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Initiative Integrity Innovation

Zhejiang Hechuan Technology Co.,Ltd.

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HCFA ATC

All information in this document is subject to change without notice.
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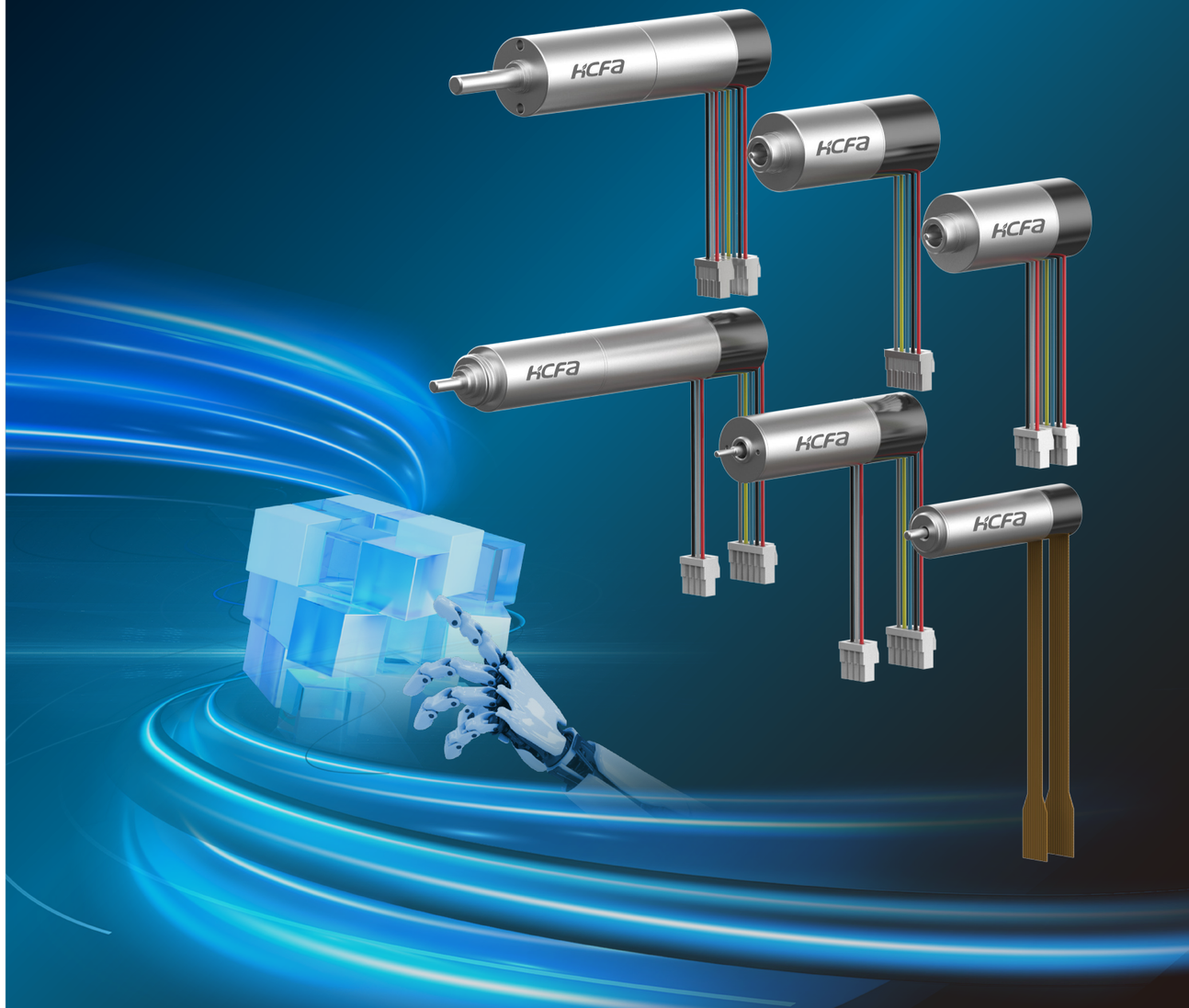
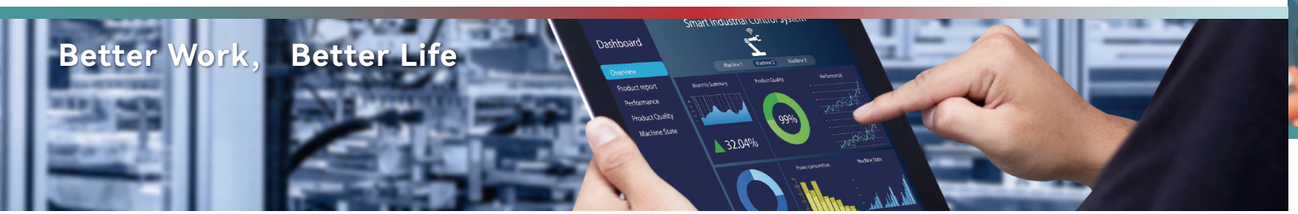
Due to the delay in updating the paper version, please refer to the official website for the latest product information.

