3. Electronic fuel injection system

Notice before service

1. The structure and working principle of the EFI system are relatively complex. Before checking and troubleshooting, you need to have a certain understanding of the working principle and structural characteristics of each EFI system . The content of this chapter requires certain maintenance experience . It is recommended to go to a qualified maintenance unit for inspection or maintenance.
2. Please keep the fuel in the fuel tank at least 3 L (3.17 US qt, 2.64 lmp qt, 0.79 US gal, 0.66 lmp gal), otherwise it will affect the normal operation of the electronic fuel injection system. Please add fuel as soon as possible when the measurement is 1 grid or lower than 1 grid .
3. Before starting the vehicle for the first time after it has been parked for more than 3 hours, you should first power on the vehicle, turn on the ignition switch " " and wait for the fuel pump to complete fuel pressurization before starting the vehicle.
4. If the start fails several times, the cylinder may be flooded. You need to turn the throttle to the bottom and press the start button for 3 seconds to perform the cylinder cleaning procedure.
5. If the low battery voltage indicator flashes, the battery should be charged in time ; too low voltage may cause the electronic fuel injection components to not work properly, fail to start or start with difficulty, insufficient power, etc.
6. When reinstalling the battery , when there is a sudden power outage during driving , when the idling speed is abnormal, when replugging the fuse, etc., the EFI system needs to be reset. The specific method is as follows:
   a. Unlock the vehicle and raise the main stand;
   b. Press the brake and start the vehicle;
   c. Increase the engine speed to over 3000 rpm ;
   d. After releasing the accelerator, turn off the ignition switch and lock the vehicle;
   e. Wait for 5 seconds and then unlock the vehicle again to reset the EFI system.
7. When checking or troubleshooting the EFI system, please note:
   a. After power is turned on, do not remove components connected to the 12V power supply at will to avoid the coil in the appliance generating self-inductance and causing instantaneous voltage to damage the ECU or sensor.
   b. Do not blindly dismantle and inspect when a fault occurs . Make sure the mechanical part is normal before checking the electronic control part.
   c. When diagnosing a fault, give priority to using a diagnostic instrument to read the fault code or determine the fault code based on the flashing frequency of the fault indicator light , and conduct targeted inspections.
   d. Check whether the EFI components are oxidized and whether the connections are reliable.

tool:

MST-500P diagnostic instrument	PT300 EFI diagnostic instrument (16PIN)	multimeter
		

● Both diagnostic instruments can read fault codes ; the PT300 diagnostic instrument can be flashed with programs.

8. The driving conditions and maintenance status of each vehicle are different, so it is impossible to list all the fault phenomena and troubleshooting procedures. Only some of the more common faults can be listed. The maintenance personnel themselves also need to have certain professional knowledge and experience accumulation process.
9. If there is a " " symbol on the right side of the step , you can click it to quickly jump to the corresponding step.

WARNING

● For new vehicles or vehicles that are about to run out of fuel, do not turn on the shutdown switch. Be sure to add enough fuel before turning it on, otherwise the fuel pump will run idle without oil and cause damage.
● Do not plug or unplug the plugs of the components at will, and do not clean the plugs directly with water. Be sure to check whether they are plugged back in correctly after plugging or unplugging .

Fault Codes

Notice:

●Unlock the vehicle and turn on the ignition switch. It is normal for the EFI fault light to be on when it is not started. If it is not on , the vehicle cannot be started.

● If the fault light comes on after starting the vehicle, indicating an EFI fault, it means there is something wrong with the EFI system.

●When the EFI system reports a fault, continuing to drive the vehicle may cause damage. Please contact a qualified maintenance unit or our authorized maintenance point for inspection in a timely manner .

1. Read the fault code through the instrument

When the engine is running, if the instrument EFI fault indicator light " " is on, it means that there is a fault in the EFI component that needs to be eliminated.

read the fault code in the ZONTES Smart APP .

Shengshi Smart APP QR code

2. Read the fault code through the diagnostic instrument

Power on the vehicle, remove the cover of the storage box and the OBD protective cover , connect the diagnostic instrument to read the fault code . The color of the OBD plug may be different in different batches. There are two colors, black and white, and the functions are the same.

Code	illustrate	Code	illustrate
P0030	Upstream 1 cylinder oxygen sensor heating control circuit open	PD116	The engine coolant temperature sensor signal is unreasonable
P0031	The voltage of the upstream cylinder 1 oxygen sensor heating control circuit is too low	P0117	Engine coolant temperature sensor circuit voltage is too low
P0032	The voltage of the upstream cylinder 1 oxygen sensor heating control circuit is too high	P0118	Engine coolant temperature sensor circuit voltage is too high
P0106	Intake pressure sensor/atmospheric pressure sensor is unreasonable	P0122	Throttle position sensor circuit voltage is below the limit
P0107	Intake air pressure sensor short circuit to ground	P0123	Throttle position sensor circuit voltage exceeds limit
P0108	Intake air pressure sensor short circuit to power supply	P0130	The upstream cylinder 1 oxygen sensor signal is unreasonable
P0112	Intake air temperature sensor signal voltage is too low	P0131	Upstream cylinder 1 oxygen sensor signal is too low
P0113	Intake air temperature sensor signal voltage is too high	P0132	Upstream 1 cylinder oxygen sensor signal circuit voltage is too high
P0134	Upstream 1 cylinder oxygen sensor circuit signal failure	P0627	Oil pump relay control circuit open
P0201	1 cylinder injector control circuit open	P0629	The oil pump relay control circuit is short-circuited to the power supply
P0261	1 cylinder injector control circuit short circuit to ground	P0650	MIL lamp driver circuit failure
P0262	1 cylinder injector control circuit short circuit to power supply	P0444	Carbon canister solenoid valve open circuit
P0322	No speed sensor pulse signal (open circuit or short circuit)	P0459	Carbon canister solenoid valve short circuit to power supply
P0480	Fan control circuit open	P0458	Carbon canister solenoid valve short circuit to ground
P0691	The fan control circuit is short-circuited to ground	P2300	1 cylinder ignition coil short circuit to ground
P0692	The fan control circuit is short-circuited to the power supply	P0628	The voltage of the oil pump relay control circuit is too low
P0511	Idle actuator control circuit open	P1098	The signal voltage of the tipping sensor is too low
P0563	System battery voltage is too high	P1099	The signal voltage of the dump sensor is too high

3. Clear fault codes

After troubleshooting the EFI fault, it needs to be cleared manually or through a diagnostic instrument .

3.1 Manual Removal

Manually clear historical faults and reset the ECU : Power on the vehicle and turn the ignition switch on and off for more than five times (on - off counts as one time). If the ignition switch is turned on and the fault light does not light up, it means that the ECU has been reset successfully.

