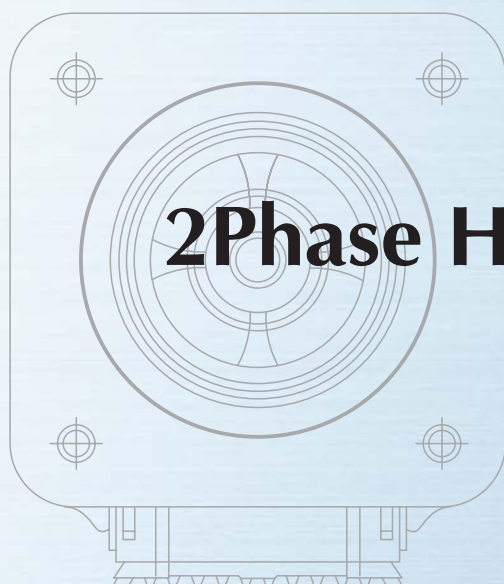


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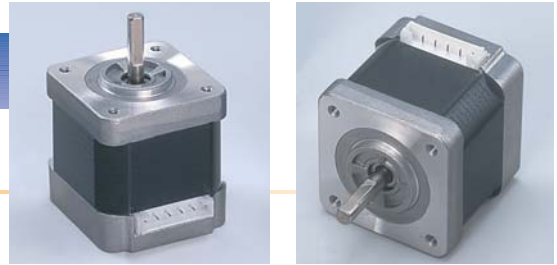
2Phase Hybrid Stepping Motors & Drivers

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

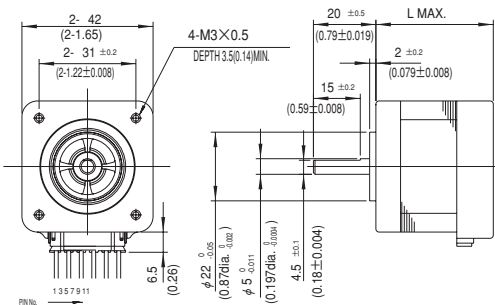
Unipolar

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·cm ²	OZ·in ²
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·cm ²	OZ·in ²
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

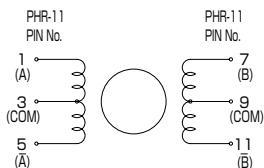
Note
 Conformable Housing: PHR-11 (JST)
 Conformable Contact: SPH-002T-P0.5S (JST)
The standard B900 motor is supplied without a leadwire assembly.
This must be ordered as a separate part.

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 °C ~ +50 °C
Storage Temp. Range	-20 °C ~ +70 °C
Humidity Range in Operation and Storage	5% ~ 95% RH (noncondensing)

Connection Diagrams

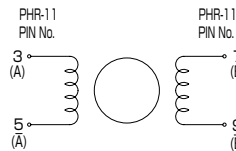
Unipolar



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	A			-	
11	B				-
3	A com	+	+	+	+
9	B com	+	+	+	+

Bipolar



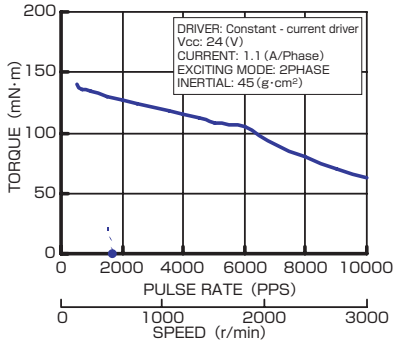
CW viewed from rotor shaft when using the following sequence diagram.