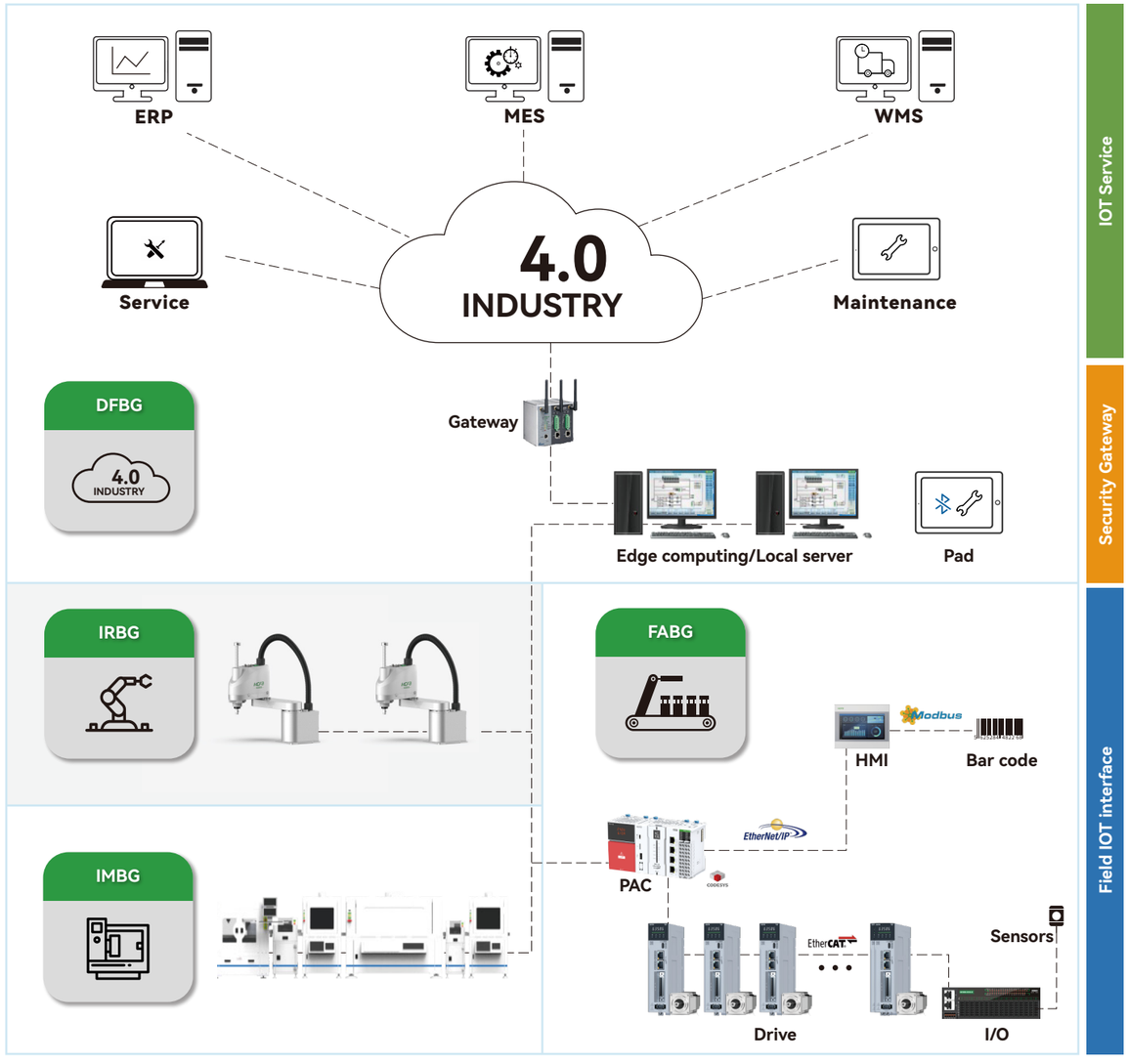
Micro drive system

—— Coreless Motor





We not only provide the core components of industrial automation, but also engage in the industrial process, industrial robots, industrial machines, and digital factories, and can provide enterprises with comprehensive solutions of automation + intelligent equipment + digitalization



Zhejiang Hechuan Technology Co., Ltd., established in 2011, is a company that focuses on the research and development, manufacturing, sales and application integration of industrial automation products, and committed to providing core components and system integration solutions for smart factories.

The main products include controllers, servo systems, vision systems, encoders, VFDs, HMIs, electric rollers, precision transmission components, etc., covering the entire field of industrial automation.

We have newly established a 200-mu high-efficiency precision industrial transmission industrialization base. By introducing industry professionals, it has orderly promoted the industrialization application of precision guide rails, lead screws and other transmission components.

In November 2023, HCFA Technology and Bosch Rexroth signed a strategic cooperation agreement. Bosch Rexroth strategically invested in HCFA Technology and planned to cooperate to establish a subsidiary. Based on common innovation concepts and innovative thinking, the two parties will integrate their respective advantages, form resource complementarity, and carry out in-depth cooperation, striving to become ecological partners in the entire value chain of industrial automation and promote the further development of China's industrial automation industry.

