HYBRID STEPPING MOTORS & DRIVERS

2 Phase KH Series(800Type)
3 Phase TRISYN KT/KR Series

JAPAN SERVO

CONTENTS

■ 2 – PHASE STEPPING MOTORS

1 .Unipolar type Stepping angle = 1.8 deg./step Vcc = 24 V

Standard size				Holding Torque		Winding Resistance	Current	Voltage	Inductance	Model	Driver	Page
mm		inch		mN·m	oz·in	Ω/phase	A/phase	V	mH/phase			
39 sq.x	20.8	1.54 sq.x	0.82	59	8.3	14	0.4	5.6	6.4	KH39EM2-801	●	4
	27		1.06	88	13.0	15	0.42	6.3	8.5	KH39FM2-801	●	6
	31		1.22	127	18.0	13.6	0.47	6.4	9.8	KH39GM2-801	●	8
42 sq.x	34	1.65 sq.x	1.34	140	20	3.4	0.9	3.06	2.4	KH42HM2-901,911	●	10
						9.6	0.58	5.57	6.0	-902,912	-	
						14.7	0.46	6.76	9.3	-903,913	-	
	40		1.58	236	33	2.85	1.2	3.42	2.5	KH42JM2-901,911	●	12
						5.5	0.88	4.4	5.1	-902,912	-	
						18.5	0.5	9.25	16.3	-903,913	-	
	50		1.97	340	48	3.1	1.2	3.72	3.1	KH42KM2-901,911	●	14
56 sq.x	42	2.2 sq.x	1.65	422	60	0.58	3.0	1.74	0.61	KH56JM2-901,911	-	16
						1.39	2.0	2.78	1.8	-902,912	●	
						4.9	1.0	4.9	6.68	-903,913	-	
	54		2.13	834	118	0.77	3.0	2.3	1.04	KH56KM2-901,911	-	18
						1.79	2.0	3.6	1.7	-902,912	●	
						6.71	1.0	6.71	9.36	-903,913	-	
	76		2.99	1324	187	1.18	3.0	3.54	2.4	KH56QM2-901,911	-	20
						2.73	2.0	5.46	5.4	-902,912	●	
						9.9	1.0	9.9	21.6	-903,913	-	

Note; Driver model FSD2U2P12-01 is applicable to the motors with ●.

2 .Bipolar type Stepping angle = 1.8 deg./step Vcc = 24 V

Standard size				Holding Torque		Winding Resistance	Current	Voltage	Inductance	Model	Driver	Page
mm		inch		mN·m	oz·in	Ω/phase	A/phase	V	mH/phase			
39 sq.x	20.8	1.54 sq.x	0.82	78	11	6.0	0.6	3.6	5.5	KH39EM2-851	●	4
	27		1.06	118	17	6.0	0.67	4.0	6.8	KH39FM2-851	●	6
	31		1.22	157	22	7.0	0.65	4.6	9.8	KH39GM2-851	●	8
42 sq.x	34	1.65 sq.x	1.34	197	28	3.1	1.0	3.1	4.3	KH42HM2-951,961	●	10
	40		1.58	314	44	5.4	0.85	4.59	9.3	KH42JM2-951,961	●	12
	50		1.97	403	57	2.3	1.2	2.76	4.0	KH42KM2-951,961	●	14
56 sq.x	42	2.2 sq.x	1.65	490	69	0.98	2.0	1.96	2.27	KH56JM2-951,961	●	16
	54		2.13	932	132	1.32	2.0	2.4	3.19	KH56KM2-951,961	●	18
	76		2.99	1373	194	2.0	2.0	4.0	7.35	KH56QM2-951,961	●	20

Note; Driver model FSD2B2P12-01 is applicable to the motors with ●.

■ 2 – Phase Driver

Applicable motors type	Standard size		Power supply	OUTPUT current A	Step angle	Model	Page
	mm	inch					
Uni-poler	57×73×42	2.25×2.88×1.65	12-30V DC	0.33-2.00	1/1, 1/2, 1/4	FSD2U2P12-01	22
Bi-poler	57×73×42	2.25×2.88×1.65	12-30V DC	0.41-2.00	1/1, 1/2, 1/4	FSD2B2P12-01	24

■ 3 – PHASE STEPPING MOTORS

1 .Low speed high torque type

Vcc = 24 V

Step angle deg./step	Standard size				Holding Torque		Winding Resistance	Current	Voltage	Inductance	Model	Driver			Page
	mm		inch		mN·m	oz·in	Ω/2phase	A/2phase	V	mH/2phase					
0.6	42 sq.x	21	1.65 sq.x	0.8	45	6.4	5.9	0.9	5.3	3.1	KT42EM06-551	●	#	&	30
		34		1.34	90	12.7	1.2	2.4	2.88	0.8	KT42HM06-551	●	#	&	
		40		1.58	180	25.5	1.3	2.4	3.12	1.3	KT42JM06-551	●	#	&	
		48		1.89	200	28.3	2.0	2.3	4.6	1.4	KT42KM06-551	●	#	&	
	60 sq.x	47	2.36 sq.x	1.85	300	42	0.55	3.8	2.09	1.0	KT60KM06-751	–	–	–	36
							1.6	2.2	3.52	3.1	-752	–	#	&	
					500	69	0.55	3.8	2.09	1.0	KT60KM06-551	–	–	–	
							1.6	2.2	3.52	3.0	-552	–	#	&	
		58		2.29	600	83	0.73	3.8	2.77	1.8	KT60LM06-751	–	–	–	38
							2.2	2.2	4.84	5.7	-752	–	#	&	
					900	125	0.73	3.8	2.77	1.7	KT60LM06-551	–	–	–	
							2.2	2.2	4.84	5.6	-552	–	#	&	
1.2	35 sq.x	28	1.38 sq.x	1.10	59	8.3	39.0	0.3	11.7	26.0	KT35FM1-552	●	#	&	28
	42 sq.x	21	1.65 sq.x	0.8	70	9.9	5.9	0.9	5.3	2.6	KT42EM1-551	●	#	&	32
		34		1.34	140	19.8	1.1	2.4	2.6	0.5	KT42HM1-551	●	#	&	
		40		1.58	210	29.7	1.2	2.4	2.88	0.8	KT42JM1-551	●	#	&	
		48		1.89	280	39.6	1.5	2.4	3.6	1.0	KT42KM1-551	●	#	&	
	60sq.x	47	2.36 sq.x	1.85	320	45.3	0.55	3.8	2.09	0.8	KT60KM1-551	–	–	–	40
		47		1.85	320	45.3	1.6	2.2	3.52	2.5	-552	●	#	&	
		58		2.29	600	85	0.73	3.8	2.77	1.0	KT60LM1-551	–	–	–	42
		58		2.29	600	85	2.2	2.2	4.84	3.3	-552	●	#	&	
	86 sq.x	61	3.38 sq.x	2.40	2000	278	1.8	3.0	5.4	18.0	KT86LM1-551	–	–	&	44
		95		3.74	4000	556	2.8	2.5	7.0	36.6	KT86SM1-551	–	#	&	
3.75	42 sq.x	20	1.65 sq.x	0.79	70	9.7	6.6	0.8	5.28	5.7	KT42EM4-551	●	#	&	34
		34		1.34	130	18	3.4	1.3	4.42	4.7	KT42HM4-551	●	#	&	
							8.8	0.8	7.04	12.3	-552	●	#	&	
		40		1.58	180	25	4.3	1.2	5.16	8.7	KT42JM4-551	●	#	&	
							11.0	0.8	8.8	22.0	-552	●	#	&	

Note-1; Driver model FTD3S2P11-01 is applicable to the motors with ●.
Note-2; Driver model FTD3S3P12-01 is applicable to the motors with #.
Note-3; Driver model FTD3S3P14 is applicable to the motors with &.

2 .High speed steady torque type

Vcc = 24 V

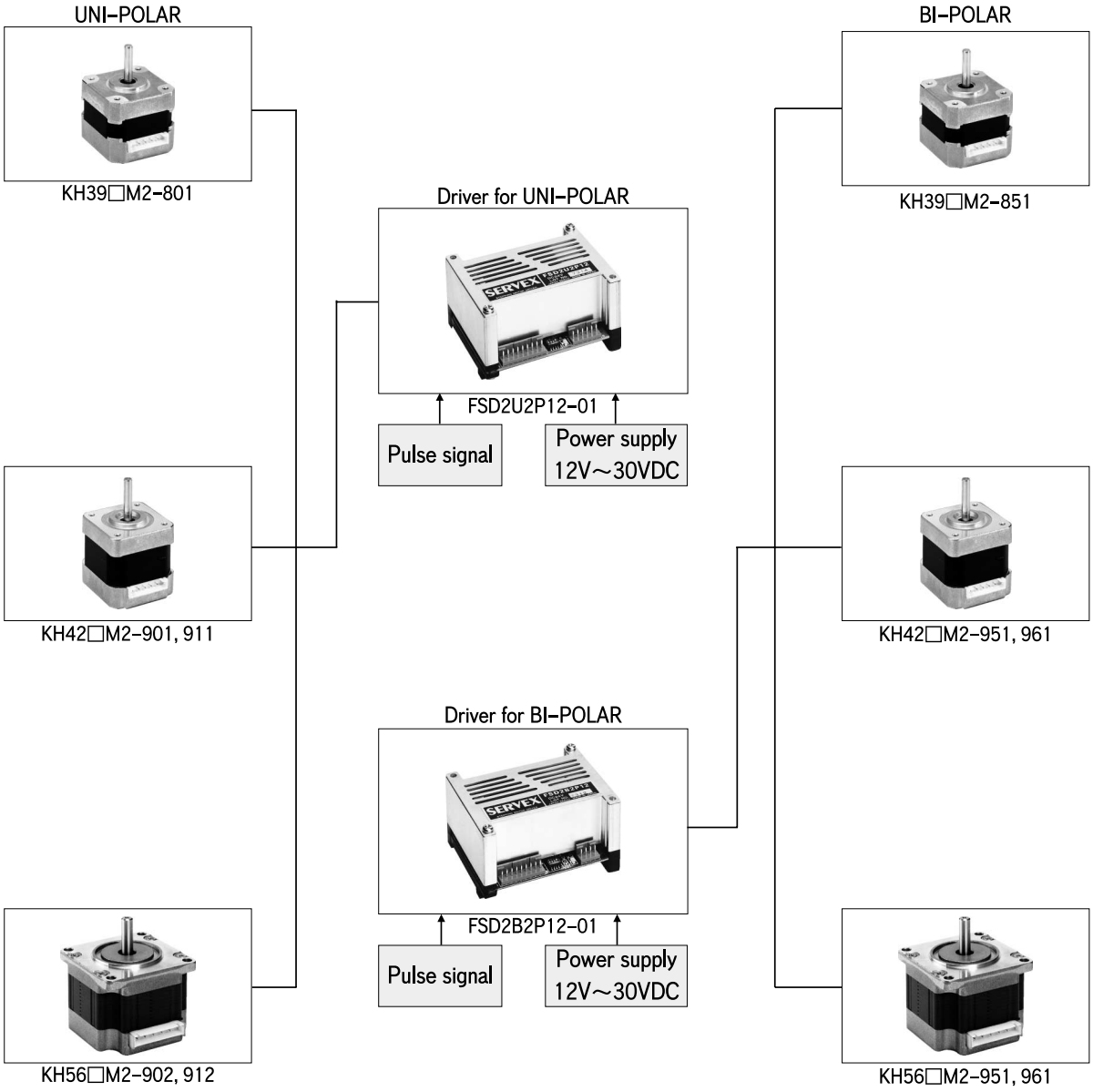
Step angle deg./step	Standard size				Holding Torque		Winding Resistance	Current	Voltage	Inductance	Model	Driver			Page
	mm		inch		mN·m	oz·in	Ω/2phase	A/2phase	V	mH/2phase					
3.75	42 sq.x	34	1.65 sq.x	1.34	49	6.9	1.4	2.0	2.8	1.7	KR42HM4-551	●	#	&	46
							3.4	1.3	4.42	4.0	-552	●	#	&	
		40		1.58	88	12.5	1.75	2.0	3.5	2.1	KR42JM4-551	●	#	&	48
							4.3	1.2	5.16	8.7	-552	●	#	&	
		48		1.89	118	16.7	1.4	2.5	3.5	1.7	KR42KM4-551	–	#	&	50
							5.0	1.3	6.5	7.7	-552	●	#	&	

Note-1; Driver model FTD3S2P11-01 is applicable to the motors with ●.
Note-2; Driver model FTD3S3P12-01 is applicable to the motors with #.
Note-3; Driver model FTD3S3P14 is applicable to the motors with &.

3 .Phase Driver

Standard size		Power supply	OUTPUT current A	Step angle	Model	Page
mm	inch					
57×73×42	2.25×2.88×1.65	12-36V DC	0.5-2.0	1/1, 1/2, 1/4, 1/8	FTD3S2P11-01	52
57×73×42	2.25×2.88×1.65	12-24V DC	0.55-3.0	1/1, 1/2	FTD3S3P12-01	54
70×134×35	2.76×5.28×1.38	22-39V DC 5 V DC	0.5-3.0	1/1, 1/2, 1/4, 1/8	FTD3S3P14-01	56

System Configuration



2–Phase Hybrid Stepping Motor 1.8°

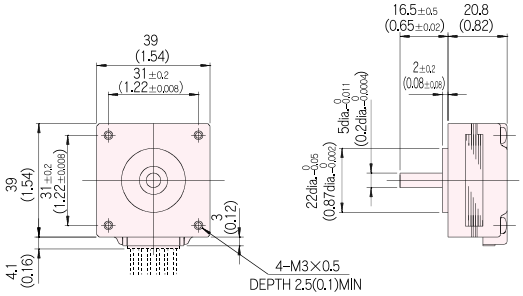
KH39 series 800 type

HIGH TORQUE, LOW VIBRATION AND LOW NOISE

■ STANDARD SPECIFICATIONS

M O D E L	UNIT	KH39EM2	
		–801	–851
SHAFT	————	SINGLE	
DRIVE METHOD	————	UNI–POLAR	BI–POLAR
NUMBER OF PHASES	————	2	2
STEP ANGLE	deg./step	1.8	1.8
VOLTAGE	V	5.6	3.6
CURRENT	A/PHASE	0.4	0.6
RESISTANCE	Ω/PHASE	14.0	6.0
INDUCTANCE	mH/PHASE	6.4	5.5
HOLDING TORQUE	mN·m	59	78
	oz · in	8.3	11
DETENT TORQUE	mN·m	7.9	7.9
	oz · in	1.1	1.1
ROTOR INERTIA	g · cm²	14	14
	oz · in²	0.08	0.08
WEIGHT	g	110	110
	lb	0.24	0.24
INSULATION CLASS	————	E EQUIVALENT (120℃ 248° F) (UL VALUE : CLASS B–130℃)	
INSULATION RESISTANCE	————	500VDC 100MΩ min.	
DIELECTRIC STRENGTH	————	500VAC 50HZ 1min.	
OPERATING TEMP.RANGE	℃	0 to 50	
ALLOWABLE TEMP.RISE	deg.	70	

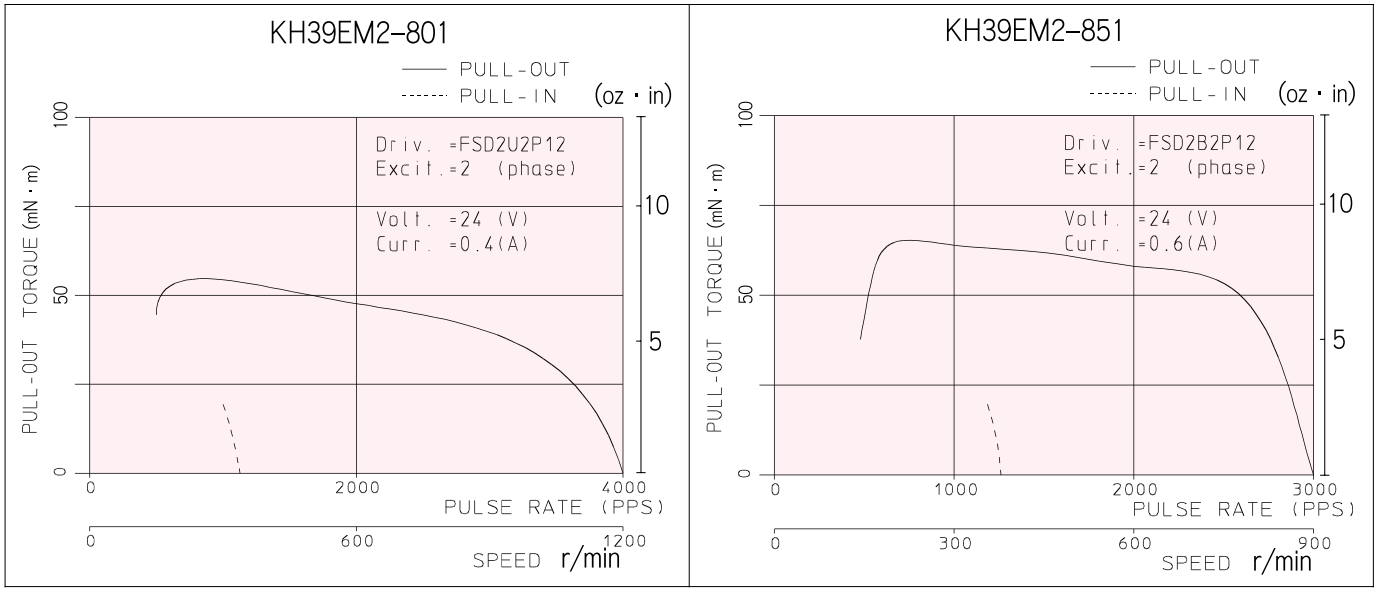
■ DIMENSIONS unit = mm (inch)



Features

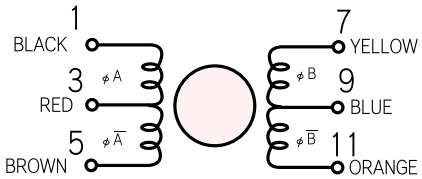
1. High torque
   Output is 1.3 times as high as conventional products.
2. Low noise −7dB(A)quieter than conventional products.

■ TORQUE CHARACTERISTICS VS PULSE RATE



■ CONNECTION DIAGRAMS

UNI−POLAR (801)

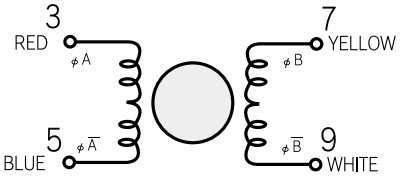


Excitation sequence

STEP	1	2	3	4
BLACK(1)	−			−
YELLOW(7)	−	−		
BROWN(5)		−	−	
ORANGE(11)			−	−
RED(3)	+	+	+	+
BLUE(9)	+	+	+	+

Rotation : CW

BI−POLAR (851)



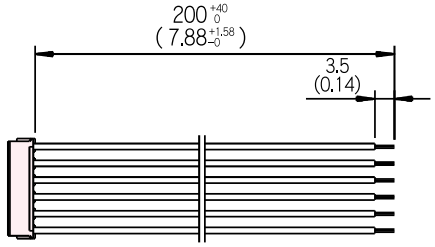
Excitation sequence

STEP	1	2	3	4
RED(3)	+	−	−	+
YELLOW(7)	+	+	−	−
BLUE(5)	−	+	+	−
WHITE(9)	−	−	+	+

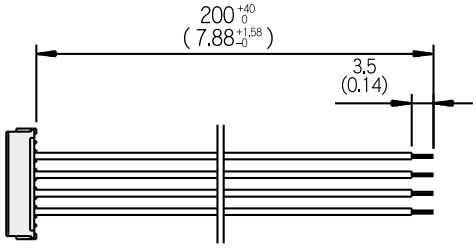
Rotation : CW

■ CONNECTION CABLE TO MOTOR unit=mm (inch)

UNI−POLAR



BI−POLAR



2–Phase Hybrid Stepping Motor 1.8°

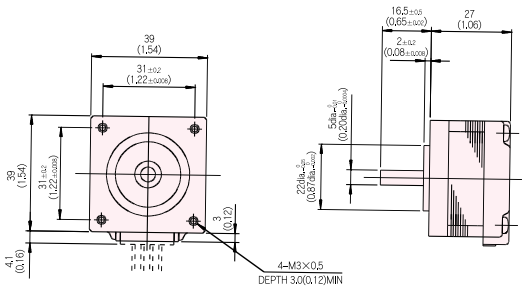
KH39 series 800 type

HIGH TORQUE, LOW VIBRATION AND LOW NOISE

■ STANDARD SPECIFICATIONS

M O D E L	UNIT	KH39FM2	
		–801	–851
DRIVE METHOD	————	UNI–POLAR	(BI–POLAR)
NUMBER OF PHASES	————	2	2
STEP ANGLE	deg./step	1.8	1.8
VOLTAGE	V	6.3	4
CURRENT	A/PHASE	0.42	0.67
RESISTANCE	Ω/PHASE	15.0	6.0
INDUCTANCE	mH/PHASE	8.5	6.8
HOLDING TORQUE	mN·m	88	118
	oz · in	13	17
DETENT TORQUE	mN·m	9.8	9.8
	oz · in	1.4	1.4
ROTOR INERTIA	g · cm^2	19	19
	oz · in^2	0.10	0.10
WEIGHT	g	160	160
	lb	0.35	0.35
INSULATION CLASS	————	**E** EQUIVALENT (120℃ 248° F) (UL VALUE : CLASS B–130℃)	
INSULATION RESISTANCE	————	500VDC 100MΩ min.	
DIELECTRIC STRENGTH	————	500VAC 50HZ 1min.	
OPERATING TEMP.RANGE	℃	0 to 50	
ALLOWABLE TEMP.RISE	deg.	70	

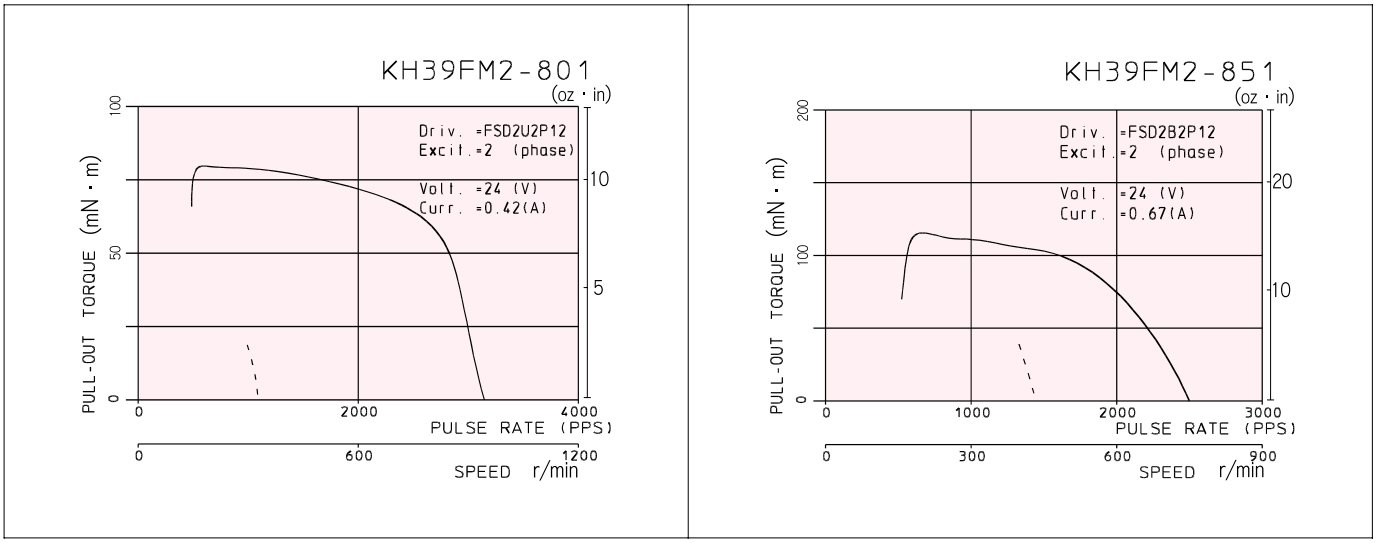
■ DIMENSIONS unit = mm (inch)



Features

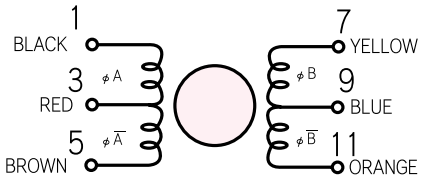
1. High torque
   Output is 1.3 times as high as conventional products.
2. Low noise –7dB(A)quieter than conventional products.

