

NMB HYBRID SERIES STEP MOTORS

Custom Features and Options

Extensive in-house machining and production capabilities enable NMB to manufacture motors with a wide variety of custom features. Listed below are some of the features and options available for NMB Hybrid Step motors. Please discuss other options not specifically mentioned here with your NMB sales engineer.

1. A variety of shaft, gear & pulley options are available.

Shafts:

- Custom Lengths
- Single & Double Shafts
- D-cut/s
- Turn Downs
- Thru-Holes
- Threaded
- Knurled
- Grooved

Gears & Pulleys:

- Machined
- Powdered Metal (Sintered)

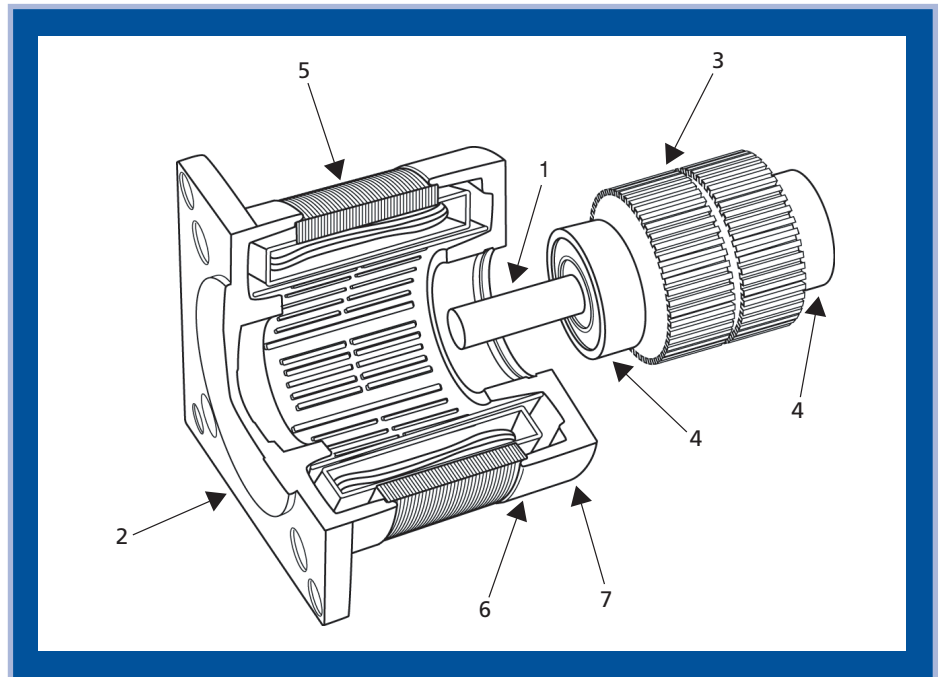
2. Custom and standard mounting flanges are available.

Material:

- Cast Aluminum
- Machined sheet metal (MTF Type)

Mounting:

- Tapped Holes
- Threaded Holes
- Thru-Holes
- Studs

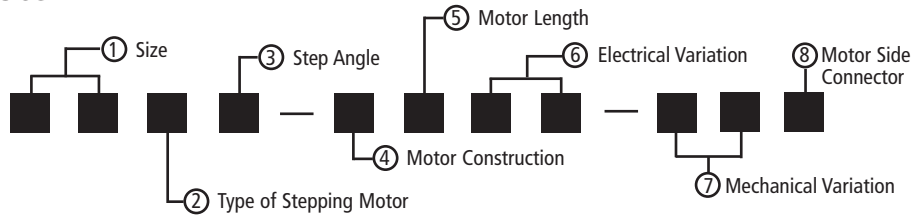


3. Laminated toothed rotor with powerful permanent magnets.
4. Precision NMB ball bearings, permanently lubricated for smooth operation and long life.
5. Laminated stator for optimum accuracy and low hysteresis.
6. Motor side connection method & lead wire options:
 - Motor side connector (4 or 6 leads)
 - Direct lead wire (4, 6 or 8 leads)
7. Driver side connector options:
 - Standard
 - Special order (Non-NMB standard)
 - None (Flying leads)

Note: The availability of some features and options may vary depending on the motor type and frame size.

HYBRID SERIES STEP MOTORS

Model Numbering System



- ① Size
Motor O.D. in tenth of an inch
(EX: Size 17=1.7" Dia)
- ② Type of Stepping Motor
P.....Laminated Stack Stepping Motor
L....."
K....."
- ③ Step Angle
M.....1.8° Y.....0.9°
U.....3.75° Q.....5°
- ④ Motor Construction
M....Phase Hybrid
Q...."
K....."
C....."
H....."
Z....."
- ⑤ Motor Length at right
- ⑥ Electrical Variation
- ⑦ Mechanical Variation
01-99.....Custom
G1-G9.....Custom
With Gear
P1-P9.....Custom
With Pulley
- ⑧ Motor Side Connector
V.....With
Connector
W.....Without
Connector
None.....Without
Connector

⑤ Motor Length

Motor Length Model No.	□ Variation						
	0	1	2	3	4	5	7
14PM-M □ **			26				
16PM-M □ **				38			
16PU-M □ **	30						
16PY-Q □ **	30		26				
17PM-K □ **	34	42	30	38	46	36	
17PU-H □ **	34	42	30	38		36	
23LM-C □ **	56.5		41	49.5			
23LM-K □ **	56.5		41	49.5			
23KM-C □ **	54	67	42	50			76
23KM-K □ **	54	67	42	50			76
23LQ-C □ **			41	49.5			
23LY-C □ **	56.5		41	49.5			
34PM-C □ **	61.9	93.7					

Unit = mmMAX

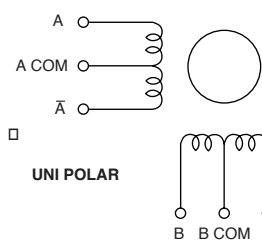
(Note: This catalog shows no mechanical variations.)

General Specifications

Step Accuracy.....	±5%
Temperature Rise.....	80°C MAX.
Ambient Temperature Range.....	-20°C~ +50°C
Insulation Resistance.....	100M Ω MIN. 500V DC
Dielectric Strength.....	500V AC 1min
Radial Play.....	0.02mm MAX. (450g Load)
End Play.....	0.08mm MAX. (450g Load)

Winding Diagram and Switching Sequence

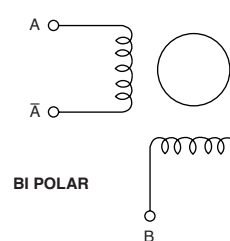
- UNIPOLAR Winding Diagram •UNIPOLAR Switching Sequence 6 Lead Wire Configuration
- BI POLAR Winding Diagram •BI POLAR Switching Sequence 4 Lead Wire Configuration



(Dual)

Step	A	B	A-bar	B-bar	A-B COM
1	-	-	0	0	+
2	0	-	-	0	+
3	0	0	-	-	+
4	-	0	0	-	+

CW Rotation Facing Mounting End



(Dual)

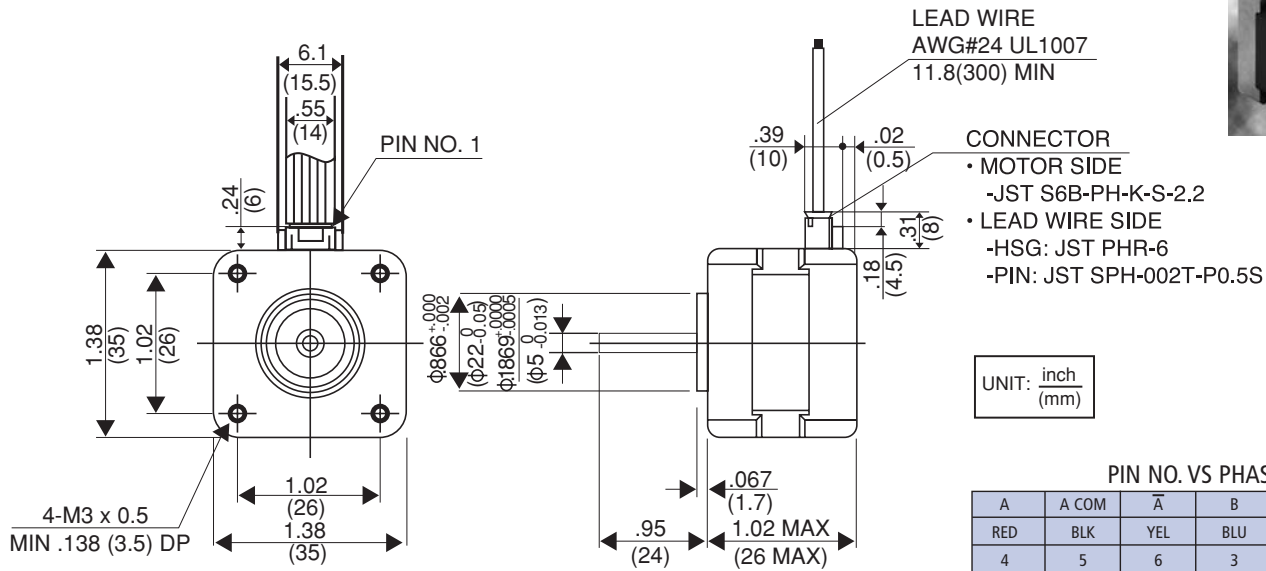
Step	A	B	A-bar	B-bar
1	+	+	-	-
2	-	+	+	-
3	-	-	+	+
4	+	-	-	+

CW Rotation Facing Mounting End

1.8°

14PM-M

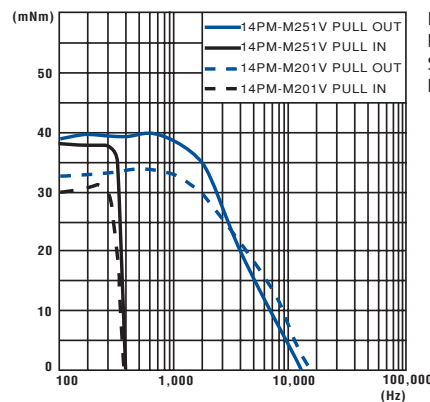
hybrid

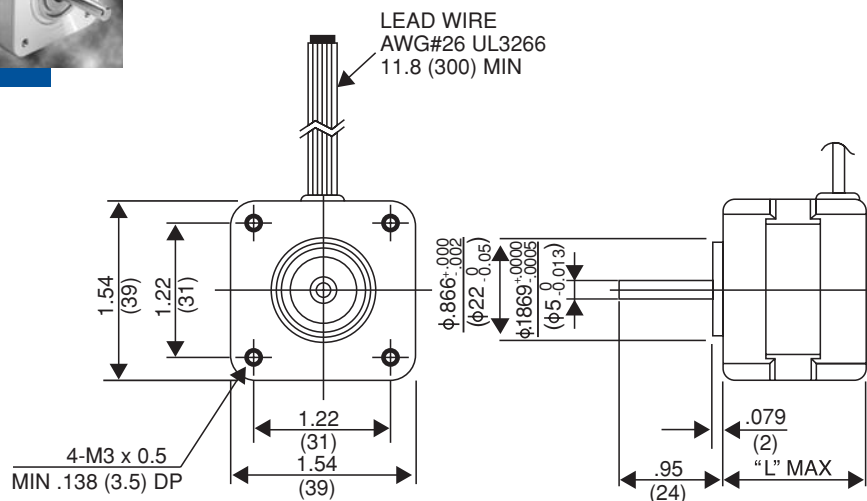


Model Specifications

Model Number	Step Angle	Drive Sequence	Rated Current/Wdg	Winding Resistance	Holding Torque	Inductance	Rotor Inertia	Detent Torque	Weight
	Degrees		Amps	Ohms	Nm (kg-cm)	mH	kg-cm ²	Nm (g-cm)	g
14PM-M201V	1.8°	UNIPOLAR	0.4	9.0	0.039 (0.4)	4.2	0.011	0.005 (50)	110
14PM-M251V	1.8°	BIPOLAR	0.4	9.0	0.049 (0.5)	6.0	0.011	0.005 (50)	110

Torque/Speed Characteristics





UNIT: $\frac{\text{inch}}{(\text{mm})}$

P/N	"L"
16PM-M3XX	1.50 (38)
16PU-M0XX	1.18 (30)

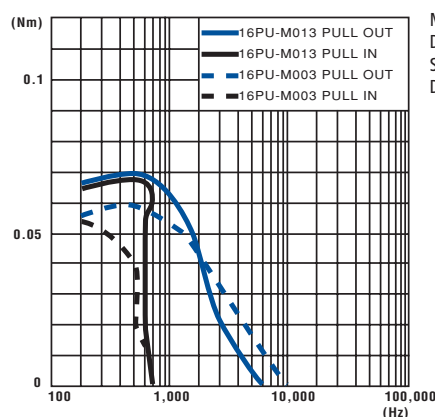
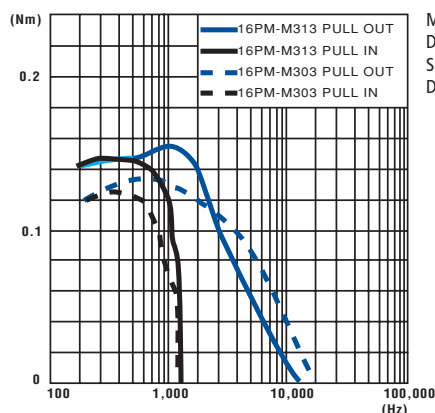
PIN NO. VS PHASE