R&D Centers
6
Set up nationally

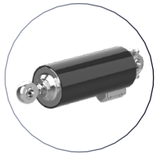
R&D investment
10%+
Proportion of revenue

R&D personnel
300+
Elite gathering

- Established six R&D centers in Longyou, Hangzhou, Shenzhen, Dalian, Suzhou and Germany
- Self-designed ASIC and SOC chips, realize localization replacement
- First-class AMR magnetic technology/high-precision encoder in the industry

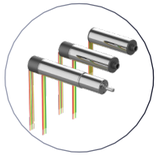
Zhejiang Hechuan Humanoid Robot Co., Ltd. was established in 2024. In August 24, it completed the "YOLO01" humanoid robot prototype, focusing more on the core research and development of power drives, electric drive joints, dexterous hand peripheral hollow cup motors, micro torque motors, hollow compact encoders, torque motors and other products for the new track of humanoid robots. The company insists on continuous innovation, win-win cooperation, providing customers with high-quality products and solutions, excellent cost performance, and improving more advantages.

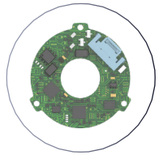
Hechuan Humanoid Robot Co., Ltd. is one of the few humanoid robot companies in the world that has the ability to develop high-performance power joints. It has comprehensive R&D capabilities for the full stack of self -developed mechanisms, from frameless high-efficiency motors, hollow cup motors, planetary roller screws, encoders, reducers, servo controls to mechanisms. At present, the second generation of special humanoid robot special rotary joints and linear joints have been developed. With outstanding lightweight, they can meet the joint requirements of all degrees of freedom of humanoids. The rotary joints have a full coverage of 200Nm, and the linear joints have a full coverage of 8kN thrust, demonstrating the strong and professional self -development capabilities of Hechuan Humanoid Robot Company.

