PM
STEP MOTORS

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PM STEP MOTORS

Contents

Product List

Product Line Up

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35PM048L	35	21.3	48	7.5
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Series	Outer Diameter (mm)	Shaft Stroke (mm)	Step No.	Step Travel (mm)
20LN024M	20	50	24	0.0508
25LN024L	25	40	24	0.0508
28L024L	28	13	24	0.0420
35LN024L	35	12	24	0.0333

Model Numbering System

42 PM 048 L 1 - 003 02

Base frame code
Outer diameter size: 42mm diameter = 42

Motor type code
PM: permanent magnet step motor
LN: permanent magnet linear step motor

Step code
020: 20 steps per rotation, 18° step angle
024: 24 steps per rotation, 15° step angle
048: 48 steps per rotation, 7.5° step angle
096: 96 steps per rotation, 3.75° step angle

Length code
S: short version
M: middle version
L: long version

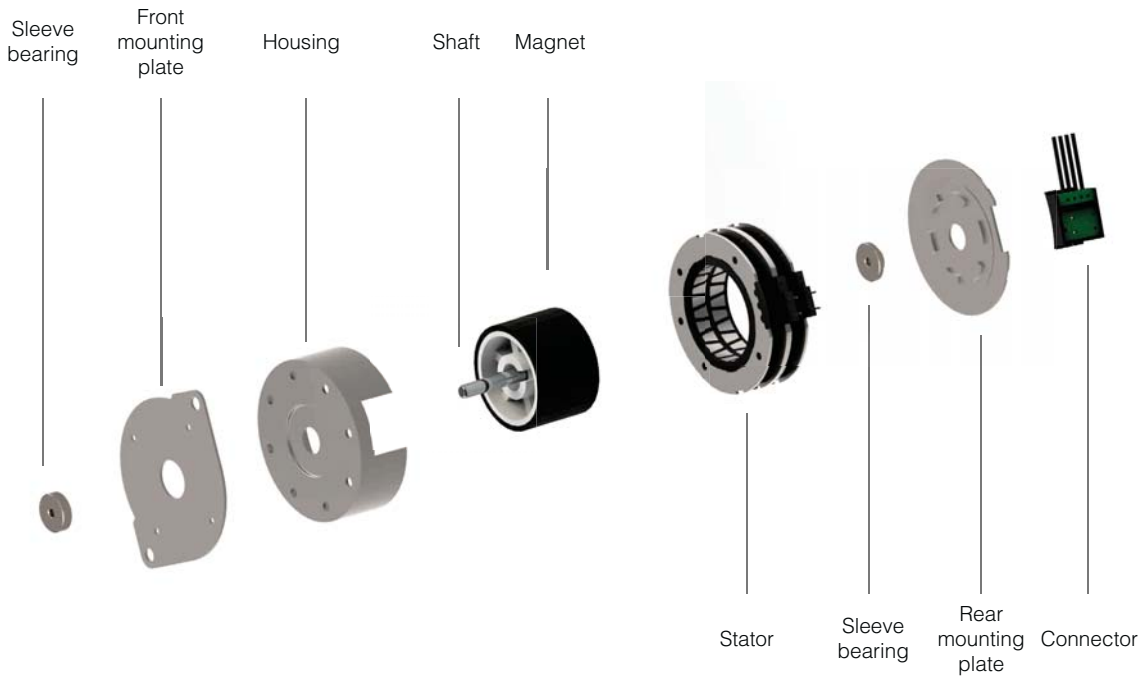
Magnet grade code

Resistance code
Winding resistance: 3Ohm = 003

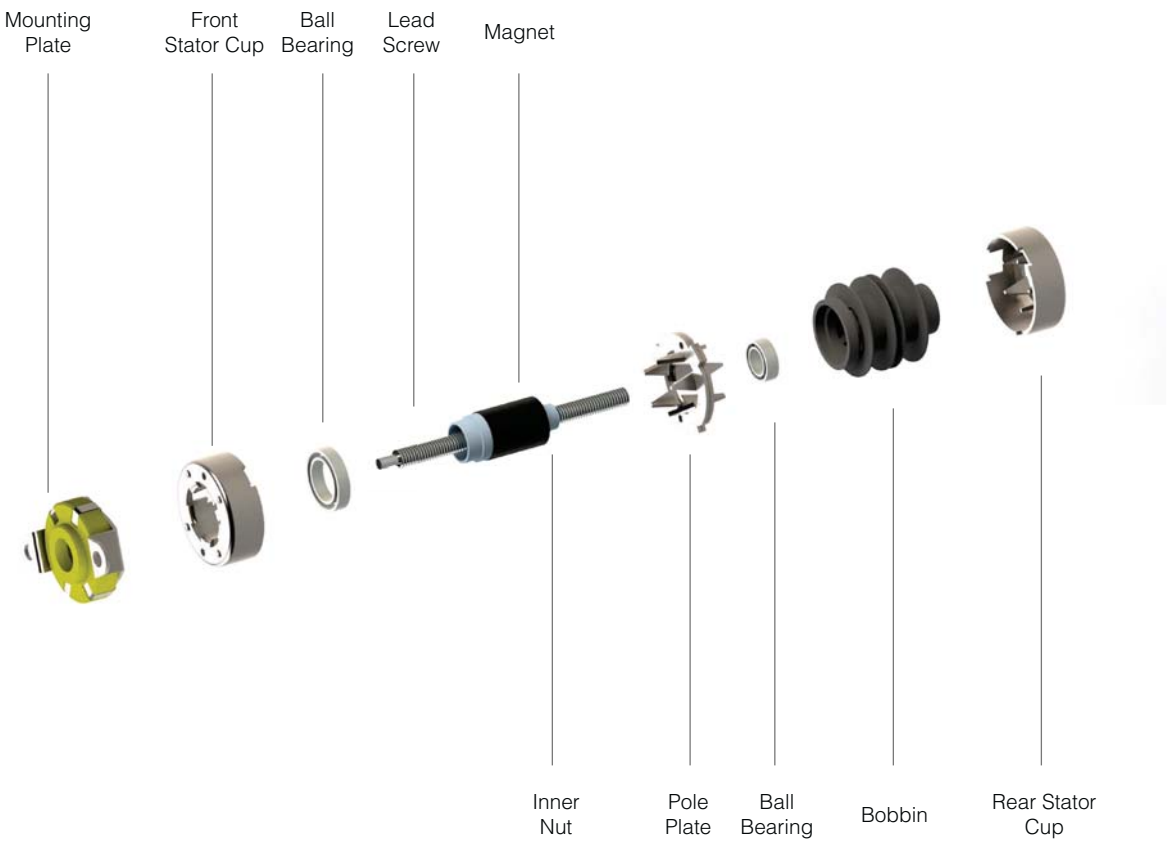
Mechanical code

Structure

Rotary Motors

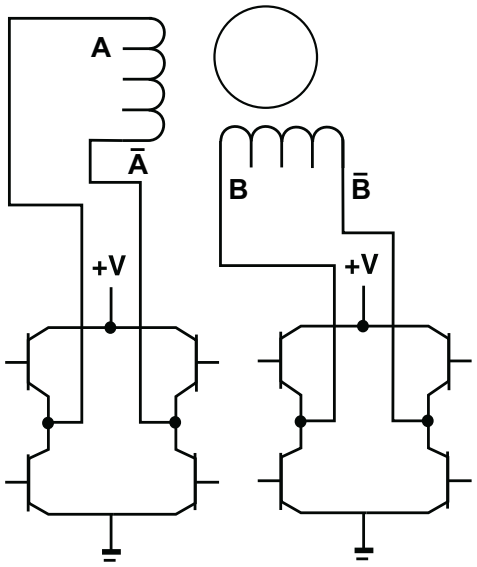


Linear Actuators



Operating Principles

Schematic Diagrams



Step Sequence

CONNECTOR PIN LOCATION							
PIN NO.	COLOR	CCW ◄——► CW (SEEN FROM FLANGE SIDE)					PHASE
1	BLACK	ON	ON			ON	A
2	YELLOW			ON	ON		Ā
3	ORANGE		ON	ON			B
4	BROWN	ON			ON	ON	B̄

Operating Principles

In response to each individual control pulse and direction signal, the drive applies power to the motor windings to cause the rotor to take a step forward, a step in reverse, or hold in position.

For example, in a 7.5 degree two phase step motor: When both phases are energized with DC current, the motor will stop rotating and hold in position. The maximum torque the motor can hold in place with rated DC current, is the rated holding torque. If the current in one phase is reversed, the motor will move 1 step (7.5 degrees) in a known direction. If the current in the other phase had been reversed, the motor would move 1 step (7.5 degrees) in the other direction. As current is reversed in each phase in sequence, the motor continues to step in the desired direction. These steps are very accurate. For a 7.5 degree step motor, there are exactly 48 steps in one revolution.

Two phase stepping motors are furnished with two types of windings: bipolar or unipolar. In a bipolar motor there is one winding on each phase. The motor moves in steps as the current in each winding is reversed. This requires a drive with eight electronic switches. In a unipolar motor there are two windings on each phase. The two windings on each phase are connected in opposite directions. Phase current is reversed by turning on alternate windings on the same phase. This requires a drive with only four electronic switches. Bipolar operation typically provides 40% more holding torque than unipolar, because 100% of the winding is energized in the bipolar arrangement.

Rotary Motors

- Ø20mm
- Ø25mm
- Ø35mm
- Ø42mm

20PM020S - Ø20mm, S, 18°

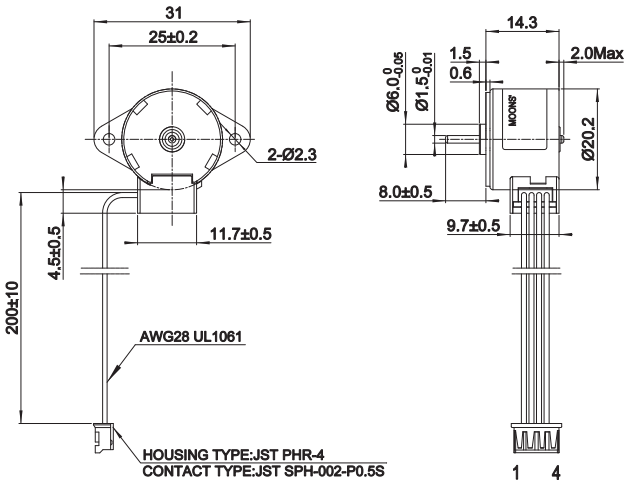
- Phases 2
- Steps / Revolution 20
- Shaft Load
  - Axial 1N
  - Radial 5N
- IP Rating 40
- Approvals RoHS
- Operating Temp. -20°C to +50°C
- Insulation Class B, 130°C
- Insulation Resistance 100 MegOhms

Motor Data

Model Number			20PM020S0-01002	20PM020S0-02501
Length			14.3mm (0.56in.)	
Step Angle	°		18	
Rated Current	Amps		0.33	0.21
Holding Torque	10^{-4} Nm	Typ.	90	100
	oz-in	Typ.	1.3	1.4
Coil Resistance	Ohms	±10% @ 20°C	10	25
Coil Inductance	mH	Typ.	4.6	10.6
Detent Torque	10^{-4} Nm	Max.	27	27
	oz-in	Max.	0.38	0.38
Rotor Inertia	gcm^2		0.24	0.24
	10^{-4} oz-in^2		13.1	13.1
Motor Weight	g		21	
	Lbs		0.05	

^ Preferred model

Dimensions: mm



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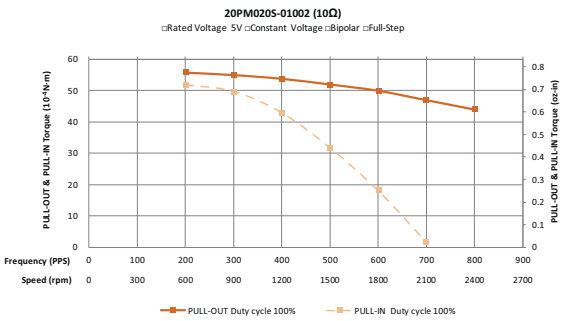

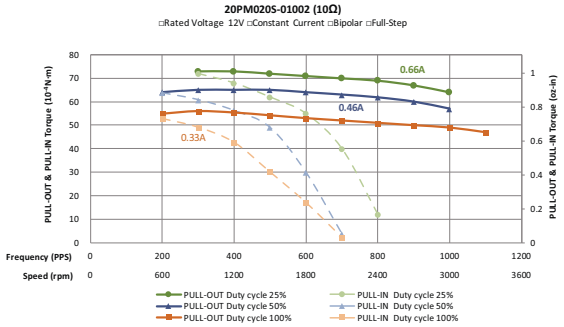

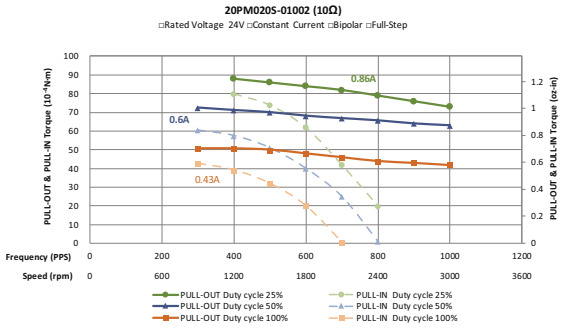

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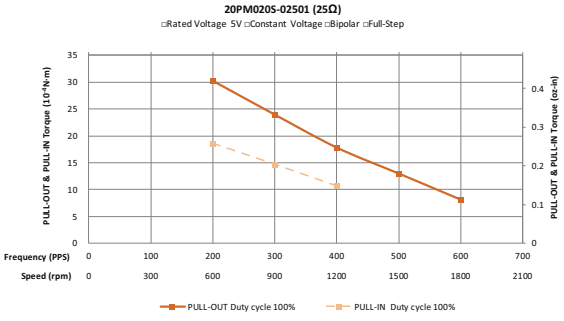
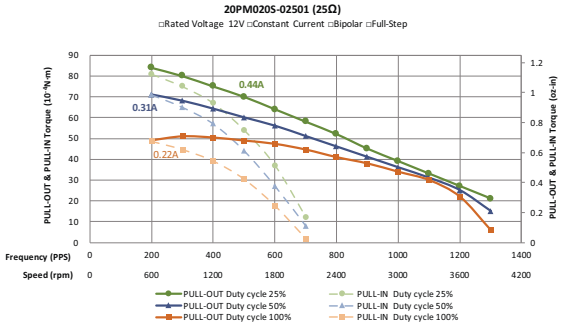
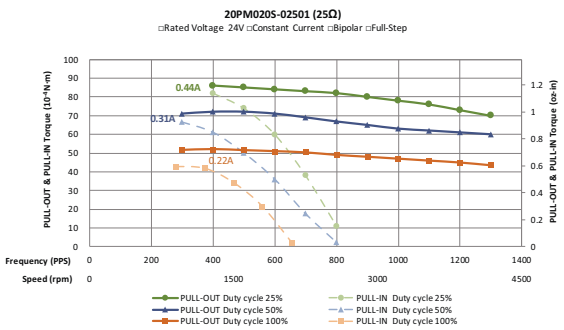






20PM020L - Ø20mm, L, 18°

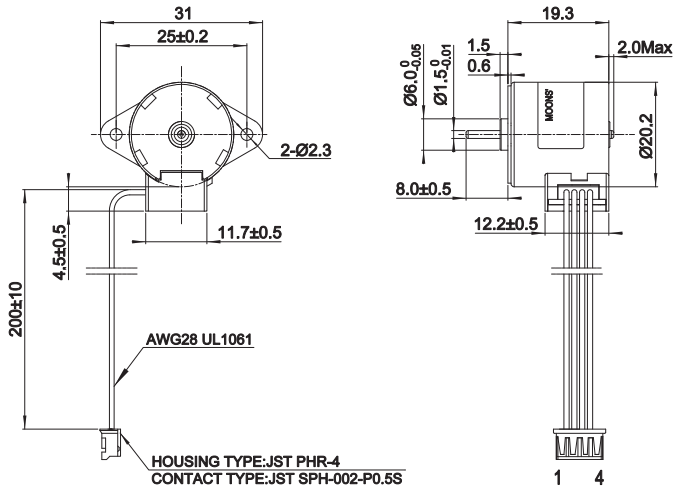
- Phases 2
- Steps / Revolution 20
- Shaft Load
  - Axial 1N
  - Radial 5N
- IP Rating 40
- Approvals RoHS
- Operating Temp. -20°C to +50°C
- Insulation Class B, 130°C
- Insulation Resistance 100 MegOhms

