

Permanent Magnet Motor Features and Customization Options

Coil

An encapsulated and welded stator design gives stronger design, greater dimensional control and improved thermal characteristics.

Mounting Plate

Custom and standard shaped mounting plates are available. Mounting holes can be threaded, tapped, slotted or customized to your application requirements.

Permanent Magnet Rotor

Three types of permanent magnets are available: ferrite anisotropic, ferrite isotropic, and neodymium.

Bushings and Bearings

Long life oil-impregnated bushings are standard in our PF, PFC, NFC, PTM and PTMC motors. Ball bearings can be requested, and are standard in the PFL series Linearstep motors.

Shaft

A variety of shaft options are available.

- Custom lengths
- Single and double shafts
- D-cut(s)
- Turn downs
- Threaded
- Knurled
- Grooved

Gears & Pulleys

A variety of gear and pulley options are available.

- Machined
- Plastic molded
- Powdered metal (sintered)

Connector

Motor side connection method. Lead wire options available.

Lead Wire

Options to change the lead wire exit direction and exit angle.

Wire Leads

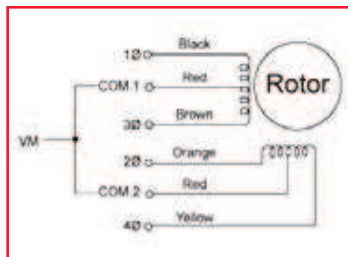
Driver side connector options.

- Standard flying leads
- Customer-selected connectors

See page 41 for additional motor customization options and for information about creating a fully custom step motor.

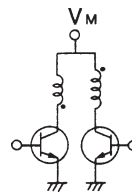
Unipolar Drive

Six lead wires are connected



Current: Single direction
Coil: Bifilar winding
Leadwires: 6

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



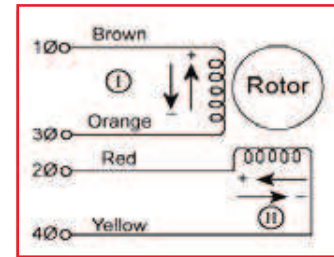
2-2 phase excitation sequence

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

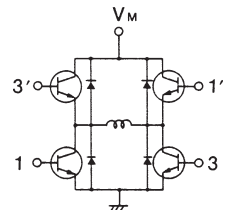
Bipolar Drive

Four lead wires are connected



Current: Dual direction
Coil: Monofilar winding
Leadwires: 4

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



2-2 phase excitation sequence

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

CW ↓ ↑ CCW

		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

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

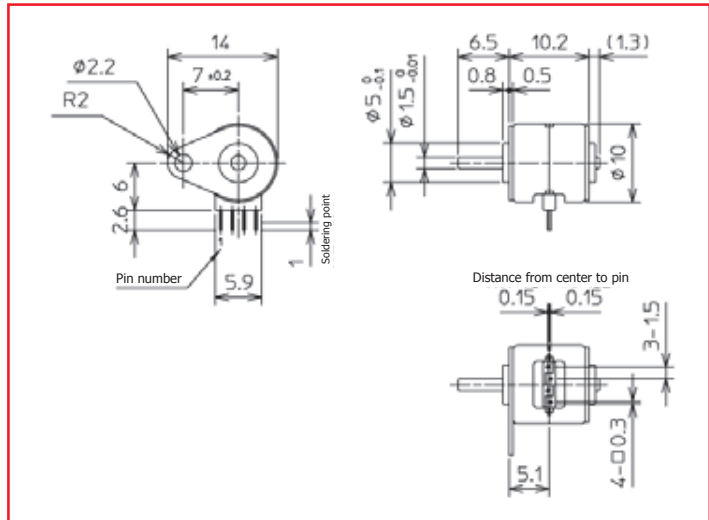
Model Number Explanation (for PF and PFC series)

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

- Series Designation
PF: Flying lead joint type
PFC: Connector joint type
- Outer Diameter in mm
- Type
Blank: Standard
T: Thin stack
H: High torque
- Steps per Revolution
24: 15°/step
48: 7.5°/step
96: 3.75°/step
- Winding
C: 12V unipolar
D: 5V unipolar
P: 12V bipolar
Q: 5V bipolar

- Magnet Material
1: Ferrite Anisotropic
3: Ferrite Isotropic
4: Neodymium
6: Molded Neodymium*
- Gear Head
Blank: No Gear Head
G: Gear Head Integrated
- Gear Ratio
With geared models only

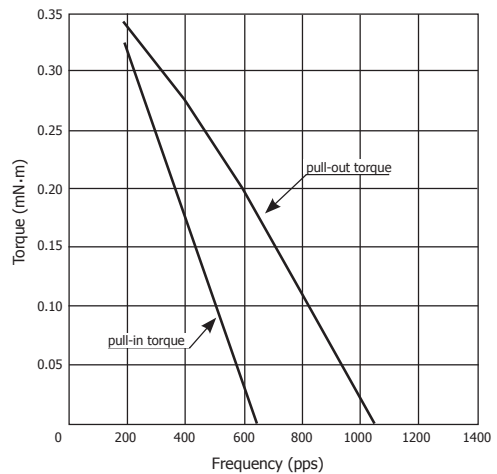
*Only applicable for PFC10 and PFC20T.



Specifications

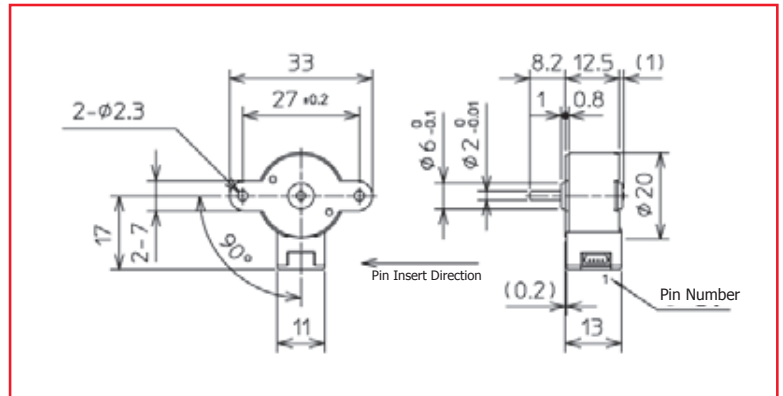
Specification	Unit	PFC10-20R6
Type of Winding		Bipolar
Excitation Mode*		Full step (2-2)
Steps/Revolution		20
Step Angle	°	18
Holding Torque	mN·m	1.0
Rated Voltage	V	2.7
Rated Current	mA/phase	135
Resistance	Ω	20
Inductance	mH / ϕ	3.2
Winding		R
Starting Pulse Rate	pps	960
Slewing Pulse Rate	pps	1600
Rotor Inertia	kg·m ²	0.03 x 10 ⁻⁷
Operating Temp. Range	°C	-10 to +50
Storage Temp. Range	°C	-30 to +80
Insulation Class		E
Temperature Rise	K	70
RoHS Compliant		Yes
Weight	g	5

Torque Curve Characteristics



Pin	Coil Phase
1	4 ϕ \bar{B}
2	1 ϕ A
3	2 ϕ B
4	3 ϕ \bar{A}

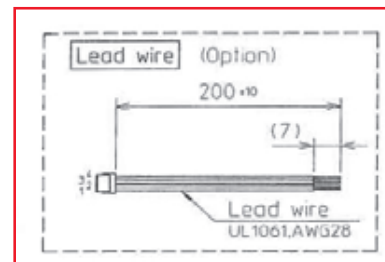
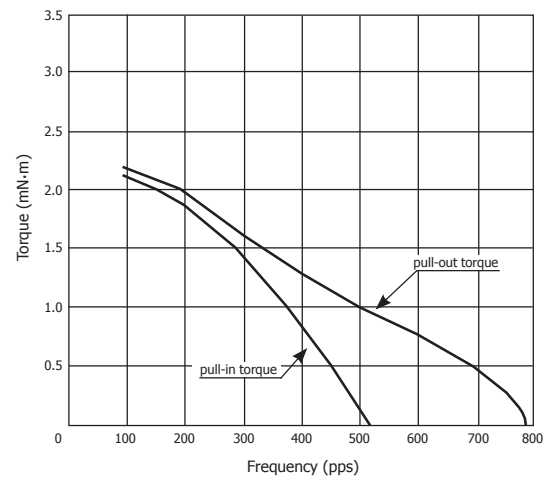
All tin-can motor specifications are based on full-step constant voltage operation. When the rated voltage is 5V, the terminal voltage is 4V. Do not use this product over maximum operating temperature (100°C).



