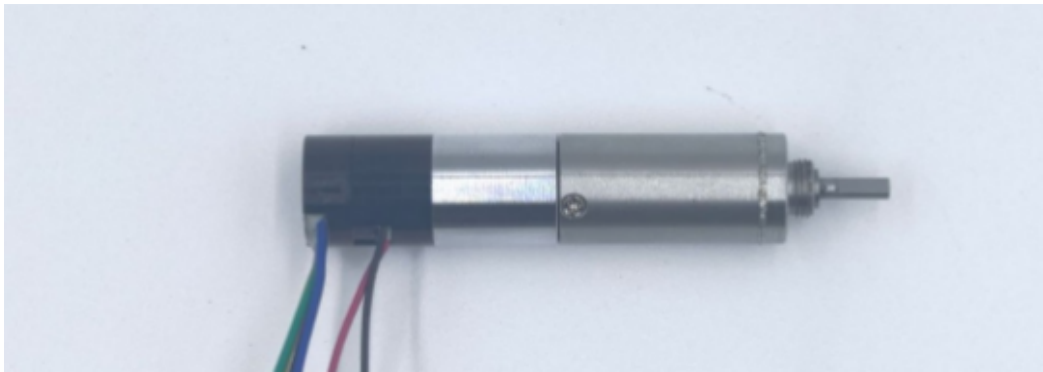


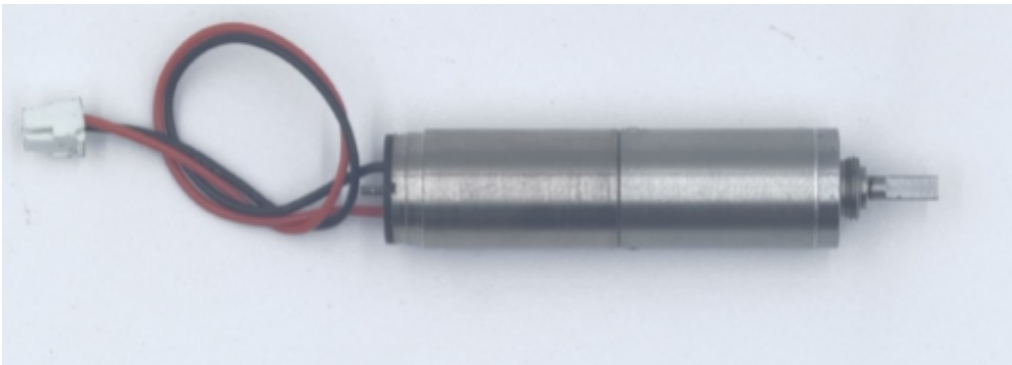
TSL-PG10K326-KS1015-SPI



Motor Type	10mm Coreless Brushed Servo Gear Motor
Motor Components	Coreless Motor + Magnetic Encoder/ SPI + Planetary Gearbox
Outer Diameter	10mm
Total Body Length	44mm
Rated Voltage	DC 12V
Rated Speed	18000rpm
Rated Torque	1.5mNM
Ratio	326:1

Note: The motor parameters are for reference only. Specifications can be customized according to customer requirements.

TSL-PG10K236-KS1022



Motor Type	10mm Coreless Brushed Gear Motor
Motor Components	Coreless Motor + Planetary Gearbox
Outer Diameter	10mm
Total Body Length	42.7mm
Rated Voltage	DC 12V
Rated Speed	16000rpm
Rated Torque	2mNM
Ratio	326:1

Note: The motor parameters are for reference only. Specifications can be customized according to customer requirements.

TSL-P10K28-KW1015



Motor Type	10mm Coreless Brushless Gear Motor
Motor Components	Coreless Motor + Hall+ Planetary Gearbox
Outer Diameter	10mm
Total Body Length	29.6mm
Rated Voltage	DC 12V
Rated Speed	18000rpm
Rated Torque	1mNM
Ratio	28:1

Note: The motor parameters are for reference only. Specifications can be customized according to customer requirements.

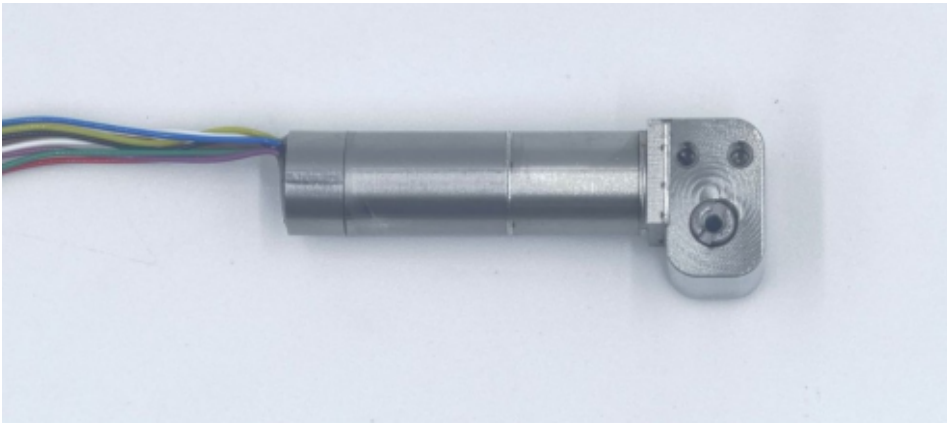
TSL-PG10K28-KW1015-WG03M



Motor Type	10mm Coreless Brushless Worm Gear Motor
Motor Components	Coreless Brushless Motor + Hall Sensor PC Cable + Planetary Gearbox
Outer Diameter	10mm
Total Body Length	36.9mm
Rated Voltage	DC 12V
Rated Speed	18000rpm
Rated Torque	1mNM
Ratio	2420:1

Note: The motor parameters are for reference only. Specifications can be customized according to customer requirements.

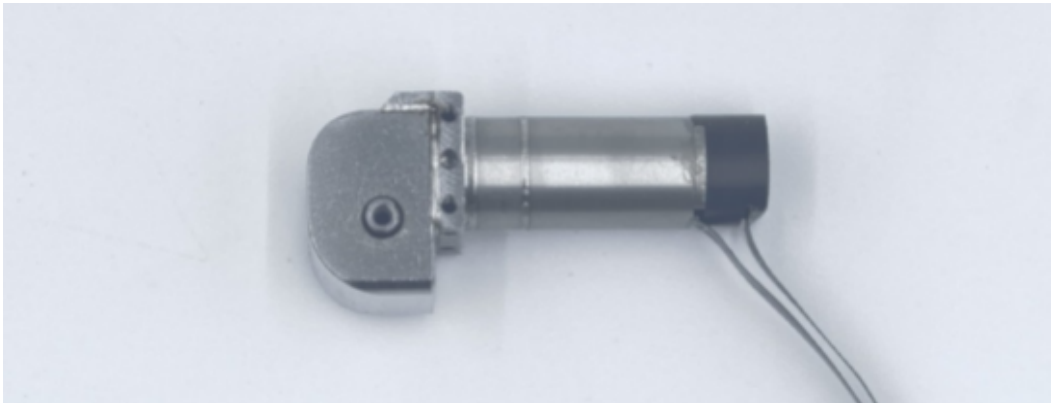
TSL-PG10K28-KW1016-WG03M



Motor Type	10mm Coreless Brushless Worm Gear Motor(Module)
Motor Components	Coreless Brushless Motor + Magnetic Encoder + Planetary Gearbox + Worm Gear Assembly
Outer Diameter	10mm
Total Body Length	45.5mm
Rated Voltage	DC 12V
Rated Speed	18000rpm
Rated Torque	1mNM
Ratio	1540:1

Note: The motor parameters are for reference only. Specifications can be customized according to customer requirements.

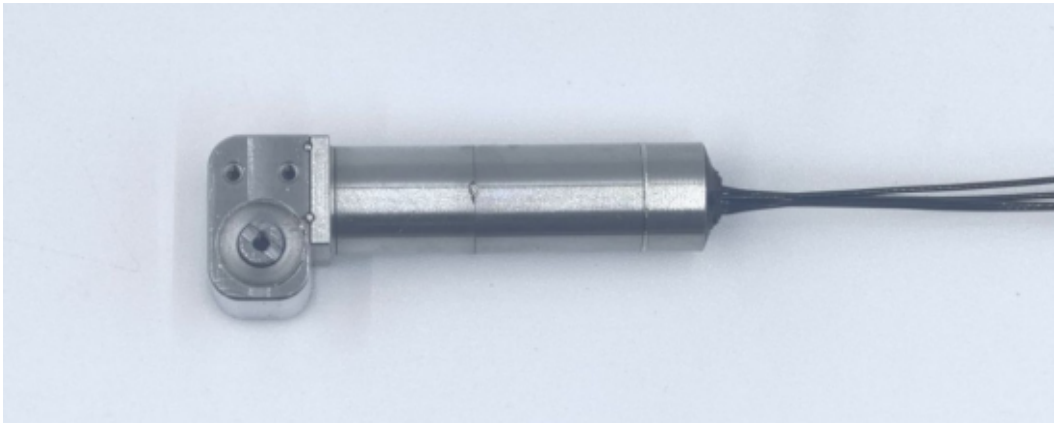
TSL-PG10K5.33-KW1016-WG04M



Motor Type	10mm Coreless Brushless Worm Gear Motor(Module)
Motor Components	Coreless Brushless Motor + SPI Encoder + Planetary Gearbox + Worm Gear Assembly
Outer Diameter	10mm
Total Body Length	40.6mm
Rated Voltage	DC 12V
Rated Speed	18000rpm
Rated Torque	1mNM
Ratio	361:1

Note: The motor parameters are for reference only. Specifications can be customized according to customer requirements.

TSL-PG10K28-KW1-16-WG03M-TO



Motor Type	10mm Integrated Drive-Control Joint Module Gear Motor
Motor Components	Brushless Motor + Built-in Drive-Control with 10 Serial Communication Ports
Outer Diameter	10mm
Total Body Length	45.5mm
Rated Voltage	DC 12V
Rated Speed	18000rpm
Rated Torque	1mNM
Ratio	1320:1

Note: The motor parameters are for reference only. Specifications can be customized according to customer requirements.

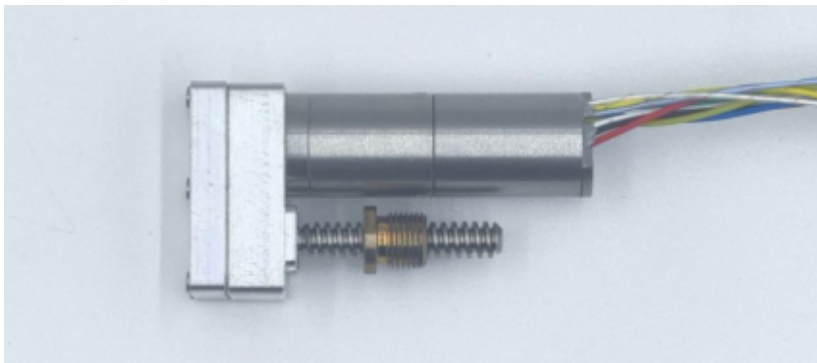
TSL-PG10K5.33-KW1015-SG5.5T



Motor Type	10mm Electric Linear Actuator (Linear Motor)
Motor Components	Brushless Motor + Planetary Gearbox+ Lead Screw Assembly
Outer Diameter	10mm
Total Body Length	26mm
Rated Voltage	DC 12V
Rated Speed	18000rpm
Rated Torque	1mNM
Ratio	28:1
Lead Screw Assembly	Single-Start T3.5 × Pitch 1.2 mm

Note: The motor parameters are for reference only. Specifications can be customized according to customer requirements.

TSL-PG10K28-KW1015-DZ3.5T



Motor Type	10mm Electric Linear Actuator (Inverted Linear Actuator)
Motor Components	Brushless Motor + Planetary Gearbox+ Lead Screw Assembly
Outer Diameter	10mm
Total Body Length	38.2mm
Rated Voltage	DC 12V
Rated Speed	18000rpm
Rated Torque	1mNM
Ratio	65:1
Lead Screw Assembly	Single-Start T3.5 × Pitch 1.2 mm

Note: The motor parameters are for reference only. Specifications can be customized according to customer requirements.

