

6. AFI SYSTEM (Autocontrol Fuel Injection System)

AFI SYSTEM

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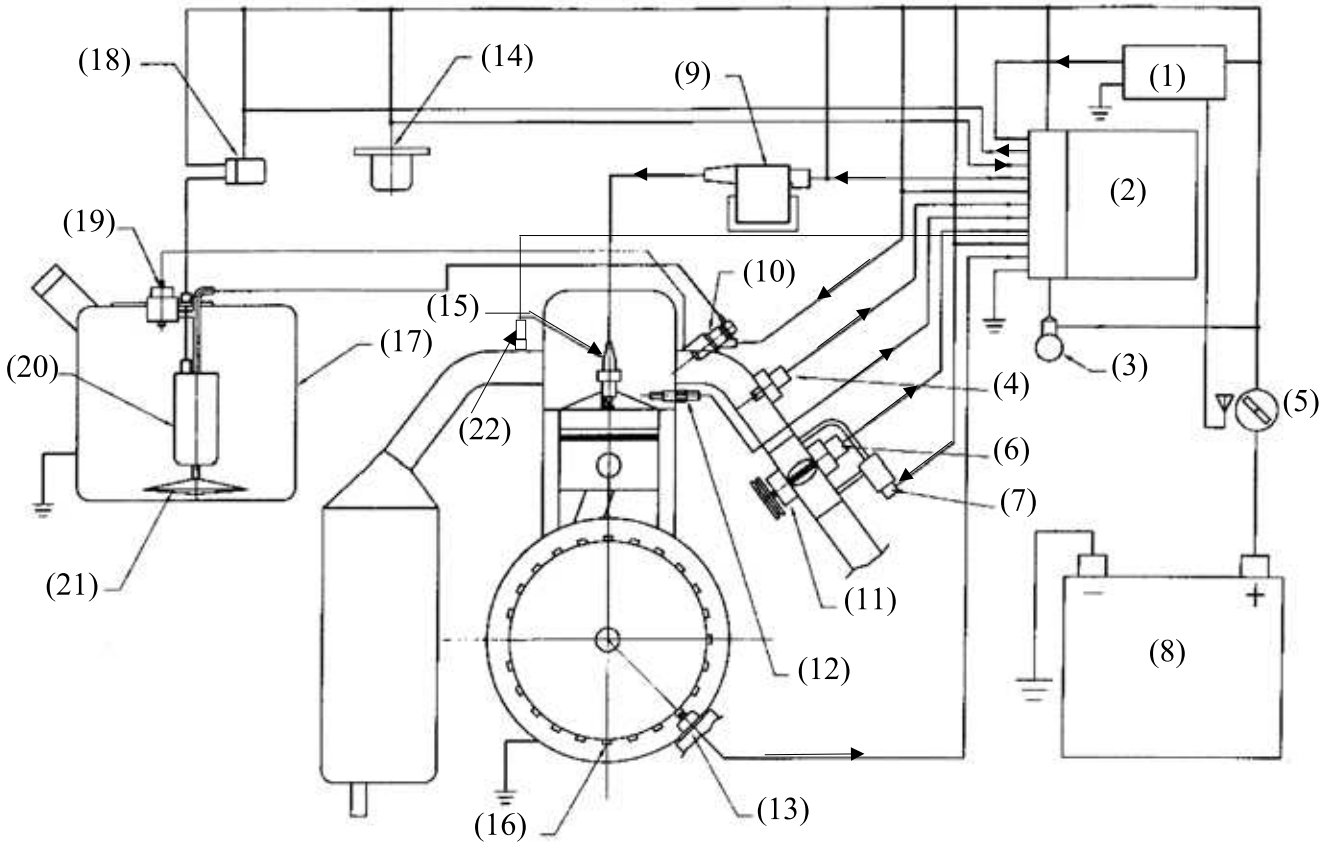
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IMPORTANT INFORMATION FOR MAINTENANCE AND REPAIR

1. Never to disassemble the wire of battery connector while engine is running, or the ECU will be destroyed.
2. Never connect the harness wire to battery on opposite electrode, or it will damage the ECU.
3. Never disassemble the ECU while engine is running, or the ECU will be destroyed.
4. When disassembling the fuel injection parts, note the location of the O-rings. Replace them with new one upon reassembly.
5. Don't loosen or tighten the painted bolts and screws of the throttle body. Or it will get the unstable idle speed.
6. The battery need to above 12 volts or the vehicle will be hard to electric start.
7. Screwing tied the harness wire on the correct electrode, don't just clip the battery electrode to avoid pressuring down the voltage.
8. Be sure to relieve the fuel pressure before removing fuel pump or fuel hose.
9. Bending or twisting the control cables will impair smooth operation and could cause the cables to stick or bind, resulting in loss of vehicle control.
10. Work in a ventilated area. Smoking or allowing flames or sparks in the work area or where gasoline is stored can cause a fire or explosion.
11. A faulty AFI system is often related to poorly connected or corroded connectors. Check those connections before proceeding.
12. Always replace the packing when the fuel pump is removed.
13. Don't snap the throttle valve from fully open to fully close after the throttle cable has been removed, it may cause incorrect idle operation.
14. Don't apply commercially available carburetor cleaner to the inside of the throttle bore, which is coated with molybdenum.
15. Seal the cylinder head intake ports with tape or a clean cloth to keep dirt and debris from entering the intake ports after the throttle body has been removed.

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SYSTEM DIAGRAM



- | | |
|---------------------------------------|---------------------------------|
| (1) Switch | (12) Engine temperature Sensor |
| (2) Electric Control Unit | (13) Crankshaft position Sensor |
| (3) Malfunction Indicator Lamp | (14) Angle Detect Sensor |
| (4) Manifold Absolute Pressure Sensor | (15) Spark Plug |
| (5) Ignition Switch | (16) Flywheel |
| (6) Throttle Position Sensor | (17) Fuel Tank |
| (7) Air By Pass Valve | (18) Fuel Cut-off Relay |
| (8) Battery | (19) Pressure Regulator |
| (9) Full Transistor Digital Ignition | (20) Fuel Pump |
| (10) Injector | (21) Fuel Strainer |
| (11) Throttle Body | (22) O2 sensor |

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SYSTEM PRINCIPLE

1. When turning on the switch, at first the fuel pump will be started to work for 5 second to build the basic fuel pressure, after then, if user doesn't start the engine yet, the fuel pump will be turned off to save the power. Then the ECU will detect the signal as following,

- (1) Crank Position Sensor: It calculates RPM and records the crank position by the sensor detect the empty tooth on the flywheel.
- (2) Throttle Position Sensor: To detect how much the throttle be opened.
- (3) Engine Temperature Sensor: Detect the engine temperature and prevent engine from overheat.
- (4) Temperature-Manifold Air Pressure Sensor: Detect the temperature and pressure of intake to provide those data to ECU.
- (5) Output Voltage: To provide the voltage compensation to those controlled components.

2. Start the engine.

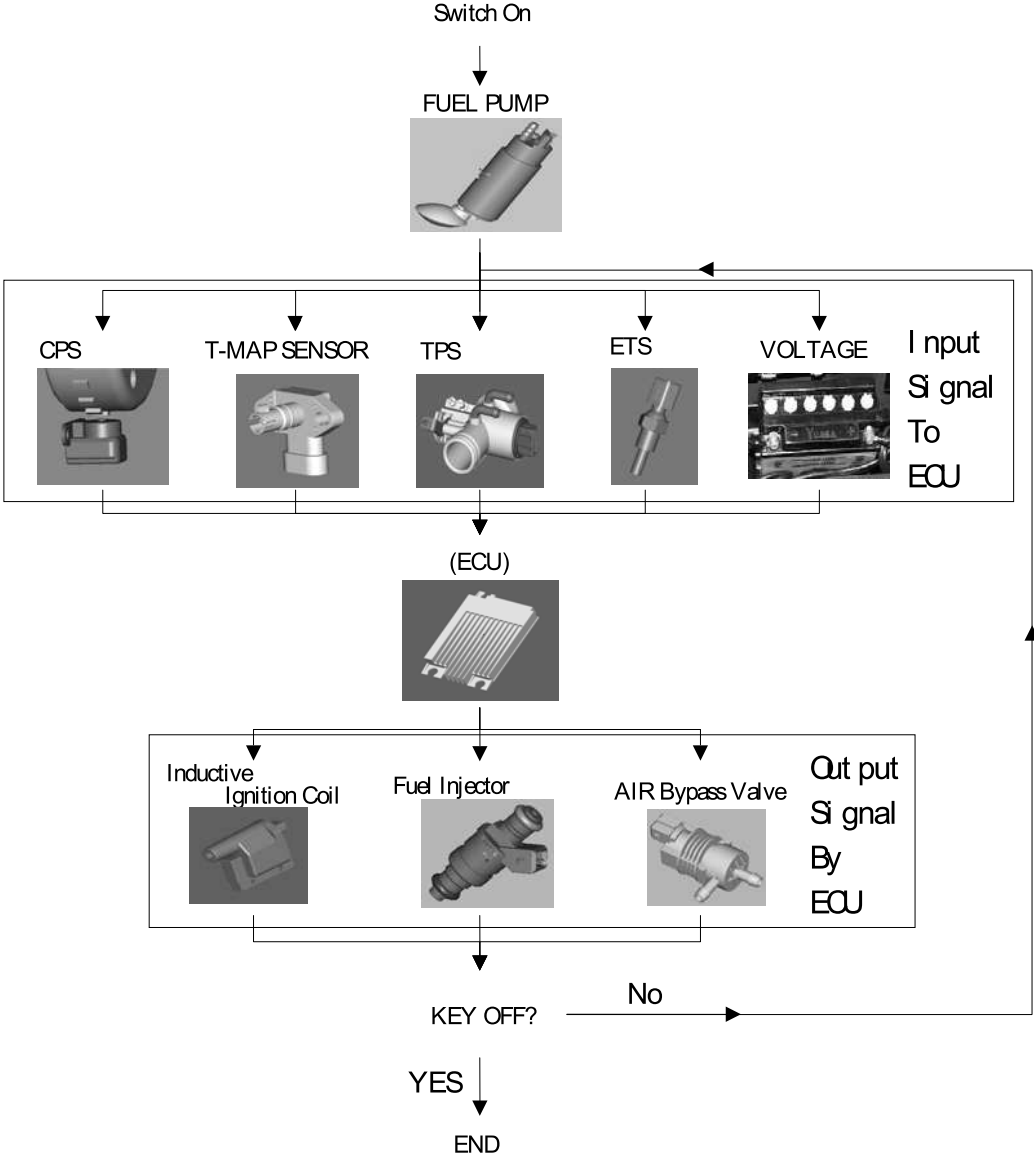
3. First of all, ECU judges the condition of engine running (Stall / Cranking / Idle / Run / Over run cut) by RPM, Throttle Position and air pressure in manifold.

4. ECU accords to the above sensors to calculate correct figure and output information to control 3 components as following,

- (1) Fuel injector: BTDC (Inject on time) and FPC (Fuelling Per Cycle) accurately.
- (2) Air Bypass Valve: Open on time and how much time it open continuously.
- (3) Inductive Ignition Coil: Ignition on time and coil charge time.

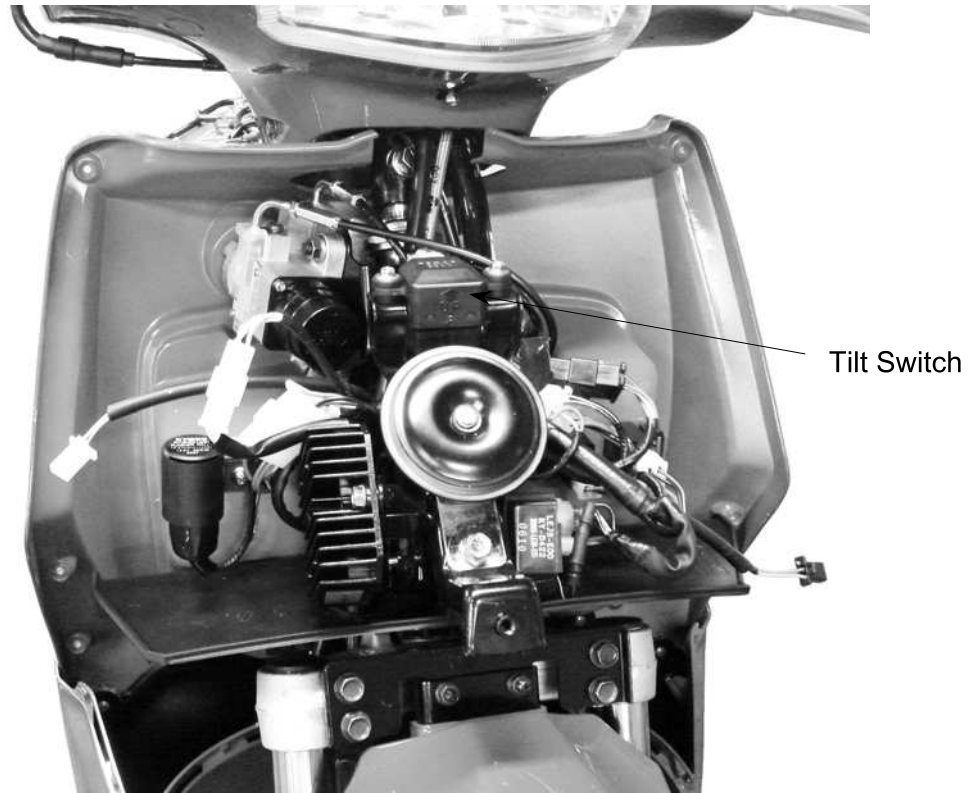
5. According to 5 sensors ECU keep controlling Fuel injector, ABV and Inductive Ignition Coil till switch off.