Motor Data

Model Number			20PM020L8-00702	20PM020L8-02101
Length			19.3mm (0.76in.)	
Step Angle	°		18	
Rated Current	Amps		0.43	0.25
Holding Torque	10^{-4} Nm	Typ.	155	155
	oz-in	Typ.	2.2	2.2
Coil Resistance	Ohms	±10% @ 20°C	7	21
Coil Inductance	mH	Typ.	4.8	14.3
Detent Torque	10^{-4} Nm	Max.	41	41
	oz-in	Max.	0.57	0.57
Rotor Inertia	gcm^2		0.37	0.37
	10^{-4} $oz\text{-}in^2$		20.2	20.2
Motor Weight	g		27	
	Lbs		0.06	

^ Preferred model

Dimensions: mm



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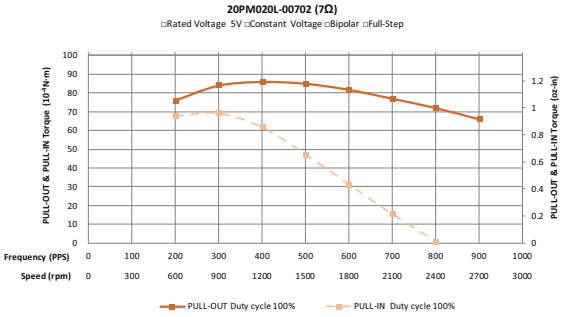

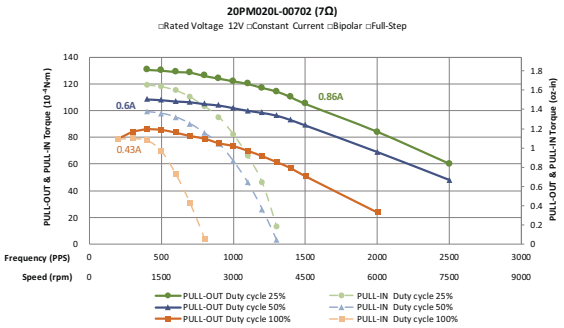

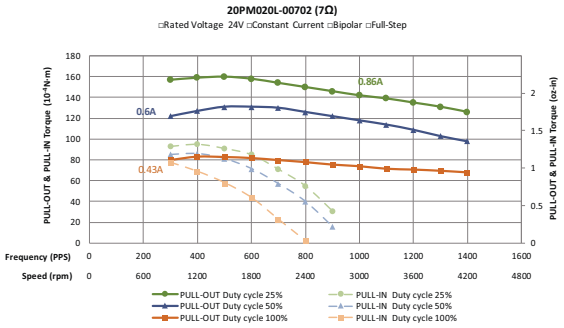

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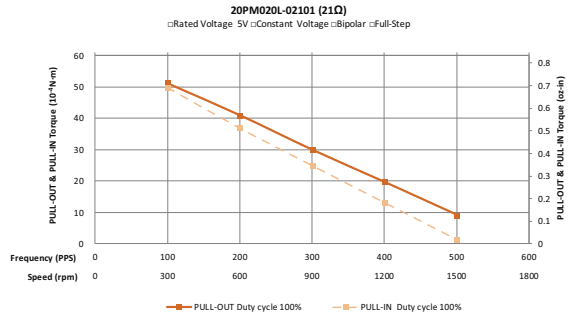
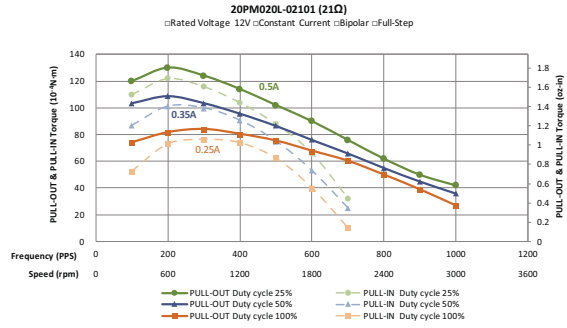
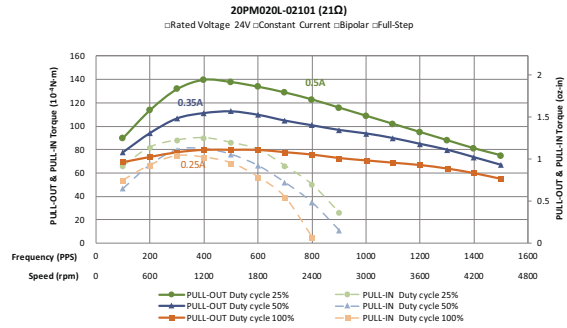






25PM024S - Ø25mm, S, 15°

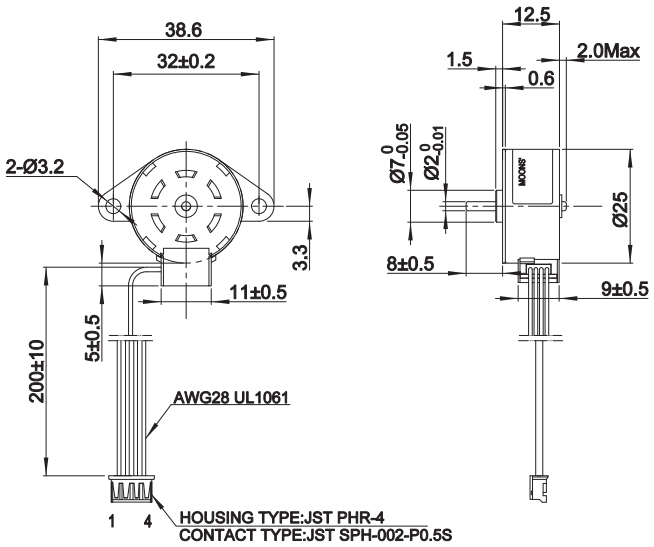
- Phases 2
- Steps / Revolution 24
- Shaft Load
  - Axial 1N
  - Radial 5N
- IP Rating 40
- Approvals RoHS
- Operating Temp. -20°C to +50°C
- Insulation Class B, 130°C
- Insulation Resistance 100 MegOhms

Motor Data

Model Number			25PM024S8-00601	25PM024S8-01601
Length			12.5mm (0.40in.)	
Step Angle	°		15	
Rated Current	Amps		0.5	0.32
Holding Torque	10^{-4} Nm	Typ.	105	115
	oz-in	Typ.	1.5	1.6
Coil Resistance	Ohms	±10% @ 20°C	6	16
Coil Inductance	mH	Typ.	2.7	7.4
Detent Torque	10^{-4} Nm	Max.	29	29
	oz-in	Max.	0.40	0.40
Rotor Inertia	gcm^2		0.54	0.54
	10^{-4} oz-in^2		29.5	29.5
Motor Weight	g		30	
	Lbs		0.07	

^ Preferred model

Dimensions: mm



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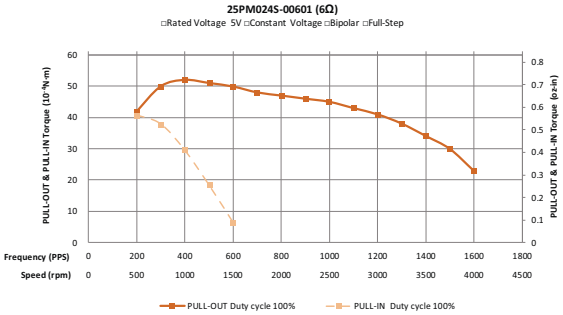

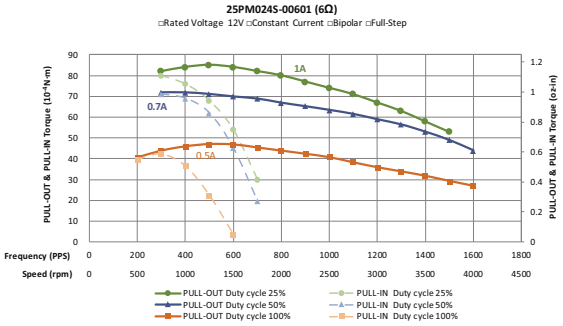

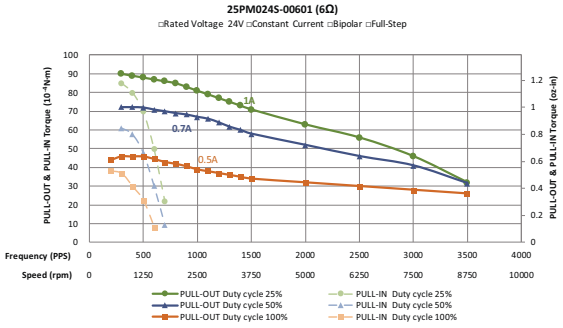

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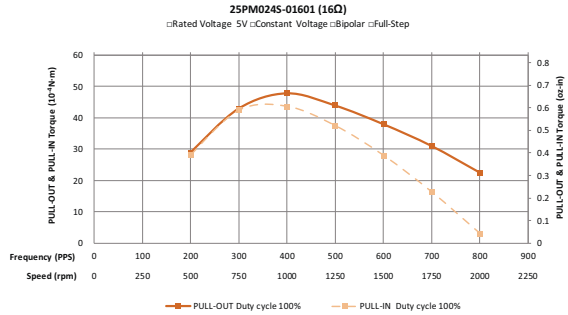
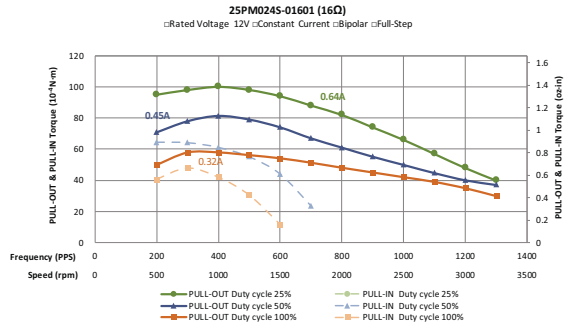
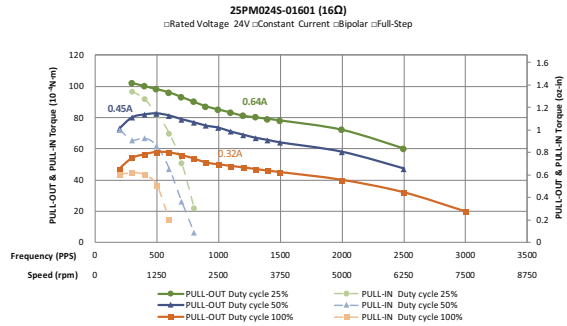






25PM048S - Ø25mm, S, 7.5°

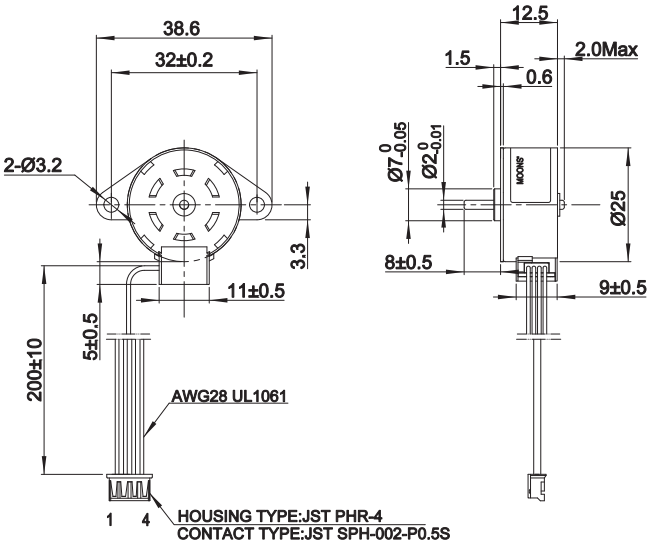
- Phases 2
- Steps / Revolution 48
- Shaft Load
  - Axial 1N
  - Radial 5N
- IP Rating 40
- Approvals RoHS
- Operating Temp. -20°C to +50°C
- Insulation Class B, 130°C
- Insulation Resistance 100 MegOhms

Motor Data

Model Number			25PM048S9-00601	25PM048S9-01601
Length			12.5mm (0.40in.)	
Step Angle	°		7.5	
Rated Current	Amps		0.5	0.32
Holding Torque	10^{-4} Nm	Typ.	170	230
	oz-in	Typ.	2.4	3.2
Coil Resistance	Ohms	±10% @ 20°C	6	16
Coil Inductance	mH	Typ.	3.4	9.4
Detent Torque	10^{-4} Nm	Max.	44	44
	oz-in	Max.	0.61	0.61
Rotor Inertia	gcm^2		0.54	0.54
	10^{-4} oz-in^2		29.5	29.5
Motor Weight	g		30	
	Lbs		0.07	

^ Preferred model

Dimensions: mm



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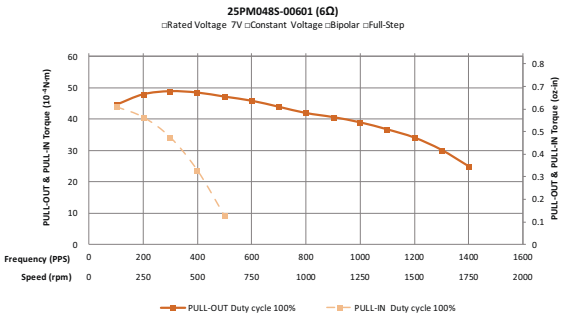

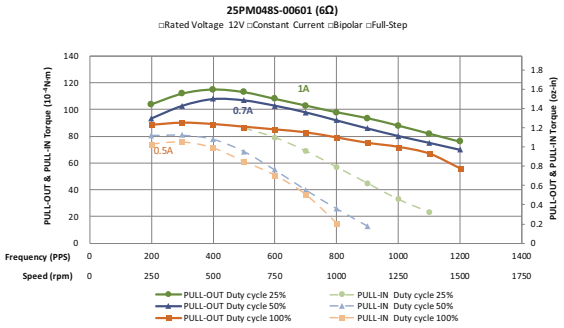

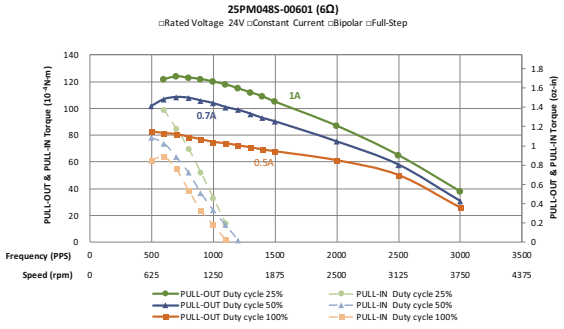

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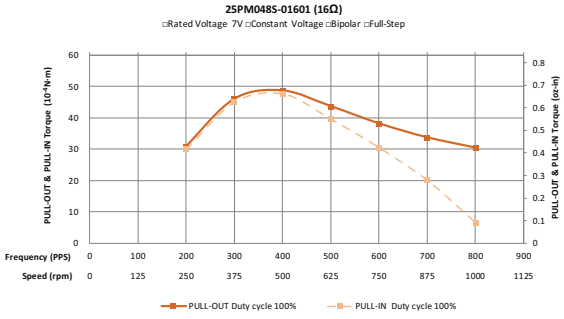
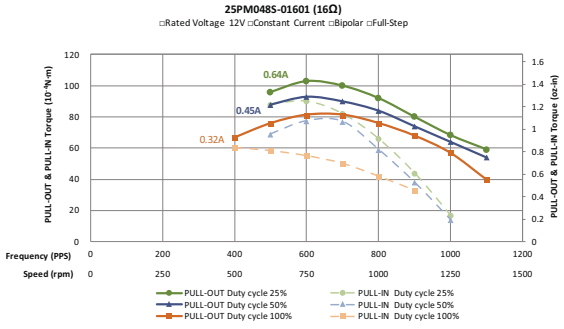
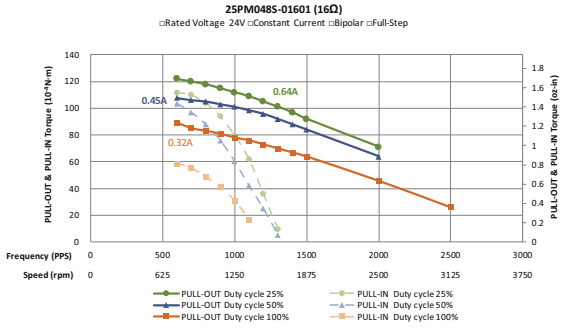