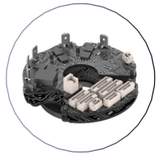

Linear joint


Rotary joint


Frameless motor


Coreless Motor

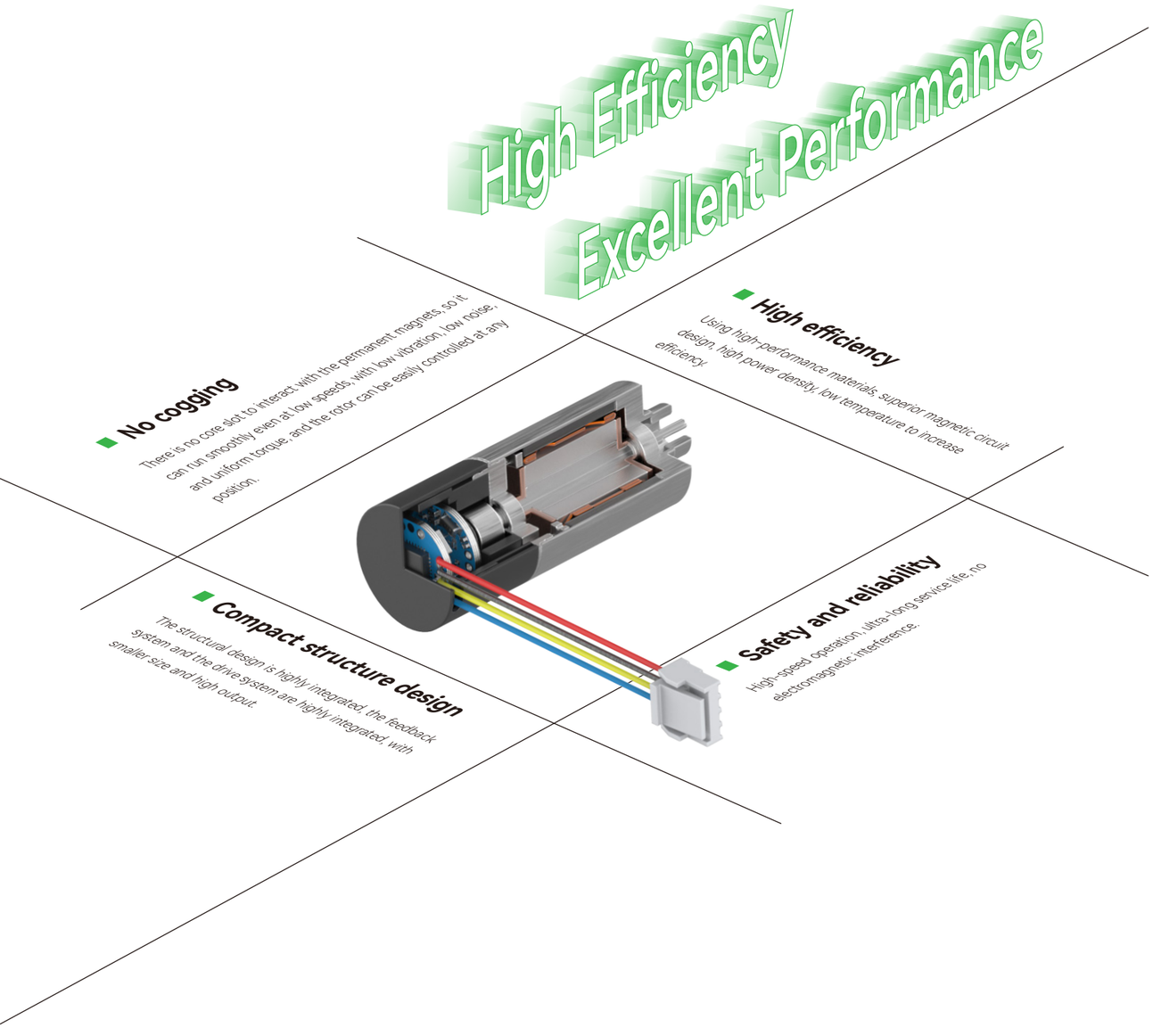

Encoder


Drive

CONTENTS

HCFA

Product Features



Naming Definition

Hu – ECU 12 45 N 24 0016 – *

① ② ③ ④ ⑤ ⑥ ⑦

①	Product series
ECU	Coreless brushless motor
ECG	Coreless gear motor

②	Outer diameter
08	8mm
10	10mm
12	12mm
16	16mm

③	Motor length
45	Body length 45mm
55	Body length 55mm

④	Feedback
N	No sensor
H	Hall sensor
E	Magnetic encoder
C	Integrated drive

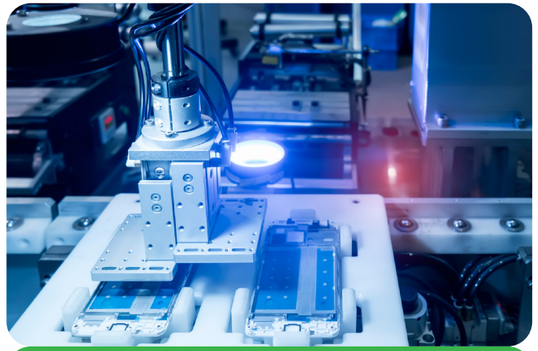
⑤	Supply voltage
06	6V
09	9V
12	12V
18	18V
24	24V
36	36V

⑥	Reduction ratio
None	No reducer
0016	Reduction ratio 16:1
0256	Reduction ratio 256:1

⑦	Customized Code
***	None

Product Application

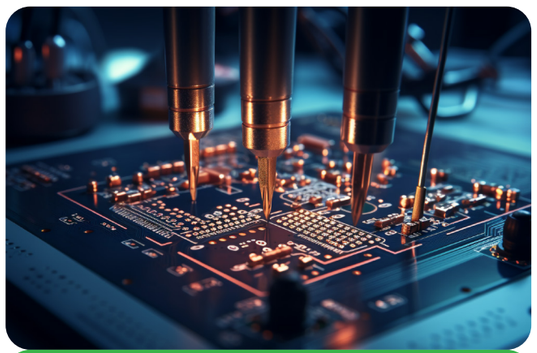
Robot Hand



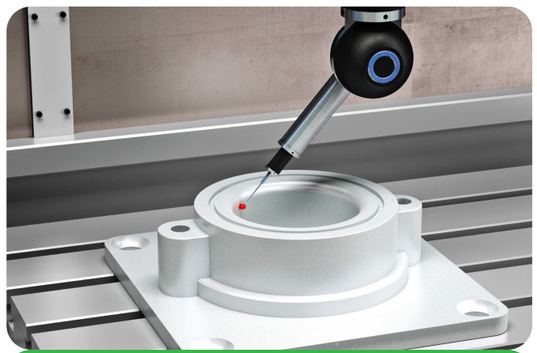
Industrial Automation

Biomedical Industry

Aerospace Industry



3C Electronics



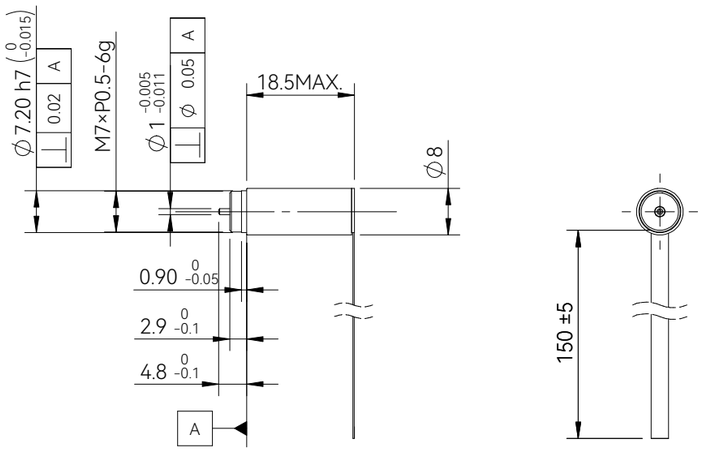
Precision Testing

Coreless Motor

Hu-ECU08

Motor parameters	Unit	BLDC motor Φ8		
		Hu-ECU0818N06	Hu-ECU0818N09	Hu-ECU0818N12
Rated voltage	Vdc	6	9	12
No-load speed	rpm	35000	39000	39000
No-load current	Arms	0.03	0.015	0.02
Rated speed	rpm	25000	30000	30000
Rated torque	mNm	1.23	1.23	1.26
Rated current	Arms	0.55	0.45	0.3
Locked-rotor torque	mNm	3.2	2.6	2.56
Locked-rotor current	Arms	2.5	2.3	1.5
Max. efficiency	%	67	67	66
Phase	-	3		
Pole pairs	-	1		
Torque constant	Nm/Arms	0.0016	0.0021	0.0028
Speed constant	rpm/V	6024	4545	3396
Rotor moment of inertia	gcm^2	0.021		
Mechanical time constant	ms	2.7	2.4	2.2
Feedback	-	No sensor /Magnetic Encoder/Hall		
Phase resistance	Ω	6.00	14.00	18.00
Phase inductance	mH	0.12	0.15	0.15
Insulation level	-	F		
Weight	g	7		