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

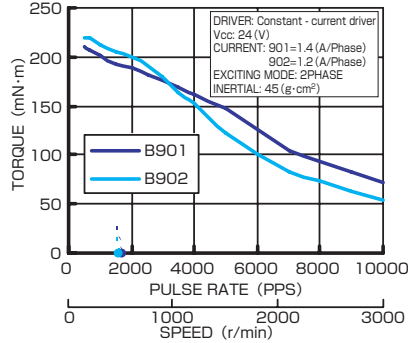
Speed-Torque Characteristics

Unipolar

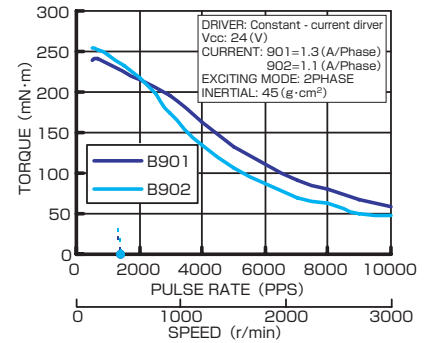
KH4234-B901 □□



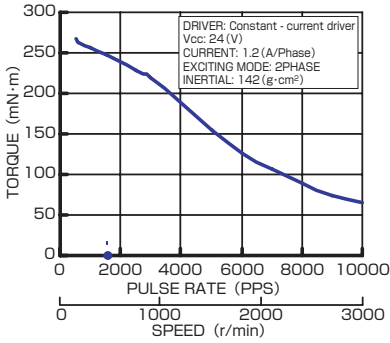
KH4238-B901 □□/ **B902** □□



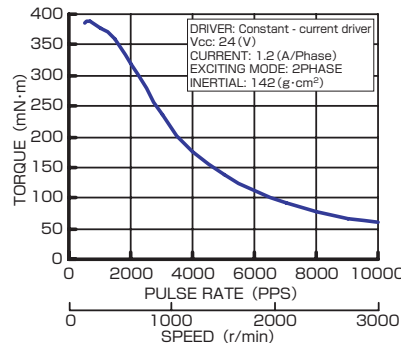
KH4242-B901 □□/ **B902** □□



KH4248-B901 □□

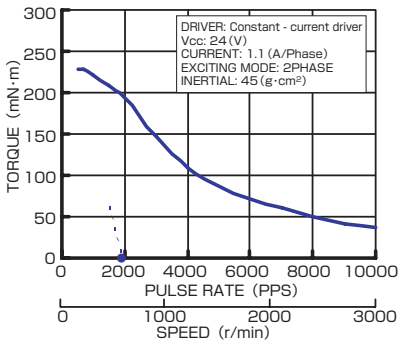


KH4254-B901 □□

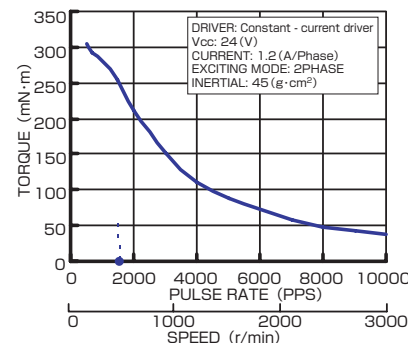


Bipolar

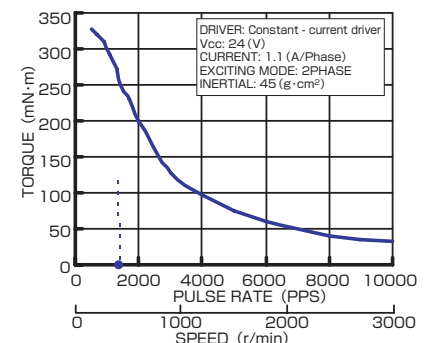
KH4234-B951 □□



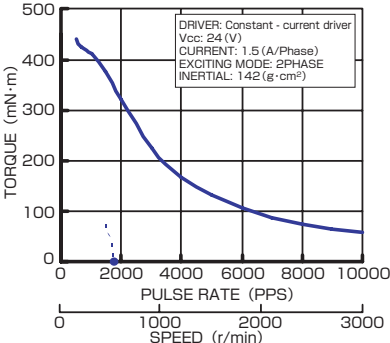
KH4238-B951 □□



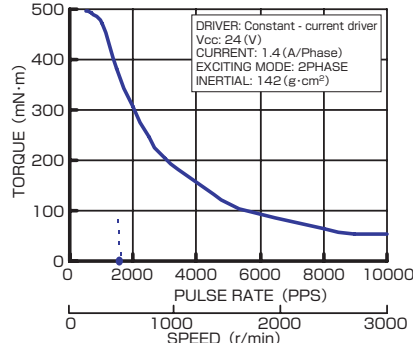
KH4242-B951 □□



KH4248-B951 □□



KH4254-B951 □□



Semi Standard Models

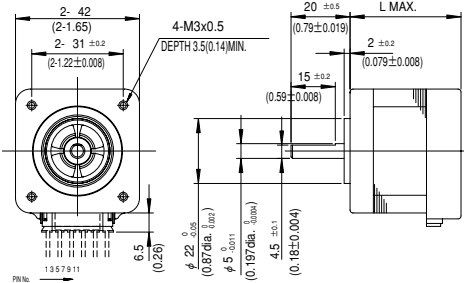
Unipolar

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	38	1.50	16	0.63	Double shaft
KH4238-B90102			24	0.95	Single shaft
KH4238-B90103			16	0.63	Single shaft
KH4238-B90111			20	0.79	Double shaft
KH4238-B90112	38	1.50	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	42	1.65	20	0.79	Double shaft
KH4238-B90212			24	0.95	Double shaft
KH4238-B90213			16	0.63	Double shaft
KH4242-B90102			24	0.95	Single shaft
KH4242-B90103	42	1.65	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	42	1.65	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	48	1.89	16	0.63	Double shaft
KH4248-B90102			24	0.95	Single shaft
KH4248-B90103			16	0.63	Single shaft
KH4248-B90111			20	0.79	Double shaft
KH4248-B90112	48	1.89	24	0.95	Double shaft
KH4248-B90113			16	0.63	Double shaft
KH4254-B90102			24	0.95	Single shaft
KH4254-B90103			16	0.63	Single shaft
KH4254-B90111	54	2.13	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	38	1.50	16	0.63	Double shaft
KH4238-B95102			24	0.95	Single shaft
KH4238-B95103			16	0.63	Single shaft
KH4238-B95111			20	0.79	Double shaft
KH4238-B95112	38	1.50	24	0.95	Double shaft
KH4238-B95113			16	0.63	Double shaft
KH4242-B95102			24	0.95	Single shaft
KH4242-B95103			16	0.63	Single shaft
KH4242-B95111	42	1.65	20	0.79	Double shaft
KH4242-B95112			24	0.95	Double shaft
KH4242-B95113			16	0.63	Double shaft
KH4248-B95102			24	0.95	Single shaft
KH4248-B95103	48	1.89	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	54	2.13	16	0.63	Double shaft

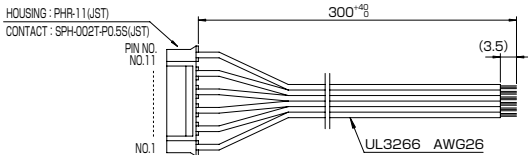
[Semi Standard Model Dimensions Unit: mm (inch)]



Note
 Conformable Housing:
 PHR-11 (JST)
 Conformable Contact:
 SPH-002T-PO.5S (JST)
The standard B900 motor is supplied without a leadwire assembly. This must be ordered as a separate part.