Specifications

Specification	Unit	PFC20T-20V6
Type of Winding		Bipolar
Excitation Mode*		Full step (2-2)
Steps/Revolution		20
Step Angle	°	18
Holding Torque	mN·m	4.4
Rated Voltage	V	8.7
Rated Current	mA/phase	87
Resistance	Ω	100
Inductance	mH	35
Winding		V
Starting Pulse Rate	pps	620
Slewing Pulse Rate	pps	1080
Rotor Inertia	kg·m ²	0.2 x 10 ⁻⁷
Operating Temp. Range	°C	-10 to +50
Storage Temp. Range	°C	-30 to +80
Insulation Class		E
Temperature Rise	K	70
RoHS Compliant		Yes
Weight	g	24

Torque Curve Characteristics

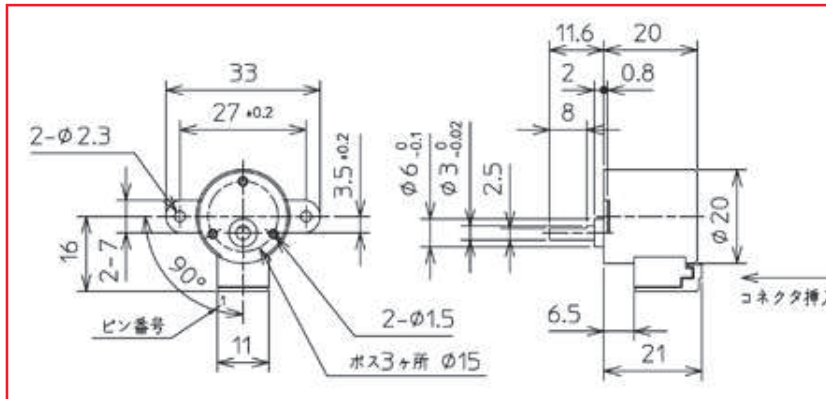


All tin-can motor specifications are based on full-step constant voltage operation. When the rated voltage is 15V, the terminal voltage is 12V-11V. Do not use this product over maximum operating temperature (100°C).

Connector (JST)

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

Pin	Coil Phase
1	4 ϕ \bar{B}
2	2 ϕ B
3	3 ϕ \bar{A}
4	1 ϕ A



Specifications

Specification	Unit	PFCU20-40_-4GM2 (1/10)		PFCU20-40_-4GM2 (1/18)	
Excitation Mode		Full-step (2-2)			
Step Angle	°	0.9		0.5	
Steps Per Revolution*		400		720	
Winding		S	V	S	V
Rated Voltage	V	11	8.7	11	8.7
Resistance ¹	Ω	160	100	160	100
Inductance ¹	mH/φ	59	39	59	39
Maximum Torque	mN·m	20			
Destruction Torque	mN·m	60			
Gear Ratio/Backlash	pps	1/10		1/18	
Operating Temp. Range	°C	-10 ~ +50			
Temperature Rise*	K	70			
Weight	g	25			

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

Magnet type: Neodymium

¹ Supply voltage 12V ±2% and at a temperature of 20°C ±5% and relative humidity 65% ±20%.

² Stated terminal voltage is with supply voltage 12V.

³ Stated temperature rise is at the time of saturation.

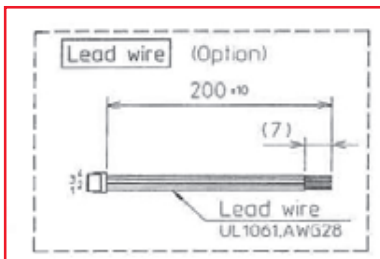
*Under test conditions

Connector (JST)

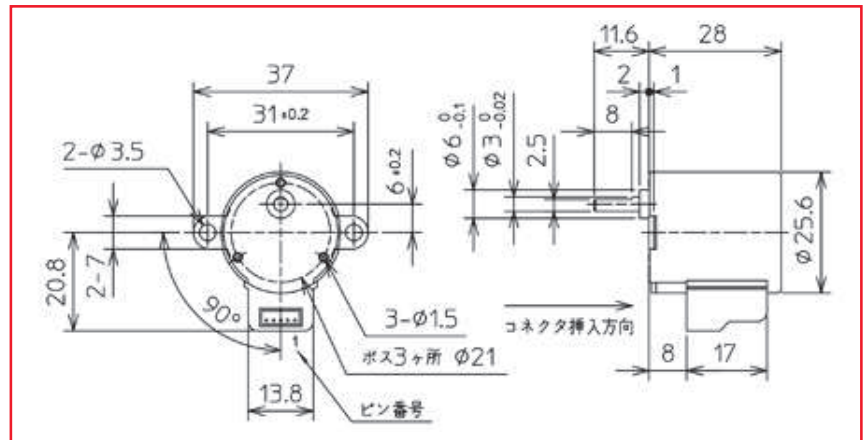
Applicable Housing: SHR-04V-S

Applicable Contact: SSH-003T-P0.2-H

Applicable Wire: AWG 32 to 28 (outer diameter of wire insulation: 0.4 to 0.8 mm)



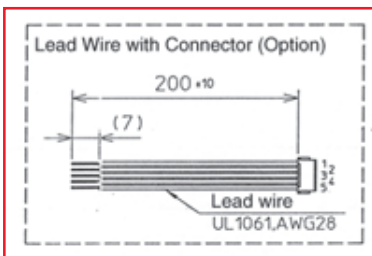
Pin	Coil Phase
1	4φ B-
2	3φ A-
3	1φ A
4	2φ B



Specifications

Specification	Unit	PFCU25-24_-1GM (1/18)		PFCU25-24_-1GM (1/20)		PFCU25-24_-1GM (1/30)	
Excitation Mode		Full Step (2-2)					
Step Angle	°	1		0.75		0.5	
Steps Per Revolution*		360		480		720	
Winding		P	T	P	T	P	T
Rated Voltage	V	12.6	6.5	12.6	6.5	12.6	6.5
Resistance ¹	Ω	122	32	122	32	122	32
Inductance ¹	mH/φ	66	16	66	16	66	16
Maximum Torque	mN·m	50					
Destruction Torque	mN·m	150					
Operating Temp. Range	°C	-10 ~ +50					
Temperature Rise*	K	70					
Weight	g	55					
Gear Ratio, Backlash		1/15		1/20		1/30	

