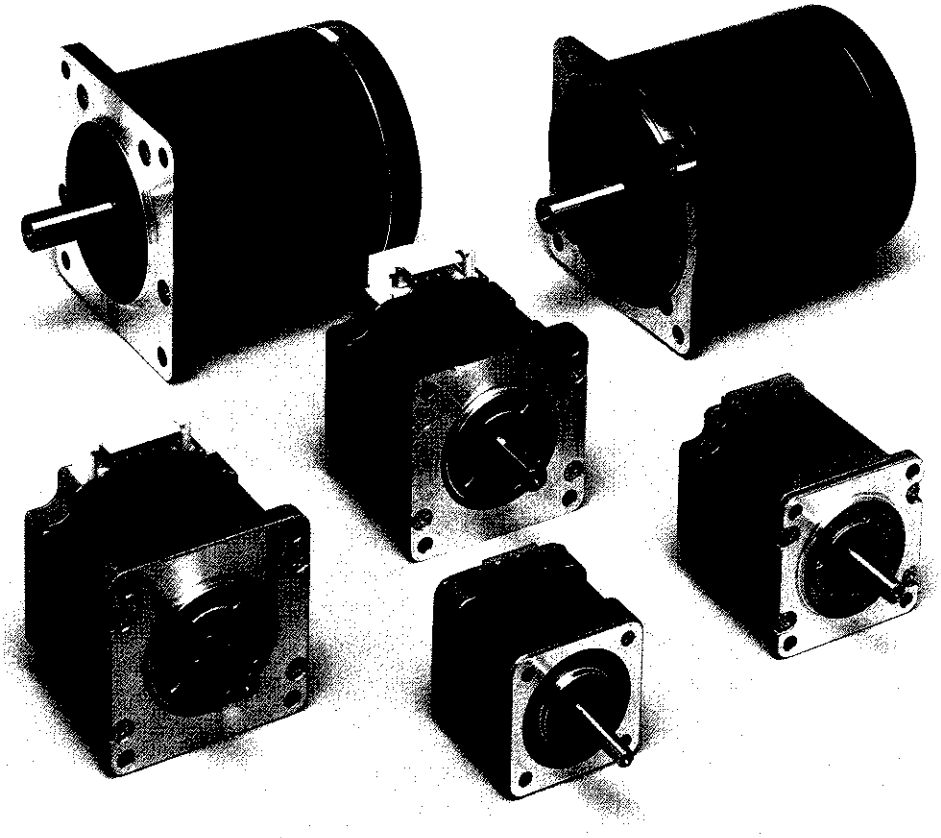
SANYO DENKI

StepSyn®

2 PHASE STEPPING MOTOR



ALZANTI®

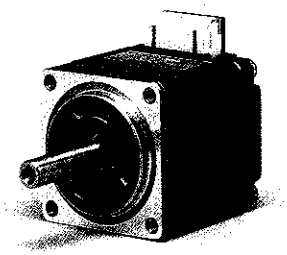
THE DRIVING FORCE IN MOTION CONTROL

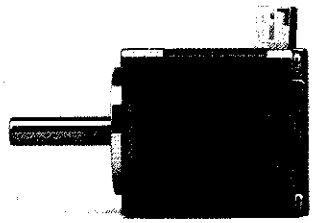
ALZANTI LIMITED

The Warren, Darby Green Lane, Blackwater,
Camberley, Surrey, UK, GU17 0DN.
Tel: +44 (0)1252 861113
Fax: +44 (0)1252 861103
Email: sales @alzanti.com
Website: http://www.alzanti.com

WHAT'S NEW! NEMA 11!!

YES, New solutions for various types of applications.





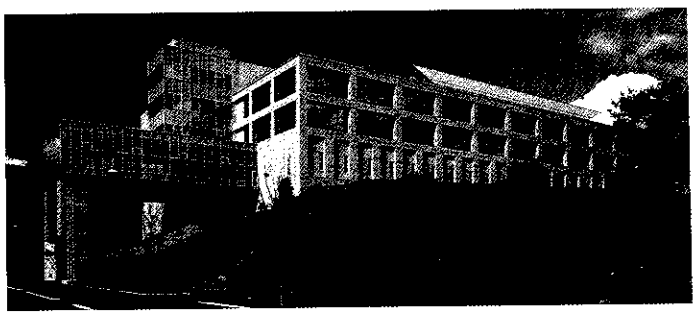
Lead wire or Connector types are available for NEMA 11 & 17 size.
See details on page 3 & 4

Frequently Asked Questions

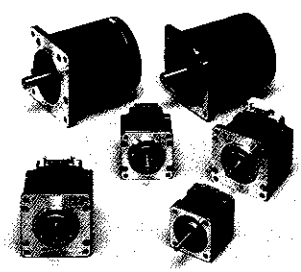
Who is Sanyo Denki?

Sanyo Denki was founded in 1927 and is one of the world's leading manufacturers of Servo, Stepper, Cooling fan and Power supply products. Sanyo Denki has six manufacturing facilities in Japan and recently opened a new labo, Technology center in the Nagano, north of Tokyo, Japan.

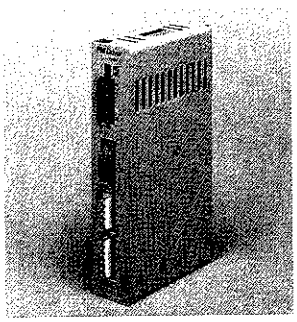
Sanyo Denki servo system products are used in a broad range of industrial applications including robots, packaging machinery, semiconductor machinery, assembly & test machinery, textile machinery, machine tools, and many other types of industrial machinery.



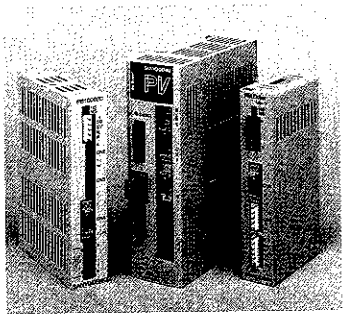
Technology center



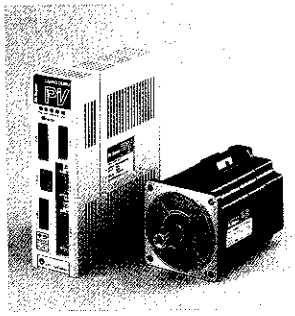
5 phase Stepping Motor



Stepping Motor Driver



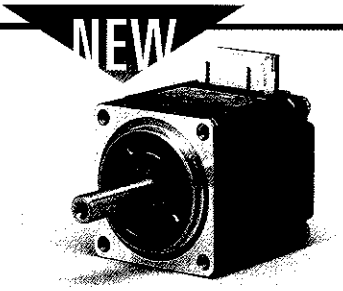
DeviceNet I/F Drive



AC Servo System

2-phase *StepSyn*® H series

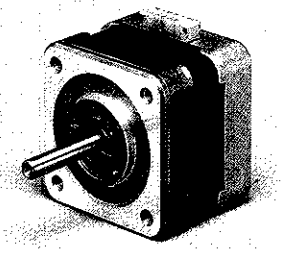
NEMA 11 (28mm sq.)



