

Stepper Motors



INDUSTRIAL SOLUTIONS

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NPM Nippon Pulse
Your Partner in Motion Control

Nippon Pulse Stepper Motors

Terminology

Abbreviations/Units

Overview

Nippon Pulse stepper motors are 2-coil permanent magnet motors and are classified by the following types:

PF/PFC Series tin-can stepper

PFL Series Linearstep®

PR Series hybrid

PTM/PTMC Series synchronous

The **PF/PFC** series stepping motors have a permanent magnet in the rotor core and have been high precision, high quality devices since their development in 1967. These low cost motors can produce high torque.

The **PFL (LINEARSTEP®)** is designed to provide a simple linear system at a fraction of the cost of a conventional rotary linear system.

The **PR** series are high torque motors with superior response characteristics. Available in sizes from 20mm (NEMA SIZE 8) to 57mm (NEMA SIZE 23) with step angles of 0.9 or 1.8 degrees.

The **PTM/PTMC** series synchronous motors are timing motors producing steady rotation from an AC power source.

Capacitor

With reversible synchronous motors (can rotate both clockwise and counterclockwise) the rotor is moved by shifting the phase by 90°. Thus, a synchronous motor requires a capacitor. The capacity depends on motor model, rated voltage, and supply frequency. The capacitor should also withstand a voltage of greater than two times the rated voltage of the motor.

Continuous Rating

Specifications are continuously applicable to the rated output.

Dielectric Strength

The maximum voltage between the case and the coils that can be sustained for one minute without damaging the motor.

- 500Vac for one minute with operating voltage <30V
- 1000Vac for one minute with operating voltage 30-150V
- 1500Vac for one minute with operating voltage >150V

Intermittent Rating

Specifications are applicable for a specific time length to the rated output.

Motor Speed

Number of revolutions per minute, which is determined by the number of rotor poles and supply frequency.

Operating Temperature Range

Ambient temperature range in which the motor can normally be driven.

Operating Voltage Range

The voltage range in which the motor can normally be driven.

Rotating Direction

Viewed from the output shaft, clockwise rotation is labeled CW, counterclockwise rotation CCW.

Rated Current

Current at which the motor is rated for constant current drives (PWM, chopper).

Rated Voltage

Voltage at which the motor is rated for constant voltage drives.

Temperature Rise

The temperature of the motor rises whenever power is applied. Temperature rise is determined by applying the motor's rated voltage and measuring the increased coil resistance or the change in surface temperature of the motor.

A

SI base unit for current (ampere)

AC

Alternating current

CCW

Counterclockwise

CW

Clockwise

DC

Direct Current

Hz

SI induced unit for frequency (cycles per second)

K

SI base unit for temperature (Kelvin); often used for temperature rise

PPS

Pulses per second

RPM

Revolutions per minute

V

SI induced unit for voltage (volts)



PF35



PR28



PTM24-AG

Insulation Ratings

Insulation Class	Y	A	E	B	F	H	C
Allowable Temp (°C)	90	105	120	130	155	180	>180

Note: All tin-can motors in this catalog are insulation Class E, hybrid motors Class B, linear stepper Class E.

Tin-Can Models by Outer Diameter

OD (mm)	Tin-Can	Synchronous		Linear Stepper
		Dual Direction	Single Direction	
20	PFCU20	--	--	
25	PF(C)25 PFCU25	PTM-24P	--	PFCL25
35	PF35 PF35T	PTM-24M PTM-24T	PTM-24B	PFL35T
42	PF(C)42 PFC42H PF(C)42T	PTM24H PTMC-24S2	PTM-12K PTM-12E	
55	PF(C)55 PFC55H	PTM-24F	--	

Nippon Pulse Stepper Motors

Table of Contents

Tin-Can Steppers	2-13
Stepper Motor Specifications	2
PFCU20.....	3
PFCU25.....	4
PF25.....	5
PF35.....	6
PF35T.....	7
PFC35TH.....	8
PF42.....	9
PFC42H.....	10
PF(C)42T.....	11
PF(C)55.....	12
PFC55H.....	13
Geared Stepper Dimensions	14
Linear Stepper Motors	15-17
Linear Stepper Motor Specifications.....	15
PFCL25.....	16
PFL35T.....	17
Hybrid Motors	18-24
Hybrid Motor Specifications	18
PR20 (NEMA 8).....	19
PR28 (NEMA 11).....	20
PR42 (NEMA 17).....	21-22
PR57 (NEMA 23).....	23-24
Synchronous Motors	25-34
Synchronous Motor Specifications	25
PTM-24F.....	26
PTM-24B.....	27
PTM-24P.....	28
PTM-24M.....	29
PTM-24H.....	30
PTM-24T.....	31
PTM-24S2.....	32
PTM-12K.....	33
PTM-12E.....	34
Board Level Controllers.....	35
Custom Specification Form.....	36

Prototyping

From Nippon Pulse's Radford, Va. facility, most sample requests can be filled within a 24-hour period, allowing customers to test the product before making a large commitment. Nippon Pulse sales engineers work closely with each customer to completely understand the project and to provide the most appropriate solution. The Nippon Pulse model shop can then produce a high-quality sample to specification.

Nippon Pulse America, Inc. is located in a 5,000 square foot facility in Radford, Virginia and from this location is able to serve customers in North and South America as well as Europe.

Note: All information in this catalog is subject to change. Please contact Nippon Pulse before making a final determination of the product that best fits your application.



About Nippon Pulse

Since its founding in 1952, Nippon Pulse has supplied high-quality products to a wide range of industries as a total motion control provider of precision motors, drivers, controllers, actuators and mechatronic systems. Nippon Pulse has always strived not only to satisfy, but also to impress its customers through the highest quality, value, technology, responsiveness and reliability.

Nippon Pulse offers a superior technical advantage in various fields demanding greater motion control precision and state-of-the-art products. As a result, Nippon Pulse has grown into a major worldwide supplier of motion control products. Nippon Pulse conducts business globally through multiple subsidiaries, sales offices, and local distributors.



Direct Product Link

Throughout this catalog, there are a series of QR (quick response) codes, also known as 2D codes. Using your smartphone, you can view additional online information about Nippon Pulse products, including detailed datasheets and video demos.

On each product page in this catalog, there is a QR code linking to the corresponding product page on our web site. There, you are able to attain updated and additional information about each of our stepper products.

There are also numerous QR codes linking to application demo videos and white papers on the Nippon Pulse web site. All QR codes linking to videos and white papers are so labeled. Otherwise, each QR code is a direct link to a specific product.

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Stepper Motor Features

Supplied Voltage/Drive Type

There are many different ways to drive a stepper motor. Whatever method you select, you must control the power into the motor and thus the current through the motor.

Constant Voltage Drives

This is the simplest, least expensive, and most repeatable method of driving a stepper motor. These types of drives apply a voltage to the winding. The supplied voltage, when applied across the motor winding, can only produce a set current (based on Ohm's Law).

Constant Current Drives

This drive method makes it possible to get higher speed performance out of the motor. These types of drives apply a voltage to the winding that is at least

double of the rated voltage. The drive then regulates the current through the motor winding so as not to exceed the rated current.

Synchronization

Stepper motors rotate in proportion to the number of pulses. They are frequency synchronized motors, the speed of which can be altered by changing the frequency of the pulse signal.

Open-loop Control

No position sensor is required.

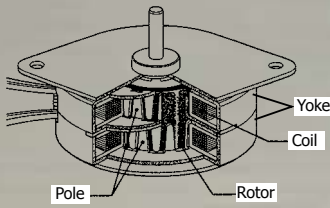
No Cumulative Error

While each step provides some angular tolerance, the step angle error is non-cumulative.

Excellent Response

Permanent magnet used for the rotor ensures excellent response at start and stop.

Basic Structure of 2-Phase Permanent Magnet Motor



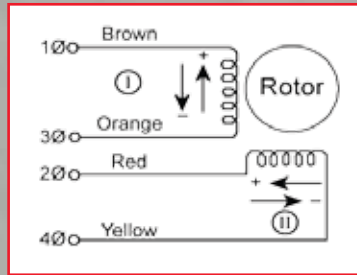
When poles are magnetized by electric pulses applied to the coils, they attract the permanent magnet rotor core in reverse polarities, thereby starting rotation. Rotation can be continued by alternately switching the direction of applied electric pulses to change polarities. When supply of pulses to the coils is stopped, the poles are magnetized by the rotor core and the rotor stops rotating at the position where the poles and the rotor core are attracted to each other. As described to the right there are two types of coil arrangements, one for bipolar, the other unipolar.

		Unipolar	Bipolar
Number of Transistors		1	2
To ensure the same temperature rise of motor	Current	1	1/√2
	Torque	1	√2
	High-speed performance	1	0.5
	Voltage	1	√2
To obtain same torque	Current	1	0.5
	Temperature rise	1	0.5
	High-speed performance	1	0.5
	Voltage	1	1

The above chart shows the comparison between bipolar and unipolar drives with parameters of unipolar set to one.

Bipolar Drive

Four leadwires are connected as shown



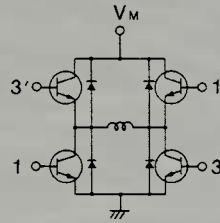
2-2 phase excitation sequence is shown below

Step	I	II
1	+	+
2	-	+
3	-	-
4	+	-

CW ↓ ↑ CCW

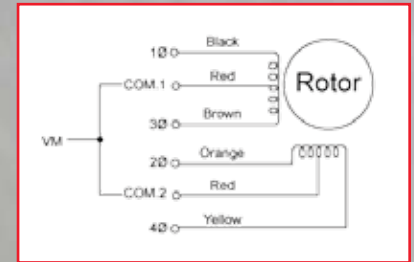
Current: Dual direction
Coil: Monofilar winding
Leadwires: 4

The basic circuit (constant voltage) is shown to the right



Unipolar Drive

Six leadwires are connected as shown below



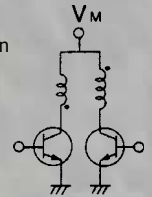
2-2 phase excitation sequence is shown below

Step	Black	Brown	Orange	Yellow	Step
1	ON	OFF	ON	OFF	4
2	OFF	ON	ON	OFF	3
3	OFF	ON	OFF	ON	2
4	ON	OFF	OFF	ON	1

CW ↓ ↑ CCW

Current: Single direction
Coil: Bifilar winding
Leadwires: 6

The basic circuit (constant voltage) is shown to the right



Model Number Explanation

PF(C) - 42 T - 48 C 1 G 1/50
1 2 3 4 5 6 7 8

1 - Series Designation

PF: Flying lead joint type
PFC: Connector joint type

2 - Outer Diameter in mm

3 - Type

Blank: Standard
T: Thin stack
H: High torque

4 - Steps per Revolution

24: 15°/step
48: 7.5°/step
96: 3.75°/step

5 - Coil Rating

C: 12V unipolar
D: 5V unipolar
P: 12V bipolar
Q: 5V bipolar

6 - Magnet Material

1: Ferrite Anisotropic
3: Ferrite Isotropic
4: Neodymium

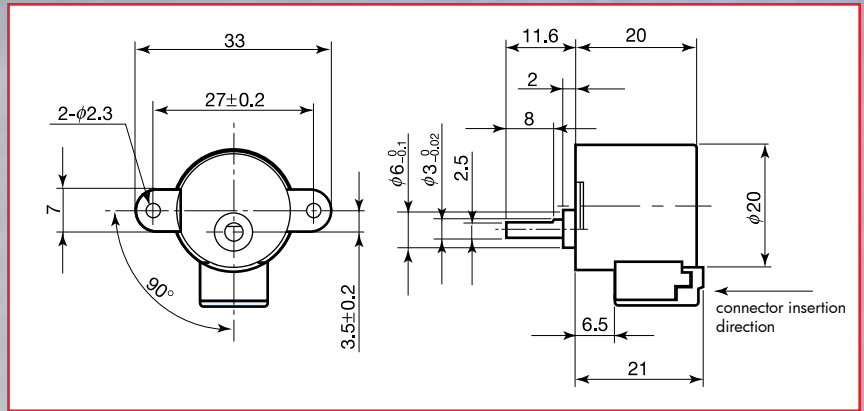
7 - Gear Head

Blank: No Gear Head
G: Gear Head Integrated

8 - Gear Ratio

With geared models only



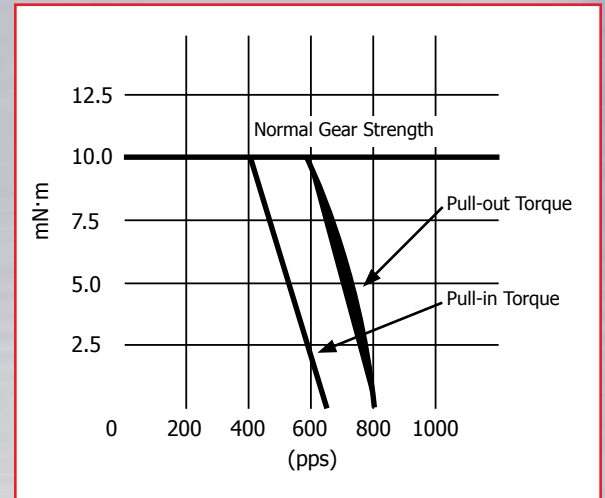


Specifications

Specification	Unit	PFCU20
Excitation Mode		Full-step (2-2)
Step Angle	°	0.9
Steps Per Revolution*		400
Rated Voltage	V	12
Resistance ¹	Ω	160 ±7%
Inductance ¹	mH	59 (1 Vrms, 1 KHz)
Maximum Torque	mN·m	10
Destruction Torque	mN·m	30
Starting Pulse Rate ^{1*}	pps	650 or more (with no load)
Slewing Pulse Rate ^{1*}	pps	800 or more (with no load)
Operating Temp. Range	°C	-10 to +50
Temperature Rise*	°C	70
Weight	g	25
Gear Ratio, Backlash		1/10, 7° or less

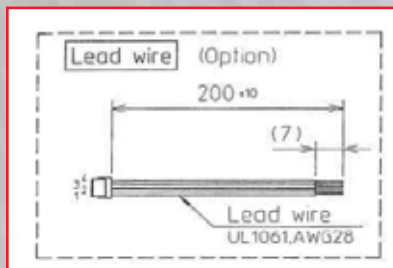
All tin-can motor specifications are based on full-step constant voltage operation
 Magnet type: Neodymium
 Note 1: Supply voltage 12V ±2% and at a temperature of 20°C ±2% and relative humidity 65% ±20%.
 Note 2: Stated terminal voltage is with supply voltage 12V.
 Note 3: Stated temperature rise is at the time of saturation.

