

USER'S MANUAL

This motorcycle is only designed to ride on highway, and a driver and a passenger are limited.

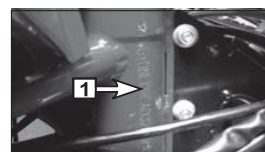
Please read this manual before using, so as to master the basic function and using methods. The data, instructions and specifications in this manual are based upon the latest design features of your motorcycle. Our company reserves the rights to make changes to the specifications of its vehicles without notification. Without the permission, any company or person couldn't reprint any part of this manual. We sincerely hope you can give us your suggestions about the design, manufacture and quality of this type of motorcycle, so that we can do the improvement in time. This manual is only for reference, taking material objects as standard.

For any repairs not mentioned in this manual, please refer to the Maintenance manual and Parts catalog of our company for future reference to help you understand the location of the main parts, the structure, parts failing, maintenance and so on. And for any unclear questions, please contact your local our company Service Center.

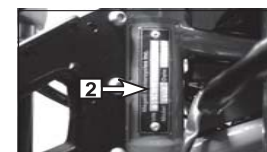
Use only genuine spare parts and oil manufactured by our company.

Vehicle Identification Number(VIN) and Engine Number

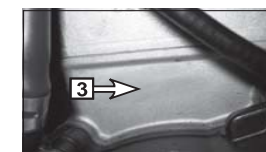
Vehicle identification number(VIN), engine number and certificate are used for license and registered residence.



1.VIN is stamped on the standing pipe of chassis



2.Nameplate is riveted to the standing pipe of chassis.



3.The engine number is stamped on the left side below the crankcase.

Fuel tank You must use No.93 unleaded gasoline or above.



DANGER

Please shut the engine when refueling, then turn the ignition switch to OFF position and keep away from fire. Refueling till the fuel head reaches at the bottom of the filler opening as shown, never excess. Or else, fuel will spill out when it expands with heat. Do not wash fuel tank cap with high pressure water in case water will enter into the tank.

Lock and instrument

Name	Specification
1.Ignition lock open	Turn the key to “○” ,connect circle and you could not pull out the key.
2.Ignition lock close	Turn the key to “⊗” ,break circle and you could remove key.
3.Direction lock	The handlebar is locked in this position. The bike can not be used and the key could be draw out.
4.Gear indicator	Indicate the present gear,N means neutral.
5.Left turning indicator	This light illuminating means left turning indicator is working.
6.Main-beam indicator	This light illuminating means main-beam is working.
7.Right turning indicator	This light illuminating means right turning indicator is working.
8.Fuel level	Indicate fuel volume in fuel tank. F means full, E means empty.
9.Failure in EFI	Indicate there are troubles in electronic fuel injection system.
10.Tachometer	Record the rev of engine.
11.Water temp indicator	When the water temperature exceeds the standard values, the lamp lightens.

WARNING

- 1.Park the motorcycle in safe place and lock the direction lock to avoid being stolen.
- 2.When the needle of speedometer get out of the range red area(the riding speed should be control out of red area), and rider should pay attention to road condition to avoid tumbling.
- 3.Never ride on high way for long time (keep the finger of tachometer out of red area) to avoid engine damage.

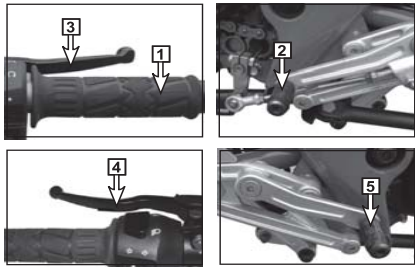
Left and right controller

Name	Specification
1.Overtake light switch PASS	When the motorcycle needs overtake another one at night, press“PASS”button to warn others.
2.Main-beam indicator	Turn the switch to “≡○” to use main beam
3.Dipped-beam indicator	Turn the switch to “≡○” to use dipped beam.
4.Direction light switch	Slide “↔” when changing riding direction.
5.Horn button	Press “” to use the horn.
6.Headlamp(on)	Turn the switch to “” to turn on the lamp.
7.Position lamp(on)	Turn the switch to “” to turn on the position light.
8.Illuminating switch(off) ●	Turn the switch to “●” to turn off illuminating system.
9.Electric starter button	Press button ,to use electric starter.(Caution:If motorcycle is at a gear,you should hold clutch handlebar or change the gear to the N-gear,Then electric starting is ready.)

CAUTION

When starting the motorcycle with electric starter,each starting time should not exceed 5s,each interval should not be less than 10s and check the motorcycle if it cannot be started successfully for continuous 3s.

Operation controls



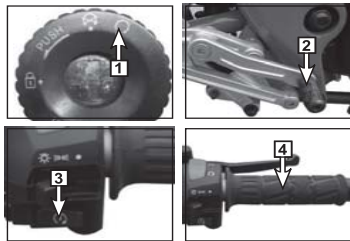
Name	Specification
1.Throttle handlebar	Control the mixed gas, free stroke:2mm~6mm
2.Gear-shift pedal	This bike adopts 6-gear shift method,decrease throttle when gearshifting
3.Front brake handle	Control the speed of front wheel and its working stroke is:10mm~20mm
4.Clutch lever	Control the output power of engine
5.Rear brake pedal	Control the speed of rear wheel and its working stroke is:20mm~30mm

CAUTION

- When starting motorcycle, shift gear at neutral position.
- If clutch slips or can not be separated completely,we advise users to adjust it at professional maintenance station or afterservice center of our company.
- Brake matters to human and proverty safety, so it needs maintenance to reach safe riding. We suggest you to maintenance your motorcycle in our special Maintenance Service Center irregularly.

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Starting and preheat



When electric starting, each starting time should not exceed 5s, each interval should not be less than 10s. If engine can not be started continuously for 3 times, inspect motorcycle. Undertake cold starting and preheating according to the following steps:

- Turn ignition lock on, then turn ignition key and stop switch to "O" position. Shift the gear to "N" neutral position or hold clutch handlebar.
- Grip front brake handlebar or step rear brake pedal, and turn starting switch on.
- Press electric starting button with right thumb.
- Rotate throttle lever to add proper volume fuel and to start motorcycle; Preheat 3~5 minutes at idle speed 1500(1±10%)r/min. After that, please return choke lever and run the motorcycle normally .

CAUTION

- When starting, shift the gear to neutral or make clutch separate. If neutral indicator does not illuminate when the gear is at neutral, inspect motorcycle at maintenance center of our company or professional maintenance station.
- If engine can not be started electrically, turn off the ignition key and wait for several seconds to protect battery, then start again. Do not continue starting over 5s for each starting.
- To prolong service life, run motorcycle after preheating it for 3-5min when cold starting, at the same time, do not run with a very high speed. When preheating, do not rotate throttle lever excessively. When motorcycle runs normally, return choke handlebar. (If choke handlebar is not returned, do not run motorcycle, otherwise motorcycle can not heat well).
- Idling of EFI motorcycle is setted base on the ECU standard, please do not disassemble it without authorization. Please maintain motorcycle at the qualified unit when it has troubles.