1.8-degree step
Holding torque
4.5 to 8.8 oz-inch
(0.032 to 0.062 N·m)

Page 3

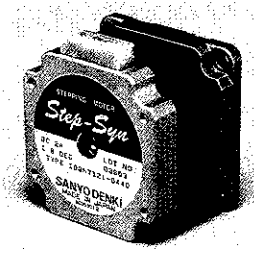
NEMA 17 (42mm sq.)



1.8-degree step
Holding torque
20.8 to 52.4 oz-inch
(0.147 to 0.37 N·m)

Page 4

NEMA 23 (56mm sq.)



1.8-degree step
Holding torque
55.2 to 180 oz-inch
(0.39 to 1.27 N·m)

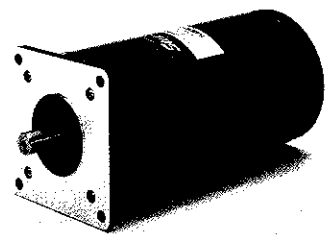
Page 5

NEMA 34 (86mm sq.)

1.8-degree step
Holding torque
305 to 1,053 oz-inch
(2.15 to 7.44 N·m)

Page 6

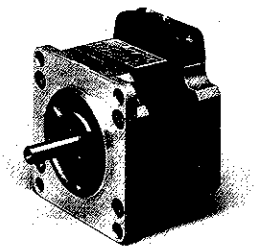
NEMA 42 (106mm sq.)



1.8-degree step
Holding torque
1,062 to 2,690 oz-inch
(7.5 to 19 N·m)

Page 7

CE Marked Models



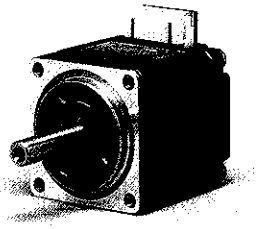
1.8-degree step
Three frame sizes
NEMA 23, 34 & 42

Page 8~9

* For options, consult our sales representative.

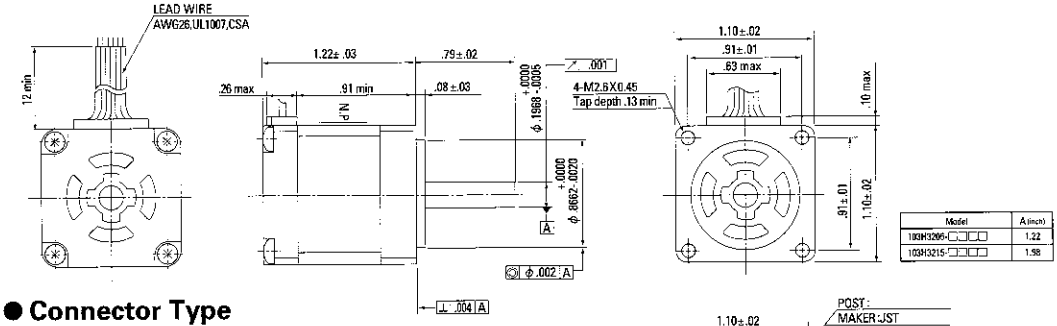
StepSyn®

NEMA 11 (28mm sq.)



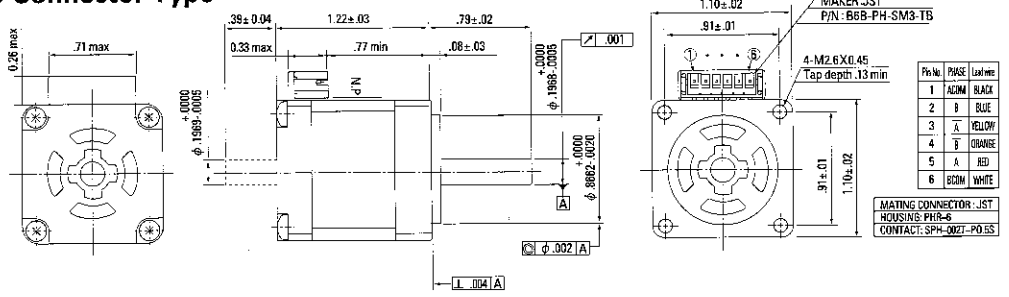
■ Dimensions [unit: inch, 1 inch=25.4mm]

● Lead Wire Type



Model	A (inch)
103H3206-□□□	1.22
103H3215-□□□	1.58

● Connector Type



Pin No.	PHASE	Lead wire
1	ACOM	BLACK
2	B	BLUE
3	$\overline{A}$	YELLOW
4	$\overline{B}$	ORANGE
5	A	RED
6	BCOM	WHITE

MATING CONNECTOR: JST
HOUSING: PHR-6
CONTACT: SPH-002T-P0.5S

■ Specifications

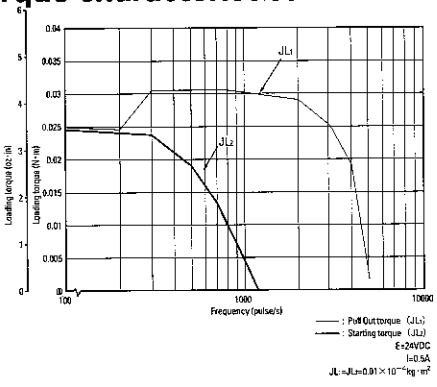
NEMA 11 (28mm sq.) MOUNTING FACE, 1.8 DEGREE PER STEP