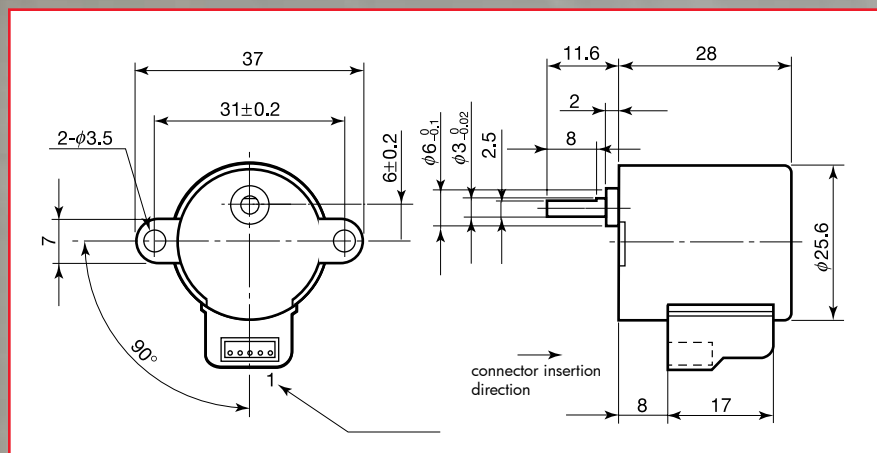
Torque Curve*



Connector

Applicable Housing: SHR-04V-S
Applicable Contact: SSH-003T-P0.2-H
Applicable Wire: AWG 32 to 28 (outer diameter of covered wire: 0.4 to 0.8 mm)





Specifications

Specification	Unit	PFCU25-24C1G (1/20)	PFCU25-24D1G (1/20)
Excitation Mode		Full Step (2-2)	
Step Angle	°	0.75	
Steps Per Revolution*		480	
Rated Voltage	V	13.3	5.4
Resistance ¹	Ω	120 ± 7%	16 ± 7%
Inductance ¹	mH	30 (1 Vrms, 1 KHz)	4.1 (1 Vrms, 1 kHz)
Maximum Torque	mN·m	20	
Destruction Torque	mN·m	60	
Starting Pulse Rate ^{1*}	pps	420 or more (with no load)	
Slewing Pulse Rate ^{1*}	pps	680 or more (with no load)	
Operating Temp. Range	°C	-10 to +50	
Temperature Rise*	°C	70	
Weight	g	55	
Gear Ratio, Backlash		1/20, 7° or less	

All tin-can motor specifications are based on full-step constant voltage operation

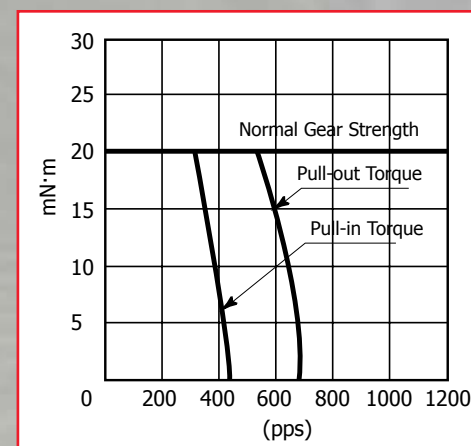
Magnet type: Anisotropic

Note 1: Supply voltage 12V ± 2% and at a temperature of 20°C ± 2% and relative humidity 65% ± 20%.

Note 2: Stated terminal voltage is with supply voltage 12V.

Note 3: Stated temperature rise is at the time of saturation.

Torque Curve*

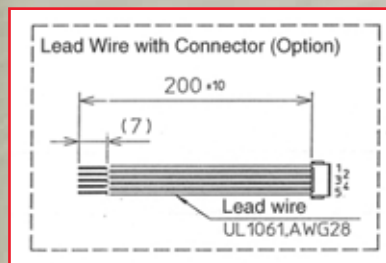


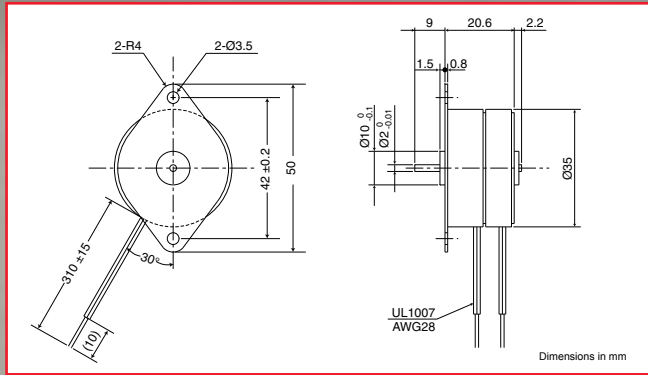
Connector

Applicable Housing: ZHR-5

Applicable Contact: SZH-002T-P0.5

Applicable Wire: AWG 28 to 26 (outer diameter of covered wire: 0.8 to 1.1 mm)





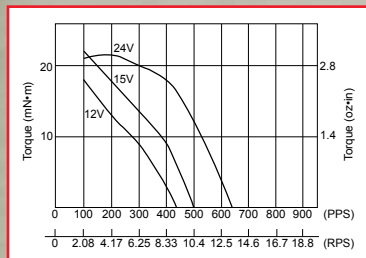
Specifications



Specification	Unit	PF35-24				PF35-48			
		Unipolar		Bipolar		Unipolar		Bipolar	
Type of Winding		Unipolar				Bipolar			
Excitation Mode*		Full step (2-2)				Full step (2-2)			
Step Angle	°	15 ±5%				7.5 ±5%			
Steps Per Revolution*		24				48			
Coil		C	D	P	Q	C	D	P	Q
Rated Voltage	V	12	5	12	5	12	5	12	5
Resistance	Ω	90	16	100	17	90	16	100	17
Inductance	mH	48	8.9	95	14	48	8.9	124	19
Holding Torque	mN·m	15	15	19	19	20	20	25	25
Rotor Inertia	kg·m ²	4.5 x 10 ⁻⁷				4.5 x 10 ⁻⁷			
Starting Pulse Rate*	pps	310				500			
Slewing Pulse Rate*	pps	410				530			
Operating Temp. Range	°C	-10 to +50							
Temperature Rise*	°C	55							
Weight	g	80							

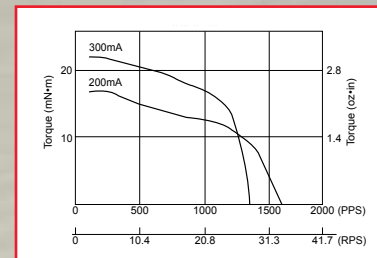
Torque Curve (pull-out torque)*

Bipolar Constant Voltage (48P1)



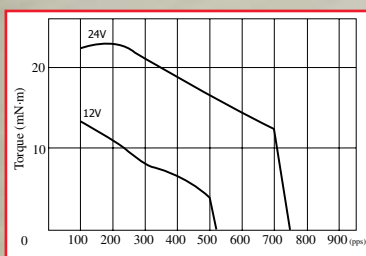
Coil Resistance: 100Ω

Bipolar Constant Current (48181)



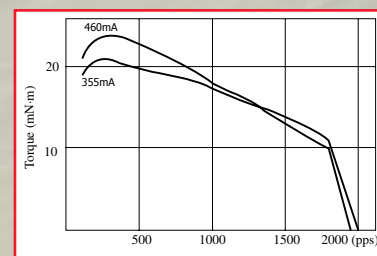
Coil Resistance: 18Ω Supply Voltage: 24V

Unipolar Constant Voltage (48C1)



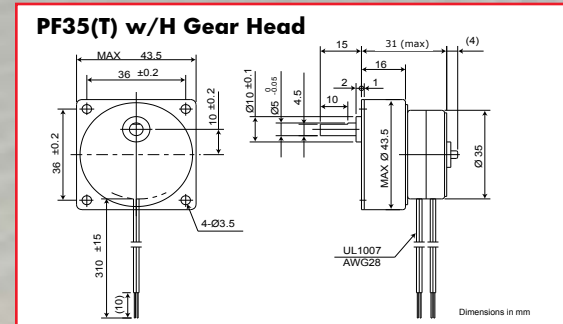
Coil Resistance: 90Ω

Unipolar Constant Current (48071)



Coil Resistance: 20Ω Supply Voltage: 24V

Dimensions of Geared Model



Gear Ratio	6/25	1/5	3/25	1/10
Ordinary Torque	200mN·m			
Destruction Torque	600mN·m			

Gear Ratio	2/25	1/15	3/50	1/20	1/25
Ordinary Torque	250mN·m				
Destruction Torque	750mN·m				

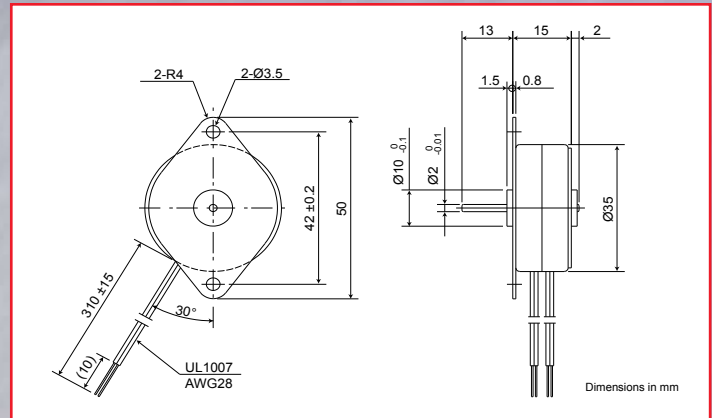
Gear Ratio	1/30	1/50	1/60	2/125	1/75
Ordinary Torque	300mN·m				
Destruction Torque	900mN·m				

Gear Ratio	1/100	1/120	1/125	1/150	1/200	1/250	1/300
Ordinary Torque	400mN·m						
Destruction Torque	1200mN·m						

All tin-can motor specifications are based on full-step constant voltage operation

Magnet type: Anisotropic

Note: Torque curves are for reference only and are not guaranteed



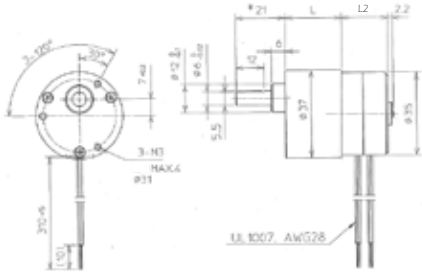
Specifications

Specifications	Unit	PF35T-48			
Type of Winding		Unipolar		Bipolar	
Excitation Mode*		Full step (2-2)			
Step Angle	°	7.5 ±5%			
Steps Per Revolution*		48			
Coil		C	D	P	Q
Rated Voltage	V	12	5	12	5
Resistance	Ω	70	12	72	16
Inductance	mH	30	6.5	60	6.2
Holding Torque	mN·m	18	18	27	27
Rotor Inertia	kg·m ²	2.7 x 10 ⁻⁷			
Starting Pulse Rate*	pps	600			
Slewing Pulse Rate*	pps	610			
Operating Temp. Range	°C	-10 to +50			
Temperature Rise*	°C	70			
Weight	g	77			



Dimensions of Geared Model

PF35(T) w/M Gear Head



	L2
PF35	19.8
PF35T	14.2

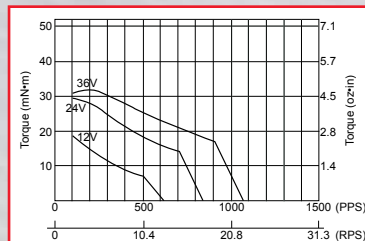
Gear Ratio	1/5	1/6	1/10	1/18	1/30
Ordinary Torque	100mN·m			200mN·m	
Destruction Torque	300mN·m			600mN·m	

Gear Ratio	1/40	1/50	1/60	1/75	1/90	1/100	1/120
Ordinary Torque	300mN·m						
Destruction Torque	900mN·m						

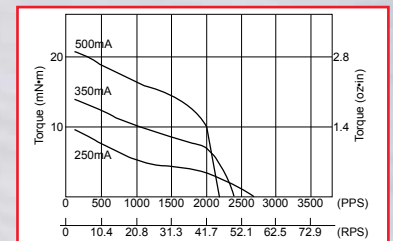
Gear Ratio	1/125	1/150	1/180	1/200	1/270	1/300
Ordinary Torque	600mN·m					
Destruction Torque	1800mN·m					

Gear Ratio	1/5	1/6	1/10	1/18	1/30	1/40	1/50	1/60	1/75	1/90	1/100	1/120	1/125	1/150	1/180	1/200	1/270	1/300
L	19.5	19.5	19.5	19.5	21.7	21.7	21.7	21.7	21.7	21.7	21.7	21.7	23.8	23.8	23.8	23.8	23.8	23.8

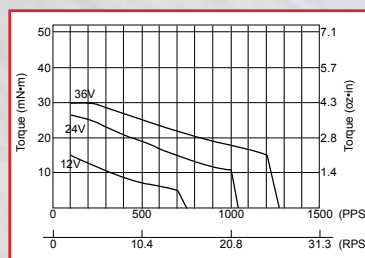
Torque Curve (pull-out torque)* Bipolar Constant Voltage (48R1)



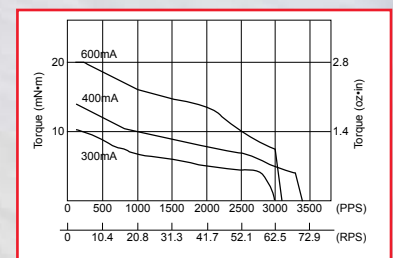
Bipolar Constant Current (48Q1)



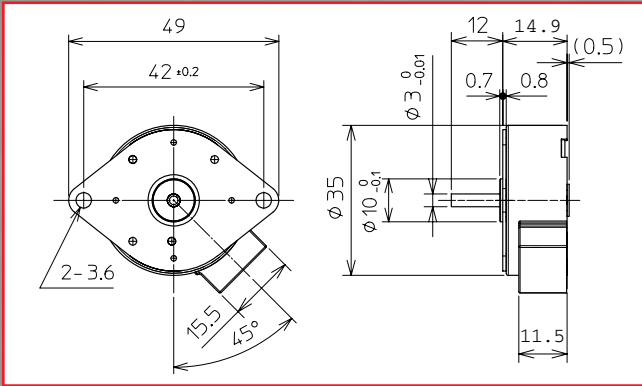
Unipolar Constant Voltage (48C1)



Unipolar Constant Current (48D1)



Note: Torque curves are for reference only and are not guaranteed
All specifications are based on full-step constant voltage operation
Magnet type: Anisotropic

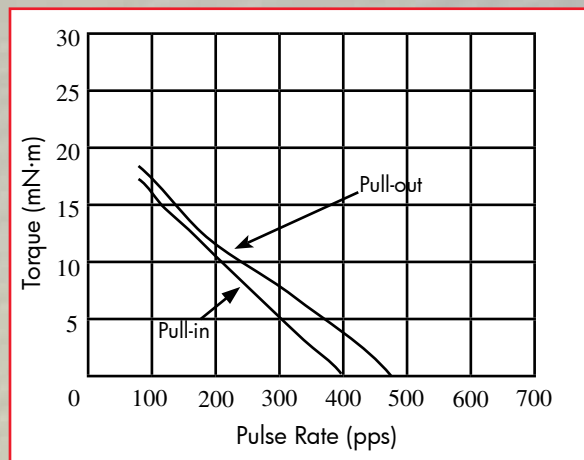


Specifications

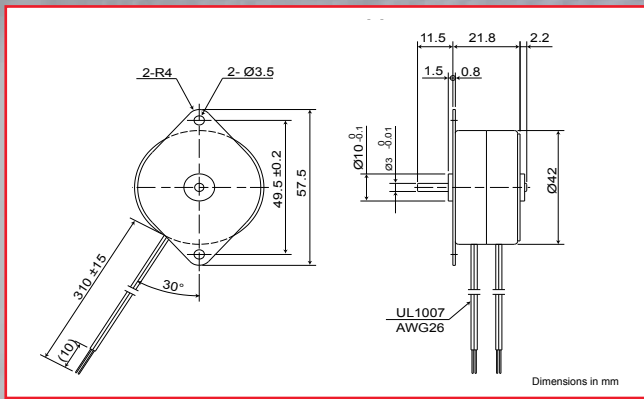


Specification	Unit	PFC35TH-48
Type of Winding		Unipolar
Excitation Mode*		2-2
Step Angle	°	7.5 ± 5%
Steps Per Revolution*		48
Rated Voltage	V	9
Resistance	Ω	37
Inductance	mH	14
Holding Torque	mN·m	33
Starting Pulse Rate*	pps	400
Slewing Pulse Rate*	pps	470
Operating Temp. Range	°C	-10 to +50
Temperature Rise*	°C	70
Operating Temp. Range	°C	+100
Weight	g	80
Dielectric Strength	AC·V	AC500V (1 min.)
Insulation Class		Class E

Torque Curve (pull-out torque)*



All tin-can motor specifications are based on full-step constant voltage operation
Magnet type: Neodymium