25PM024L - Ø25mm, L, 15°

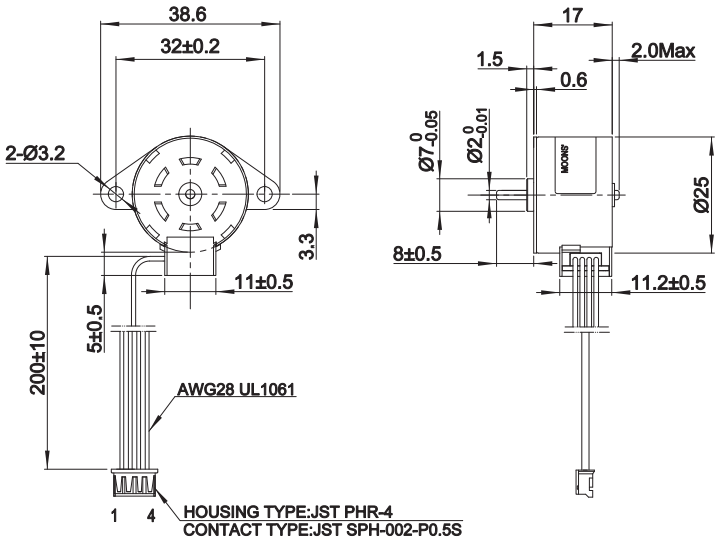
- Phases 2
- Steps / Revolution 24
- Shaft Load
  - Axial 1N
  - Radial 5N
- IP Rating 40
- Approvals RoHS
- Operating Temp. -20°C to +50°C
- Insulation Class B, 130°C
- Insulation Resistance 100 MegOhms

Motor Data

Model Number			25PM024L8-00801	25PM024L8-01403
Length			17mm (0.67in.)	
Step Angle	°		15	
Rated Current	Amps		0.47	0.35
Holding Torque	10^{-4} Nm	Typ.	160	170
	oz-in	Typ.	2.2	2.4
Coil Resistance	Ohms	±10% @ 20°C	8	14
Coil Inductance	mH	Typ.	7.9	14.4
Detent Torque	10^{-4} Nm	Max.	36	36
	oz-in	Max.	0.50	0.50
Rotor Inertia	gcm^2		0.88	0.88
	10^{-4} oz-in^2		48.1	48.1
Motor Weight	g		39	
	Lbs		0.09	

^ Preferred model

Dimensions: mm



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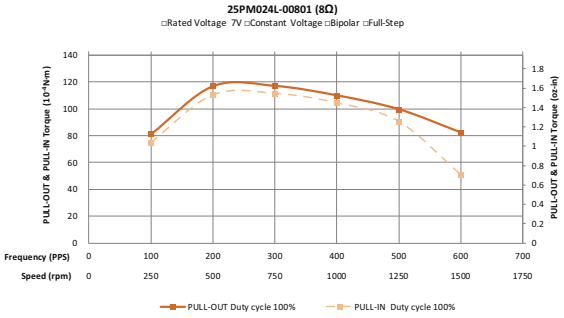

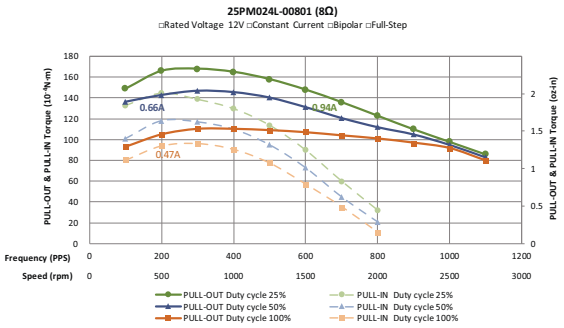

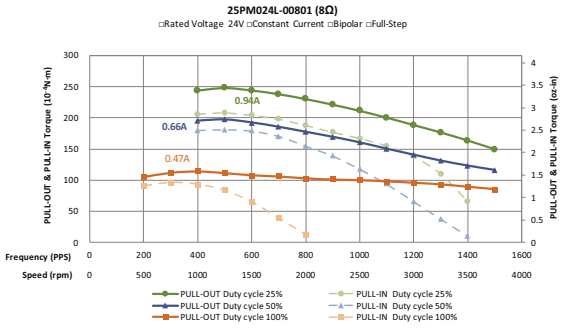

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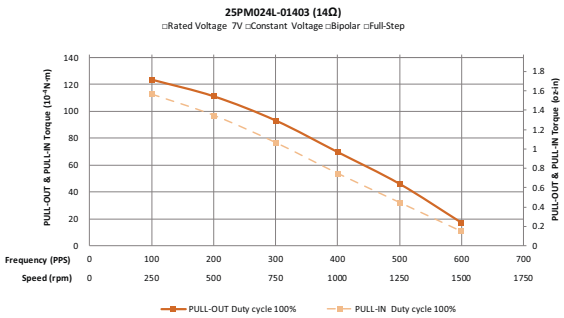
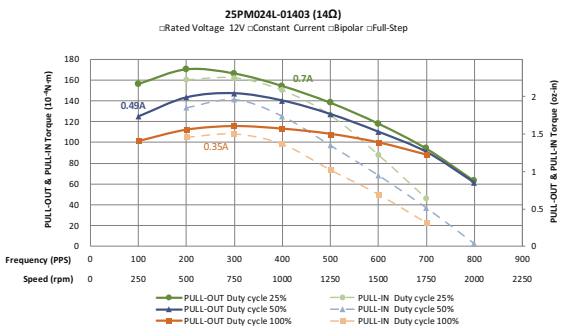
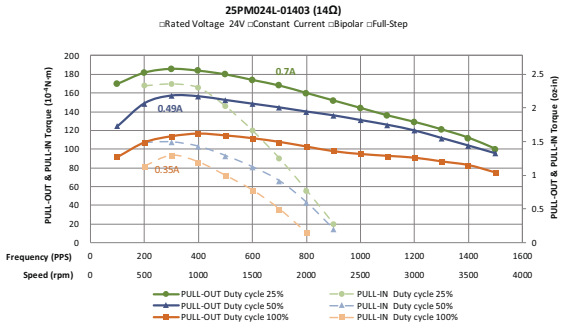






25PM048L - Ø25mm, L, 7.5°

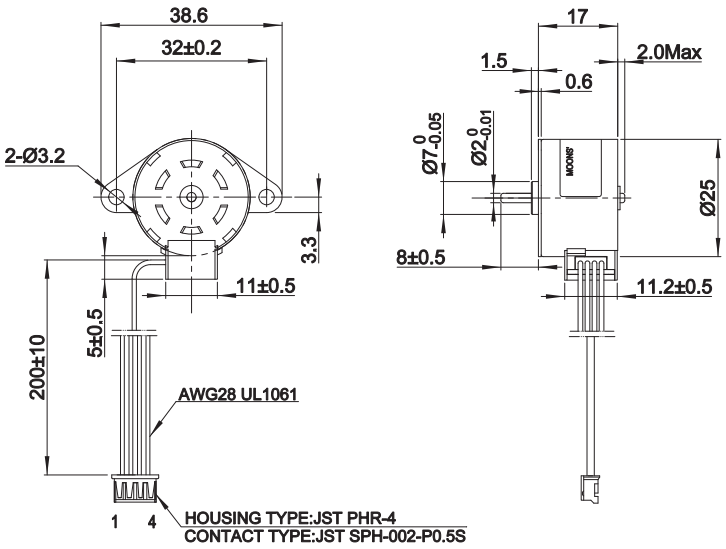
- Phases 2
- Steps / Revolution 48
- Shaft Load
  - Axial 1N
  - Radial 5N
- IP Rating 40
- Approvals RoHS
- Operating Temp. -20°C to +50°C
- Insulation Class B, 130°C
- Insulation Resistance 100 MegOhms

Motor Data

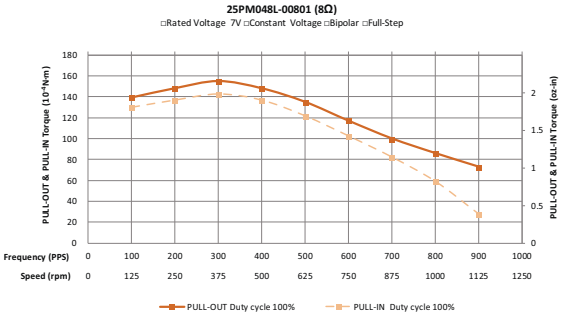
Model Number			25PM048L9-00801	25PM048L9-01401
Length			17mm (0.67in.)	
Step Angle	°		7.5	
Rated Current	Amps		0.47	0.35
Holding Torque	10^{-4} Nm	Typ.	270	270
	oz-in	Typ.	3.8	3.8
Coil Resistance	Ohms	±10% @ 20°C	8	14
Coil Inductance	mH	Typ.	7.2	14.5
Detent Torque	10^{-4} Nm	Max.	33	33
	oz-in	Max.	0.45	0.45
Rotor Inertia	gcm^2		0.88	0.88
	10^{-4} oz-in^2		48.1	48.1
Motor Weight	g		39	
	Lbs		0.09	

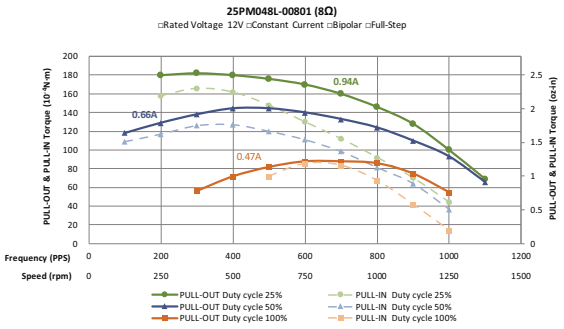
^ Preferred model

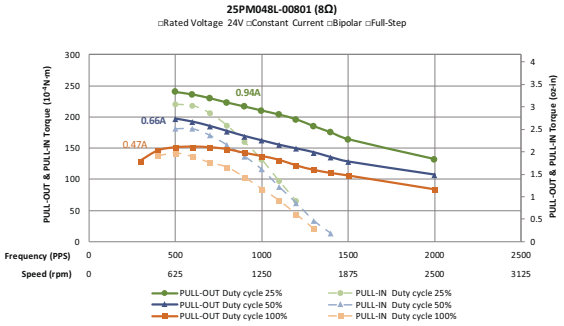
Dimensions: mm



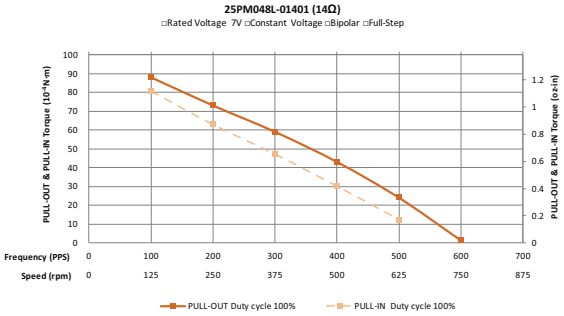
25PM048L9-00801

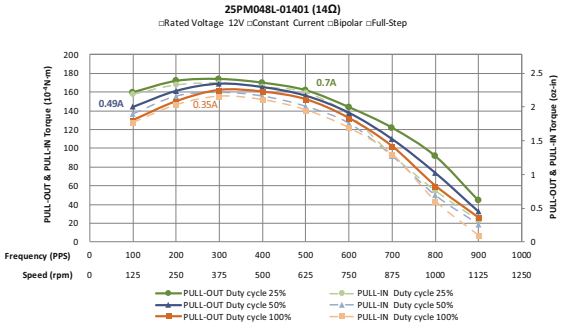


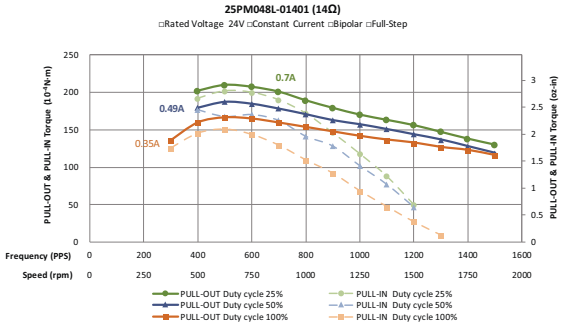




25PM048L9-01401







35PM024S - Ø35mm, S, 15°

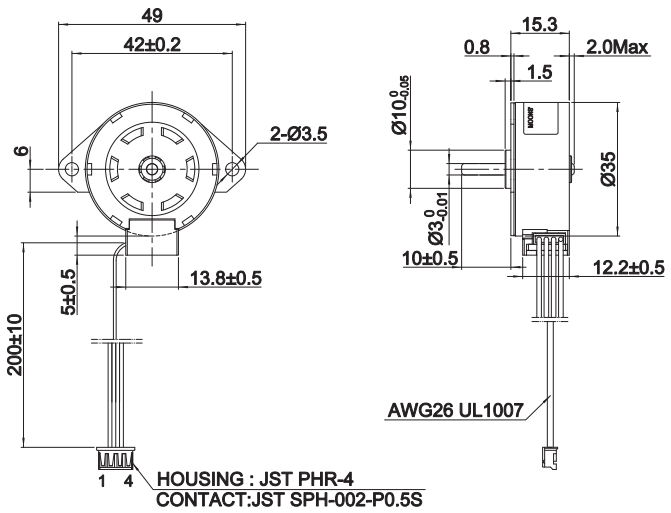
- Phases 2
- Steps / Revolution 24
- Shaft Load
  - Axial 1 N
  - Radial 7.5 N
- IP Rating 40
- Approvals RoHS
- Operating Temp. -20°C to +50°C
- Insulation Class B, 130°C
- Insulation Resistance 100 MegOhms

Motor Data

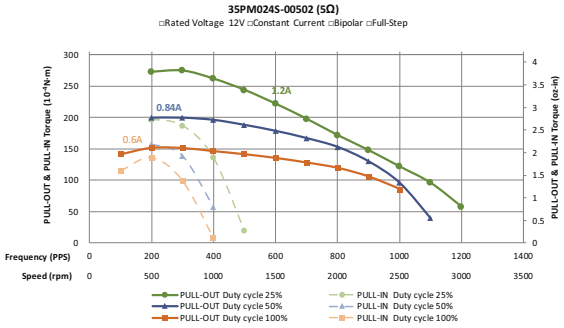
Model Number			35PM024S9-00502	35PM024S9-01201	35PM024S9-08001
Length			15.3mm (0.60in.)		
Step Angle	°		15		
Rated Current	Amps		0.6	0.38	0.15
Holding Torque	10^{-4} Nm	Typ.	270	270	310
	oz-in	Typ.	3.8	3.8	4.3
Coil Resistance	Ohms	±10% @ 20°C	5	12.5	80
Coil Inductance	mH	Typ.	4.2	10	62.4
Detent Torque	10^{-4} Nm	Max.	55	70	70
	oz-in	Max.	0.77	0.97	0.97
Rotor Inertia	gcm^2		2.8	2.8	2.8
	10^{-4} oz-in^2		153	153	153
Motor Weight	g		70		
	Lbs		0.15		