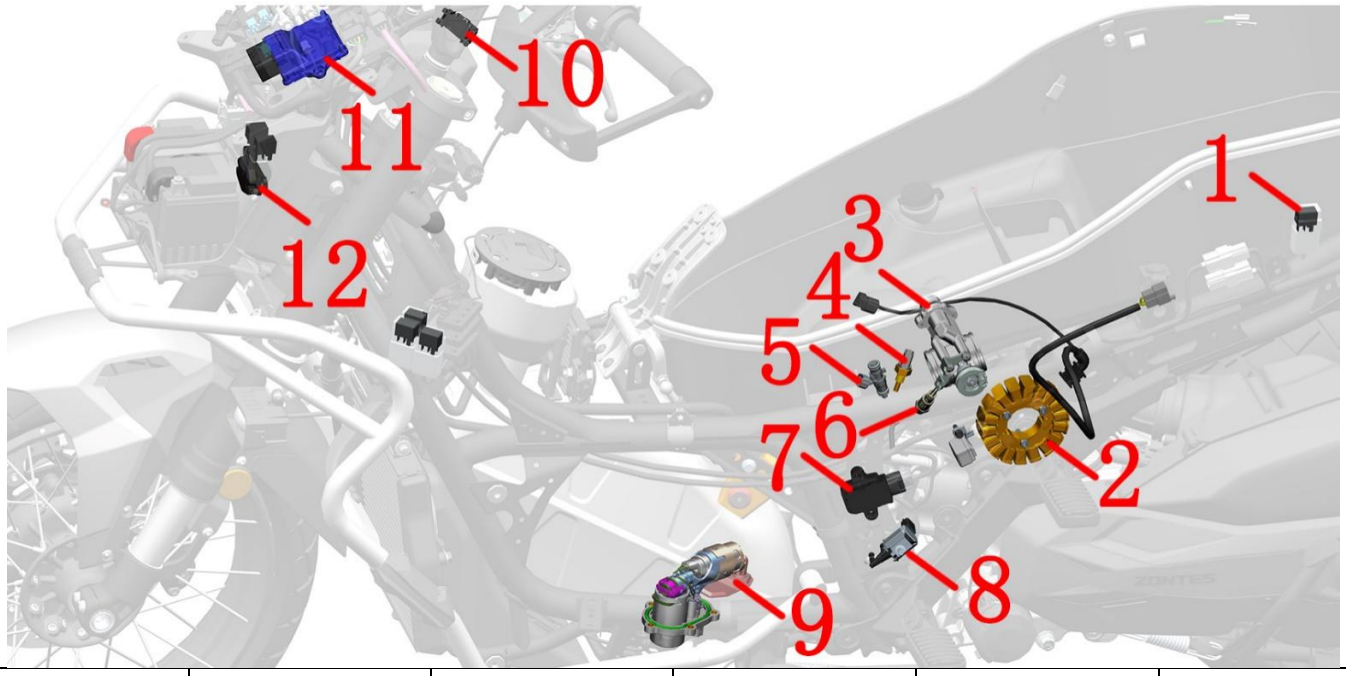
3.2 Clear using diagnostic instrument

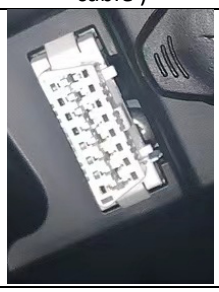
different brands or models may vary , so please refer to the description in the diagnostic tool manual to clear the fault code.


CAUTION

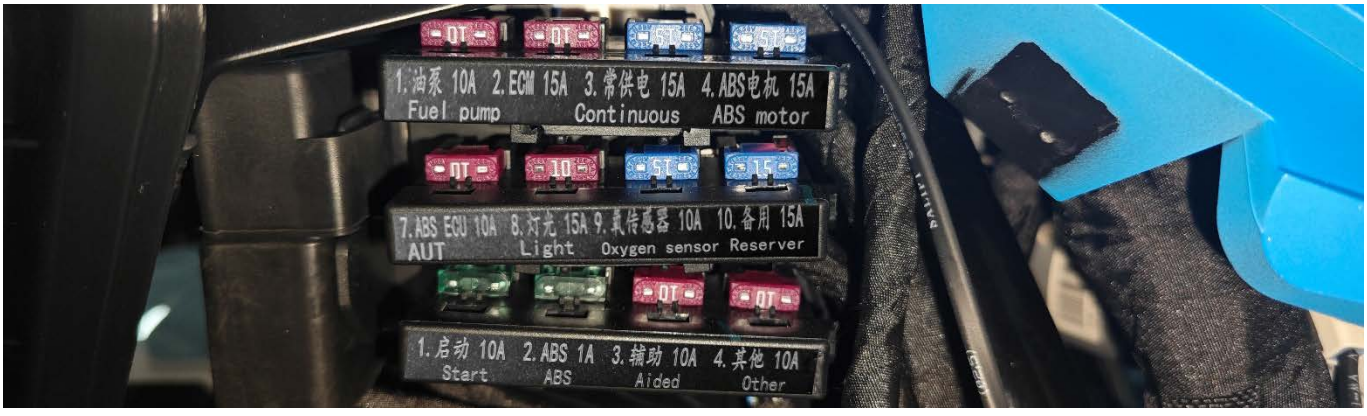
If the fault light does not light up during engine operation and flashes after the engine is turned off, it is a historical fault that will not affect the performance and life of the vehicle and will disappear automatically later.

EFI parts layout



1	2	3	4	5	6
EFI relay	Crankshaft Position Sensor	Throttle body	Water and oil common sensor	Fuel Injector	Oxygen Sensor
					
7	8	9	10	11	12
Ignition coil	Carbon canister solenoid valve	Fuel Pump	OBD diagnostic interface (main cable)	ECU	Dump switch
					

* The throttle valve assembly includes (sensor, idle speed control valve, stepper motor) . The crankshaft position sensor is integrated with the magneto stator.



Fault diagnosis and troubleshooting of EFI parts

Notice:

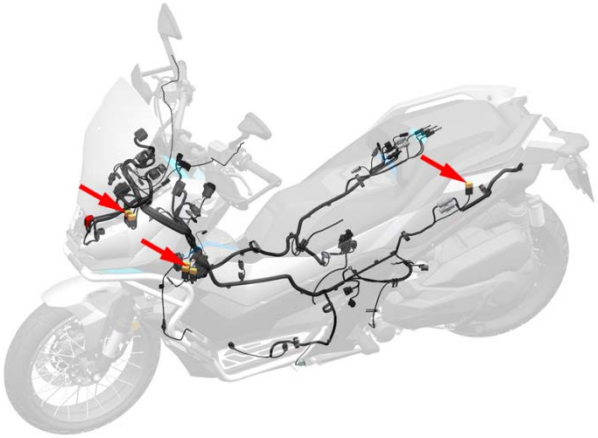
● Once the EFI parts are removed, the EFI system needs to be reset. For detailed methods, refer to the service information in this chapter.