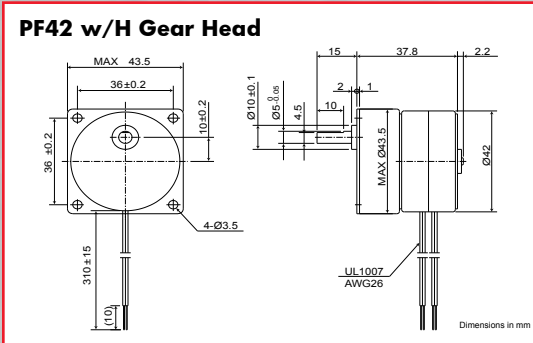


Specifications

Specification	Unit	PF42-24				PF42-48			
		Unipolar		Bipolar		Unipolar		Bipolar	
Type of Winding		Unipolar		Bipolar		Unipolar		Bipolar	
Excitation Mode*		Full step (2-2)				Full step (2-2)			
Step Angle	°	15 ±5%				7.5 ±5%			
Steps Per Revolution*		24				48			
Coil		C	D	P	Q	C	D	P	Q
Rated Voltage	V	12	5	12	5	12	5	12	5
Resistance	Ω	70	12	76	14	70	12	76	14
Inductance	mH	35	7.2	74	14	41	9.1	87	16
Holding Torque	mN·m	28	28	41	41	45	45	54	54
Rotor Inertia	kg·m ²	16.8 x 10 ⁻⁷				12.8 x 10 ⁻⁷			
Starting Pulse Rate*	pps	180				310			
Slewing Pulse Rate*	pps	250				320			
Operating Temp. Range	°C	-10 to +50							
Temperature Rise*	°C	55							
Weight	g	160							



Dimensions of Geared Model



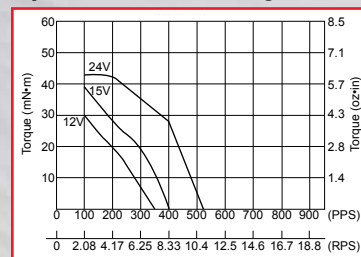
Gear Ratio	6/25	1/5	3/25	1/10	2/25	1/15	3/50	1/20	1/25
Ordinary Torque	200mN·m					250mN·m			
Destruction Torque	600mN·m					750mN·m			

Gear Ratio	1/30	1/50	1/60	2/125	1/75
Ordinary Torque	300mN·m				
Destruction Torque	900mN·m				

Gear Ratio	1/100	1/120	1/125	1/150	1/200	1/250	1/300
Ordinary Torque	400mN·m						
Destruction Torque	1200mN·m						

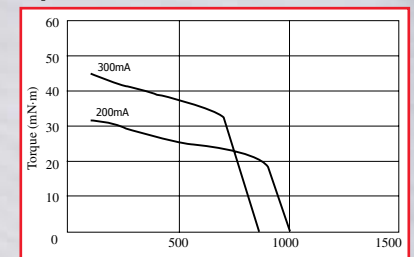
Torque Curve (pull-out torque)*

Bipolar Constant Voltage (48P1)



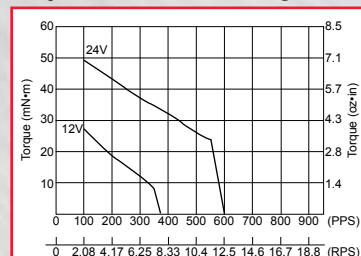
Coil Resistance: 76Ω

Bipolar Constant Current (48Y1)



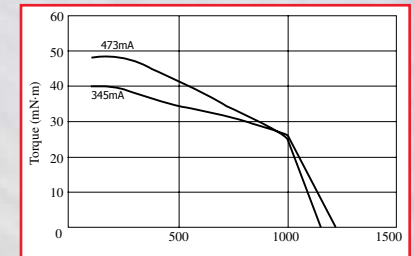
Coil Resistance: 20Ω Supply Voltage: 24V

Unipolar Constant Voltage (48C1)



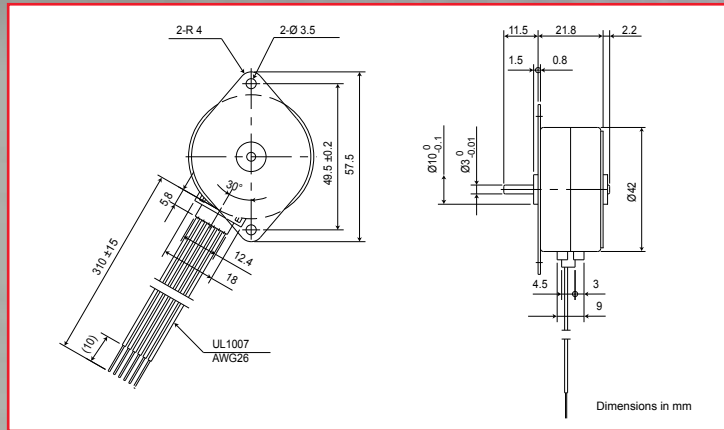
Coil Resistance: 70Ω

Unipolar Constant Current (48I1)



Coil Resistance: 20Ω Supply Voltage: 24V

All tin-can motor specifications are based on full-step constant voltage operation
Magnet type: Anisotropic
Note: Torque curves are for reference only and are not guaranteed

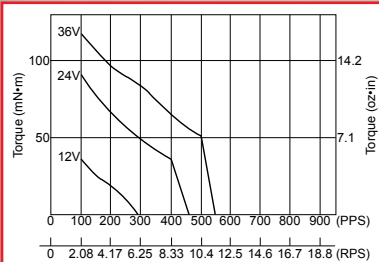


Specifications

Specification	Unit	PFC42H-48			
Type of Winding		Unipolar		Bipolar	
Excitation Mode*		Full step (2-2)			
Step Angle	°	7.5 ±5%			
Steps Per Revolution*		48			
Coil		C	D	P	Q
Rated Voltage	V	12	5	12	5
Resistance	Ω	70	12	70	12
Inductance	mH	39	6.6	80	13
Holding Torque	mN·m	50	50	70	70
Rotor Inertia	kg·m ²	27 x 10 ⁻⁷			
Starting Pulse Rate*	pps	290			
Slewing Pulse Rate*	pps	320			
Operating Temp. Range	°C	-30 to +80			
Temperature Rise*	°C	55			
Weight	g	160			

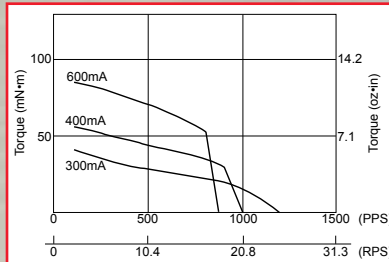


Torque Curve (pull-out torque)* Bipolar Constant Voltage (48P1)



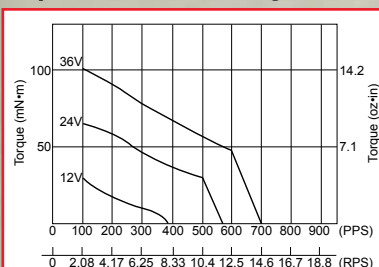
Coil Resistance: 70Ω

Bipolar Constant Current (48Q1)



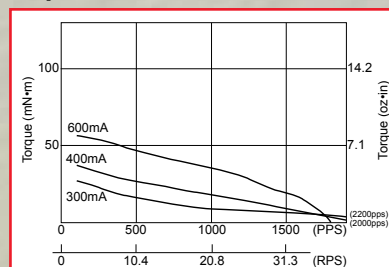
Coil Resistance: 12Ω Supply Voltage: 24V

Unipolar Constant Voltage (48C1)



Coil Resistance: 70Ω

Unipolar Constant Current (48D1)



Coil Resistance: 12Ω Supply Voltage: 24V

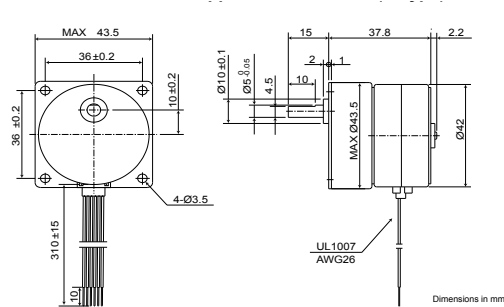
All tin-can motor specifications are based on full-step constant voltage operation

Magnet type: Anisotropic

Note: Torque curves are for reference only and are not guaranteed

Dimensions of Geared Model

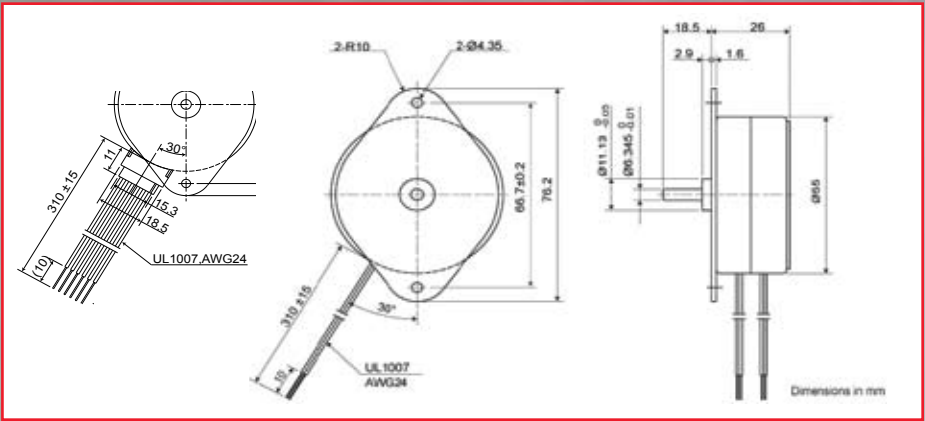
PFC42H w/H Gear Head



Gear Ratio	6/25	1/5	3/25	1/10	2/25	1/15	3/50	1/20	1/25
Ordinary Torque	200mN·m					250mN·m			
Destruction Torque	600mN·m					750mN·m			

Gear Ratio	1/30	1/50	1/60	2/125	1/75
Ordinary Torque	300mN·m				
Destruction Torque	900mN·m				

Gear Ratio	1/100	1/120	1/125	1/150	1/200	1/250	1/300
Ordinary Torque	400mN·m						
Destruction Torque	1200mN·m						



Specifications

Specification	Unit	PFC55-48			
		Unipolar		Bipolar	
Type of Winding		Unipolar		Bipolar	
Excitation Mode*		Full step (2-2)			
Step Angle	°	7.5 ±5%			
Steps Per Revolution*		48			
Coil		C	D	P	Q
Rated Voltage	V	12	5	12	5
Resistance	Ω	36	5	40	6.75
Inductance	mH	37	5.9	84	12
Holding Torque	mN·m	120	120	150	150
Rotor Inertia	kg·m ²	40 x 10 ⁻⁷			
Starting Pulse Rate*	pps	280			
Slewing Pulse Rate*	pps	300			
Operating Temp. Range	°C	-10 to +50			
Temperature Rise*	°C	55			
Weight	g	300			

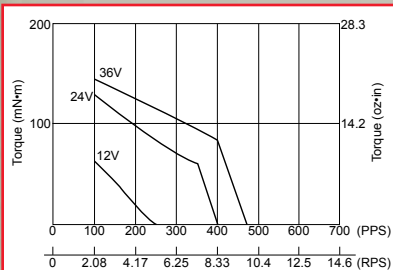


PF55



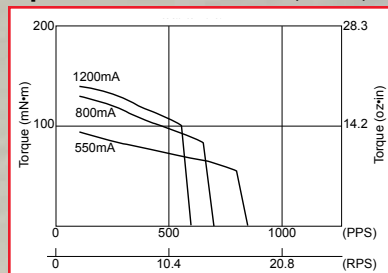
PFC55

Torque Curve (pull-out torque)* Bipolar Constant Voltage (48P1)



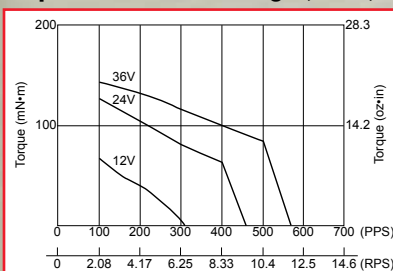
Coil Resistance: 40Ω

Bipolar Constant Current (48Q1)



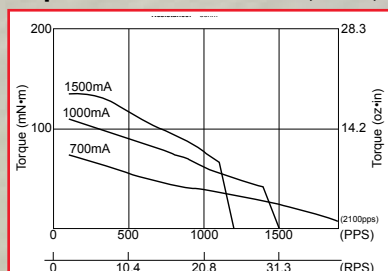
Coil Resistance: 6.75Ω Supply Voltage: 24V

Unipolar Constant Voltage (48C1)



Coil Resistance: 36Ω

Unipolar Constant Current (48D1)



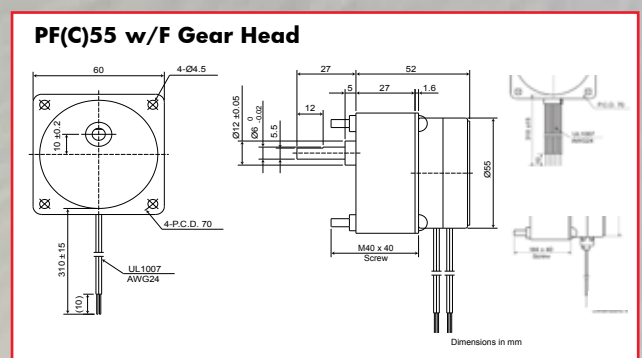
Coil Resistance: 5Ω Supply Voltage: 24V

All tin-can motor specifications are based on full-step constant voltage operation

Magnet type: Anisotropic

Note: Torque curves are for reference only and are not guaranteed

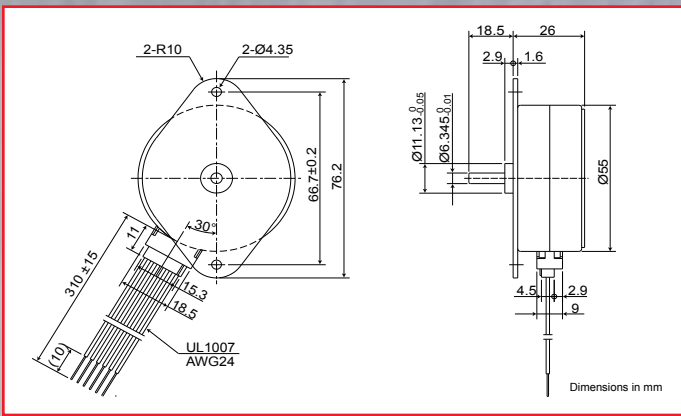
Dimensions of Geared Model



Gear Ratio	6/25	1/5	3/25	1/10	2/25	1/15	3/50	1/20
Ordinary Torque	400mN·m							
Destruction Torque	1200mN·m							

Gear Ratio	1/25	1/30	1/50	1/60
Ordinary Torque	700mN·m			
Destruction Torque	2100mN·m			

Gear Ratio	2/125	1/75	3/250	1/100	1/125	1/150	1/250	1/300
Ordinary Torque	1000mN·m							
Destruction Torque	3000mN·m							



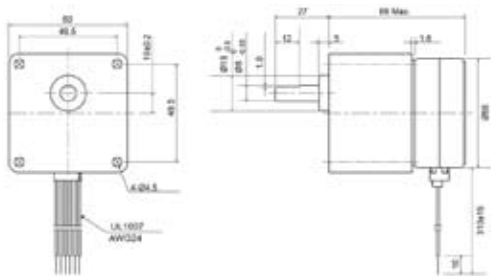
Specifications

Specification	Unit	PFC55H-48			
Type of Winding		Unipolar		Bipolar	
Excitation Mode*		Full step (2-2)			
Step Angle	°	7.5 ±5%			
Steps Per Revolution*		48			
Coil		C	D	P	Q
Rated Voltage	V	12	5	12	5
Resistance	Ω	36	5	40	8
Inductance	mH	37	4.4	66	16
Holding Torque	mN·m	150	150	180	180
Rotor Inertia	kg·m ²	97 x 10 ⁻⁷			
Starting Pulse Rate*	pps	210			
Slewing Pulse Rate*	pps	230			
Operating Temp. Range	°C	-10 to +50			
Temperature Rise*	°C	55			
Weight	g	300			



