

Dark Flag 500 Service Manual

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- 4) Grasp the clutch handle tightly, shift into neutral, and then come to a complete stop. After shifting into neutral, the neutral indicator light on the instrument panel lights up.
- 5) If you want to park on a gentle slope with a single support, you should shift to a lower gear and keep the front of the car uphill to avoid overturning. (Be sure to shift to neutral position when starting again)
- 6) Turn off the ignition lock; In emergency situations, the engine can be turned off by directly turning off the ignition switch.
- 7) Lock the steering mechanism and remove the key to prevent theft.

⚠ Danger:

1. The higher the vehicle speed, the longer the braking distance will be. Therefore, it is necessary to maintain a safe distance to prevent rear end collisions. (Frequent use of only the rear brake will accelerate the wear and tear of the braking system, and the braking distance will become longer.)
2. Using only the front or rear brakes can cause slipping and loss of control; Be cautious when using the braking system on slippery roads and when changing lanes; Emergency braking on uneven or smooth roads can cause the motorcycle to lose control.

VI、Maintenance and upkeep

6.1、Maintenance cycle table

Motorcycles should be regularly maintained according to the time and mileage specified in Table 4, and the vehicle must be cleaned before maintenance.

maintenance frequency Maintenance items	maintenance period	Odometer km (Note②)				
		1000km	4000km	8000km	12000km	Note
★Fuel tank and oil pipe		Damage and aging should be repaired or replaced in a timely manner				Before using
★Throttle		I	I	I	I	Before using
★Coolant		Change every 2 years				Check before using
Air filter element	Note ①	Every 40 hours of driving or 1000km/I; Every 80 hours of driving or 2000km/C; Every driving 20000km/R				
Spark plug		Every driving 2000km or 80hours/I; Every driving 6000km/R				
Engine lubricate oil		New vehicle replace once at 1000km, Replace when driving 2000km for the second time, Replace every 3000km after the third journey, and thereafter every Replace once after driving around 4000km				
Lubricating oil filter element		New vehicle Replace once at 1000km, replace after the second journey of 2000km, replace after the third journey of 3000km, and replace every 4000km thereafter				
Chain/Sprocket	Note ①	Perform I and L every 500km				
★Brake friction pad		Perform I and, if necessary, R every 1000km				
★★Brake oil		Replace every two years				
★★Front and rear	Note	I	I	I	I	Before using

brake systems	③					
★ Switch		I	I	I	I	Before using
★ Lights and speakers		I	I	I	I	Before using
★ Battery	Every month	I	I	I	I	
Fuses		I	I	I	I	
Connecting lines		I	I	I	I	
★★ Valve clearance	Note ③	Initially: 20 hours or 200km/l; Every 2000km or 80 hours/l				
★ Clutch		Every 2000km or 80 hours/l				Before using
★ Suspension system		I	I	I	I	
★ Tightening of nuts and bolts		I	I	I	I	Before using
★ Wheels		I	I	I	I	Before using
★★ Steering handle bearing (steering column thrust bearing)	Note ③	I	I	I	I	
★★ Engine maintenance	Note ③	I	I	I	I	

The symbol in the table above is: "I" for timely inspection, cleaning, adjustment, lubrication or replacement; "C" cleaning; "R" replacement; "L" lubrication.

No ★ items require your own maintenance, or you can go to the BENDA specialty store for maintenance.

A ★ project is maintained by personnel from a BENDA specialty store; If you have specialized tools, repair parts, or repair capabilities, you can also repair and maintain them yourself.

Two ★★ projects, for the sake of driving safety, can only be maintained by personnel from the BENDA specialty store.

Note ① indicates that when driving in dusty areas, the cleaning cycle should be shortened.

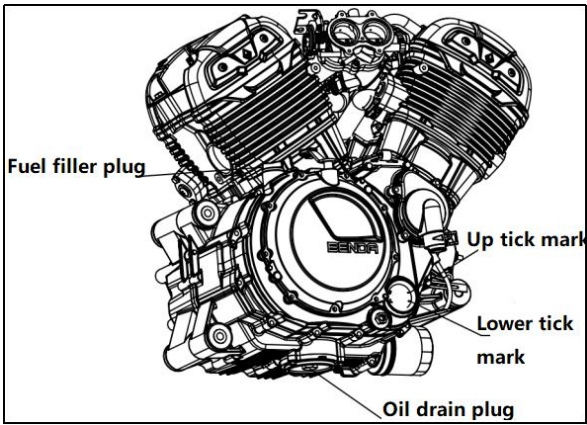
Note ② indicates that when the odometer reading exceeds the highest number in the table, the maintenance and repair cycle will still be repeated according to the mileage specified in the table.

Note ③ indicates that maintenance and adjustment can only be carried out by personnel from BENDA specialty stores.

6.2、Inspection, selection, and replacement of engine lubricating oil

The function of lubricating oil on the engine is to reduce friction, increase sealing, cool parts, clean parts, and prevent rust.

If the quality of lubricating oil is poor, the usage time is too long, or the lubricating oil quantity is insufficient, it will accelerate the wear of engine parts and reduce the service life of the engine; Even causing excessive engine temperature, clutch wear or burning, decreased power, abnormal noise, and burning of lubricating oil.



[Inspection] (Fig17)

Before each use, the lubricating oil level must be checked, and there is oil on the right crankcase cover window.

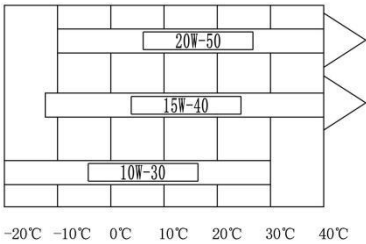
Start the engine and run it for 3 minutes, then wait for the engine to stop for 3 minutes. Park the motorcycle on a flat surface with the entire vehicle perpendicular to the ground. At this point, the oil level should be between the upper and lower markings on the oil window.

If the lubricating oil is insufficient, directly open the oil filler plug and add an appropriate amount of lubricating oil. After installing the fuel plug, check for any leaks.

Fig 17 Lubricating oil inspection

SG level	SAE10W-30
	SAE15W-40
	SAE20W-50

(Fig18) Fig18 Lubricating oil selection



Lubricate oil grade:SAE 15W-40

Quality requirements for lubricating oil: SG level or above

The use of high-quality four stroke engine lubricating oil can prolong the engine life. You need to choose according to Figure 18 and compare it with the local temperature situation at your discretion:

When the local temperature rises, lubricating oil with high viscosity, such as SAE15W-50, should be replaced;
When the local temperature drops, lubricating oil with low viscosity should be replaced, such asSAE10W-30.

