

BAFANG Bafang Electric (Suzhou) Co., Ltd	File No.	TSP-01-037
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	Distribution:	Technical Center

Product Specification



Product category: PMSM Brushless Rear Motor

Product line: H400B

Product model: RM G020.250/350/500.DC

Prepared by:	Wang Yisheng	Reviewed by:	Xue Qirui	Approved by:	Huang Shanjin
Prepared on:	2024-03-07	Reviewed on:	2024-03-07	Approved on:	2024-03-08

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Revision			
Version	Date	Description	Revised by
A/0	2024-03-07	First edition	Wang Yisheng

Prepared by: Wang Yisheng Reviewed by: Xue Qirui Approved by: Huang Shanjin

Prepared on: 2024-03-07 Reviewed on: 2024-03-07 Approved on: 2024-03-08

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1. Preface

This product specification will introduce the appearance, performance, installation of Bafang two-wheeler's drive unit and the safety instructions of installation, operation, transportation and storage, aiming to let you fully understand the product performance, and ensure safe and efficient use of the product.

This product specification contains the latest product information at the time when it was prepared. Bafang continues to pursue the improvement of product design and quality. Due to the update of product design, there may be some inconsistencies between the specifications and the real objects. We will not inform you otherwise. Should have any questions, you can contact Bafang after-sales technical personnel. Email: service@bafang-e.com

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March 2024

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2. Importance Notice

- This product specification is intended to manufacturers and technicians who have professional knowledge of electrically power assisted cycles.
- Before configuring, installing, and operating the product, read the specification carefully. Please keep it for future reference.
- If you sell or lend the product to a third party, please attach this product specification and inform them of the safety instructions. This product is not suitable for people with physical and sensory defects, intellectual disabilities, people who lack basic life experience and knowledge and minors. The above-mentioned people should operate the product under the supervision of their guardians and under the guidance of the product specifications.

3. Safety Instructions

Configuration

- Do not attempt to change the performance of the product. Especially increase the power of the drive unit or the maximum speed that it supports. Doing this may put yourself and others at risk, and you may also breach statutory regulations.

Installation

- In order to protect the electric parts, before disassembling, switch off the system power first by pressing the control unit of HMI and then disconnect the power cable. When installing the product, fix the parts first, then connect the power cable, and finally switch on the system power by pressing the control unit of HMI.

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- Do not disassemble the drive unit yourself. The drive unit must only be repaired by qualified personnel using only original spare parts.

Operation

- Environmental conditions for operation:
 - a) Operating temperature: -20°C~45°C;
 - b) Relative humidity: (20~90)%RH;
 - c) Atmospheric pressure: (86~106)kPa;
 - d) No seriously corrosive gas or no medium affecting the electrical insulation around.
- Avoid water immersion during operation.
- Avoid violent impact during operation.
- Prohibit overload for a long time.
- Avoid direct touch of hands or legs with products that have been running for a long time without protection to prevent heat burns.
- Observe the appropriate rules and regulations of the country, state or region in which you use the e-bikes.
- It is recommended to regularly check whether the end cap nuts on both sides of the product are loose, whether the connector is loose, whether the shape is deformed or whether the power cord is broken.
- Power off the e-bike system before cleaning the product by pressing the On/Off button of HMI. Do not clean the product with a high-pressure washer. If water seeps into the electrical components, operating problems or corrosion may result.

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4. Product Introduction

4.1 Model

RM G020.250/350/500.DC

4.2 Category and Line

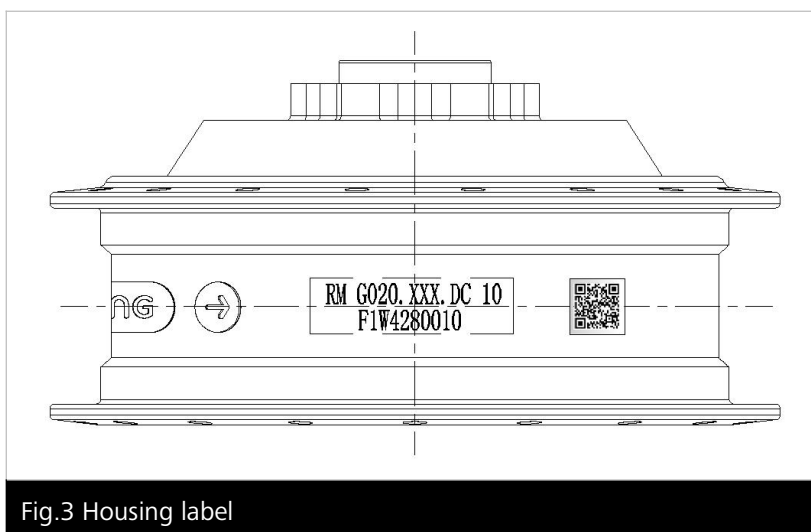
PMSM Brushless Rear Motor - H400B

4.3 Appearance



4.4 Nameplate

Laser mark and QR code label on the motor housing are shown in the Fig.3:



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4.4.1 Laser Mark

① First line: RM G020.XXX.DC 10

RM	G020	XXX	DC	10
Rear motor	Motor structure	Rated power (Actual data may vary)	Disc brake & Cassette	Number of turns: 10

② Second line: F1 W 4280010

F1	W	4	28	0010
Production line code: 1	Year U: 2020 V: 2021 W: 2022	Month 1-12	Date 1-31	Serial No. 0001 - 9999 (Based on the actual production date)

4.4.2 QR Code Label

The content is consistent with the laser mark:

RM G020.XXX.DC 10; F1W4280010;

Note: It is forbidden to maliciously erase, polish, stain the laser mark and QR code label, otherwise no after-sales service will be provided.

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4.5 Product Performance

4.5.1 Technical Parameters

Item	Parameter			Note
Rated voltage	36V		48V	
Rated power	250W	350W	500W	
Rated efficiency*	75%			Min.
Rated bus current*	9.3A	13A	13.8	Max.
No-load current*	1.8A			Max.
Max. allowable phase current	40A	50A	60A	Peak value
Number of turns	10T			
No-load speed*	295±10RPM		390±15RPM	
Rated speed*	265±10RPM	255±10RPM	340±15RPM	
Pole-pairs	10			
Reduction ratio	1:5			
Qty. of speed magnets	6			
Rated torque*	9N.m	13.1 N.m	14 N.m	Min.
Effective torque*	6.5-30N.m			When the efficiency is above 70%
Max. torque*	55N.m			
Tamp. range	Without thermistor			

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Noise*	55dB	Max., sound level meter 1 m from motor
Insulation class	F	
Protection rating*	IPX6	
Cabling route	Shaft side_right	
Brake	Disc brake	Ø 160-180mm
Color/ Surface treatment	Black(RAL9017)/plastic spraying	
Weight	3.5KG	
Anti-corrosion test	Salt spray test for 96H	Refer to: GB/T2423.17 IEC 60068-2-11
Certifications	CE	

(Items with * are based on the Bafang control system and are provided by Bafang Laboratory Centers.)

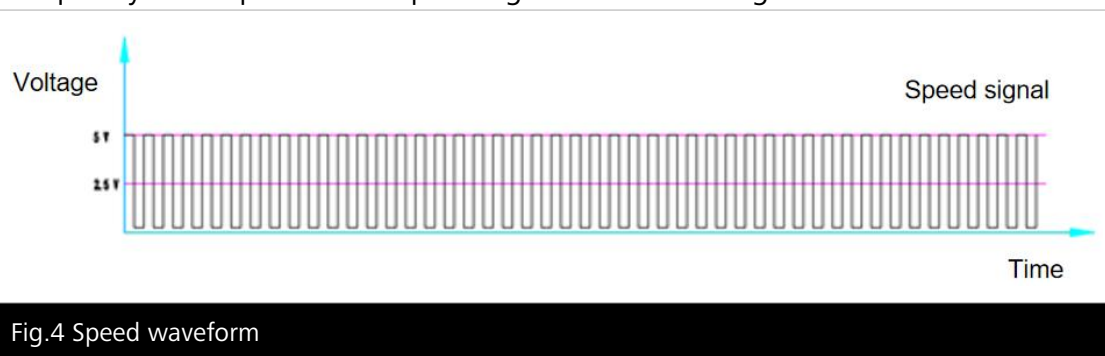
Note: Please consult the latest data before matching, as the product performance is constantly improved.

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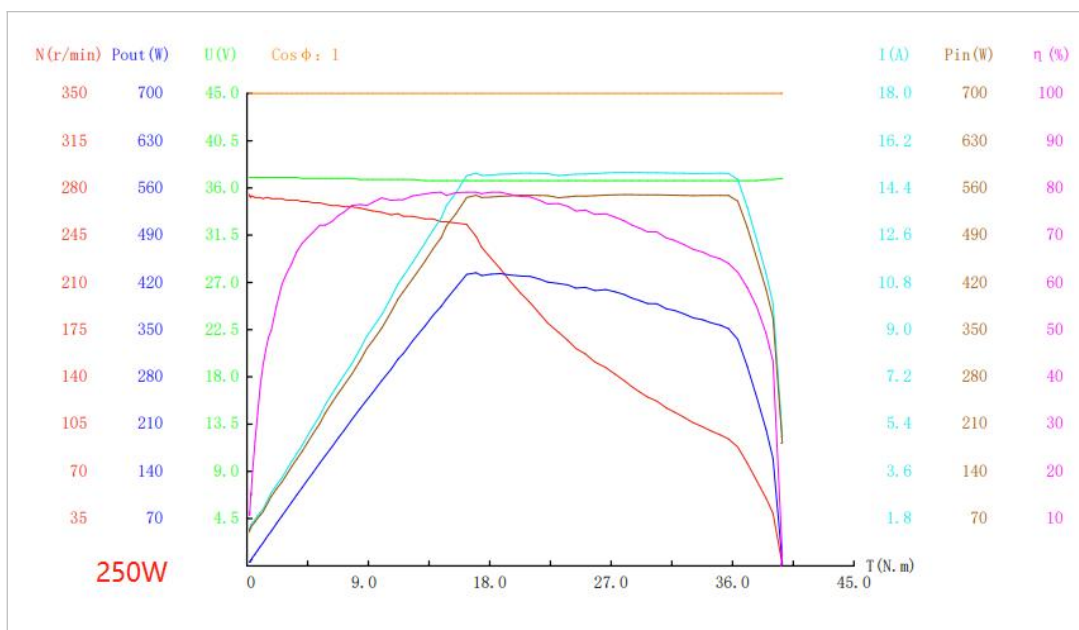
4.5.2 Speed

