

WISPER
Electric Bikes

ProductName : Wisper HT Mid Drive Motor
Wisper HT Mid Drive Motor User Manual

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Introduction

Purpose

Professional electric bicycle technicians can correctly install electric bicycle components according to the contents of this manual.

Readers

This manual is mainly suitable for professional electric bicycle technicians. For users who have not received professional training in the assembly of electric bicycles, do not attempt to use this manual to install components yourself. If you are unsure about any part of the manual information, do not install it.

How to use this manual

1. Be sure to read all installation manuals included with the product.
2. Except for the information described in this manual, do not disassemble or modify the product.

Precautions

1. Be sure to follow the manual to install the product.
2. When performing maintenance operations (such as replacing parts) (it is recommended that you use "Truckrun" accessories), be sure to wear goggles to protect your eyes.
3. Keep this manual in a safe place after reading it through.

Instructions for electric bicycle installation and maintenance

1. Always unplug the battery before wiring or installing parts of the electric bicycle. Failure to do this may result in electric shock.
2. When installing the product, be sure to follow the instructions given in the manual. If the screws and nuts become loose or the product is damaged, the bicycle may suddenly fall over and cause serious injury.
3. Maintenance intervals depend on usage and cycling conditions. Clean the chain regularly with a suitable chain cleaner. Never use alkaline or acidic solvents such as rust cleaners. If these solvents are used, the chain may be damaged and serious injuries may occur.

For the sake of safety, please read this user manual carefully before using it correctly.

Notices

For riding safety, please follow the instructions in the user's manual of the electric bicycle.

1. Familiarize yourself with how to start an electric bike before riding it. Otherwise the electric bicycle may start unexpectedly and cause an accident.
2. Please use this product under the guidance of safety supervisors or according to the instructions for use. Do not allow people with physical, sensory or mental illness, people with no operating experience or people without the necessary knowledge (including children) to use this product.
3. Before riding, please check that the wheels are fixed. Otherwise you may fall off your bicycle and get seriously injured.
4. When riding a bicycle be careful not to let the meter display distract you otherwise it may cause you to fall off your bicycle.
5. When cycling at night make sure the headlights are on.
6. Do not let children play near this product to avoid getting injured
7. Regularly check the battery charger for any damage especially the wires, connectors, and casing. If the battery charger is damaged it must be repaired before it can be used.
8. If any malfunction or problem occurs consult your nearest dealer.
9. Never modify the system. This will cause a system failure.
10. For information on product installation and adjustment consult your dealer.
11. Please do not perform high pressure washing as water could enter the bicycle which may cause failure or rust.
12. Although the device is completely waterproof and designed to be able to drive on rainy days do not intentionally soak it in water.
13. When the product is transported at high speed on rainy days the battery should be taken out and kept in a safe place to prevent rainwater from entering.
14. When cleaning the battery and plastic cover use a damp cloth
15. This product does not guarantee that natural wear and tear will not occur due to normal use and aging.

System main configuration:

Name	Model	Remarks
Mid Motor	TK.BM01	
Chainwheel	TK.CW.A01	Chainwheel support can be optional
Cranks	TK.CK01	Optional (BCD104mm GB Standard)
Display	TK.CA01	
Sensor	TK.PS.SW01	Shift sensor can be optional
Integrated cable	TK.JC.C01	1-1,1-3,1-4 cables can be chosen
Brakes	TK.BK.A01	Need the integrated cable with 3 ore Connectors (2 brakes and 1 display)

M01



Hanger

Crank



Brakes



Chain wheel



Speed sensor



Shift sensor



Display CA.01



Integrated cable +
Battery cable



Necessary Screws

I. Motor description

1. Performance characteristics

1.1 The motor uses torque sensor assisted speed and wheel speed detection. The system uses dual speed signal feedback protection to ensure the safety and reliability of the system