■ TORQUE CHARACTERISTICS vs. PULSE RATE



■ CONNECTION DIAGRAMS

UNI-POLAR (801)

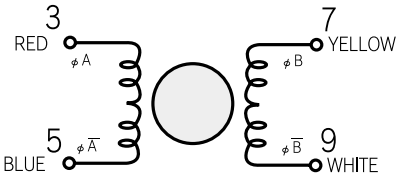


Excitation sequence

STEP	1	2	3	4
BLACK(1)	–			–
YELLOW(7)	–	–		
BROWN(5)		–	–	
ORANGE(11)			–	–
RED(3)	+	+	+	+
BLUE(9)	+	+	+	+

Rotation : CW

BI-POLAR (851)



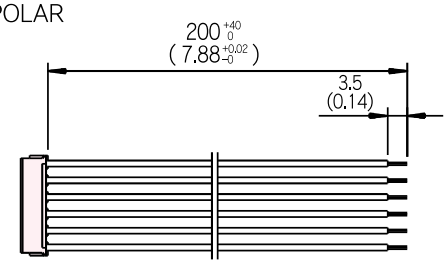
Excitation sequence

STEP	1	2	3	4
RED(3)	+	–	–	+
YELLOW(7)	+	+	–	–
BLUE(5)	–	+	+	–
WHITE(9)	–	–	+	+

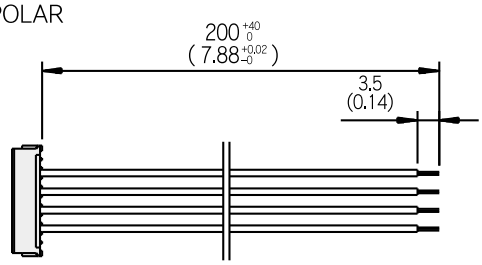
Rotation : CW

■ CONNECTION CABLE TO MOTOR unit = mm (inch)

UNI-POLAR



BI-POLAR



2–Phase Hybrid Stepping Motor 1.8°

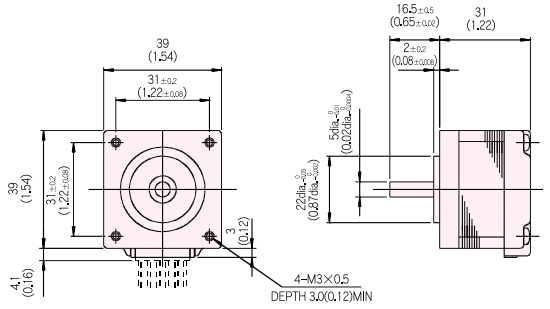
KH39 series 800 type

HIGH TORQUE, LOW VIBRATION AND LOW NOISE

■ STANDARD SPECIFICATIONS

M O D E L	UNIT	KH39GM2	
		–801	–851
DRIVE METHOD	————	UNI–POLAR	(BI–POLAR)
NUMBER OF PHASES	————	2	2
STEP ANGLE	deg./step	1.8	1.8
VOLTAGE	V	6.4	4.6
CURRENT	A/PHASE	0.47	0.65
RESISTANCE	Ω/PHASE	13.6	7.0
INDUCTANCE	mH/PHASE	9.8	9.8
HOLDING TORQUE	mN·m	127	157
	oz · in	18	22
DETENT TORQUE	mN·m	11.8	11.8
	oz · in	1.7	1.7
ROTOR INERTIA	g · cm^2	27	27
	oz · in^2	0.15	0.15
WEIGHT	g	240	240
	lb	0.53	0.53
INSULATION CLASS	————	E EQUIVALENT (120℃ 248° F) (UL VALUE : CLASS B–130℃)	
INSULATION RESISTANCE	————	500VDC 100MΩ min.	
DIELECTRIC STRENGTH	————	500VAC 50HZ 1min.	
OPERATING TEMP.RANGE	℃	0 to 50	
ALLOWABLE TEMP.RISE	deg.	70	

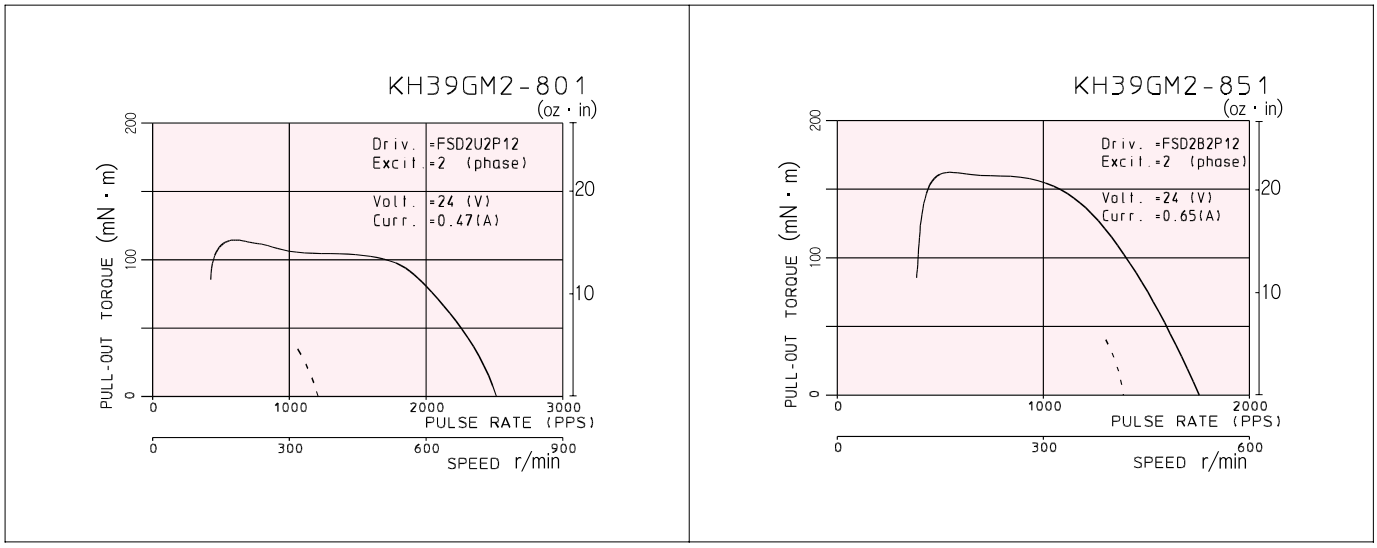
■ DIMENSIONS unit = mm (inch)



Features

1. High torque
   Output is 1.3 times as high as conventional products.
2. Low noise –7dB(A)quieter than conventional products.

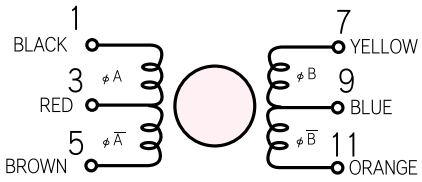
■ TORQUE CHARACTERISTICS vs. PULSE RATE



PULL–OUT
PULL–IN

■ CONNECTION DIAGRAMS

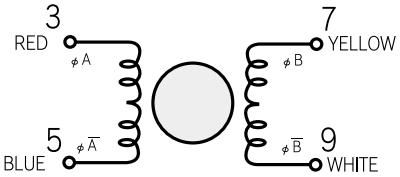
UNI–POLAR (801)



EXCITATION SEQUENCE

STEP	1	2	3	4
BLACK(1)	–			–
YELLOW(7)	–	–		
BROWN(5)		–	–	
ORANGE(11)			–	–
RED(3)	+	+	+	+
BLUE(9)	+	+	+	+

BI–POLAR (851)

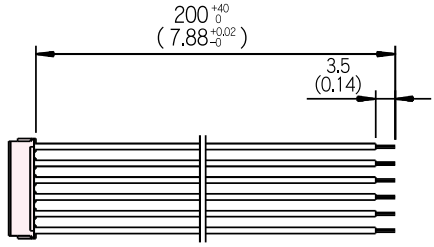


EXCITATION SEQUENCE

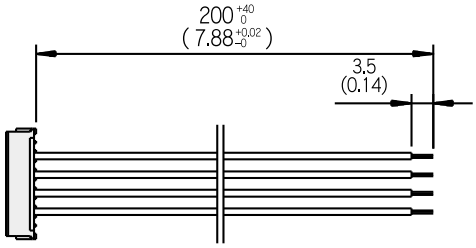
STEP	1	2	3	4
RED(3)	+	–	–	+
YELLOW(7)	+	+	–	–
BLUE(5)	–	+	+	–
WHITE(9)	–	–	+	+

■ CONNECTION CABLE TO MOTOR unit = mm (inch)

UNI–POLAR



BI–POLAR



2-Phase Hybrid Stepping Motor 1.8°

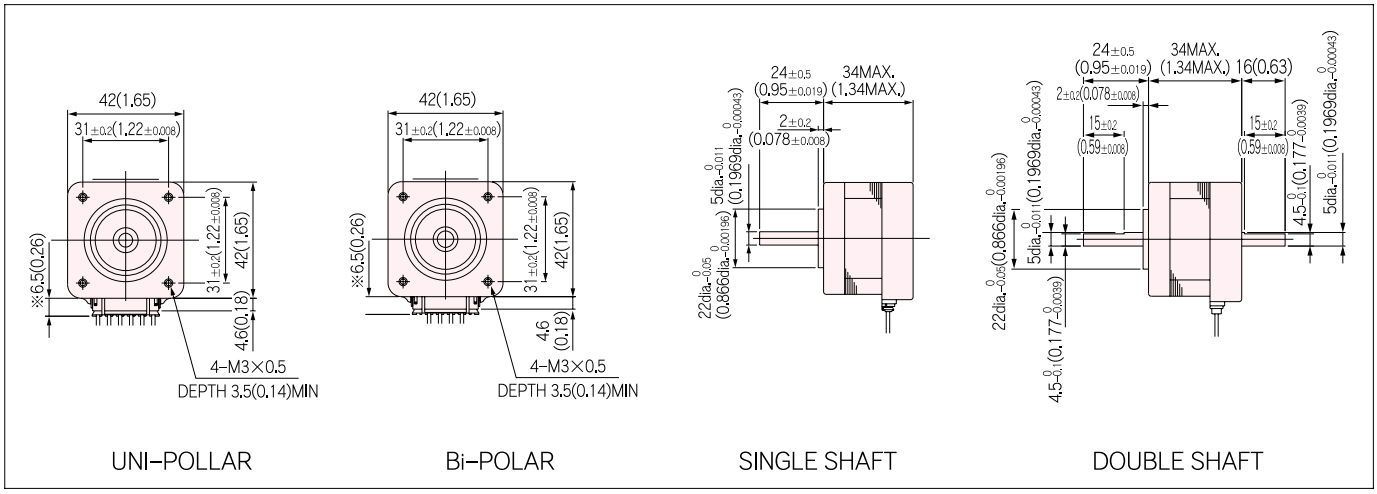
KH42 series 900 type

HIGH TORQUE, LOW VIBRATION AND LOW NOISE

■ STANDARD SPECIFICATIONS

MODEL		KH42HM2			
	SINGLE SHAFT	-901	-902	-903	-951
	DOUBLE SHAFT	-911	-912	-913	-961
DRIVE METHOD	———	UNI-POLAR			BI-POLAR
NUMBER OF PHASES	———	2			2
STEP ANGLE	deg./step	1.8			1.8
VOLTAGE	V	3.06	5.57	6.76	3.10
CURRENT	A/PHASE	0.9	0.58	0.46	1.0
WINDING RESISTANCE	Ω/PHASE	3.4	9.6	14.7	3.1
INDUCTANCE	mH/PHASE	2.4	6.0	9.3	4.3
HOLDING TORQUE	mN · m	140	140	140	197
	oz · in	20	20	20	20
DETENT TORQUE	mN · m	11.8	11.8	11.8	11.8
	oz · in	1.7	1.7	1.7	2.1
ROTOR INERTIA	g · cm²	38	38	38	38
	oz · in²	0.21	0.21	0.21	0.21
WEIGHTS	g	200	200	200	200
	lb	0.44	0.44	0.44	0.57
INSULATION CLASS	———	JIS Class E (120℃ 248° F) (UL VALUE : CLASS B-130℃ 266° F)			
INSULATION RESISTANCE	———	500VDC 100MΩ min.			
DIELECTRIC STRENGTH	———	500VAC 50HZ 1 min.			
OPERATING TEMP. RANGE	℃	0 to 50			
ALLOWABLE TEMP.RISE	deg.	70			

■ DIMENSIONS unit = mm (inch)



UNI-POLLAR Bi-POLAR SINGLE SHAFT DOUBLE SHAFT

Features

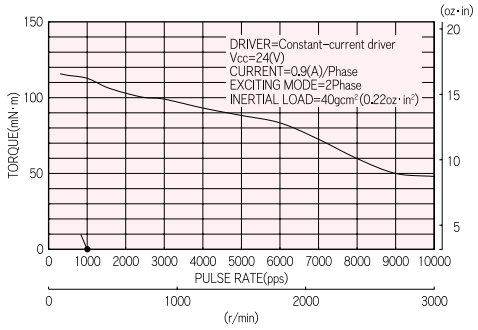
- Improved Dynamic Torque

  KH42HM2–901)
- Lowered Vibration & Noise Level
  (by increased stiffness of body construction)
- Improved Efficiency
  (1.1 times of our previous model, by high grade materials.)

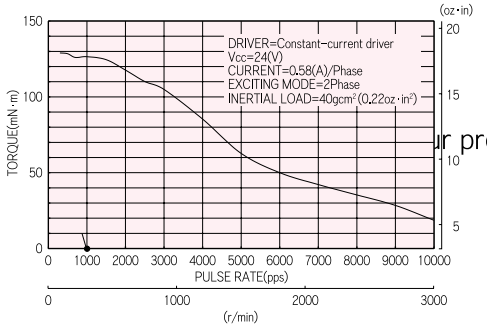
■ TORQUE CHARACTERISTICS vs. PULSE RATE

UNI–POLAR

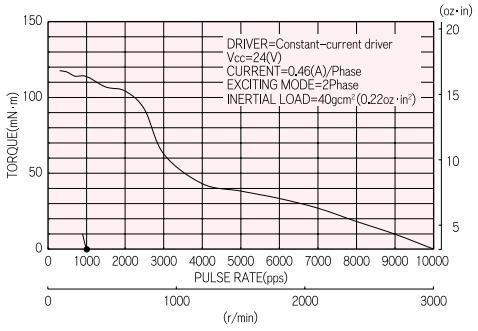
KH42HM2–901, 911



KH42HM2–902, 912

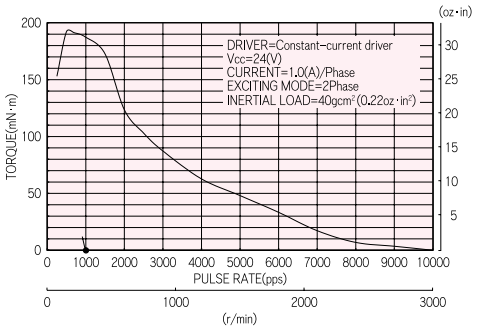


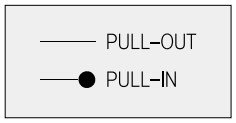
KH42HM2–903, 913



BI–POLAR

KH42HM2–951, 961

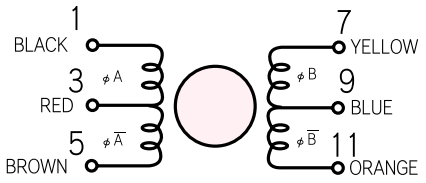




r previous model is generated at 300 r/min, on model :

■ CONNECTION DIAGRAMS

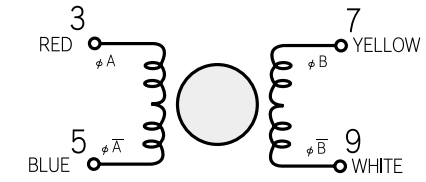
UNI–POLAR



EXCITATION SEQUENCE

STEP	1	2	3	4
BLACK(1)	–			–
YELLOW(7)	–	–		
BROWN(5)		–	–	
ORANGE(11)			–	–
RED(3)	+	+	+	+
BLUE(9)	+	+	+	+

BI–POLAR

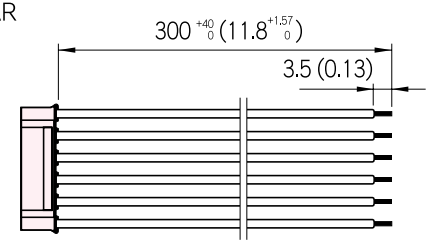


EXCITATION SEQUENCE

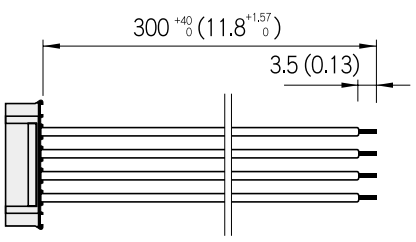
STEP	1	2	3	4
RED(3)	+	–	–	+
YELLOW(7)	+	+	–	–
BLUE(5)	–	+	+	–
WHITE(9)	–	–	+	+

■ CONNECTION CABLE TO MOTOR unit = mm (inch)

UNI–POLAR



BI–POLAR



2-Phase Hybrid Stepping Motor 1.8°

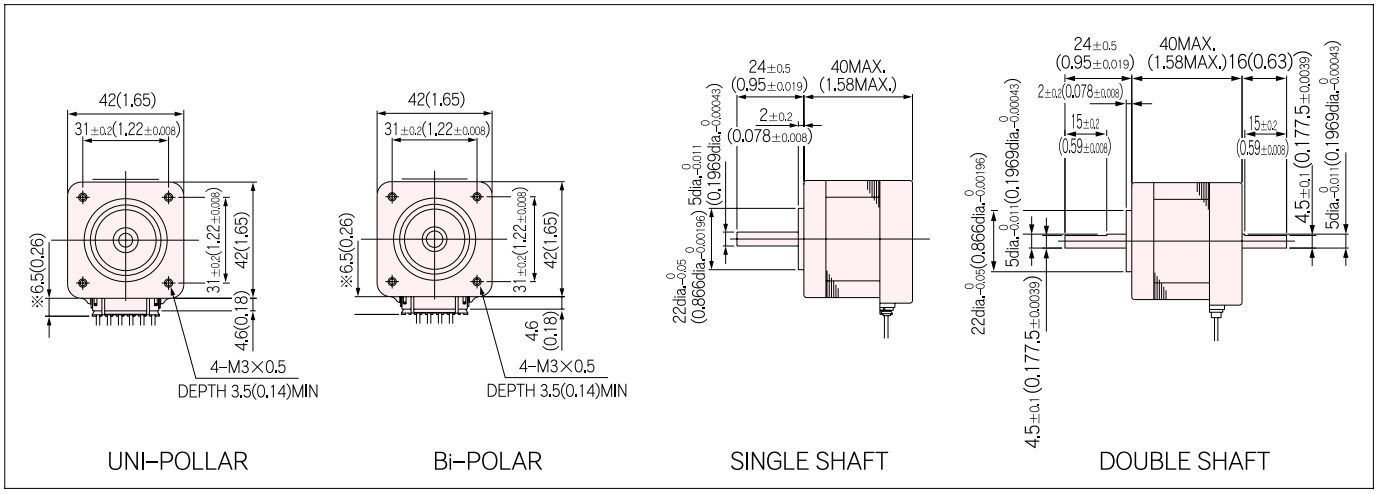
KH42 series 900 type

HIGH TORQUE, LOW VIBRATION AND LOW NOISE

■ STANDARD SPECIFICATIONS

MODEL		KH42JM2			
	SINGLE SHAFT	-901	-902	-903	-951
	DOUBLE SHAFT	-911	-912	-913	-961
DRIVE METHOD	———	UNI-POLAR			BI-POLAR
NUMBER OF PHASES	———	2			2
STEP ANGLE	deg./step	1.8			1.8
VOLTAGE	V	3.42	4.4	9.25	4.59
CURRENT	A/PHASE	1.2	0.88	0.5	0.85
WINDING RESISTANCE	Ω/PHASE	2.85	5.5	18.5	5.4
INDUCTANCE	mH/PHASE	2.5	5.1	16.3	9.3
HOLDING TORQUE	mN · m	236	236	236	314
	oz · in	33	33	33	44
DETENT TORQUE	mN · m	14.7	14.7	14.7	14.7
	oz · in	2.1	2.1	2.1	2.1
ROTOR INERTIA	g · cm^2	56	56	56	56
	oz · in^2	0.3	0.3	0.3	0.3
WEIGHTS	g	260	260	260	260
	lb	0.57	0.57	0.57	0.57
INSULATION CLASS	———	JIS Class E (120℃ 248° F) (UL VALUE : CLASS B-130℃ 266° F)			
INSULATION RESISTANCE	———	500VDC 100MΩmin.			
DIELECTRIC STRENGTH	———	500VAC 50HZ 1min.			
OPERATING TEMP. RANGE	℃	0 to 50			
ALLOWABLE TEMP. RISE	deg.	70			

■ DIMENSIONS unit = mm (inch)



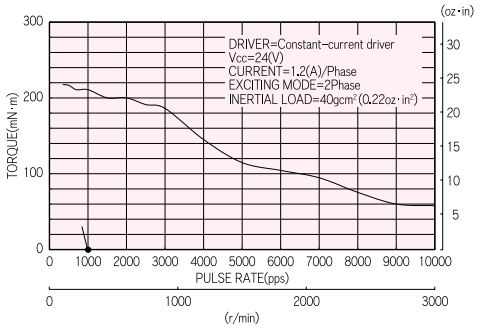
Features

- Improved Dynamic Torque
  (1.2 times torque of our previous model is generated at 300 r/min, on model : KH42HM2–901)
- Lowered Vibration & Noise Level
  (by increased stiffness of body construction)
- Improved Efficiency
  (1.1 times of our previous model, by high grade materials.)

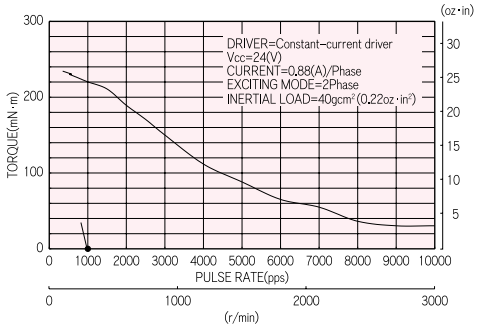
■ TORQUE CHARACTERISTICS vs. PULSE RATE

UNI–POLAR

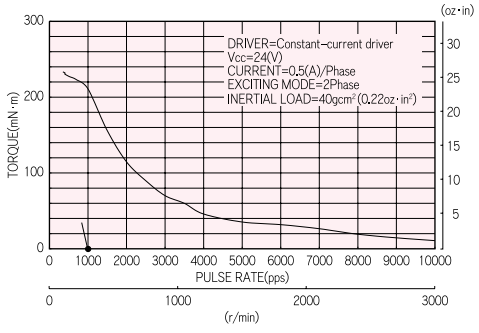
KH42JM2–901, 911



KH42JM2–902, 912

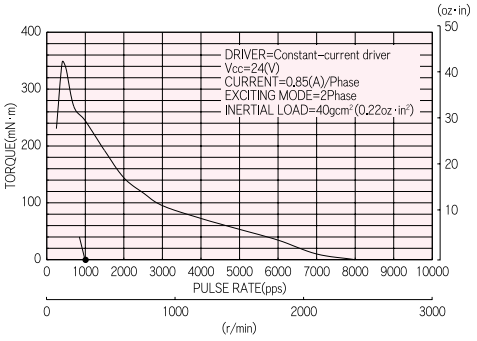


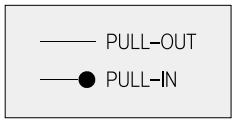
KH42JM2–903, 913



BI–POLAR

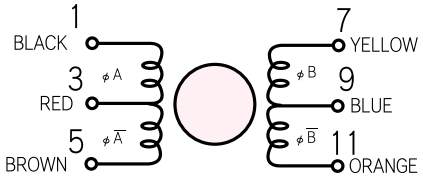
KH42JM2–951, 961





■ CONNECTION DIAGRAMS

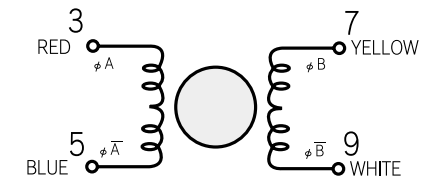
UNI–POLAR



EXCITATION SEQUENCE

STEP	1	2	3	4
BLACK(1)	–			–
YELLOW(7)	–	–		
BROWN(5)		–	–	
ORANGE(11)			–	–
RED(3)	+	+	+	+
BLUE(9)	+	+	+	+

BI–POLAR

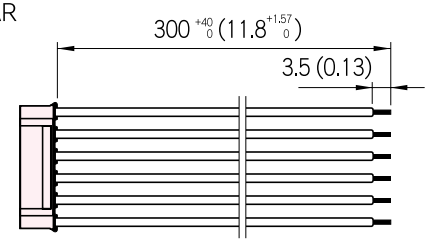


EXCITATION SEQUENCE

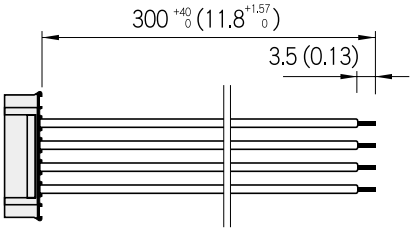
STEP	1	2	3	4
RED(3)	+	–	–	+
YELLOW(7)	+	+	–	–
BLUE(5)	–	+	+	–
WHITE(9)	–	–	+	+

■ CONNECTION CABLE TO MOTOR unit = mm (inch)

UNI–POLAR



BI–POLAR



2-Phase Hybrid Stepping Motor 1.8°

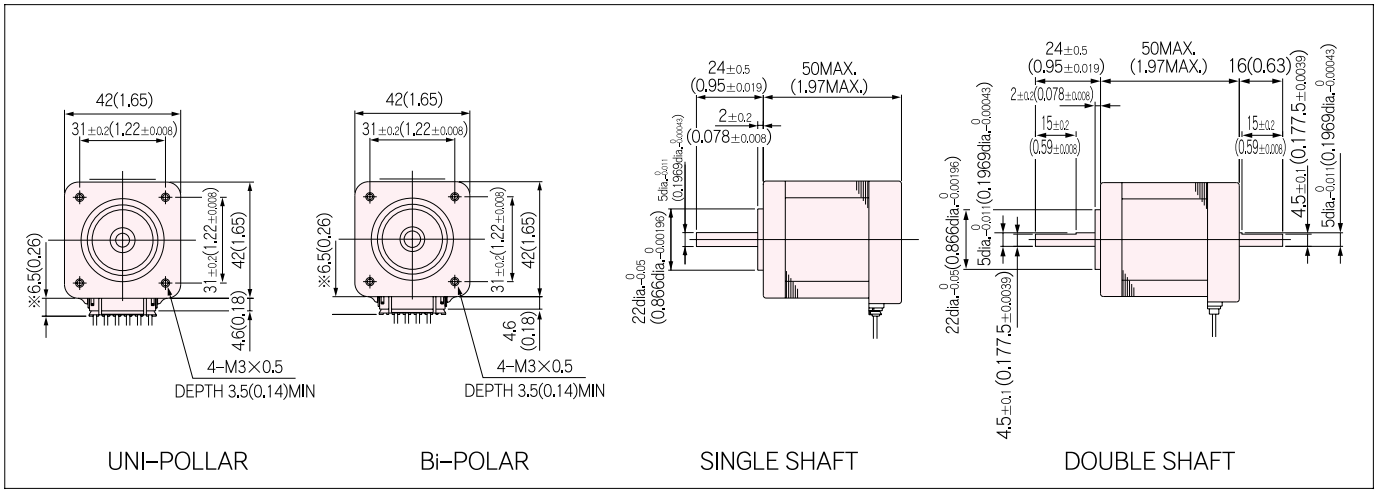
KH42 series 900 type

HIGH TORQUE, LOW VIBRATION AND LOW NOISE

■ STANDARD SPECIFICATIONS

MODEL		KH42KM2	
	SINGLE SHAFT	-901	-951
	DOUBLE SHAFT	-911	-961
DRIVE METHOD	———	UNI-POLAR	BI-POLAR
NUMBER OF PHASES	———	2	2
STEP ANGLE	deg./step	1.8	1.8
VOLTAGE	V	3.72	2.76
CURRENT	A/PHASE	1.2	1.2
WINDING RESISTANCE	Ω/PHASE	3.1	2.3
INDUCTANCE	mH/PHASE	3.1	4.0
HOLDING TORQUE	mN · m	340	403
	oz · in	48	57
DETENT TORQUE	mN · m	19.6	19.6
	oz · in	2.8	2.8
ROTOR INERTIA	g · cm²	85	85
	oz · in²	0.46	0.46
WEIGHTS	g	360	360
	lb	0.79	0.79
INSULATION CLASS	———	JIS Class E (120℃ 248° F) (UL VALUE : CLASS B-130℃ 266° F)	
INSULATION RESISTANCE	———	500VDC 100MΩmin.	
DIELECTRIC STRENGTH	———	500VAC 50HZ 1min.	
OPERATING TEMP. RANGE	℃	0 to 50	
ALLOWABLE TEMP. RISE	deg.	70	

■ DIMENSIONS unit = mm (inch)



UNI-POLLAR Bi-POLAR SINGLE SHAFT DOUBLE SHAFT

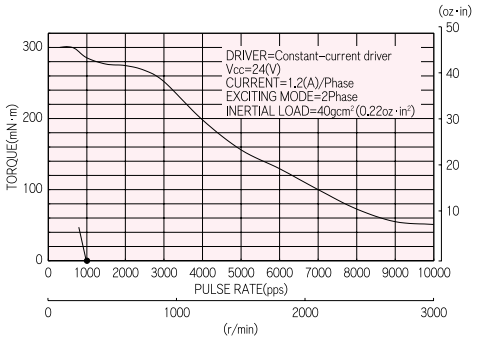
Features

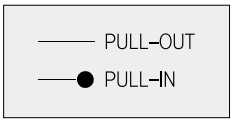
- Improved Dynamic Torque
  (1.2 times torque of our previous model is generated at 300 r/min, on model : KH42HM2–901)
- Lowered Vibration & Noise Level
  (by increased stiffness of body construction)
- Improved Efficiency
  (1.1 times of our previous model, by high grade materials.)