Option

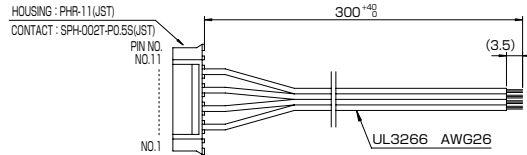
Leadwire Assembly KH42LUS300 (Unipolar)



PHR-11 (Pin No.)	1	3	5	7	9	11
Excitation (PHASE)	A	A com	A	B	B com	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)

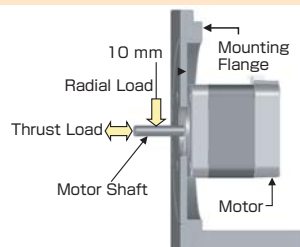


PHR-11 (Pin No.)	3	5	7	9
Excitation (PHASE)	A	A	B	B
Cable Color	Red	Blue	Yellow	White

Max. Allowable Load/Runout For Motor Shaft

Load For Motor Shaft

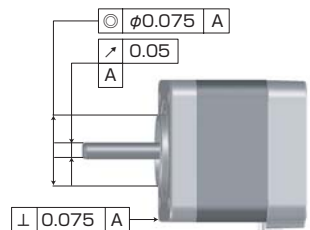
Type	Thrust Load	Radial Load
		Load
KA50	14.7 N (1.5 kgf) (3.3 lb)	19.6 N (2.0 kgf) (4.4 lb)



Shaft Runout

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

※ T.I.R. (Total Indicator Reading)



Stepping Motor & Driver

2-Phase Hybrid Stepping Motor Driver

FSD2U2P14-01



Features

- Ultra-compact driver measuring a mere 2.2 x 2.9 x 1.7 inches.
- Uni-polar constant current driver.
- 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).
- 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.
- Input commands may be selected from either direction-of-rotation separate serial pulse signals or a combination of directional signals and pulse signals.

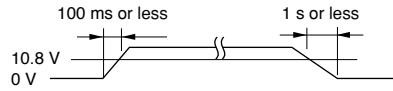
Applicable Motor

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

Power Supply Specifications

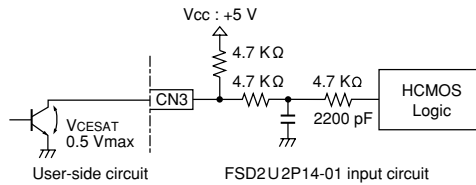
Motor Power Supply Voltage (VM): 10.8 V ~ 33.0 V

Set up time



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

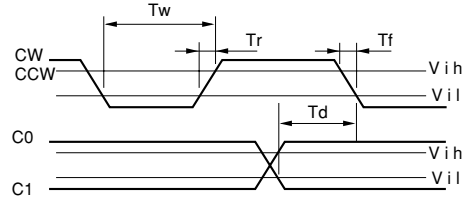
Input Circuit: C0, C1, C2, H-OFF, CW, CCW



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



Required Operating Environment Conditions

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

Functions, Setting and Connections

[CN1 Input Signal Connector]

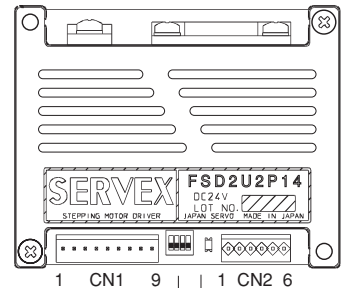
Terminal No.	Signal Name	Function
1 (Red)	VM	Motor power supply (to be connected to 12-30 V power supply)
2 (Black)	P.GND	Motor power supply ground (GND)
3 (Orange)	CW (Note 1)	CW directional drive pulse and serial pulse signal input
4 (Yellow)	CCW (Note 1)	CCW directional drive pulse and direction-of-rotation 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 L L H L H L
6 (Blue)	C1	H L H L L L H L H 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.

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
CLK/DIR		LOW	CW
		HIGH	CCW
	HIGH	X	HOLDING



[Functions Setting Switch] On Name Plate Side

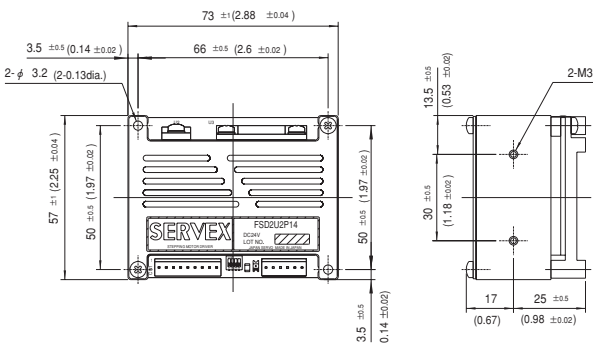
Switch No.	Name	Function	Switch Settings	
			OFF	ON
1	SEL	Drive Pulse Format	CW/CCW	CLK/DIR
2	SAVE (Note 3)	Automatic Power Saving	Saving	Not Saving
			Division of Step Angle	1/2 1/1
3	MS0	ON OFF	ON OFF	OFF OFF
4	MS1	ON ON	OFF OFF	OFF OFF

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)	\bar{A}	To Motor Phase \bar{A}
4 (Green)	B	To Motor Phase B
5 (White)	B.COM	To Motor Phase B Common Line
6 (White/Green)	\bar{B}	To Motor Phase \bar{B}

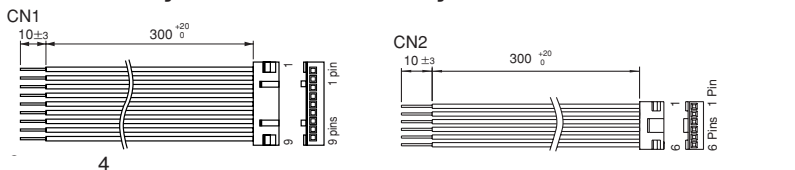
Dimensions Unit: mm (inch)



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



Stepping Motor & Driver

FSD2U3P13-01

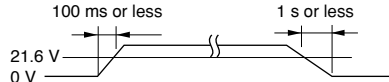


2-Phase Hybrid Stepping Motor Driver

Power Supply Specifications

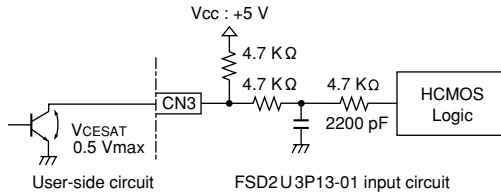
Motor Power Supply Voltage (VM): 21.6 V~26.4 V

Set up time



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

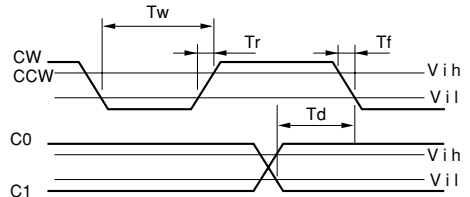
Input Circuit: C0, C1, C2, H-OFF, CW, CCW



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



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 (°C)	0 ~ +50	-20 ~ +60	
Ambient Humidity %	35 ~ 85	35 ~ 85	Non Condensation

Functions, Setting and Connections

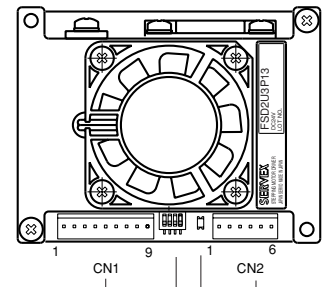
[CN1 Input Signal Connector]

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 L H L H L L
6 (Blue)	C1	H H L L L H H L 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.

