

Gasoline Engine Diagnosis (Worksheet)

Worksheet Type A - Diagnosis in class

- 1. Symptom analysis**
- 2. Current data analysis**

Worksheet Type B - System Inspection

- 1. Intake system**
- 2. Fuel system**
- 3. Ignition system**
- 4. Compression test**
- 5. Sensor inspection**
- 6. GDS test mode**

Worksheet Type C - Vehicle Diagnosis

- Vehicle Diagnosis – 1**
- Vehicle Diagnosis - 2**
- Vehicle Diagnosis - 3**
- Vehicle Diagnosis – 4**
- Vehicle Diagnosis – 5**
- Vehicle Diagnosis – 6**
- Vehicle Diagnosis – 7**
- Vehicle Diagnosis - 8**

Worksheet Type A - Vehicle Diagnosis in class

Worksheet type A is consist of two parts. One is symptom diagnosis and the other is current data analysis of the vehicle which has abnormal engine behavior. Each task should be completed in the classroom. Share knowledge and experience with group member. Use proper materials such as workshop manual, training manual and any kinds of service information to get the conclusion.

1. Symptom analysis

Q. What will be the possible causes of each vehicle symptom below?

Vehicle symptom	Possible causes
<p>1. Engine hesitation (Engine idle is not stable)</p>	
<p>2. Hard starting</p>	
<p>3. Engine stall while driving</p>	
<p>4. Excessive fuel consumption</p>	

2. Current data analysis

There are 4 captured current data from 4 defected vehicles. Analyze the current data and write down the vehicle symptom and estimated causes of each current data.

1) Current data 1 (in engine idle)

- Vehicle information: LD 1.6 CVVT 2007MY, General market, Unleaded

Current Data		
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Engine Coolant Temperature Sensor	101	'C
<input checked="" type="checkbox"/> Engine Speed-Fine	1852	RPM
<input checked="" type="checkbox"/> Idle Speed Control Actuator	19.9	%
<input checked="" type="checkbox"/> Cylinder 1 Injection Time	4.2	mS
<input checked="" type="checkbox"/> Ignition Timing Advance for 1 Cylinder	ATDC 3	'
<input checked="" type="checkbox"/> Oxygen Sensor-Bank1/Sensor1	0.70	V
<input checked="" type="checkbox"/> Short Term Fuel Trim	2.4	%
<input checked="" type="checkbox"/> Long Term Fuel Trim-Idle Load	0.1	%
<input checked="" type="checkbox"/> EVAP Purge Valve	0.0	%
<input checked="" type="checkbox"/> Manifold Absolute Pressure Sensor	1.8	V
<input checked="" type="checkbox"/> Manifold Absolute Pressure Sensor	459	hPa
<input type="checkbox"/> Long Term Fuel Trim-Part Load	-2.1	%
<input type="checkbox"/> Knock Adaption-Cylinder 1	0.0	'
<input type="checkbox"/> Knock Adaption-Cylinder 2	0.0	'
<input type="checkbox"/> Knock Adaption-Cylinder 3	0.0	'
<input type="checkbox"/> Knock Adaption-Cylinder 4	0.0	'
<input type="checkbox"/> Camshaft Adaption-#1	154.4	'
<input type="checkbox"/> Camshaft Adaption-#2	522.4	'
<input type="checkbox"/> Angle Between CKP & CMP #1	522.6	'
<input type="checkbox"/> Camshaft Actual Position	27.2	'
<input type="checkbox"/> Camshaft Position-Target	27.0	'

What is the vehicle behavior?

What will be the possible cause of the vehicle? And why do you think?

2) Current data 2 (in engine idle)

- Vehicle information: LD 1.6 CVVT 2007MY, General market, Unleaded

Current Data 23/63		
Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Engine Coolant Temperature Sensor	98	°C
<input checked="" type="checkbox"/> Engine Speed-Fine	1072	RPM
<input checked="" type="checkbox"/> Idle Speed Control Actuator	21.1	%
<input checked="" type="checkbox"/> Cylinder 1 Injection Time	1.9	mS
<input checked="" type="checkbox"/> Ignition Timing Advance for 1 Cylinder	BTDC 31	'
<input checked="" type="checkbox"/> Oxygen Sensor-Bank1/Sensor1	0.72	V
<input checked="" type="checkbox"/> Short Term Fuel Trim	-0.8	%
<input checked="" type="checkbox"/> Long Term Fuel Trim-Idle Load	0.8	%
<input checked="" type="checkbox"/> EVAP Purge Valve	17.4	%
<input checked="" type="checkbox"/> Manifold Absolute Pressure Sensor	1.1	V
<input checked="" type="checkbox"/> Manifold Absolute Pressure Sensor	275	hPa
<input type="checkbox"/> Throttle Position	0.4	V
<input type="checkbox"/> Throttle Position	0.8	%
<input type="checkbox"/> Adapted Throttle Position	8.1	%
<input type="checkbox"/> Battery Positive Voltage	14.1	V
<input type="checkbox"/> Battery Charging	0.0	%
<input type="checkbox"/> Intake Air Temperature Sensor	60	°C
<input type="checkbox"/> Cylinder 2 Injection Time	1.9	mS
<input type="checkbox"/> Cylinder 3 Injection Time	1.9	mS
<input type="checkbox"/> Cylinder 4 Injection Time	1.9	mS
<input type="checkbox"/> Actual Torque	14.1	%

What is the vehicle behavior?

What will be the possible cause of the vehicle? And why do you think?

3) Current data 3 (in engine idle)

- Vehicle information: LD 1.6 CVVT 2007MY, General market, Unleaded

Sensor Name	Value	Unit
<input checked="" type="checkbox"/> Engine Coolant Temperature Sensor	99	'C
<input checked="" type="checkbox"/> Engine Speed-Fine	616	RPM
<input checked="" type="checkbox"/> Idle Speed Control Actuator	28.9	%
<input checked="" type="checkbox"/> Cylinder 1 Injection Time	3.9	mS
<input checked="" type="checkbox"/> Ignition Timing Advance for 1 Cylinder	BTDC 20	'
<input checked="" type="checkbox"/> Oxygen Sensor-Bank1/Sensor1	0.26	V
<input checked="" type="checkbox"/> Short Term Fuel Trim	-0.9	%
<input checked="" type="checkbox"/> Long Term Fuel Trim-Idle Load	3.7	%
<input checked="" type="checkbox"/> EVAP Purge Valve	0.0	%
<input checked="" type="checkbox"/> Manifold Absolute Pressure Sensor	1.6	V
<input checked="" type="checkbox"/> Manifold Absolute Pressure Sensor	414	hPa
<input type="checkbox"/> Throttle Position	0.4	V
<input type="checkbox"/> Throttle Position	0.0	%
<input type="checkbox"/> Adapted Throttle Position	7.8	%
<input type="checkbox"/> Battery Positive Voltage	13.9	V
<input type="checkbox"/> Battery Charging	0.0	%
<input type="checkbox"/> Intake Air Temperature Sensor	60	'C
<input type="checkbox"/> Cylinder 2 Injection Time	3.8	mS
<input type="checkbox"/> Cylinder 3 Injection Time	3.8	mS
<input type="checkbox"/> Cylinder 4 Injection Time	3.8	mS
<input type="checkbox"/> Actual Torque	16.4	%

What is the vehicle behavior?

What will be the possible cause of the vehicle? And why do you think?