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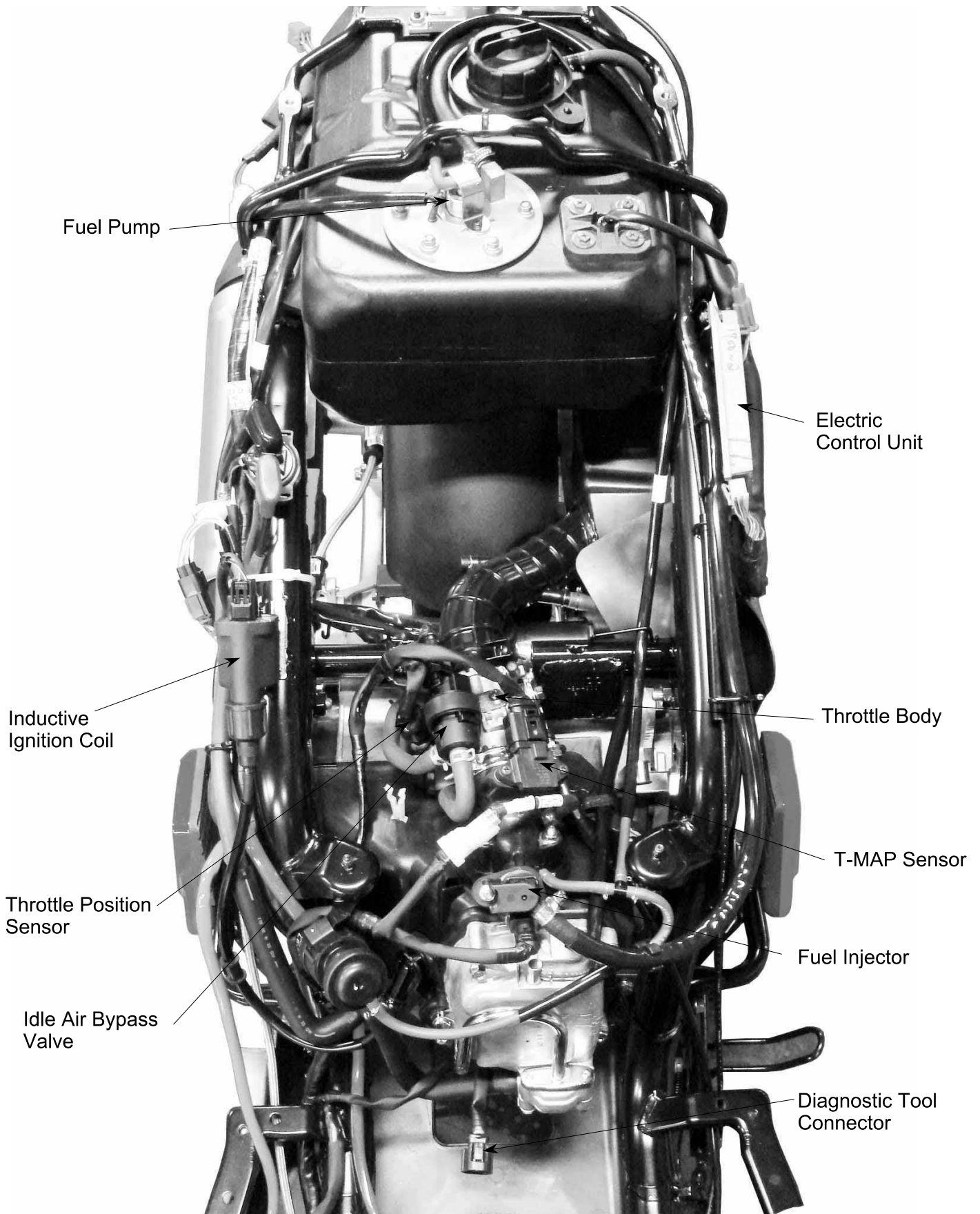


6. AFI SYSTEM (Autocontrol Fuel Injection System)

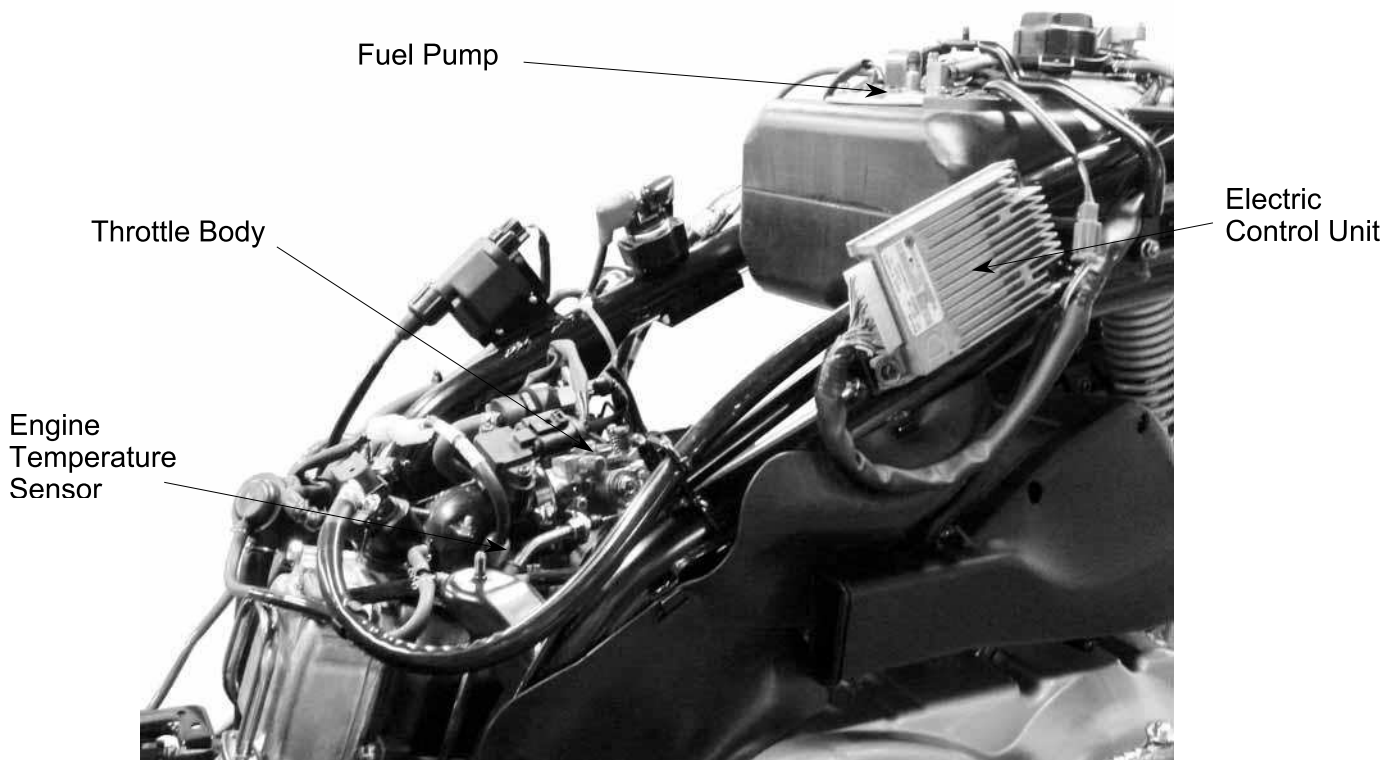
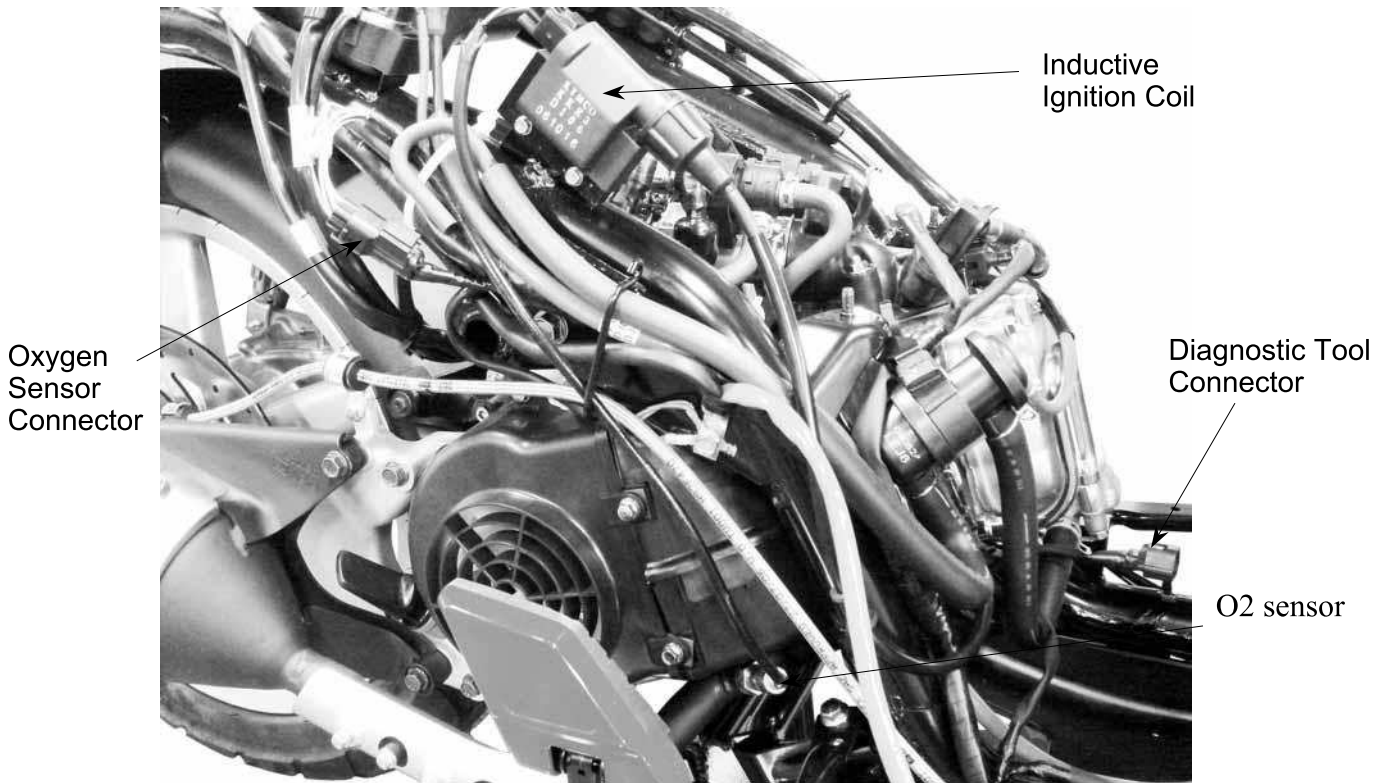
SYSTEM LOCATION



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SPECIFICATIONS (Peoples 200i)

Item	Standard
Charging voltage of battery	13.5~14.5V
Voltage from the ECU to sensor	4.98~5.02v
Injector resistance (20°C/68°F)	13.78~15.23Ω
Air by pass valve resistance (20°C/68°F)	24.7~24.3Ω
Full transistor digital ignition resistance	0.57~0.66Ω(20°C/68°F)
Engine temperature sensor resistance	24452~5458.3Ω (10°C~40°C) 1005.2~234.2Ω (90°C~140°C)
Throttle position sensor voltage (20°C/68°F)	Idle (0%)=0.68±0.05V W.O.T. (100%)=4.01±0.04V
Manifold absolute pressure sensor resistance	2544~568.9Ω (20°C~60°C)
Manifold absolute pressure sensor voltage	3.87~4.03V (25°C)
Fuel pump	Ignition switch ON that operates for 10~15 seconds
Angle detect sensor voltage (diagnostics)	Normal: 3.5~4.7V ±65° angle position: 0.3~1.4V

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TROUBLESHOOTING

Engine won't start

- Battery voltage too low
- Fuel level too low
- Pinched or clogged fuel hose
- Faulty fuel pump operating system
- Clogged fuel filter
- Clogged fuel injector
- Faulty spark plug or wrong type
- Clogged Airflow Bypass Valve
- ABV show circuit
- Wet spark plug
- Cut by ECU due to angle detect sensor or incorrect function

Backfiring or misfiring during acceleration

- Ignition system malfunction

Poor performance (drive ability) and poor fuel economy

- Pinched or clogged fuel hose
- Faulty fuel injector

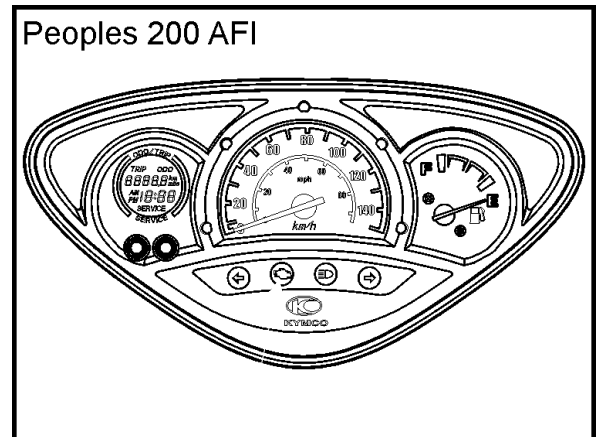
Engine stall, hard to start, rough idling

- Intake air leak
- Fuel contaminated/deteriorated
- Pinched or clogged fuel hose
- Idle speed misadjusted
- Wet spark plug

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CHECK ENGINE LAMP (CELP) INTRODUCTION

- When turning on the switch, the lamp will light for 2 seconds then it will be off. Let the user to realize the ECU is available and the lamp isn't broken.
- But after then or during riding, if the CELP began to blink or keep lighting, it shows user that the vehicle get trouble.



- There are 3 kinds of priority grade let user to notice the trouble of vehicle.

Priority grade 1: CELP blink continuously.
This is the most emergent situation.

Priority grade 2: CELP lights all the time.
It means something wrong with this vehicle,
you better do the further check to find out
the failure code to know which part get
trouble.

Priority grade 3: CELP just blinks once
suddenly and then disappear suddenly.
It sometimes just warns user something like
the RPM was too high in a short time.

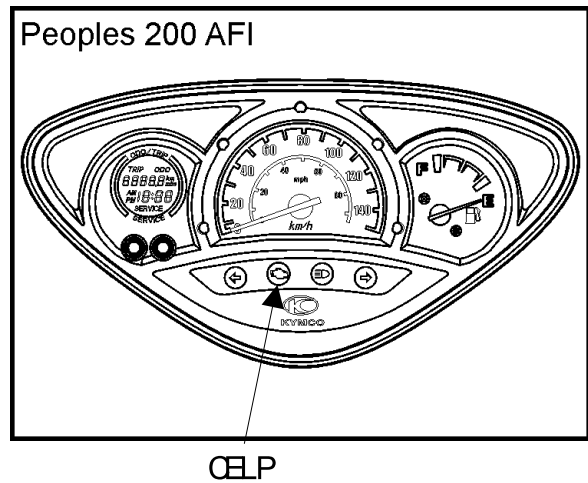
PRIORITY	LAMP ACTION
1	<p>ON OFF</p>
2	<p>ON OFF</p>
3	<p>ON OFF</p>

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SELF-DIAGNOSIS PROCEDURES (NO PDA, BY MANUAL)

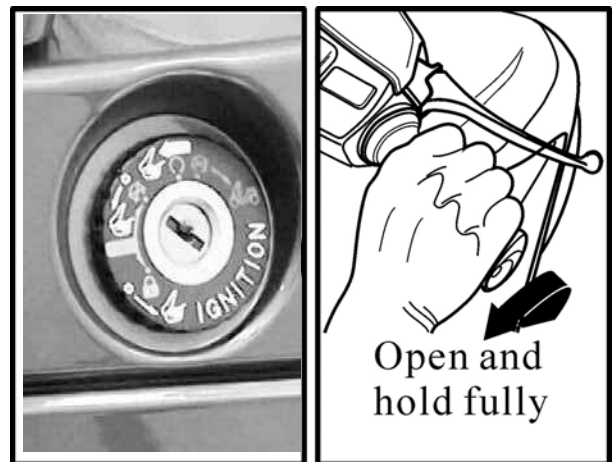
Without the diagnostic tool (PDA) condition.