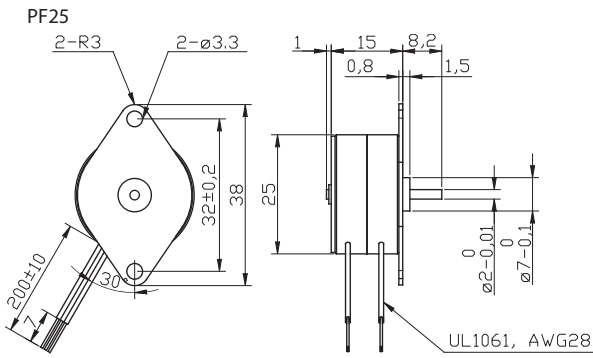
All tin-can motor specifications are based on full-step constant voltage operation,
 Magnet type: Anisotropic
¹ Supply voltage 12V ±2% and at a temperature of 20°C ±5% and relative humidity 65% ±20%.
² Stated terminal voltage is with supply voltage 12V.
³ Stated temperature rise is at the time of saturation.
 *Under test conditions



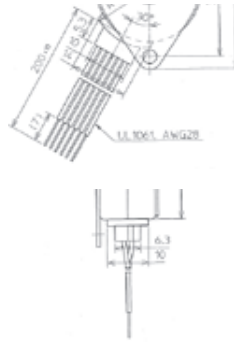
Pin	Coil Phase
1	3φ A-
2	2φ B
3	1φ A
4	4φ B-

Connector (JST)

Applicable Housing: ZHR-4
 Applicable Contact: SZH-002T-P0.5
 Applicable Wire: AWG 28 to 26 (outer diameter of wire insulation: 0.8 to 1.1 mm)



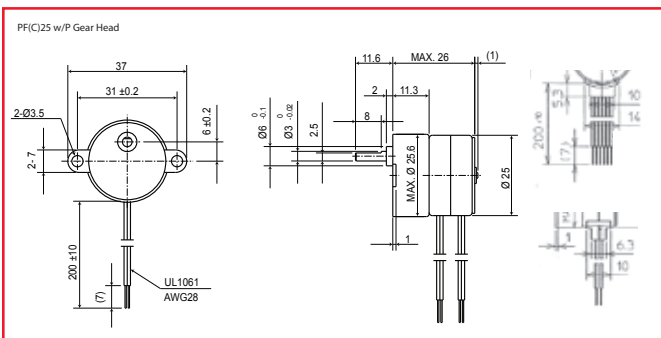
PFC25



Specifications

Specification	Unit	PF(C)25-24				PF(C)25-48			
		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			
Winding		C	D	P	Q	C	D	P	Q
Rated Voltage	V	12	5	12	5	12	5	12	5
Resistance	Ω	120	16	122	15	120	16	122	15
Inductance	mH	34	4.5	66	8	37	5	81	10
Holding Torque*	mN-m	8	8	10	10	10	10	12	12
Rotor Inertia	kg-m ²	1.0 x 10 ⁻⁷				1.0 x 10 ⁻⁷			
Starting Pulse Rate*	pps	490				790			
Slewing Pulse Rate*	pps	900							
Operating Temp. Range	°C	-10 to +50							
Temperature Rise*	K	70							
Weight	g	35							

Dimensions of Geared Model



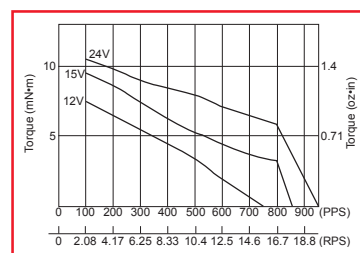
Gear Ratio	6/25	1/5	3/25	1/10	2/25	1/15	3/50	1/20
Ordinary Torque	20mN-m				50mN-m			
Destruction Torque	60mN-m				150mN-m			

Gear Ratio	1/25	1/30	1/50	1/60	1/75	2/125
Ordinary Torque	70mN-m					
Destruction Torque	210mN-m					

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

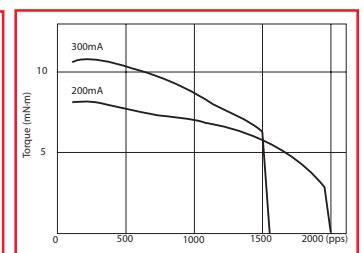
Torque Curve (pull-out torque)*

Bipolar Constant Voltage (48P1)



Coil Resistance: 122Ω

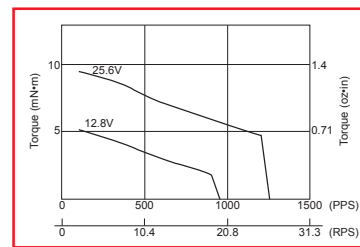
Bipolar Constant Current (48R1)



Coil Resistance: 35Ω

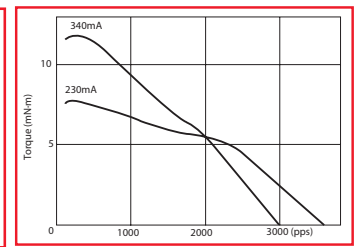
Supply Voltage: 24V

Unipolar Constant Voltage (48C1)



Coil Resistance: 120Ω

Unipolar Constant Current (48H1)



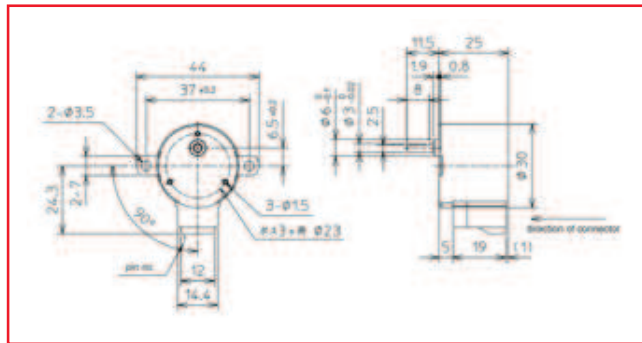
Coil Resistance: 34Ω

Supply Voltage: 24V

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

Magnet type: Anisotropic

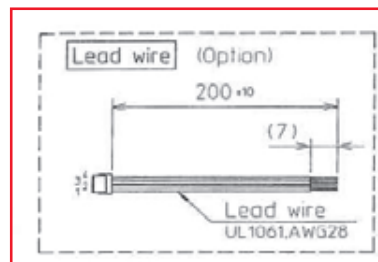
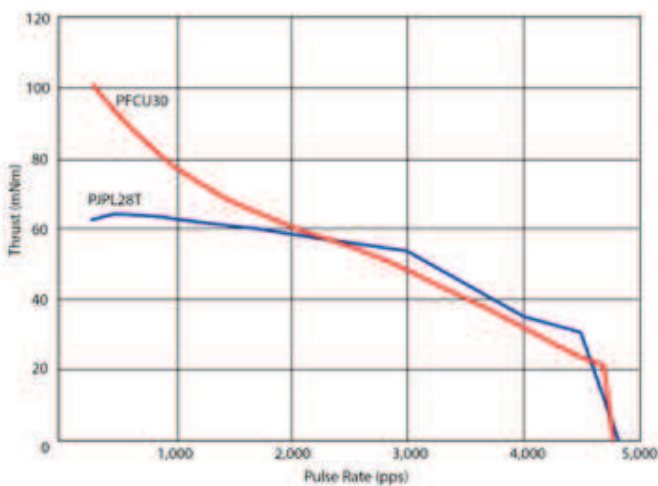
*Torque curves are for reference only and are not guaranteed