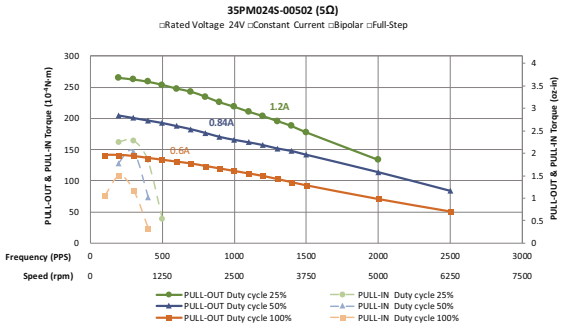
^ Preferred model

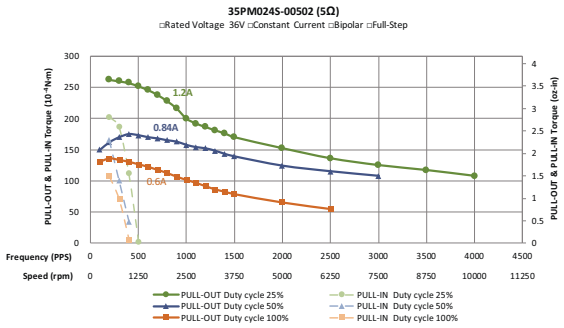
Dimensions: mm



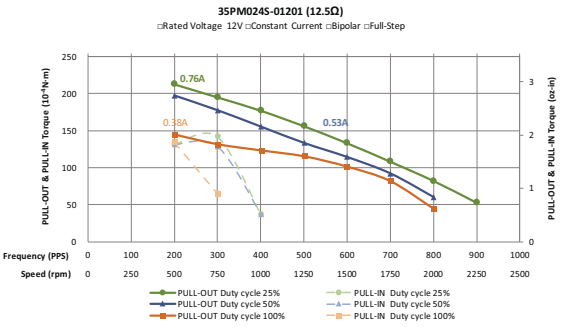
35PM024S9-00502

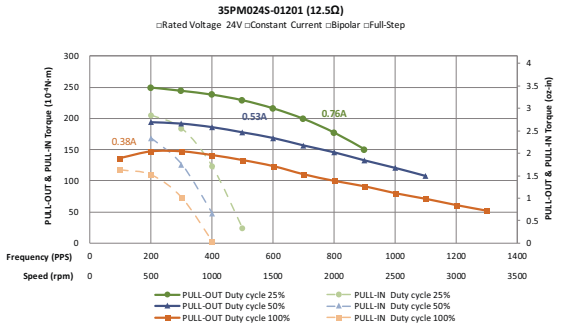


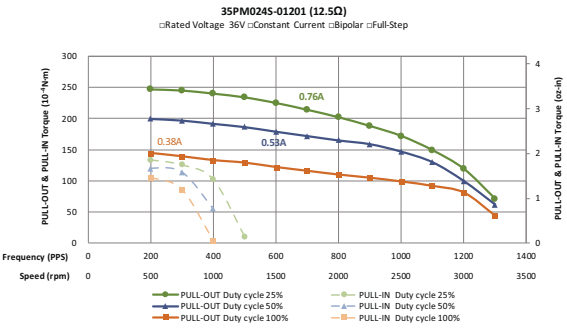




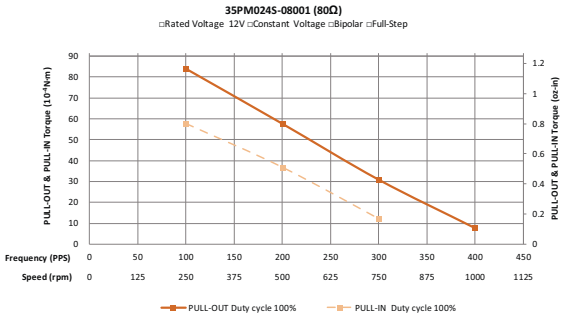
35PM024S9-01201

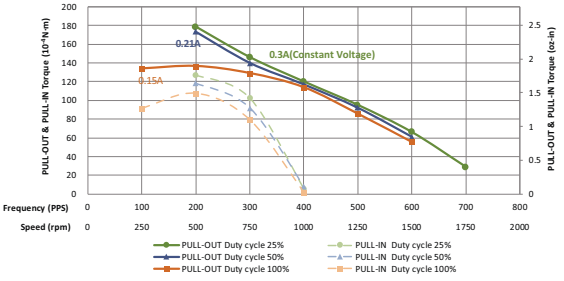


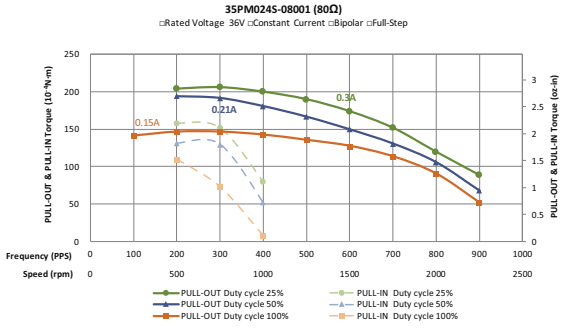




35PM024S9-08001







35PM048S - Ø35mm, S, 7.5°

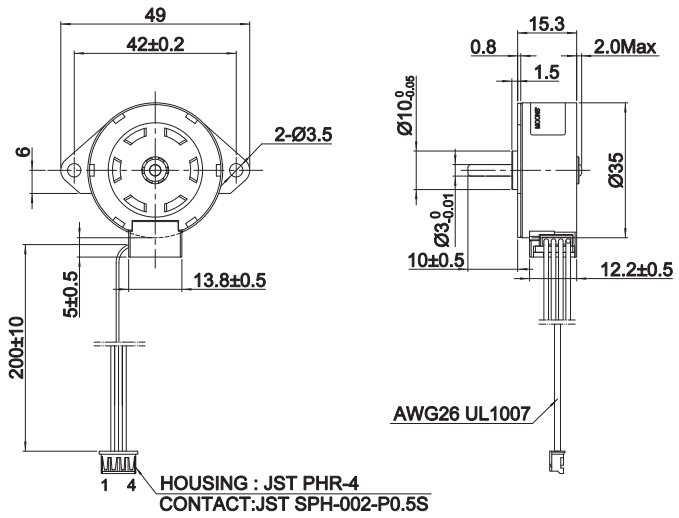
- Phases 2
- Steps / Revolution 48
- Shaft Load
  - Axial 1 N
  - Radial 7.5 N
- IP Rating 40
- Approvals RoHS
- Operating Temp. -20°C to +50°C
- Insulation Class B, 130°C
- Insulation Resistance 100 MegOhms

Motor Data

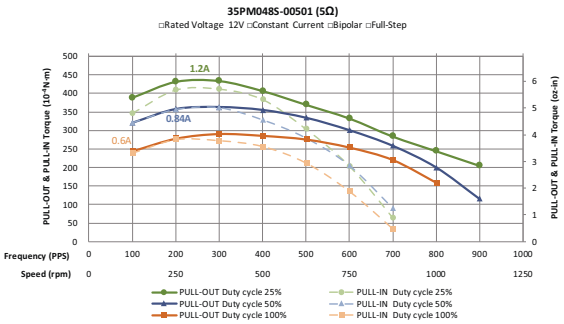
Model Number			35PM048S8-00501	35PM048S8-01201	35PM048S8-08001
Length			15.3mm (0.60in.)		
Step Angle	°		7.5		
Rated Current	Amps		0.6	0.38	0.15
Holding Torque	10^{-4} Nm	Typ.	450	450	540
	oz-in	Typ.	6.3	6.3	7.6
Coil Resistance	Ohms	±10% @ 20°C	5	12.5	80
Coil Inductance	mH	Typ.	5.2	12.5	78
Detent Torque	10^{-4} Nm	Max.	60	75	75
	oz-in	Max.	0.8	1.04	1.04
Rotor Inertia	gcm^2		2.8	2.8	2.8
	10^{-4} $oz\text{-}in^2$		153	153	153
Motor Weight	g		70		
	Lbs		0.15		

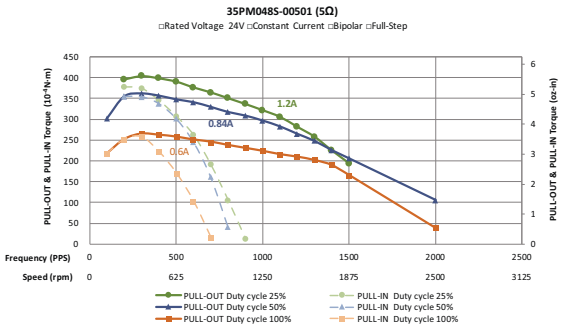
^ Preferred model

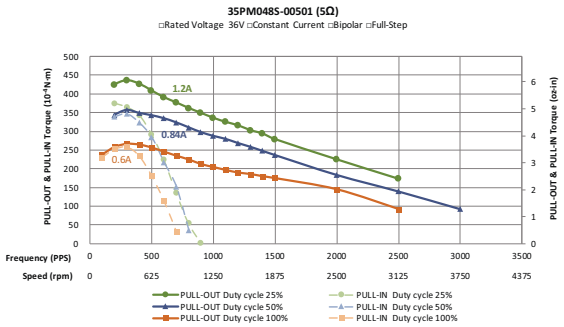
Dimensions: mm



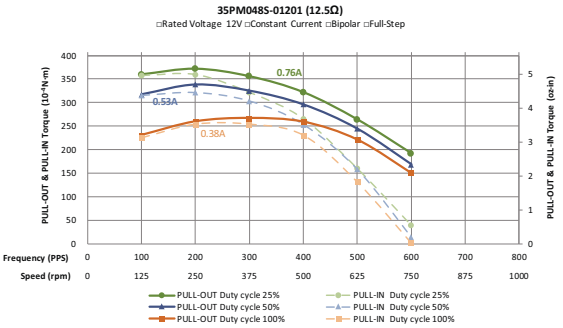
35PM048S8-00501

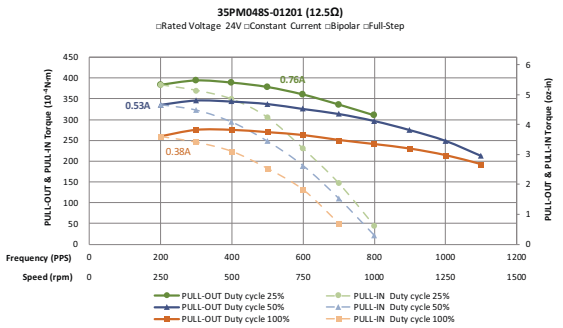


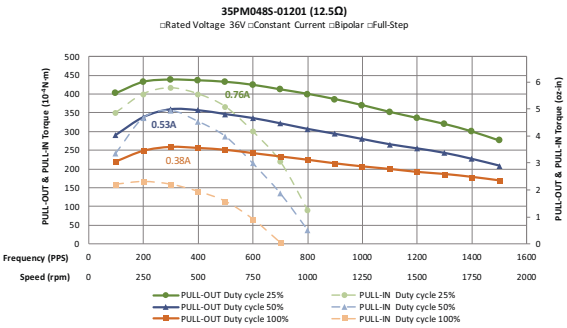




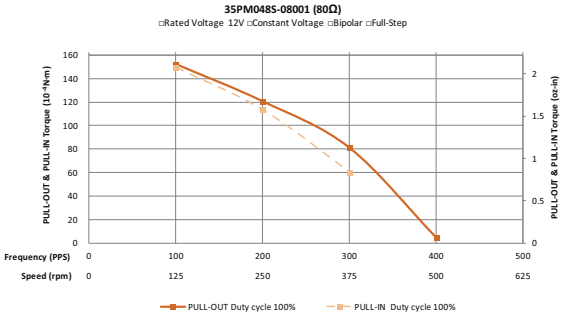
35PM048S8-01201

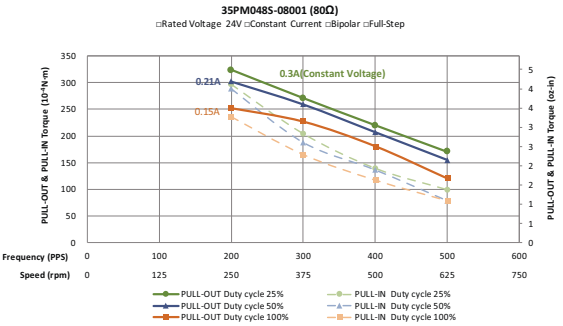


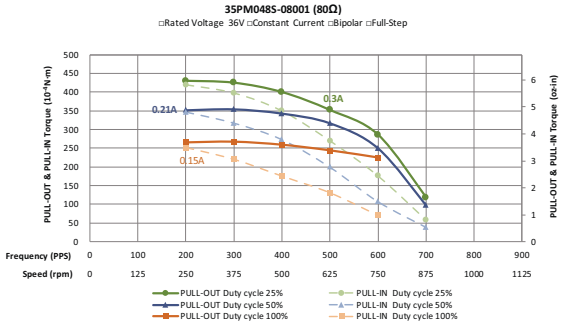




35PM048S8-01201







35PM024L - Ø35mm, L, 15°

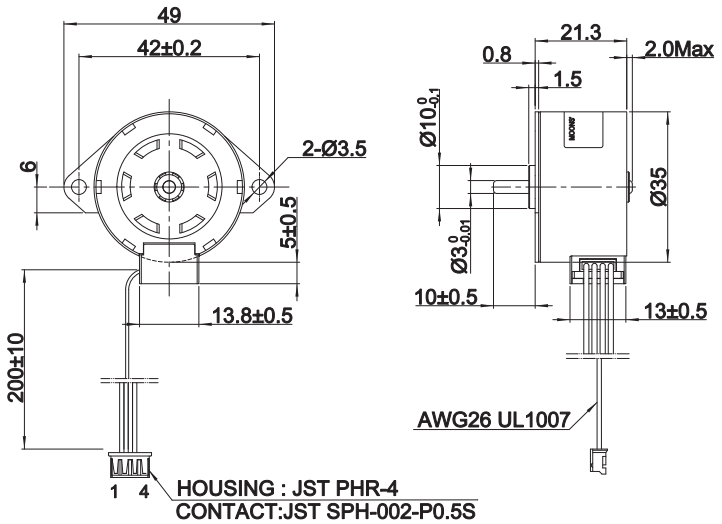
- Phases 2
- Steps / Revolution 24
- Shaft Load
  - Axial 1 N
  - Radial 7.5 N
- IP Rating 40
- Approvals RoHS
- Operating Temp. -20°C to +50°C
- Insulation Class B, 130°C
- Insulation Resistance 100 MegOhms

Motor Data

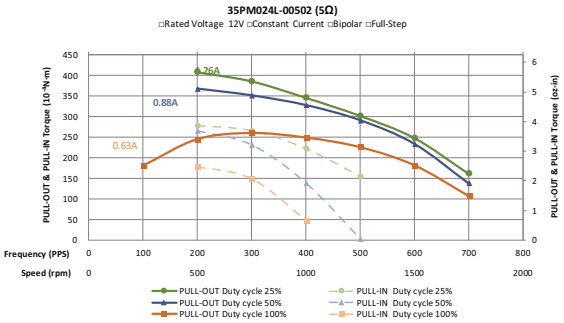
Model Number			35PM024L9-00502	35PM024L9-01204	35PM024L9-07501
Length			21.3 mm (0.84 in.)		
Step Angle	°		15		
Rated Current	Amps		0.63	0.4	0.16
Holding Torque	10^{-4} Nm	Typ.	450	450	490
	oz-in	Typ.	6.3	6.3	6.9
Coil Resistance	Ohms	±10% @ 20°C	5	12.5	75
Coil Inductance	mH	Typ.	6.2	14.7	71
Detent Torque	10^{-4} Nm	Max.	150	185	185
	oz-in	Max.	2.1	2.57	2.57
Rotor Inertia	gcm^2		4.7	4.7	4.7
	10^{-4} oz-in^2		257	257	257
Motor Weight	g		90		
	Lbs		0.2		