A	A COM	Ā	B	B COM	B̄
RED	BLK	YEL	BLU	WHT	ORG

Model Specifications

Model Number	Step Angle	Drive Sequence	Rated Current/Wdg	Winding Resistance	Holding Torque	Inductance	Rotor Inertia	Detent Torque	Weight
	Degrees		Amps	Ohms	Nm (kg-cm)	mH	kg-cm ²	Nm (g-cm)	g
16PM-M303	1.8°	UNIPOLAR	0.5	10.0	0.167 (1.7)	11.0	0.028	0.0245 (250)	220
16PM-M313	1.8°	BIPOLAR	0.5	10.0	0.187 (1.9)	17.0	0.028	0.0245 (250)	220
16PU-M003	3.75°	UNIPOLAR	0.8	3.7	0.0786 (0.8)	2.4	0.017	0.0117 (120)	180
16PU-M013	3.75°	BIPOLAR	0.8	3.7	0.098 (1.0)	3.8	0.017	0.0117 (120)	180

Torque/Speed Characteristics



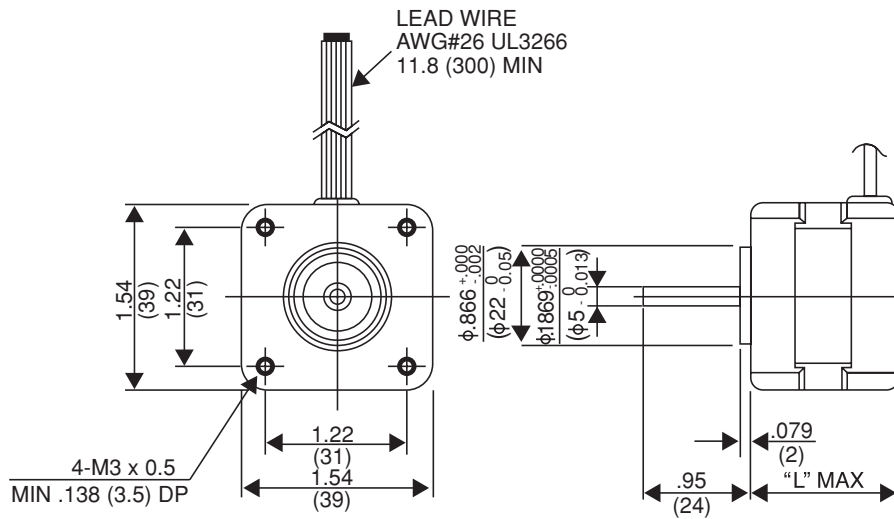
Model No.: 16PU-M003, M013
Driver: Chopper Dual
Supply Voltage: 24.0 (Volt)
Drive Current: 0.8 (A/WDG)

— BI POLAR PULL OUT
— BI POLAR PULL IN
- - UNI POLAR PULL OUT
- - UNI POLAR PULL IN

0.9°

16PY-Q

hybrid



UNIT: $\frac{\text{inch}}{\text{(mm)}}$

P/N	"L"
16PY-Q2XX	1.02 (26)
16PY-Q0XX	1.18 (30)

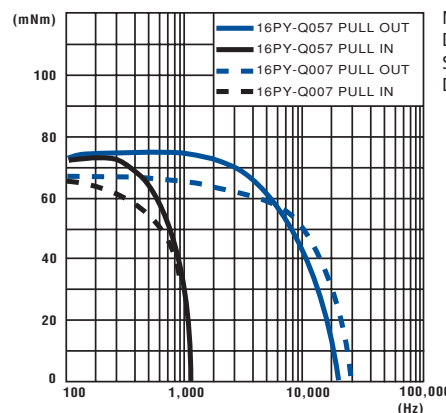
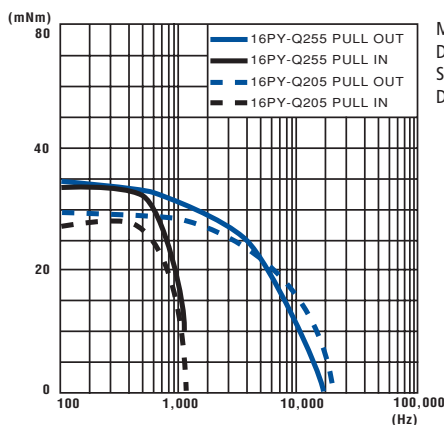
PIN NO. VS PHASE

A	A COM	\bar{A}	B	B COM	\bar{B}
RED	BLK	YEL	BLU	WHT	ORG

Model Specifications

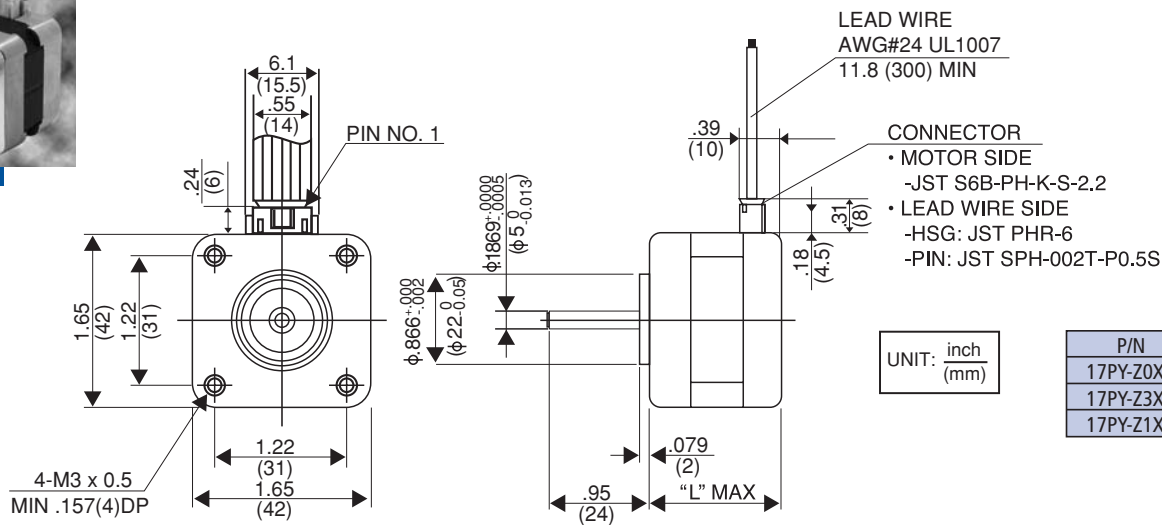
Model Number	Step Angle	Drive Sequence	Rated Current/Wdg	Winding Resistance	Holding Torque	Inductance	Rotor Inertia	Detent Torque	Weight
	Degrees		Amps	Ohms	Nm (kg-cm)	mH	kg-cm ²	Nm (g-cm)	g
16PY-Q205	0.9°	UNIPOLAR	1.0	2.5	0.059 (0.6)	1.0	0.012	0.003 (30)	120
16PY-Q255	0.9°	BIPOLAR	1.0	2.5	0.068 (0.7)	1.4	0.012	0.003 (30)	120
16PY-Q007	0.9°	UNIPOLAR	0.8	4.5	0.078 (0.8)	1.4	0.016	0.005 (50)	170
16PY-Q057	0.9°	BIPOLAR	0.8	4.5	0.093 (.95)	2.0	0.016	0.005 (50)	170

Torque/Speed Characteristics



Model No.: 16PY-Q007, Q057
Driver: Chopper Dual
Supply Voltage: 24.0 (Volt)
Drive Current: 0.8 (A/WDG)

— BI POLAR PULL OUT
 — BI POLAR PULL IN
 - - - UNI POLAR PULL OUT
 - - - UNI POLAR PULL IN



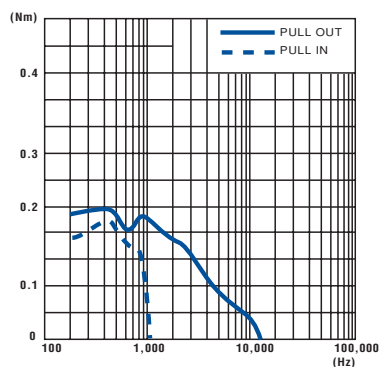
PIN NO. VS PHASE

A	A COM	\bar{A}	B	B COM	\bar{B}
RED	BLK	YEL	BLU	WHT	ORG
4	5	6	3	2	1

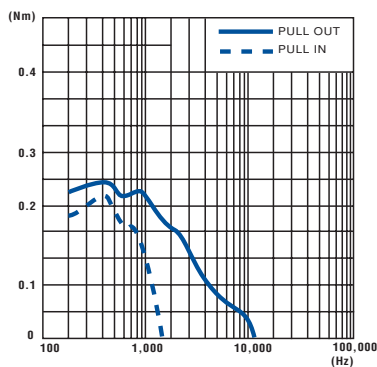
Model Specifications

Model Number	Step Angle	Drive Sequence	Rated Current/Wdg	Winding Resistance	Holding Torque	Inductance	Rotor Inertia	Detent Torque	Weight
	Degrees		Amps	Ohms	Nm (kg-cm)	mH	kg-cm ²	Nm (g-cm)	g
17PY-Z005VS	0.9°	UNIPOLAR	0.8	5.0	0.216 (2.2)	7.4	0.034	0.0118 (120)	200
17PY-Z302VS	0.9°	UNIPOLAR	1.0	3.5	0.265 (2.7)	5.8	0.045	0.0123 (125)	250
17PY-Z103VS	0.9°	UNIPOLAR	1.2	3.0	0.294 (3.0)	6.0	0.056	0.0127 (130)	300

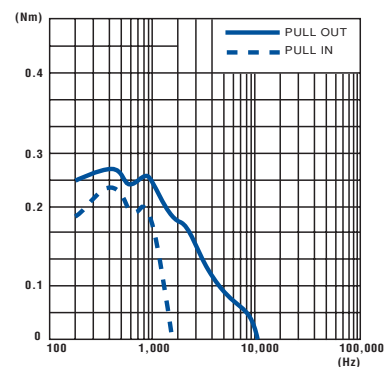
Model No.: 17PY-Z005VS
Driver: Chopper Dual
Supply Voltage: 24.0 (Volt)
Drive Current: 0.8 (A/WDG)

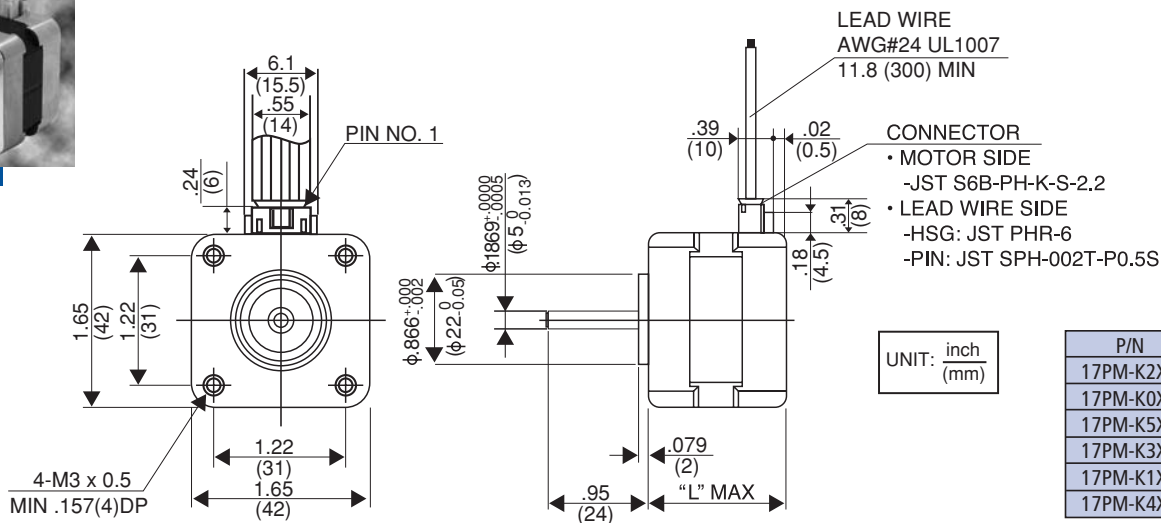


Model No.: 17PY-Z302VS
Driver: Chopper Dual
Supply Voltage: 24.0 (Volt)
Drive Current: 1.0 (A/WDG)



Model No.: 17PY-Z103VS
Driver: Chopper Dual
Supply Voltage: 24.0 (Volt)
Drive Current: 1.2 (A/WDG)