Single Shaft	Double Shaft	Holding Torque oz-inch (N·m)	Motor Length inch (mm)	Rotor Inertia oz-in² (kg·m²x10⁻⁷)	Volts Phase V	Amps Phase A	Ohms Phase Ω	mH Phase mH	Lead wire=L Connector=C	No. of Leads	Weight lb (kg)
103H3205-5040	103H3205-5010	4.5 (0.032)	1.22 (31)	0.05 (9)	10	0.25	40	9.1	C	6	0.26 (0.12)
103H3205-5070	103H3205-5030				10	0.25	40	9.1	L		
103H3205-5140	103H3205-5110				4.7	0.5	9.4	2.4	C		
103H3205-5170	103H3205-5130				4.7	0.5	9.4	2.4	L		
103H3215-5140	103H3215-5110	8.8 (0.062)	1.98 (50.3)	0.09 (16)	5.5	0.5	11	3.1	C	6	0.44 (0.2)
103H3215-5170	103H3215-5130				5.5	0.5	11	3.1	L		
103H3215-5240	103H3215-5210				2.6	1.0	2.6	0.8	C		
103H3215-5270	103H3215-5230				2.6	1.0	2.6	0.8	L		

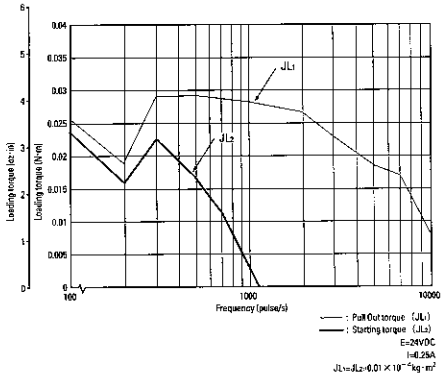
See page 10 for the lead wire configuration.

■ Frequency-torque characteristics

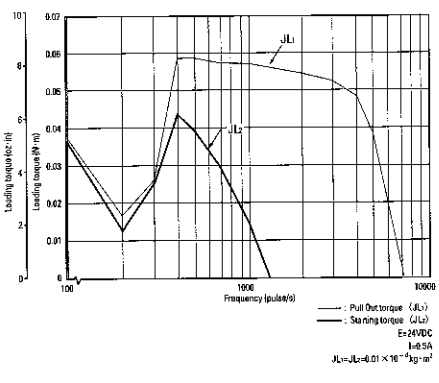
103H3205-5040
103H3205-5070



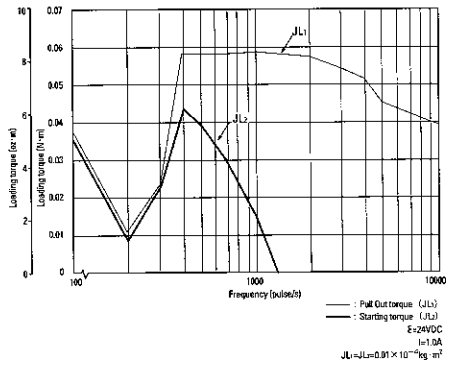
103H3205-5140
103H3205-5170



103H3215-5140
103H3215-5170

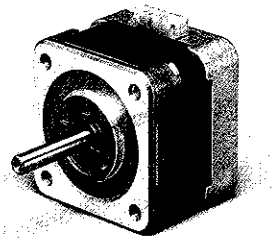


103H3215-5240
103H3215-5270



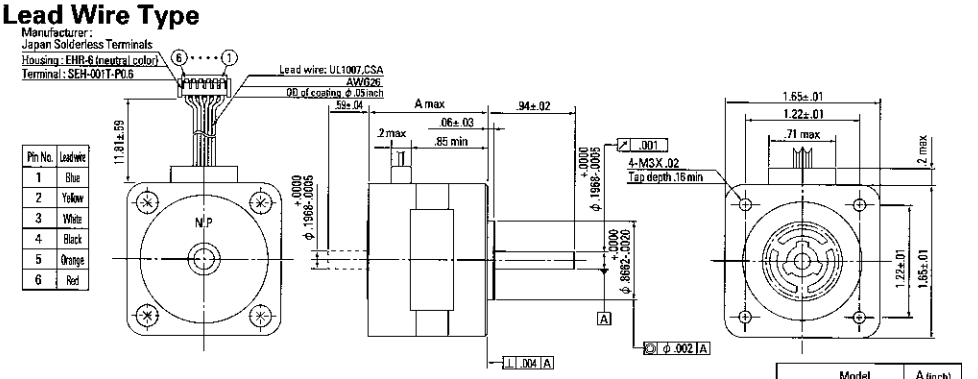
StepSyn®

NEMA 17 (42mm sq.)



■ Dimensions [unit: inch, 1 inch=25.4mm]

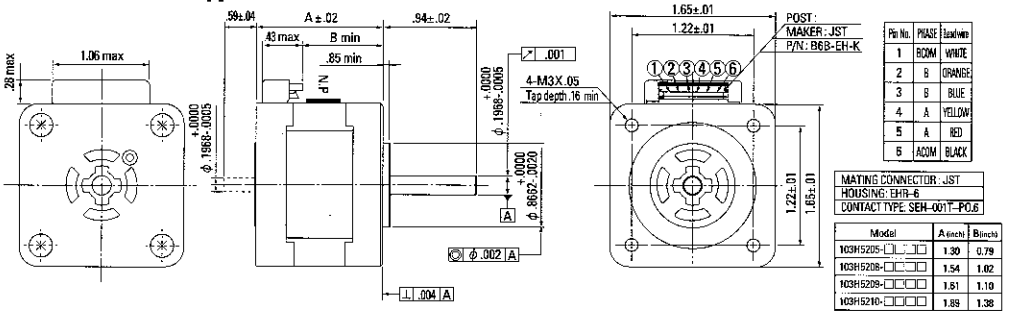
● Lead Wire Type



Pin No.	Lead wire
1	Blue
2	Yellow
3	White
4	Black
5	Orange
6	Red

Model	A (inch)
103H546-□□□□	1.26
103H548-□□□□	1.61
103H549-□□□□	1.85

● Connector Type



Pin No.	PHASE	Lead wire
1	BCOM	WHITE
2	B	ORANGE
3	B	BLUE
4	A	YELLOW
5	A	RED
6	ACOM	BLACK

MATING CONNECTOR: JST
HOUSING: EHR-6
CONTACT TYPE: SEH-001T-P0.6

Model	A (inch)	B (inch)
103H5205-□□□□	1.30	0.79
103H5208-□□□□	1.54	1.02
103H5209-□□□□	1.61	1.10
103H5210-□□□□	1.89	1.38

■ Specifications

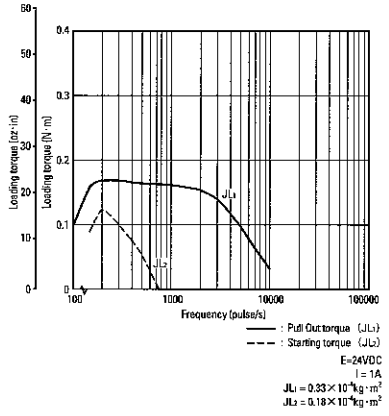
NEMA 17 (42mm sq.) MOUNTING FACE, 1.8 DEGREE PER STEP