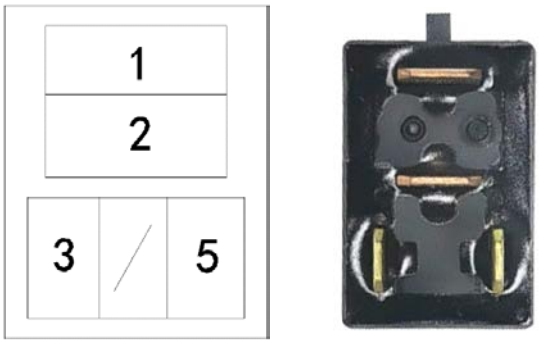
●Fuel pump, three-in-one sensor, stepper motor, ECU, etc. are precision parts. If they are disassembled without permission, they may be damaged, and they are not covered by the three guarantees due to human factors .

● After removing the throttle body, use lint- free cloth or masking paper to seal the air filter outlet and intake manifold to prevent foreign matter from entering .

1. EFI relay

6 relays (starting aid, light, fuel tank lock, fuel pump, ECM main relay, cooling fan) on the relay bracket on the left side of the head front riser . 2 are on the head bracket, 3 are near the fuse box, and 1 is on the left tail cover.





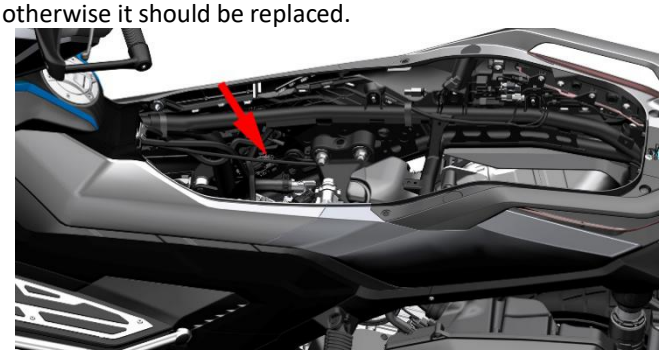
Cable end relay

3 and 5 are normally closed contacts, which can be tested with the beeping mode of a multimeter. 1 and 2 are normally open contacts. Otherwise, it can be judged as a relay failure.

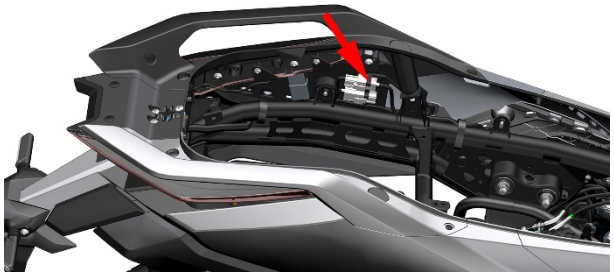
2. Crankshaft position sensor

When the engine fails to start cleanly or has difficulty starting, poor acceleration, unstable idle speed, or intermittent flameout, check whether the crankshaft position sensor is normal.

crankshaft position sensor is installed on the right crankcase cover and integrated with the magneto stator . Find the sensor plug in front of the right side cradle of the vehicle body , press the head anti-drop lock and pull it out. Use a multimeter to measure the resistance of the crankshaft position sensor at 25 ℃ (77F). It should be 150±20Ω , otherwise it should be replaced.



Find the plug on the inside of the left tail cover of the motorcycle body. In addition, use a multimeter to measure the phase-to-phase resistance of any two terminals of the three -pin plug of the magneto stator. It should be 0.7 ± 0.15Ω at 25 ℃ (77F) .



3. Throttle valve body

3.1 Common fault phenomena

1. The engine is prone to stalling while the vehicle is driving and is difficult to start , especially when it is cold.

2. The idle speed is unstable or there is no idle speed, and there is intermittent shaking when accelerating .

3. Insufficient power leads to poor acceleration performance and unstable operation.

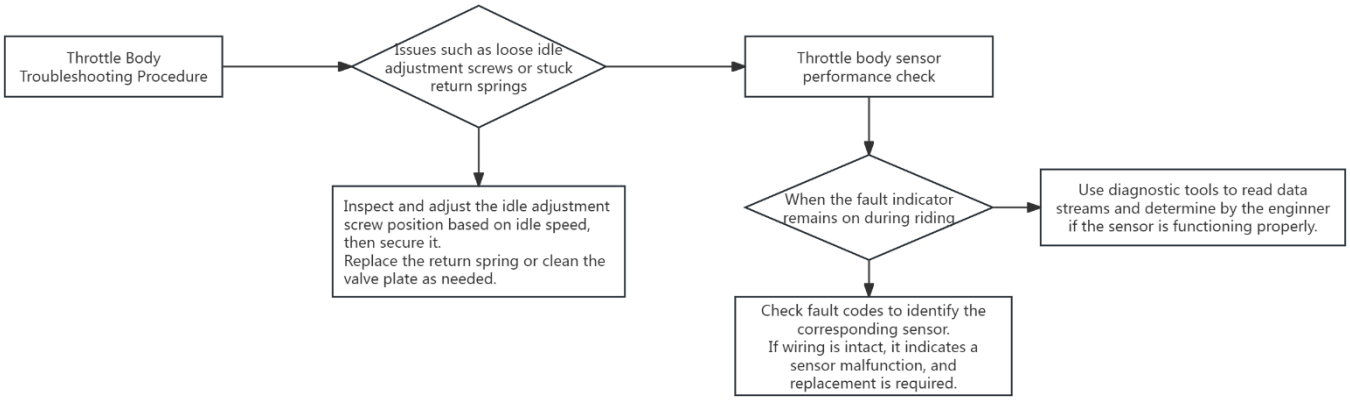
3.2 Sensors

For details on the disassembly, assembly and inspection of the throttle valve position sensor and external intake pressure sensor, please refer to the previous section on the throttle valve body .

Air filter intake temperature sensor

Remove the temperature sensor from the air filter, place it in an ambient temperature (20 to 30 °C), and use a multimeter to check whether the resistance of the two pins is between 2726 and 1770 Ω.

3.3 Troubleshooting process



4. Water and oil shared sensor

When the engine is difficult to start, the idle speed is unstable, the engine performance is poor, and it is easy to stall, you need to check whether this sensor is abnormal. You can use the diagnostic instrument to read the fault code to confirm whether the water-oil shared sensor is faulty.