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INSPECTION BEFORE RIDING

In order to ensure your safety,make a general inspection before riding according.

No.	Item	Inspection	Remark
1	Fuel system	Check fuel capacity and fuel leakage.	For the vehicles with different riding miles and performance, please adopt different maintenance. Elementary maintenance: 1000km~2000km riding, please lubricate and fasten vehicle. Secondary maintenance: 3000km~6000km riding,please check, adjust, lubricate and fasten vehicle. Advanced maintenance: 6000km~10000km riding,please disassemble, inspect, lubricate, fasten, replace wearing parts and do troubleshooting. To inspect and maintain your motorcycle at professional maintenance station or afterservice center of our company.
2	Luboil	Check luboil for quality and whether capacity is lower than lower scale mark.	
3	Electrical system	Check electrical system for condition.	
4	Battery	Check whether voltage is lower than 12V and whether electrolyte level is lower than lower scale mark.	
5	Clutch/Front brake lever	Check whether free stroke is within stated value and clutch can be separated and meshed normally.	
6	Gearshift/Rear brake pedal	Check gearshift for flexibility and stability and whether travel of brake pedal is within stated value.	
7	Throttle lever	Check throttle lever for flexibility and stroke of (2~6)mm.	
8	Steering mechanism	Check steering mechanism for flexibility and stability.	
9	chain	Check chain for stroke of (15~25)mm,abrasion and lubrication.	
10	Tire/Wheel	Check tires for pressure and abrasion.	
11	Illumination/Signal indicator	Check illuminating lights/signal lights/indicators for condition.	
12	Brake	Check brake disc for abrasion and brake performance.	
13	Main/side stand	Check whether main stand and side stand are bended or deformed,whether they can return well.	
14	Tightening parts	Check tightening parts for looseness and falling.	

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Riding operation



- After starting and proheating, return side stand and then step shift lever down with left foot(caution: Before shifting gear from neutral, the brake is at braking condition) to the first gear.
- Release the brake and rotate throttle handlebar slowly to accelerate to make motorcycle start to move. After the motorcycle runs smoothly and reaches a certain speed, shift the gear from lower one to higher one.

DANGER

- Before riding,please wear protector.(such as, helmet, protecting gloves, protecting glasses, protecting clothes, etc).
- If clutch slips or can not be separated completely, the motorcycle are forbidden to ride.
- Never rotate the throttle grip when you want to increase the throttle.

Operation for new vehicle

After buying new vehicle, please pay attention to running-in for it(1000km is running-in period, subject to odometer reading). Running-in period is very important for a new vehicle, which will have a direct impact on the service life. For the first 1000km, keep the engine rev below 6500 r/min at all gears (speed is below 50km/h, refer to the speedometer) and choose the right gear-shift method to make sure all the gear match well. Maintain the vehicle after the first running-in procedure, which will assure performance and durability. Replace special engine oil of our company after running per 300km.Contact local distributor or service center of our company if there is any failure on engine during running-in period.

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Guide for safe riding

1.Attention items for riding up and down slopes

When riding up and down slopes on mountain roads,shift gears according to the actual situation and do not make engine run under over loading condition.

①.When riding up sharp slopes,use lower gears to increase engine torque.Shift gears quickly to avoid engine flameout.

②.When riding down sharp slopes,use higher gears to avoid engine over heating.Control speed by engine rev and do not run with neutral gear.

2.Attention items for riding on wet and skiddy roads (in rain or fog)

The rainy day or foggy day will cause low visibility and poor adhesion between tires and ground,which might cause accident.So pay attention to the following items to ensure safety:

①.Keep a certain speed,do not accelerate or brake suddenly.Do not use over-worn tires.If tire abrasion exceeds maintenance limit value of 2mm,reduce speed and do not brake suddenly.

②.Keep low speed when riding on sludgy roads and do not start,accelerate,brake or turn suddenly.

3.Attention items for riding on ice and snow roads

When riding on ice and snow roads,assemble tire chain on tires or use antiskid tires.

①.Try to keep in low speed to avoid accident, Do not accelerate,brake or turn suddenly.Return throttle handlebar to decelerate,which is helpful for improving brake efficiency. Do not step brake pedal powerfully to brake.

②.When turning, reduce speed and turn steering handlebar slowly. Do not ride motorcycle with a high speed.

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Inspection and replacement for engine oil

Replace engine oil periodically; Please replace oil after preheating several minutes,and obey the rules strictly.



1.Check whether the oil is blackening or deterioration through observation hole;if so,Replace engine oil.Check whether oil level is lower than lower mark;if so,add engine oil to the level between upper and lower marks.

2.When lubeoil is blackened or bad, remove drain bolt to drain lubeoil and replace engine oil.

3.Before pouring out oil, put a pan under the engine, and then disassemble the bolt.When the oil almost poured over, rotate engine to make sure all oil gone out. Then put 0.5L petrol into the crankcase, and clean it. Then assemble the bolt and add special engine oil.

4.Use the special oil recommended by our company.

CAUTION

1.Support motorcycle with main stand to check oil level.Make motorcycle stable,because any incline might cause wrong reading.

2.Advise you to replace engine oil at maintenance center of our company and use special engine oil of our company.

3.Do not add any chemical additive into engine oil,because engine oil can lubricate clutch,while additive can make it slip.

4.After replacing lubricating oil, tighten the oil plug and check for leakage.

5.After replacing engine oil, check oil pressure according to the following details. Dismount oil-drain bolt, start engine and keep it in idling speed untill engine oil drop out from oil-drain hole. If there is no oil dropped out within one minute, stop the engine.

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Maintenance schedule

ITEMS	Odometer reading km			Remark
	Break-in period 1000km or 1 month	Primary 3000km or 3 months	Each 3000km or 3 months	
Valve clearance*	Inspect/adjust	Inspect/adjust	Inspect/adjust	1.※※:refers to the middle-weight lubeoil for wheel. 2.※:advise you to maintain motorcycle or parts at maintenance center of our company. 3.Shorten maintenance cycle if motorcycle runs at humid or dusty places.
Spark plug **	Clean/adjust	Clean/adjust	Clean/adjust/replace	
Air cleaner **		Clean/Inspect	Clean/Inspect	
Oil filter ** **	adjust spoke once per 8000km-10000km			
Engine oil **	replace once 300km	Inspect/replace once	Inspect/replace once	
Oil strainer *	Clean/replace	Clean/replace	Clean/replace	
Brake **	Inspect/adjust	Inspect/adjust	Inspect/adjust/replace	
Clutch **	Inspect/adjust	Inspect/adjust	Inspect/adjust/replace	
Aluminium wheel/spoke wheel**	adjust spoke once per 300km	Clean/adjust	Inspect/adjust	
Wheel bearing** **	inspect	Clean/replace/lubricate	Clean/replace/lubricate	
Steering bearing** **	Clean/replace/lubricate	Clean/lubricate	Clean/lubricate	
Absorber *	inspect	Inspect/adjust	Inspect/adjust	
Driving chain/sprocket** **	inspect/adjust	Clean/adjust/lubriacte	Clean/adjust/lubriacte	
Battery **	inspect	Charge/add electrolyte	Charge/add electrolyte	
Tightening parts	Inspect/tight/replace	Inspect/tight/replace	Inspect/tight/replace	

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Air cleaner cleaning



A dusty and blocked air cleaner element will cause a low power, high fuel consumption and rich concentration of mixed gas.So inspect,clean and replace the element periodically.