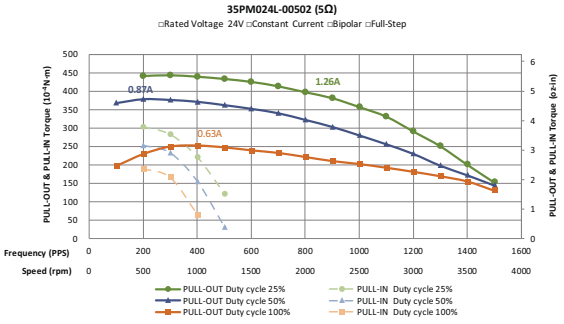
^ Preferred model

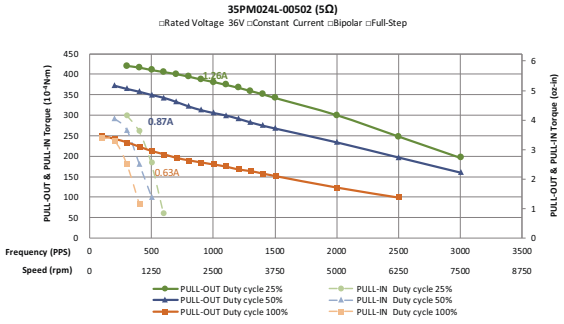
Dimensions: mm



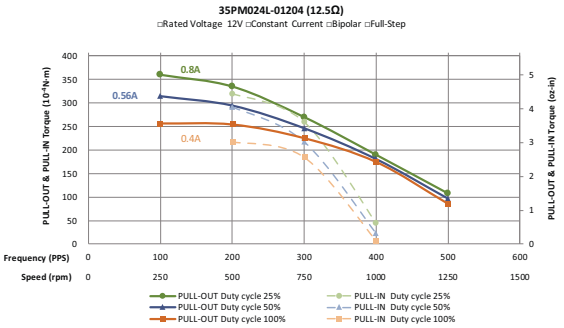
35PM024L9-00502

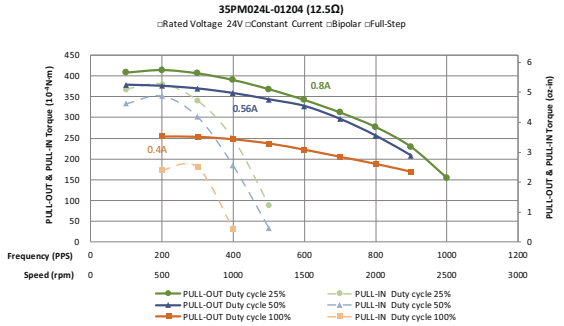


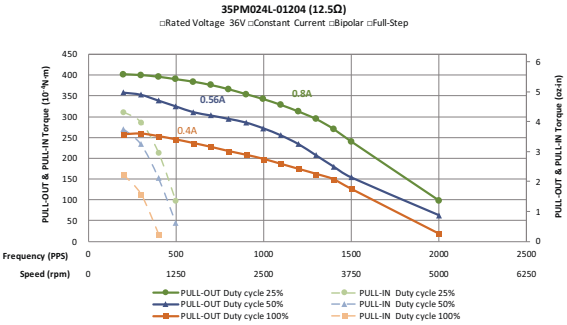




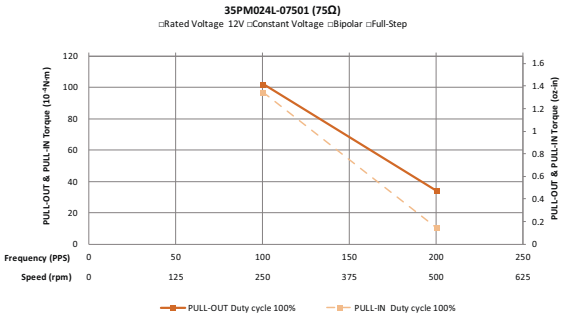
35PM024L9-01204

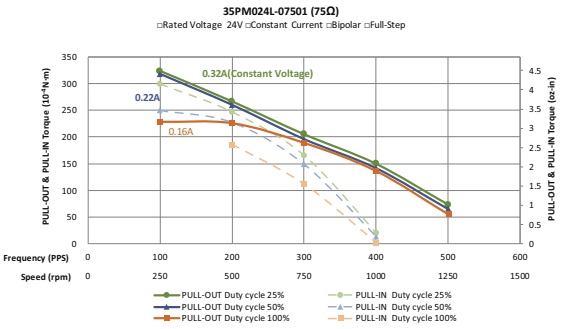


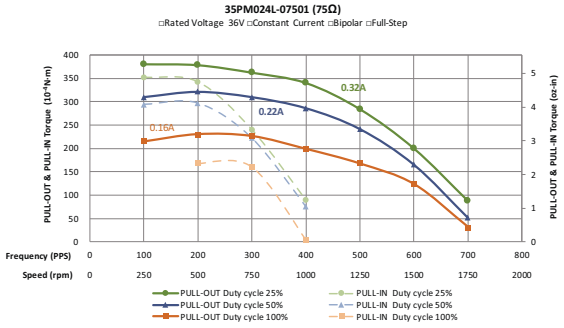




35PM024L9-07501







35PM048L - Ø35mm, L, 7.5°

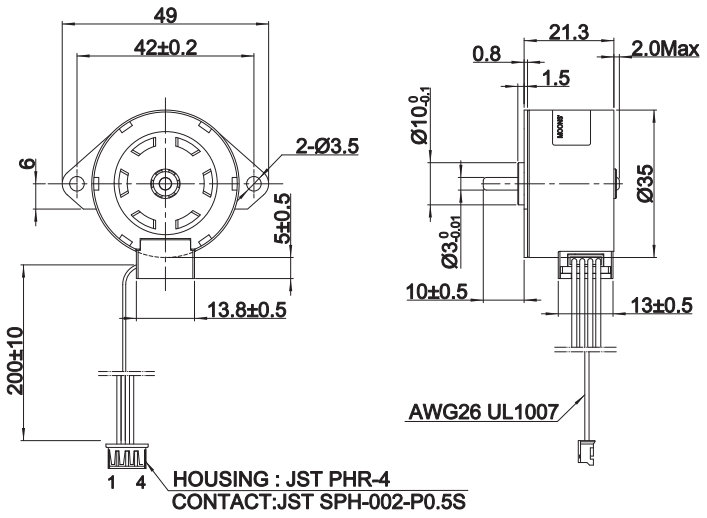
- Phases 2
- Steps / Revolution 48
- Shaft Load
  - Axial 1 N
  - Radial 7.5 N
- IP Rating 40
- Approvals RoHS
- Operating Temp. -20°C to +50°C
- Insulation Class B, 130°C
- Insulation Resistance 100 MegOhms

Motor Data

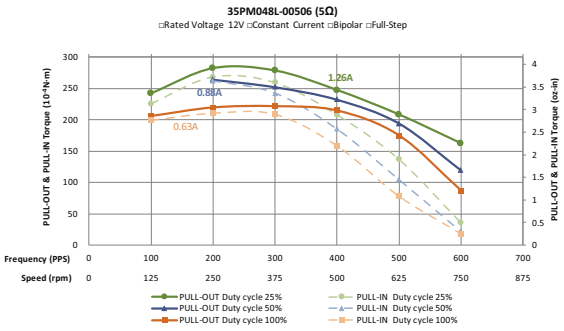
Model Number			35PM048L8-00506	35PM048L8-01201	35PM048L8-07501
Length			21.3 mm (0.84 in.)		
Step Angle	°		7.5		
Rated Current	Amps		0.63	0.4	0.16
Holding Torque	10^{-4} Nm	Typ.	670	670	700
	oz-in	Typ.	9.4	9.4	9.8
Coil Resistance	Ohms	±10% @ 20°C	5	12.5	75
Coil Inductance	mH	Typ.	8.6	20.1	98.5
Detent Torque	10^{-4} Nm	Max.	130	130	130
	oz-in	Max.	1.81	1.81	1.81
Rotor Inertia	gcm^2		4.7	4.7	4.7
	10^{-4} oz-in^2		257	257	257
Motor Weight	g		90		
	Lbs		0.2		

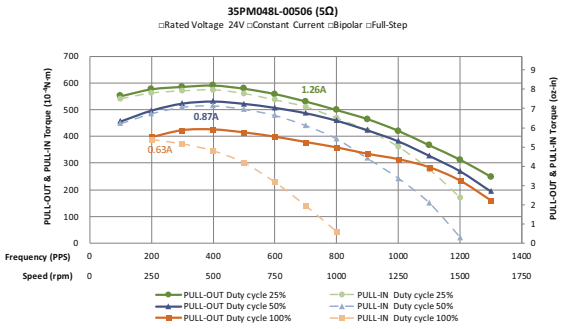
^ Preferred model

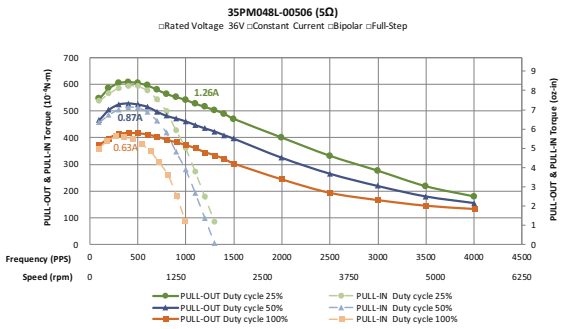
Dimensions: mm



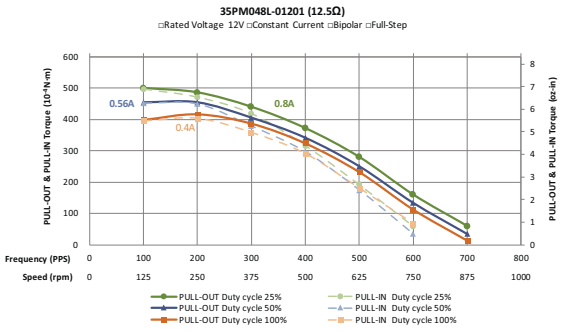
35PM048L8-00506

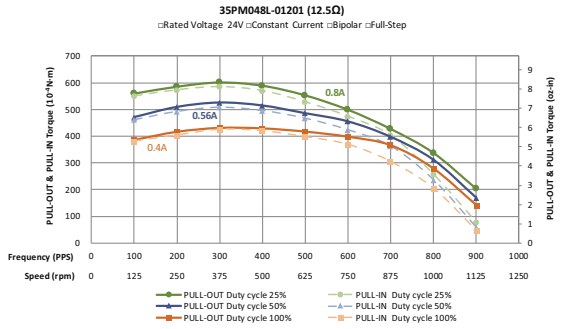


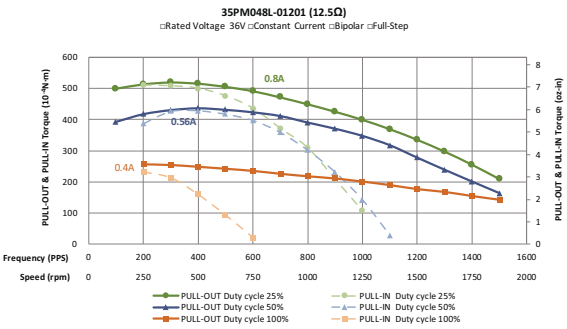




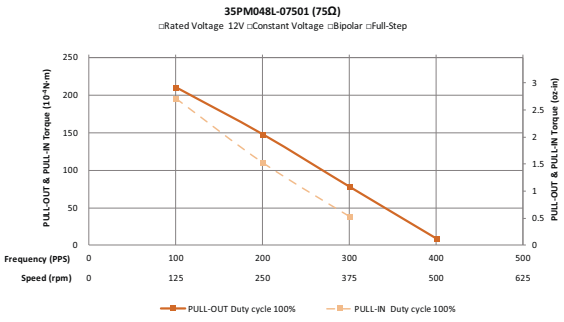
35PM048L8-01201

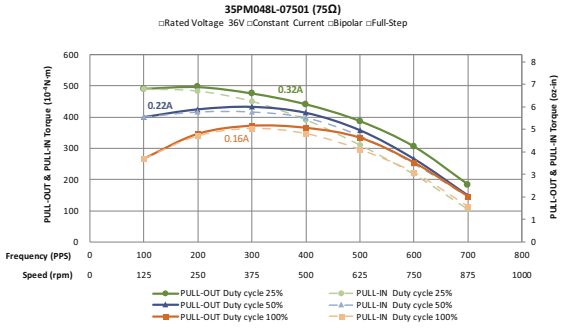


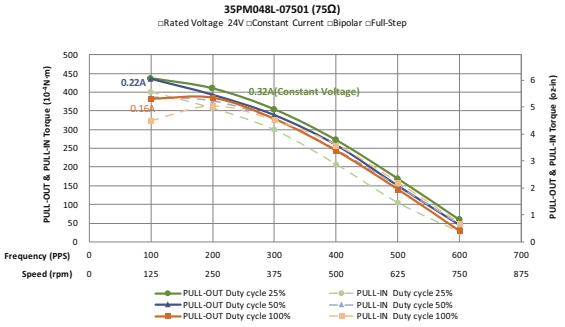




35PM048L8-07501







42PM048S - Ø42mm, S, 7.5°

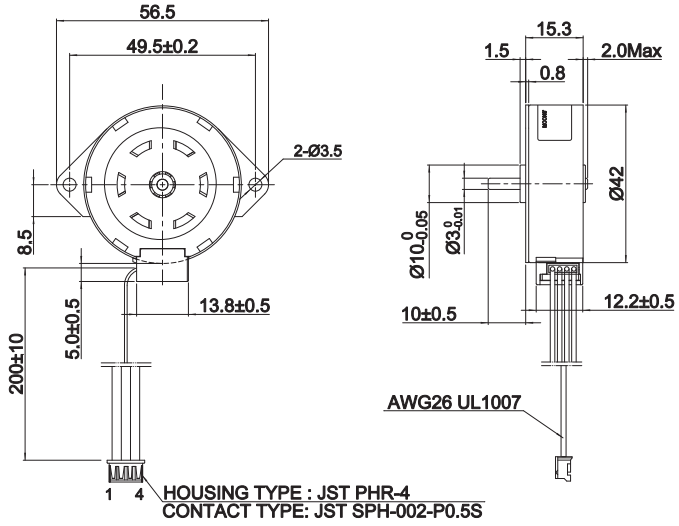
- Phases 2
- Steps / Revolution 48
- Shaft Load
  - Axial 1 N
  - Radial 7.5 N
- IP Rating 40
- Approvals RoHS
- Operating Temp. -20°C to +50°C
- Insulation Class B, 130°C
- Insulation Resistance 100 MegOhms

Motor Data

Model Number			42PM048S0-00501	42PM048S0-01201	42PM048S0-08001
Length			15.3mm (0.60in.)		
Step Angle	°		7.5		
Rated Current	Amps		0.65	0.42	0.15
Holding Torque	10^{-4} Nm	Typ.	870	830	800
	oz-in	Typ.	12.2	11.6	11.2
Coil Resistance	Ohms	±10% @ 20°C	5	12	80
Coil Inductance	mH	Typ.	5.4	11.6	72.5
Detent Torque	10^{-4} Nm	Max.	126	126	126
	oz-in	Max.	1.75	1.75	1.75
Rotor Inertia	gcm^2		7.4	7.4	7.4
	10^{-4} oz-in^2		404	404	404
Motor Weight	g		90		
	Lbs		0.2		

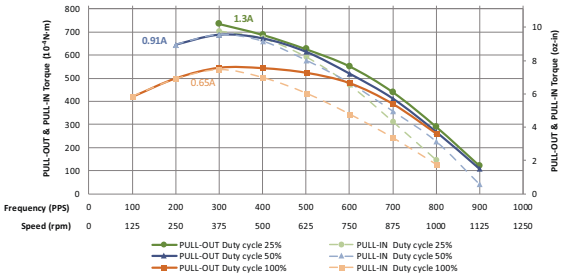
^ Preferred model

Dimensions: mm

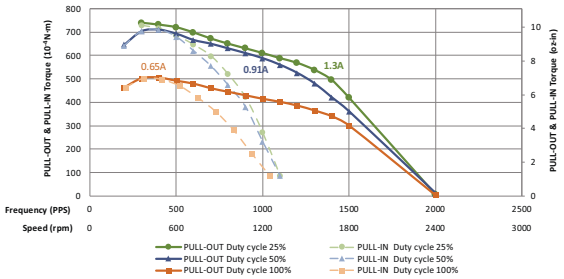


42PM048S0-00501

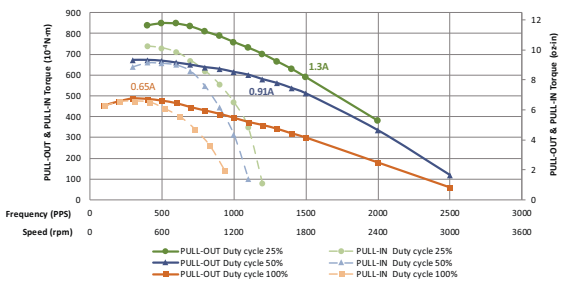
42PM048S-00501 (5Ω)
□Rated Voltage 12V □Constant Current □Bipolar □Full-Step