1.2 Starting torque and the maximum torque of the motor is $\geq 100N.m$ which is more conducive to climbing.

1.3 High efficiency, low power consumption and long endurance.

1.4 Low noise and stable operation.

2. Using environment

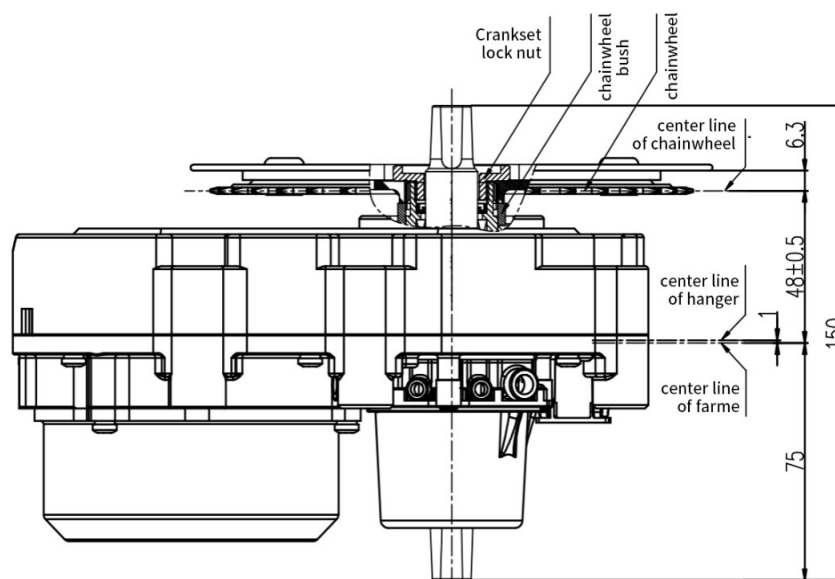
The motor will work normally under the following conditions:

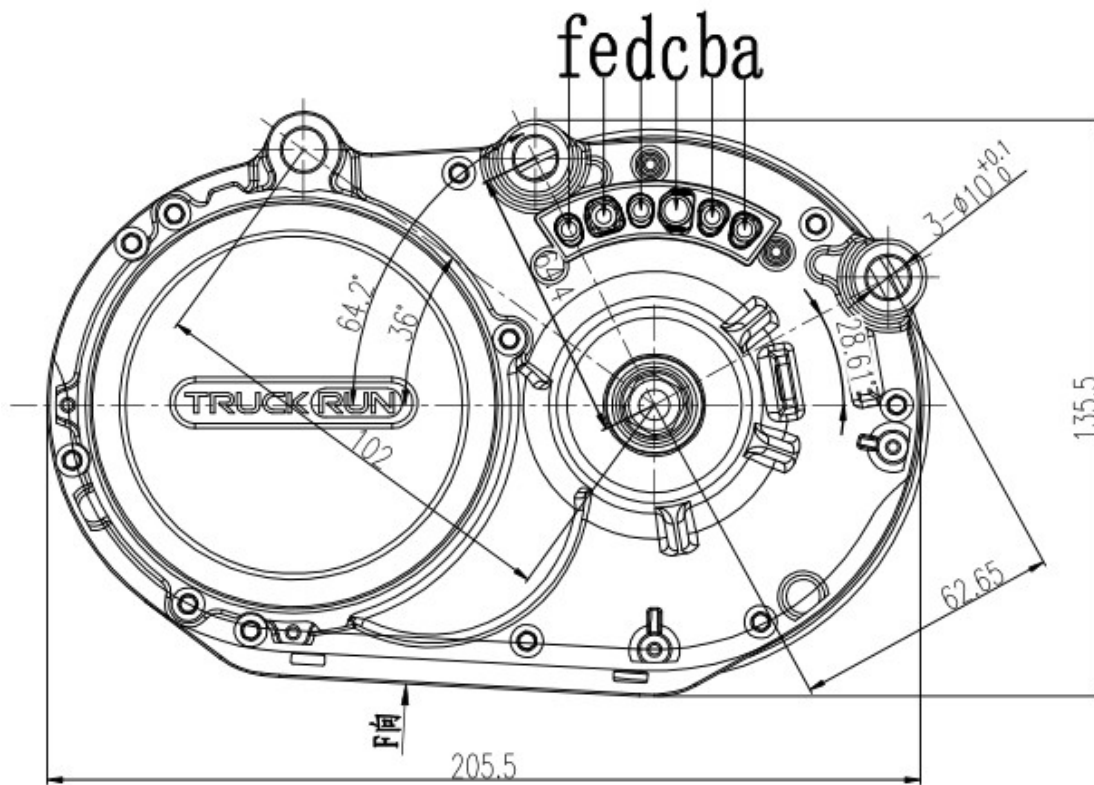
2.1 Ambient temperature: $(-20 \text{---} + 55) \text{ } ^\circ \text{C}$

2.2 Relative humidity: $(15-95) \% \text{ RH}$

Note: Severe corrosive liquids or gas and a medium or strong magnetic field (that affects electrical insulation performance) will affect the normal use of the motor.