■ TORQUE CHARACTERISTICS vs. PULSE RATE

UNI–POLAR

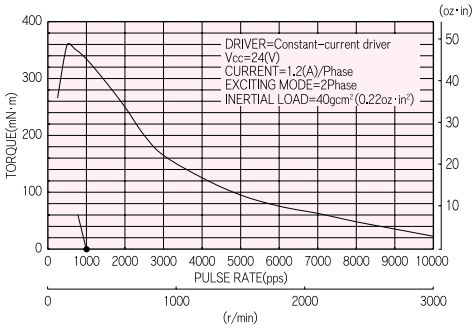
KH42KM2–901, 911





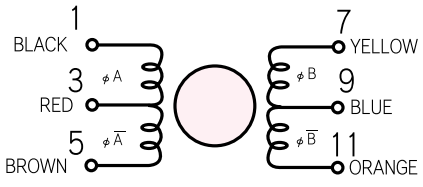
BI–POLAR

KH42KM2–951, 961



■ CONNECTION DIAGRAMS

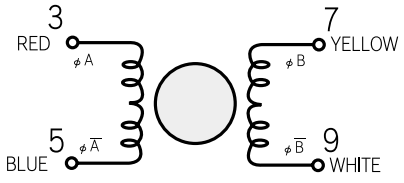
UNI–POLAR



EXCITATION SEQUENCE

STEP	1	2	3	4
BLACK(1)	–			–
YELLOW(7)	–	–		
BROWN(5)		–	–	
ORANGE(11)			–	–
RED(3)	+	+	+	+
BLUE(9)	+	+	+	+

BI–POLAR

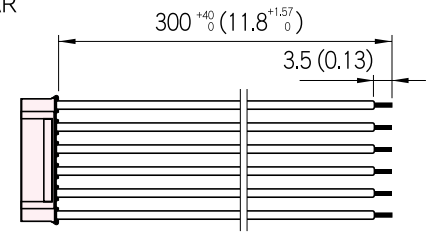


EXCITATION SEQUENCE

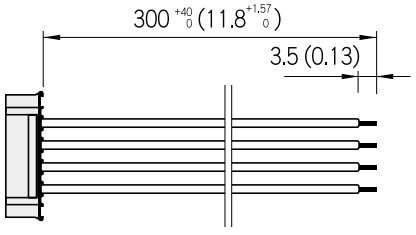
STEP	1	2	3	4
RED(3)	+	–	–	+
YELLOW(7)	+	+	–	–
BLUE(5)	–	+	+	–
WHITE(9)	–	–	+	+

■ CONNECTION CABLE TO MOTOR unit = mm (inch)

UNI–POLAR



BI–POLAR



2-Phase Hybrid Stepping Motor 1.8°

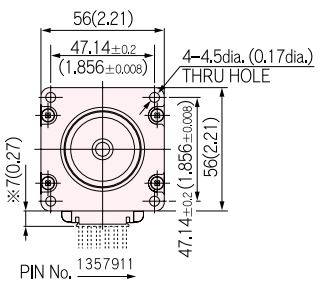
KH56 series 900 type

HIGH TORQUE, LOW VIBRATION AND LOW NOISE

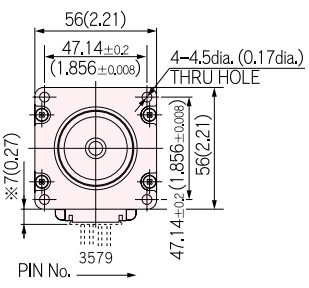
■ STANDARD SPECIFICATIONS

MODEL		KH56JM2			
	SINGLE SHAFT	-901	-902	-903	-951
	DOUBLE SHAFT	-911	-912	-913	-961
DRIVE METHOD	———	UNI-POLAR			BI-POLAR
NUMBER OF PHASES	———	2			2
STEP ANGLE	deg./step	1.8			1.8
VOLTAGE	V	1.74	2.78	4.9	1.96
CURRENT	A/PHASE	3.0	2.0	1.0	2.0
WINDING RESISTANCE	Ω/PHASE	0.58	1.39	4.9	0.98
INDUCTANCE	mH/PHASE	0.61	1.8	6.68	2.27
HOLDING TORQUE	mN · m	422	422	422	490
	oz · in	60	60	60	69
DETENT TORQUE	mN · m	25	25	25	25
	oz · in	3.5	3.5	3.5	3.5
ROTOR INERTIA	g · cm^2	115	115	115	115
	oz · in^2	0.62	0.62	0.62	0.62
WEIGHTS	g	400	400	400	400
	lb	0.88	0.88	0.88	0.88
INSULATION CLASS	———	JIS Class E (120℃ 248° F) (UL VALUE : CLASS B 130℃ 266° F)			
INSULATION RESISTANCE	———	500VDC 100MΩmin.			
DIELECTRIC STRENGTH	———	500VAC 50HZ 1min.			
OPERATING TEMP. RANGE	℃	0 to 50			
ALLOWABLE TEMP.RISE	deg.	70			

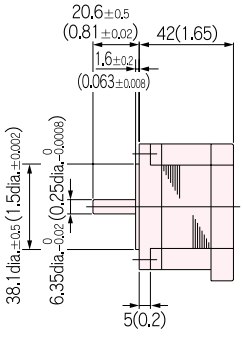
■ DIMENSIONS unit = mm (inch)



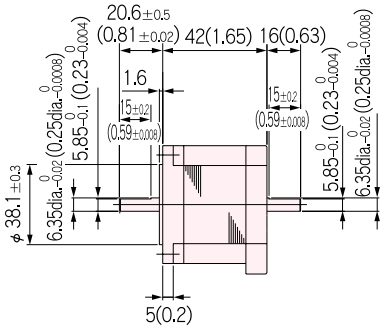
UNI-POLLAR



Bi-POLAR



SINGLE SHAFT



DOUBLE SHAFT

Features

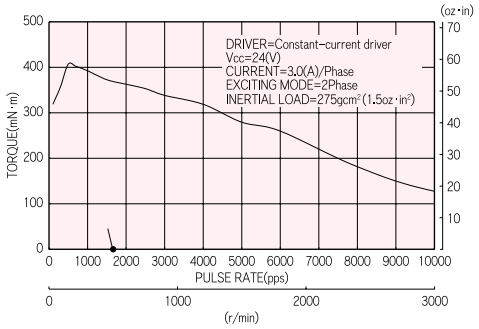
- Stronger torque generated in higher speed zone
  (KH56KM2–901 generates 1.2 times torque of our previous model at 1200 r/min. speed)
- Lowered Vibration by increased stiffness of body construction
  (lowered by 10% than our previous model)
- Improved Efficiency
  (1.1 times of our previous model, by high grade materials)

PULL–OUT
PULL–IN

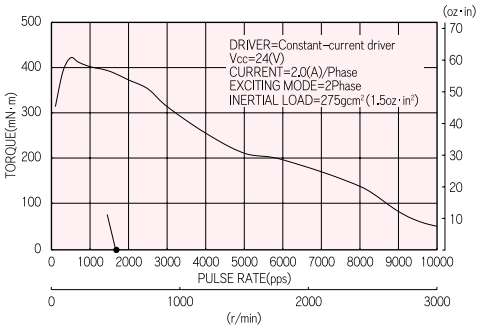
■ TORQUE CHARACTERISTICS vs. PULSE RATE

UNI–POLAR

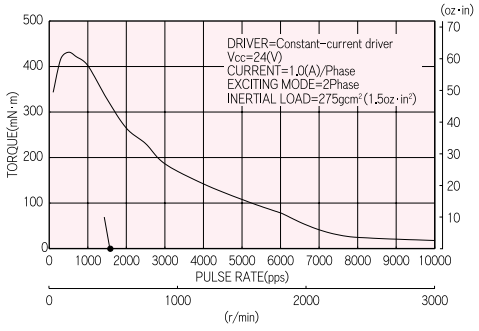
KH56JM2–901, 911



KH56JM2–902, 912

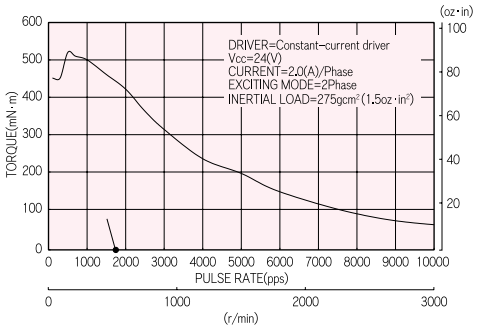


KH56JM2–903, 913



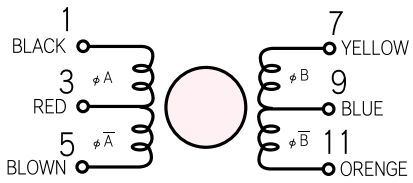
BI–POLAR

KH56JM2–951, 961



■ CONNECTION DIAGRAMS

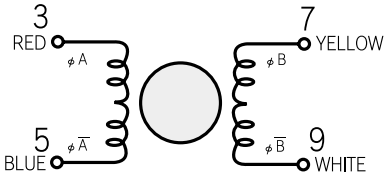
UNI–POLAR



EXCITATION SEQUENCE

STEP	1	2	3	4
BLACK	–			–
YELLOW	–	–		
BLOWN		–	–	
ORENGE			–	–
RED	+	+	+	+
BLUE	+	+	+	+

BI–POLAR

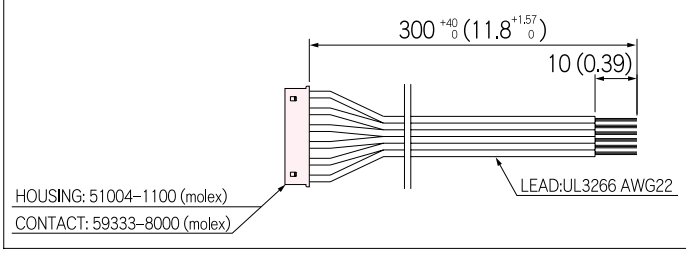


EXCITATION SEQUENCE

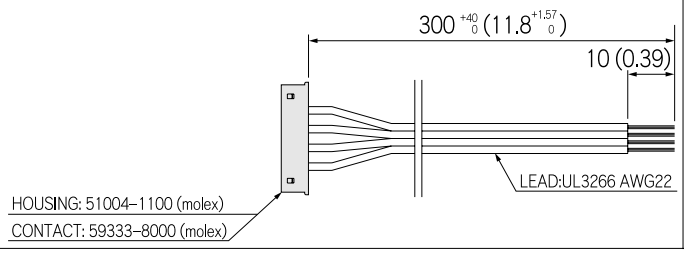
STEP	1	2	3	4
RED	+	+	–	–
YELLOW	–	+	+	–
BLUE	–	–	+	+
WHITE	+	–	–	+

■ CONNECTION CABLE TO MOTOR unit = mm (inch)

UNI–POLAR



BI–POLAR



2-Phase Hybrid Stepping Motor 1.8°

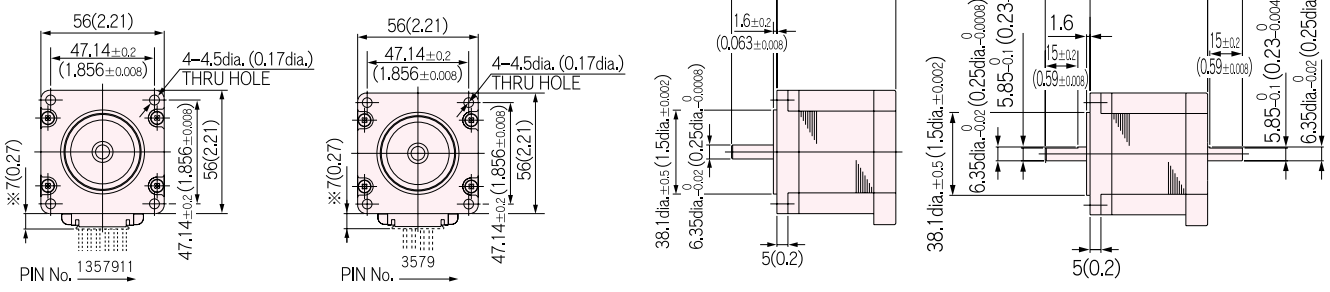
KH56 series 900 type

HIGH TORQUE, LOW VIBRATION AND LOW NOISE

■ STANDARD SPECIFICATIONS

MODEL		KH56KM2			
	SINGLE SHAFT	-901	-902	-903	-951
	DOUBLE SHAFT	-911	-912	-913	-961
DRIVE METHOD	————	UNI-POLAR			BI-POLAR
NUMBER OF PHASES	————	2			2
STEP ANGLE	deg./step	1.8			1.8
VOLTAGE	V	2.3	3.6	6.71	2.4
CURRENT	A/PHASE	3.0	2.0	1.0	2.0
WINDING RESISTANCE	Ω/PHASE	0.77	1.79	6.71	1.32
INDUCTANCE	mH/PHASE	1.04	1.7	9.36	3.19
HOLDING TORQUE	mN・m	834	834	834	932
	oz・in	118	118	118	132
DETENT TORQUE	mN・m	37	37	37	37
	oz・in	5.2	5.2	5.2	5.2
ROTOR INERTIA	g・cm²	188	188	188	188
	oz・in²	1.0	1.0	1.0	1.0
WEIGHTS	g	650	650	650	650
	lb	1.4	1.4	1.4	1.4
INSULATION CLASS	————	JIS Class E (120℃ 248° F) (UL VALUE : CLASS B 130℃ 266° F)			
INSULATION RESISTANCE	————	500VDC 100MΩmin.			
DIELECTRIC STRENGTH	————	500VAC 50HZ 1min.			
OPERATING TEMP. RANGE	℃	0 to 50			
ALLOWABLE TEMP. RISE	deg.	70			

■ DIMENSIONS unit = mm (inch)



UNI-POLLAR Bi-POLAR SINGLE SHAFT DOUBLE SHAFT

Features

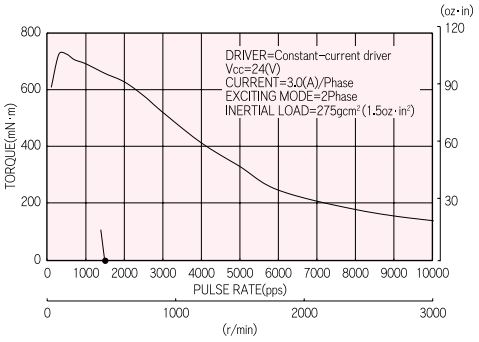
- Stronger torque generated in higher speed zone
  (KH56KM2–901 generates 1.2 times torque of our previous model at 1200 r/min. speed)
- Lowered Vibration by increased stiffness of body construction
  (lowered by 10% than our previous model)
- Improved Efficiency
  (1.1 times of our previous model, by high grade materials)

PULL–OUT
PULL–IN

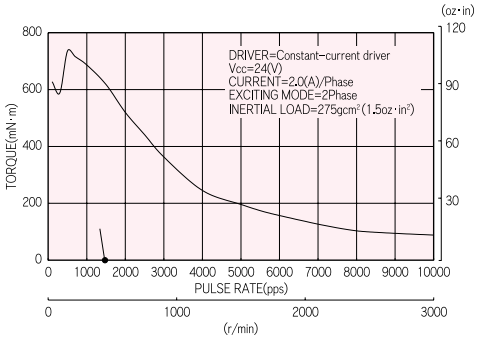
■ TORQUE CHARACTERISTICS vs. PULSE RATE

UNI–POLAR

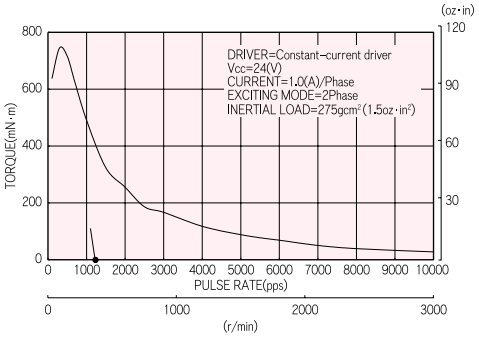
KH56KM2–901, 911



KH56KM2–902, 912

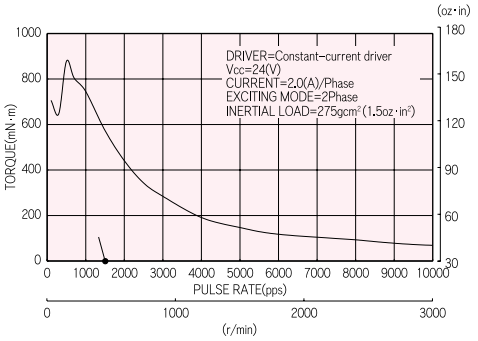


KH56KM2–903, 913



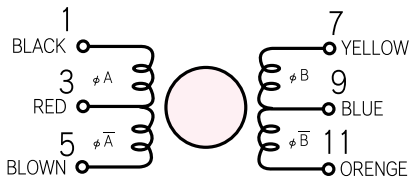
BI–POLAR

KH56KM2–951, 961



■ CONNECTION DIAGRAMS

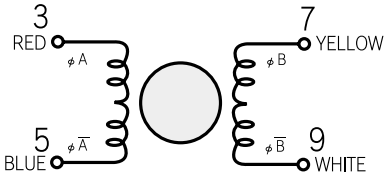
UNI–POLAR



EXCITATION SEQUENCE

STEP	1	2	3	4
BLACK	–			–
YELLOW	–	–		
BLOWN		–	–	
ORENGE			–	–
RED	+	+	+	+
BLUE	+	+	+	+

BI–POLAR

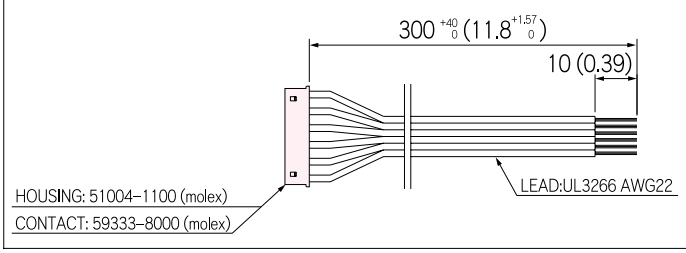


EXCITATION SEQUENCE

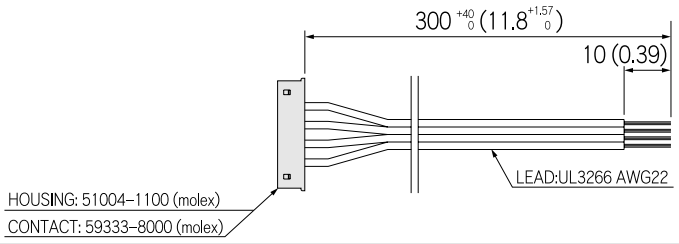
STEP	1	2	3	4
RED	+	+	–	–
YELLOW	–	+	+	–
BLUE	–	–	+	+
WHITE	+	–	–	+

■ CONNECTION CABLE TO MOTOR unit = mm (inch)

UNI–POLAR



BI–POLAR



2-Phase Hybrid Stepping Motor 1.8°

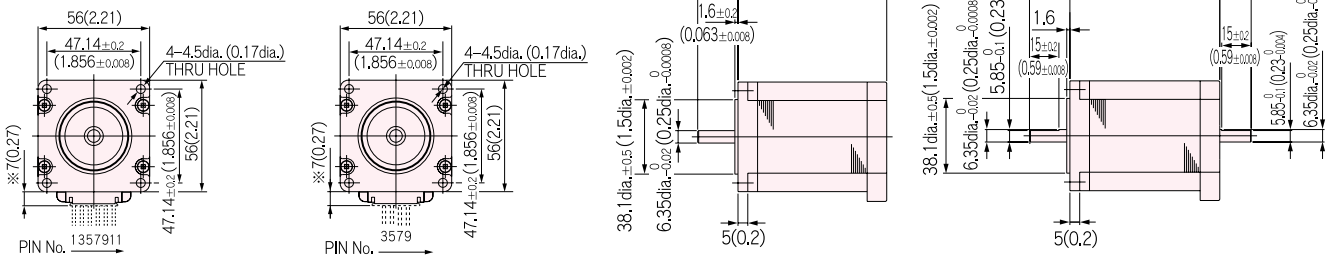
KH56 series 900 type

HIGH TORQUE, LOW VIBRATION AND LOW NOISE

■ STANDARD SPECIFICATIONS

MODEL		KH56QM2			
	SINGLE SHAFT	-901	-902	-903	-951
	DOUBLE SHAFT	-911	-912	-913	-961
DRIVE METHOD	———	UNI-POLAR			BI-POLAR
NUMBER OF PHASES	———	2			2
STEP ANGLE	deg./step	1.8			1.8
VOLTAGE	V	3.54	5.46	9.9	4.0
CURRENT	A/PHASE	3.0	2.0	1.0	2.0
WINDING RESISTANCE	Ω/PHASE	1.18	2.73	9.9	2.0
INDUCTANCE	mH/PHASE	2.4	5.4	21.6	7.35
HOLDING TORQUE	mN · m	1324	1324	1324	1373
	oz · in	187	187	187	194
DETENT TORQUE	mN · m	69	69	69	69
	oz · in	9.8	9.8	9.8	9.8
ROTOR INERTIA	g · cm²	269	269	269	269
	oz · in²	1.47	1.47	1.47	1.47
WEIGHTS	kg	1.0	1.0	1.0	1.0
	lb	2.2	2.2	2.2	2.2
INSULATION CLASS	———	JIS Class E (120℃ 248° F) (UL VALUE : CLASS B 130℃ 266° F)			
INSULATION RESISTANCE	———	500VDC 100MΩmin.			
DIELECTRIC STRENGTH	———	500VAC 50HZ 1min.			
OPERATING TEMP. RANGE	℃	0 to 50			
ALLOWABLE TEMP. RISE	deg.	70			

■ DIMENSIONS unit = mm (inch)



UNI-POLLAR Bi-POLAR SINGLE SHAFT DOUBLE SHAFT

Features

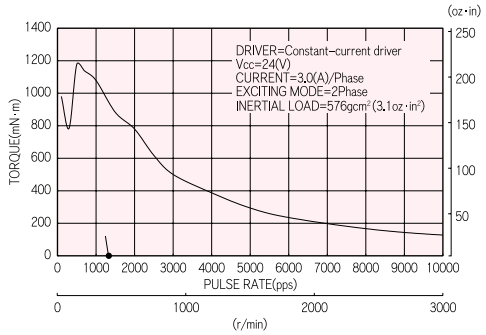
- Stronger torque generated in higher speed zone
  (KH56KM2–901 generates 1.2 times torque of our previous model at 1200 r/min. speed)
- Lowered Vibration by increased stiffness of body construction
  (lowered by 10% than our previous model)
- Improved Efficiency
  (1.1 times of our previous model, by high grade materials)

PULL–OUT
PULL–IN

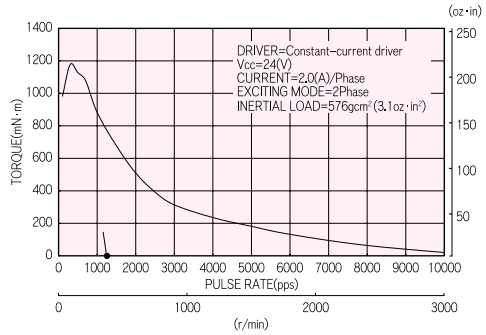
■ TORQUE CHARACTERISTICS vs. PULSE RATE

UNI–POLAR

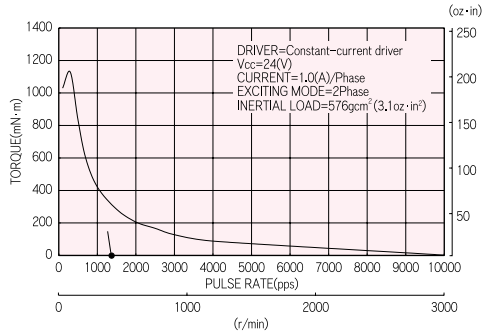
KH56QM2–901, 911



KH56QM2–902, 912

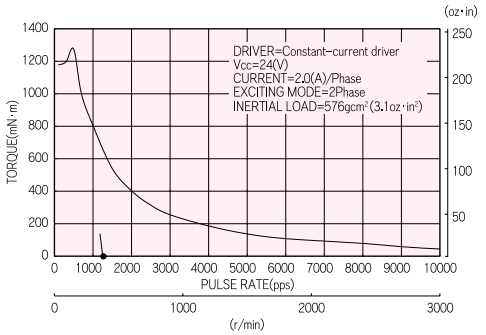


KH56QM2–903, 913



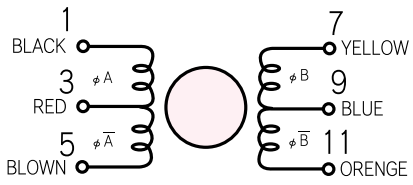
BI–POLAR

KH56QM2–951, 961



■ CONNECTION DIAGRAMS

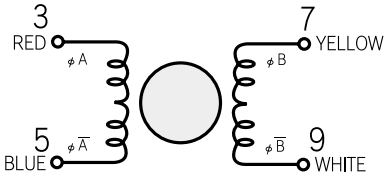
UNI–POLAR



EXCITATION SEQUENCE

STEP	1	2	3	4
BLACK	–			–
YELLOW	–	–		
BLOWN		–	–	
ORENGE			–	–
RED	+	+	+	+
BLUE	+	+	+	+

BI–POLAR

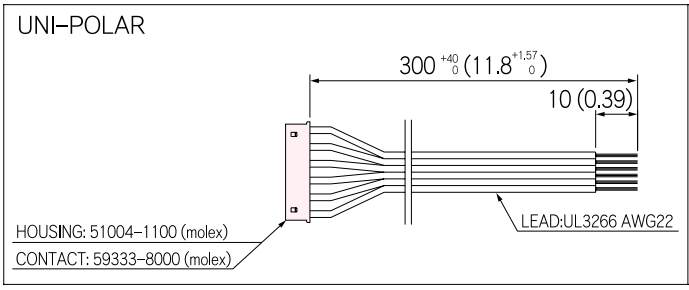


EXCITATION SEQUENCE

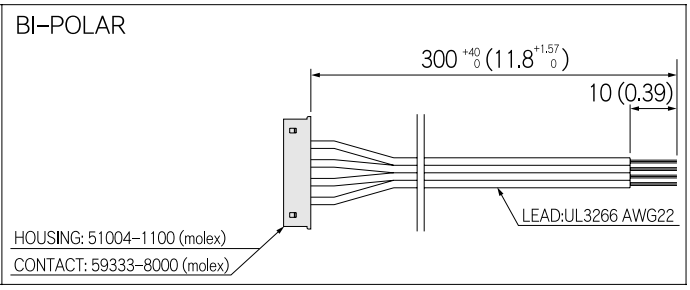
STEP	1	2	3	4
RED	+	+	–	–
YELLOW	–	+	+	–
BLUE	–	–	+	+
WHITE	+	–	–	+