① Speed signal

In the motor 9-core wire, the white cable is the speed signal cable, and the frequency of the pulse is the speed signal is shown in Figure 4.



② External characteristic curve



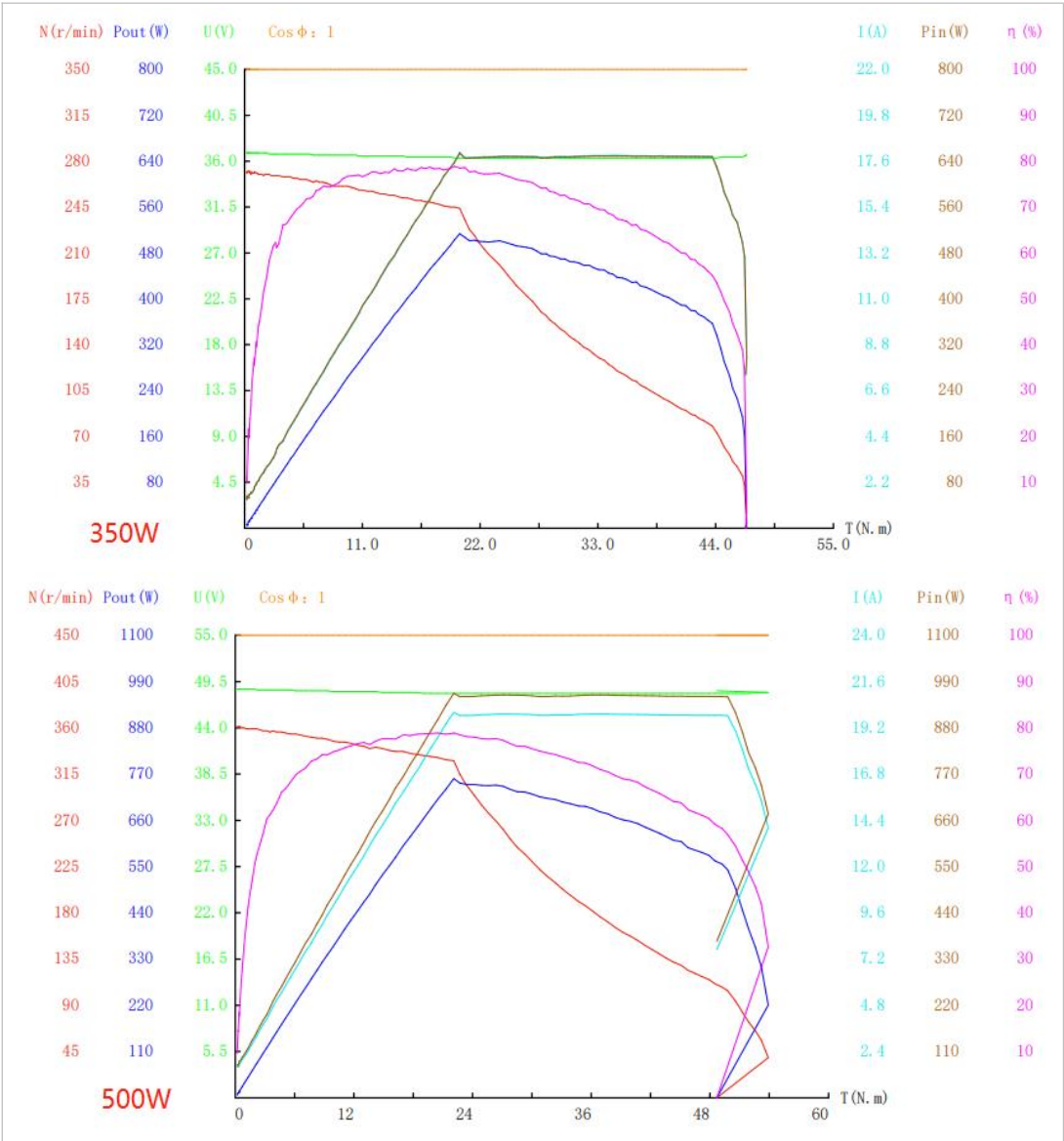
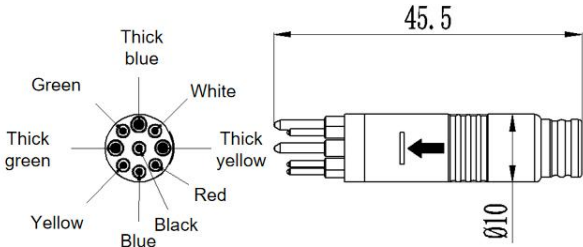


