

# Forward

1.Welcome to read this motorcycle maintenance manual. This manual aims to provide you with basic knowledge and skills related to motorcycle repair and maintenance. Before carrying out any repair or maintenance work, please ensure that you have read and understood all the information in this manual.

2.Safety Tips: Please ensure you have taken appropriate safety actions before performing any maintenance work.

3.The book is only the reference for maintaining BD500-15(Chinchilla),Please refer to the actual product and the relevant content in the user manual when repairing.

4.BENDA MOTO will continue to work hard to improve and manufacture various models and models. If any modifications or significant changes to product specifications.We will inform distributor in advance and incorporate the content into the reprinted maintenance manual.

## Important Information

The following text and symbols often appear in this manual, and are explained as follows:



Warning sign indicate attention ! Warning ! Self safety and vulnerability.

Tips: This means that certain procedures must be followed to avoid damaging the locomotive

## How to use this manual

### The structure

The manual is made up of various categories.(Refer to the symbol description part on the next page)

The First Title①: In the upper right part of each page,there are representative texts and symbols on this page

The second Title②: In the upper left corner of every chapter,both have this title.

The Third Title③: The title is sub-title,and it is used in a step-by-step manner in conjunction with the wireframe

### Stretch-out view

In order to understand the sequence of parts and disassembly steps, there is an expansion diagram at the beginning of each decomposed chapter for reference:

1.For decomposition and combination work, there is an unfolding diagram④for reference.

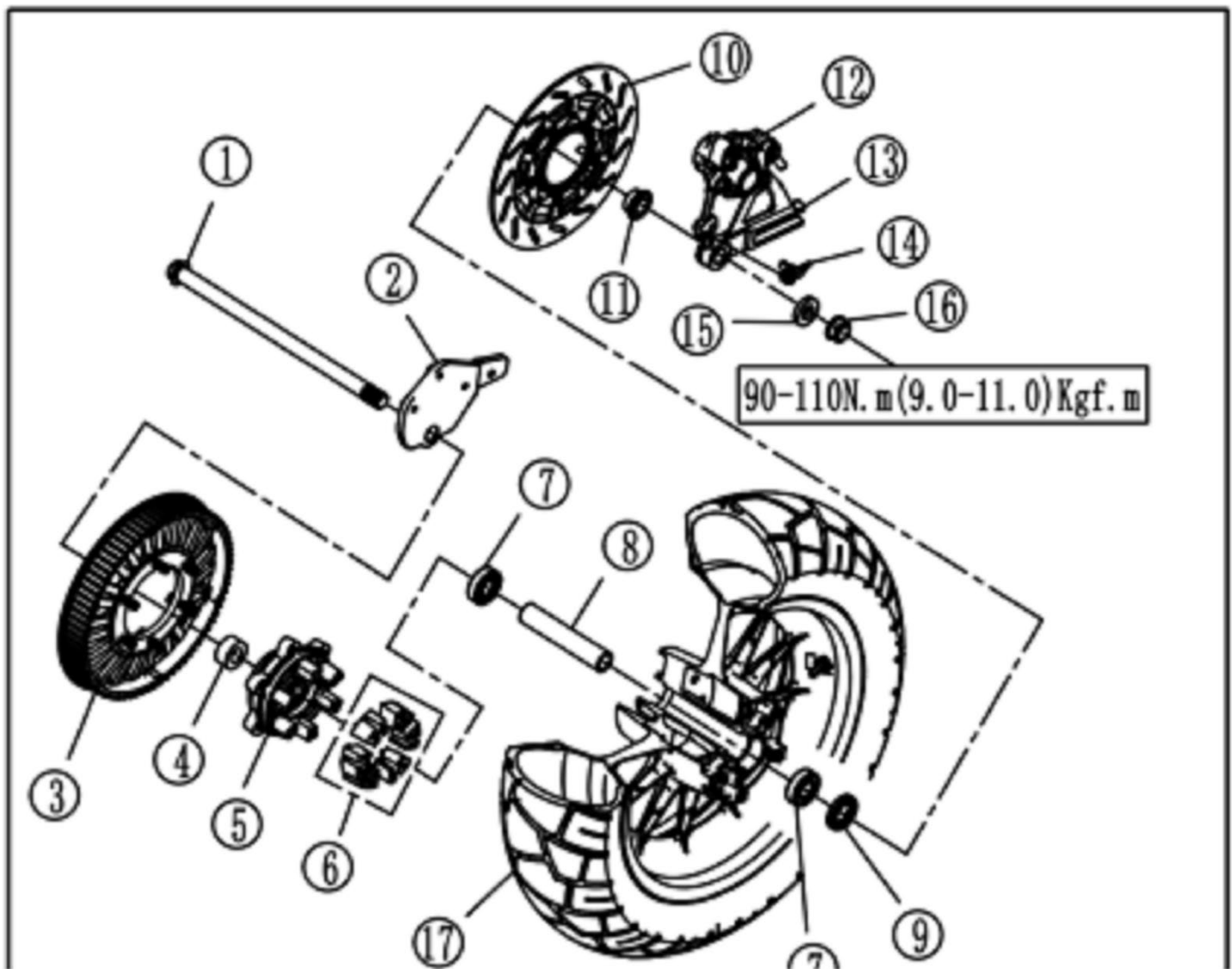
2.Regarding work related information, in addition to the expansion diagram, there are detailed explanations in the work step format⑤.

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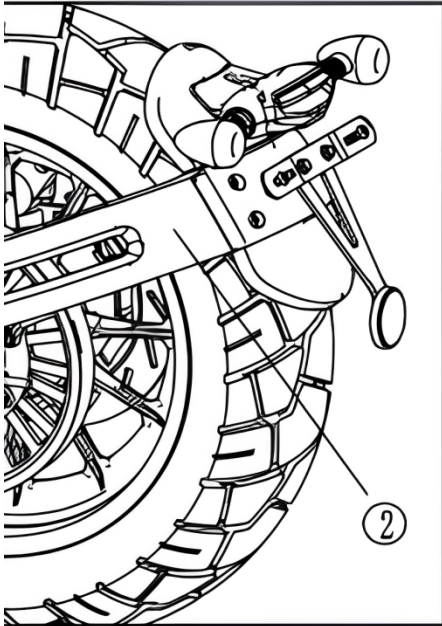


### Rear wheel

- |                                  |                                  |
|----------------------------------|----------------------------------|
| (1) rear axle                    | (9) Oil seal (hub assembly)      |
| (2) Rear fender bracket          | (10) Rear brake disc             |
| (3) Large pulley                 | (11) Rear wheel liner            |
| (4) Left rear wheel liner        | (12) Rear brake lower pump       |
| (5) Wheel seat assembly          | (13) Rear carbon brake bracket   |
| (6) Bumper                       | (14) Rear wheel speed sensor     |
| (7) Bearing (hub assembly)       | (15) Rear wheel right liner      |
| (8) Bushing (wheel hub assembly) | (16) Rear wheel axle locking nut |



## Rear wheel



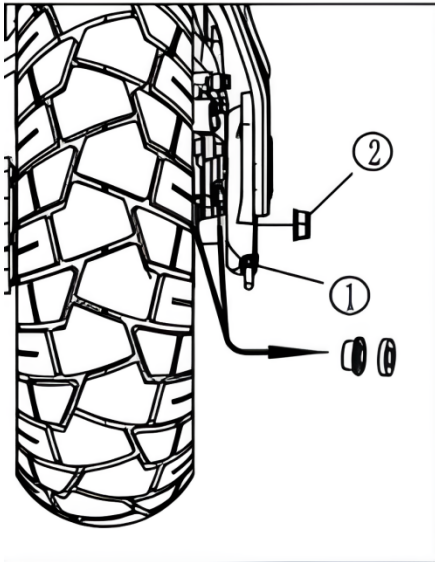
**warning**  
Firmly support the motorcycle to prevent it from overturning

### 1 Dismantle

- "Rear mudguard 2" fixing bolt ①
- "Rear mudguard bracket 2 and rear mudguard 2" ②
- Adjusting bolts for the rear fender mounting bracket ③

### 2 Dismantle

- Belt adjustment nut ①
- Rear wheel locking nut ②
- Rear axle ③
- Rear wheel liner



#### Tips:

When disassembling the rear axle, the bushing will fall off, be careful not to lose it.



Warning: operating repairing and maintaining a vehicle can expose you to chemicals, including Engine exhaust, carbon monoxide, phthalates, and Lead, which can cause cancer, congenital defects, Or other injuries. In order to to maximize reduce the Exposure, avoid inhaling exhaust, unless necessary, Otherwise, do not idle the engine, maintain the vehicle in a well ventilated area, wear gloves or wash hands frequently when maintaining the vehicle.

**Before repairing and maintaining this vehicle, please read this manual carefully**

# The first Chapter. Overview

## 1.1 Motorcycle identification

### VIN

At the left fender ① of the vehicle, rotate the key clockwise,  
Open the rear seat cushion ② and then remove the front seat cushion ③.

You can see the frame identification code ①

### Engine serial number

The engine serial number ③ is engraved on the left crankcase of the engine

## 1.2 Maintenance precautions

### 1.Car wash

- Clean the dirt and dust on the vehicle body and engine very well.

To prevent entry into the machine during operation.

### 2.No smoke and fire

- Do not allow the fireworks approach the repair site.

### 3.Using correct tool

- Special tools must be used for the parts that require special tools. Ensure that the parts are not damaged
- Reliance on appropriate tools and measuring instruments for correct maintenance operations.

### 4.Using authentic components

- The components and oils used must be genuine products and recommended varieties from "BENDA", and do not use components from other brands.

### 5.Vulnerable parts must be replaced with new ones

- The sealing gasket (gasket), O-ring, cotter pin, spring ring, and lock washer must be replaced with new ones.

Pay attention to safe operation

### 6.Pay attention to safe operation

- During maintenance, great attention should be paid to operational safety to avoid work-related accidents and avoid burns from engines, exhaust pipes, mufflers, etc.
- Always consider the correct tools, correct handling, correct fixing position, and convenient force during homework to ensure a stable operating position for the body.

### 7.When carrying out disassembly work, the correct sequence should be followed and the disassembled parts should be sorted out in a timely manner

- The sequence of loosening threads is:

Twist from the outside to the inside, and loosen 2-3 times along the diagonal.

- When disassembling, important components part should be inspected and measured and their records should be retained for reference during assembly.
- Arrange the removed components in order according to their respective parts to prevent mixing and loss.

8. During assembly, the actions of each part should be confirmed

- The sequence of tightening threads is:

Tighten 2-3 times diagonally from the inside to the outside.

- During assembly, confirm the correction results of each component and the data before disassembly while carrying out the operation.
- Do not allow dust and foreign objects to adhere to various parts during assembly.

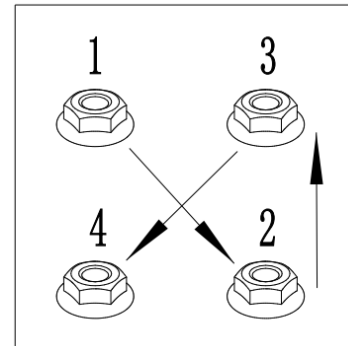
- Assemble each part while confirming its action. Apply engine oil to the rotating and sliding parts (on the oil seal and O-ring)

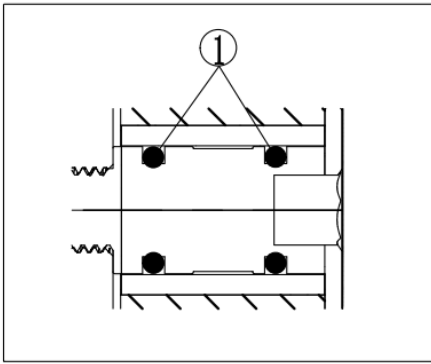
Apply lubricating grease. Follow the prescribed tightening torque.

- When two people work together on homework, they should closely cooperate.

9. Essential maintenance manuals and parts catalogs around you

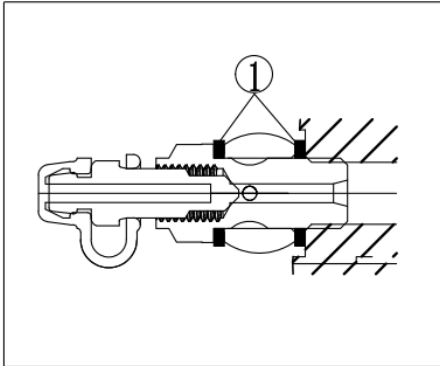
- To ensure efficient, reliable, and safe operation.





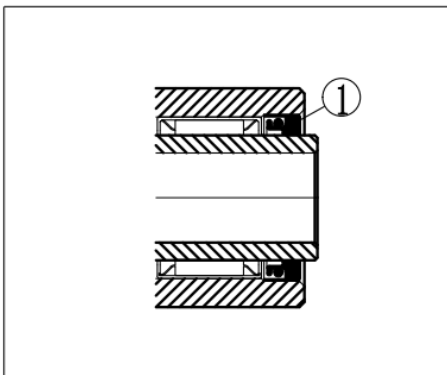
### Gaskets, oil seals, and O-ring seals

1. All the sealing gasket, oil seal and o-ring seals should be replaced during the vehicle overhaul process. Its surface must be cleaned in advance.
2. During the reassembly process, all matching parts and bearings should be properly coated with lubricating oil, and the lip of the oil seal should be coated with lubricating oil.



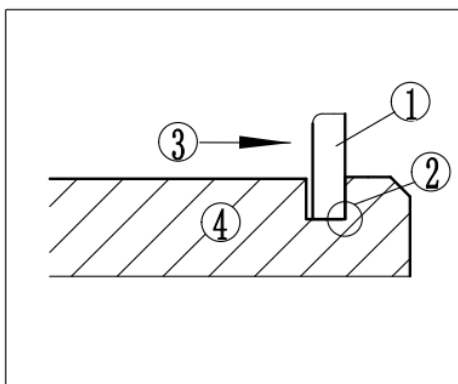
### Lock washers and split pins

1. All locking washers, locking washers, and split pins must be replaced after disassembly.



### Bearings and oil seals

When installing bearings and oil seals, grease should be applied to their sealing lips, and sufficient lubricating oil should be added when installing bearings.



### Circlip

Before reassembling, all elastic retaining rings should be carefully inspected. All deformed circlips need to be replaced.

When installing the elastic retaining ring, make sure that its sharp angle part ② is located on the opposite side of the retaining ring that bears thrust ③, and ④ is the shaft.

## The Second Chapter. Specification

### 2.1 Tightening torque

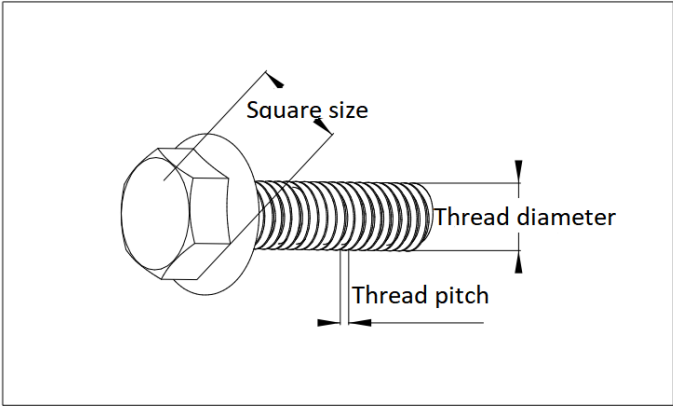
No	Locking components	Name	Size	Number	Locking number	
					Kgf.m	N.m
1	Instrument bracket fixation	Internal hexagonal cylindrical head bolt	M8×1.25	2	2.5-3.0	25-30
2	Handle switch and steering handle	Internal hexagonal cylindrical head bolt	M6×1.0	4	0.3-0.5	3-5
3	Upper connecting plate and handle fixing seat	Hexagon flange nuts	M10×1.25	2	4.5-5.9	45-59
4	Steering shaft and ring nut	Nut	M25×1.0	1	2.0-2.4	20-24
5	Calipers and front forks	Internal hexagonal cylindrical head bolt	M10×1.25	2	3.3-4.5	33-45
6	Front mounting plate and frame of engine suspension bracket	Internal hexagonal cylindrical head combination bolt	M8×1.25	2	2.5-3.0	25-30
7	Engine suspension and frame	Nut	M10×1.25	3	4.9-6.0	49-60
8	Rear mounting plate and frame of engine suspension bracket	Hexagonal flange bolt	M10×1.25	2	4.5-5.9	45-59
9	Rear shock absorber and frame	Cap nut	M10×1.25	2	4.0-5.0	40-50
10	Rear shock absorber and rear fork	Internal hexagonal cylindrical head bolt	M10×1.25	2	4.5-5.9	45-59
11	Rear fork shaft and nut	Nut	M16×1.5	1	10.0-15.0	100-150
12	Fuel tank and fuel pump	Internal hexagonal large pan head bolt	M5×0.8	6	0.5-0.8	5-8
13	Fuel tank and oil level sensor	Hexagonal flange bolt	M5×0.8	4	0.15-0.2	1.5-2
14	Fuel tank and frame	Internal hexagonal cylindrical head bolt	M6×1.0	2	0.8-1.2	8-12
15	Front axle and fork	Inner hexagonal wheel axle	M20×1.5	1	5.0-7.0	50-75
16	Rear axle and nut	Nut	M20×1.5	1	12.0-15.0	120-150
17	Brake disc and wheel hub	Internal hexagonal pan head step bolt	M8×1.25	10	1.8-2.8	18-28
18	Brake pump and brake oil pipe	Hexagonal flange bolt	M10×1.25	3	3.0-4.0	30-40

19	ABS control unit and brake oil pipe	Hexagonal flange bolt	M10×1.0	3	3.0-4.0	Specification
20	Large pulley and pulley seat	Hexagonal flange bolt	M10×1.25	6	4.5-5.5	45-55

**Tightening torque**

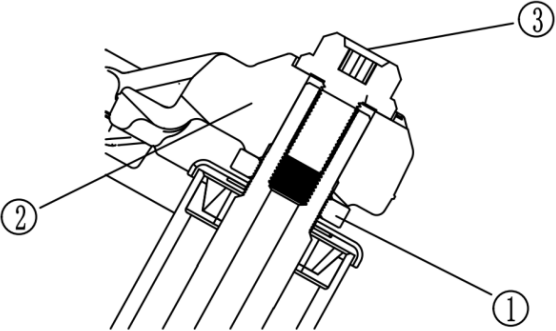
In addition to the specified locking torque, the general locking torque can be determined based on the diameter of the screw (opposite side width) when tightening screws and nuts (as shown in the table on the right).

Screw diameter (across edge width) × pitch	Locking
M5 (8mm) ×0.8	3-4Nm (0.3-0.4kg.m)
M6 (10mm) ×1.0	5-8Nm (0.5-0.8kg.m)
M8 (12mm) ×1.25	12-19Nm (1.2-1.9kg.m)
M10 (14mm) ×1.25	24-39Nm (2.4-3.9kg.m)
M12 (19mm) ×1.25	45-72Nm (4.5-7.2kg.m)



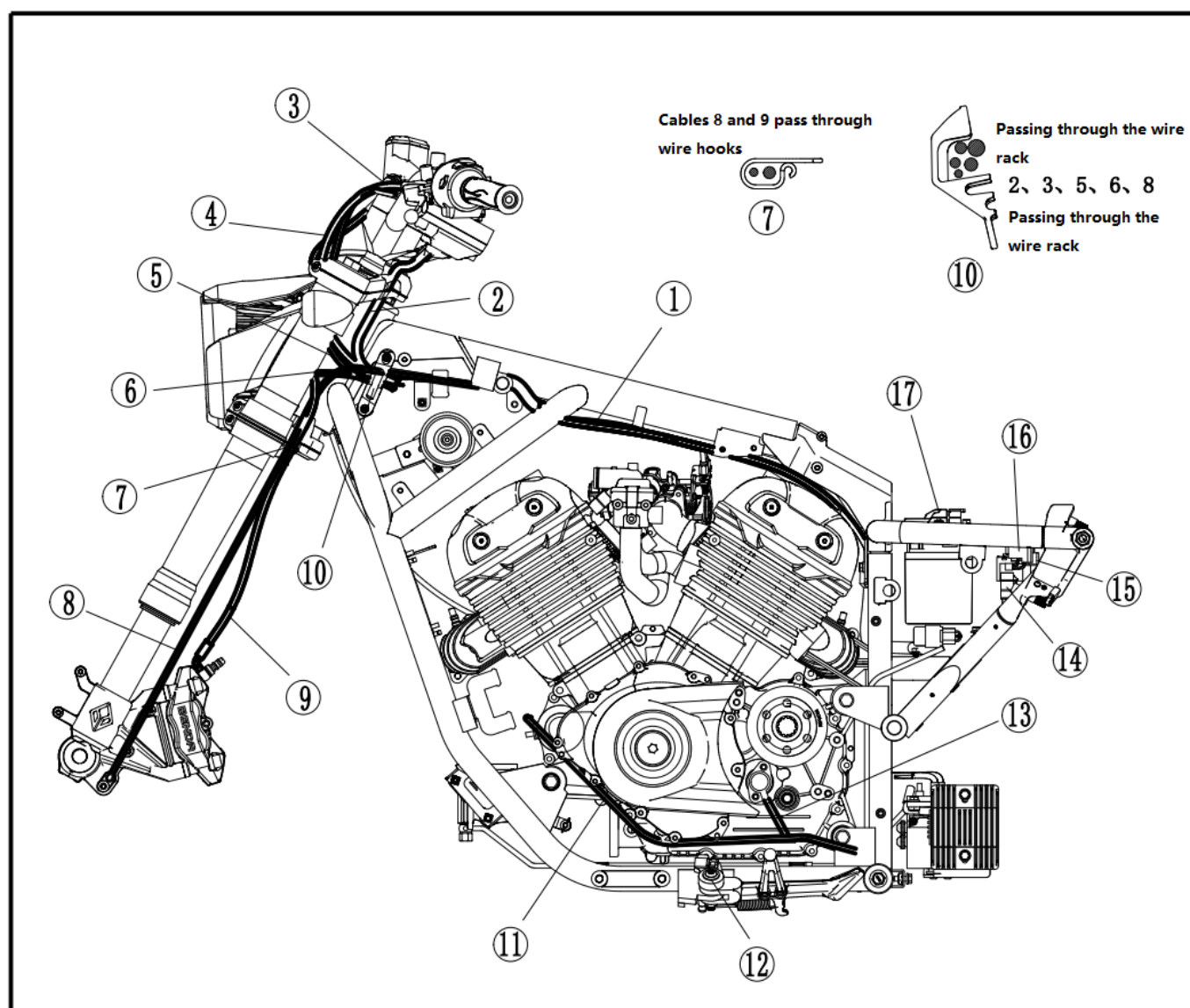
**Tightening sequence for steering system**

1. First, tighten the nut number ① to 30-35N. m.
2. Rotate the steering wheel 2-3 times left and right again, and ensure that it does not get stuck and the bearings do not loosen.
3. Loosen the nut ① by 1/4 turn and tighten it again, with a tightening torque of 20N. m. Rotate the direction knob to check for flexibility and appropriate tightness.
4. Then assemble the upper connecting plate of serial number ② and the bolt of serial number ③, with a tightening torque of 40-50N. m.



## 2.2 Cable wiring diagram

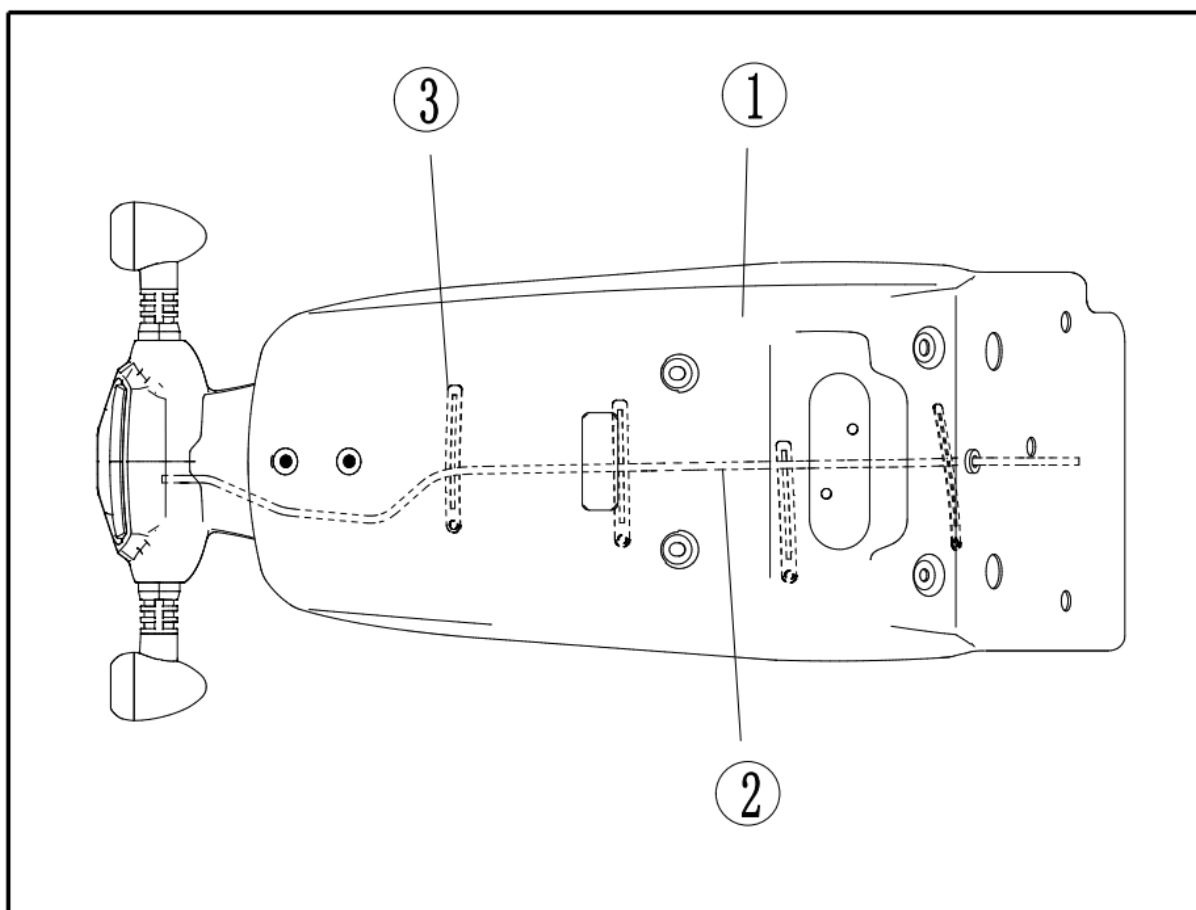
- |                                 |  |                             |
|---------------------------------|--|-----------------------------|
| 1 Main wiring harness           | 7 Wire hook                            | 13 Gear display cable       |
| 2 Instrument cables             | 8 Front wheel speed sensor cable       | 14 Flasher                  |
| 3 Left Hand Handle Switch Cable | 9 Front disc brake lower pump oil pipe | 15 OBD Diagnostic interface |
| 4 Clutch cable                  | 10 Threading rack                      | 16 Fuse box                 |
| 5 Headlight cable               | 11 Starting motor cable                | 17 ECU                      |
| 6 Front left turn signal cable  | 12 Side bracket flameout switch        |                             |



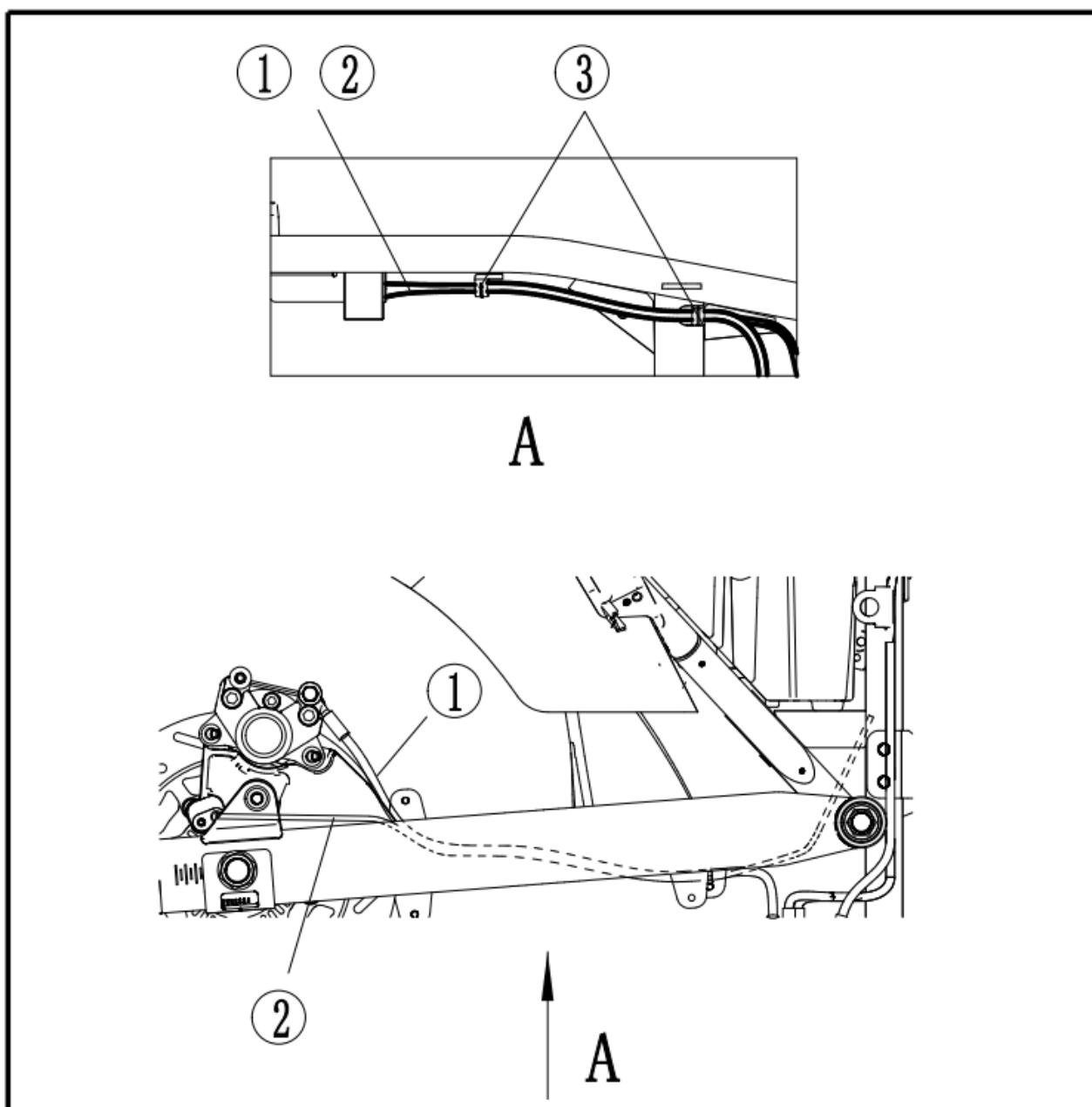
- A The plastic wrapped wire clip welded to the frame constrains the cable
- B The clutch line must pass through the line hook
- C Use zip ties to constrain the rear brake oil pipe



- 1 Wire clamp(Welded on the inner side of the rear fender)
- 2 Auxiliary cable
- A The rear taillight cable must pass through the bottom left side of the rear fork and be fixed with a pressure plate.



- 1 Rear wheel speed sensor cable
- 2 Rear brake caliper oil pipe
- 3 P-shaped clamp



## The Third Chapter. Check and adjust

### 3.1 Check and adjust

#### Brief introduction

This chapter includes project information that should be regularly checked and adjusted. Strictly implementing these preventive maintenance measures can ensure more reliable operation and longer service life of vehicles. The information in this chapter applies to both vehicles that have started regular maintenance and vehicles that are ready for sale. All maintenance personnel should be familiar with the content of this chapter.

#### Content

Project	Content	Run- in period 1000KM or One month	Original 3000km Or 3 month	Every 3000KM Or 3 month
Valve*	Check the valve clearance and adjust it if necessary	○	○	○
spark plug	Check its condition and replace or clean it if necessary	○	○	○
Air filter	Clean and replace if necessary	○	○	○
Fuel pipeline*	Check for cracks or damage in the fuel pipes and replace them if necessary		○	○
Engine oil	Replace (preheat the engine before draining)	○	○	○
Engine oil filter	Cleaning or replacement	○	○	○
Front brake*	Check its movement and adjust or replace it if necessary		○	○
Rear brake*	Check its movement and adjust or replace it if necessary		○	○
Clutch*	Check its movement and adjust or replace it if necessary		○	○
Suspension system*	Check if the rocker arm system is loose and tighten it if necessary.	○	○	○
Wheels*	Proper lubrication and maintenance.		○	○

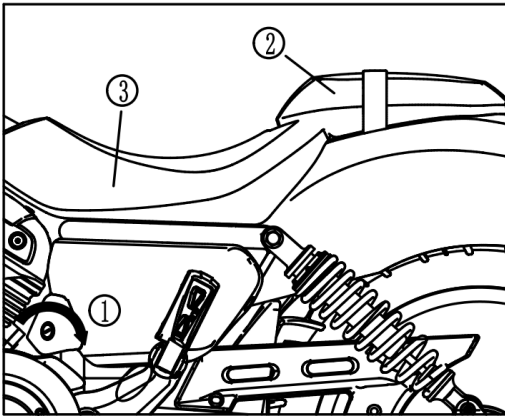
Wheel bearings*	Check if the bearings are loose and make necessary corrections. Perform appropriate disassembly and maintenance every 12000 (8000) or 12 months.		○	○
Steering bearings*	Check if the bearings are loose/damaged, and replace them if they are damaged	○	○	○
Front shock absorber*	Check balance status/damage, repair if necessary		○	○
Rear shock absorber*	Check the action status/oil leakage, and repair if necessary		○	○
Drive belt*	Check the action status/oil leakage, and repair if necessary	Check before driving		
Accessories/fastening parts*	Check the belt tension and adjust it if necessary	○	○	○
Battery*	Check all attachments and fastening parts, and make necessary corrections	○	○	○

\*: These items are recommended to be repaired by BENDA dealers.

**Tips:**

**Brake fluid replacement**

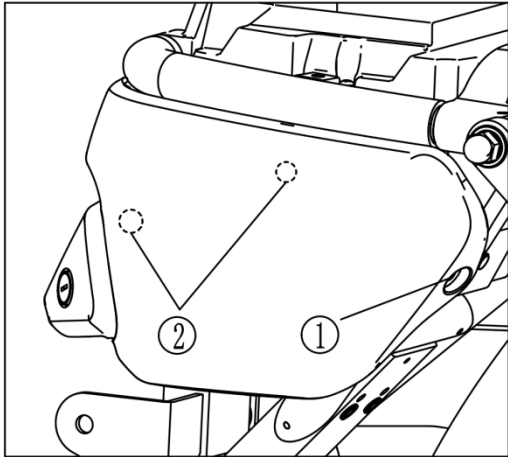
- 1.If the master cylinder or caliper needs to be disassembled, the brake fluid needs to be replaced. Check the brake fluid level under normal conditions and replenish it if necessary.
2. Oil seals should be replaced every two years inside the master cylinder and caliper cylinder.
3. Replace the brake hose every 4 years. Alternatively, if cracks or damage are found, they should be replaced promptly.