42PM048S-00501 (5Ω)
□Rated Voltage 24V □Constant Current □Bipolar □Full-Step

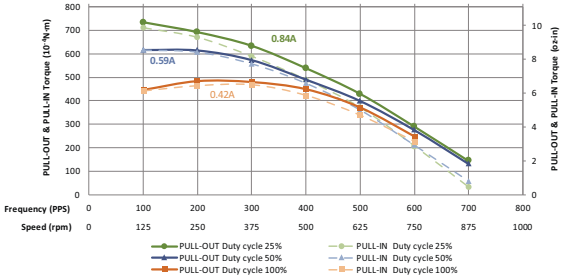


42PM048S-00501 (5Ω)
□Rated Voltage 36V □Constant Current □Bipolar □Full-Step

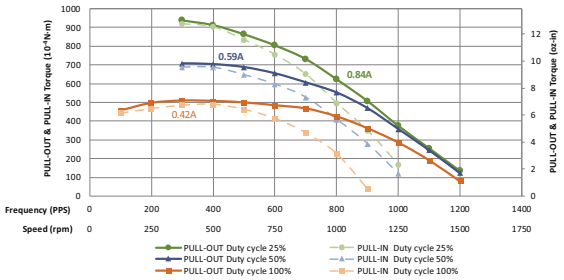


42PM048S0-01201

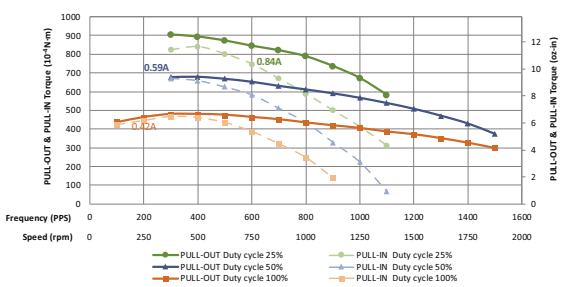
42PM048S-01201 (12Ω)
□Rated Voltage 12V □Constant Current □Bipolar □Full-Step



42PM048S-01201 (12Ω)
□Rated Voltage 24V □Constant Current □Bipolar □Full-Step

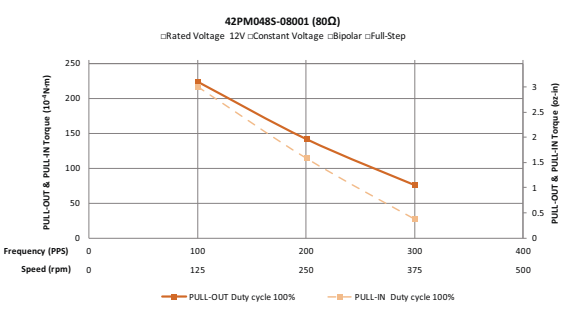


42PM048S-01201 (12Ω)
□Rated Voltage 36V □Constant Current □Bipolar □Full-Step

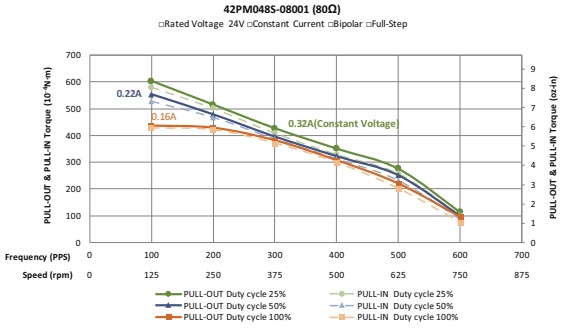


42PM048S0-08001

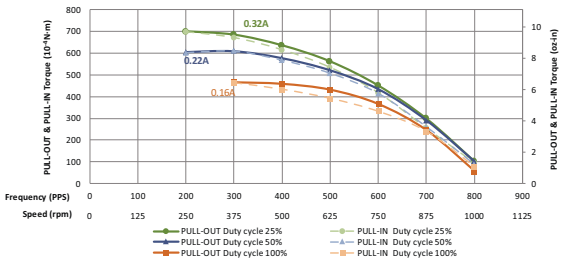
42PM048S-08001 (80Ω)
□Rated Voltage 12V □Constant Voltage □Bipolar □Full-Step



42PM048S-08001 (80Ω)
□Rated Voltage 24V □Constant Current □Bipolar □Full-Step



42PM048S-08001 (80Ω)
□Rated Voltage 36V □Constant Current □Bipolar □Full-Step



42PM096S - Ø42mm, S, 3.75°

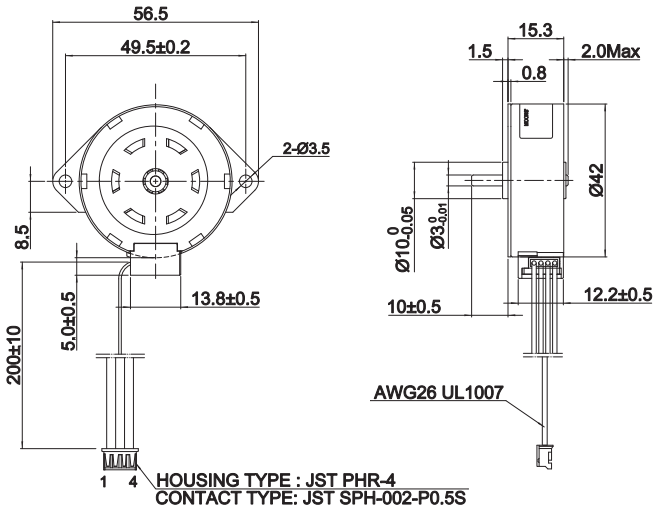
- Phases 2
- Steps / Revolution 96
- Shaft Load
  - Axial 1 N
  - Radial 7.5 N
- IP Rating 40
- Approvals RoHS
- Operating Temp. -20°C to +50°C
- Insulation Class B, 130°C
- Insulation Resistance 100 MegOhms

Motor Data

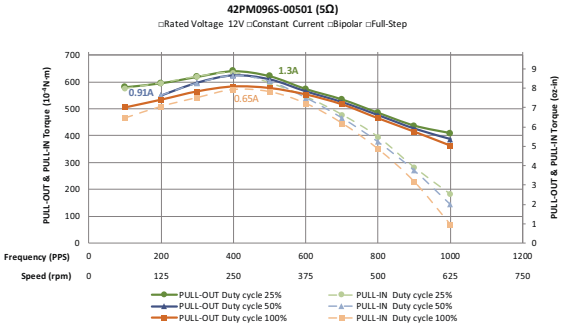
Model Number			42PM096S0-00501	42PM096S0-01201	42PM096S0-08001
Length			15.3mm (0.60in.)		
Step Angle	°		3.75		
Rated Current	Amps		0.65	0.42	0.15
Holding Torque	10^{-4} Nm	Typ.	960	940	780
	oz-in	Typ.	13.4	13.2	10.9
Coil Resistance	Ohms	±10% @ 20°C	5	12	80
Coil Inductance	mH	Typ.	6.2	13.4	82
Detent Torque	10^{-4} Nm	Max.	90	90	90
	oz-in	Max.	1.25	1.25	1.25
Rotor Inertia	gcm^2		7.4	7.4	7.4
	10^{-4} oz-in^2		404	404	404
Motor Weight	g		90		
	Lbs		0.2		

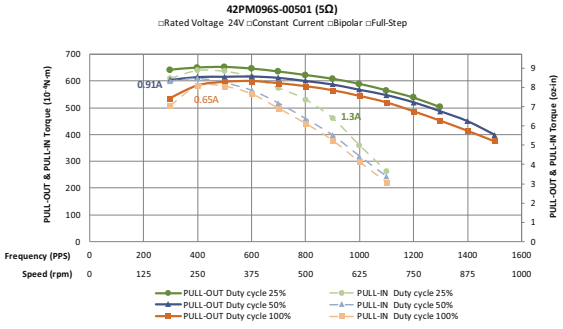
^ Preferred model

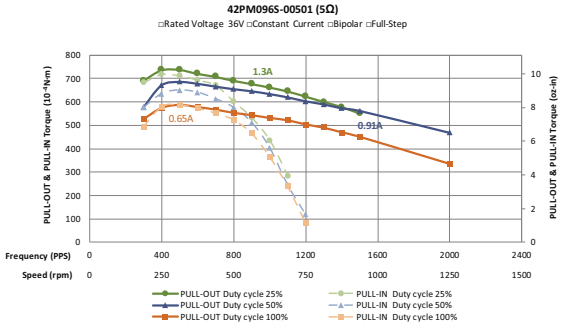
Dimensions: mm



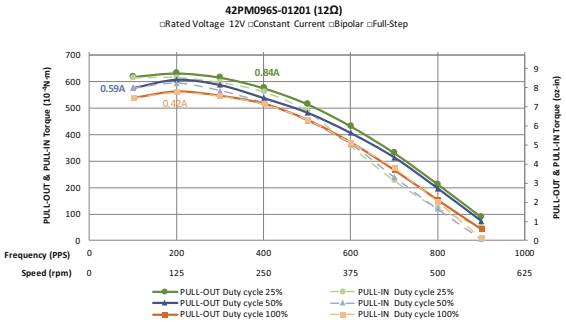
42PM096S0-00501

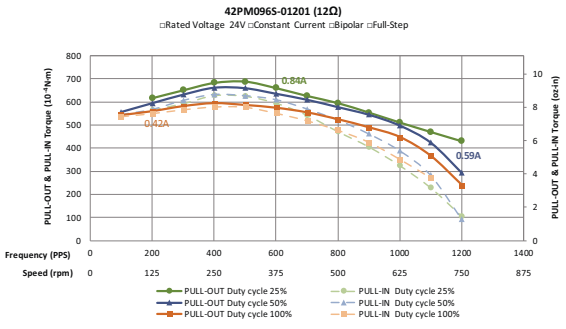


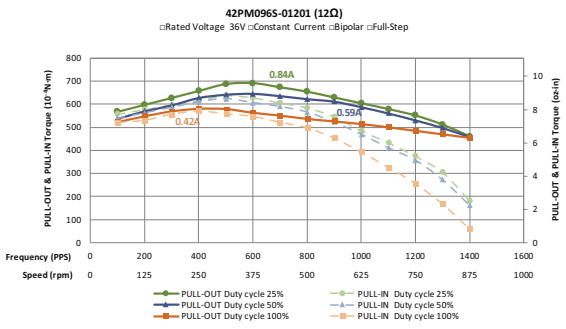




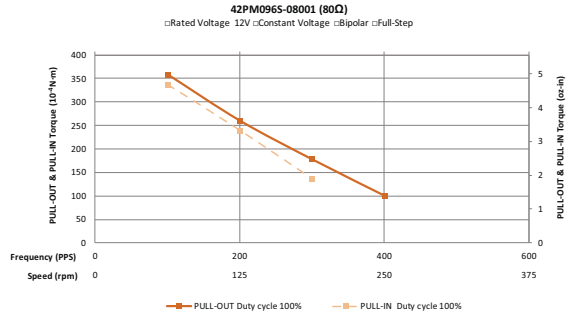
42PM096S0-01201

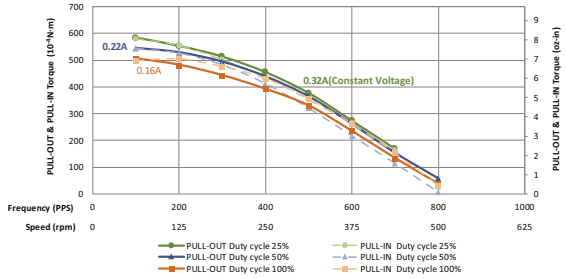


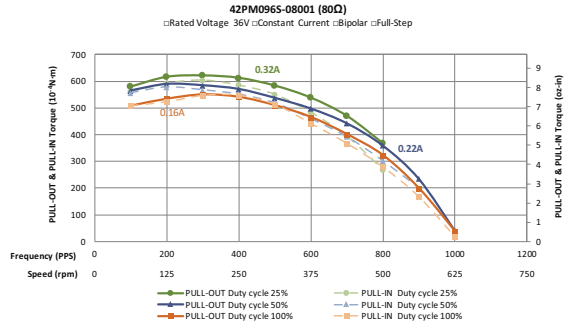




42PM096S0-08001







42PM048L - Ø42mm, L, 7.5°

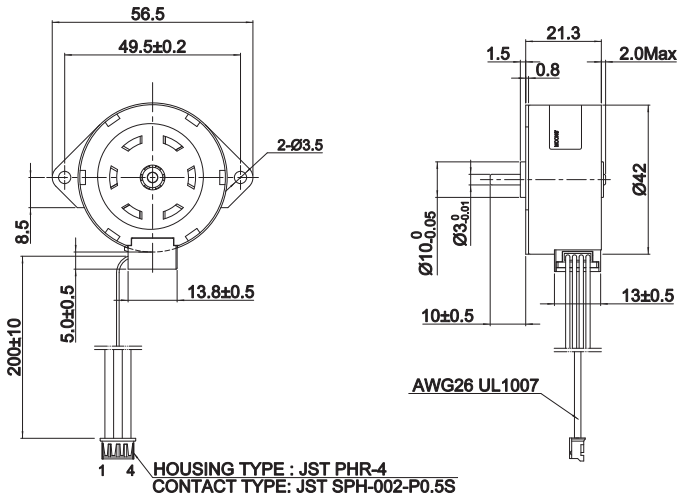
- Phases 2
- Steps / Revolution 48
- Shaft Load
  - Axial 1 N
  - Radial 7.5 N
- IP Rating 40
- Approvals RoHS
- Operating Temp. -20°C to +50°C
- Insulation Class B, 130°C
- Insulation Resistance 100 MegOhms

Motor Data

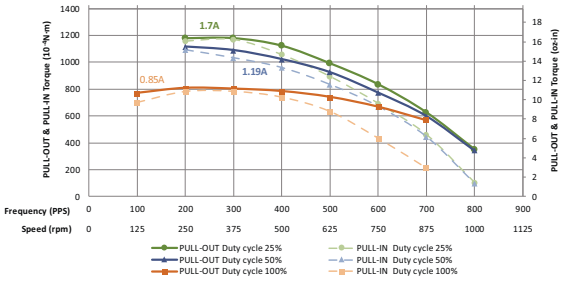
Model Number			42PM048L1-00302	42PM048L1-00711	42PM048L1-06001
Length			21.3 mm (0.84 in.)		
Step Angle	°		7.5		
Rated Current	Amps		0.85	0.55	0.2
Holding Torque	10^{-4} Nm	Typ.	1200	1200	1250
	oz-in	Typ.	16.8	16.8	17.5
Coil Resistance	Ohms	±10% @ 20°C	3	7	60
Coil Inductance	mH	Typ.	4.4	9.6	82
Detent Torque	10^{-4} Nm	Max.	215	215	215
	oz-in	Max.	2.99	2.99	2.99
Rotor Inertia	gcm^2		11	11	11
	10^{-4} oz-in^2		601	601	601
Motor Weight	g		120		
	Lbs		0.26		