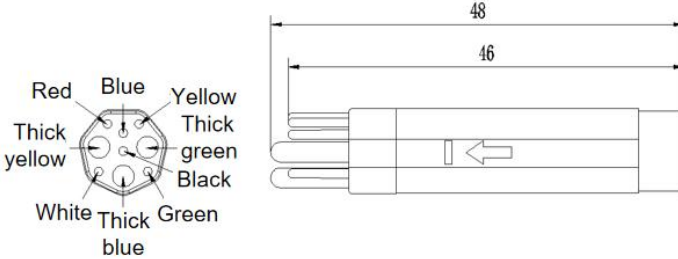
Fig.5 External characteristic curve

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4.5.3 Pin Definition of Connectors

Model G9.1 (For motors < 500W)					
Power			Signal		
Phase	Diameter	Color	Signal wire	Diameter	Color
A	1.5	Thick blue	Hall signal Ha	0.14	Blue
B	1.5	Thick green	Hall signal Hb	0.14	Green
C	1.5	Thick yellow	Hall signal Hc	0.14	Yellow
			Hall+	0.14	Red
			Hall-	0.14	Black
			Speed signal	0.14	White

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Model G9.14.2 (For 500W motors)					
Power			Signal		
Phase	Diameter	Color	Signal wire	Diameter	Color
A	2.0	Thick blue	Hall signal Ha	0.14	Blue
B	2.0	Thick green	Hall signal Hb	0.14	Green
C	2.0	Thick yellow	Hall signal Hc	0.14	Yellow
			Hall+	0.14	Red
			Hall-	0.14	Black
			Speed signal	0.14	White