■ CONNECTION CABLE TO MOTOR unit = mm (inch)

UNI–POLAR



BI–POLAR



2-Phase Hybrid Stepping Motor Driver

HIGH TORQUE, SILENT ROTATION
SERVEX FSD2U2P12-01 DC24V

Features

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

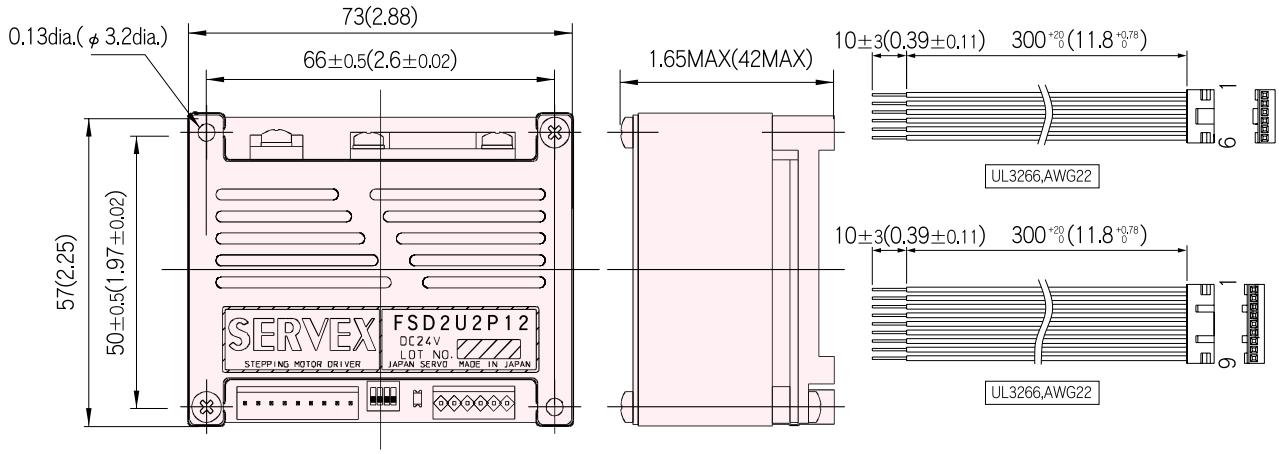
Applicable motors

KH42HM2-901, 911
KH42JM2-901, 911
KH42KM2-901, 911
KH56JM2-902, 912
KH56KM2-902, 912
KH56QM2-902, 912

KH39EM2-801
KH39FM2-801
KH39GM2-801

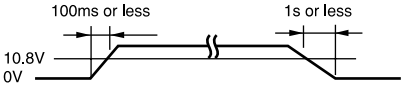
Dimensions

Unit = mm (inch)



Power supply specifications

Motor Power supply voltage(VM) : 10.8V~33.0V



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

Connector specifications

	FSD2U2P12-01 side	User side		Maker
	Maker Model	Applicable Housing	Applicable terminal(real)	
CN3	IL-G-9P-S3T2-E	IL-G-9S-S3C2	IL-G-C2-SC-10000	J.A.E
CN2	IL-G-6P-S3T2-E	IL-G-6S-S3C2	IL-G-C2-SC-10000	J.A.E

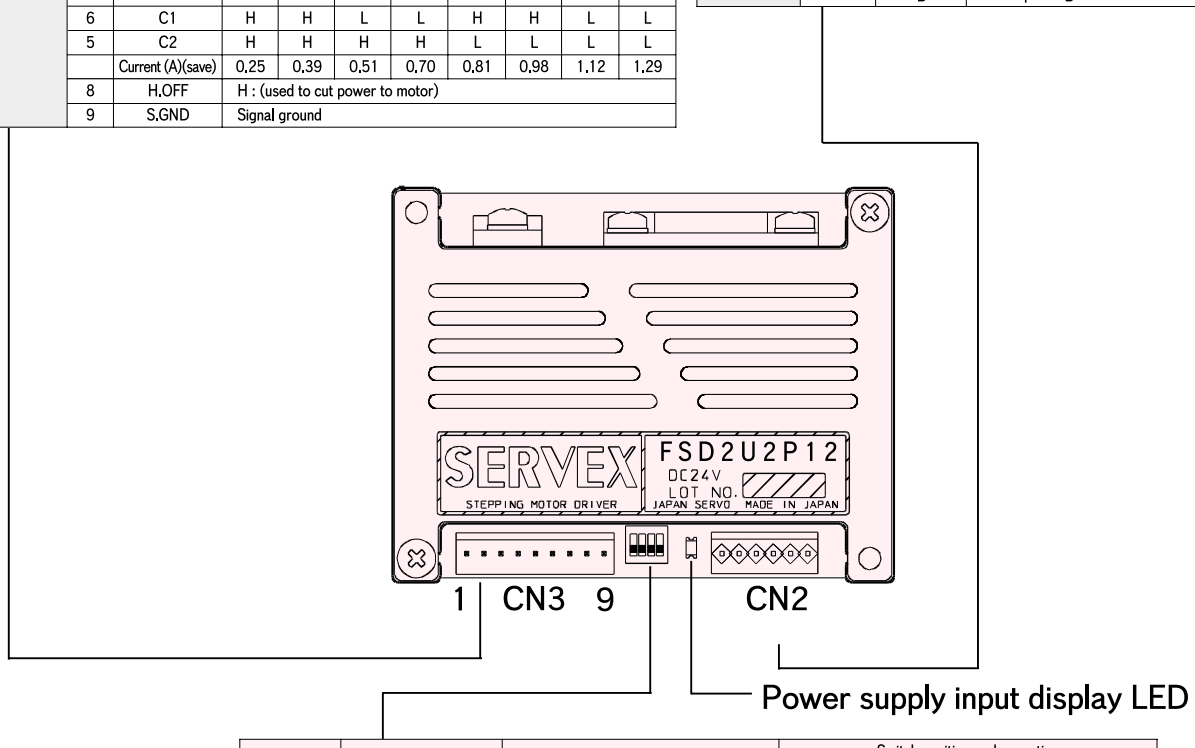
Required operating environment conditions

	In operation	At rest	Comments
Ambient temperature (℃)	0~+50	-20~60	
Ambient humidity(%)	35~85	35~85	Non condensation

Functions, Setting and Connections

Connector Name	Pin No.	Signal Name	Function							
CN3	1	VM	Motor power supply(to be connected to 12–30V power supply)							
	2	P.GND	Motor power supply GND(to be connected between port and interior panel)							
	3	CW	CW directional drive pulse and serial pulse signal input							
	4	CCW	CCW directional drive pulse and direction–of–rotation signal input							
		Motor current (A)	0.33	0.57	0.81	0.19	1.28	1.52	1.76	2.00
	7	C0	H	L	H	L	H	L	H	L
	6	C1	H	H	L	L	H	H	L	L
	5	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	H.OFF	H : (used to cut power to motor)							
	9	S.GND	Signal ground							

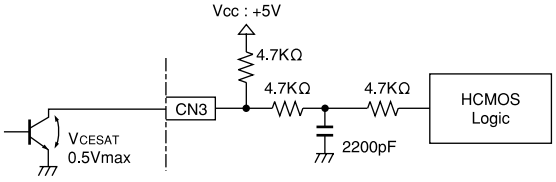
Connector Name	Pin No.	Signal Name	Function
CN2	1	A	Motor phase A
	2	A.COM	Motor phase A common line
	3	$\overline{A}$	Motor phase $\overline{A}$
	4	B	Motor phase B
	5	B.COM	Motor phase B common line
	6	$\overline{B}$	Motor phase $\overline{B}$



Switch No.	Switch Name		Function		Switch position and operation	
					OFF	ON
1	SEL		Pulse input method settings		CW／CCW	Serial Pulse／DIR signal
2	SAVE		Selection of automatic motor power save function		save	do not save
3	Step angle settings	Divisions	1／2	1／1	1／4	1／2
		MSO	ON	OFF	ON	OFF
4		MS1	ON	ON	OFF	OFF

Input circuit

CW, CCW, C0, C1, C2, HOFF

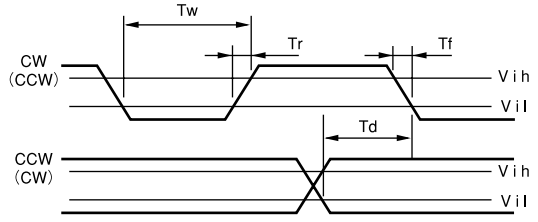


User-side circuit　　FSD2B2P12-01 input curcuit

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	0.8
Rise time	Tr(μs)	—	25
Fall time	Tf(μs)	—	15
Input pulse range	Twl(μs)	18	—
Direction of rotation change timing	Td(μs)	10	—

Note)Specified the voltage waveform between the user circuit ground and the FSD2U2P12–01 terminal



2-Phase Hybrid Stepping Motor Driver

HIGH TORQUE, SILENT ROTATION
SERVEX FSD2B2P12-01 DC24V

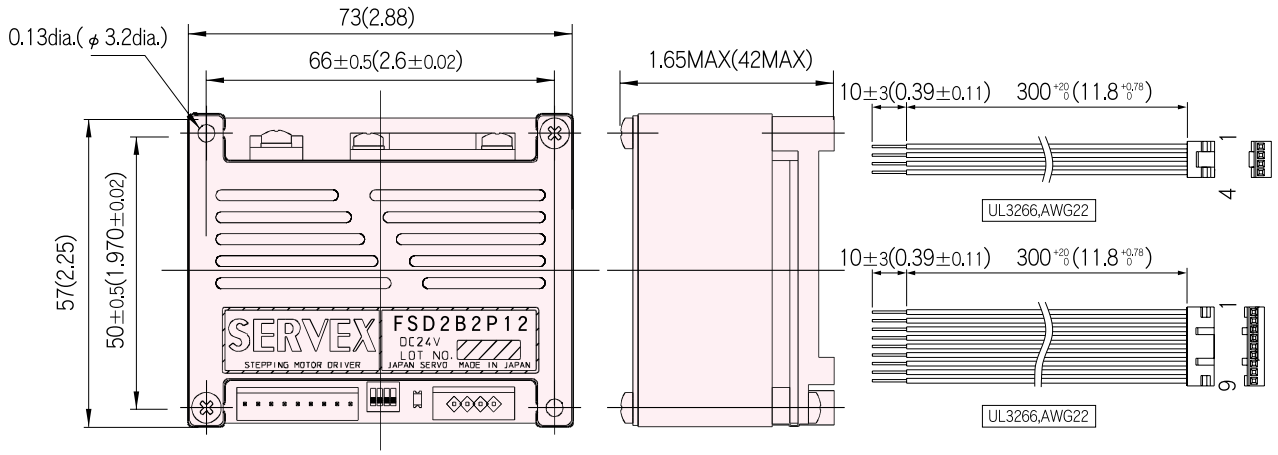
Features

1. Ultra-compact driver measuring a mere 2.2 x 2.9 x 1.7 inches.
2. Bi-polar fixed-current driver.
3. Micro-stepping feature may be used to be selected from any one of 1/1 (full-step), 1/2 (micro-step), and 1/4 (micro-step)settings.
4. Through the use of 3-bit external signals, electric current settings may be specified to any one of a range of 8 different settings from 0.41-2A/phase power.
5. Input commands may be selected from either of direction-of-rotation separate serial

Applicable motors

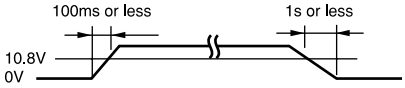
KH42HM2-951, 961
KH42JM2-951, 961
KH42KM2-951, 961
KH56JM2-851, 951, 961
KH56KM2-851, 951, 961
KH56QM2-851, 951, 961
KH39EM2-851
KH39FM2-851
KH39GM2-851

Dimensions



Power supply specifications

Motor Power supply voltage(VM) : 10.8V~33.0V



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

Connector specifications

	FSD2U2P12-01 side	User side		Maker
	Maker Model	Applicable Housing	Applicable terminal(real)	
CN3	IL-G-9P-S3T2-E	IL-G-9S-S3C2	IL-G-C2-SC-10000	J.A.E
CN2	IL-G-6P-S3T2-E	IL-G-6S-S3C2	IL-G-C2-SC-10000	J.A.E

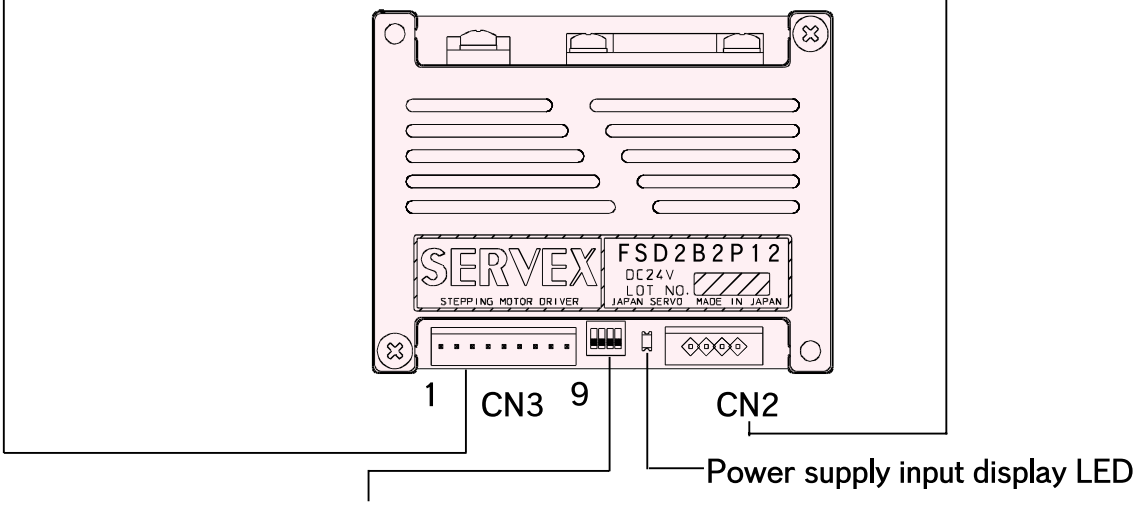
Required operating environment conditions

	In operation	At rest	Comments
Ambient temperature (℃)	0~+50	-20~60	
Ambient humidity(%)	35~85	35~85	Non condensation

Functions, Setting and Connections

Connector Name	Pin No.	Signal Name	Function							
CN3	1	VM	Motor power supply(to be connected to 12–30V power supply)							
	2	P.GND	Motor power supply GND							
	3	CW	CW directional drive pulse and serial pulse signal input							
	4	CCW	CCW directional drive pulse and direction–of–rotation signal input							
		Motor current (A)	0.41	0.64	0.86	1.09	1.32	1.55	1.77	2.00
	7	C0	H	L	H	L	H	L	H	L
	6	C1	H	H	L	L	H	H	L	L
	5	C2	H	H	H	H	L	L	L	L
	8	H.OFF	H. off (used to cut power to motor)							
	9	S.GND	Signal ground							

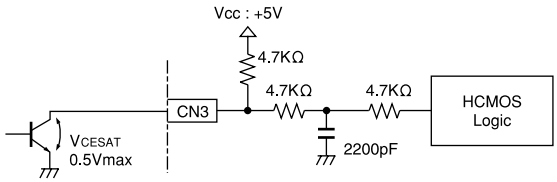
Connector Name	Pin No.	Signal Name	Function
CN2	1	A	Motor current(A)
	2	$\overline{A}$	Motor current($\overline{A}$)
	3	B	Motor current(B)
	4	$\overline{B}$	Motor current($\overline{B}$)



Switch No.	Switch Name		Function		Switch position and operation	
					OFF	ON
1	SEL		Pulse input method settings		CW／CCW	Serial Pulse / DIR signal
2	SAVE		Selection of automatic motor power save feature		save	do not save
3	Step angle settings	Divisions	1／2	1／1	1／4	1／2
		MSO	ON	OFF	ON	OFF
4		MS1	ON	ON	OFF	OFF

Input circuit

CW, CCW, C0, C1, C2, H. OFF

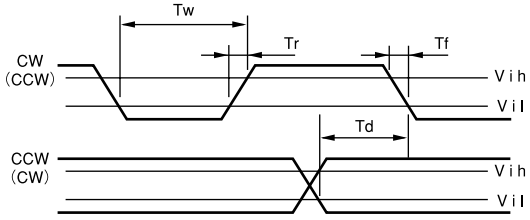


User-side circuit FSD2B2P12-01 input curcuit

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	0.8
Rise time	Tr(μ s)	—	25
Fall time	Tf(μ s)	—	15
Input pulse range	Twl(μ s)	18	—
Direction of rotation change timing	Td(μs)	10	—

Note)Specified the voltage waveform between the user circuit ground and the FSD2B2P12–01 terminal



Connector specifications

	FSD2B2P12–01 side	User side		Maker
	Maker Model	Applicable Housing	Applicable terminal(real)	
CN3	IL–G–9P–S3T2–E	IL–G–9S–S3C2	IL–G–C2–SC–10000	J.A.E
CN2	IL–G–4P–S3T2–E	IL–G–4S–S3C2	IL–G–C2–SC–10000	J.A.E

3-Phase Hybrid Stepping Motor Driver

HIGH TORQUE, SILENT ROTATION

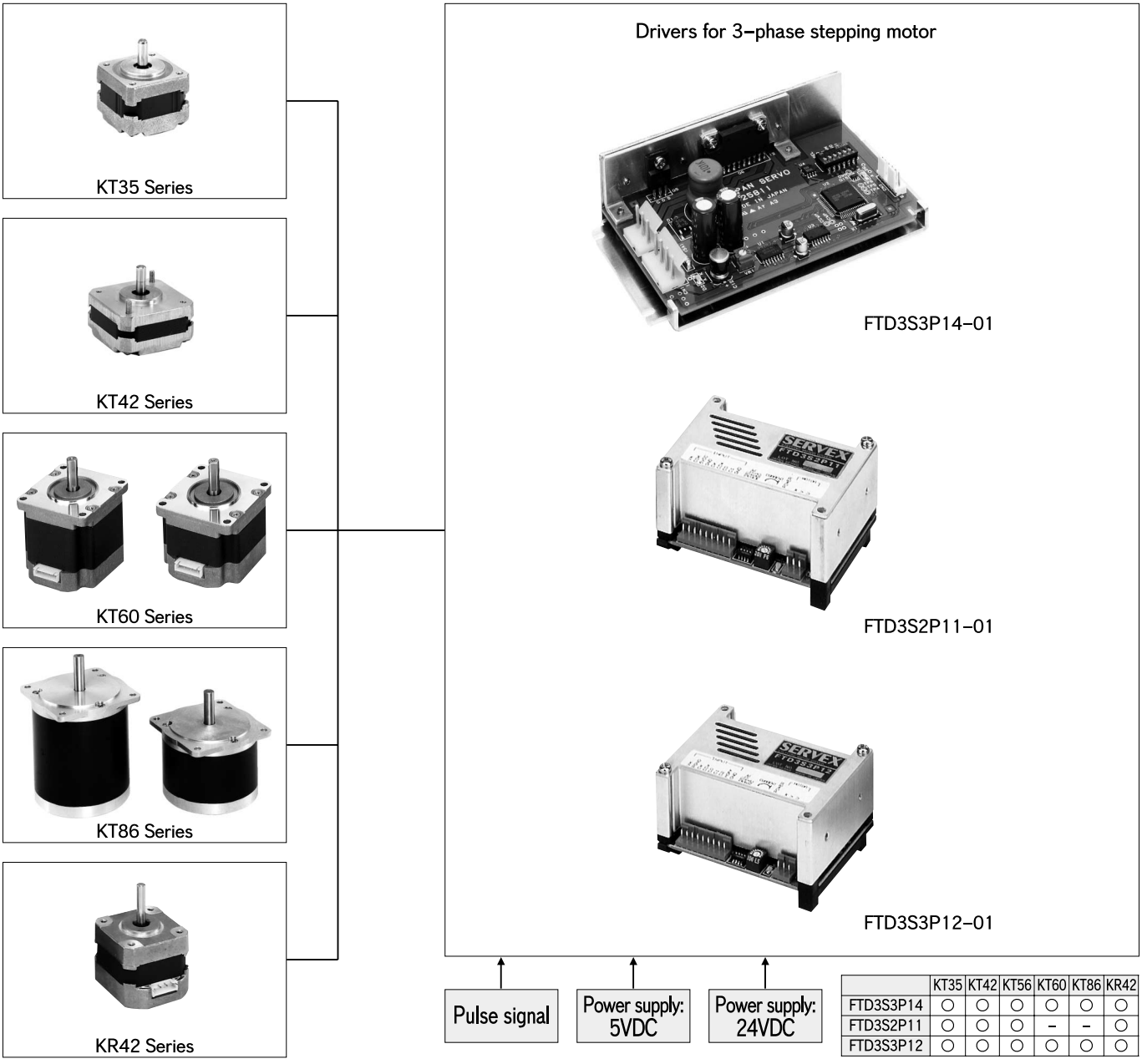
Features

1. Drive circuit is simplified because the motor is driven with star wiring connection.
2. High torque is obtained at low speed with the micro-step driver.
3. Ultra-low vibration and low noise achieved with our micro-step driver.
4. The step angle of 1/1, 1/2, 1/4, and 1/8 may be chosen using our micro-step driver.

Applications

Suitable as controlled driving source in scientific or high precision industrial equipment such as OA equipment, measuring equipment, medical treatment equipment, physics and chemistry equipment, optical equipment, semiconductor processing equipment, and other precision machinery.

System Configuration

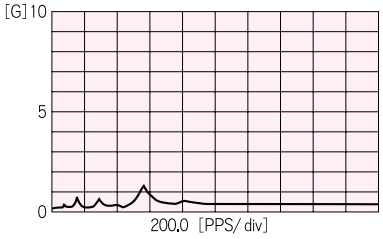


	KT35	KT42	KT56	KT60	KT86	KR42
FTD3S3P14	○	○	○	○	○	○
FTD3S2P11	○	○	○	–	–	○
FTD3S3P12	○	○	○	○	○	○

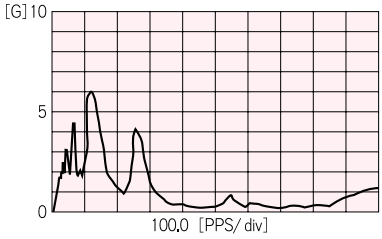
○ = applicable – = not applicable

Vibration Comparison

Micro–Step drive 1/8



Full–Step drive



Advantage

Constant current driver

With the fixed current drive method, a voltage sufficiently higher than the specified voltage, of the motor, is finely sliced in the switching circuit than applied to the motor coil. The current is maintained at a constant level whether the motor is rotating at low or high speed. With this method the output torque during high speed rotation is greatly improved with power consumption minimized.

Micro–step driver

With the micro–step drive method, the mechanically determined step angle (3.75°, 1.2° or 0.60°) is divided by an electronic circuit and the motor is gradually rotated by a fine angle. The conventional excitation method makes a rotor rotates by a fixed angle by turning the magnetizing phase on and off through an input pulse. On the other hand, with the micro–step driving method, the current of one phase of the magnetizing phase can be gradually increased while the current of other phase is decreased thereby further dividing the step angle of the motor and making rotation even smoother. THE FTD3S3P14 driver, the FTD3S2P11 enable to set to step divisions of 1/4 and 1/8. Micro stepping drive is effective to reduce mechanical driving noise particularly when divisions not exceeding 1/8.

Rectangular wave drive

- ●2–phase excitation (full–step)
  This is then or mal 2–phase excitation method. Torque is large and damping characteristics are excellent.
- ●2–3 phase excitation (half–step)
  This method alternates between 2 and 3 phases excitation. The motor step angle is halved.