PIN NO. VS PHASE

A	A COM	\bar{A}	B	B COM	\bar{B}
RED	BLK	YEL	BLU	WHT	ORG
4	5	6	3	2	1

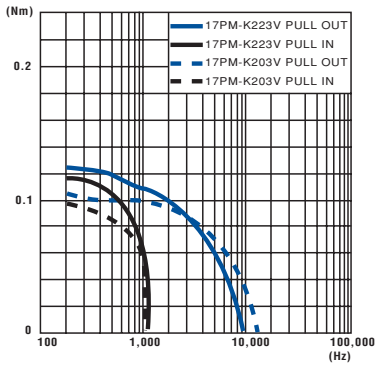
Model Specifications

Model Number	Step Angle	Drive Sequence	Rated Current/Wdg	Winding Resistance	Holding Torque	Inductance	Rotor Inertia	Detent Torque	Weight
	Degrees		Amps	Ohms	Nm (kg-cm)	mH	kg-cm ²	Nm (g-cm)	g
17PM-K203V	1.8°	UNIPOLAR	0.6	5.5	0.128 (1.30)	4.7	0.028	0.006 (60)	180
17PM-K223V	1.8°	BIPOLAR	0.6	5.5	0.148 (1.50)	7.4	0.028	0.006 (60)	180
17PM-K204V	1.8°	UNIPOLAR	0.8	3.0	0.123 (1.25)	2.6	0.028	0.006 (60)	180
17PM-K244V	1.8°	BIPOLAR	0.8	3.0	0.143 (1.45)	4.1	0.028	0.006 (60)	180
17PM-K008V	1.8°	UNIPOLAR	0.6	8.3	0.167 (1.7)	8.7	0.034	0.008 (80)	200
17PM-K034V	1.8°	BIPOLAR	0.6	8.3	0.196 (2.0)	15.0	0.034	0.008 (80)	200
17PM-K018V	1.8°	UNIPOLAR	1.0	3.0	0.167 (1.7)	2.7	0.034	0.008 (80)	200
17PM-K048V	1.8°	BIPOLAR	1.0	3.0	0.196 (2.0)	4.9	0.034	0.008 (80)	200
17PM-K502V	1.8°	UNIPOLAR	0.6	8.9	0.196 (2.0)	9.0	0.040	0.009 (90)	220
17PM-K503V	1.8°	BIPOLAR	0.6	8.9	0.225 (2.3)	16.2	0.040	0.009 (90)	220
17PM-K504V	1.8°	UNIPOLAR	1.0	3.2	0.196 (2.0)	3.5	0.040	0.009 (90)	220
17PM-K505V	1.8°	BIPOLAR	1.0	3.2	0.225 (2.3)	5.9	0.040	0.009 (90)	220
17PM-K302V	1.8°	UNIPOLAR	1.0	3.5	0.225 (2.3)	3.3	0.045	0.0098 (100)	250
17PM-K301V	1.8°	BIPOLAR	1.0	3.5	0.255 (2.6)	5.5	0.045	0.0098 (100)	250
17PM-K304V	1.8°	UNIPOLAR	1.4	1.8	0.225 (2.3)	1.7	0.045	0.0098 (100)	250
17PM-K303V	1.8°	BIPOLAR	1.4	1.8	0.255 (2.6)	3.0	0.045	0.0098 (100)	250
17PM-K103V	1.8°	UNIPOLAR	1.0	4.3	0.294 (3.0)	4.5	0.056	0.0118 (120)	300
17PM-K104V	1.8°	BIPOLAR	1.0	4.3	0.343 (3.5)	8.2	0.056	0.0118 (120)	300
17PM-K106V	1.8°	UNIPOLAR	1.4	2.2	0.294 (3.0)	3.2	0.056	0.0118 (120)	300
17PM-K115V	1.8°	BIPOLAR	1.4	2.2	0.343 (3.5)	6.0	0.056	0.0118 (120)	300
17PM-K403V	1.8°	UNIPOLAR	1.0	4.7	0.422 (4.3)	6.3	0.080	0.0147 (150)	350
17PM-K404V	1.8°	BIPOLAR	1.0	4.7	0.490 (5.0)	11.5	0.080	0.0147 (150)	350
17PM-K401V	1.8°	UNIPOLAR	1.4	2.4	0.422 (4.3)	3.0	0.080	0.0147 (150)	350
17PM-K406V	1.8°	BIPOLAR	1.4	2.4	0.490 (5.0)	5.7	0.080	0.0147 (150)	350

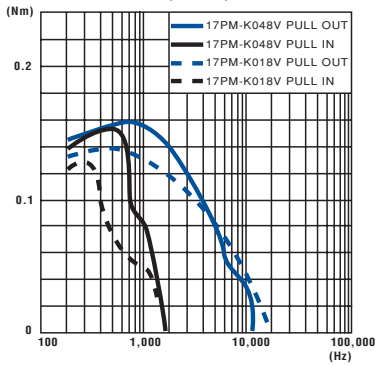
Torque/Speed Characteristics

hybrid

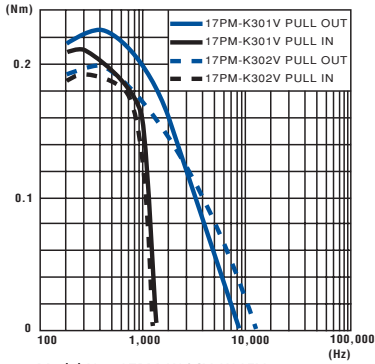
Model No.: 17PM-K203V, K223V
Driver: Chopper Dual
Supply Voltage: 24.0 (Volt)
Drive Current: 0.6 (A/WDG)



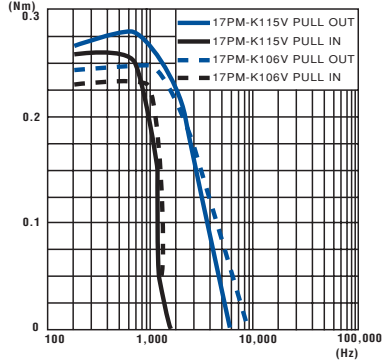
Model No.: 17PM-K018V, K048V
Driver: Chopper Dual
Supply Voltage: 24.0 (Volt)
Drive Current: 1.0 (A/WDG)



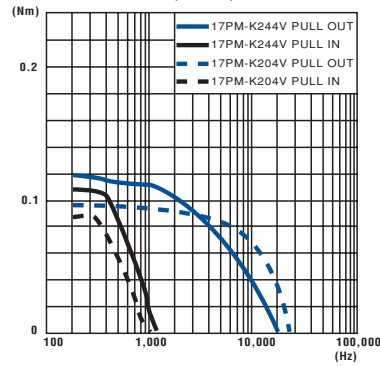
Model No.: 17PM-K302V, K301V
Driver: Chopper Dual
Supply Voltage: 24.0 (Volt)
Drive Current: 1.0 (A/WDG)



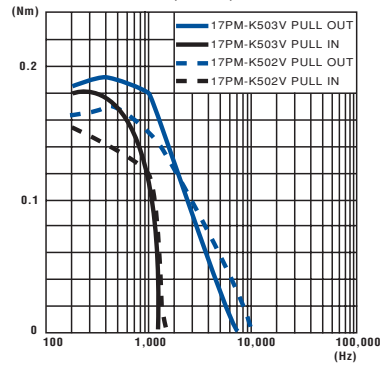
Model No.: 17PM-K106V, K115V
Driver: Chopper Dual
Supply Voltage: 24.0 (Volt)
Drive Current: 1.4 (A/WDG)



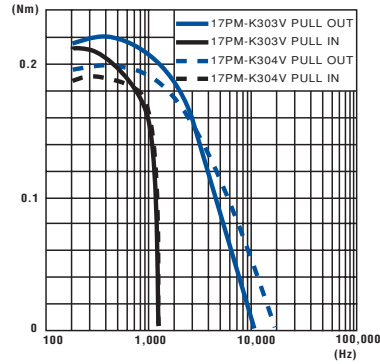
Model No.: 17PM-K204V, 244V
Driver: Chopper Dual
Supply Voltage: 24.0 (Volt)
Drive Current: 0.8 (A/WDG)



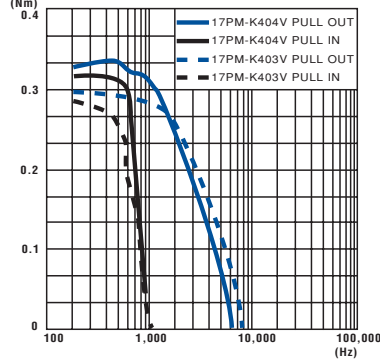
Model No.: 17PM-K502V, K503V
Driver: Chopper Dual
Supply Voltage: 24.0 (Volt)
Drive Current: 0.6 (A/WDG)



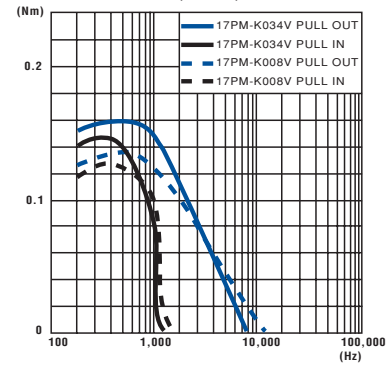
Model No.: 17PM-K304V, K303V
Driver: Chopper Dual
Supply Voltage: 24.0 (Volt)
Drive Current: 1.4 (A/WDG)



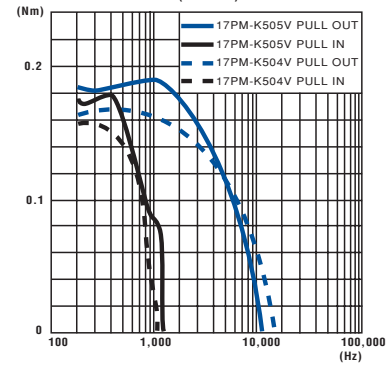
Model No.: 17PM-K403V, K404V
Driver: Chopper Dual
Supply Voltage: 24.0 (Volt)
Drive Current: 1.0 (A/WDG)



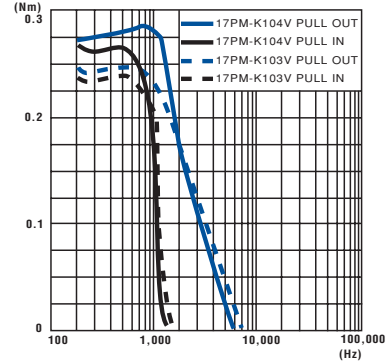
Model No.: 17PM-K008V, K034V
Driver: Chopper Dual
Supply Voltage: 24.0 (Volt)
Drive Current: 0.6 (A/WDG)



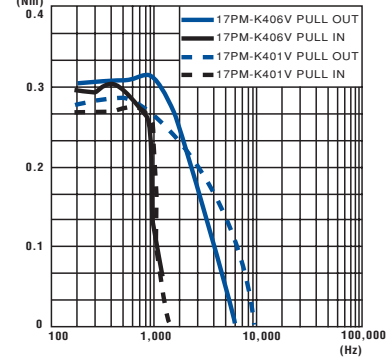
Model No.: 17PM-K504V, K505V
Driver: Chopper Dual
Supply Voltage: 24.0 (Volt)
Drive Current: 1.0 (A/WDG)



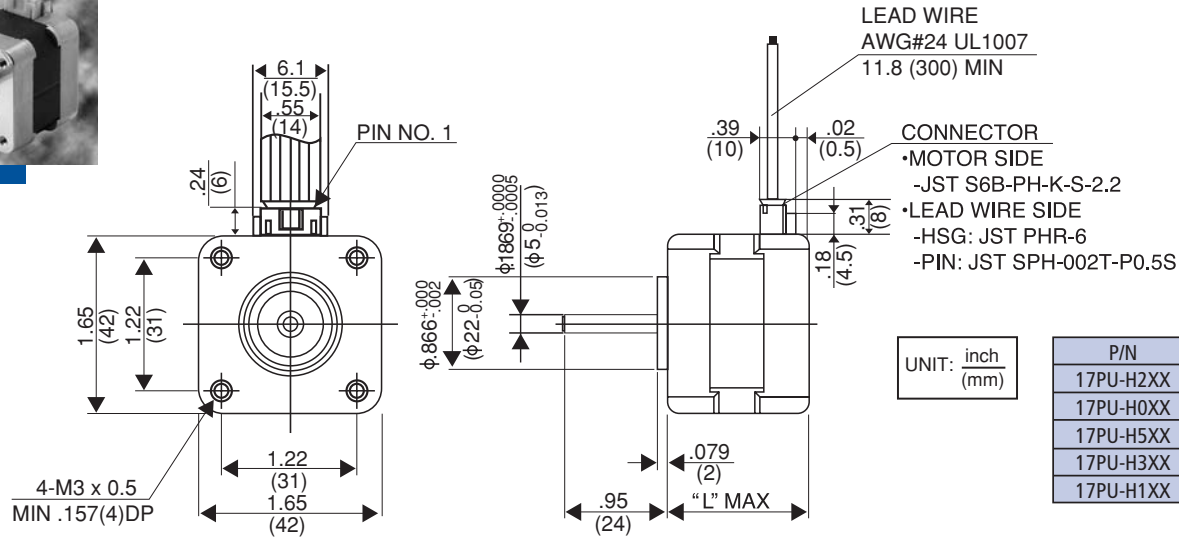
Model No.: 17PM-K103V, K104V
Driver: Chopper Dual
Supply Voltage: 24.0 (Volt)
Drive Current: 1.0 (A/WDG)