1.Remove the core of air cleaner .
2.Wipe the dust and dirt of core with compression air or change the core. Clean the net with neutral liquid, and dry it.

WARNING

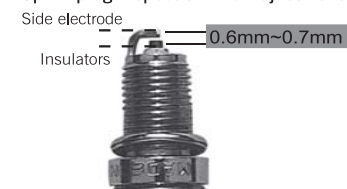
1.Install the element or strainer on the right position.When motorcycle often runs at a dusty place,shorten the maintenance cycle of air cleaner.

2.These stuffs are forbidden to clean strainer:gasoline,solvent of low-burning point and acidity or alkalescence naphtha gasoline.

3.Do not start motorcycle until the element or strainer is installed well,otherwise the piston,piston ring and cylinder block might be worn.

4.Clean,maintain or replace the element periodically at service center of our company.

Spark plug inspection and adjustment



1.Remove spark plug.When the plug with gray deposit on isolater skirt indicates an overheated engine.The reasons are the heat value of spark plug is small or the spark plug is revolved too long .Replace the spark plug. Clean the air cleaner when the plug insulator with sooty black deposit indicates mixture is rich. When the spark plug insulator with brown indicates balanced combustion of engine.

2.When cleaning spark plug,first soak spark plug with detergent or gasoline for half an hour and then remove the carbon deposit with nonmetal brush. Measure the clearance of spark plug with feeler gauge before assembling spark plug. If necessary,adjust the clearance to the stated value. Wash the gasket and tighten spark plug to right torque.

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Brake inspection and adjustment

Hydraulic brake inspection

1. Check the stroke of brake handlebar and pedal to see if it is in the range of standard value. When the handlebar and the pedal can not be readjusted which means the broken of brake shoe and unable to maintain, replace the brake shoe.
2. Check the oil level from the observation hole. When the oil level is lower than the lower limit, add brake oil to upper limit. Recommended brake oil: DOT4 or DOT3.
3. The thickness of the brake disc limit value is 2.0 mm, disc runout limit value is 0.3 mm. If exceed the value, replace it.

Drum brake adjustment

1. Check the stroke of brake handlebar and pedal to see if it is in the range of standard value. When the pedal can not be readjusted or the needle of brake arm surpass the mark of drum cover which means the broken of brake shoe and unable to maintain, replace the brake shoe.
2. Hold the brake arm, and adjust the adjusting nut clockwise to decrease the free stroke of pedal, otherwise, adjust in anticlockwise to increase. So to reach the standard value.
3. If brake switch needs to be adjusted, hold it still first and then turn the adjusting nut. when step on the pedal, brake light illuminate mean the brake switch is in the right position.

Standard value of brake handlebar: 10mm~20mm Standard value of brake pedal: 20mm~30mm

CAUTION

1. After adjusting transmission chain or dismantling rear wheel, recheck and adjust the free stroke of rear brake pedal.
2. After adjusting rear brake, must readjust rear brake light switch. Also check whether the wheel can rotate freely.
3. Adjust rear brake or replace brake pads at after-service center of our company.
4. Inspect and adjust brake system periodically at service center of our company.

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Throttle cable adjustment

In order to adjust free stroke of throttle handlebar, adjust steel wire of choke through rotating the adjusting nut.

1. If the maximum free stroke of throttle handlebar is exceed or under the standard value 2mm~6mm, readjust it.
2. The adjustment way of throttle valve cable free stroke: unscrew the locknut. Adjust the adjusting nut until free stroke reaches standard value. Tighten the locknut.

WARNING

1. Adjust idle speed before adjusting free stroke of steel wire of choke.
2. If steel wire of choke intervenes or is worn, disassemble throttle handlebar and steel wire to wash or replace and add some grease.

Battery The battery could be used after adding electrolyte for 30mins (Advice: slowly charge the battery once).

CAUTION

1. Inspect charge periodically at service station of our company, replace the battery if the electrode board has sulfuration or there are a lot of deposits under the board. Be sure to shut off the ignition switch before replace the battery.
2. There is vitriol contained in the electrolyte, so avoid contacting the electrolyte with skin, eyes or clothes and go to hospital at once if splash the electrolyte on skin or into eyes.
3. Charge the battery in a ventilative place and far away from fire. stop charging when the temperature of electrolyte exceeds 45℃.
4. Send waste battery to recycle pin and deal with it according to regulations because waste battery will cause environmental pollution.
5. Energizing around 15 seconds first after replacing a storage battery, and then disconnect around 10 seconds. finally, Energizing again and resetting the ECU system to avoid no idle speed in a short period after replacing.

Fuse replacement

There is fuse in charging and discharging. If the current exceeds the stated value, the fuse will be burned out to protect the battery and electric components from damage.

CAUTION

If the fuse is burned-out, inspect it at service station of our company and replace the fuse with the same type.

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Wheel inspection

1. High tire pressure of motorcycle will decline the comfort of riding and quicken the abrasion of components. Low tire pressure will increase the rolling resistance of wheel, increase the fuel consumption. Seriously, it will make tire take off and damaged.
2. If the valve core of inner tire has leakage, repair or replace it. If the inner tire has leakage, repair or replace it.
3. Adjust the spoke wheel once per 300km and readjust the wheel after changing the broken spoke.
4. Inspect and adjust wheels periodically at service station of our company.

Limit value of outer tyre abrasion			The limit value of wheel warp		
Limit value of outer tyre abrasion	Front wheel	2.0mm	Limit value	Axial	spoke wheel 2.0mm Aluminum wheel 0.8mm
	Rear wheel	3.0mm		Radial	spoke wheel 2.0mm Aluminum wheel 0.8mm

Chain cleaning and adjustment

Clean mud and dirt of the chain with brush and cotton cloth, and then add some grease on it (Clean and grease it once per 500km), or take out the chain and dip in detergent for 30 minutes and then clean it. Do that several times and then take out chain to dry, then dip it in grease for 10 minutes. After that, take it out and wipe it. At last, assemble the chain and add grease. The open end of chain clip must be installed in the opposite direction as chain running.

Standard value of free stroke of driving chain: 15mm~25mm

Check if the free stroke is in the range of standard value. If less, the chain will be abraded very soon. And add wear piece in the lower chain box, so if the value is greater than the standard, the chain will abrade with the chain box to make noise. So the stroke of chain need to be readjusted. At the same time check the abrasion of sprocket and the chain. If it is bad, replace the whole set. When readjust the stroke of chain, release the nut and adjusting nut of rear wheel first. Attention, rotate the adjusting nut anticlockwise means tight, otherwise means release.

