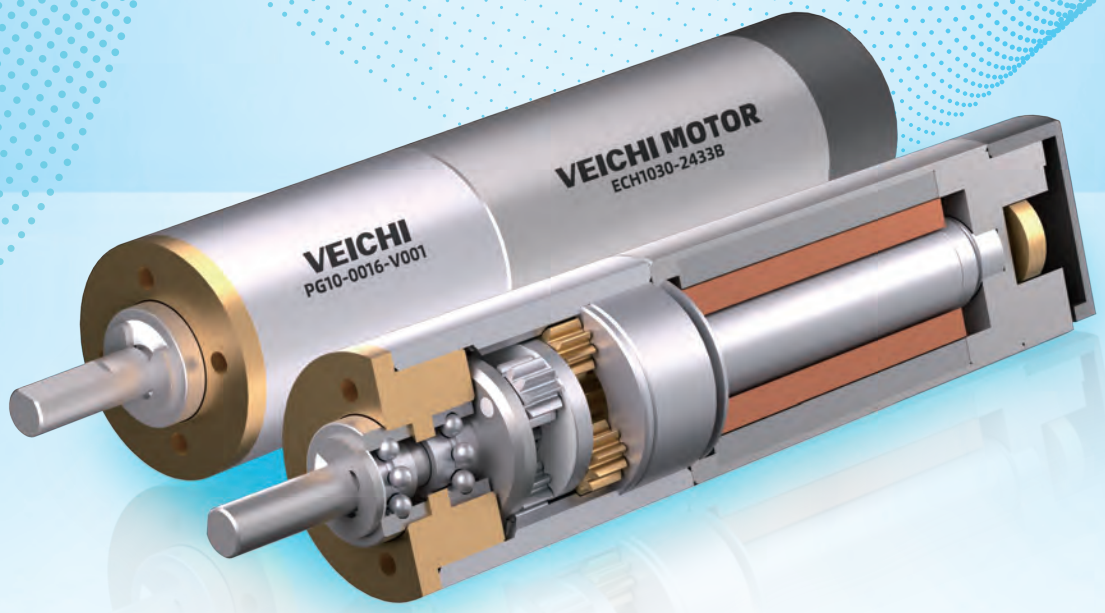
VEICHI

ECH Series
Brushless Coreless Motor



Stock Code: 688698

About Us

VEICHI Electric (stock code: 688698) has always been dedicated to the field of electrical drive and industrial control since its establishment, and now it is a high-tech enterprise engaged in R&D, production, and sales of industrial automation products in one. With R&D and production bases in Suzhou, Shenzhen and Xi'an, and a wholly-owned subsidiary in India, VEICHI now is capable of conducting its business to many countries and regions with competitive, safe and reliable products and services to customers all over the world.

The company boasts an extensive portfolio of products, encompassing AC drives, servo systems, and control systems. These products have been extensively deployed across various sectors such as heavy industry, light industry, and high-end equipment. With numerous mature application cases, they offer scenario-based solutions designed to facilitate the digital and intelligent transformation and upgrading of the manufacturing industry. Moreover, the company is in lockstep with the zeitgeist, expanding its reach into burgeoning fields like robotics, new energy, and healthcare. It has developed a suite of innovative products, including hollow cup motors, frameless motors, photovoltaic energy storage inverters, and surgical power systems. These cutting-edge offerings significantly enhance the prosperity and advancement of the industries they serve.

On long-term and persistent R&D and innovation, VEICHI has successfully cultivated a series of patented technologies with independent intellectual property rights, and has mastered the core technologies of motor control such as vector control of PMSM, high-frequency pulse injection control, field-weakening control for higher speed, scalar V/F control and vector control etc, and of silicon carbide application, motor parameter tuning and identification, motor control and protection, and motor speed tracking and start-up control. As of June 30, 2024, a total of 221 patents have been granted, including 51 patents for inventions.

Over the course of 19 years, the company has steadily progressed, earning numerous accolades and certifications from national and authoritative bodies. It has been recognized in the third batch of specialized, high-end and innovation-driven SMEs that provide distinctive products or services, and titles of "high-tech enterprise", "Jiangsu Provincial Engineering Technology Research Center", "Jiangsu Provincial Enterprise Technology Center", and "Jiangsu Industrial Internet Development Demonstration Enterprise (Benchmarking Factory Category)".

Moving forward, steadfast in its commitment to the business philosophy of "guided by market demand and driven by technological innovation", VEICHI will fortify its research in key core technologies and enhance product iteration to expand relentlessly across the spectrum of high-performance and quality applications. This strategic focus will enable us to make significant contributions to the evolution of electrical drive and industrial control systems, ensuring that our efforts are directed towards propelling the industry forward with determination and vigor.