Specifications

Specifications	Unit	PFCU30-24_-4GM (1/5)		PFCU30-24_-4GM (3/25)		PFCU30-24_-4GM (1/12)	
Type of Winding		Bipolar					
Excitation Mode*		Full step (2-2)					
Step Angle	°	3		1.8		1.25	
Steps Per Revolution*		120		200		288	
Gear Ratio		1/5		3/25		1/12	
Winding		T	V	T	V	T	V
Rated Voltage	V	9.8	6.9	9.8	6.9	9.8	6.9
Resistance	Ω	60	30	60	30	60	30
Inductance	mH / φ	49	26	49	26	49	26
Ordinary Torque	mN·m	100					
Destruction Torque	mN·m	300					
Operating Temp. Range	°C	-10 ~ +50					
Storage Temp. Range	°C	-30 ~ +80					
Temperature Rise*	K	70 (at 700pps)					
Weight	g	75					

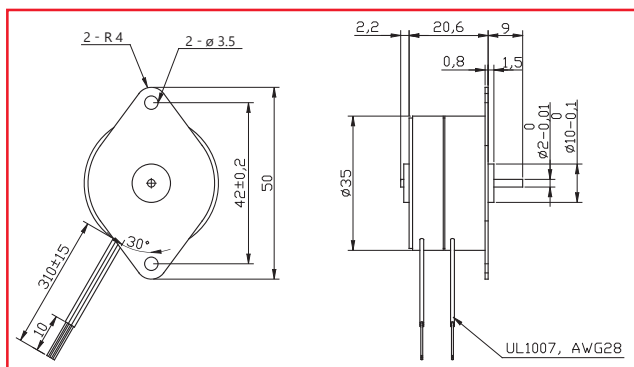
PFCU30-24_-4GM(3/25) vs. PJP28T32E16 (Hybrid)



Connector

Applicable Housing: ZHR-4
 Applicable Contact: SZH-002T-P0.5
 Applicable Wire: AWG 28 to 26 (outer diameter of wire insulation: 0.4 to 0.8 mm)

Pin	Coil Phase
1	4φ B-
2	3φ A-
3	1φ A
4	2φ B

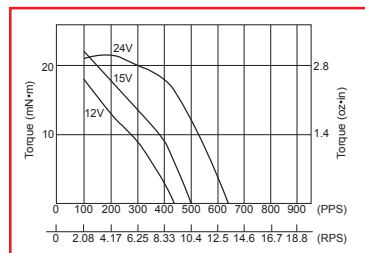


Specifications

Specification	Unit	PF35-24				PF35-48			
		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			
Winding		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	37	8.7	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 × 10 ⁻⁷				4.5 × 10 ⁻⁷			
Starting Pulse Rate*	pps	310				500			
Slewing Pulse Rate*	pps	410				530			
Operating Temp. Range	°C	-10 to +50							
Temperature Rise*	K	55							
Weight	g	80							

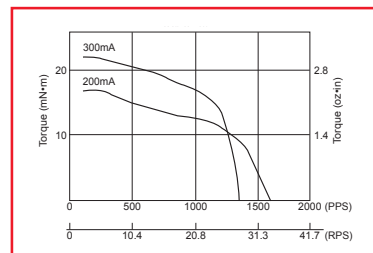
Torque Curve (pull-out torque)*

Bipolar Constant Voltage (48P1)



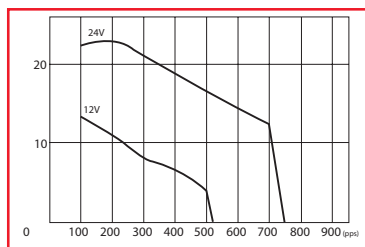
Coil Resistance: 100Ω

Bipolar Constant Current (48181)



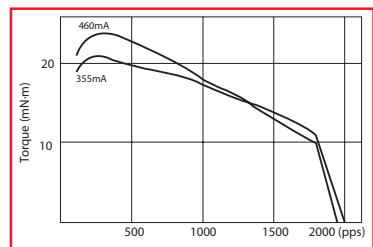
Coil Resistance: 18Ω Supply Voltage: 24V

Unipolar Constant Voltage (48C1)



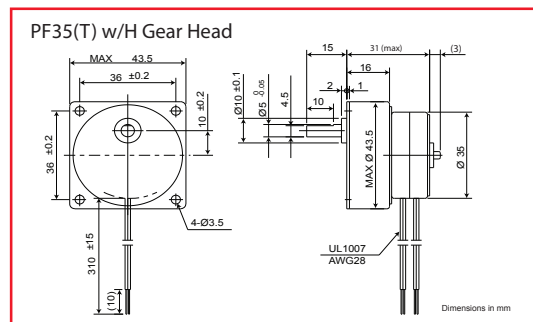
Coil Resistance: 90Ω

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				

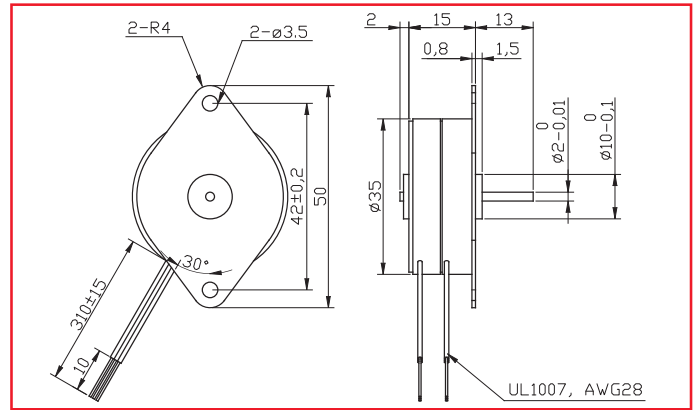
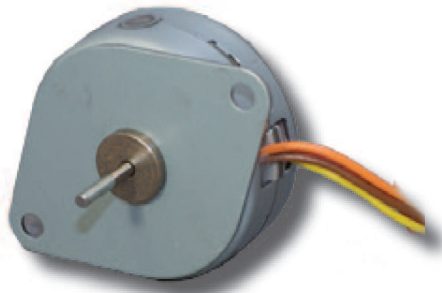
Gear Ratio	1/30	1/50	1/60	2/125	1/75
Ordinary Torque	300mN·m				
Destruction Torque	900mN·m				

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

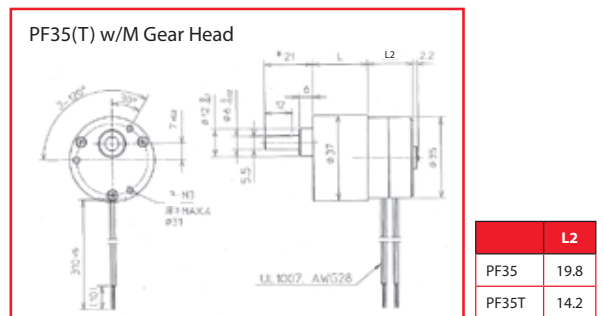
*Torque curves are for reference only and are not guaranteed



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			
Winding		C	D	R	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 × 10 ⁻⁷			
Starting Pulse Rate*	pps	600			
Slewing Pulse Rate*	pps	610			
Operating Temp. Range	°C	-10 to +50			
Temperature Rise*	K	70			
Weight	g	77			

Dimensions of Geared Model



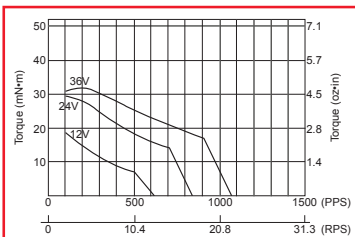
Gear Ratio	1/5	1/6	1/10	1/12	1/15	1/18	1/25	1/30
Ordinary Torque	100mN·m			200mN·m				
Destruction Torque	300mN·m			600mN·m				

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	1/5	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	1/300
L	19.5	19.5	19.5	19.5	19.5	21.7	21.7	21.7	21.7	21.7	21.7	21.7	23.8	23.8	23.8	23.8	23.8