Table.1 Input Signal and Motor Direction Relation

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



Power Supply Input Display LED

[Functions Setting Switch] On Name Plate Side

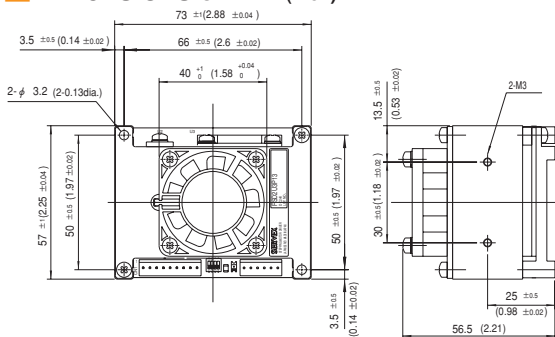
Switch No.	Name	Function	Switch Settings	
			OFF	ON
1	SEL	Drive Pulse Format	CW/CCW	CLK/DIR
2	SAVE (Note 3)	Automatic Power Saving	Saving	Not Saving
			Division of Step Angle	1/2
3	MS0	ON OFF	ON	OFF
4	MS1	ON ON	OFF	OFF

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)	A̅	To Motor Phase A̅
4 (Green)	B	To Motor Phase B
5 (White)	B.COM	To Motor Phase B Common Line
6 (White/Green)	B̅	To Motor Phase B̅

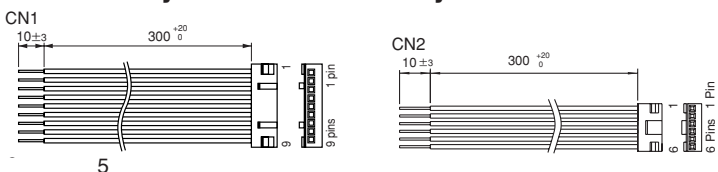
Dimensions Unit: mm (inch)



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



Stepping Motor & Driver

2-Phase Hybrid Stepping Motor Driver

FSD2B2P13-01



Features

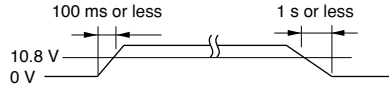
1. Ultra-compact driver measuring a mere 2.2 x 2.9 x 1.86 inches.
2. Bi-polar constant current driver.
3. The micro-stepping feature may be selected from any one of the following settings: 1/1 (full step), 1/2 (micro-step), and 1/4 (micro step).
4. Through the use of 3-bit external signals, electric 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

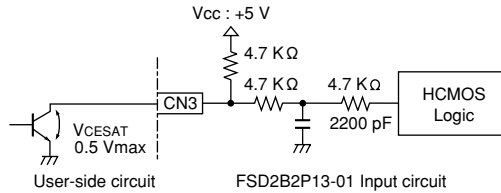
Power Supply Specifications

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)

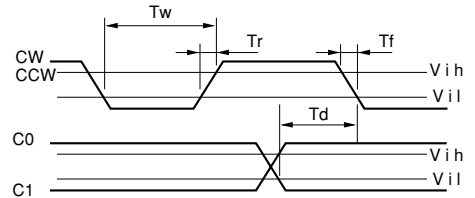
Input Circuit: C0, C1, C2, H-OFF, CW, CCW



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



Required Operating Environment Conditions

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

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 L H L H L L
6 (Blue)	C1	H H L L L H H L 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.steps.

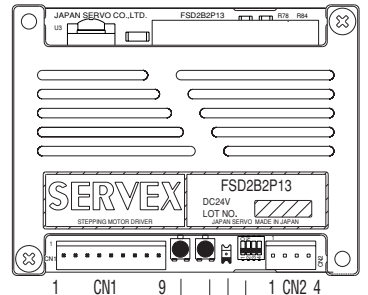
[Functions Setting Switch] On Name Plate Side

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
3	MS0		ON	OFF
4	MS1		ON	OFF

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

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	HOLDING
CLK/DIR		LOW	CW
		HIGH	CCW
	HIGH	X	HOLDING



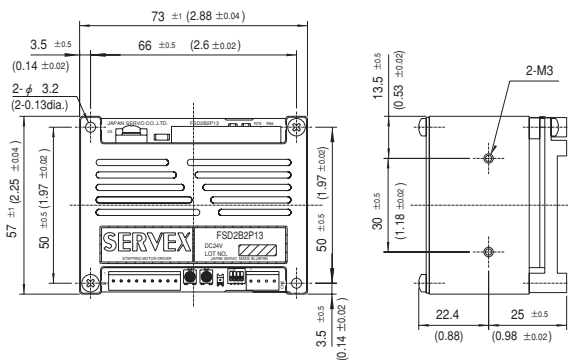
Please do not turn the trimmers.

Power Supply Input Display LED

[CN2 Motor connector]

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

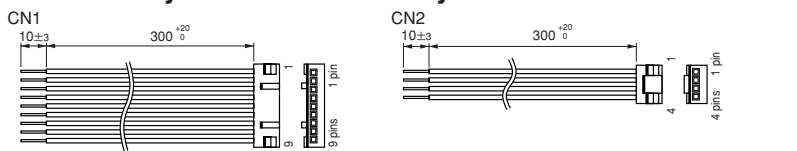
Dimensions Unit: mm (inch)



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





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WARNING

- Please do not exceed the specifications noted in this catalogue, otherwise there is a chance of electric shock, injury, or other damage.
- Any modifications made to this motor are beyond the limits of our guarantee. Japan Servo cannot take responsibility for any customer modifications.
- Please ensure that a thorough evaluation has been done before using this motor in medical equipment or other devices related to human lives.
- Please ensure that a thorough evaluation has been done before using this motor in applications that have a serious effect on the public.