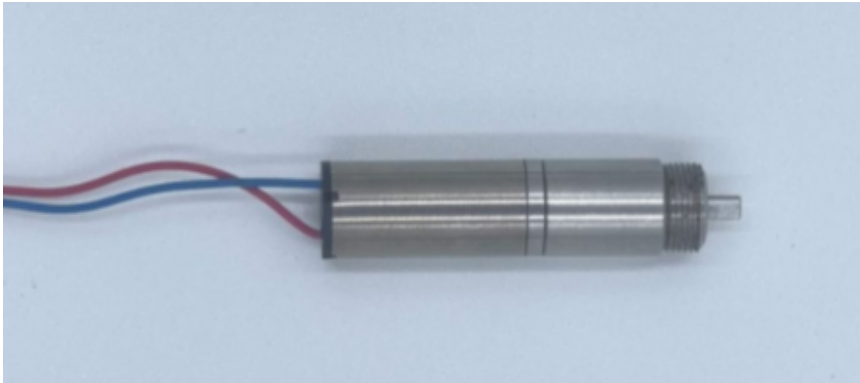
TSL-PG8K1024-KW0816



Motor Type	8mm Coreless Brushles Gear Motor
Motor Components	Coreless Brushless Motor + Hall Encoder+ Planetary Gearbox
Outer Diameter	8mm
Total Body Length	40.7mm
Rated Voltage	DC 12V
Rated Speed	18000rpm
Rated Torque	1mNM
Ratio	1024:1

Note: The motor parameters are for reference only. Specifications can be customized according to customer requirements.

TSL-PG8K125-KS0816



Motor Type	8mm Coreless Brushed Gear Motor
Motor Components	Coreless Motor + Planetary Gearbox
Outer Diameter	8mm
Total Body Length	31.5mm
Rated Voltage	DC 12V
Rated Speed	18000rpm
Rated Torque	1mNM
Ratio	125:1

Note: The motor parameters are for reference only. Specifications can be customized according to customer requirements.

TSL-PG8K1024-KS0816-MA1024



Motor Type	8mm Coreless Brushed Gear Motor
Motor Components	Coreless Motor +Magnetic Encoder+ Planetary Gearbox
Outer Diameter	8mm
Total Body Length	43.4mm
Rated Voltage	DC 12V
Rated Speed	18000rpm
Rated Torque	1mNM
Ratio	1024:1

Note: The motor parameters are for reference only. Specifications can be customized according to customer requirements.

TSL-PG8K64-KS0816-WG03M



Motor Type	8mm Coreless Brushed Worm Gear Motor
Motor Components	Coreless Motor + Planetary Gearbox+Worm Gear
Outer Diameter	8mm
Total Body Length	30.4mm
Rated Voltage	DC 12V
Rated Speed	18000rpm
Rated Torque	1mNM
Ratio	1600:1

Note: The motor parameters are for reference only. Specifications can be customized according to customer requirements.

TSL-PG8K64-KW0816-MA1024-LG3.5T



Motor Type	8mm Coreless Brushless Gear Motor
Motor Components	Coreless Motor + Magnetic Encoder+ Planetary Gearbox+Lead Screw Assembly
Outer Diameter	8mm
Total Body Length	23.6mm
Rated Voltage	DC 12V
Rated Speed	20000rpm
Rated Torque	1.5mNM
Ratio	64:1
Lead Screw Assembly	Single-Start T3.5 × Pitch 1mm

Note: The motor parameters are for reference only. Specifications can be customized according to customer requirements.

TSL-PG8K256-KS0816-LG3.5T



Motor Type	8mm Coreless Brushed Gear Motor
Motor Components	Coreless Motor + Planetary Gearbox+Lead Screw Assembly
Outer Diameter	8mm
Total Body Length	41.9mm(Including thrust bearing)
Rated Voltage	DC 7.4V
Rated Speed	15000rpm
Rated Torque	1.5mNM
Ratio	256:1
Lead Screw Assembly	Single-Start T3.5 × Pitch 1.2 mm

Note: The motor parameters are for reference only. Specifications can be customized according to customer requirements.

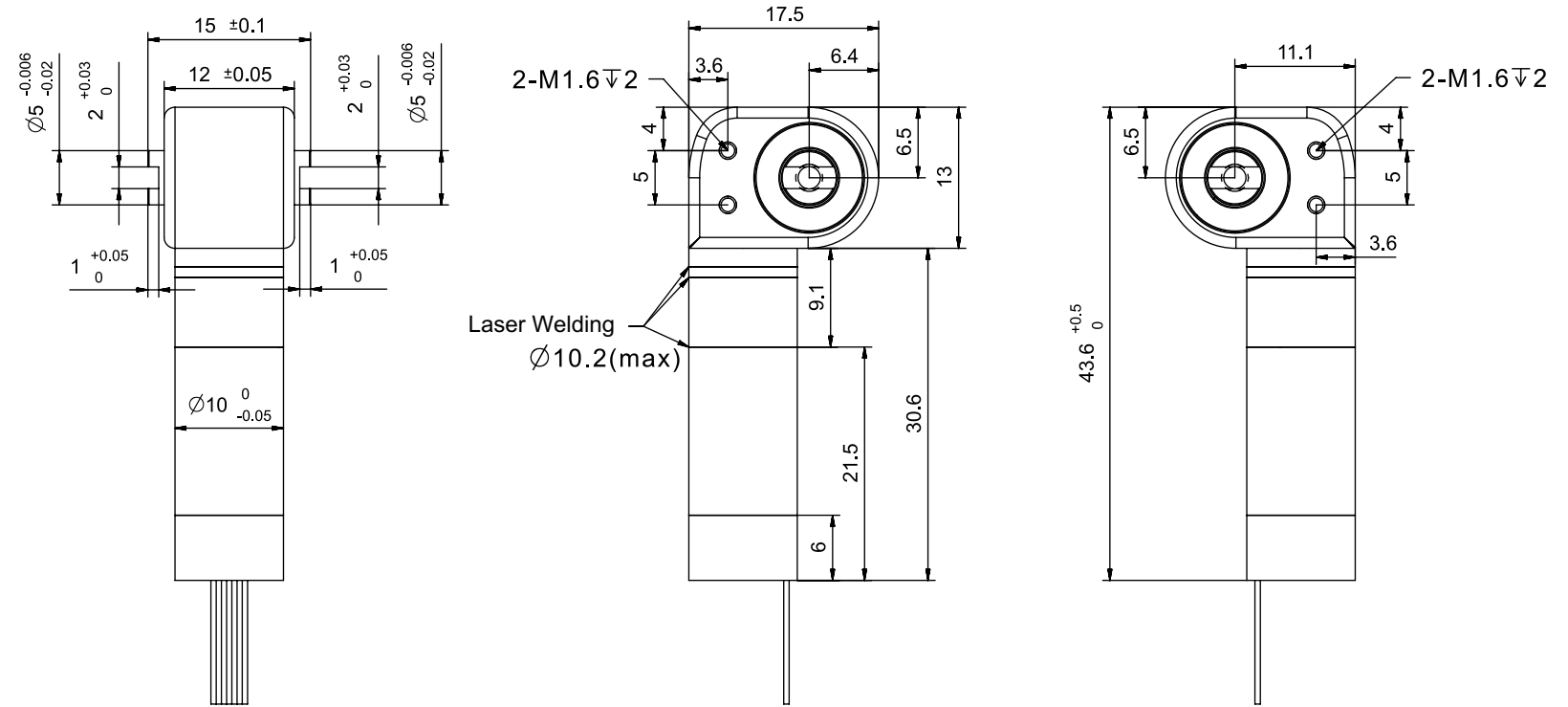
TSL-PG8K125-KS0816-TG3.5T



Motor Type	8mm Electric Linear Actuator
Motor Components	Coreless Motor + Planetary Gearbox+Linear Actuator Assembly
Outer Diameter	8mm
Total Body Length	108mm
Rated Voltage	DC 7.4V
Rated Speed	10000rpm
Rated Torque	2mNM
Ratio	125:1
Thrust	100N

Note: The motor parameters are for reference only. Specifications can be customized according to customer requirements.

Worm and Worm Gear Parameter Table		
	Worm	Worm Gear
Module	0.4	
Number of Starts/ Number of Teeth	1	20
Pressure Angle	20°	20°
Tip Diameter	5	8.8
Reference Diameter	4.2	8
Lead Angle	Right-hand 5.44°	
Worm Lead	1.257	-
Worm Pitch	1.257	-
Addendum Coefficient	1	1
Clearance Coefficient	0.25	0.25
Modification Coefficient	-	-
Transmission Center Distance	6.1	
Material	20CrMnTi	
Accuracy Class	GB/T 10095-2001 - Grade 8	



Motor Performance Parameters:

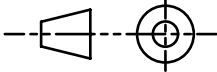
1. Motor Type: Coreless Brushless Motor
2. Operating Voltage: 12V
3. No-load Speed: 32000 ±10% RPM
4. No-load Current: ≤0.15A
5. Rated Speed: 18000 ±10% RPM
6. Rated Torque: ≥10 g.cm
7. RatedCurrent: ≤0.5A
8. Pole Pairs: 2 Pole Pairs
9. Operating Temperature: -40-85°C
10. Noise: ≤45 DB
11. Motor Maximum Efficiency: 75%

Gearmotor Performance Parameters:

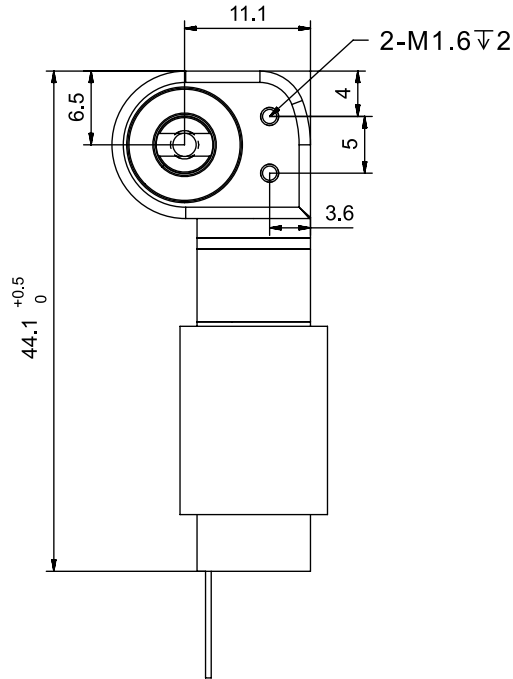
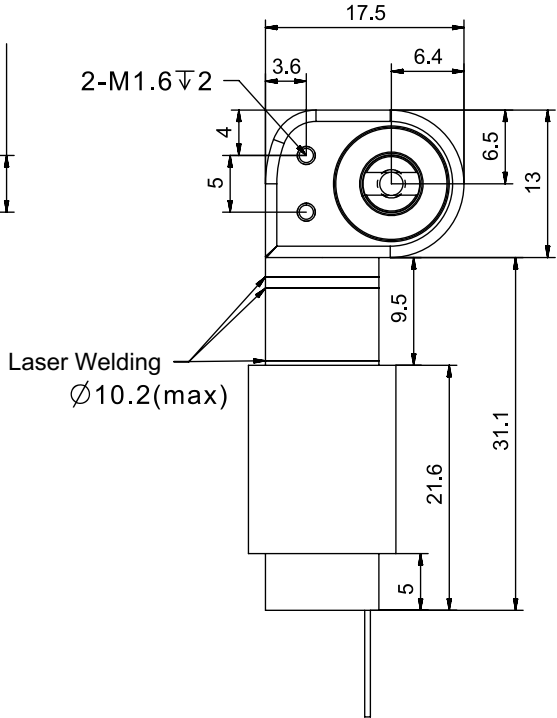
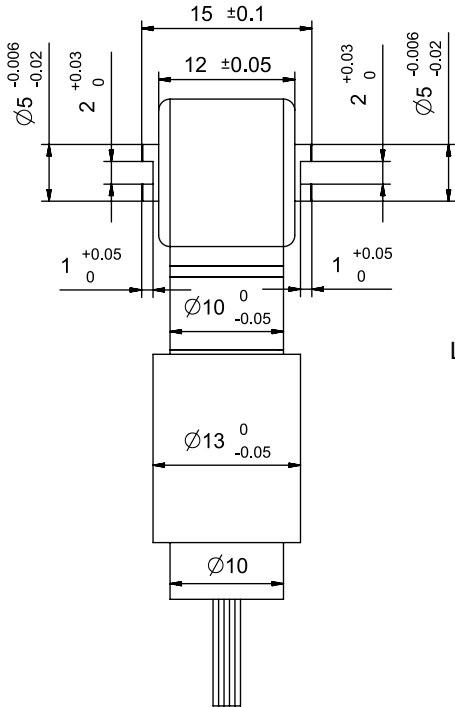
1. Operating Voltage: 12V
2. No-load Speed: 55 ±10% RPM
3. No-load Current: ≤0.2A
4. Rated Speed: 35 ±10% RPM
5. Rated Torque: ≥800 g.cm
6. Rated Current: ≤0.5A
7. Operating Temperature: -40-80°C
8. Reduction Ratio: 1:560
(Planetary Stage 1:28, Worm and Worm Gear Stage 1:20)
9. Noise: ≤55 DB
10. Gearbox Material: Pure Steel
(Machined)