Single Shaft	Double Shaft	Holding Torque oz-inch (N·m)	Motor Length inch (mm)	Rotor Inertia oz-in² (kg·m²x10⁻⁷)	Volts Phase V	Amps Phase A	Ohms Phase Ω	mH Phase mH	Lead wire=L Connector=C	No. of Leads	Weight lb (kg)
103H546-0440	103H546-0410	20.8 (0.147)	1.26 (32)	0.16 (30.0)	3.15	1	3.15	2.8	L	6	0.44 (0.2)
103H546-4940	103H546-4910				1.60	1	1.60	2.8	L	4	
103H546-5040	103H546-5010				1.20	2	0.60	0.7	L		
103H548-0440	103H548-0410	37.5 (0.265)	1.61 (41)	0.29 (53.0)	3.60	1.2	3.00	4.3	L	6	0.62 (0.28)
103H548-4940	103H548-4910	31.2 (0.22)			1.60	1	1.60	4.3	L	4	
103H548-5040	103H548-5010	37.5 (0.265)			1.60	2	0.80	1.5	L		
103H549-0440	103H549-0410	44.5 (0.314)	1.85 (47)	0.36 (65)	4.0	1.2	3.30	3.80	L	6	0.77 (0.35)
*103H5205-0440	103H5205-0410	28.3 (0.2)	1.3 (33)	0.20 (36)	2.88	1.2	2.4	2.3	C	6	0.49 (0.22)
*103H5208-0440	103H5208-0410	42.5 (0.3)	1.54 (39)	0.31 (56)	3.48	1.2	2.9	3.4	C	6	0.66 (0.3)
*103H5209-0440	103H5209-0410	45.3 (0.32)	1.61 (41)	0.34 (62)	3.6	1.2	3.0	3.9	C	6	0.68 (0.31)
*103H5210-0440	103H5210-0410	52.4 (0.37)	1.89 (48)	0.40 (74)	4.0	1.2	3.3	3.4	C	6	0.77 (0.35)

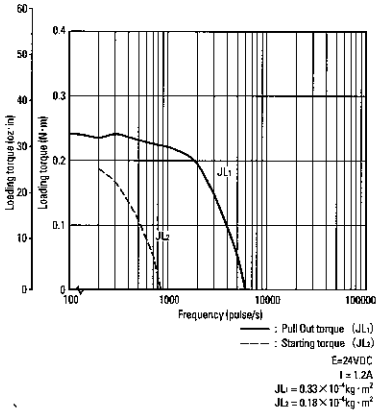
See page 10 for the lead wire configuration.

■ Frequency-torque characteristics

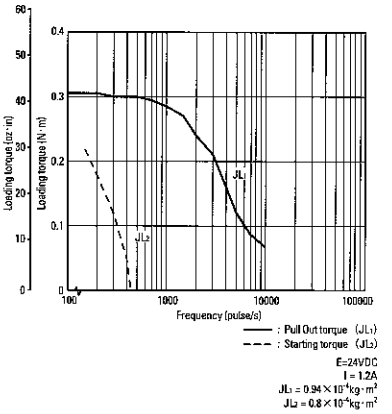
103H546-0440



103H548-0440



103H549-0440



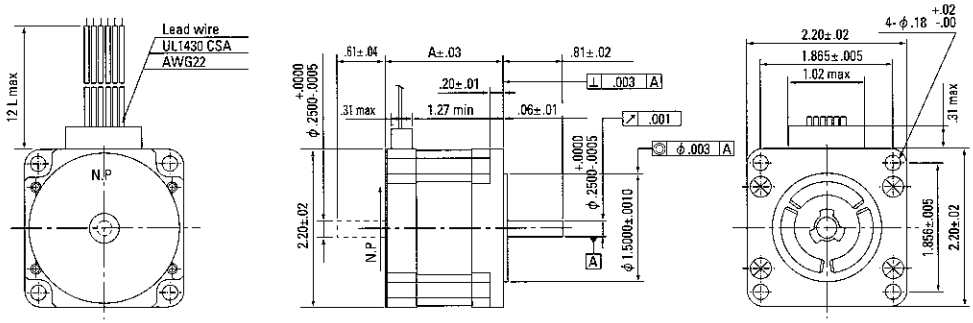
* F/T curves of 103H5205, 5208, 5209, 5210 are also available, and to be provided upon request.

StepSyn®

NEMA 23 (56mm sq.)

■ Dimensions [unit: inch, 1 inch=25.4mm]

● Lead Wire Type



Model	A (inch)
103H7121-□□□□	1.65
103H7123-□□□□	2.12
103H7124-□□□□	2.51
103H7126-□□□□	2.98

■ Specifications

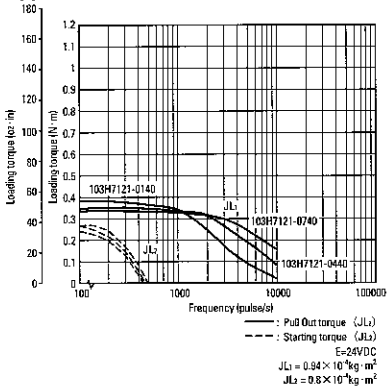
NEMA 23 (56mm sq.) MOUNTING FACE, 1.8 DEGREE PER STEP