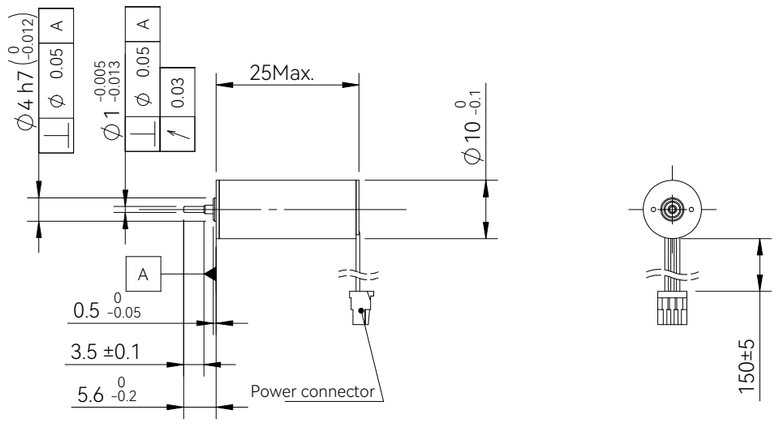
· **Mechanical dimensions**



Hu-ECU10

Motor parameters	Unit	BLDC电机Φ10		
		Hu-ECU1025N06	Hu-ECU1025N09	Hu-ECU1025N12
Rated voltage	Vdc	6	9	12
No-load speed	rpm	32000	32000	27200
No-load current	Arms	0.05	0.05	0.025
Rated speed	rpm	26000	25000	20500
Rated torque	mNm	1.2	1.2	1.2
Rated current	Arms	0.7	0.45	0.3
Locked-rotor torque	mNm	3.8	3.8	4
Locked-rotor current	Arms	3.4	2.8	1.6
Max. efficiency	%	66	67	67
Phase	-	3		
Pole pairs	-	1		
Torque constant	Nm/Arms	0.0018	0.0026	0.0042
Speed constant	rpm/V	5333	3550	2264
Rotor moment of inertia	gcm²	0.06		
Mechanical time constant	ms	2.7	2.2	1.6
Feedback	-	No sensor/Magnetic encoder/Hall/Built-in integrated drive		
Phase resistance	Ω	1.50	4.50	12.80
Phase inductance	mH	0.04	0.05	0.17
Insulation level	-	F		
Weight	g	15		

· Mechanical dimensions

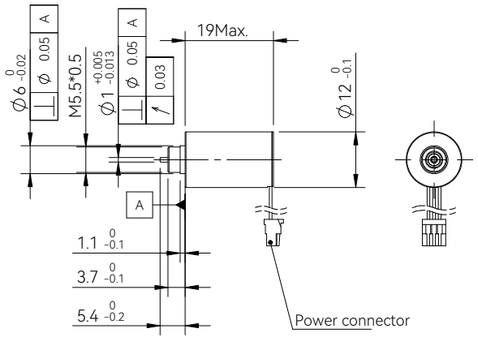


Hu-ECU12

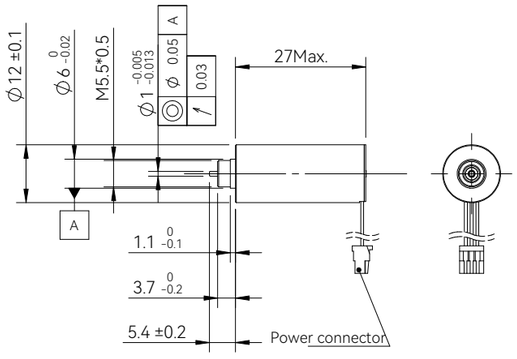
Motor parameters	Unit	BLDC motor Φ12		
		Hu-ECU1218N12	Hu-ECU1218N18	Hu-ECU1227N24
Rated voltage	Vdc	12	18	24
No-load speed	rpm	30000	29500	28000
No-load current	Arms	0.04	0.02	0.02
Rated speed	rpm	25000	24000	24000
Rated torque	mNm	7.1	7.0	7.1
Rated current	Arms	2.3	1.5	1.1
Locked-rotor torque	mNm	41.5	44	35.3
Locked-rotor current	Arms	8.1	6.3	4.8
Max. efficiency	%	72	72	72
Phase	-	3		
Pole pairs	-	1		
Torque constant	Nm/Arms	0.0036	0.0056	0.0076
Speed constant	rpm/V	2608	4685	1250
Rotor moment of inertia	gcm²	0.3		
Mechanical time constant	ms	3.2	2.8	2.5
Feedback	-	No sensor/Magnetic encoder/Hall/Built-in integrated drive		
Phase resistance	Ω	2.52	5.7	9
Phase inductance	mH	0.12	0.15	0.15
Insulation level	-	F		
Weight	g	12	12	20