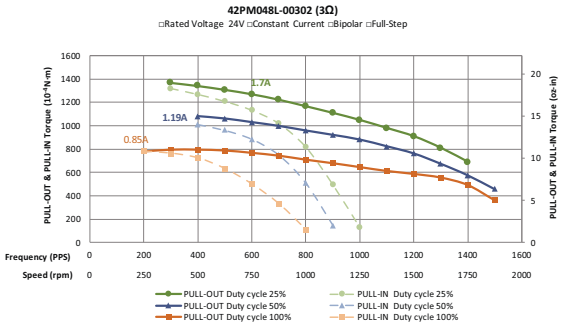
^ Preferred model

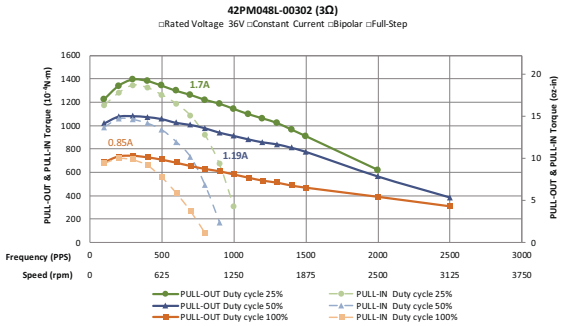
Dimensions: mm



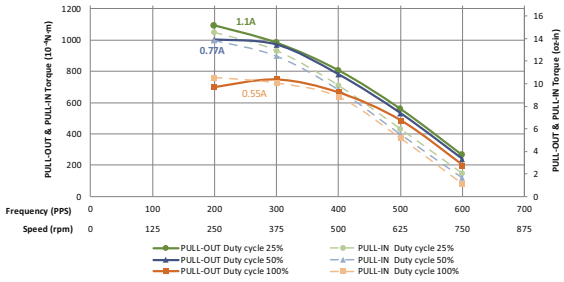
42PM048L1-00302

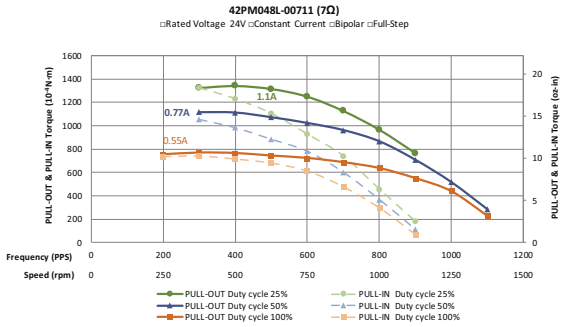


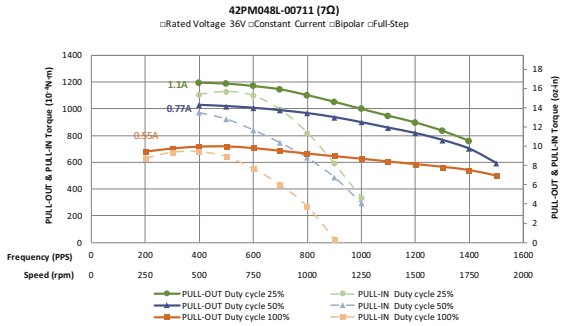




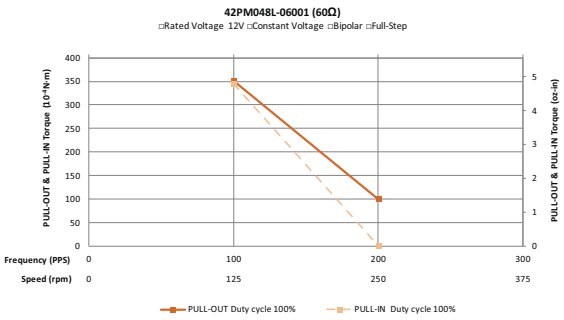
42PM048L1-00711

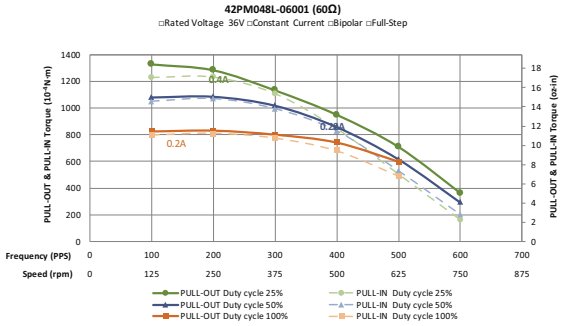


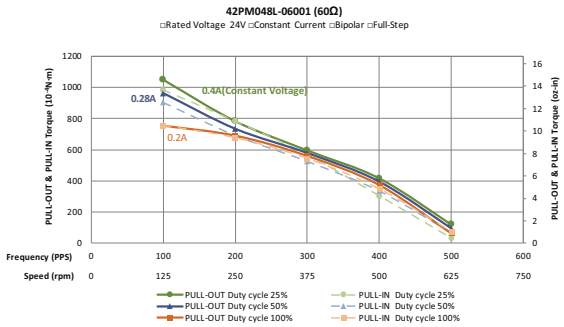




42PM048L1-06001







42PM096L - Ø42mm, L, 3.75°

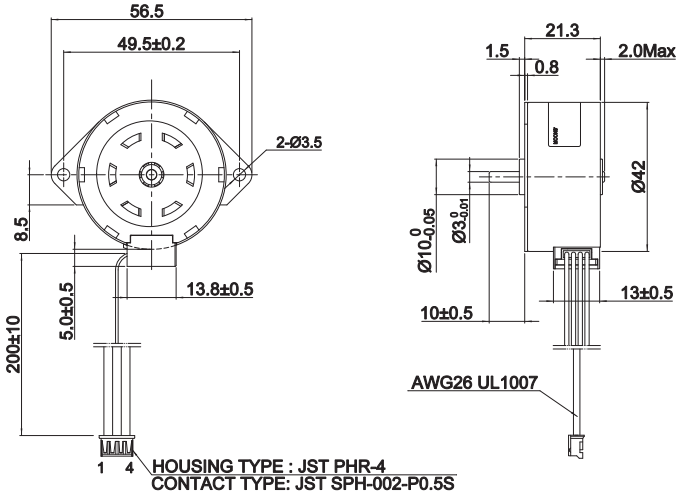
- Phases 2
- Steps / Revolution 96
- Shaft Load
  - Axial 1 N
  - Radial 7.5 N
- IP Rating 40
- Approvals RoHS
- Operating Temp. -20°C to +50°C
- Insulation Class B, 130°C
- Insulation Resistance 100 MegOhms

Motor Data

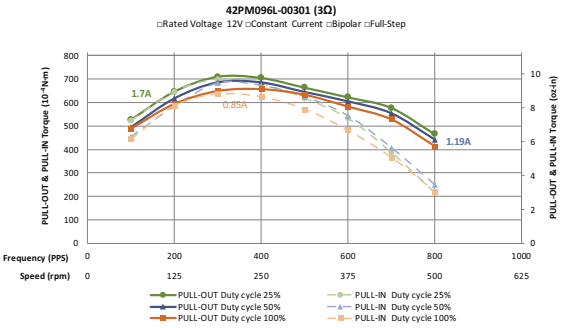
Model Number			42PM096L1-00301	42PM096L1-00701	42PM096L1-06001
Length			21.3 mm (0.84 in.)		
Step Angle	°		3.75		
Rated Current	Amps		0.85	0.55	0.2
Holding Torque	10^{-4} Nm	Typ.	970	920	900
	oz-in	Typ.	13.6	12.9	12.6
Coil Resistance	Ohms	±10% @ 20°C	3	7	60
Coil Inductance	mH	Typ.	5.5	12.1	103
Detent Torque	10^{-4} Nm	Max.	215	215	215
	oz-in	Max.	2.99	2.99	2.99
Rotor Inertia	gcm^2		11	11	11
	10^{-4} $oz\text{-}in^2$		601	601	601
Motor Weight	g		120		
	Lbs		0.26		

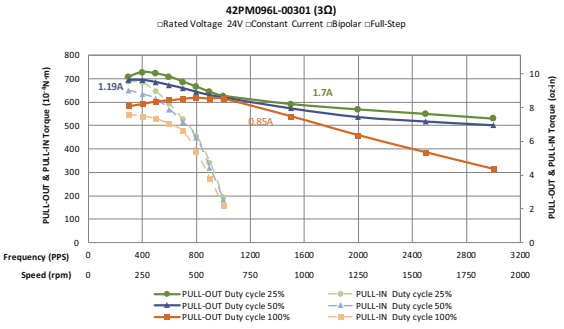
^ Preferred model

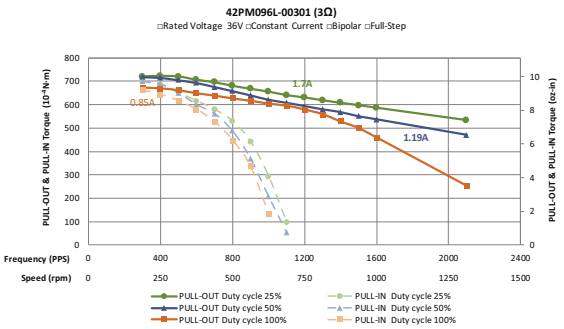
Dimensions: mm



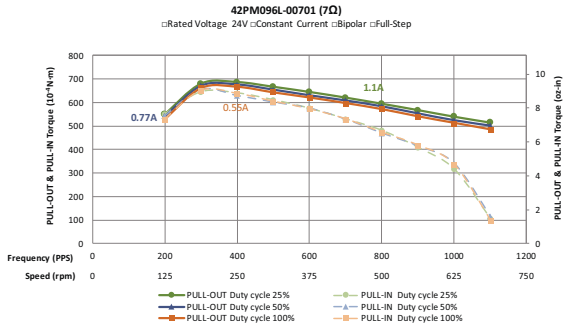
42PM096L1-00301

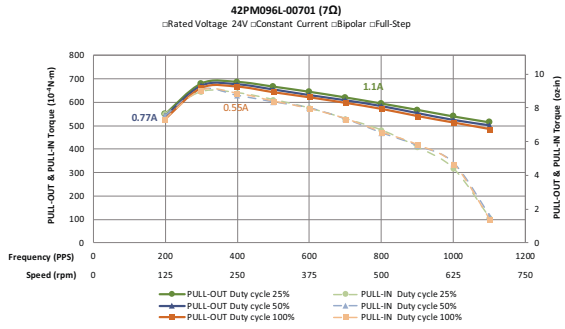


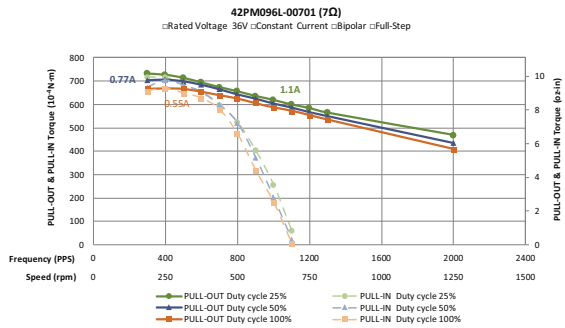




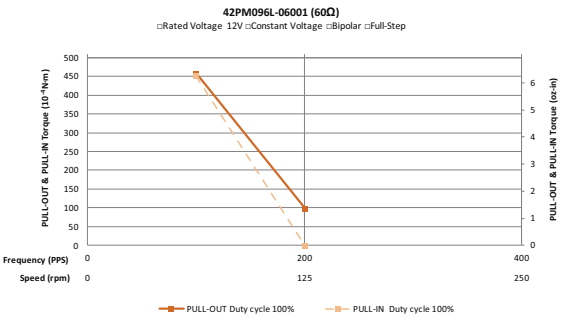
42PM096L1-00701

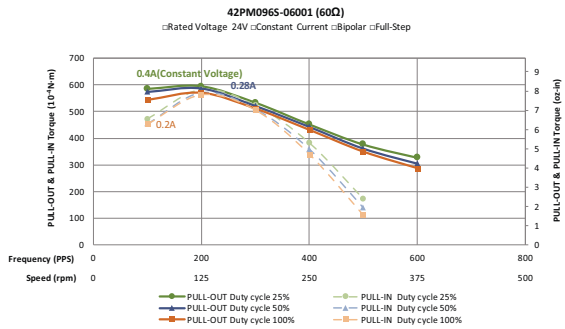


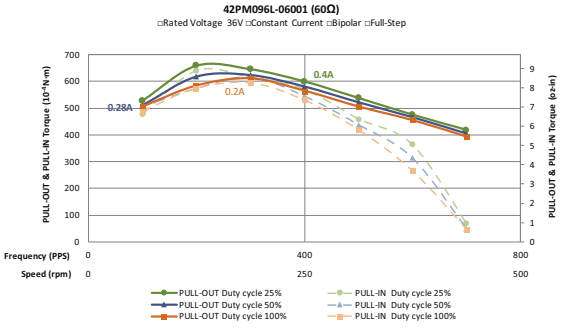




42PM096L1-06001







Note

Linear Actuators

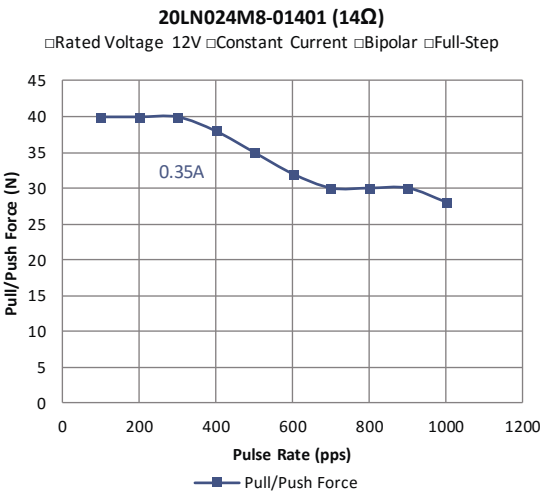
- Ø20mm
- Ø25mm
- Ø28mm
- Ø35mm

20LN024M - Ø20mm, M, 15°

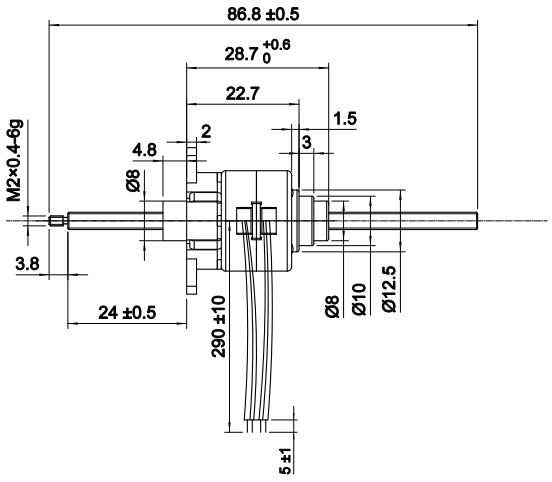
- Phases 2
- Steps 24
- Shaft Stroke 50mm
- Linear Step Travel 0.0508 mm
- Bearing System 2 Ball Bearings
- Ambient Temp. -10°C to +65°C
- Insulation Class B, 130°C
- Insulation Resistance 20MegOhms

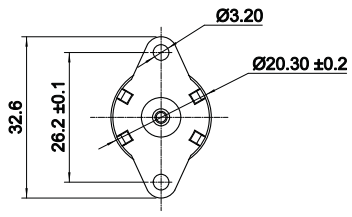
Motor Data

Model Number			20LN024M8-01401
Step Angle	°		15
Constant Current	Amps		0.35
Holding Force	N	Typ.	30
	oz	Typ.	107.9
Coil Resistance	Ohms	±7% @ 25°C	14
Coil Inductance	mH	±15%	6.4
Pull/Push Force	N	@ 400pps	30
	oz		107.9
Rated Net Weight	g		45
	Lbs		0.099



Dimensions: mm



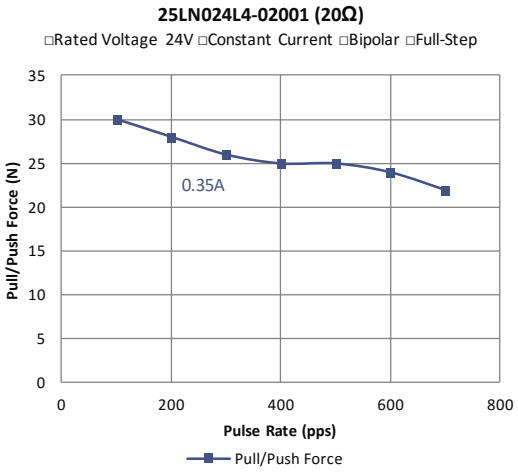


25LN024L - Ø25mm, L, 15°

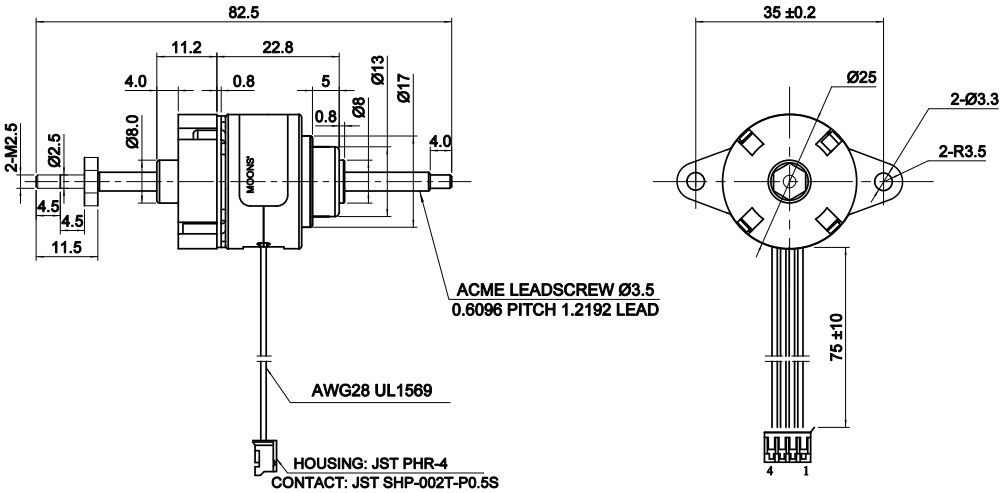
- Phases 2
- Steps 24
- Shaft Stroke 40mm
- Linear Step Travel 0.0508 mm
- Bearing System 2 Ball Bearings
- Ambient Temp. -20°C to +65°C
- Insulation Class B, 130°C
- Insulation Resistance 100MegOhms