[Replace]

Replace the new vehicle once at 1000km, the second time at 2000km, the third time at 3000km, and every 4000km thereafter.

1. After running the engine for 3 minutes, turn off the engine and place an oil container under the engine drain bolt.
2. Drain the engine lubricating oil after 3 minutes (be careful not to be scalded by the engine or lubricating oil). Unscrew the oil bolt, loosen the nut, and take out the machine filter cover, spring, filter element, etc.
3. After draining the oil, the drain bolts and filter cover must be cleaned thoroughly; Replace the filter element and check if the sealing ring is intact. If there is any damage, replace it with a new one; Then install the filter element, spring, sealing ring, and machine filter cover.
4. Inject approximately 2.6 L of new lubricating oil from the oil filling port; If a new filter element is replaced, 2.8 L of new lubricating oil is required; Check and confirm that there is no oil leakage, then install the oil filler plug.
5. Run the engine at different speeds for 3 minutes. During operation, check for leaks at the disassembled parts. Wait for the engine to shut down for 3 minutes. In idle mode, if the oil level is still below the mark below the oil window, an appropriate amount of lubricating oil should be added. It is necessary to check again for any leaks.

⚠ Warning:

1. The use of inferior lubricating oil can seriously affect the performance and lifespan of the engine.
2. Long term failure to change lubricating oil can cause deterioration, and deteriorated lubricating oil can cause excessive wear and tear on the engine and components.
3. If the lubricating oil is insufficient, it will seriously damage the engine.

Common causes of lubricating oil deterioration:

1. The lubricating oil temperature is too high and naturally deteriorates.
2. Lubricating oils with different labels are mixed together to deteriorate.
3. The metal shavings generated by the friction of the components are increasing.
4. There are many dust and impurities in the lubricating oil barrel.
5. The gap between the piston and cylinder is too large to leak exhaust gas, and carbon residue is generated during fuel combustion.

⚠ Danger:

1. The exhaust pipes of engine lubricating oil and muffler can burn people. Before discharging the old lubricating oil, wait for the oil drain bolt and exhaust pipe to cool down.
2. Children and pets who accidentally drink lubricating oil can cause physical injury. Reiterating: Long term exposure to lubricating oil can lead to skin cancer. Short term exposure to lubricating oil can irritate the skin. Keep children and pets away from lubricating oil. When changing lubricating oil, to reduce skin irritation, please wear long sleeved clothes and protective gloves (such as gloves used when washing clothes). If the skin comes into contact with lubricating oil, wash thoroughly with soap and water. Clean clothes and cloths contaminated with lubricating oil.

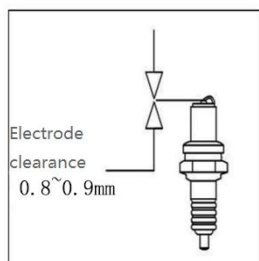
⚠ Attention:

Please dispose of discarded engine lubricating oil properly and do not pour it into the trash can or directly onto the ground to avoid polluting the environment. We suggest that you pack the waste oil into a sealed container and send it to the local recycling center

⚠ Warning:

If the specified engine lubricating oil is not used, it may damage the engine.

6.3 Selection and replacement of spark plugs



(Fig19)

Type: CR9EH-9

Spark plug sleeve opposite side: 16mm

[Check and replace]

1. The replacement cycle for spark plugs is around 6000 km.

2. Remove the spark plug cap, remove the surrounding dirt, use the spark plug socket wrench in the tool bag to remove the spark plug, and use a wire brush to remove the carbon and dirt from the spark plug.
3. Check whether the spark plug is damaged, whether the electrode gap is burned, and whether the sealing gasket is intact; If there is damage, it should be replaced.
4. Check the electrode gap with a high-precision feeler gauge, and the normal electrode gap is 0.8-0.9mm.
5. When installing spark plugs: First, screw the spark plug into the thread by hand, and then tighten it with a spark plug socket wrench.

⚠ Warning:

1. Dirt can enter the engine through the spark plug installation hole and damage the engine. After removing the spark plug, something must be used to cover the spark plug installation hole.
2. If the color of the spark plug electrode is different from that of a normal spark plug, a new spark plug of the same model must be replaced. Spark plugs of different models have different heating value ranges, which can cause serious engine damage. This kind of loss cannot be claimed for.
3. Excessive torque or loose threads when installing spark plugs can seriously damage the engine cylinder head. Therefore, careful manual installation of spark plugs is necessary.

6.4 Cleaning and disassembly of air filters

[Clean or replace]

1. The element of the air filter must be regularly maintained: the filter element must be checked, cleaned, and adjusted in a timely manner every 40 hours or 1000km of driving; The air filter must be cleaned every 80 hours or 2000km of driving; The filter must be replaced with a new one every 20000km.
2. If the motorcycle is used in muddy, humid, or dusty environments, the cleaning or replacement cycle of the filter should be shortened.
3. If the filter element is too dirty, water ingress or damaged, it must be replaced with a new one, otherwise it will increase the intake resistance, decrease the engine output power, and increase fuel consumption. Keeping the air filter clean can improve the efficiency of the engine and extend its service life.
4. This motorcycle is a paper filter element. When cleaning, you can gently knock it on the ground to shake off most of the dust. If there is an air pump, you can blow it from the inside out to blow off the dust. If the filter paper is already dusty or wet with oil, water, etc., it must be replaced with a new filter element.
5. During regular maintenance, remove the oil accumulation pipe and drain the waste oil inside. The oil accumulation pipe is located under the air filter.

[Disassembly and assembly] (Fig20)

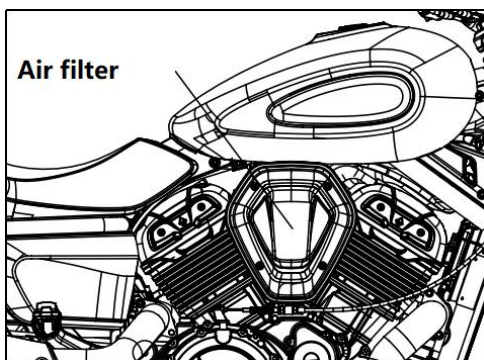


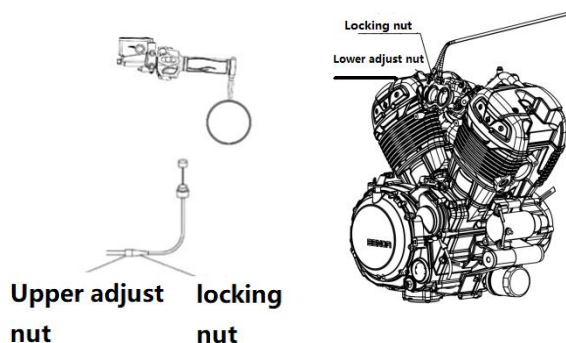
Fig20 Air filter position

1. Remove the four screws on the side cover of the air filter and remove the fixing screws of the filter element. Remove the filter element.
2. Assembly: Follow the reverse order of the disassembly steps mentioned above.