2005
- Beginning in Shenzhen
- First-generation of AC drives launched

2013
- Suzhou VEICHI Electric established
- First generation servo system launched

2014
- Suzhou VEICHI Phase I groundbreaking

2016
- Suzhou VEICHI Phase I project put into operation
- First generation control system launched

2019
- Strategic restructure to a joint stock company VEICHI
- India subsidiary established

2020
- SSE STAR Market landing
- Specialized, high-end and innovation-driven
- SMEs that provide distinctive products or services

2021
- VEICHI subsidiary established Third batch of specialized, high-end and innovation-driven
- SMEs that provide distinctive products or services

2022
- Xi'an R&D Center established
- VEICHI digital energy subsidiary established

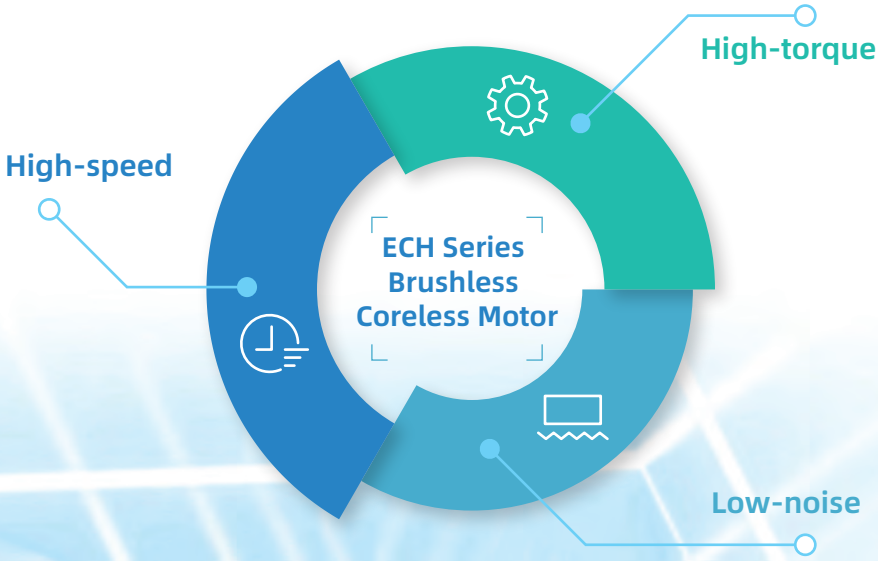
2023
- Suzhou VEICHI Phase II put into operation
- Suzhou VEICHI Phase III put into operation
- VEICHI medical subsidiary established

01 ECH Series Brushless Coreless Motor

ECH series DC brushless coreless motors adopt electronic commutation, which senses the position of permanent magnets by Hall elements and then switches the current direction in the electronic circuit, thus changing the magnetic force.

The advantage of ECH series motors is that it **eliminates the loss of brushes and the interference of electric spark to electronic equipment, prolonging service life to tens of thousands of hours.**

These motors offer **higher speed and torque and lower noise and vibration** for smooth operation and more precise control.



Naming Rules

EC H 13 48 - 48 80 H - V 001

Product Series
EC: Electronic phase change, for brushless motors
DC: Brushed motors

Speed
H: High-speed motor
Empty: General motor

Motor OD
13: Outer diameter of the motor 13mm

Motor Length
48: Length of the motor 48mm

Motor Voltage
48: Input motor voltage 48V

Other Product Series
001:General models.
More models coming up to terminals and axes

Brand
V: VEICHI

Sensor Type
H: Hall sensor
B: Encoder sensor
Empty: No sensor

Motor Speed
80: Rated motor speed 80000rpm

Composition

Temperature-resistant and flame-retardant tail wire molding

One-piece stainless steel motor housing for high structural strength

Super iron core for high speed operation, low iron loss and no-load loss

Efficient hollow cup winding

Dynamically balanced rotor for high-speed and low-vibration operation

Ultra-quick sterilized bearings for long operating life

Customizable high-strength spindles

Terminal Definition

Motor Terminal	
Red	U
Black	V
White	W

Sensor Terminal	
Orange	+5V
Blue	GND
Yellow	h1
Brown	h2
Grey	h3

Features

This motor is free of the brush and the core while it can offer high-speed, high-torque, and low-noise and low-vibration operation by even more precise control. And the compact motor provides higher efficiency and power density.

High-speed/torque:
Low eddy current losses in the core and the close arrangement of the windings for high-speed and high-torque operation

Low-noise/vibration:
No cogging effect on the motor core for stable motor performance at different speeds