If the vehicle got problem the Check Engine Lamp (CEL) will keep light or blink.

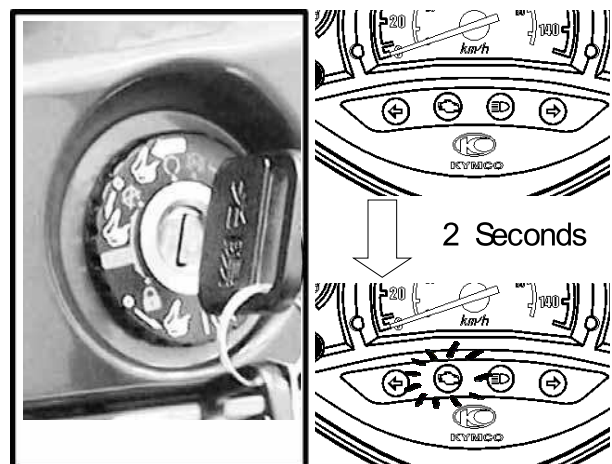


You can read the failure code by manual as following steps:

- (1) Turn ignition switch off, then open and hold the throttle fully.

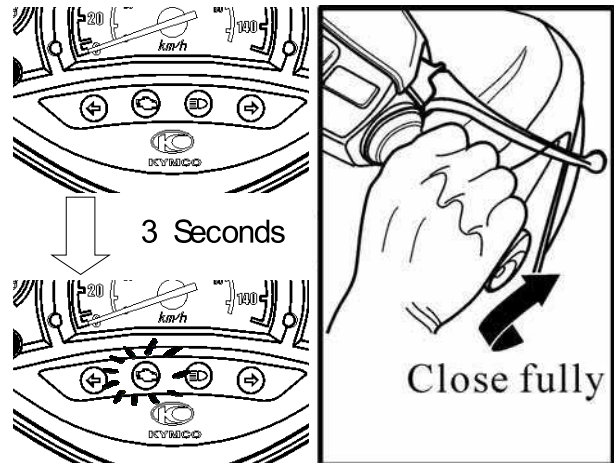


- (2) Turn ignition switch on. The CELP will light for 2 seconds then put out.

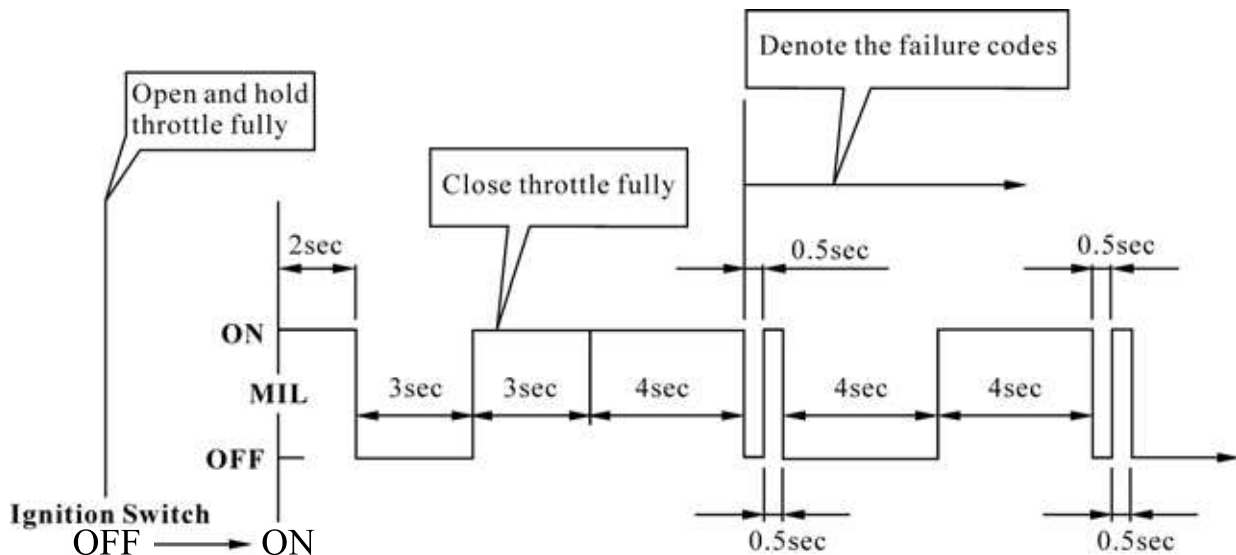


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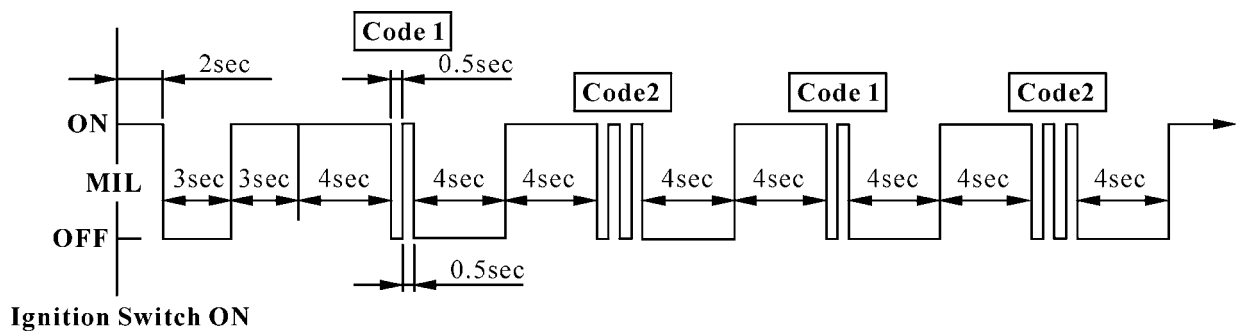
- (3) When the CELP lights again. Close the throttle fully
- (4) Then the CELP begins to blink to show the failure codes (the number of blinks from 1 to 22).
- (5) If vehicle got more than one failure code, the CELP will shows them from lower number code to higher one after 8 seconds separately.
- (6) All the failure codes will be showed repeatedly.



Example 1 (procedures):



Example 2 (failure codes 1 and 2):



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CHECK ENGINE LAMP (CELP) FAILURE CODES

Blinks	Failure Codes	Fault description	Priority	Fault management
1	P0217	Engine over temperature condition	1	<p>1.Slow down the vehicle and go to repair house for checking immediately.</p> <p>2.The confirmation has 'the engine temperature sensor know the machine or the electric circuit abnormality' it the breakdown yard occurrence, if have already asked confirm the engine temperature sensor to know a machine whether abnormality? Connect line and deal with contact to there is just like often?</p> <p>3.The check lubricates cooling system whether abnormality? The engine light fire or provide the oil system whether abnormality? The phenomenon that the engine appears to burn to pay?</p>
2	P0335	Crankshaft position sensor circuit malfunction	2	<p>1.Does the position sensor of checking the crank know the machine outputs whether the feet is anti- or not to connect?</p> <p>2.The position sensor of checking the crank know whether the machine deals with contact combine or not appropriate? Does connecting line break road?</p> <p>3.The position sensor of checking the crank know a machine and code the cleft of the Chi whether within the scope of 0.6~1.2 mm?</p> <p>4.When checking the crank turned to move whether be partial to put?</p> <p>5.Change a new article to confirm whether does the sensor know a machine abnormality?</p>
3	P1120	Throttle position sensor adaption problem	2	<p>1.Connect to maintain to examine a patient the machine Reset to reset the TPI position, confirm TPS position to return to initial value scope?</p> <p>2.Does confirming the TPS deal with contact, connect line and haven't moved and short circuit?</p> <p>3.Check Dai soon the air side valve to open a degree whether in the specification(new car 30~40;Old car <180)</p> <p>4.Adjust Dai soon CO% go to enactment the specification scope(0.75~2.8%;Float to move the value min 0.4% above)?5.If still appear an abnormality, depend on to change whether the new article process confirmation reduce expenses a valve body TPS abnormality or not?</p>
4	P1121	Throttle position sensor range problem	2	<p>1.Does confirming the TPS deal with contact, connect line and haven't moved and short circuit?</p> <p>2.If still appear an abnormality, depend on to change whether the new article process confirmation reduce expenses a valve body TPS abnormality or not?</p>

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Blinks	Failure Codes	Fault description	Priority	Fault management
5	P1122	Throttle position sensor movement problemn	2	<ol style="list-style-type: none"> 1.Does confirming the TPS deal with contact, connect line and haven't moved and short circuit? 2.If still appear an abnormality, depend on to change whether the new article process confirmation reduce expenses a valve body TPS abnormality or not?
6	P0560	Battery voltage malfunction	1	<ol style="list-style-type: none"> 1.To confirm if the battery voltage is too low or too high? 2.Confirm three mutually does the generator(ACG) refresh whether system break the road or abnormality or not? 3.Does confirming the ECU PIN15 go to whether the electric cell anode circuit break road or not? 4.To check if the battery is normal, if it can't to charge any more, replace it with a new one.
7	P0110	Intake air temperature circuit malfunction	2	<ol style="list-style-type: none"> 1.Does confirming the sensor know whether the machine electric resistance is normal or not? 2.Does confirming the sensor know the machine deals with contact, connects line and hasn't moved and break road? 3. If still appear an abnormality, depend on to change new article process to confirm whether does the sensor know a machine abnormality?
8	P0410	Idle air valve circuit malfunction	2	<ol style="list-style-type: none"> 1.Confirm Dai soon the air side whether valve electric resistance break the road or short circuit or not? 2.Does confirming the sensor know the machine deals with contact, connects line and hasn't moved and break road? 3.If still appear an abnormality, depend on to change new article process to confirm whether the Dai is an air soon is beside valve abnormality?
9	P0505	Idle speed control adaption problem	2	<ol style="list-style-type: none"> 1.Check Dai soon the air side valve to open a degree whether in the specification (new car 30~40;Does the old car<180) also confirm to reduce expenses whether the valve body accumulates carbon to jam or not?(enter current of air quantity shortage) 2.Confirm Dai soon accelerator to open a degree whether abnormality?(block or the air screw adjust inappropriate) 3.Confirm and haven't leaked air phenomenon into the windpipe?
10	P0251	Injection fuel metering control malfunction	2	<ol style="list-style-type: none"> 1.Confirming the fuel spray the mouth electric resistance whether in the specification? 2.Does confirming the fuel spray a mouth and deal with contact, connect line and haven't moved and break road?(the ECU pin 13) 3.Does confirming the fuel spray whether the mouth power supply supply is normal or not? 4.If still appear an abnormality, depend on to change new article process to confirm whether does the fuel spray a mouth abnormality?

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Blinks	Failure Codes	Fault description	Priority	Fault management
11	P0350	Ignition circuit malfunction	2	1.The confirmation light the front line turn electric resistance whether in the specification? 2.Does the confirmation light the front line turn and deal with contact, connect line and haven't moved and break road?(the ECU pin 12) 3.Does the confirmation light the front line turn whether power supply supply is normal or not? 4.If still appear an abnormality, depend on to change whether the new article process confirmation light the front line turn an abnormality or not?
12	P0230	Fuel pump circuit malfunction	1	1.Confirm the fuel pump and deal with contact, connect line and haven't moved and break road after the electrical appliance?(the ECU pin 14) 2.If still appear an abnormality, change a new fuel pump to confirm after the electrical appliance whether fuel pump after electrical appliance abnormality?
13	P0219	Engine overspeed condition	2	1.Turn soon exceed engine safe enactment, reduce the engine operation speed then cancellation breakdown yard. 2.Does checking the CVT leather belt split?Cause the engine lead high turn soon.
14	P1560	Transducer power supply malfunction	2	1.Confirm the ECU pin 18 whether output 5 V DC? 2.Confirm whether power supply electric voltage is the 5 V DC or not that each sensor knows the machine connects line to carry?(the ECU pin 18 and pin 16 it press bad) 3.If the ECU output for the 5 V DC, but still show'the sensor know the machine power supply supply abnormality' then depend on to change new article process to carry on ECU to change.
15	P0700	Exceeded CVT speed threshold condition	2	1.When the engine start turns soon over the 3250 rpms, in order to avoid hurtling suddenly and violently, the ECU will reduce engine to turn to even turn off soon. 2.Ask user to avoid launching the engine moment nasty open accelerator. 3.Does checking the accelerator line(Cable) block? 4.Is the Dai whether the screw position enactment is normal or not soon?(0.68 ±s 0.05)5. Does the CVT leather belt split?
16	P0115	Engine temperature circuit malfunction	2	1.Confirming the sensor know the machine electric resistance whether in the specification? 2.Does confirming the sensor know the machine deals with contact, connects line and hasn't moved and break road?(the ECU pin 9)
17	P1561	Transducer power supply fault for enforced idle condition	2	If the engine temperature gauge fails, the rider will be aware because no output from the gauge will be observed. The ECU will still have engine temperature feedback from the temperature sensor and provide engine management regardless of the gauge fault. If a faults is detected during the “Turn-on” diagnostic test, the CELP is activated for a 2 second period from the detection of a fault, and the temperature gauge is turned on again, at least every 1second, until the fault is cleared.