Dimensions of Geared Model

PFC55H w/F(BB) Gear Head



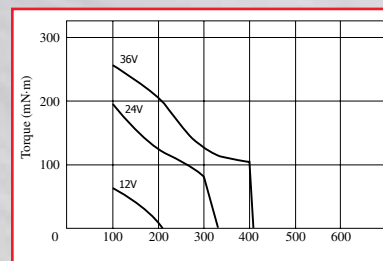
Gear Ratio	1/3	1/5	2/15	1/10	2/25	1/15	1/20
Ordinary Torque	400mN·m		500mN·m		600mN·m		800mN·m
Destruction Torque	1200mN·m		1500mN·m		1800mN·m		2400mN·m

Gear Ratio	1/25	1/30	1/50	1/60
Ordinary Torque	900mN·m	1100mN·m	1600mN·m	
Destruction Torque	2700mN·m	3300mN·m	4800mN·m	

Gear Ratio	1/75	1/100	1/125	1/150	1/180
Ordinary Torque	2500mN·m				
Destruction Torque	7500mN·m				

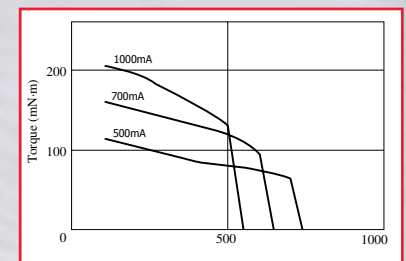
Torque Curve (pull-out torque)*

Bipolar Constant Voltage (48011)



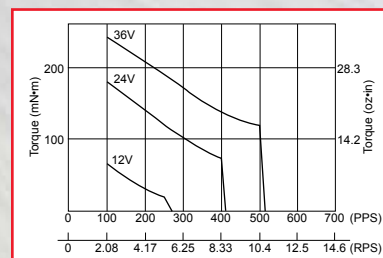
Coil Resistance: 40Ω

Bipolar Constant Current (4851)



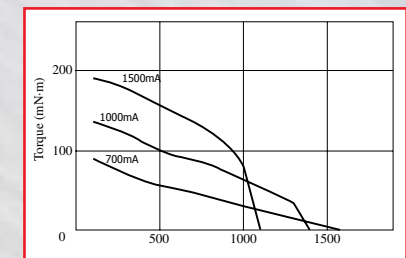
Coil Resistance: 8Ω Supply Voltage: 24V

Unipolar Constant Voltage (48C1)



Coil Resistance: 36Ω

Unipolar Constant Current (48D1)



Coil Resistance: 5Ω Supply Voltage: 24V

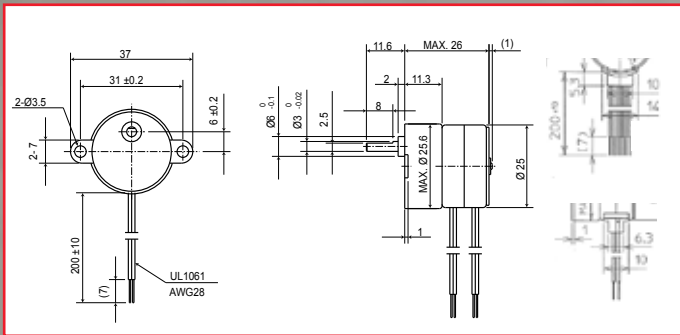
All tin-can motor specifications are based on full-step constant voltage operation

Magnet type: Anisotropic

Note: Torque curves are for reference only and are not guaranteed

See page 14 for PFC55H with F gearhead ratios

PF(C)25 w/P Gearhead

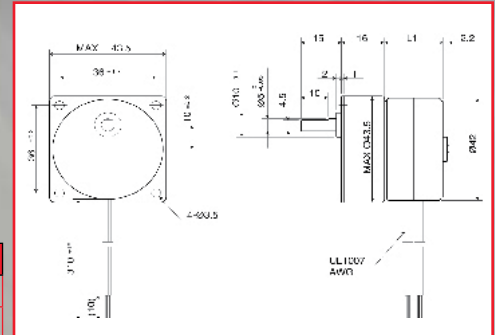


Gear Ratio	6/25	1/5	3/25	1/10	2/25	1/15	3/50	1/20
Ordinary Torque	20mN·m				50mN·m			

Gear Ratio	1/25	1/30	1/50	1/60	1/75
Ordinary Torque	70mN·m				

Gear Ratio	1/100	1/120	1/125	1/150	1/200	1/250	1/300
Ordinary Torque	100mN·m						

PF(C)42/42H/42T w/H Gearhead



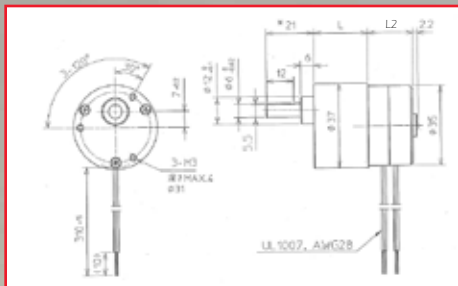
	L	AWG
PF42/PFC42H	37.8	26
PF42T/PFC42T	31	28

Gear Ratio	6/25	1/5	3/25	1/10	2/25	1/15	3/50	1/20	1/25
Ordinary Torque	200mN·m					250mN·m			

Gear Ratio	1/30	1/50	1/60	2/125	1/75
Ordinary Torque	300mN·m				

Gear Ratio	1/100	1/120	1/125	1/150	1/200	1/250	1/300
Ordinary Torque	400mN·m						

PF35/35T w/M Gearhead



	L2
PF35	19.1
PF35T	13.5

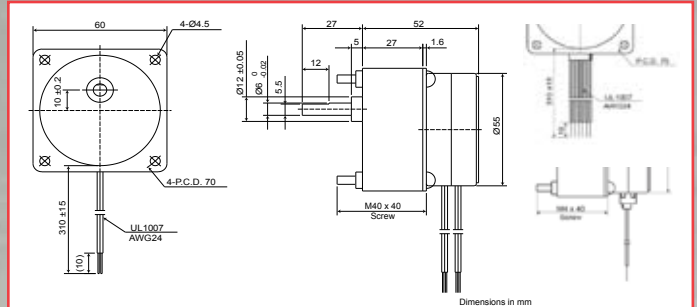
see Page 7 for L specifications

Gear Ratio	1/5	1/6	1/10	1/18	1/30
Ordinary Torque	100mN·m			200mN·m	

Gear Ratio	1/40	1/50	1/60	1/75	1/90	1/100	1/120
Ordinary Torque	300mN·m						

Gear Ratio	1/125	1/150	1/180	1/200	1/270	1/300
Ordinary Torque	600mN·m					

PF(C)55/55H w/F Gearhead

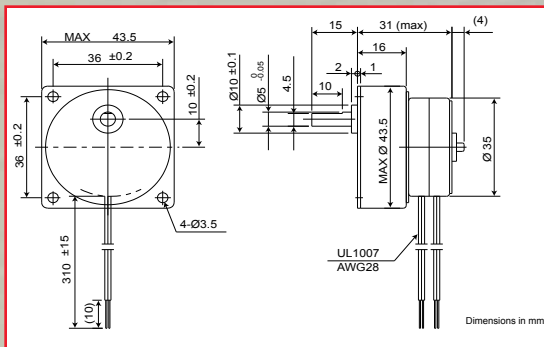


Gear Ratio	6/25	1/5	3/25	1/10	2/25	1/15	3/50	1/20
Ordinary Torque	400mN·m							

Gear Ratio	1/25	1/30	1/50	1/60
Ordinary Torque	700mN·m			

Gear Ratio	2/125	1/75	3/250	1/100	1/125	1/150	1/250	1/300
Ordinary Torque	1000mN·m							

PF35/35T w/H Gearhead



	L
PF35	36.6
PF35T	31

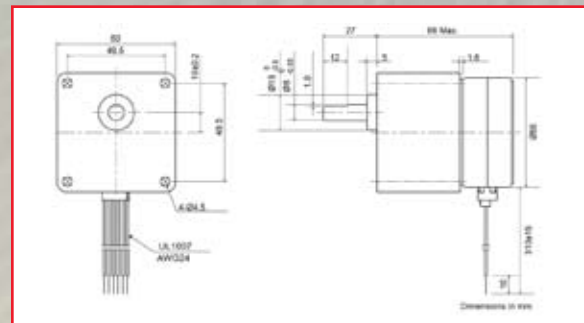
Gear Ratio	6/25	1/5	3/25	1/10	2/25	1/15	3/50	1/20	1/25
Ordinary Torque	200mN·m					250mN·m			

Gear Ratio	1/30	1/50	1/60	2/125	1/75
Ordinary Torque	300mN·m				

Gear Ratio	1/100	1/120	1/125	1/150	1/200	1/250	1/300
Ordinary Torque	400mN·m						

PF(C)55/55H w/F(BB) Gearhead

F(BB) gearhead provides ball-bearing support for all stages, ensuring long service life



Gear Ratio	1/3	1/5	2/15	1/10	2/25	1/15	1/20
Ordinary Torque	400mN·m	500mN·m	600mN·m	800mN·m			

Gear Ratio	1/25	1/30	1/50	1/60
Ordinary Torque	900mN·m	1100mN·m	1600mN·m	

Gear Ratio	1/75	1/100	1/125	1/150	1/180
Ordinary Torque	2500mN·m				

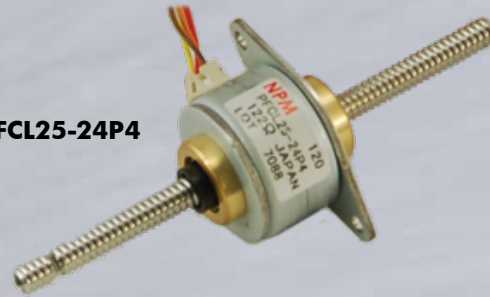
Reduction Ratio	L
1/3 to 1/15	32
1/20 to 1/180	42

Nippon Pulse LINEARSTEP® Motors

A tin-can linear actuator, the PFL series (LINEARSTEP®) is designed to provide a simple system at a fraction of the cost of a conventional rotary stepper motor. Offered in diameters of 25mm and 35mm, the LINEARSTEP® series can also be ordered with one of three pitches on the lead thread screw (0.48mm, 0.96mm, and 1.2mm). The LINEARSTEP series comes with either a bipolar or unipolar winding.



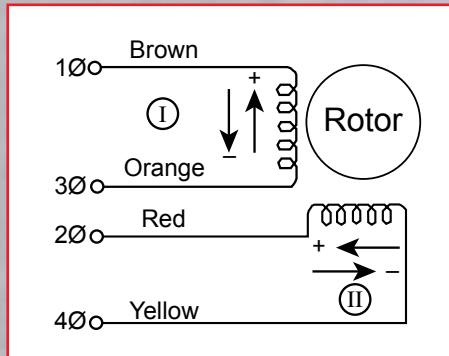
PFL35T-48C4



PFCL25-24P4



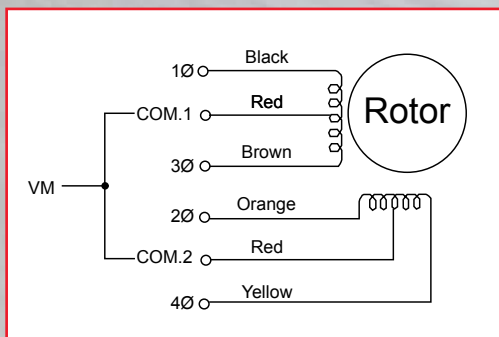
Bipolar Wiring Diagram



Step	I	II
1	+	+
2	-	+
3	-	-
4	+	-

CW ↓ ↑ CCW

Unipolar Wiring Diagram



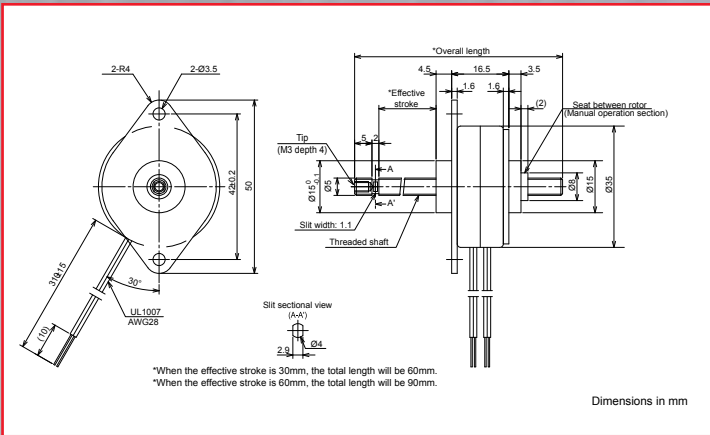
Step	Black	Brown	Orange	Yellow	Step
1	ON	OFF	ON	OFF	4
2	OFF	ON	ON	OFF	3
3	OFF	ON	OFF	ON	2
4	ON	OFF	OFF	ON	1

CW ↓ ↑ CCW

Model Number Explanation

PF(C) L 25 T - 48 Q 4 - 048 - 30
 1 2 3 4 - 5 6 7 8 9

- 1 - Series Designation**
 PF: Standard
 PFC: Connector
- 2 - LINEARSTEP® Designation**
- 3 - Motor Diameter (mm)**
 25mm
 35mm
- 4 - Thin stack**
- 5 - Steps per Revolution**
 24: 15°/step
 48: 7.5°/step
- 6 - Coil Rating**
 C: 12V unipolar
 D: 5V unipolar
 P: 12V bipolar (PFCL25 only)
 Q: 5V bipolar
 R: 12V bipolar (PFL35T only)
- 7 - Magnet Material**
 4: Neodymium
- 8 - Thread Pitch**
 048: 0.48mm
 096: 0.96mm
 120: 1.20mm
- 9 - Shaft Stroke in mm**



		PFL35T-48											
Type Of Winding		Unipolar						Bipolar					
Steps Per Revolution		48											
Thread Pitch	mm	0.48	0.96	1.2	0.48	0.96	1.2	0.48	0.96	1.2	0.48	0.96	1.2
Travel/Step	mm	0.01	0.02	0.025	0.01	0.02	0.025	0.01	0.02	0.025	0.01	0.02	0.025
Effective Stroke	mm	30 or 60											
Force @ 200pps	N	35	32	30	35	32	30	39.5	38	35	39.5	38	35
Rated Voltage	V	12			5			12			5		
Rated Current	A/Ø	0.17			0.42			0.17			0.31		
Resistance	ohm/Ø	70 ±7%			12 ±7%			72 ±7%			16 ±7%		
Inductance	mH/Ø	26			4.8			53			5.5		
Operating Temp. Range	°C	-10 to +50											
Temperature Rise	°K	70											
Weight	g	95											

Nippon Pulse Hybrid Motors

Nippon Pulse's hybrid stepper motors (**PR series**) are high torque motors with superior response characteristics. They are available in sizes from 20mm (NEMA SIZE 8) to 57mm (NEMA SIZE 23) with step angles of 0.9° or 1.8°. All Nippon Pulse hybrid motors are available with a bipolar winding.