Motor Data

Model Number			25LN024L4-02001
Step Angle	°		15
Constant Current	Amps		0.35
Holding Force	N	Typ.	40
	oz	Typ.	143.9
Coil Resistance	Ohms	±7% @ 25°C	20
Coil Inductance	mH	±15%	12.9
Pull/Push Force	N	@ 600pps	24
	oz		86.3
Rated Net Weight	g		45
	Lbs		0.099



Dimensions: mm

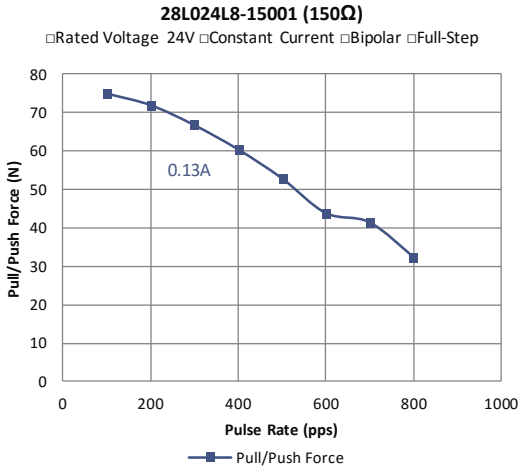


28L024L - Ø28mm, L, 15°

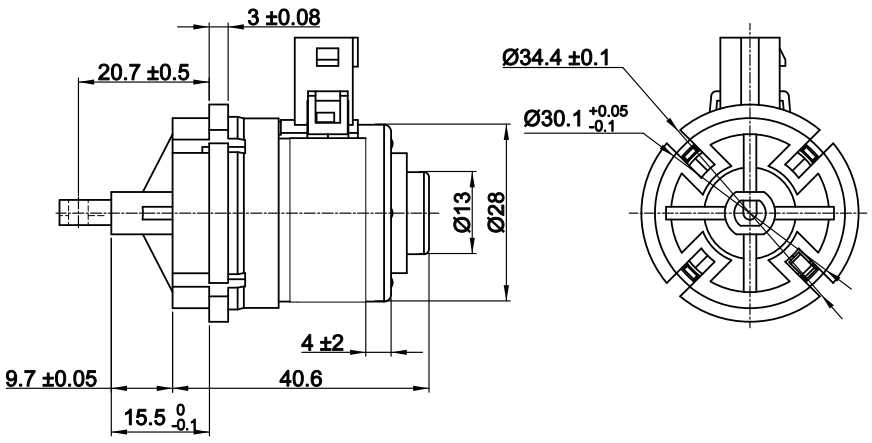
- Phases 2
- Steps 24
- Shaft Stroke 13mm
- Linear Step Travel 0.042 mm
- Bearing System 2 Ball Bearings
- Ambient Temp. -10°C to +80°C
- Insulation Class B, 130°C
- Insulation Resistance 100MegOhms

Motor Data

Model Number			28L024L8-15001
Step Angle	°		15
Constant Current	Amps		0.13
Holding Force	N	Typ.	100
	oz	Typ.	359.7
Coil Resistance	Ohms	±7% @ 25°C	150
Coil Inductance	mH	±15%	112
Pull/Push Force	N	@ 200pps	60
	oz		215.8
Rated Net Weight	g		75
	Lbs		0.165



Dimensions: mm

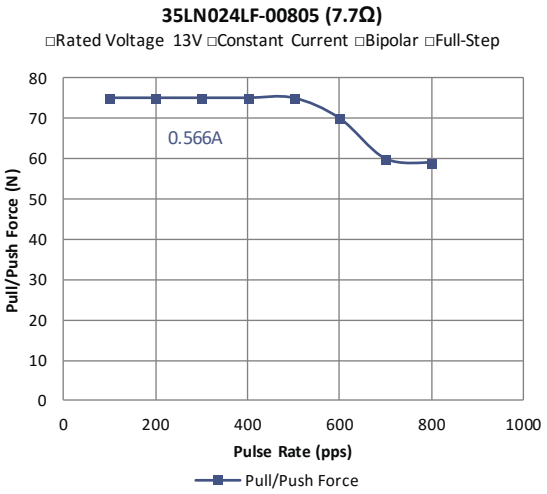


35LN024L - Ø35mm, L, 15°

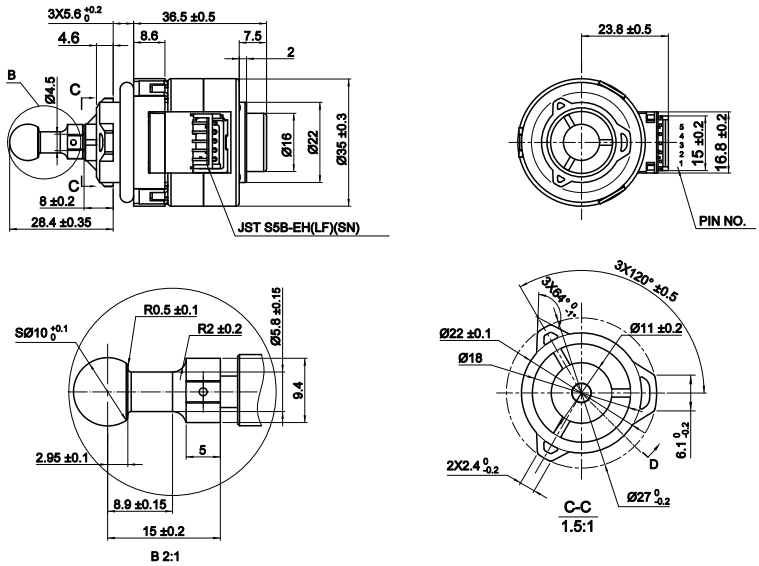
- Phases 2
- Steps 24
- Shaft Stroke 12mm
- Linear Step Travel 0.0333 mm
- Bearing System 2 Ball Bearings
- Ambient Temp. -40°C to +120°C
- Insulation Class B, 130°C
- Insulation Resistance 100MegOhms

Motor Data

Model Number			35LN024LF-00805
Step Angle	°		15
Constant Current	Amps		0.566
Holding Force	N	Typ.	110
	oz	Typ.	395.7
Coil Resistance	Ohms	±7% @ 25°C	7.7
Coil Inductance	mH	±15%	9.75
Pull/Push Force	N	@ 364pps	50
	oz		179.9
Rated Net Weight	g		115
	Lbs		0.254



Dimensions: mm



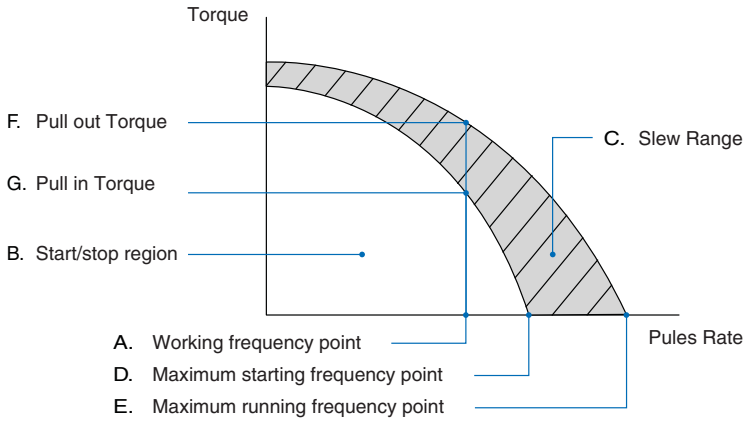
Note

Technical

· Speed-Torque Characteristics
· About Rated Current
· Conversion Factors

Speed-Torque Characteristics

The dynamic torque curve is an important aspect of stepping motor's output performance. The followings are some keyword explanations.



A. Working frequency point express the stepping motors rotational speed versus the drive pulse rate.
n = q * Hz / (360 * D)
n: rev/sec
Hz: the frequency value or the driver pulse rate.
D:the subdividing value of motor driver
q: the step angle of stepping motor

B. Start/Stop region: the region in which a stepping motor can be directly started or stopped.

C. Slew Range: the motor cannot be started directly in this area. It must be started in the start/stop region first and then accelerated to this area. In this area, the motor can not be directly stopped, either. Otherwise this will lead to losing-step. The motor must be decelerated back to the start/stop region before it can be stopped.

D. Maximum starting frequency point at this point, the stepping motor can reach its maximum starting speed under unloaded condition.

E. Maximum running frequency point at this point the stepping motor can reach its maximum running speed under an unloaded condition.

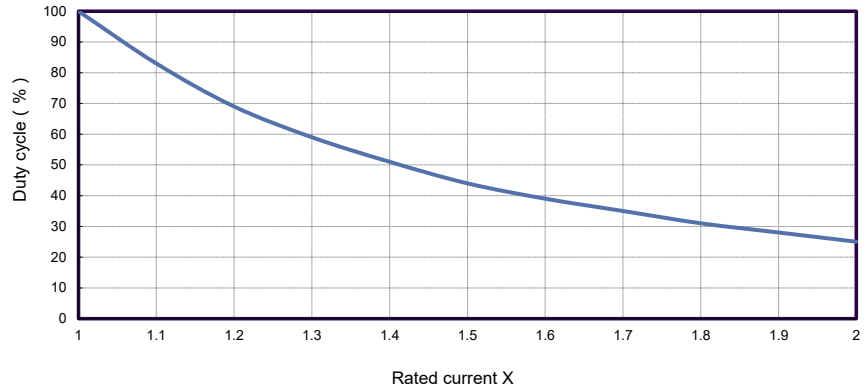
F. Pull-in Torque: the maximum dynamic torque value that a stepping motor can load directly at the particular operating frequency point.

G. Pull-out Torque: the maximum dynamic torque value that a stepping motor can load at the particular operating frequency point when the motor has been started. Because of the inertia of rotation the Pull-Out Torque is always larger than the Pull-In Torque.

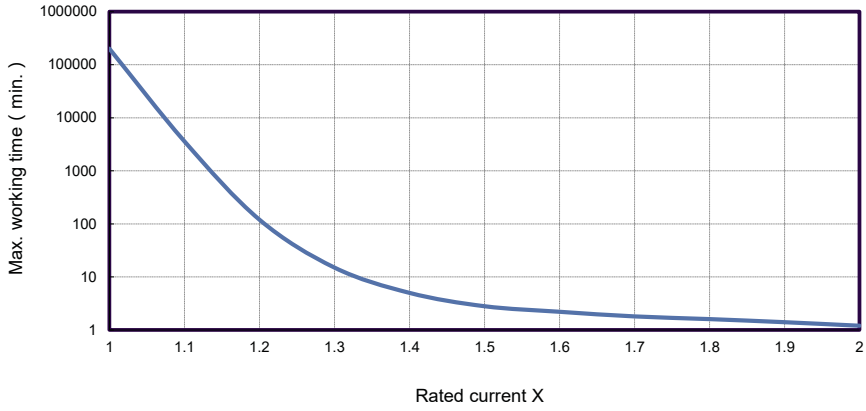
About Rated Current

Rated current of PM stepper is limited by thermal characteristics.
In actual application, to get higher output torque we can supply with higher current, which extend rated value. In such case, the motor can't be in continuous working, otherwise the winding will be overheat even damage device. Duty cycle need to be not reach to 100%, also we must consider Max. working time - Ton Max.

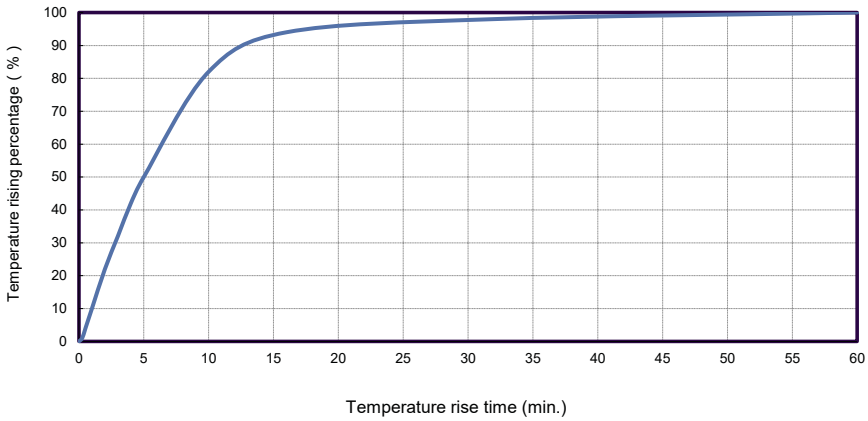
How to define the duty cycle with multiple of rated current



How to calculate the max. Single working time with multiple of rated current



Motor winding temperature rising curve



Conversion Factors

- **Length**

A \ B	mm	cm	m	inch	feet
mm	--	0.1	0.001	0.03937	0.003281
cm	10	--	0.01	0.3937	0.03281
m	1,000	100	--	39.37	3.281
inch	25.4	2.54	0.0254	--	0.08333
feet	304.8	30.48	0.348	12	--

Multiply "A" units by conversion factor to obtain "B" units

- **Force**

A \ B	g	kgf	oz	lb	Newton
g	--	0.001	0.03527	0.002205	0.0098
kgf	1,000	--	35.27	22.05	9.807
oz	28.35	0.02835	--	0.0625	0.278
lb	453.6	0.4536	16	--	4.448
Newton	102	0.102	3.597	0.2248	--

- **Torque**

A \ B	Nm	Ncm	mNm	kgm*	kgcm*	gcm*	oz-in	lb-ft	lb-in
Nm	--	100	1,000	0.102	10.2	10,200	141.6	0.7376	8.851
Ncm	0.01	--	10	0.00102	0.102	102	1.416	0.007376	0.08851
mNm	0.001	0.1	--	0.000102	1.0102	10.2	0.1416	0.000738	0.008851
kgm*	9.807	980.7	9807	--	100	100,000	1,389	7.233	86.8
kgcm*	0.09807	9.807	98.07	0.01	--	1,000	13.89	0.07233	0.868
gcm*	9.81E-05	0.009807	0.09807	0.00001	0.001	--	0.01389	7.23E-05	0.000868
oz-in	0.007062	0.7062	7.062	0.00072	0.07201	72.01	--	0.00521	0.0625
lb-ft	1.356	135.6	135.6	0.1383	13.83	13,830	192	--	12
lb-in	0.113	11.3	113	0.01152	1.152	1,152	16	0.0833	--

- **Inertia**

A \ B	kgm²	kgcm²	gcm²	oz-in²	oz-in-sec²	lb-in²	lb-in-sec²	lb-ft²	lb-ft-sec² (slug ft²)
kgm²	--	10,000	10,000,000	54,700	142	3,420	8.85	23.7	0.738
kgcm²	0.0001	--	1,000	5.47	0.0142	0.342	0.000885	0.00237	7.38E-05
gcm²	1E-07	0.001	--	0.00547	1.42E-05	0.000342	8.85E-07	2.37E-06	7.38E-08
oz-in²	1.83E-05	0.1829	183	--	0.00259	0.0625	0.000162	0.000434	1.35E-05
oz-in-sec²	0.00706	70.62	70,600	386	--	24.1	0.0625	0.168	0.00521
lb-in²	0.000293	2.926	2,930	16	0.0414	--	0.00259	0.00694	0.000216
lb-in-sec²	0.113	1,130	1,130,000	6,180	1.6	386	--	2.68	0.0833
lb-ft²	0.0421	421.4	421,000	2,300	5.97	144	0.373	--	0.318
lb-ft-sec² (slug ft²)	1.36	13,600	13,600,000	74,100	192	4,630	12	32.2	--

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