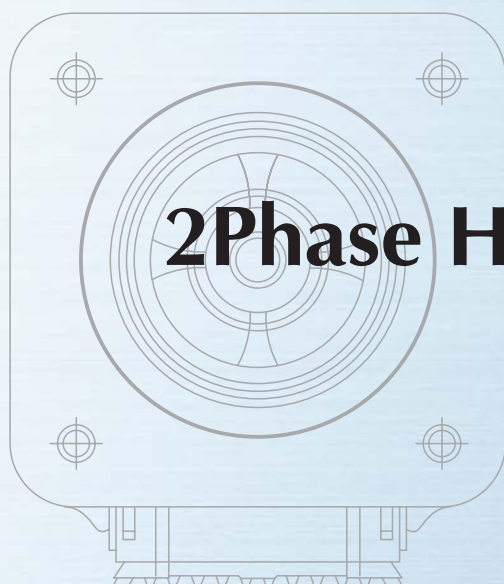
NOTE

- Figures in this catalogue are average measured values. Please request the product delivery specification when preparing a purchase specification.
- The dimensions, specifications, and components contained in this catalogue are subject to change without prior notice due to further product improvements.

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SERVO

All for dreams



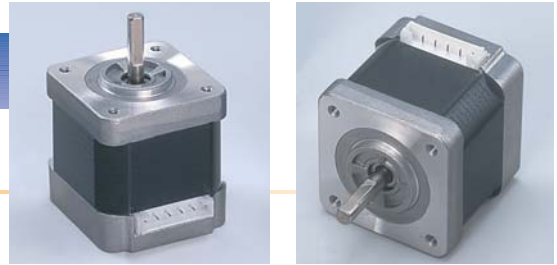
2Phase Hybrid Stepping Motors & Drivers

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

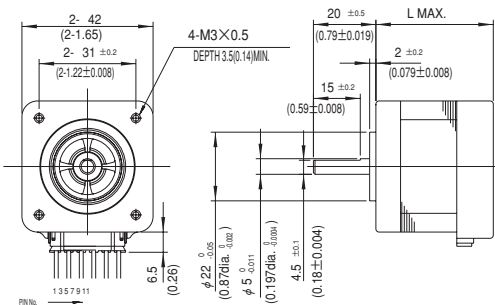
Unipolar

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·cm ²	OZ·in ²
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·cm ²	OZ·in ²
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

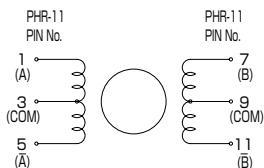
Note
 Conformable Housing: PHR-11 (JST)
 Conformable Contact: SPH-002T-P0.5S (JST)
The standard B900 motor is supplied without a leadwire assembly.
This must be ordered as a separate part.

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 °C ~ +50 °C
Storage Temp. Range	-20 °C ~ +70 °C
Humidity Range in Operation and Storage	5% ~ 95% RH (noncondensing)

Connection Diagrams

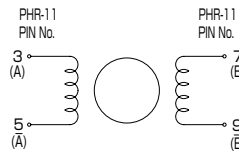
Unipolar



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	A			-	
11	B				-
3	A com	+	+	+	+
9	B com	+	+	+	+

Bipolar



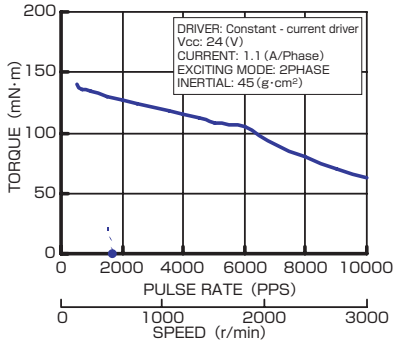
CW viewed from rotor shaft when using the following sequence diagram.