Warning:

1. Starting the engine without installing a filter is very dangerous. Without the obstruction of the filter element, the engine flame will spray back into the air filter intake chamber from the engine, and dirt will also be sucked into the engine interior, causing serious wear and tear to the engine. Therefore, it is prohibited to start and run the engine without installing a filter element.
2. When washing the motorcycle, do not let water enter the interior of the air filter.
3. If the filter element is damaged, it must be replaced with a new one. When cleaning the air filter, the filter element must be checked for damage.
4. If the installation position of the filter element is incorrect, dust will bypass the filter element and enter the engine, damaging the engine. Confirm that the filter element is installed in the correct position and properly sealed.

6.5 Check and adjust of throttle handle



[Check] (Fig21)

1. Check if the front of the car is turning from the far left to the far right normally and if the limit is reliable.
2. Check if the rotation of the throttle control handle is flexible from the fully open position to the fully closed position; Can it automatically return to its original position when releasing the handle.
3. Check if the throttle cable is flexible and in good condition.

[Adjust]

1. The free stroke of the throttle handle is 2-6mm.
2. The upper adjustment screw can be fine tuned, and the lower adjustment screw (at the connection between the throttle valve and the throttle cable) can be adjusted to a certain stroke.
3. When making minor adjustments, first loosen the locking nut on the upper adjustment screw tube, and then rotate the upper adjustment screw tube for adjustment.
4. When making larger adjustments, loosen the fastening nut and adjust the free stroke to 2-6mm.
5. The throttle cable should be regularly lubricated to reduce the wear of the steel wire rope; Do not bend the throttle cable.

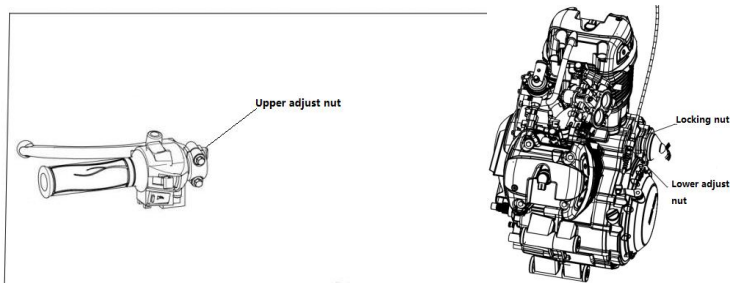
⚠ Danger:

1. The throttle cable is not properly routed and should be reinstalled correctly.
2. If the throttle cable is twisted, stuck or cannot return, the throttle control cable should be replaced.
3. After the free stroke adjustment of the throttle cable is completed, it is necessary to ensure that the throttle control handle can automatically return and the idle speed will not increase. After simultaneous adjustment, there should be

[Throttle body]

The throttle limit screw on the throttle body has been precisely set and cannot be adjusted by yourself. Check if the idle speed of the vehicle is stable (after the engine is fully preheated, the idle speed of the engine should be between 1350-1650RPM per minute). If the idle speed is unstable, please have our company's designated professional service personnel from the maintenance unit inspect and handle it.

6.6 Adjustment of clutch



The free stroke of the clutch handle is 5-10mm.

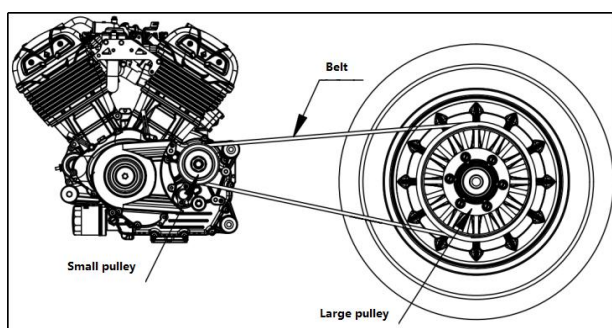
The function of the clutch: (Fig 22)

1. Ensure a smooth and gentle combination between the engine crankshaft and the variable transmission system to ensure a smooth start of the motorcycle.
2. Enable the engine crankshaft to quickly and thoroughly separate from the variable transmission system to ensure that the motorcycle does not experience impact during gear shifting
3. It can prevent damage to components of the variable speed transmission system due to excessive load.

⚠Attention:

When using the clutch handle, you should fully grasp or fully release it; Try to avoid grabbing only half or releasing only half (using a semi clutch), otherwise it may cause clutch wear or burning.

VII、 Inspection and adjustment of the belt



Type: 1881-H11M-30mm

[Inspection] (Fig23)

Before each ride, check if the belt drive system is working properly. If you notice any defects or damages, you must immediately inspect and repair them carefully. If necessary, replace the components of the transmission system, and the components can only be obtained from qualified dealers. Your dealer is able to identify any signs of wear and can replace necessary components. Therefore, if necessary, please bring the vehicle to the dealer for testing.

[Adjustment]

The installation tension of the belt needs to be checked using professional tools. If you need to check or adjust the belt tension, please go to the vehicle dealer and do not adjust it on your own.

[Replace]

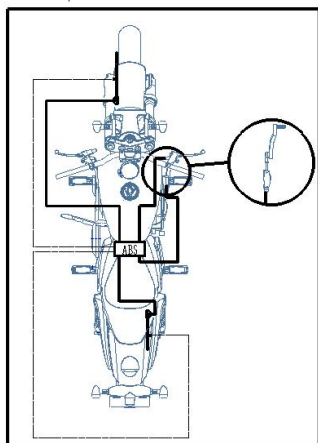
1. Use tools to remove the large and small sprockets;

2. Install the large pulley, small pulley, and transmission belt in the opposite order of disassembly, and adjust the swing of the chain;
3. During the installation and debugging process of the belt, it should be noted that if the belt is not operated correctly, the tension rope may break,

This will cause the belt to lose its tensile strength and tear, posing a risk of failure!