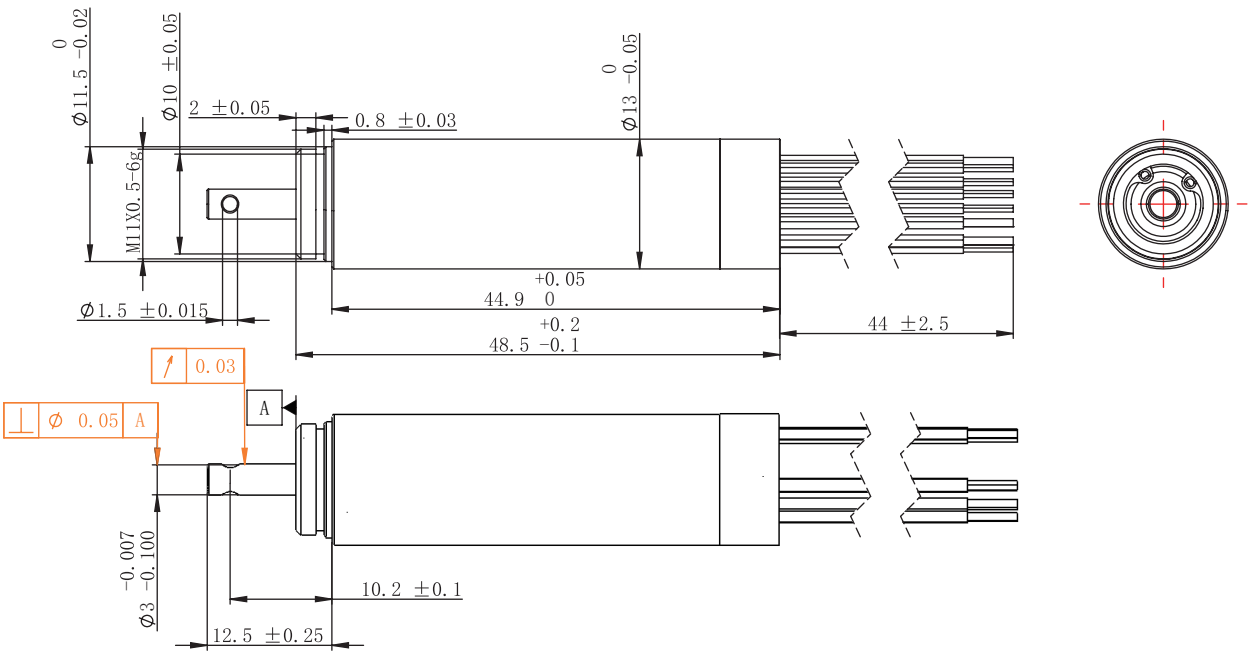
Rapid response:
Low motor rotor inertia, mechanical time constant less than 28ms, 10ms for certain products (100ms or more for general motors with cores)

High power density:
Less weight and volume by 1/3-1/2 compared to general motors with cores

13mm Motor

No.	Item	Value			Unit
Ratings					
01	Rated voltage	24	36	48	V
02	No-load speed	87000	87000	87000	rpm
03	No-load current	600	450	350	mA
04	Rated speed	80000	80000	80000	rpm
05	Rated torque	7	7	7	mNm
06	Rated current	3.37	2.31	1.4	A
07	Stall torque	191	202	201.44	mNm
08	Stall current	75	52.9	38.17	A
09	Maximum efficiency	90	90	90	%
10	Inter-phase resistance	0.32	0.68	1.45	Ω
11	Inter-phase inductance	160	350	650	uH
12	Torque constant	3.55	3.82	5.4	mNm/A
13	Speed constant	3750	2500	1835	rpm/V
14	RPM/torque gradient	471	445	437	rpm/mNm
15	Mechanical time constant	1.92			ms
16	Rotor inertia	0.42			gcm²
Thermal Parameters					
17	Housing-Ambient thermal resistance	22.13			K/W
18	Winding- Housing thermal resistance	1.92			K/W
19	Winding thermal time constant	2.62			S
20	Motor thermal time constant	502			S
21	Working temperature	-40~135			℃
22	Maximum winding temperature	155			℃
Ball Bearing					
23	Maximum speed	90000			rpm
24	Axial clearance	0~0.28			mm
	Preload	4.5			N
	Preload direction	Drawing			
25	Axial clearance	Preload			
26	Maximum axial load	1.5			N
27	Maximum allowable mounting force	50			N
28	Static axial support	1500			N
	Maximum radial load	6 (5)			N
Other Parameters					
29	Pole pair	1			
30	Phase no.	3			
31	Motor weight	42			g
32	Typical noise	56			dBA
33	Autoclaving cycle	500+			

