

Diagnosis – Complaint Related Diagnostic Chart – Injection/Ignition

 **WARNING!**

Risk of severe injury when touching ignition parts which produce high voltages. Do not touch ignition components.

Persons with heart pacemakers are not to perform repairs on this type of ignition system..

Electronic ignition systems produce dangerous high voltages on both the primary circuit and the secondary (ignition) circuits. Due to the high voltages produced, contact with any of the voltage carrying components can be dangerous to your health (burns, heart palpitations, cardiac arrest etc).

- Ignition must be turned OFF prior to performing any repair work on the ignition system.
- Do not come in contact or remove with any of the ignition components while the engine is cranking or idling.
- Wear rubber soled shoes.
- Disconnect connectors for CKP sensor at sensor or control module.
- If repairs require that the ignition be turned on, then dangerous voltages will be present through out the entire ignition system.
- No exposed metal connectors or sending units may be installed in the ignition wires.

 **WARNING!**

Risk of fatal injury from being pulled into rotating vehicle parts.

Do not reach into rotating parts.

Wear closed and tight-fitting work clothes.

Protect vicinity of rotating vehicle components from unauthorized access.

 **WARNING!**

Risk of explosion from fuel igniting, risk of poisoning from inhaling and swallowing fuel as well as risk of injury to eyes and skin from contact with fuel.

No fire, sparks, exposed flames or smoking.

Pour fuels only into suitable and appropriately marked containers.

Wear protective clothing when handling fuel.

Possible hazards

Risk of explosion, poisoning and injury

Fuels are highly inflammable and toxic if inhaled. Fuel may cause skin damage. Contact with gasoline fuel, for example, removes the natural oils on the skin. Fuel vapors are explosive, invisible and spread out at floor level. They are toxic if inhaled and have a narcotic effect in high concentrations.

Protective measures/guidelines

- Pay attention to national safety regulations and provisions.
- No fire, sparks, exposed flames or smoking.
- Ensure that the place of work is adequately ventilated.
- Never drain or pour in fuels over assembly pits.
- Store drained fuel in suitable and sealed containers.
- Immediately eliminate any fuel spills which have been spilled out of the container.

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Conducting work on a vehicle with exposed flame

(e.g. welding etc.)

- Prior to commencing such work, remove appropriate parts of the fuel system and seal open fuel lines with plugs.


First-aid measures

- Clean contaminated/exposed skin with water and soap.
- Change contaminated clothing as quickly as possible.
- If fuel gets into the eyes, rinse out eyes immediately with water, and contact a doctor, if necessary.

To Avoid Damage to the Ignition System

- To avoid damage to the engine control module, connect/disconnect the control module connectors only with the ignition: **OFF**.
- Circuit 1 of the ignition coil may not be shorted to ground, e.g. theft deterrence.
- Only original equipment should be installed in the ignition system.
- Do not operate the ignition system at cranking speed unless the entire ignition harness is connected.
- Do not perform any tests (grounding of ignition cable 4 disconnecting a spark plug connector or pulling cable 4 out of the ignition coil) at cranking or idle speed.

- The high output side of the ignition system must carry at least 2 kΩ of load (spark plug connector).
- If assisting a disabled vehicle and it becomes necessary to perform an ignition spark test, perform this test only on one ignition/sark plug. Ensure a good ground connection to the spark plug.
- ME - SFI: the ignition system is to be turned OFF, when cranking engine to perform compression tests, additionally, it is necessary to disconnect connector 2 from the control module.

 Engine 120 has separate ignition and fuel injection system.



Readout via the impulse counter scan tool is not possible.

Note:

Symbol for emission related malfunctions which lead to the activation of the CHECK ENGINE MIL when a certain test cycle was performed and a fault was recognized.

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Preparation for Test:

1. Review 11, 21, 22, 23, 24, 31, 33,
2. Connect HHT with test cable) to data link connector (X11/4), Readout DTC fault codes.