· Mechanical dimensions

Hu-ECU1218N12
Hu-ECU1218N18



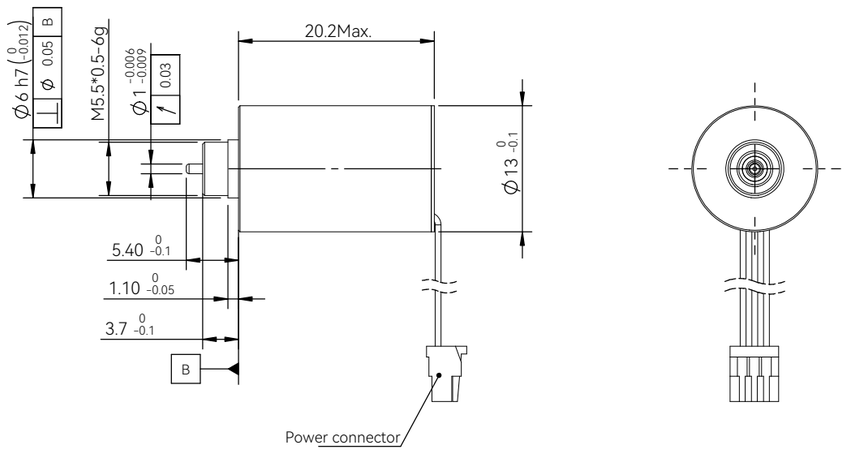
Hu-ECU1227N24



Hu-ECU13

Motor parameters	Unit	BLDC motor Φ13		
		Hu-ECU1320N12	Hu-ECU1320N18	Hu-ECU1320N24
Rated voltage	Vdc	12	18	24
No-load speed	rpm	22000	22000	21000
No-load current	Arms	0.04	0.023	0.012
Rated speed	rpm	18000	17500	17000
Rated torque	mNm	4.2	4.2	4.2
Rated current	Arms	0.82	0.56	0.43
Locked-rotor torque	mNm	28.5	33.5	35.8
Locked-rotor current	Arms	7.5	6.3	4.5
Max. efficiency	%	80	80	80
Phase	-	3		
Pole pairs	-	2		
Torque constant	Nm/Arms	0.0049	0.0077	0.0106
Speed constant	rpm/V	1924	1242	905
Rotor moment of inertia	gcm²	0.42		
Mechanical time constant	ms	3.2	5.4	5.5
Feedback	-	No sensor/Magnetic encoder/Hall/Built-in integrated drive		
Phase resistance	Ω	2.2	4.6	7.2
Phase inductance	mH	0.04	0.09	0.17
Insulation level	-	F		
Weight	g	17		

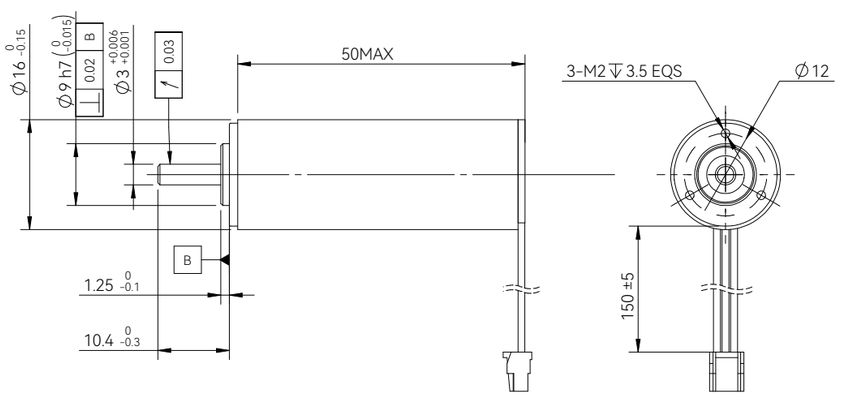
· Mechanical dimensions



Hu-ECU16

Motor parameters	Unit	BLDC motor Φ16		
		Hu-ECU1650N18	Hu-ECU1650N24	Hu-ECU1650N36
Rated voltage	Vdc	18	24	36
No-load speed	rpm	30500	27000	27000
No-load current	Arms	0.56	0.48	0.34
Rated speed	rpm	22000	20000	20000
Rated torque	mNm	15.0		
Rated current	Arms	3.3	1.9	1.5
Locked-rotor torque	mNm	290	245	197
Locked-rotor current	Arms	68	57	42
Max. efficiency	%	89	89.5	89.5
Phase	-	3		
Pole pairs	-	1		
Torque constant	Nm/Arms	0.0054	0.0083	0.013
Speed constant	rpm/V	1745	1148	760
Rotor moment of inertia	gcm²	1.25		
Mechanical time constant	ms	3.5	2.9	2.1
Feedback	-	No sensor /Magnetic encoder/Hall		
Phase resistance	Ω	0.6	1.1	2.6
Phase inductance	mH	0.032	0.082	0.12
Insulation level	-	F		
Weight	g	70		