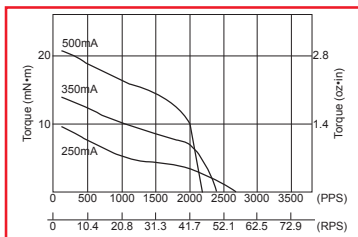
Torque Curve (pull-out torque)*

Bipolar Constant Voltage (48R1)



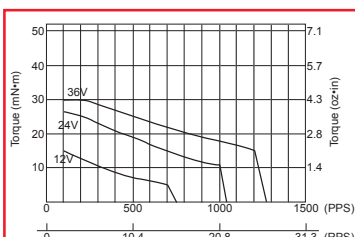
Coil Resistance: 72Ω

Bipolar Constant Current (48Q1)



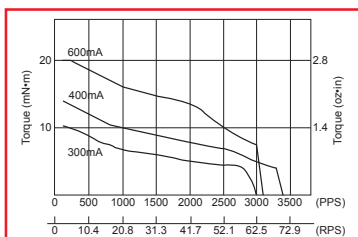
Coil Resistance: 16Ω Supply Voltage: 24V

Unipolar Constant Voltage (48C1)



Coil Resistance: 70Ω

Unipolar Constant Current (48D1)

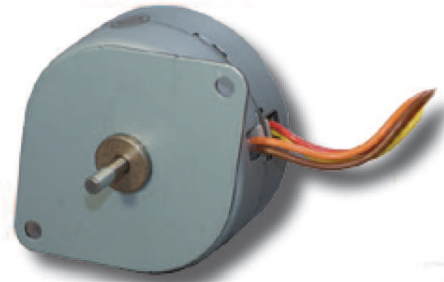
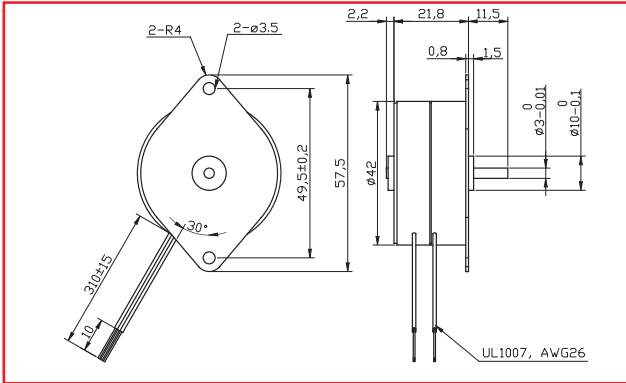


Coil Resistance: 12Ω Supply Voltage: 24V

Available with H or M gearhead. See previous page for H gearhead drawing.

Gear Ratio	1/125	1/150	1/180	1/200	1/250	1/300
Ordinary Torque	600mN·m					
Destruction Torque	1800mN·m					

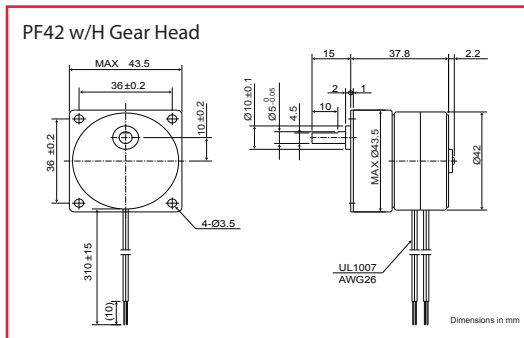
*Torque curves are for reference only and are not guaranteed
All specifications are based on full-step constant voltage operation.
Magnet type: Anisotropic



Specifications

Specification	Unit	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			
Winding		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	5.9	74	14	41	6.1	87	16
Holding Torque	mN·m	28	28	41	41	45	45	54	54
Rotor Inertia	kg·m ²	16.8 × 10 ⁻⁷				12.8 × 10 ⁻⁷			
Starting Pulse Rate*	pps	180				310			
Slewing Pulse Rate*	pps	250				320			
Operating Temp. Range	°C	-10 to +50							
Temperature Rise*	K	55							
Weight	g	160							

Dimensions of Geared Model



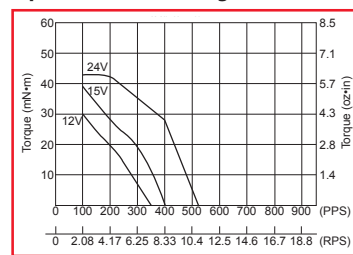
Gear Ratio	6/25	1/5	3/25	1/10	2/25	1/15	3/50	1/20	1/25
Ordinary Torque	200mN·m				250mN·m				
Destruction Torque	600mN·m				750mN·m				

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						

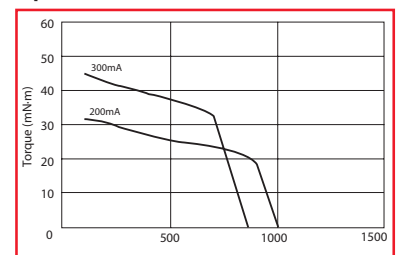
Torque Curve (pull-out torque)*

Bipolar Constant Voltage (48P1)



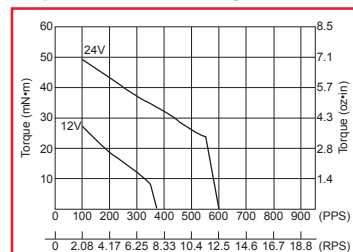
Coil Resistance: 76Ω

Bipolar Constant Current (48Y1)



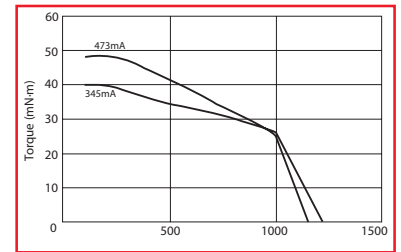
Coil Resistance: 20Ω Supply Voltage: 24V

Unipolar Constant Voltage (48C1)



Coil Resistance: 70Ω

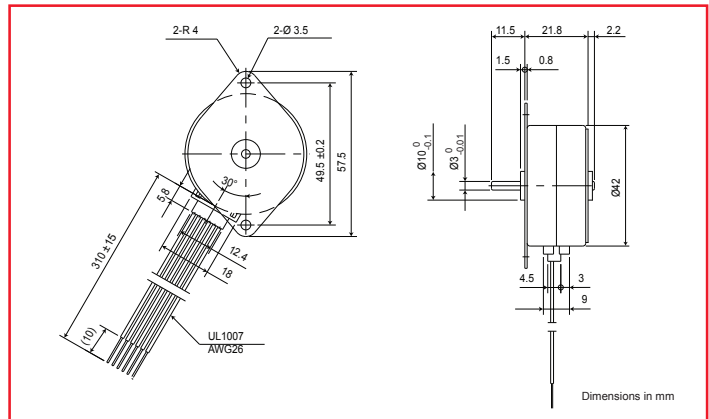
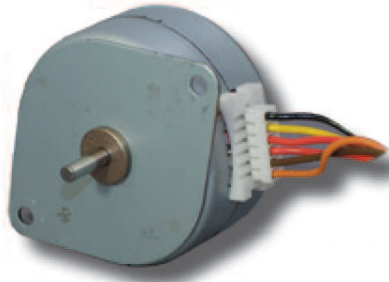
Unipolar Constant Current (48I1)



