambient temperature Conversation temperature Operating ambient humidity Conversation humidity Operation altitude Vibration resistance Impact resistance Insulation class Withstandable voltage Insulation resistance Protection grade Winding temperature rise Static angle error Thrust play *1 Radial play *2 Shaft runout Concentricity of mounting pilot relative to shaft	SH160 □ - 10°C to + - 20°C to + 20 to 90% R 5 to 95% RH 1000 m (328 Vibration fre 500 Hz), swe 500 m/s² of a Class B (+13 At normal tem ure with 1000 minute betwee At normal te IP40 80 K max. (E ± 0.054° 0.075 mm (0 0.025 mm (0.001 in) (load: 5 N (1.12 lbs)) 0.025 mm (0 0.025 mm (0	103H78 □□ 50°C 65°C H (no condense of feet) max. equency 10 to experime 15 n exceleration for the feet of feet) max. equency 10 to experime 15 n exceleration for the feet of feet	sH286 sation) sation) sation) above sea leto 500 Hz, tota inin/cycle, 12 or 11 ms with applied for one ing and frame. Ind humidity, no Denki sta (load: 10 N 0.025 mm (0.001 in) (load: 5 N (1.12 lbs))	vel al amplitude 1 sweeps in ea a half-sine wa At normal 1 applied for not less ther (2.25 lbs)) 0.025 mm (0.001 in) (10 ad: 10 N (2.25 lbs))	S1 (contin – 10°C to – 20°C to 95% max. 35% max. 1.52 mm (10 ch X, Y and ve applying Class F (+155°C) temperature one minute in 100 MΩ be IP43 0.025 mm (0.001 in) (load: 5 N (1.12 lbs))	CE Model uous operation + 40°C + 60°C - 40°C max., 5 - 60°C max. (n to 70 Hz), vib Z direction. three times for Class B (+ and humidity between moder etween windin 0.025 mm (0.001 in) (load: 5 N (1.12 lbs))	CE Mode on) 7% max.: 50°C to condensation acceler or X, Y and Z at 130°C) 7, no failure water winding a and frame 0.025 (0.001 (load: (1.12 li	el Ci	/s² (70 to stimes in total. C @50/60 Hz megger. 025 mm .001 in) oad: 10 N25 lbs))
Motor model number Type Operating ambient temperature Conversation temperature Operating ambient humidity Conversation humidity Operation altitude Vibration resistance Impact resistance Impact resistance Insulation class Withstandable voltage Insulation resistance Protection grade Winding temperature rise Static angle error Thrust play *1 Radial play *2 Shaft runout Concentricity of mounting pilot relative to shaft Squareness of mounting	SH160 □ - 10°C to + - 20°C to + 20 to 90% R 5 to 95% RH 1000 m (328 Vibration fre 500 Hz), swe 500 m/s² of a Class B (+13 At normal ter ure with 1000 minute betwee At normal ter IP40 80 K max. (E ± 0.054° 0.075 mm (0.001 in) (load: 5 N (1.12 lbs)) 0.025 mm (0.005 mm (0.0075 mm (0.0075 mm)) 0.025 mm (0.0075 mm) 0.0075 mm (0.0075 mm)	103H78 D 50°C 65°C H (no condens to the condens to feet) max. To the condens to feet) max. To the condens to feet to fee	sH286 sation) sation) sation) above sea letoromore of 500 Hz, tota nin/cycle, 12 or 11 ms with umidity, no fail- applied for one ng and frame. Ind humidity, nyo Denki sta (load: 10 N 0.025 mm (0.001 in) (load: 5 N (1.12 lbs)) 0.15 mm	vel al amplitude 1 sweeps in ea an half-sine wa At normal 1 applied for not less ther (2.25 lbs)) 0.025 mm (0.001 in) (10ad: 10 N (2.25 lbs))	S1 (contin — 10°C to — 20°C to 95% max. 35% max. I.52 