Single Shaft	Double Shaft	Holding Torque oz-inch (N·m)	Motor Length inch (mm)	Rotor Inertia oz-in² (kg·m²x10⁻⁷)	Volts Phase V	Amps Phase A	Ohms Phase Ω	mH Phase mH	No. of Leads	Weight lb (kg)
103H7121-0140	103H7121-0110	55.2 (0.39)	1.65 (41.8)	0.55 (100)	4.80	1	4.80	8.00	6	1.04 (0.47)
103H7121-0440	103H7121-0410				2.50	2	1.25	1.90		
103H7121-0740	103H7121-0710				1.80	3	0.60	0.80		
103H7121-4940	103H7121-4910				2.40	1	2.40	8.00	4	
103H7121-5040	103H7121-5010				1.30	2	0.65	1.90		
103H7123-0140	103H7123-0110	117 (0.83)	2.12 (53.8)	1.15 (210)	6.70	1	6.70	15.00	6	1.43 (0.65)
103H7123-0440	103H7123-0410				3.20	2	1.60	3.80		
103H7123-0740	103H7123-0710	110 (0.78)			2.30	3	0.77	1.58		
103H7123-4940	103H7123-4910				3.20	1	3.20	15.0	4	
103H7123-5040	103H7123-5010	117 (0.83)			1.60	2	0.80	3.80		
*103H7124-0140	103H7124-0110	139 (0.98)	2.51 (63.8)	1.34 (245)	7.00	1	7.00	12.50	6	1.76 (0.8)
*103H7124-0440	103H7124-0410				3.40	2	1.70	3.10		
*103H7124-0740	103H7124-0710				2.20	3	0.74	1.40		
103H7126-0140	103H7126-0110	180 (1.27)	2.98 (75.8)	1.97 (360)	8.60	1	8.60	19.00	6	2.16 (0.98)
103H7126-0440	103H7126-0410				4.00	2	2.00	4.50		
103H7126-0740	103H7126-0710				2.75	3	0.90	2.20		
103H7126-4940	103H7126-4910				4.30	1	4.30	19.00	4	
103H7126-5040	103H7126-5010				2.10	2	1.05	4.50		

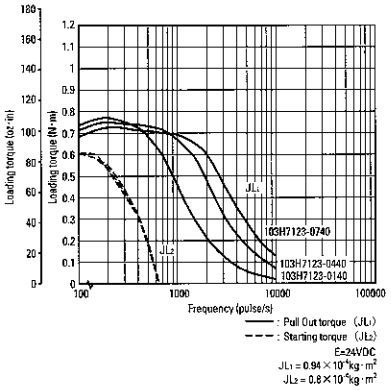
See page 10 for the lead wire configuration.

■ Frequency-torque characteristics

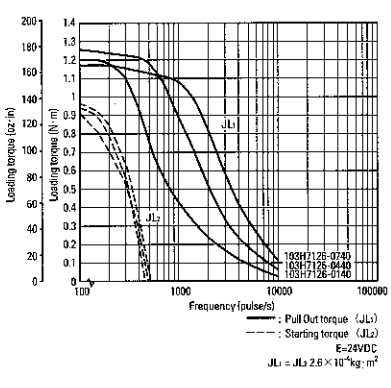
103H7121-0140
103H7121-0440
103H7121-0740



103H7123-0140
103H7123-0440
103H7123-0740



103H7126-0140
103H7126-0440
103H7126-0740



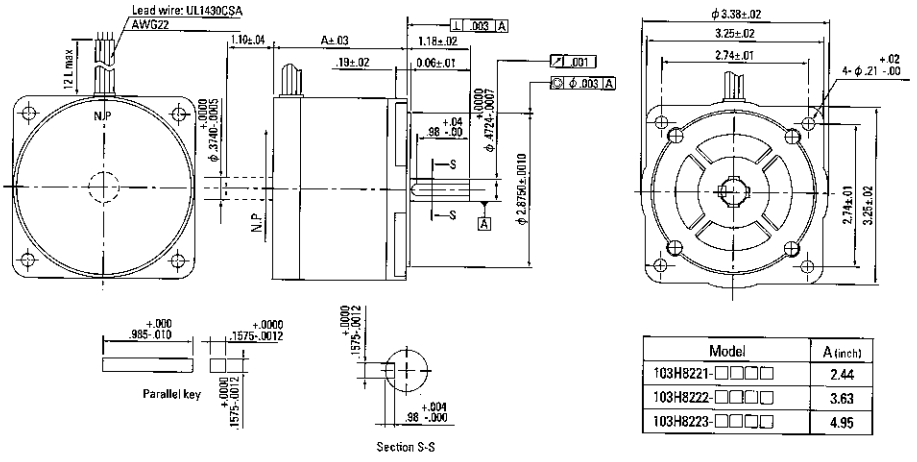
* F/T curves of 103H7124 models are also available, and to be provided upon request.

StepSyn®

NEMA 34 (86mm sq.)

■ Dimensions [unit: inch, 1 inch=25.4mm]

● Lead Wire Type



Model	A (inch)
103H8221-□□□□	2.44
103H8222-□□□□	3.63
103H8223-□□□□	4.95

■ Specifications

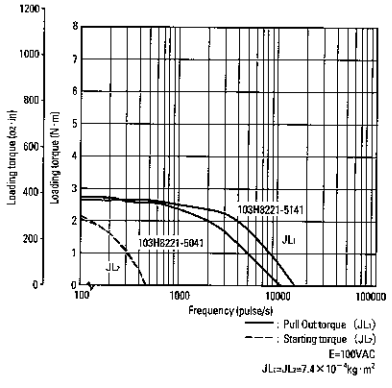
NEMA 34 (86mm sq.) MOUNTING FACE, 1.8 DEGREE PER STEP

Single Shaft	Double Shaft	Holding Torque oz-inch (N·m)	Motor Length inch (mm)	Rotor Inertia oz-in² (kg·m²x10⁻⁷)	Volts Phase V	Amps Phase A	Ohms Phase Ω	mH Phase mH	No. of Leads	Weight lb (kg)
103H8221-0441	103H8221-0411	304 (2.15)	2.44 (62)	7.93 (1450)	5.00	2	2.50	7.20	6	3.31 (1.5)
103H8221-0941	103H8221-0911				2.50	4	0.62	1.80		
103H8221-5041	103H8221-5011	388 (2.74)			4.60	2	2.30	14.00	4	
103H8221-5141	103H8221-5111				2.40	4	0.60	3.50		
103H8221-5241	103H8221-5211				1.80	6	0.30	1.65		
103H8222-0441	103H8222-0411	610 (4.31)	3.63 (92.2)	15.86 (2900)	8.00	2	4.00	15.00	6	5.50 (2.5)
103H8222-0941	103H8222-0911				3.90	4	0.97	3.60		
103H8222-5041	103H8222-5011	720 (5.09)			5.40	2	2.70	23.00	4	
103H8222-5141	103H8222-5111				2.80	4	0.70	5.70		
103H8222-5241	103H8222-5211				2.10	6	0.35	2.70		
103H8223-0441	103H8223-0411	887 (6.27)	4.95 (125.8)	24.06 (4400)	11.20	2	5.60	24.00	6	7.72 (3.5)
103H8223-0941	103H8223-0911				5.40	4	1.35	5.60		
103H8223-5041	103H8223-5011	1053 (7.44)			7.20	2	3.60	32.50	4	
103H8223-5141	103H8223-5111				3.60	4	0.90	8.10		
103H8223-5241	103H8223-5211				2.70	6	0.45	3.40		

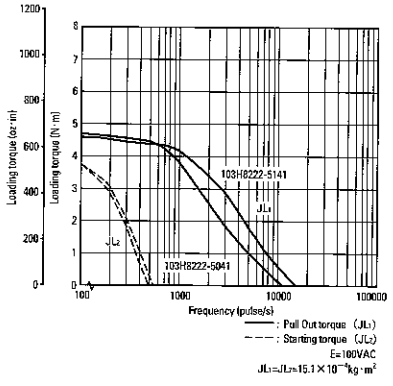
See page 10 for the lead wire configuration.