## Removal and installation of seat cushion, protective plate, and fuel tank

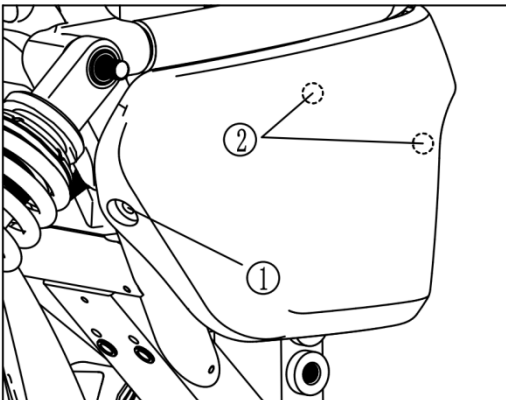
### 1.Seat cushion

Use a 6 # hex wrench to remove the left and right mounting bolts (1), and remove the seat cushion from the rear and top.



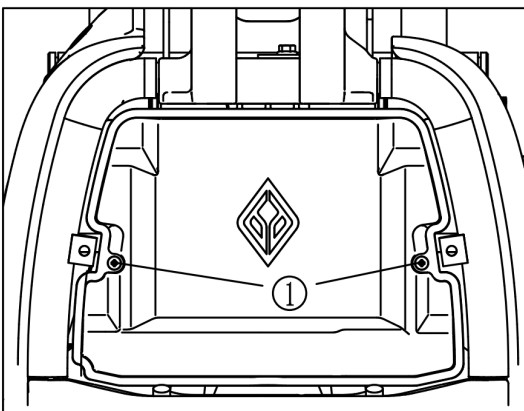
### 2.Left guard board

Use a 5 # hex wrench to remove bolt (1), and then pull out the positioning pin (2) of the protective plate outward.



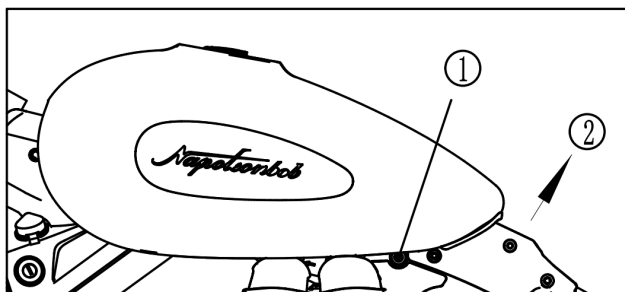
### 3.Right guard board

Use a 5 # hex wrench to remove bolt (1), and then pull out the positioning pin (2) of the protective plate outward.



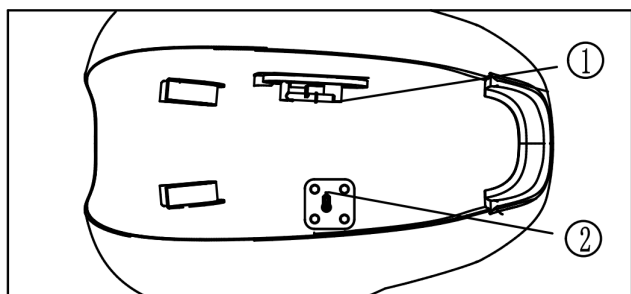
### 4.Battery box cover

Use a 5 # hex wrench to remove bolt (1).



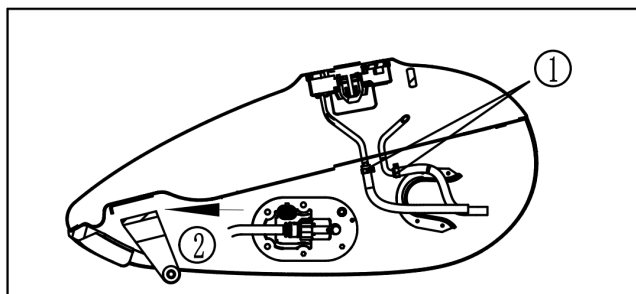
### 5. Fuel tank

Use a 5 # hex wrench to remove the left and right bolts ①, and then lift the fuel tank in the direction of the arrow ②.



### 6. Fuel pump, fuel position sensor

Remove the connectors for the fuel pump ① and oil level sensor ②.



### 7. Fuel pipe, suction hose, and overflow pipe

Release the clamp ① with snap ring pliers and pull off the two rubber hoses. Then pull off the high-pressure oil pipe along arrow ②. Remove the fuel tank

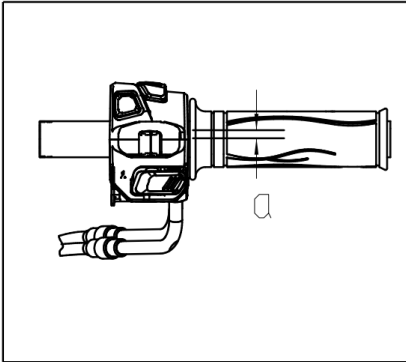
### Installment

Contrary to the disassembly steps, pay attention to the following points

#### 1. Fuel tank

Torque: 10N. m (1Kgf. m)

## 3.2 Adjust the throttle cable



### Check/adjust the free play of the throttle cable

1. Conduct an inspection

The free clearance of the peripheral part of the throttle handle  $\alpha$

The amount of free clearance on the periphery of the throttle handle:

3-7mm

Beyond the specified value → Adjust

1. Adjust followings

- The amount of free clearance on the periphery of the throttle

### Adjust order

First step (Accelerator handle cable)

- Pull the adjusting sheath down in the direction of arrow.

### Adjust order

First step (Accelerator handle cable)

- Pull the adjusting sheath down in the direction of arrow.

- Loosen the locking nut ① Adjust the regulator ② Adjust

Spin in → Increase gap  
Swivel out → Reduce gap

Tips:

When the throttle handle cable cannot be used for adjustment, make adjustments at the throttle valve body area

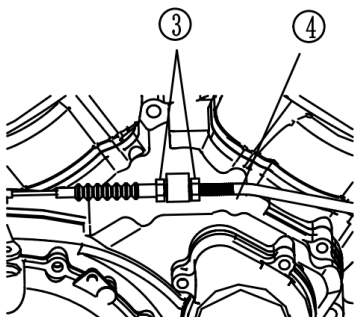
The second step (Throttle valve)

- Loosen the locking nut ②
- Adjust the regulatory bolt ① up and down.

Spin in → Increase gap  
Spin out → reduce gap

- Tighten the locking nut ②

### 3.3 Clutch adjustment



#### Clutch adjustment

##### 1. Inspection

- The free stroke of the clutch cable exceeds the specification range → Adjustment

Free travel:  
10-15mm  
Measure at the clutch handle

##### 2. Adjust:

- Throttle cable free travel

##### Adjust step

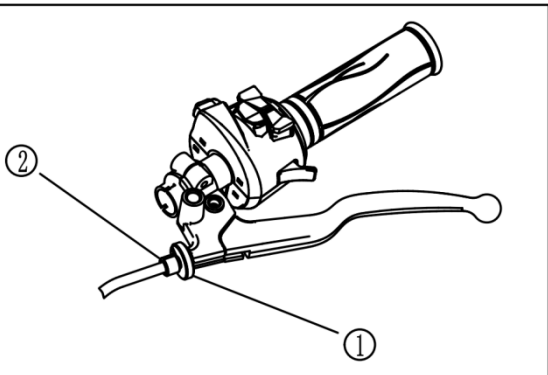
1. Confirm that the adjustment device (2) and locking nut (1) have been fully tightened.
2. Loosen the locking nut (1).
3. Tighten or unscrew the adjustment nut (2) until the specified free stroke is reached.

Twisted in → increased free stroke  
Twist out → decrease in free travel

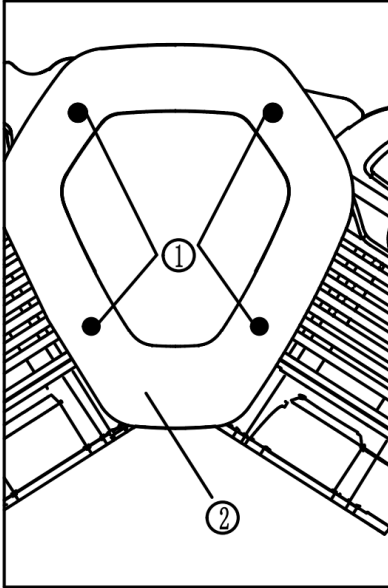
4. Tighten the loosening nut (1).
5. Loosen the locking nut (3).
6. Adjust the screw (4) between the front and rear (with the

Forward → Free travel decreases  
Back → increasing free travel

7. Tighten the locking nut (3)



### 3.4 Air filter cleaning



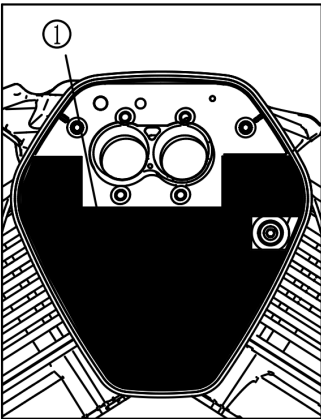
Air filter cleaning

1. Disassemble the left exhaust gas collection box.

Use a 5 # hex wrench to remove bolt ① and remove the left decorative cover ②.

**Note:**

It is strictly prohibited to start the engine with the air filter removed. Otherwise, unfiltered air may enter the engine, causing rapid wear of its components and potentially damaging the engine.



● Remove the air filter ①

2. Inspection

Damaged → Replace


Dust present → Use compressed air to blow off the dust on the sponge.

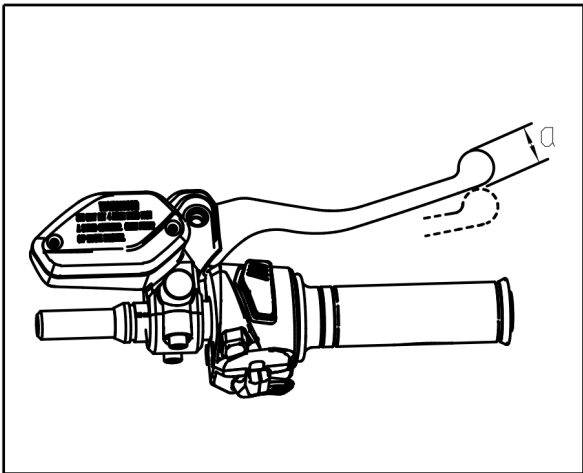
If there is too much dirt in the filter element, it can be cleaned with a neutral solution. After cleaning

Must be air dried.

### 3.5 Front brake inspection

#### Front brake inspection

 **Warning:** When the brake feels soft, it may be due to oil leakage or air mixing that the braking effect is not good. It is necessary to check the amount of brake fluid, check the oil bolts, or remove air.

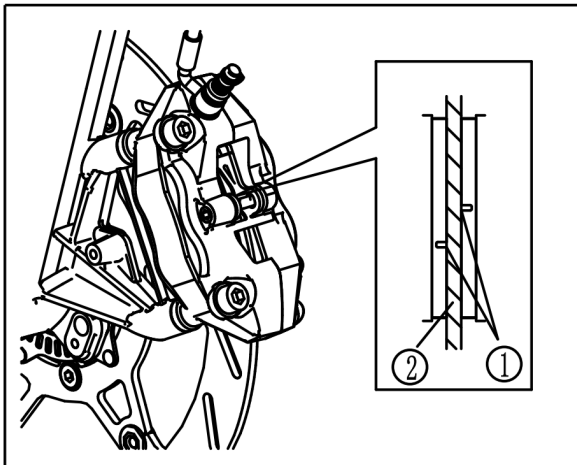


1. Conduct the following inspections: • When turning left or right or driving, check if the brake hose has touched any other parts that are worn or may be worn. If touched → corrected
2. Check the free clearance at the front end of the brake handle.

Free clearance at the front end of the brake handle:  
a: 5.5-10.5mm

**Tips:**

The gap amount is guaranteed by manufacturing and does not require adjustment



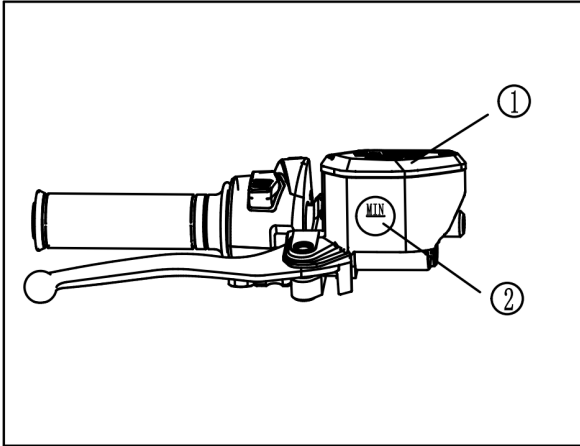
#### Check brake pad

1. Conduct the following checks

When the wear indicator ① is almost close to the brake disc ②, replace the entire set of brake pads.

When the wear of the brake disc is not greater than 4mm, replace it.

### 3.6 Check brake fluid volume/ exhaust air



#### Check brake fluid volume

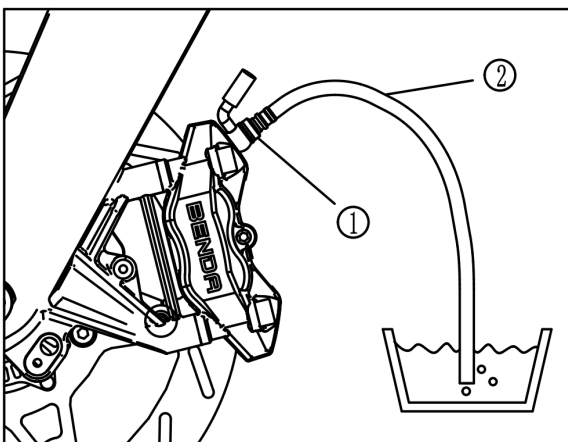
##### 1. Conduct following checks

- Brake volume
- When the brake fluid cover surface ① is in a horizontal state, check the fluid level, which should be above the level shown in the figure ②.
- Fill the brake fluid below the lower limit position to above the lower limit position.

Designated brake fluid: pure brake fluid DOT4

##### Tips:

Do not mix different brands of brake fluid. If DOT4 oil is not available, DOT3 oil can also be used. Brake fluid can corrode painted surfaces and rubber parts. If splashing occurs, please wipe it clean immediately.



#### Exhaust air

**Warning:** When disassembling brake fluid related parts, it is necessary to confirm whether other parts are locked and sealed before releasing air.

The order of releasing air:

1. Remove the brake fluid cylinder head.
2. Remove the brake fluid cylinder diaphragm.
3. Install a plastic tube ② at the front end of the oil drain screw ①, and prepare an oil pan at the front end of the plastic tube.
4. After applying the brakes several times, grip the brake handle tightly and loosen the oil drain screw by about 1/2

turn, then quickly tighten it again.

**Tips:**


Do not loosen the brake handle before retightening the oil drain screw

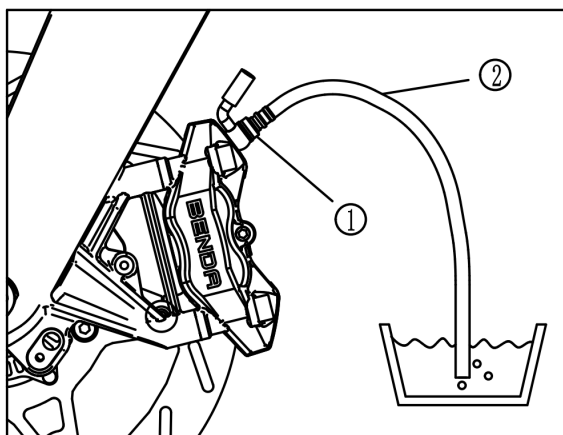
5.Repeat the above actions, Until the oil drain screw completely discharges the air bubbles.

**Tips:**

Simultaneously replenish the brake fluid, do not lower it below the lower limit

### 3.7 Exhaust air/Change brake fluid


 **Warning:** Hold the brake handle and check for brake fluid leaks. Wipe off the brake fluid sprayed on the brake discs, tires, and wheels.

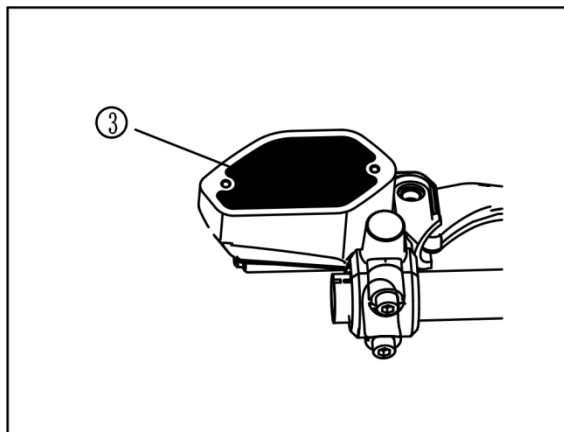


6. Install the brake fluid cylinder diaphragm back.
7. Replace the brake cylinder cover.

#### Replace brake fluid

1. Place the master cylinder in a horizontal position and remove the brake fluid cylinder head.
2. Install a plastic tube (2) at the front end of the oil drain screw (1), and prepare an oil pan at the front end of the plastic tube. Loosen the oil drain screw and repeat several times until the oil drain screw no longer discharges brake fluid.

 **Warning:** Wipe off the brake fluid sprayed on the brake discs, tires, and wheels.



3. Lock the oil drain screw

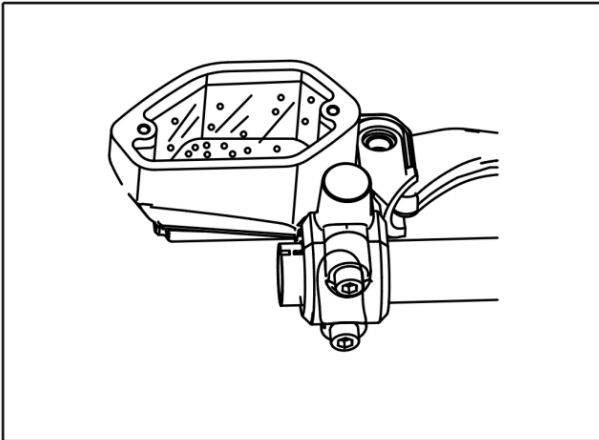
Oil drain screw:  
6Nm (0.6kg.m)

#### Tips:

Do not mix different brands of brake fluid. If DOT4 oil is not available, DOT3 oil can also be used.

4. Remove the brake fluid cylinder diaphragm (3).
5. Inject brake fluid above the lower limit.
6. Pull the brake handle to fill the brake fluid pipe with brake fluid

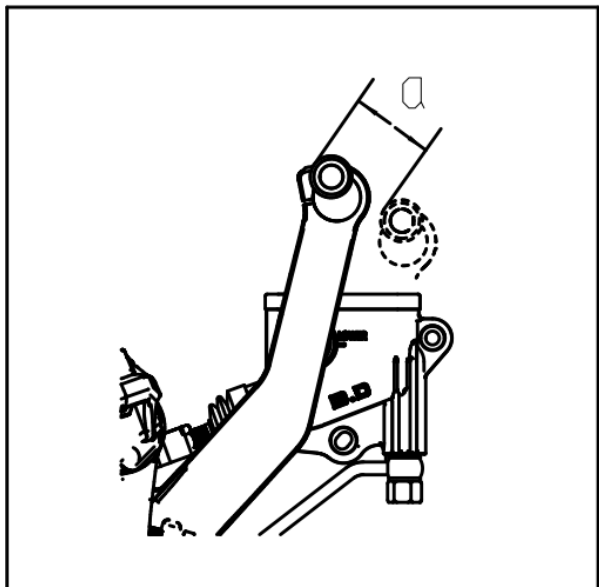
### 3.8 Check and adjust the rear brake/rear brake pad inspection



7. Slowly move the brake handle until no more bubbles emerge from the small hole in the brake cylinder, and feel the brake handle strong.

8. Release air.

9. After the adjustment is completed, install in the opposite order of disassembly.



#### Rear brake Inspection



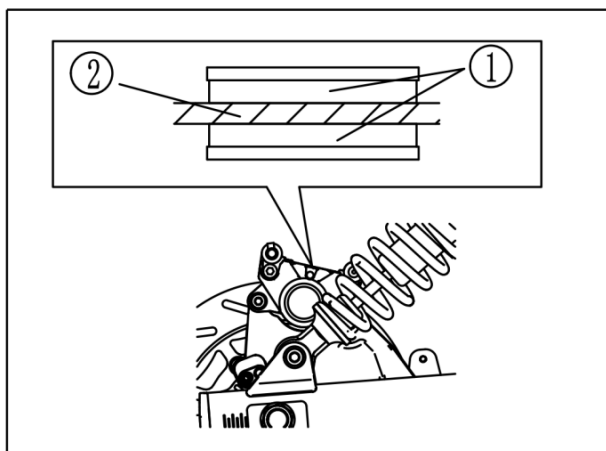
**Warning:** When the brake feels soft, it may be due to oil leakage or air mixing that the braking effect is not good. The brake fluid level should be checked, the oil bolts should be checked, or air should be removed.

1. Perform the following checks

- When turning left or right or driving, check whether the brake hose has touched other parts, which are worn or may be worn. If touched → corrected

2. Check the free clearance at the front end of the brake pedal.

Free clearance of the front end of the brake handle: a: 20—30mm



#### Check brake pads

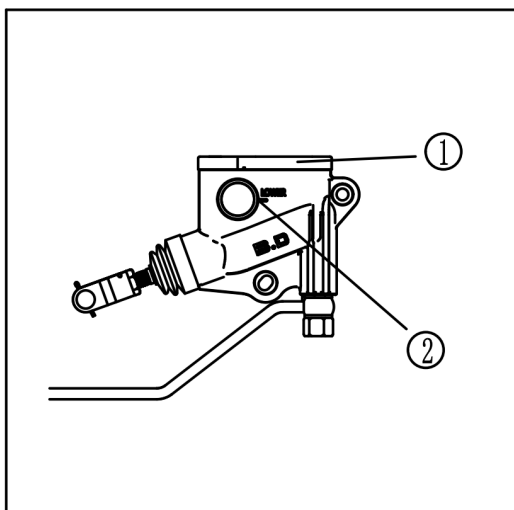
1. Perform the following checks

- Wear amount of brake pads

If the thickness of brake pad ① is worn to only 2-3mm, replace the entire set of brake pads.

- When the wear of the brake disc reaches a thickness of no more than 4mm, replace it.

### 3.9 Check brake fluid volume/exhaust air

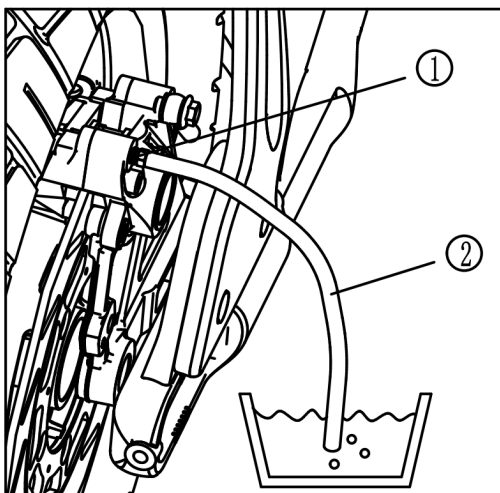


#### Check brake fluid volume

##### 1. Conduct following checks

- Brake fluid level
- Make the brake fluid cap ① surface level, Check the fluid volume, should above the level shown in the figure ②
- Fill the brake fluid below the lower limit position to above the lower limit position.

Designated: Pure brake fluid DOT4



#### Tips:

Do not mix brake fluid with different brands.  
If DOT4 oil is not available, DOT3 oil can also be used.  
Brake fluid can corrode painted surface and rubber parts. If

#### Exhaust air

**Warning:** When dismantling parts related with brake fluid, it is necessary to confirm whether other parts are locked or sealed before releasing the air.

#### Sequence of release air:

1. Remove brake fluid oil cover
2. Remove brake fluid cylinder diaphragm
3. Install a plastic tube ② at the front end of the oil drain screw ①, and prepare an oil container at the front end of the plastic tube.

Prepare an oil pan at the front end.

4. After brake several time, press and hold the brake pedal, loosen the oil drain screw by about 1/2 turn, and quickly tighten it again.

#### Tips:

Do not loosen brake pedal before tightening oil drain screw.

5.Repeat the above action until the oil drain screw completely discharges the air bubbles

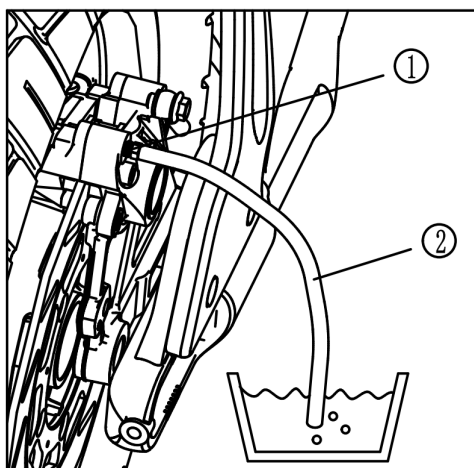
Tips:

Simultaneously replenish the brake fluid, do not lower it below the lower limit.

## Check brake fluid volume/exhaust air

Check and adjust

### 3.10 Check brake fluid volume/exhaust air



**Warning:** Hold the brake handle and check for any brake fluid leaks. Wipe off the brake fluid sprayed on the brake discs, tires, and wheels.

6. Install the brake fluid cylinder diaphragm back.

7. Replace the brake cylinder cover.

#### Replace brake fluid

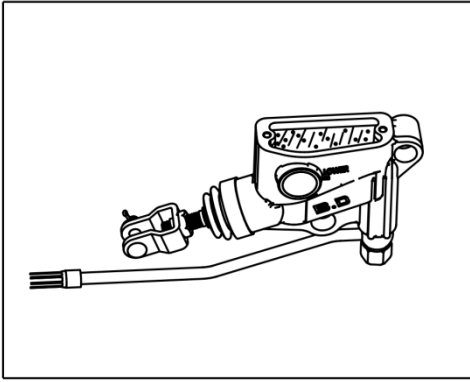
1.Place the main cylinder in a horizontal,Dismantle brake fluid cylinder cover.

2.Install a plastic tube (2) at the front end of the oil drain screw (1), and prepare an oil pan at the front end of the plastic tube. Loosen the oil drain screw and repeat several times until the oil drain screw no longer discharges brake fluid.

**Warning:** Wipe off the brake fluid on the brake sprayed on the brake discs, tires, and wheels.

3.Tighten oil drain screw.

Oil drain screw:  
6Nm (0.6kg.m)



4.Remove brake fluid cylinder diaphragm③.

5.Inject brake fluid above the lower limit.

Designated brake fluid: pure DOT4

Tips:

Do not mix brake fluid in different brands.If DOT4 oil is not available,DOT3 oil is also can be used.

6.Pull the brake pedal to fill the brake fluid pipe with brake fluid

Tips:

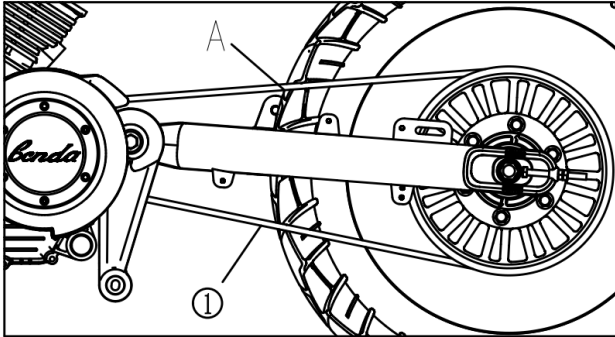
Simultaneously replenish the brake fluid, do not lower it below the lower limit.

7.Slowly move the brake pedal until no more bubbles appear at the small hole in the brake cylinder, and feel the brake pedal strong.

8.Release air.

9.After adjustment, install in the reverse order of disassembly

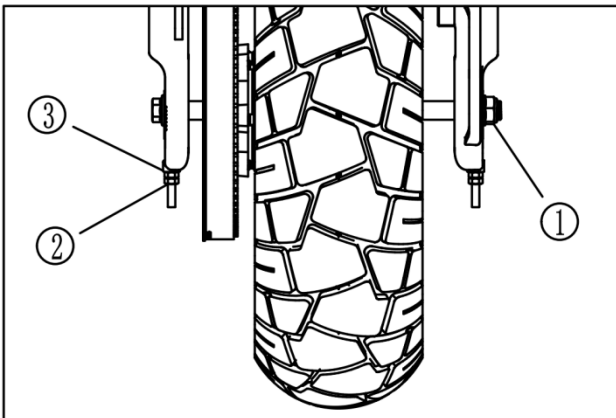
### 3.11 Check and adjust the drive chain/front fork adjustment



#### Check adjust drive belt

- Use a tool (wrench, T-shaped socket, etc.) with one hand to strike the middle A position on the upper end of the belt ① with appropriate force, and use the red dot of the belt tensioner with the other hand to align with the striking area and take a reading.

Belt tension force:  
65—70HZ

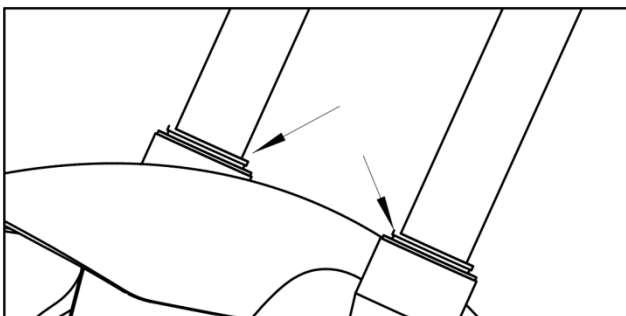


#### Tips:

There are scale marks on the belt adjuster. When adjusting, ensure that the number of marking grids on both sides of the rear fork adjuster is consistent. After passing the left and right adjustment, tighten the locking nut ② of the regulator and the locking nut of the wheel axle.



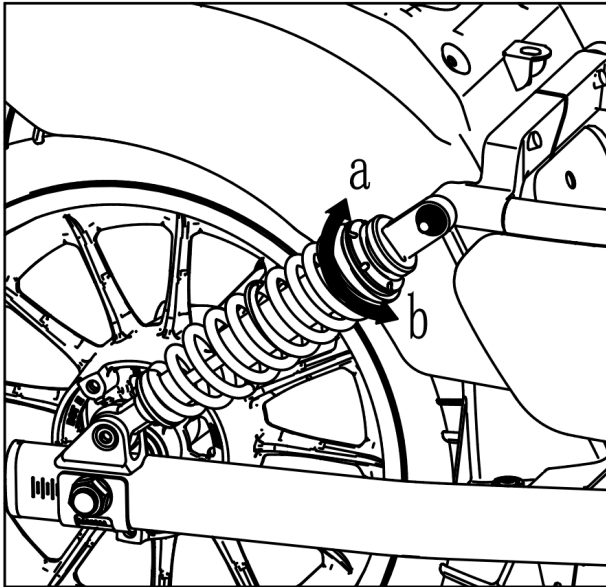
**Warning:** For your safety, it is recommended to go to a BENDA dealer or designated repair location for inspection and repair



#### Front fork Inspection

1. Park the motorcycle on a flat surface.
2. Check
  - Content  
There are scars or damage → replace.
  - Oil seal  
Serious oil leakage → Replace

### 3.12 Front fork inspection/ rear shock absorber inspection



3. Maintain the motorcycle in a vertical parking position and brake the front brake.

4. Inspection:

- Action status

Slide the front fork up and down several times.

Interference in action → Repair

#### Rear shock absorber adjustment

 Warning:

- The motorcycle should be firmly supported to eliminate the risk of overturning.

1. Use a 5 # hex wrench to unscrew bolt ① and remove the right protective plate ②.

2. Adjust

- Loosen the locking nut ① with spring preload, and turn the adjustment device ② to either the a or b

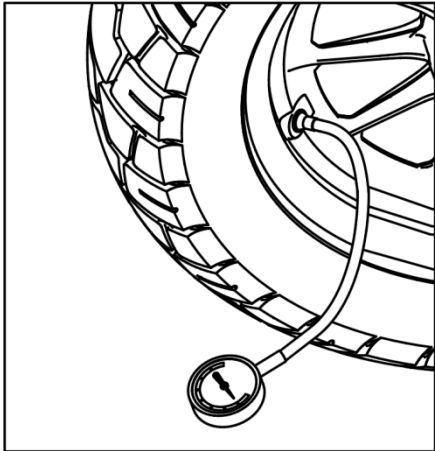
Twist towards a → Spring preload value increases

Twist towards b → decrease in spring preload value

Tips:

Do not turn the adjustment device beyond the maximum or minimum position.

### 3.13 Tire Inspection



#### 1.Gauge

##### ●Tire pressure

Exceeding the specification value range → Adjust

Cold tire pressure	Front tire	Rear tire
Load below 0-90kg	240 (2.4kgf/cm <sup>2</sup> )	290 (2.9kgf/cm <sup>2</sup> )
Front 345kg/Rear462kg Maximum load	280kpa (3.0kgf/cm <sup>2</sup> )	300kpa (3.0kgf/cm <sup>2</sup> )

**Load** refers to the total weight of goods, cyclists, and accessories

Front tire	150/80-16 (4PR)
Rear tire	180/65-16 (6PR)

#### 2.Inspection

##### ●Tire surface

Wear/Damage→Replace

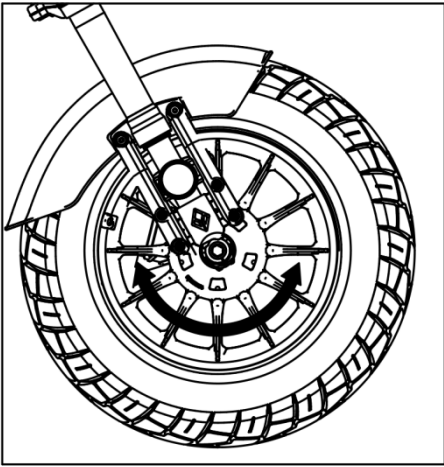
Minimum pattern depth  
(front and rear wheels):  
Almost close to the wear indicator  
strip

- ① Pattern depth
- ② Sidewall
- ③ Wear indicator layer

#### ⚠Warning:

- It is dangerous to use worn tires and motorcycles in a timely manner. If the tire pattern is about to be worn out, the tire should be replaced immediately.

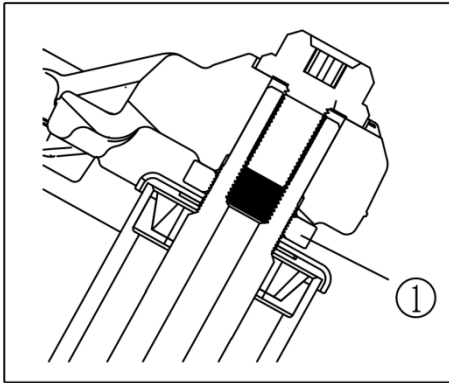
### 3.14 Check the steering device



#### Steering device inspection

##### 1. Conduct following inspection

With the front wheels supported, shake the lower part of the front fork by hand to check if the steering shaft is loose. Check if the steering handle can rotate smoothly left and right.