Complaint/Problem	Possible cause	Test step/Remedy ¹⁾	 Actual value Engine test Menu item
Engine starts and accelerates poorly when cold	Injector (Y62) activation and injection duration. Hot film MAF sensor (B2/5). ECT sensor (B11/4). Ignition voltage too low. Intake air leak.	23 ⇒ 18.0 – 23.0 23 ⇒ 4.0 – 5.0 23 ⇒ 8.0 24 ⇒ 17.0 Remedy air leak.	3/11 2/11 4/11 – –
Engine does not start	Voltage supply from engine control module (N3/10) is missing. Malfunction of drive authorization system (DAS). Fuel pumps defective. No compression due to high oil pressure. Ignition voltage too low.	23 ⇒ 1.0 – 3.0 23 ⇒ 34.0 34 ⇒ 2.0 Check compression and oil pressure. 24 ⇒ 17.0	– DAS 1/1 – – –
Engine has uneven idle	Injector (Y62) activation and injection duration. Intake air leak.	23 ⇒ 18.0 – 23.0 Remedy air leak.	3/11 –


¹⁾ Observe Preparation for Test, see 22.

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Complaint/Problem	Possible cause	Test step/Remedy ¹⁾	 Actual value Engine test Menu item
Engine has insufficient output	TWC flow restricted. O2S 1 (G3/3 or G3/4) (before TWC). ECT sensor (B11/4). Hot film MAF sensor (B2/5). Resonance intake manifold does not function Knock control at adjustment stop	Check exhaust back pressure, see DM, Engines, Vol. 1, section A, “Engine Output” 23 ⇒ 10.0 – 13.0 23 ⇒ 8.0 23 ⇒ 4.0 23 ⇒ 28.0 Knock sensors	– 8/11 4/11 2/11 – 2/11
Engine runs unevenly (shakes)	Injector (Y62) activation and injection duration. Injector leaking, spray pattern. O2S 1 (G3/3 or G3/4) (before TWC). Ignition voltage too low. Compression on one or more cylinders too low. Intake air leak. Exhaust gas recirculation valve leaks/sticks	23 ⇒ 18.0 – 23.0 36 ⇒ 1.0– 2.0 23 ⇒ 10.0 – 13.0 24 ⇒ 17.0 Check compression. Remedy air leak. Replace valve.	3/11 – 8/11 – – – –
Engine runs unevenly (misfires)	Ignition voltage too low. Hot film MAF sensor (B2/5).	24 ⇒ 17.0 23 ⇒ 4.0	– 2/11
Engine surges after cold start	Intake air leak.	Remedy air leak.	–
Transition failure during warm-up	ECT sensor (B11/4). Hot film MAF sensor (B2/5). Intake air leak.	23 ⇒ 8.0 23 ⇒ 4.0 Remedy air leak.	4/11 2/11 –

¹⁾ Observe Preparation for Test, see 22.

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Complaint/Problem	Possible cause	Test step/Remedy ¹⁾	 Actual value Engine test Menu item
Transition failure when warm or increased fuel consumption	O2S 1 (G3/3 or G3/4) (before TWC). Purge control valve (Y58/1) stuck in open position.	23 ⇒ 10.0 – 13.0 23 ⇒ 29.0 – 30.0	8/11 4/11
Engine bucks, jerks	Hot film MAF sensor (B2/5). Ignition voltage too low. O2S 1 (G3/3 or G3/4) (before TWC).	23 ⇒ 4.0– 5.0 24 ⇒ 17.0 23 ⇒ 10.0 – 13.0	2/11 – 8/11
EA is in “limp-home” mode	Nominal value potentiometer in pedal value sensor (B37). EA/CC/ISC actuator actual value potentiometer.	25 ⇒ 1.0 – 2.0 25 ⇒ 3.0	5/11 5/11

¹⁾ Observe Preparation for Test, see 22.