13mm Motor

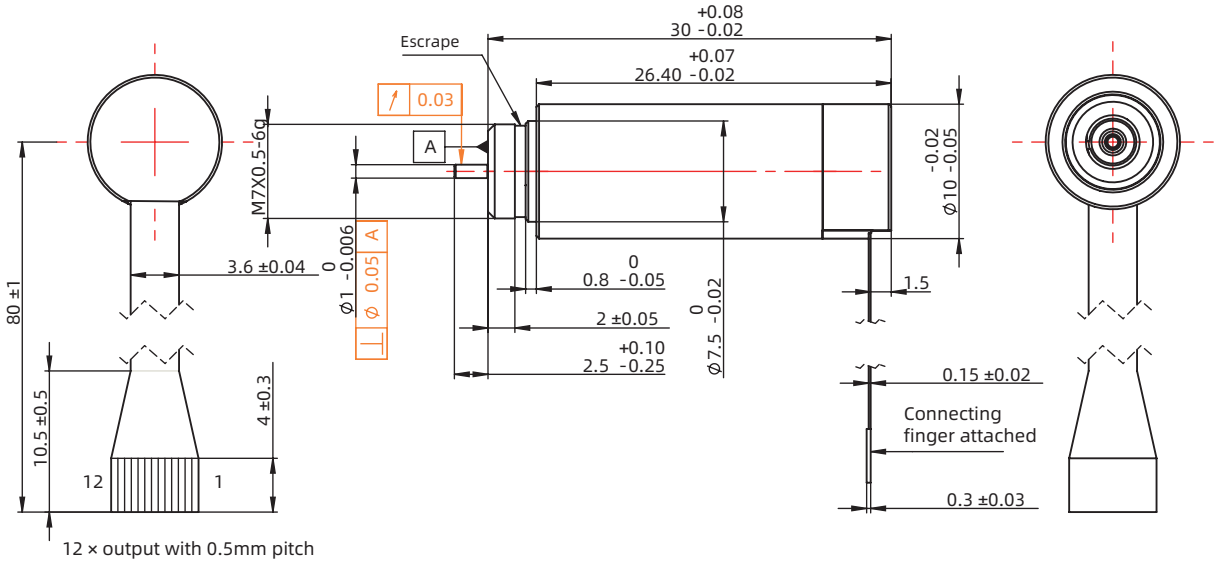


Products above are standard , and they are customizable according to the actual requirements of different motor grades and speeds, with different gearbox reduction ratios.

10mm Motor

No.	Item	Value		Unit
	Ratings			
01	Rated voltage	12	24	V
02	No-load speed	33600	33600	rpm
03	No-load current	65	50	mA
04	Rated speed	27397	28170	rpm
05	Rated torque (maximum continuous torque)	2.28	2.40	mNm
06	Rated current (maximum continuous current)	0.74	0.40	A
07	Stall torque	12.48	14.88	mNm
08	Stall current	3.69	2.18	A
09	Maximum efficiency	76.4	78.2	%
10	Inter-phase resistance	3.25	11	Ω
11	Inter-phase inductance	6.35	9.2	mH
12	Torque constant	3.38	6.82	mNm/A
13	Speed constant	2825	1400	rpm/V
14	RPM/torque gradient	2716	2258	rpm/mNm
15	Mechanical time constant	2.2		ms
16	Rotor inertia	0.07		gcm²
	Thermal Parameters			
17	Housing-Ambient thermal resistance	42.0		K/W
18	Winding- Housing thermal resistance	7.0		K/W
19	Winding thermal time constant	5.0		S
20	Motor thermal time constant	155.0		S
21	Working temperature	-40~105		℃
22	Maximum winding temperature	155		℃
	Ball Bearing			
23	Maximum speed	50000		rpm
24	Axial clearance	0~0.28		mm
	Preload	1.5		N
	Preload direction			
25	Axial clearance	Preload		
26	Maximum axial load	1.3		N
27	Maximum allowable mounting force	11		N
28	Static axial support	200		N
	Maximum radial load	2.5 (4)		N
	Encoder Parameters			
29	Maximum wire no. per turn	1024		
30	Channel No.	3		Channel
31	Power supply voltage	5		V
32	Typical current	10		mA
33	Maximum operating frequency	900		kHz
34	Maximum allowable speed	55000		rpm
	Other Parameters			
35	Pole pair	1		
36	Phase no.	3		
37	Motor weight	10		g
38	Typical noise	55		dBA

10mm Motor



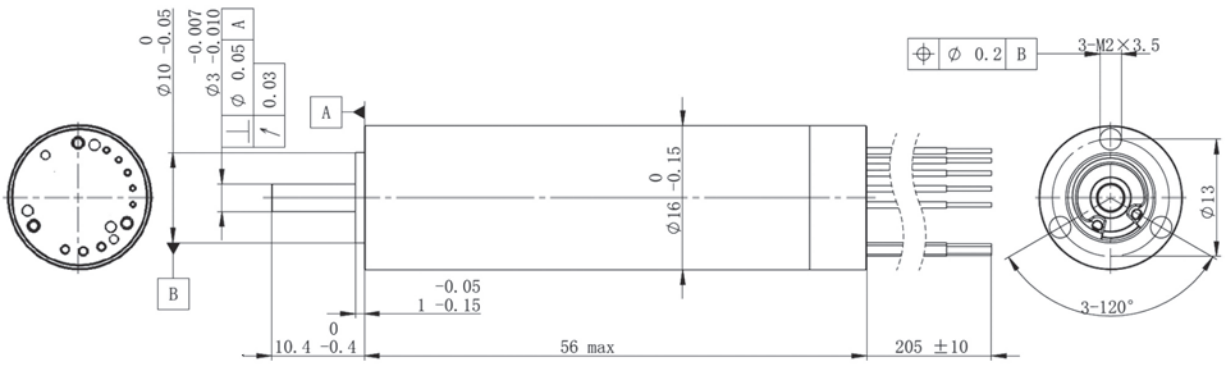
No.	1	2	3	4	5	6
Function	W-phase	V-phase	U-phase	GND	U_{DD}	Hall sensor C
No.	7	8	9	10	11	12
Function	Hall sensor B	Hall sensor A	Signal source B	Signal source A	Signal source I(Index)	Reserved

Products above are standard, and they are customizable according to the actual requirements of different motor grades and speeds, with different gearbox reduction ratios.