3. Structure size





4.Cable pins definition

- a: Speed measuring cable: speed measuring sensor (PS.SW01)
- B: Shift Sensor cable : Shift sensors (PS.BS0 . 1)
- c: Battery cable: battery + battery communication (PI.A01-A2.3)
- d: Rear light cable: rear light (PI.A01-T0.2-2)
- e: Integrated cable harness: signal integration (JC.C0 1)
- F: Headlight cable: headlight (PI.A01-A0.2-2)

5.Technical parameters

Rated Voltage (DCV)	36V
Rated Power (W)	250W

Rated efficiency (%)	≥ 80%
Rated speed (rpm)	100±4
Torque (N.m)	≥100
Chain wheel	38T/or other
Weight (Kg)	3.6
Sensor	Temperature sensor, assisting torque and wheel speed measurement, assisting speed
Using environment	-20°C ~ 55°C
Noise (dB)	< 55
Ingress protection	IP65
Functions	Optional Gear Sensor mould, DC 500mA/ 6Vfront and rear light mould
Certification	CE/ROHS/EN14764/REACH

6. Built-in controller Features:

This is an efficient and quiet DC brushless motor control system. It uses the leading magnetic orientation (FOC) sine wave synthesis technology which can effectively reduce the torque ripple and noise of the motor making the motor run smoother and with lower noise.

- Stable and reliable wiring design and installation
- Smooth and flexible operation
- Built-in temperature sensing device to monitor the working condition of the product and provide temperature torque proportional control

- High-reliability and high-efficiency drive unit, the matching instrument can prompt the operating status (common for LED / LCD)
- Excellent running comfort during quiet running and cycling
- Vector-driven brushless motor can guarantee higher cost performance and high efficiency parameters
- The system has high compatibility and expandability and the built-in I2C and RS-485 communication provide convenience for future function expansion.
- HDQ management system, always monitor the running status of the battery
- Using the built-in digital communication interface you can set the parameters through a personal computer
- Applicable to pulse assisting sensor and torque sensor
- Comply with EU EN15194 electromagnetic compatibility certification standard and RoHS testing standard

7. Built-in torque sensor description

7.1 Performance characteristics

TK.PS, ST01 torque sensor is a high-quality and high-performance sensor suitable for electric bicycles. It uses a non-contact method to convert the pedal force into a high-accuracy and linear voltage output. The output of the speed Hall pulse signal can accurately transmit the state of the riding process to the controller. The perfect combination of the power output of the entire system and the pedaling force of the riding system has achieved the best assisted riding effect. In particular the parameters are optimized according to the needs of the markets in different regions and the high level parameter indicators are reflected in the cost-effective and comfortable feeling of assistance.

7.2 Technical Data

Torque sensor model		TK.PS, ST01
Parameter	Voltage input	5 (V)
	Power input	< 0.3W
	Voltage output	0.75-3.5(V)
	Torque detection range	0.5-80N.M


	Torque linear ratio	35mv/N.m
	Speed signal ratio	36r
	Speed signal duty cycle	50%
	Operating environment	-20°C~85°C
	Ingress protection	IP65
Testing standard		EN14764/EN15194/ROSH/CE

8.Rear wheel speed measuring sensor

8.1 Product Description

TK.PS. SW 01 rear wheel speed measurement sensor is a dedicated sensor that matches the mid motor system. It is used in combination with magnetic steel installed on the spokes. It is mainly used for the accurate detection of the speed of the rear wheel. Simple structure, stable and reliable product.