■ Frequency-torque characteristics

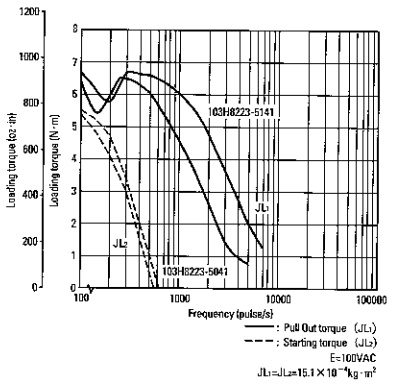
103H8221-5041
103H8221-5141



103H8222-5041
103H8222-5141

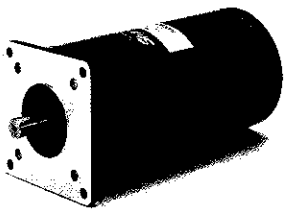


103H8223-5041
103H8223-5141



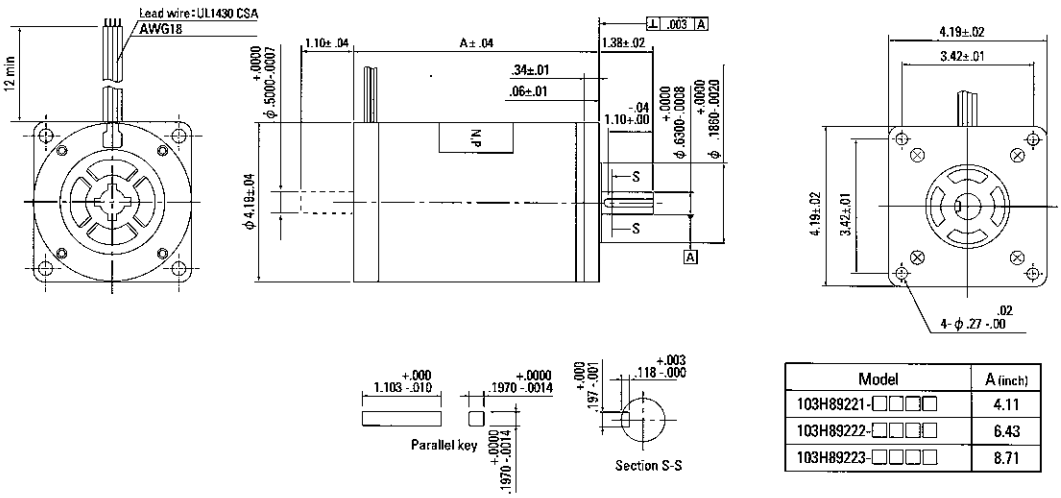
StepSyn®

NEMA 42 (106mm sq.)



■ Dimensions [unit: inch, 1 inch=25.4mm]

● Lead Wire Type



Model	A (inch)
103H89221-□□□□	4.11
103H89222-□□□□	6.43
103H89223-□□□□	8.71

■ Specifications

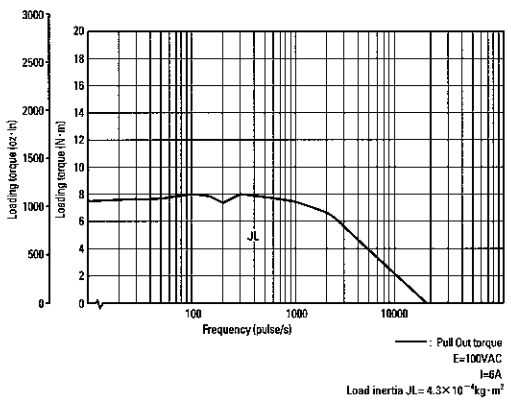
NEMA 42 (106mm sq.) MOUNTING FACE, 1.8 DEGREE PER STEP

Single Shaft	Double Shaft	Holding Torque oz-inch (N·m)	Motor Length inch (mm)	Rotor Inertia oz-in^2 (kg·m^{2}x10^{-7})	Volts Phase V	Amps Phase A	Ohms Phase Ω	mH Phase mH	No. of Leads	Weight lb (kg)
103H89221-5241	103H89221-5211	1,062 (7.5)	4.11 (104.3)	41.55 (7,600)	2.40	6	0.40	3.90	4	9.26 (4.2)
103H89222-0941	103H89222-0911	1,528 (10.8)	6.43 (163.3)	79.82 (14,600)	3.90	4	0.98	6.30	6	16.5 (7.5)
103H89222-5241	103H89222-5211	1,869 (13.2)			2.70	6	0.45	5.40	4	
103H89223-0941	103H89223-0911	2,194 (15.5)	8.71 (221.3)	120.28 (22,000)	5.60	4	1.40	9.70	6	22.7 (10.3)
103H89223-5241	103H89223-5211	2,690 (19)			3.80	6	0.63	8.00	4	

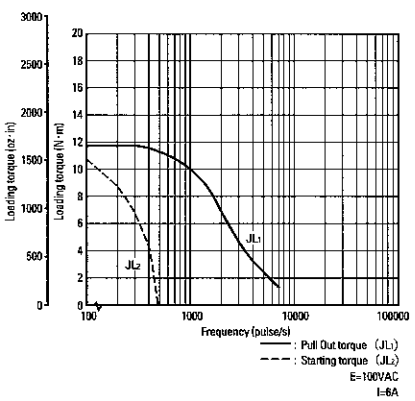
See page 10 for the lead wire configuration.

■ Frequency-torque characteristics

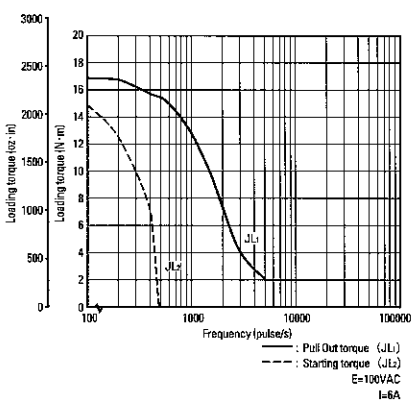
103H89221-5241



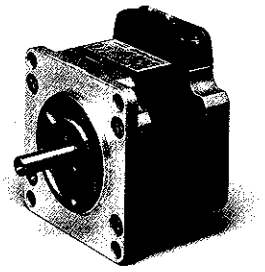
103H89222-5241



103H89223-5241



StepSyn® CE Marked Models



NEMA 23 (56mm sq.)
NEMA 34 (86mm sq.)
NEMA 42 (106mm sq.)

