KH42-B900 Series

A Nidec Group Company

SERVO

All for dreams

2Phase Hybrid Stepping Motors & Drivers

KH42-B900 Series

With high output and low noise, a new kind of motor for today's needs.

KH42-B900 Series (1.8 degree/step)

Model Code

KH 42 34 – B901 0 1

① ② ③ ④ ⑤ ⑥

①	Series	KH (Hybrid Type 2 Phase Stepping Motor)				
②	Motor Size	□42				
③	Motor Length	34 mm	38 mm	42 mm	48 mm	54 mm
④	Winding Method	Unipolar: B901, B902		Bipolar: B951		
⑤	Shaft Specification	0: Single Shaft		1: Double Shaft		
⑥	Shaft Length	1: 20 mm	2: 24 mm		3: 16 mm	

Standard Specifications

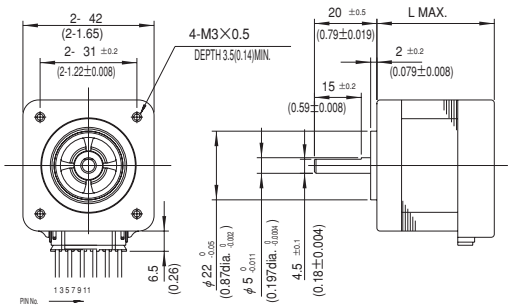
Unipolar

Model	Voltage	Current	Resistance	Inductance	Holding Torque		Detent Torque		Rotor Inertia	
	V/Φ	A/Φ	Ω/Φ	mH/Φ	mN·m	OZ·in	mN·m	OZ·in	g·cm²	OZ·in²
KH4234–B90101	2.97	1.1	2.7	2.1	190	27	12	1.7	38	0.2
KH4238–B90101	3.08	1.4	2.2	1.9	260	37	16	2.3	48	0.3
KH4238–B90201	3.60	1.2	3.0	2.8	260	37	16	2.3	48	0.3
KH4242–B90101	3.25	1.3	2.5	2.6	300	42	18	2.5	59	0.3
KH4242–B90201	3.74	1.1	3.4	4.0	300	42	18	2.5	59	0.3
KH4248–B90101	3.60	1.2	3.0	2.6	350	50	24	3.4	78	0.4
KH4254–B90101	4.20	1.2	3.5	4.1	460	65	30	4.2	98	0.5

Bipolar

Model	Voltage	Current	Resistance	Inductance	Holding Torque		Detent Torque		Rotor Inertia	
	V/Φ	A/Φ	Ω/Φ	mH/Φ	mN·m	OZ·in	mN·m	OZ·in	g·cm²	OZ·in²
KH4234–B95101	3.41	1.1	3.1	4.4	250	35	12	1.7	38	0.2
KH4238–B95101	3.24	1.2	2.7	4.9	340	48	16	2.3	48	0.3
KH4242–B95101	3.41	1.1	3.1	6.9	380	54	18	2.5	59	0.3
KH4248–B95101	3.00	1.5	2.0	3.6	480	68	24	3.4	78	0.4
KH4254–B95101	3.22	1.4	2.3	5.0	570	81	30	4.2	98	0.5

Dimensions Unit: mm (inch)



Model	L (mm)	L (inch)
KH4234	34	1.34
KH4238	38	1.50
KH4242	42	1.65
KH4248	48	1.89
KH4254	54	2.13

Note

Conformable Housing: PHR-11 (JST)

Conformable Contact: SPH-002T-P0.5S (JST)

The standard B900 motor is supplied without a leadwire assembly.

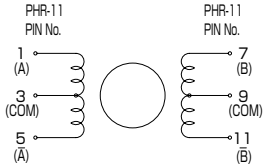
This must be ordered as a separate part.

Specification

Temperature Rise	70 K max. (By resistance method)
Insulation Class	Class E equivalent
Insulation Resistance	100 MΩ min. At 500 V DC (at normal temp. & humidity, between lead and case)
Dielectric Strength	500 V AC 50 Hz for 1 minute (at normal temp. & humidity, between lead and case)
Ambient Temp. Range	-10 ℃ ～ +50 ℃
Storage Temp. Range	-20 ℃ ～ +70 ℃
Humidity Range in Operation and Storage	5 % ～ 95 % RH (noncondensing)

Connection Diagrams

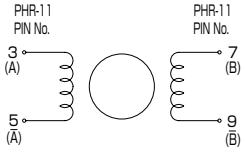
Unipolar



CW viewed from rotor shaft when using the following sequence diagram.