Model No.: 17PM-K401V, K406V
Driver: Chopper Dual
Supply Voltage: 24.0 (Volt)
Drive Current: 1.4 (A/WDG)



— BI POLAR PULL OUT - - - UNI POLAR PULL OUT
— BI POLAR PULL IN - - - UNI POLAR PULL IN



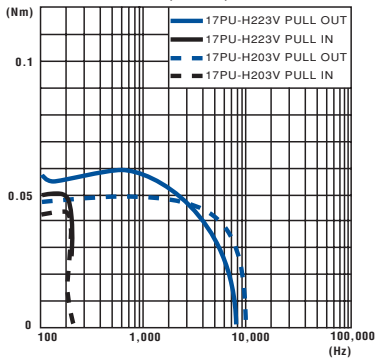
Model Specifications

Model Number	Step Angle	Drive Sequence	Rated Current/Wdg	Winding Resistance	Holding Torque	Inductance	Rotor Inertia	Detent Torque	Weight
	Degrees		Amps	Ohms	Nm (kg-cm)	mH	kg-cm ²	Nm (g-cm)	g
17PU-H203V	3.75°	UNIPOLAR	0.6	5.5	0.074 (0.75)	4.4	0.028	0.006 (60)	180
17PU-H233V	3.75°	BIPOLAR	0.6	5.5	0.079 (0.80)	7.9	0.028	0.006 (60)	180
17PU-H204V	3.75°	UNIPOLAR	0.8	3.0	0.074 (0.75)	2.1	0.028	0.006 (60)	180
17PU-H244V	3.75°	BIPOLAR	0.8	3.0	0.079 (0.80)	3.8	0.028	0.006 (60)	180
17PU-H008V	3.75°	UNIPOLAR	0.6	8.3	0.114 (1.15)	7.3	0.034	0.008 (80)	200
17PU-H034V	3.75°	BIPOLAR	0.6	8.3	0.142 (1.45)	12.3	0.034	0.008 (80)	200
17PU-H018V	3.75°	UNIPOLAR	1.0	3.0	0.114 (1.15)	2.5	0.034	0.008 (80)	200
17PU-H048V	3.75°	BIPOLAR	1.0	3.0	0.142 (1.45)	4.0	0.034	0.008 (80)	200
17PU-H502V	3.75°	UNIPOLAR	0.6	8.9	0.142 (1.45)	7.4	0.040	0.009 (90)	220
17PU-H503V	3.75°	BIPOLAR	0.6	8.9	0.172 (1.75)	13.5	0.040	0.009 (90)	220
17PU-H504V	3.75°	UNIPOLAR	1.0	3.2	0.142 (1.45)	3.5	0.040	0.009 (90)	220
17PU-H505V	3.75°	BIPOLAR	1.0	3.2	0.172 (1.75)	5.9	0.040	0.009 (90)	220
17PU-H302V	3.75°	UNIPOLAR	1.0	3.5	0.167 (1.7)	2.9	0.045	0.0098 (100)	250
17PU-H301V	3.75°	BIPOLAR	1.0	3.5	0.205 (2.1)	4.6	0.045	0.0098 (100)	250
17PU-H304V	3.75°	UNIPOLAR	1.4	1.8	0.167 (1.7)	1.4	0.045	0.0098 (100)	250
17PU-H303V	3.75°	BIPOLAR	1.4	1.8	0.205 (2.1)	2.4	0.045	0.0098 (100)	250
17PU-H103V	3.75°	UNIPOLAR	1.0	4.3	0.254 (2.6)	3.2	0.056	0.0118 (120)	300
17PU-H104V	3.75°	BIPOLAR	1.0	4.3	0.294 (3.0)	7.0	0.056	0.0118 (120)	300
17PU-H106V	3.75°	UNIPOLAR	1.4	2.2	0.254 (2.6)	1.8	0.056	0.0118 (120)	300
17PU-H115V	3.75°	BIPOLAR	1.4	2.2	0.294 (3.0)	4.3	0.056	0.0118 (120)	300

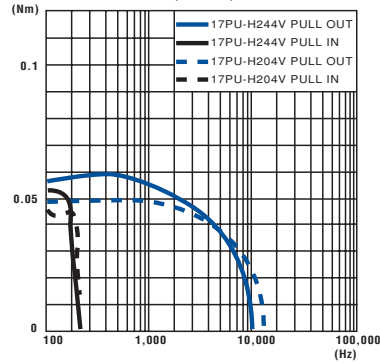
Torque/Speed Characteristics

hybrid

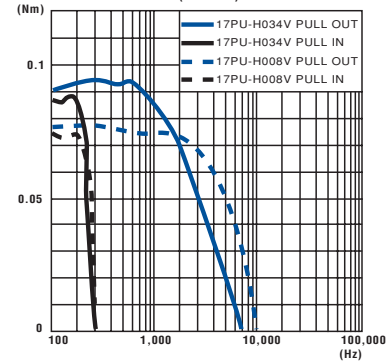
Model No.: 17PU-H203V, H223V
Driver: Chopper Dual
Supply Voltage: 24.0 (Volt)
Drive Current: 0.6 (A/WDG)



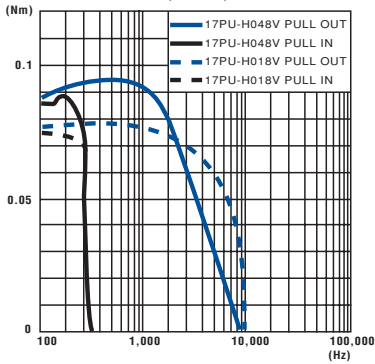
Model No.: 17PU-H204V, H244V
Driver: Chopper Dual
Supply Voltage: 24.0 (Volt)
Drive Current: 0.8 (A/WDG)



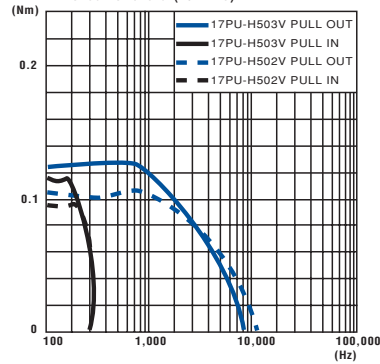
Model No.: 17PU-H008V, H034V
Driver: Chopper Dual
Supply Voltage: 24.0 (Volt)
Drive Current: 0.6 (A/WDG)



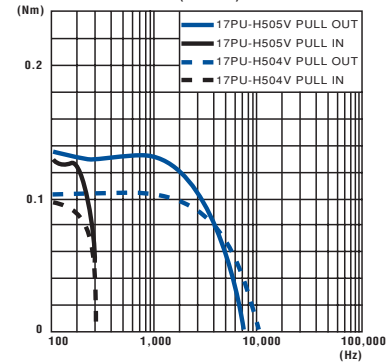
Model No.: 17PU-H018V, H048V
Driver: Chopper Dual
Supply Voltage: 24.0 (Volt)
Drive Current: 1.0 (A/WDG)



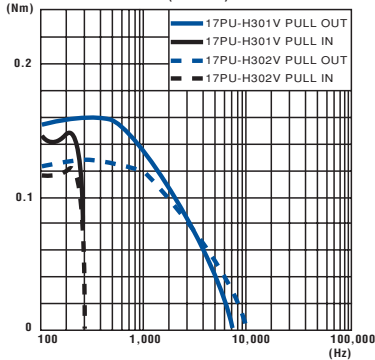
Model No.: 17PU-H502V, H503V
Driver: Chopper Dual
Supply Voltage: 24.0 (Volt)
Drive Current: 0.6 (A/WDG)



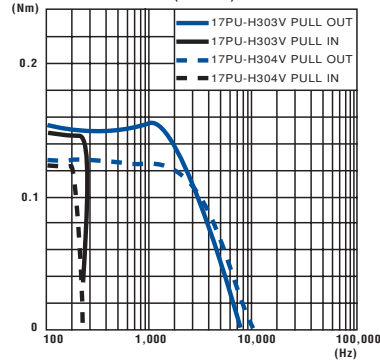
Model No.: 17PU-H504V, H505V
Driver: Chopper Dual
Supply Voltage: 24.0 (Volt)
Drive Current: 1.0 (A/WDG)



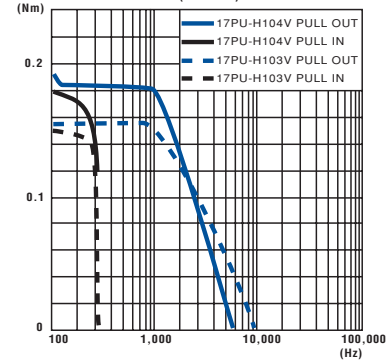
Model No.: 17PU-H302V, H301V
Driver: Chopper Dual
Supply Voltage: 24.0 (Volt)
Drive Current: 1.0 (A/WDG)



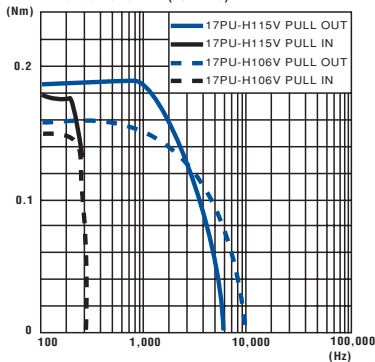
Model No.: 17PU-H304V, H303V
Driver: Chopper Dual
Supply Voltage: 24.0 (Volt)
Drive Current: 1.4 (A/WDG)



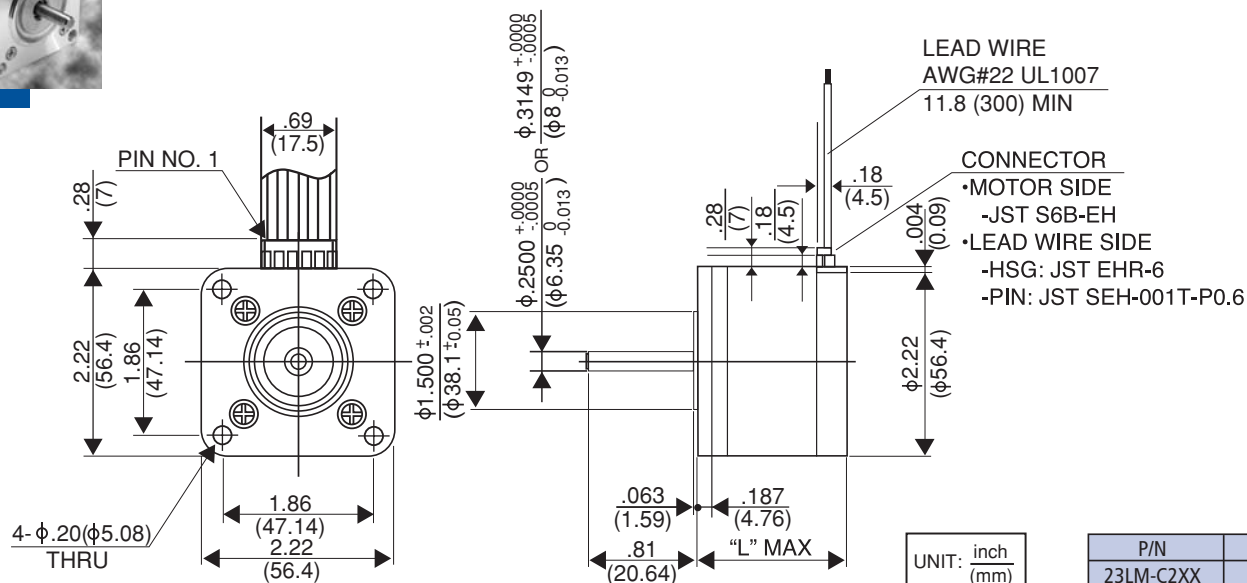
Model No.: 17PU-H103V, H104V
Driver: Chopper Dual
Supply Voltage: 24.0 (Volt)
Drive Current: 1.0 (A/WDG)



Model No.: 17PU-H106V, H115V
Driver: Chopper Dual
Supply Voltage: 24.0 (Volt)
Drive Current: 1.4 (A/WDG)