	Noise level	Vibration	Torque		High speed capability
			Low speed	High speed	
Micro–step drive	○	○	○	△	△
Rectangular wave drive	△	△	○	○	○

3–Phase Hybrid Stepping Motor 1.2°

KT35 series *TRISYN*

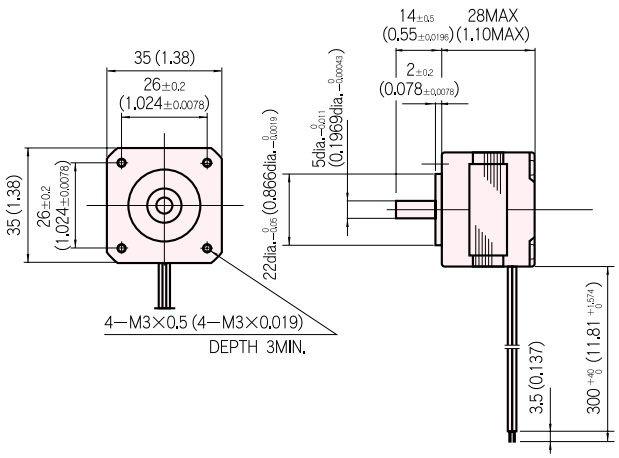
HIGH TORQUE, SILENT ROTATION

■ STANDARD SPECIFICATIONS

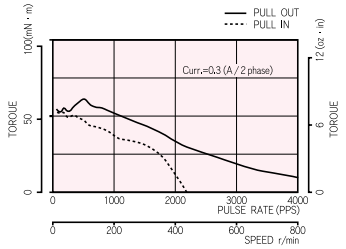
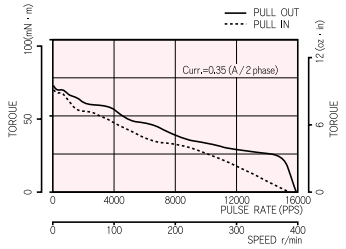
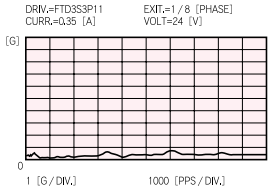
MODEL	UNIT	KT35FM1
		–552
DRIVE METHOD	————	BI–POLAR
NUMBER OF PHASES	————	3
STEP ANGLE	deg./step	1.2
VOLTAGE	V	11.7
CURRENT	A/2–PHASE	0.3
WINDING RESISTANCE	Ω/2–PHASE	39
INDUCTANCE	mH/2–PHASE	26
HOLDING TORQUE	mN · m	5.9
	oz · in	8.3
DETENT TORQUE	mN · m	9.8
	oz · in	1.4
ROTOR INERTIA	g · cm²	8
	oz · in²	0.044
WEIGHTS	g	110
	lb	0.24
INSULATION CLASS	————	JIS Class E (120℃ 248° F)(UL VALUE:CLASS B 130℃ 266° F)
INSULATION RESISTANCE	————	500VDC 100MΩ min.
DIELECTRIC STRENGTH	————	500VAC 50HZ 1min.
OPERATING TEMP. RANGE	℃	0 to 50
ALLOWABLE TEMP. RISE	deg.	70

KT35FM1

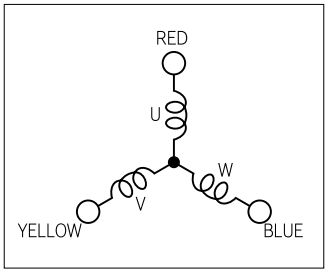
■ DIMENSIONS unit = mm (inch)



KT35FM1

TORQUE CHARACTERISTICS vs. PULSE RATE (FULL STEP) 24V 2 PHASE	
TORQUE CHARACTERISTICS vs. PULSE RATE (MICRO-STEP) 24V 1/8 DIVISIONS	
VIBRATION CHARACTERISTICS (MICRO-STEP DRIVEN)	

■ Connection Diagram



3-Phase Hybrid Stepping Motor 0.6°

KT42 series *TRISYN*

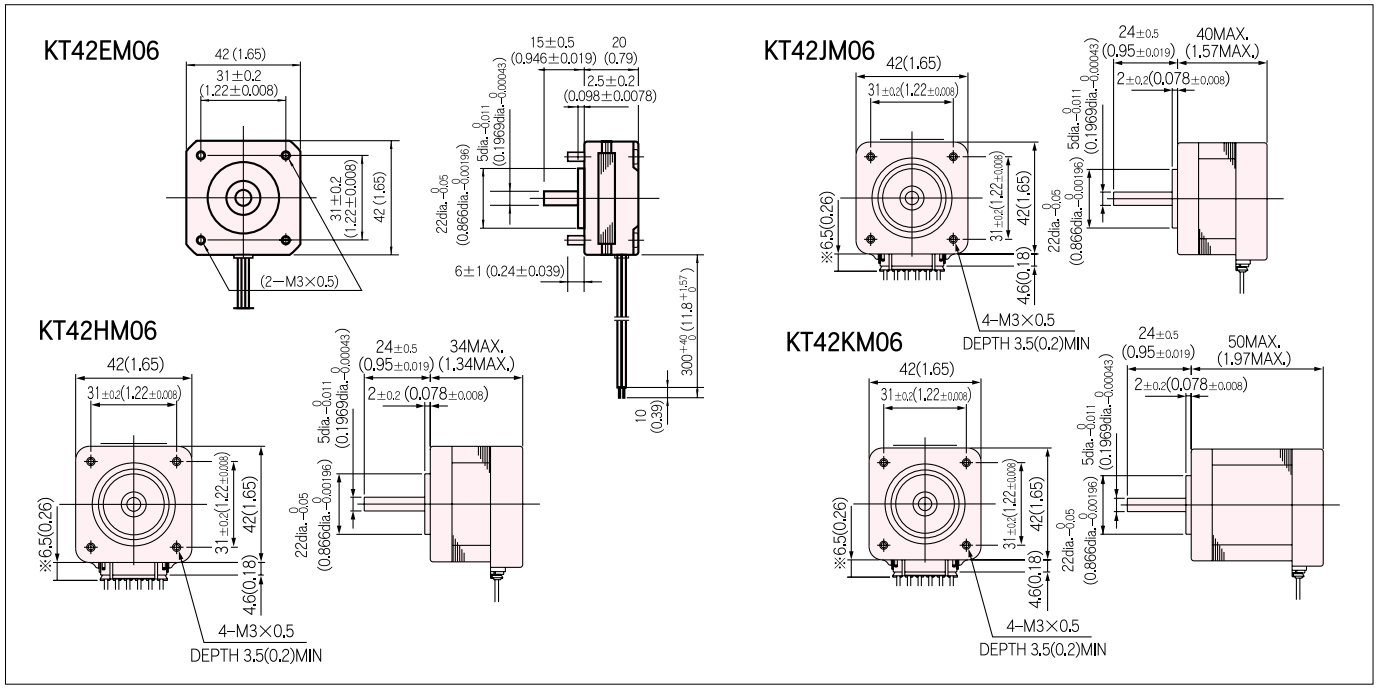
HIGH TORQUE, SILENT ROTATION

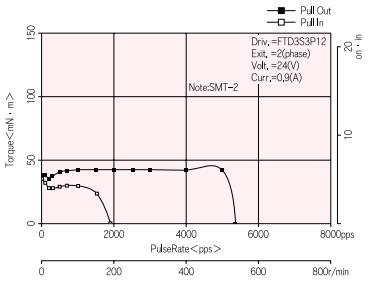
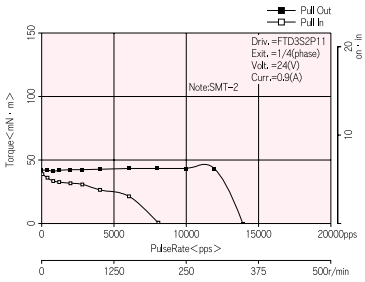
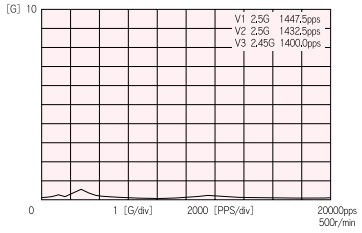
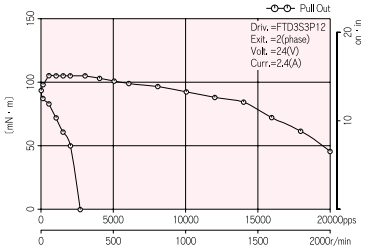
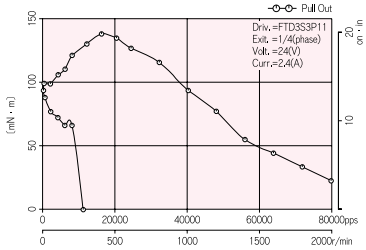
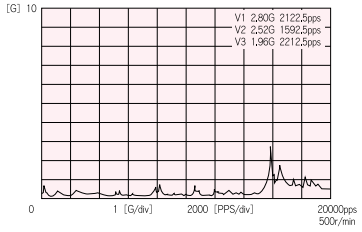
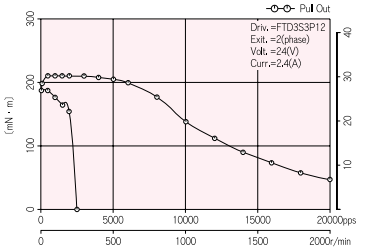
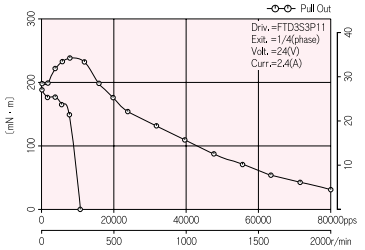
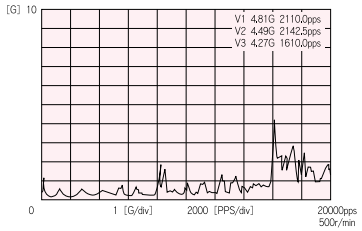
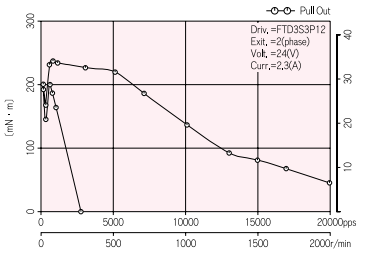
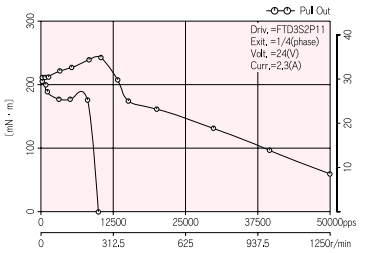
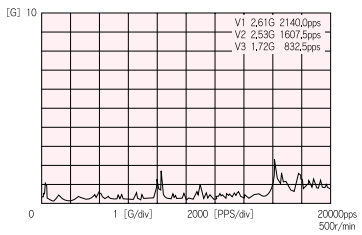
■ STANDARD SPECIFICATIONS

MODEL	UNIT	KT42EM06 -551	KT42HM06 -551	KT42JM06 -551	KT42KM06 -551
DRIVE METHOD	————	BI-POLAR			
NUMBER OF PHASES	————	3			
STEP ANGLE	deg./step	0.6			
VOLTAGE	V	5.3	2.88	3.12	4.6
CURRENT	A/2-PHASE	0.9	2.4	2.4	2.3
WINDING RESISTANCE	Ω/2-PHASE	5.9	1.2	1.3	2.0
INDUCTANCE	mH/2-PHASE	3.1	0.8	1.3	1.4
HOLDING TORQUE	mN · m	45	90	180	200
	oz · in	6.4	12.7	25.5	28.3
DETENT TORQUE	mN · m	10	6	8	9
	oz · in	1.4	0.8	1.1	1.3
ROTOR INERTIA	g · cm²	20	42	60	85
	oz · in²	0.11	0.23	0.33	0.46
WEIGHTS	g	140	210	310	360
	lb	0.31	0.46	0.68	0.79
INSULATION CLASS	————	JIS Class E (120℃ 248° F)(UL VALUE:CLASS B 130℃ 266° F)			
INSULATION RESISTANCE	————	500VDC 100MΩ min.			
DIELECTRIC STRENGTH	————	500VAC 50HZ 1 min.			
OPERATING TEMP. RANGE	℃	-10 to 50			
ALLOWABLE TEMP. RISE	deg.	70			

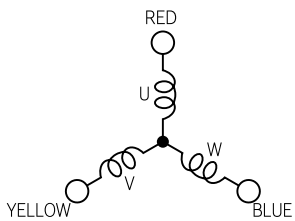
KT42EM4

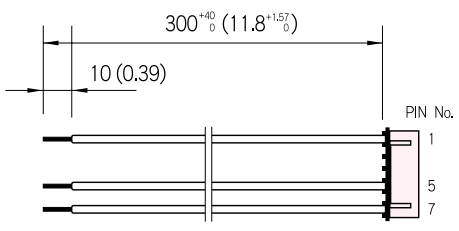
■ DIMENSIONS unit = mm (inch)



	TORQUE CHARACTERISTICS VS. PULSE RATE (FULL STEP) 24V 2 PHASE	TORQUE CHARACTERISTICS VS. PULSE RATE (MICRO-STEP) 24V 1/4 DIVISIONS	VIBRATION CHARACTERISTICS (MICRO-STEP DRIVEN)
KT42EM06 -551			
KT42HM06 -551			
KT42JM06 -551			
KT42KM06 -551			

■ CONNECTION CABLE TO MOTOR unit = mm (inch) (Except for KT42EM06-551)





PIN No.	LEAD COLOR
1	RED
2	
3	
4	
5	BLUE
6	
7	YELLOW

3–Phase Hybrid Stepping Motor 1.2°

KT42 series *TRISYN*

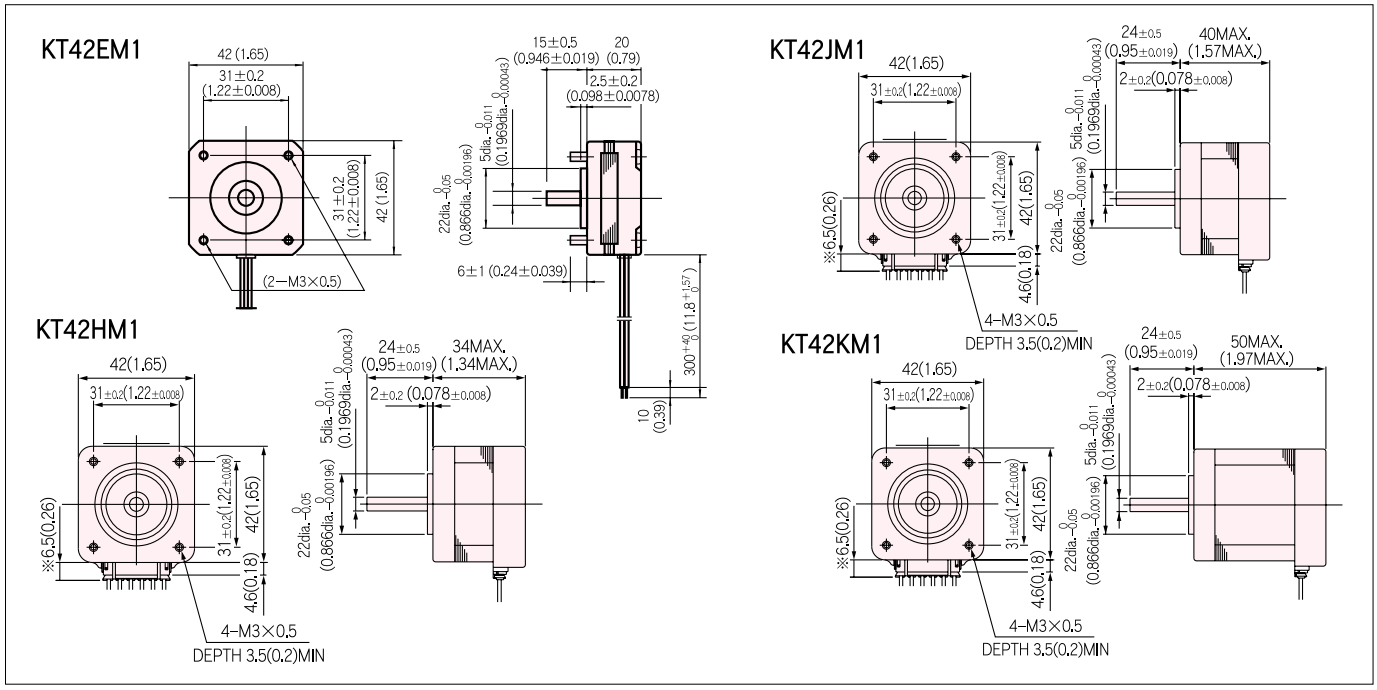
HIGH TORQUE, SILENT ROTATION

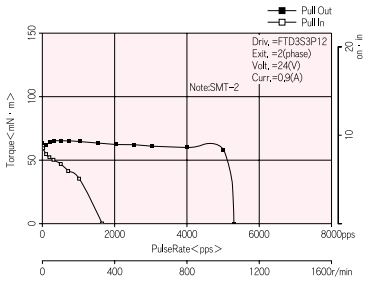
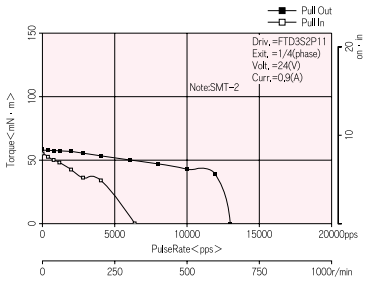
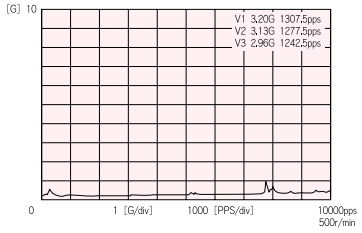
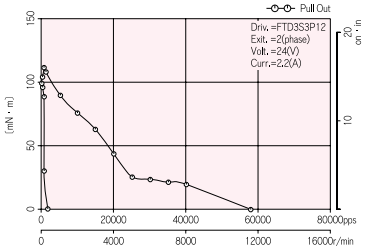
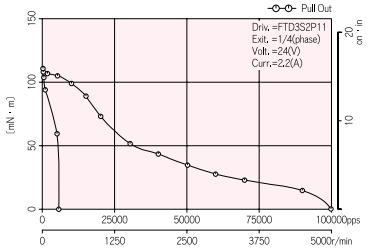
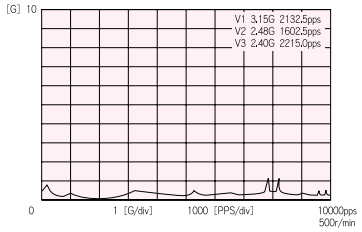
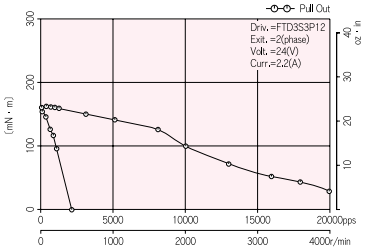
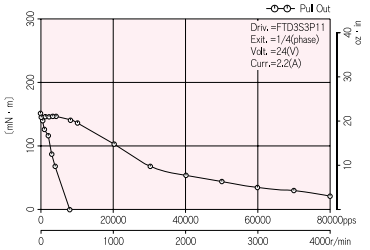
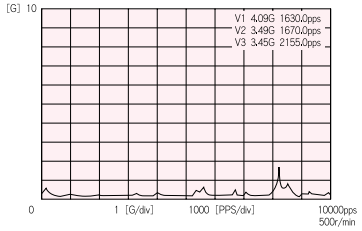
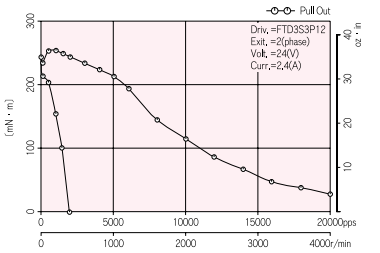
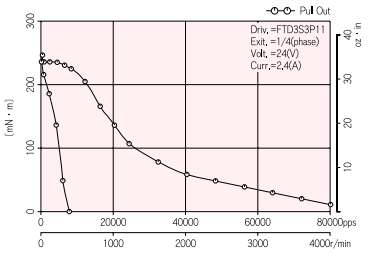
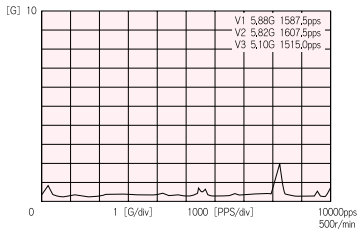
■ STANDARD SPECIFICATIONS

MODEL	UNIT	KT42EM1 –551	KT42HM1 –551	KT42JM1 –551	KT42KM1 –551
DRIVE METHOD	————	BI–POLAR			
NUMBER OF PHASES	————	3			
STEP ANGLE	deg./step	1.2			
VOLTAGE	V	5.3	2.64	2.88	3.6
CURRENT	A/2–PHASE	0.9	2.4	2.4	2.4
WINDING RESISTANCE	Ω/2–PHASE	5.9	1.1	1.2	1.5
INDUCTANCE	mH/2–PHASE	2.6	0.5	0.8	1.0
HOLDING TORQUE	mN · m	70	140	210	280
	oz · in	9.9	19.8	29.7	39.6
DETENT TORQUE	mN · m	10	10	12	16
	oz · in	1.4	1.4	1.7	2.3
ROTOR INERTIA	g · cm²	20	42	60	85
	oz · in²	0.11	0.23	0.33	0.46
WEIGHTS	g	140	210	310	360
	lb	0.31	0.46	0.68	0.79
INSULATION CLASS	————	JIS Class E (120℃ 248° F)(UL VALUE:CLASS B 130℃ 266° F)			
INSULATION RESISTANCE	————	500VDC 100MΩ min.			
DIELECTRIC STRENGTH	————	500VAC 50HZ 1 min.			
OPERATING TEMP. RANGE	℃	–10 to 50			
ALLOWABLE TEMP. RISE	deg.	70			

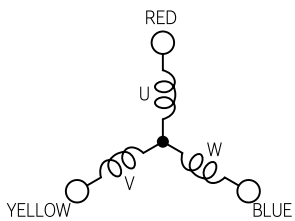
KT42EM1

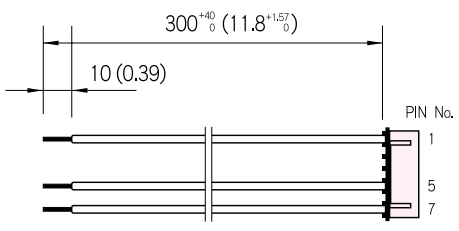
■ DIMENSIONS unit = mm (inch)



	TORQUE CHARACTERISTICS VS. PULSE RATE (FULL STEP) 24V 2 PHASE	TORQUE CHARACTERISTICS VS. PULSE RATE (MICRO-STEP) 24V 1/4 DIVISIONS	VIBRATION CHARACTERISTICS (MICRO-STEP DRIVEN)
KT42EM1 -551			
KT42HM1 -551			
KT42JM1 -551			
KT42KM1 -551			

■ CONNECTION CABLE TO MOTOR unit = mm (inch) (Except for KT42EM1-551)





PIN No.	LEAD COLOR
1	RED
2	
3	
4	
5	BLUE
6	
7	YELLOW

3–Phase Hybrid Stepping Motor 3.75°

KT42 series *TRISYN*

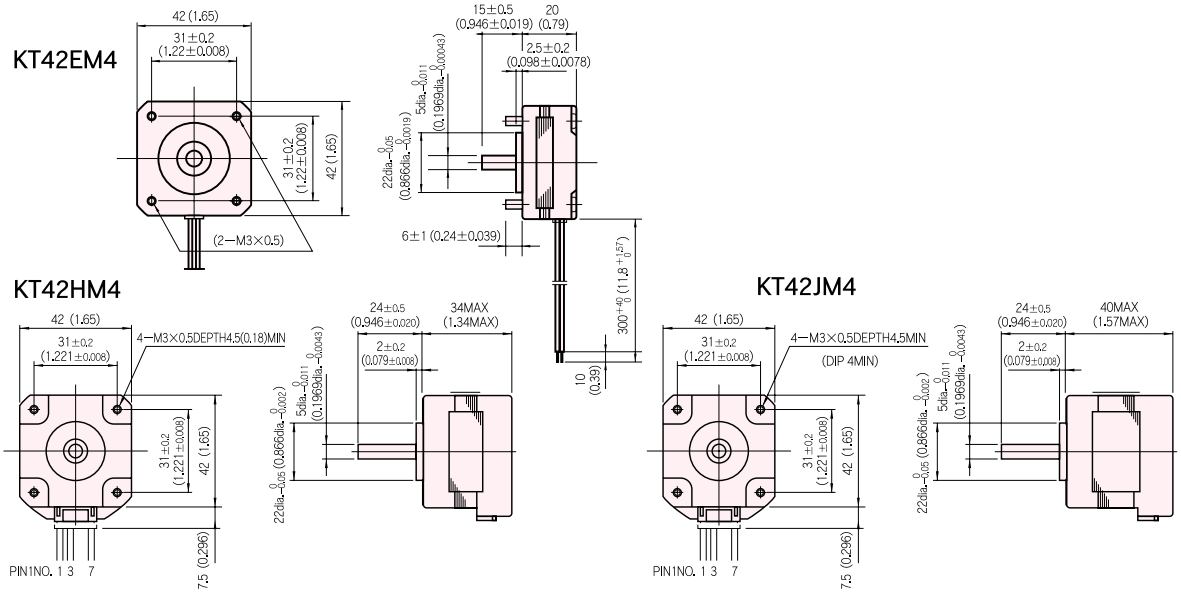
HIGH TORQUE, SILENT ROTATION

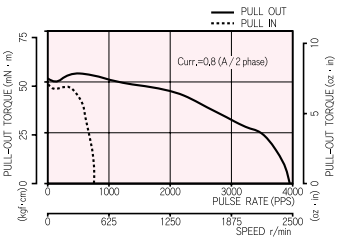
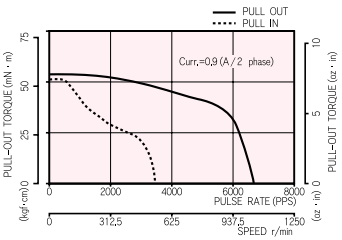
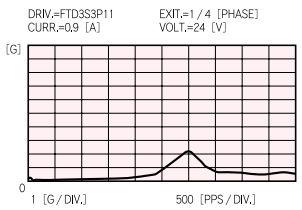
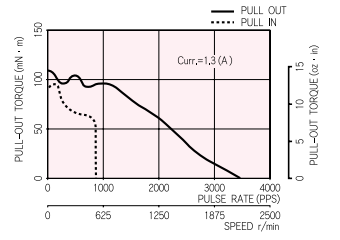
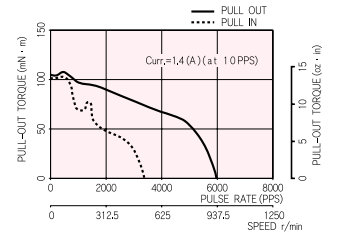
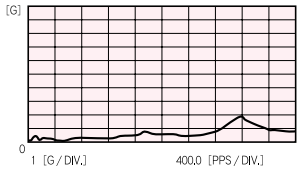
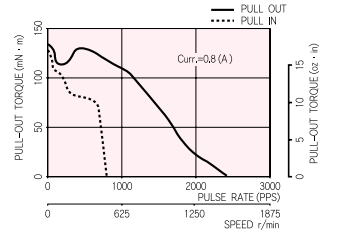
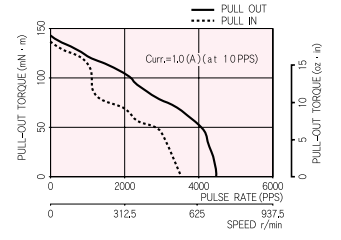
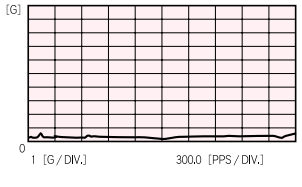
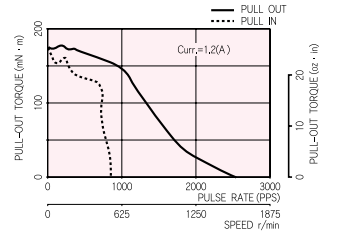
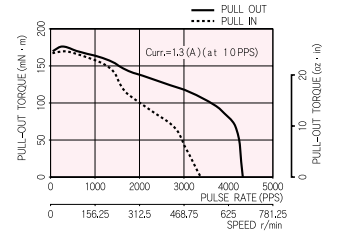
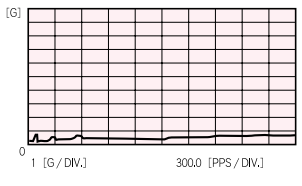
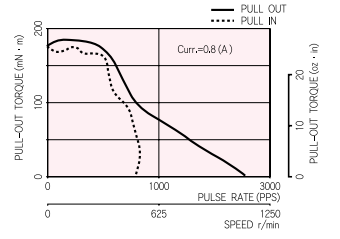
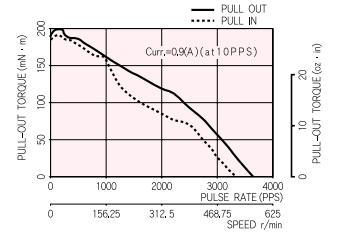
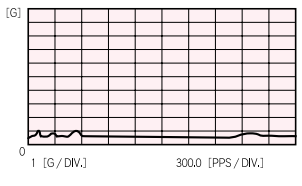
■ STANDARD SPECIFICATIONS