Model Number Explanation

PR 28 H - 32 - 095 4 JA G 1/5 44
 1 2 3 4 5 6 7 8 9 10 11

1 - Series Designation

2 - Motor Frame Size

20mm
 28mm
 42mm
 57mm

3 - Motor Type

H: High Torque

4- Motor Case Length

PR20: 30mm, 42
 PR28: 32, 45, 51
 PR42: 33, 38, 47
 PR57: 41, 56

5 - Coil Winding Type

Amps per Phase

6 - Number of Lead Wires

4: Bipolar
 8: Bipolar

7 - Step Angle

M: 0.9°
 J: 1.8°

8 - Shaft Type

A: Single
 B: Double

9 - Gearhead

Gearhead attached

10 - Gearhead Ratio

11 - Factory Code



PR57
(NEMA 23)



PR20
(NEMA 8)



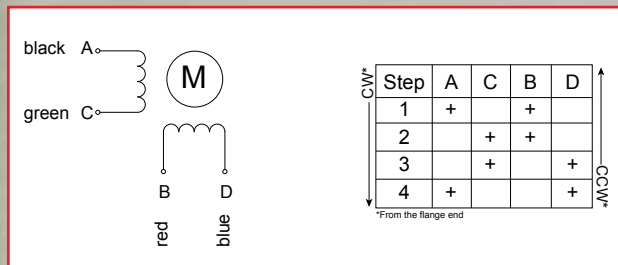
PR42
(NEMA 17)



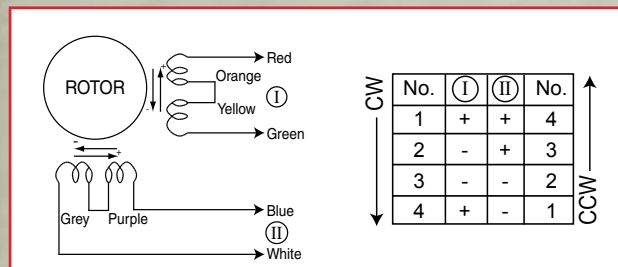
PR28
(NEMA 11)

Wiring Diagrams

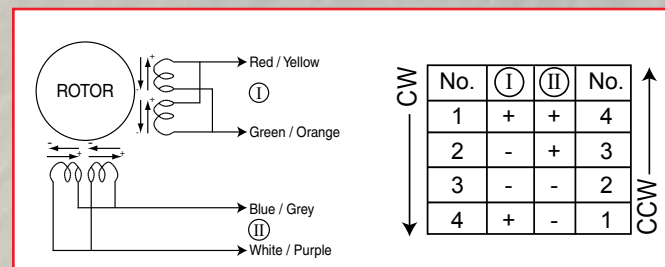
4-Lead Bipolar

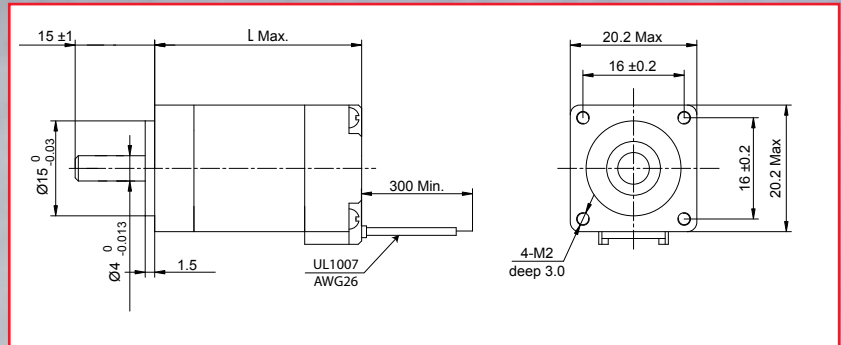


8-Lead Bipolar, Series



8-Lead Bipolar, Parallel

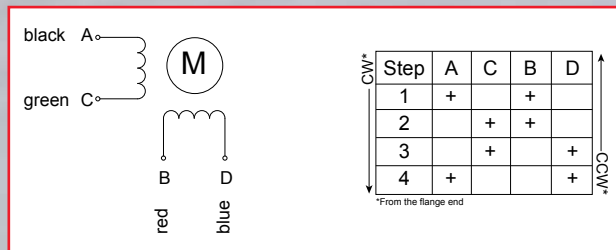




NEMA Size 8 hybrid stepper motors produce high torque in a small, RoHS compliant package. They are ideal for motion control applications where the benefits of smaller size with high torque are essential.

The compact and lightweight 1.8° NEMA 8 bipolar stepper motors provide flexibility in applications with limited space. The NEMA 8 stepper motors measure only 20mm (0.8in) square by as little as 30mm (1.18in) long.

Wiring Diagram



Specifications

Specification	Unit	PR20H-30-0604JA	PR20H-42-0804JA
Type Of Winding		Bipolar	Bipolar
Step Angle	°	1.8	1.8
Steps Per Revolution		200	200
Rated Voltage	V	3.9	4.32
Rated Current	A/Ø	0.60	0.80
Resistance	ohm/Ø	6.5	5.4
Inductance	mH/Ø	1.7	1.5
Holding Torque	mN·m	18	30
Rotor Inertia	kg·m ²	2.0 x 10 ⁻⁷	3.6 x 10 ⁻⁷
Motor Length	mm	30	42
Weight	g	60	80
Operating Temp. Range	°C	-20 to +50	-20 to +50
Temperature Rise	°C	80	80
Insulation Class		B	B

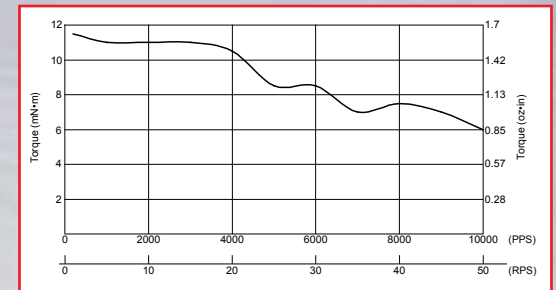
* - All hybrid motor specifications are based on full-step constant current operation

Model No.	Max. Length
PR20H-30	30mm
PR20H-42	42mm



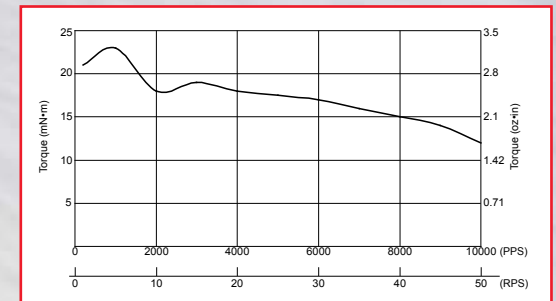
Torque Curves

PR20H-30 w/Bipolar Constant Current



Excitation Mode: Full-step
Voltage: 24VDC
Current: 0.6A

PR20H-42 w/Bipolar Constant Current



Excitation Mode: Full-step
Voltage: 24VDC
Current: 0.78A



NEMA Size 11 hybrid stepper motors produce high torque in a small, RoHS compliant package. They are ideal for motion control applications where the benefits of smaller

size with high torque are essential.

The compact and lightweight 1.8° NEMA 11 bipolar stepper motors provide flexibility in applications with limited space. The NEMA Size 11 stepper motors measure only 28mm (1.10in) square by as little as 32mm (1.25in) long.

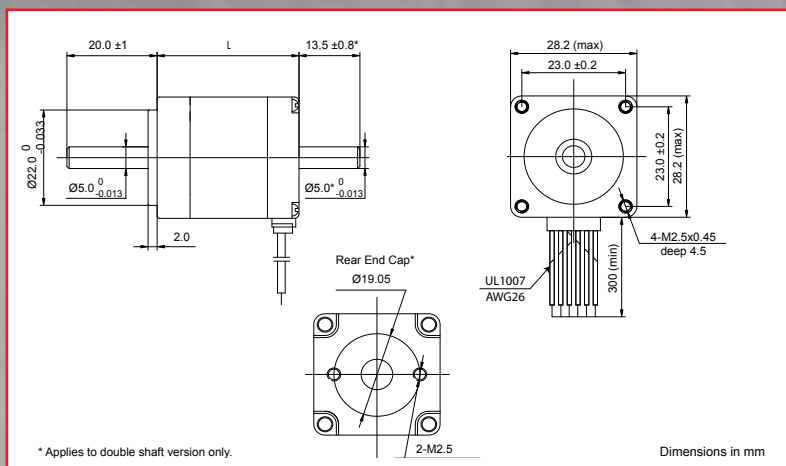
Specifications

Specification	
Motor Type	Hybrid
Step Angle	1.8°
Operating Temp. Range	-20°C to +50°C
Temperature Rise	80°C
Insulation Class	B

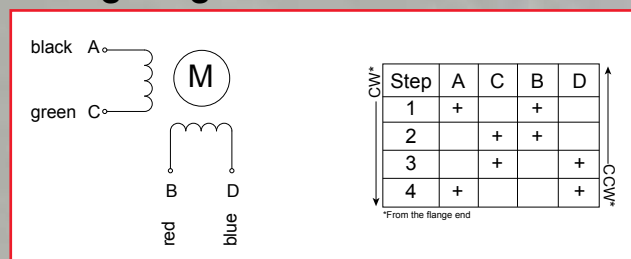
Model No.	Max. Length
PR28H-32	32mm
PR28H-45	45mm
PR28H-51	51mm

Specification	Unit	PR28H-32-0674JA PR28H-32-0674JB	PR28H-45-0674JA PR28H-45-0674JB	PR28H-51-0674JA PR28H-51-0674JB
Type of Winding		Bipolar	Bipolar	Bipolar
Rated Voltage	V	3.8	4.56	6.2
Rated Current	A/∅	0.67	0.67	0.67
Resistance	ohm/∅	5.6	6.8	9.2
Inductance	mH/∅	3.4	4.9	7.2
Holding Torque	mN·m	60	93.2	117.7
Rotor Inertia	kg·m ²	9 x 10 ⁻⁷	12 x 10 ⁻⁷	18 x 10 ⁻⁷
Motor Length	mm	31.5	45	51
Weight	g	110	140	200

* - All hybrid motor specifications are based on full-step constant current operation
 Note: (A) = Single shaft and (B) = double shaft

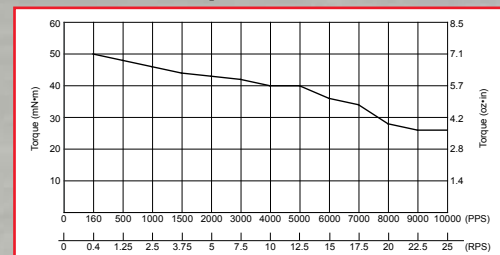


Wiring Diagram



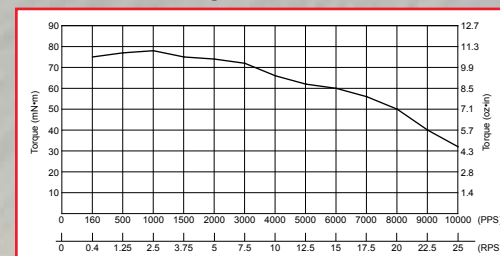
Torque Curves

PR28H-32 w/Bipolar Constant Current



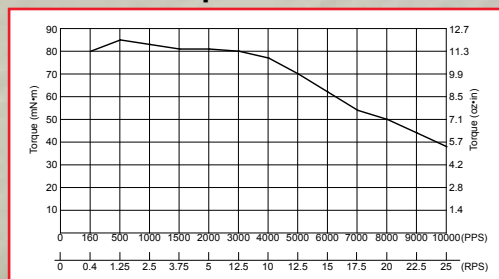
Excitation Mode: Half-step
 Voltage: 24VDC
 Current: 0.67A

PR28H-45 w/Bipolar Constant Current



Excitation Mode: Half-step
 Voltage: 24VDC
 Current: 0.67A

PR28H-51 w/Bipolar Constant Current



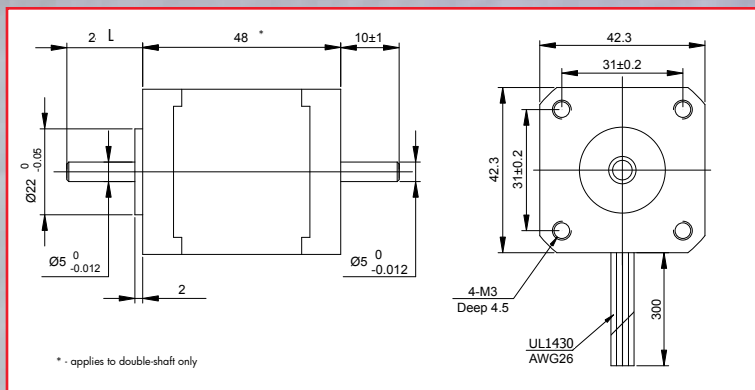
Excitation Mode: Half-step
 Voltage: 24VDC
 Current: 0.67A



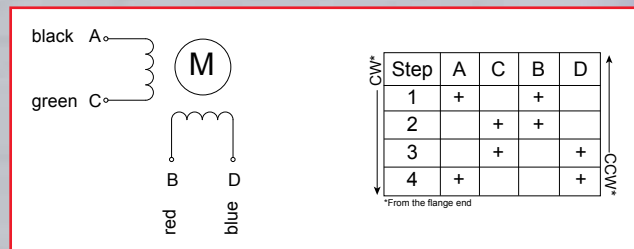


NEMA Size 17 hybrid stepper motors produce high torque in a small, RoHS compliant package. They are ideal for motion control applications where the benefits of smaller size with high torque are essential.

The NEMA Size 17 stepper motors measure only 42mm (1.65in) square by as little as 25mm (0.98in) long.