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Horn adjustment

The fixing nut and adjusting screw of horn will loose and horn will has no sound after running a certain time. Adjust horn must at the service station of our company. The users should never adjust the fixing nut and adjusting nut of horn. Otherwise, our company will comply with Three Guarantees.

Cleaning and storage

1. Cleaning

(1) Before cleaning the vehicle, block the tail of muffler. Then clean dust and dirt with high-pressure water gun. Do not make the pressure too high, otherwise it will clean grease on some parts (such as: wheel bearing, steering bearing, oil seal, etc.). (2) After cleaning the vehicle, dry motorcycle and parts with clean cotton cloth, dry driving chain and lubricate it. (3) Smear wax on the surface of varnished parts, antirust oil on chromed parts. Then start engine under idle speed condition for minutes.

2. Storage

(1) For long-term storage (above 60 days), store the vehicle after it is cleaned completely. Drain fuel in fuel tank, fuel pipe out and spray some antirust oil into fuel tank, then close fuel tank cap. (2) Disassemble spark plug, add 5ml SF10W30 or SF20W40 into cylinder, and assemble spark plug. Step starting lever for several times (turn ignition lock to OFF position) to make the lubeoil distribute evenly inside combustion chamber, which will make cylinder wall lubricated. (3) Disassemble driving chain, clean it and lubricate it. Reassemble the chain or store it in a plastic bag. Seal muffler tail with a plastic bag to avoid humidity or pollution. (4) Remove battery, charge it once slowly, and store it under a dry and no light environment. Do not store battery at a hot or humid environment: lower than 0℃ or higher than 30℃. (5) Disassemble control cables and lubricate them. Make tires off ground with wood block after inflate tires to stated pressure value. (6) Store the vehicle under a ventilated, dry, clean, rainproof and sunproof environment. Make the vehicle away from combustible materials and corrosive chemicals. (7) After storage, clean and check the vehicle completely, add fuel into fuel tank after cleaning antirust oil in it. Charge battery once slowly. Replace engine lubeoil if the vehicle is stored above 4 months.

The instructions for modification of electrical appliance

Bulb of headlamp can not be modified and changed bulb must be the same type (HS1 12V/35W); The power of electrical devices can not exceed 20W; Our company will not be responsible for all the consequences if you do not operate as required.

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■ BD250-2

■ BD250-3

■ BD250-5



■ BD250-6

■ BD250-7

■ BD250-11

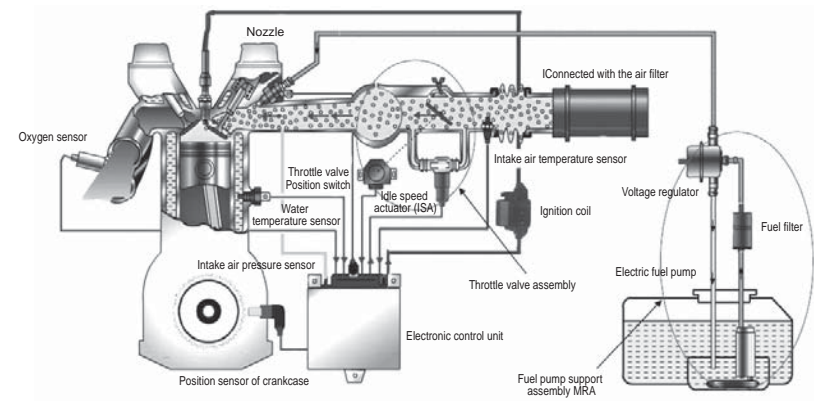
Electronic Injection System

Instructions for Assembly and Maintenance


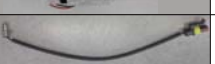


Introduction of Parts and Installation Precautions of ZMI Electronic Injection System


System Diagram



S/N	Parts Name	Installation and Working Environment Requirements	Parts Photo	Remarks
1	ECU	<ol style="list-style-type: none"> The controller must be connected with M5 bolts, and it shall ensure that the tightening torque is 3.9Nm±10%. The installation surface must be flat to prevent the controller circuit board from bending due to external stress on the controller. The ECU works normally at the ambient temperature between -20°C and +85°C. Prohibition: do not place the controller near the exhaust pipe or engine. Normal operating voltage of ECU is 9V-16V. 	 100080501, CG250D electronic injection and electronic control unit (ECU_ZSG4)	Although different types of engines and vehicles adopt the same model of ECU, different calibration procedures will be used, so they cannot be used interchangeably .
2	Fuel injector	<ol style="list-style-type: none"> Apply a small amount of lubricant to the lower side of O-ring and fuel injector seat during installation. ISO 10 light mineral oil or equivalent product is recommended. Prohibition: do not dip the nozzle end in the lubricant, which will cause the nozzle hole to be blocked. Operating temperature: -30-125°C 	 100078981, CG250D electronic fuel injector (mainland_10G-09) 100078981, CG250D electronic fuel injector (mainland_10G-09)	Choose model according to engine fuel consumption
3	Throttle valve assembly (integral and split)	<ol style="list-style-type: none"> Pay attention to the throttle valve installation direction; Prohibition: do not insert tools or other items into the throttle valve body to keep the valve block open. This may distort the valve block or scratch the inner wall of the throttle valve body; Do not immerse the throttle valve position sensor into the liquid. 	 100085554, integrated throttle valve q24 100124116, integrated throttle valve q26 100085553, integrated throttle valve q28 100124115, integrated throttle valve q30 100085555, integrated throttle valve q34 100124121, integrated throttle valve q36	Choose the caliber of throttle valve body according to engine displacement.