Encoder + Driver: pin1-4 wire

- pin1:VDD
pin2:GND
pin3:RXD
pin4:TXD

Design		First Angle Projection 	10mm Planetary Gearbox+10mm Coreless Brushless Motor+Encoder-Driver Integrated Unit+Worm and Worm Gear Reducer Gearbox (Product Type)
Reviewed			PG10K28-KW1016+LG13175K20 (Product Model)
Approved		General tolerances for untoleranced linear and angular dimensions: GB/T 1804-m eqv ISO 2768-1:m	Tsinglin Micromotor Co., Ltd
Date			

Worm and Worm Gear Parameter Table		
	Worm	Worm Gear
Module	0.4	
Number of Starts/ Number of Teeth	1	20
Pressure Angle	20°	20°
Tip Diameter	5	8.8
Reference Diameter	4.2	8
Lead Angle	Right-hand 5.44°	
Worm Lead	1.257	-
Worm Pitch	1.257	-
Addendum Coefficient	1	1
Clearance Coefficient	0.25	0.25
Modification Coefficient	-	-
Transmission Center Distance	6.1	
Material	20CrMnTi	
Accuracy Class	GB/T 10095-2001 - Grade 8	



Motor Performance Parameters:

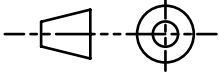
1. Motor Type: Coreless Brushless Motor
2. Operating Voltage: 12V
3. No-load Speed: 25000 ±10% RPM
4. No-load Current: ≤0.4A
5. Load Speed: 18000 ±10% RPM
6. Load Torque: ≥15 g.cm
7. Load Current: ≤1A
8. Stall Torque: ≥100 g.cm
9. Pole Pairs: 2 Pole Pairs
10. Operating Temperature: -40-85°C
11. Noise: ≤45 DB
12. Motor Maximum Efficiency: 75%

Gearmotor Performance Parameters:

1. Operating Voltage: 12V
2. No-load Speed: 45 ±10% RPM
3. No-load Current: ≤0.5A
4. Rated Speed: 30 ±10% RPM
5. Rated Torque: ≥2500 g.cm
6. Rated Current: ≤1.2A
7. Operating Temperature: -40-80°C
8. Reduction Ratio: 1:560
(Planetary Stage 1:28, Worm and Worm Gear Stage 1:20)
9. Noise: ≤55 DB
10. Gearbox Material: Pure Steel
(Machined)

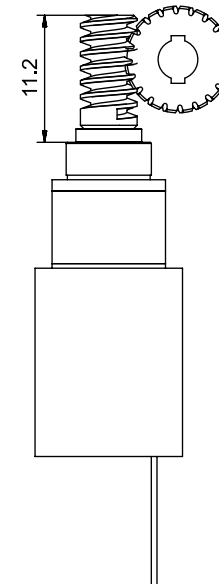
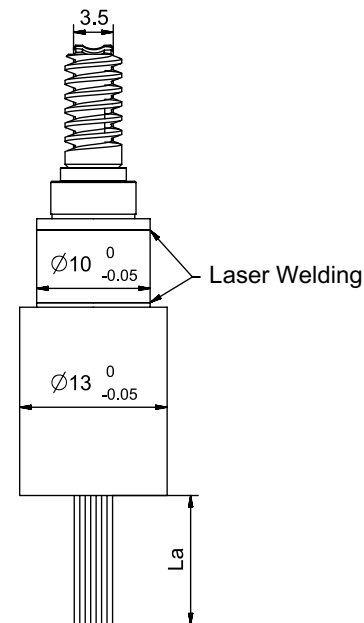
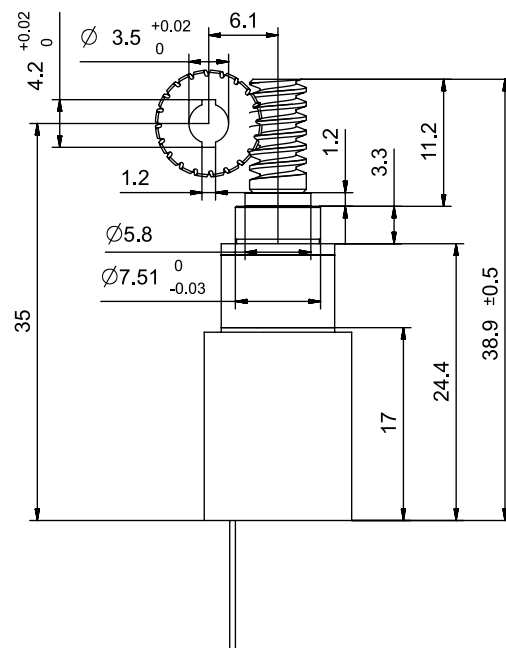
Encoder + Driver: pin1-4 wire

pin1:VDD
pin2:GND
pin3:RXD
pin4:TXD

Design		First Angle Projection 	10mm Planetary Gearbox+13mm Coreless Brushless Motor+Encoder-Driver Integrated Unit+Worm and Worm Gear Reducer Gearbox (Product Type)
Reviewed			PG10K28-KW1317+LG13175K20 (Product Model)
Approved		General tolerances for untoleranced linear and angular dimensions: GB/T 1804-m eqv ISO 2768-1:m	Tsinglin Micromotor Co., Ltd
Date			

	Worm	Worm Gear
Module	0 . 4	
Number of Starts/ Number of Teeth	1	20
Pressure Angle	20°	20°
Tip Diameter	5	8 . 8
Reference Diameter	4 . 2	8
Lead Angle	Right-hand 5 . 4 4°	
Worm Lead	1 . 2 5 7	-
Worm Pitch	1 . 2 5 7	-
Addendum Coefficient	1	1
Clearance Coefficient	0 . 2 5	0 . 2 5
Modification Coefficient	-	-
Transmission Center Distance	6 . 1	
Material	SUS416	20crmnti
Accuracy Class	GB/T 10095-2001 - Grade 8	

1. Motor Type: Coreless Brushless Motor
2. Operating Voltage: 12V
3. No-load Speed: 30000 $\pm$ 10% RPM
4. No-load Current: $\leq$ 0.4A
5. Rated Speed: 23000 $\pm$ 10% RPM
6. Rated Torque: $\geq$ 3mN.m
7. Rated Current: $\leq$ 1.5A
8. Pole Pairs: 2 Pole Pairs
9. Operating Temperature: -40-85°C
10. Noise: $\leq$ 45 DB
11. Motor Maximum Efficiency: 75%



FPC Harness
Length La:
70mm



Coreless Brushless Motor:
FPC: 0.5mm-12P
Pin Assignment: PIN1-12

- pin1-HALL A
- pin2-HALL B
- pin3-HALL Z
- pin4-3.3V
- pin5-GND
- pin6+7-Motor U
- pin8+9-Motor V
- pin10+11-Motor W
- pin12-Temp. Ctrl.

1. Operating Voltage: 12V
2. No-load Speed: $50 \pm 10\%$ RPM
3. No-load Current: $\leq 0.4A$
4. Rated Speed: $40 \pm 10\%$ RPM
5. Rated Torque: $\geq 0.75\text{NM}$
6. Rated Current: $\leq 1.5A$
7. Peak Torque (2s): 1.5 N.m
8. Peak Current: $\leq 2.5A$
9. Operating Temperature: $-40\text{--}80^{\circ}\text{C}$
10. Reduction Ratio: 1:560
(Planetary Stage 1:28, Worm and Worm Gear Stage 1:20)
11. Worm and Worm Gear Self-locking Torque: $\geq 3\text{ NM}$
- 12.. Noise: $\leq 55\text{ DB}$
13. Gearbox Material: Pure Steel
(Machined)

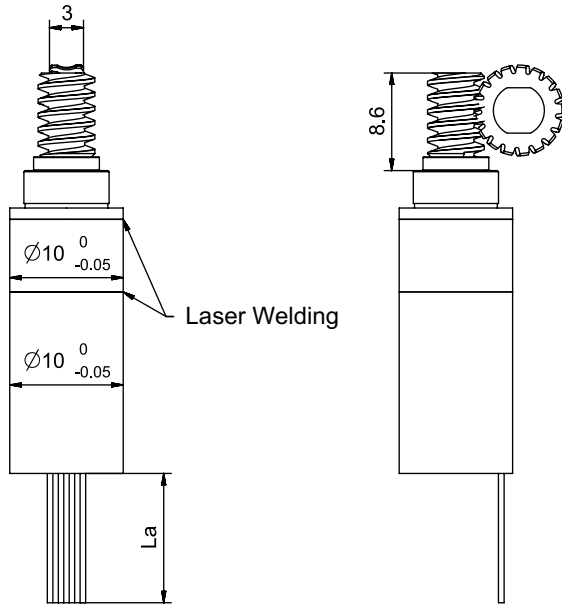
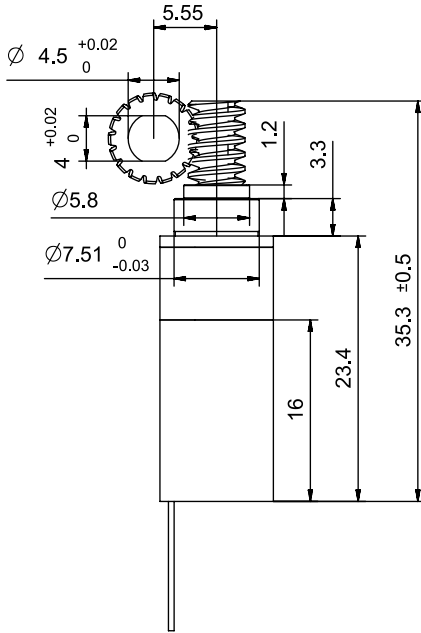
Design		First Angle Projection 	10mm Planetary Gearbox+13mm Coreless Brushless Motor+Worm and Worm Gear Reducer Gearbox (Product Type)
Reviewed			PG10K28-KW1317+LG04M20Z (Actuator 3) (Product Model)
Approved		General tolerances for untoleranced linear and angular dimensions: GB/T 1804-m eqv ISO 2768-1:m	Tsinglin Micromotor Co., Ltd
Date	2026.01.20		

Worm and Worm Gear Parameter Table		
	Worm	Worm Gear
Module	0.4	
Number of Starts/ Number of Teeth	1	17
Pressure Angle	20°	20°
Tip Diameter	5	7.6
Reference Diameter	4.2	6.8
Lead Angle	Right-hand 5.44°	
Worm Lead	1.257	-
Worm Pitch	1.257	-
Addendum Coefficient	1	1
Clearance Coefficient	0.25	0.25
Modification Coefficient	-	-
Transmission Center Distance	5.55	
Material	SUS416	20crmnti
Accuracy Class	GB/T 10095-2001 - Grade 8	

- Motor Performance Parameters:
- Motor Type: Coreless Brushless Motor
 - Operating Voltage: 12V
 - No-load Speed: 32000 ±10% RPM
 - No-load Current: ≤0.4A
 - Rated Speed: 20000 ±10% RPM
 - Rated Torque: ≥10 g.cm
 - RatedCurrent: ≤0.6A
 - Pole Pairs: 2 Pole Pairs
 - Operating Temperature: -40-85°C
 - Noise: ≤45 DB
 - Motor Maximum Efficiency: 75%

Gearmotor Performance Parameters:

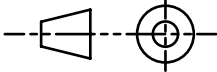
- Operating Voltage: 12V
- No-load Speed: 65 ±10% RPM
- No-load Current: ≤0.3A
- Rated Speed: 40 ±10% RPM
- Rated Torque: ≥0.25NM
- Rated Current: ≤0.6A
- Peak Torque (2s): 0.6 N.m
- Peak Current: ≤1A
- Operating Temperature: -40-80°C
- Reduction Ratio: 1:476
(Planetary Stage 1:28, Worm and Worm Gear Stage 1:17)
- Worm and Worm Gear Self-locking
Torque: ≥2 NM
- .. Noise: ≤55 DB
- Gearbox Material: Pure Steel
(Machined)



FPC Harness
Length La:
70mm



Coreless Brushless Motor:
FPC: 0.5mm-12P
Pin Assignment: PIN1-12
pin1-HALL A
pin2-HALL B
pin3-HALL Z
pin4-3.3V
pin5-GND
pin6+7-Motor U
pin8+9-Motor V
pin10+11-Motor W
pin12-Temp. Ctrl.