Wiring Diagram



Specifications

Specification	
Motor Type	Hybrid
Type Of Winding	Bipolar
Operating Temp. Range	-20°C to +50°C
Temperature Rise	80°C
Insulation Class	B

Model No.	Max. Length
PR42H-33	34mm
PR42H-38	40mm
PR42H-47	48mm

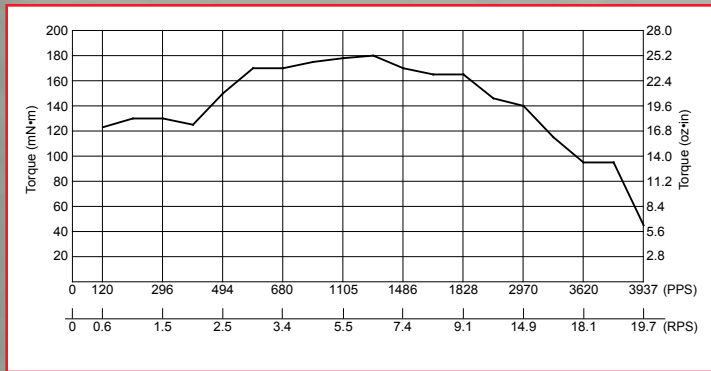
Specification	Step Angle	Rated Voltage	Rated Current	Resistance	Inductance	Holding Torque	Rotor Inertia	Motor Length	Weight
Unit	°	V	A/Ø	ohm/Ø	mH/Ø	mN·m	kg·m ²	mm	g
PR42H-33-0404Jx	1.8	12	0.4	30	36	250	35 x 10 ⁻⁷	34	220
PR42H-33-1004Jx	1.8	3.6	1	3.6	4.6	220	35 x 10 ⁻⁷	34	220
PR42H-33-1004Mx	0.9	3.6	1	3.6	7.5	220	35 x 10 ⁻⁷	34	220
PR42H-33-1334Jx	1.8	2.8	1.3	2.1	2.5	220	35 x 10 ⁻⁷	34	220
PR42H-33-1334Mx	0.9	2.8	1.3	2.1	4.2	220	35 x 10 ⁻⁷	34	220
PR42H-38-1004Jx	1.8	4.8	1	4.8	9.2	360	54 x 10 ⁻⁷	40	360
PR42H-38-1004Mx	0.9	4.8	1	4.8	9.2	360	54 x 10 ⁻⁷	40	360
PR42H-38-1684Jx	1.8	2.8	1.68	1.65	3.2	360	54 x 10 ⁻⁷	40	360
PR42H-38-1684Mx	0.9	2.8	1.68	1.65	3.2	360	54 x 10 ⁻⁷	40	280
PR42H-47-1004Jx	1.8	6	1	6	8.4	440	68 x 10 ⁻⁷	48	440
PR42H-47-1004Mx	0.9	6	1	6	14	440	68 x 10 ⁻⁷	48	440
PR42H-47-1684Jx	1.8	2.8	1.68	1.65	2.8	440	68 x 10 ⁻⁷	48	350
PR42H-47-1684Mx	0.9	2.8	1.68	1.65	4.1	440	68 x 10 ⁻⁷	48	350

* - All hybrid motor specifications are based on full-step constant current operation
 x represents shaft option, single (A) or double (B)



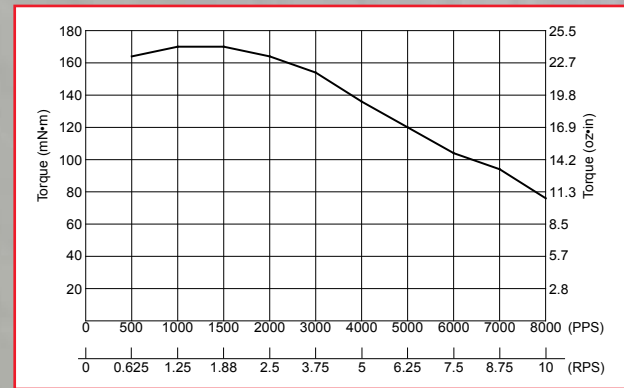
Torque Curves

PR42H-33-1004JA/JB w/Bipolar Constant Current



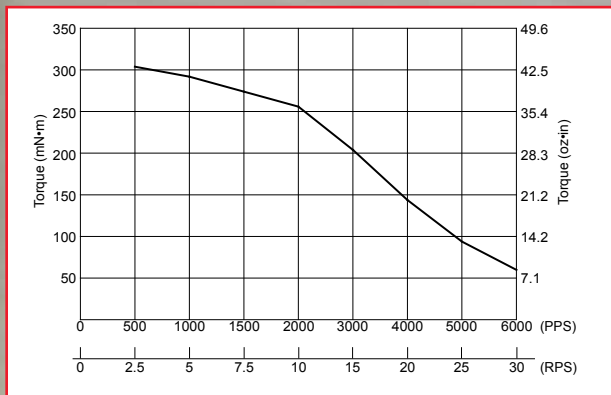
Excitation Mode: Full-step
Voltage: 24VDC
Current: 1.0A

PR42H-33-1004MA/MB w/Bipolar Constant Current



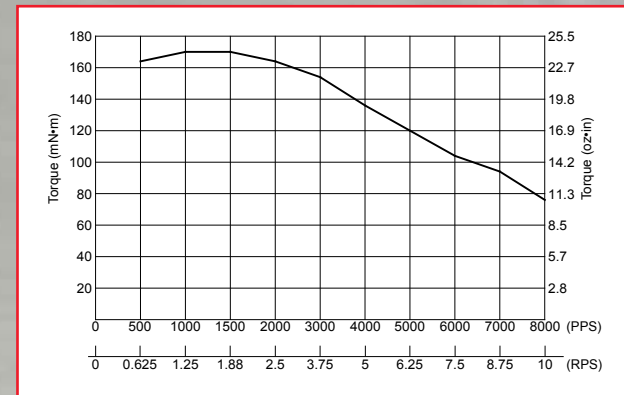
Excitation Mode: Half-step
Voltage: 24VDC
Current: 1.0A

PR42H-38-1004JA/JB w/Bipolar Constant Current



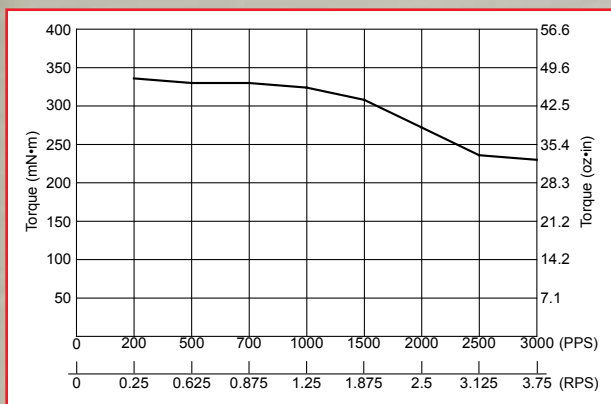
Excitation Mode: Full-step
Voltage: 24VDC
Current: 1.0A

PR42H-38-1004MA/MB w/Bipolar Constant Current



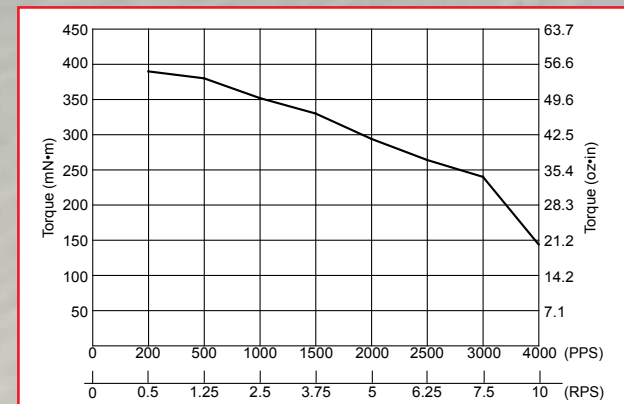
Excitation Mode: Full-step
Voltage: 24VDC
Current: 0.4A

PR42H-47-1004MA/MB w/Bipolar Constant Current



Excitation Mode: Half-step
Voltage: 24VDC
Current: 1.0A

PR42H-47-1004JA/JB w/Bipolar Constant Current

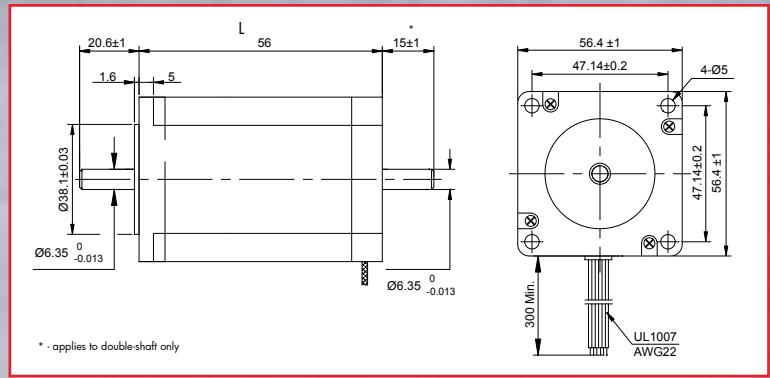


Excitation Mode: Half-step
Voltage: 24VDC
Current: 1.0A



NEMA Size 23 hybrid stepper motors produce high torque in a small, RoHS compliant package. They are ideal for motion control applications where the benefits of smaller size with high torque are essential.

The NEMA Size 23 stepper motors measure only 23mm (2.24in) square by as little as 41mm (1.6in) long.



Model No.	Max. Length	Specification	
PR57H-41	41mm	Motor Type	Hybrid
PR57H-76	76mm	Ambient Temp. Range	-20°C to +50°C
		Temperature Rise	80°C
		Insulation Class	B

Specifications

Specification	Type Of Winding	Step Angle	Rated Voltage	Rated Current	Resistance	Inductance	Holding Torque	Rotor Inertia	Motor Length	Weight
Unit		°	V	A/Ø	ohm/Ø	mH/Ø	mN·m	kg·m ²	mm	g
PR57H-41-1008Jx	Bipolar (series)	1.8	7.98	0.70	11.4	26	550	120 x 10 ⁻⁷	41	450
PR57H-41-1008Jx	Bipolar (parallel)	1.8	3.92	1.40	2.8	6.5	550	120 x 10 ⁻⁷	41	450
PR57H-41-1008Mx	Bipolar (series)	0.9	7.98	0.70	11.4	32	550	120 x 10 ⁻⁷	41	450
PR57H-41-1008Mx	Bipolar (parallel)	0.9	3.92	1.40	2.8	8	550	120 x 10 ⁻⁷	41	450
PR57H-41-2008Jx	Bipolar (series)	1.8	3.92	1.40	2.8	5.6	550	120 x 10 ⁻⁷	41	450
PR57H-41-2008Jx	Bipolar (parallel)	1.8	1.96	2.80	0.7	1.4	550	120 x 10 ⁻⁷	41	450
PR57H-41-2008Mx	Bipolar (series)	0.9	3.92	1.40	2.8	8.8	550	120 x 10 ⁻⁷	41	450
PR57H-41-2008Mx	Bipolar (parallel)	0.9	1.96	2.80	0.7	2.2	550	120 x 10 ⁻⁷	41	450
PR57H-41-2804Jx	Bipolar	1.8	2	2.80	0.7	1.4	550	120 x 10 ⁻⁷	41	450
PR57H-41-2804Mx	Bipolar	0.9	2	2.80	0.7	2.2	550	120 x 10 ⁻⁷	41	450

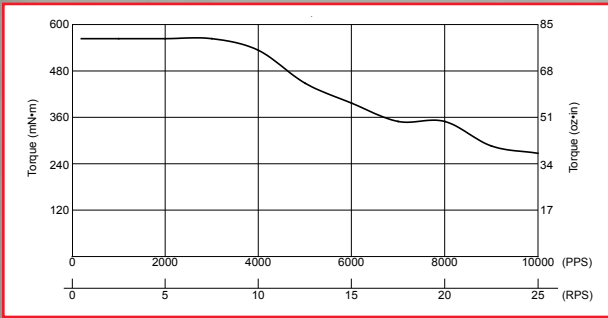
Specification	Type Of Winding	Step Angle	Rated Voltage	Rated Current	Resistance	Inductance	Holding Torque	Rotor Inertia	Motor Length	Weight
Unit		°	V	A/Ø	ohm/Ø	mH/Ø	mN·m	kg·m ²	mm	g
PR57H-51-2804Jx	Bipolar	1.8	2.3	2.80	0.83	2.2	1010	275 x 10 ⁻⁷	51	650
PR57H-56-1008Jx	Bipolar (series)	1.8	10.36	0.70	14.8	40	1260	300 x 10 ⁻⁷	56	700
PR57H-56-1008Jx	Bipolar (parallel)	1.8	5.18	1.40	3.7	10	1260	300 x 10 ⁻⁷	56	700
PR57H-56-1008Mx	Bipolar (series)	0.9	10.36	0.70	14.8	70	1260	300 x 10 ⁻⁷	56	700
PR57H-56-1008Mx	Bipolar (parallel)	0.9	5.18	1.40	3.7	17.5	1260	300 x 10 ⁻⁷	56	700
PR57H-56-2008Jx	Bipolar (series)	1.8	5.04	1.40	3.6	10	1260	300 x 10 ⁻⁷	56	700
PR57H-56-2008Jx	Bipolar (parallel)	1.8	2.52	2.80	0.9	2.5	1260	300 x 10 ⁻⁷	56	700
PR57H-56-2008Mx	Bipolar (series)	0.9	5.04	1.40	3.6	18	1260	300 x 10 ⁻⁷	56	700
PR57H-56-2008Mx	Bipolar (parallel)	0.9	2.52	2.80	0.9	4.5	1260	300 x 10 ⁻⁷	56	700
PR57H-56-2804Jx	Bipolar	1.8	2.5	2.80	0.9	2.5	1260	300 x 10 ⁻⁷	56	700
PR57H-56-2804Mx	Bipolar	0.9	2.5	2.80	0.9	4.5	1200	300 x 10 ⁻⁷	56	750

* - All hybrid motor specifications are based on full-step constant current operation
x represents shaft option, single (A) or double (B)



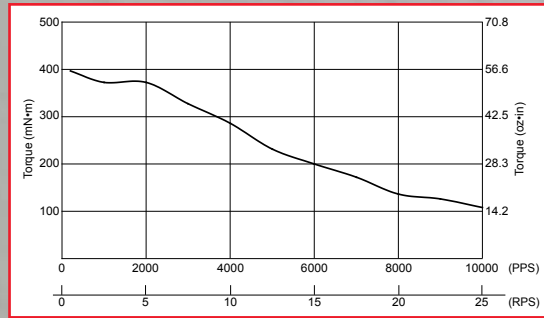
Torque Curves

PR57-41-2008JA/JB w/Bipolar Constant Current



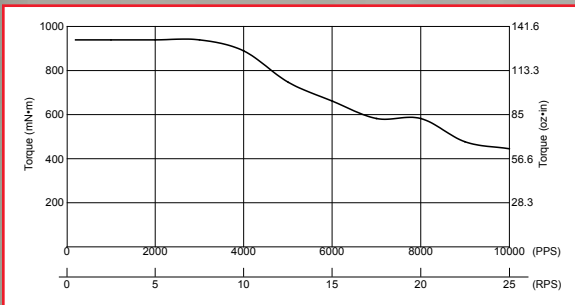
Excitation Mode: Half-step
Voltage: 30VDC
Current: 2.7A

PR57-41-2008MA/MB w/Bipolar Constant Current



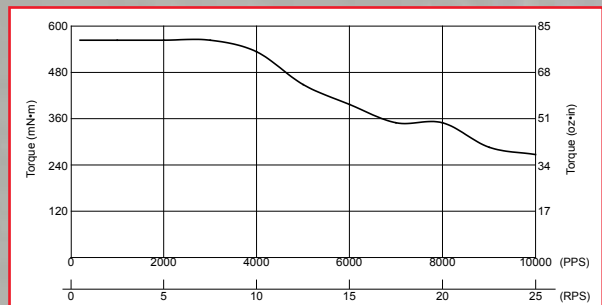
Excitation Mode: Full-step
Voltage: 30VDC
Current: 2.7A

PR57-41-2804MA/MB w/Bipolar Constant Current



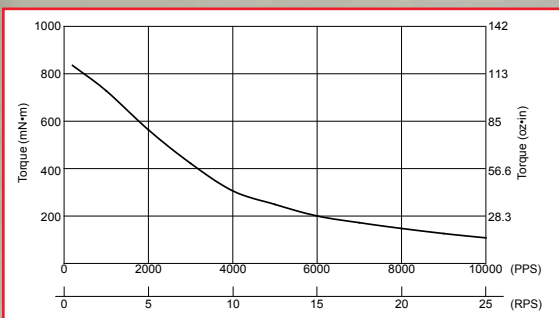
Excitation Mode: Full-step
Voltage: 30VDC
Current: 2.7A

PR57-41-2804JA/JB w/Bipolar Constant Current



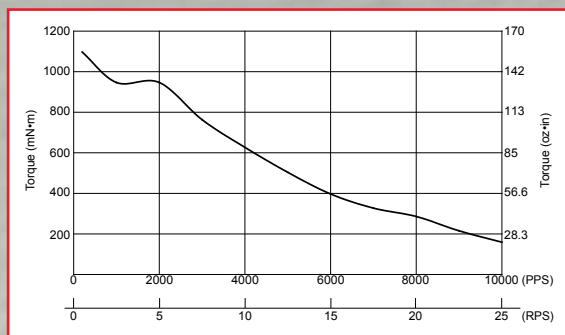
Excitation Mode: Half-step
Voltage: 30VDC
Current: 2.7A

PR57-56-2804MA/MB w/Bipolar Constant Current



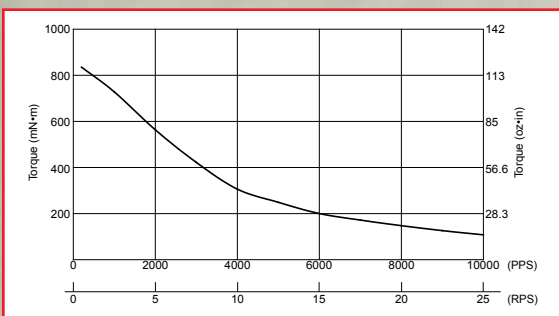
Excitation Mode: Full-step
Voltage: 30VDC
Current: 2.7A

PR57-56-2008JA/JB w/Bipolar Constant Current



Excitation Mode: Half-step
Voltage: 30VDC
Current: 2.68A

PR57-56-2008MA/MB w/Bipolar Constant Current



Excitation Mode: Half-step
Voltage: 30VDC
Current: 2.7A

About Nippon Pulse Synchronous Motors

No Power or Load Fluctuation Effect

Synchronous motors rotate in synch with supplied power frequency. If power frequency is constant, the motor will rotate at a constant speed (synchronized speed).