##### 2. Conduct following inspection

- Steering nut

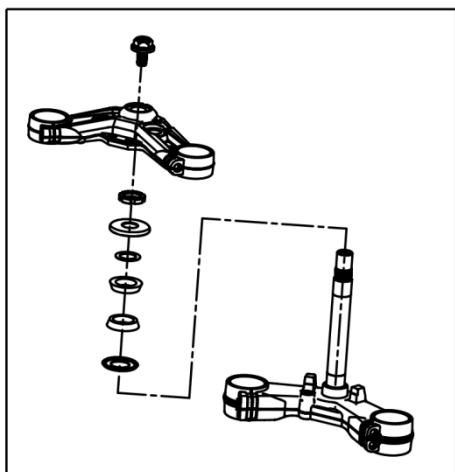
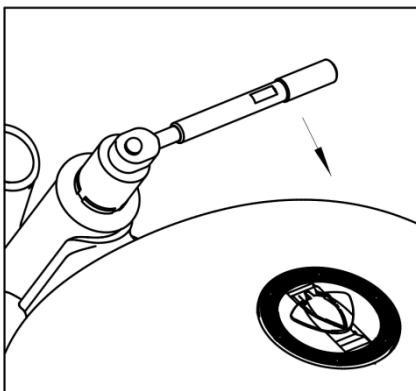
Adjust sequence:

- Remove steering handle

(Refer to "49" page)

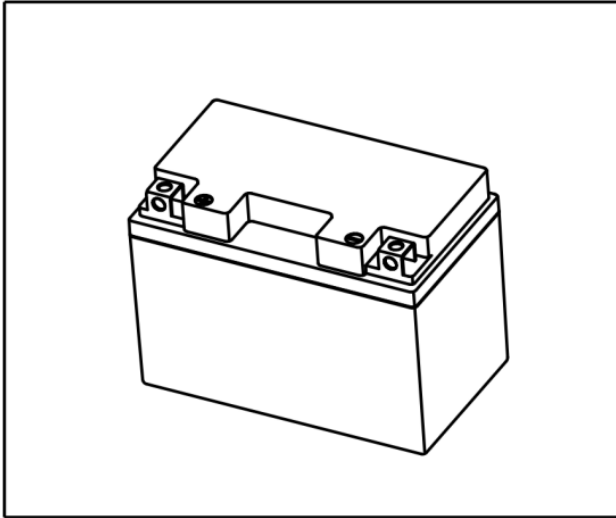
- Removing and installing the handle base

Lock the nut with a turning nut wrench (see page 11 for locking sequence and method)



- Install the steering seat
- Install the steering handle

## 3.15 Battery Check



### Check Battery

#### 1. Dismantle:

- Battery Box cover
- Refer to the section on "Removing the Battery Box Cover"

#### 2. Battery maintenance requirements for inventory vehicles

- If the vehicle has been parked for more than 15 days, the negative terminal connection of the battery should be disconnected and the battery terminal voltage checked once a month. If the terminal voltage of the battery is lower than 12.6V, charging should be carried out.
- For batteries on vehicles parked for more than a year, if they are not recharged according to the above requirements, they must be replaced and disposed of as scrap.
- Before using the vehicle, the battery terminal voltage should reach 12.6V, otherwise charging should be carried out.

#### 3. Appearance inspection of the battery before charging

- Appearance inspection of the battery before charging  
If the battery casing is broken or acid leakage occurs, the battery cannot be charged. After identifying the cause, replace the battery.
  - The battery with a broken end post cannot be charged.  
After identifying the cause, replace the battery.  
A battery with bloating caused by excessive discharge or overcharging cannot be charged and should be replaced.
  - Before charging, clean the end post and remove the oxide skin on the surface. Apply butter on the pole during charging to prevent electrical corrosion.
- #### 4. Precautions during charging
- Maintain ventilation during charging and charge at room temperature.
  - Smoking is strictly prohibited during charging and the introduction of sparks should be avoided.
  - When wiring after charging, connect the positive wire first: When disassembling the wire before charging, disconnect the negative wire first.

#### 5. Battery Charging

- Connect the positive pole of the charger to the positive pole of the battery, and connect the negative pole of the charger to the negative pole of the battery.
- Confirm that the battery terminal is clean and the charging

circuit is connected properly.

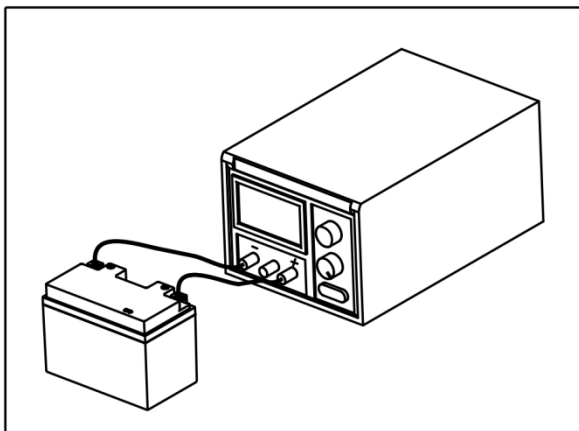
- It is recommended to use a constant voltage of 14.7 volts (maximum cannot exceed  $14.7 \pm 0.1$  volts, charging current should not exceed 0.3 times the battery capacity, i.e. 0.3C) until the charging current is within 0.3A, indicating that the battery is fully charged.

- There is no condition for constant voltage charging, and constant current charging can be carried out according to the following specifications:

(a) Charge at a current of 1/10 capacity value. (b) Correspondence between charging time and battery voltage (reference)

## Battery inspection Check and adjust

Battery Voltage V	12.85~12.75	12.75~12.65	12.65~12.55	12.55~12.45	12.45~12.35	12.35~12.20	12.20~12.05	12.05~11.95
Charge time h	2.5	3.5	5	6.5	8	9	10	11



(c) For batteries with an open circuit voltage below 12.6 volts, there may be a phenomenon of the battery not charging in the early stages of charging. Due to severe battery depletion, the proportion of lead acid inside the battery is close to pure water, and the internal resistance of the battery is high. As the battery charges, the proportion of lead acid inside the battery increases, and the charging current of the battery can gradually return to normal.

- During the charging process, if there is acid spraying from the battery exhaust hole, the charging should be stopped immediately.

- During the charging process, when the battery temperature exceeds 45 degrees, stop charging until the battery temperature drops to room temperature, reduce the charging current by half, and continue charging.

- When the battery is repeatedly fed seriously (when the battery terminal voltage repeatedly drops below 12V), it will greatly shorten the battery life.

- For a low battery, if it cannot maintain a rear end

voltage of more than 12V after being charged and left at room temperature ( $24 \pm 5$  °C) for 24 hours, it is considered to meet the scrapping conditions and is not allowed to be loaded for use.

#### 6.Requirement for Install

- The voltage of the battery should be  $\geq 12.6$  before assembly, otherwise it should be charged.
- The sequence of connecting the battery wires: first connect the positive battery wire and then connect the negative battery wire.
- Sequence of disconnecting battery connections:  
Disconnect the negative terminal of the battery first, and then the positive terminal of the battery.
- When assembling the battery, ensure that all electrical accessories are in the "off" position.
- Ensure that all electrical systems on the vehicle are turned off during breaks, lunches, shifts, and at the end of work

## The Fourth Chapter. Car body

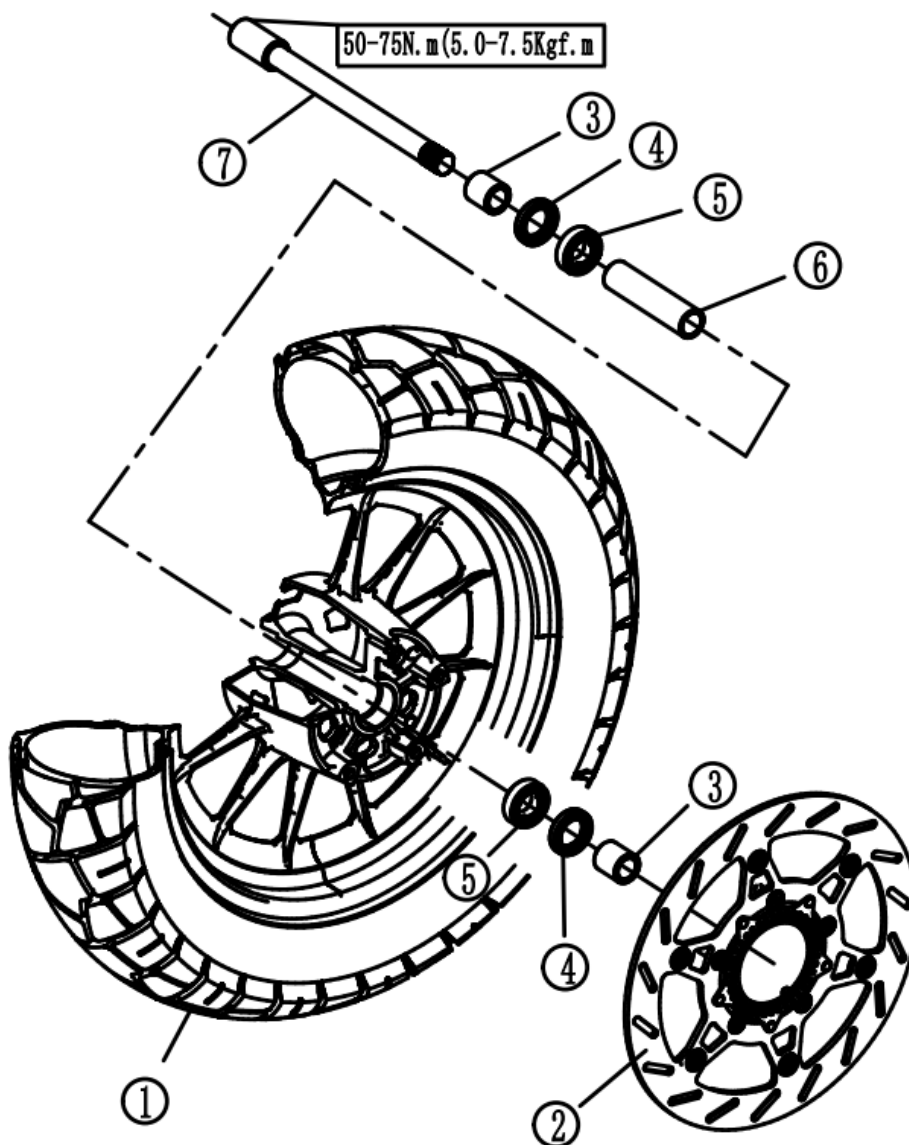
### 4.1 Front and rear tire inspection

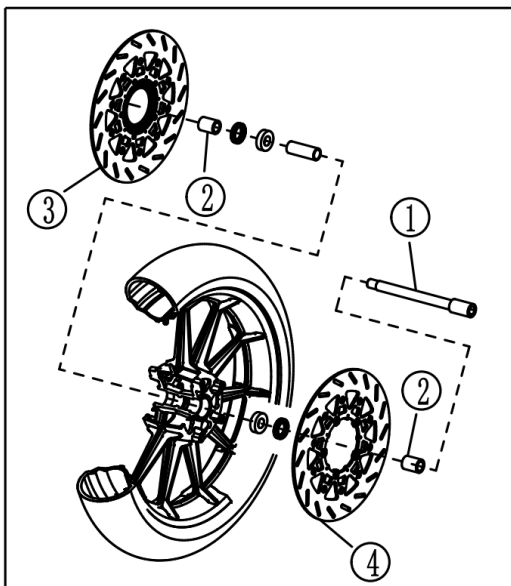
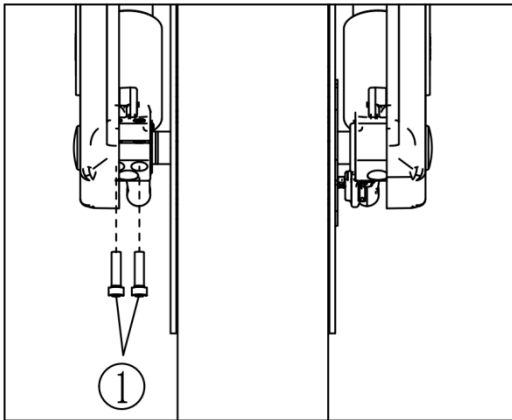
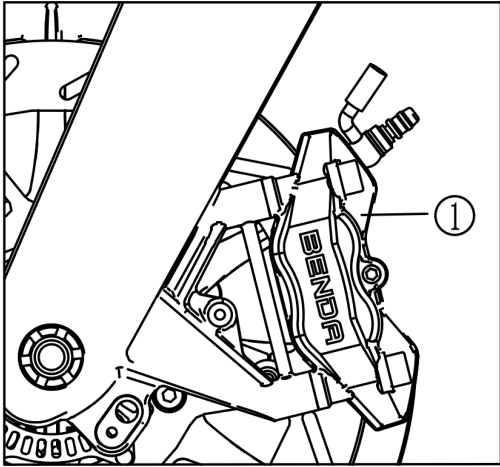
#### Front wheel

- ① Front wheel
- ② Front brake disc
- ③ Front wheel liner
- ④ Oil seal (hub assembly)
- ⑤ Rolling bearing (hub assembly)
- ⑥ Front wheel hub spacer sleeve (wheel hub assembly)
- ⑦ Front wheel axle

#### Warning

1. Park the motorcycle on a flat surface.
2. Place the motorcycle on its central support.
3. Place appropriate items under the frame or engine and lift the front wheels





### Dismantle



Warning

4. Park the motorcycle on a flat surface.
5. Place the motorcycle on its central support.
6. Place appropriate items under the frame or engine and lift the front wheels

### 1.Dismantle

#### ●Front Brake①

Use an 8 # Allen wrench to remove the bolts.

#### Front wheel axle cover ②

Remove using a plastic pry

Remove using a plastic pry

### 2. Disassembly

#### Front shock absorber locking screw ①

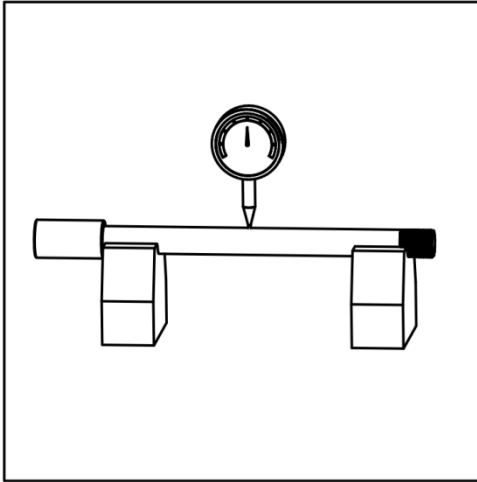
Use a 6 # Allen wrench

### 3. Disassembly

#### ●Front wheel axle ①

#### ●Front wheel liner ②

#### ● Front brake discs ③ and ④



### Front wheel inspection

#### 1. Check

- Check the front axle with a dial gauge:

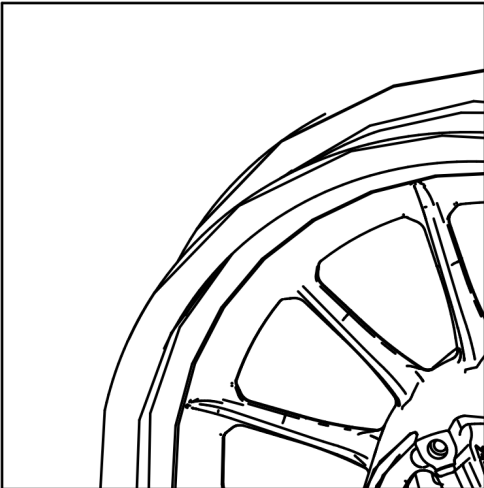
Bending → Replace



Warning

Do not attempt to straighten the bent front axle

Front wheel axle twist degree: 0.25mm



#### 2. Inspection

- Wheel

Deformation, damage or bending → Replace



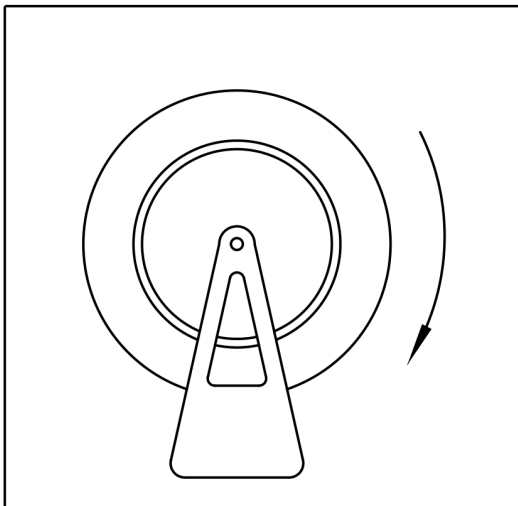
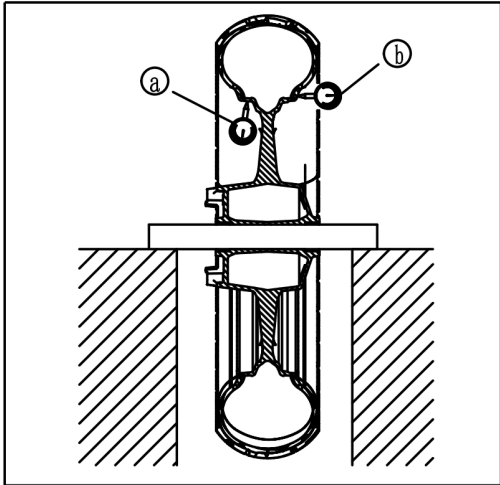
Warning

Even minor repairs should not attempt to repair the wheels themselves

### 3. Inspection

- Slowly rotate the wheel rim to check for radial and axial runout
- Exceeding the limit → Replace

Rim runout limit  
 Radial: 1mm  
 Axial direction: 0.5mm



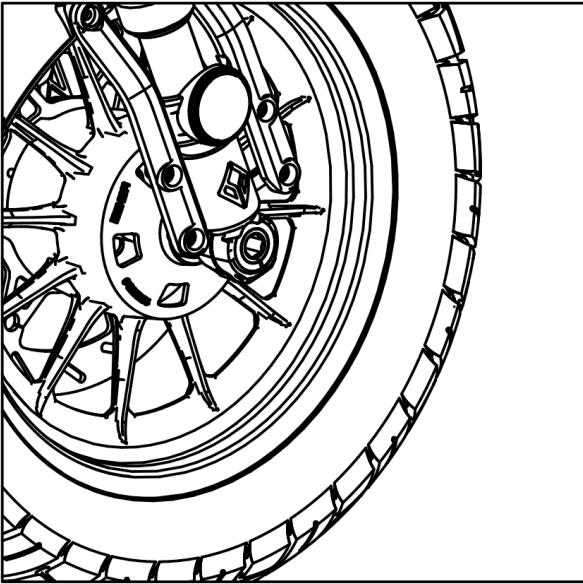
### 4. Inspection

- Wheel bearings

There is clearance or uneven rotation, looseness, or abnormal noise in the bearing inside the wheel hub → Replace.

- Oil seal

Worn or damaged → Replace.

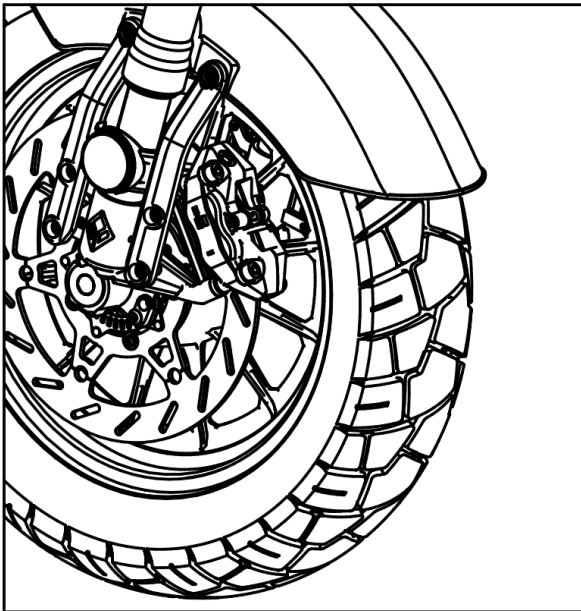


Install the front wheel

### 1. Installation

- Front wheel liner
- Front wheel axle
- Front wheel axle plug cover

Front wheel axle tightening torque:  
50-75N.m (5.0-7.5Kgf.m)

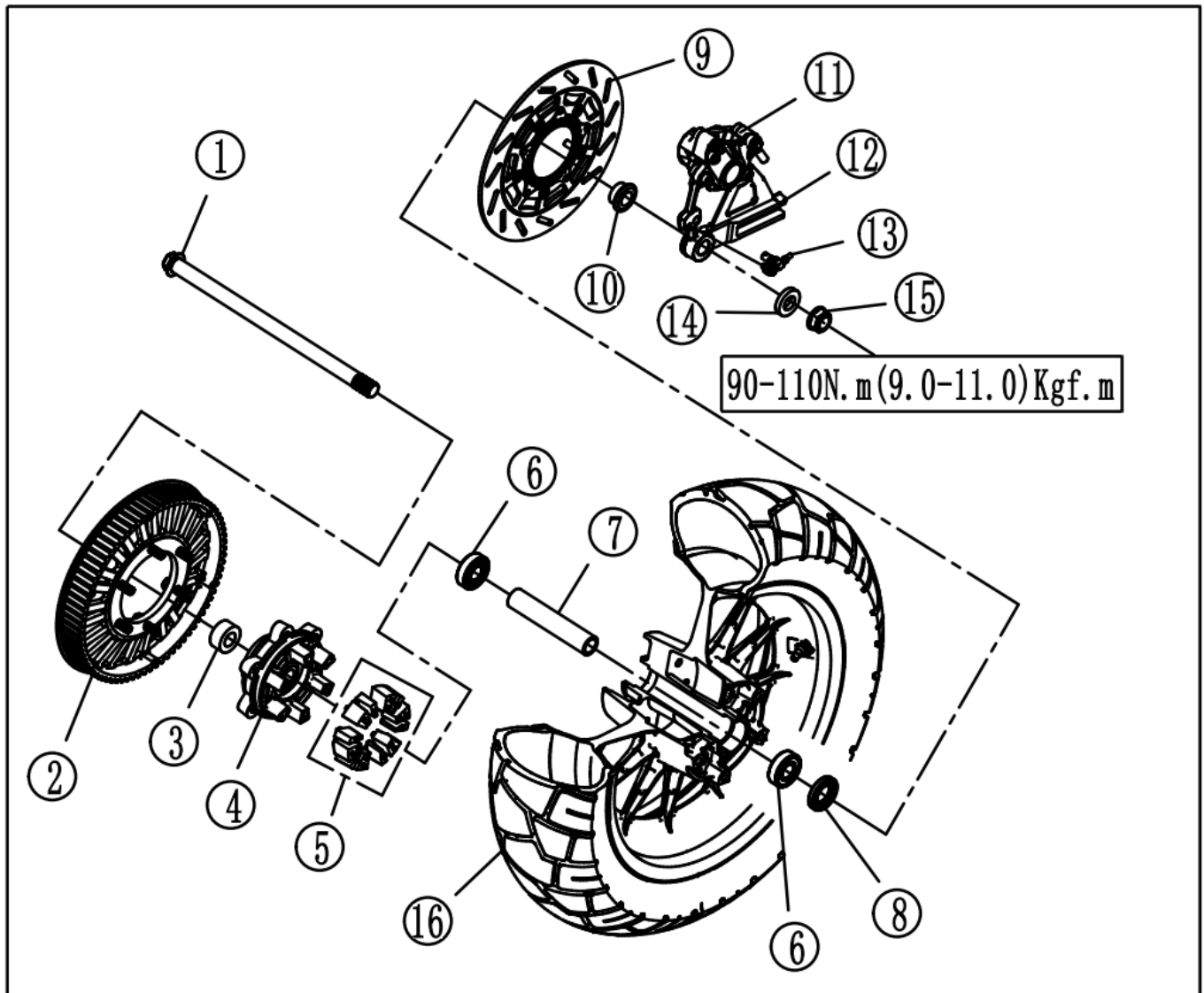


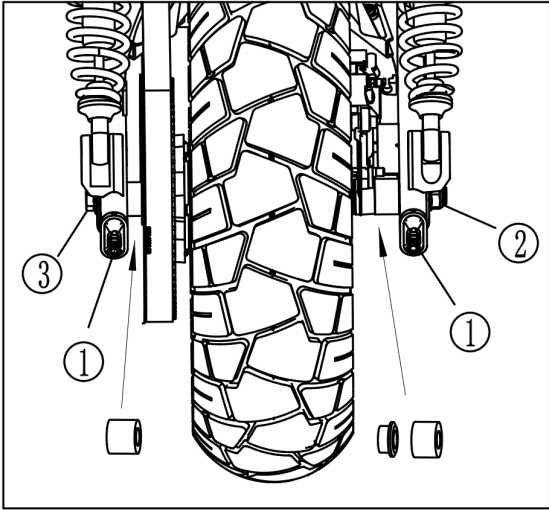
### 2.Install

- Front wheel
- Front Brake Caliper

**Rear wheel**

- |                                  |                                  |
|----------------------------------|----------------------------------|
| (1) Rear wheel axle              | (9) Rear brake disc              |
| (2) Large pulley                 | (10) Rear wheel bushing          |
| (3) Left rear wheel liner        | (11) Rear brake lower pump       |
| (4) Wheel seat assembly          | (12) Rear disc brake bracket     |
| (5) Bumper                       | (13) Rear wheel speed sensor     |
| (6) Bearing (hub assembly)       | (14) Rear wheel right bushing    |
| (7) Bushing (wheel hub assembly) | (15) Rear wheel axle locking nut |
| (8) Oil seal (hub assembly)      |                                  |





### Rear wheel



#### Warning

Firmly support the motorcycle to prevent it from overturning.

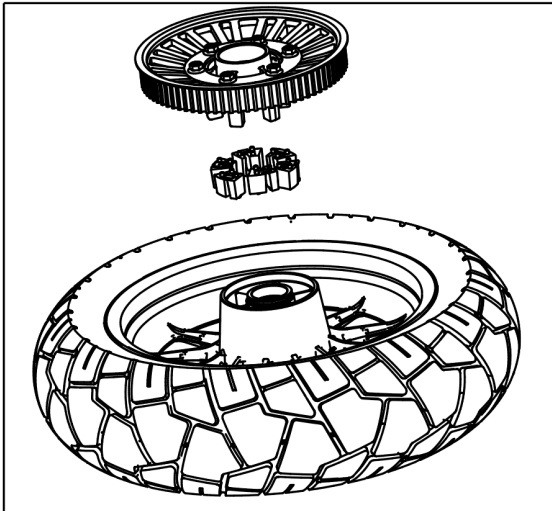
#### 1. Disassembly

Belt adjustment nut (1)

- Rear wheel axle locking nut (2)
- Rear wheel axle (3)

#### Tips:

When disassembling the rear axle, the bushing will fall off, be careful not to lose it.

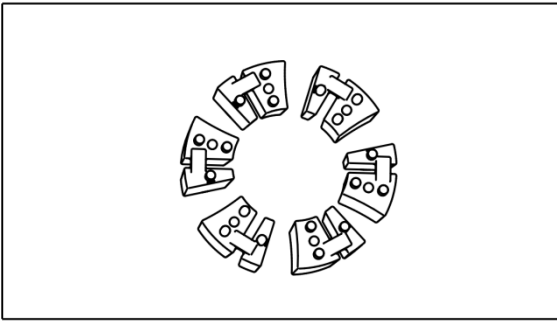


#### 2. Dismantle

- Rear wheel

#### Tips:

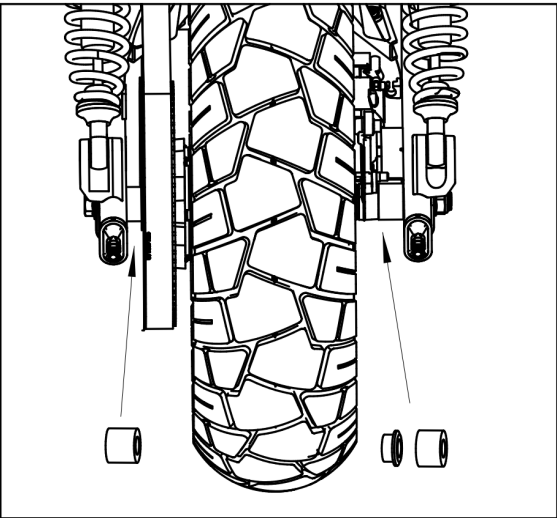
When disassembling the rear axle, the rear brake caliper will fall off, please pay attention to safety.



#### 4. Dismantle

- Bumper

Damaged or deformed → replace



#### 5. Installation

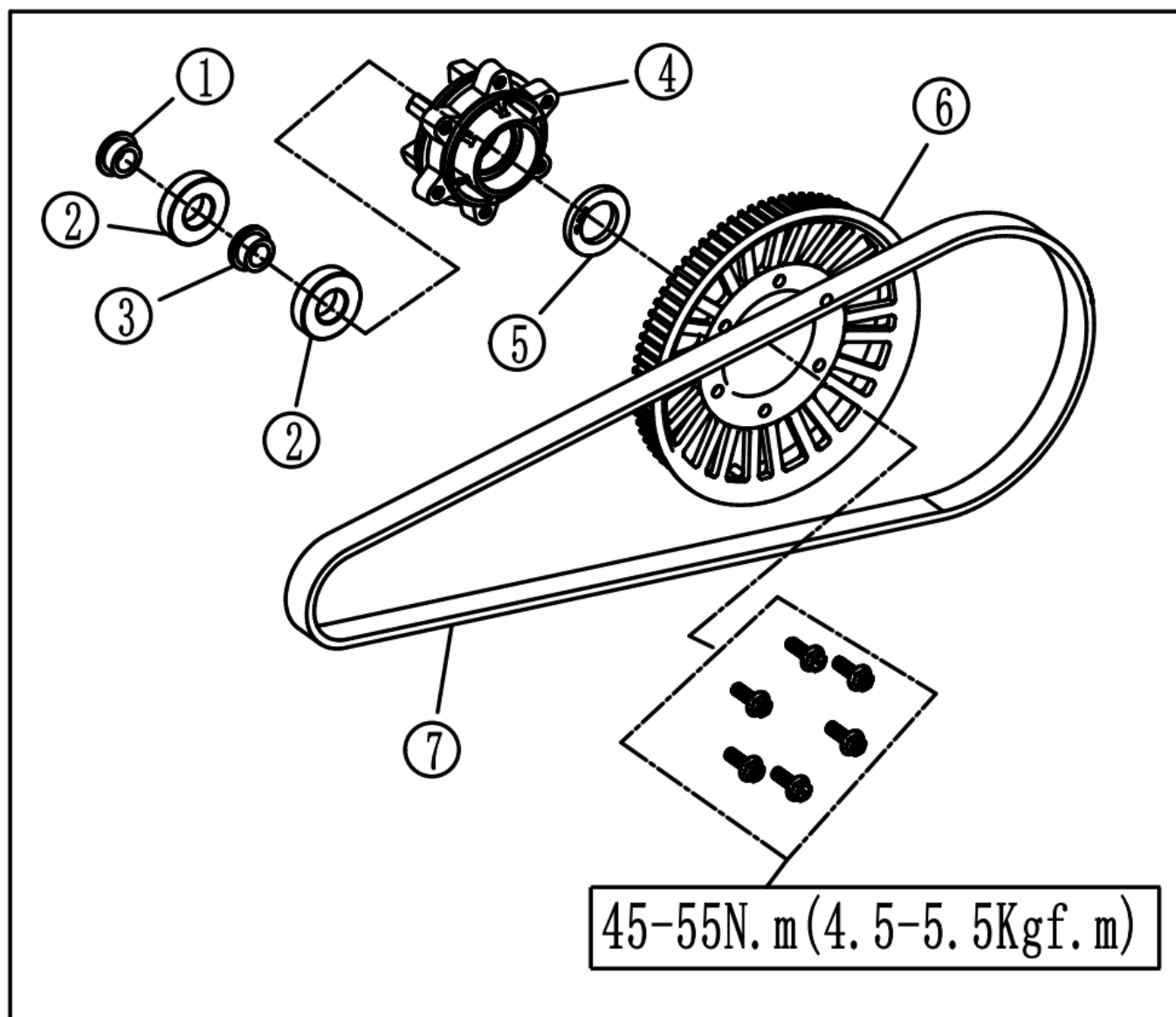
- Rear wheels
- Disc brake caliper bracket
- Large pulley
- Rear wheel liner
- Rear wheel axle

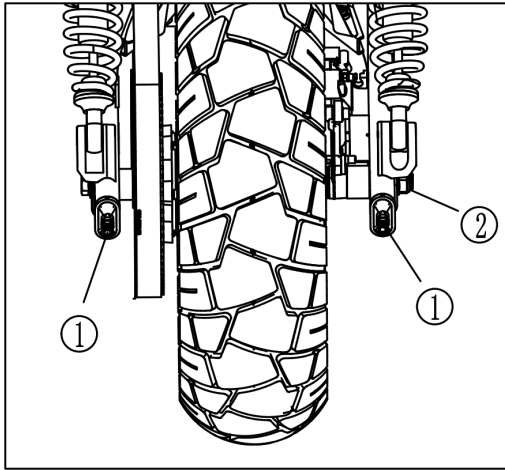
Rear wheel axle tightening torque :  
90-110N.m (9.0-11.0Kgf.m)

## 4.2 Driver belt

### Drive belt

- |                              |                  |
|------------------------------|------------------|
| (1) Spacer 2                 | (5) Oil seal     |
| (2) deep groove ball bearing | (6) Large pulley |
| (3) Spacer 1                 | (7) Drive belt   |
| (4) Wheel seat               |                  |



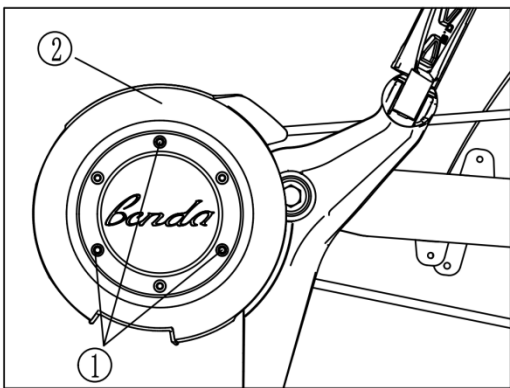


warning

1. Park the motorcycle on a flat surface.
2. Place the motorcycle on its central bracket.

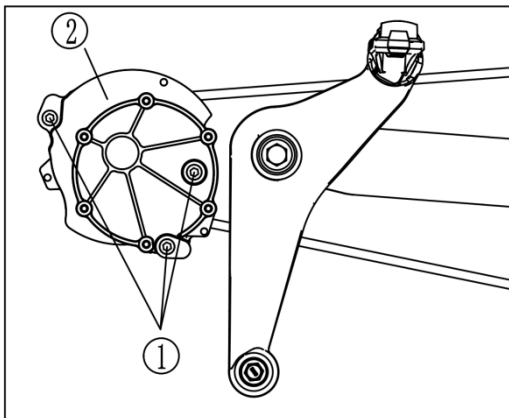
#### 1. Disassembly

- Loosen the belt adjustment nut ①
- Loosen the rear axle nut ② so that the tire and axle can move back and forth.