MODEL	UNIT	KT42EM4	KT42HM4		KT42JM4	
		–551	–551	–552	–551	–552
DRIVE METHOD	————	BI–POLAR				
NUMBER OF PHASES	————	3				
STEP ANGLE	deg./step	3.75				
VOLTAGE	V	5.28	4.42	7.04	5.16	8.8
CURRENT	A/2–PHASE	0.8	1.3	0.8	1.2	0.8
WINDING RESISTANCE	Ω/2–PHASE	6.6	3.4	8.8	4.3	11.0
INDUCTANCE	mH/2–PHASE	5.7	4.7	12.3	8.7	22.0
HOLDING TORQUE	mN · m	70	130	130	180	180
	oz · in	9.7	18	18	25	25
DETENT TORQUE	mN · m	8.8	14.7	14.7	19.6	19.6
	oz · in	1.3	2.1	2.1	2.8	2.8
ROTOR INERTIA	g · cm²	20	38	38	60	60
	oz · in²	0.11	0.21	0.21	0.33	0.33
WEIGHTS	g	140	210	210	240	240
	lb	0.31	0.46	0.46	0.53	0.53
INSULATION CLASS	————	JIS Class E (120℃ 248° F)(UL VALUE:CLASS B 130℃ 266° F)				
INSULATION RESISTANCE	————	500VDC 100MΩ min.				
DIELECTRIC STRENGTH	————	500VAC 50HZ 1 min.				
OPERATING TEMP. RANGE	℃	–10 to 50				
ALLOWABLE TEMP. RISE	deg.	70				

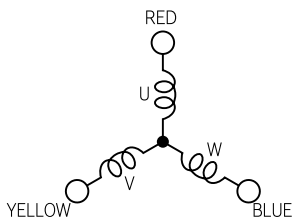
KT42EM4

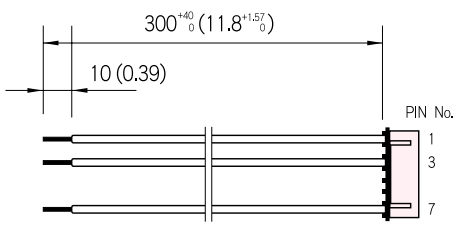
■ DIMENSIONS unit = mm (inch)



	TORQUE CHARACTERISTICS VS. PULSE RATE (FULL STEP) 24V 2 PHASE	TORQUE CHARACTERISTICS VS. PULSE RATE (MICRO-STEP) 24V 1/4 DIVISIONS	VIBRATION CHARACTERISTICS (MICRO-STEP DRIVEN)
KT42EM4 -551			
KT42HM4 -551			
KT42HM4 -552			
KT42JM4 -551			
KT42JM4 -552			

■ CONNECTION CABLE TO MOTOR unit = mm (inch) (Except for KT42EM4-551)





PIN No.	LEAD COLOR
1	YELLOW
2	
3	BLUE
4	
5	
6	
7	RED

3–Phase Hybrid Stepping Motor 0.6°

KT60 series *TRISYN*

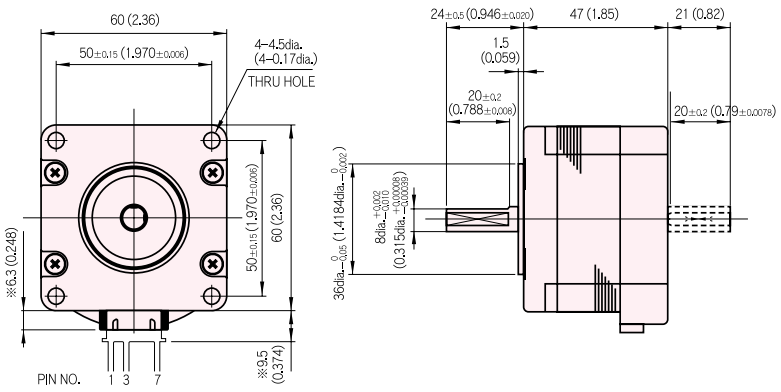
HIGH TORQUE, SILENT ROTATION

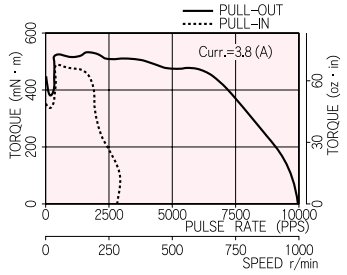
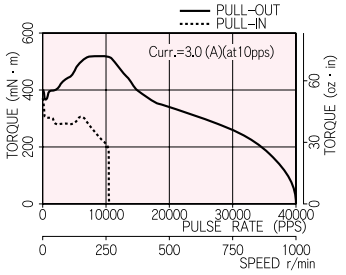
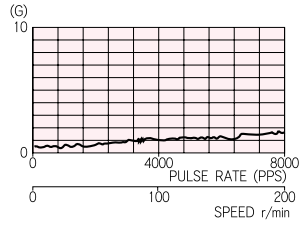
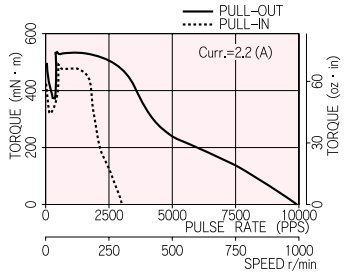
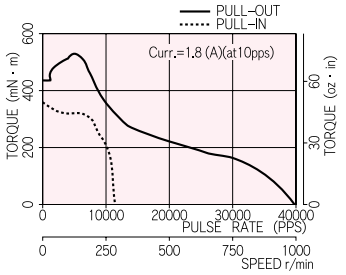
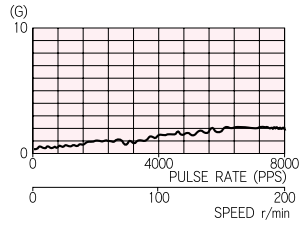
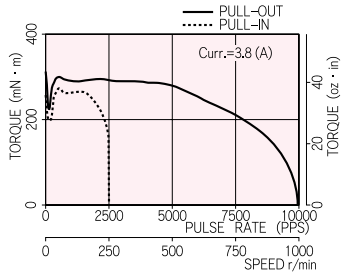
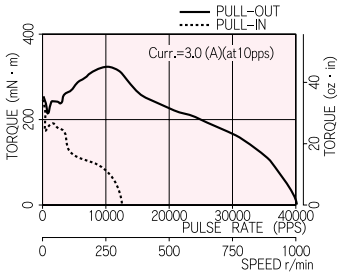
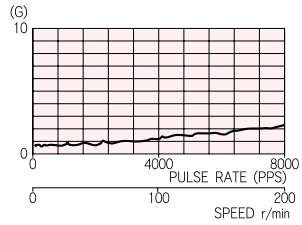
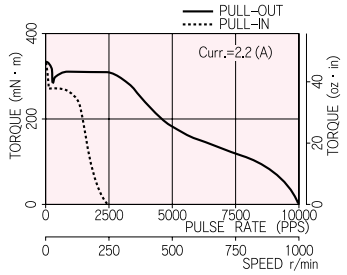
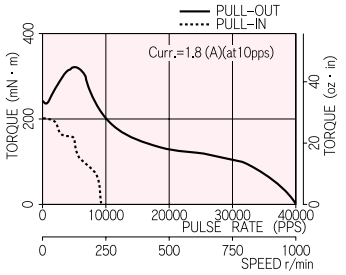
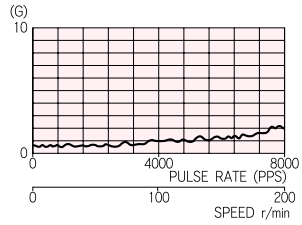
■ STANDARD SPECIFICATIONS

MODEL	UNIT	KT60KM06			
		–551	–552	–751	–752
DRIVE METHOD	————	BI–POLAR			
NUMBER OF PHASES	————	3			
STEP ANGLE	deg./step	0.6			
VOLTAGE	V	2.09	3.52	2.09	3.52
CURRENT	A/2–PHASE	3.8	2.2	3.8	2.2
WINDING RESISTANCE	Ω/2–PHASE	0.55	1.6	0.55	1.6
INDUCTANCE	mH/2–PHASE	1.0	3.0	1.0	3.1
HOLDING TORQUE	mN · m	500	500	300	300
	oz · in	69	69	42	42
DETENT TORQUE	mN · m	20	20	10	10
	oz · in	2.8	2.8	1.4	1.4
ROTOR INERTIA	g · cm^2	170	170	170	170
	oz · in^2	0.93	0.93	0.93	0.93
WEIGHTS	g	510	510	510	510
	lb	1.1	1.1	1.1	1.1
INSULATION CLASS	————	JIS Class E (120℃ 248° F)(UL VALUE:CLASS B 130℃ 266° F)			
INSULATION RESISTANCE	————	500VDC 100MΩ min.			
DIELECTRIC STRENGTH	————	500VAC 50HZ 1min.			
OPERATING TEMP. RANGE	℃	–10 to 50			
ALLOWABLE TEMP. RISE	deg.	70			

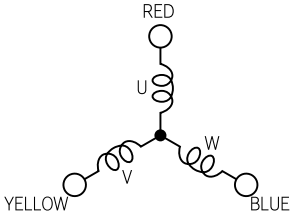
KT60KM06

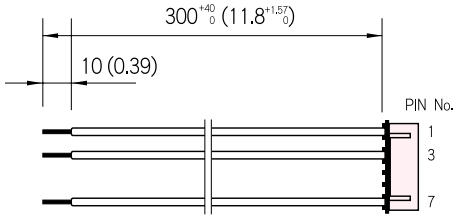
■ DIMENSIONS unit = mm (inch)



	TORQUE CHARACTERISTICS VS. PULSE RATE (FULL STEP) 24V 2 PHASE J:142g·cm² (0.78oz·in²)	TORQUE CHARACTERISTICS VS. PULSE RATE (MICRO-STEP) 24V 1/4 DIVISIONS J:142g·cm² (0.78oz·in²)	VIBRATION CHARACTERISTICS (MICRO-STEP DRIVEN)
KT60KM06 -551			
KT60KM06 -552			
KT60KM06 -751			
KT60KM06 -752			

■ CONNECTION CABLE TO MOTOR unit = mm (inch)





PIN No.	LEAD COLOR
1	YELLOW
2	
3	BLUE
4	
5	
6	
7	RED

3-Phase Hybrid Stepping Motor 0.6°

KT60 series *TRISYN*

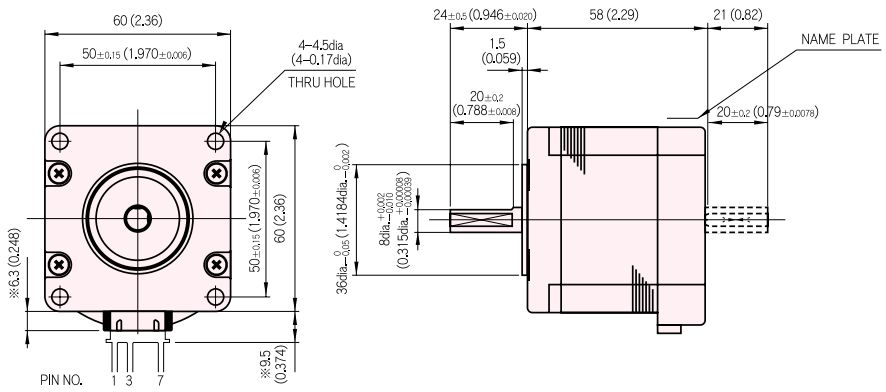
HIGH TORQUE, SILENT ROTATION

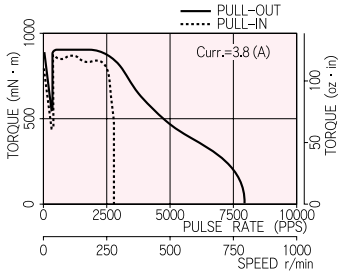
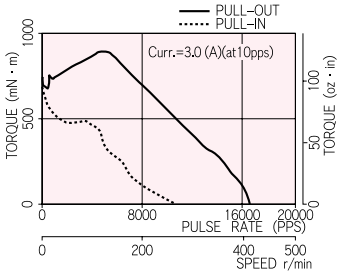
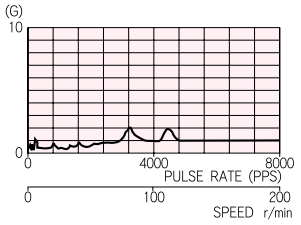
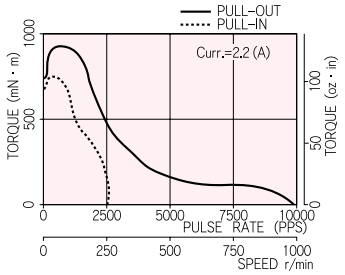
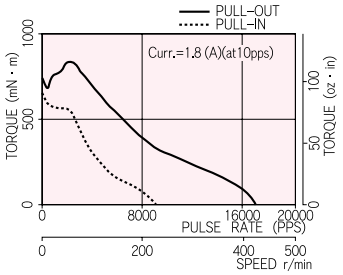
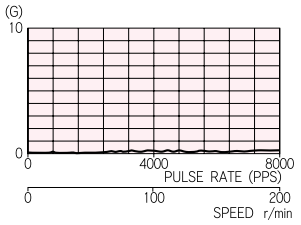
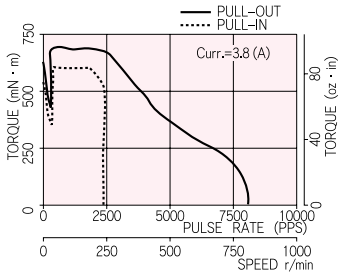
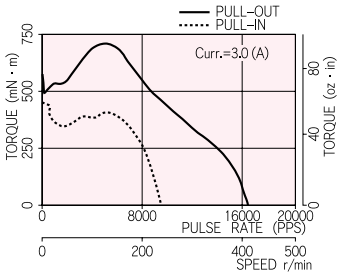
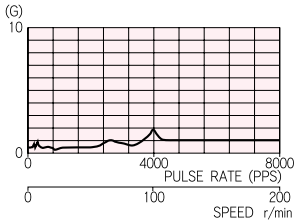
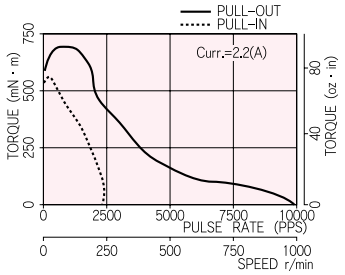
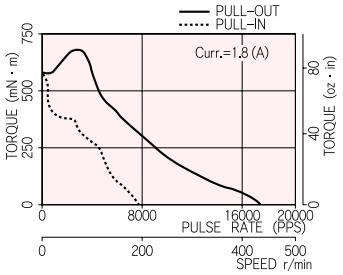
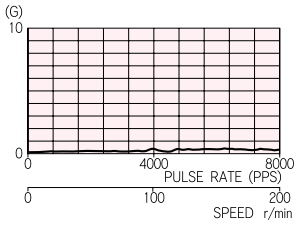
■ STANDARD SPECIFICATIONS

MODEL	UNIT	KT60LM06			
		-551	-552	-751	-752
DRIVE METHOD	————	BI-POLAR			
NUMBER OF PHASES	————	3			
STEP ANGLE	deg./step	0.6			
VOLTAGE	V	2.77	4.84	2.77	4.84
CURRENT	A/2-PHASE	3.8	2.2	3.8	2.2
WINDING RESISTANCE	Ω/2-PHASE	0.73	2.2	0.73	2.2
INDUCTANCE	mH/2-PHASE	1.7	5.6	1.8	5.7
HOLDING TORQUE	mN · m	900	900	600	600
	oz · in	125	125	83	83
DETENT TORQUE	mN · m	25	25	15	15
	oz · in	3.5	3.5	2.1	2.1
ROTOR INERTIA	g · cm^2	265	265	265	265
	oz · in^2	1.45	1.45	1.45	1.45
WEIGHTS	g	720	720	720	720
	lb	1.6	1.6	1.6	1.6
INSULATION CLASS	————	JIS Class E (120℃ 248° F)(UL VALUE:CLASS B 130℃ 266° F)			
INSULATION RESISTANCE	————	500VDC 100MΩ min.			
DIELECTRIC STRENGTH	————	500VAC 50HZ 1min.			
OPERATING TEMP. RANGE	℃	-10 to 50			
ALLOWABLE TEMP. RISE	deg.	70			

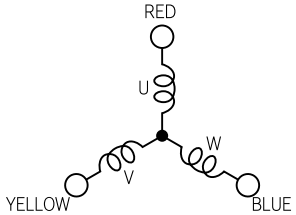
KT60LM06

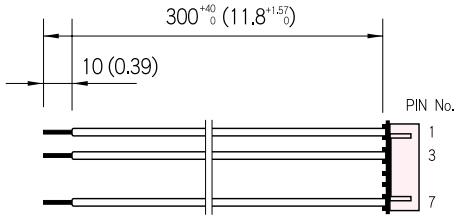
■ DIMENSIONS unit = mm (inch)



	TORQUE CHARACTERISTICS VS. PULSE RATE (FULL STEP) 24V 2 PHASE J:142g·cm² (0.78oz·in²)	TORQUE CHARACTERISTICS VS. PULSE RATE (MICRO-STEP) 24V 1/4 DIVISIONS J:142g·cm² (0.78oz·in²)	VIBRATION CHARACTERISTICS (MICRO-STEP DRIVEN)
KT60LM06 -551			
KT60LM06 -552			
KT60LM06 -751			
KT60LM06 -752			

■ CONNECTION CABLE TO MOTOR unit = mm (inch)





PIN No.	LEAD COLOR
1	YELLOW
2	
3	BLUE
4	
5	
6	
7	RED

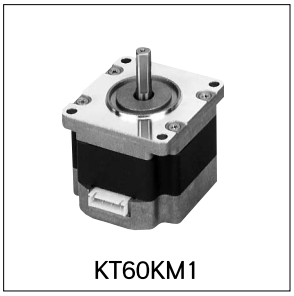
3–Phase Hybrid Stepping Motor 1.2°

KT60 series *TRISYN*

HIGH TORQUE, SILENT ROTATION

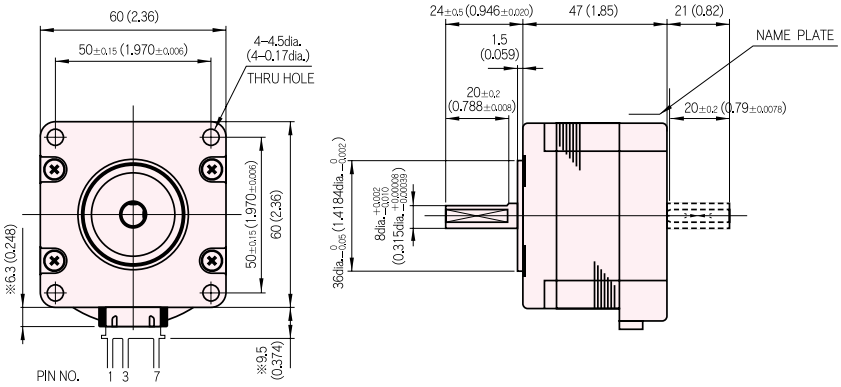
■ STANDARD SPECIFICATIONS

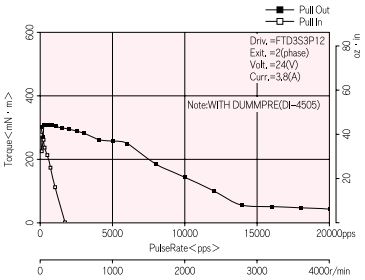
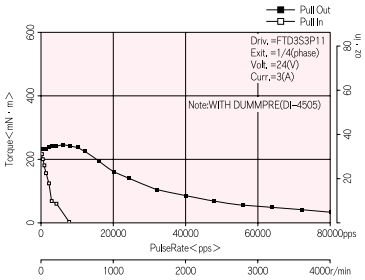
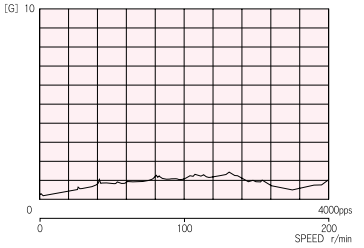
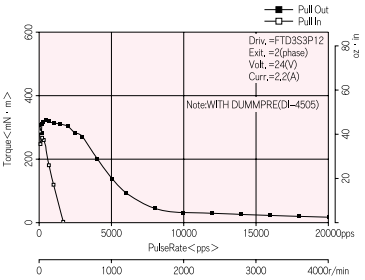
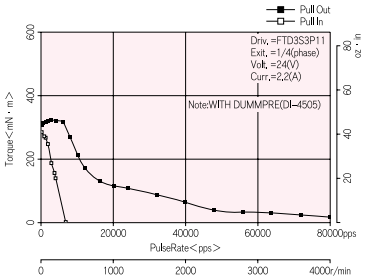
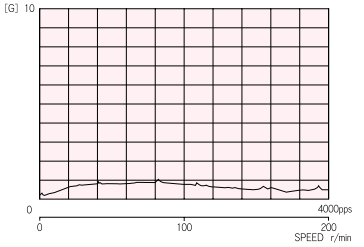
MODEL	UNIT	KT60KM1	
		–551	–552
DRIVE METHOD	————	BI–POLAR	
NUMBER OF PHASES	————	3	
STEP ANGLE	deg./step	1.2	
VOLTAGE	V	2.09	3.52
CURRENT	A/2–PHASE	3.8	2.2
WINDING RESISTANCE	Ω/2–PHASE	0.55	1.6
INDUCTANCE	mH/2–PHASE	0.8	2.5
HOLDING TORQUE	mN · m	320	320
	oz · in	45.3	45.3
DETENT TORQUE	mN · m	20	20
	oz · in	2.8	2.8
ROTOR INERTIA	g · cm^2	170	170
	oz · in^2	0.93	0.93
WEIGHTS	g	510	510
	lb	1.1	1.1
INSULATION CLASS	————	JIS Class E (120℃ 248° F)(UL VALUE:CLASS B 130℃ 266° F)	
INSULATION RESISTANCE	————	500VDC 100MΩ min.	
DIELECTRIC STRENGTH	————	500VAC 50HZ 1min.	
OPERATING TEMP. RANGE	℃	–10 to 50	
ALLOWABLE TEMP. RISE	deg.	70	



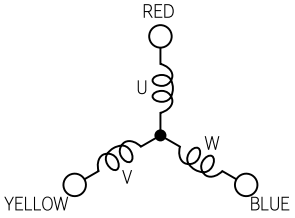
KT60KM1

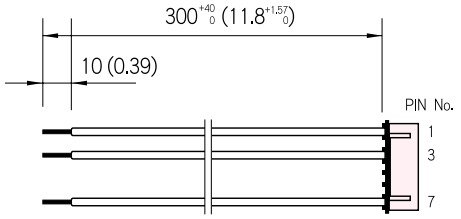
■ DIMENSIONS unit = mm (inch)



	TORQUE CHARACTERISTICS VS. PULSE RATE (FULL STEP) 24V 2 PHASE J:142g·cm² (0.78oz·in²)	TORQUE CHARACTERISTICS VS. PULSE RATE (MICRO-STEP) 24V 1/4 DIVISIONS J:142g·cm² (0.78oz·in²)	VIBRATION CHARACTERISTICS (MICRO-STEP DRIVEN)
KT60KM1 -551			
KT60KM1 -552			

■ CONNECTION CABLE TO MOTOR unit = mm (inch)





PIN No.	LEAD COLOR
1	YELLOW
2	
3	BLUE
4	
5	
6	
7	RED

3–Phase Hybrid Stepping Motor 1.2°

KT60 series *TRISYN*

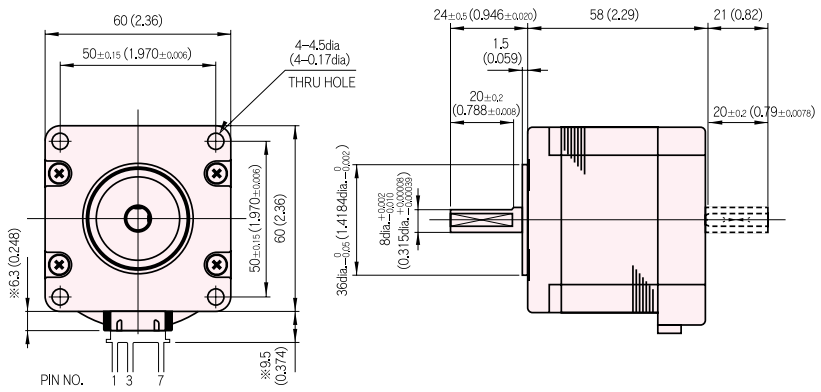
HIGH TORQUE, SILENT ROTATION

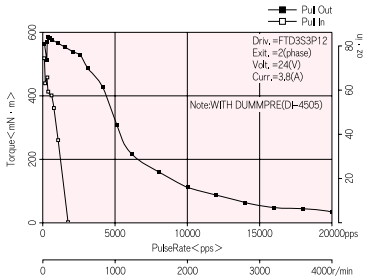
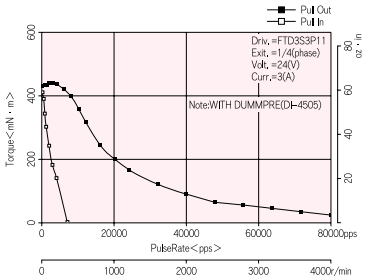
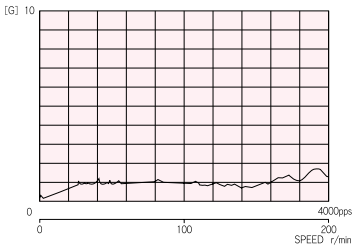
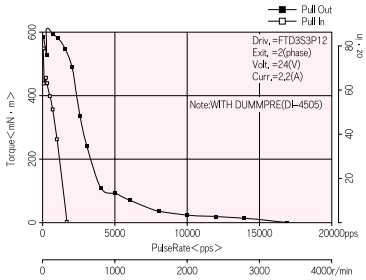
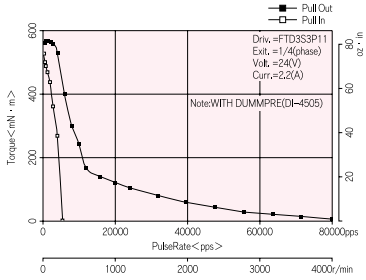
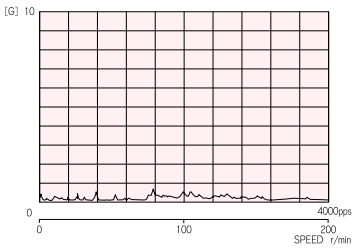
■ STANDARD SPECIFICATIONS