16mm Motor

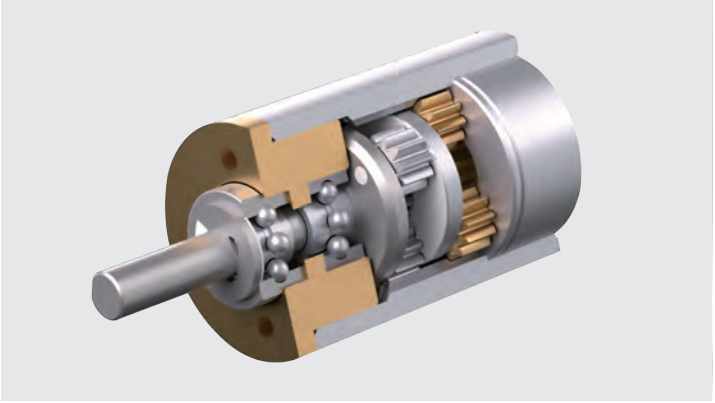
No.	Item	Value	Unit
	Ratings		
01	Rated voltage	48	V
02	No-load speed	68000	rpm
03	No-load current	500	mA
04	Rated speed	60000	rpm
05	Rated torque (maximum continuous torque)	14	mNm
06	Rated current (maximum continuous current)	2.20	A
07	Stall torque	390	mNm
08	Stall current	55	A
09	Maximum efficiency	88	%
10	Inter-phase resistance	0.2	Ω
11	Inter-phase inductance	90	uH
12	Torque constant	7	mNm/A
13	Speed constant	1333	rpm/V
14	RPM/torque gradient	164	rpm/mNm
15	Mechanical time constant	1.65	ms
16	Rotor inertia	0.952	gcm²
	Thermal Parameters		
17	Housing-Ambient thermal resistance	13.7	K/W
18	Winding- Housing thermal resistance	0.6	K/W
19	Winding thermal time constant	1.3	S
20	Motor thermal time constant	490	S
21	Working temperature	-40 ~ 135	℃
22	Maximum winding temperature	155	℃
	Ball Bearing		
23	Maximum speed	70000	rpm
24	Axial clearance	0 ~ 0.29	mm
	Preload	1.5	N
	Preload direction	Drawing	
25	Axial clearance	Preload	
26	Maximum axial load	1.5	N
27	Maximum allowable mounting force	60	N
	Static axial support	2500	N
28	Maximum radial load	10（5）	N
	Other Parameters		
29	Pole pair	1	
30	Phase no.	3	
31	Motor weight		g
32	Typical noise	55	dBA

16mm Motor



Products above are standard , and they are customizable according to the actual requirements of different motor grades and speeds , with different gearbox reduction ratios.

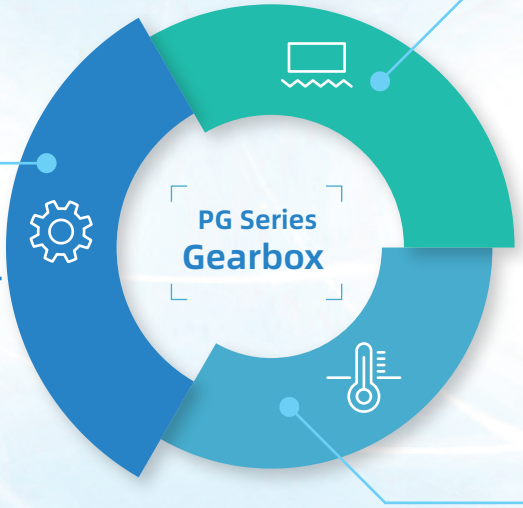
02 PG Series Gearbox



The VEICHI PG gearboxes, with their compact design and small dimensions, adopts the swing wheel system to save the footprint. Modular structure and scaling size provide solutions for customized drives in many fields. With its superior performance in the aspects of torque, speed, power, efficiency, noise and backlash, VEICHI PG meets all the drive applications.

Features

PG series gearboxes are characterized by high speed, high torque, high power, low noise, and low backlash. The gearboxes run smoothly and transmit power accurately; Trace friction and compact structure bring the gearboxes excellent performance of low temperature rise .



Low-noise/backlash

Dedicated gear design and compact structure brings more stable gearbox performance.

High-speed/torque/power

Special lubrication and selected gear materials ensure transmission at high speeds, high torques and high power.

Low temperature rise and high efficiency

Low friction and small contact area result in less heat generation and higher efficiency in the gear.