— BI POLAR PULL OUT
— BI POLAR PULL IN
- - - UNI POLAR PULL OUT
- - - UNI POLAR PULL IN

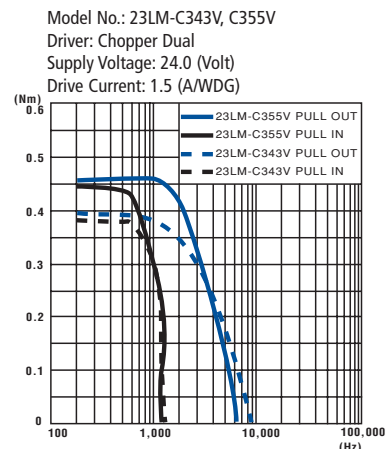
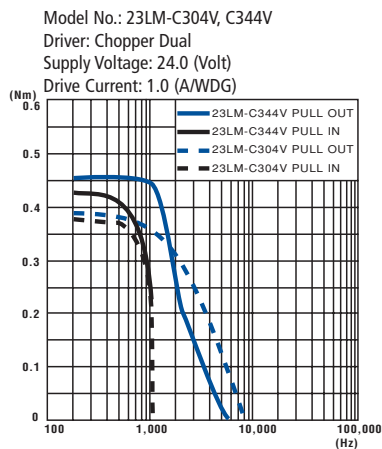
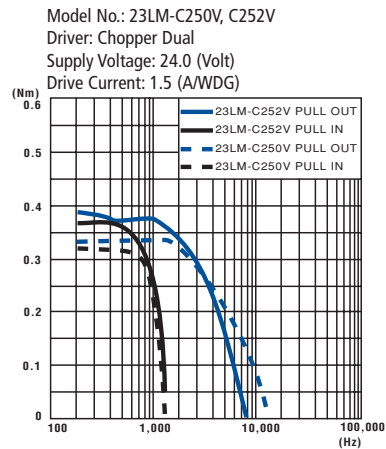
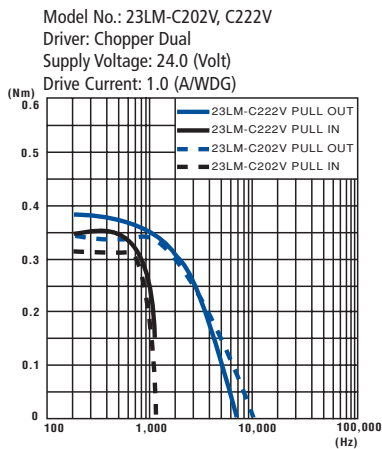


PIN NO. VS PHASE

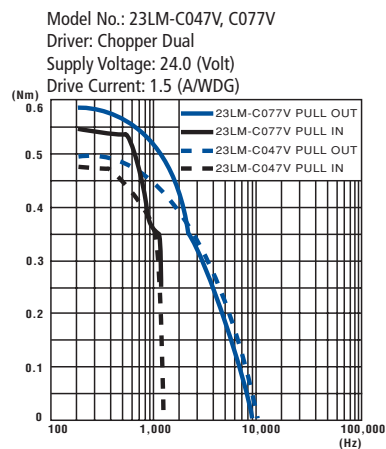
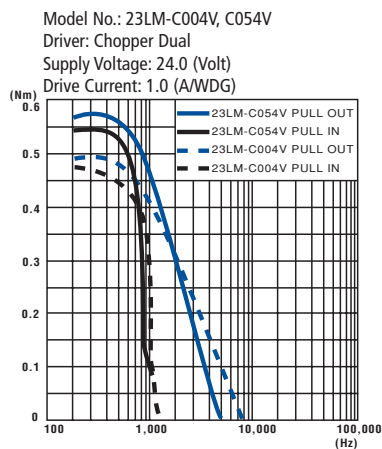
A	A COM	\bar{A}	B	B COM	\bar{B}
RED	BLK	YEL	BLU	WHT	ORG
6	5	4	3	2	1

Model Specifications

Model Number	Step Angle	Drive Sequence	Rated Current/Wdg	Winding Resistance	Holding Torque	Inductance	Rotor Inertia	Detent Torque	Weight
	Degrees		Amps	Ohms	Nm (kg-cm)	mH	kg-cm ²	Nm (g-cm)	g
23LM-C202V	1.8°	UNIPOLAR	1.0	3.5	0.314 (3.2)	4.0	0.055	0.0492 (500)	360
23LM-C222V	1.8°	BIPOlar	1.0	3.5	0.374 (3.8)	6.4	0.055	0.0492 (500)	360
23LM-C250V	1.8°	UNIPOLAR	1.5	1.55	0.314 (3.2)	2.5	0.055	0.0492 (500)	360
23LM-C252V	1.8°	BIPOlar	1.5	1.55	0.374 (3.8)	4.0	0.055	0.0492 (500)	360
23LM-C304V	1.8°	UNIPOLAR	1.0	5.0	0.544 (5.5)	9.1	0.110	0.0540 (550)	450
23LM-C344V	1.8°	BIPOlar	1.0	5.0	0.614 (6.2)	15.0	0.110	0.0540 (550)	450
23LM-C343V	1.8°	UNIPOLAR	1.5	2.2	0.544 (5.5)	3.5	0.110	0.0540 (550)	450
23LM-C355V	1.8°	BIPOlar	1.5	2.2	0.614 (6.2)	5.5	0.110	0.0540 (550)	450
23LM-C004V	1.8°	UNIPOLAR	1.0	7.0	0.624 (6.3)	14.0	0.160	0.0588 (600)	540
23LM-C054V	1.8°	BIPOlar	1.0	7.0	0.794 (7.0)	22.1	0.160	0.0588 (600)	540
23LM-C047V	1.8°	UNIPOLAR	1.5	3.1	0.624 (6.3)	6.1	0.160	0.0588 (600)	540
23LM-C077V	1.8°	BIPOlar	1.5	3.1	0.794 (7.0)	9.8	0.160	0.0588 (600)	540

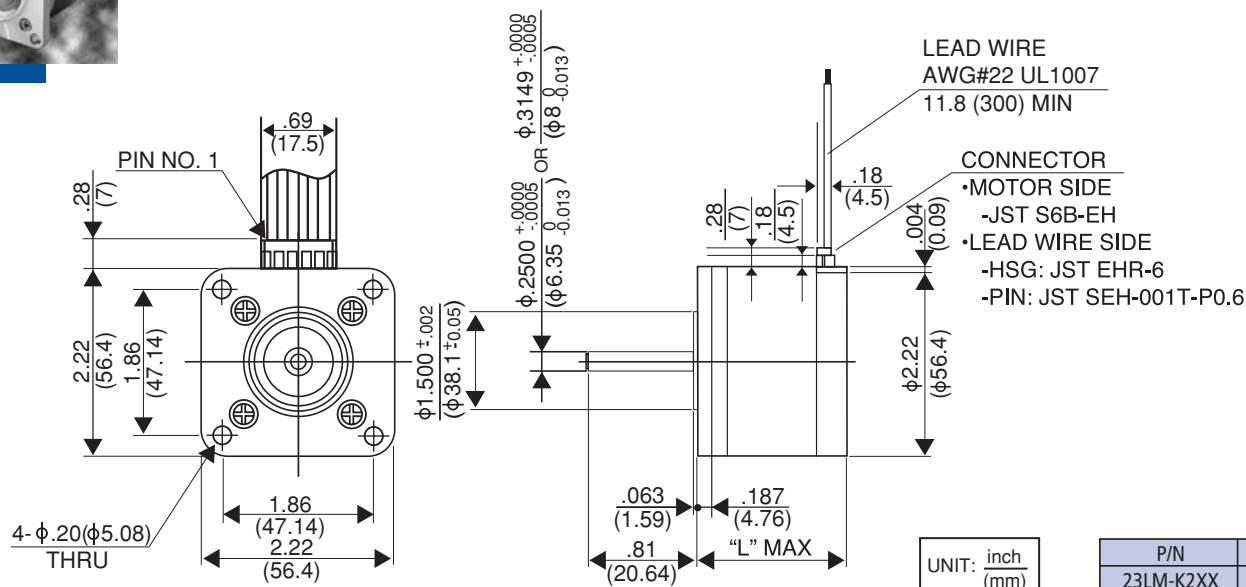


— BI POLAR PULL OUT
— BI POLAR PULL IN
- - UNI POLAR PULL OUT
- - UNI POLAR PULL IN





MICROSTEP



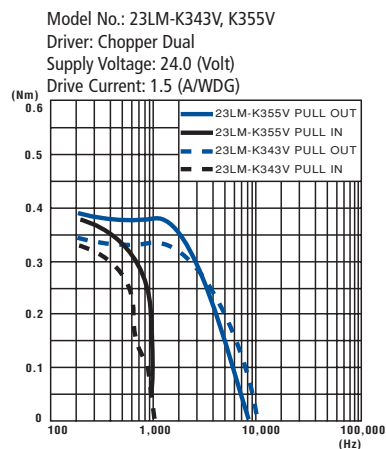
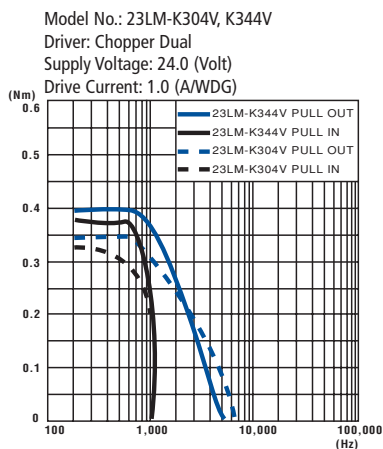
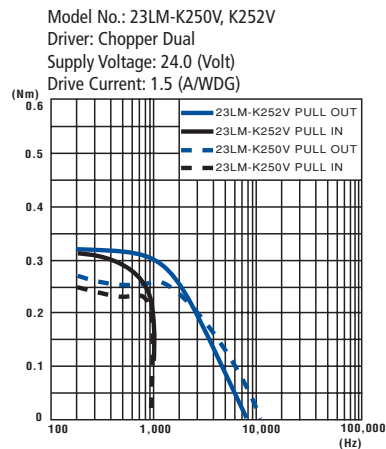
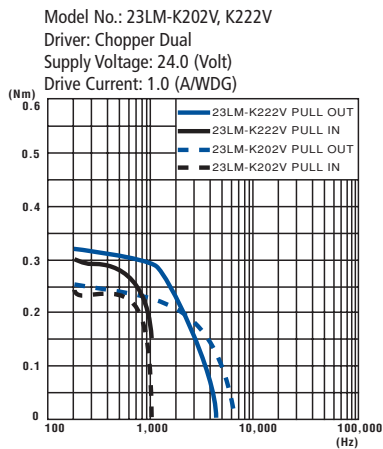
P/N	"L"
23LM-K2XX	1.61 (41)
23LM-K3XX	1.95 (49.5)
23LM-K0XX	2.22 (56.5)

PIN NO. VS PHASE

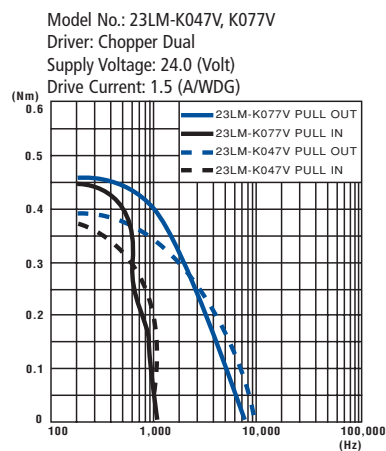
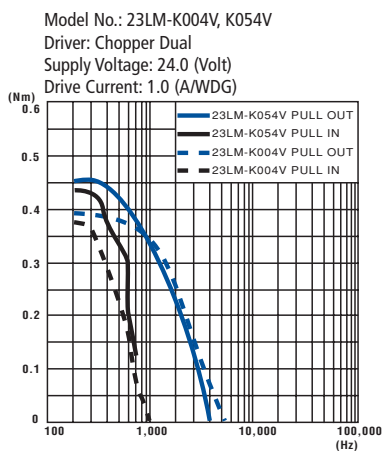
A	A COM	\bar{A}	B	B COM	\bar{B}
RED	BLK	YEL	BLU	WHT	ORG
6	5	4	3	2	1

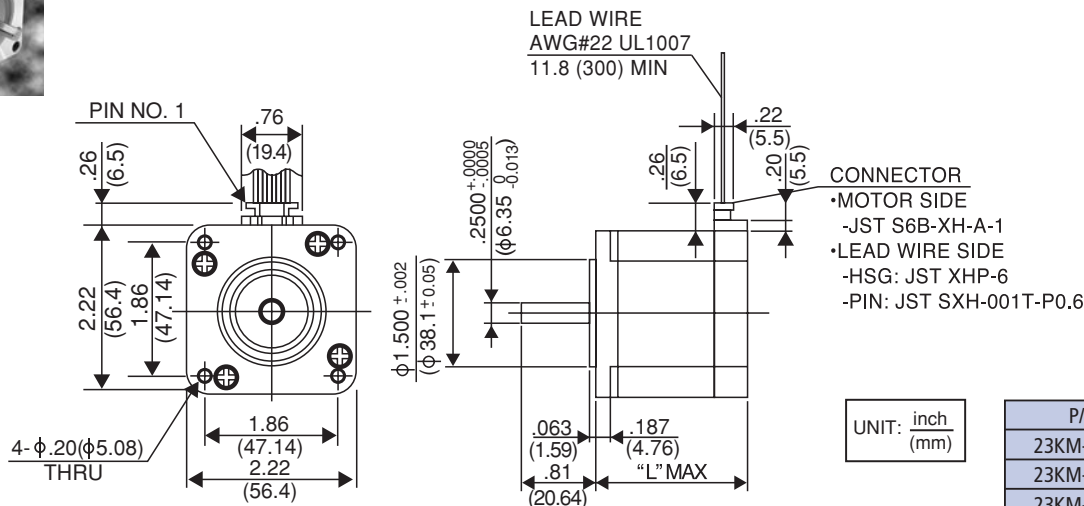
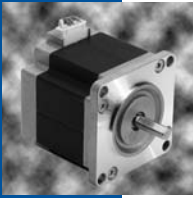
Model Specifications