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5. Product Assembly

5.1 Dimension Requirements

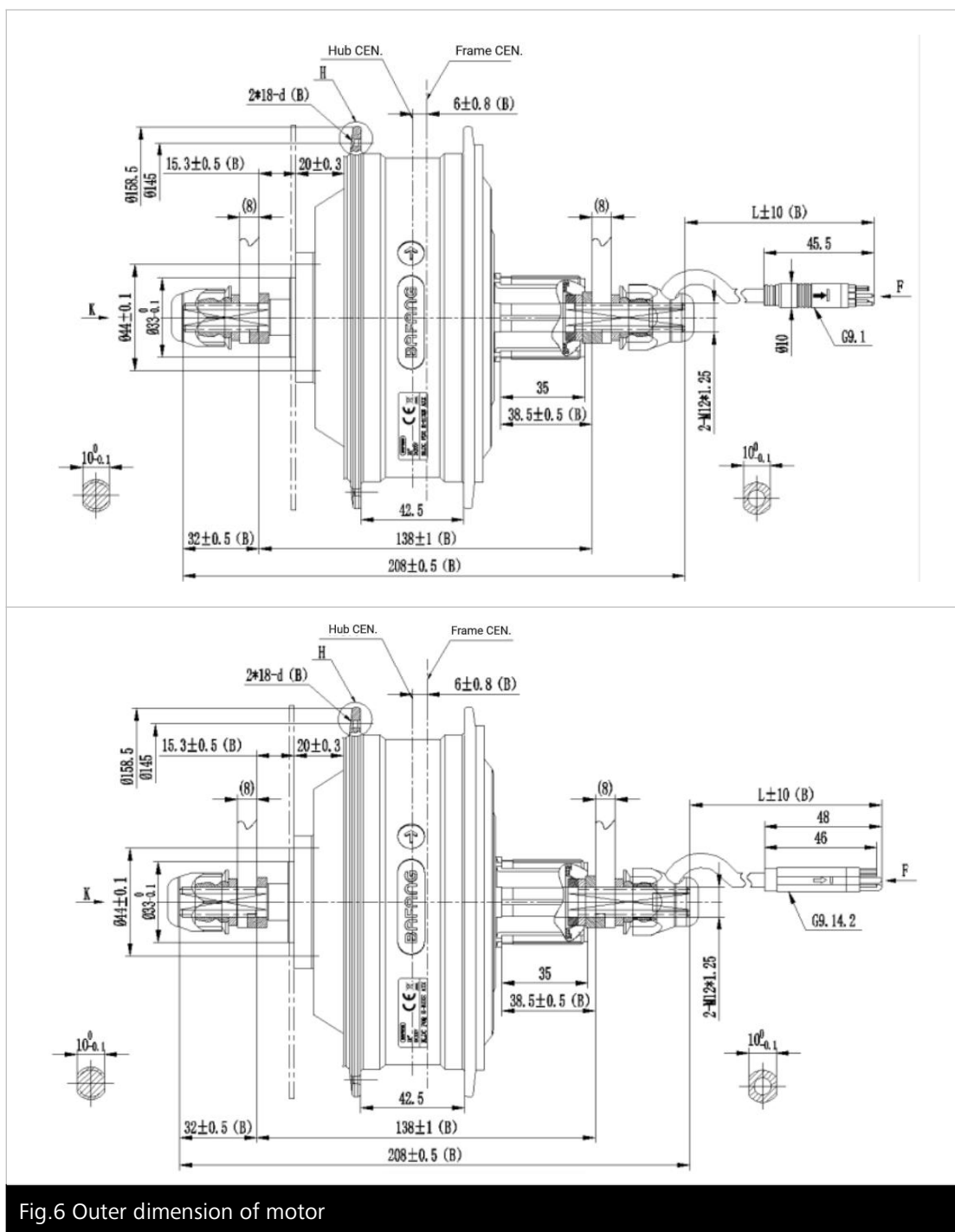
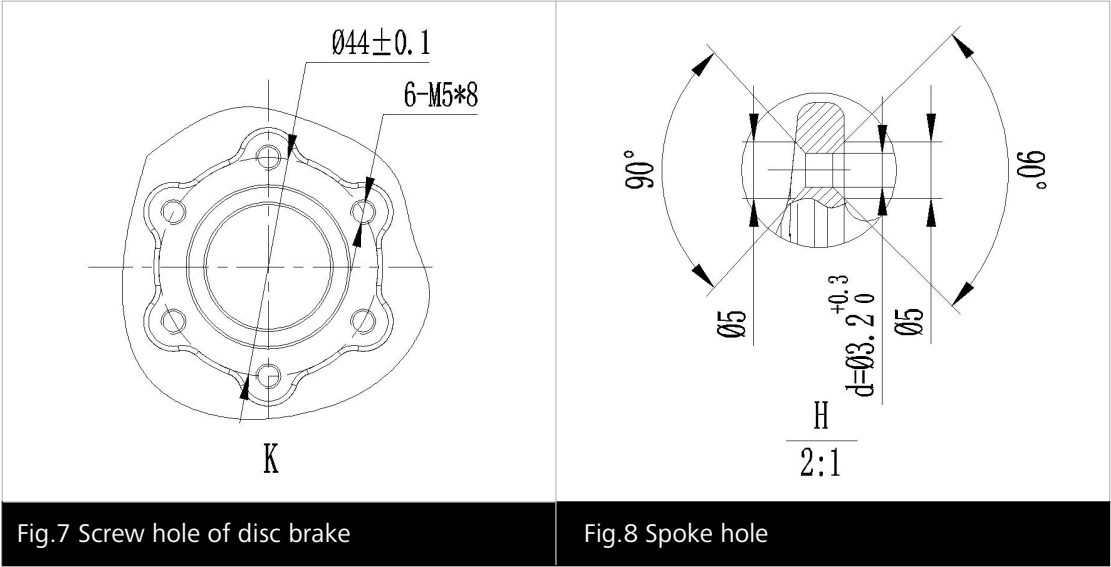


Fig.6 Outer dimension of motor

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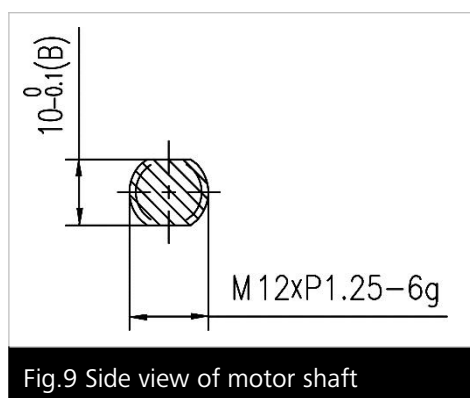