- Avoid twisting, bending, twisting, knotting, or flipping the belt, and do not use it as a belt whip.
- Do not use a sprocket to lift the belt during installation.
- Do not use sharp edged tools to tamper with the belt.
- Do not oil or lubricate the belt.
- Do not attempt to open or repair the belt.

VIII、ABS/Anti-lock braking system



ABS consists of hydraulic unit, ABS control unit, and return pump, installed under the seat. There are two wheel speed sensors on the front and rear wheels.

ABS operates using two independent brake circuits (front brake and rear brake). In normal operating mode, the function of the braking system is the same as that of a conventional braking system without ABS. Only when the ABS control unit recognizes that a wheel is tending to lock up, will the ABS start working by adjusting the brake pressure. This adjustment process can be felt through slight jumps on the front brake handle or brake pedal.

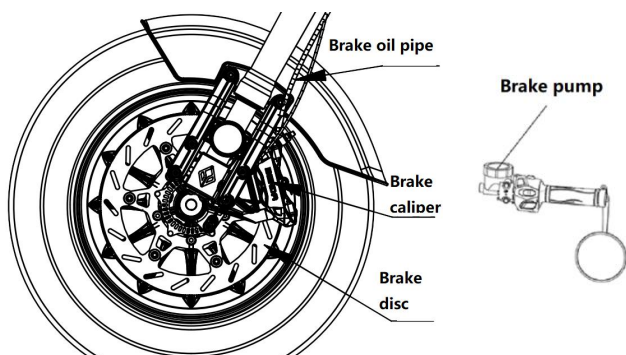
After turning on the ignition switch, the ABS warning indicator light must light up and turn off after starting. If the ABS warning indicator light does not turn off after starting or lights up during driving, it indicates a malfunction in the ABS system. At this time, ABS cannot be activated again. The wheels may lock up when braking. The braking system itself still works, only the ABS adjustment system fails.

⚠ Warning:

1. Only when the ABS is in the off state can the rear wheels rotate when the front brake is tightened.
2. If modifications are made, such as shortening or extending the shock absorption stroke, using other wheel rim diameters, using other tires, incorrect tire pressure, or using other brake friction pads, it may prevent ABS from continuing to function. Only when using spare parts and tires recommended by Benda Motors on the braking system can the optimal function of ABS be guaranteed.
3. Please perform maintenance and repairs as required.

IX、Check and adjustment of front brakes

[Inspection] (Fig25)



- Measure the free stroke of the front brake handle to be 5-10mm.
 - Measure the thickness of the front brake disc and brake friction pad.
 - Check the oil level in the oil cup; Check if the brake caliper is functioning properly; Check the brake oil pipe and
- The brake oil cup has no oil leakage or cracks; Check the wear of the

brake discs.

● When operating the brake handle, if you feel insufficient pressure on the handle, there is air in the brake system; The braking system should be completely emptied of air before it can be used normally; Otherwise, it will reduce braking performance or result in braking failure. This work should be completed at the BENDA specialty store.

⚠Warning:

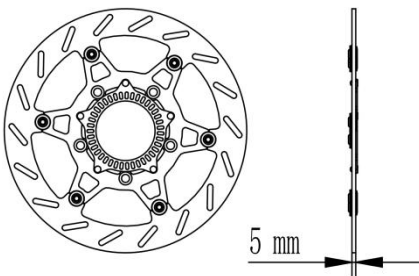
1. Should add: non petroleum based brake oil with brand name DOT3 or DOT4; Different grades cannot be mixed for use;
2. Brake oil has strong corrosiveness and should not splash onto the surface of painted or plastic parts; If accidentally consumed, it should be forcibly vomited out; If it gets on the eyes or skin, immediately rinse with plenty of water and seek medical attention;
3. Hydraulic disc brakes operate under high pressure. To ensure safety and reliability, the replacement time of brake friction pads and brake oil should not exceed the maintenance cycle;
4. When the hydraulic disc brake system needs maintenance, it can only be repaired by professional technicians.

⚠Attention:

The brake is an extremely important component to ensure the personal safety of the rider, and it should be checked and adjusted regularly.

Replace with new brake discs or brake friction pads, do not drive immediately; You should first operate (grip) the front brake handle several times until the brake disc and brake caliper are well engaged.

9.1 Check the front brake discs



The brake disc will gradually wear out during long-term use, so it is necessary to check the thickness dimension of the brake disc at multiple positions. And inspect its appearance to confirm whether the brake disc is damaged, cracked, or deformed.

If the thickness of the brake disc is lower than the specified value: please replace the brake disc.

If the brake disc is damaged, cracked, or deformed: please replace the brake disc

Fig26 Front brake disc inspection

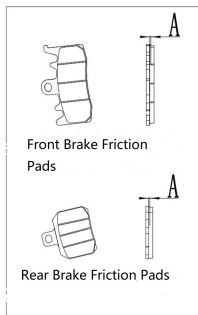
Brake disc wear limit	
Front	4mm
Rear	4mm

⚠Warning:

The wear of the brake disc can reduce the thickness of the brake disc within the contact area of the brake friction plate, which will reduce the braking effect and pose a threat to your driving safety. Once damage, cracks, or deformation occurs, please replace the brake disc immediately.

When the brake disc is worn to the maximum thickness of 4mm, it must be replaced; Remove the front brake calipers and front wheels, and then replace the brake discs.

9.2 Check the brake pads of the front brake



Check the minimum thickness of brake pads(A)

Minimum thickness: A=1.5mm.

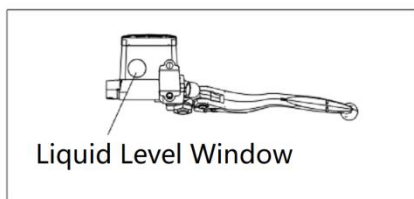
If the thickness is lower than the minimum thickness: please replace the friction plate in a timely manner. If any damage or cracks are found on the friction plate, please replace it in a timely manner.

Fig27 Front brake friction pad inspection

⚠Attention:

Friction pads will gradually wear out during vehicle braking. The braking effect will gradually decrease. To ensure your safety and that of the vehicle, please check regularly and replace it promptly. If you are not familiar with the specifications of the friction plate or cannot replace it on your own, please go to the designated after-sales point of BENDA for repair.