mm (10 ch X, Y and ve applying Class F (+155°C) temperature one minute 100 MΩ be IP43 0.025 mm (0.001 in) (load: 5 N (1.12 lbs))	CE Model uous operation + 40°C + 60°C - 40°C max., 5 - 60°C max. (note of the content of th	CE Mode on) 7% max.: 50°C o condensati ration acceler or X, Y and Z at 130°C) 7, no failure water winding a ng and frame 0.025 i (0.001 (load: (1.12 ll))	el Ci C max., on) ration 150 m. exes each, 18 vith 1500 VA nd frame. by 500 VDC mm 0. in) (0 5 N (II bs)) (2	/s² (70 to ditimes in total. C @50/60 Hz megger. 025 mm 0.001 in) coad: 10 N 0.25 lbs))
Motor model number Type Operating ambient temperature Conversation temperature Operating ambient humidity Conversation humidity Operation altitude Vibration resistance Impact resistance Insulation class Withstandable voltage Insulation resistance Protection grade Winding temperature rise Static angle error Thrust play *1 Radial play *2 Shaft runout Concentricity of mounting pilot relative to shaft	SH160 □ - 10°C to + - 20°C to + 20 to 90% R 5 to 95% RH 1000 m (328 Vibration fre 500 Hz), swe 500 m/s² of a Class B (+13 At normal tem ure with 1000 minute betwee At normal te IP40 80 K max. (E ± 0.054° 0.075 mm (0.001 in) (load: 5 N (1.12 lbs)) 0.025 mm (0.0075 mm (0.007	103H78 D 50°C 65°C H (no condens of the condens of feet) max. of feet) max. of feet of the condens of feet of fe	sH286 sation) sation) sation) above sea le of 500 Hz, tota nin/cycle, 12 or 11 ms with umidity, no fail- applied for one ng and frame. ind humidity, nyo Denki sta . (load: 10 N 0.025 mm (0.001 in) (load: 5 N (1.12 lbs)) 0.15 mm (0.006 in)	vel al amplitude 1 sweeps in ea an half-sine wa At normal 1 applied for not less ther (2.25 lbs)) 0.025 mm (0.001 in) (load: 10 N (2.25 lbs)) 0.1 mm (0.004 in)	S1 (contin – 10°C to – 20°C to 95% max. 35% max. 1.52 mm (10 ch X, Y and ve applying Class F (+155°C) temperature one minute in 100 MΩ be IP43 0.025 mm (0.001 in) (load: 5 N (1.12 lbs))	CE Model uous operation + 40°C + 60°C - 40°C max., 5 - 60°C max. (n to 70 Hz), vib Z direction. three times for Class B (+ and humidity between moder etween windin 0.025 mm (0.001 in) (load: 5 N (1.12 lbs))	CE Mode on) 7% max.: 50°C to condensation acceler or X, Y and Z at 130°C) 7, no failure water winding a and frame 0.025 (0.001 (load: (1.12 li	el Ci C max., on) ration 150 m. exes each, 18 vith 1500 VA nd frame. by 500 VDC mm 0. in) (0 5 N (II bs)) (2	/s² (70 to stimes in total. C @50/60 Hz megger. 025 mm .001 in) oad: 10 N25 lbs))

■ Safety standards

Model Number: SM286 ☐ CE/UL marked models

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CE	Standard category		Applicable standard						
(TÜV)	Low-voltage directive	es	EN60034-1, EN60034-5						
	Acquired standards Applicable standard		File No.						
UL	UL	UL1004-1, UL1004-6	E179832						
	UL for Canada	CSA C22.2 No.100	- E179832						
Model N	Model Number: 103H712 ☐ -6 ☐ 0, 103H822 ☐ -6 ☐ 0, 103H8922 ☐ -63 ☐ 1 CE marked model								
CE	Standard category		Applicable standard						
(TÜV)	Low-voltage directive	26	EN60034-1 EN60034-5						

^{*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.