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5.2 Adaptation

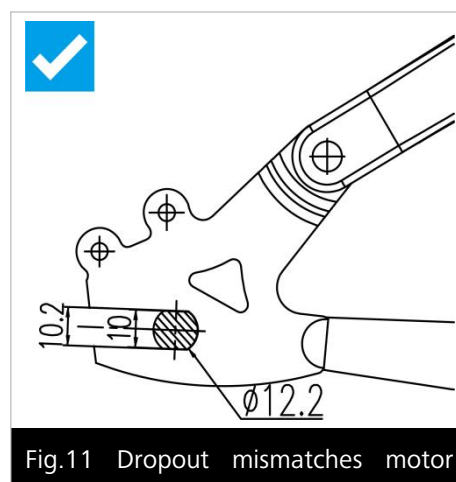
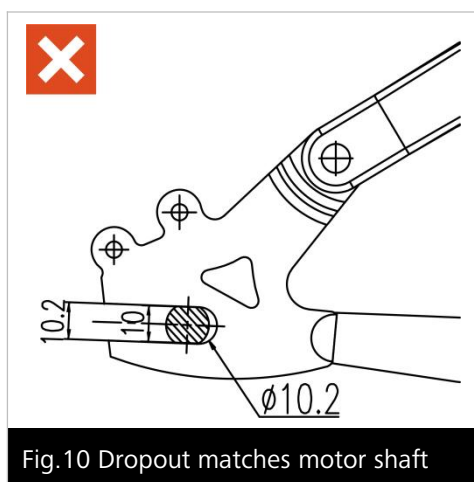
① Motor shaft and dropout

The diameter of the motor shaft is 12mm, which is flush cut with a width of 10mm on both sides. (See Fig.9)



If the diameter of the dropout is designed to be 10.2mm, the dropout does not match the motor shaft (see Fig.10).

It is recommended that the diameter of the dropout be designed to be 12.2mm, which is larger than the thread diameter of the motor shaft (see Fig.11).



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5.3 Material List

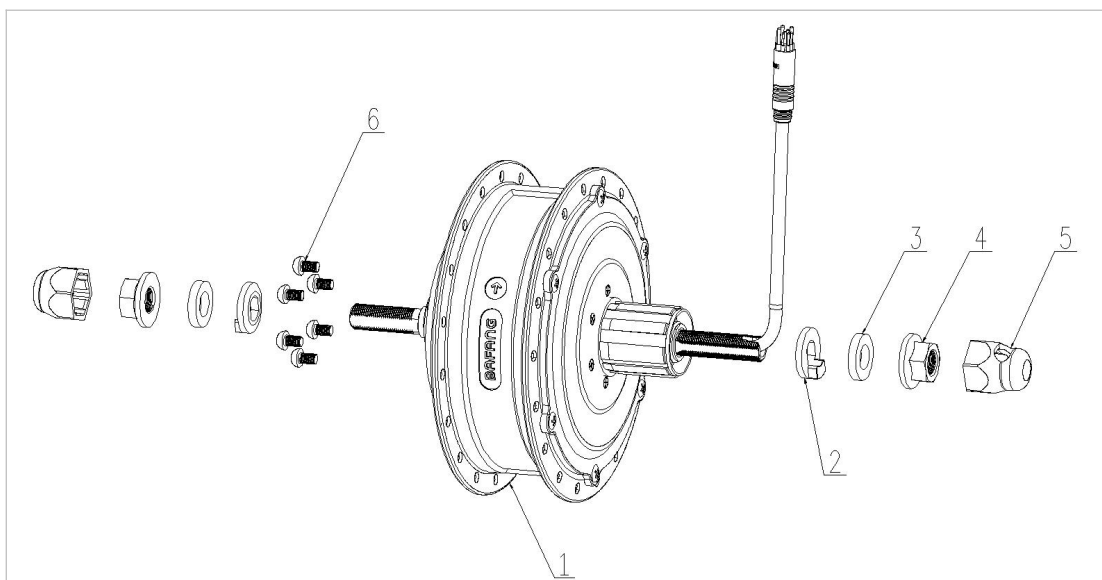


Fig.12 Exploded view of the motor

No.	Name	Spec. (mm)	Qty. (pcs)
1	Motor	OLD: 138	1
2	Stop pin	∅ 12.1*∅ 20*4	2
3	Bushing	∅ 12.2*∅ 19*4	2
4	Flange nut	M12*1.25*12	2
5	Hex bushing	QSWXB12-1/2	1 pair
6	Hex screw	M5*8	6

Note: The brake parts and extension cords are not included in the material list.
If you need them, please list them in the order separately (fees extra).

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5.4 List of Tools to be Used

Diagram	Name
	4mm Hex wrench
	Hook wrench
	Chain wrench
	19mm Open-end wrench
	19mm Plum wrench

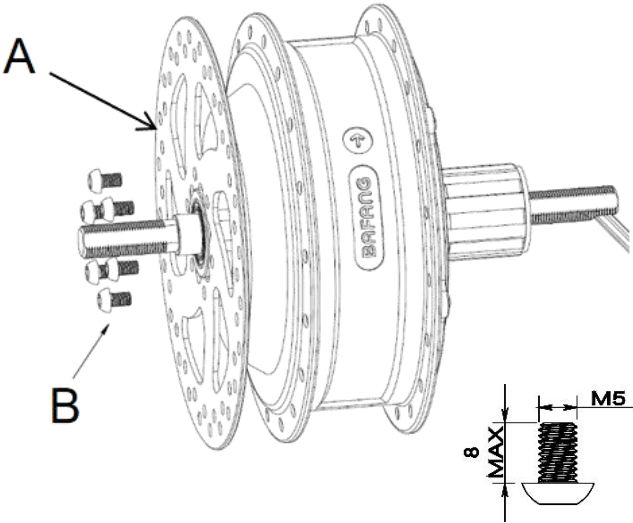
Note: Customers need to purchase the tools used in the installation steps, which will not be provided by Bafang.