Model Number	Step Angle	Drive Sequence	Rated Current/Wdg	Winding Resistance	Holding Torque	Inductance	Rotor Inertia	Detent Torque	Weight
	Degrees		Amps	Ohms	Nm (kg-cm)	mH	kg-cm²	Nm (g-cm)	g
23LM-K202V	1.8°	UNIPOLAR	1.0	3.5	0.235 (2.4)	5.4	0.055	0.0177 (180)	360
23LM-K222V	1.8°	BIPOLAR	1.0	3.5	0.274 (2.8)	8.9	0.055	0.0177 (180)	360
23LM-K250V	1.8°	UNIPOLAR	1.5	1.55	0.235 (2.4)	3.0	0.055	0.0177 (180)	360
23LM-K252V	1.8°	BIPOLAR	1.5	1.55	0.274 (2.8)	4.9	0.055	0.0177 (180)	360
23LM-K304V	1.8°	UNIPOLAR	1.0	5.0	0.404 (4.1)	12.0	0.110	0.0216 (220)	450
23LM-K344V	1.8°	BIPOLAR	1.0	5.0	0.474 (4.8)	20.0	0.110	0.0216 (220)	450
23LM-K343V	1.8°	UNIPOLAR	1.5	2.2	0.404 (4.1)	4.7	0.110	0.0216 (220)	450
23LM-K355V	1.8°	BIPOLAR	1.5	2.2	0.474 (4.8)	7.3	0.110	0.0216 (220)	450
23LM-K004V	1.8°	UNIPOLAR	1.0	7.0	0.464 (4.7)	18.7	0.160	0.0275 (280)	540
23LM-K054V	1.8°	BIPOLAR	1.0	7.0	0.524 (5.3)	30.0	0.160	0.0275 (280)	540
23LM-K047V	1.8°	UNIPOLAR	1.5	3.1	0.464 (4.7)	8.1	0.160	0.0275 (280)	540
23LM-K077V	1.8°	BIPOLAR	1.5	3.1	0.524 (5.3)	12.8	0.160	0.0275 (280)	540



— BI POLAR PULL OUT
— BI POLAR PULL IN
- - - UNI POLAR PULL OUT
- - - UNI POLAR PULL IN





P/N	"L"
23KM-C2XX	1.65 (42)
23KM-C3XX	1.97 (50)
23KM-C0XX	2.13 (54)
23KM-C1XX	2.64 (67)
23KM-C7XX	2.99 (76)

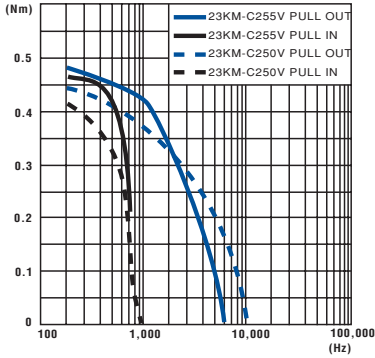
PIN NO. VS PHASE

A	A COM	\bar{A}	B	B COM	\bar{B}
RED	BLK	YEL	BLU	WHT	ORG
6	5	4	3	2	1

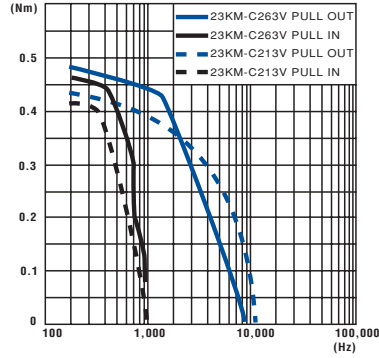
Model Specifications

Model Number	Step Angle	Drive Sequence	Rated Current/Wdg	Winding Resistance	Holding Torque	Inductance	Rotor Inertia	Detent Torque	Weight
	Degrees		Amps	Ohms	Nm (kg-cm)	mH	kg-cm ²	Nm (g-cm)	g
23KM-C250V	1.8°	UNIPOLAR	1.5	2.2	0.411 (4.2)	2.8	0.150	0.0488 (500)	470
23KM-C255V	1.8°	BIPOLAR	1.5	2.2	0.480 (4.9)	4.2	0.150	0.0488 (500)	470
23KM-C213V	1.8°	UNIPOLAR	2.0	1.25	0.411 (4.2)	1.7	0.150	0.0488 (500)	470
23KM-C263V	1.8°	BIPOLAR	2.0	1.25	0.480 (4.9)	3.3	0.150	0.0488 (500)	470
23KM-C379V	1.8°	UNIPOLAR	1.5	2.7	0.607 (6.2)	3.9	0.230	0.0687 (700)	590
23KM-C380V	1.8°	BIPOLAR	1.5	2.7	0.676 (6.9)	5.6	0.230	0.0687 (700)	590
23KM-C307V	1.8°	UNIPOLAR	2.0	1.5	0.607 (6.2)	2.1	0.230	0.0687 (700)	590
23KM-C308V	1.8°	BIPOLAR	2.0	1.5	0.676 (6.9)	3.5	0.230	0.0687 (700)	590
23KM-C032V	1.8°	UNIPOLAR	1.5	3.4	0.783 (8.0)	6.0	0.280	0.0786 (800)	680
23KM-C040V	1.8°	BIPOLAR	1.5	3.4	0.881 (9.0)	8.4	0.280	0.0786 (800)	680
23KM-C033V	1.8°	UNIPOLAR	3.0	0.85	0.783 (8.0)	1.6	0.280	0.0786 (800)	680
23KM-C043V	1.8°	BIPOLAR	3.0	0.85	0.881 (9.0)	2.2	0.280	0.0786 (800)	680
23KM-C101V	1.8°	UNIPOLAR	3.0	0.95	1.13 (11.5)	1.7	0.400	0.097 (1000)	900
23KM-C102V	1.8°	BIPOLAR	3.0	0.95	1.273 (13.0)	2.4	0.400	0.097 (1000)	900
23KM-C732V	1.8°	UNIPOLAR	1.5	4.2	1.273 (13.0)	7.4	0.440	0.107 (1100)	1050
23KM-C740V	1.8°	BIPOLAR	1.5	4.2	1.42 (14.5)	11.8	0.440	0.107 (1100)	1050
23KM-C733V	1.8°	UNIPOLAR	3.0	1.05	1.273 (13.0)	3.5	0.440	0.107 (1100)	1050
23KM-C743V	1.8°	BIPOLAR	3.0	1.05	1.42 (14.5)	5.1	0.440	0.107 (1100)	1050

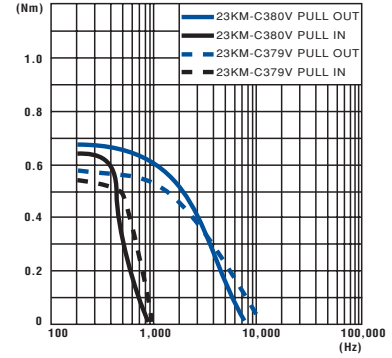
Model No.: 23KM-C250V, C255V
Driver: Chopper Dual
Supply Voltage: 24.0 (Volt)
Drive Current: 1.5 (A/WDG)



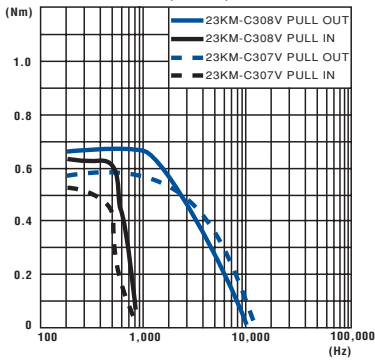
Model No.: 23KM-C213V, C263V
Driver: Chopper Dual
Supply Voltage: 24.0 (Volt)
Drive Current: 2.0 (A/WDG)



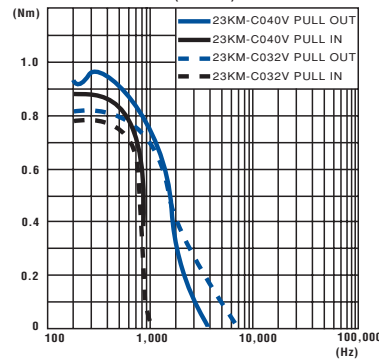
Model No.: 23KM-C379V, C380V
Driver: Chopper Dual
Supply Voltage: 24.0 (Volt)
Drive Current: 1.5 (A/WDG)



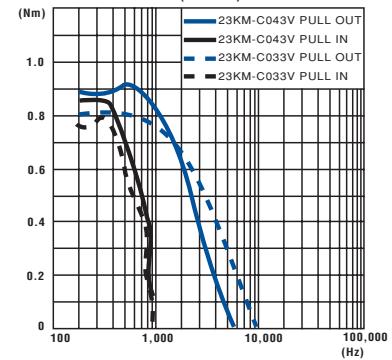
Model No.: 23KM-C307V, C308V
Driver: Chopper Dual
Supply Voltage: 24.0 (Volt)
Drive Current: 2.0 (A/WDG)



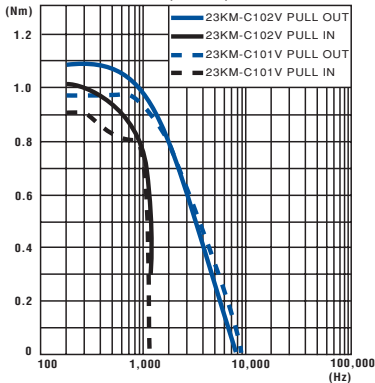
Model No.: 23KM-C032V, C040V
Driver: Chopper Dual
Supply Voltage: 24.0 (Volt)
Drive Current: 1.5 (A/WDG)



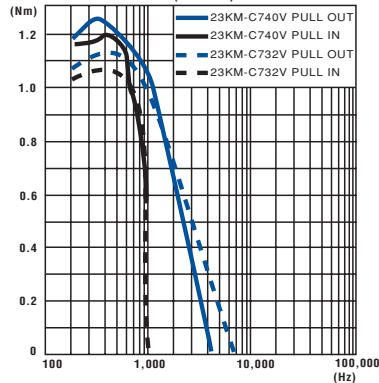
Model No.: 23KM-C033V, C043V
Driver: Chopper Dual
Supply Voltage: 24.0 (Volt)
Drive Current: 0.8 (A/WDG)



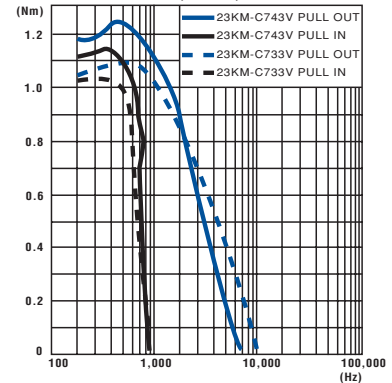
Model No.: 23KM-C101V, C102V
Driver: Chopper Dual
Supply Voltage: 24.0 (Volt)
Drive Current: 3.0 (A/WDG)



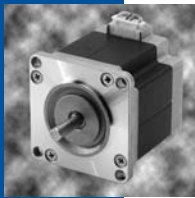
Model No.: 23KM-C732V, C740V
Driver: Chopper Dual
Supply Voltage: 24.0 (Volt)
Drive Current: 1.5 (A/WDG)



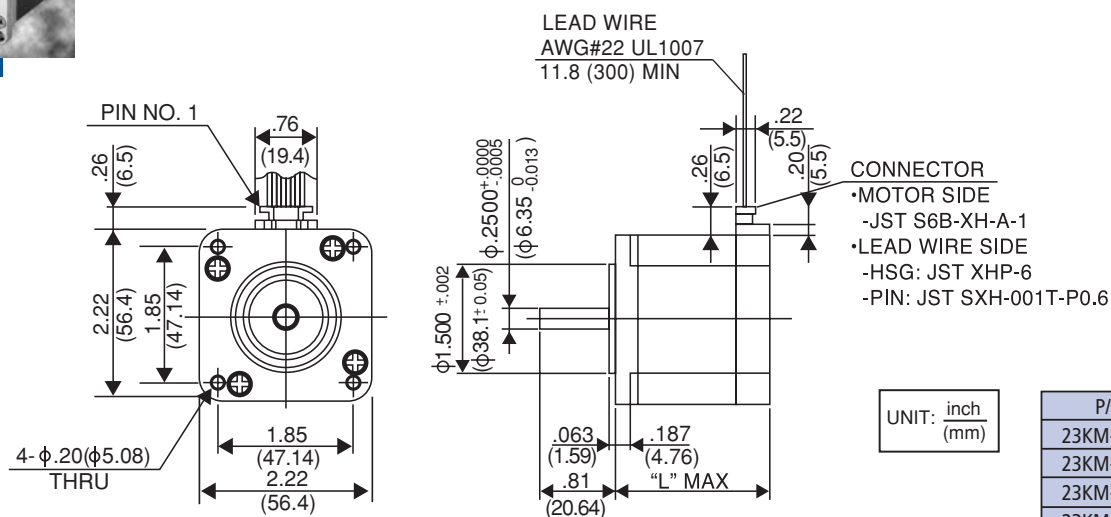
Model No.: 23KM-C733V, C743V
Driver: Chopper Dual
Supply Voltage: 24.0 (Volt)
Drive Current: 3.0 (A/WDG)