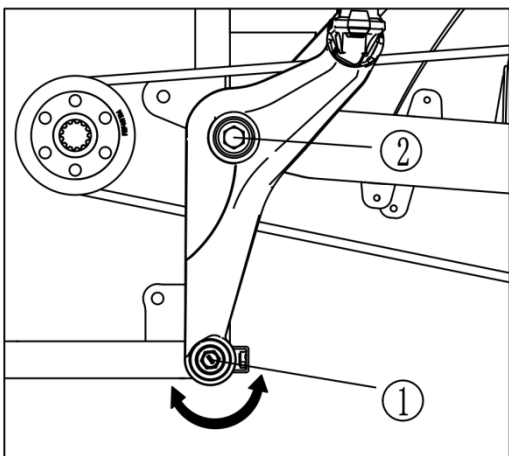
#### 2. Dismantle

- Small wheel cover bolt ①
- Small wheel cover ②



#### 3. Dismantle

- Small wheel cover installation bracket fixing bolt ①
- Small wheel cover installation bracket ②



#### 4. Dismantle

- Left bracket mounting bolt ①
- Loosen the flat fork shaft ②
- Release the rear left footrest bracket ③, Take out the belt.

## Drive belt inspection

### 1.Safe using warning

●Check belt system is working properly every time you ride.If noticing any abnormalities or damage on the right side,need to inspect and repair.If is is necessary to change transmission system components,it is necessary to consult a qualified retailer and provide corresponding technical and after-sales services.

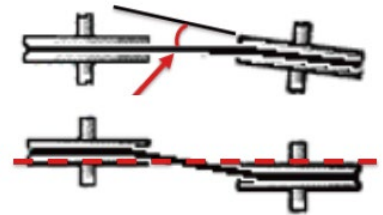
●Please carefully read the precautions in the user manual to avoid damaging the belt drive system. For the safe use of belt drive systems, please rule out the following forms of improper use:

- Damage caused by human factors to the belt
- Use in competitions,stunts and techniques
- Drive belt failure caused by wheel lock up
- Improper repair and maintenance
- Exterior disturb or vehicle's construction change
- Any one mistake operation or other incorrect usage can lead the Belt early failure and termination of warranty.

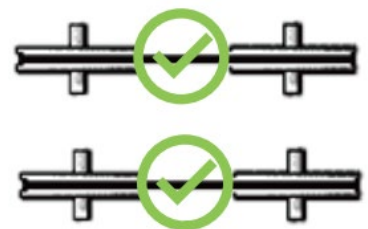
### 2.Precautions for belt installation and use

- The belt needs to be installed to the recommended tension value ( 65-70Hz )
- The transmission belt should be placed on or removed from the wheel system in its natural state. It is prohibited to use any tools to pry the belt or use large external forces to forcibly install it, otherwise it will damage the strength of the belt and cause early failure of the belt.

- Parallelism is particularly important for the installation of synchronous belts.
- Ensure that the maximum parallelism of the belt installation does not exceed  $0.25^\circ$



- The installation of intermediate synchronous belts is also very important.
- Ensure that the maximum does not exceed 0.5% of the center distance of the wheel system





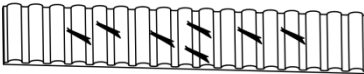
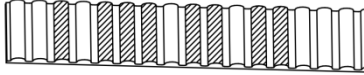




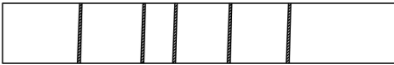
- No curved tooth surface
- No curved back
- No twist,no overturn
- No Strapping belts
- No Applying lubricating oil to the tooth surface
- No Using a belt to remove pulleys
- No Prying the belt

### 3.Precautions for belt maintenance and upkeep

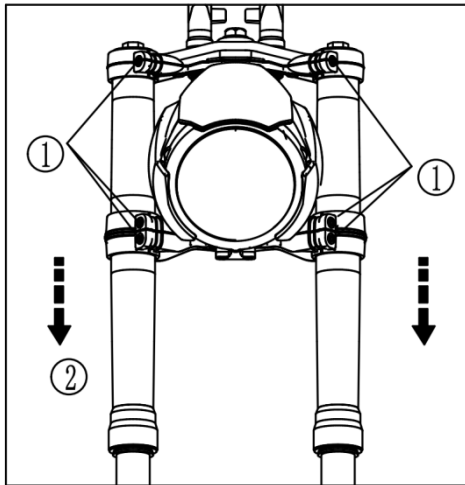
- Check the belt tension within a fixed mileage. If it is below the lower limit value, the belt needs to be re tensioned and the tensioning screws checked for abnormalities.
- When belt appear deviation and edge grinding occur.Need to check .Need to check if the parallelism of the shaft is abnormal and readjust the belt alignment
- Need to check transmission system after driving in harsh environment.If there is sediment accumulation in the system, rinse it with clean water before cycling.
- Foreign objects entering the wheel system cause abnormal damage to the belt. It is necessary to replace the belt in a timely manner and inspect the damage to the pulley, If pulley was damaged it should change timely.

### 4.Belt common problems and solutions

Common problem	Illustrated image	Possible Reason	Solution
Tooth shear		<ol style="list-style-type: none"> <li>1. Improper operation</li> <li>2. Exceeding the lifespan of the belt design</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace the new belt and use it correctly</li> <li>2. Replace with a new belt</li> </ol>
Belt neat and broken		<ol style="list-style-type: none"> <li>1. Excessive bending of the belt before or during installation</li> <li>2. Foreign objects entering the drive system</li> <li>3. The diameter of the pulley is too small</li> <li>4. The installation tension is too low</li> </ol>	<ol style="list-style-type: none"> <li>1. Replace the new belt and install it correctly</li> <li>2. Remove foreign objects and replace the belt with a new one</li> <li>3. Choose a suitable pulley and replace it with a new belt</li> <li>4. Replace the belt with a new one and set the correct tension</li> </ol>
Irregular belt breakage		<ol style="list-style-type: none"> <li>1. Excessive system impact load</li> <li>2. The design and service life of the excess wire rope</li> </ol>	<ol style="list-style-type: none"> <li>1. Check the transmission system and replace it with a wider or stronger belt</li> <li>2. Replace with a new belt</li> </ol>
Cutting on the toothed side		<ol style="list-style-type: none"> <li>1.Transmission system abnormal alignment</li> </ol>	<ol style="list-style-type: none"> <li>1.Check the alignment of the transmission system and replace it with a new belt</li> </ol>
Scratches on the tooth surface of the belt		<ol style="list-style-type: none"> <li>1. There are foreign objects in the transmission system</li> <li>2. Abnormal surface of the pulley</li> </ol>	<ol style="list-style-type: none"> <li>1. Remove foreign objects and replace the belt with a new one</li> <li>2. Check the surface condition of the pulley and replace it with a new pulley and belt</li> </ol>
Belt and canvas wear		<ol style="list-style-type: none"> <li>1. There are foreign objects in the transmission system</li> <li>2. Excessive installation tension</li> <li>3. Abnormal surface of the pulley</li> <li>4. Belt and pulley mismatch</li> </ol>	<ol style="list-style-type: none"> <li>1. Remove foreign objects and replace the belt with a new one</li> <li>2. Replace the new belt and set the correct tension</li> <li>3. Check the surface condition of the pulley and replace it with a new pulley and belt</li> <li>4. Replace with toothed</li> </ol>

			matching pulleys and belts
Local damage to the belt		1. Foreign objects entering the transmission system	1. Remove foreign objects and replace the belt with a new one
Belt side wear		1. Abnormal alignment of the transmission system 2. Defects in the wheel guard edge	1. Check the alignment of the transmission system and replace it with a new belt 2. Replace with new pulleys and belts
Belt back cracking		1. The ambient temperature is too high or too low 2. Belt aging	1. Check the working environment and replace the belt with a new one 2. Replace with a new belt

## 4.3 Front fork



### Remove front fork



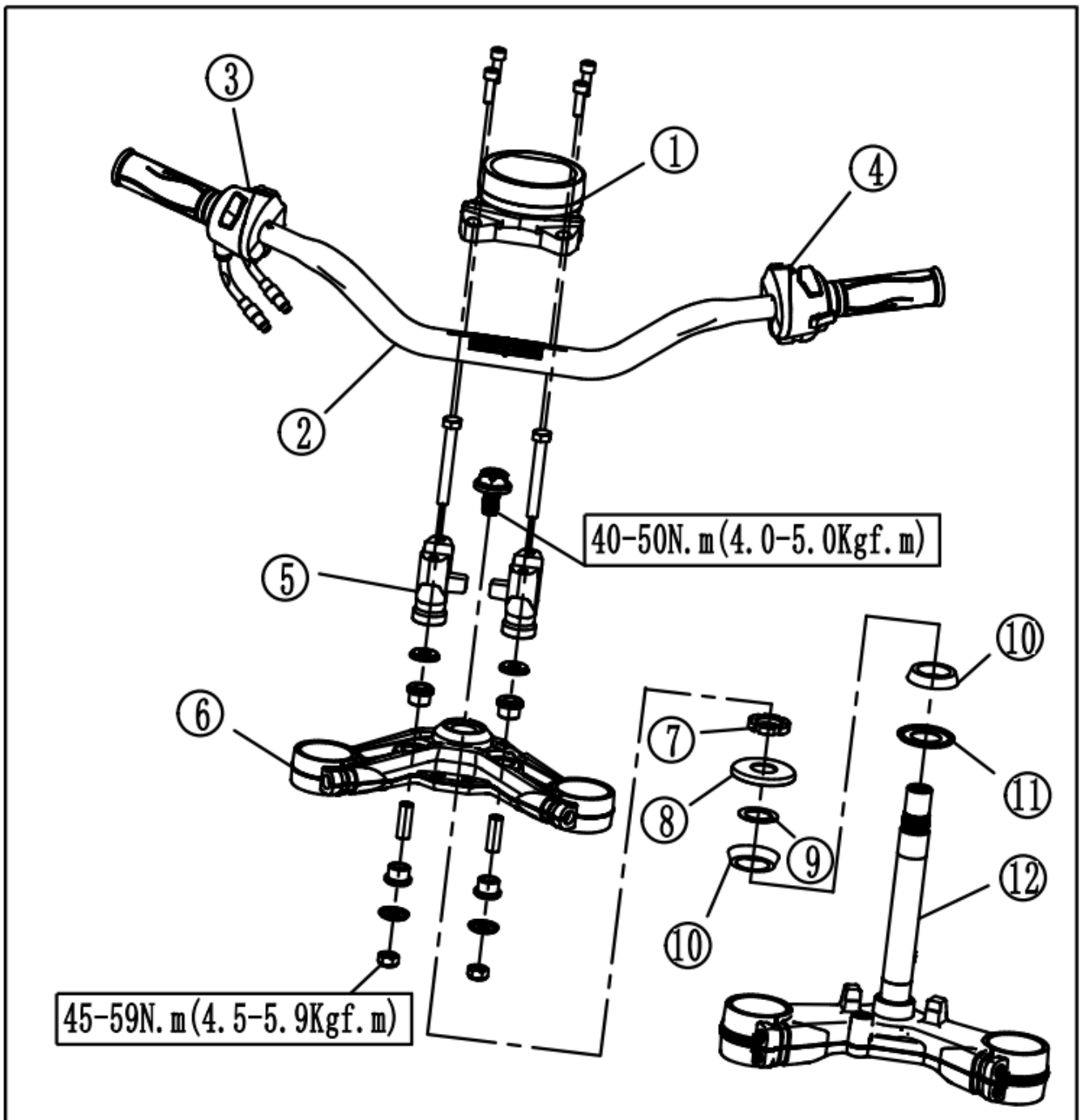
warning

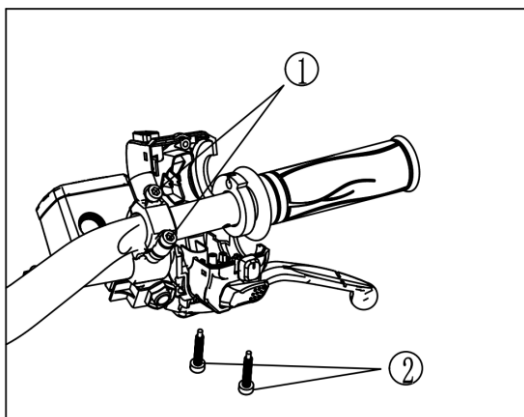
The motorcycle should be firmly supported to prevent

1. Park the motorcycle on a flat surface.
  2. Place suitable brackets under the frame and engine to support the front wheels.
  3. Dismantle
    - Front wheel
    - Front mudguard
  4. Dismantle
    - Use a 6 # hex wrench to loosen the locking bolts ① on both sides, following the arrow ②
- Remove the front fork in the direction.

## 4.4 Steering shaft and handle

- |                                 |   |
|---------------------------------|---|
| (1) Instrument                  | (7) Ring locking nut  |
| (2) Directional handle          | (8) Dust cover  |
| (3) Right hand handle switch    | (9) Flat gasket $\phi 26 \times \phi 38 \times 2$ stainless steel |
| (4) Left handlebar switch       | (10) Conical needle roller bearings                               |
| (5) Steering handle fixing seat | (11) Dust ring  |
| (6) Upper Link Board            | (12) Lower Link Board   |

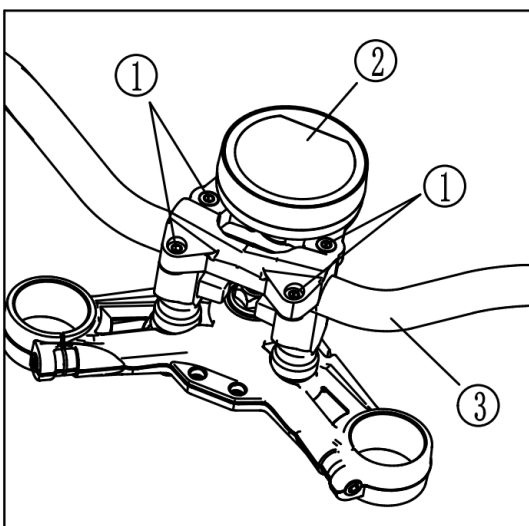




## Handle

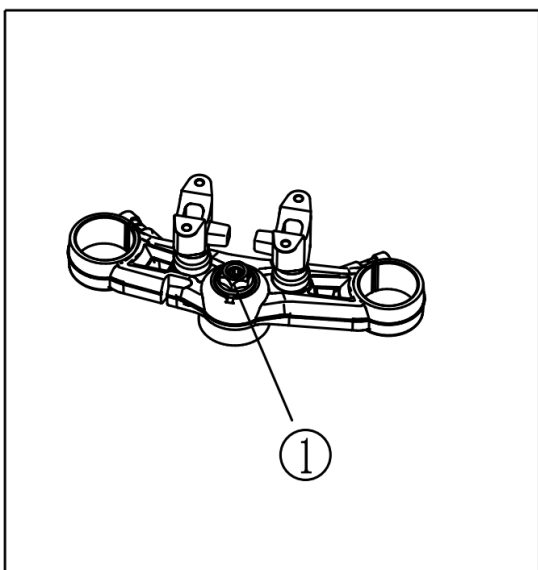
## 1.Dismantle

- Left and right handle switches
- Clutch and brake handle



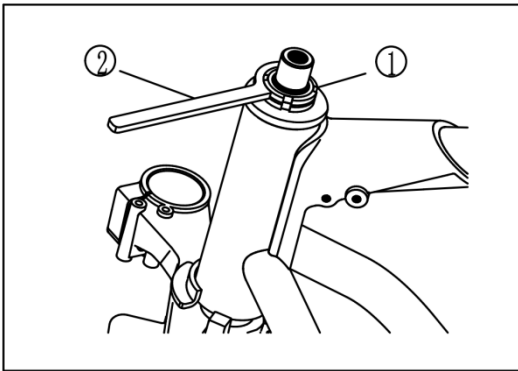
## 2.Dismantle

- Steering handle fixing bolt①
- Instrument bracket②
- Front wheel
- Front wheel



## 3.Dismantle

- ①Upper connecting plate clamping bolt



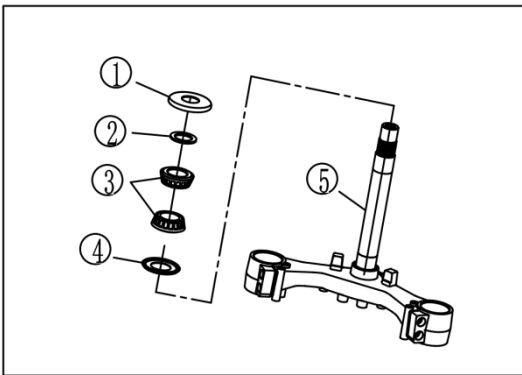
## 4.Dismantle

- Ring nut (1)
- Use a steering nut wrench (2) to disassemble



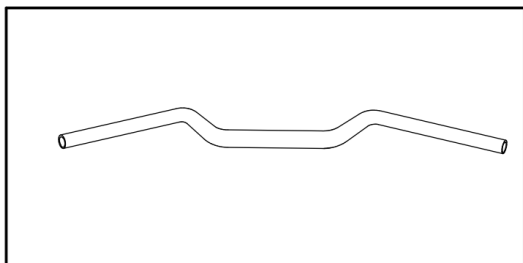
warning

Except for using a special wrench, no tools other than a wrench can be used for disassembly



## 5.Dismantle

- Dust cover (1)
- Flat gasket (2)
- Conical needle roller bearings (3)
- Wipers (4)
- Steering axle (5)



## Check the steering handle

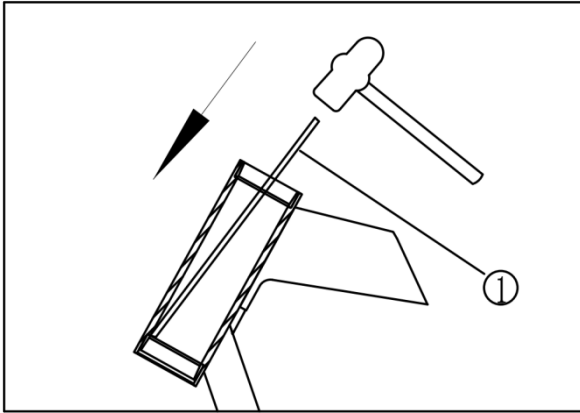
## 1.Inspection

- Left and right handlebars
- Bending, cracking, damage → replace



warning

Do not attempt to straighten the bending direction of the handle, as this may weaken the handling of the handle and cause danger.



### Check the steering shaft

1. Clean the needle bearing and bearing ring seat thoroughly

2. Inspection

- Roller pin bearing
- Bearing race

Wear and damage → replace

\*\*\*\*\*

#### Replacement steps:

- As shown in the figure, use a long rod (1) and a hammer to remove the bearing race and take it out of the groove of the steering pipe.

- Install new dust seals, needle roller bearings, and bearing races.

\*\*\*\*\*

#### Tips:

- The bearing races, needle bearings, and dust seals are always replaced as a complete set.

- Obliquely installed bearing races can cause damage to the frame, so it is important to carefully install them in a horizontal state.

Do not strike the needle roller and rod surface.

### Install the steering shaft

Install in the reverse order of disassembly.

1. Apply butter

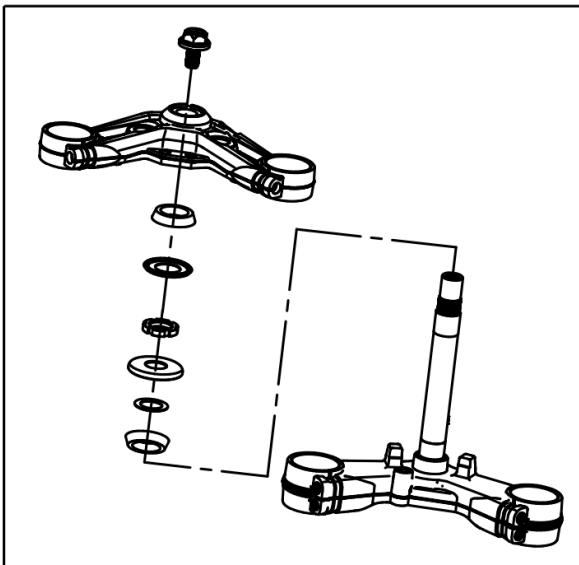
- Needle roller bearings (upper and lower)
- Bearing race (upper and lower)

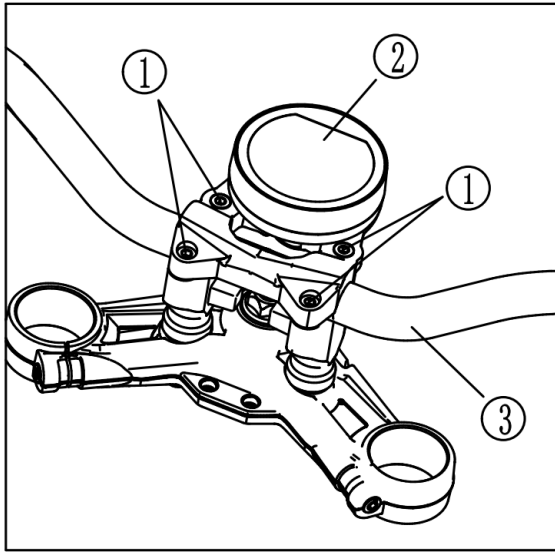
Apply lithium based grease

2. Installation

- Flat washer
- Dust cover
- Ring nut

After installation, make adjustments according to the methods described in Chapter 3.





### Install the handle

#### 1. Install

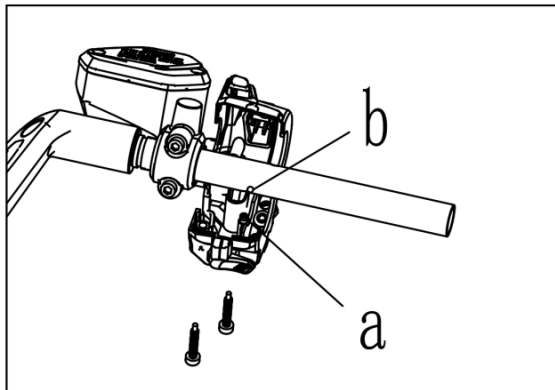
- Handle (3)

Tightening torque

25-30N.m (2.5-3.0Kgf.m)

#### Note:

The middle position of the handle tube is marked and aligned with the scale line during installation



#### 2. Installment

- Front brake handle
- Clutch handle

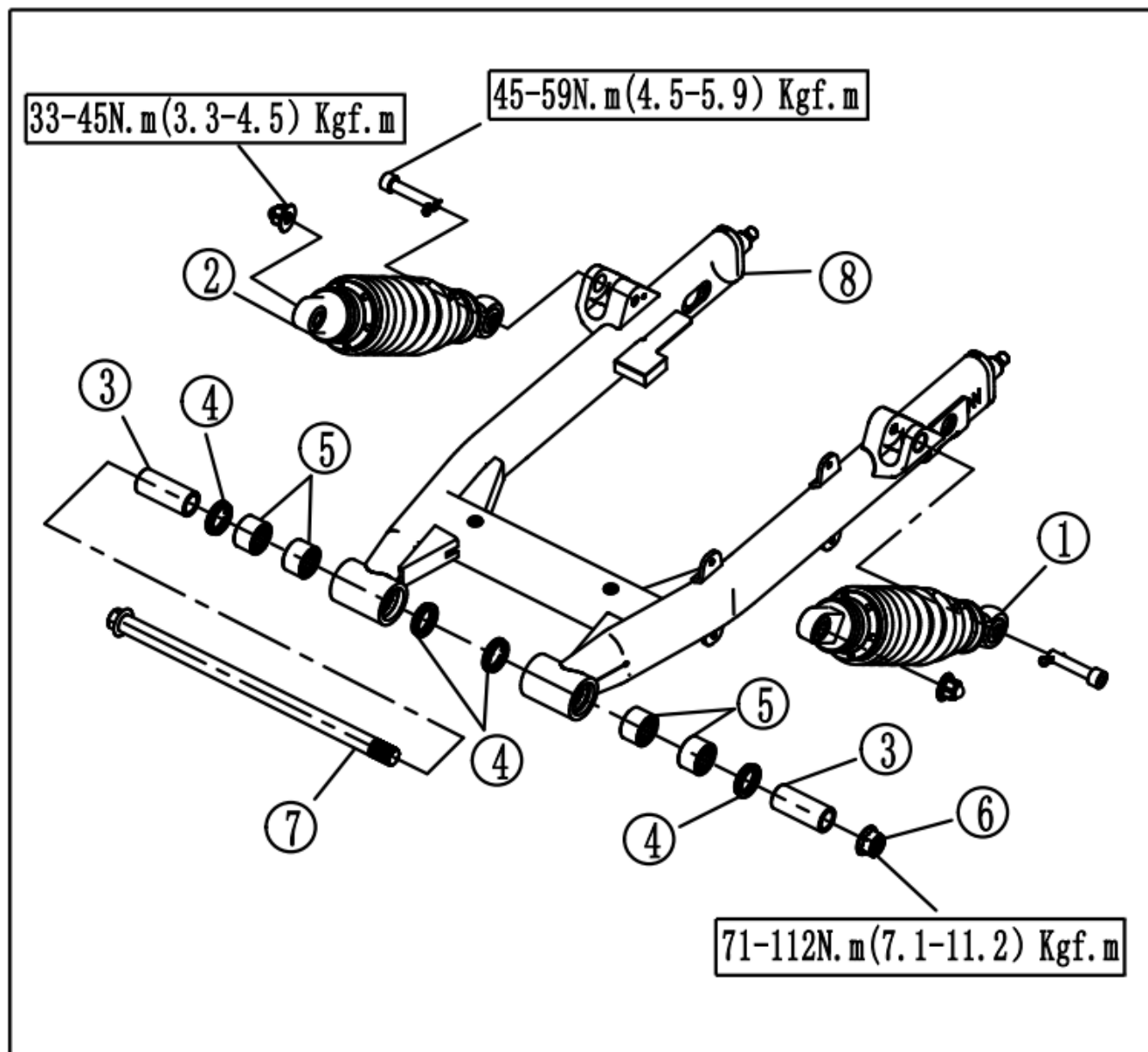
#### 3. Installment

- Handle switch

During installation, insert the handle switch positioning pin a into the handle positioning hole b.

## 4.5 Rear shock absorber and rear fork

- |                               |                            |
|-------------------------------|----------------------------|
| (1) Left rear shock absorber  | (5) Roller pin bearing     |
| (2) Right rear shock absorber | (6) Rear fork axle bearing |
| (3) Bushing                   | (7) Rear fork axle         |
| (4) Oil seal                  | (8) Rear fork              |



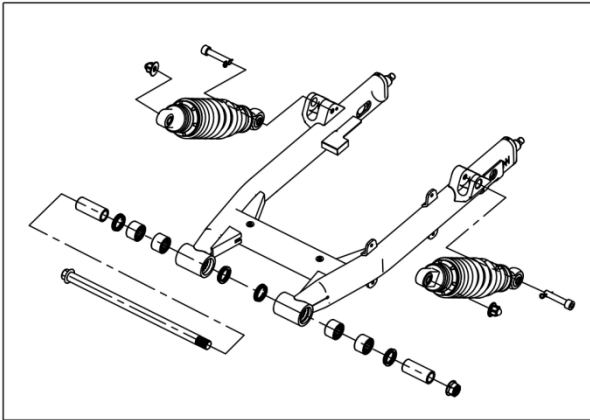
### Dismantle

#### 1.Rear shock absorber



warning

The motorcycle should be firmly supported to avoid overturning.



#### 2.Dismantle

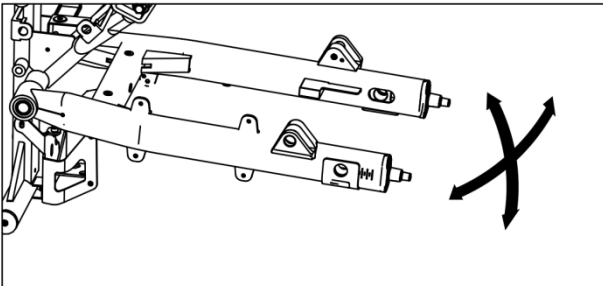
- Rear wheel

#### 3.Dismantle

- Belt

#### 4.Dismantle

- Nut
- Rear fork



### Inspection

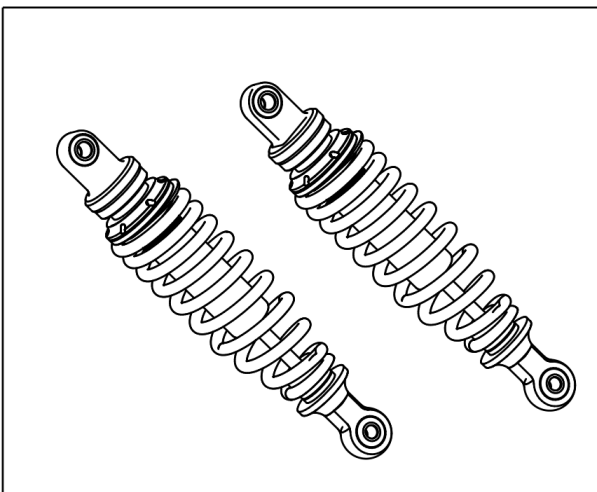
#### 1.Inspection

- Rear flat fork tightness

If loose, tighten the shaft nut or exchange the bushing.

- The movement of the rear fork up and down

If the movement is not smooth, curved, or has rough areas → Replace the liner



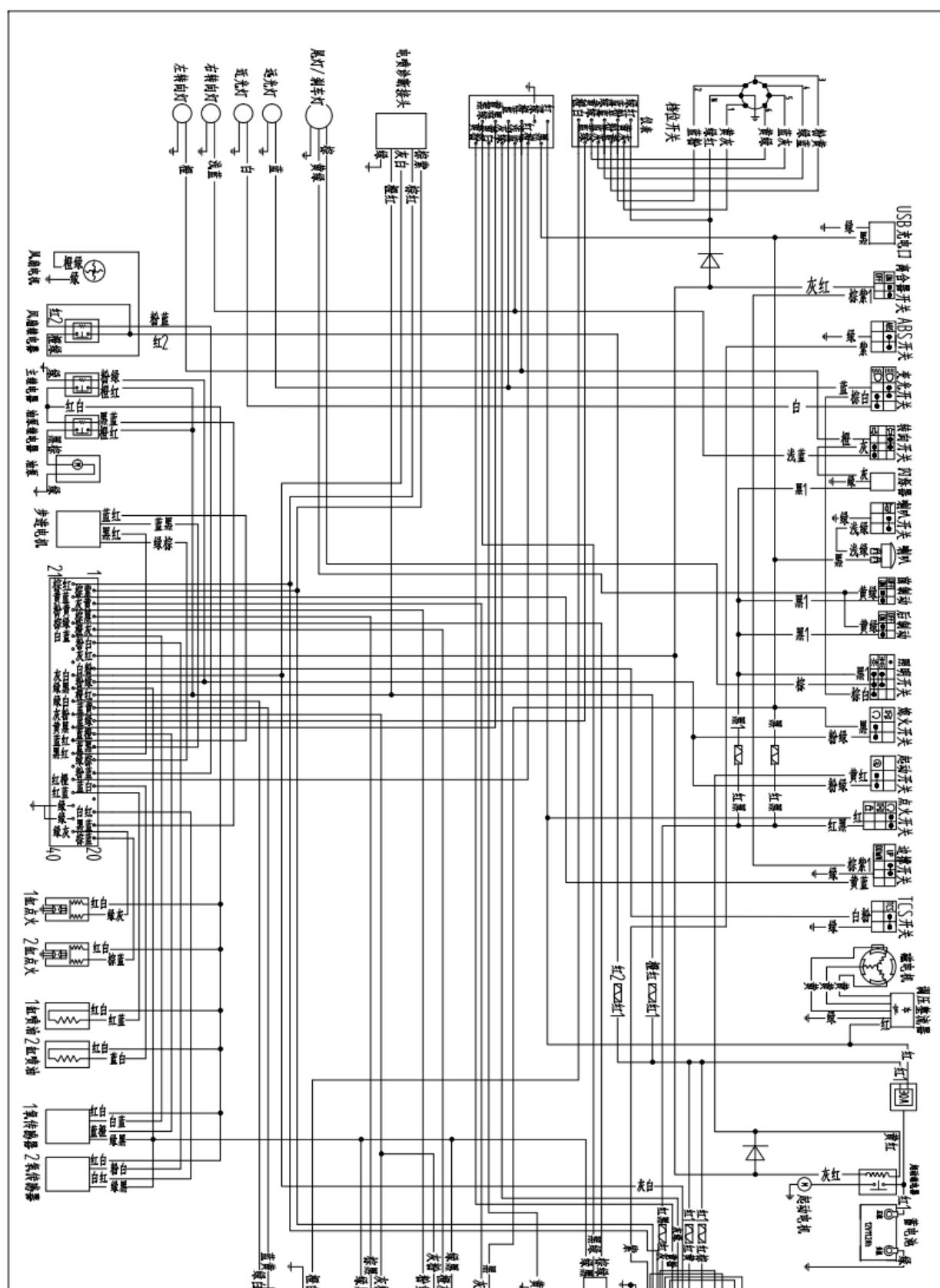
#### 2.Inspection

- Rear shock absorber

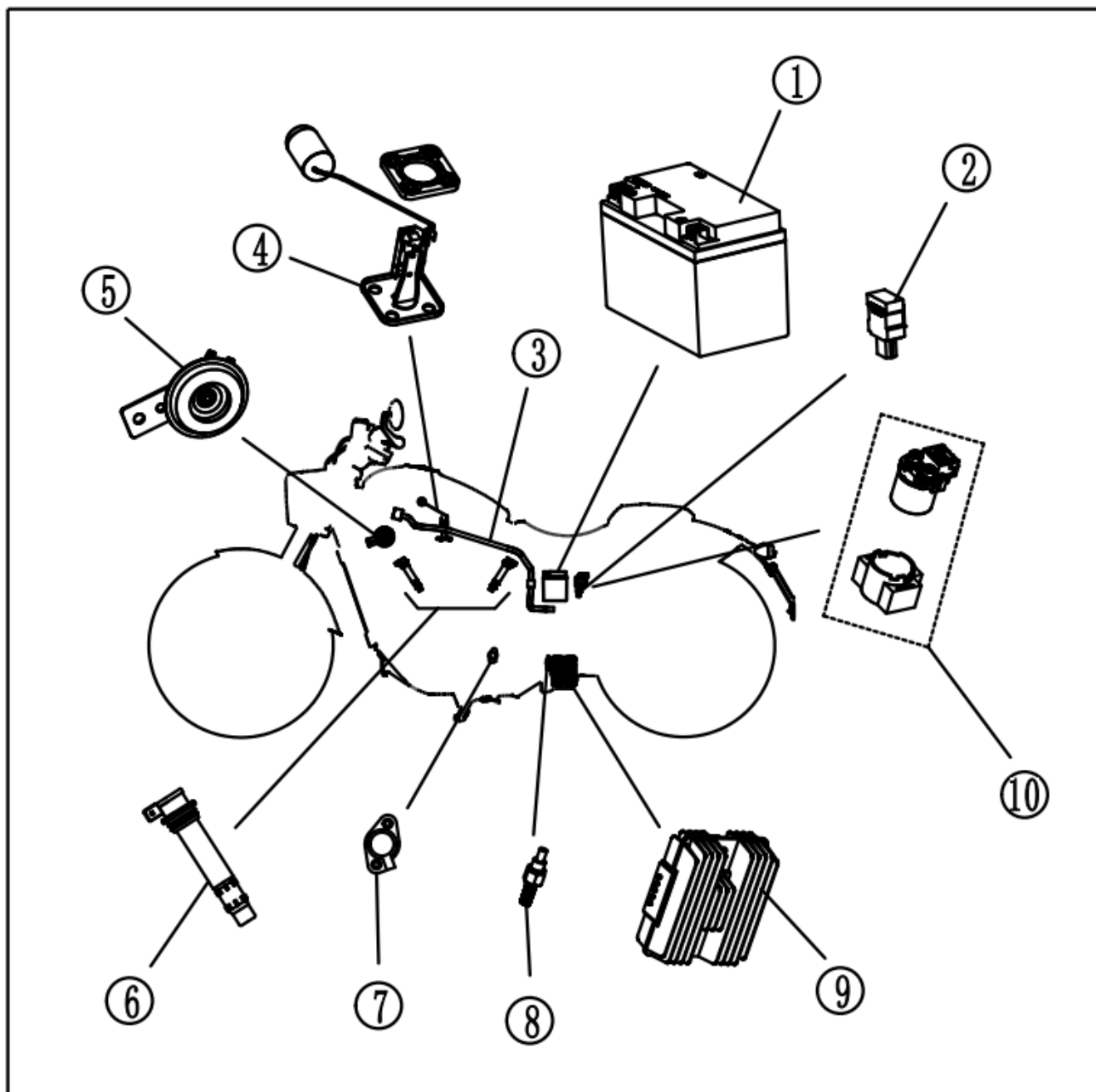
Oil leakage and deformation → replace

# The Fifth Chapter. Electrical Equipment

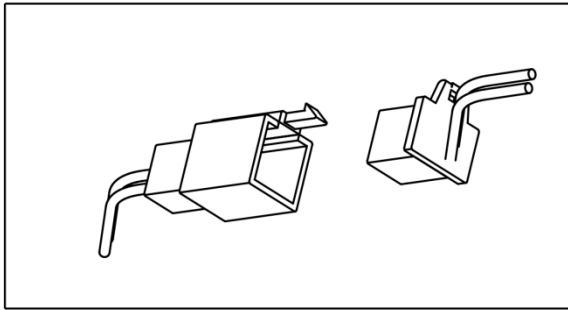
## 5.1 circuit diagram



- |                 |                                |
|-----------------|--------------------------------|
| (1) Battery     | (6) Spark plug cap             |
| (2) Flasher     | (7) Gear display               |
| (3) Main cable  | (8) Rear brake switch          |
| (4) Fuel sensor | (9) Variable voltage rectifier |
| (5) Horn        | (10) Start relay               |



## 5.2 Connector inspection

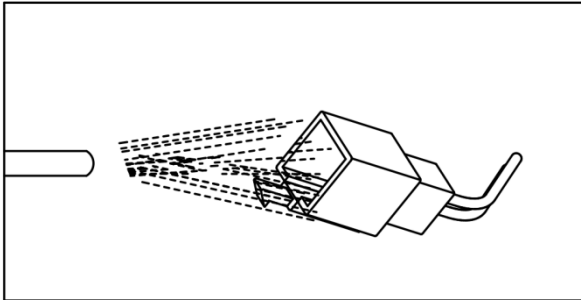


### Connector inspection

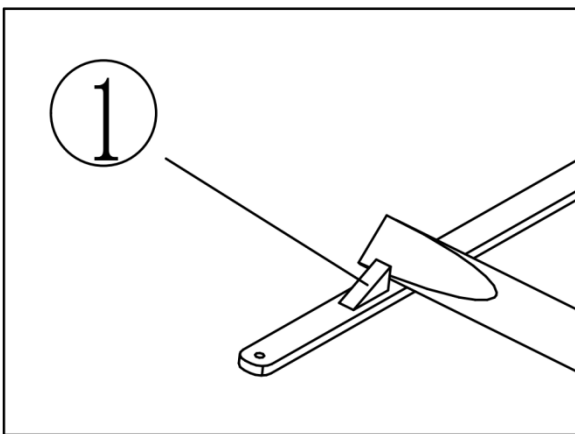
Dirt, rust, moisture, etc. on the connector should be removed.