8.2 Technical parameters

Operating Voltage	4.0-5.5V	Image 
Output high	Vcc-.4.0~Vcc	
Output low	0-0.5V	
Working current	10mA	
Operating temperature	-20~60°C	
Storage temperature	-20~80°C	
Cable pull-out force	20~30N	

II. Optional accessories

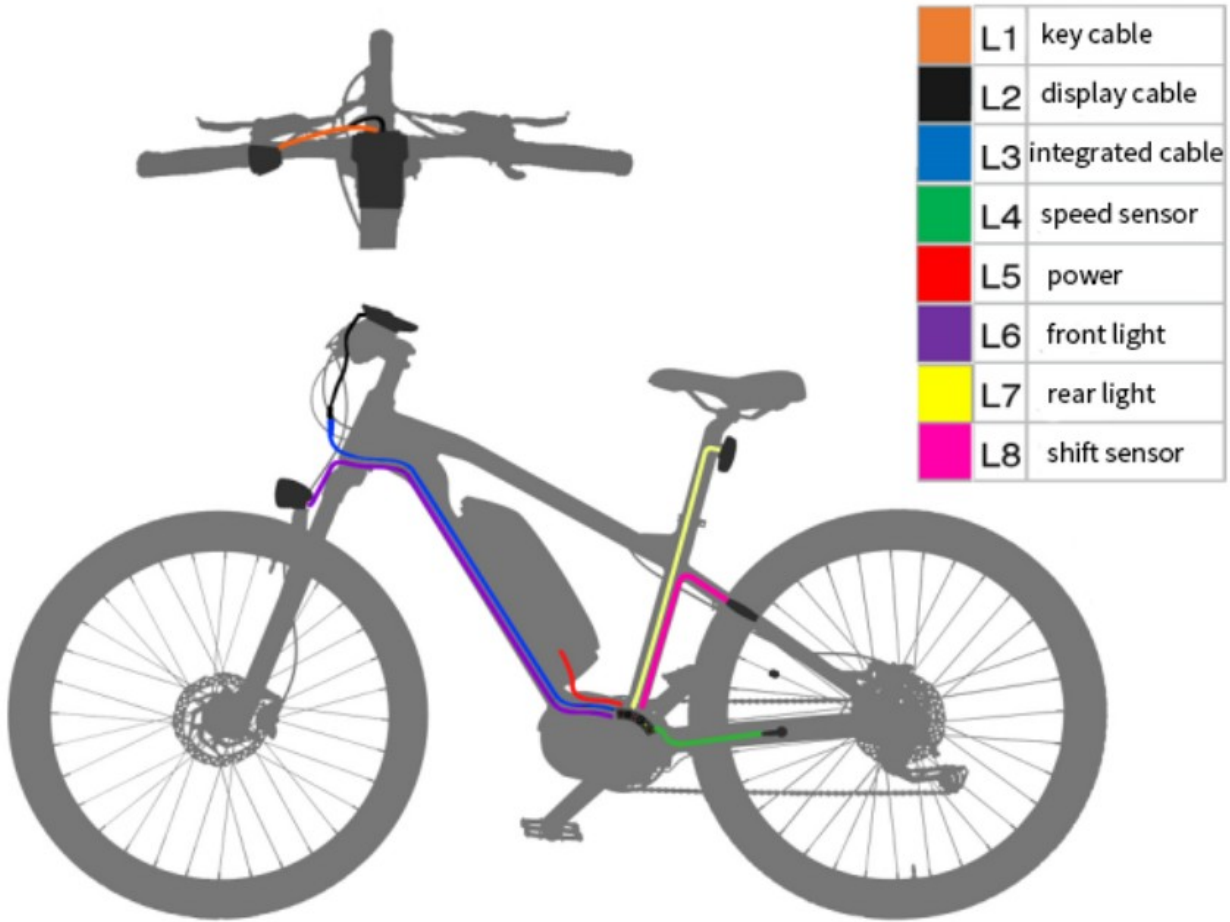
Product name	Product model	Image
Power off Brakes	TK.BK01	
Throttle	TK.TR01	

III. Installation instructions

1. Tools list

Component	Accessories	Tool
Display	Fixing screw M4	Allen wrench
	Fixing screw M4	Allen wrench
Mid motor	M6*14hanger screws	Allen wrench
	M3Cross half countersunk head screw/M3 Cross pan	Cross screw driver
	Install the sprocket guard	BB Sleeve
	M8 Crank mounting screw	Allen wrench
Speed sensor	Mounting magnetic steel	Slotted screwdriver
	Screw to fix the speed sensor M5	Cross screwdriver

2. System installation



2.1 Install the display

Mounting steps	Image	Accessories
<p>1. Open the left and right wrists of the display and then put the rubber clamp ring into the correct position of the wrist as shown in the figure. (Depending on the diameter of the handlebar, you can choose whether you need rubber clamps or not)</p>		<p>Rubber clamps Φ22.2, Φ25.4 φ25.4 、 Φ31.8</p>

2. Fit the left and right wrists with the rubber clamps on the handlebars.

Use an Allen wrench to secure and tighten the handlebar fixing screws.