S/N	Parts Name	Installation and Working Environment Requirements	Parts Photo	Remarks
4	Oxygen sensor	<ol style="list-style-type: none"> Installation angle: included angle with the horizontal plane: $\pm 10^\circ$; Tightening torque: 40-60 Nm; Fuel quality requirements: <ul style="list-style-type: none"> P<0.002g/L S<0.10% (weight ratio) MMT<0.0085g/L S<4ppm Operating temperature range: 260-850°C 	 100080531, CG250D electronic injection oxygen sensor (heating type-G4)	Universal
5	Ignition coil (including high-voltage wire and spark plug cap)	<ol style="list-style-type: none"> Be as close as possible to the spark plug, and keep the high-voltage wire very short (less than 150mm); Stay away from inductive sensors, especially VR speed sensors and camshaft sensors. The ignition coil and VR sensor shall be kept at a minimum distance of 150mm; Prohibition: do not tie the ignition coil and the connection wire of the speed sensor together. There is a potential voltage of up to 200V between the ignition coil and the engine, which may interfere with the sensor signal; Installation torque: 8.8-11.8Nm; Input voltage: 9-14 VDC; Operating temperature: -30-110°C 	 100124000, CG250D electronic injection high pressure pack (2#, G4) 100124000, CG250D electronic injection high pressure pack (2#, G4)	Universal Special spark plug cap shall be replaced for special type.
6	Fuel oil pump assembly	<ol style="list-style-type: none"> Boundary dimensions of cover plate installed on the bottom surface: 115mm×70mm. Installation height: 55mm (from the bottom plane of the mailbox to the highest point of the pump body); Operating voltage: 10V-14V; Permanent physical damage can occur when the oil pump is not immersed in oil for rotating. 	 External oil return 100080144, CG250D electronic injection fuel pump assembly (4#) Internal oil return electronic injection fuel pump assembly (internal oil return)	Carry out selection according to the shape of the fuel tank and the arrangement space of the vehicle.
7	Cylinder temperature sensor	<ol style="list-style-type: none"> Operating temperature: -40-150°C; It is suitable for air cooled engine. 	 electronic injection cylinder head temperature sensor	Universal
8	Water temperature sensor	<ol style="list-style-type: none"> Normal operating temperature range: -40-135°C ; Installation torque requirements: minimum: 20 N·m, maximum: 25 N·m; It is suitable for water cooled engine. 	 Two-wire water temperature sensor code: 100201289 Three-wire water temperature sensor code: 100097091	Universal

S/N	Parts Name	Installation and Working Environment Requirements	Parts Photo	Remarks
9	Fuel filter	During the installation, the fuel will flow in the direction of the circular arc edge (refer to the figure on the right, i.e. flow from left to right).	 100125672, CG250D electronic injection fuel filter-2# (quick plug interface) 100201288, CG250D electronic injection fuel filter	Connected with high-pressure oil pipe with oil-way quick coupling Connected with high-pressure oil pipe through the hoop
10	Oil-way quick coupling	Connect the oil pump, fuel filter and high-pressure oil pipe.	 electronic injection button type middle-sized straight coupling 100104482, CG250D electronic injection button type middle-sized elbow coupling	Universal
11	Fuel pipe tee		 100204204, CG250D electronic injection fuel pipe tee 100304208, CG250D electronic injection fuel pipe tee (excluding support)	Universal (single-outlet oil pump, not needing this part)
12	Fuel injector mounting cap and gasket	Installed on the fuel injector for connection of high-pressure oil pipe. The picture on the right shows two types of fuel injector installation caps, which are selected according to the actual situation of the vehicle.	 100086450, CG250D electronic fuel injector pressing cap 100097864, CPS250 electronic fuel injector pressing cap	Universal

S/N	Parts Name	Installation and Working Environment Requirements	Parts Photo	Remarks
13	Intake pipe rubber bush	For connecting the intake pipe with the throttle valve body	 100201167, CG150D electronic injection intake pipe connected rubber bush 100201174, NC250 electronic injection intake pipe connecting pipe	Select and use according to the intake pipes matched with different engine types as well as the external size of the valve body. 110-150 commonly-used CG150D electronic injection connection rubber bush; 175-300 commonly-used NC250 electronic injection intake pipe connection rubber bush.
14	Catalyst	Select different catalyst specifications and formulations according to different vehicles.		
15	Cable of the vehicle	See (II. 2.) for detailed description.		

System Assembly Description

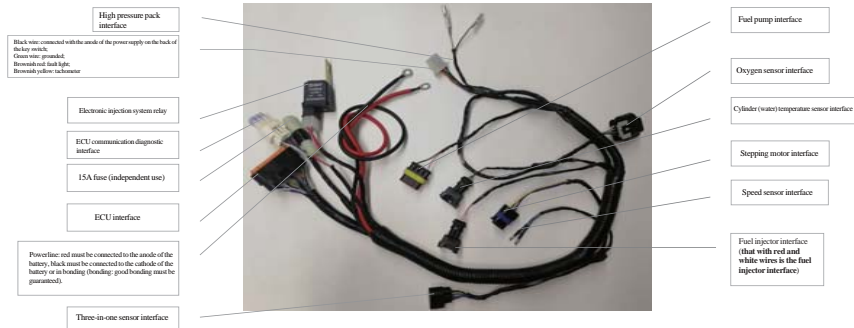
1. Definition of each pin of ECU and schematic diagram of wiring harness connection of single-cylinder engine (PDF version of the drawing, double click to open (it can be opened only when the PDF reader is installed in the computer))

2. Electronic injection sub-cable drawing and connection description

Scope of application and difference of two electronic injection main cable sub-cables	PDF version of the drawing, double click to open (it can be opened only when the PDF reader is installed in the computer)
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ERP Code	Name	Scope of Application	Characteristics (differences)
100121450	CG200-A tsunami electronic injection main cable sub-cable (ZSG4_three-in-one second-generation)	It is suitable for water cooled engine.	Water temperature sensor connector
100121451	CG150D National IV electronic injection main cable sub-cable (ZSG4 three-in-one second-generation)	It is suitable for air cooled engine.	Cylinder temperature sensor connector

Figure: 100121450 CG200-A tsunami electronic injection main cable sub-cable (ZSG4_three-in-one second-generation) (water-cooled wiring harness)



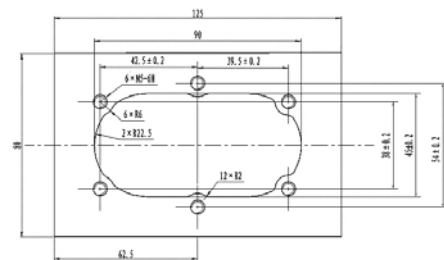
25

B. Reconstruction of fuel tank

For the reconstruction of sample car, the fuel tank baseplate can be manufactured by wire cutting (attached to the drawing) and then welded to the bottom of the fuel tank. M5 bolts are used for oil pump installation.

Schematic Diagram of Installation Baseplate of Electronic Injection Oil Pump

Material: Q235, thickness: 4mm



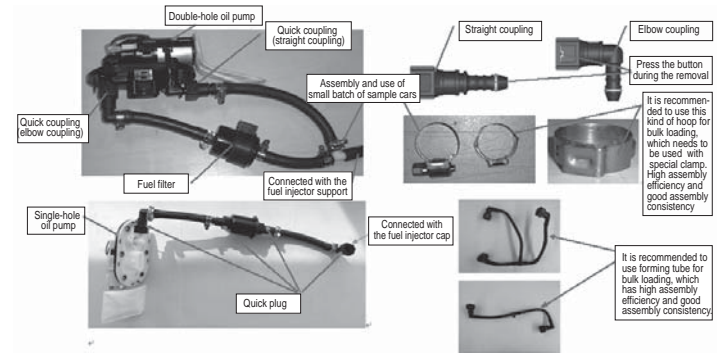
Important tips:

1. threaded mounting hole shall be made into a blind hole, which can avoid oil leakage better. Bolts must be tightened diagonally and evenly during installation.
2. Good flatness shall be guaranteed for the oil pump installation baseplate, then the uniform deformation and the amount of deformation of rubber sealing ring can be controlled, so as to ensure the airtightness. Meanwhile, it also needs enough strength (especially in batch molding), if not, easy deformation will occur, as well as oil leakage.