PHR-11 Pin No.	PHASE	1	2	3	4
1	A	–			
7	B		–		
5	Ā			–	
11	B̄				–
3	A com	+	+	+	+
9	B com	+	+	+	+

Bipolar



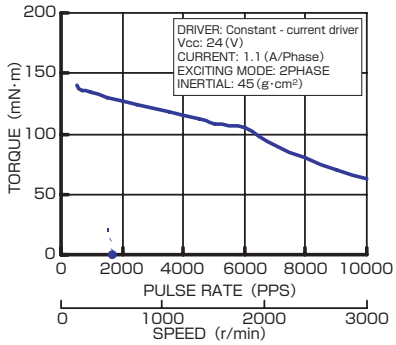
CW viewed from rotor shaft when using the following sequence diagram.

PHR-11 Pin No.	PHASE	1	2	3	4
3	A	–	+	+	–
7	B	–	–	+	+
5	Ā	+	–	–	+
9	B̄	+	+	–	–

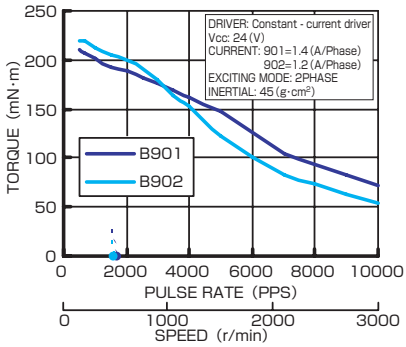
Speed-Torque Characteristics

Unipolar

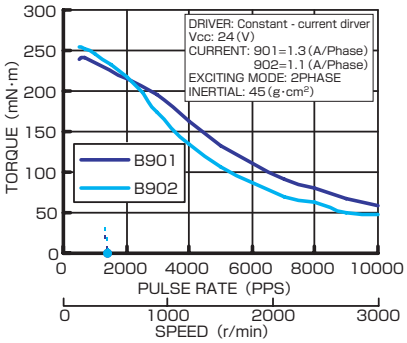
KH4234-B901□□



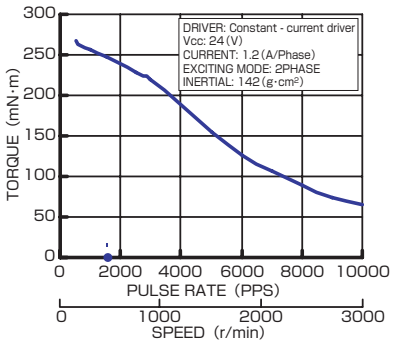
KH4238-B901□□/B902□□



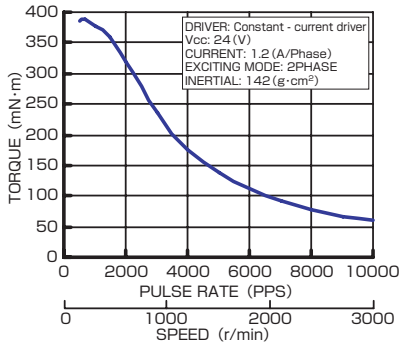
KH4242-B901□□/B902□□



KH4248-B901□□

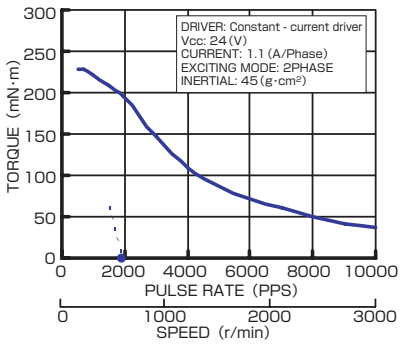


KH4254-B901□□

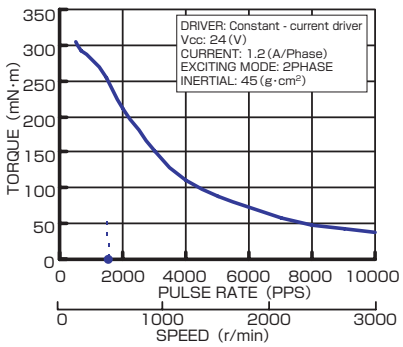


Bipolar

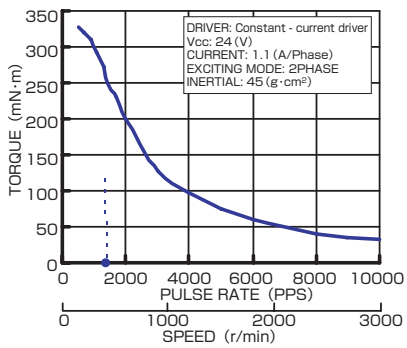
KH4234-B951□□



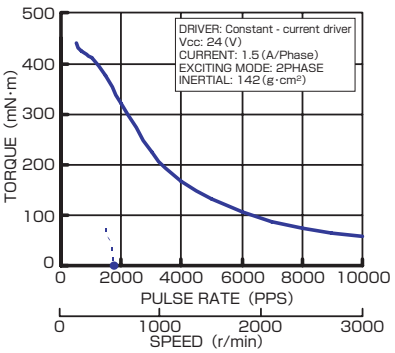
KH4238-B951□□



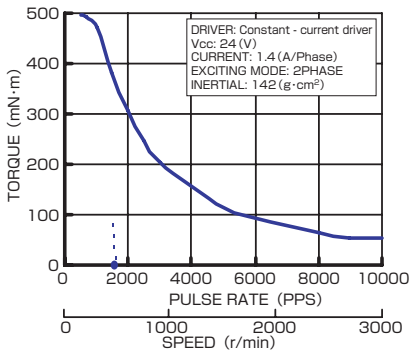
KH4242-B951□□



KH4248-B951□□



KH4254-B951□□



Semi Standard Models

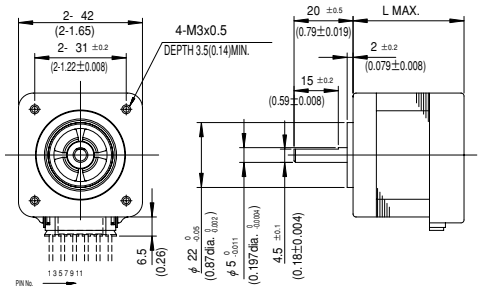
Unipolar

Model	Motor Length L1		Shaft Length L2		Shaft Specification
	mm	inch	mm	inch	
KH4234-B90102	34	1.34	24	0.95	Single shaft
KH4234-B90103			16	0.63	Single shaft
KH4234-B90111			20	0.79	Double shaft
KH4234-B90112			24	0.95	Double shaft
KH4234-B90113			16	0.63	Double shaft
KH4238-B90102	38	1.50	24	0.95	Single shaft
KH4238-B90103			16	0.63	Single shaft
KH4238-B90111			20	0.79	Double shaft
KH4238-B90112			24	0.95	Double shaft
KH4238-B90113			16	0.63	Double shaft
KH4238-B90202			24	0.95	Single shaft
KH4238-B90203			16	0.63	Single shaft
KH4238-B90211			20	0.79	Double shaft
KH4238-B90212			24	0.95	Double shaft
KH4238-B90213			16	0.63	Double shaft
KH4242-B90102	42	1.65	24	0.95	Single shaft
KH4242-B90103			16	0.63	Single shaft
KH4242-B90111			20	0.79	Double shaft
KH4242-B90112			24	0.95	Double shaft
KH4242-B90113			16	0.63	Double shaft
KH4242-B90202			24	0.95	Single shaft