9.3 Check the brake fluid level of the front brake system



Adjust the vehicle's placement posture so that the brake fluid in the brake fluid tank is in a horizontal position, and check the brake fluid level through the fluid level window. When the brake fluid level is below the mark, please replenish the brake fluid in a timely manner.

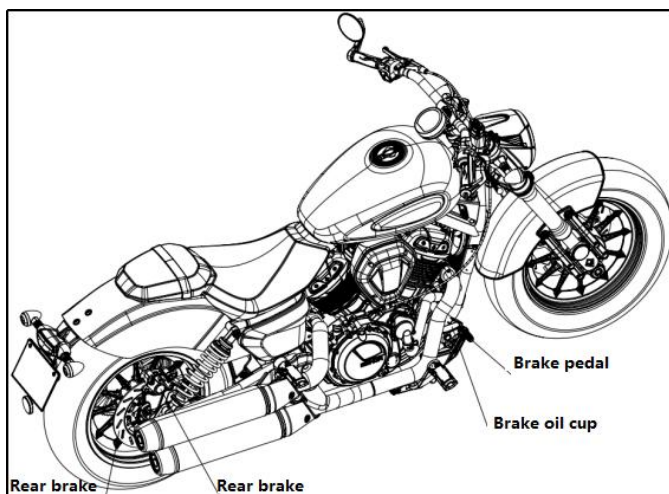
Fig28 Front brake fluid level check

⚠Warning:

If the brake fluid level is below the mark, it means that the brake system is not sealed or the brake friction pads are completely worn. Check the brake system and do not continue driving. Please go to the designated after-sales point of BENDA for repair.

Excessive use of brake fluid can reduce braking effectiveness. Please replace the brake fluid in a timely manner.

X、Check and adjustment of rear brake

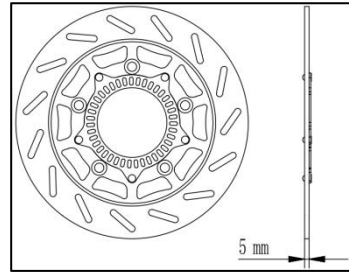


[Check] (Fig29)

- Measure the free stroke of the rear brake pedal to be 10-20mm.
 - Measure the thickness of the rear brake disc and brake friction pad.
 - Check the oil level in the oil cup; Check if the brake caliper is functioning properly.
 - Check for oil leakage or cracks in the brake oil pipe and brake oil cup; Check the wear of the brake discs.
- When operating the brake pedal and feeling

insufficient pedal pressure, there is air in the brake system; The braking system should be completely emptied of air before it can be used normally; Otherwise, it will reduce braking performance or result in braking failure. Please have the professional technical personnel of the repair unit serve you for this repair.

10.1 Check rear brake disc



The brake disc will gradually wear out during long-term use, so it is necessary to check the thickness dimension of the brake disc at multiple positions. And inspect its appearance to confirm whether the brake disc is damaged, cracked, or deformed.

If the thickness of the brake disc is lower than the specified value: please replace the brake disc.

If the brake disc is damaged, cracked, or deformed: please replace the brake disc.

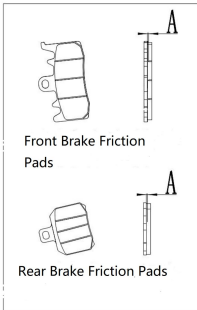
Fig30 Rear brake disc inspection

Brake disc wear limit	
Front	4mm
Rear	4mm

Warning:

Brake disc wear will reduce thickness of brake disc within the contact area of the brake friction pads and also reduce braking effect to have a threaten to you.Once damage, cracks, and deformation occur, please replace the brake discs immediately.When the brake disc is worn to the maximum thickness of 3mm, it must be replaced; Remove the rear brake calipers and rear wheels, then replace the brake discs.

10.2 Check the brake pads of the rear brake



Check the minimum thickness (A) of the brake friction plate.

The minimum thickness value of the brake friction plate is A=1.5mm.

If the thickness is lower than the minimum thickness: please replace the friction plate in a timely manner.

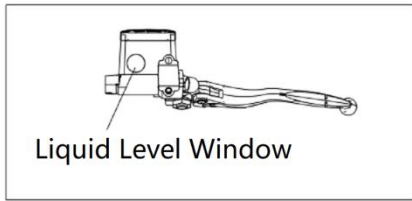
If any damage or cracks are found on the friction plate, please replace it in a timely manner

Fig31 Rear brake friction pads inspection

Attention:

Friction plates will gradually wear out during vehicle braking. The braking effect will gradually decrease. To ensure your safety and that of the vehicle, please check regularly and replace it promptly. If you are not familiar with the specifications of the friction plate or cannot replace it on your own, please go to the designated after-sales point of BENDA for repair.

10.3 Check the brake fluid level of the rear brake system



Adjust the placement posture of the vehicle so that the brake fluid in the brake fluid filling is in a horizontal position, and check the brake fluid level through the liquid level window.

When the brake fluid level is below the scale mark: please replenish the brake fluid in time.

Fig32 Rear brake fluid level check

Warning:

If the brake fluid level is below the mark, it means that the brake system is not sealed or the brake friction pads are completely worn. Check the brake system and do not continue driving. Please go to the designated after-sales point of BENDA for repair.

Excessive use of brake fluid can reduce braking effectiveness. Please replace the brake fluid in a timely manner.

XI、 Battery maintenance

[Battery model]

Type: MG14ZS-C

Capacity: 12V 11.2Ah

standard charge: 1A~1.5A×6~8hours

[Disassembly and assembly of battery] (Fig33)

Dismantle:

1. Open the seat cushion lock and remove the seat cushion;
2. Open the battery box cover;
3. Remove the ECU bracket;
4. First, remove the negative electrode wire (-);
5. Remove the positive electrode wire (+) afterwards;
6. Remove the battery.

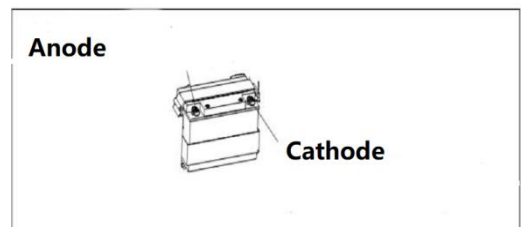
Install:

- 1.The installation sequence is opposite to the disassembly steps
- 2.First install the positive wire (+), then install the negative wire (-), and ensure that it is positive and negative

The terminal block is not loose, and the positive and negative terminals cannot be reversed. Reverse connection can damage electrical components.