Tightening torque: 1N.m



Display wrists

Hex socket head cap screws

M4*8

Tool: 3mm Allen wrench

3. Adjust the angle of the display to make it easier to see the screen while riding. After determining the angle, tighten the screws to the specified torque.

2.2 Install the auxiliary switches

Mounting steps	Images	Accessories
<p>1. Open Mounting clamp of the auxiliary switch and put it on the appropriate position of the handlebar. Adjust the angle of the auxiliary switch to make it easier to see the switch and operate it when riding.</p> <p>(Suitable for handle tube with outer diameter Φ 22.2mm)</p>	<p>A close-up view of a black handlebar with a grip. A black auxiliary switch is being attached to the handlebar. A blue arrow points to the switch, and the word 'switch' is written in a white box next to it.</p>	<p>Wrist</p>

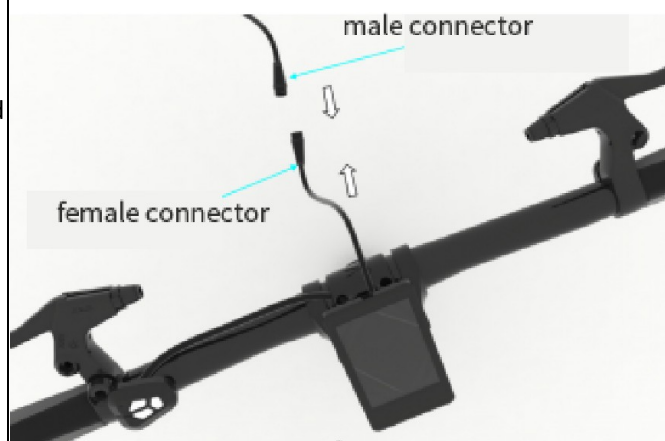
2. Fix and tighten the handlebar fixing screws with an Allen wrench

Torque: 1N.m

Hexagon socket head cap screws M3*8

Tool: 2.5mm Allen wrench

3. Connect the display into the five-pins cable connector of the integrated cable harness as indicated.



2.3 Install speed sensor

Mounting steps	Images	Accessories
<p>1. Before installing the sensor, check to make sure the gap between the speed sensor and the magnet unit is within 5 to mm.</p>	<p>The image shows a speed sensor being mounted on a white rear fork. A cable is attached to the sensor. A hand is shown adjusting the sensor's position. Labels with red arrows point to the 'sensor', the 'distance from sensor to magnets', and the 'magnets' on the fork.</p>	<p>Spokes Magnetic steel Speed sensor Rear fork</p>

2. If the clearance is within the specified range fix the speed sensor with the speed sensor fixing bolt.

If the gap is more than 20mm use a spacer between the sensor and the rear fork boss to adjust

Tightening torque: 1.5 ~ 2N.m



Sensor bracket
 speed sensor
 Sensor fixing screw M5 * 12
 Dust plug
 Tool: Phillips screwdriver

3. Arrange the speed sensor and magnet as shown.

3.1 Clamp the magnetic steel on the spokes, adjust and position the sensor and tighten the magnetic steel fastening screws

Note: When installing the magnet align its center with the center of the sensor's sensing area.