Coil Resistance: 20Ω Supply Voltage: 24V

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

*Torque curves are for reference only and are not guaranteed

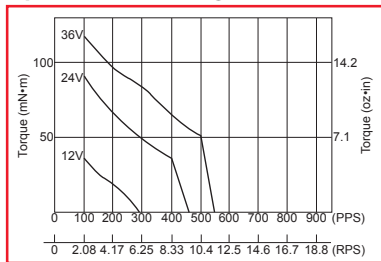


Specifications

Specification	Unit	PFC42H-48			
		Unipolar		Bipolar	
Type of Winding		Unipolar		Bipolar	
Excitation Mode*		Full step (2-2)			
Step Angle	°	7.5 ±5%			
Steps Per Revolution*		48			
Winding		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	-10 to +50			
Temperature Rise*	K	55			
Weight	g	160			

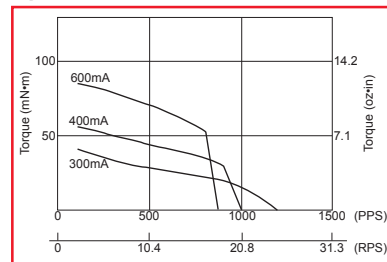
Torque Curve (pull-out torque)*

Bipolar Constant Voltage (48P1)



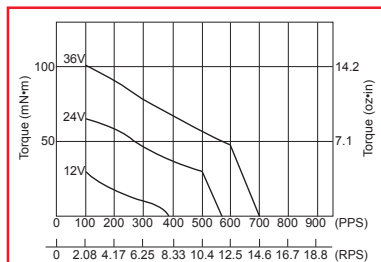
Coil Resistance: 70Ω

Bipolar Constant Current (48Q1)



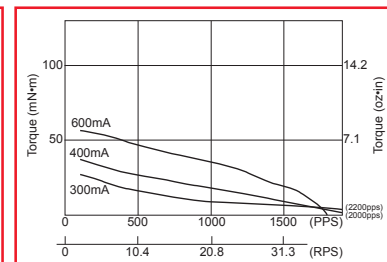
Coil Resistance: 12Ω Supply Voltage: 24V

Unipolar Constant Voltage (48C1)



Coil Resistance: 70Ω

Unipolar Constant Current (48D1)



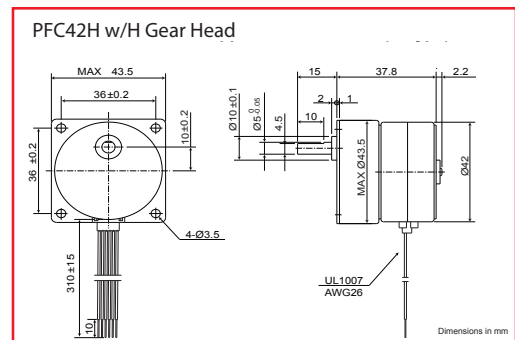
Coil Resistance: 12Ω Supply Voltage: 24V

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

Magnet type: Anisotropic

*Torque curves are for reference only and are not guaranteed

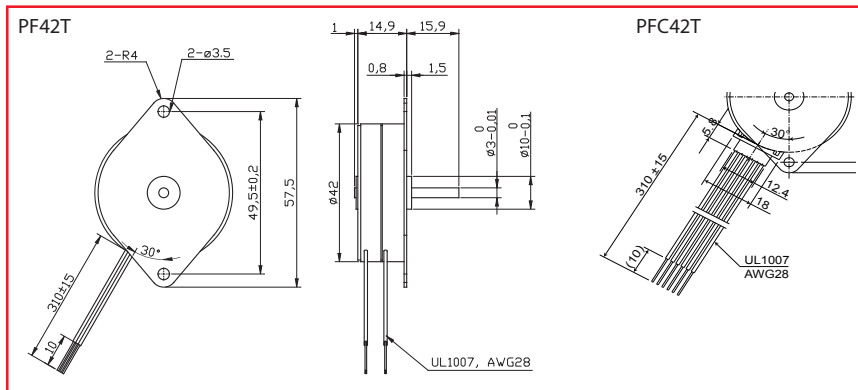
Dimensions of Geared Model



Gear Ratio	6/25	1/5	3/25	1/10	2/25	1/15	3/50	1/20	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				

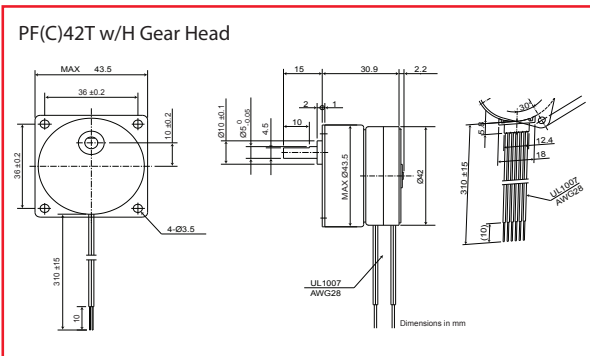
Gear Ratio	1/100	1/120	1/125	1/150	1/200	1/250	1/300
Ordinary Torque	400mN-m						
Destruction Torque	1200mN-m						



Specifications

Specification	Unit	PF(C)42T-48				PF(C)42T-96			
		Unipolar		Bipolar		Unipolar		Bipolar	
Type of Winding		Unipolar				Bipolar			
Excitation Mode*		Full step (2-2)				Full step (2-2)			
Step Angle	°	7.5 ±5%				3.75 ±5%			
Steps Per Revolution*		48				96			
Winding		C	D	P	Q	C	D	P	Q
Rated Voltage	V	12	5	12	5	12	5	12	5
Resistance	Ω	60	9.5	64	12	60	95	64	12
Inductance	mH	25	4	51	12	29	4.6	59	13
Holding Torque	mN-m	34	34	42	42	30	36	49	49
Rotor Inertia	kg-m ²	14.8 x 10 ⁻⁷				14.8 x 10 ⁻⁷			
Starting Pulse Rate*	pps	345				450			
Slewing Pulse Rate*	pps	550				590			
Operating Temp. Range	°C	-10 to +50							
Temperature Rise*	K	70							
Weight	g	105							

Dimensions of Geared Model



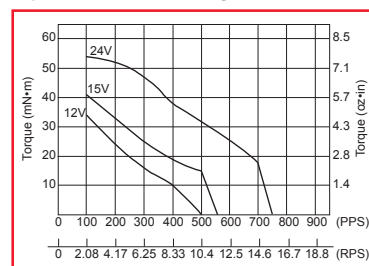
Gear Ratio	6/25	1/5	3/25	1/10	2/25	1/15	3/50	1/20	1/25
Ordinary Torque	200mN-m				250mN-m				
Destruction Torque	600mN-m				750mN-m				

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						

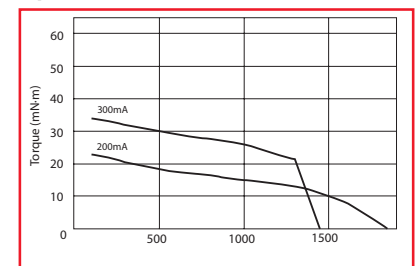
Torque Curve (pull-out torque)*

Bipolar Constant Voltage (48P1)



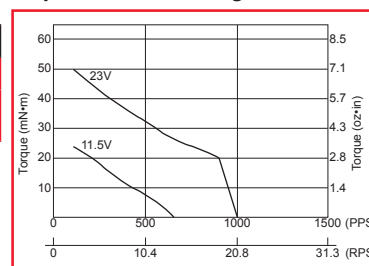
Coil Resistance: 64Ω

Bipolar Constant Current (48271)



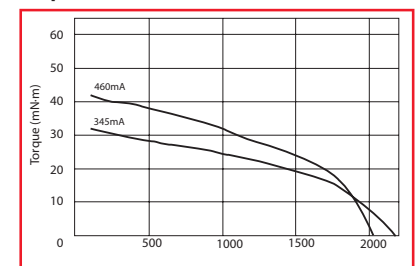
Coil Resistance: 19Ω Supply Voltage: 24V