[Battery charging]

- 1.Remove the seat cushion.
- 2.Remove the battery tie, remove the positive and negative wires, and take out the battery
- 3.Connect the charger wire and ensure that the charging current is 1/10A of the battery capacity. For example,if a battery with a capacity of 10Ah is charged, its charging current is 1 ampere.



4. For detailed instructions on the charger, please contact your dealer.

[Inspection and maintenance of batteries]

- 1 When frequently used, the motorcycle charging system automatically charges the battery fully. If you occasionally use a motorcycle or use it for a short period of time, the battery may be low. The battery will generate self discharge, and the self discharge rate varies with the type of battery and ambient temperature.
- 2 When the motorcycle is not used for a long time, the battery must be removed for charging and stored, and the battery must be charged regularly;
- 3 The positive (+) and negative (−) battery terminals should be cleaned regularly.
- 4 When replacing the battery, the same type and specification of battery should be used.

Danger:

- Battery terminals, terminals, and related components contain lead or lead compounds. If lead or lead compounds enter the blood system, they can harm your health. After contact with pollution, they must be cleaned promptly.
2. The battery must be stored out of reach of children.
 3. Batteries contain toxic substances such as sulfuric acid and lead. It can cause harm to people and pollute the environment. Used batteries must be disposed of or recycled in accordance with local legal regulations. It cannot be discarded like ordinary household waste.

Attention:

1. Overcharging or undercharging the battery can shorten its lifespan. Do not let the battery overcharge or undercharge.
2. If your vehicle is rarely driven, you must use a voltmeter to check the battery voltage every week. If the voltage of the battery is below 12.8V, a charger must be used to charge the battery.
3. If you do not use the vehicle for more than two weeks, you must use a charger to charge the battery. Do not use an automatic fast charger to charge the battery, as this can cause overload and damage to the battery.

[Replacement of fuses]

The circuit system has a total of seven plug-in fuses, including 5 fuses for 20A fans, lighting fixtures, ABS motors, ECU, and other electrical components; 1 10A-ABSECU fuse; One 5A-ABS starter fuse. A total of 7. In addition, there is an additional 20A and 10A spare fuse in the fuse box. If the fuse frequently burns out, there may be a short circuit or overload in the circuit system. Please have professional technicians from the maintenance unit serve you.

When replacing a fuse, first unplug the old fuse and plug in a spare fuse.

Warning:

Before checking or replacing fuses, the ignition switch and electrical switches must be turned off to prevent circuit shorts. Never use a fuse with a current rating that is different from the rated current, otherwise it may cause damage to the vehicle's electrical system or cause a fire. It may also pose a risk of lighting failure or engine failure

XII、 Engine water cooling system maintenance instructions

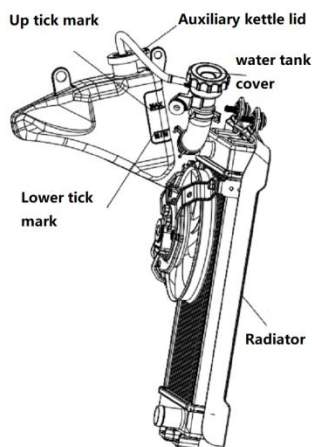


Fig3 Cooling System

[Cooling system] (Fig34)

The cooling system can prevent engine overheating, and proper use and maintenance of the cooling system can extend the service life of the engine.

The radiator is located at the front of the engine and should be regularly cleaned of dust and soil according to the road conditions you are driving on.

[Type of coolant]

The coolant have five characteristics: corrosion prevention, cavitation prevention, high boiling point, anti scaling, and anti freezing.

Cooling liquid is generally mixed with concentrated antifreeze and soft water (purified or distilled water) in an appropriate proportion. Please mix it into a fixed concentration that adapts to the local minimum temperature. Generally, when mixed into a concentration of 40% to 50%, the antifreeze function is the best.

The direct coolant specially used for aluminum alloy engine is used. This coolant has been prepared in the factory and contains Antifreeze, rust inhibitor, foam inhibitor and trace silicate. The ambient temperature for use is indicated on the container.

Attention:

1. This coolant is a specialized coolant and cannot be replaced with tap water or other liquids, as it may cause engine damage.
2. Please go to the "BENDA Exclusive Store" to purchase direct coolant for aluminum alloy engines.
3. If you need to replace the coolant or if there is a coolant leak, please go to the "BENDA Exclusive Store" for replacement and repair.

[Check the coolant capacity]

The total amount of coolant in the cooling system is approximately 2300ml

1. Park the motorcycle on a flat surface with a single support.
2. Check the coolant level while the engine is cooling, and the coolant level should be between the upper and lower scale lines.

[Add a small amount coolant]

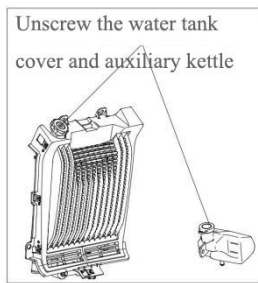


Fig 36 Adding coolant

If the coolant in the auxiliary water tank is at or below the lower mark position, please add special coolant in a timely manner to the upper mark position.

[Add method]

1. Park the motorcycle on a flat surface with a single support and wait for the engine to cool down; Otherwise, heat may cause burns to the skin;
2. Unscrew the water tank cover and the auxiliary kettle cover;;Install the water tank cover and auxiliary kettle cover.
3. Pour the coolant into the water tank and add it to the upper mark position;
4. Cover the water tank cover and the auxiliary kettle cover.

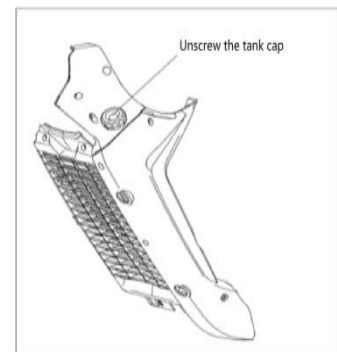


Fig35 Adding coolant

[Storage of the coolant]

1. When the coolant is not in use, it should be stored in a dedicated sealed container.
2. It should be placed in a cool and dry place. The coolant is a toxic liquid and must be kept away from children.
3. Pay attention to the strict prevention of contamination of the coolant by petroleum products, and do not mix or store two different brands of coolant

⚠ Danger:

1. Antifreeze is an organic solvent with toxicity and corrosive. During use, it is not allowed to splash onto the surface of rubber products or paint parts, nor should it come into contact with human skin. If it accidentally splashes onto rubber products, paint surfaces, or human bodies, it should be immediately rinsed with water.
2. When repairing the engine, if it is necessary to loosen the cylinder nut, please drain the coolant first to prevent it from entering the crankcase.
3. Due to the higher boiling point of antifreeze compared to pure water, the radiator cap must not be opened when the engine is running normally or the temperature has not dropped (60 °C) after parking to avoid burning the body.