— BI POLAR PULL OUT
— BI POLAR PULL IN
- - - UNI POLAR PULL OUT
- - - UNI POLAR PULL IN



HIGH TORQUE MICROSTEP



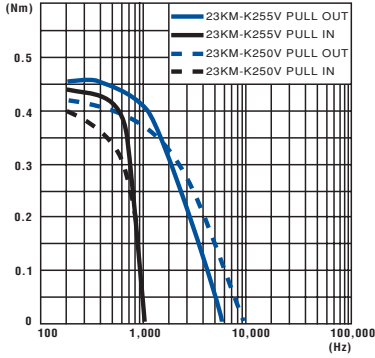
PIN NO. VS PHASE

A	A COM	\bar{A}	B	B COM	\bar{B}
RED	BLK	YEL	BLU	WHT	ORG
6	5	4	3	2	1

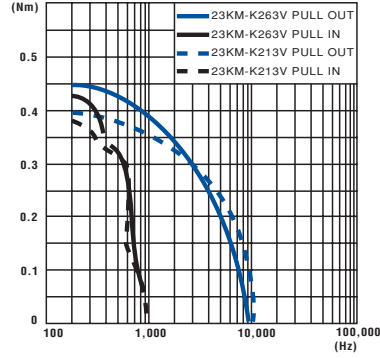
Model Specifications

Model Number	Step Angle	Drive Sequence	Rated Current/Wdg	Winding Resistance	Holding Torque	Inductance	Rotor Inertia	Detent Torque	Weight
	Degrees		Amps	Ohms	Nm (kg-cm)	mH	kg-cm ²	Nm (g-cm)	g
23KM-K250V	1.8°	UNIPOLAR	1.5	2.2	0.392 (4.0)	3.1	0.150	0.0196 (200)	470
23KM-K255V	1.8°	BIPOLAR	1.5	2.2	0.460 (4.7)	4.5	0.150	0.0196 (200)	470
23KM-K213V	1.8°	UNIPOLAR	2.0	1.25	0.392 (4.0)	1.9	0.150	0.0196 (200)	470
23KM-K263V	1.8°	BIPOLAR	2.0	1.25	0.460 (4.7)	3.6	0.150	0.0196 (200)	470
23KM-K379V	1.8°	UNIPOLAR	1.5	2.7	0.578 (5.9)	4.2	0.230	0.0294 (300)	590
23KM-K380V	1.8°	BIPOLAR	1.5	2.7	0.636 (6.5)	6.0	0.230	0.0294 (300)	590
23KM-K307V	1.8°	UNIPOLAR	2.0	1.5	0.578 (5.9)	2.4	0.230	0.0294 (300)	590
23KM-K308V	1.8°	BIPOLAR	2.0	1.5	0.636 (6.5)	3.8	0.230	0.0294 (300)	590
23KM-K032V	1.8°	UNIPOLAR	1.5	3.4	0.734 (7.5)	6.4	0.280	0.0392 (400)	680
23KM-K040V	1.8°	BIPOLAR	1.5	3.4	0.832 (8.5)	8.8	0.280	0.0392 (400)	680
23KM-K033V	1.8°	UNIPOLAR	3.0	0.85	0.734 (7.5)	2.4	0.280	0.0392 (400)	680
23KM-K043V	1.8°	BIPOLAR	3.0	0.85	0.832 (8.5)	3.8	0.280	0.0392 (400)	680
23KM-K101V	1.8°	UNIPOLAR	3.0	0.95	1.03 (10.5)	1.8	0.400	0.0488 (500)	900
23KM-K102V	1.8°	BIPOLAR	3.0	0.95	1.175 (12.0)	2.5	0.400	0.0488 (500)	900
23KM-K732V	1.8°	UNIPOLAR	1.5	4.2	1.175 (12.0)	8.0	0.440	0.0588 (600)	1050
23KM-K740V	1.8°	BIPOLAR	1.5	4.2	1.322 (13.5)	12.5	0.440	0.0588 (600)	1050
23KM-K733V	1.8°	UNIPOLAR	3.0	1.05	1.175 (12.0)	3.8	0.440	0.0588 (600)	1050
23KM-K743V	1.8°	BIPOLAR	3.0	1.05	1.322 (13.5)	5.6	0.440	0.0588 (600)	1050

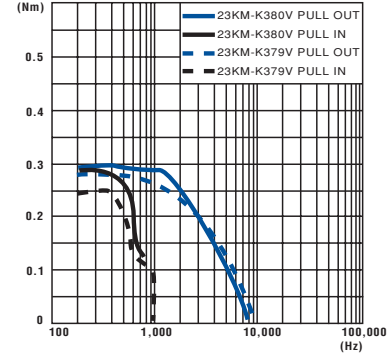
Model No.: 23KM-K250V, K255V
Driver: Chopper Dual
Supply Voltage: 24.0 (Volt)
Drive Current: 1.5 (A/WDG)



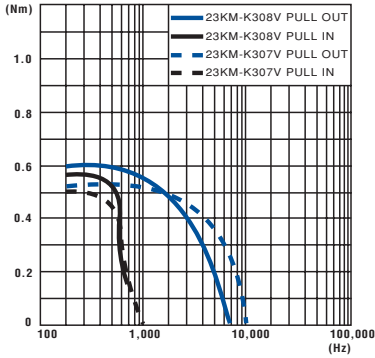
Model No.: 23KM-K213V, K263V
Driver: Chopper Dual
Supply Voltage: 24.0 (Volt)
Drive Current: 2.0 (A/WDG)



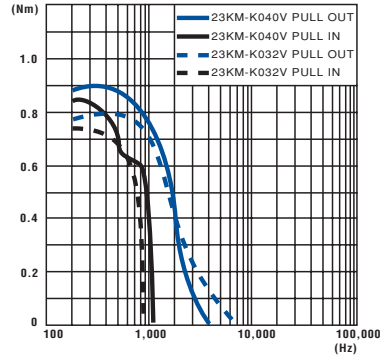
Model No.: 23KM-K379V, K380V
Driver: Chopper Dual
Supply Voltage: 24.0 (Volt)
Drive Current: 1.5 (A/WDG)



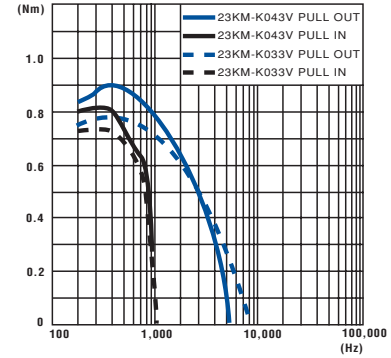
Model No.: 23KM-K307V, K308V
Driver: Chopper Dual
Supply Voltage: 24.0 (Volt)
Drive Current: 2.0 (A/WDG)



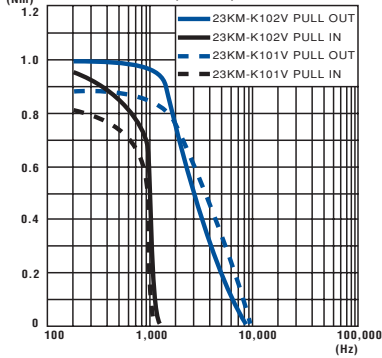
Model No.: 23KM-K032V, K040V
Driver: Chopper Dual
Supply Voltage: 24.0 (Volt)
Drive Current: 1.5 (A/WDG)



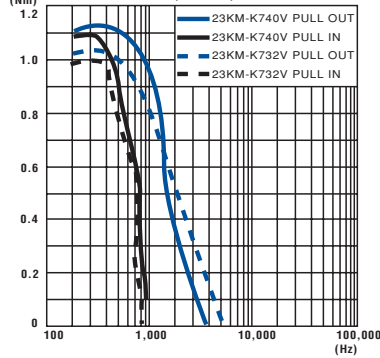
Model No.: 23KM-K033V, K043V
Driver: Chopper Dual
Supply Voltage: 24.0 (Volt)
Drive Current: 0.8 (A/WDG)



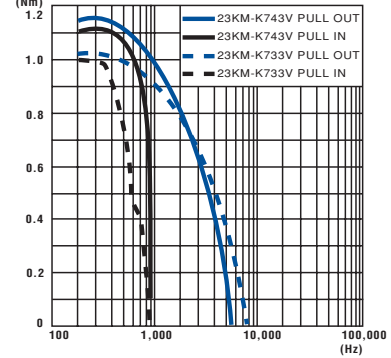
Model No.: 23KM-K101V, K102V
Driver: Chopper Dual
Supply Voltage: 24.0 (Volt)
Drive Current: 3.0 (A/WDG)



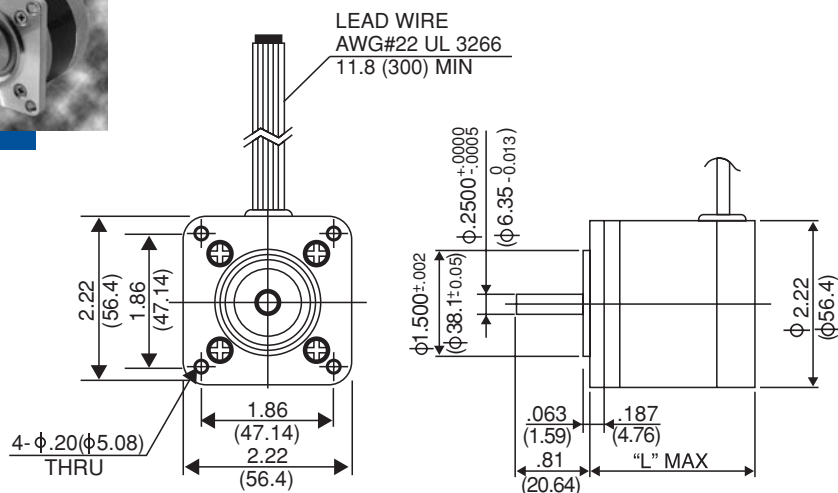
Model No.: 23KM-K732V, K740V
Driver: Chopper Dual
Supply Voltage: 24.0 (Volt)
Drive Current: 1.5 (A/WDG)



Model No.: 23KM-K733V, K743V
Driver: Chopper Dual
Supply Voltage: 24.0 (Volt)
Drive Current: 3.0 (A/WDG)



- BI POLAR PULL OUT
- BI POLAR PULL IN
- - - UNI POLAR PULL OUT
- - - UNI POLAR PULL IN



UNIT: $\frac{\text{inch}}{\text{mm}}$

P/N	"L"
23LY-C2XX	1.61 (41.0)
23LY-C3XX	1.45 (49.5)
23LY-C0XX	2.22 (56.5)

PIN NO. VS PHASE

A	A COM	\bar{A}	B	B COM	\bar{B}
RED	BLK	YEL	GRN	WHT	BLU

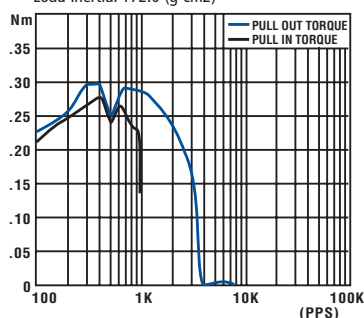
Model Specifications

Model Number	Step Angle	Drive Sequence	Rated Current/Wdg	Winding Resistance	Holding Torque	Inductance	Rotor Inertia	Detent Torque	Weight
	Degrees		Amps	Ohms	Nm (kg-cm)	mH	kg-cm ²	Nm (g-cm)	g
23LY-C205	0.9°	UNIPOLAR	1.10	3.6	0.294 (3.0)	5.3	0.055	0.0245 (250)	360
23LY-C201	0.9°	UNIPOLAR	0.78	7.1	0.294 (3.0)	8.3	0.055	0.0245 (250)	360
23LY-C202	0.9°	UNIPOLAR	1.25	3.0	0.294 (3.0)	4.5	0.055	0.0245 (250)	360
23LY-C301	0.9°	UNIPOLAR	1.70	1.8	0.394 (4.0)	4.5	0.110	0.0294 (300)	450
23LY-C303	0.9°	UNIPOLAR	1.00	5.1	0.394 (4.0)	13.0	0.110	0.0294 (300)	450
23LY-C305	0.9°	UNIPOLAR	0.85	7.1	0.394 (4.0)	18.0	0.110	0.0294 (300)	450
23LY-C002	0.9°	UNIPOLAR	1.60	2.7	0.471 (4.8)	7.2	0.160	0.0343 (350)	560
23LY-C001	0.9°	UNIPOLAR	0.85	10.0	0.471 (4.8)	30.0	0.160	0.0343 (350)	560

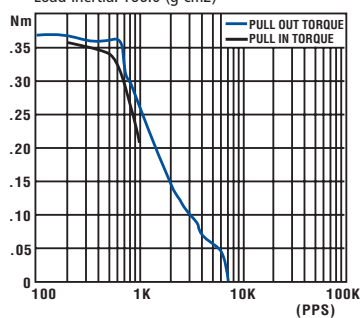
NOTE: Bipolar models also available.