KH4242-B90203			16	0.63	Single shaft
KH4242-B90211			20	0.79	Double shaft
KH4242-B90212			24	0.95	Double shaft
KH4242-B90213			16	0.63	Double shaft
KH4248-B90102	48	1.89	24	0.95	Single shaft
KH4248-B90103			16	0.63	Single shaft
KH4248-B90111			20	0.79	Double shaft
KH4248-B90112			24	0.95	Double shaft
KH4248-B90113			16	0.63	Double shaft
KH4254-B90102	54	2.13	24	0.95	Single shaft
KH4254-B90103			16	0.63	Single shaft
KH4254-B90111			20	0.79	Double shaft
KH4254-B90112			24	0.95	Double shaft
KH4254-B90113			16	0.63	Double shaft

Bipolar

Model	Motor Length L1		Shaft Length L2		Shaft Specification
	mm	inch	mm	inch	
KH4234-B95102	34	1.34	24	0.95	Single shaft
KH4234-B95103			16	0.63	Single shaft
KH4234-B95111			20	0.79	Double shaft
KH4234-B95112			24	0.95	Double shaft
KH4234-B95113			16	0.63	Double shaft
KH4238-B95102	38	1.50	24	0.95	Single shaft
KH4238-B95103			16	0.63	Single shaft
KH4238-B95111			20	0.79	Double shaft
KH4238-B95112			24	0.95	Double shaft
KH4238-B95113			16	0.63	Double shaft
KH4242-B95102	42	1.65	24	0.95	Single shaft
KH4242-B95103			16	0.63	Single shaft
KH4242-B95111			20	0.79	Double shaft
KH4242-B95112			24	0.95	Double shaft
KH4242-B95113			16	0.63	Double shaft
KH4248-B95102	48	1.89	24	0.95	Single shaft
KH4248-B95103			16	0.63	Single shaft
KH4248-B95111			20	0.79	Double shaft
KH4248-B95112			24	0.95	Double shaft
KH4248-B95113			16	0.63	Double shaft
KH4254-B95102	54	2.13	24	0.95	Single shaft
KH4254-B95103			16	0.63	Single shaft
KH4254-B95111			20	0.79	Double shaft
KH4254-B95112			24	0.95	Double shaft
KH4254-B95113			16	0.63	Double shaft

[Semi Standard Model Dimensions Unit: mm (inch)]



Note

Conformable Housing: PHR-11 (JST)

Conformable Contact: SPH-002T-P0.5S (JST)

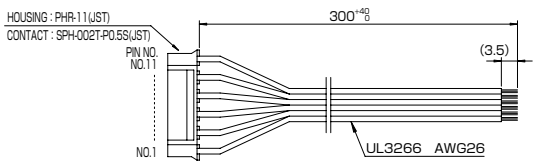
The standard B900 motor is supplied without a leadwire assembly.