MODEL	UNIT	KT60LM1	
		–551	–552
DRIVE METHOD	————	BI–POLAR	
NUMBER OF PHASES	————	3	
STEP ANGLE	deg./step	1.2	
VOLTAGE	V	2.77	4.84
CURRENT	A/2–PHASE	3.8	2.2
WINDING RESISTANCE	Ω/2–PHASE	0.73	2.2
INDUCTANCE	mH/2–PHASE	1.0	3.3
HOLDING TORQUE	mN · m	600	600
	oz · in	85	85
DETENT TORQUE	mN · m	25	25
	oz · in	3.5	3.5
ROTOR INERTIA	g · cm^2	265	265
	oz · in^2	1.45	1.45
WEIGHTS	g	720	720
	lb	1.6	1.6
INSULATION CLASS	————	JIS Class E (120℃ 248˚ F)(UL VALUE:CLASS B 130℃ 266˚ F)	
INSULATION RESISTANCE	————	500VDC 100MΩ min.	
DIELECTRIC STRENGTH	————	500VAC 50HZ 1min.	
OPERATING TEMP. RANGE	℃	–10 to 50	
ALLOWABLE TEMP. RISE	deg.	70	

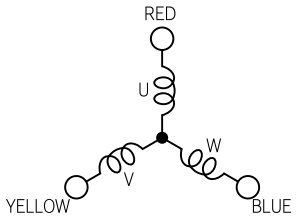
KT60LM06

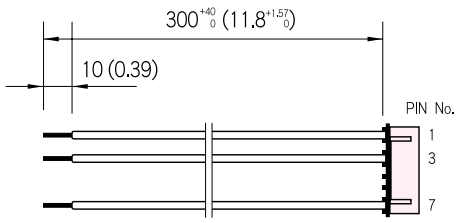
■ DIMENSIONS unit = mm (inch)



	TORQUE CHARACTERISTICS VS. PULSE RATE (FULL STEP) 24V 2 PHASE J:142g·cm² (0.78oz·in²)	TORQUE CHARACTERISTICS VS. PULSE RATE (MICRO-STEP) 24V 1/4 DIVISIONS J:142g·cm² (0.78oz·in²)	VIBRATION CHARACTERISTICS (MICRO-STEP DRIVEN)
KT60LM1 -551			
KT60LM1 -552			

■ CONNECTION CABLE TO MOTOR unit = mm (inch)





PIN No.	LEAD COLOR
1	YELLOW
2	
3	BLUE
4	
5	
6	
7	RED

3-Phase Hybrid Stepping Motor 1.2°

KT86 series *TRISYN*

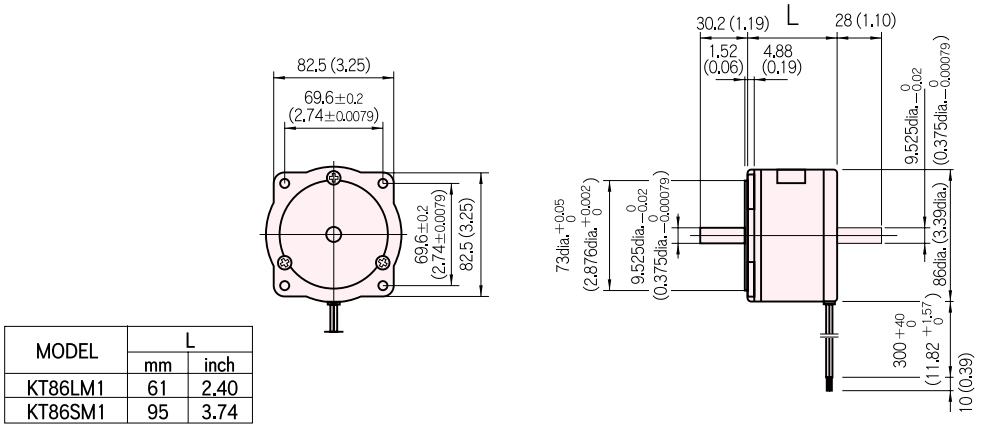
HIGH TORQUE, SILENT ROTATION

■ STANDARD SPECIFICATIONS

MODEL	UNIT	KT86LM1 -551(SINGLE SHAFT) -561(DOUBLE SHAFT)	KT86SM1 -551(SINGLE SHAFT) -561(DOUBLE SHAFT)
DRIVE METHOD	————	BI-POLAR	
NUMBER OF PHASES	————	3	
STEP ANGLE	deg./step	1.2	
VOLTAGE	V	5.4	7.0
CURRENT	A/2-PHASE	3	2.5
WINDING RESISTANCE	A/2-PHASE	1.8	2.8
INDUCTANCE	mH/2-PHASE	18	36.6
HOLDING TORQUE	N · m	2.0	4.0
	oz · in	278	556
DETENT TORQUE	N · m	0.1	0.2
	oz · in	13.9	27.8
ROTOR INERTIA	g · cm²	670	1340
	oz · in²	3.67	7.34
WEIGHTS	kg	1.6	2.1
	lb	3.52	4.63
INSULATION CLASS	————	JIS Class E (120℃ 248° F) (UL VALUE:CLASS B 130℃ 266° F)	
INSULATION RESISTANCE	————	500VDC 100MΩmin.	
DIELECTRIC STRENGTH	————	500VAC 50HZ 1min.	
OPERATING TEMP. RANGE	℃	-10 to 50	
ALLOWABLE TEMP. RISE	deg.	70	

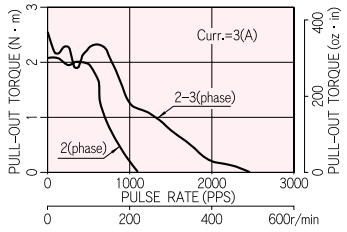
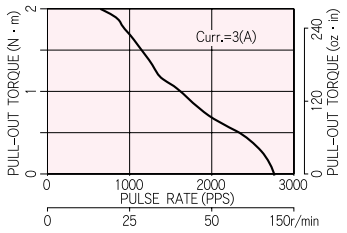
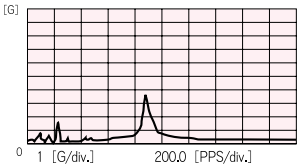
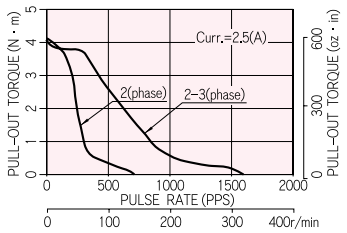
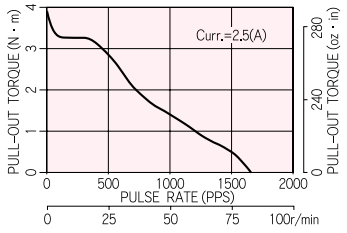
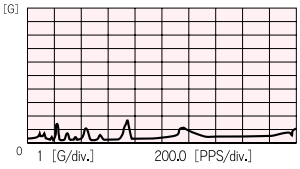
KT86LM1/SM1

■ DIMENSIONS unit = mm (inch)

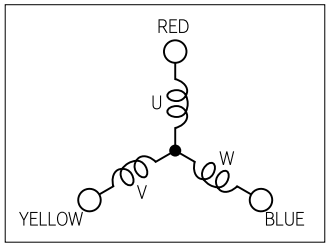


MODEL	L	
	mm	inch
KT86LM1	61	2.40
KT86SM1	95	3.74

KT86LM1/SM1

TORQUE CHARACTERISTICS VS. PULSE RATE (FULL STEP) 24V KT86LM1	
TORQUE CHARACTERISTICS VS. PULSE RATE (MICRO-STEP) 24V 1/4 divisions KT86LM1	
VIBRATION CHARACTERISTICS (MICRO-STEP DRIVEN) KT86LM1	
TORQUE CHARACTERISTICS VS. PULSE RATE (FULL STEP) 24V KT86SM1	
TORQUE CHARACTERISTICS VS. PULSE RATE (MICRO-STEP) 24V 1/4 divisions KT86SM1	
VIBRATION CHARACTERISTICS (MICRO-STEP DRIVEN) KT86SM1	

■ Connection Diagram



3–Phase Hybrid Stepping Motor 3.75°

KR42 series *TRISYN*

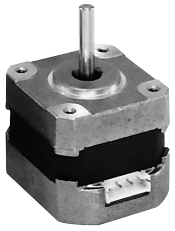
HIGH TORQUE, LOW VIBRATION AND LOW OPERATING NOISE

■ STANDARD SPECIFICATIONS

MODEL	UNIT	KR42HM4	
		–551	–552
NUMBER OF PHASES	————	3	
STEP ANGLE	deg./step	3.75	
VOLTAGE	V	2.8	4.42
CURRENT	A/2–PHASE	2	1.3
WINDING RESISTANCE	Ω/2–PHASE	1.4	3.4
INDUCTANCE	mH/2–PHASE	1.7	4.0
HOLDING TORQUE	mN・m	※1 49	※2 49
	oz・in	6.9	6.9
DETENT TORQUE	mN・m	9.8	9.8
	oz・in	1.4	1.4
ROTOR INERTIA	g・cm²	31	31
	oz・in²	0.17	0.17
WEIGHTS	kg	0.19	0.19
	lb	0.42	0.42
INSULATION CLASS	————	JIS Class E (120℃ 248° F)(UL VALUE:CLASS B 130℃ 266° F)	
INSULATION RESISTANCE	————	500VDC 100MΩmin.	
DIELECTRIC STRENGTH	————	500VAC 50HZ 1 min.	
OPERATING TEMP. RANGE	℃	–10 to 50	
ALLOWABLE TEMP. RISE	deg.	70	

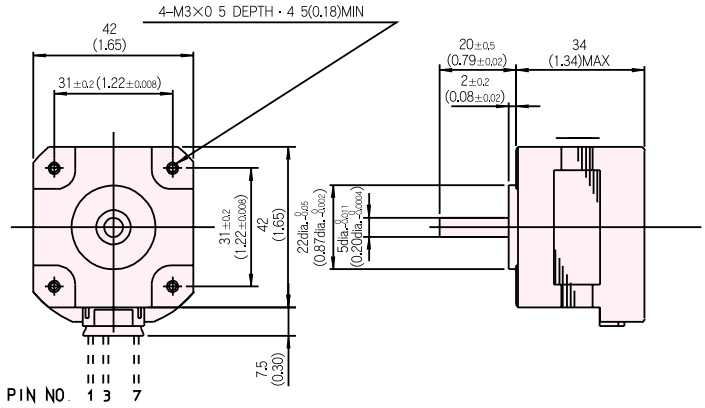
※1 : 2A/2–Phase

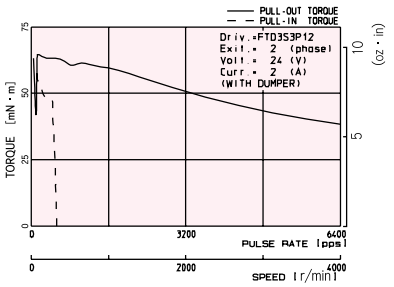
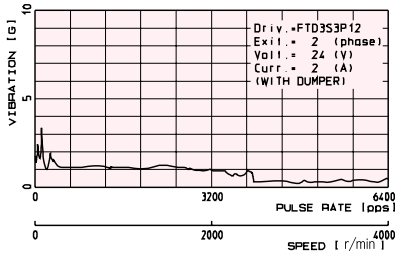
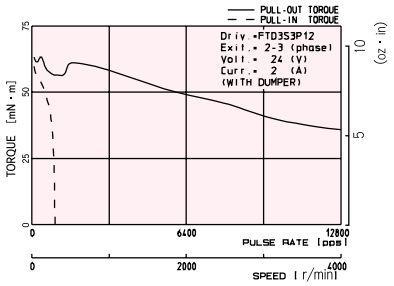
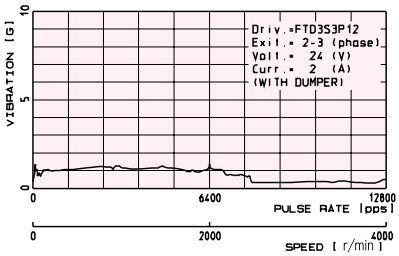
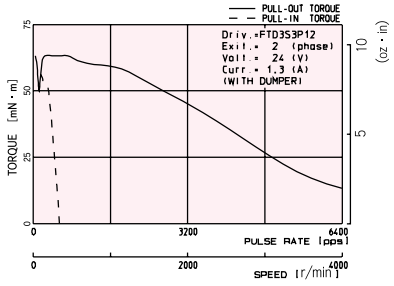
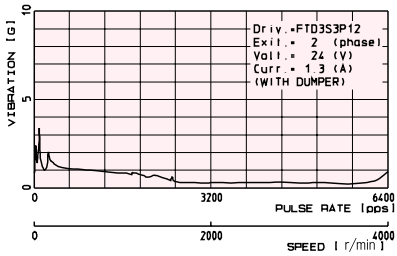
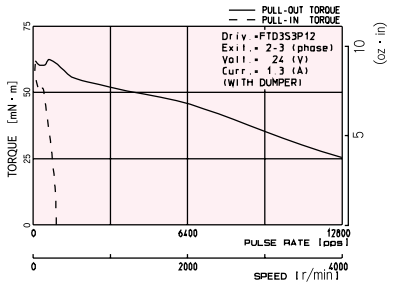
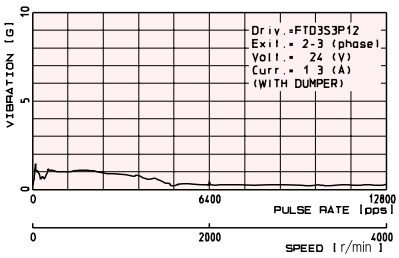
※2 : 1.3A/2–Phase



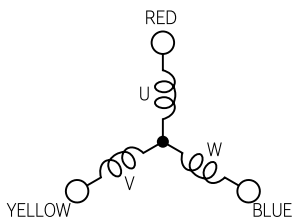
KR42HM4

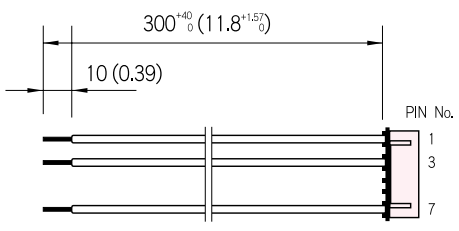
■ DIMENSIONS unit = mm (inch)



		TORQUE CHARACTERISTICS VS. PULSE RATE	VIBRATION CHARACTERISTICS
KR42HM4 –551	2PHASE EXCITATION		
	2-3PHASE EXCITATION		
KR42HM4 –552	2PHASE EXCITATION		
	2-3PHASE EXCITATION		

■ CONNECTION CABLE TO MOTOR unit = mm (inch) (Except for KT42EM4–551)





PIN No.	LEAD COLOR
1	YELLOW
2	
3	BLUE
4	
5	
6	
7	RED

3–Phase Hybrid Stepping Motor 3.75°

KR42 series *TRISYN*

HIGH TORQUE, LOW VIBRATION AND LOW OPERATING NOISE

■ STANDARD SPECIFICATIONS

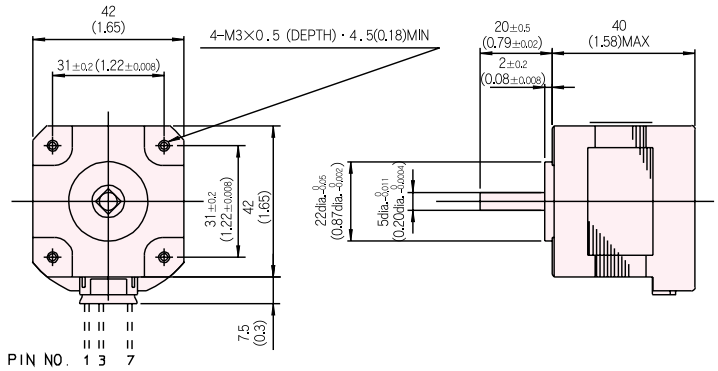
MODEL	UNIT	KR42JM4	
		–551	–552
NUMBER OF PHASES	————	3	
STEP ANGLE	deg./step	3.75	
VOLTAGE	V	3.5	5.16
CURRENT	A/2–PHASE	2	1.2
WINDING RESISTANCE	Ω/2–PHASE	1.75	4.3
INDUCTANCE	mH/2–PHASE	2.1	8.7
HOLDING TORQUE	mN · m	※1 88	※2 88
	oz · in	12.5	12.5
DETENT TORQUE	mN · m	9.8	9.8
	oz · in	1.4	1.4
ROTOR INERTIA	g · cm²	45	45
	oz · in²	0.25	0.25
WEIGHTS	kg	0.24	0.24
	lb	0.53	0.53
INSULATION CLASS	————	JIS Class E (120℃ 248° F)(UL VALUE:CLASS B 130℃ 266° F)	
INSULATION RESISTANCE	————	500VDC 100MΩ min.	
DIELECTRIC STRENGTH	————	500VAC 50HZ 1 min.	
OPERATING TEMP. RANGE	℃	–10 to 50	
ALLOWABLE TEMP. RISE	deg.	70	

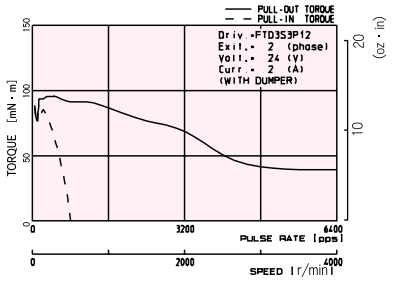
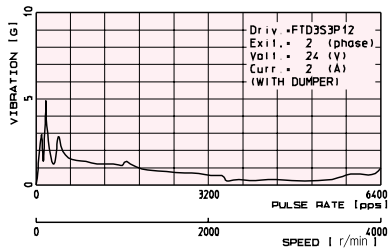
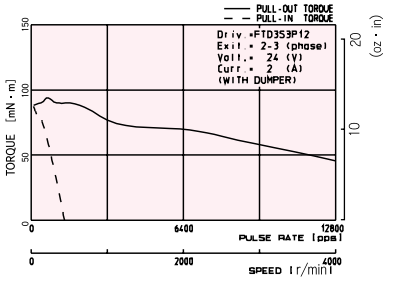
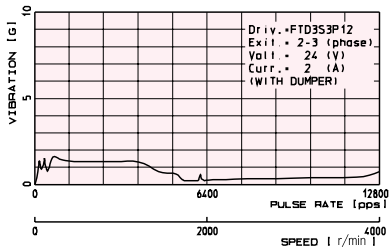
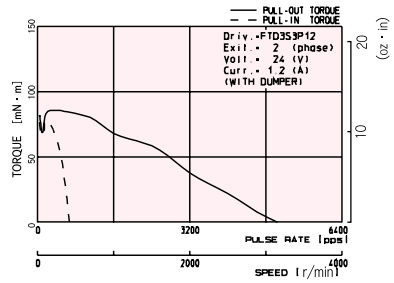
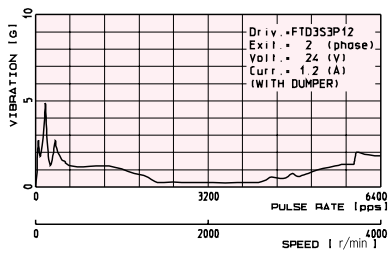
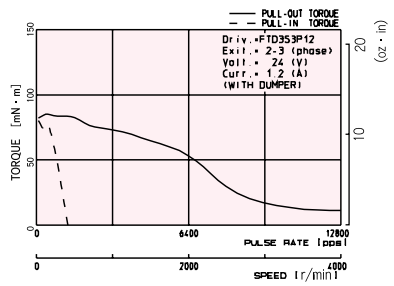
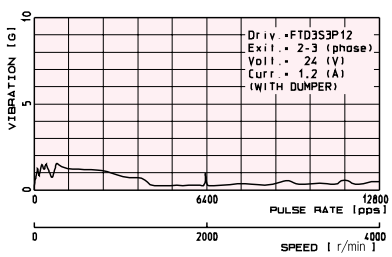
※ 1 : 2A/2–Phase

※ 2 : 1.3A/2–Phase

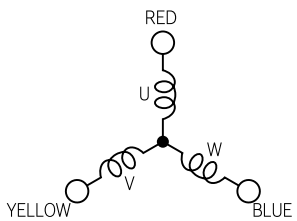
KR42JM4

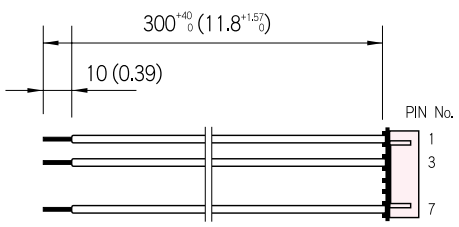
■ DIMENSIONS unit = mm (inch)



		TORQUE CHARACTERISTICS VS. PULSE RATE	VIBRATION CHARACTERISTICS
KR42JM4 –551	2PHASE EXCITATION		
	2-3PHASE EXCITATION		
KR42JM4 –552	2PHASE EXCITATION		
	2-3PHASE EXCITATION		

■ CONNECTION CABLE TO MOTOR unit = mm (inch) (Except for KT42EM4–551)





PIN No.	LEAD COLOR
1	YELLOW
2	
3	BLUE
4	
5	
6	
7	RED

3–Phase Hybrid Stepping Motor 3.75°

KR42 series *TRISYN*

HIGH TORQUE, LOW VIBRATION AND LOW OPERATING NOISE

■ STANDARD SPECIFICATIONS

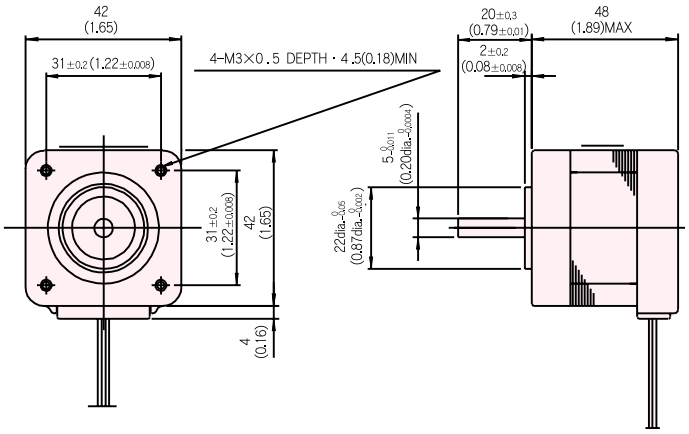
MODEL	UNIT	KR42KM4	
		–551	–552
NUMBER OF PHASES	————	3	
STEP ANGLE	deg./step	3.75	
VOLTAGE	V	3.5	6.5
CURRENT	A/2–PHASE	2.5	1.3
WINDING RESISTANCE	Ω/2–PHASE	1.40	5.0
INDUCTANCE	mH/2–PHASE	1.7	7.7
HOLDING TORQUE	mN・m	※1 118	※2 118
	oz・in	16.7	16.7
DETENT TORQUE	mN・m	9.8	9.8
	oz・in	1.4	1.4
ROTOR INERTIA	g・cm²	57	57
	oz・in²	0.31	0.31
WEIGHTS	kg	0.32	
	lb	0.70	
INSULATION CLASS	————	JIS Class E (120℃ 248° F)(UL VALUE:CLASS B 130℃ 266° F)	
INSULATION RESISTANCE	————	500VDC 100MΩmin.	
DIELECTRIC STRENGTH	————	500VAC 50HZ 1 min.	
OPERATING TEMP. RANGE	℃	–10 to 50	
ALLOWABLE TEMP. RISE	deg.	70	

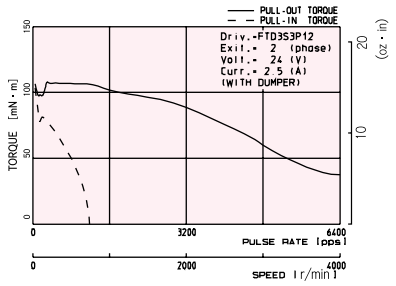
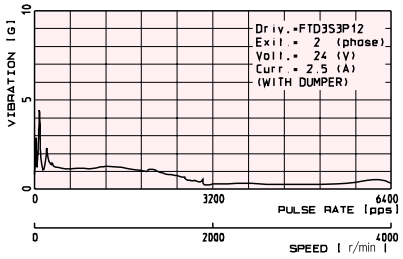
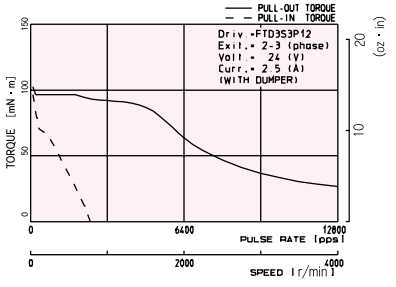
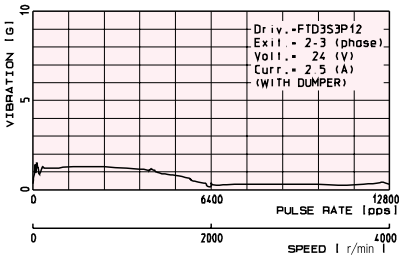
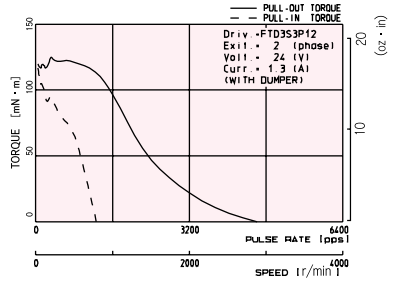
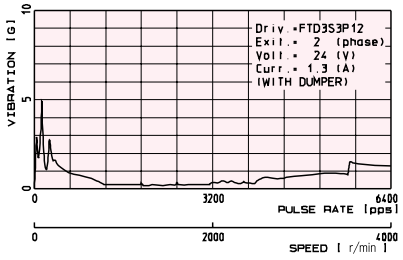
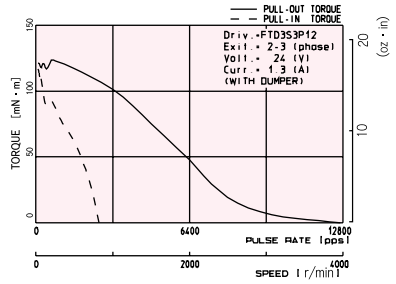
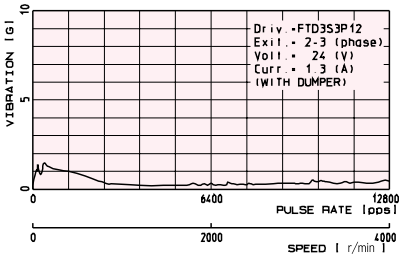
※1 : 2A/2–Phase

※2 : 1.3A/2–Phase

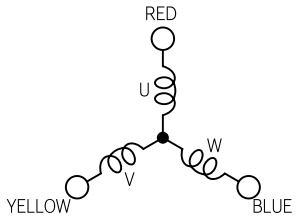
KR42KM4

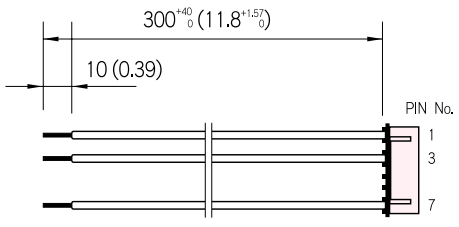
■ DIMENSIONS unit = mm (inch)



		TORQUE CHARACTERISTICS VS. PULSE RATE	TORQUE CHARACTERISTICS VS. PULSE RATE
KR42KM4 –551	2PHASE EXCITATION		
	2-3PHASE EXCITATION		
KR42KM4 –552	2PHASE EXCITATION		
	2-3PHASE EXCITATION		

■ CONNECTION CABLE TO MOTOR unit = mm (inch) (Except for KT42EM4–551)





PIN No.	LEAD COLOR
1	YELLOW
2	
3	BLUE
4	
5	
6	
7	RED

3-Phase Hybrid Stepping Motor Driver

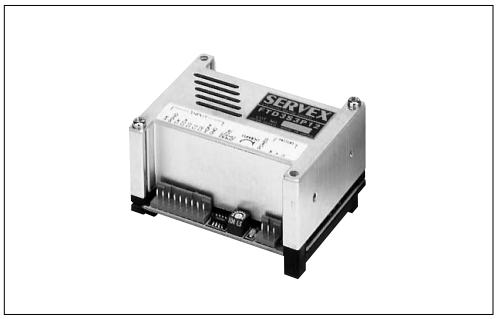
HIGH TORQUE, SILENT ROTATION
SERVEX FTD3S2P11-01 DC24V

Features

1. Enables motor rotate silently when micro step driven.
2. Free choice of step angles among 1/8, 1/4, 1/2 and 1/1.
3. High torque and high speed response achieved using the constant current driver.
4. Choice of input command between serial pulse signal for each rotating direction and direction signal with pulse signal.
5. A mechanism installed to suppress motor temperature rise by cutting motor current below 70% of the rated when the system stalls.
6. The input signal terminals include an H. OFF terminal that can cut the power to the motor allowing for free motion.