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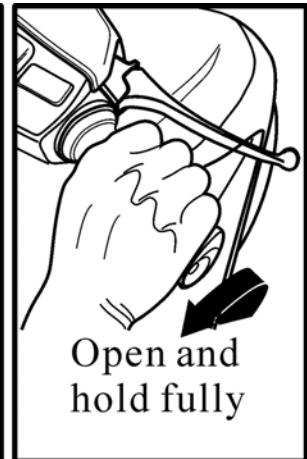
Blinks	Failure Codes	Fault description	Priority	Fault management
18	P0650	Malfunction indicator lamp control circuit malfunction	3	<ol style="list-style-type: none"> 1.Does checking the engine examination light light bulb destroy by fire? 2.Checking the engine examination light light bulb specification is a 1.7 Ws, 12 VDCs? 3.Does checking the engine examination light circuit break road?(the ECU pin 4)
21	P0105	Atmospheric Pressure Sensor/Circuit Malfunction	2	<ol style="list-style-type: none"> 1.Confirm whether the output voltage of the sensor is within specification? 2.Check whether the output pin position of the sensor is correct or open circuit occurs? (the ECU pin 8) 3.Replace with a new sensor according to the part-exchanging process to confirm whether the error code still exists?
22	P1110	Cut out switch circuit malfunction	2	<ol style="list-style-type: none"> 1.Confirming the sensor know the machine outputs electric voltage whether in the specification? 2.Does confirming the sensor know the machine deals with contact, connects line and hasn't moved and break road?(the ECU pin 11) 3.If still appear an abnormality, change to turn to pour sensor to know lately the machine confirms whether does the sensor know a machine abnormality?
23	P0136	O2 sensor circuit malfunction	1	<ol style="list-style-type: none"> 1.Slow down the vehicle and go to repair house for checking immediately. 2.Check the O2 sensor circuit.
24	P0141	O2 sensor heater circuit malfunction	1	<ol style="list-style-type: none"> 1.Slow down the vehicle and go to repair house for checking immediately. 2.Check the O2 sensor circuit.
25	P0171	O2 control loop out of range	1	<ol style="list-style-type: none"> 1.Slow down the vehicle and go to repair house for checking immediately. 2.Check the O2 sensor circuit. 3.Checking the engine exhaust airflow, it could be too lean or too rich and out of the range.

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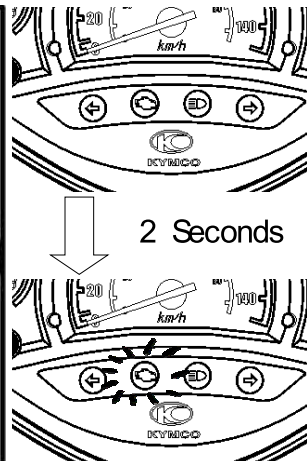
ERASE THE FAILURE CODE PROCEDURE(BY MANUAL)

If you have solved the problem already, you should erase the failure code, otherwise it will always exist in the ECU memory. When you maintain the vehicle next time it will show up again and confuse you.

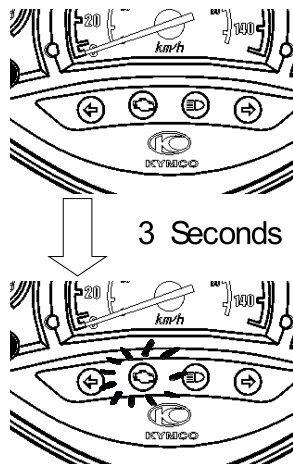
- (1) Turn ignition switch to OFF, open and hold the throttle fully.



- (2) Turn ignition switch to ON while the CELP lights, after 2 seconds the CELP will be off.



- (3) Close the throttle fully when the CELP lights again.
- (4) The CELP begins to blink to show the failure codes.
- (5) The self-diagnosis memory data will be erased when all the failure codes has showed 5 cycles.



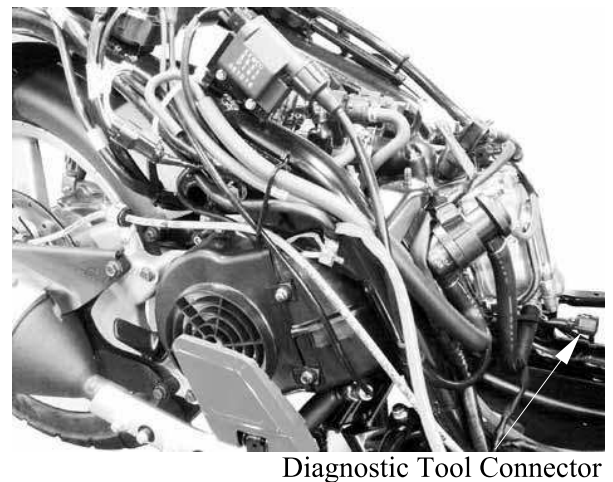
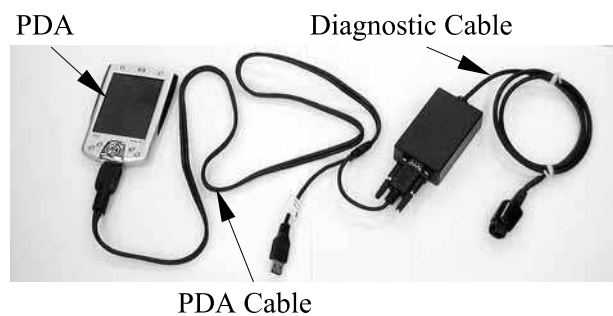
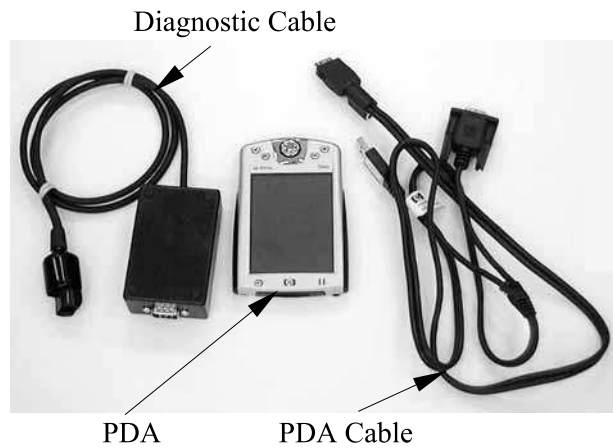
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DIAGNOSTIC TOOL INTRODUCTION (PDA)

When the vehicle get problem or you want to know the condition of vehicle, you can use PDA and diagnostic software to help you do the repair work and maintenance conveniently.

The method of use as following step:

1. Connect PDA, PDA cable and diagnostic cable.
2. Connect the PDA to the diagnostic tool connector.
3. Turn on the vehicle ignition switch.



4. Turn on the PDA, and choose "Start" pull down manual then choose the "DTool 5.0" to run the AFI software.

Select "OK" to quit the software info display.



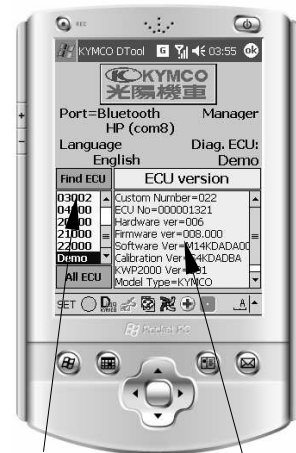
DTool 5.0

"OK"

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5. It will detect the ECU and show the code automatically. Choose “ECU version” to show the ECU info.

Then you can start to operate the diagnostic tool.



ECU CODE

ECU INFO

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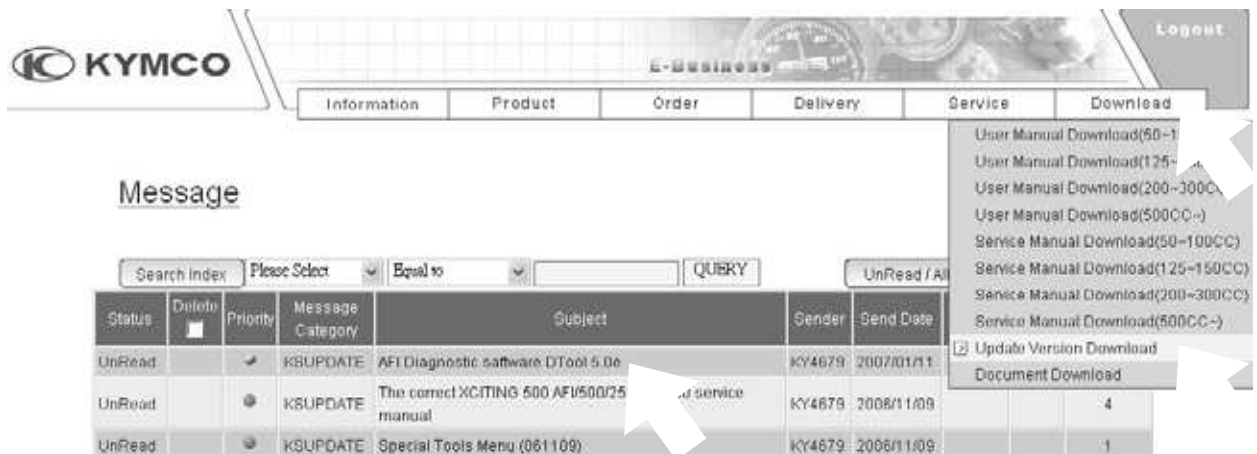
HOW TO DOWNLOAD AND INSTALL THE DIAGNOSTIC SOFTWARE

DOWNLOAD:

1. Visit our E-Order Website.
<http://KYDMS.KYMCO.COM>
2. The User ID is D12345 and Password is the same then choose "Submit".
3. Choose "KY Global Ordering System" to get into E-Order system



4. Choose pull down menu "Download" then select "Update Version Download" then select "AFI Diagnostic software DTool 5.0e"



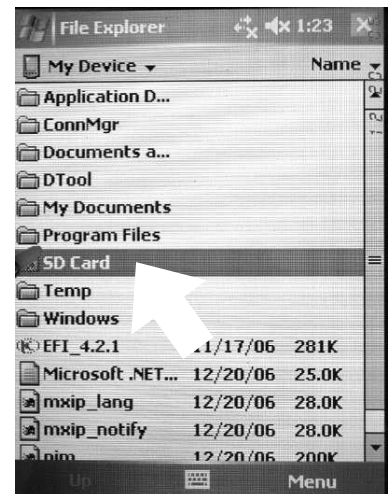
6. AFI SYSTEM (Autocontrol Fuel Injection System)

- Choose "1. DTool 50E CAB" and download this file then copy it into PDA SD card

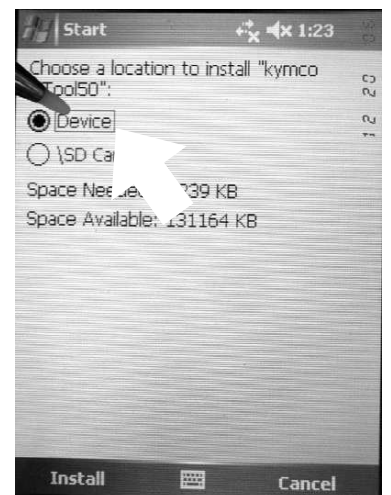
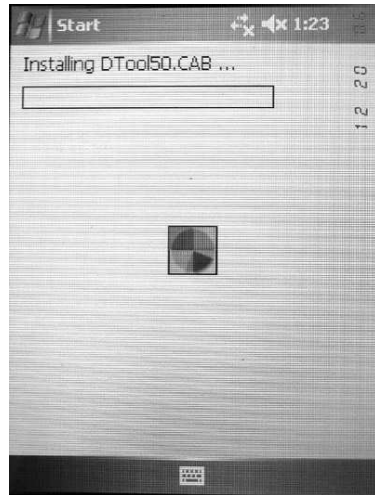
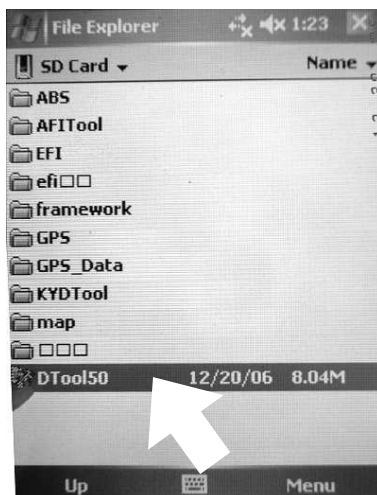
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SenderCode	KY4679		
Priority	Middle	Function Name	DOWNLOAD
Receive DepartmentName	All Department	ReceiverCode	All Receiver
Send Date	2007/01/11	Receive Date	
Invalid Date			
Attachment Link	1.DTool50E.CAB - 2 Mbytes		
Key Word			
Subject	AFI Diagnostic software DTool 5.0e		
AFI Diagnostic software DTool 5.0e 2007.01.10			
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INSTALL:

- Choose "Start" pull down menu, select "File Explorer", select "SD Card"

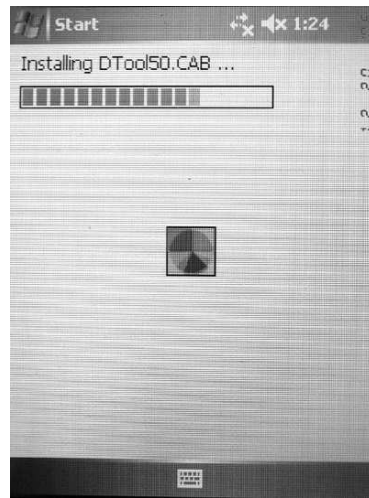
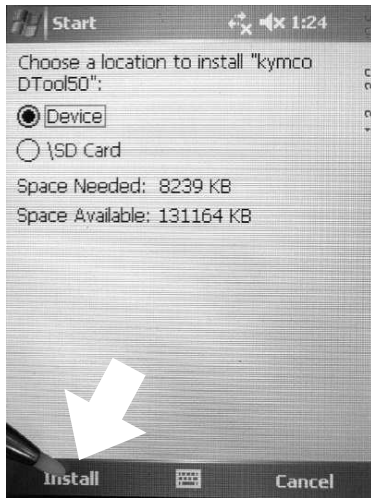


- Choose "Dtool 50E", select "Device"

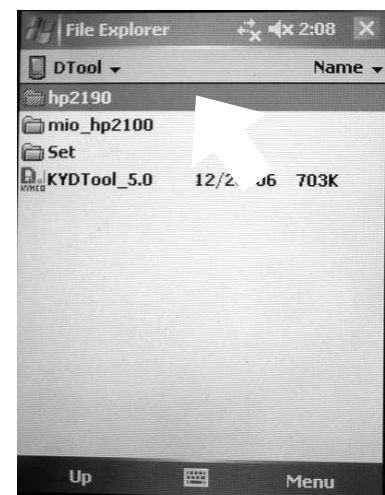
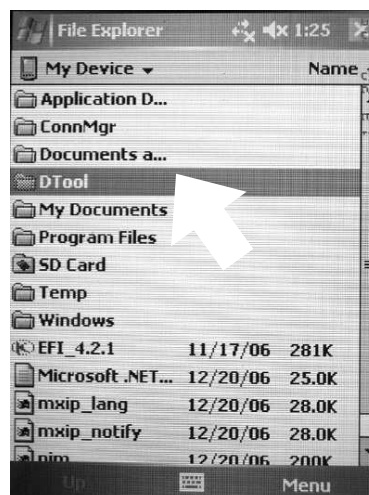
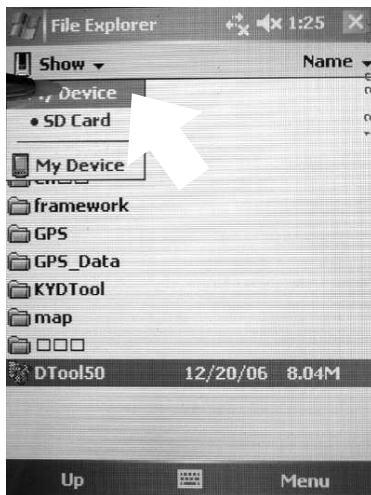