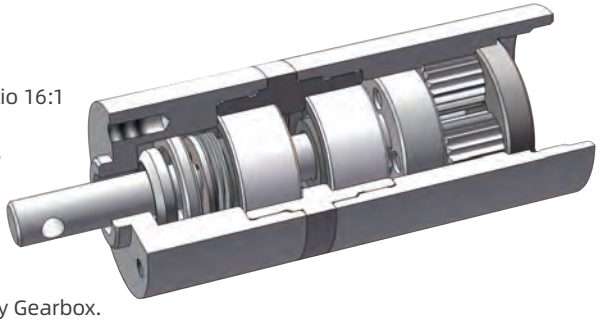
Naming Rules

PG 10 - 16

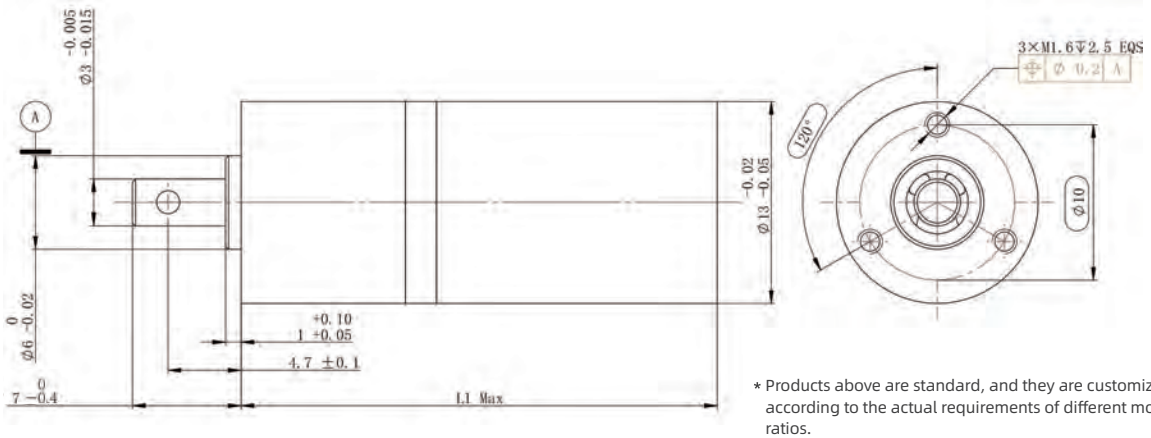
Reduction Ratio
16: Gearbox reduction ratio 16:1

Gearbox Outer Diameter
10: Outer diameter of the gearbox is 10mm

Product Series PG
Abbreviation for Planetary Gearbox.



13mm Gearbox

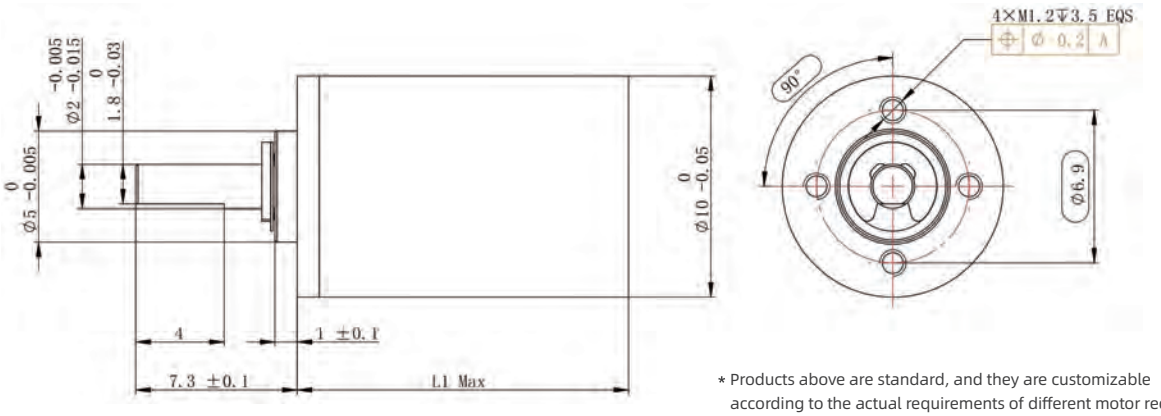


* Products above are standard, and they are customizable according to the actual requirements of different motor reduction ratios.

Main Technical Parameters		
Maximum transmission power	W	15
Maximum continuous torque	Nm	0.15
Maximum continuous input speed	rpm	80000
No-load average backlash	°	3
Working temperature	℃	-40~150
Output bearing		Ball Bearing

Gearbox Parameters				
Stage		1	2	3
Reduction ratio		5	25	125
Max. transmission power (continuous)	W	0.04	15	7
Max. transmission power (instantaneous)	W	0.047	19	9
Max. continuous torque	Nm	0.032	0.06	0.15
Max. continuous torque	Nm	0.038	0.075	0.19
Max. continuous input speed	rpm	60000	60000	60000
Max. instantaneous input speed	rpm	70000	70000	70000
Max. efficiency	%	90%	81%	73%
Max. axial load	N	5	5	5
Max. radial load	N	5	10	10
Reduction gearbox length L1	mm	30.4	37.6	44.8
Weight	g	22	28	34

10mm Gearbox



* Products above are standard, and they are customizable according to the actual requirements of different motor reduction ratios.