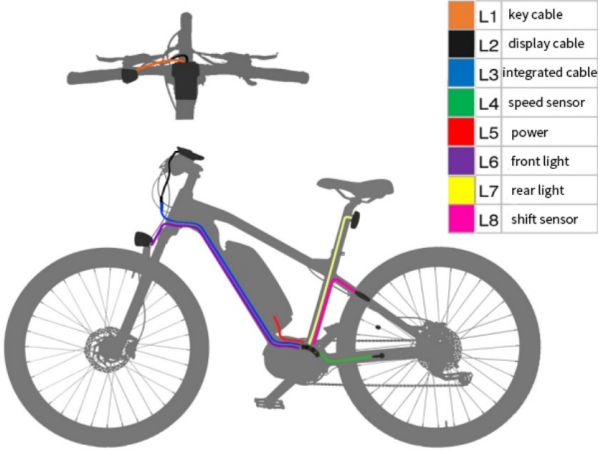
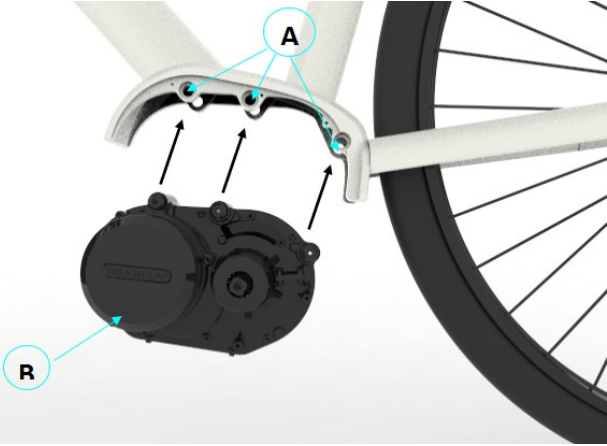
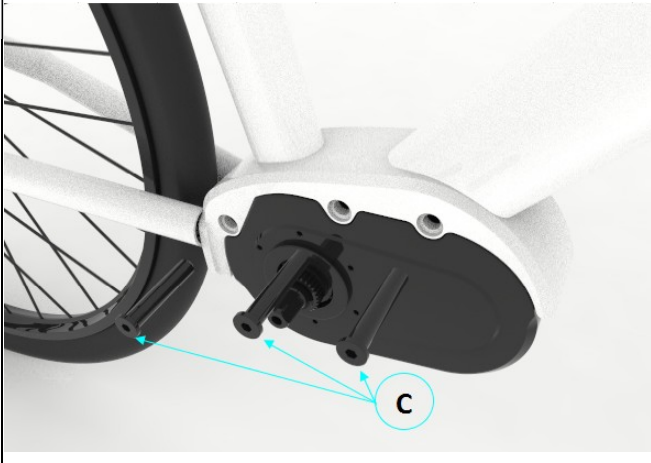


Tachometer
 magnetic screws
 Spokes

4. Check the distance between the pick up magnet and the sensing position of the sensor as shown. Effective working distance range (between 5 ~ 25mm)

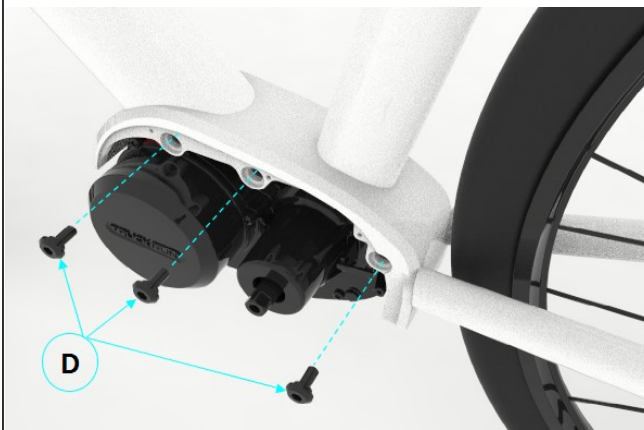
Tachometer
 magnetic screws
 Spokes

2.4 Install the mid drive motor

Mounting steps	Images	Accessories
<p>1. Before installing the motor it needs to be wired in advance according to different models and wiring structures.</p>		<p>Display cable Front light cable Rear light cable Battery cable Speed sensor cable</p>
<p>2. Align the three mounting holes in the drive unit with the mounting holes in the frame.</p> <p>Note: Pay attention to the position of the cable outlet when aligning the holes. Ensure that the cable won't be squeezed by the motor.</p>		<p>A: Mounting hole B: Mid motor (TK.BM01)</p>
<p>3. Insert the M6* 53.5 hanger bolt from the right into the frame and the motor mounting holes.</p>		<p>C: M6*53.5 hanger bolts</p>

4. Insert the M6 * 14 hanger screw from the other side into the frame to fix it with the nut and tighten it to the specified torque.