XIII、 Vehicle cleaning and storage

[Vehicle cleaning]

1. Motorcycles should be cleaned regularly to detect damage, wear, or oil leakage in a timely manner.
2. When cleaning, it is necessary to wait for the engine to cool down and rinse with clean water. After cleaning, dry the motorcycle and start the engine, allowing it to run for a few minutes; Use lubricating oil to lubricate the chain; Before driving on the road, check the brakes, and the front and rear brakes should be normal.
3. Parts that cannot be sprayed with high-pressure water: headlights, turn signals, ignition lock, electrical switches, instruments, electrical parts and circuits, batteries, air filters, wheel hubs, exhaust pipe outlets, under the fuel tank, and engine cylinder heads. These components are best wiped with a cloth.
4. The braking performance may decrease after cleaning, and it must be tested and adjusted before use.

[Vehicle storage]

After the motorcycle is used on the same day, it should be stored in a dry, small temperature difference, and well ventilated safe place. If stored for a long time (over 30 days), necessary repairs should be carried out before storing the motorcycle; Otherwise, problems that require repair may be forgotten when using after storage. Long term storage (over 30 days) should not only be repaired according to the above requirements, but also be maintained according to the following requirements:

1. Clean and dry the motorcycle, and apply wax to the painted surface of the entire vehicle.
2. Drain the fuel from the fuel tank and spray rust inhibitor into the tank.
3. Completely drain the oil and refill the crankcase with new oil.
4. Remove the spark plug and inject a small amount (15-20 milliliters) of lubricating oil into the cylinder; Then reinstall the spark plug, open the ignition switch lock, press the start button for 2-3 seconds, and evenly distribute the oil on the cylinder wall.
5. Remove the battery, remove rust from the terminals and wiring connectors, and store in a well ventilated, dry, cool, and away from direct sunlight.
6. Inflate the tires to the specified pressure and place the motorcycle above the cushion blocks, so that the front and rear wheels are off the ground. If the tire pressure is too low, it will cause premature aging and cracking of the tires.
7. Cover the intake port of the air filter and the exhaust port of the exhaust muffler with a cloth containing new engine oil to prevent moisture from entering.
8. Cover the motorcycle with highly breathable materials and store it in a dry, safe place with low temperature difference and good ventilation.

[Use after vehicle storage]

1. Remove the motorcycle cover and clean the motorcycle.
2. Check the voltage of the battery. If the voltage is below 12.8V, it must be charged at low speed before installing the battery.
3. Remove the rust inhibitor from the fuel tank and add new fuel.
4. Test drive the motorcycle in a safe place to check whether its performance is normal.

XIV、Service life and vehicle handling of vehicle

[Vehicle service life]

Please follow the rules and regulations of the traffic management department or the local vehicle management office for the duration of the vehicle's use.

[Vehicle handling]

1. Disposal of used engine oil: The used engine oil under the motorcycle replacement should be put into a plastic bucket and handed over to the recycling company for disposal. You can't discharge the used engine oil at will, otherwise it will cause damage to the site, soil, water source and other environment.

2. Disposal of used batteries, light bulbs, exterior parts, filter elements, tires, iron parts, aluminum parts and other parts: these end-of-life parts should be classified and recycled. You can't just throw them away, and you can't dump the diluted sulfuric acid in the battery and cause harm to people or pollution to the environment.

3. After the vehicle is scrapped, please handle it according to the vehicle scrapping regulations of the traffic management department or local vehicle management office.

XV、Adjustment data related to motorcycle

Front (handbrake) free travel 5~10mm

Free clearance of throttle handle: 2~6mm

Free travel of rear (foot) brake 10~20mm

The free stroke of the clutch: 5~10mm

Spark plug clearance: 0.8~0.9mm

Gap between intake and exhaust valves: 0.08~0.12 mm

Rear shock absorber fastening bolt torque value: 30~40 N • m

Torque value of handle fastening bolts: 4~6 N • m T

The torque value of the flat fork shaft fastening nut: 70~90 N • m

Front wheel axle fastening nut torque value: 70~90 N • m

Steering system fastening nut torque value: 50~70 N • m

Rear wheel axle fastening nut torque value: 70~90 N • m

Front shock absorber and upper connecting plate fastening bolt torque value: 10~14 N • m

Front shock absorber and steering column fastening bolt torque value: 20~25 N • m

Engine suspension fastening nut torque value: M8: 18~25 N • m, M10: 30~40 N • m

XVI、Table of main technical parameters

Model Name		BD500-15
Vehicle parameters	Manufacturer Name	HANGZHOU SATURN TECHNOLOGY CO.,LTD
	Vehicle model (commercial name)	BD500-15
	Vehicle brand	(BENDA)
	Vehicle type	Ordinary two wheeled motorcycle
	Vehicle identification number	H84PDPDxxxxxx
	Authorized passenger capacity	Two people (One driver and one passenger each)
	Turning form	Directional handle
	Gear format	Sixth gear constant engagement
	Braking form	Front wheel: disc type Rear wheel: disc type
	Braking operation mode	Front wheel: Hand brake Rear wheel: Foot brake
	Clutch form	Oil bath multi plate type
	Starting method	Electronic start
	Length * Width * Height	2260*846*1183
	Wheelbase	1545
	Minimum ground clearance	153
	Vehicle curb weight	198
	Maximum load capacity mass	150
Vehicle model (project)		BD500-15
Vehicle parameter	Fuel tank capacity	16L
	Number of tires	2
	Front wheel specifications	150/80-16
	rear tire	180/65-16
Electrical installations	Ignition method	ECU
	Spark plug model	CR9EH-9
	Headlamp specifications	12V LED
	Turn signal specifications	12V LED
	Tail/brake light specifications	12V LED
	fuse value	20A(5)、10A(1)、5A(1)
	Battery specifications	12V 11.2Ah
Engine	Engine form	V-shaped twin cylinder
	Engine model	BD2V69MR
	Compression ratio	11.5: 1
	Actual displacement	475.6ml
	Maximum net power	35kW/8800rpm
	Maximum torque	42N•m/6700rpm
	Bore * stroke	69*63.6

	idling	1500±150
	Engine lubricating oil	SAE
	Brand	10W-40
	Lubricating oil capacity	2.8L
	Fuel grade	92 # or above gasoline
	Spark plug gap	0.8~0.9 mm
Ratio	Primary speed ratio	2.16
	First gear ratio	3.23
	Second gear ratio	2.12
	Third gear ratio	1.57
	Fourth gear ratio	1.33
	Five speed ratio	1.13
	Six speed ratio	1.04
	Final speed ratio	2.89
Performance	Maximum speed	150
	Fuel consumption	≤5L/100km