· Mechanical dimensions



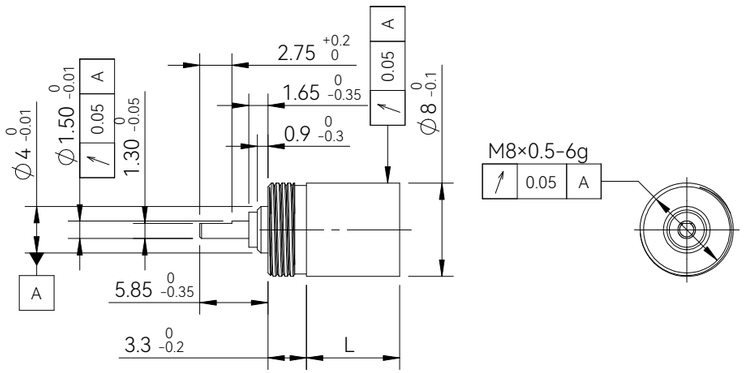
Planetary gearbox

GPA8 Series

Series	1	2	2	3	3	4	4	5
Reduction ratio	4	16	36	64	216	256	1296	1024
Continuous output torque/N.m	0.01	0.02	0.08	0.06	0.02	0.08	0.04	0.1
Instantaneous output torque/N.m	0.015	0.03	0.012	0.09	0.03	0.12	0.06	0.15
Efficiency	90%	81%	76%	73%	55%	65%	57%	59%
No-load hysteresis/ °	≤1.8	≤2.0	≤2.4	≤2.4	≤2.6	≤2.5	≤2.8	≤2.8
Length/mm	5.5	8.1	8.3	10.7	11.1	13.3	13.9	15.9

Gearbox characteristic parameters	
Max. allowable radial load /N	5
Max. allowable axial load /N	5
Max. installation force /N	10
Output shaft radial clearance /mm	≤0.08
Output shaft axial clearance /mm	≤0.08
Recommended temperature range /℃	-15~80

· **Mechanical dimensions**

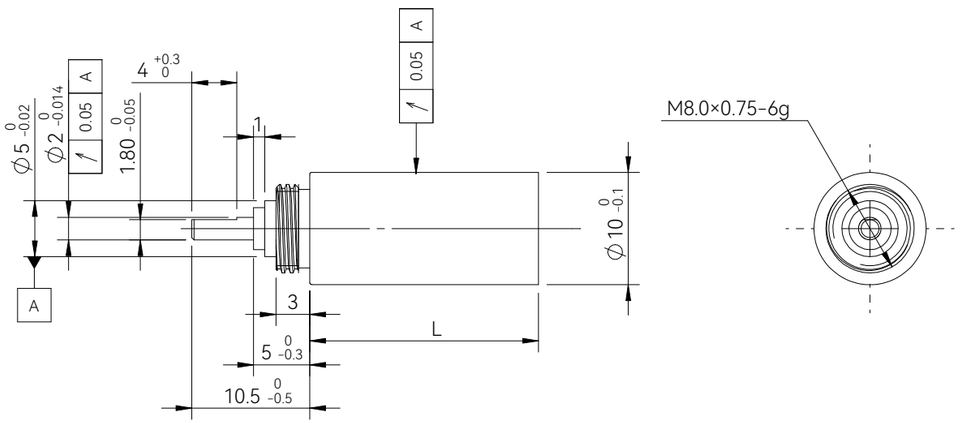


GPA10 Series

Series	1	2	3	4	5
Reduction ratio	4	16	64	256	1024
Continuous output torque/N.m	0.01	0.03	0.1	0.15	0.15
Instantaneous output torque/N.m	0.02	0.05	0.15	0.2	0.2
Efficiency	90%	80%	70%	60%	50%
No-load hysteresis/ °	≤1.5	≤1.8	≤2	≤2.2	≤2.5
Length/mm	11	14.1	17.2	20.4	23.5

Gearbox characteristic parameters	
Max. allowable radial load /N	5
Max. allowable axial load /N	5
Max. installation force /N	10
Output shaft radial clearance /mm	≤0.1
Output shaft axial clearance /mm	≤0.1
Recommended temperature range /℃	-30~105

· **Mechanical dimensions**

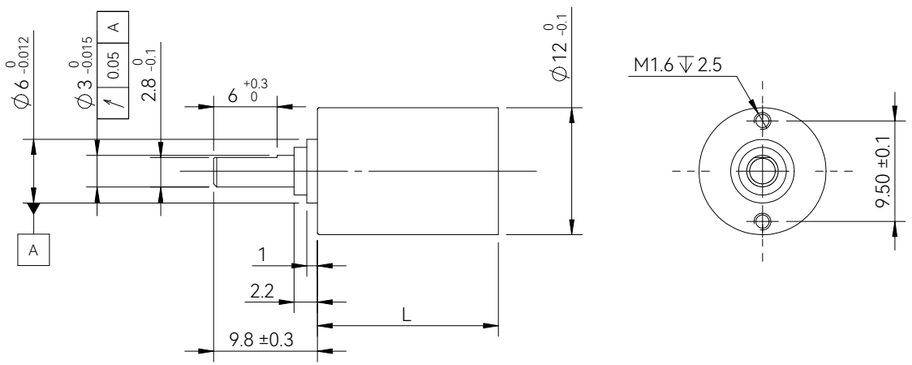


GPA12 Series

Series	1	2	3	4	5
Reduction ratio	3.50~12.25	14.00~22.56	42.88~90.25	150.06~509.07	525.22~2418.07
Continuous output torque/N.m	0.2	0.3	0.3	0.3	0.4
Instantaneous output torque/N.m	0.3	0.5	0.5	0.5	0.6
Efficiency	90%	80%	70%	60%	53%
No-load hysteresis/ °	≤2	≤2	≤2	≤2	≤2
Length/mm	14.3	17.1	19.9	22.7	25.5