Design		First Angle Projection 	10mm Planetary Gearbox+10mm Coreless Brushless Motor+Worm and Worm Gear Reducer Gearbox (Product Type)
Reviewed			PG10K28-KW1016+LG04M17Z (Actuator 1) (Product Model)
Approved		General tolerances for untoleranced linear and angular dimensions: GB/T 1804-m eqv ISO 2768-1:m	Tsinglin Micromotor Co., Ltd
Date	2026.01.20		

Worm and Worm Gear Parameter Table		
	Worm	Worm Gear
Module	0 . 3	
Number of Starts / Teeth	1	20
Pressure Angle	20°	20°
Addendum Circle Diameter	4 . 5	6 . 6
Pitch Circle Diameter	3 . 9	6
Lead Angle	Right-hand 4 . 5 1°	
Worm Lead	0 . 9 4 2	-
Worm Pitch	0 . 9 4 2	-
Addendum Coefficient	1	1
Clearance Coefficient	0 . 2 5	0 . 2 5
Modification Coefficient	-	-
Center Distance	4 . 9 5	
Material	SUS416	Beryllium Bronze
Accuracy Grade	GB/T 10095-2001, Grade 8	

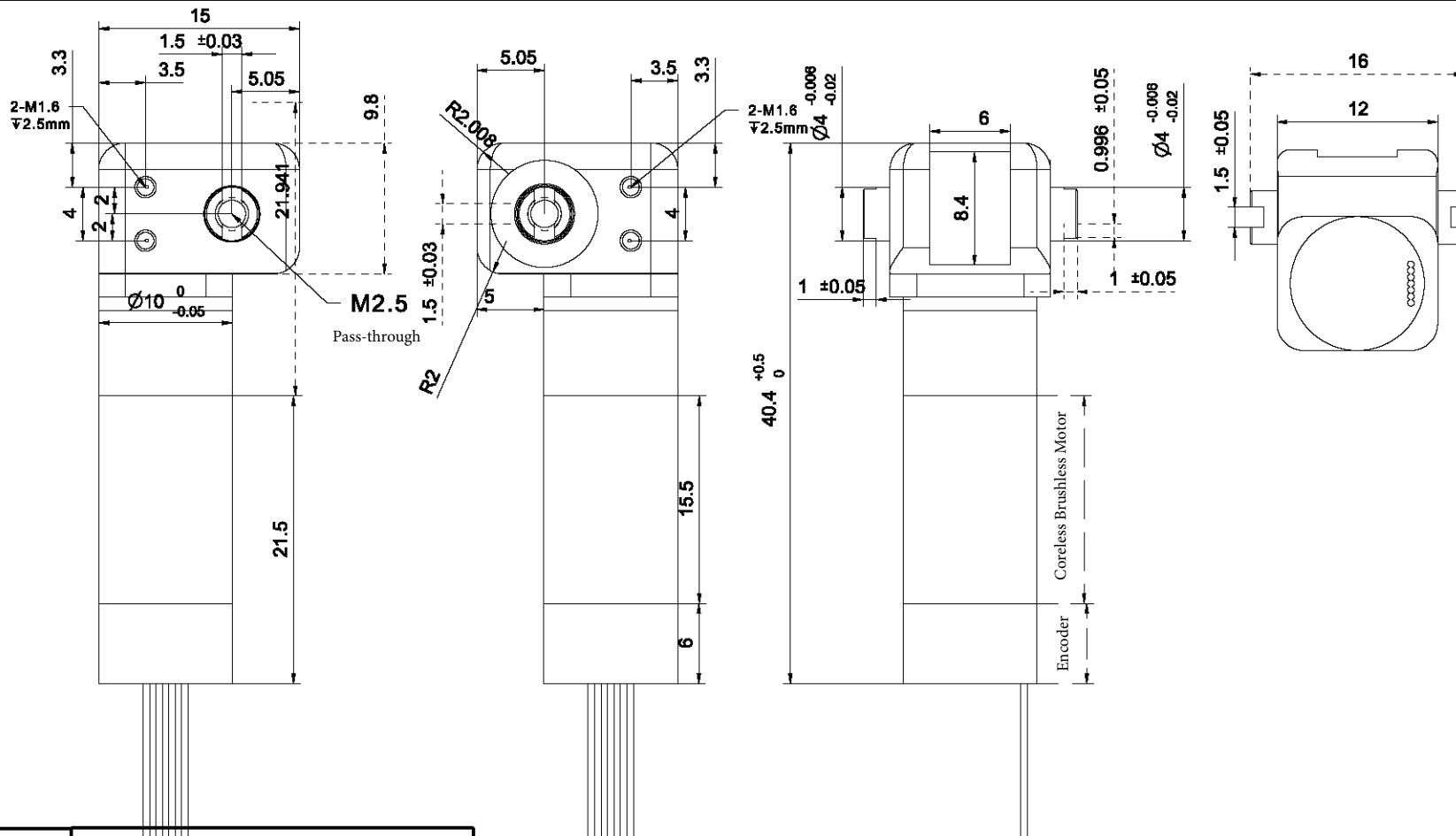
Motor Performance Specifications:

1. Motor Type: Coreless Brushless Motor
2. Operating Voltage: 12V
3. No-load Speed: $33,000 \pm 10\%$ RPM
4. No-load Current: ≤ 0.15 A
5. Load Speed: $18,000 \pm 10\%$ RPM
6. Load Torque: ≥ 10 g·cm
7. Load Current: ≤ 0.5 A
8. Number of Pole Pairs: 2 pole pairs
9. Operating Temperature: -20 to 85°C
10. Noise Level: ≤ 45 dB
11. Maximum Motor Efficiency: 75%

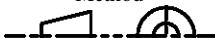
Reducer Motor Performance Specifications:

1. Operating Voltage: 12V
2. No-load Speed: $55 \pm 10\%$ RPM
3. No-load Current: ≤ 0.25 A
4. Load Speed: $35 \pm 10\%$ RPM
5. Load Torque: ≥ 800 g·cm
6. Load Current: ≤ 0.5 A
7. Operating Temperature: -20 to 80°C
8. Reduction Ratio: 1:560
(Planetary: 1:28, Worm Gear: 1:20)
9. Noise Level: ≤ 55 dB (measured at 30 cm)
10. Gearbox Material: Pure Copper (Machined)

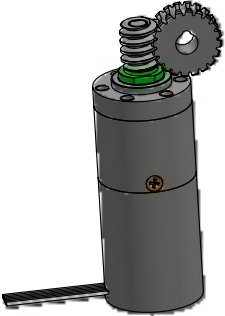
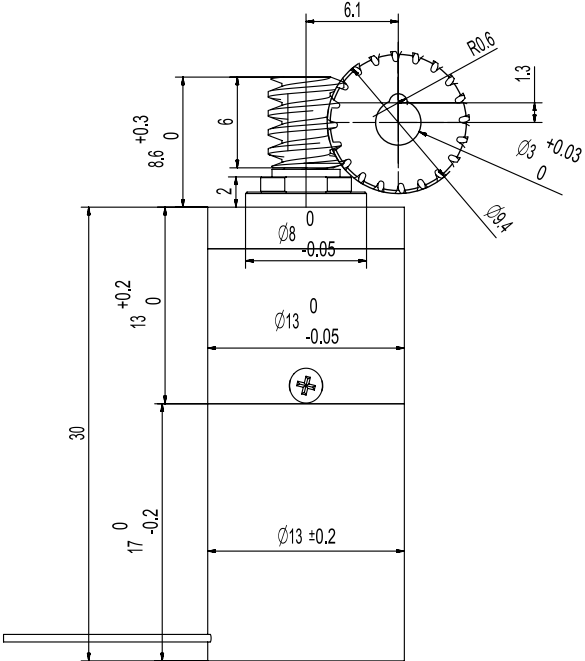
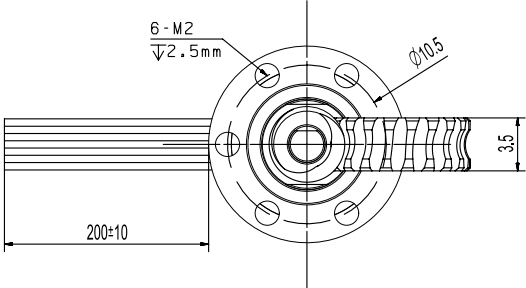
Note: The motor shaft material is relatively soft; long-term heavy-load operation is not recommended.



Encoder + Encoder: pin1-8 Wiring Sequence

Design		First-Angle Projection Method 	10 mm Planetary Gearbox + 10 mm Coreless Brushless Motor
Review			+Encoder + Worm-Gear Reducer (Product Type)
Approval		Unspecified linear and angular dimension tolerances: GB\T1804-m eqv ISO 2768-1:m	TSL-PG10K28-KW1016 -WG03M (Product Model)
Date	2025.08.27		Tsinglin Micromotor Co., Ltd

Worm and Worm Gear Parameter Table		
	Worm	Worm Gear
Module	0 . 4	
Number of Starts / Teeth	1	2 0
Pressure Angle	2 0°	2 0°
Addendum Circle Diameter	5	8 . 8
Pitch Circle Diameter	4 . 2	8
Lead Angle	Right-hand 5 . 4 4°	
Addendum Coefficient	1	1
Clearance Coefficient	0 . 2 5	0 . 2 5
Modification Coefficient	-	-
Material	SUS 4 1 6	
Accuracy Grade	GB/T 10095-2001, Grade 8	