#### 1. Detachment

- Connector



#### 2. Blow dry each terminal with air.



#### 3. Each connector should be connected and disconnected 2-3 times.

#### 4. Check by pulling the wire by hand to ensure that it does not come out.

#### 5. If the terminal is pulled out by hand, bend the pin ① and reinsert the terminal into the connector.

#### 6. Connect

- Connector

#### 7. Check for continuity with a multimeter.

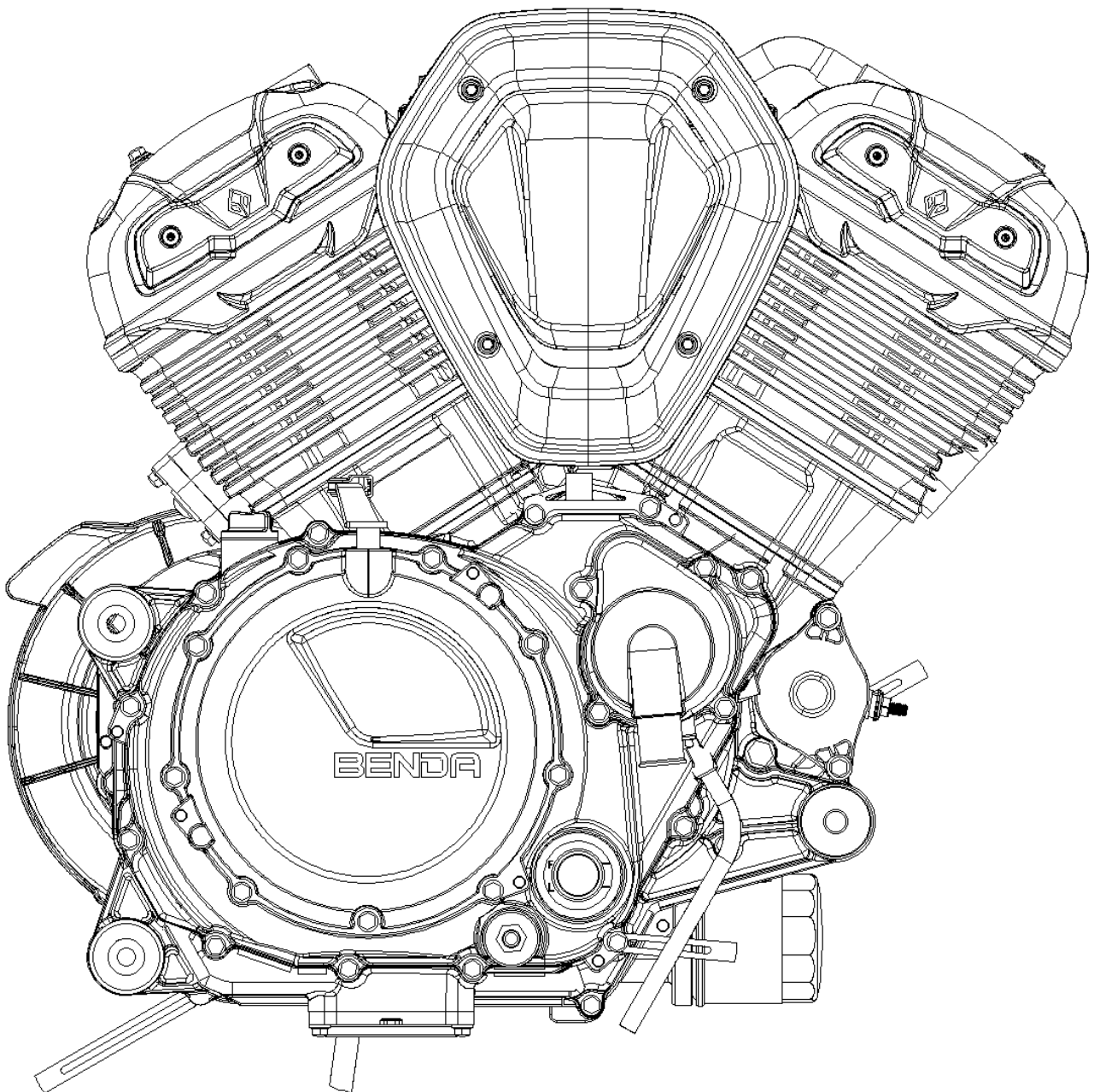
#### Tips:

- If it is found that the circuit is not conducting, clean all wiring terminals.

- Whenever checking the wiring harness, be sure to follow steps 1-7 for inspection.

- As shown in the figure, connect the multimeter to the connector for inspection.

## The Sixth Chapter. Introduction Engine Maintenance

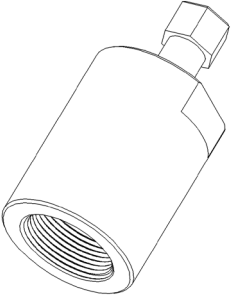


The correct maintenance process is crucial for the safety of maintenance personnel and the reliability and safety of the engine.

- When two or more people work together, they should pay attention to safety.
- When starting the engine indoors, it is necessary to ensure that the exhaust gas is discharged outdoors.
- When working, When using toxic or flammable materials, it is necessary to strictly follow the manufacturer's instructions and ensure smooth ventilation in the workplace.
- It is strictly prohibited to use gasoline as cleaning fluid.
- To avoid burns, do not touch uncooled engine, oil, and exhaust system components.
- If the fuel, lubrication, and exhaust systems have been repaired, their markings and leaks must be checked.
- To protect the natural environment, do not dispose of engine oil and unused parts at will.

Warning:

- When repairing and maintaining, if it is necessary to replace parts, genuine components from Hangzhou Saturn Power Technology Co., Ltd. or recommended products must be used.
- Disassembled components that need to be reused should be arranged in order to avoid confusion during assembly.
- Ensure the use of specialized tools in accordance with the requirements specified in the maintenance manual.
- Ensure that the components used for assembly are clean and that the areas that require lubrication must be lubricated.
- Use specialized lubricants, adhesives, and sealants.
- When tightening bolts, screws, and nuts, first tighten the ones with larger specifications and tighten them from the inside out according to the specified torque.
- Use a torque wrench to tighten bolts with torque requirements. If grease and oil are stuck on the threads, they must be wiped off.
- After disassembling the components, they should be inspected and cleaned before measurement.
- After assembly, inspect the fastening and operation of the components.
- Do not use disassembled oil seals, gaskets, self-locking nuts, locking washers, cotter pins, elastic retaining rings, and other components during assembly. New parts should be replaced.

Special tools and code	Disassembly and install related components and description	Special tools and code	Disassembly and install related components and description
272V0.GZ1014 	Dismantling fixture for magneto rotor		

269 Engine torque table		
Project	Torque(N.m)	Note
Oil drain bolt	23±2	
Screw plug Rc1/8	15±2	sealant
Screw plug Rc1/4	24±2	sealant
Screw plug M12	24±2	sealant
Hexagon socket set screws with flat pointM6X8	15±2	sealant
Countersunk screw	10±2	Tightening adhesive
connecting-rod bolt	15→30→55	
Oil filter connector	15±2	Thread adhesive
oil pressure sensor	20	
Shift spring return pin	25	
Variable speed drum positioning wheel step bolt	8-12	
Tightening plate screws	9	
Chain guard bolt M6X12	4	Tightening adhesive
Five star wheel bolt	25	Tightening adhesive
Clutch drive gear bolt M10X1.25LH X25	50	Tightening adhesive
Clutch nut	125	Tightening adhesive
Clutch combination bolt	10	
Water pump impeller	11	
Pressure relief valve screw plug	15	
Cylinder head bolts	15→30→50	
Screw plug M16	25	sealant
Small pulley nut	120	Thread adhesive
Gear display internal hexagonal bolt M5X20	5-8	
Magneto rotor M12X1.25X30	115	Thread adhesive
Magnetic motor rotor internal hexagonal cylindrical head screw M8X16	25	Thread adhesive

Timing sprocket bolt M6X12	15-17	Thread adhesive
Camshaft mounting bolt M6X40	10-12	
Tensioner bolt M6X20	10-12	
Left cover screw plug M12	18-23	
Rotary crankshaft hole plug	7-14	
Magneto stator	12	Tightening adhesive
Trigger bolt M5X12	8	
Cylinder head cover step bolt	8	
Ventilation chamber baffle bolt M6X12	10	
spark plug	15	
Water temperature sensor	25	Sealant
Fuel injector internal hexagonal bolt M6X18	8-12	
Exhaust muffler joint bolt M8X25	25	
Oil filling hole plug	Hand tightening	

269 Engine technical parameters (First)		
Project	Specification	
	BD2V69MQ	
type	V-type dual cylinder, four stroke, water-cooled, overhead camshaft	
Bore X stroke	69mm x 63.6mm	
Total displacement	476mL	
Compression ratio	11.5:1	
Minimum no-load stable speed (idle)	1500r/min±150r/min	
Starting method	Electrical start	
power	35KW/8800rpm	
Electrical system	Ignition method	ECU Ignition
	Spark plug model	CR8E (NGK)
	Electrode gap	0.8~0.9 mm
	Magnetic motor form	Permanent magnet three-phase AC engine rotor flywheel type
Ignition	Combustion chamber type	Triangular combustion chamber
	Air filter	Sponge filter cartridge filtration type
	gasoline	95 # or above unleaded gasoline
Air distribution system	Gas distribution method	DOHC/Chain Drive
Lubricating system	Lubrication method	Pressure splash lubrication
	Oil pump type	Rotor type
	Filter type	Full flow filtration paper filter cartridge
	Oil grade	SAE10W/40
	Oil filling amount	3.0L
Cooling system	Cooling method	Closed coolant circulation cooling
	Type of coolant	-35 ° C rust proof and antifreeze solution
Drive system	Clutch type	Wet multi plate sliding clutch
	Variable speed mode	Six speed constant mesh continuously variable transmission
	Decelerator gear position	6Gear
	Shift mode/sequence	Mechanical reciprocating/1-N-2-3-4-5-6-5-4-3-2-N-1

	Transmission transmission ratio	Primary transmission ratio	2.161	
		Secondary transmission ratio	1st gear	3.231
			2nd gear	2.118
			3rd gear	1.571
			4th gear	1.333
			5th gear	1.130
			6th gear	1.042
Net mass	50KG			
External dimensions	Length X Width X Height:			
output mode	Sprocket output			
Engine output rotation direction	Looking counterclockwise from the left end of the engine when moving forward			

267 Engine technical parameters (Second)		
Inlet valve clearance		0.16±0.02mm
Exhaust valve clearance		0.25±0.02mm
Number of valves		Entering 8 rows and 8 rows
Working voltage (V)		12
Piston diameter	Size A	66.965-66.970
	Size B	66.960-66.965
	Size C	66.955-66.960
Cylinder diameter	Size A	67.000-67.005
	Size B	66.995-67.000
	Size C	66.990-66.995
Installation clearance of piston cylinder	New conditions	0.05-0.085mm
	Wear limit	0.1mm
Installation clearance of piston rings		0.03-0.05mm
Jumping at the crankshaft bearing shell		Less than 0.03mm
Gap between connecting rod big end and crankshaft crank		0.05-0.2mm
Camshaft runout		Less than 0.04mm

### 10.1 Waterway inspection and maintenance

#### 10.1.1 Note:

- When the engine is very hot, removing the radiator cap may cause coolant to spray out and cause serious burns to people. Dismantling and scattering. Before covering the heat exchanger, make sure to let the engine and radiator cool down.
- The use of coolants containing silicate corrosion inhibitors may cause water pump seal wear or radiator blockage. Using tap water may cause engine damage.
- The coolant should be inspected and replaced according to the maintenance plan
- When adding or replacing coolant, do not use non ethylene glycol coolant, tap water, or mineral water.
- Improper use of coolant may cause damage, such as engine corrosion, blocked cooling channels, or premature wear of radiator and water pump seals.
- After repairing the system, use a coolant detector to detect leaks.

#### 10.1.2 Troubleshooting of abnormal water temperature

##### 1 High engine temperature

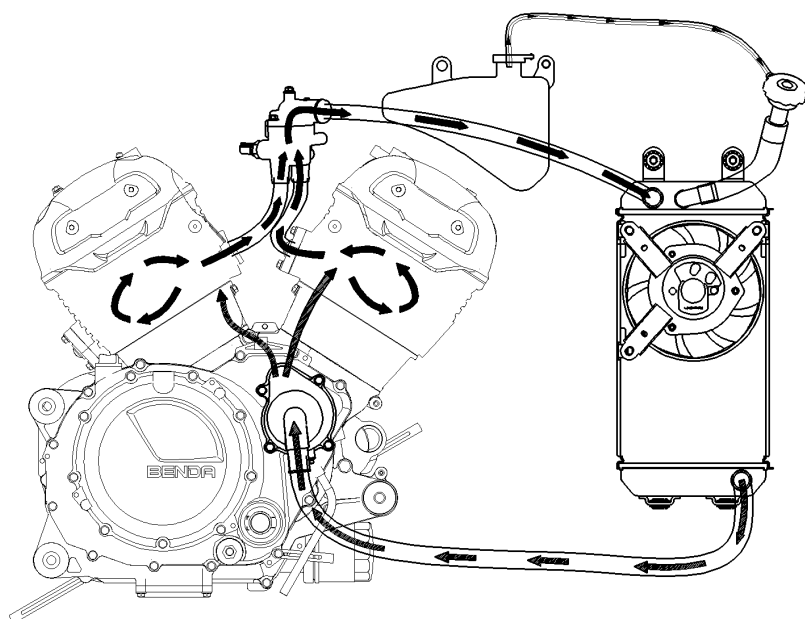
- High temperature coolant temperature indicator or water temperature sensor malfunction
- Thermostat stuck or closed
- Radiator cover malfunction
- Insufficient coolant
- Blocked channels in radiators, hoses, or water jackets
- Air intake system
- Cooling fan motor malfunction
- Fan control relay malfunction
- Water pump malfunction

##### 2 Low engine temperature

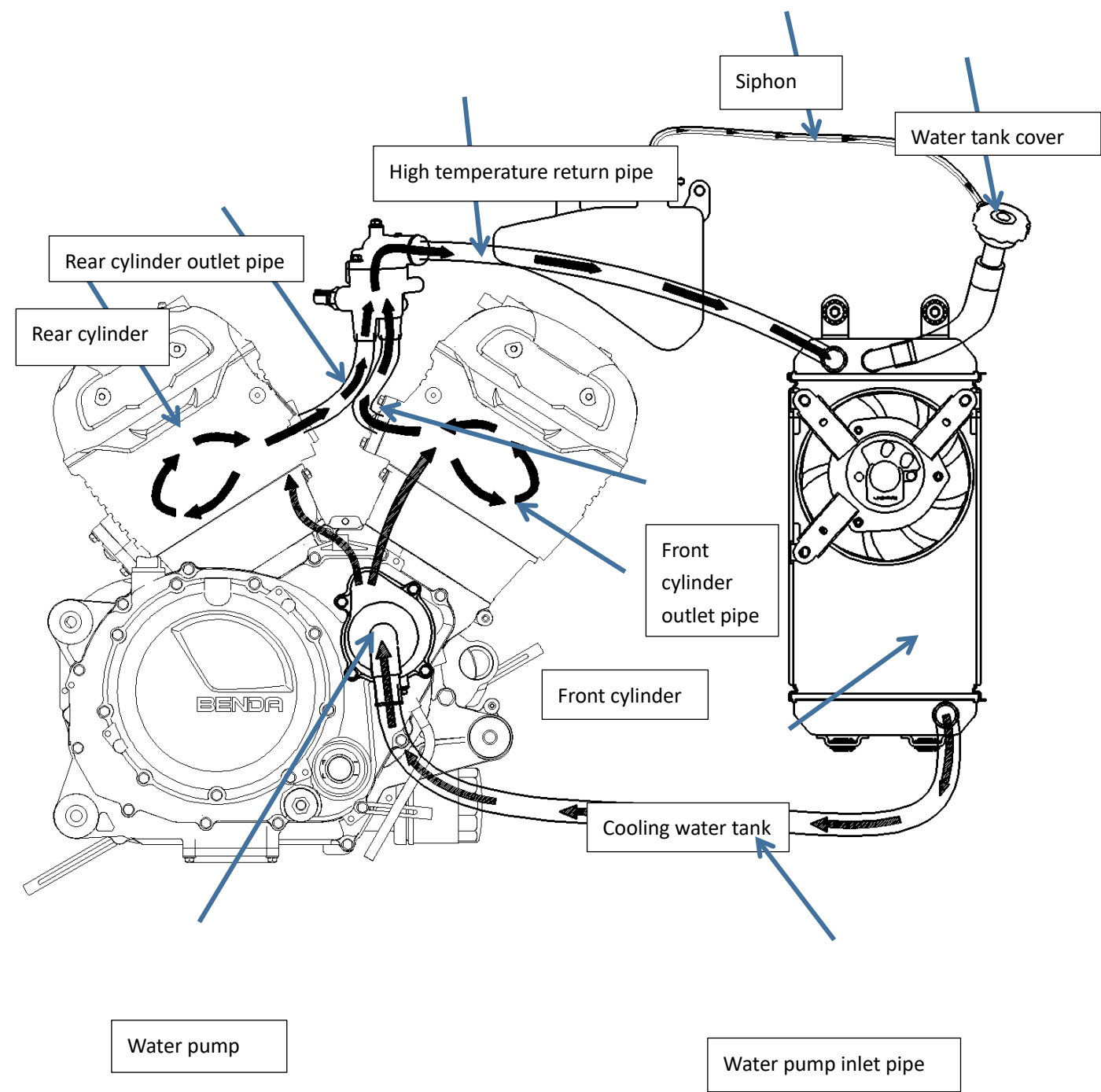
- High temperature coolant temperature indicator or water temperature sensor malfunction
- Thermostat stuck
- Fan control relay malfunction

##### 3 Coolant leakage

- Mechanical seal failure of water pump
- O-ring deterioration
- Radiator cover malfunction
- Damaged or deteriorated cylinder head gasket
- Loose hose connections or clamps
- Damaged or deteriorated hoses
- Damaged radiator



Waterway schematic diagram



### 10.2 Oil circuit inspection and maintenance

#### 10.2.1 Notice:

The engine can be repaired with the oil pump on the frame. The disassembly and installation of the oil pump maintenance procedure must be carried out with the oil drained. When using it, attention should be paid not to let dust or dirt enter the engine. After installing the oil pump, check if the engine oil pressure is normal. If any part of the oil pump is damaged beyond the specified usage limit, the oil pump assembly should be replaced.

#### 10.2.2 Oil circuit inspection and maintenance

##### 1 Oil level too low

- Oil consumption
- External oil leakage
- piston ring wear
- Improper installation of piston rings
- Cylinder wear
- Valve stem sea
- Worn valve guide

##### 2 Low oil pressure

- Low oil level
- Oil filter blockage
- Internal oil leakage
- Use Incorrect oil

##### 3 No oil pressure

- Oil level too low
- The oil pressure relief valve is stuck
- Oil pump transmission chain broken
- Oil pump transmission or driven broken
- Oil pump damaged
- Internal oil leakage

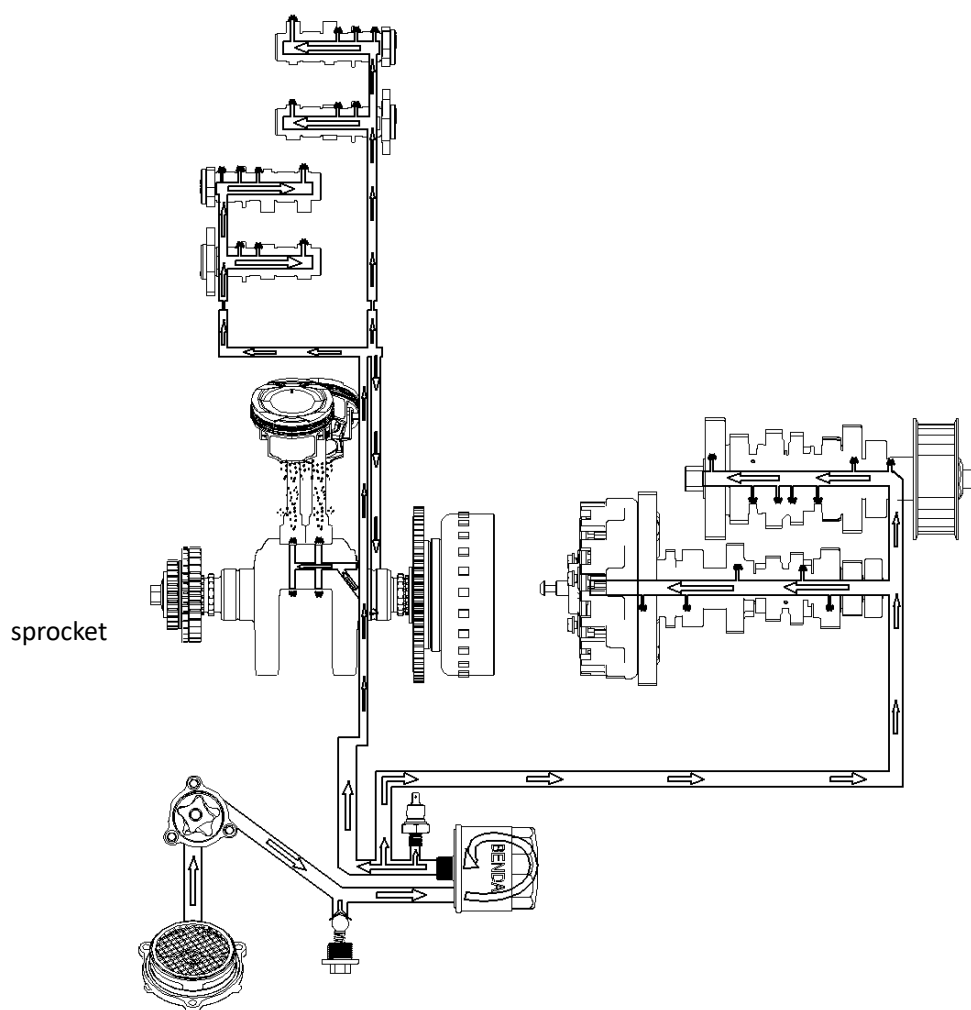
##### 4 High oil pressure

- Oil pressure relief valve stuck or closed
- Blocked oil filter channel or metering hole
- Use incorrect oil

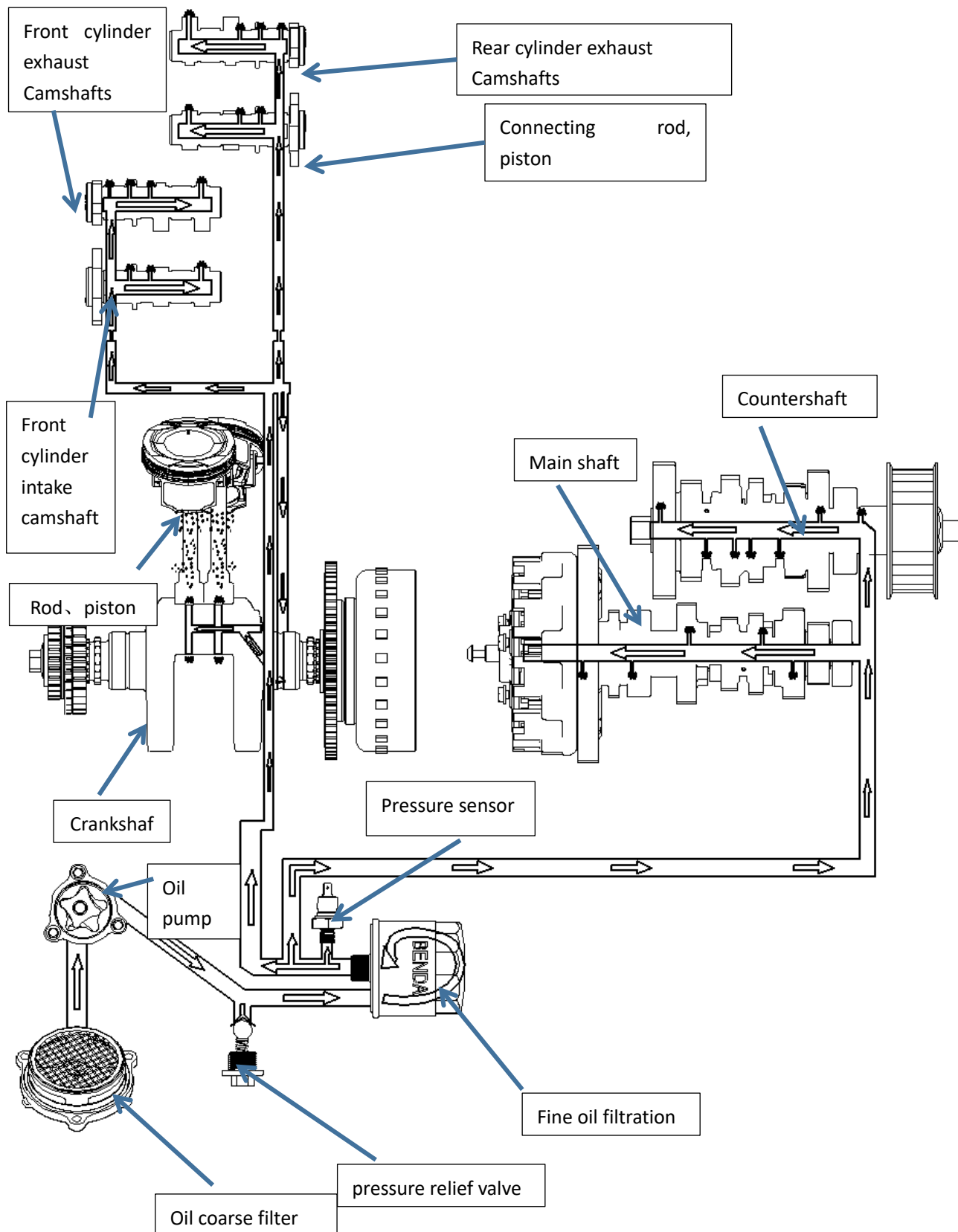
##### 5 Oil emulsification

- Damaged cylinder head gasket
- The coolant leaks into the oil passage
- Inlet

Oil circuit diagram (detailed diagram on the next page)

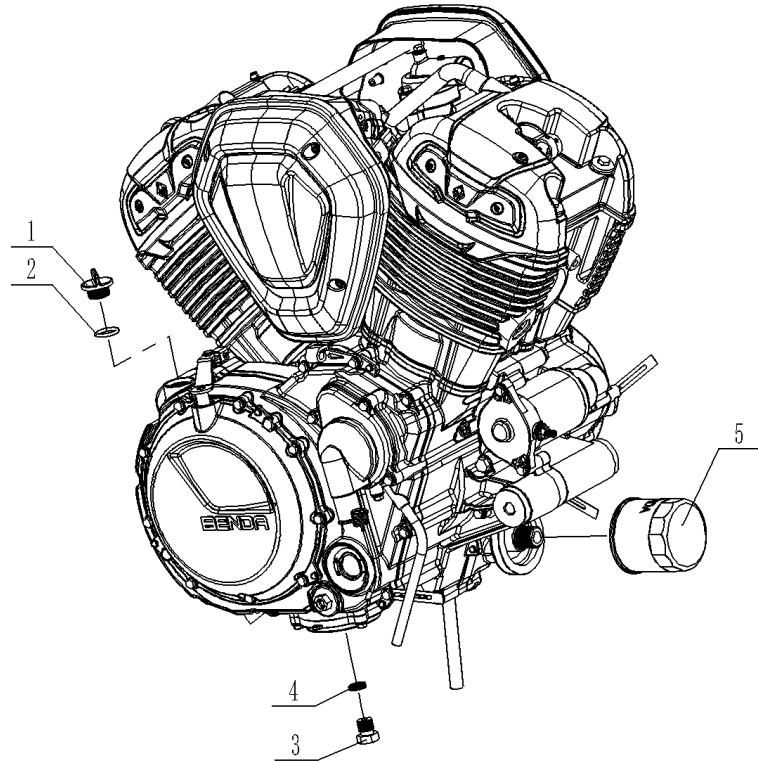


# Oil circuit diagram



## 10.2.3 Change engine oil and oil filter element

- Remove the combination of oil dipstick 1 and O-ring 2
- Remove the oil drain bolt 3 and gasket 4
- Drain the engine oil
- Remove oil filter element 5
- Replace oil filter element 5
- Assemble gasket 4 and tighten oil drain bolt 3
- Inject 2.8L of engine oil into the oil dipstick hole
- Tighten the oil dipstick combination 3 by hand



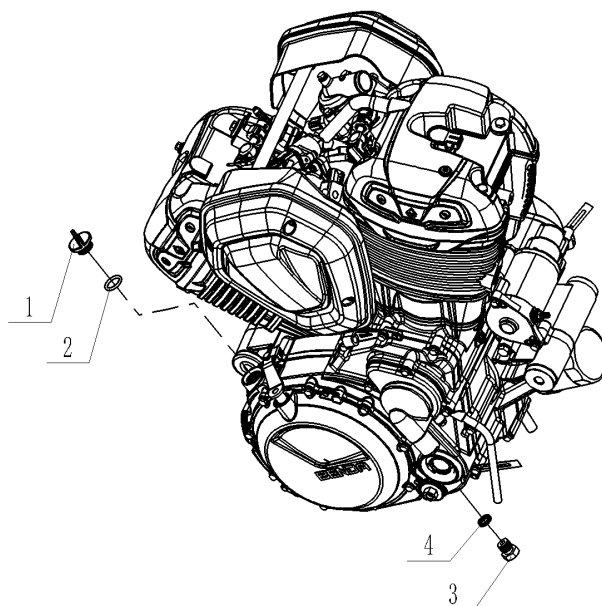
## Attention

Be careful of burns when draining oil from the hot engine.