Torque/Speed Characteristics

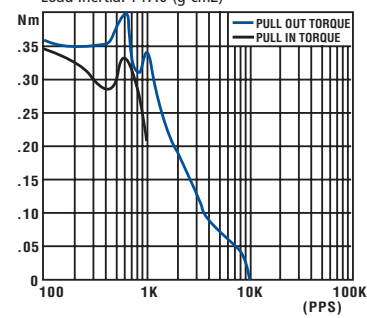
Model No.: 23LY-C202
Driver: Unipolar Chopper Dual
Supply Voltage: 24.0 (Volt)
Drive Current: 1.25 (A/WDG)
Load Inertia: 172.0 (g-cm²)



Model No.: 23LY-C305
Driver: Unipolar Chopper Dual
Supply Voltage: 24.0 (Volt)
Drive Current: 0.80 (A/WDG)
Load Inertia: 166.0 (g-cm²)



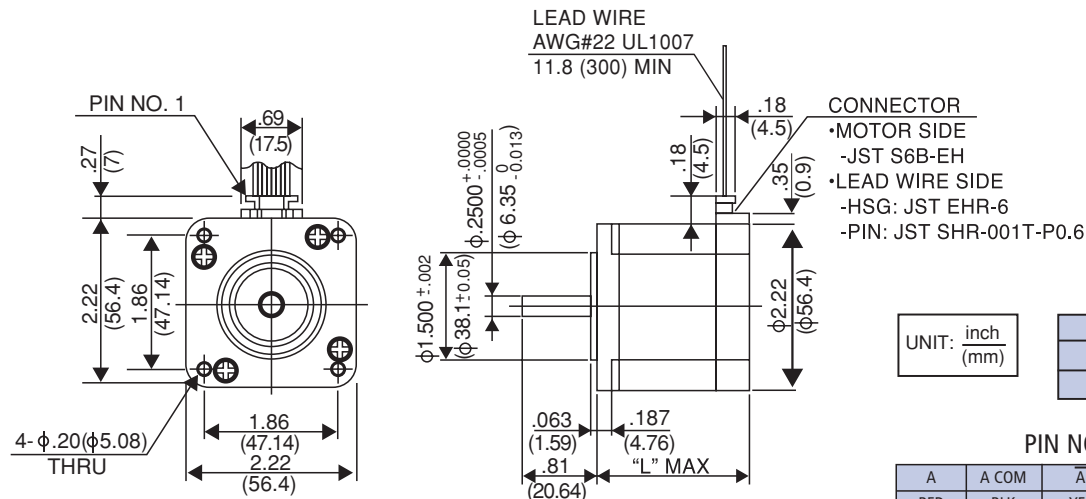
Model No.: 23LY-C002
Driver: Unipolar Chopper Dual
Supply Voltage: 24.0 (Volt)
Drive Current: 1.60 (A/WDG)
Load Inertia: 147.0 (g-cm²)



5.0°

23LQ-C

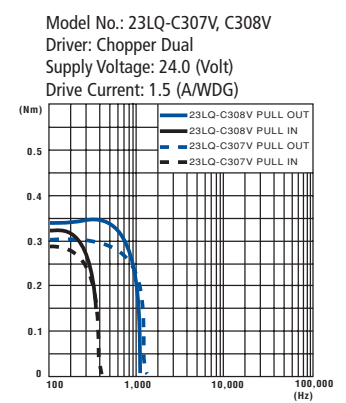
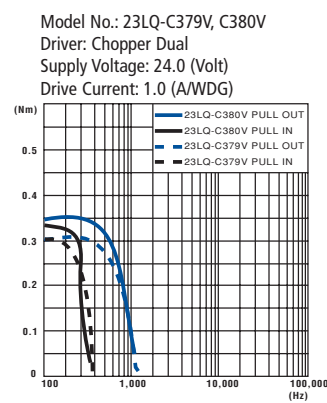
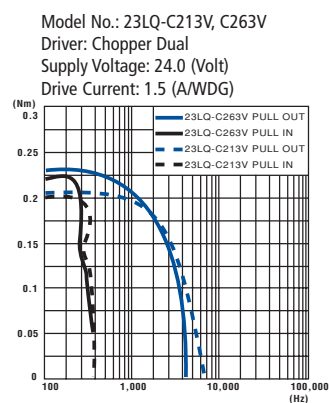
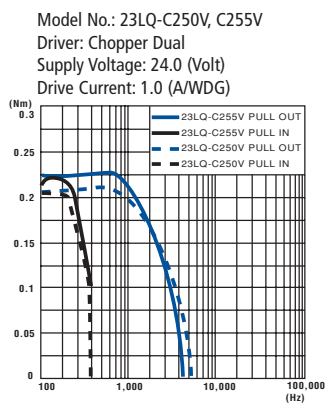
hybrid



Model Specifications

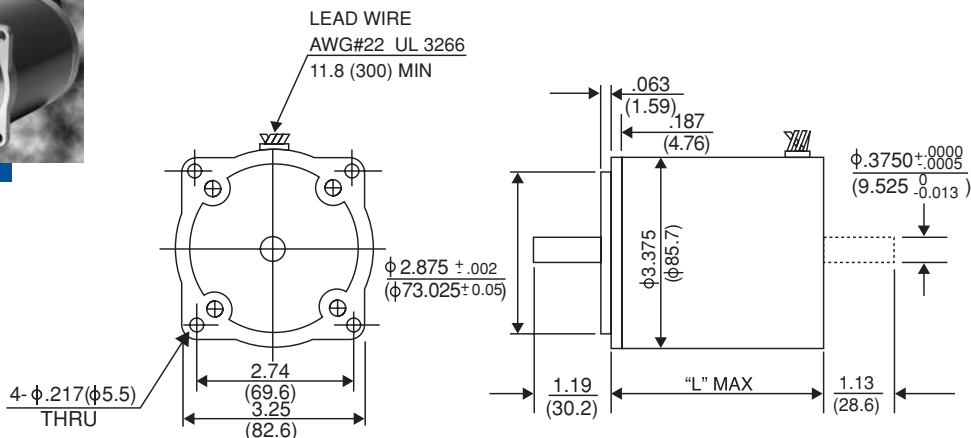
Model Number	Step Angle	Drive Sequence	Rated Current/Wdg	Winding Resistance	Holding Torque	Inductance	Rotor Inertia	Detent Torque	Weight
	Degrees		Amps	Ohms	Nm (kg-cm)	mH	kg-cm ²	Nm (g-cm)	g
23LQ-C250V	5.0°	UNIPOLAR	1.0	3.5	0.225 (2.3)	2.7	0.150	0.0488 (500)	470
23LQ-C255V	5.0°	BIPOLAR	1.0	3.5	0.274 (2.8)	4.2	0.150	0.0488 (500)	470
23LQ-C213V	5.0°	UNIPOLAR	1.5	1.55	0.225 (2.3)	1.9	0.150	0.0488 (500)	470
23LQ-C263V	5.0°	BIPOLAR	1.5	1.55	0.274 (2.8)	3.6	0.150	0.0488 (500)	470
23LQ-C379V	5.0°	UNIPOLAR	1.0	5.0	0.392 (4.0)	3.4	0.230	0.0687 (700)	590
23LQ-C380V	5.0°	BIPOLAR	1.0	5.0	0.450 (4.6)	5.3	0.230	0.0687 (700)	590
23LQ-C307V	5.0°	UNIPOLAR	1.5	2.2	0.392 (4.0)	2.4	0.230	0.0687 (700)	590
23LQ-C308V	5.0°	BIPOLAR	1.5	2.2	0.450 (4.6)	3.8	0.230	0.0687 (700)	590

Torque/Speed Characteristics



— BI POLAR PULL OUT
— BI POLAR PULL IN

- - - UNI POLAR PULL OUT
- - - UNI POLAR PULL IN



UNIT: $\frac{\text{inch}}{\text{mm}}$

P/N	"L"
34PM-C1XX	3.69 (93.7)
34PM-C0XX	2.44 (61.9)

PIN NO. VS PHASE

A	A COM	\bar{A}	B	B COM	\bar{B}
RED	BLK	RED/ WHT	GRN	WHT	GRN/ WHT

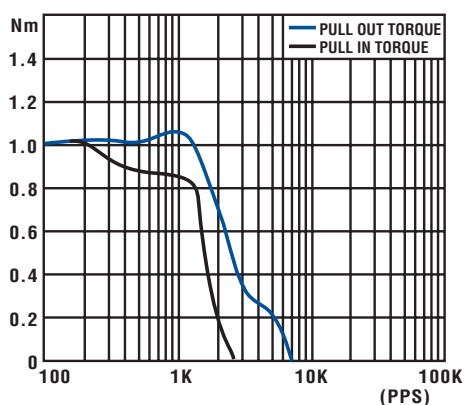
Model Specifications

Model Number	Step Angle	Drive Sequence	Rated Current/Wdg	Winding Resistance	Holding Torque	Inductance	Rotor Inertia	Detent Torque	Weight
	Degrees		Amps	Ohms	Nm (kg-cm)	mH	kg-cm ²	Nm (g-cm)	g
34PM-C101	1.8°	UNIPOLAR	4.00	0.75	1.961 (20)	3.50	1.1000	0.1275 (1300)	2,400
34PM-C108	1.8°	UNIPOLAR	1.00	12.00	1.961 (20)	56.00	1.1000	0.1275 (1300)	2,400
34PM-C007	1.8°	UNIPOLAR	1.25	4.40	1.177 (12)	14.50	0.5600	0.0883 (900)	1,400
34PM-C049	1.8°	UNIPOLAR	4.70	0.36	1.177 (12)	1.65	0.5600	0.0883 (900)	1,400

NOTE: Bipolar models also available.

Torque/Speed Characteristics

Model No.: 34PM-C007
Driver: Unipolar Chopper Dual
Supply Voltage: 35.0 (Volt)
Drive Current: 1.25 (A/WDG)
Load Inertia: 26.9 (g-cm²)



Specification Requirements for Customized Aluminum-flange and MTF-type Hybrid Motors.

NMB can provide custom windings and other features for your Hybrid and MTF type motors. The following form will help you gather the specifications that will be required in order to request a customized Hybrid or MTF type motor. If you have any questions, or require immediate engineering help, please call motor engineering at 818-341-3355 or e-mail us at motors@nmbtc.com.

Project Information

Customer Name: _____
 Customer PN: _____
 Engineer/Contact: _____
 Phone Number: _____
 Project Name: _____
 Application: _____
 Function: _____
 Target Price: _____
 Production Start: _____
 EAU: _____

Type

Size/step Angle

☐ Hybrid _____

☐ MTF _____

Magnet for MTF

☐ Ferrite (Std) ☐ Neodymium

Mounting for MTF

☐ Standard ☐ Special Flange

Torque

☐ g-cm @ ☐ pps

☐ oz-in @ ☐ rpm

☐ mN-m

Holding Torque _____

Detent Torque _____

Pull Out Torque _____ @ _____

Pull Out Torque _____ @ _____

Pull In Torque _____ @ _____

Electrical Specs

Drive Mode ☐ Bipolar ☐ Unipolar

Driver Maker _____

Driver IC P/N _____

Stepping:

☐ Dual Phase Full Step (2-2) ☐ Half Step (1-2)

☐ Single Phase Full Step (1-1) ☐ Microstepping

Drive Type:

☐ Chopper (Constant current)

☐ L/R (Constant voltage)

Drive Voltage _____ V

Drive Current _____ A/phase

Coil Resistance _____ Ω (If known)

Which is Priority ☐ Torque ☐ Resistance

Mechanical Specs

Lead Wires

Number of Lead Wires:

☐ 4 (Bipolar only)

☐ 6 (Unipolar-can be run bipolar)

☐ 8 (Customer wiring diagram required)

Lead Wire Length:

☐ Standard

☐ Custom _____ mm ☐ in

Cable-End Connector:

☐ No (Just fly leads)

☐ Yes (Switching sequence required)

Maker _____

Houseing PN _____

Pin PN _____

Shaft

Front Shaft Diameter:

☐ Standard

☐ Custom _____ mm ☐ in

Front Shaft Length:

☐ Standard

☐ Custom _____ mm ☐ in

Rear Shaft:

☐ None (Single shaft)

☐ Length _____ mm ☐ in

☐ Diameter _____ mm ☐ in

Gear/Pulley or D-Cut:

☐ Yes (Customer drawing required)

☐ No