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

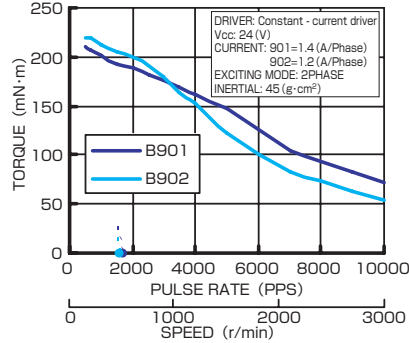
Speed-Torque Characteristics

Unipolar

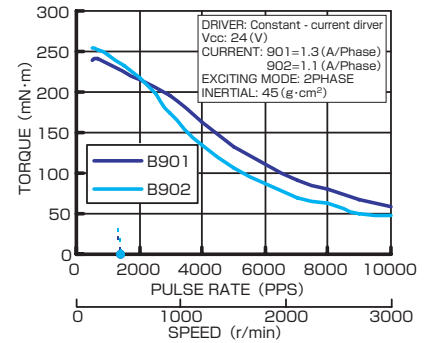
KH4234-B901 □□



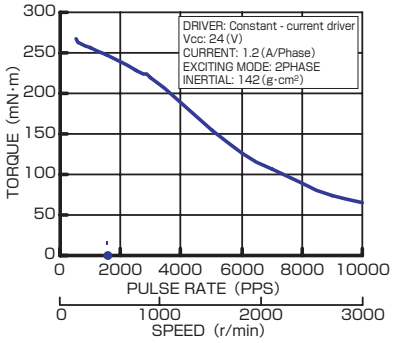
KH4238-B901 □□/ **B902** □□



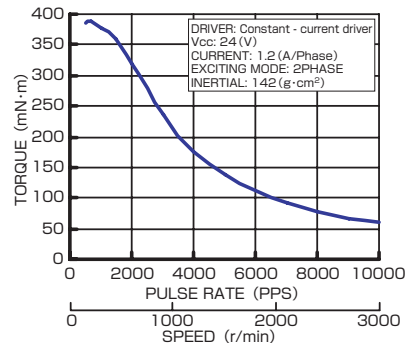
KH4242-B901 □□/ **B902** □□



KH4248-B901 □□

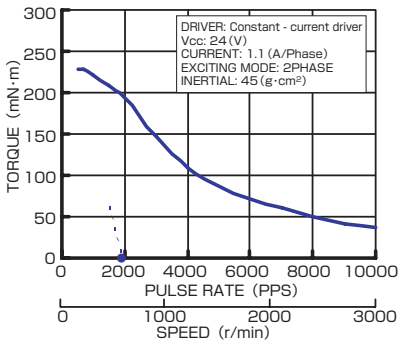


KH4254-B901 □□

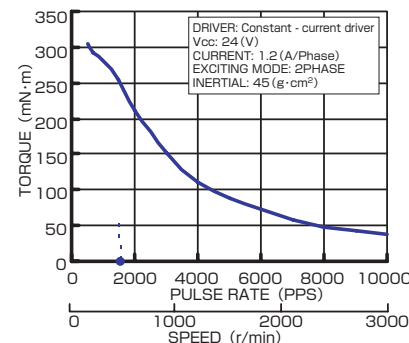


Bipolar

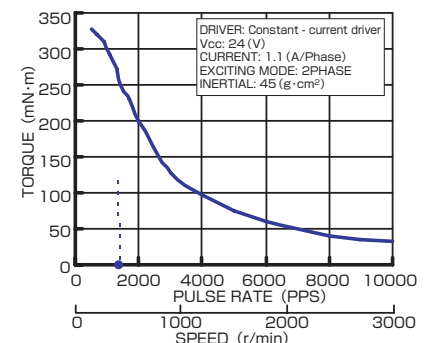
KH4234-B951 □□



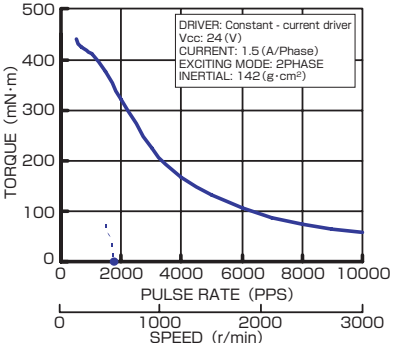
KH4238-B951 □□



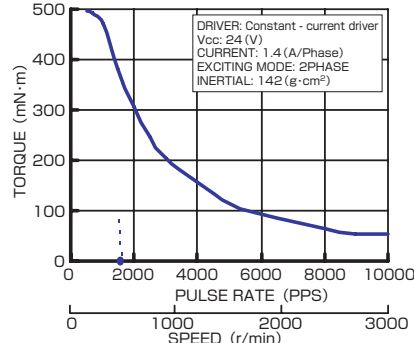
KH4242-B951 □□



KH4248-B951 □□



KH4254-B951 □□



Semi Standard Models

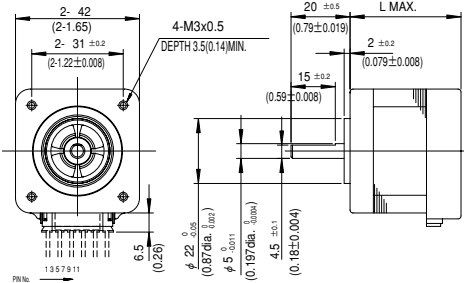
Unipolar

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	38	1.50	16	0.63	Double shaft
KH4238-B90102			24	0.95	Single shaft
KH4238-B90103			16	0.63	Single shaft
KH4238-B90111			20	0.79	Double shaft
KH4238-B90112	38	1.50	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	42	1.65	20	0.79	Double shaft
KH4238-B90212			24	0.95	Double shaft
KH4238-B90213			16	0.63	Double shaft
KH4242-B90102			24	0.95	Single shaft
KH4242-B90103	42	1.65	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	42	1.65	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	48	1.89	16	0.63	Double shaft
KH4248-B90102			24	0.95	Single shaft
KH4248-B90103			16	0.63	Single shaft
KH4248-B90111			20	0.79	Double shaft
KH4248-B90112	48	1.89	24	0.95	Double shaft
KH4248-B90113			16	0.63	Double shaft
KH4254-B90102			24	0.95	Single shaft
KH4254-B90103			16	0.63	Single shaft
KH4254-B90111	54	2.13	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	38	1.50	16	0.63	Double shaft
KH4238-B95102			24	0.95	Single shaft
KH4238-B95103			16	0.63	Single shaft
KH4238-B95111			20	0.79	Double shaft
KH4238-B95112	38	1.50	24	0.95	Double shaft
KH4238-B95113			16	0.63	Double shaft
KH4242-B95102			24	0.95	Single shaft
KH4242-B95103			16	0.63	Single shaft
KH4242-B95111	42	1.65	20	0.79	Double shaft
KH4242-B95112			24	0.95	Double shaft
KH4242-B95113			16	0.63	Double shaft
KH4248-B95102			24	0.95	Single shaft
KH4248-B95103	48	1.89	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	54	2.13	16	0.63	Double shaft

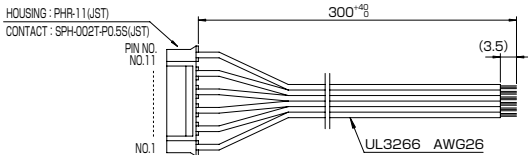
[Semi Standard Model Dimensions Unit: mm (inch)]



Note
 Conformable Housing:
 PHR-11 (JST)
 Conformable Contact:
 SPH-002T-PO.5S (JST)
The standard B900 motor is supplied without a leadwire assembly. This must be ordered as a separate part.