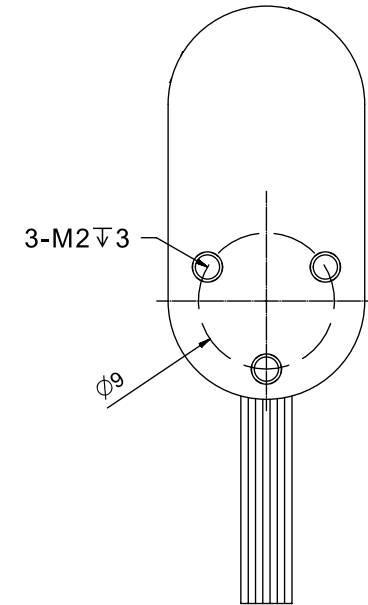
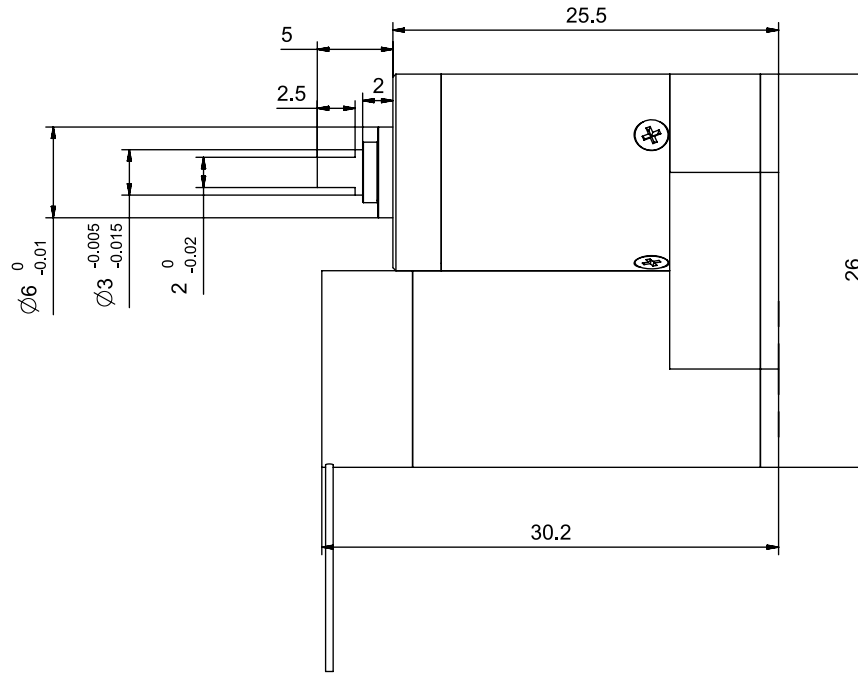
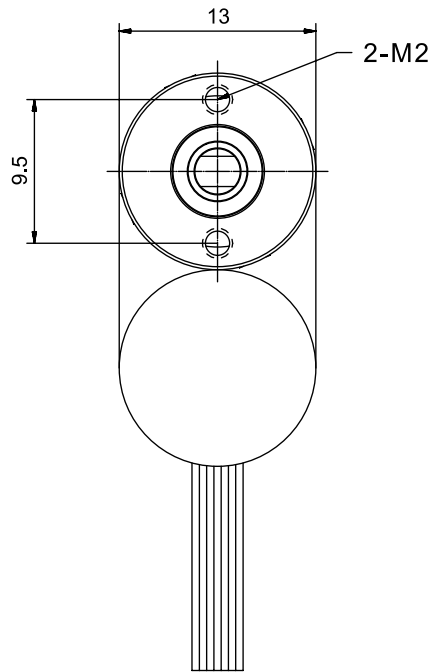
Coreless Brushless Motor Hall Sensor Pin Assignment: PIN1-8

- pin1 – U (Purple)
- pin2 – V (Brown)
- pin3 – W (White)
- pin4 – +5V (Red)
- pin5 – GND (Black)
- pin6 – HALL_U (Yellow)
- pin7 – HALL_V (Green)
- pin8 – HALL_W (Blue)

Design		First-Angle Projection Method 	13 mm Planetary Gear Reducer + 13 mm Coreless Brushless Motor +Worm-Gear Gearbox (Product Type)
Review			
Approval		Unspecified Linear and Angular Dimension Tolerances: GB \ T 1 8 0 4 - m e q v I S O 2 7 6 8 - 1 : m	TSL-13P1317RB-25+LG04M20Z (Product Model)
Date	2025.03.21		Tsinglin Micromotor Co., Ltd

- Motor Performance Specifications:
- Motor Type: Coreless Brushless Motor
 - Operating Voltage: 12V
 - No-load Speed: 25,000 ± 10% RPM
 - No-load Current: ≤ 0.2 A
 - Load Speed: 18,000 ± 10% RPM
 - Load Torque: ≥ 15 g·cm
 - Load Current: ≤ 0.8 A
 - Stall Torque: ≥ 100 g·cm
 - Number of Pole Pairs: 2 pole pairs
 - Operating Temperature: -40 to 85°C
 - Weight: ≤ 30 g
 - Noise Level: ≤ 45 dB
 - Maximum Motor Efficiency: 75%

- Reducer Motor Performance Specifications:
- Operating Voltage: 12V
 - No-load Speed: 50 ± 10% RPM
 - No-load Current: ≤ 0.3 A
 - Load Speed: 35 ± 10% RPM
 - Load Torque: ≥ 0.4 N·m
 - Load Current: ≤ 1 A
 - Stall Torque: ≥ 3 N·m
 - Operating Temperature: -40 to 80°C
 - Gear Reduction Ratio: 1:500 (Planetary: 1:25, Worm Gear: 1:20)
 - Noise Level: ≤ 55 dB
 - Gearbox Material: Pure Copper (Machined)



Motor Performance Parameters:

- 1.Motor Type:Coreless Brushless Motor
- 2.Operating Voltage:12V
- 3.No-load Speed:25000±10%RPM
- 4.No-load Current:≤0.2A
- 5.Load Speed:18000±10%RPM
- 6.Load Torque:≥15g.cm
- 7.Load Current:≤0.8A
- 8.Stall Torque:≥100g.cm
- 9.Pole Pairs:2 Pole Pairs
- 10.Operating Temperature:-40-85°C
- 11.Weight: ≤30g
- 12.Noise:≤45DB
- 13.Motor Maximum Efficiency:75%

Gearmotor Performance Parameters:

- 1.Operating Voltage:12V
- 2.No-load Speed:250±10%RPM
- 3.No-load Current:≤0.3A
- 4.Rated Speed:180±10%RPM
- 5.Rated Torque:≥0.08NM
- 6.Rated Current:≤1A
- 7.Stall Torque: ≥0.5 Nm
- 8.Operating Temperature:-40-80°C
- 9.Reduction Ratio:1:100
- 10.Noise:≤55DB
- 11.Gearbox Material:Pure Steel (Machined)

Coreless Brushless Motor

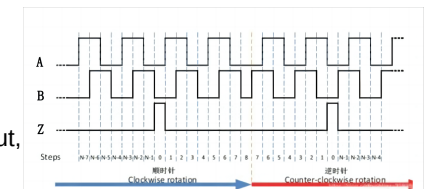
Wiring Sequence: PIN1-3

- pin1 - U (White)
pin2 - V (Yellow)
pin3 - W (Blue)

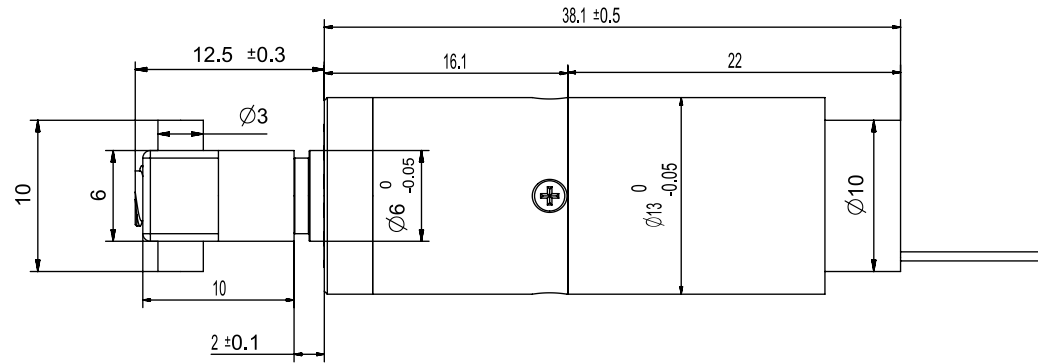
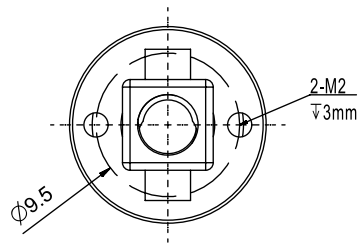
Encoder Wiring Sequence: PIN1-5

- pin1 - GND (Black)
pin2 - VCC (Red)
pin3 - A± (Single-ended) (Yellow)
pin4 - B± (Single-ended) (Green)
pin5 - Z± (Single-ended) (Blue)

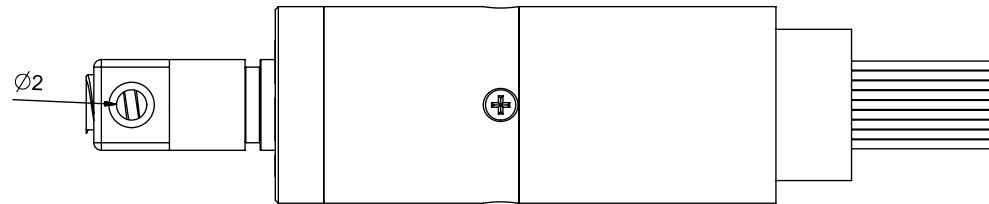
Note: Magnetic encoder, digital output,
3 channels, 1024 PPR



设计			13mm Planetary Gearbox + 13mm Coreless Brushless Motor + Encoder (Product Type)
审核			TSL-PG13K100-KW1317+MA1024 (Inverted Module) (Product Model)
批准		未注线性与角度尺寸公差： GB/T1804-m eqv ISO 2768-1:m	Tsinglin Micromotor Co., Ltd
日期	2025.11.15		



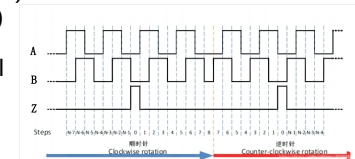
Lower lead screw nut, lead 2, diameter 4mm



Encoder Wiring Sequence: PIN1-5

pin1 - GND (Black)
pin2 - VCC (Red)
pin3 - A+ (Single-ended) (Yellow)
pin4 - B+ (Single-ended) (Green)
pin5 - Z+ (Single-ended) (Blue)

Note: Magnetic encoder, digital output, 3 channels, 1024 PPR



Motor Performance Parameters:

- 1.Motor Type:Coreless Brushless Motor
- 2.Operating Voltage:12V
- 3.No-load Speed:25000±10%RPM
- 4.No-load Current:≤0.2A
- 5.Load Speed:18000±10%RPM
- 6.Load Torque:≥15g.cm
- 7.Load Current:≤0.8A
- 8.Stall Torque:≥100g.cm
- 9.Pole Pairs:2 Pole Pairs
- 10.Operating Temperature:-40-85°C
- 11.Noise:≤45DB
- 12.Motor Maximum Efficiency:75%

Gearmotor Performance Parameters:

- 1.Operating Voltage:12V
- 2.No-load Speed:1000±10%RPM
- 3.No-load Current:≤0.3A
- 4.Load Speed:720±10%RPM
- 5.Load Torque:≥220g.cm
- 6.Load Current:≤1A
- 7.Operating Temperature:-40-85°C
- 8.Reduction Ratio:1:25
- 9.Noise:≤55DB
- 10.Gearbox Material:Pure Steel (Machined)
- 11.Geared motors should not be subjected to frequent impacts or stalling during operation.

Coreless Brushless Motor

Wiring Sequence: PIN1-3

pin1 - U (White)
pin2 - V (Yellow)
pin3 - W (Blue)

设计

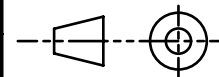
审核

批准

日期

2025.11.05

第一视觉画法



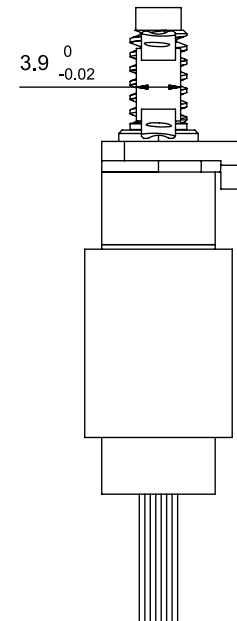
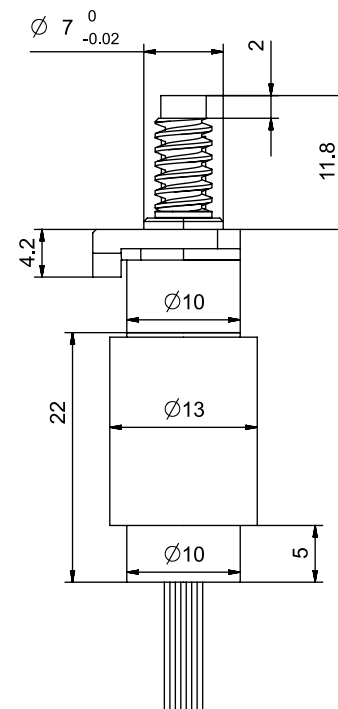
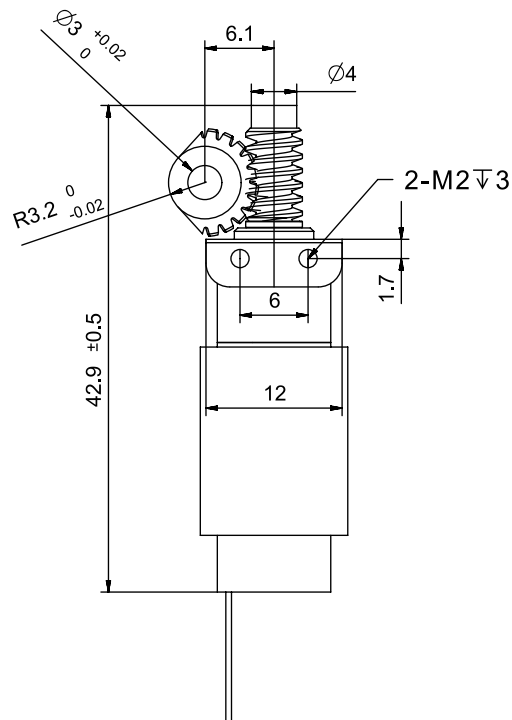
未注线性与角度尺寸公差：
GB/T1804-m eqv
ISO 2768-1:m