XVII、 Common Motorcycle Troubles and Causes

Phenomenon	Part location	Causes	Ways
Unable to start	Fuel system	There is no fuel in the fuel tank	come on
		Oil pump blockage or damage, poor fuel quality	Cleaning or replacement
	Ignition system	Spark plug malfunction: Excessive carbon buildup and prolonged use	Check or replace
		Spark plug cap malfunction: poor contact or burnt out	Check or replace
		Ignition coil malfunction: poor contact or burnt out	Check or replace
		CDI malfunction: poor contact or burnt out	Check or replace
		Trigger coil malfunction: poor contact or burnt out	Check or replace
		Stator fault: poor contact or burning	Check or replace
	Cylinder pressure system	Starting mechanism malfunction: worn or damaged	Check or adjust
		Malfunction of intake and exhaust valves and valve seats: Fuel contains too much gum or has been used for too long	Check or replace
		Cylinder, piston, and piston ring malfunction: Fuel contains gum or is worn	Check or replace
		Air intake pipe leakage: used for too long	Check or replace
		Valve timing malfunction	Check or replace
Insufficient power	Valve piston	Excessive carbon deposits on the intake and exhaust valves and pistons: poor fuel quality, poor oil quality	Check or replace
	clutch	Clutch slipping: poor oil quality, prolonged use, overload	Repair or replace
	Cylinder block and ring	Wear of cylinder block and piston rings: poor oil quality and prolonged use time	Adjust or replace
	Brakes	Incomplete brake release: brake too tight	Oil Change
	chain	Chain too tight: improper adjustment	adjustment
	engine	Engine overheating: The mixture is too rich or too thin, and the quality of the engine oil and fuel is poor,	adjustment
	spark plug	There are obstructions, etc	Adjust or replace
	Intake pipe	Improper spark plug gap, normal 0.8-0.9 mm	Adjust or replace
	Cylinder head	Air leakage in the intake pipe: adjusted or replaced after prolonged use	Adjust or replace
	Electrical system	Electrical system malfunction	Inspect or repair
	Air filter clogged	Air filter clogged	Cleaning or adjusting
Headlamps and tail lights do not light	cable	Poor wiring connection	adjustment
	Left and right switches	Poor or damaged switch contact	Adjust or replace

up	Headlamps	Inspection of light bulbs and lamp holders	Adjust or replace
Headlamps and tail lights do not light up	Voltage regulator	Voltage regulator inspection: poor contact or burnt out	Check or replace
	Magneto	Magnetic motor coil inspection: poor contact or burnt out	Check or replace
The horn does not sound	Battery	The battery is dead	Adjust or replace
	Left switch	Horn button inspection	Adjust or replace
	cable	Poor circuit contact	Adjust or replace
	horn	Damaged horn	Adjust or replace

The above are common malfunctions of motorcycles. If your motorcycle malfunctions, please go to the designated repair unit for inspection and repair in a timely manner.DE08 Fault code table

Fault codes	description
P 0118	Cylinder temperature sensor circuit high voltage/open circuit
P 0117	Low voltage in the cylinder temperature sensor circuit
P 0336	Interference in the signal of the crankshaft position sensor circuit
P 0335	No signal from the crankshaft position sensor circuit
P 2301	Short circuit of ignition coil "A" to high voltage (cylinder 1)
P 2300	Short circuit of ignition coil "A" to low voltage (cylinder 1)/open circuit
P 2304	Short circuit of ignition coil "B" to high voltage (cylinder 2)
P 2303	Short circuit of ignition coil "B" to low voltage (cylinder 2)/open circuit
P 0123	The throttle position sensor is short circuited to high voltage
P 0122	Short circuit to low voltage/open circuit of throttle position sensor
P 0459	Carbon canister solenoid valve circuit short circuited to high voltage
P 0458	Carbon canister solenoid valve circuit short circuit to low voltage/open circuit
P 0232	Oil pump relay short circuited to high voltage
P 0231	Oil pump relay short circuited to low voltage/open circuit
P 0601	ECM read-only memory verification error
P 0262	Cylinder 1 injector short circuited to high voltage
P 0261	Cylinder 1 injector short circuited to low voltage/open circuit
P 0265	Cylinder 2 injector short circuited to high voltage
P 0264	Cylinder 2 injector short circuit to low voltage/open circuit
P 0108	High voltage in the intake pressure sensor circuit
P 0107	Low voltage/open circuit in the intake pressure sensor circuit
P 0113	High voltage/open circuit in the intake temperature sensor circuit

P 0112	Low voltage in the intake temperature sensor circuit
P 0650	Engine malfunction indicator light malfunction
P 0132	Short circuit to high voltage/open circuit of the oxygen sensor in front of cylinder 1
P 0131	The oxygen sensor in front of cylinder 1 is short circuited to ground
P 0031	Cylinder 1 front oxygen sensor heater short circuited to low voltage/open circuit
P 0032	Cylinder 1 front oxygen sensor heater short circuited to high voltage
P 0138	Short circuit to high voltage/open circuit of the oxygen sensor in front of cylinder 2
P 0137	The oxygen sensor in front of cylinder 2 is short circuited to ground
P 0037	Cylinder 2 front oxygen sensor heater short circuited to low voltage/open circuit
P 0038	Cylinder 2 front oxygen sensor heater short circuited to high voltage
P 0563	High system voltage
P 0562	Low system voltage
P 0500	Vehicle speed sensor malfunction
P 0505	Idle control malfunction

The above are common fault codes for motorcycles. If your motorcycle malfunctions, please go to the designated repair unit for inspection and repair in a timely manner.

Remember: You cannot handle motorcycle malfunctions on your own, otherwise it may cause safety hazards or accidents. If you handle motorcycle malfunctions on your own and cause safety accidents, you are solely responsible.

XVIII、BD500-15 Electrical schematic diagram