$23 \pm 2 \text{ N.m}$

### 11.1 Empty the engine

- Remove the oil filler plug 1
- Remove O-ring 2
- Remove the oil drain bolt 3
- Remove the metal gasket 4 from the oil drain bolt
- Drain the engine oil
- Assemble the oil drain bolt metal gasket 4
- Assemble oil drain bolt 3
- Assemble O-ring 2
- Assemble the oil hole plug 1 and tighten it by hand



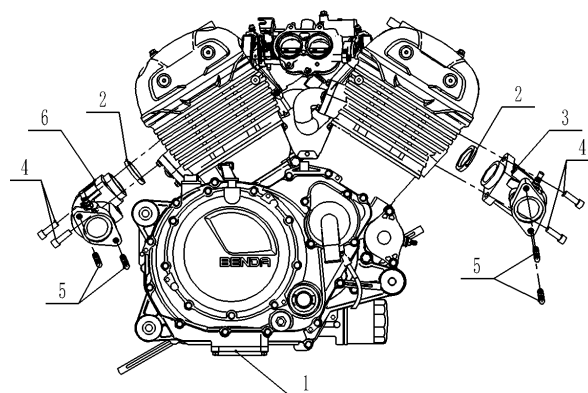
$23 \pm 2\text{N.m}$

#### Attention

**Be careful of burns when draining oil from the hot engine.**

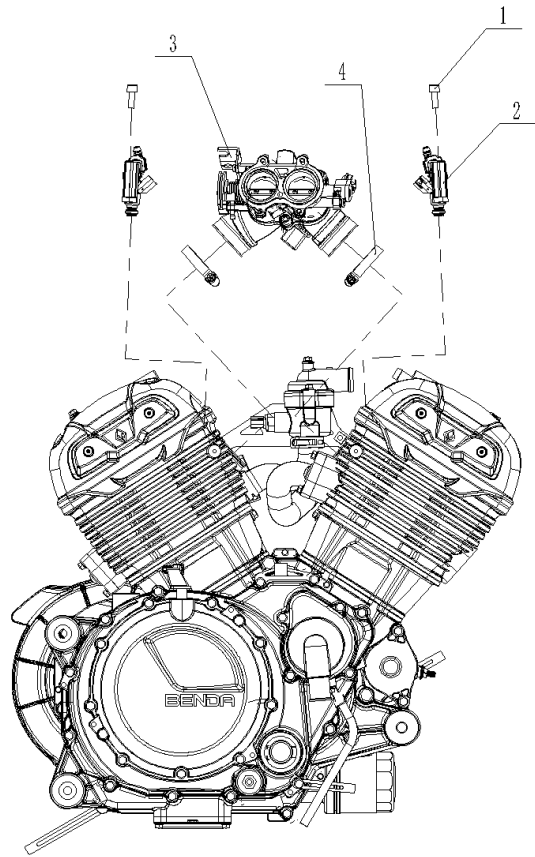
### 11.2 Muffler adapter

- Remove the hexagonal cylindrical head bolt 4 (M8X25)
- Remove the front cylinder muffler joint 3
- Remove the rear cylinder muffler joint 6
- Remove the exhaust muffler gasket 2



### 11.3 Throttle body

- Remove the hexagon bolt1 (M6X18)
- Remove fuel injector 2
- Remove clamp 4
- Remove throttle valve body 3

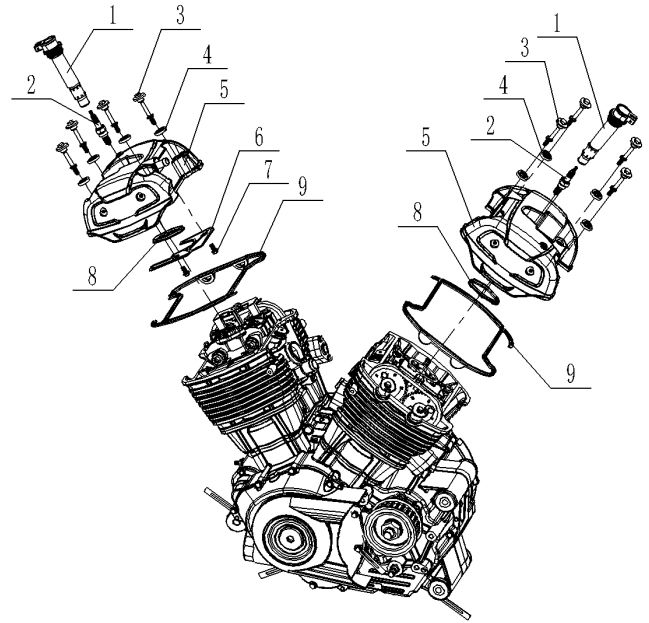


### 11.4 Thermostat

- Remove bolt 1 (M6X12)
- Remove aluminum washer 2
- Remove bolt 3 (M6X20)
- Remove thermostat cover 4
- Remove thermostat 5
- Remove water temperature sensor 7
- Remove bolt 8 (M6X14)
- Remove the wide edge clamp 9 (specification 26)
- Remove thermostat housing 6
- Remove the front cylinder outlet pipe 10
- Remove the rear cylinder outlet pipe 11
- Remove bolts 12 and 13 (M6X14)
- Remove the thermostat mounting bracket 14

## 11.5 Cylinder head cover

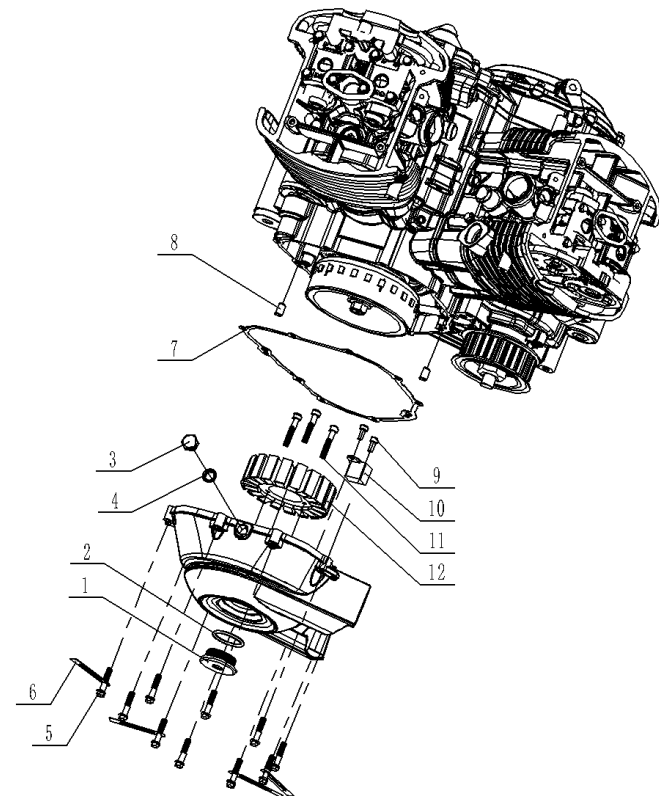
- Remove ignition coil 1
- Remove the step bolts 3
- Remove rubber gasket 4
- Remove the cylinder head cover 5
- Remove the bolts 7(M6X12)
- Remove Ventilation chamber baffle6
- Remove the rectangular sealing ring8
- Remove the sealing ring of the cylinder head cover9



- Removing spark plugs2

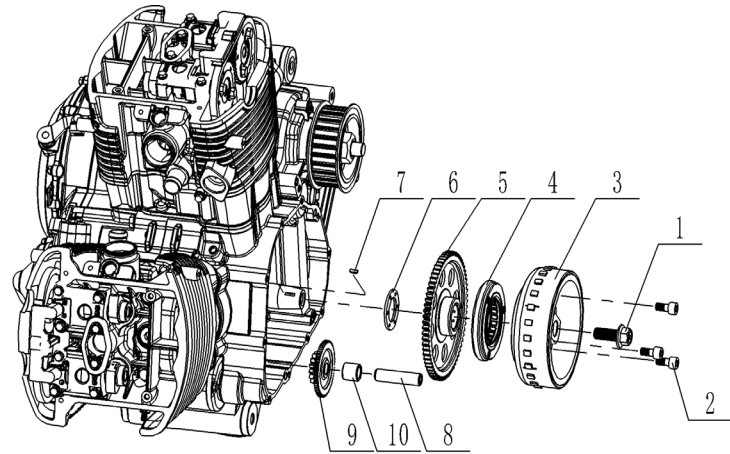
## 11.6 Left side cover

- Remove the crankshaft hole plug1
- Remove O-ring 2 (33X3)
- Remove bolt plug 3
- Remove the sealing gasket of the top dead center plug 4
- Remove the bolt 5 (M6X30)
- Remove the wire clamp 6
- Remove the left cover
- Remove the left cover paper pad 7
- Remove locating pin 8
- Remove bolts 9 (M5X12)
- Remove trigger 10
- Remove the hexagonal cylindrical head bolt 11 (M6X35)
- Remove the stator of the magneto 12

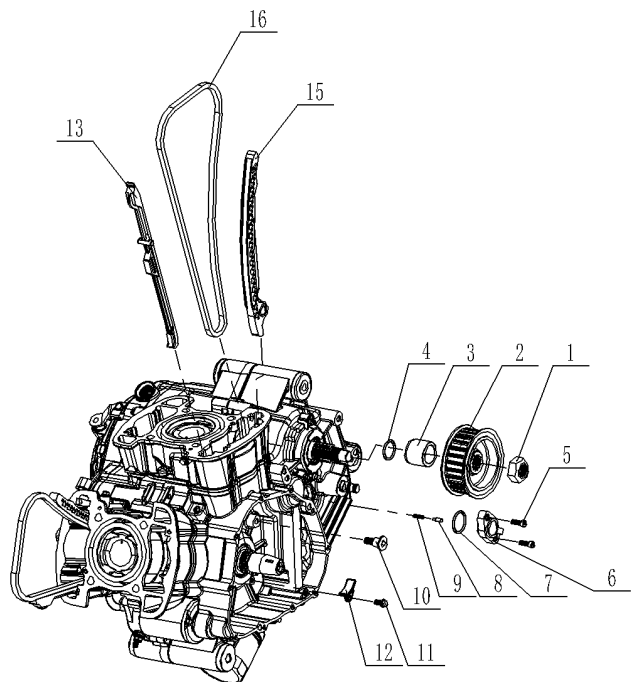


**tensioning plate****11.7 Magneto, double gear**

- Remove bolts1 (M12X1.25X30)
- Remove the hexagonal cylindrical head bolt2(M8X16)
- Remove the rotor of the magneto 3
- Remove the overrunning clutch 4
- Remove the starting driven gear 5
- Remove gasket 6 (27X45X2.5)
- Remove the semicircle key 7
- Remove the starting dual gear shaft 8
- Remove the starting dual gear 9
- Remove the starting double gear spacer sleeve 10

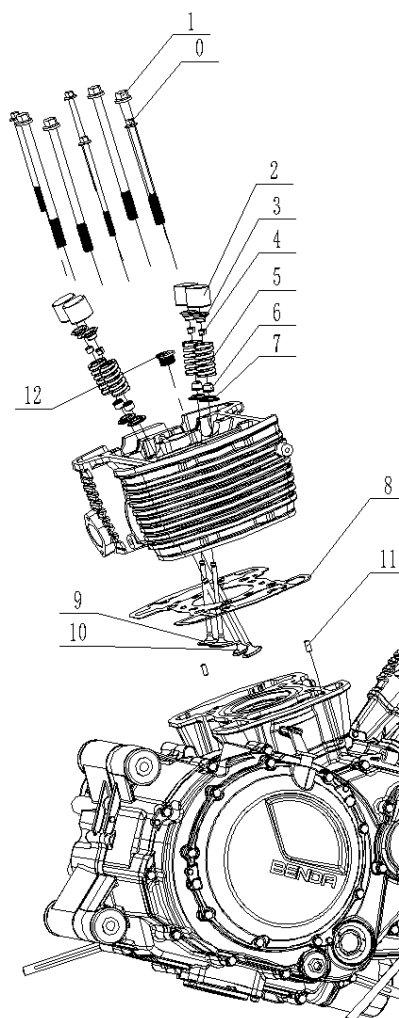
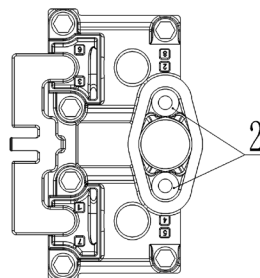
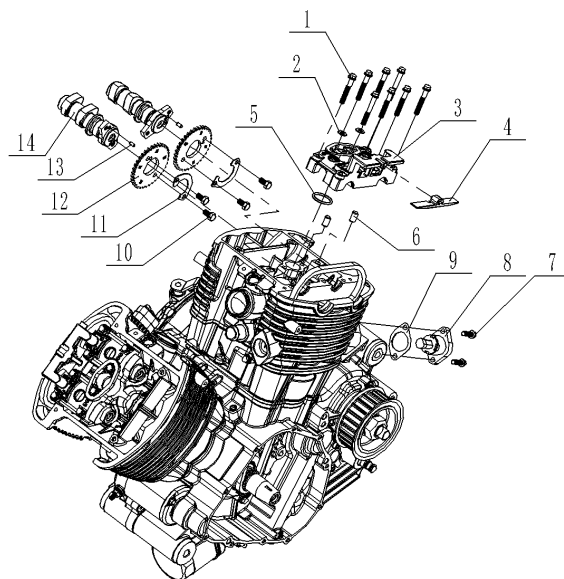
**11.8 Gear display Small pulley chain guard card, chain, tensioning plate**

- Remove the small pulley nut
- Remove the small pulley 2
- Remove liner 3
- Remove O-ring 4
- Remove the inner hexagon bolt 5
- Remove the gear display 6
- Remove o-ring 7
- Remove the gear display contact 8
- Remove the gear display contact spring 9
- Remove the tensioning plate bolts 10
- Remove bolts 11 (M6X12)
- Remove the chain guard card 12



### 11.9 Camshafts, timing sprockets

- Remove bolt 1 ( M6X40 )
- Remove the aluminum washer 2
- Remove the camshaft mounting bracket 3
- Remove Chain guide plate 4
- Remove o-ring 5
- Remove locating pin 6
- Remove bolts 7
- Remove the tensioner 8
- Remove the tensioner gasket 9
- Remove bolt 10
- Remove the timing sprocket pressure plate 11
- Remove timing sprocket 12
- Remove roll pin 13

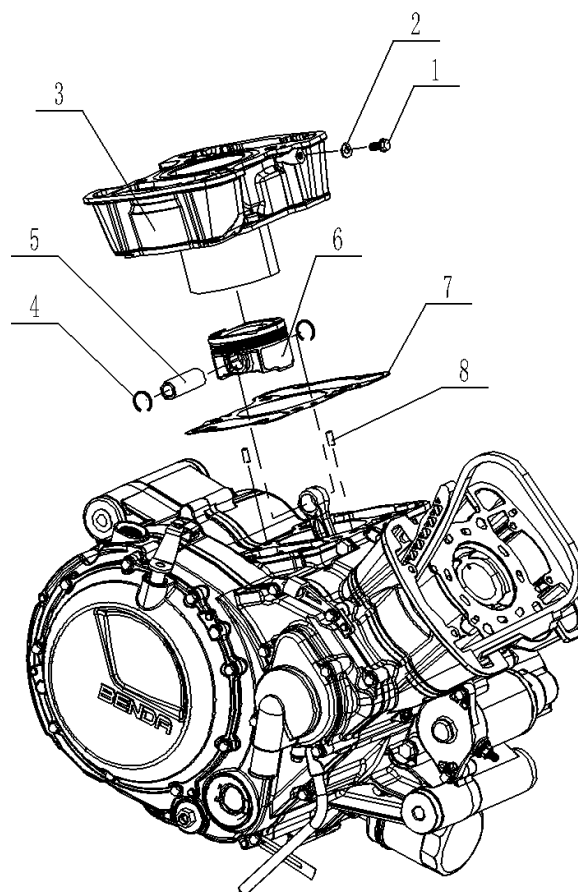


### 11.10 Cylinder head

- Remove the cylinder head bolts 1
- Remove bolt 0 ( M6X105 )
- Remove the valve lifter 2
- Remove the upper seat of the valve spring 3
- Remove the valve lock clip 4
- Remove the valve spring 5
- Remove the valve oil seal 6
- Remove the lower seat of the valve spring 7
- Remove the cylinder head gasket 8
- Remove exhaust valve 9
- Remove the intake valve 10
- Remove cylindrical pin 11
- Remove the screw plug 12

### 11.11 Valve cylinder body,piston

- Remove body 1 (M6X12)
- Remove aluminum washer 2
- Remove cylinder block 3
- Remove the piston pin retaining ring 4
- Remove piston pin 5
- Remove piston 6
- Remove cylinder block paper pad 7
- Remove cylindrical pin 8



### 11.12 Piston assembly

※Detection:Piston ring, Using an old cylinder block, measure as shown in the following diagram  
If the value exceeds 0.4, replace the piston ring.

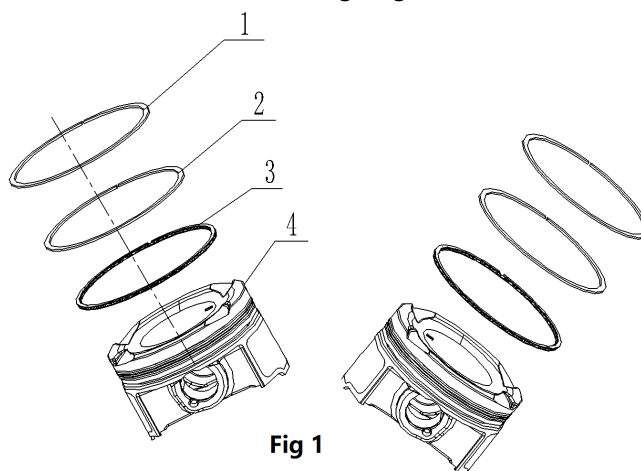
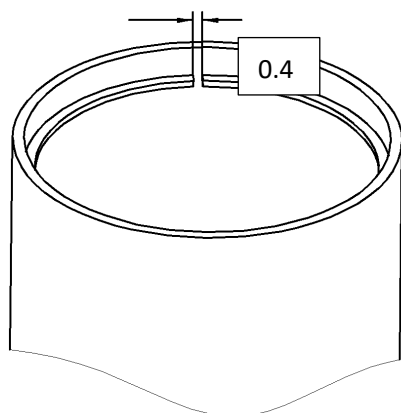
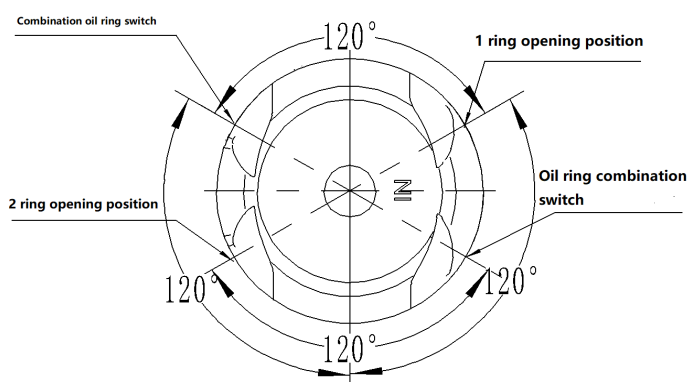


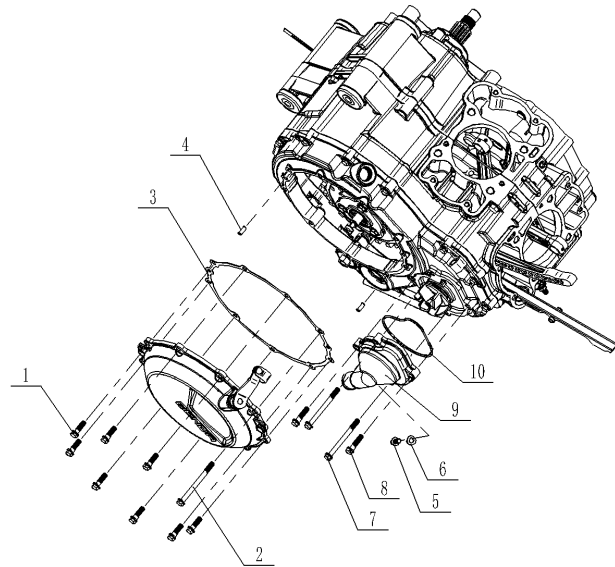
Fig 1

- Remove the first piston ring 1
- Remove the second piston ring 2
- Remove the combination oil ring 3



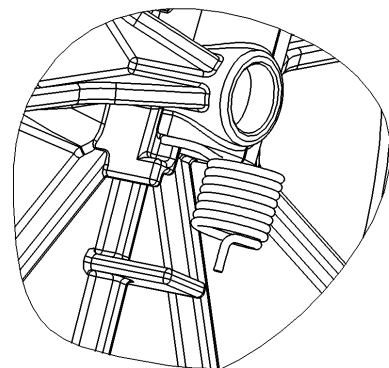
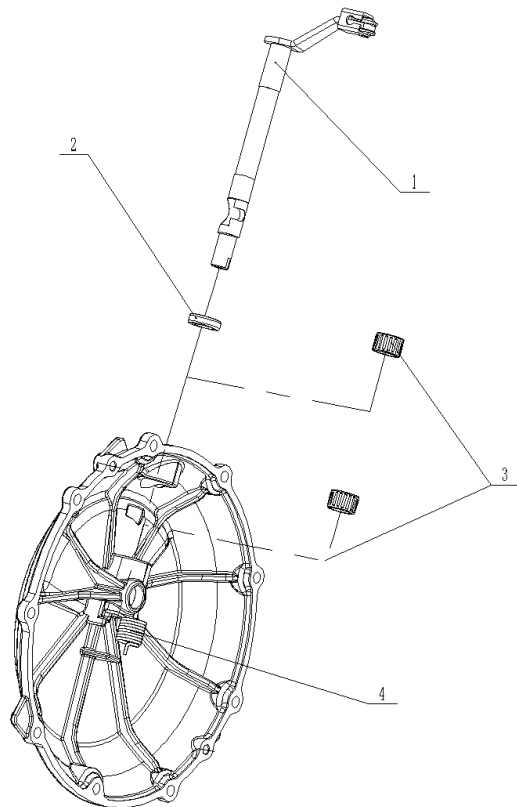
### 11.13 Clutch cover,water pump cover

- Remove bolts 1 (M6X20)
- Remove bolts2 (M6X70)
- Remove clutch cover
- Remove the clutch cover paper pad 3
- Remove cylindrical pin 4
- Remove bolts 5 (M6X12)
- Remove aluminum washer 6
- Remove bolts 7 (M6X70)
- Remove bolt 8 (M6X25)
- Remove water pump 9
- Remove water pump sealed ring10



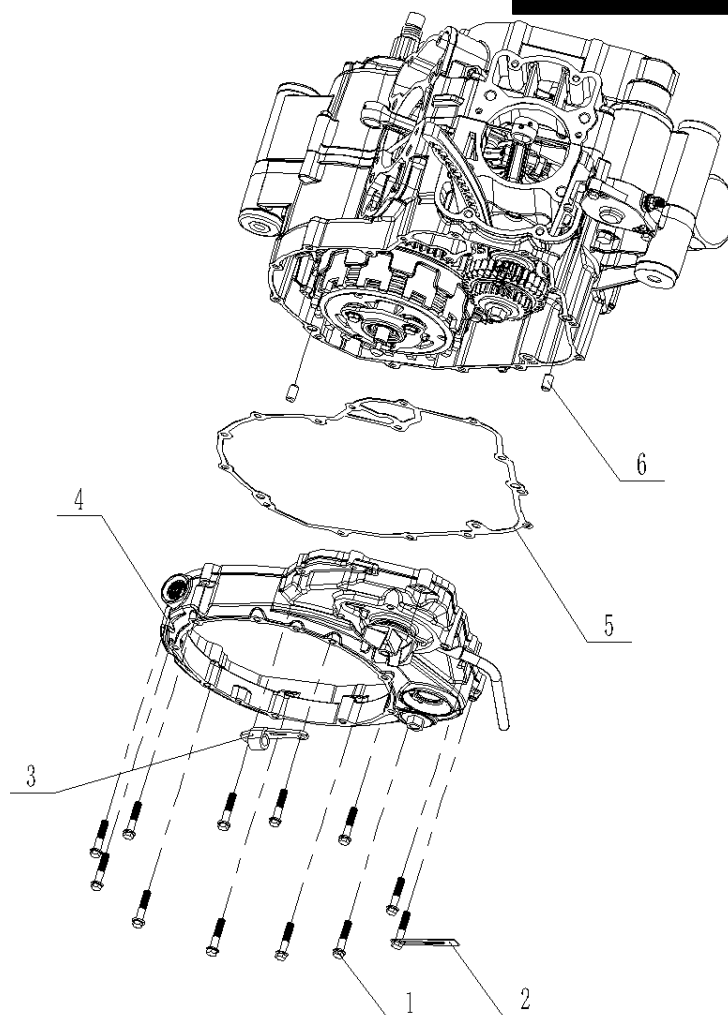
### 11.14 Disassembly of clutch

- Remove clutch operating lever 1
- Remove oil seal 2
- Remove needle bearing 3
- Remove the clutch lever torsion spring 4



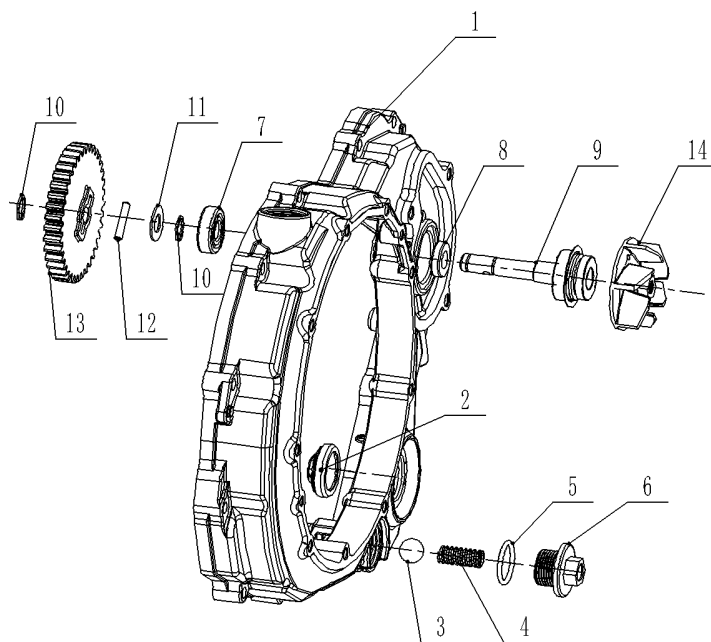
## 11.15 Right side cover

- Remove bolt 1 (M6X30)
- Remove clamp 2
- Remove the clutch lock mounting bracket 3
- Remove the right cover 4
- Remove the right cover paper pad 5
- Remove locating pin 6



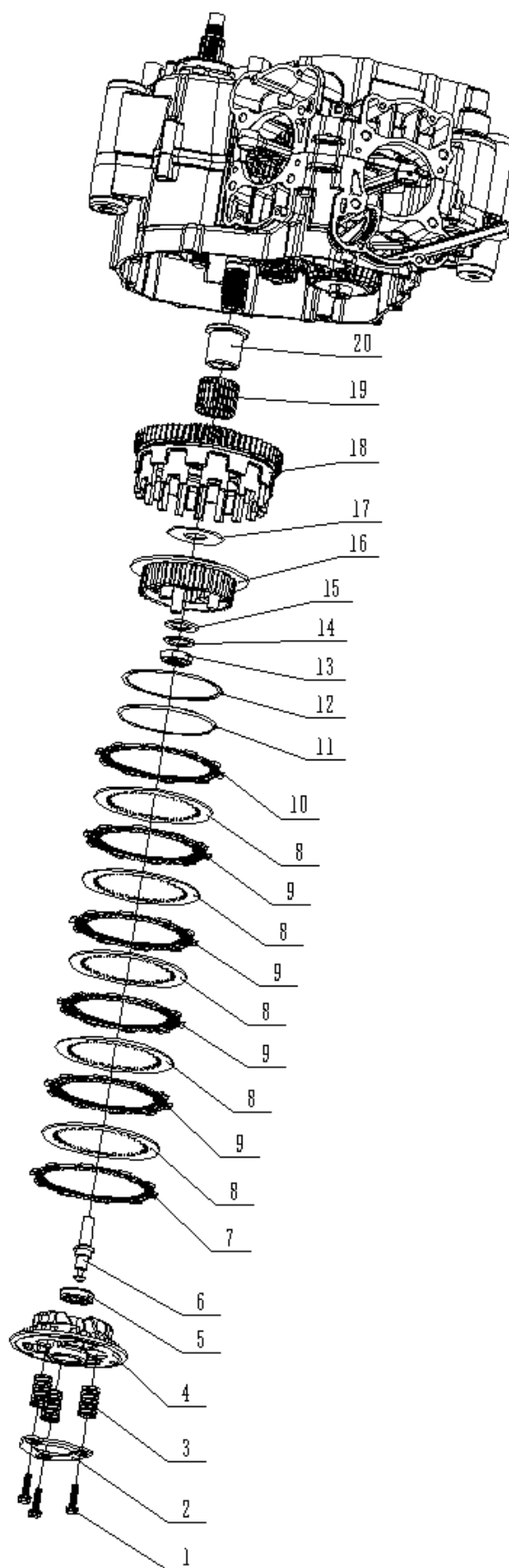
## 11.16 Dismantling of right side cover

- Remove oil level sight glass 2
- Remove the pressure relief valve screw plug 6
- Remove O-ring 5 (20X2.5)
- Remove the pressure relief valve spring 4
- Remove steel ball 3
- Remove the water pump impeller 14
- Remove the shaft retaining ring 10
- Remove the driven gear 13 of the water pump
- Remove needle 12
- Remove washer 11
- Remove the shaft retaining ring 10
- Remove bearing 7 (6000)
- Remove the water pump shaft seal assembly 9
- Remove oil seal 8



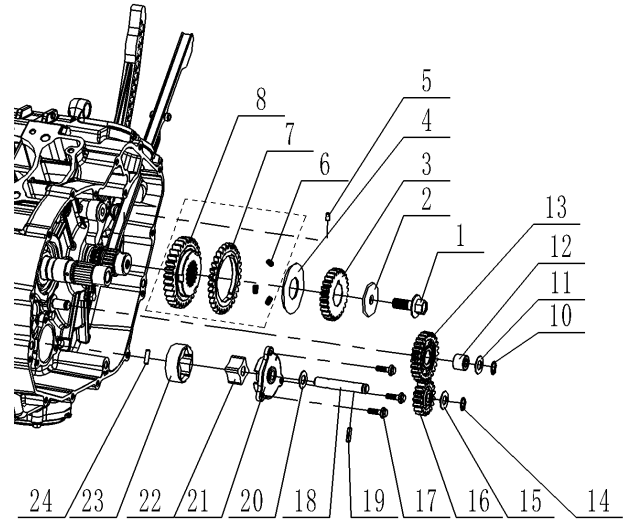
## 11.17 Clutch

- Remove the clutch combination bolt 1
- Remove the clutch spring pressure plate 2
- Remove the clutch pressure plate spring 3
- Remove clutch cover 4
- Remove bearing 5 (6003)
- Remove clutch release rod 6
- Remove friction plate 7 (C)
- Remove the clutch driven plate 8
- Remove friction plate 9 (B)
- Remove the clutch driven plate 8
- Remove friction plate 9
- Remove the clutch driven plate 8
- Remove friction plate 9
- Remove the clutch driven plate 8
- Remove friction plate 9
- Remove the clutch driven plate 8
- Remove friction plate 10 (A)
- Remove magnetic washer 11
- Remove washer 12
- Remove clutch nut 13
- Remove the waveform washer 14
- Remove washer 15 (22X35.2X2.5)
- Remove the clutch center sleeve 16
- Remove washer 17 (25X60X2)
- Remove the clutch housing assembly 18
- Removing needle roller bearings 19
- Remove clutch liner 20



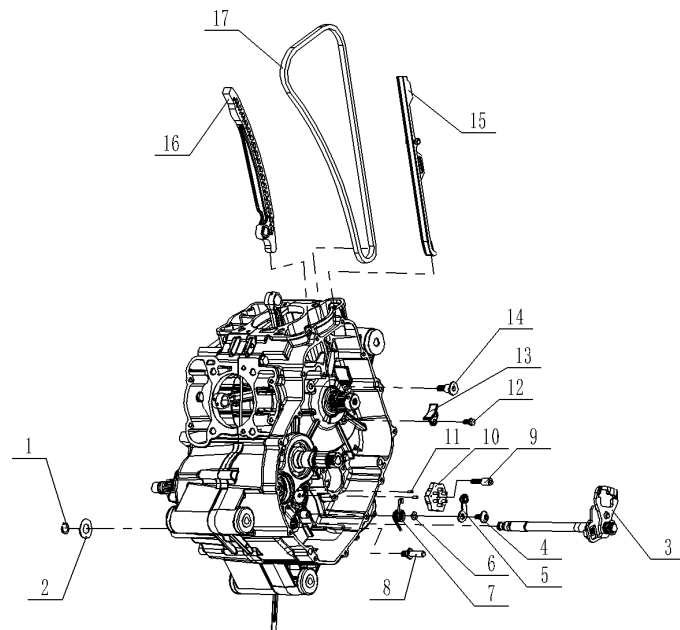
## 11.18 Clutch driving gear, oil pump

- Remove bolt 1 (M10X1.25LHX25)
- Remove washer 2 (10.2X37X2.5)
- Remove the water pump drive gear 3
- Remove washer 4 (24.2X55.1X1.5)
- Remove clutch drive gear components 6, 7, and 8
- Remove needle roller 5 (4X8)
- Remove the shaft retaining ring 10
- Remove washer 11 (10X20X1)
- Remove the oil pump idler gear components 12 and 13
- Remove the shaft retaining ring 14 (size 10)
- Remove washer 15 (10X20X1)
- Remove the oil pump driven gear 16
- Remove bolt 17 (M5X16)
- Remove oil pump shaft 18
- Remove needle 19 (4X15.8)
- Remove washer 20 (10X20X1)
- Remove the oil pump cover 21
- Remove the rotor 22 inside the oil pump
- Remove the outer rotor of the oil pump 23
- Remove needle 24 (4X15.8)



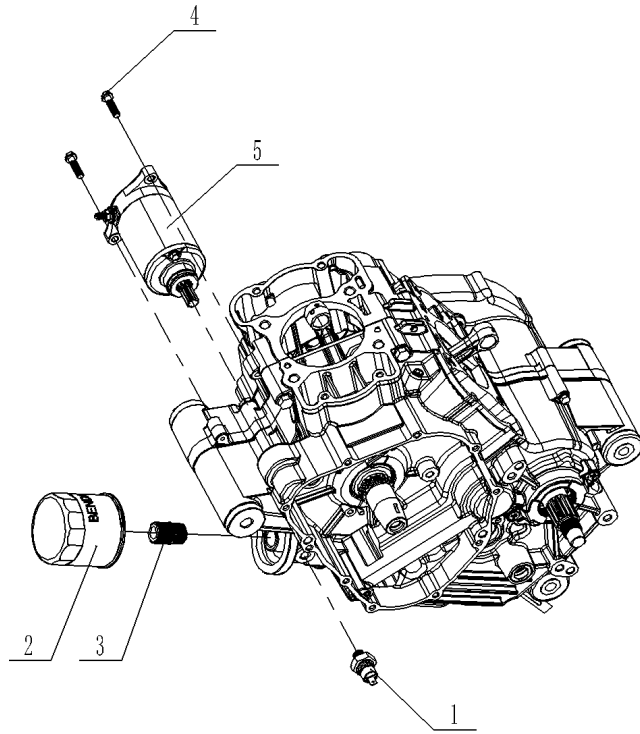
## 11.19 Shift combination, chain, Tensioning plate

- Remove the shaft retaining ring 1 (specification 14)
- Remove gasket 2 (29X14.2X0.8)
- Remove gear lever assembly 3
- Remove step bolt 4
- Remove the variable speed drum positioning wheel 5
- Remove washer 6 (6X12X1)
- Remove the positioning wheel torsion spring 7
- Remove the shift spring return pin 8
- Remove the five star wheel bolt 9
- Remove the Five Star Wheel 10
- Remove needle 11
- Remove bolt 12 (M6X12)
- Remove chain guard 13
- Remove the tightening plate screw 14
- Remove guide chain plate 15 (A)
- Remove the tensioning plate 16
- Remove Chain 17



## 11.20 Starting motor oil filter

- Remove oil pressure sensor 1
- Remove oil filter element 2
- Remove the oil filter element connector 3
- Remove bolt 4 (M6X25)
- Remove the start motor 5