Option

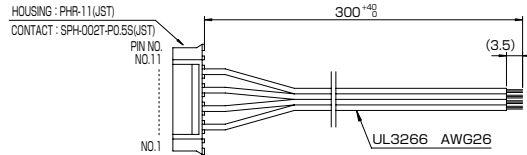
Leadwire Assembly KH42LUS300 (Unipolar)



PHR-11 (Pin No.)	1	3	5	7	9	11
Excitation (PHASE)	A	A com	A	B	B com	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)

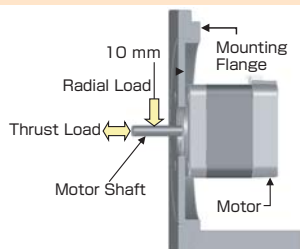


PHR-11 (Pin No.)	3	5	7	9
Excitation (PHASE)	A	A	B	B
Cable Color	Red	Blue	Yellow	White

Max. Allowable Load/Runout For Motor Shaft

Load For Motor Shaft

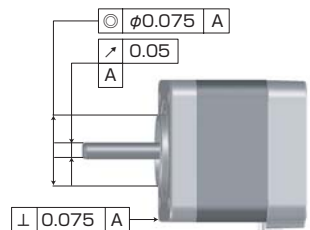
Type	Thrust Load	Radial Load
		Load
KA50	14.7 N (1.5 kgf) (3.3 lb)	19.6 N (2.0 kgf) (4.4 lb)



Shaft Runout

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

※ T.I.R. (Total Indicator Reading)



Stepping Motor & Driver

2-Phase Hybrid Stepping Motor Driver

FSD2U2P14-01



Features

- Ultra-compact driver measuring a mere 2.2 x 2.9 x 1.7 inches.
- Uni-polar constant current driver.
- 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).
- 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.
- Input commands may be selected from either direction-of-rotation separate serial pulse signals or a combination of directional signals and pulse signals.

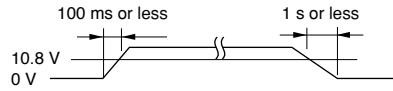
Applicable Motor

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

Power Supply Specifications

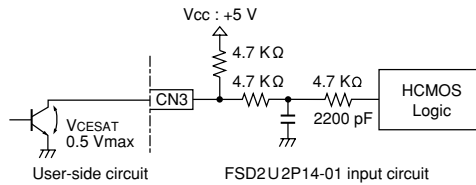
Motor Power Supply Voltage (VM): 10.8 V ~ 33.0 V

Set up time



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

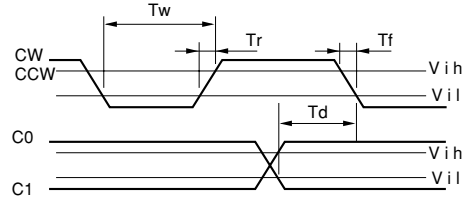
Input Circuit: C0, C1, C2, H-OFF, CW, CCW



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



Required Operating Environment Conditions

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

Functions, Setting and Connections

[CN1 Input Signal Connector]

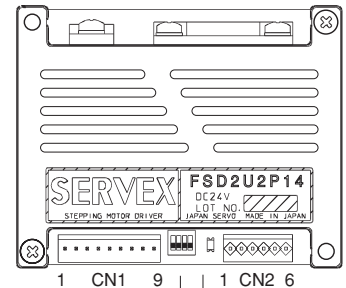
Terminal No.	Signal Name	Function
1 (Red)	VM	Motor power supply (to be connected to 12-30 V power supply)
2 (Black)	P.GND	Motor power supply ground (GND)
3 (Orange)	CW (Note 1)	CW directional drive pulse and serial pulse signal input
4 (Yellow)	CCW (Note 1)	CCW directional drive pulse and direction-of-rotation 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 L L H L H L
6 (Blue)	C1	H L H L L L H L H 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.

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
CLK/DIR		LOW	CW
		HIGH	CCW
	HIGH	X	HOLDING



[Functions Setting Switch] On Name Plate Side

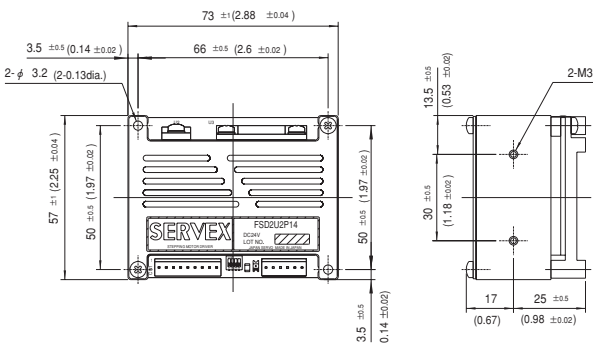
Switch No.	Name	Function	Switch Settings		
			OFF	ON	
1	SEL	Drive Pulse Format	CW/CCW	CLK/DIR	
2	SAVE (Note 3)	Automatic Power Saving	Saving	Not Saving	
			Division of Step Angle	1/2	1/1
3	MS0	ON	OFF	ON	OFF
4	MS1	ON	ON	OFF	OFF

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)	\bar{A}	To Motor Phase \bar{A}
4 (Green)	B	To Motor Phase B
5 (White)	B.COM	To Motor Phase B Common Line
6 (White/Green)	\bar{B}	To Motor Phase \bar{B}

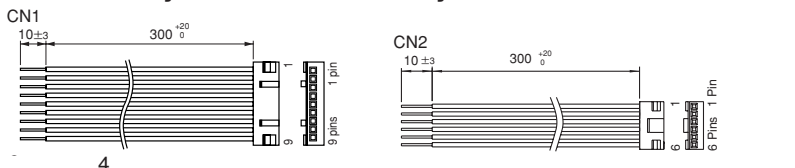
Dimensions Unit: mm (inch)



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



Stepping Motor & Driver

2-Phase Hybrid Stepping Motor Driver

FSD2U3P13-01



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.