■ Specifications

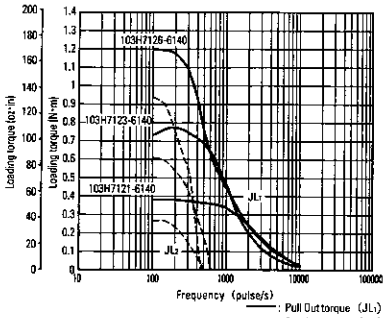
CE MARKED MODELS **NEMA 23 (56mm sq.), NEMA 34 (86mm sq.), NEMA 42 (106mm sq.)**

	Single Shaft	Double Shaft	Holding Torque oz-inch (N·m)	Motor Length inch (mm)	Rotor Inertia oz-in² (kg·m²x10⁻⁷)	Volts Phase V	Amps Phase A	Ohms Phase Ω	mH Phase mH	No. of Leads	Weight lb (kg)
NEMA 23	103H7121-6140	103H7121-6110	55.2 (0.39)	1.65 (41.8)	0.55 (100)	4.80	1	4.80	8.00	6	1.04 (0.47)
	103H7121-6740	103H7121-6710				1.80	3	0.60	0.80		
	103H7123-6140	103H7123-6110	117.0 (0.83)	2.12 (53.8)	1.15 (210)	6.70	1	6.70	15.00	6	1.43 (0.65)
	103H7123-6740	103H7123-6710	110.0 (0.78)			2.30	3	0.77	1.58		
	103H7126-6140	103H7126-6110	180.0 (1.27)	2.98 (75.8)	1.97 (360)	8.60	1	8.60	19.00	6	2.16 (0.98)
	103H7126-6740	103H7126-6710				2.70	3	0.90	2.20		
NEMA 34	103H8221-6240	103H8221-6210	388.0 (2.74)	2.44 (62)	7.93 (1450)	1.80	6	0.30	1.65	4	3.3 (1.5)
	103H8222-6340	103H8222-6310	720.0 (5.09)	3.63 (92.2)	15.86 (2900)	2.10	6	0.35	2.70	4	5.50 (2.5)
	103H8223-6340	103H8223-6310	1053.0 (7.44)	5.0 (125.8)	24.06 (4400)	2.70	6	0.45	3.40	4	7.72 (3.5)
NEMA 42	103H89222-6341	103H89222-6311	1869.0 (13.2)	6.43 (163.3)	79.82 (14600)	2.70	6	0.45	5.40	4	16.53 (7.5)
	103H89223-6341	103H89223-6311	2690.0 (19.0)	8.71 (221.3)	120.28 (22000)	3.80	6	0.63	8.00	4	22.16 (10.5)

See page 10 for the lead wire configuration.

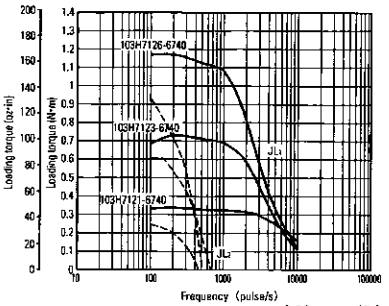
■ Frequency-torque characteristics

103H7126-6140
103H7123-6140
103H7121-6140



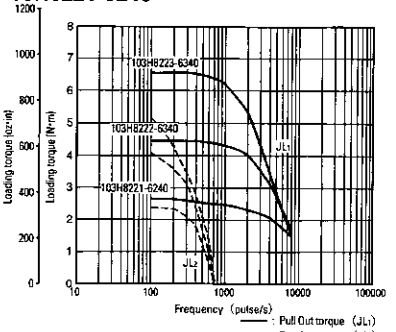
——: Pull Out torque (JL1)
– – –: Starting torque (JL2)
E=24VDC
I=1A
JL1=0.94×10⁻⁴kg·m²
JL2=0.8×10⁻⁴kg·m² (103H7121, 7123)
=2.6×10⁻⁴kg·m² (103H7126)

103H7126-6740
103H7123-6740
103H7121-6740



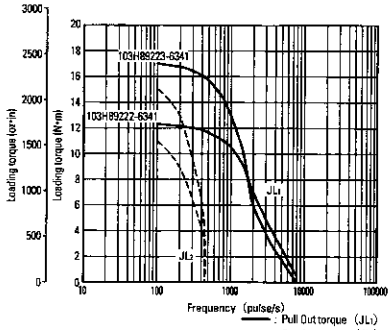
——: Pull Out torque (JL1)
– – –: Starting torque (JL2)
E=24VDC
I=3A
JL1=0.94×10⁻⁴kg·m²
JL2=0.8×10⁻⁴kg·m² (103H7121, 7123)
=2.6×10⁻⁴kg·m² (103H7126)

103H8223-6340
103H8222-6340
103H8221-6240



——: Pull Out torque (JL1)
– – –: Starting torque (JL2)
E=100VAC
I=6A
JL1-JL2=1.45×10⁻⁴kg·m² (103H8221)
2.9×10⁻⁴kg·m² (103H8222)
4.4×10⁻⁴kg·m² (103H8223)

103H89223-6341
103H89222-6341

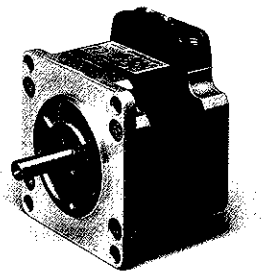


——: Pull Out torque (JL1)
– – –: Starting torque (JL2)
E=100VAC
I=6A
JL1-JL2=14.6×10⁻⁴kg·m² (103H89222)
=22×10⁻⁴kg·m² (103H89223)

CE Marked Models continued on page 9.