Unipolar Constant Voltage (48C1)



Coil Resistance: 60Ω

Unipolar Constant Current (48071)

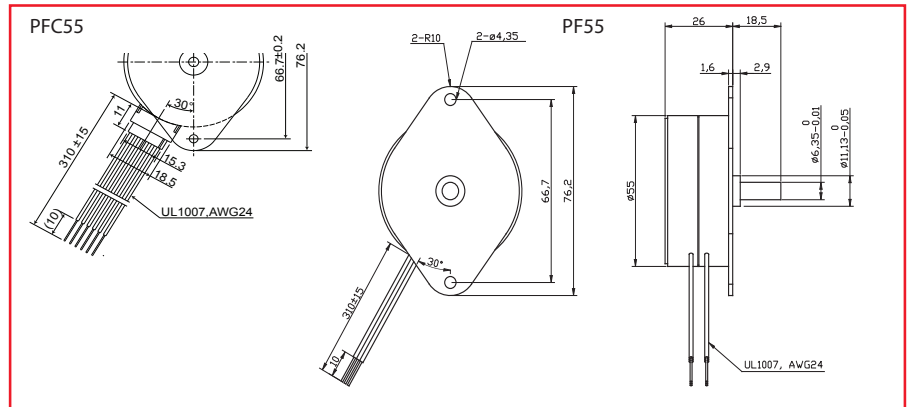
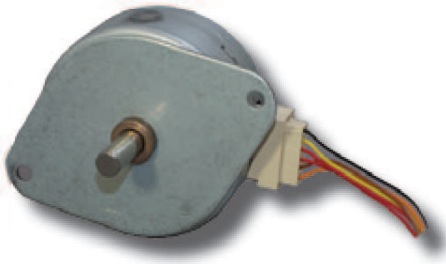


Coil Resistance: 20Ω Supply Voltage: 24V

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

Magnet type: Anisotropic

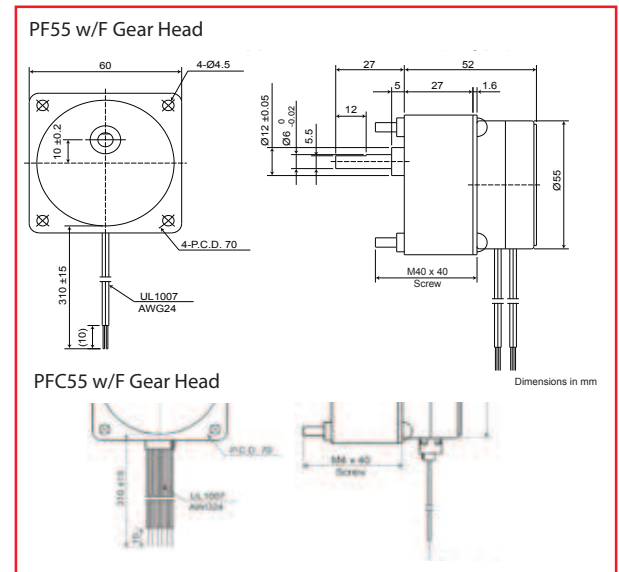
*Torque curves are for reference only and are not guaranteed



Specifications

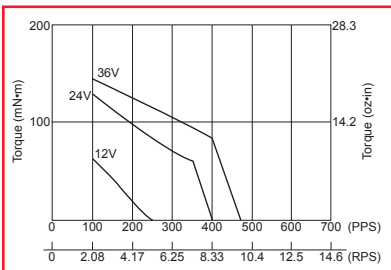
Specification	Unit	PFC55-48			
Type of Winding		Unipolar		Bipolar	
Excitation Mode*		Full step (2-2)			
Step Angle	°	7.5 ±5%			
Steps Per Revolution*		48			
Winding		C	D	P	Q
Rated Voltage	V	12	5	12	5
Resistance	Ω	36	5	40	6.75
Inductance	mH	37	4.6	84	12
Holding Torque	mN·m	120	120	150	150
Rotor Inertia	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*	K	55			
Weight	g	300			

Dimensions of Geared Model



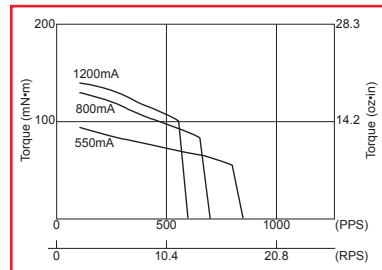
Torque Curve (pull-out torque)*

Bipolar Constant Voltage (48P1)



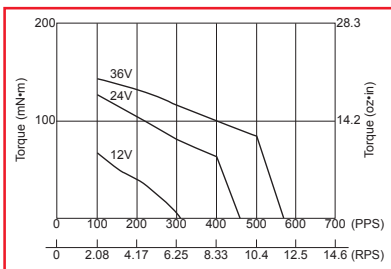
Coil Resistance: 40Ω

Bipolar Constant Current (48Q1)



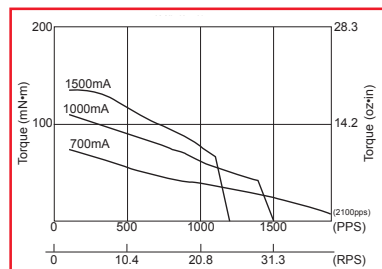
Coil Resistance: 6.75Ω Supply Voltage: 24V

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

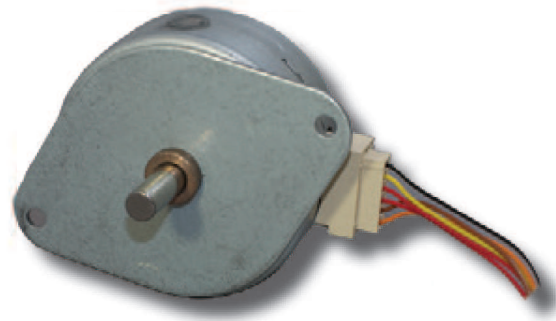
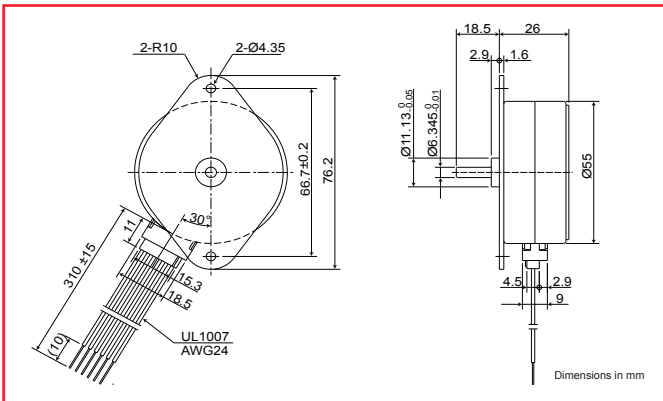
Magnet type: Anisotropic

*Torque curves are for reference only and are not guaranteed

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							

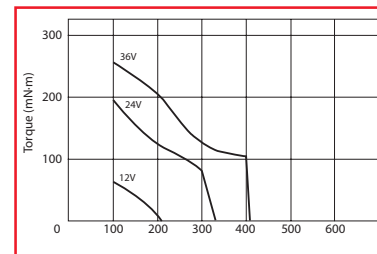


Specifications

Specification	Unit	PFC55H-48			
Type of Winding		Unipolar		Bipolar	
Excitation Mode*		Full step (2-2)			
Step Angle	°	7.5 ±5%			
Steps Per Revolution*		48			
Winding		C	D	P	Q
Rated Voltage	V	12	5	12	5
Resistance	Ω	36	5	36	5
Inductance	mH	30	4.4	65	9.3
Holding Torque	mN·m	150	150	180	180
Rotor Inertia	kg·m ²	97 × 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			