This must be ordered as a separate part.

Option

Leadwire Assembly

KH42LUS300 (Unipolar)



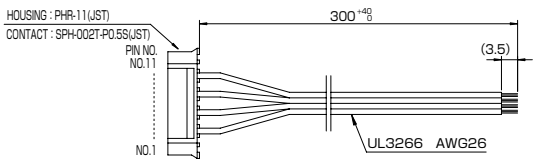
PHR-11 (Pin No.)	1	3	5	7	9	11
Excitation (PHASE)	A	A com	$\overline{A}$	B	B com	$\overline{B}$
Cable Color	Black	Red	Brown	Yellow	Blue	Orange

Note

The standard B900 motor is supplied without a leadwire assembly.

This must be ordered as a separate part.

KH42LBS300 (Bipolar)

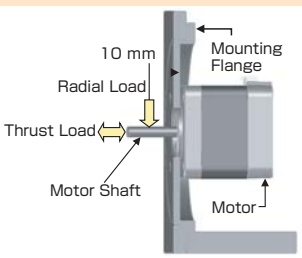


PHR-11 (Pin No.)	3	5	7	9
Excitation (PHASE)	A	$\overline{A}$	B	$\overline{B}$
Cable Color	Red	Blue	Yellow	White

Max. Allowable Load/Runout For Motor Shaft

Load For Motor Shaft

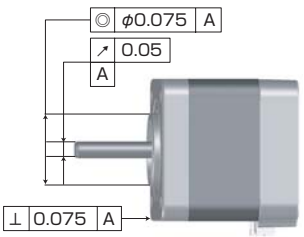
Type	Thrust Load	Radial Load
		Load
KA50	14.7 N (1.5 kgf) (3.3 lb)	19.6 N (2.0 kgf) (4.4 lb)



Shaft Runout

Shaft Runout	0.05 T.I.R. (mm) ※
Concentricity Between Shaft and Mouting Circle	0.075 T.I.R. (mm) ※
Perpendicularity Between Shaft and Mouting Face	0.075 T.I.R. (mm) ※

※ T.I.R. (Total Indicator Reading)



Stepping Motor & Driver

2-Phase Hybrid Stepping Motor Driver

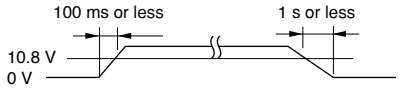
FSD2U2P14-01

Uni-Polar

Power Supply Specifications

Motor Power Supply Voltage (VM): 10.8 V～33.0 V

Set up time



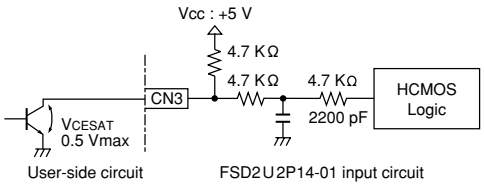
Motor output current: About 2 A max. (different depending on the drive parameters of the motor being used)

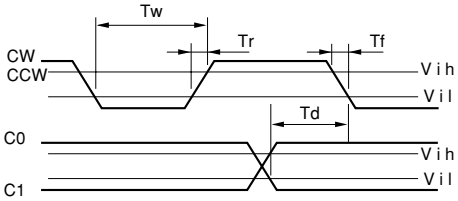
Input Signal Specifications

Item	Signal	Specification	
		MIN	MAX
High Level Input Voltage	Vih(V)	3.5	5.3
Low Level Input Voltage	Vil(V)	0	0.8
Rise Time	Tr(μs)	—	25
Fall Time	Tf(μs)	—	15
Input Pulse Range	Twl(μs)	18	—
Direction of Rotation Change Timing	Twh(μs)	10	—

Note: Specified by the voltage waveform between the user circuit ground and the FSD2U2P14-01 terminal

Input Circuit: C0, C1, C2, H-OFF, CW, CCW





Features

1. Ultra-compact driver measuring a mere 2.2 x 2.9 x 1.7 inches.
2. Uni-polar constant current driver.
3. The micro-stepping feature may be selected from any one of the following settings: 1/1 (full step), 1/2 (micro-step), and 1/4 (micro step).
4. Through the use of 3-bit external signals, electric current settings may be specified to any one of 8 different settings from 0.33 - 2.00 A/phase.
5. Input commands may be selected from either direction-of-rotation separate serial pulse signals or a combination of directional signals and pulse signals.