6. AFI SYSTEM (Autocontrol Fuel Injection System)

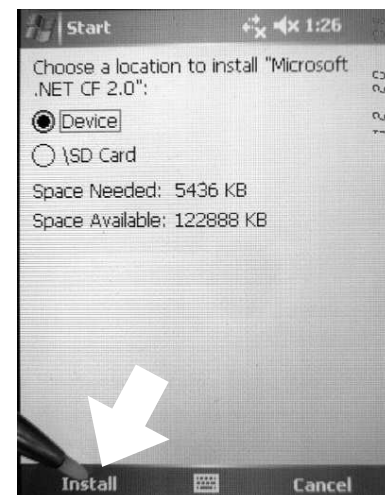
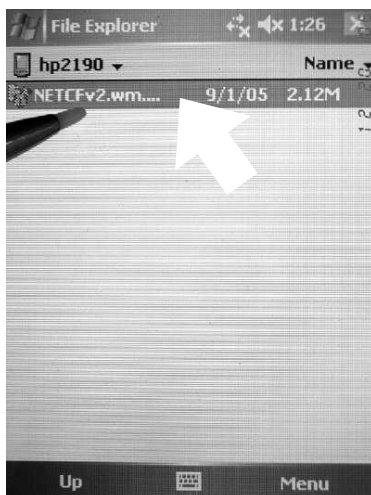
3. Choose “Install” to set up software into PDA



4. After installing, program will produce a driver folder in your device, you also have to set up a driver which let the software to fit for your PDA version. Choose “My Device”, “Dtool”, “hp2190”

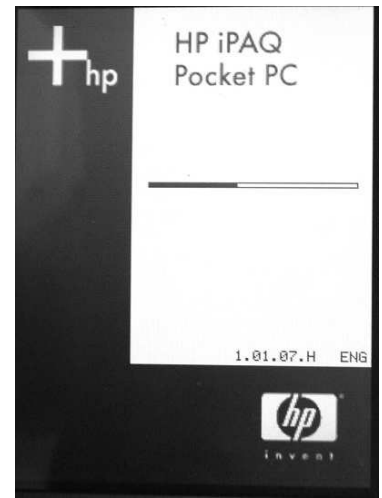
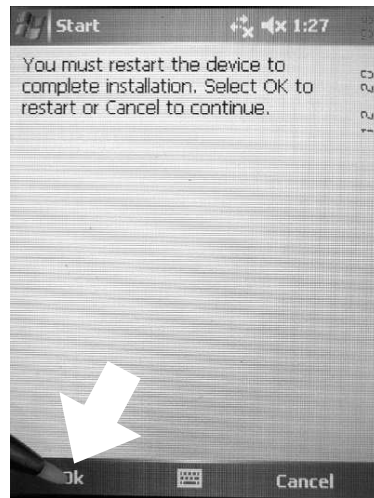
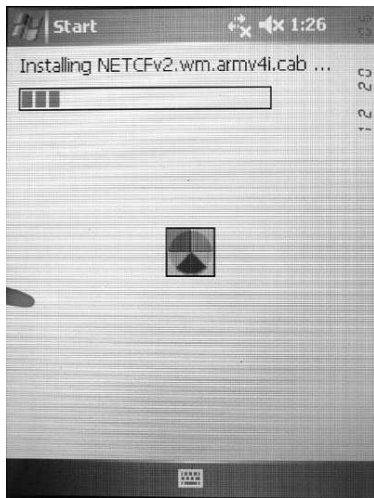


5. Choose “NETCFv2.wm...” “Device” “Install” to set up the driver.

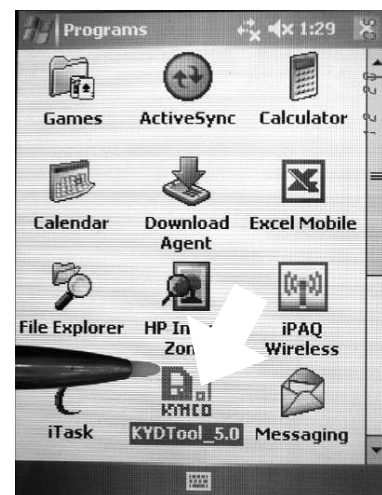


6. AFI SYSTEM (Autocontrol Fuel Injection System)

6. When finishing the installation, choose “Ok”, it will restart the PDA



7. Choose “start” pull down menu, select “DTool 5.0” or select “Programs” choose the short cut of “KYDTool_5.0”, now you can begin to use the diagnostic software.



6. AFI SYSTEM (Autocontrol Fuel Injection System)

FUNCTION OF DIAGNOSTIC SOFTWARE INTRODUCTION



Communication light, when transporting data between PDA and ECU, it will blink.

ECU version, connection .. info

Read the signal of vehicle



Change language, select connect port, exit system..

Maintenance and adjustment

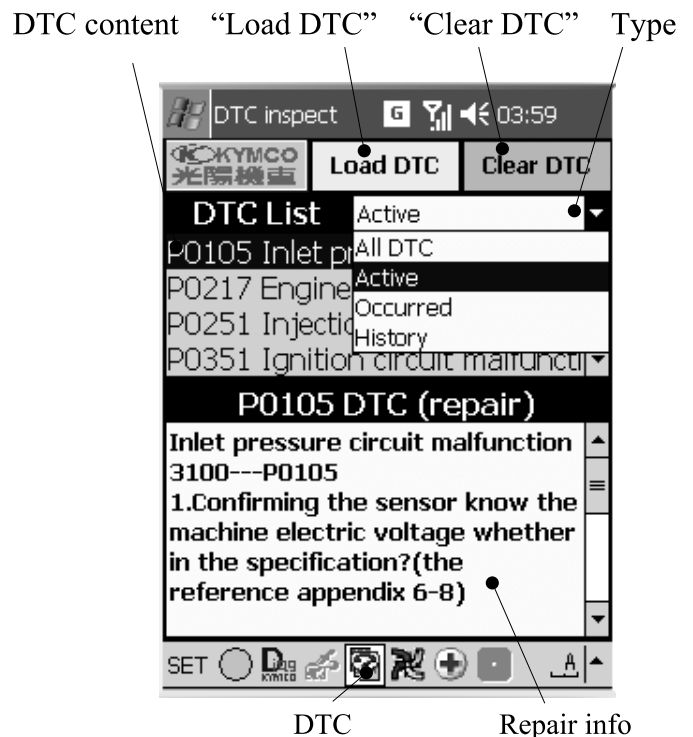
DTC (Detected Trouble Code)

6. AFI SYSTEM (Autocontrol Fuel Injection System)

SELF-DIAGNOSIS PROCEDURES (USE PDA)

1. Choose the “DTC” icon.
2. Choose “Load DTC” to show failure code.
3. If the vehicle got detected trouble it will show failure code on the DTC List.
4. Choose the failure code, it will show the repair info and proposal in the under column.
5. There are 4 kinds of DTC to show the failure code in different situation.
Which type of DTC List will be shown it depend on what type of DTC you chose.

- A. All DTC:
Show all DTC.
 - B. Active:
Show current detected trouble code only.
The failure is detected now, or it has been repaired, but you didn’t clear DTC yet.
 - C. Occurred:
Show passed detected trouble code only.
Passed DTC means the failure was detected before, but it hasn’t been repaired yet.
Or it was repaired, but the DTC has never been cleared.
 - D. History:
History DTC will record all the detected trouble codes those have ever happen.
But you can’t see the content, it just for ECU supplier’s study and watch them by special software.
6. When you have solved the problem, to be sure to clear the DTC, otherwise it will show up again when you load DTC next time even though you’ve finished the repair work.



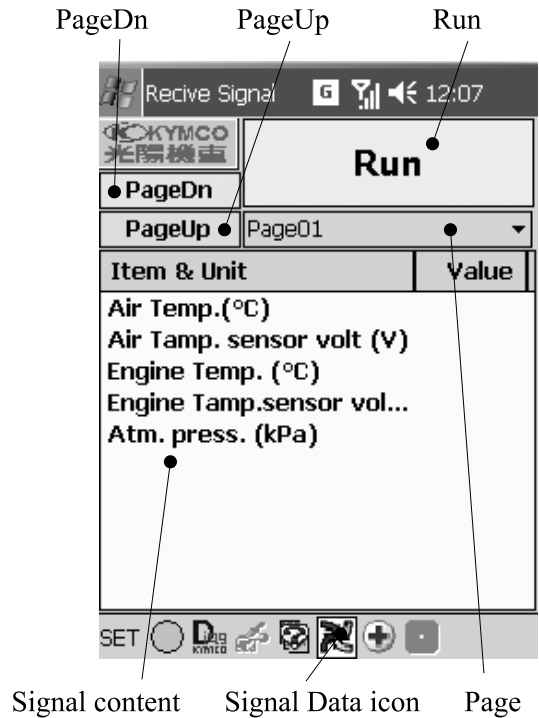
6. AFI SYSTEM (Autocontrol Fuel Injection System)

AFI SIGNAL DATA READING

- There are 7 pages in this section to display the signal data to let you know about the vehicle condition.

READ SIGNAL DATA PROCEDURES

1. Choose “Signal Date” icon to show vehicle information.
2. Choose “RUN” to receive the signal data.
3. Choose “PageDn” or “PageUp” or select page directly to show the any page of signal data.

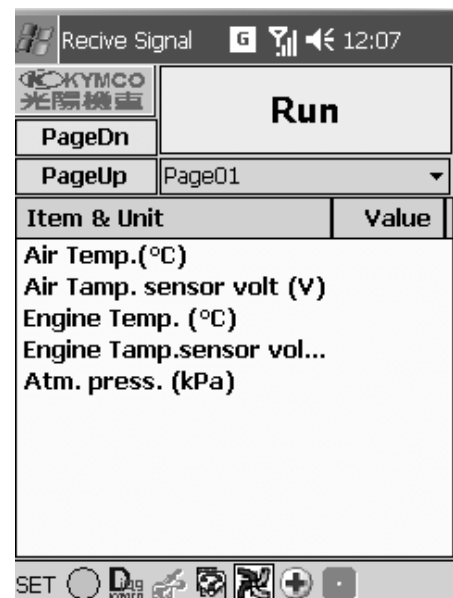


SIGNAL DATA CONTENTS

Page: 1/7

This page showing detected information by T-MAP, ETS sensor as following:

- Air temperature (°C)
- Air Temperature sensor volt (V)
- Engine Temperature (°C)
- Engine Temperature sensor volt (V)
- Atmospheric pressure (kpa)

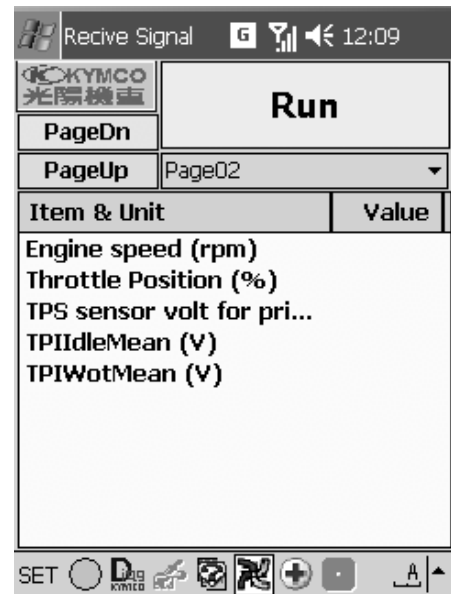


6. AFI SYSTEM (Autocontrol Fuel Injection System)

Page: 2/7

This page showing detected information by CPS, TPI sensor as following:

Engine speed (rpm)
 Throttle Position (%)
 TPS sensor volt for primary (V)
 TPIIdleMean (V)
 TPIWotMean (V)

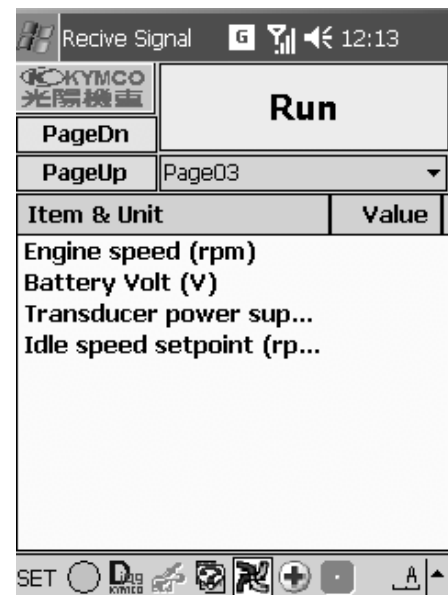


Item & Unit	Value
Engine speed (rpm)	
Throttle Position (%)	
TPS sensor volt for pri...	
TPIIdleMean (V)	
TPIWotMean (V)	

Page: 3/7

It shows the vehicle running condition and idle speed setpoint information as following:

Engine speed (rpm)
 Battery Volt (V)
 Transducer power supply volt (V)
 Idle speed setpoint (rpm)

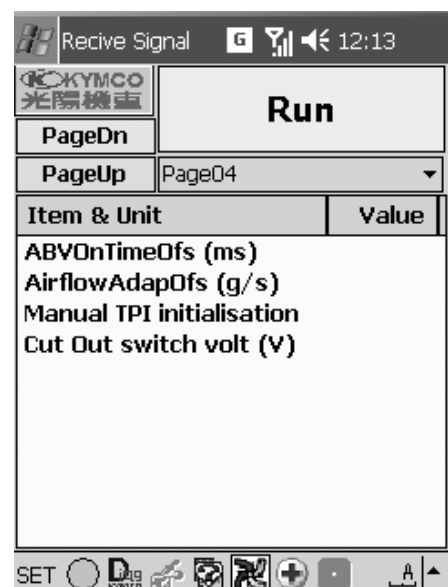


Item & Unit	Value
Engine speed (rpm)	
Battery Volt (V)	
Transducer power sup...	
Idle speed setpoint (rp...	