First , refer to the steps for removing the storage box to remove the storage box , and refer to the steps for removing the throttle body to remove the throttle body to facilitate the removal of the water-oil common sensor. Located on the right side of the intake manifold . First, pinch the top of the plug, press the anti-drop card, and then pull out the plug.

of the two pins of the multimeter at room temperature is: 1.5 ~ 4.0kΩ .

Due to limited space , it is recommended to use a 72-tooth 17 # ratchet wrench to remove the water-oil common sensor counterclockwise and remove the 9×2 EPDM rubber O-ring. When reassembling, replace the new O- ring to avoid leakage.

Standard torque: 13 ± 1.5 Nm (1.3 ± 0.2 kgf.m, 10 ± 1 lbf.ft)

5. Injector

When the engine is unstable, has poor acceleration and poor power performance , you need to check whether the injector is normal .

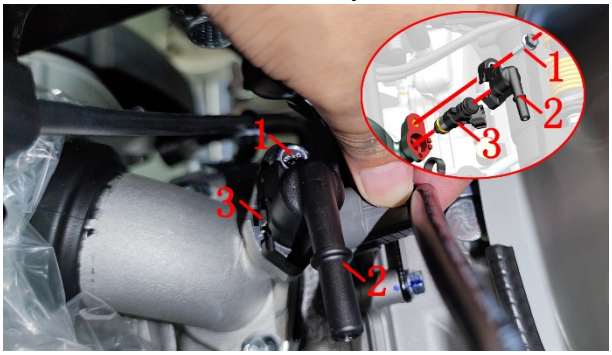
The seat cushions and storage box must be removed first .

can be determined by the following methods :

a. After parking the vehicle firmly, start the engine and let it run at idle speed. Use a stethoscope or a stethoscope to listen to the working sound of the cylinder. You should be able to hear the rhythmic working sound of the injector. If the sound is crisp and even, it is working properly. If the sound is small or inaudible, remove the injector for inspection. Or if the engine shuts down when the injector plug is unplugged , it means the injector is normal .

b. Press the anti-drop lock and pull out the plug. Use a multimeter to measure the static coil resistance, which should be 12 ± 0.6Ω , otherwise the injector is faulty and needs to be replaced.

If you need to replace the injector, wait until the engine and muffler are cooled before you proceed. After placing the oil container at the bottom, refer to the steps for removing the high-pressure oil pipe to pull out the high-pressure oil pipe at the fuel pump end and release the remaining fuel . Use a 10 # sleeve to remove the bolt (1), remove the nozzle holder (2), and then remove the injector (3) .



6. Oxygen sensor

WARNING

●Be sure to wait until the engine and muffler are completely cooled before removing the oxygen sensor.

When the engine performance is poor, the idle speed is unstable, the fuel consumption is high, and the air-fuel ratio is incorrect, the oxygen sensor needs to be checked. The fault code can be read through the diagnostic instrument to confirm whether the oxygen sensor is faulty.

6.1 Detection

Find the oxygen sensor plug above the oil dipstick on the right side of the vehicle and unplug it . Use an 8# socket to remove the bolts and pull out the oxygen sensor together with the bracket.

Use a multimeter to measure the resistance of the heating element of the two white wires to be 9 ±2kΩ ; or measure the current to be ≤2.1A. Otherwise, it can be judged that the oxygen sensor is faulty. The ceramic inside the oxygen sensor is hard and brittle. Do not use hard objects to knock or blow with strong gas, otherwise it will easily cause damage.

Or remove the oxygen sensor and observe the color of the top of the head . Normally it is light gray. If it is white, it means that the silicon is poisoned and damaged and needs to be replaced. If it is black, it means that there is carbon deposit and it can be cleaned and continued to be used . If it is brown, it is lead poisoning and needs to be replaced.

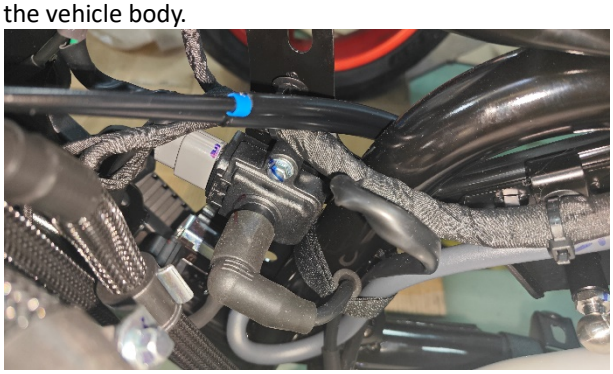
7. Ignition coil

No high-voltage spark ; low -voltage spark intensity ; when the engine cannot start, check whether the ignition coil is normal. Common ignition coil faults such as coil winding short circuit, open circuit or grounding will result in no high-voltage electricity; in addition, aging of the ignition coil insulation material , poor insulation performance, and leakage of the ignition coil will make the spark weak and the ignition energy insufficient, resulting in unstable idle speed, intermittent flameout, and failure to ignite. In case of such a fault, it is necessary to check whether the resistance and insulation performance of the ignition coil meet the requirements. If not, it must be replaced.

Refer to the steps in the section “Maintenance - Spark Plug - Removal of Spark Plug” to remove the spark plug from the engine and install it on the high-voltage cap. Put away the side stand, use the main stand to park the vehicle firmly, unlock the vehicle, turn the ignition switch to “ ” , hold the brake handle and move the spark plug close to the engine cylinder head cover or box (should be away from the spark plug installation screw hole) for about 6 mm (0.24 in), press the start button, if blue sparks are found at the spark plug electrode, the ignition system is normal, otherwise it should be repaired by a qualified maintenance unit.

If you want to replace the ignition coil, follow these steps:

a. First remove the seat cushion and storage box, and find the ignition coil above the cylinder head on the left side of the vehicle body.



Remove the cable tie and pull out the high-voltage wire near the ignition coil.

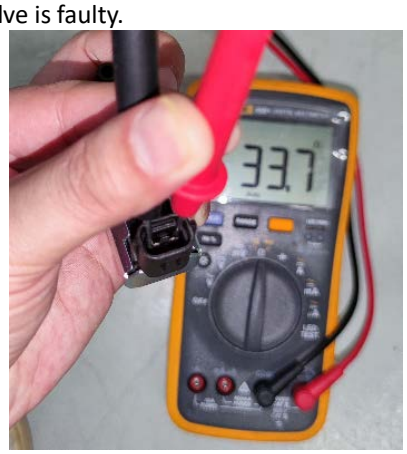
Hold the ignition coil body with one hand and press the plug anti-drop buckle with the other hand to pull out the plug. It is difficult to pull out the plug because there is a waterproof rubber plug inside.

Use 8 # to remove the M6×22 bolts and remove the ignition coil body.