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3.Oil-way system

A. Connection diagram of all components and parts:



Precautions: special quick coupling shall be used for connecting the oil outlet and return interface of oil pump, and customers can choose straight coupling or elbow coupling according to the installation position requirements of vehicle models.

Since the oil pressure in the oil way of electronic injection system is 250kpa, special high pressure oil pipe must be used for the oil-way rubber hose. If common rubber hose is used, rubber hose burst will be caused, as well as dangerous accident.

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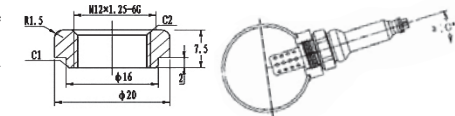
4.Installation of oxygen sensor

A. Process the installation seat of oxygen sensor according to the figure below;

B. The oxygen sensor is installed 100-150mm from the exhaust port.

C. Installation angle: included angle with the horizontal plane: ≥ 10

D. Tighteningtorque (18±1.5) Nm



The installation surface shall be flat without burrs, ensuring good tightness after installing oxygen sensor.

For full weld, it needs to check the air tightness. Special attention shall be paid to the stainless steel silencer!

Notes:

- ① The oxygen sensor shall be installed and welded onto the silencer. The weld shall be fully welded and the air tightness shall be guaranteed;
- ② For full weld, it needs to check the air tightness. Special attention shall be paid to the stainless steel silencer;
- ③ Before installing the oxygen sensor, it is necessary to check whether there is welding slag in the threaded hole and on the surface of the mounting base. If welding slag is found, it shall be removed before installation, so as to ensure the good tightness of the oxygen sensor after installation.
- ④ Check for air leakage after installation.

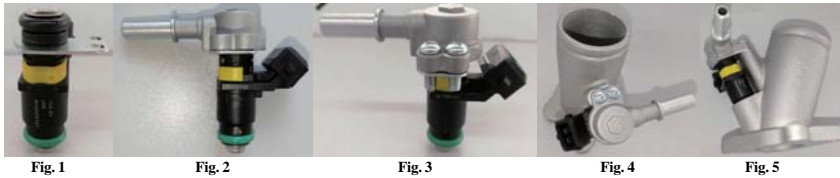
28

5. Fuel evaporation system



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7. Installation of fuel injector and related accessories



Attention: during the installation of the fuel injector, the O-ring must be lubricated. Otherwise, it is easy to damage the O-ring to cause untight seal, eventually resulting in the vehicle idling abnormal.

8. Catalytic encapsulation

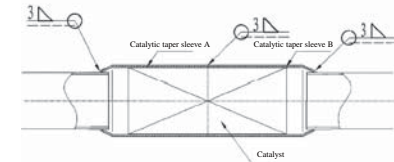
- The recommended location of catalyst is 500±50mm from the exhaust port;
- Reasonable transition, uniform welding;
- It is recommended to adopt the double-taper sleeve encapsulation (as shown in the figure below), and two ends are connected with the exhaust pipe by welding;
- It is forbidden to assemble the catalyst by striking or pressing, so that the catalyst can be pressed into the taper sleeve with the force of hand;
- The connection part between the two ends of the taper sleeve and the silencer pipe, as well as between the taper sleeve, shall be welded to ensure that the catalyst does not move relatively within the taper sleeve.

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6. Assembly of ignition coil and high voltage wire



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9. Installation precautions

1. The requirement of power supply for electronic injection system is respectively high, so the rectifier voltage regulator with reliable quality shall be used. Exceeding the normal operating voltage will cause abnormal operation of the electronic injection system and even burn down the components and parts.

2. Since all components and parts of the electronic injection system need to be driven by power, the minimum working voltage of these components and parts is 9V. Therefore, it shall choose battery with large capacity as far as possible, and ensure that the battery voltage is not less than 9V during electrical starting.

3. Circuit problem of the vehicle

As the electrical injection system is different from the carburetor system, the signal requirement is much higher, so the grounding signal of ECU must be put on the engine separately, and the grounding signal of the vehicle line shall be separated. The power supply line of the electronic injection system cannot be laid on the starting relay, but it needs to be directly connected to the battery, separating from the vehicle's large current.

10. Description of partial phenomenon in the electronic injection vehicle

The rotating speed rises during starting, and the speed will be reduced gradually to normal idle speed after successful starting.

Zongshen electronic injection system has idle control valve (stepper motor). In order to ensure good startup performance, the stepper motor has a large opening at startup, so the engine's air intake is correspondingly large (larger than the air required at idle). After the standby engine is started successfully, ECU will automatically control the stepper motor to gradually reduce the opening.

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■ System Fault Diagnosis Function Introduction

OBD is short for On-Board Diagnostic. When there is fault in the system, the fault light (MIL) will be ON, and the OBD system will store the fault information in the memory. The relevant information can be read in the form of fault codes through standard diagnostic instruments and diagnostic interfaces. According to the indication of the fault code, the maintenance personnel can quickly and accurately determine the nature and location of the fault.

1、Maintenance instructions for electronic injection system

Special note: please use genuine parts, otherwise the normal operation of the electronic injection system cannot be guaranteed. Although some parts are similar in installation dimension and boundary dimension, their performance parameters are not the same at all.

Precautions during maintenance (for important items, please read carefully)

- ① Be sure to turn off the ignition switch when disconnecting or connecting the plug-in, otherwise it may damage the electrical components.
- ② The oil supply pressure of the electronic injection system is high (about 250kpa), and all fuel pipelines are high-pressure resistant pipes. High fuel pressure is maintained in the oil-way for a long time after the engine stops running. Therefore, do not remove the oil pipe easily in the maintenance process. Before removing the oil pipe, the fuel system shall be decompressed. Methods of decompression:

- Vehicle transmission is in the state of "neutral gear";
 - Disconnect the plug connector between the wiring harness of oil pump assembly and vehicle wiring harness;
 - Start the engine till the engine automatically extinguishes, then continuously switch the ignition key for 2-3 times at the time interval of three seconds each time, and then turn off the key switch;
 - After the above operations are completed, the oil pipe can be removed. After the oil pipe is reinstalled, reconnect the wiring harness plug connector of the pump assembly.
- ③ Do not electrify the fuel pump when it is removed from the fuel tank to avoid sparking the fire.
 - ④ The fuel pump shall not be tested in dry condition or in water.
 - ⑤ Idle speed regulation is completely solidified by the electronic injection system program, without manual regulation. Throttle limit screw of the throttle valve has been adjusted in the factory, and users are not allowed to change its initial position at will.
 - ⑥ The battery is not allowed to be removed while the engine is running.

4. Fault indicator description and control strategy

The fault indicator is generally an indicator light that can be displayed on the instrument and whose shape meets the requirements of the regulatory standards (National IV and Euro IV regulations have corresponding requirements, please refer to the corresponding regulatory documents for details).