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5.5 Installation Steps

1

Place the disc brake onto the motor shaft from the left side and tighten it with six M5*8 hex screws.



(A) Disc brake

(B) M5*8 hex screw

Tool

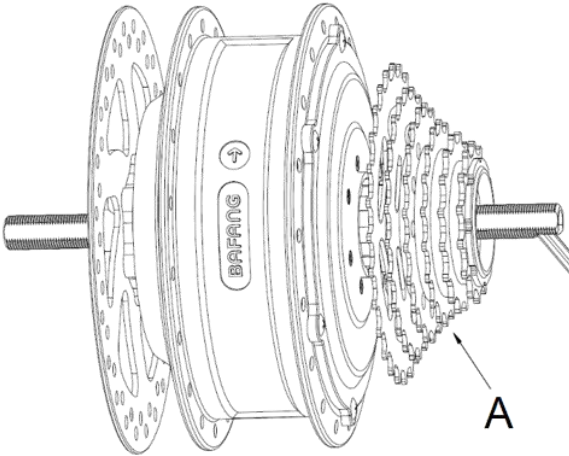


Tightening torque

4 N.m

2

Place the freewheel onto the motor shaft right end cover and tighten it.



(A) Freewheel

Tool



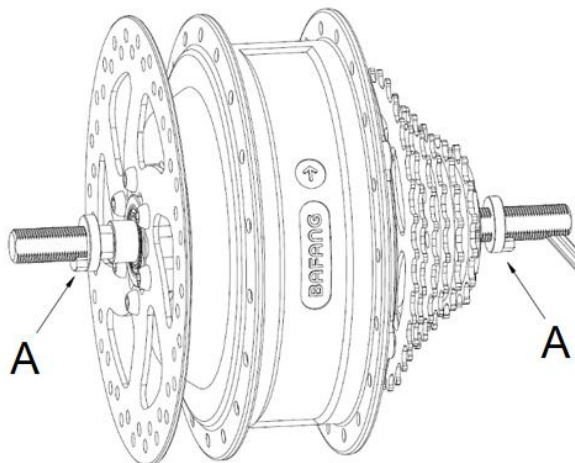
Tightening torque

35 N.m

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Place two stop pins onto the motor shaft from both sides respectively.

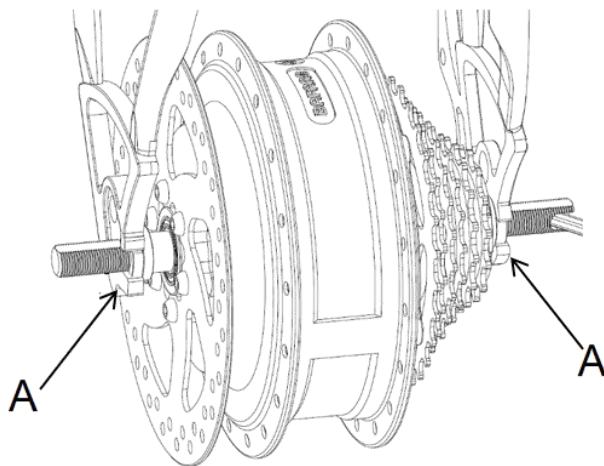
3



(A) Stop pin

Install the motor into the frame.

4

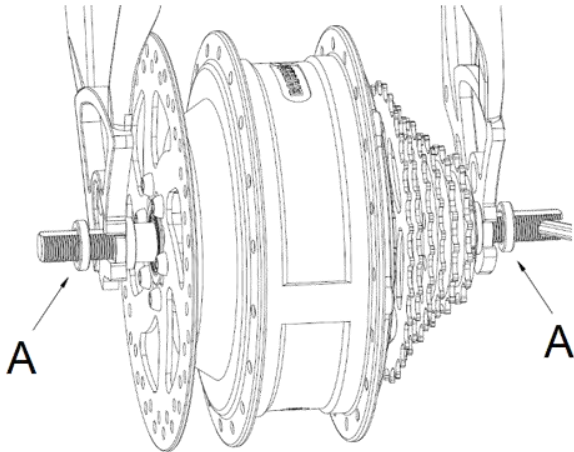


(A) Frame

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Place two 4mm bushings onto the motor shaft from both sides respectively.