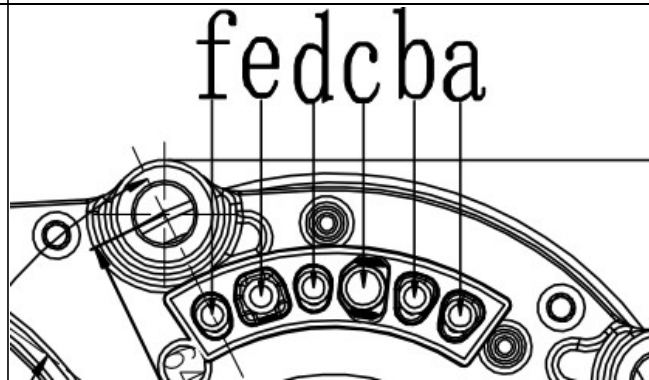
Tightening torque: 9-10 N·m



D:M6*14 hanger screws

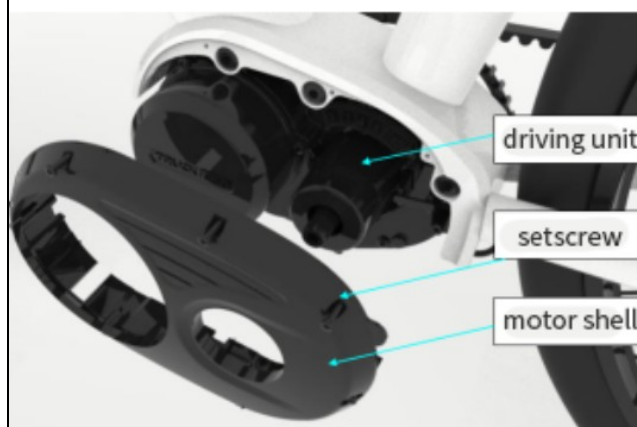
5. Connect all cables to the drive unit as shown.

The cables should be arranged neatly.



a: Speed cable: speed sensor (PS.SW01);
 b: Variable speed cable: the shift sensor (PS.BS02);
 c: Battery cable: Battery cable + battery communication (PI.A01-A2.3) ;
 d: Rear light cable: Rear light (PI.A01-T0.2-2) ;
 e: Integrated cable harness: signal integration (JC.C0 1) ;
 f: Headlight cable: Headlight (PI.A01-A0.2-2) .

6. Install the 7 holes on the drive unit cover corresponding to the 7 holes on the drive unit (the top 3 are through the holes on the frame) and then tighten with 7 screws.



Motor cover
 Locking screws : M3 cross pan head screw

7. Arrange the brakes or shift speed cable from the bottom of the motor and then insert the bottom cable clips into the relative position to fix the cables.

Cable clips

8. Here is the image of the finished motor

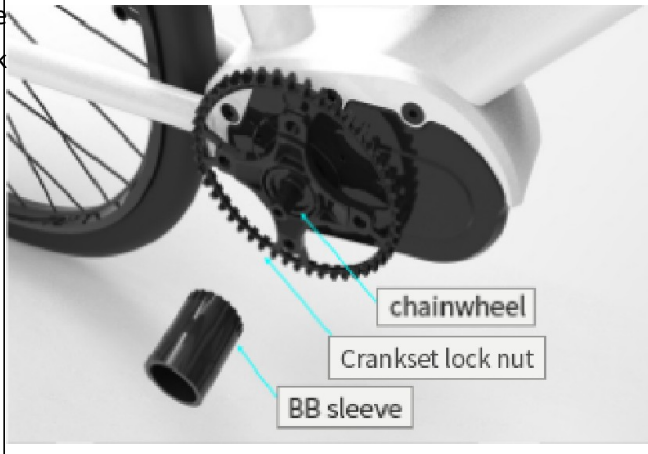


2.5 Install Chainwheel

Mounting steps	Images	Accessories
<p>1. Install the chainwheel bush first then the Chainwheel and finally the wrist guard (left rotation) according to the sequence shown in the right figure.</p>		<p>Chainwheel Chainwheel bush $\Phi 35^*$ $\varphi 30^*7$ Wrist $\varphi 38^*11^*M24$</p>

2. After installation, use the central shaft sleeve to lock the wrist guard.

Tightening torque : 35N.m



Tool: Central shaft sleeve

2.6. Install cranks

Mounting steps	Images	Accessories
<p>1. Install the right crank on the right central shaft and lock it with an M8 socket head cap screw. Install the left crank in the same way.</p> <p>Tightening torque : 40~45N.m</p>	<p>The diagram shows the crank being installed onto the central shaft. A black crank is being pushed onto the shaft. A black screw is shown separately, intended to be used to lock the crank. Labels with blue arrows point to the crank and the screw.</p>	<p>170 Crank Hexagon socket head M8 screw</p>