The working instructions of the fault indicator light are as follows:

- ① In normal mode, and when there is no current fault code.

Turn on the ignition switch, initialize the ECU, the fault light will be ON, and the MIL light will be OFF immediately after the engine starts successfully.

- ② When the current fault code exists.

At the running time of the engine, if the current fault occurs, the fault light will be ON from OFF to remind the driver that there is a fault. When the engine goes out, the current fault is converted into a historical fault stored in the ECU.

ECU reset

In special cases, ECU reset can be performed, and the ECU reset will clear all fault codes and all self-learning data. Due to the reset and clearing of all ECU self-learning data at the same time, there may be some abnormal conditions in the vehicle, which needs to return to normal after the ECU completes the self-adaptive learning again. Specific reset operation methods are as follows:

- 1) Open the key;
- 2) Throttle opening unchanged is =0%, maintain it above 2S;
- 3) Maintain the full throttle opening above 2s;
- 4) Return the throttle back to zero, and increase the opening to full opening within 0.1s and 1s, and the indicator light will be OFF;
- 5) The above operation must be completed within 15s;
- 6) Reset operation shall be started for ECU;
- 7) After the indicator light goes off and starts timing 5s, the initialization is completed to close the key;

2. Fault information records

The electronic control unit continuously monitors sensors, actuators, associated circuits, fault indicator lamp and battery voltage, etc., and electronic control unit itself, and reliability test is carried out for the sensor output signals, actuator driving and internal signals (such as λ closed-loop control, cylinder temperature/coolant temperature, idle speed control, battery voltage control, etc.). Once a fault is found in a certain link or a certain signal value is not trusted, the electronic control unit immediately sets up the fault information record in the fault memory of RAM. Fault information records are stored in the form of fault code, the current existence of fault code has been known as a current fault code, due to causes such as poor contact of the transient fault, and the current missing record is the historical fault code, which has been troubleshot, but the operation of eliminating malfunction code is not carried out, the fault information records also can be stored in the form of historical fault code in the fault memory.

3. List of fault codes

Fault Code	Cause	Fault Code	Cause
P0032	Short circuit of oxygen sensor heating control signal	P0123	Short circuit of throttle position signal line
P0031	Open circuit of oxygen sensor heating control signal	P0122	Open circuit of throttle position signal line
P0132	Open circuit of oxygen sensor signal line	P0231	Open circuit of oil pump circuit
P0131	Short circuit of oxygen sensor signal line	P0262	Short circuit of fuel injector signal line
P0108	Short circuit of intake manifold absolute pressure signal line	P0261	Open circuit of fuel injector signal line
P0107	Open circuit of intake manifold absolute pressure signal line	P0336	Interference waves interfere with crankshaft position signal or convex hull of the magneto rotor is not uniform.
P0118	Open circuit of engine temperature signal line	P0337	Open circuit of crankshaft position
P0117	Short circuit of engine temperature signal line	P2300	Open circuit of ignition control circuit
P0113	Open circuit of engine intake temperature signal line	P0505	Step loss of stepping motor (the bypass valve is stuck or the actual opening of the bypass valve is not consistent with the ECU control opening)
P0112	Short circuit of engine intake temperature signal line		

5. Connection and usage of diagnostic instrument

Functions of diagnostic instrument: reading fault code, clearing fault code, displaying data flow and status identification, etc.

- ① Connect the diagnostic instrument to the diagnostic interface on the electronic injection wiring harness;
- ② Switch on the ignition switch;
- ③ Read the fault code; check maintenance manual to confirm fault parts and types; and make maintenance scheme according to inquiry information and experience;
- ④ After troubleshooting, remove the historical fault codes with the fault diagnosis instrument.



The connecting line is connected with the diagnostic interface on the electronic injection wiring harness.

6- Procedures for overhaul according to fault codes

If the fault code is described as open circuit, short circuit and parts fault, first check whether the circuit and connector are installed in place, and whether the plug connector is oxidized to cause poor contact or even circuit fault. If the fault is not eliminated, replace the corresponding sensor or ECU.

7- Diagnosis procedures for overhaul according to fault phenomena

Prior to starting the steps of fault diagnosis based on engine fault phenomena, initial inspection shall be carried out first:

- ① Confirm that the engine fault indicator light is working normally;
- ② Check with fault diagnosis instrument and confirm that there is no fault information record;
- ③ Confirm the existence of the fault of the vehicle owner's complaint, and confirm the occurrence of the fault conditions.

And then carry out appearance inspection:

- ① Check whether there is any leakage of fuel pipeline;
- ② Check whether the intake pipe is blocked, leaking, compressed or damaged;
- ③ Check whether the high voltage wire of the ignition system is broken and aged, and whether the ignition sequence is correct;
- ④ Check whether the wiring harness grounding place is clean and firm;
- ⑤ Check whether the sensor and actuator connectors are loose or not in good contact;
- ⑥ Check whether the connecting line from the fuel injector, the pressure temperature sensor and the intake pipe negative pressure nozzle to the solenoid valve of the carbon tank leaks.

Important note: If the above phenomenon exists, carry out maintenance for the fault phenomenon first, otherwise it will affect the subsequent fault diagnosis and maintenance work.

2- When starting, the engine can be towed but cannot start successfully.

General fault location: 1: no fuel in the fuel tank; 2: fuel pump; 3: speed sensor; 4: ignition coil; 5: mechanical part of engine

General diagnostic procedure:

S/N	Operating Steps	Follow-up Steps
1	Connect the adapter of the electronic injection system, turn on the ignition switch, and check whether the power supply of 13, 18 and 19 pins is normal; check whether the bonding of pin 10 is normal, and whether the bonding between the engine and battery is good.	Overhaul the corresponding lines.
2	Connect the electronic injection system diagnostic instrument, observe the data item of "engine speed", start the engine, and observe whether there is speed signal output.	Overhaul the speed sensor line and the speed sensor, and confirm that magneto rotor is 24-1 toothed.
3	Remove the spark plug cap and connect the spark plug to the engine body, start the engine and check for continuous blue and white high pressure fire.	Overhaul the ignition system.
4	Connect the fuel pressure gauge and open the key switch to check whether the fuel pressure is around 250kPa. If there is no fuel pressure gauge, pinch the high pressure oil pipe with your hands to check the hardness.	Overhaul the oil supply system.
5	Check the pressure of each cylinder of the engine to see if there is insufficient pressure in the cylinder.	Carry out mechanical troubleshooting of the engine (pay attention to checking whether the engine valve clearance is too small).
6	Remove the fuel injector from the intake pipe (not removing the oil-way and wiring harness connector), start the engine and check whether there is fuel injection.	Carry out maintenance of fuel injector line and the fuel injector.

▲ Common fault phenomena:

- When starting, the engine does not turn or turns slowly.
- When starting, the engine can be towed but cannot start successfully.
- It is difficult to start.
- It starts normally, with unstable idle speed.
- It starts normally, with too high idle speed.
- During acceleration, the speed cannot go up or the engine stalls, with slow acceleration response and poor acceleration performance, powerless.