8. Carbon canister solenoid valve

When the engine performance is poor, the idle speed is bad, or the air-fuel ratio is incorrect, the carbon canister solenoid valve needs to be checked .

Use a multimeter to measure the resistance between the two plugs of the carbon canister solenoid valve plug, which should be 35±2Ω , otherwise it can be judged that the solenoid valve is faulty.



9. Fuel pump

Notice:

●The fuel pump is a precision component that needs to be assembled in a dust-free workshop and requires strict testing, so it is prohibited to disassemble it by yourself.

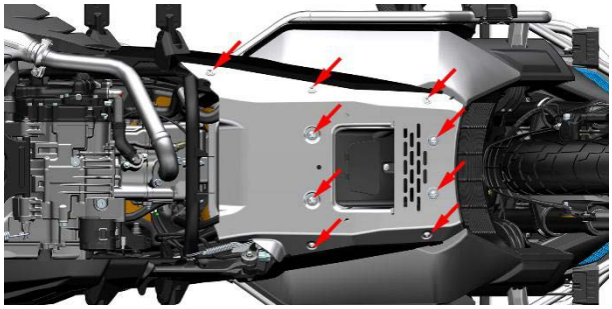
● The engine of this vehicle is designed with a high compression ratio. It is recommended to add 95 # and above unleaded gasoline for a long time . In order to extend the service life of the vehicle, please be sure to refuel at a regular gas station .

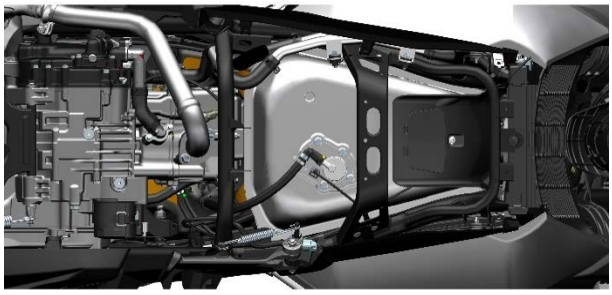
●The fuel pump is prohibited from running in dry state or in water , otherwise its service life will be shortened, and in serious cases, it will be directly damaged. The positive and negative wires of the fuel pump cannot be connected in reverse. It is prohibited to disassemble the fuel inlet filter, which may easily cause foreign matter to enter the fuel pump or block the injector.

● Disassembly of the fuel pump or high-pressure oil pipe should be carried out in a well-ventilated, dust-free or dust-free environment; dangerous operations such as fireworks or making phone calls are strictly prohibited at the disassembly site .

When the engine is difficult to start or dust-free starting occurs; the engine is not working properly, running unsteadily, etc.; the injector does not spray fuel; the engine runs weakly and the acceleration performance deteriorates , it is necessary to check whether the fuel pump is abnormal.

After lifting the vehicle , use a T 25 box end wrench to remove the 4 bolts with threaded fasteners in the middle of the bottom of the lower air deflector, and remove the flanged bushing. Then use a T 25 box end wrench to remove the 5 bolts on both sides. Remove the bottom of the lower air deflector, and then remove the high-pressure oil pipe. Use an oil pressure gauge to measure the fuel pressure, or use a simple test method to test whether the fuel pump is normal.





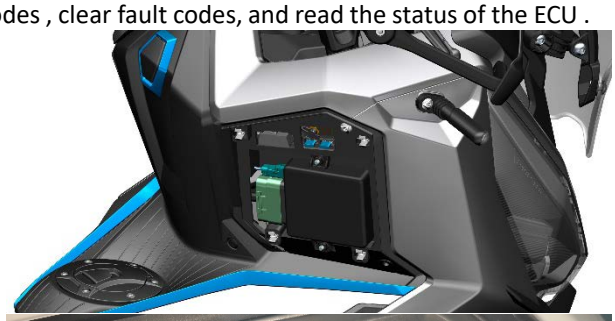
If you need to remove the fuel pump from the vehicle, use the fuel pump to drain the fuel in the fuel tank. Lift the vehicle and press the plug buckle shown in the figure to pull out the cable. Remove the 5 bolts from the bottom with a 10 # socket , and remove the high-pressure oil pipe bracket to remove the fuel pump .

Be careful not to press the oil outlet pipe circled in red . Once damaged, the entire fuel pump assembly can only be replaced.

When reassembling, you need to pre-tighten the bolts diagonally first and then tighten the 5 bolts . Otherwise, the uneven compression of the fuel pump 's sealing rubber ring may easily lead to leakage and cause safety hazards .

10. OBD interface

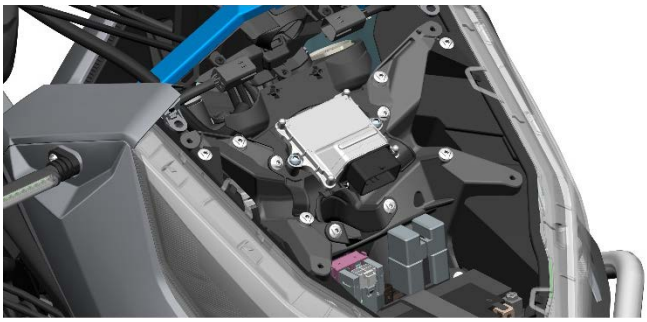
main cable has an OBD interface . For details on its location, see the official website assembly video "ZT368T-G Charging Port, OBD Interface, and Fuse Box Location Instructions" . Remove the expansion pins at the bottom of the right storage box cover, and you can see it after removing it. Through the diagnostic interface, you can use a diagnostic instrument to read historical fault codes , current fault codes , clear fault codes, and read the status of the ECU .



11. MSE 6.0 ECU

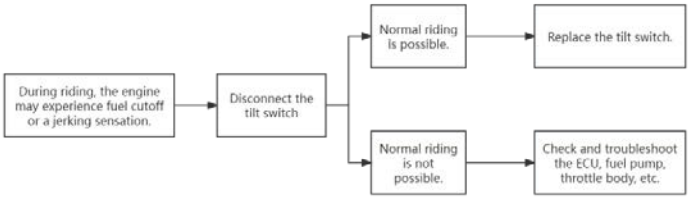
When the engine fails to start or has poor performance, you need to check whether the ECU is normal . Because the ECU is complex and difficult to judge , you can generally use the elimination method to remove the ECU from a normal vehicle of the same model and replace it with the faulty vehicle.

The index finger and middle finger are located under the pull rod . While pressing the buckle with the thumb , use the index finger and middle finger to turn the ECU plug in the direction of the thumb to unplug it. Remove the bolt with a 5# hexagon socket to remove the ECU .