13mm Planetary Gearbox + 13mm Coreless Brushless Motor+T-type lead screw + Encoder
(Product Type)

TSL-PG13K25-KW1317-SG04+MA1024
(Product Model)

Tsinglin Micromotor Co., Ltd

Worm and Worm Gear Parameter Table		
	Worm	Worm Gear
Module	0 . 4	
	1	20
Pressure Angle	20°	20°
Tip Diameter	5	8 . 8
Reference Diameter	4 . 2	8
Lead Angle	Right-hand 5 . 4 4°	
Worm Lead	1 . 2 5 7	-
Worm Pitch	1 . 2 5 7	-
Addendum Coefficient	1	1
Clearance Coefficient	0 . 2 5	0 . 2 5
Modification Coefficient	-	-
Transmission CenterDistance	6 . 1	
Material	SUS416	20crmnti
Accuracy Class	GB/T 10095-2001-8级	



Motor Performance Parameters:

- 1.Motor Type:Coreless Brushless Motor
- 2.Operating Voltage:12V
- 3.No-load Speed:25000±10%RPM
- 4.No-load Current:≤0.4A
- 5.Load Speed:18000±10%RPM
- 6.Load Torque:≥15g.cm
- 7.Load Current:≤1A
- 8.Stall Torque:≥100g.cm
- 9.Pole Pairs:2 Pole Pairs
- 10.Operating Temperature:-40-85°C
- 11.Weight: ≤30g
- 12.Noise:≤45DB
- 13.Motor Maximum Efficiency:75%

Gearmotor Performance Parameters:

- 1.Operating Voltage:12V
- 2.No-load Speed:45±10%RPM
- 3.No-load Current:≤0.5A
- 4.Rated Speed:30±10%RPM
- 5.Rated Torque:≥2500g.cm
- 6.Rated Current:≤1.2A
- 7.Operating Temperature:-40-80°C
- 8.Reduction Ratio:1:560
(Planetary Stage1:28,Wormand
WormGear Stage1:20)
- 9.Noise:≤55DB
- 10.Gearbox Material:PureSteel
(Machined)

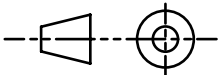
Coreless Brushless Motor

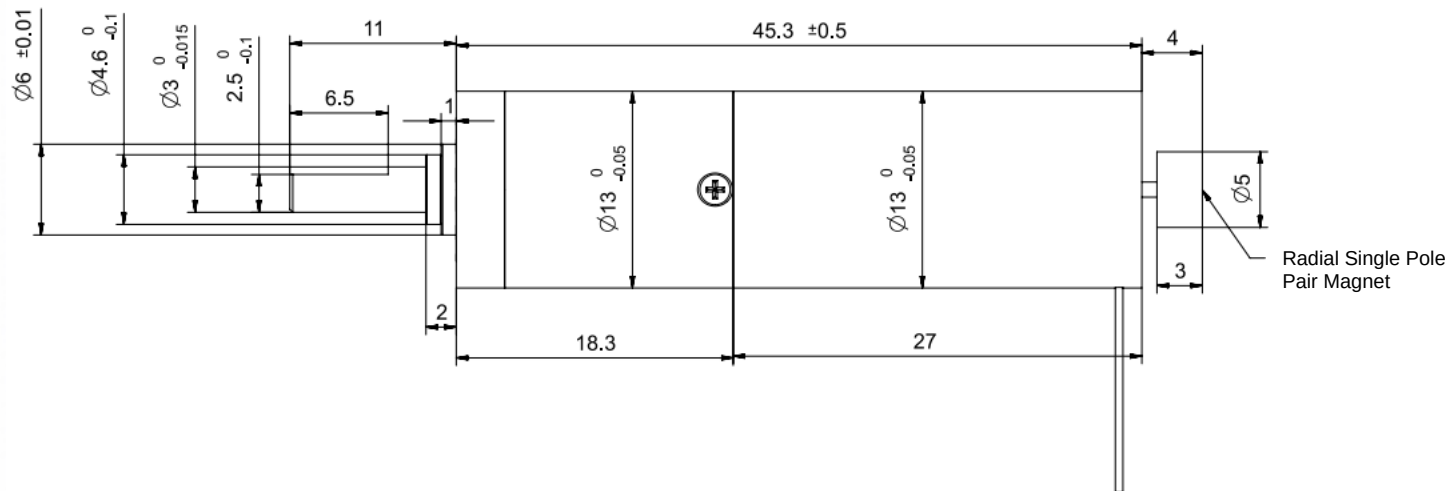
Wiring Sequence: PIN1-3

pin1 - U

pin2 - V

pin3 - W

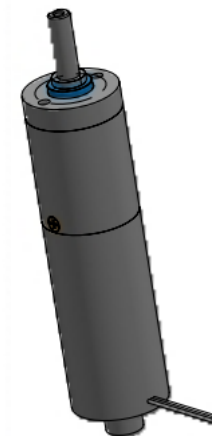
设计			10mm Planetary Gearbox + 13mm Coreless Brushless Motor+Worm Gear Reducer + Drive (Product Type)
审核			TSL-PG10K28-KW1317+LG04M20Z(Module) (Product Model)
批准		未注线性与角度尺寸公差： GB\T1804-m eq v ISO 2768-1:m	Tsinglin Micromotor Co., Ltd
日期	2025.11.22		

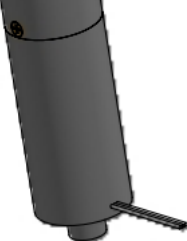
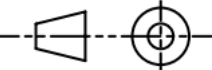


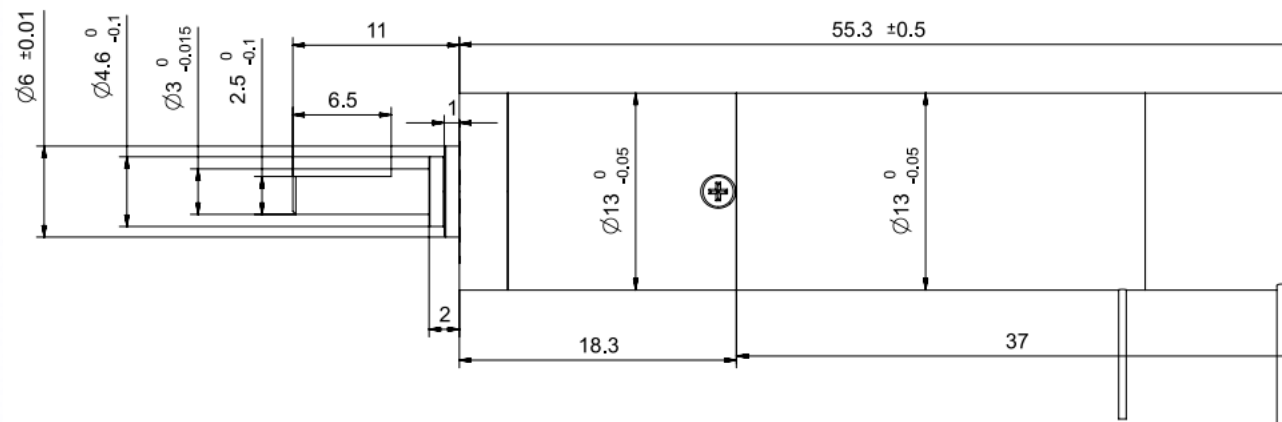
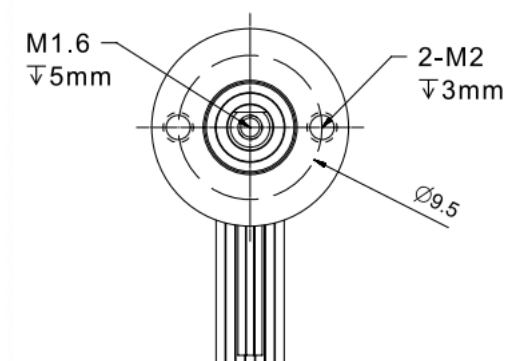
Wiring Sequence: PIN1-3

pin2 - V (Yellow)

pin3 - W (Blue)



Motor Performance Parameters: Motor Type: Coreless Brushless Motor 1.Operating Voltage: 12V 2.No-load Speed: 25000 ±10% RPM 3.No-load Current: ≤0.4A 4.Load Speed: 20000 ±10% RPM 5.Load Torque: ≥60 g·cm 6.Load Current: ≤0.8A 7.Stall Torque: >100 g·cm 8.Pole Pairs: 2 9.Operating Temperature: -40~85℃ 10.Noise: ≤45 dB 11.Maximum Motor Efficiency: 75%	Gear Motor Performance Parameters: 1.Operating Voltage: 12V 2.No-load Speed: 200 ±10% RPM 3.No-load Current: ≤0.5A 4.Load Speed: 80 ±10% RPM 5.Load Torque: ≥0.4 N·m 6.Load Current: ≤1A 7.Operating Temperature: -40~80℃ 8.Gear Ratio: 1:125 9.Noise: ≤55 dB 10.Gearbox Material: Solid Steel (Machined)	pin2 - V (Yellow)				
		pin3 - W (Blue)				
		设计			第一视觉画法 	13mm Planetary Gearbox + 13mm Coreless Brushless Motor (Product Type)
		审核				TSL-PG13K125-KW1327 (Product Model)
		批准			未注线性与角度尺寸公差： GB\T1804-m eqv ISO 2768-1:m	Tsinglin Micromotor Co., Ltd
日期	2025.08.08					



Brushless Coreless Motor

Wiring Sequence: PIN1-3

pin1 - U (White)

pin2 - V (Yellow)

pin3 - W (Blue)

Encoder Wiring Sequence: PIN1-5

pin1 - GND (Black)

pin2 - VCC (Red)

pin3 - A+ (Single-ended) (Yellow)

pin4 - B+ (Single-ended) (Green)

pin5 - Z+ (Single-ended) (Blue)

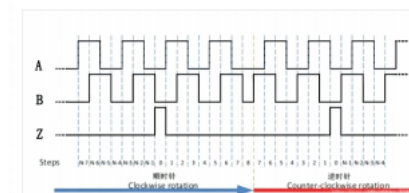
Note: Magnetic encoder, digital output,
3 channels, 1024 PPR

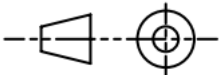
Motor Performance Parameters:

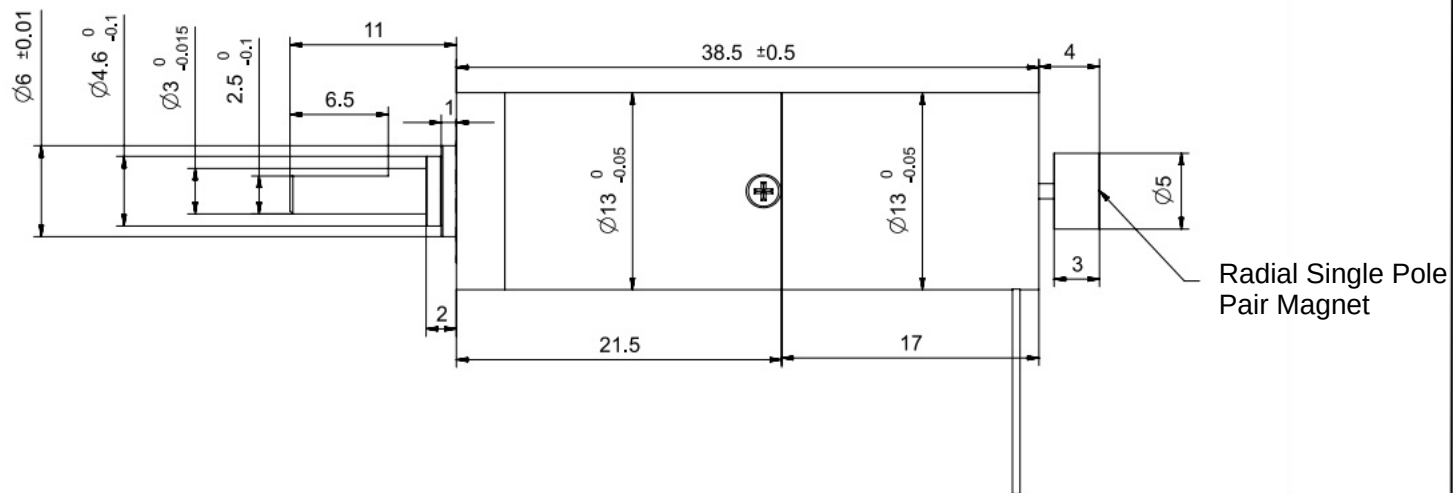
- 1.Motor Type: Brushless Coreless Motor
- 2.Operating Voltage: 12V
- 3.No-load Speed: 25000 ±10% RPM
- 4.No-load Current: ≤0.4A
- 5.Load Speed: 20000 ±10% RPM
- 6.Load Torque: ≥60 g·cm
- 7.Load Current: ≤0.8A
- 8.Stall Torque: >100 g·cm
- 9.Pole Pairs: 2
- 10.Operating Temperature: -40~85°C
- 11.Noise: ≤45 dB
- 12.Maximum Motor Efficiency: 75%

Gear Motor Performance Parameters:

- 1.Operating Voltage: 12V
- 2.No-load Speed: 200 ±10% RPM
- 3.No-load Current: ≤0.5A
- 4.Load Speed: 80 ±10% RPM
- 5.Load Torque: ≥0.4 N·m
- 6.Load Current: ≤1A
- 7.Operating Temperature: -40~80°C
- 8.Gear Ratio: 1:125
- 9.Noise: ≤55 dB
- 10.Gearbox Material: Solid Steel (Machined)



设计		第一视觉画法 	13mm Planetary Gearbox + 13mm Coreless Brushless Motor+Magnetic Encoder (Product Type)
审核			TSL-PG13K125-KW1327+MA1024 (Product Model)
批准		未注线性与角度尺寸公差： GB\T1804-m eqv ISO 2768-1:m	Tsinglin Micromotor Co., Ltd
日期	2025.12.22		



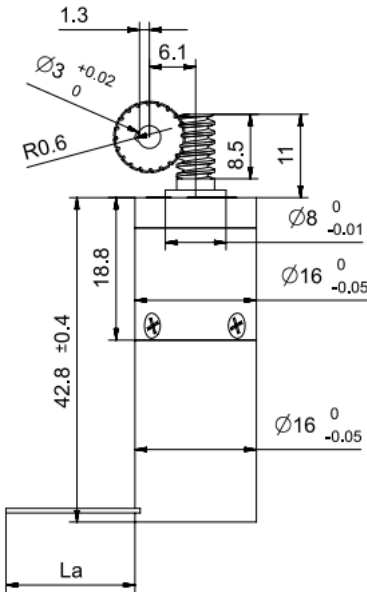
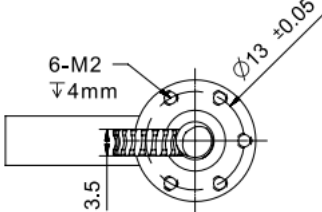
pin3 - W (Blue)



1. Operating Voltage: 12V
2. No-load Speed: $90 \pm 10\%$ RPM
3. No-load Current: $\leq 0.5A$
4. Load Speed: $80 \pm 10\%$ RPM
5. Load Torque: $\geq 0.7 \text{ N}\cdot\text{m}$
6. Load Current: $\leq 1A$
7. Operating Temperature: $-40 \sim 80^\circ\text{C}$
8. Gear Ratio: 1:256
9. Noise: $\leq 55 \text{ dB}$
10. Gearbox Material: Solid Steel (Machined)

设计		第一视觉画法	13mm Planetary Gearbox + 13mm Coreless Brushless Motor (Product Type)
审核			TSL-PG13K256-KW1317 (Product Model)
批准		未注线性与角度尺寸公差： GB\T1804-m eqv ISO 2768-1:m	Tsinglin Micromotor Co., Ltd
日期	2025.08.08		

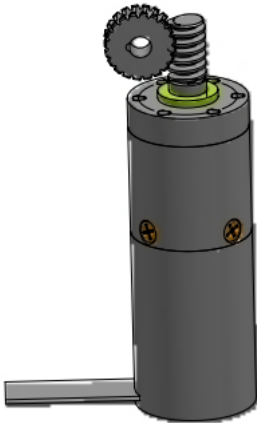
Worm and Worm Gear Parameter		
	Worm	Worm Gear
Module	0.4	
Number of Starts/Teeth	1	20
Pressure Angle	20°	20°
Addendum Circle Diameter	5	8.8
Pitch Circle Diameter	4.2	8
Lead Angle	右旋5.44°	
worm lead	1.257	-
worm pitch	1.257	-
Addendum Coefficient	1	1
Clearance Coefficient	0.25	0.25
Modification Coefficient	-	-
center distance	6.1	
Material	20crmnti	SUS416
Accuracy Grade	GB/T 10095-2001-8级	

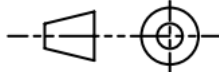


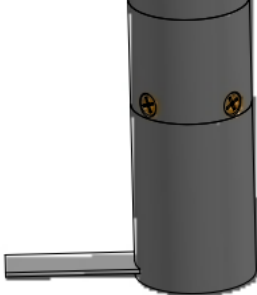
FPC Cable
Length (La): 90 mm

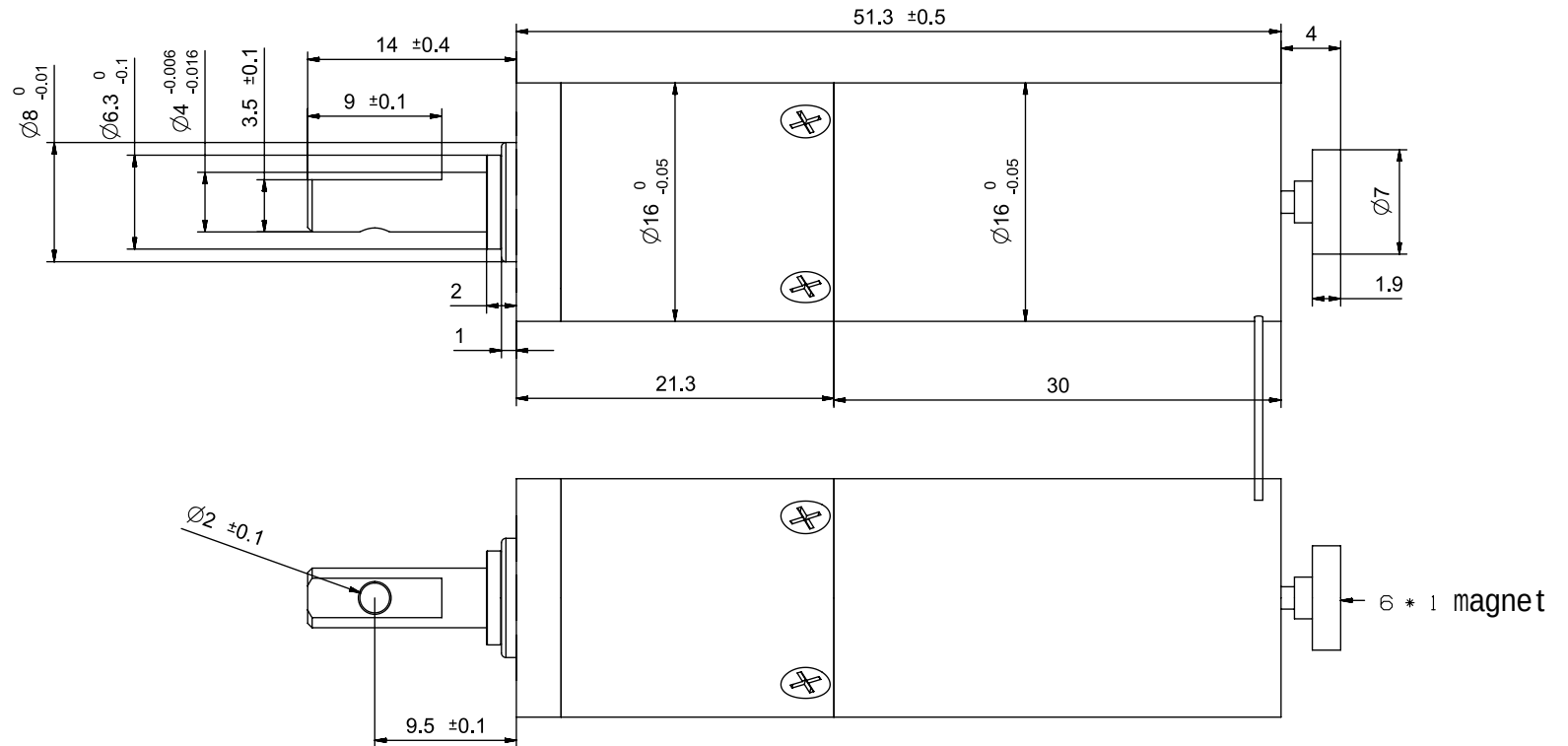
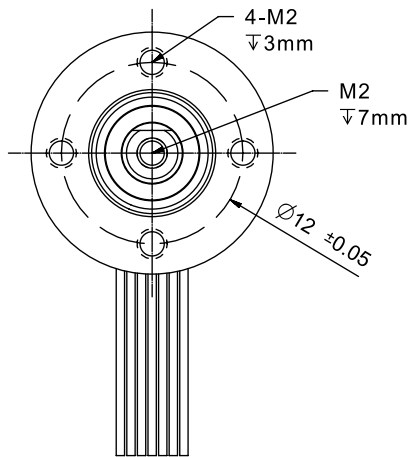
Pin Number Definition

- pin1-Ha
- pin2-Hb
- pin3-Hc
- pin4-3.3V
- pin5-GND
- pin6+7-U
- pin8+9-V
- pin10+11-W
- pin12-Thermistor

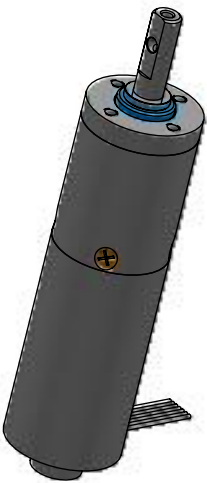


Motor Performance Parameters 1.Motor Type: Coreless brushless motor 2.Operating Voltage: 12 V 3.No-load Speed: 35000 ± 10% RPM 4.No-load Current: ≤ 0.4 A 5.Rated Speed: 18000 ± 10% RPM 6.Rated Torque: ≥ 70 g·cm 7.Rated Current: ≤ 2 A 8.Stall Torque: ≥ 200 g·cm 9.Stall Current: ≤ 6 A 10.Pole Pairs: 1 pair 11.Operating Temperature: -40 - 80 °C 12.Noise: ≤ 45 dB 13.Maximum Motor Efficiency: 75%	Gear Motor Performance Parameters 1.Operating Voltage: 12 V 2.No-load Speed: 60 ± 10% RPM 3.No-load Current: ≤ 0.4 A 4.Rated Speed: 30 ± 10% RPM 5.Rated Torque: ≥ 2 N·m 6.Rated Current: ≤ 2 A 7.Stall Torque: ≥ 5 N·m 8.Operating Temperature: -40 - 80 °C 9.Reduction Ratio: 1:580 (Planetary: 1:29; Worm Gear: 1:20) 10.Noise: ≤ 55 dB 11.Gearbox Material: Pure copper (machined)	版本	变更日期	变更内容		
		A 1	2025.04.10	Changed worm shaft and output shaft to be integrated		
		A 2	2025.04.11	Changed overall machine length and worm shaft length		
		设计		第一视觉画法  未注线性与角度尺寸公差： GB\T1804-m eqv ISO 2768-1:m	16mm Planetary Gearbox + 16mm Coreless Brushless Motor + Worm Gear Output (Product Type) PG16K29-KW1624+LG04K20 (Product Model) Tsinglin Micromotor Co., Ltd	
		审核				
		批准				
		日期	2025.04.10			