Impedance Protected

Unless otherwise stated, these motors provide high electrical resistance, which prevents overcurrent from flowing to the motor, which would in turn burn the coils.

No Control Circuit Required

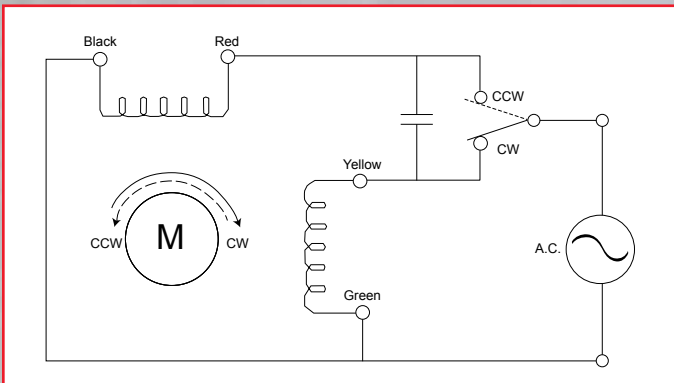
Because these motors are AC motors, they start rotating when a power connection is made.

Excellent Response

The type of magnet used in these motors ensures excellent response and also ensures the motor will start and stop immediately when power is supplied or removed.

Dual Direction Synchronous Motors

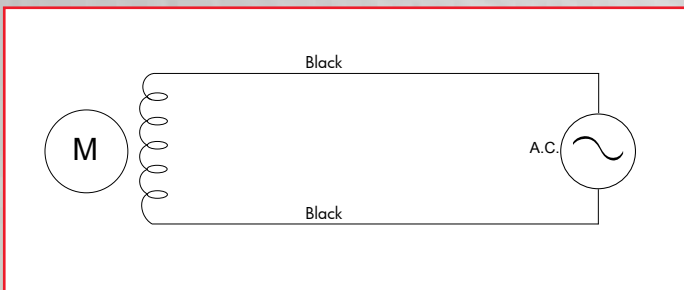
Motors that move in two directions are capacitor-based phase advancing motors. Because the rotor is moved by shifting the phase current by 90° it is essential for the circuit to have a capacitor. The proper wiring is below.



As viewed from the output shaft of the motor

Single Direction Synchronous Motor

Motors that are driven in just one direction, whether clockwise or counterclockwise, do not require any specific wiring to the AC power supply. A wiring diagram is below. The leadwires have no polarity.



Dual Direction Synchronous Motors

PTM(C) - 24 F 3 4 G 1/2
 1 2 3 4 5 6 7

1 - Series Designation

PTM: Flying lead joint type
 PTMC: Connector joint type

2 - Number of Poles

12: Speed is 500 rpm w/50Hz
 Speed is 600 rpm w/60Hz
 24: Speed is 250 rpm w/50Hz
 Speed is 300 rpm w/60Hz

3 - Outer Diameter (Type)

P: 22mm, M: 35mm, T: 35mm (thin), H: 42mm, S: 42mm (thin), F: 55mm, R: 55mm (w/ connector)

4 - Coil Specification

Blank: Standard Coil
 (continuous for 24, 100, 200 Vac)
 1-18: Coil # for specific rating

5 - Magnet Type

Blank: Anisotropic
 3: Isotropic
 4: Neodymium
 5: Plastic

6 - Gear Head

Blank: No Gear Head
 G: Gear Head Integrated

7 - Gear Ratio

see chart below

Gear Ratio	rpm w/12 poles		rpm w/24 poles	
	50Hz	60Hz	50Hz	60 Hz
Motor only	500	600	250	300
1/10	50	60	25	30
1/50	10	12	5	6
1/100	5	6	2.5	3

Single Direction Synchronous Motors

PTM - 24 B (GII)100 - 50/60- 2/2.4CW

1 2 3 4 5 6 7 8 9

1 - Series Designation

PTM: Flying lead joint

2 - Number of Poles

12: Speed is 500rpm w/50Hz
 Speed is 600rpm w/60Hz
 24: Speed is 250rpm w/50Hz
 Speed is 300rpm w/60Hz

3 - Outer Diameter

B: 35mm
 K: 42mm
 E: 42mm (high output torque)

4 - Gear Head

Blank: No gear head
 G: Gear head intergrated

5 - PTM-24BGII only

Denotes BG gear type II

6 - Supply Voltage

24, 100, 200 Vac
 voltage depends on model

7 - Power Frequency

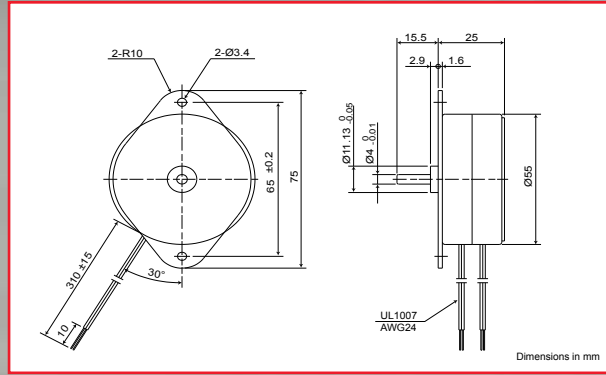
50, 60, or 50/60Hz

8 - Rotating Speed

Line frequency of 60Hz
 makes the motor speed
 1.2 times higher than
 50Hz

9 - Direction

CW - Clockwise
 CCW - Counterclockwise



Specifications



Specifications	Units	PTM-24F	PTM-24FG (gearhead)								
Rated Voltage	V	24/100/117/200/220 ±10%									
Frequency	Hz	50/60									
Rated Current	mA	35/45									
Revolutions	rpm	250/300	1	2	3	5	10	20	30	60	
Rotating Direction		Dual Direction (CC/CCW)									
Torque @ 60Hz	mN·m	35/30	1000	1000	1000	1000	650	360	240	120	
Temperature Rise	°K	50									
Operating Temp. Range	°C	-10 to +50									
Dielectric Strength	V	1500Vac for 10 seconds	1500Vac for 10 seconds								
Weight	g	300	500								
Capacitor	µF	6.8	0.47/0.11								

Magnet type: Anisotropic

Torque Characteristics

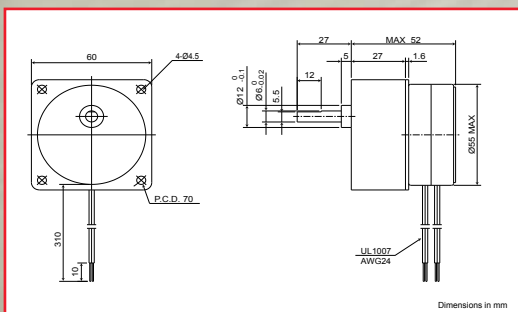
Model	PTM-24FG				
	Speed	Torque (mN·m)		Gear Ratio	
	rpm	50Hz	60Hz	50Hz	60Hz
60	93	95	6/25	1/5	
30	185	190	3/25	1/10	
20	280	285	2/25	1/15	
10	445	460	1/25	1/30	
5	700*	700*	1/50	1/60	
4	895	920	2/125	1/75	
3	1000*	1000*	3/250	1/100	
2	1000*	1000*	1/125	1/150	
1	1000*	1000*	1/250	1/300	

* - Values regulated by normal gear strength. Do not apply any load exceeding the normal gear strength.

Model	PTM-24FG(BB)				
	Speed	Torque (mN·m)		Gear Ratio	
	rpm	50Hz	60Hz	50Hz	60Hz
60	--	96	--	1/5	
30	--	190	--	1/10	
20	280	285	2/25	1/15	
10	445	460	1/25	1/30	
5	895	920	1/50	1/60	
4	--	970	--	1/75	
3	1150	1200	3/250	1/100	
2	1750	1800	1/125	1/150	
1	--	--	--	--	

Geared Models

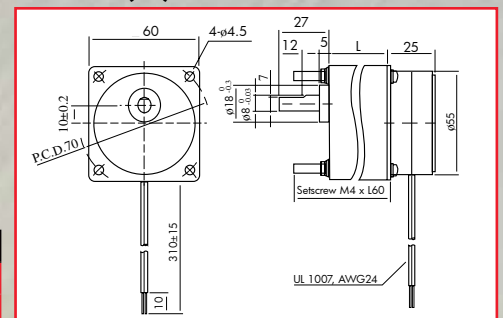
PTM-24FG

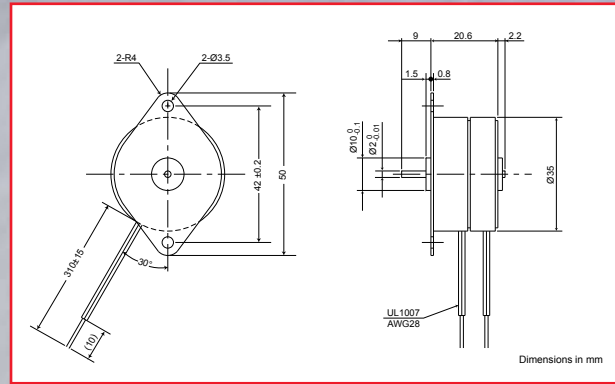


Gear Ratio	L
1/3 ~ 1/8	32
1/20 ~ 1/180	42

Reduction Ratio	L
1/3 - 1/8	32
1/20 to 1/180	42

PTM-24FG(BB)





Specifications

Specifications	Units	PTM-24M		PTM-24MG (gearhead)						
Rated Voltage	V	24/100 ±10%								
Frequency	Hz	50/60								
Rated Current	mA	16/17								
Revolutions	rpm	250/300	1/3	1/2	1	2	5	10	30	60
Rotating Direction		Dual Direction (CC/CCW)								
Torque @ 60Hz	mN·m	12/12.5	600	600	600	500	380	220	90	45
Temperature Rise	°K	55								
Operating Temp. Range	°C	-10 to +50								
Dielectric Strength	V	1500Vac for 10 seconds			1500Vac for 10 seconds					
Weight	g	80			112					
Capacitor	µF	3.9			0.23					

Magnet type: Anisotropic

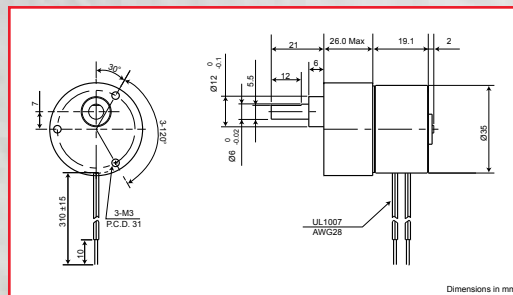
Torque Characteristics

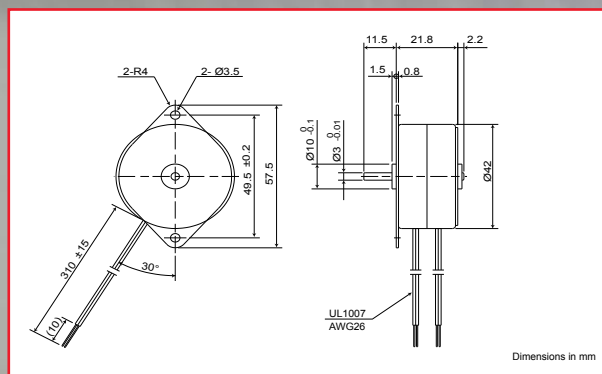
Model	PTM-24M			
Speed	Torque (mN·m)		Gear Ratio	
rpm	50Hz	60Hz	50Hz	60Hz
60	--	40	--	1/5
30	--	80	--	1/10
20	--	96	--	1/15
10	150	190	1/25	1/30
5	245	300*	1/50	1/60
4	--	300*	--	1/75
3	--	300*	--	1/100
2	400	600*	1/125	1/150
1	--	600*	--	1/300

*-Values regulated by normal gear strength. Do not apply any load exceeding the normal gear strength.

Geared Models

PTM-24MG





Specifications

Specifications	Units	PTM-24H	PTM-24HG (gearhead)							
Rated Voltage	V	24/100/117/200 ±10%								
Frequency	Hz	50/60								
Rated Current	mA	18/21								
Revolutions	rpm	250/300	1	2	3	5	10	20	30	60
Rotating Direction		Dual Direction (CC/CCW)								
Torque @ 60Hz	mN·m	22/21.5	400	400	400	400	250	130	100	50
Temperature Rise	°K	55								
Operating Temp. Range	°C	-10 to +50								
Dielectric Strength	V	1500Vac for 10 seconds	1500Vac for 10 seconds							
Weight	g	160	200							
Capacitor	µF	5.6	0.27							

Magnet type: Anisotropic

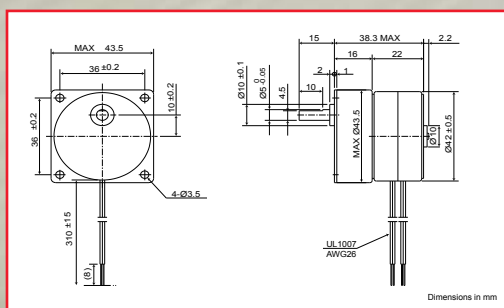
Torque Characteristics

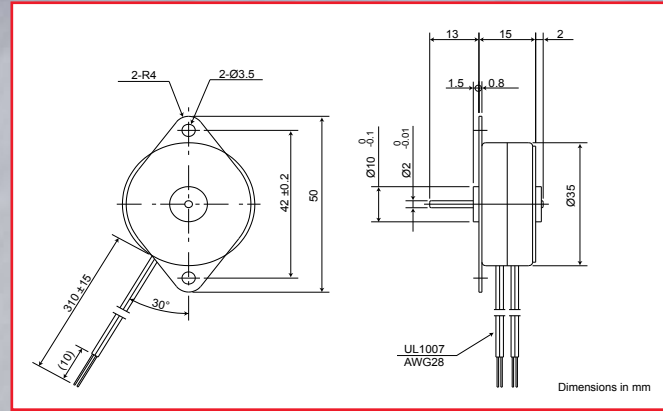
Model	PTMC-24HG			
Speed	Torque (mN·m)		Gear Ratio	
rpm	50Hz	60Hz	50Hz	60Hz
60	58	68	6/25	1/5
30	115	135	3/25	1/10
20	140	165	2/25	1/15
10	250*	260	1/25	1/30
5	300*	300*	1/50	1/60
4	300*	300*	2/125	1/75
3	--	400*	--	1/100
2	400*	400*	1/125	1/150
1	400*	400*	1/250	1/300

*-Values regulated by normal gear strength. Do not apply any load exceeding the normal gear strength.