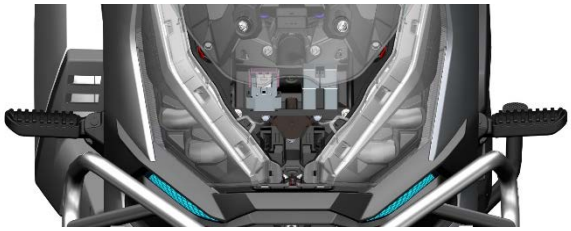
1 2. Dump switch

Troubleshooting process



Disassembly

After removing the front panel and battery, the dump switch is exposed. Unplug it and use an 8# socket to remove the bolts to remove it.



Examine

Remove the dump switch without disconnecting the plug.

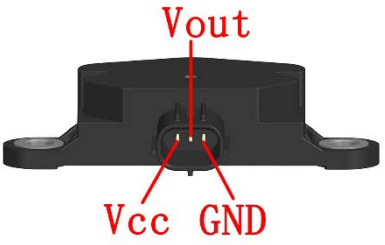
Use OBD diagnostic instrument to detect whether the dump switch is faulty.

If there is no diagnostic instrument, use a multimeter to detect the output voltage to determine whether there is a fault.

standard:

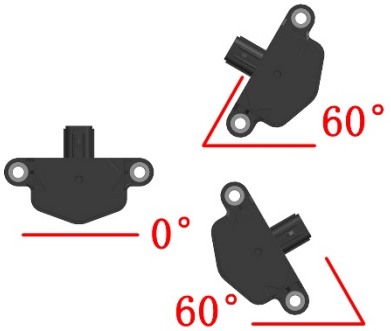
Horizontal position: 0.4-1.4V

About 60°: 3.7-4.4V



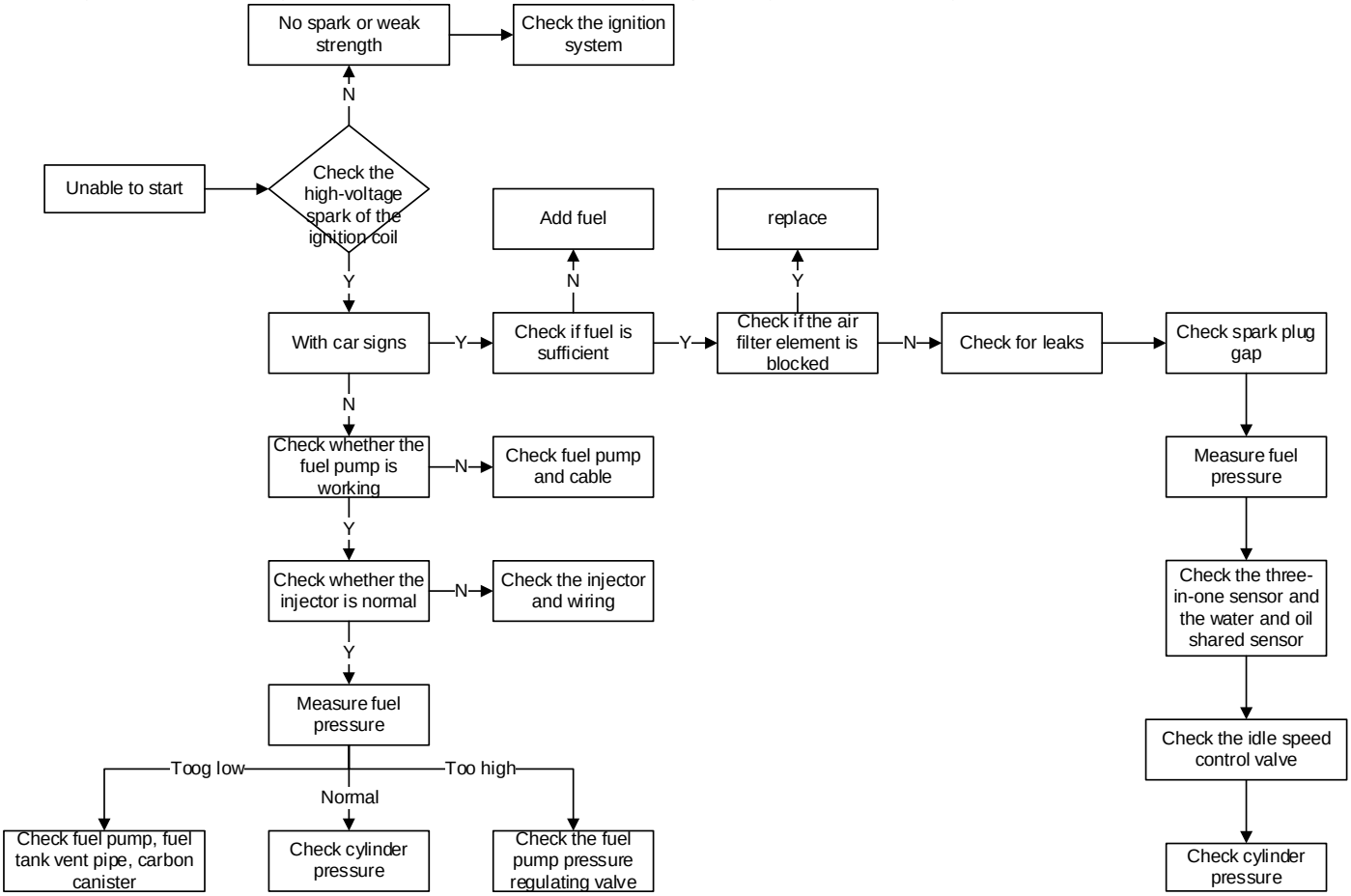
Functional Check

Remove the dump switch without unplugging it, place the dump switch horizontally, and start the engine. Tilt the dump switch to the left or right by about 60 °. The engine should shut down in a short time, otherwise the dump switch is faulty.