Coreless Brushless Motor
Hall Wiring Sequence: PIN1-8



Motor Performance Parameters:

- 1.Motor Type: Coreless Brushless Motor
- 2.Operating Voltage: 12V
- 3.No-load Speed: 26000 ±10% RPM
- 4.No-load Current: ≤0.4A
- 5.Rated Speed: 21000 ±10% RPM
- 6.Rated Torque: ≥160 g·cm
- 7.Rated Current: ≤2A
- 8.Pole Pairs: 2
- 9.Operating Temperature: -40~80℃
- 10.Noise: ≤35 dB
- 11.Maximum Motor Efficiency: 75%

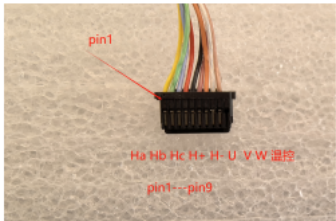
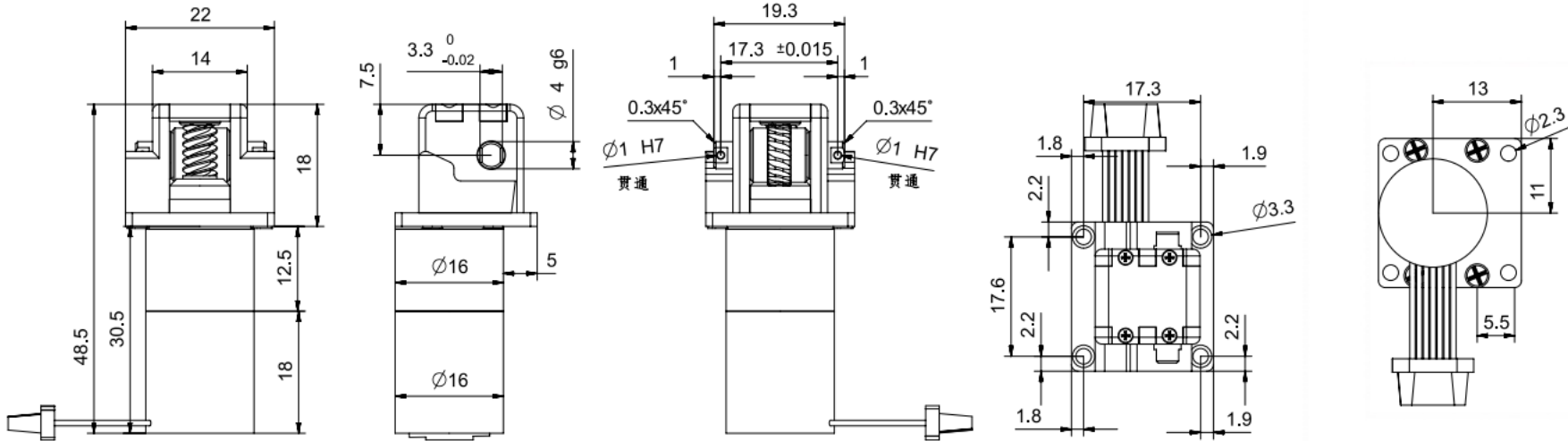
Gear Motor Performance Parameters:

- 1.Operating Voltage: 12V
- 2.No-load Speed: 300 ±10% RPM
- 3.No-load Current: ≤0.4A
- 4.Rated Speed: 240 ±10% RPM
- 5.Rated Torque: ≥0.8 N·m
- 6.Rated Current: ≤2A
- 7.Operating Temperature: -40~80℃
- 8.Gear Ratio: 1:84
- 9.Noise: ≤45 dB
- 10.Gearbox Material: Solid Steel (Machined)

- pin1 - U (White \ Thick)
- pin2 - V (Yellow \ Thick)
- pin3 - W (Blue \ Thick)
- pin4 - +5V (Red)
- pin5 - GND (Black)
- pin6 - HALL_U (White)
- pin7 - HALL_V (Yellow)
- pin8 - HALL_W (Blue)

设计		第一视觉画法 	16mm Planetary Gearbox + 16mm Coreless Brushless Motor (Product Type)
审核			TSL-PG16K84-KW1630 (Product Model)
批准		未注线性与角度尺寸公差： GB\T1804-m eqv ISO 2768-1:m	Tsinglin Micromotor Co., Ltd
日期	2025.02.25		

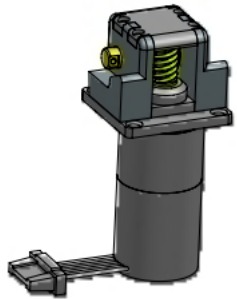
Worm and Worm Gear Parameter		
	Worm	Worm Gear
Module	0.4	
Number of Starts/Teeth	3	20
Pressure Angle	20°	20°
Addendum Circle Diameter	5	8.8
Pitch Circle Diameter	4.2	8
Lead Angle	Right-hand 5.95°	
Addendum Coefficient	1	1
Clearance Coefficient	0.25	0.25
Modification Coefficient	-	-
Material	20crmnti	SUS416
Accuracy Grade	GB/T 10095-2001, Grade 8	

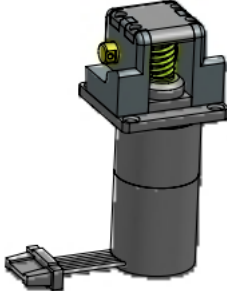
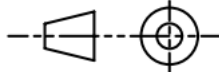


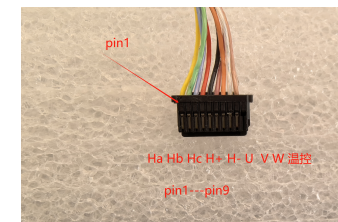
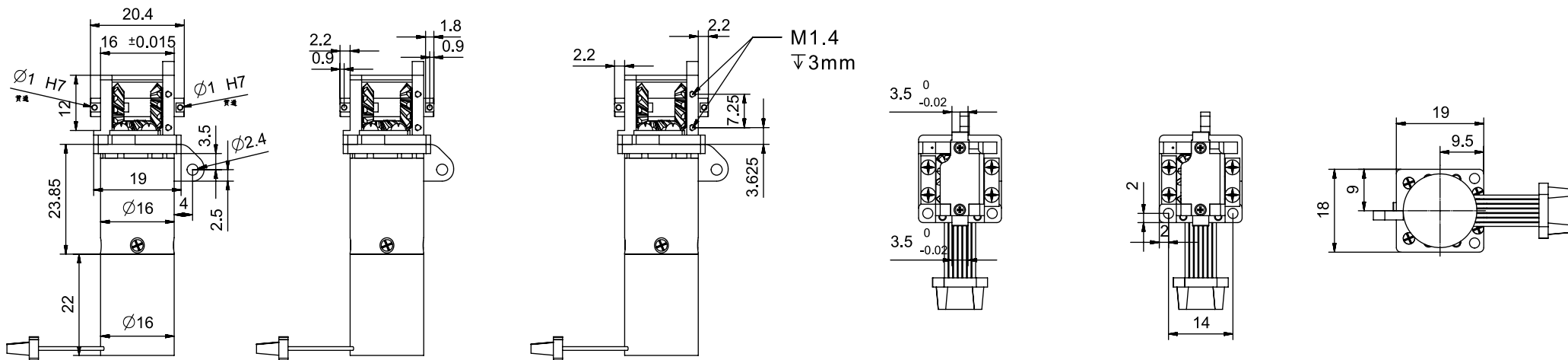
Terminal Model:KW30-10P-1C(800)

Wiring Sequence:1-9

pin1-HALLA
pin2-HALLB
pin3-HALLZ
pin4-3.3V
pin5-GND
pin6-motor U
pin7-motor V
pin8-motorW
pin9-Temp.Ctrl.



Motor Performance Specifications: 1.Motor Type:Coreless Brushless Motor 2.Operating Voltage:12V 3.No-load Speed:32000±10%RPM 4.No-load Current:≤0.5A 5.Load Speed:28000±10%RPM 6.Load Torque:≥3mNm 7.Load Current:≤2A 8.Number Of Pole Pairs:2 pole pairs 9.Operating Temperature:-40 to 85°C 10.Noise Level:≤45DB 11.Maximum Motor Efficiency:75%	Reducer Motor Performance Specifications: 1.Operating Voltage:12V 2.No-load Speed:35±10%RPM 3.No-load Current:≤0.5A 4.Load Speed:30±10%RPM 5.Load Torque:≥1mNm 6.Load Current:≤2A 7.Operating Temperature:-40 to 85°C 8.Gear Reduction Ratio:1:853 (Planetary:1:128,Worm Gear:1:6.67) 9.Noise Level:≤55DB 10.Gearbox Backlash: ≤1.5 degree 11.Gearbox Material:Pure Copper (Machined)	版本	变更日期	变更内容		pin3-HALLZ pin4-3.3V pin5-GND pin6-motor U pin7-motor V pin8-motorW pin9-Temp.Ctrl. 
		A 1	2025.03.22	Change the worm gear and output shaft to an integrated design		
		设计				
审核		第一视觉画法 		16mm Planetary Gearbox+16mm Coreless Brushless Motor+worm gear reverse output (Product Type)		
批准				PG16K128-KW1618+LG04M20Z (Thumb Grasp Motor Module) (Product Model)		
日期	2025.04.30	未注线性与角度尺寸公差： GB\T1804-m eqv ISO 2768-l:m		Tsinglin Micromotor Co., Ltd		



Connector Model: KW30-10P-1C (800)

Wire Sequence (Pins 1-9):
Pin Number Definition

pin1 HALLA
pin2 HALLB
pin3 HALLZ
pin4 3.3V
pin5 GND
pin6 Motor U
pin7 Motor V
pin8 Motor W
pin9 Motor Thermistor



Motor Performance Parameters

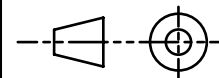
- 1.Motor Type: Coreless brushless motor
- 2.Operating Voltage: 12 V
- 3.No-load Speed: 20000 ± 10% RPM
- 4.No-load Current: ≤ 0.15 A
- 5.Rated Speed: 18000 ± 10% RPM
- 6.Rated Torque: ≥ 25 g·cm
- 7.Rated Current: ≤ 0.5 A
- 8.Stall Torque: ≥ 260 g·cm
- 9.Stall Current: ≤ 3 A
- 10.Pole Pairs: 1 pair
- 11.Operating Temperature: -40 - 80 °C
- 12.Weight: ≤ 50 g
- 13.Noise: ≤ 45 dB
- 14.Maximum Motor Efficiency: 75%a

Gear Motor Performance Parameters

- 1.Operating Voltage: 12 V
- 2.No-load Speed: 50 ± 10% RPM
- 3.No-load Current: ≤ 0.2 A
- 4.Rated Speed: 45 ± 10% RPM
- 5.Rated Torque: ≥ 0.6 N·m
- 6.Rated Current: ≤ 0.6 A
- 7.Stall Torque: ≥ 5 N·m
- 8.Operating Temperature: -40 - 80 °C
- 9.Reduction Ratio: 1:388
- 10.Noise: ≤ 55 dB
- 11.Gearbox Backlash: ≤ 1.5°
- 12.Gearbox Material: Pure copper (machined)

版本	变更日期	变更内容
A 1	2025.03.22	Modified upper and lower brackets to enhance rigidity
设计		
审核		
批准		
日期	2025.04.30	

第一视觉画法



未注线性与角度尺寸公差：

GB\T1804-m eq v
ISO 2768-1:m

16mm Planetary Gearbox + 16mm Coreless Brushless Motor + 0.8 Modulus Bevel Gear
Direction Change Output (Product Type)

PG16K388R-KW1622

+SC08M12Z (Right-hand Wrist Motor Module)
(Product Model)

Tsinglin Micromotor Co., Ltd