Applicable Motor

KH4234-B901
KH4238-B901
KH4238-B902
KH4242-B901
KH4242-B902
KH4248-B901
KH4254-B901

Required Operating Environment Conditions

	In Operation	In Storage	Comments
Ambient Temperature (℃)	0 ～ +50	-20 ～ +60	
Ambient Humidity %	35 ～ 85	35 ～ 85	Non Condensation

Table.1 Input Signal and Motor Direction Relation

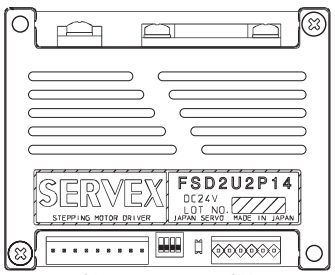
Drive Pulse Format	Terminal No.3	Terminal No.4	Motor Direction
CW/CCW	⊓	HIGH	CW
	HIGH	⊓	CCW
	HIGH	HIGH	HOLDING
CLK/DIR	⊓	LOW	CW
	⊓	HIGH	CCW
	HIGH	×	HOLDING

Functions, Setting and Connections

[CN1 Input Signal Connector]

Terminal No.	Signal Name	Function							
1 (Red)	VM	Motor power supply (to be connected to12-30 V power supply)							
2 (Black)	P.GND	Motor power supply ground (GND)							
3 (Orange)	CW (Note 1)	CW directional drive pulse and serial pulse signal input							
4 (Yellow)	CCW (Note 1)	CCW directional drive pulse and direction-of-rotation signal input							
(Note 2)	Motor Current (A)	0.33	0.57	0.81	1.09	1.28	1.52	1.76	2.00
7 (Purple)	C0	H	L	H	L	H	L	H	L
6 (Blue)	C1	H	H	L	L	H	H	L	L
5 (Green)	C2	H	H	H	H	L	L	L	L
	Current (A) (save)	0.25	0.39	0.51	0.70	0.81	0.98	1.12	1.29
8 (Gray)	H.OFF	Motor on/off (H: off)							
9 (White)	S.GND	Signal ground (GND)							

Note1: The CW or CCW rotation starts at the falling edge of the signal. (Please refer to Table.1)
Note2: It is defined at the RMS value of each winding when the motor is in holding mode (0 PPS) at full step without current saving.stops.



[Functions Setting Switch] On Name Plate Side

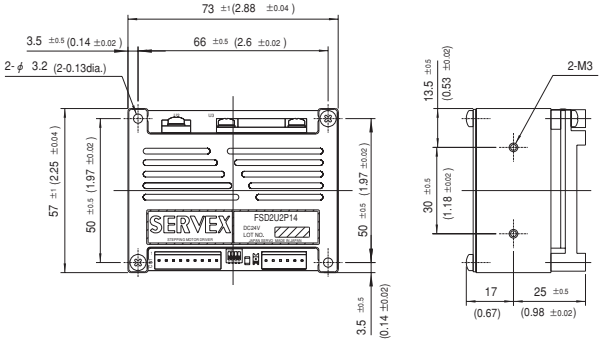
Switch No.	Name	Function		Switch Settings	
				OFF	ON
1	SEL	Drive Pulse Format		CW/CCW	CLK/DIR
2	SAVE (Note 3)	Automatic Power Saving		Saving	Not Saving
	Division of Step Angle	1/2	1/1	1/4	1/2
3	MS0	ON	OFF	ON	OFF
4	MS1	ON	ON	OFF	OFF

Note3: The motor enters current saving mode about 0.25 sec. after the input pulse signal stops.

[CN2 Motor connector]

Terminal No.	Name	Function
1 (Red)	A	To Motor Phase A
2 (Black)	A.COM	To Motor Phase A Common Line
3 (White/Red)	$\overline{A}$	To Motor Phase $\overline{A}$
4 (Green)	B	To Motor Phase B
5 (White)	B.COM	To Motor Phase B Common Line
6 (White/Green)	$\overline{B}$	To Motor Phase $\overline{B}$

Dimensions Unit: mm (inch)

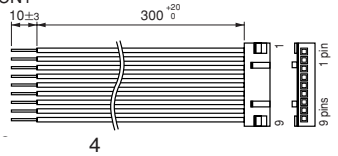


Connector Specifications

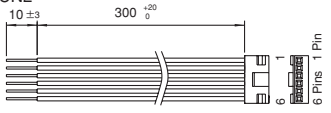
	FSD2U2P14-01 Side Maker Model	Lead Wire	User Side		Maker
			Applicable Housing	Applicable Terminal (reel)	
CN1	IL-G-9P-S3T2-SA	UL3266, AWG22	IL-G-9S-S3C2-SA	IL-G-C2-SC-10000	J. A. E.
CN2	IL-G-6P-S3T2-SA	UL3266, AWG22	IL-G-6S-S3C2-SA	IL-G-C2-SC-10000	J. A. E.