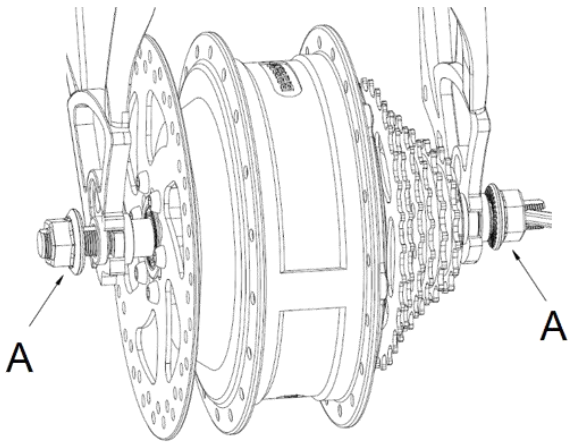
5



(A) Bushing

Install 2 M12 flange nuts onto the motor shaft from the both sides, and lock the flange nuts with a 19 mm wrench.

6



(A) Flange nut

Tool



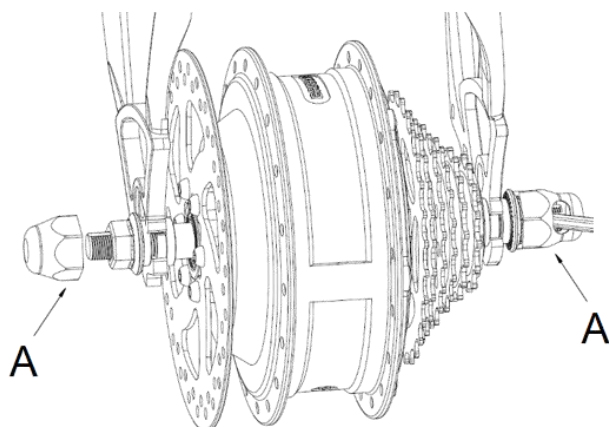
Tightening torque

40-45 N.m

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Install 2 hex sheaths onto the flange nuts.

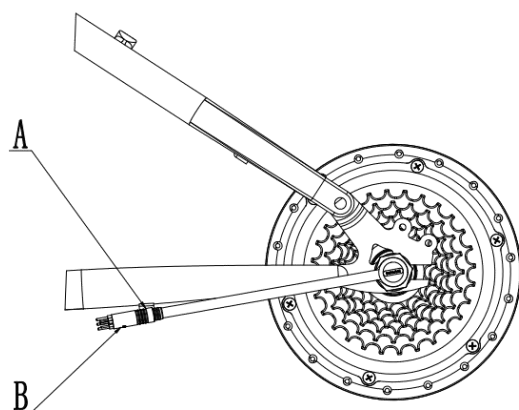
7



(A) Hex sheath

Connect the power cord of the motor to the controller, facing the foot pedals.

8



(A) Cable groove

(B) Power cord

Note: To avoid short circuit due to water, the motor power cord should be extended forward along the chain stay to ensure the connector faces the ground. The chain stay shall reserve space to fix the cord. The power cord of 6.3 mm can be through the cable groove.

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6. Product Package

6.1 Packing Details

Item	Parameter	Item	Parameter
Net weight (kg)	3.5	Pallet stacking method	6 boxes/layer, 5 layers in total
Quantity/carton (pcs)	4	Quantity/pallet (pcs)	120
Gross weight/carton (kg)	15.2	Pallet dimension (mm)	1250*830*135
Carton outer dimension (mm)	415*415*235	Pallet stacking dimension (mm)	1250*830*1310
Lining material	EPS foam	Weight/ pallet stacking (kg)	476

6.2 Precautions for Transportation

- The cartons shall be loaded, unloaded and transported according to the packing indicators on the cartons.
- In the process of loading and unloading, the cartons shall be handled gently and prevented from being dropped, tossed and pressed.
- During transportation, the cartons shall not be subjected to violent mechanical impact, exposure to the sun, rain, chemical corrosive substances or harmful gas erosion.

6.3 Precautions for Storage

- The cartons shall be stored in a dry, clean, well-ventilated warehouse with a temperature of -10℃~40℃ and a relative humidity of not more than 75%.
- The cartons shall not be exposed to direct sunlight, and the distance from the heat source (heating equipment, etc.) shall not be less than 2 m.
- The cartons must not be stored with inflammable materials and active chemicals.
- The cartons shall not be subject to any mechanical shock or heavy pressure.

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Bafang Electric (Suzhou) Co., Ltd

No.6 Dongyanli Rd., Suzhou Industrial Park, 215125

Suzhou, China

Email: sales@bafang-e.com

Web: www.bafang-e.com

This product specification complies with the regulations of the machinery directive ISO 4210:2014 and EN 15194.

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