Page: 4/7

This page showing detected information by ABV, Tilt sensor, manual TPI reset status and APC learning as following:

ABV On Time Offset (ms)
 Airflow Adapt Offset (g/s)
 Manual TPI initiation
 Cut Out switch volt (V)



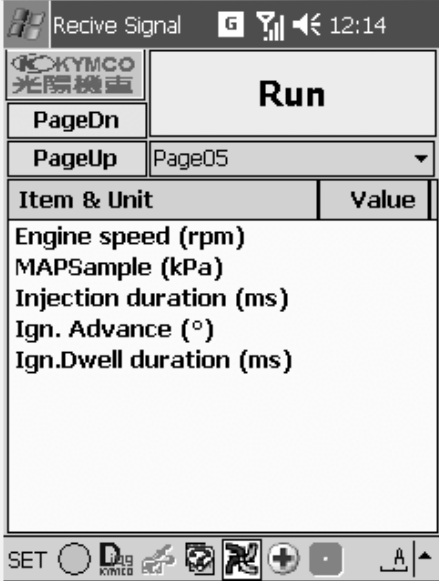
Item & Unit	Value
ABVOnTimeOfs (ms)	
AirflowAdapOfs (g/s)	
Manual TPI initialisation	
Cut Out switch volt (V)	

6. AFI SYSTEM (Autocontrol Fuel Injection System)

Page: 5/7

This page showing detected information by T-MAP sensor and injector condition as following:

Engine speed (rpm)
 MAPSample (kpa)
 Injection duration (ms)
 Ignition Advance (°)
 Ignition Dwell duration (ms)

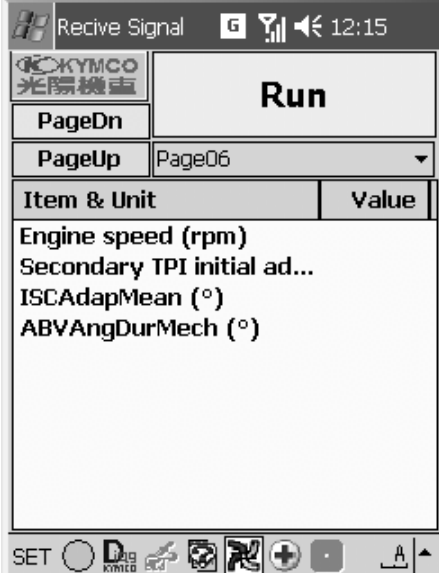


Item & Unit	Value
Engine speed (rpm)	
MAPSample (kPa)	
Injection duration (ms)	
Ign. Advance (°)	
Ign.Dwell duration (ms)	

Page: 6/7

This page showing detected information by CPS, ABV sensor and ABV activity condition as following:

Engine speed (rpm)
 Secondary TPI initial adaptation value (V)
 ISCAdapMean (°)
 ABVAngDurMech (°)

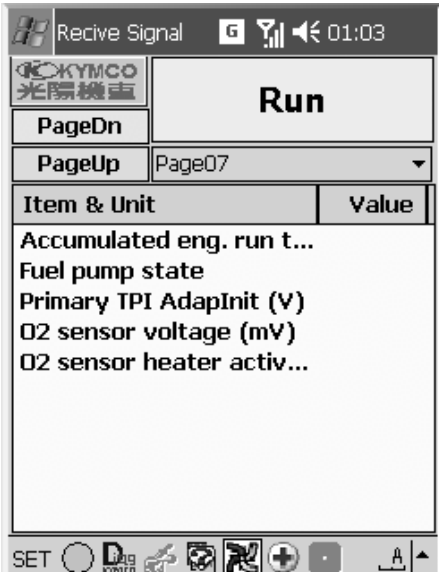


Item & Unit	Value
Engine speed (rpm)	
Secondary TPI initial ad...	
ISCAdapMean (°)	
ABVAngDurMech (°)	

Page: 7/7

This page showing detected information by O2, TPI sensor and fuel pump activity condition as following:

Accumulated engine run time (hr)
 Fuel pump state
 Primary TPI AdapInit (V)
 O2 sensor voltage (mV)
 O2 sensor heater activation (Yes/No)



Item & Unit	Value
Accumulated eng. run t...	
Fuel pump state	
Primary TPI AdapInit (V)	
O2 sensor voltage (mV)	
O2 sensor heater activ...	

6. AFI SYSTEM (Autocontrol Fuel Injection System)

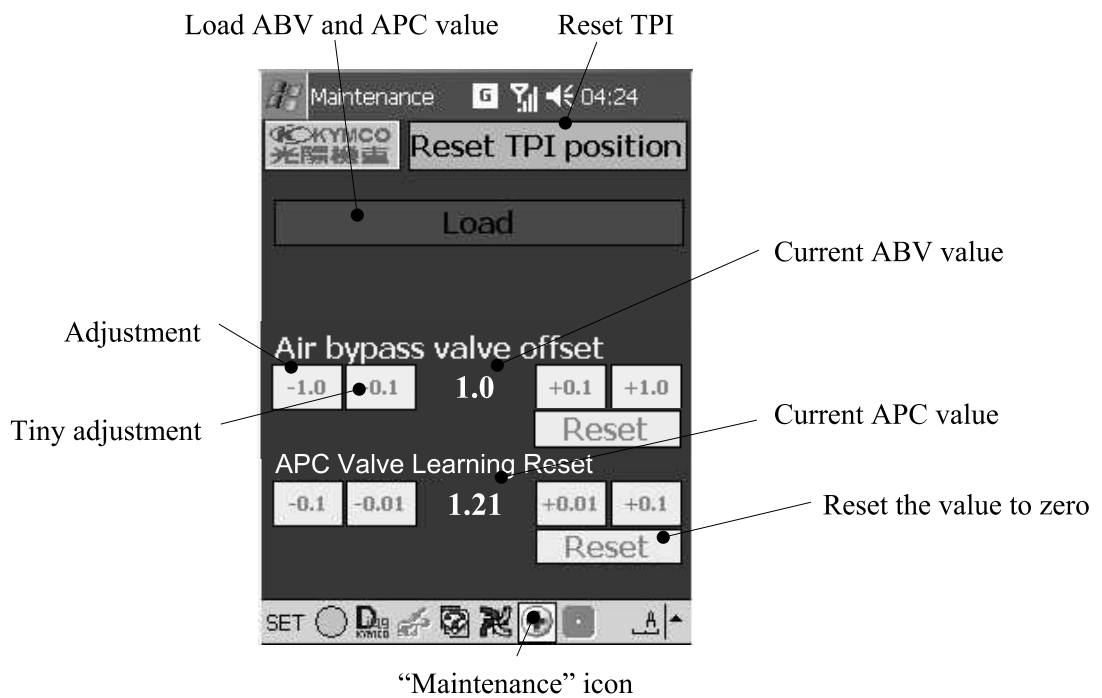
MAINTENANCE AND ADJUSTMENT

Choose “Maintenance” icon to show the adjustment function.

There are three functions in this section.

1. Reset TPI position
2. Air bypass valve offset
3. APC Valve Learning Rest.

Each function and operation method will show on following page.

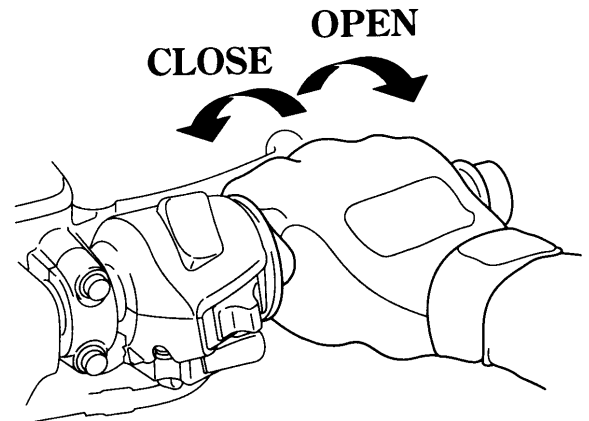


6. AFI SYSTEM (Autocontrol Fuel Injection System)

1. Reset TPI position

TPI: Throttle Position Inspection

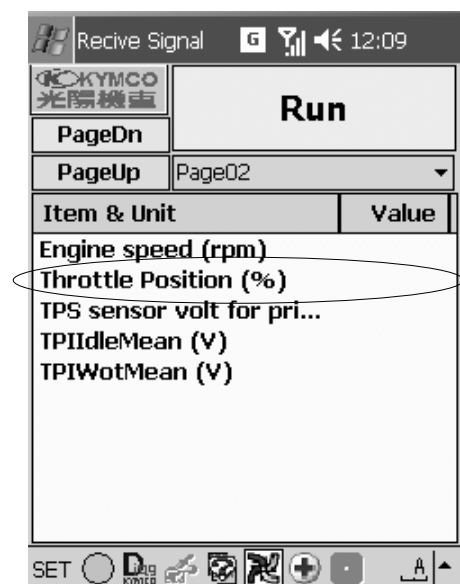
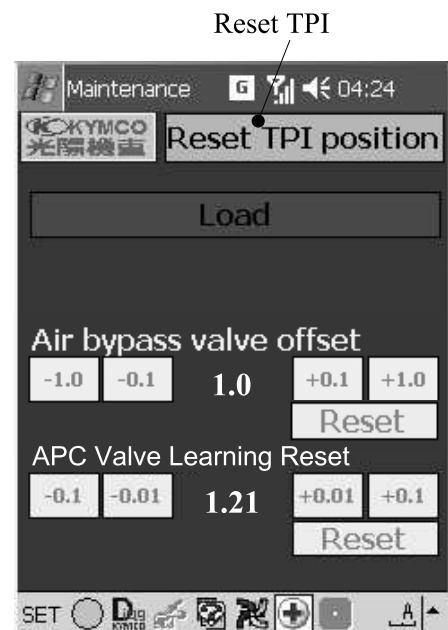
- When replacing throttle body or ECU, ECU might record uncorrected data. In this situation you have to reset TPI position to let the ECU renew the record of whole open (100%) and whole close (0%) throttle position.



Procedure:

1. Choose Reset TPI position function.
2. It will show a message “<TPI reset>Complete, Please KEY OFF -> KEY ON run once”.
3. KEY OFF, whole open throttle.
4. KEY ON, whole open throttle keep 2~4 seconds.
5. Whole close throttle
6. KEY OFF and wait for 2 seconds.
7. KEY ON
8. Well done
9. Remember to check if the Throttle Position (%) is correct, on signal page 2.

Notice: If you don't have PDA in hand, but you have to reset TPI in hurry, you can dismantle the connector of ABV, T-MAP, TPI sensor in the same time instead of procedure 1.



6. AFI SYSTEM (Autocontrol Fuel Injection System)

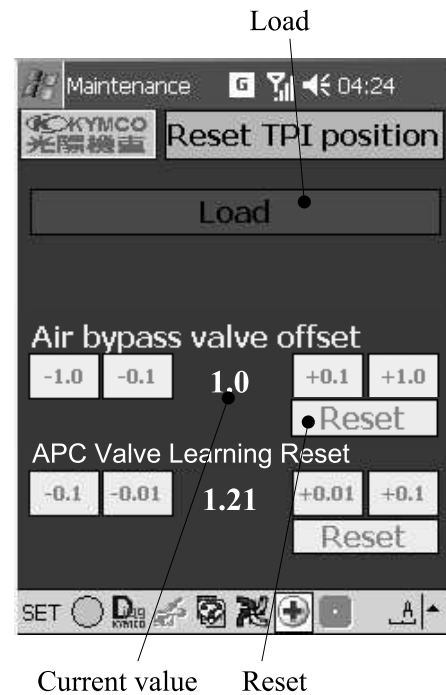
2. Air bypass valve offset

- When replacing throttle body or ABV then you have to reset “Air bypass valve offset” for revising the air bypass offset quantity.

Procedure:

1. Choose “Load” to show how much the Air bypass valve offset is.
2. Choose “Reset” to set the figure to zero.
3. Well done.

Note: Adjusting the air bypass valve offset is not recommend. All you have to do just reset it while maintaining vehicles.



6. AFI SYSTEM (Autocontrol Fuel Injection System)

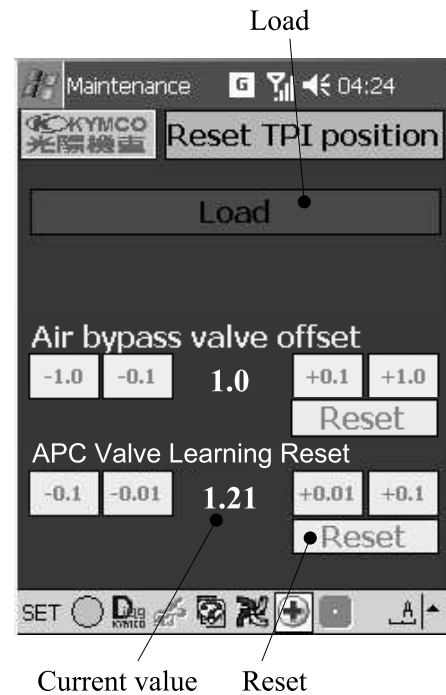
3. APC Valve Learning Reset. (Airflow Per Cycle)

- When replacing or cleaning carbon of throttle body and intake system.
- When overhauling engine, like dismantle intake valve, piston, piston rings, cylinder. It will change the efficiency of air intake, in this situation, you have to reset the APC Valve Learning.

Procedure:

1. Choose “Load” to show how much the APC valve Learning figure is.
2. Choose “Reset” to set the value zero let the ECU to re-learn new situation and change how much gas it should inject.