III. System Accessories list

Accessories	Description	Quantity	Spec
Display components	Display	1	
	Φ22.2 Rubber clamp	2	Φ22.2
	Hexagon socket head cap screws	1	M3*8
	Hexagon socket head cap screws	2	M4*8
Speed measuring sensor	Speed sensor (including dust plug)	1	
	Sensor fixing screw	1	M5*12
	Speed measuring magnetic steel	1	

	Speed measuring screw	1	
	Speed measuring nut	1	
Motor components	M01mid motor	1	
	Hanger bolts	3	M6*53.5
	Hanger screws	3	M6*14
	Cross half countersunk head screw	2	M3
Motor cover components	Motor cover	1	
	Cable clip	2	
	Cross pan head screw	7	M3
Chainwheel components	chainwheel	1	
	Chainwheel Bushing	1	Φ35*φ30*7
	Wrist	1	φ38*11*M24
Crank components	Right crank	1	170mm
	Left crank	1	170mm
	Crank mounting screws	2	M8
Cable harness	Integrated cable	1	As per order requirements
	Cable for shift sensor	1	As per order requirements
	Battery cable	1	As per order requirements
	Head light	1	As per order requirements
	Rear light	1	As per order requirements

V. Error code definition

When the drive system fails, the display LCD screen will have a fault display icon, and an error code n will be displayed at the speed position.

Error code	Failure description	Trouble shooting method
"03"	Brake already	Check if the brake wire is stuck
"04"	Throttle is not returned	Check if the throttle is in original place
"05"	Throttle failure	Check the throttle
"06"	Low voltage protection	Check battery voltage
"07"	Over voltage protection	Check battery voltage
"08"	Motor Hall signal failure	Check the motor
"09"	Motor phase fault	Check the motor
"10"	High temperature	Check the controller
"11"	Controller temperature sensor failure	Check controller
"12"	Current sensor failure	Check controller
"13"	Temperature failure inside battery	Check battery
"21"	Speed sensor failure	Check the speed sensor installation position
"22"	BMS communication failure	Replace battery
"30"	Communication failure	Check controller connector or replace battery

VI. Warranty statement

Wuxi Truckrun Motor Co.,Ltd guarantees: During the warranty period if any products purchased by our vehicle manufacturers and distributors have problems regarding quality of the product parts and materials the warranty service will be provided by our company.

(This warranty is only for the complete drive system of our company. If only some parts of our company are used, it will not be covered by this warranty)

According to the date of shipment of Wuxi Truckrun Motor Co., Ltd., the warranty of the motor will last 24 months, and the display or other electronic components shall be guaranteed within 18 months.

Warranty time period and scope

Products that meet the above warranty statement, but are damaged by one of the following Conditions will not be covered by the warranty:

- 1) Damage due to improper modification, maintenance for competition or commercial purposes, misuse or abuse or caused by traffic accidents
- 2) Damage that occurs during transportation
- 3) Damage to the product caused by installation, commissioning or repair due to the failure of following the product installation manual (service manual);
- 4) Damage caused by improper use of the consumer, damage caused by non-material or non-process reasons
- 5) damage due to changes in the appearance of the product, and the damage does not affect the function of the product
- 6) Damage caused by repairs, installations etc. which are not specified by our company

Wuxi Truckrun Motor Co., Ltd. has the right to choose repair or replacement, and has sole responsibility to repair or replace the product. When the vehicle manufacturer or dealer encounters quality problems in the use or sale of Truckrun products, the purchase order No. and product serial No. shall be reported to Truckrun Motor Service Department and must be confirmed by them. If the problem is in warranty range, Truckrun will provide free repair or replacement. If the customers need repair service outside the warranty range, Truckrun will charge the corresponding parts, labor service and transportation costs.

If the customers need to repair the Truckrun system installed on the complete vehicle, please contact the manufacturer or dealer of the vehicle directly. If this warranty statement conflicts with the current laws, the local law shall prevail. Truckrun Motor reserves the right to modify the above terms without prior notice.

If you need more instant information and content, please pay attention to the official website of Truckrun: www.truckrun-e.com