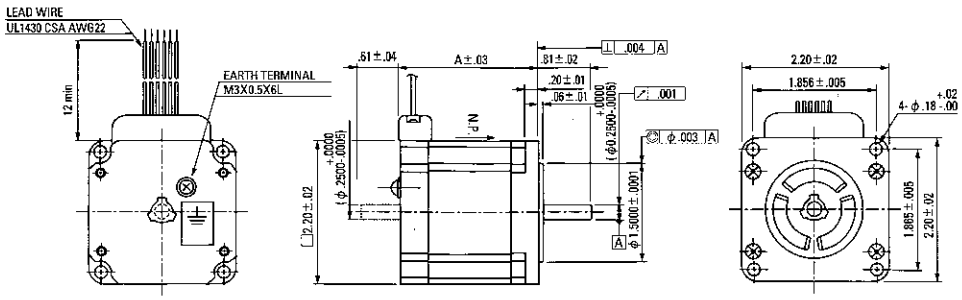
StepSyn®

CE Marked Models

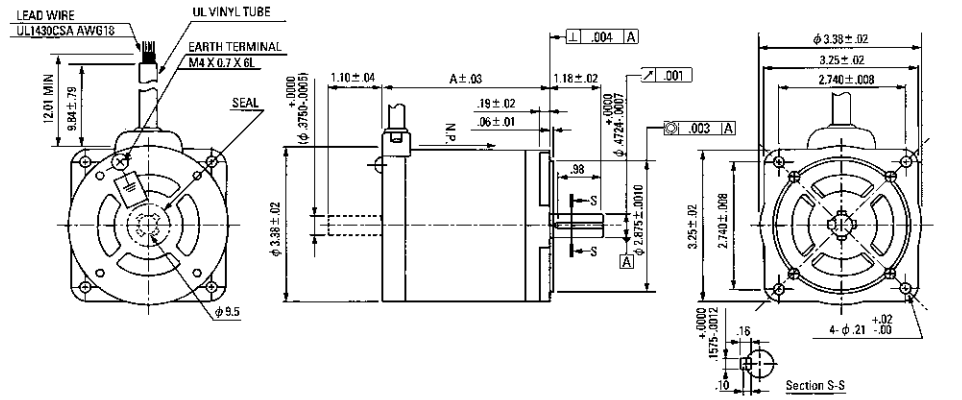


NEMA 23 (56mm sq.)
NEMA 34 (86mm sq.)
NEMA 42 (106mm sq.)

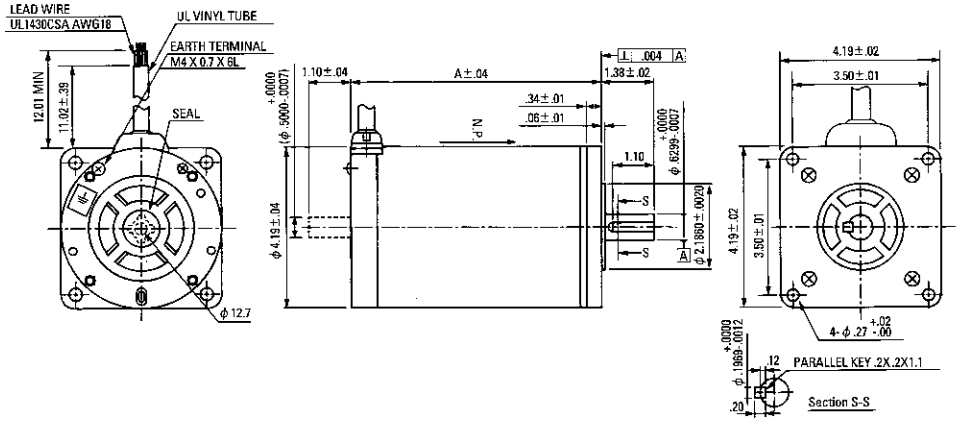
■ Dimensions [unit: inch, 1 inch=25.4mm]



Model	A (inch)
103H7121-6□□□□	1.65
103H7123-6□□□□	2.12
103H7126-6□□□□	2.98



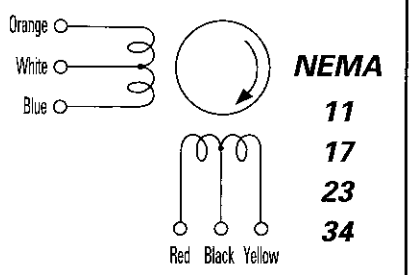
Model	A (inch)
103H8221-6□□□□	2.44
103H8222-6□□□□	3.63
103H8223-6□□□□	4.96



Model	A (inch)
103H89222-6□□□□	6.43
103H89223-6□□□□	8.71

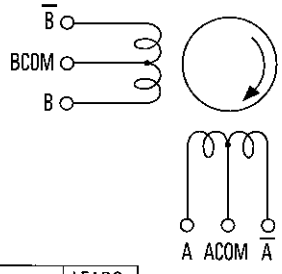
Lead Wire Configuration

6 LEADS



NEMA 11 17 23 34

6 LEADS (CONNECTOR TYPE)



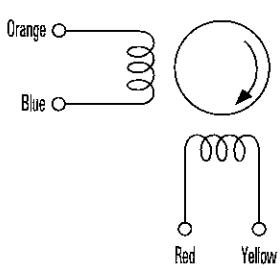
NEMA 11 17

PIN	PHASE	LEADS COLOR
1	B com	White
2	B	Orange
3	B	Blue
4	A	Yellow
5	A	Red
6	A com	Black

MATING CONNECTOR

NEMA11	Manufacture	JST
	Housing type	PHR-6
	Contact type	SPH-002T-P0.5S
NEMA17	Manufacture	JST
	Housing type	EHR-6
	Contact type	SEH-001T-P0.6

4 LEADS



NEMA 17 23 34 42

Warranty

Sanyo Denki Co., Ltd. is pleased to offer suggestions on the use of its various products. However, Sanyo Denki neither assumes responsibility for any omissions or errors nor assumes liability for any damages that result from the use of its products in accordance with information provided by Sanyo Denki, either verbal or written. Sanyo Denki only warrants that the parts provided or manufactured by it will be as specified and free of defects, for a period of one year from date of delivery.

⚠ Caution!

- This product can not be used with the following equipment.
  1) Medical equipment which directly affects human lives.
  2) Equipment which has significant impact on society or the public.
  3) Do not use this products in a car, ship or any other environment subject to vibration.
  4) Do not use the unit where it could be exposed to dust, corrosive gas, inflammable gas, salt, or water.
- Do not modify the stepping motor. Standard performance can not be guaranteed when modified.
- Apply drive voltage of 60VDC and under for stepping motor. Please contact our sales representative if you require drive voltage higher than 60VDC when using stepping motor.
- Please do not touch while in operation, the stepping motor may reach high temperatures.
- Never touch a rotating part of the stepping motor while in operation. Doing so may cause serious injuries.