Gearbox characteristic parameters	
Max. allowable radial load /N	8
Max. allowable axial load /N	8
Max. installation force /N	20
Output shaft radial clearance /mm	≤0.1
Output shaft axial clearance /mm	≤0.1
Recommended temperature range /℃	-30~105

· **Mechanical dimensions**

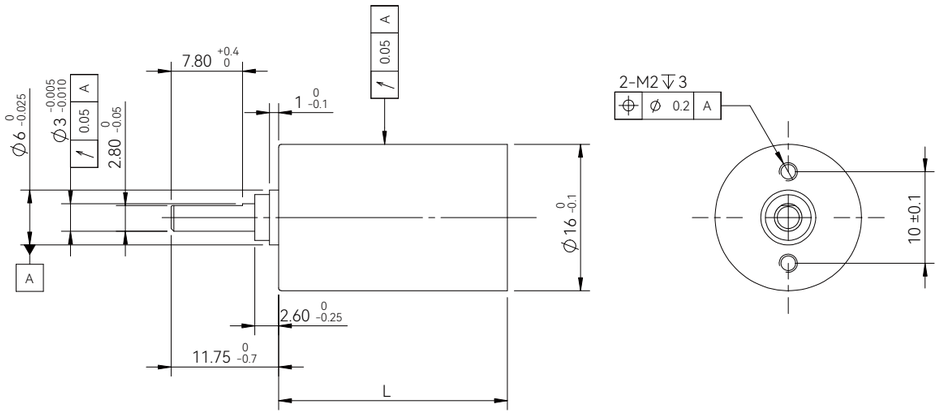


GPA16 Series

Series	1	2	3	4
Reduction ratio	3.55~6.6	13~44	45~287	158~1526
Continuous output torque/N.m	0.25	0.35	0.5	0.6
Instantaneous output torque/N.m	0.35	0.5	0.7	0.8
Efficiency	90%	81%	72%	63%
No-load hysteresis/ °	≤1.5	≤2	≤2	≤2.2
Length/mm	16.5	20.8	27.2	31.5

Gearbox characteristic parameters	
Max. allowable radial load /N	20
Max. allowable axial load /N	20
Max. installation force /N	30
Output shaft radial clearance /mm	≤0.1
Output shaft axial clearance /mm	≤0.2
Recommended temperature range /℃	-20~100

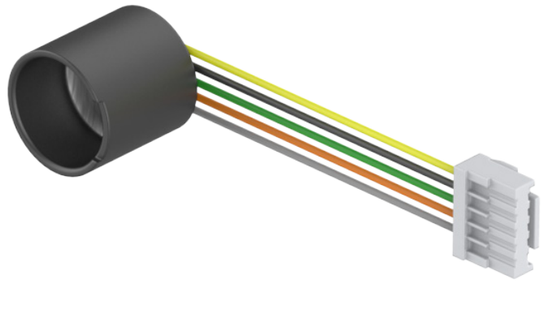
· **Mechanical dimensions**



Encoder

HSR-RMP4096 Series

Model	HSR-RMP4096-D8H	HSR-RMP4096-D10H	HSR-RMP4096-D12H
Diameter/mm	8mm	10mm	12mm
Number of pulses per revolution	4096	4096	4096
Number of channels	ABZ	ABZ	ABZ
Power supply voltage/V	5V	5V	5V
Power supply current/mA	≤40 mA	≤30 mA	≤30 mA
Max. output current per channel/mA	≤10 mA	≤10 mA	≤10 mA
AB max. frequency/MHz	2 MHz	2 MHz	2 MHz
Operating temperature/℃	-40~+125℃	-40~+125℃	-40~+125℃
Length/mm	6.2	10	8



RMA17-M014 Series

Model	RMA17-M014-B16H
Diameter/mm	16mm
Output protocol	Tamagawa
Encoder accuracy	17bit
Power supply voltage/V	5V
Power supply current/mA	≤100 mA
Baud rate/MHz	2.5 MHz
Operating temperature/℃	-40~+125℃
Length/mm	8

Integrated Drive

MMPHC09-18-R1-1

Parameter/Unit	MMPHC09-18-R1-1
Length/mm	12
Diameter/mm	ϕ10、ϕ12、ϕ13
Feedback type	Single-turn absolute encoder
Control mode	Torque mode, speed mode, absolute/incremental position mode
Supply voltage/V	5~18V
Continuous supply current/A	1
Peak supply current/A	2
PWM frequency/kHz	80
Communication method	RS485（modbusRTU）
Drive protection	UVLO/OCP
Operating temperature/℃	-20~65
Operating humidity/%Rh	0~90