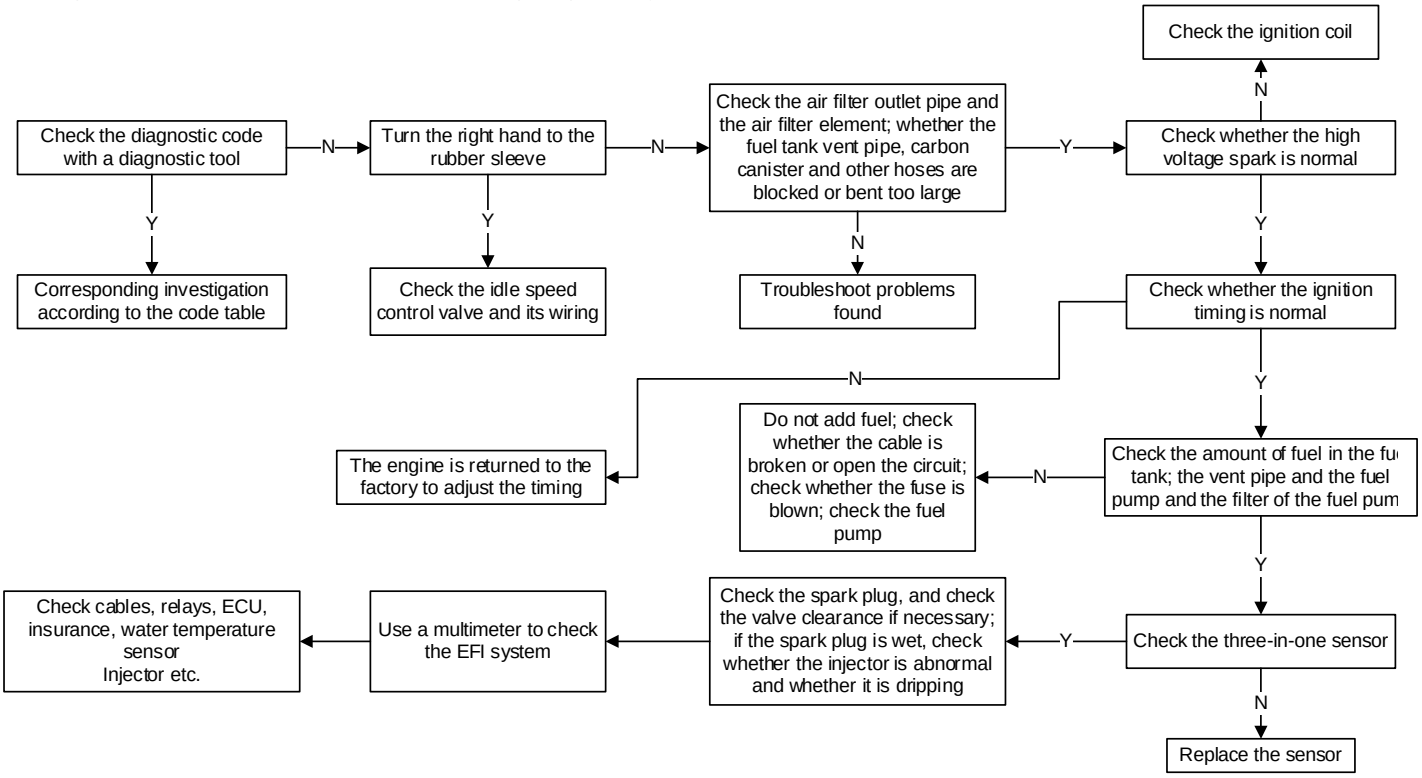
Engine cannot start and there is no sign of starting fault diagnosis process

When the starter motor can drive the engine to run normally when the start button is pressed , but the engine cannot work normally and there is no sign of starting, refer to the following diagnostic process to identify the cause of the fault.



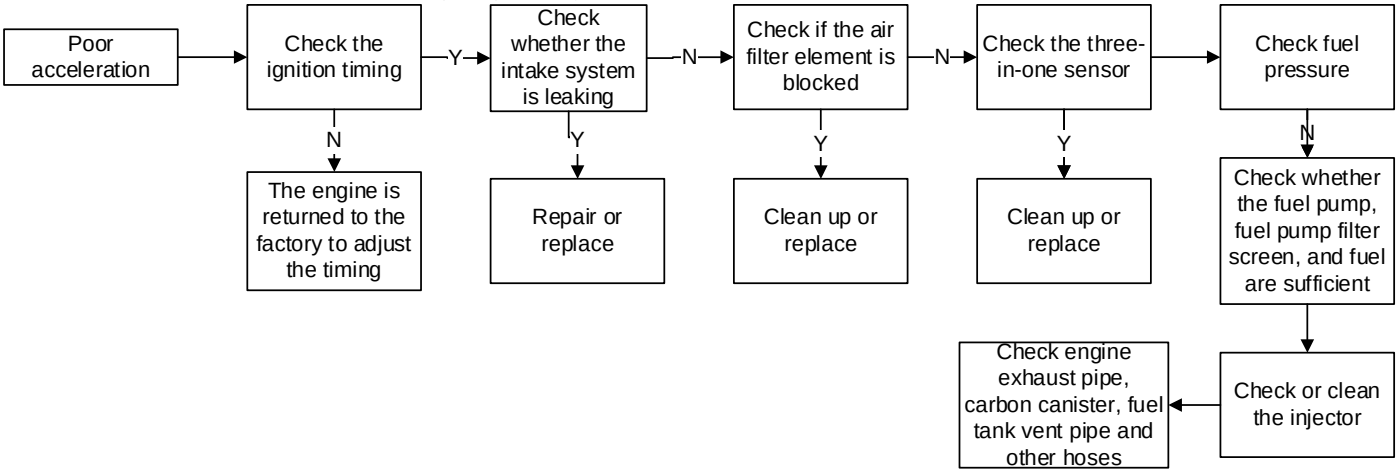
Engine cannot start with motorcycle fault diagnosis process

When the starter motor can drive the engine to run normally when the start button is pressed , and there are signs of starting but it cannot start, refer to the following diagnostic process to find the cause of the fault.