Main Technical Parameters		
Maximum transmission power	W	5.5
Maximum continuous torque	Nm	0.15
Maximum continuous input speed	rpm	26000
No-load average backlash	°	3
Working temperature	℃	-40~150
Output bearing		Ball Bearing

Gearbox Parameters							
Stage		1	2	3	4	5	6
Reduction ratio		4	16	64	256	1024	4096
Max. transmission power (continuous)	W	5.5	5	3	1	0.26	0.1
Max. transmission power (instantaneous)	W	8.3	7.5	4.7	1.6	0.4	0.15
Max. continuous torque	Nm	0.008	0.03	0.07	0.1	0.1	0.15
Max. continuous torque	Nm	0.012	0.04	0.1	0.15	0.15	0.2
Max. continuous input speed	rpm	26000	26000	26000	26000	26000	26000
Max. instantaneous input speed	rpm	33000	33000	33000	33000	33000	33000
Max. efficiency	%	90%	81%	73%	66%	59%	53%
Max. axial load	N	5	5	5	5	5	5
Max. radial load	N	5	10	10	10	10	10
Reduction gearbox length L1	mm	12.4	15.5	18.6	21.7	24.8	27.9
Weight	g	5.6	7	8.4	9.8	11.2	12.6

Application

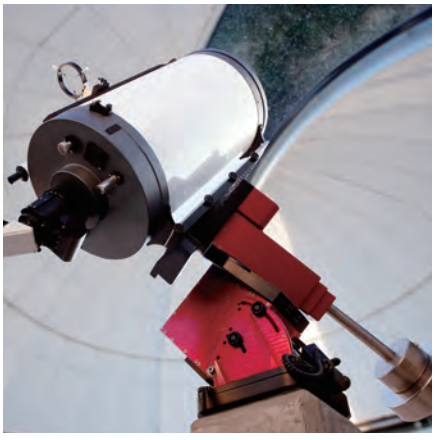
PG gearboxes are widely used in scenarios requiring precision, speed response, size limit and energy saving.

- Fast response
  Missile-related recording and inspection equipment that require fast regulation and high sensitivity and industrial robots

- Vehicles with weight and energy requirements, including drones and model airplanes

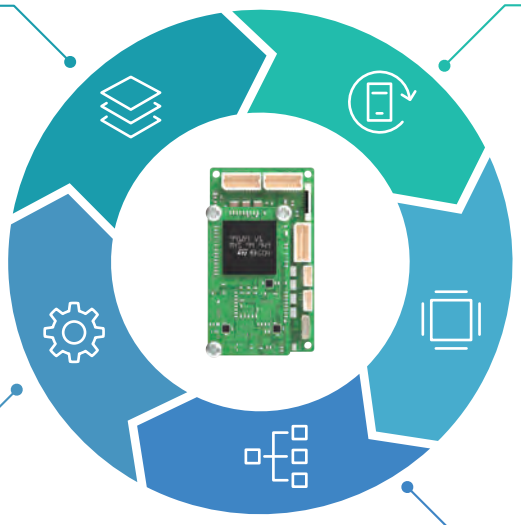
- Medical instruments, orthopedic power, robotic medicine, medical testing, medical dentistry, therapeutic equipment, therapeutic instruments, medical prosthetics and more

- Other home appliances and industrial products
  It can replace the traditional gear box with improved the product performance



03 SD200 Series Drive

Features



Modular design
Flexible adaptation to different application scenarios

High efficiency
Efficiency up to 96%

Small volume
Ultra-thin stacked circuit

High power density
High output torque and speed

Various interface
Incremental encoder and absolute encoder

Basic Function :

Shared power supply for motor and drive
Speed control via PI regulator
Setting of target speed by PWM or analog voltage
Switching signal input to control motor direction
Setting as frequency or fault signal output to the DO terminal

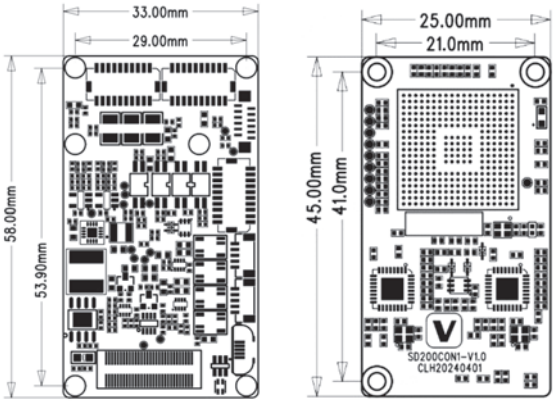
Additional Function:

Integrated current limit function against thermal overload

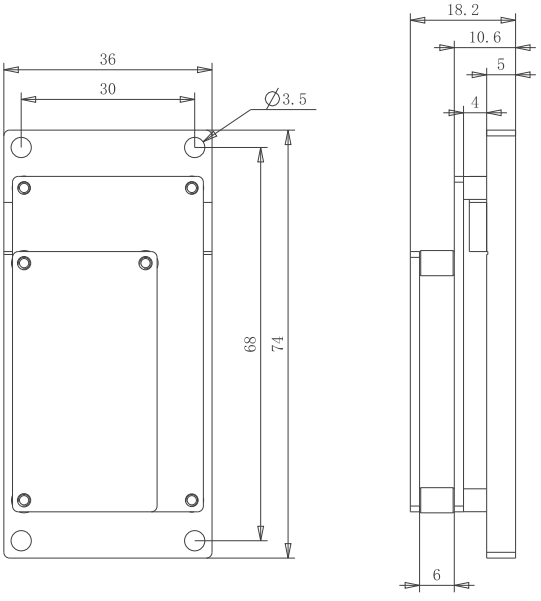
Specifications

Basic specifications:

Drive voltage	U_P	6-48	V DC
Motor voltage	U_{mot}	0-48	V DC
PWM switching frequency	f_{pwm}	100	kHz
Drive circuit efficiency	η	96	%
Maximum continuous output current	I_{cont}	5	A
Maximum peak output current	I_{max}	7	A
Drive standby current (voltage UP = 24V)	I_{el}	100	mA
Operating temperature		-10~+60	℃
Weight	M1	120	g
Dimension	M2	58*25*13	mm



Installation Dimension:



Naming Rules:

SD200 - 007 G - C B

Product Series:
SD200 Series

Rated Current:
007: 7A

Operating voltage:
G: DC 6V-48V

Communication:
P: Pulse
C: CANopen
E: EtherCAT
PN: Profinet

Encoder Type:
B: ABZ incremental encoder
C: Hall sensor (analog)
D: Hall sensor (digital)
E: Absolute encoder
(Tamagawa protocol)

Interface Definition								
Power interface 1	1	Input power supply	6		11	Signal ground	16	
	2	U-phase	7		12	V-phase	17	Safety ground
	3	Input power supply	8		13	Signal ground	18	W-phase
	4	U-phase	9	Signal ground	14		19	Safety ground
	5	Input power supply	10	V-phase	15	Signal ground	20	W-phase
Encoder	1	5V	6	INC_A-	11	HALL_U	16	AIN1+
	2	Signal ground	7	A	12	INC_Z+	17	AIN2+
	3	ABS_CLK+	8	INC_B+	13	HALL_V	18	Signal ground
	4	INC_A+	9	B	14	INC_Z-	19	Signal ground
	5	ABS_CLK-	10	INC_B-	15	HALL_W	20	Safety ground
IO	1	24VOUT	6	STO_RET	11	COMOUT	16	COMIN
	2	STO_1	7	24VOUT	12	DI2	17	DO1
	3	24VOUT	8	STO_RET	13	COMOUT	18	COMIN
	4	STO_2	9	COMOUT	14	DI3	19	DO2
	5	24VOUT	10	DI1	15	COMOUT	20	DC_OC
Power interface 2	1	MODE	6	HALL_V	11	V-phase		
	2	INC_Z+	7	HALL_W	12	W-phase		
	3	INC_A+	8	5V				
	4	INC_B+	9	Signal ground				
	5	HALL_U	10	U-phase				

Research and Production

R&D and Technology Platform

- Consolidating a dynamic force of top-tier professionals and technical experts in domestic industrial control, our R&D team represents 37.16% of our workforce, with 74.62% of our technical staff boasting bachelor's degrees or higher.
- Guided by philosophy of "Innovate with technology and strive for excellence," VEICHI is deeply customer-centric by providing stable and reliable products and technologies designed to the evolving needs of our clients.
- Investing 10% of our revenue into R&D, VEICHI has crafted advanced labs for EMC, safety, reliability, and performance testing to ensure product quality.
- In-depth cooperation with many famous universities and research institutions in China has been established and "Jiangsu Postdoctoral Innovation Practice Base" and "Jiangsu Postgraduate Workstation" are set up successively.

Intelligent Automation

- Digitally driven from inception to production, VEICHI boasts an annual capacity of 914,600 units with streamlined efficiency.
- 5 imported SMT placement lines, 5 automated coating lines, 4 DIP test lines, a robotic arm-equipped automated line, and 12 production lines are equipped with the latest intelligent manufacturing tools.
- All of the product checks are carried out automatically by the management mode of 3 (tri-inspection system)+ 1(proportional inspection) during the whole process for standard performance.
- Three major production management system WMS, MES and ERP together ensure that the unique code of each product is traceable in the system to manage product quality.




ISO9001:2015 ISO14001:2015 ISO45001:2018	Full series with CE certification	Dedicated products with 3C certification	Customized products with RoHS2.0 certification	Measurement Management System AAA certification	5-star after-sales service certification	QC080000 Management system

VEICHI

Suzhou Veichi Electric Co., Ltd

No.1000 Songjia Road, Guoxiang street, Wuzhong Economic and Technological Development Zone,

Tel：+86-512-6617 1988 Fax：+86-512-6617 3610

Facebook: https://www.facebook.com/ veichigroup

WhatsApp：+86-138 2881 8903

Https://www.veichi.org/

Official Website

Version: Jun. 2024