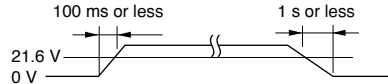
Applicable Motor

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

Power Supply Specifications

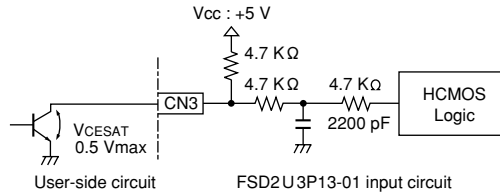
Motor Power Supply Voltage (VM): 21.6 V~26.4 V

Set up time



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

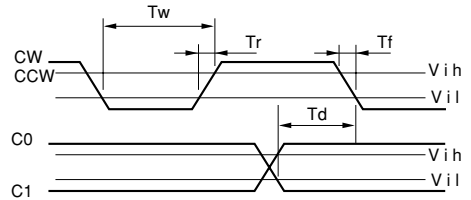
Input Circuit: C0, C1, C2, H-OFF, CW, CCW



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



Required Operating Environment Conditions

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

Functions, Setting and Connections

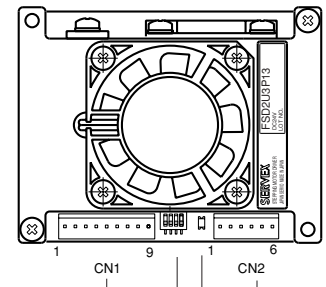
[CN1 Input Signal Connector]

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 L H L H L L
6 (Blue)	C1	H H L L L H H L 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.

Table.1 Input Signal and Motor Direction Relation

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



Power Supply Input Display LED

[Functions Setting Switch] On Name Plate Side

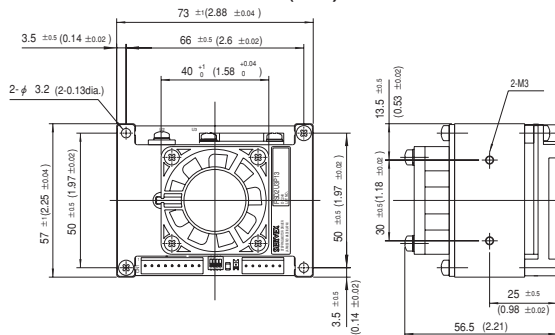
Switch No.	Name	Function	Switch Settings	
			OFF	ON
1	SEL	Drive Pulse Format	CW/CCW	CLK/DIR
2	SAVE (Note 3)	Automatic Power Saving	Saving	Not Saving
			Division of Step Angle	1/2
3	MS0	ON OFF	ON	OFF
4	MS1	ON ON	OFF	OFF

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)	Ā	To Motor Phase Ā
4 (Green)	B	To Motor Phase B
5 (White)	B.COM	To Motor Phase B Common Line
6 (White/Green)	B̄	To Motor Phase B̄

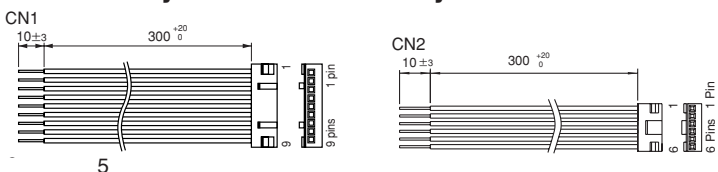
Dimensions Unit: mm (inch)



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



Stepping Motor & Driver

2-Phase Hybrid Stepping Motor Driver

FSD2B2P13-01



Features

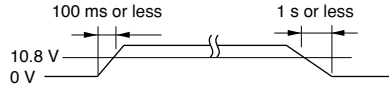
1. Ultra-compact driver measuring a mere 2.2 x 2.9 x 1.86 inches.
2. Bi-polar constant current driver.
3. The micro-stepping feature may be selected from any one of the following settings: 1/1 (full step), 1/2 (micro-step), and 1/4 (micro step).
4. Through the use of 3-bit external signals, electric 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

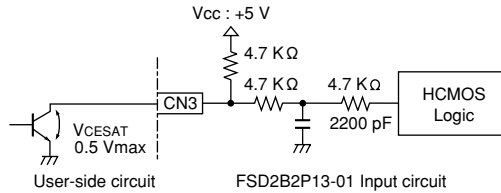
Power Supply Specifications

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)

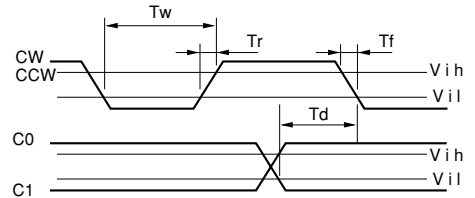
Input Circuit: C0, C1, C2, H-OFF, CW, CCW



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



Required Operating Environment Conditions

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

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 L H L H L L
6 (Blue)	C1	H H L L L H H L 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.steps.

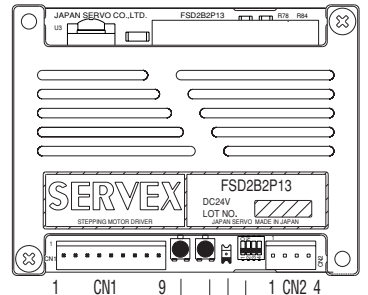
[Functions Setting Switch] On Name Plate Side

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
3	MS0		ON	OFF
4	MS1		ON	OFF

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

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	HOLDING
CLK/DIR		LOW	CW
		HIGH	CCW
	HIGH	X	HOLDING



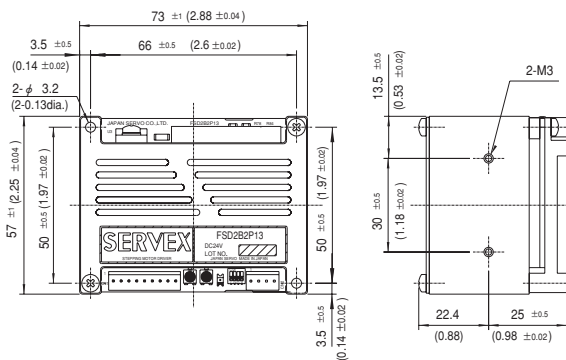
Please do not turn the trimmers.

Power Supply Input Display LED

[CN2 Motor connector]

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