Accessory Leadwire Assembly

CN1



CN2



Stepping Motor & Driver

2-Phase Hybrid Stepping Motor Driver

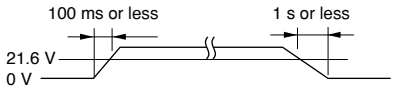
FSD2U3P13-01

Uni-Polar

Power Supply Specifications

Motor Power Supply Voltage (VM): 21.6 V～26.4 V

Set up time



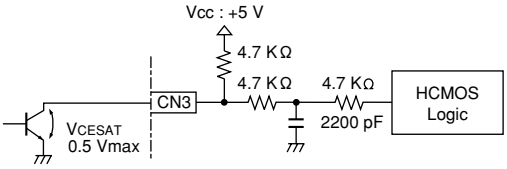
Motor output current: About 2 A max. (different depending on the drive parameters of the motor being used)

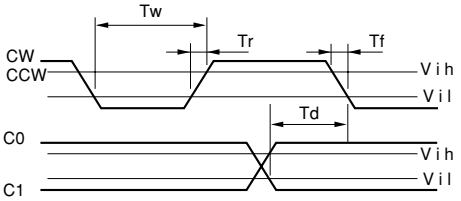
Input Signal Specifications

Item	Signal	Specification	
		MIN	MAX
High Level Input Voltage	Vih(V)	3.5	5.3
Low Level Input Voltage	Vil(V)	0	0.8
Rise Time	Tr(μs)	—	25
Fall Time	Tf(μs)	—	15
Input Pulse Range	Twl(μs)	18	—
Direction of Rotation Change Timing	Twh(μs)	10	—

Note: Specified by the voltage waveform between the user circuit ground and the FSD2U3P13-01 terminal

Input Circuit: C0, C1, C2, H-OFF, CW, CCW





Features

1. The high current (3 A MAX) small FSD driver.
2. Uni-polar constant current driver.
3. The micro-stepping feature may be selected from any one of the following settings: 1/1 (full step), 1/2 (micro-step), and 1/4 (micro step).
4. Through the use of 3-bit external signals, electric current settings may be specified to any one of 8 different settings from 0.50 - 3.00 A/phase.
5. Input commands may be selected from either direction-of-rotation separate serial pulse signals or a combination of directional signals and pulse signals.

Applicable Motor

KH4234-B901
KH4238-B901
KH4238-B902
KH4242-B901
KH4242-B902
KH4248-B901
KH4254-B901

Required Operating Environment Conditions

	In Operation	In Storage	Comments
Ambient Temperature (℃)	0 ～ +50	-20 ～ +60	
Ambient Humidity %	35 ～ 85	35 ～ 85	Non Condensation

Table.1 Input Signal and Motor Direction Relation

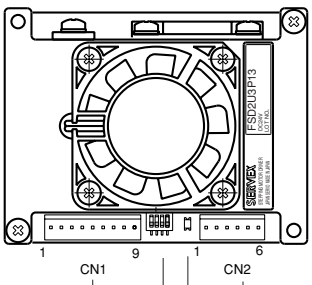
Drive Pulse Format	Terminal No.3	Terminal No.4	Motor Direction
CW/CCW	⊓	HIGH	CW
	HIGH	⊓	CCW
	HIGH	HIGH	HOLDING
CLK/DIR	⊓	LOW	CW
	⊓	HIGH	CCW
	HIGH	×	HOLDING

Functions, Setting and Connections

[CN1 Input Signal Connector]

Terminal No.	Signal Name	Function							
1 (Red)	VM	Motor power supply 24 VDC							
2 (Black)	P.GND	Motor power supply ground (GND)							
3 (Orange)	CW (Note 1)	The CW direction drive pulse or the step command pulse (Switch No.1)							
4 (Yellow)	CCW (Note 1)	The CCW direction drive pulse or the direction signal (Switch No.1)							
(Note 2)	Motor Current (A)	0.50	0.88	1.24	1.60	1.98	2.35	2.68	3.00
7 (Purple)	C0	H	L	H	L	H	L	H	L
6 (Blue)	C1	H	H	L	L	H	H	L	L
5 (Green)	C2	H	H	H	H	L	L	L	L
	Current (A) (save)	0.38	0.60	0.86	1.05	1.19	1.35	1.50	1.74
8 (Gray)	H.OFF	Motor on/off (H: off)							
9 (White)	S.GND	Signal ground (GND)							

Note1: The CW or CCW rotation starts at the falling edge of the signal. (Please refer to Table.1)
Note2: It is defined at the RMS value of each winding when the motor is in holding mode (0 PPS) at full step without current saving.stops.