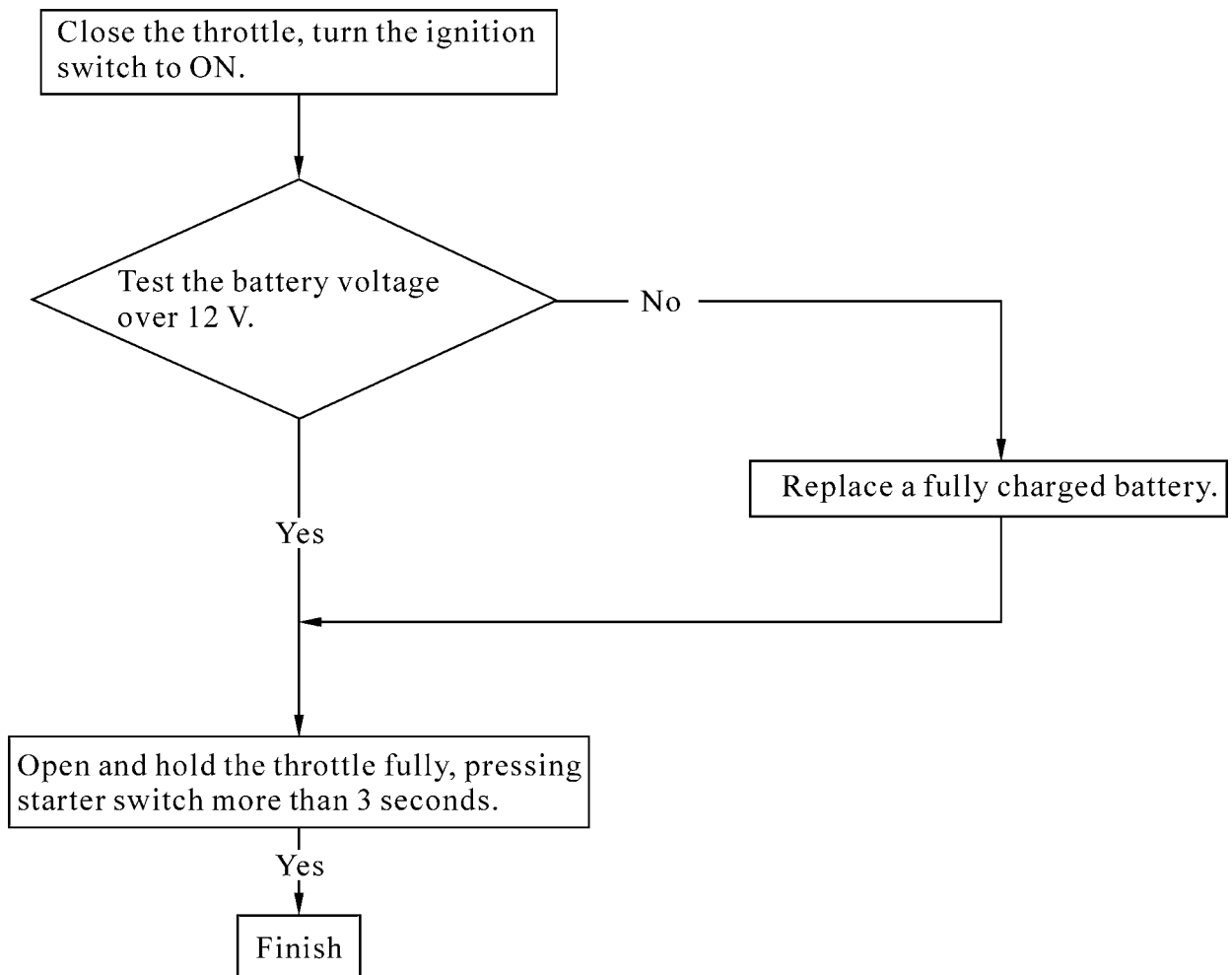
Note: To adjust the APC Valve Learning is not recommend. All you have to do while maintaining just reset.



6. AFI SYSTEM (Autocontrol Fuel Injection System)

SPARK PLUG ANTI-FLOOD

When no failure code occurs and pressing starter switch repeatedly still can not start the engine, maybe the spark plug is flood by fuel, perform the spark plug anti-flood to purge the fuel in the engine.



6. AFI SYSTEM (Autocontrol Fuel Injection System)

AUTO CONTROL FUEL INJECTION SYSTEM MAINTAIN

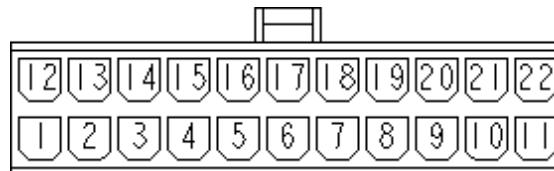
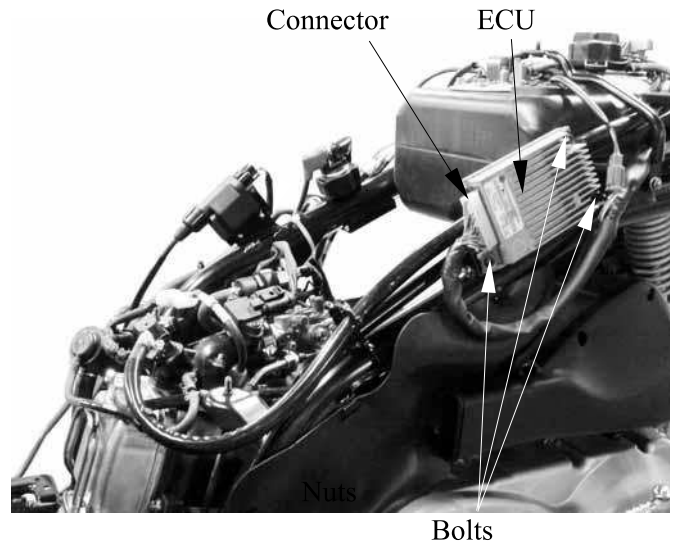
ENGINE CONTROL UNIT

Removal

Remove the frame body cover.

Remove three bolts and disconnect ECU connector, then remove ECU.

- Keep out of water.
- Remove the battery when the ignition switch is ON may cause the ECU damage.



11	B/W	CSWM	CUT-OUT SWITCH MONITOR	22	Br/B	MATH	MANIFOLD AIR TEMPERATURE SENSOR MONITOR
10	GR/B	O2-S	O2 SENSOR	21	W/L	COMK	ISO 9141 SERIAL COMMUNICATIONS
9	G/L	ETSM	ENGINE TEMPERATURE SENSOR MONITOR	20	G/W	CPS -	CRANKSHAFT POSITION SENSOR -
8	Br/W	MAPM	MANIFOLD/BAROMETRIC AIR PRESSURE MONITOR	19	L/Y	CPS +	CRANKSHAFT POSITION SENSOR +
7	V/B	TPIM	THROTTLE POSITION SENSOR MONITOR	18	V/R	XDRP	TRANSDUCER POWER (5V)
6	/	DVB	DRIVER-VB	17	RL	ECUP	ECU POWER (KEY SWITCH)
5	L/B	FPDD	FUEL PUMP DRIVER (RELAY)	16	V/G	XDRG	TRANSDUCER GROUND
4	L/R	LSD2	CHECK ENGINE LIGHT DRIVER	15	RL	DRVP	DRIVER POWER (BATTERY)
3	W/R	FIND	FUEL INJECTOR	14	GR/W	O2-H	O2 HEATER
2	/	LSD1	CANNISTER VAPOUR PURGE DRIVER	13	G/B	AIND	IDEL AIR VALVE DRIVER
1	G	DRVG	DRIVER GROUND	12	B/Y	IGND	IGNITION COIL DRIVER
PIN	COLOR	LABEL	P1 FUNCTION	PIN	COLOR	LABEL	P1 FUNCTION

1. The fuse burned while KEY ON:

Cause: Harness wire or components short circuit, please check the power of every components.

The way of checking ECU: Using an ammeter to measure pin 1 and pin 15 if its resistance is above 50 K, pin 1 and pin 17 is above 80 K. If found out the figure is not correct, change the ECU.

2. Showing the failure code of P0560 (Abnormal battery voltage), vehicle running no smoothing and CO % is abnormal:

To measure that if the voltage of battery is correct or not.

To measure the ECU connector of harness wire pin 15 to see if it is short circuit.

It's not short circuit, it means the function of detecting battery voltage is failure, please change ECU.

It is short circuit, it means the harness wire got problem, please find out where get short, if it is tough to find, to change the harness is recommended.

6. AFI SYSTEM (Autocontrol Fuel Injection System)

T-MAP SENSOR (TEMPERATURE MANIFOLD AIR PRESSURE SENSOR)

Removal

Remove luggage box.

Turn the ignition switch to OFF.

Disconnect manifold absolute pressure sensor connector and remove two screws, then remove manifold absolute pressure sensor.



Screws

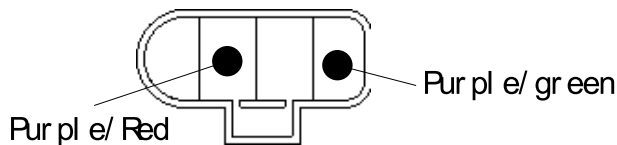
Inspection

(Using a commercially available multimeter)

Turn ignition switch to OFF, and Disconnect the manifold absolute pressure sensor connector.

Turn ignition switch to ON.

Connect the multimeter (+) probe to the purple/red wire and the multimeter (-) probe to the purple/green wire to measure the voltage from the ECU input to manifold absolute pressure sensor.



Standard (20°C/68°F): 5±0.25 V

Be sure that the battery is in good condition before performing this measurement.

(Using PDA)

Connect PDA to diagnostic connector.

Turn the ignition switch to ON.

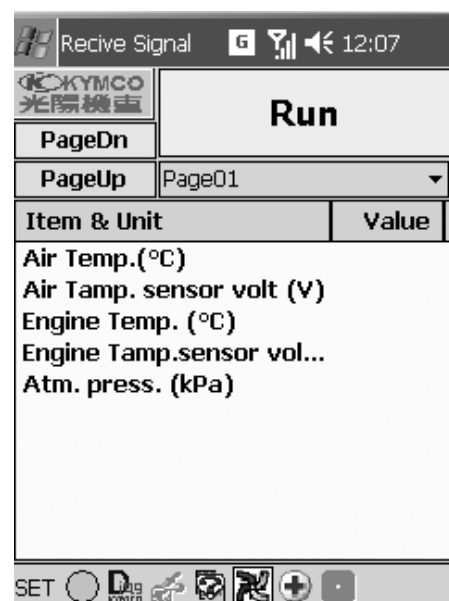
Be sure the “Engine temperature” ≤ “Air temperature”

Check the “Sensor output”.

Standard:

Standard: 0~5 V

Be sure that the battery is in good condition before performing this measurement.



6. AFI SYSTEM (Autocontrol Fuel Injection System)

Manifold air pressure sensor inspection

Measure the manifold absolute pressure sensor resistance.

Standard: 568.9~2544 Ω (20°C/68°F)



AIR BYPASS VALVE

Removal

Remove luggage box.

Turn ignition switch to OFF.

Disconnect the air by pass valve connector and air tube.

Remove air by pass valve.



Air By Pass Valve

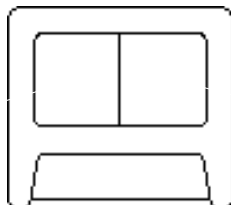
Inspection

(Using a commercially available multimeter)

Turn ignition switch to ON.

Disconnect the air by pass valve connector.

Connect the multimeter (+) probe to the red/blue wire and the multimeter (-) probe to the green/black wire to measure the voltage from the ECU input to air by pass valve.



Standard (20°C/68°F): 12~14.5 V

Be sure that the battery is in good condition before performing this measurement.

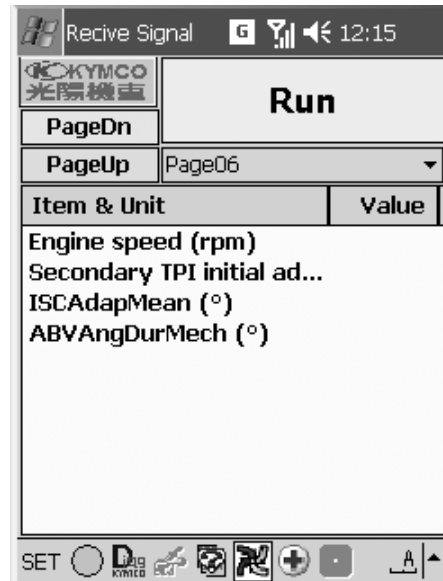
6. AFI SYSTEM (Autocontrol Fuel Injection System)

(Using PDA)

Connect PDA to diagnostic connector.
Turn the ignition switch to ON.
Check the “ISCAdapMean”.

Standard:

ISCAdapMean: 0°



Recive Signal	
KYMCO 光陽機車	
PageDn	Run
PageUp	Page06
Item & Unit	Value
Engine speed (rpm)	
Secondary TPI initial ad...	
ISCAdapMean (°)	
ABVAngDurMech (°)	

Air by pass valve inspection

Measure the air by pass valve resistance.

Standard: 24.7~27.3 Ω (20°C/68°F)



THROTTLE BODY REMOVAL

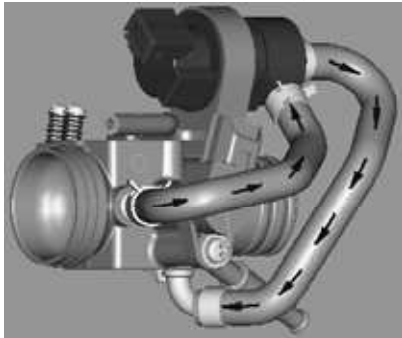
Remove air by pass valve.
Disconnect the throttle body connector and two air tubes.
Disconnect throttle cable.
Loosen intake manifold and air ventilation hose band screws.
Disconnect throttle position sensor connector, then remove throttle.



6. AFI SYSTEM (Autocontrol Fuel Injection System)

THE CLEAN PROCEDURE FOR THROTTLE BODY:

The timing of cleaning throttle body:



1. While riding the vehicle a period of time, throttle body will get some carbon inside, at that moment ABV (Air Bypass Valve) will offset air to make the idle speed stable, but if ABV open over 180°, it won't be useful and cause some problem like idle speed instable.
2. Keep looking on diagnostic software 6/7 signal page ABVAngDurMech (°), if the value is over 180°, you have to clean the throttle body.
3. While maintaining vehicle like change oil, if the ABVAngDurMech (°) is over 140°, to clean the throttle body is recommended.

Notice:

1. Be sure the parts of intake system are no leakage or loosed before engine start.
2. Start the engine and connect the diagnostic tool to run the warm-up process until the temperature to 120 degree centigrade on cylinder head.
3. To check the valve angle of ABV (Air Bypass Valve), Diagnostic software 6/7 signal page ABVAngDurMech(°), if the angle is over 180 degree, remove the throttle body for clean..
4. After cleaning the throttle body, to reset the air bypass valve offset, (Maintenance page, reset the Air bypass valve offset).

Clean procedure:

1. To remove the TPS; ABV(air bypass valve) and vacuum tube from throttle body first. After that, to remove the throttle body from the engine.
2. To remove the intake and exhaust tube of ABV(air bypass valve) from throttle body.
3. To spray the carbon clean detergent into the hole of throttle body and wait for some minutes, when the carbon is melted, use the compressing air to clean out the residual liquid on the surface of throttle body.
4. Install the throttle body after cleaning then tighten the band to ensure no leakage problem.
5. Turn the key on and connect the diagnostic tool to check the voltage of different valve angle on throttle when the engine is in idle to full speed. If the DTC (Diagnostic Trouble Code) is found, please refer to the chapter of troubleshooting for operation.

6. AFI SYSTEM (Autocontrol Fuel Injection System)

Inspection

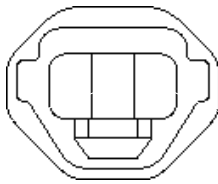
(Using a commercially available multimeter)

Turn ignition switch to ON.

Disconnect throttle position sensor connector.

Connect the multimeter (+) probe to the purple/red wire and the multimeter (-) probe to the purple/green wire to measure the voltage from the ECU input to air by pass valve.

Standard (20°C/68°F): 5±0.25 V



(Using PDA)

Connect PDA to diagnostic connector.

Turn the ignition switch to ON.

Close throttle fully to check the “Throttle position” and “Sensor volt for primary”.