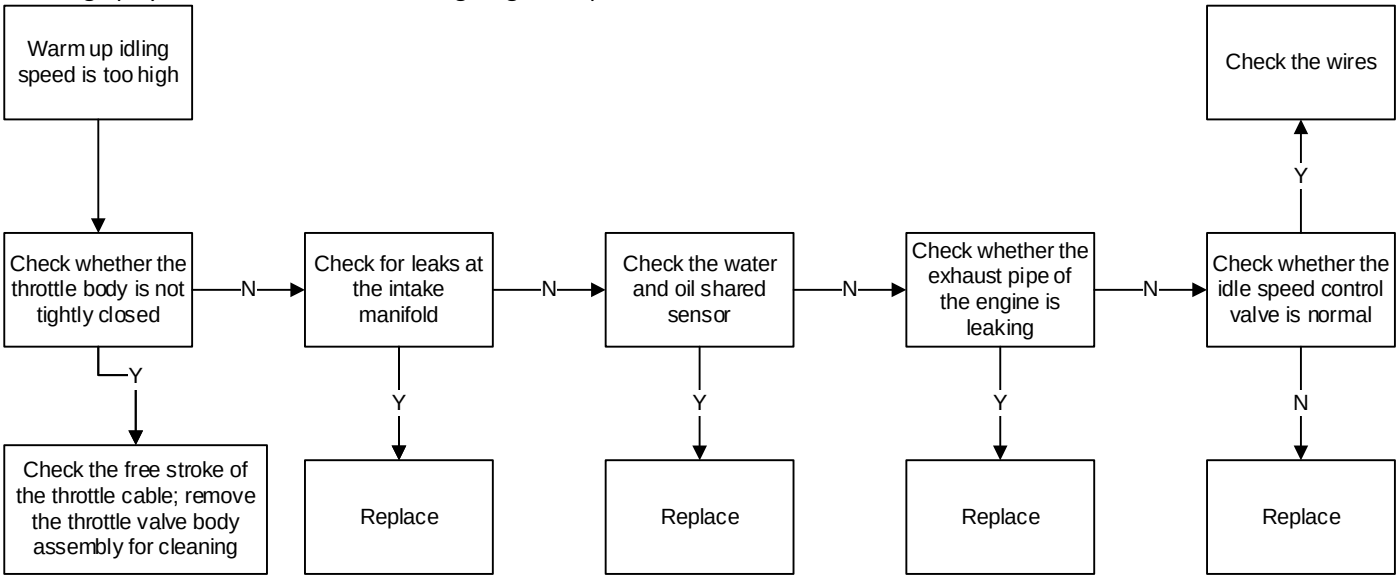
Acceleration failure

The engine speed cannot be increased immediately by turning the right-hand handle, and there is hysteresis and slow acceleration. Please refer to the following diagnostic process to find out the cause of the fault.

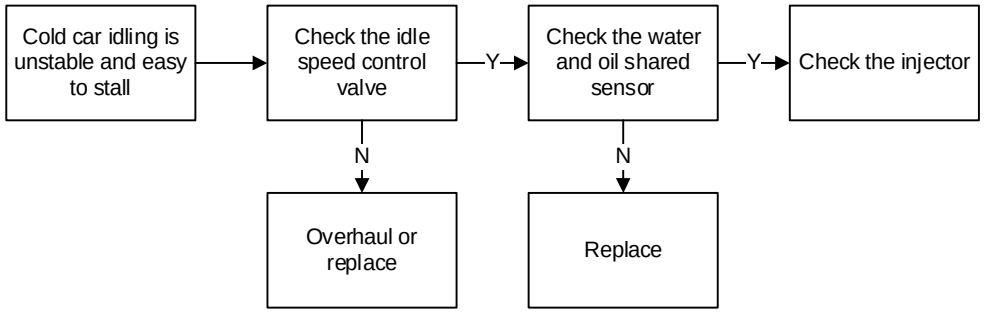


High idle speed on hot motorcycle

If the engine can run normally at fast idle when it is cold , but the idle speed does not drop back to 1500-1700 rpm after warming up , you can refer to the following diagnostic process to troubleshoot the cause of the fault.

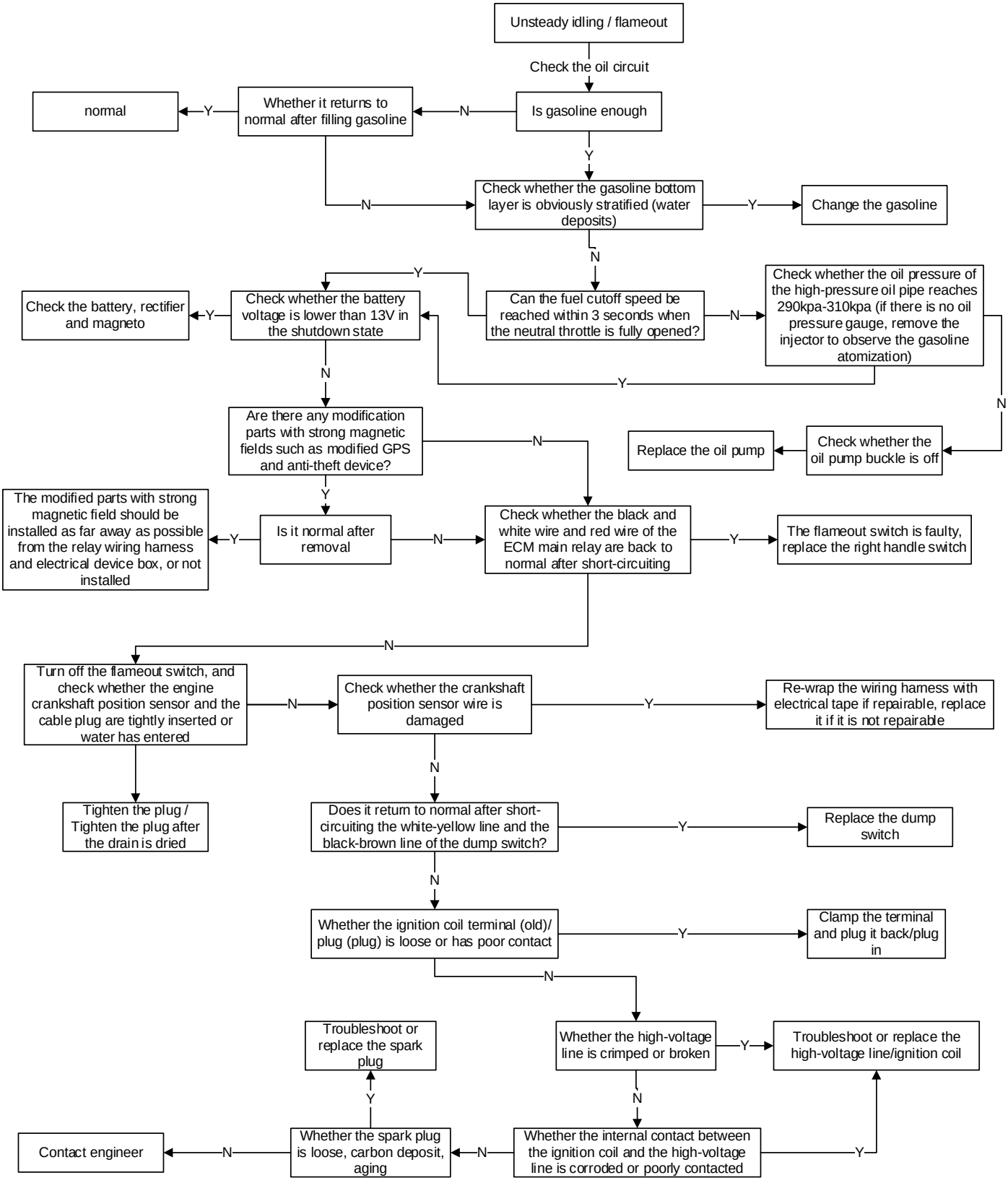


Cooling motorcycle idling unstable



Unstable idling speed, easy to stall

The engine idle speed is unstable and easy to stall, but it can return to normal after warming up. Please refer to the following diagnostic process to find out the cause of the fault.



EFI fault indicator light always on analysis flow chart

If the EFI fault indicator light " " is always on, you should first check whether the wire plugs of each EFI sensor are loose .