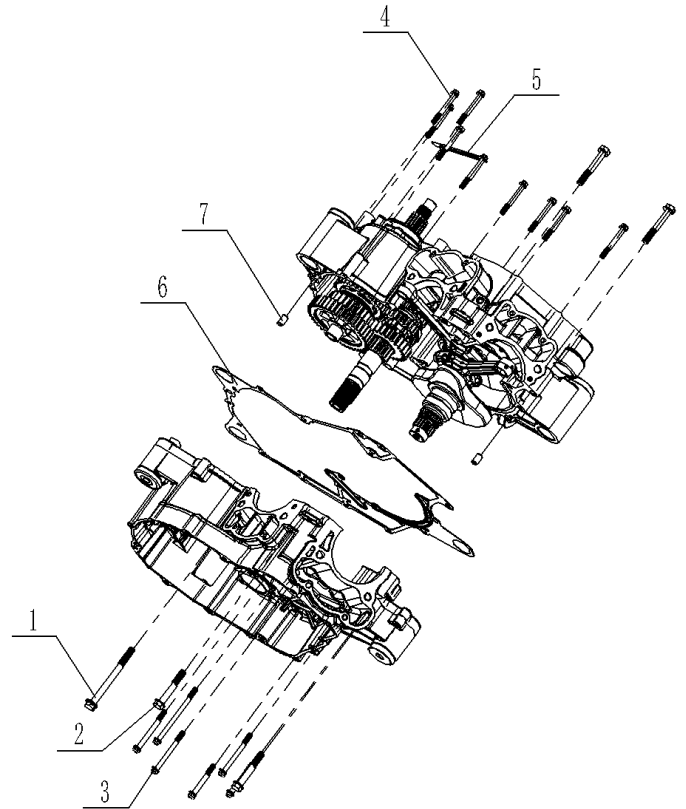


## 11.21 Binning

- Remove bolt 1
- Remove bolt 2
- Remove bolt 3
- Remove bolt 4
- Remove clamp 5
- Remove the right box body
- Remove the box paper pad 6
- Remove locating pin 7

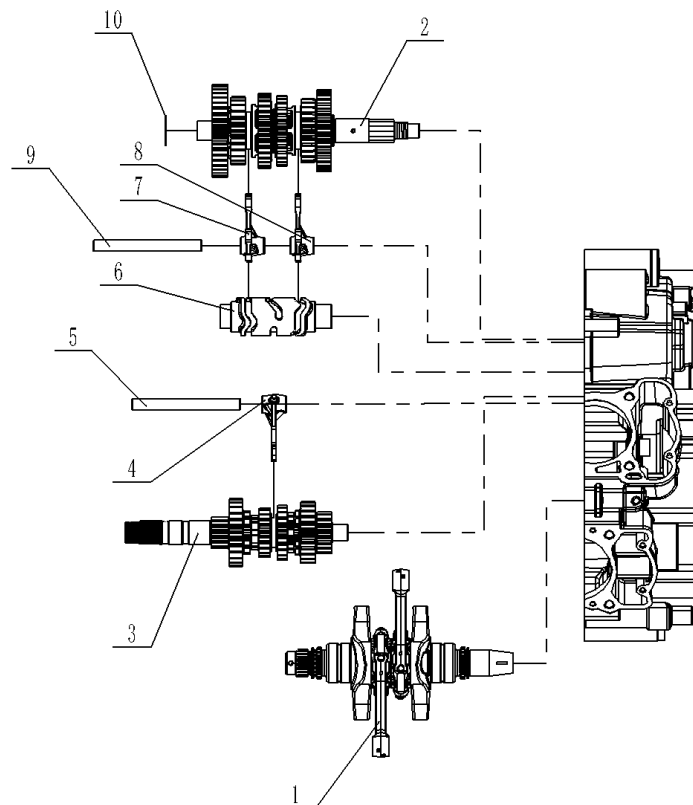
### 11.22 Right box disassembly

- Remove Countersunk screw 1
- Remove Bearing pressure plate 2
- Remove Bearing 3 (6305)
- Remove Bearing 4 (6204)
- Remove bolts 5 (M6X20)
- Remove the oil suction tray cover 6
- Remove O-ring 7
- Remove the coarse oil filter screen 8
- Remove screw plug 9



### 11.23 Crankshaft, Primary and secondary shaft

- Remove the crankshaft assembly 1
- Remove the shift fork shaft 5 ( II )
- Remove the gear shift fork 4 ( II )
- Remove the shift fork shaft 9 ( I )
- Remove the gear shift fork 7 ( II )
- Remove secondary axis combination 2
- Remove Spindle combination 3

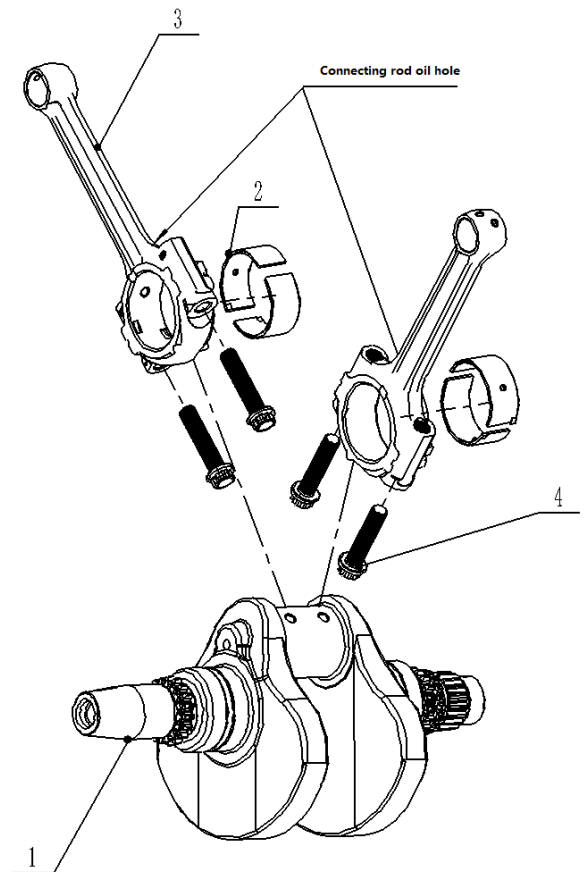


### 11.24 Crankshaft disassembly

- Remove the connecting rod bolt 4
- Remove the connecting rod cap
- Remove connecting rod bearing 2

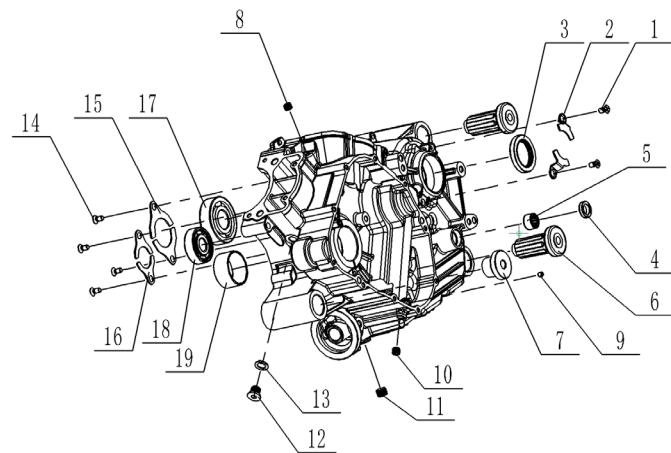
#### Attention

Paired placement of connecting rod body and connecting rod cap



### 11.25 Left box assembly

- Remove the countersunk screw 1
- Remove bearing baffle 2
- Remove the oil seal 3 (35X50)
- Remove the oil seal 4 (14X22X5)
- Remove the needle roller bearing 5
- Remove the shock absorber sleeve 6
- Remove the suspension hole cylinder liner 7
- Remove the screw plug 8
- Remove the hexagonal flat end set screw 9 (M6X8)
- Remove bolt plug 10 (Rc1/8)
- Remove bolt plug 11 (Rc1/4)
- Remove bolt plug 12 (M12)
- Remove the aluminum washer 13
- Remove the countersunk screw 14
- Remove the bearing pressure plate 15(B)
- Remove the bearing pressure plate 16(A)
- Remove bearings 17(6305)
- Remove bearings 18(6303)
- Remove the upper and lower main bearing shells 19



✕Cleaning inspection: Clean the components with cleaning agent and check if there are any  
No defects affecting use, if replaced

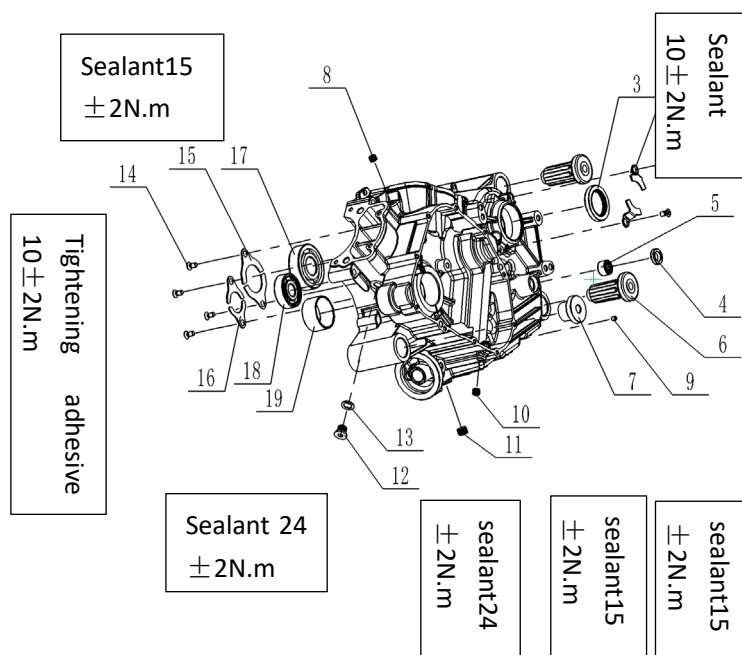
※Cleaning inspection: Clean the components with cleaning agent and check if there are any No defects affecting use, if replaced.

### 12.1 Left box assembly

※Inspection: Whether each oil passage is cleaned thoroughly, whether there is any damage to the joint surface, and whether there are any defects in the appearance. If there are any, they need to be treated and replaced

Assemble the bearing shells and select the main bearing shells according to the grouping identification of the crankshaft holes in the right table. The distance between the bearing shell end face and the crankshaft hole end face is 1.5mm

- Assembling bearings18 (6303)
- Assembling bearings17(6305)
- Assembly of bearing pressure plate 16 (A)
- Assembly of bearing pressure plate 15 (B)
- Assembling countersunk screws 14
- Assembling aluminum washers 13
- Assembly screw plug 12 (M12)
- Assembly screw plug 11 (Rc1/4)
- Assembly screw plug 10 (Rc1/8)
- Assembly of hexagonal flat end set screws 9(M6X8)
- Assembly screw plug 8 (Rc1/8)
- Assembling suspension hole cylinder liner 7
- Assembling shock absorber sleeves 6
- Assembling needle roller bearings 5
- Assembling oil seals 4(14X22X5)Outer circle application Sealant
- Assemble oil seal3 (35X50)
- Assemble bearing baffle2
- Assemble countersunk screws1

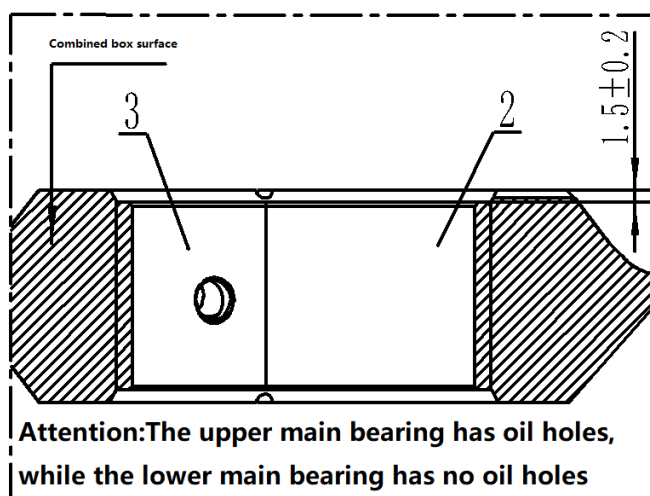


Main bearing selection table

Group of crankshaft holes	Tile axis group
A	Black $(2^{+0.019}_{+0.014})$
B	Green $(2^{+0.024}_{+0.019})$

**Attention**

As shown in the diagram on the right, align the oil hole of the upper main bearing with the oil hole of the box.



## 12.2 Crankshaft assembly

Main Separation	Connecting rod journal diameter $\phi 36_{-0.015}^0$	bore diameter of connecting rod body: $\phi 39_{+0.012}^0$	CONNECTING ROD BEARING
	Group size/markings	Group size/markings	Mark
	$\phi 36_{-0.015}^{-0.01}$ (A)	$\phi 39_{+0.006}^{+0.006}$ (1)	Green
	$\phi 36_{-0.015}^{-0.01}$ (A)	$\phi 39_{+0.012}^{+0.012}$ (2)	Brown
	$\phi 36_{-0.01}^{-0.005}$ (B)	$\phi 39_{+0.006}^{+0.006}$ (1)	Yellow
	$\phi 36_{-0.01}^{-0.005}$ (B)	$\phi 39_{+0.012}^{+0.012}$ (2)	Green
	$\phi 36_{-0.005}^0$ (C)	$\phi 39_{+0.012}^{+0.012}$ (2)	Yellow

✂Inspection: The connecting rod and crankshaft are in good condition, and if necessary, they should be replaced

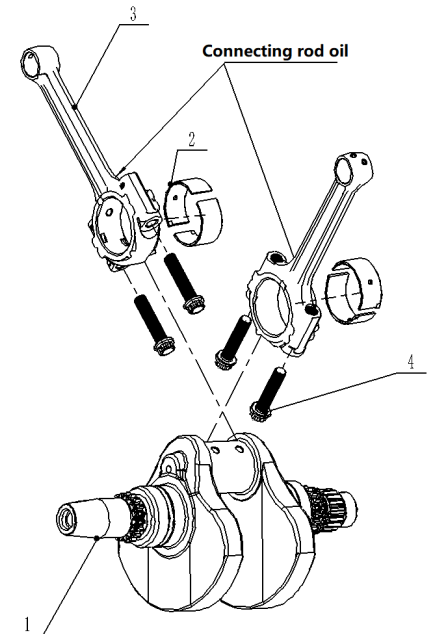
·Remove the connecting rod bolts

·Remove the connecting rod cap and use an air gun to blow off impurities from the connecting rod body and the expanded section of the connecting rod cap

·Assembling connecting rod bearings, optional connecting rod bearings

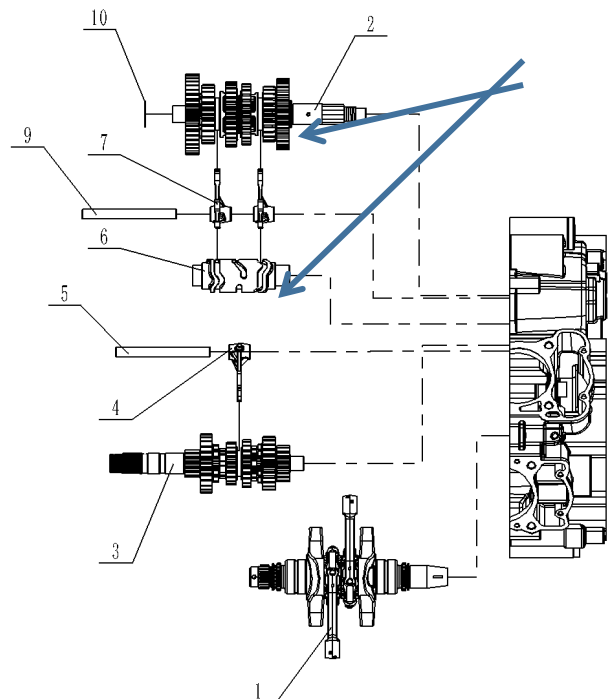
·Assembling connecting rod cap

·Assembling connecting-rod bolt 4



### Attention

- 1 Paired placement of connecting rod body and connecting rod cap
- 2 As shown in the diagram on the right, align the oil hole of the upper main bearing with the oil hole of the box body
- 3 The direction of the connecting rod oil hole is shown in the diagram



## 12.3 Crankshaft, main and auxiliary shafts

- Assembling spindle assembly 3
- Assembly of secondary shaft assembly 2
- Assembly of gear shift fork 7 (I)
- Remove the gear shift fork shaft 9 (I)
- Assembly of shift fork 4 (II)
- Assembly of shift fork shaft 5 (II)
- Assemble crankshaft assembly 1

### Attention

1. The direction of the shift fork 4 (II) and shift fork 7 (I) markings is shown in the diagram
2. Shift fork shaft (I) 5 with hole facing outward
3. The fork is inserted into the main and auxiliary shaft shift sleeves
4. After assembly, check that the main and auxiliary shafts rotate flexibly

## Right box assembly

## Engine disassembly

### 12.4 Right box assembly

※Inspection: Whether each oil passage is cleaned thoroughly, whether there is any damage to the joint surface, and whether there are any defects in the appearance. If there are any, they need to be treated and replaced.

·The assembly of the bearing shell is the same as that of the left box body

·Assemble screw plug 9 (Rc1/8)

·Assembling the crude oil filter screen 8

·Assemble 7

·Assemble the oil suction tray cover 6

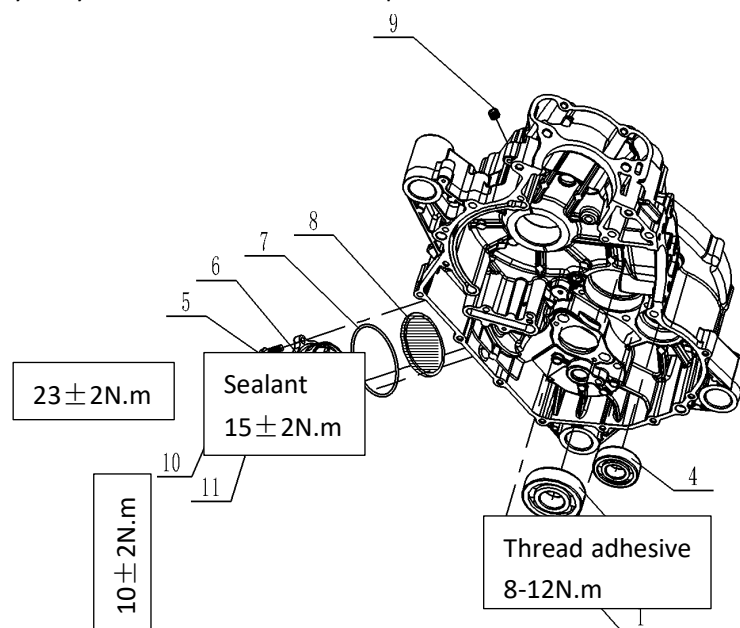
·Mounting bolt 5 (M6X20)

·Assemble 4 (6204)

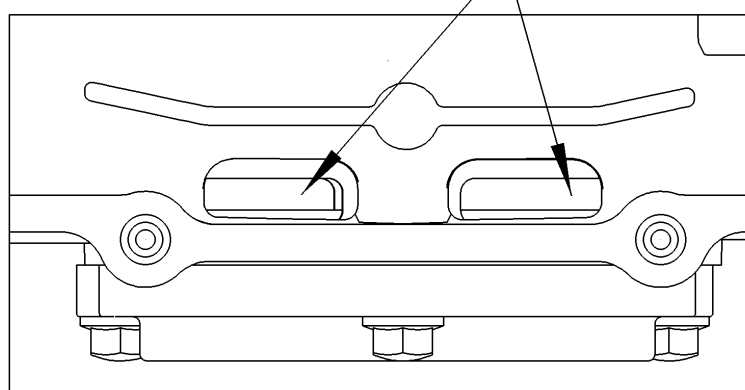
·Assemble bearing 3 (6305)

·Assemble bearing pressure plate 2

·Assembling countersunk screws 1



Installation of oil suction cup hole position

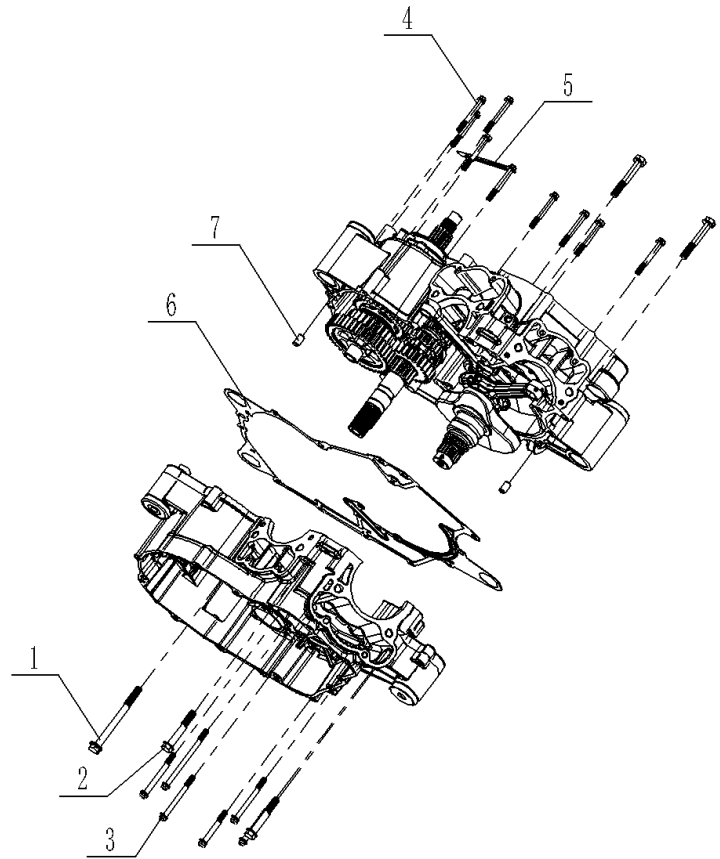


### Attention

- 1、Align the 6 slot holes of the oil suction cup with the box holes, as shown in the right figure

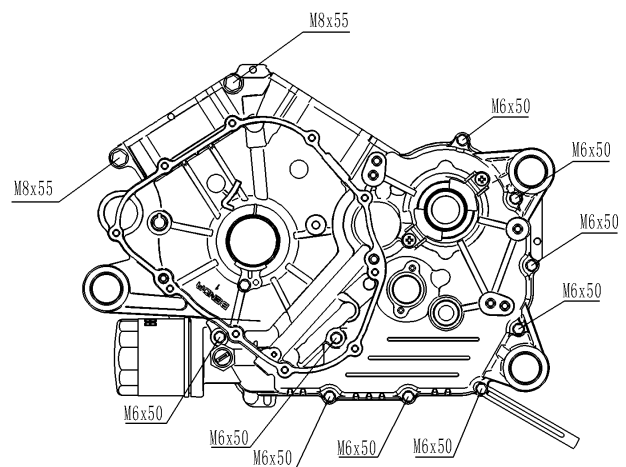
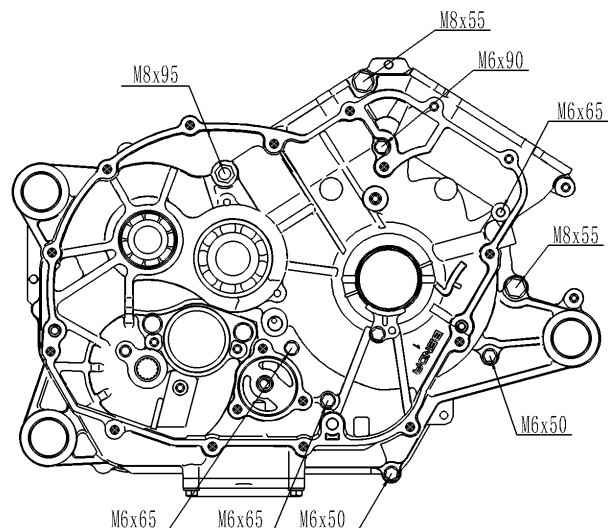
### 12.5 Mould assembling

- Assemble locating pin 7
- Assembling box paper pad6
- Assemble right box
- Assembly line clamp 5
- Assemble bolt 4
- Assembly bolt 3
- Assembly bolt 2
- Assembly bolt 1



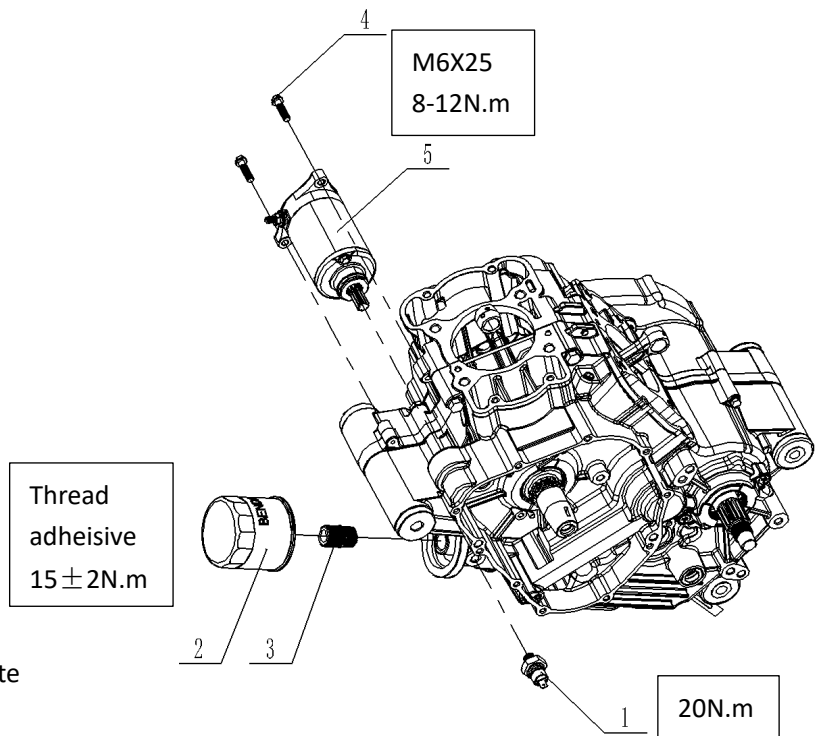
#### Attention

- 1 Bolt tightening sequence: Tighten diagonally
- 2 M6 Bolt tightening torque:  $10 \pm 2 \text{ N.m}$
- 3 M8 Bolt tightening torque:  $25 \pm 2 \text{ N.m}$



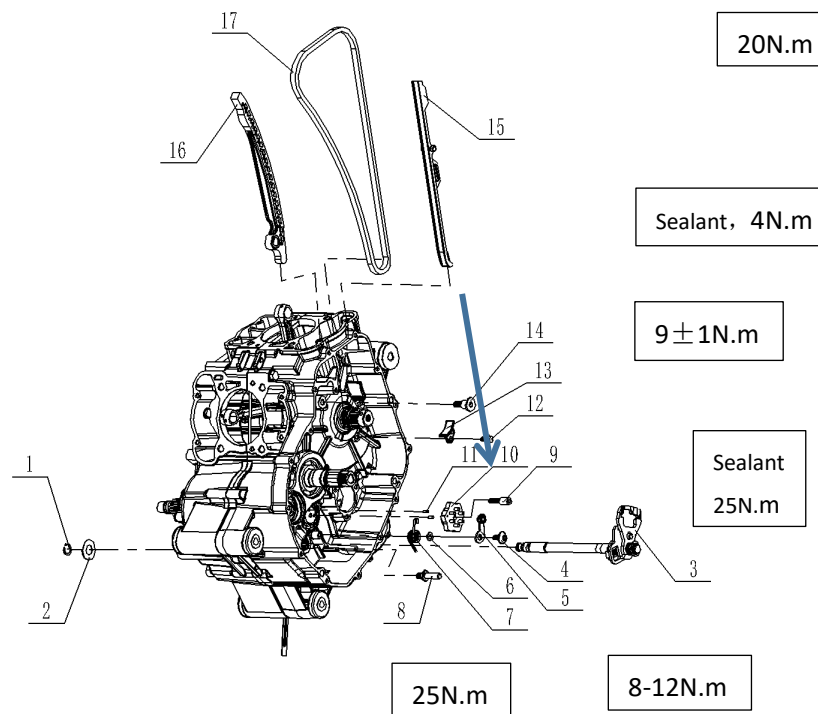
### 12.6 Starter motor, Oil filter

- Assemble starter motor 5
- Assemble bolts 4 (M6X25)
- Assemble oil filter connector 3
- Assemble oil filter element 2
- Assembling oil pressure sensor 1



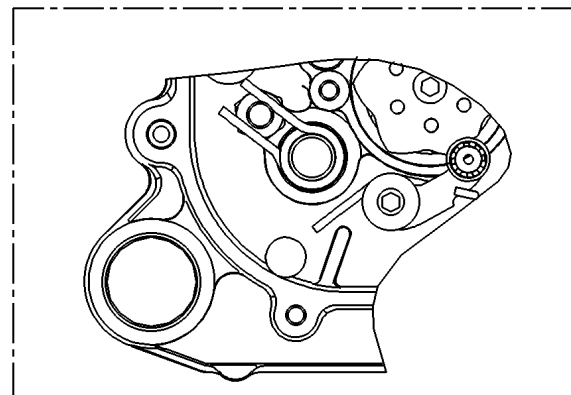
### 12.7 Shift combination chain tensioning plate

- Assemble chain 17
- Assemble tensioning plate 16
- Assemble guide chain plate 15(A)
- Assemble tightening plate screws 14
- Assemble Chain guard card 13
- Assemble bolt 12(M6X12)
- Assemble Roller pin 11
- Assemble Five star wheel 10
- Assemble five star wheel bolt 9
- Assemble shift spring return pin 8
- Assemble Positioning wheel torsion spring 7
- Assemble washer 6(6X12X1)
- Assemble Variable speed drum positioning wheel 5
- Assemble Step bolt 4
- Assemble Shift lever assembly 3
- Assemble washer 2(29X14.2X0.8)
- Assemble shaft ring 1(specification 14)



### ATTENTION

The position of the gear change spring is shown in the schematic diagram on the right



## 12.8 Clutch driving gear, oil pump

·Assembling the outer rotor of the oil pump 23

·Assemble Internal rotor of oil pump 22

·Assemble Oil pump cover 21

·Assemble oil pump shaft 18

·Assemble roller pin 24 (4X15.8)

·Assemble washer 20(10X20X1)

·Assemble roller pin 19 (4X15.8)

·Assemble bolt 17 (M5X16)

·Assembling the driven gear of the oil pump 16

·Assemble washer 15 (10X20X1)

·Assemble shaft retaining ring 14 (Specification10)

·Assemble Oil pump idle gear assembly 12,13

·Assemble washer 11 (10X20X1)

·Assemble shaft retaining ring 10

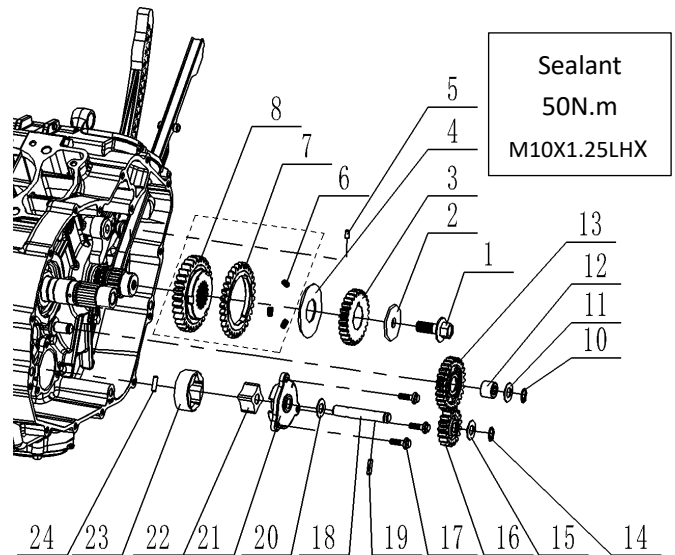
·Assembling needle rollers 5 (4X8)

·Assemble Clutch driving gear assembly 6,7,8

·Assemble washer 4 (24.2X55.1X1.5)

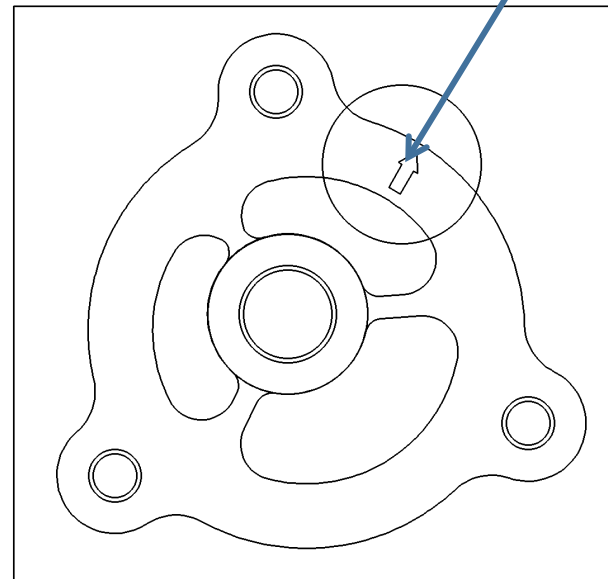
·Assemble Water pump driving gear 3

·Assemble washer 2 (10.2X37X2.5)



8N.m

Arrow markings facing upwards

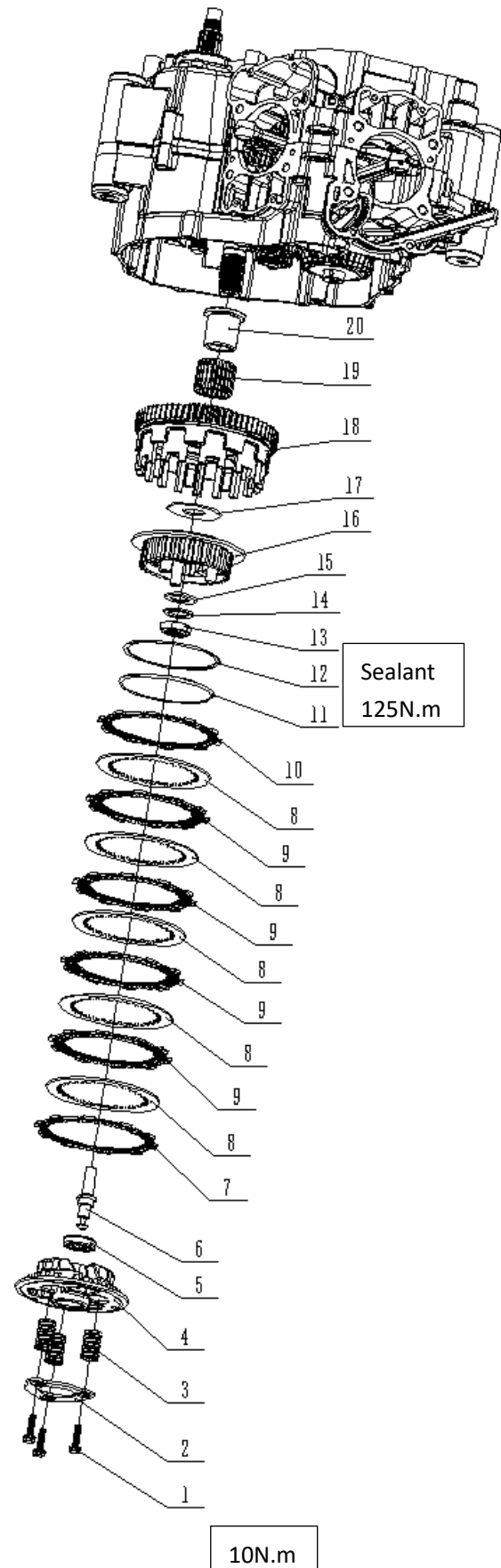


### Attention

The assembly direction of oil pump cover 21 is shown in the diagram on the right

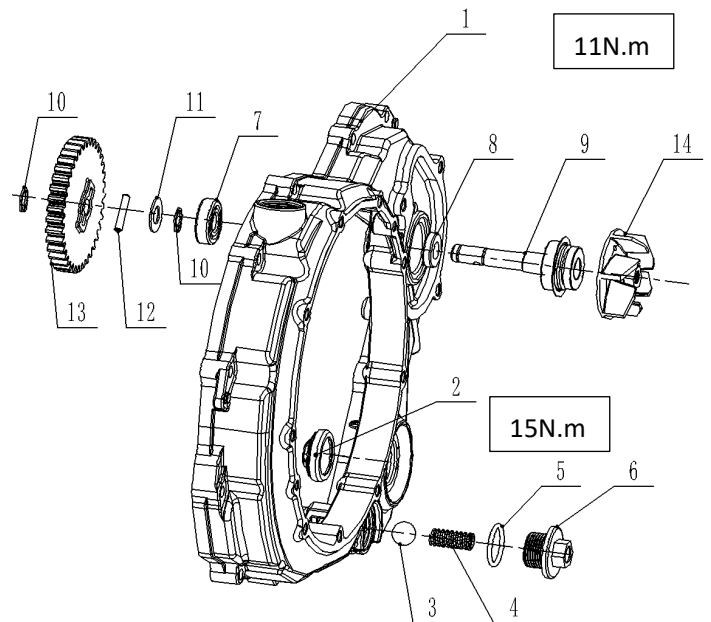
## 12.9 Clutch

- Assemble clutch liner 20
- Assemble needle roller bearings19
- Assemble Clutch cover assembly18
- Assemble washer17 (25X60X2)
- Assemble Clutch center sleeve16
- Assemble washer 15 (22X35.2X2.5)
- Assemble wave washer 14
- Assemble Clutch nut13
- Assemble washer12
- Assemble Magnetic washer 11
- Assemble Friction pad 10 (A)
- Assemble Clutch driven plate 8
- Assemble friction pad 9
- Clutch driven plate 8
- Assemble friction plate9
- Assemble clutch driven plate8
- Assemble friction plate 9
- Assemble clutch driven plate 8
- Assemble friction plate 9 (B)
- Assemble clutch driven plate 8
- Assemble friction plate 7 (C)
- Assemble Clutch release lever6
- Assemble bearing 5 (6003)
- Assemble Clutch cover4
- Assemble Clutch pressure plate spring 3
- Assemble Clutch spring pressure plate2
- Assemble Clutch combination bolt1