1- When starting, the engine does not turn or turns slowly.

General fault location: 1: battery; 2: starter motor; 3: wiring harness or starting relay and related control circuits; 4: mechanical part of engine

General diagnostic procedure:

S/N	Test steps	Follow-up Steps
1	Use the multimeter to check the voltage between the two terminals of the battery, and check whether it is about 9-12v when the engine starts.	Replace battery
2	The ignition switch shall be kept in the starting position, and the multimeter shall be used to check whether the terminal of the anode of the starter motor has the voltage above 9V.	Check the relevant circuits of the starter motor.
3	Remove the starter motor and check the working condition of it. Focus on checking whether it is broken or stuck due to poor lubrication.	Repair or replace the starter motor.
4	If the fault occurs only in winter, check whether the improper selection of engine lubricating oil causes excessive resistance to the starter motor.	Replace the lubricating oil with appropriate label.
5	Check whether the internal mechanical resistance of the engine is too large, and whether the starter transmission system works properly.	Overhaul the engine interior. properly.

3- It is difficult to start.

General fault location: 1: water in the fuel; 2: fuel pump; 3: coolant temperature sensor; 4: fuel injector; 5: ignition coil; 6: throttle valve body and idle bypass ventilation channel; 7: air inlet; 8: ignition timing; 9: spark plug; 10: mechanical part of engine

General diagnostic procedure:

S/N	Operating Steps	Follow-up Steps
1	Remove the coolant temperature (cylinder head temperature) sensor connector, start the engine and observe whether the engine is started successfully.	Overhaul the line or replace the coolant temperature (cylinder head temperature) sensor.
2	Connect the fuel pressure gauge and open the key switch to check whether the fuel pressure is around 250kPa (do not judge by hands).	Overhaul the oil supply system.
3	Remove the spark plug cap and connect the spark plug to the engine body, start the engine and check for continuous blue and white high pressure fire.	Overhaul the ignition system.
4	Gently add the valve and observe whether it is easy to start.	Clean the throttle valve and the idle bypass ventilation channel.
5	Check the air filter for blockage and air leakage in the air inlet (especially the connection of the intake pipe).	Overhaul the intake system.
6	Check spark plug to see if its type and clearance comply with the specification.	Adjust or replace
7	Check the engine cylinder pressure and see if there is any cylinder pressure deficiency.	Carry out mechanical troubleshooting of the engine (pay attention to checking whether the engine valve clearance is too small).
8	Check whether the fuel label (containing ethanol or not) meets the requirements of the vehicle.	Replace fuel

4. It starts normally, with unstable idle speed.

General fault location: 1: water in the fuel; 2: fuel injector; 3: spark plug; 4: throttle valve body and idle bypass ventilation channel; 5: air inlet; 6: idle speed regulator; 7: ignition timing; 8: sparking plug; 9: mechanical part of engine; 10: coolant (cylinder) temperature sensor

General diagnostic procedure:

S/N	Operating Steps	Follow-up Steps	Remarks
1	Check the air filter for blockage and air leakage in the intake system.	Overhaul the intake system.	
2	Check whether the throttle valve is stuck.	Clean or replace	
3	Check spark plug to see if its type and clearance comply with the specification.	Adjust or replace	
4	Check whether there is carbon deposition in the throttle valve body and idle bypass ventilation channel.	Clean	
5	Check whether the fuel label (containing ethanol or not) meets the requirements of the vehicle.	Replace fuel	
6	Check the engine cylinder pressure and see if there is any cylinder pressure deficiency.	Carry out mechanical troubleshooting of the engine (pay attention to checking whether the engine valve clearance is too small).	
7	Check whether the ignition sequence and ignition timing of the engine comply with the specification.	Carry out maintenance of ignition timing	
8	Check whether there is leakage, blockage or overflow of the fuel injector.	Replace for fault	
9	Pull down the coolant temperature sensor connector, start the engine, and observe whether the engine is idling unsteadily during warm-up..	Repair lines or replace sensors	The idle speed is unstable during the warm-up.

Check spark plug to see if its type and clearance comply with the specification.

S/N	Operating Steps	Follow-up Steps	Remarks
1	Check the air filter for blockage.	Overhaul the intake system.	
2	Connect the fuel pressure gauge and start the engine to check whether the fuel pressure of the engine is around 250kPa under all working conditions.	Overhaul the oil supply system.	
3	Check spark plug to see if its type and clearance comply with the specification.	Adjust or replace	
4	Remove the idle speed regulator, and check whether there is carbon deposition in the throttle valve body, idle speed regulator and idle bypass ventilation channel.	Clean the relevant components and parts.	
5	Check whether the intake pressure sensor, throttle position sensor and its circuit are normal.	Repair lines or replace sensors	
6	Check whether there is leakage or blockage of the fuel injector.	Replace for fault	
7	Check whether the fuel label (containing ethanol or not) meets the requirements of the vehicle.	Replace fuel	
8	Check whether the ignition sequence and ignition timing of the engine comply with the specification.	Carry out maintenance of ignition timing	
9	Check whether the exhaust pipe is smooth.	Repair or replace the exhaust pipe.	
10	Remove the spark plug cap and connect the spark plug to the engine body, start the engine and check for continuous blue and white high pressure fire.	Overhaul the ignition system.	
11	Check for clutch slippage, low tire pressure, brake drag, and user adjustment of final-stage transmission ratio.	Repair	Poor acceleration performance, powerless

5. It starts normally, with too high idle speed.

General fault location: 1: throttle valve body and idle bypass ventilation channel; 2: idle speed regulator; 3: coolant temperature sensor; 4: Ignition timing

General diagnostic procedure:

S/N	Operating Steps	Follow-up Steps
1	Check whether the throttle cable is jammed or too tight, resulting in that the throttle valve is not fully closed.	Adjust
2	Check the intake system for air leakage	Overhaul the intake system.
3	Remove the idle speed regulator, and check whether there is carbon deposition in the throttle valve body, idle speed regulator and idle bypass ventilation channel.	Clean the relevant components and parts.
4	Pull down the coolant temperature sensor connector, start the engine, and observe whether the engine is idling too fast.	Repair lines or replace sensors
5	Check whether the ignition timing of the engine complies with the specification.	Carry out maintenance of ignition timing

6. During acceleration, the speed cannot go up or the engine stalls, with slow acceleration response and poor acceleration performance, powerless.

General fault location: 1: water in the fuel; 2: intake pressure sensor and throttle position sensor; 3: spark plug; 4: throttle valve body and idle bypass ventilation channel; 5: air inlet; 6: idle speed regulator; 7: fuel injector; 8: ignition timing; 9: mechanical part of engine; 10: exhaust pipe

General diagnostic procedure:

OWNER'S MANUAL

**Model Covered: BD250-2 BD250-3
BD250-5 BD250-6
BD250-7 BD250-11**

Website: www.xprousa.com