[Functions Setting Switch] On Name Plate Side

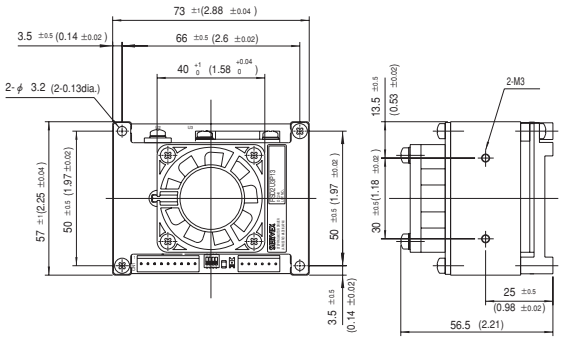
Switch No.	Name	Function		Switch Settings	
				OFF	ON
1	SEL	Drive Pulse Format		CW/CLK	CW/DIR
2	SAVE (Note 3)	Automatic Power Saving		Saving	Not Saving
	Division of Step Angle	1/2	1/1	1/4	1/2
3	MS0	ON	OFF	ON	OFF
4	MS1	ON	ON	OFF	OFF

Note3: The motor enters current saving mode about 0.25 sec. after the input pulse signal stops.

[CN2 Motor connector]

Terminal No.	Name	Function
1 (Red)	A	To Motor Phase A
2 (Black)	A.COM	To Motor Phase A Common Line
3 (White/Red)	$\overline{A}$	To Motor Phase $\overline{A}$
4 (Green)	B	To Motor Phase B
5 (White)	B.COM	To Motor Phase B Common Line
6 (White/Green)	$\overline{B}$	To Motor Phase $\overline{B}$

Dimensions Unit: mm (inch)

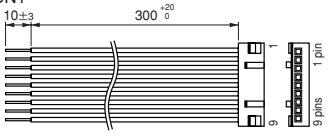


Connector Specifications

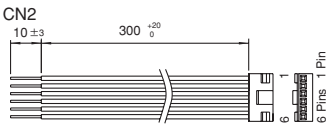
	FSD2U3P13-01 Side Maker Model	Lead Wire	User Side		Maker
			Applicable Housing	Applicable Terminal (reel)	
CN1	IL-G-9P-S3T2-SA	UL3266, AWG22	IL-G-9S-S3C2-SA	IL-G-C2-SC-10000	J. A. E.
CN2	IL-G-6P-S3T2-SA	UL3266, AWG22	IL-G-6S-S3C2-SA	IL-G-C2-SC-10000	J. A. E.

Accessory Leadwire Assembly

CN1



CN2



Stepping Motor & Driver

2-Phase Hybrid Stepping Motor Driver

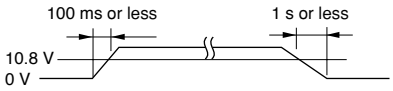
FSD2B2P13-01

Bi-Polar

Power Supply Specifications

Motor Power Supply Voltage (VM): 10.8 V～26.4 V

Set up time



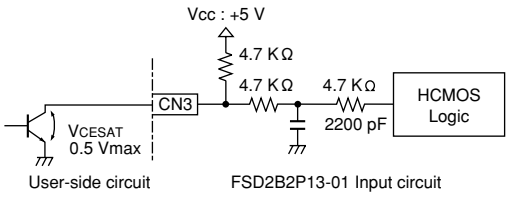
Motor output current: About 2 A max. (different depending on the drive parameters of the motor being used)

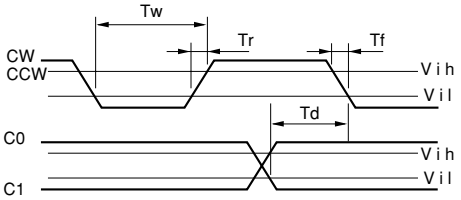
Input Signal Specifications

Item	Signal	Specification	
		MIN	MAX
High Level Input Voltage	Vih(V)	3.5	5.3
Low Level Input Voltage	Vil(V)	0	0.8
Rise Time	Tr(μs)	—	25
Fall Time	Tf(μs)	—	10
Input Pulse Range	Twl(μs)	18	—
Direction of Rotation Change Timing	Twh(μs)	10	—

Note: Specified by the voltage waveform between the user circuit ground and the FSD2B2P13-01 terminal

Input Circuit: C0, C1, C2, H-OFF, CW, CCW





Features

1. Ultra-compact driver measuring a mere 2.2 x 2.9 x 1.86 inches.
2. Bi-polar constant current driver.
3. The micro-stepping feature may be selected from any one of the following settings: 1/1 (full step), 1/2 (micro-step), and 1/4 (micro step).
4. Through the use of 3-bit external signals, electric current settings may be specified to any one of 8 different settings from 0.44 - 2.00 A/phase.
5. Input commands may be selected from either direction-of-rotation separate serial pulse signals or a combination of directional signals and pulse signals.