Geared Models

PTMC-24HG





Specifications

Specifications	Units	PTM-24T	PTM-24TG (gearhead)								
Rated Voltage	V	24/100 ±10%									
Frequency	Hz	50/60									
Rated Current	mA	41/43									
Revolutions	rpm	250/300	1/3	1/2	1	2	5	10	30	60	
Rotating Direction		Dual Direction (CC/CCW)									
Torque @ 60Hz	mN·m	12/13.5	600	600	600	600	400	220	95	48	
Temperature Rise	°K	70									
Operating Temp. Range	°C	-10 to +50									
Dielectric Strength	V	1500Vac for 10 seconds					1500Vac for 10 seconds				
Weight	g	77	120								
Capacitor	µF	3.3									

Magnet type: Anisotropic

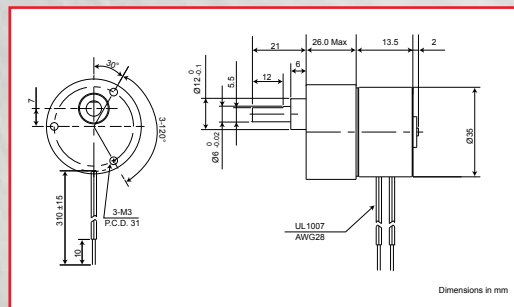
Torque Characteristics

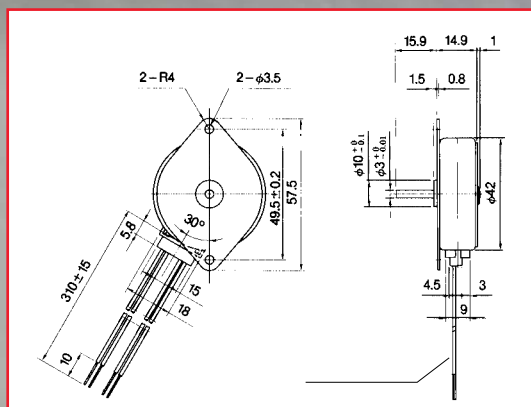
Model	PTM-24TG			
Speed	Torque (mN·m)		Gear Ratio	
rpm	50Hz	60Hz	50Hz	60Hz
60	--	30	--	1/5
30	--	60	--	1/10
20	--	72	--	1/15
10	115	145	1/25	1/30
5	180	230	1/50	1/60
4	--	290	--	1/75
3	--	300*	--	1/100
2	365	465	1/125	1/150
1	--	600*	--	1/300

*-Values regulated by normal gear strength. Do not apply any load exceeding the normal gear strength.

Geared Models

PTM-24TG





Specifications

Specification	Unit	PTMC-24S2
Rated Voltage (AC)	V	24 ±10%
Frequency	Hz	50/60
Rated Current	mA	110/115
Revolutions	rpm	250/300
Rotating Direction		Dual Direction (CC/CCW)
Torque	mN·m	20.5/19.5
Temperature Rise	°C	70
Operating Temp. Range	°C	-10 to +50
Dielectric Strength	V	500Vac for one minute
Weight	g	105
Capacitor	μF	5.6

Magnet type: Anisotropic

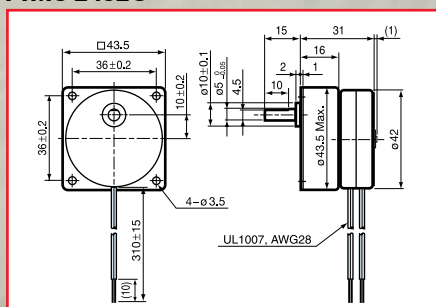
Torque Characteristics

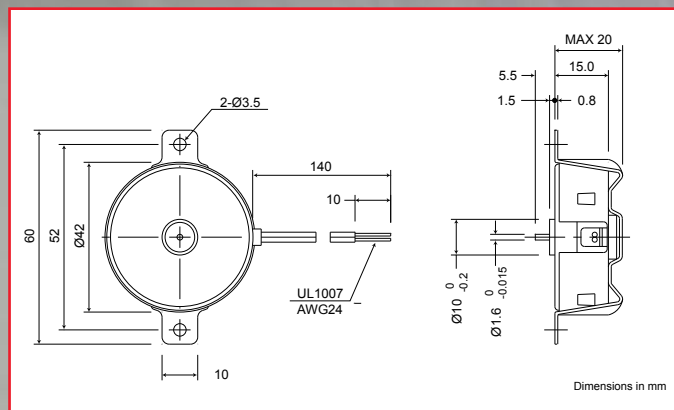
Model	PTMC-24S2			
Speed	Torque (mN·m)		Gear Ratio	
rpm	50Hz	60Hz	50Hz	60Hz
60	49	55	6/25	1/5
30	98	110	3/25	1/10
20	115	135	2/25	1/15
10	235	220	1/25	1/30
5	300*	300*	1/50	1/60
4	300*	300*	2/125	1/75
3	--	400*	--	1/100
2	400*	400*	1/125	1/150
1	400*	400*	1/250	1/300

*-Values regulated by normal gear strength. Do not apply any load exceeding the normal gear strength.

Geared Models

PTMC-24S2G





Specifications

Specifications	Units	PTM-12E	PTM-12EG (gearhead)								
Rated Voltage	V	12/24/100/117/220/240 ±10%									
Frequency	Hz	50/60									
Rated Current	mA	20/19									
Revolutions	rpm	500/600	1	2	4	5	6	10	15	20	
Rotating Direction		Single Direction (CC/CCW)									
Torque @ 60Hz	mN·m	1.7	200	200	160	120	100	60	40	30	
Temperature Rise	°K	45									
Operating Temp. Range	°C	-10 to +50									
Dielectric Strength	V	1500Vac for 10 seconds	1500Vac for 10 seconds								
Weight	g	90	130								
Capacitor	µF	--									

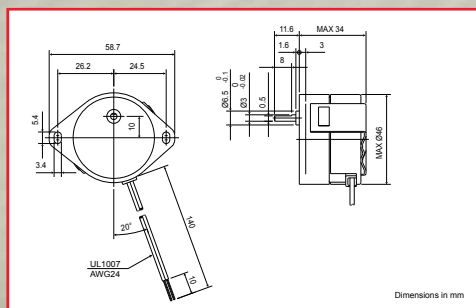
Magnet type: Anisotropic

Torque Characteristics

Model	PTM-12EG		
Speed	Torque	Gear Ratio	
rpm	mN·m	50Hz	60Hz
20	30	1/25	1/30
10	60	1/50	1/60
6	100	3/250	1/100
5	120	1/100	1/120
4	160	1/125	1/150
2	200	1/250	1/300
1	200	1/500	1/600

Geared Models

PTM-12EG



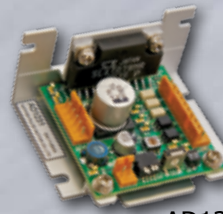
AD Series Driver Boards



AD1111



AD1131



AD1231



AD1431

AD Series	AD1111	AD1131	AD1231	AD1431
Electrical Specifications				
Core Chip	NP2671E2	NP2671E2		
Input Power Supply	5 to 30 ±5% Vdc	5 to 30 ±5% Vdc	12 to 24 ±10% Vdc	12 to 24 ±10% Vdc
Drive Method	Unipolar Constant Voltage	Unipolar Constant Voltage	Unipolar Constant Current	Bipolar Constant Current
Excitation Mode	Full, Half	Full, Half	Full, Half, 1/4, 1/8, 1/16	Full, Half, 1/4, 1/16
Output Current	350mA	1.1A	2.0A	1.2A
Control Signals				
Input Interface	Photocoupler	Photocoupler	Photocoupler	Photocoupler
Input Signal	CW/CCW, PULSE/DIR	CW/CCW, PULSE/DIR	CW/CCW, PULSE/DIR	CW/CCW, PULSE/DIR
Output Signal				
Environmental Conditions				
Operating Temperature	0 to +55°C	0 to +50°C	0 to +50°C	0 to +50°C
Storage Temperature		-10 to +60°C	-10 to +60°C	-10 to +60°C
Other				
Dimensions	70mm x 67mm	70mm x 49mm x 17mm	60mm x 50mm x 30mm	60mm x 50mm x 30mm
Weight		20g	43g	35g
RoHS Compliant		Yes		

PPCI Series



PPCI series (PPCI7443) is an advanced PCI-bus format 4-axis motion control board that controls stepper motors or/and servomotors. The PPCI7443 incorporates a PCL6045 series motion control chip as part of its compact design, and it comes with user-friendly software that incorporates MS-DOS, C/C++ programming library; Windows® 95/98/ME/NT/2000 DLL; and a test monitor. The software allows for easy set-up and supports up to a maximum of 12 PPCI7443 cards, allowing for operation of up to 48 axes.

NPMC Series



NPMC series is an advanced PC/104-bus format multi-axes motion control board that controls stepper motors or/and servomotors. The PCL5023 motion control chip is used as key component for 2-axes (NPMC5023-2104) controller boards, while the PCL6045 motion control chip is used as key component for 4-axes (NPMC6045A-4104) controller boards.

Motion Checker 5



Nippon Pulse Motion Checkers are palm-sized controllers with a built-in integrated driver circuit for 2-phase stepper motors. Both Motion Checker-3 and Motion Checker-5 series run unipolar and bipolar-winding stepper motors. MCH-5 series has a pulse/direction output signal enabling its use as a standalone controller to connect to any driver board.

The Motion Checker series can be used for quick stepper motor evaluation, stepper motor life testing, and educational training.



Custom Specification Form

Below is a worksheet for use when determining which Nippon Pulse stepper motor will best fit an application. Complete as much information as possible and forward the form to one of our Sales Engineers (f: 1-540-633-1674; e: info@nipponpulse.com). An editable PDF file of this form is also available at www.nipponpulse.com. One of our sales technicians will be in contact with you to further discuss your needs.

Customer Name _____

Company _____ Title _____

Telephone _____ Fax _____

Address _____

City _____ State _____ Zip _____

Email _____

Products Interested in:

PF Series (Tin-Can Stepper) Linear Stepper Hybrid Stepper

Specific Product (Model Number) _____

Application _____

Quantity _____ Target Price _____

Driving Method Bipolar Unipolar

Constant Current at _____ mA/phase Constant _____ V

Excitation Mode

2 Phase 1-2 Phase 1-4 Phase 1-8 Phase

1 Phase Other

Winding Resistance _____ W Stepping Angle _____ at 2 Phase

Max Speed _____ pps Scope of Operation _____ pps - _____ pps

Pull-in Torque _____ g-cm at _____ pps 2-2 Phase or 1-2 Phase

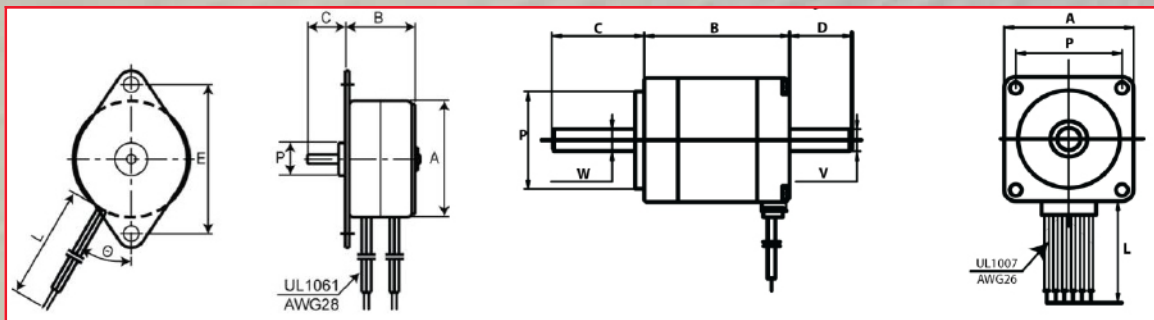
Pull-out Torque _____ g-cm at _____ pps 2-2 Phase or 1-2 Phase

Outline Dimensions

A _____ B _____ C _____ D _____

P _____ L _____ Ø _____ V _____

W _____ E _____



Module		# of teeth	
Pressure Angle		Outer Diameter	
Length		Shift	
Quality class		Material	
Other:			

Nos.	1	2	3	4	5	6	7	8
Lead Color								
Phase								

About Nippon Pulse

Nippon Pulse provides a wide array of motion control solutions to meet the needs of its current and future customers. This includes industry-leading stepper motors, the innovative Linear Shaft Motor, controllers, drivers and networks. With several customization options, we can provide products that can be utilized in an extensive number of applications.

Your Partner in Motion Control

At Nippon Pulse, we approach customer applications from an overall project standpoint. This enables us to provide the best electro-mechatronic solutions that help you design and build your motion control systems. Our system engineering services include complete design, engineering and manufacturing. Applications we have worked on range from various pick-and-place machines to large scale sorting and distributing systems, biomedical handling equipment, healthcare products, and more. Our sales engineers have extensive product knowledge and can help you determine the best solution for your particular motion control application.

From standard industrial sectors to the high-level electronics, Nippon Pulse optimizes development and manufacturing and provides many high-performance product groups. In order to provide the most efficient products and facilities, we are always conscious of a smooth flow from planning to design and manufacturing. This efficient flow makes it possible to create a wide variety of products which meet customers' needs.



It is essential that we provide products exceeding customer expectations, so they are able to use them with complete confidence. Maintaining excellent quality while ensuring a stable supply chain for each of our products is achieved by thorough quality control methods. These methods guarantee reliability above industry standards, even on mass-produced items, such as motors and controllers.

Whether we provide entire systems or just one motor, ensuring those products have exceeded expectations is part of our methodology. In-depth communications with the customer from the design phase through delivery and beyond installation guarantees this.

We strive to ensure all aspects of our process allow us to meet and exceed customer expectations through communication, support and by providing reliable products.

In-House Model Shop

The Nippon Pulse model shop provides quick turnaround on prototype requests for our tin-can stepper motors. Most requests can be shipped within 24 hours, allowing you to test the product in your application before committing to a purchase order. Nippon Pulse sales engineers work closely with you to understand your project so we are able to suggest the best solution possible and get a high-quality prototype to you as quickly as possible.

Nippon Pulse offers the flexibility to ship just one piece, if that is all you need, to make sure our product is the correct fit for your project. In addition to the tin-can type stepper motors, we have various linear step motors, hybrid motors, controllers, and drivers in stock for quick prototyping.



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Instrumentation
Machine Tooling
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Pharmaceutical
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Siemens
Smiths Medical
Trimble Navigation Limited
Yokogawa



The Nippon Pulse Advantage



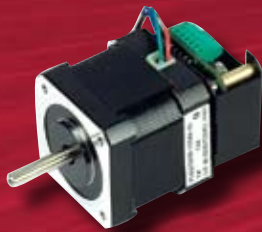
For sixty years, Nippon Pulse has built state-of-of-the-art products based on a solid foundation of advancing technology and thorough product research.

Nippon Pulse America, Inc. (NPA) faithfully provides these high-quality products to a wide range of industries in North and South America, as well as Europe. Nippon Pulse has established itself as a leader in stepper motor, driver, and controller technology while introducing innovative products such as the Linear Shaft Motor and Motionnet. At Nippon Pulse, we believe by bringing products to market which meet customers' requirements, and also impresses them, we contribute to the progression of technology and its positive impact on our society. We pride ourselves on the reputation of our high-quality products that provide that impact. Nippon Pulse's mission is to faithfully create new products sought by its customers and to contribute to the development of society from a global viewpoint.

Nippon Pulse has representatives throughout North and South America and Europe to directly assist customers. Limited quantities of stock on standard motors and electronics are available to allow faster response to customer needs. In addition, Nippon Pulse America has a model shop in its headquarters for quick turnaround on custom prototypes and special orders. A wholly owned subsidiary of Nippon Pulse Motor Co., Ltd., Nippon Pulse America is headquartered in Radford, Va.

When you choose a Nippon Pulse motor, driver, controller, network or stage, you're doing more than just buying a quality product. You're benefitting from what we call the Nippon Pulse Advantage. This includes superior prototyping, complete system engineering, proper compliance and certification according to international guidelines, and exceptional tailoring to your needs. It also includes unmatched support.

Our biggest asset at Nippon Pulse is our people, both our employees and our customers. We ensure that we have the best people working for us so that we build loyalty among those buying from us. It's an advantage you won't find at any of our competitors and why we pride ourselves on our products and our company.



NPM

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