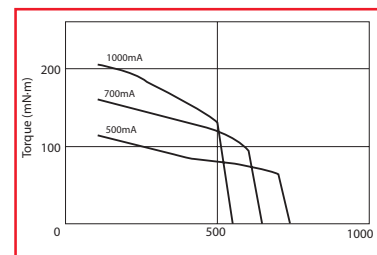
Torque Curve (pull-out torque)*

Bipolar Constant Voltage (48011)



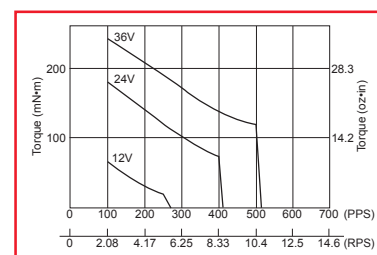
Coil Resistance: 40Ω

Bipolar Constant Current (48S1)



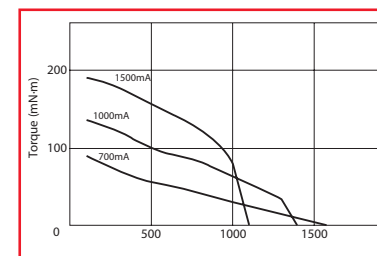
Coil Resistance: 8Ω Supply Voltage: 24V

Unipolar Constant Voltage (48C1)



Coil Resistance: 36Ω

Unipolar Constant Current (48D1)

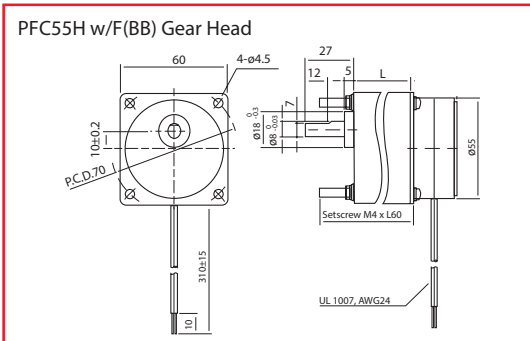


Coil Resistance: 5Ω Supply Voltage: 24V

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

*Torque curves are for reference only and are not guaranteed

Dimensions of Geared Model



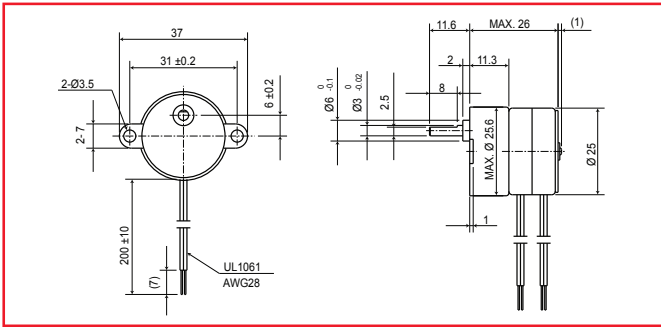
Gear Ratio	1/3	1/5	2/15	1/10	2/25	1/15	1/20
Ordinary Torque	400mN·m			500mN·m		600mN·m	800mN·m
Destruction Torque	1200mN·m			1500mN·m		1800mN·m	2400mN·m

Gear Ratio	1/25	1/30	1/50	1/60	Reduction Ratio	L
Ordinary Torque	900mN·m	1100mN·m	1600mN·m		1/3 to 1/15	32
Destruction Torque	2700mN·m	3300mN·m	4800mN·m		1/20 to 1/180	42

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

See page 16 for PFC55H with F gearhead ratios

PF25 w/P Gearhead

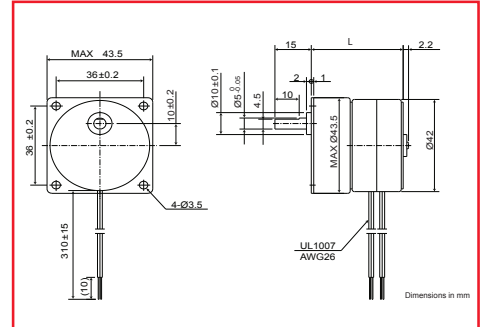


Gear Ratio	6/25	1/5	3/25	1/10	2/25	1/15	3/50	1/20
Ordinary Torque	20mN-m				50mN-m			

Gear Ratio	1/25	1/30	1/50	1/60	1/75	2/125
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



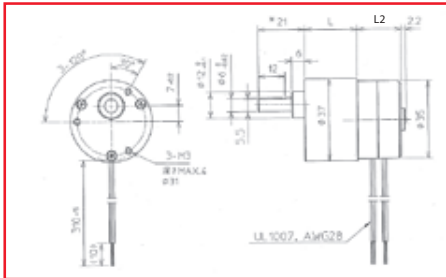
	L
PF42/ PFC42H	37.8
PF42T/ PFC42T	31

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						

PF35/35T w/M Gearhead



	L2
PF35	19.8
PF35T	14.2

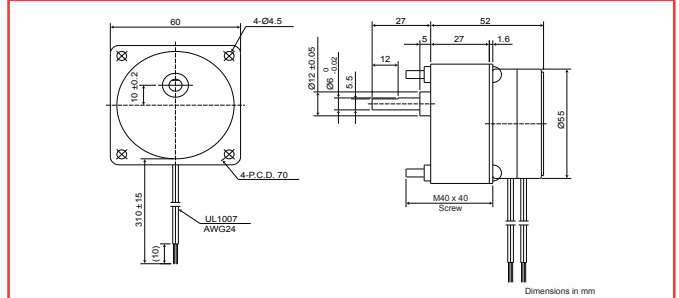
see Page 13 for L specifications

Gear Ratio	1/5	1/6	1/10	1/12	1/15	1/18	1/25	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	1/250	1/300
Ordinary Torque	600mN-m					

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

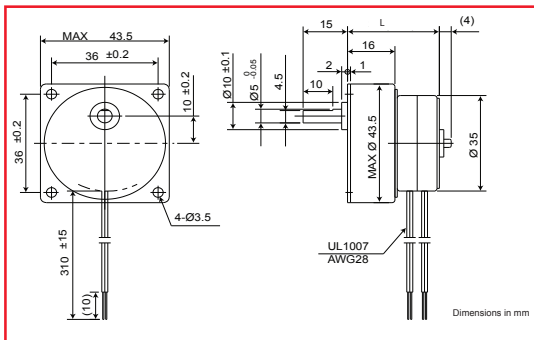


Gear Ratio	6/25	1/5	3/25	1/10	2/25	1/15	3/50	1/20
Ordinary Torque	400mN-m							

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

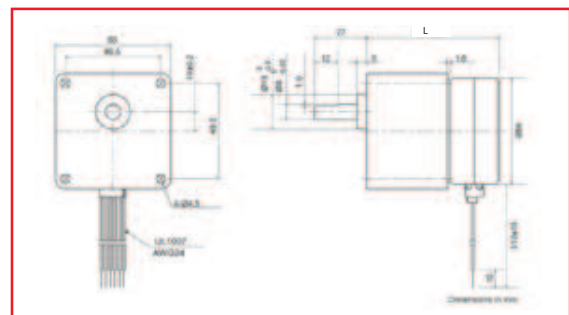
Gear Ratio	6/25	1/5	3/25	1/10	2/25	1/15	3/50	1/20	1/25
Ordinary Torque	200mN-m					250mN-m			

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