Standard:

Throttle position: 0%

Sensor volt for primary: 0.68±0.05V

Open throttle fully to check the “Throttle position” and “Sensor output”.

Standard:

Throttle position: 100%

Sensor volt for primary: 4.1±0.1V

Notice:

1. Never adjust those two TP screws, it was adjusted to the best condition by KYMCO, if change this condition it may cause instable riding.

2. Before or after cleaning the throttle body and warming up the vehicle, if the idle speed rpm is out of the range (1800 rpm) more than 200 rpm, you can remove the rubber and adjust the air bypass adjustment screw to fit the target rpm. But if ABV open over 180°, all you have to do just cleaning the throttle body first.

3. Don't adjust the air bypass adjustment screw over 1 circle.

Screw in will down the rpm.

Screw out will up the rpm.

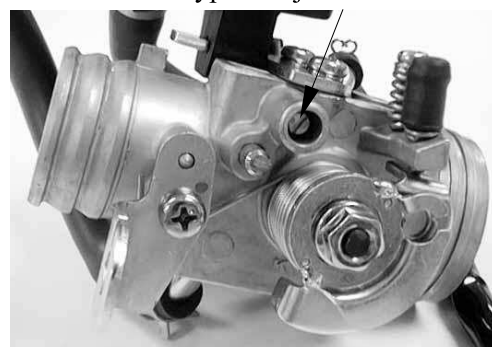
Recive Signal		12:09
KYMCO 光陽機車		Run
PageDn		
PageUp	Page02	
Item & Unit	Value	
Engine speed (rpm)		
Throttle Position (%)		
TPS sensor volt for pri...		
TPIIdleMean (V)		
TPIWotMean (V)		

Rubber

TP screws



Air bypass adjustment screw



6. AFI SYSTEM (Autocontrol Fuel Injection System)

Throttle position sensor inspection

Measure the throttle position sensor resistance.

Standard: 0.6k~1.4k Ω (20°C/68°F)

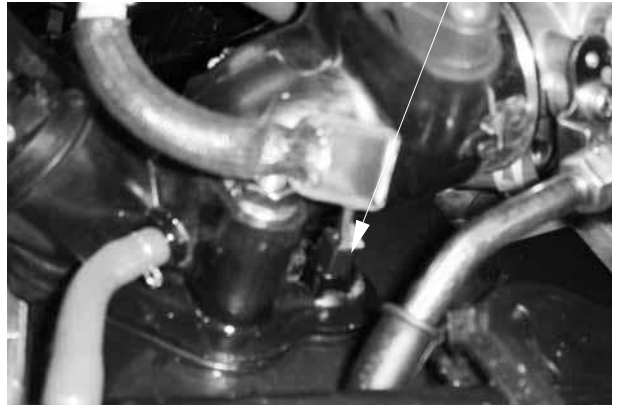


ENGINE TEMPERATURE SENSOR

Removal

Remove throttle body.
Remove intake manifold.
Disconnect the engine temperature sensor connector, then remove engine temperature sensor.

Engine Temperature Sensor

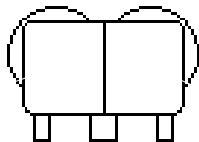
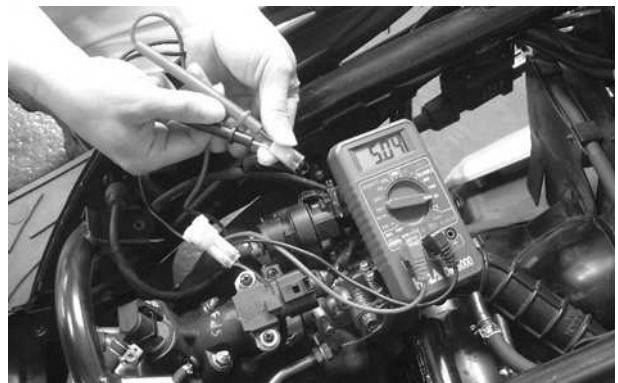


Inspection

(Using a commercially available multimeter)

Turn ignition switch to OFF.
Disconnect engine temperature sensor connector.
Turn ignition switch to ON.

Connect the multimeter (+) probe to the green/blue wire and the multimeter (-) probe to the purple/green wire to measure the voltage from the ECU input to air by pass valve.



Standard (20°C/68°F): 5±0.25 V

6. AFI SYSTEM (Autocontrol Fuel Injection System)

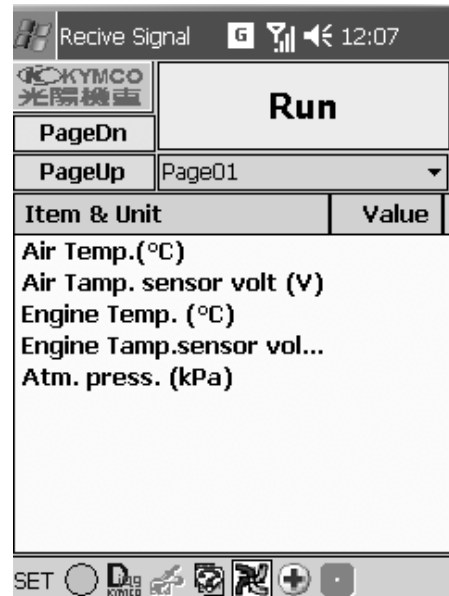
(Using PDA)

Connect PDA to diagnostic connector.
Turn the ignition switch to ON.

Be sure the “Engine temperature” \leq “Air temperature”

Check the “Air Temp. sensor volt (V)” and “Engine Temp.sensor volt (V)”.

Standard: 0~5 V

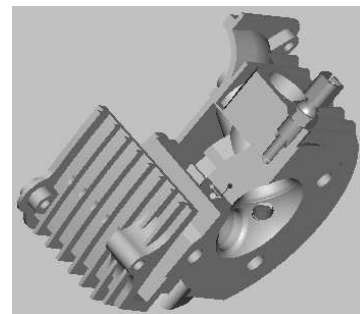
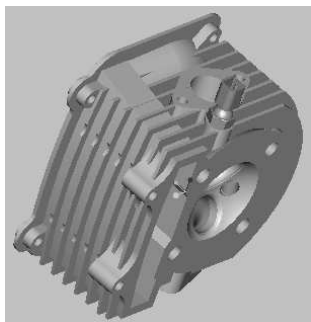


Engine temperature sensor inspection

Measure the engine temperature sensor resistance.

Standard: 5.64k~24.5k Ω (20°C/68°F)

When screwing this component, the torque need to be limited between 60~90 Kg-cm.



6. AFI SYSTEM (Autocontrol Fuel Injection System)

INJECTOR

Removal

Remove luggage box.

Disconnect the fuel tube from injector.

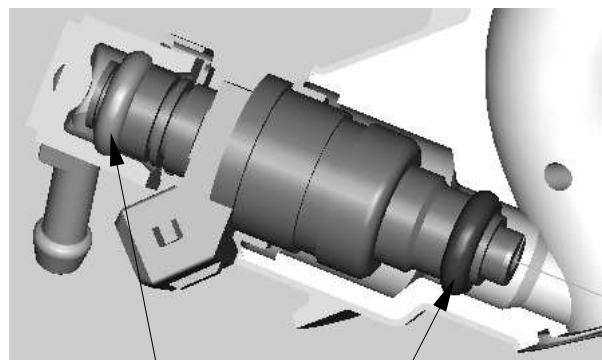
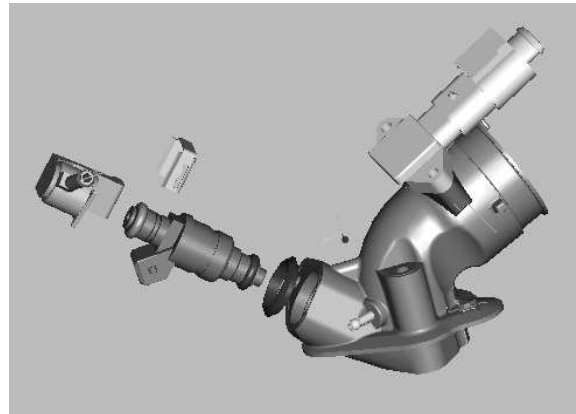
Remove the bolt and injector.

Disconnect injector connector.



Notice:

While dismantling the injector, remember to notice that replace those 2 O-rings with new and apply some oil before mount them, never damage the O-ring while mounting it, otherwise it will cause seal insufficient.



O-ring

O-ring

6. AFI SYSTEM (Autocontrol Fuel Injection System)

Injector inspection

Measure the injector resistance.

Standard: $14.5 \pm 0.725 \Omega$ (20°C/68°F)



FUEL PUMP

Removal

Remove six bolts and fuel pump.

While reinstall the fuel pump remember to align the mark and apply the sealed glue to keep the sealed ability.

Inspection

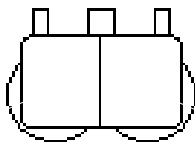
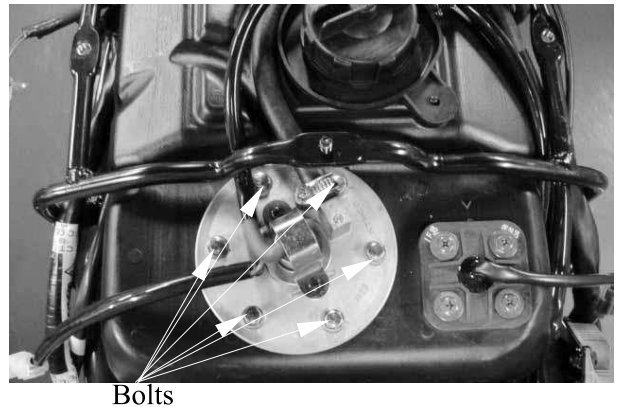
(Using a commercially available multimeter)

Turn ignition switch to OFF.

Disconnect fuel pump unit connector.

Turn ignition switch to ON.

Connect the multimeter (+) probe to the red/black wire and the multimeter (-) probe to the green wire to measure the voltage from the ECU input to fuel pump unit.



Standard (20°C/68°F): 8~16 V

Be sure that the battery is in good condition before performing this measurement.



6. AFI SYSTEM (Autocontrol Fuel Injection System)

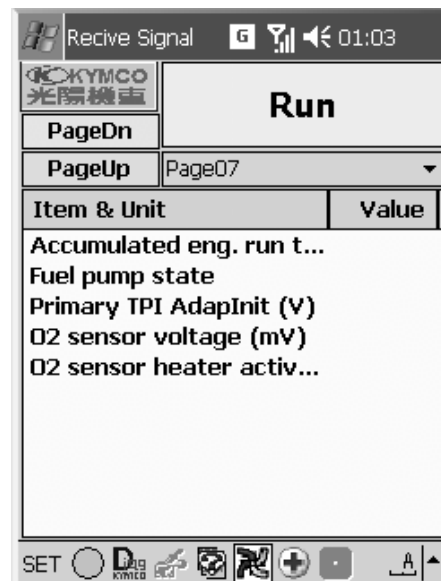
(Using PDA)

Connect PDA to diagnostic connector.

Turn the ignition switch to ON.

When the engine is stopping, check the “Fuel pump state” is OFF.

When the engine is running, check the “Fuel pump state” is ON.



Fuel pump inspection

Check the furl pump for continuity.

Standard: continuity



6. AFI SYSTEM (Autocontrol Fuel Injection System)

DIAGNOSTIC RECORD SHEET

It's easier to figure problem out, please fill out this form, when you maintaining AFI vehicle.

Peoples 200 i Diagnostic Record Sheet

Name:

Frame Number:

Environment Temperature:

Engine Number:

Date: Time:

Mileage:

	Item	Record	Value for reference	Note
Version	ECU serial number		0000008200	
	Hardware version		006	
	Software version		M14KDALA001	
	Revise ID		O4KDALCA	
Before engine running (cold engine)	Air temperature		Fit in with local temperature $\pm 2^{\circ}\text{C}$	
	Engine temperature		Fit in with local temperature $\pm 2^{\circ}\text{C}$	
	Atmospheric pressure		101.3 ± 2 kPa	
	Throttle position		0	
	Adapted idle throttle position		0.68V ± 0.05 / 0%	
	Adapted WOT Position		4.1V ± 0.1 / 100%	
	Battery voltage		>12V	
	Sensor power supply voltage		5 ± 0.2 V	
	Idle speed set point		—	It will change depend on engine temperature.
	ABV On TimeOfs (ms)		—	ABV On TimeOfs (ms)
	Airflow AdapOfs (g/s)		—	Airflow AdapOfs (g/s)(-0.35max)
	Manual TPI initialization		Not active	
	Cut Out switch volt (V)		3.5–4.7V	While using the main stand. (Vehicle keep vertical)
ECU Run time accumulation		—		
Before maintaining (Hot engine)	Engine speed (Idle)		1800 ± 100 rpm	
	Manifold pressure		39–50kpa	
	Injection duration (ms)		2.8–3.7ms	
	Ignition Advance (°C)		10–14BTDC	
	Ignition Dwell duration		1.90–2.2ms	
	Air temperature (°C)		Fit in with local temperature $\pm 2^{\circ}\text{C}$	
	Engine Temperature		>110 $^{\circ}\text{C}$	
	CO% (Before catalyze)		0.8–3.0%	It needs to test CO value between catalyzing and AICV(The condition of test is that warm the engine till 110–120 $^{\circ}\text{C}$)
	Idle CO adjustment		—	O2 sensor will detect the value and ABV offset the air automatically. So you needn't to adjust COFPC)
	ABV AngDurMech (°)		< 140 $^{\circ}$	1.While the angle of opening above 140 $^{\circ}$, Suggest to clean throttle body harmony with replacing the engine oil. 2.While the angle of ABV open above 180 $^{\circ}$, please clean throttle body.
After maintaining (Hot engine)	Revolutions Per Minute		1800 ± 100 rpm	
	Manifold pressure		39–50kpa	
	Injection duration (ms)		1.90–2.2ms	
	Ignition Advance (°C)		10–14BTDC	
	Ignition Dwell duration		1.90–2.2ms	
	Air temperature (°C)		Fit in with local temperature $\pm 2^{\circ}\text{C}$	
	Engine Temperature		>110 $^{\circ}\text{C}$	
	CO% (Before catalyze)		0.8–3.0%	It needs to test CO value between catalyzing and AICV(The condition of test is that warm the engine till 110–120 $^{\circ}\text{C}$)
	Idle CO adjustment		—	O2 sensor will detect the value and ABV offset the air automatically. So you needn't to adjust COFPC)
	ABV AngDurMech (°)		< 140 $^{\circ}$	1.While the angle of opening above 140 $^{\circ}$, Suggest to clean throttle body harmony with replacing the engine oil. 2.While the angle of ABV open above 180 $^{\circ}$, please clean throttle body.