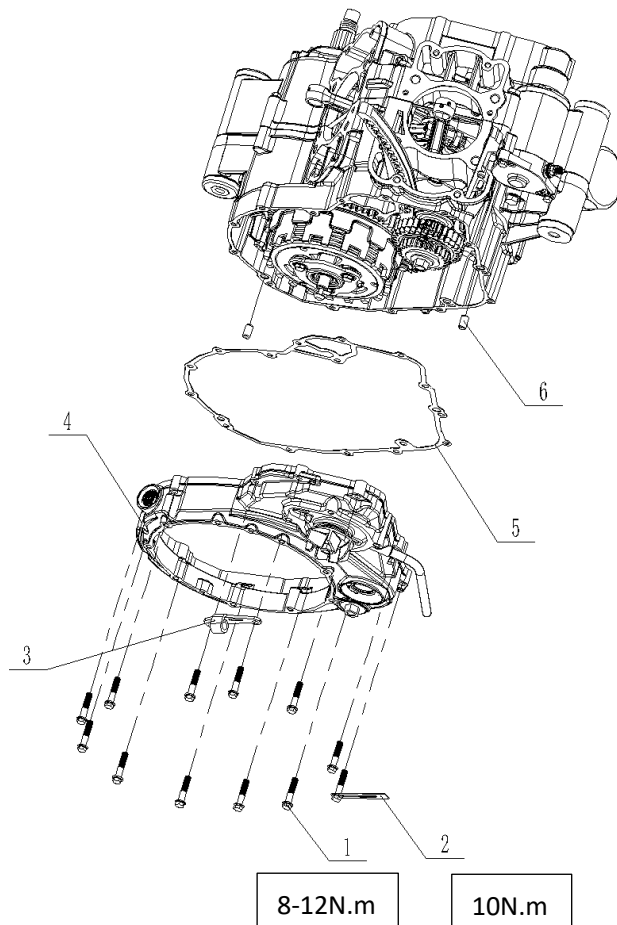
## 12.10 Right side cover assembly

- Assemble oil seal 8,
- Apply the outer circle surface before assembly
- Cylinder fixing adhesive
- Assemble Pump shaft water seal combination9
- Assemble bearing 7 (6000)
- Assemble shaft ring 10
- Assemble washer 11
- Assemble roller pin 12
- Assemble driven gear of water pump13
- Assemble shaft ring 10
- Assemble water pumpimpeller14
- Assemble steel ball 3
- Assemble Pressure relief valve spring4
- Assemble O-ring 5 (20X2.5)
- Assemble Pressure relief valve screw plug 6
- Assemble Oil level observation mirror 2



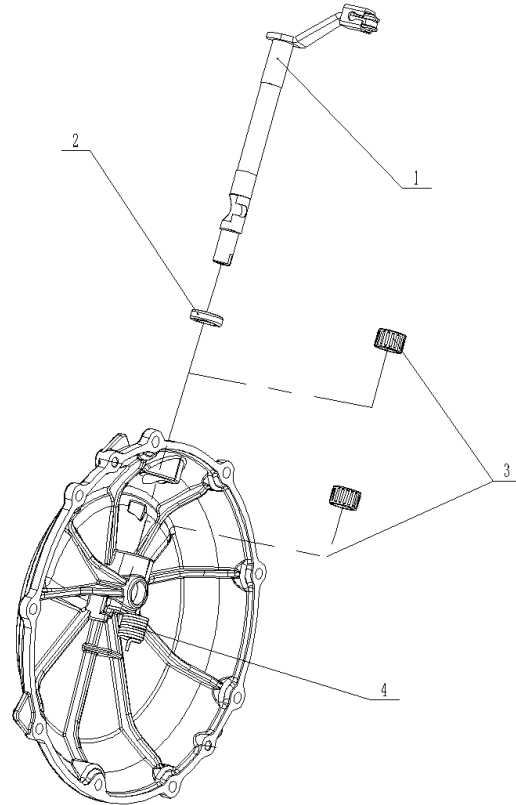
## 12.11 Right side cover

- Assemble locating pin 6
- Assemble right cover paper pad 5
- Assemble right side cover 4
- Assemble clutch lock mounting bracket 3
- Assemble clamp 2
- Assemble bolt 1 (M6X30)



### 12.12 Assembly of clutch cover

- Assemble roller pin bearing3
- Assemble oil seal 2,Flush with the end face
- Assemble clutch lever 1
- Assemble clutch lever torsion spring 4



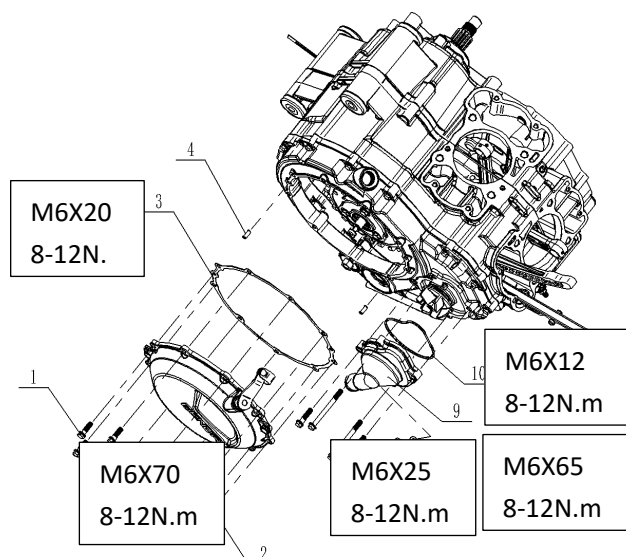
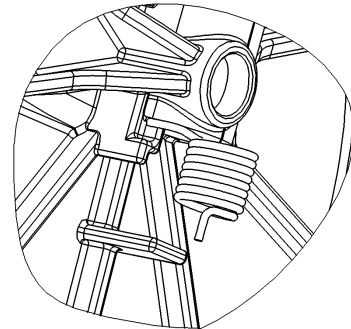
#### Attention

**First, place part 1 onto part 4, adjust the position, and then tighten the rotation angle. The majority of the gap in part 1 is facing the clutch**

**Location as shown in the diagram**

### 12.13 Clutch cover,water pump cover

- Assemble Sealing ring for water pump cover 10
- Assemble water pump cover 9
- Assemble bolt 8 ( M6X25 )
- Assemble bolt 7 ( M6X70 )
- Assemble aluminum washer 6
- Assemble bolt 5 ( M6X12 )
- Assemble cylindrical pin 4
- Assemble clutch Cover paper pad3
- Assemble clutch cover
- Assemble bolt 2 ( M6X70 )
- Assemble bolt 1 ( M6X20 )



## 12.14 Piston assembly

- Assemble combination oil ring 3
- Assemble the second piston ring 2
- Assemble the first piston ring 1

### Attention

- 1、 The first ring 1 and the second ring 2 have the logo facing upwards
- 2、 The gaps of each piston ring are offset by 120°from each other

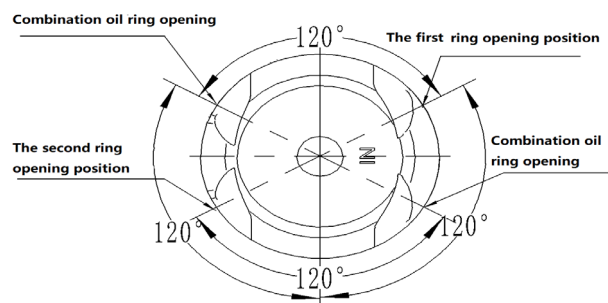
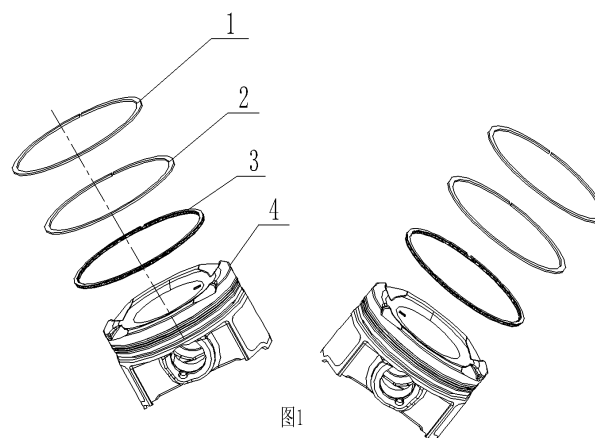


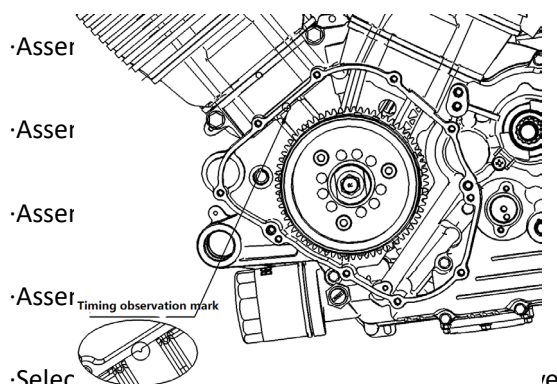
Fig 2

## 12.15 Cylinder block, piston

Piston diameter $\phi 67_{-0.045}^{-0.030}$	cylinder diameter $\phi 67_{-0.010}^{+0.005}$
Group size/Mark	Group size/ Mark
$\phi 67_{-0.035}^{-0.030}$ (A)	$\phi 67_0^{+0.005}$ Red
$\phi 67_{-0.040}^{-0.0351}$ (B)	$\phi 67_{-0.005}^0$ Yellow
$\phi 67_{-0.045}^{-0.0401}$ (C)	$\phi 67_{-0.010}^{-0.005}$ Blue



- Assemble cylindrical pin 8

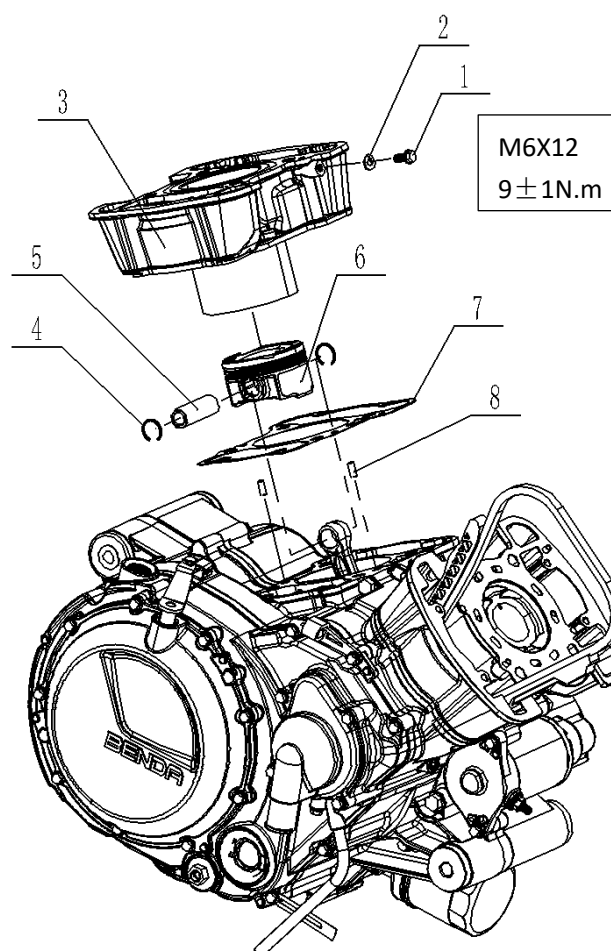


- Assemble aluminium washer 2

- Assemble bolt 1 (M6X12)

### Attention

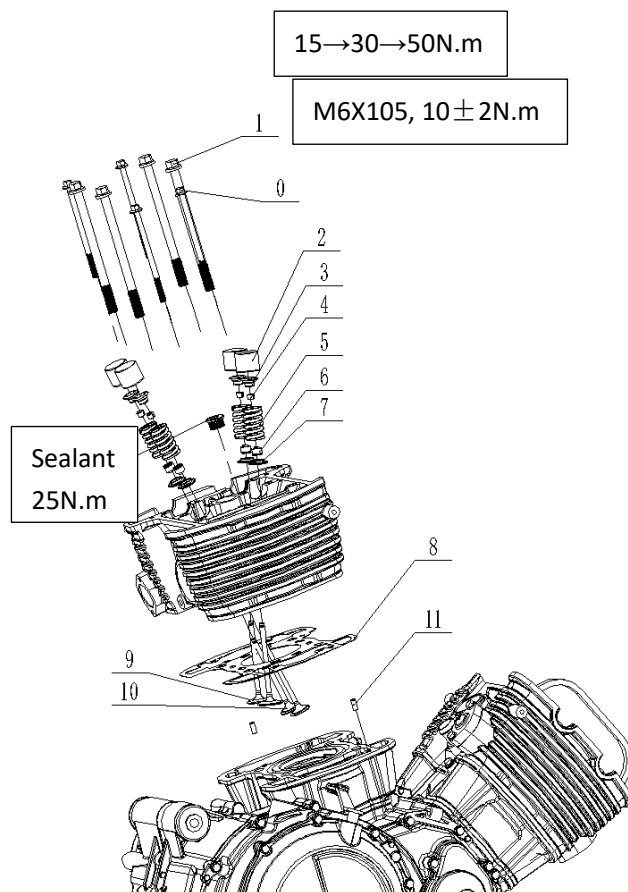
- 1 The circular dot markings on the top surface of the front and rear cylinder pistons face the intake side
- 2 The joint surface of the casing cylinder head needs to be coated with sealant



### plate

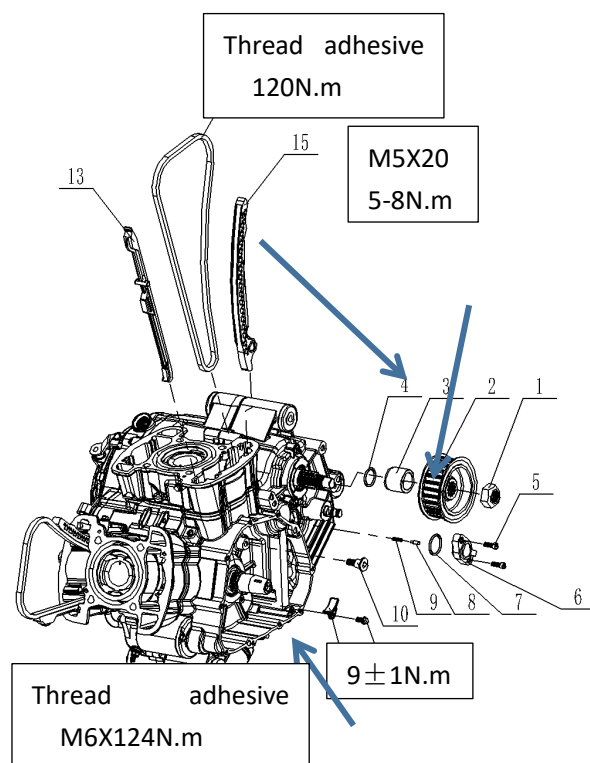
#### 12.16 Cylinder cover

- Assemble screw plug12 ( M16 )
- Assemble cylindrical pin11
- Assemble intake valve 10
- Assemble exhaust valve 9
- Assemble Cylinder head gasket8
- Assemble lower seat of valve spring7
- Assemble valve oil seal 6
- Assemble valve spring 5
- Assemble Valve collet4
- Assemble Valve Spring Upper Seat3
- Assemble valve lifters2
- Assemble bolt 0 ( M6X105 )
- Assemble Cylinder Head Bolt 1



#### 12.17 Gear display,small pulley,chain guard card,chain,tensioning Plate

- Assemble chain guard card 12
- Assemble bolt 11 ( M6X12 )
- Assemble Tensioning plate bolts 10
- Assemble Gear display contact spring 9
- Gear display contact spring 8
- Assemble O- ring7
- Assemble gear display 6
- Assemble Hexagon socket bolt 5
- Assemble O-ring 4
- Assemble bushing 3
- Assemble small pulley 2
- Assemble small pulley nut 1

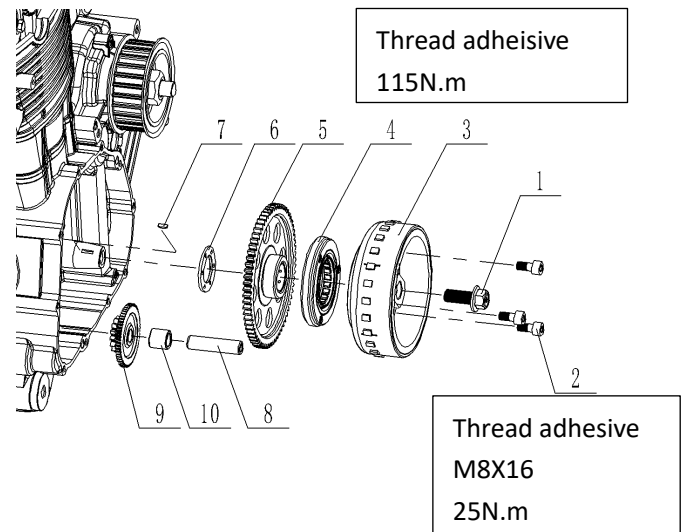


## Magneto, double gear; Adjusting valve clearance, camshaft, timing sprocket

Engine assembly

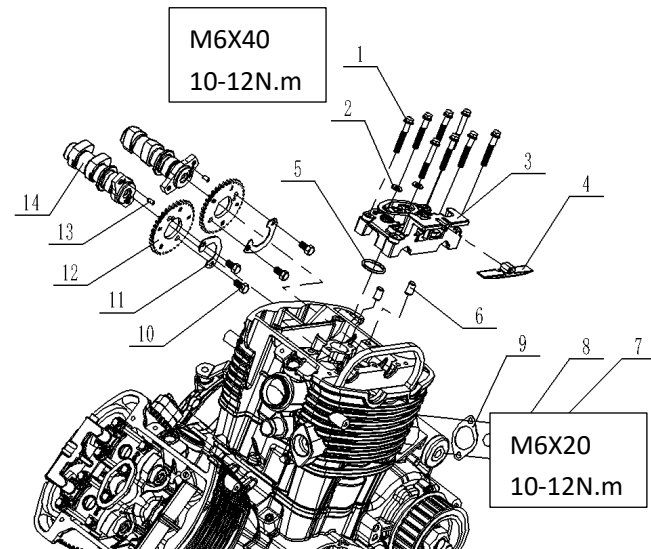
### 12.18 Magneto, double gear

- Assemble starting double 10
- Assemble the starting dual gear 9
- Assemble the starter dual gear shaft 8
- Assemble Semicircle key 7
- Assemble washer 6 (27X45X2.5)
- Assemble the starting driven gear 5
- Assemble overrun clutch 4
- Assemble Magneto rotor 3
- Assemble hexagon socket head screws 2 (M8X16)
- Assemble bolt 1 (M12X1.25X30)



### 12.19 Adjust valve clearance, camshaft, timing sprocket

- Assemble roller pin 13
- Assemble timing sprocket 12
- Assemble timing sprocket pressure plate 11
- Assemble bolt 10
- The scale lines on the rotating magneto rotor (Mark R)  
Align with the timing observation hole (as shown in the figure )



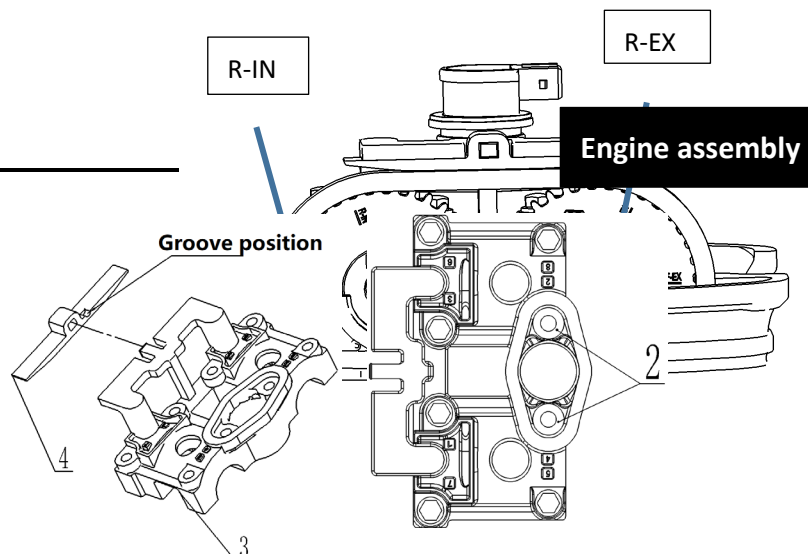
- Assemble the intake and exhaust sprocket assembly, timing sprocket marking line is flush with the edge of the cylinder head, as shown in the right figure



M6X20  
10-12N.m

- Assemble Tensioner gasket 9

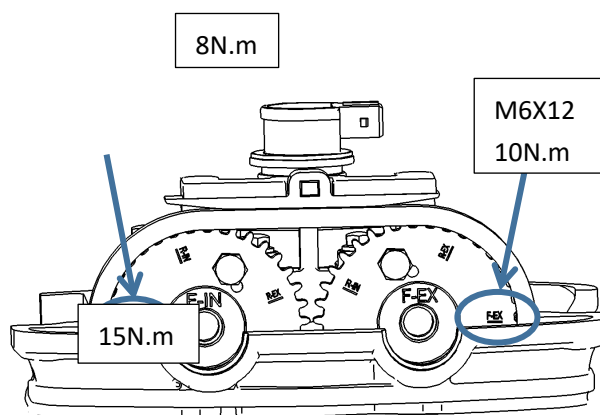
- Assemble tensioner 8
- Assemble bolt 7
- Assemble locating pin 6
- Assemble O-ring 5
- Assemble chain guide plate 4
- Assemble Camshaft mounting seat 3
- Assemble aluminum washer 2
- Assemble bolt 1 (M6X40)



·Insert a feeler gauge into the intake valve clearance record data. The intake valve clearance requirement is  $0.1 \pm 0.02\text{mm}$ . If it is not qualified, replace it

### Attention

**Before adjusting and adjusting the front cylinder timing, rotate the magnetic motor counterclockwise ( $360^\circ + 60^\circ$ ) until the mark on the scale is aligned with the timing observation hole mark.**

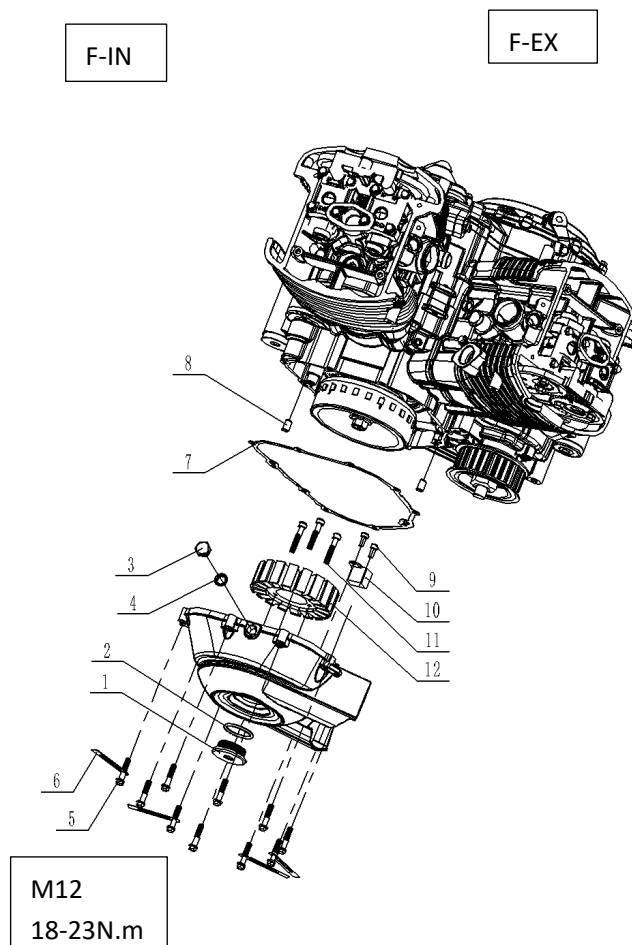


### 12.20 Left side cover

- Assemble magneto stator 12
- Assemble hexagon socket head screws 11 (M6X35)
- Assemble trigger 10
- Assemble bolt 9 (M5X12)
- Assemble locating pin 8
- Assemble the left cover paper pad 7
- Assemble the left cover
- Assemble line clamp 6
- Assemble bolt 5 (M6X30)
- Assemble the top dead center plug sealing gasket 4
- Assemble screw plug 3
- Assemble O-ring 2 (33X3)
- Assemble of crankshaft hole plug 1

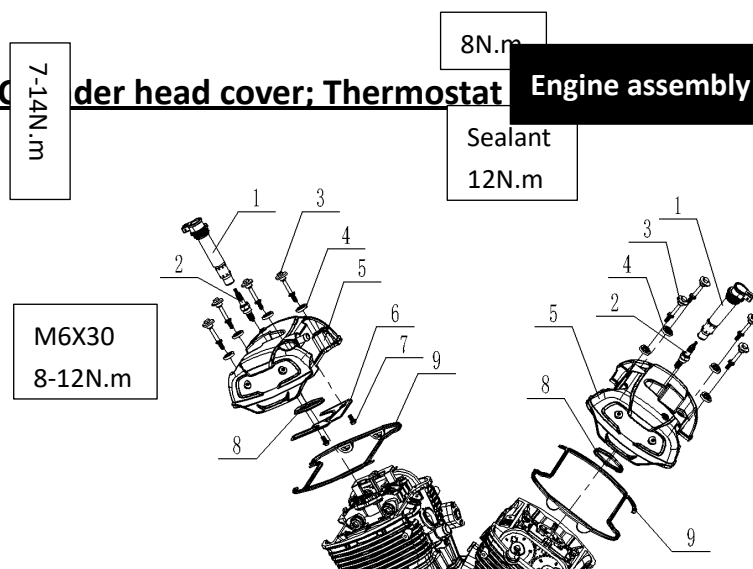
### Attention

- 1 The fixing plate of part 12 wire harness is stuck in the left cover slot**
- 2 Apply sealant to the rubber block of the left cover**
- 3 Piece 4 with the circular surface facing downwards**



### 12.21 Cylinder head cover

- Assemble spark plug 2
- Assemble the cylinder head cover sealing ring 9
- Assemble rectangular sealing oil 8
- Assemble Ventilation chamber baffle 6
- Assemble bolt 7 (M6X12)
- Assemble front cylinder cover 5



- Assemble rubber gasket 4
- Assemble step bolt 3
- Assemble ignition coil 1

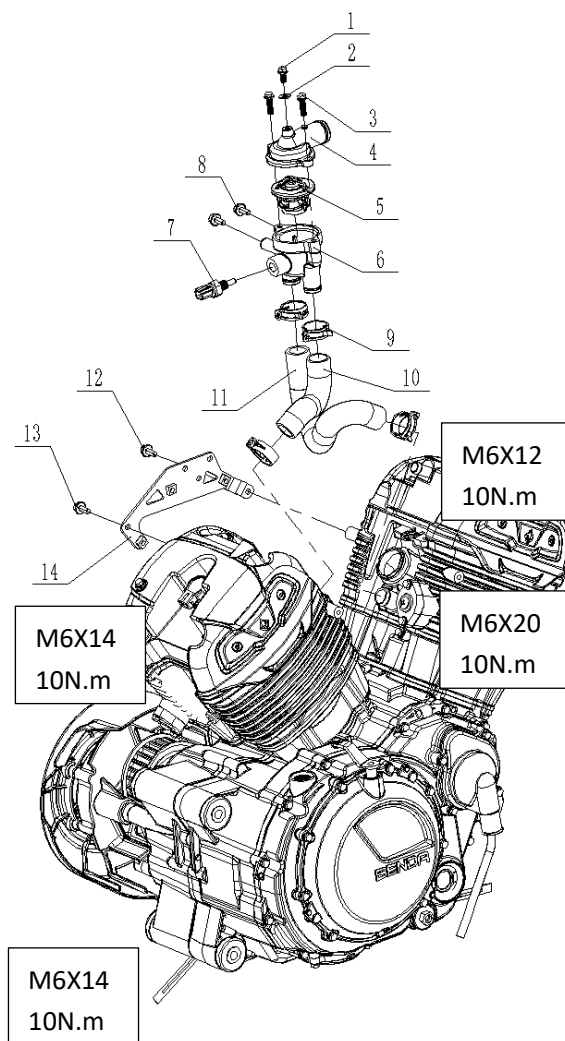
M6X18  
8-12N.m

### Attention

**1 Place a small amount of steel wire balls in the cavity between the ventilation chamber baffle and the cylinder head cover ventilation pipe**  
**2 piece 2 with four raised faces facing downwards**

## 12.22 Thermostat

- Assemble of thermostat mounting bracket 14
- Assemble bolts 12 and 13 (M6X14)
- Assemble cylinder outlet pipe 11
- Assemble the front cylinder outlet pipe 10
- Assemble of thermostat housing 6
- Assemble the wide edge clamp 9 (26)
- Assemble bolt 8 (M6X14)
- Assemble water temperature sensor 7
- Assemble thermostat 5
- Assemble of thermostat cover 4
- Assemble bolt 3 (M6X20)
- Assemble aluminum washer 2
- Assemble bolt 1 (M6X12)

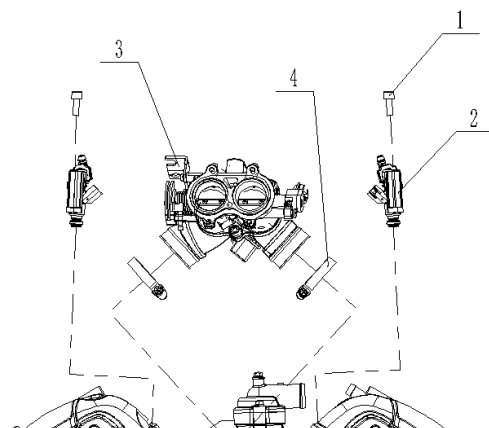


## Throttle valve body; Muffler adapter; Adding engine oil

## Engine assembly

## 12.23 Throttle body

- Assemble throttle valve body 3
- Assemble clamp 4
- Assemble fuel injector 2



·Assemble the hexagonal bolt 1 (M6X18)

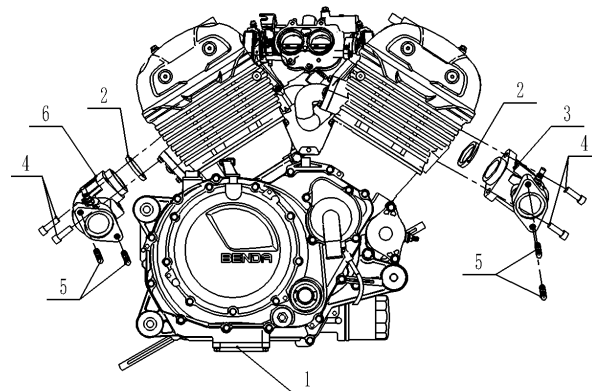
#### 12.24 Muffler adapter

·Assemble exhaust muffler gasket 2

·Assemble the rear cylinder muffler join 6

·Assemble the front cylinder muffler joint 3

·Assemble the hexagonal cylindrical head bolt 4 (M8X25)



#### 12.25 Adding engine oil

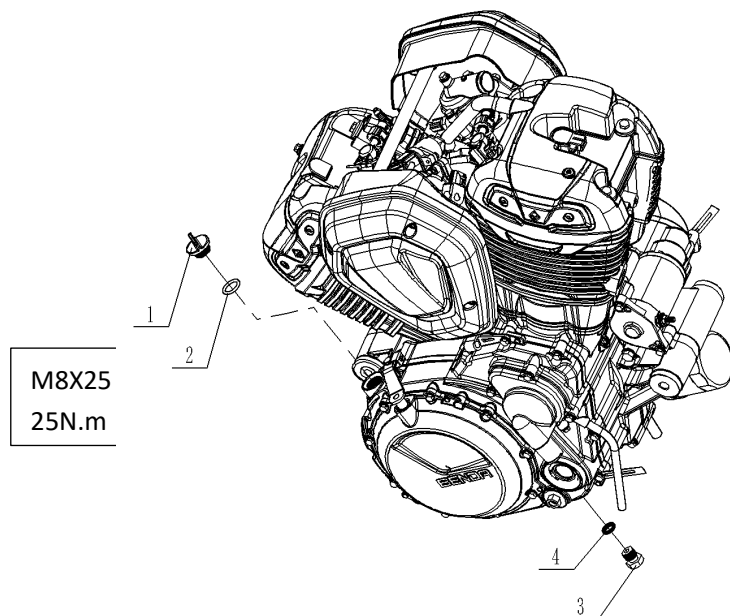
·Adding o-ring 2

·Assemble Oil filling hole plug1,Hand tightening

·Assemble oil drain bolt metal gasket 4

·Assemble oil drain bolt 3

·Add oil 10W-40 10W-40 ,3L



$23 \pm 2\text{N.m}$