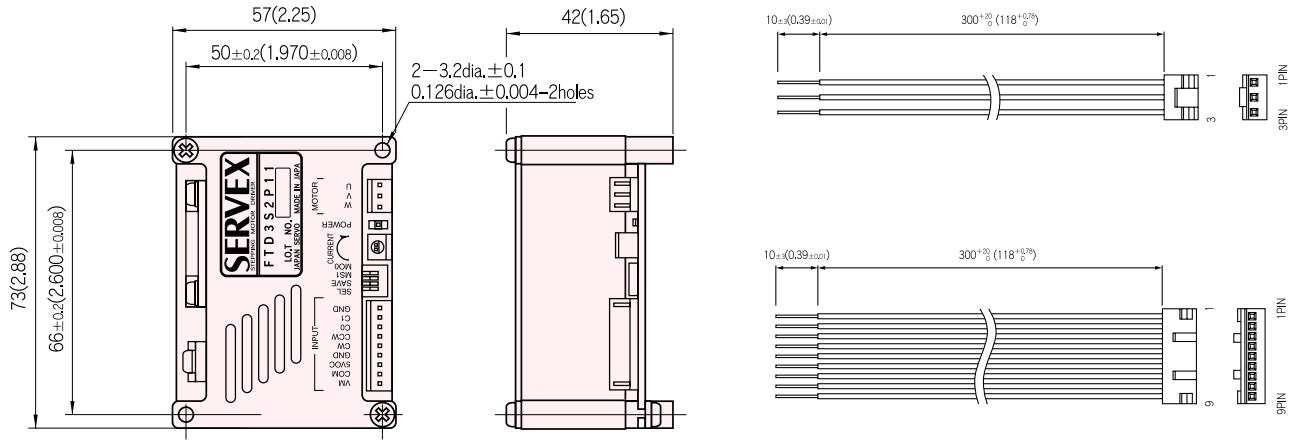
Applicable motors

KT42EM4-551
KT42HM4-551,552
KT42JM4-551,552
KT42EM06-551
KT42EM1-551
KT42HM06-551
KR42HM4-551,552
KR42JM4-551,552
KR42KM4-552



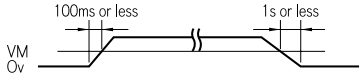
Dimensions

Unit = mm(inch)

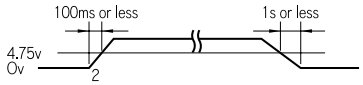


Power supply specifications

Motor power supply voltage(VM) : 21.6V~39.6V
Start up time



Logic power supply voltage(5VDC):5V±5%
Start up time



Motor output current; About 3A max.(different dependeing on the drive parameters of the motor being used)Reset time:3±2MS(Electric current does not pass through the motor during reset.)

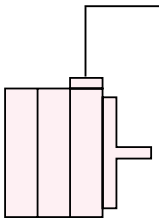
Connector specifications

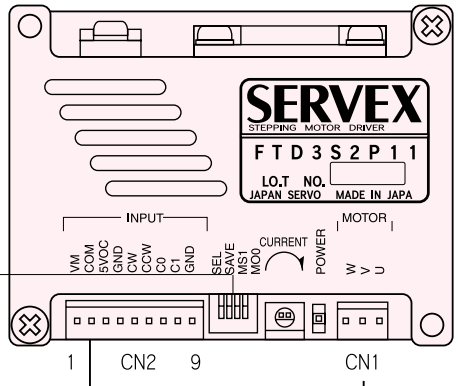
	FTD3S2P11-01side	User side		
	Model	Applicable housing	Applicable terminal (real)	Maker
CN_2	IL-G-9P-S3T2-E	IL-G-9S-S3C2	IL-G-2C-SC-10000	J·A·E
CN_1	IL-G-3P-S3T2-E	IL-G-3S-S3C2	IL-G-2C-SC-10000	J·A·E

Functions, Setting and Connections

Switch No.	Switch name	Function	Setting and operation				
1	SEL	Drive pulse format	OFF	CW/CCW pulse input			
			ON	Serial pulse/rotational direction CCW terminal= "H," Rotation in CCW direction CCW terminal= "L," Rotation in CW direction			
2	SAVE	Automatic power saving	OFF	NOT ENABLE motor output is reduced to 70% of the rated power.			
			ON	NOT ENABLE			
3	MS1	Micro step Number of divisions	Number of divisions	1/8	1/4	1/2	1/1
			MS1	ON	ON	OFF	OFF
4	MS0		MS0	ON	OFF	ON	OFF

Motor cable (attched)





Connector Name	Pin No.	Signal Name	Function
CN1	1	MOTOR W	To Motor phase – W
	2	MOTOR V	To Motor phase – V
	3	MOTOR U	To Motor phase – U

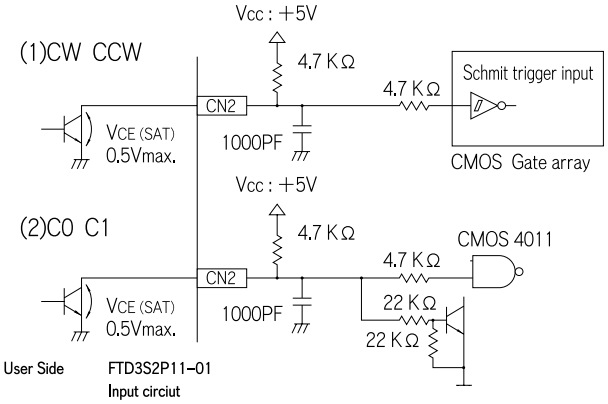
Power source connector

Connector Name	Pin No.	Signal Name	Function
CN2	1	VM	Motor power supply 12–36 Vdc
	2	COM	Motor power supply GND
	3	5VDC	Logic circuit power supply +5V
	4	GND	Logic circuit GND

Signal input connector

Connector name	Terminal number	Signal name	Connection			
CN2	5	CW	The CW direction drive pulse or the serial pulse signal input			
	6	CCW	The CCW direction drive pulse or the direction signal input			
	Current%		120~150	100	50~80	0
	7	C0	L	L	H	H
	8	C1	L	H	L	H
	9	GND	Signal GND			

Input circuit

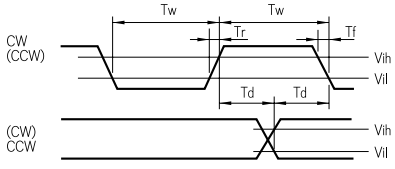


User Side FTD3S2P11–01
Input circuit

Input signal specifications

Item	Signal	Specification	
		MIN	MAX
High level input voltage	Vih (V)	4.0	Vcc+0.3
Low level input voltage	Vil (V)	–0.3	0.8
Rise time	Tr (μ S)	2.0	9.5
Fall time	Tf (μ S)	–	0.5
Low level maintenance	Twi (μ S)	10	–
High level maintenance	Twh (n S)	100	–

Note)Specified the voltage waveform between the user circuit ground and the FTD3S2P11–01 terminal.



3-Phase Hybrid Stepping Motor Driver

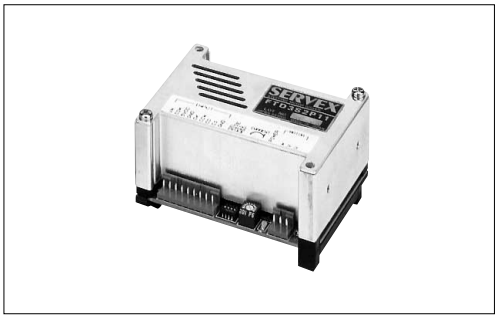
HIGH TORQUE, SILENT ROTATION
SERVEX FTD3S3P12-01 DC24V

Features

1. Ultra-compact driver measuring a mere 2.2 X 2.9 X 1.7inch.
2. Fixed-current driver makes it possible to obtain high torque and excellent responsiveness.
3. Input commands may be selected from either of direction-of-rotation separate serial pulse signals or a combination of directional signals and pulse signals.
4. Through the use of 3-bit external signals,electric current settings may be specified to any one of a range of 8 different settings from 0.55-3A/2-phase power.
5. The internal trimmer may also be used to adjust power settings even more precisely.
6. An automatic save feature is also provided which makes it possible to save from 45 to 60 percent of the power remaining at the time of shutdown to drive the motor, thus making it possible to prevent the temperature of the motor from rising.Input signal pins contain h. off pins which may be used to cut power to the engine, thus make it possible to free the motor.

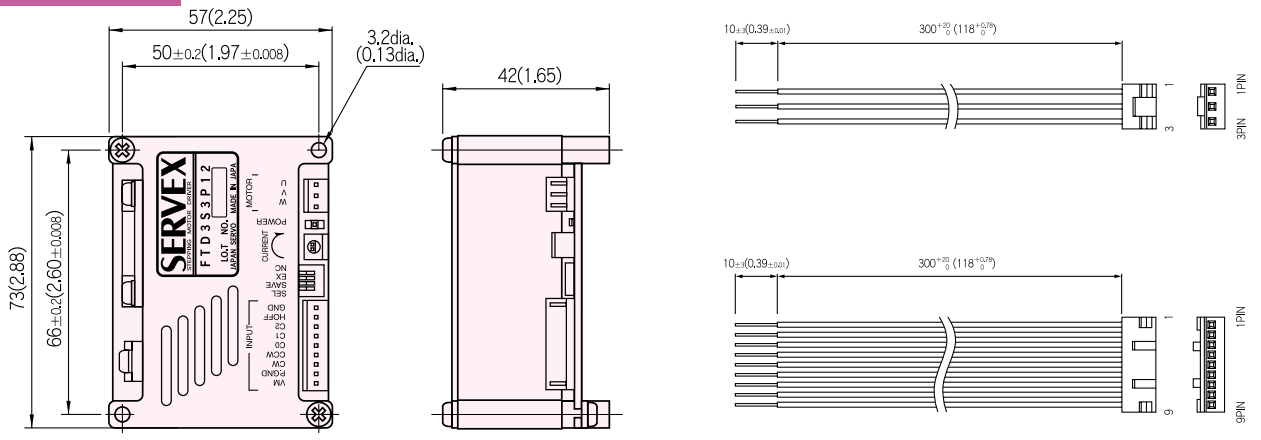
Applicable motors

KT35FM1-552
KT56JM4551,552,553,554
KT42EM4-551
KT56KM4-551,552,553
KT42HM4-551,552
KT56LM4-551,552,553
KT42JM4-551,552
KT60KM06-552,752
KT60LM06-552,752
KT86SM1-551

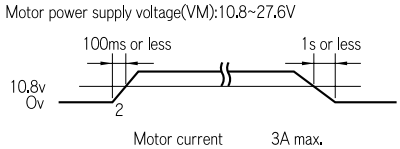


Dimensions

Unit = mm(inch)



Power supply specifications



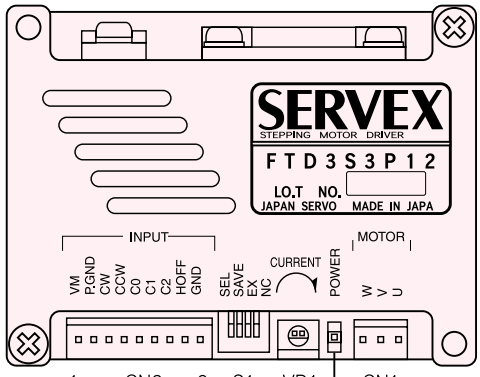
Connector specifications

	FTD3S3P12 side	Specification		Maker
	Model	Applicable Housing	Applicable terminal (real)	
CN_1	IL-G-9P-S3T2-E	IL-G-9S-S3C2	IL-G-C2-SC-10000	J.A.E
CN_2	IL-G-3P-S3T2-E	IL-G-3S-S3C2	IL-G-C2-SC-10000	J.A.E

Functions, Setting and Connections

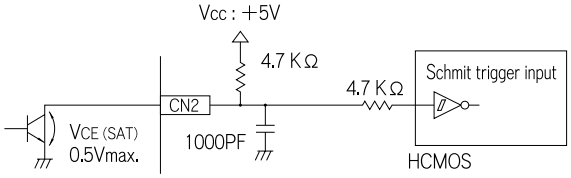
Connector Name	Pin No.	Signal Name	Function
CN2	1	VM	Motor power supply(to be connected to 12~24V power supply)
	2	P.GND	Motor power supply grounding wire(to be connected between and port and interior panel)
	3	CW	CW directional drive pulse and serial pulse signal input
	4	CCW	CCW directional drive pulse and direction-of-rotation signal input
	5	CO	Motor voltage setting "0"
	6	C1	Motor voltage setting "1"
	7	C2	Motor voltage setting "2"
	8	HOFF	Motor h. off signal input (H: state in which power is cut off to motor)
	9	GND	Signal GND

Connector Name	Pin No.	Signal Name	Function
CN1	1	MOTOR W	To be connected to W phase of 3-phase motor
	2	MOTOR V	To be connected to V phase of 3-phase motor
	3	MOTOR U	To be connected to U phase of 3-phase motor



Switch No.	Switch Name	Function	Switch position and operation					
1	SEL	Pulse input direction	OFF	CW/CCW pulse input				
			ON	Serial pulse/direction of rotation CCW pin = "L" : rotate in direction of CW CCW pin = "H" : rotate in direction of CCW				
2	SAVE	Automatic motor current save	OFF After 0.23 seconds after the termination of transmission of input pulses, the output current of the motor will be lowered to the current used during saves.	ENABLE			Motor current (A)	Save current (A)
				CO	C1	C2		
				H	H	H	0.55	0.25
				L	H	H	0.90	0.45
				H	L	H	1.25	0.70
				L	L	H	1.60	0.95
				H	H	L	1.95	1.20
				L	H	L	2.30	1.40
				H	L	L	2.65	1.60
				L	L	L	3.00	1.80
			ON	NOT ENABLE(Disengaged)				
3	EX	Excitation method	OFF	Full-step (2-phase excitation)				
			OFF	Half-step (2-3 phase excitation)				
4	NC	Not connected						

Input circuit

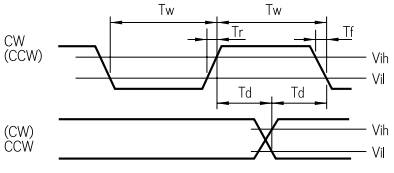


User Side FTD3S3P12-01 Input Circuit

Input signal specifications

Item	Signal	Specification	
		MIN	MAX
High level input voltage	Vih(V)	4.0	5.3
Low level input voltage	Vil(V)	-0.3	0.9
Rise time	Tr(μ s)	2.0	9.5
Fall time	Tf(μ s)	—	0.5
Input Pulse Range	Twl(μ s)	10	—
Direction of Rotation change Timing	Td(ns)	100	—

Note)Specified the voltage waveform between the user circuit ground and the FTD3S3P12-01 terminal



3-Phase Hybrid Stepping Motor Driver

HIGH TORQUE, SILENT ROTATION
SERVEX FTD3S3P14-01 DC24V

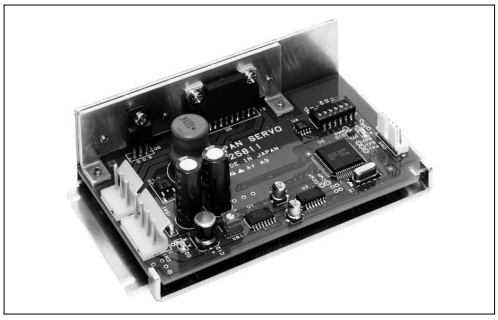
Features

1. Micro-step drive makes for quite operation.
2. Stepping angles may be selected from any one of 1/8, 1/4, 1/2, and 1/1 settings.
3. Fixed-current driver makes it possible to obtain high torque and excellent responsiveness.
4. Input commands may be selected from either of direction-of-rotation separate serial pulse signals or a combination of directional signals and pulse signals.
5. A feature is also provided which makes it possible to save from 70 percent of the power remaining at the time of shutdown, thus making it possible to prevent the temperature of the motor from rising.
6. Input signal pins contain h. off pins which may be used to cut power to the engine, thus make it possible to free the motor.

Applicable motors

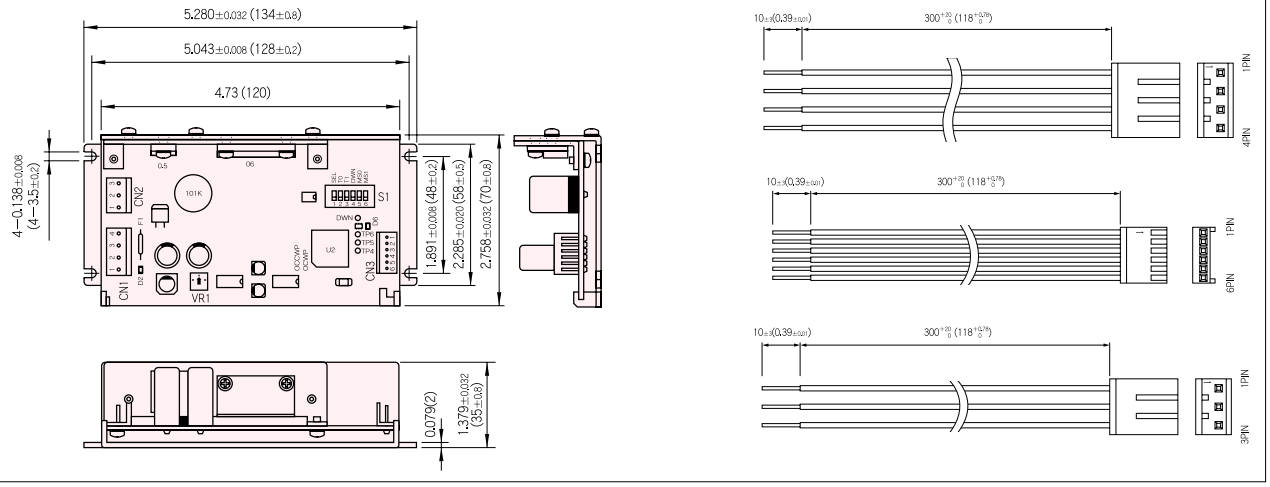
KT35FM1-552
KT56JM4551,552,553,554
KT42EM4-551
KT56KM4-551,552,553
KT42HM4-551,552
KT56LM4-551,552,553

KT42JM4-551,552
KT60KM06-552,752
KT60LM06-552,752
KT86SM1-551



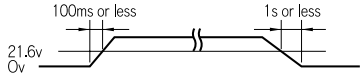
Dimensions

Unit = mm(inch)

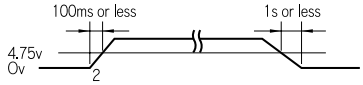


Power supply specifications

Motor power supply voltage(VM) : 21.6V~39.6V
Start up time



Logic power supply voltage(5VDC) : 5V±5%
Start up time



Motor output current; About 3A max.(different dependeing on the drive parameters of the motor being used)

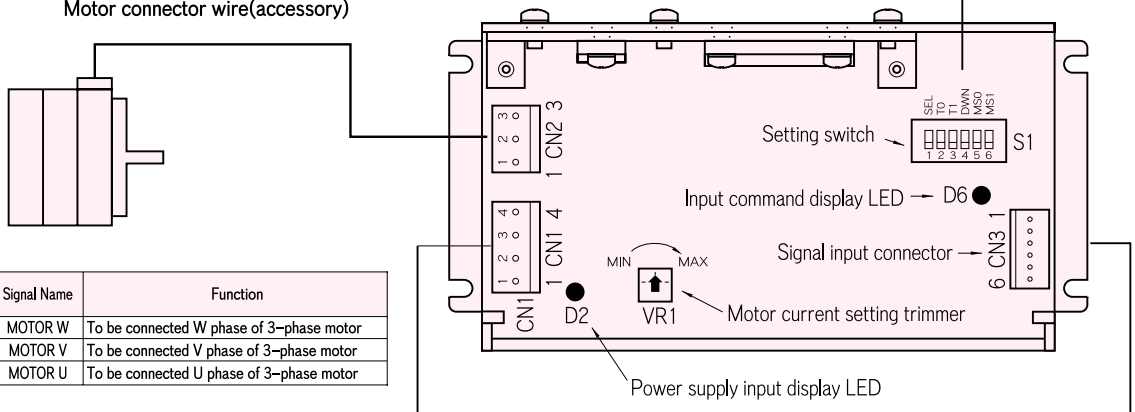
Connector specifications

	FTD3S3P11-01 side	User side		Maker
	Model	Applicable housing	Applicable terminal (real)	
CN1	5281-04A	5258-04	5168T or 5168TL	Molex
CN2	5281-03A	5258-03	5168T or 5168TL	Molex
CN3	5045-06A	5051-06	5159T or 5159TL	Molex

Functions, Setting and Connections

Switch No.	Switch name	Function	Setting and operation				
1	SEL	Pulse input direction	OFF	CW/CCW pulse input			
			ON	Serial pulse/rotational direction CCW terminal= "H," Rotation in CCW direction CCW terminal= "L," Rotation in CW direction			
2	T0	Time interval between drive pulse stop and motor current save	TIME(S)	1.04~2.08	0.52~1.04	0.26~0.52	0.13~0.26
			T0	OFF	OFF	ON	ON
3	T1		T1	OFF	ON	OFF	ON
4	DWN	Selection of automatic motor current save function	OFF	ENABLE After the time set by T0 and T1 elapsed, motor output is reduced to 70% of the VR1.			
			ON	NOT ENABLE			
5	MS0	Setting for the number of microstep divisions	Number of divisions	1/8	1/4	1/2	1/1
			MS0	ON	OFF	ON	OFF
6	MS1		MS1	ON	ON	OFF	OFF

Motor connector wire(accessory)



Connector Name	Pin No.	Signal Name	Function
CN2	1	MOTOR W	To be connected W phase of 3–phase motor
	2	MOTOR V	To be connected V phase of 3–phase motor
	3	MOTOR U	To be connected U phase of 3–phase motor

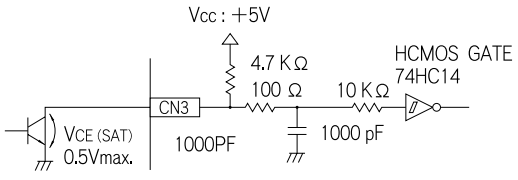
Power source connector

Connector Name	Terminal number	Signal Name	Connection
CN1	1	5VDC	Logic circuit power supply +5V
	2	GND	Logic circuit GND
	3	VM	Motor power supply 24–36V
	4	COM	Motor power supply GND (connected to GND within board)

Signal input connector

Connector name	Terminal number	Signal name	Connection
CN3	1	CW	CW direction drive pulse or serial pulse signal input
	2	GND	Ground for CW
	3	CCW	CCW direction drive pulse or direction signal input
	4	GND	Ground for CCW
	5	H.OFF	Motor output off(motor free)
	6	GND	Ground for H.OFF56

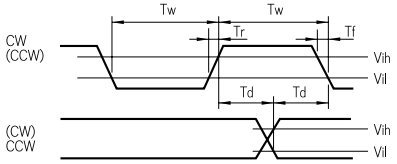
Input circuit



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	1.0
Rise time	Tr(μ s)	—	5.0
Fall time	Tf(μ s)	—	5.0
Input pulse range	Tw(μ s)	10	—
Direction of rotation change timing	Td(ns)	100	—

Note)Specified the voltage waveform between the user circuit ground and theFSD3S3P11–01terminal



Japan Servo Co., Ltd.

Certified as Japan's first ISO14001 small motor manufacturer

Quality, environment and safety have always remained as top priorities in Japan Servo's business policy. Our Urizura (Ibaraki Prefecture) production facility for fans and water circulation pumps was first approved for ISO9001 in March 1994 by Lloyd 's Register Quality. During the following year, the Kiryu (Gunma Prefecture) factory, centered on the production of a wide array of motors, was certified, along with the Hotaka (Nagano Prefecture) and Gunma (Gunma Prefecture) production affiliates. In 1997, another affiliate, Saitama Koki (Saitama Prefecture) became ISO9001 compliant. On the international forefront, Japan Servo Motors (S) Pte., Ltd. (Singapore) and P.T. Japan Servo Batam (Indonesia) have been ISO9002 since 1994.

As for meeting ISO14001 environmental standards, an environmental management committee was organized in 1996 to launch a company wide effort under the slogan, "Working together towards a clean environment in the future." Five fundamental principles center around the continual improvement of the environment :

- Scrap recycling and improved industrial waste treatment
- On-going sewage PH surveillance system
- Standardized motor parts for reusage
- Light-weight downsizing of products
- Design of high efficiency motors

Our policies, commitment and close adherence to these fundamental principles have contributed significantly to receiving ISO14001 safety approval for our Kiryu site, including the factory, laboratory, and Servo Techno System Co., Ltd. facility, following the audit by JACO, a Japanese environmental certification organization. We are proud of being the first Japanese small motor manufacturer to receive this level of qualification.

	Facility	Certificate No.	Dated
ISO9001	Urizura Operation	930229	Mar. 1994
	Kiryu Operation	930231	Mar. 1994
	Japan Servo Hotaka Co., Ltd.	941887	Aug. 1995
	Japan Servo Gunma Co., Ltd.	946447	Nov. 1995
ISO9002	Japan Servo Singapore Pte, Ltd.	94/2775	Jan. 1994
	PT. Japan Servo Batam	94/3741	Sep. 1994
	Saitama Koki Co., Ltd.	957132	Feb. 1997
ISO14001	Kiryu-Urizura Site	EC971191	Feb. 1998

R & D, design engineering and manufacturing activities on precision small motors, sensors and their application systems in Kiryu Site including Kiryu Operation, Laboratory and Servo Techno System Co., Ltd.

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