Applicable Motor

KH4234-B951
KH4238-B951
KH4242-B951
KH4248-B951
KH4254-B951

Required Operating Environment Conditions

	In Operation	In Storage	Comments
Ambient Temperature (℃)	0 ～ +50	-20 ～ +60	
Ambient Humidity %	35 ～ 85	35 ～ 85	Non Condensation

Table.1 Input Signal and Motor Direction Relation

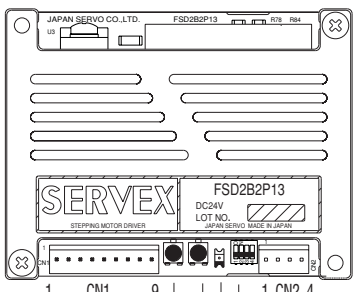
Drive Pulse Format	Terminal No.3	Terminal No.4	Motor Direction
CW/CCW	⊓	HIGH	CW
	HIGH	⊓	CCW
	HIGH	HIGH	HOLDING
CLK/DIR	⊓	LOW	CW
	⊓	HIGH	CCW
	HIGH	×	HOLDING

Functions, Setting and Connections

[CN1 Input Signal Connector]

Terminal No.	Signal Name	Function							
1 (Red)	VM	Motor power supply(to be connected to 12-24 V power supply)							
2 (Black)	P.GND	Motor power supply ground (GND)							
3 (Orange)	CW (Note 1)	CW directional drive pulse and serial pulse signal input							
4 (Yellow)	CCW (Note 1)	CCW directional drive pulse and direction-of-rotation signal input							
(Note 2)	Motor Current (A)	0.44	0.67	0.88	1.10	1.32	1.54	1.77	2.00
7 (Purple)	C0	H	L	H	L	H	L	H	L
6 (Blue)	C1	H	H	L	L	H	H	L	L
5 (Green)	C2	H	H	H	H	L	L	L	L
	Current (A) (save)	0.41	0.46	0.59	0.71	0.83	0.95	1.07	1.19
8 (Gray)	H.OFF	Motor on/off (H: off)							
9 (White)	S.GND	Signal ground (GND)							

Note1: The CW or CCW rotation starts at the falling edge of the signal. (Please refer to Table.1)
Note2: It is defined at the RMS value of each winding when the motor is in holding mode (0 PPS) at full step without current saving.stops.



[Functions Setting Switch] On Name Plate Side

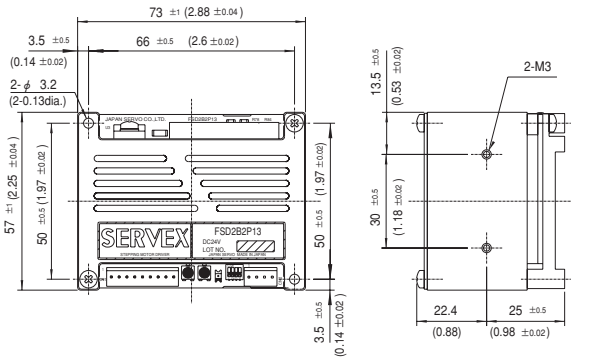
Switch No.	Name	Function		Switch Settings	
				OFF	ON
1	SEL	Drive Pulse Format		CW/CCW	CLK/DIR
2	SAVE (Note 3)	Automatic Power Saving		Saving	Not Saving
	Division of Step Angle	1/2	1/1	1/4	1/2
3	MS0	ON	OFF	ON	OFF
4	MS1	ON	ON	OFF	OFF

Note3: The motor enters current saving mode about 0.25 sec. after the input pulse signal stops.

[CN2 Motor connector]

Terminal No.	Name	Function
1 (Red)	A	To Motor Phase A
2 (White/Red)	$\overline{A}$	To Motor Phase $\overline{A}$
3 (Green)	B	To Motor Phase B
4 ((White/Green)	$\overline{B}$	To Motor Phase $\overline{B}$

Dimensions Unit: mm (inch)

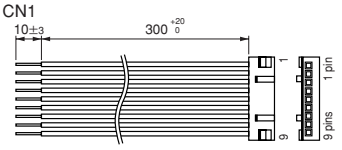


Connector Specifications

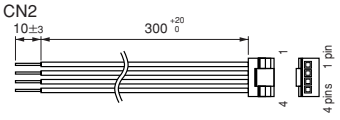
	FSD2B2P13-01 Side Maker Model	Lead Wire	User Side		Maker
			Applicable Housing	Applicable Terminal (reel)	
CN1	IL-G-9P-S3T2-SA	UL3266, AWG22	IL-G-9S-S3C2-SA	IL-G-C2-SC-10000	J. A. E.
CN2	IL-G-4P-S3T2-SA	UL3266, AWG22	IL-G-4S-S3C2-SA	IL-G-C2-SC-10000	J. A. E.

Accessory Leadwire Assembly

CN1



CN2



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