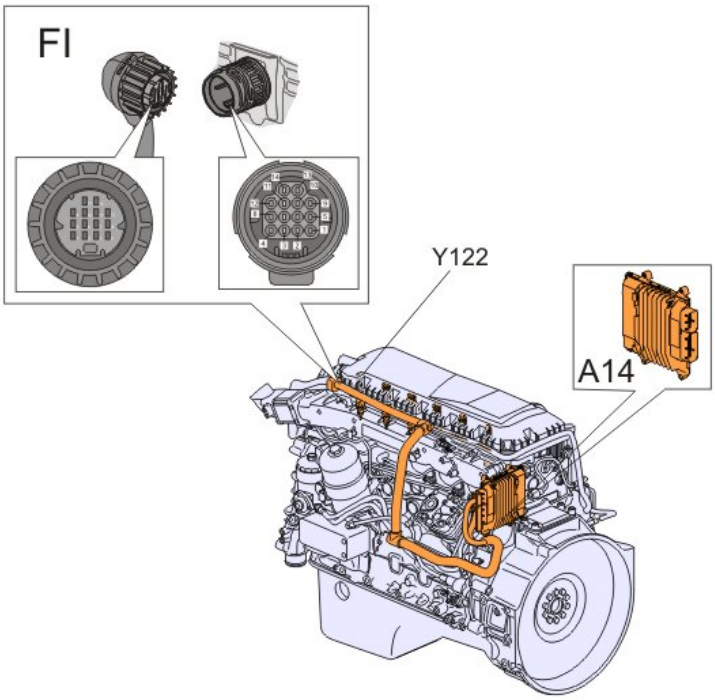
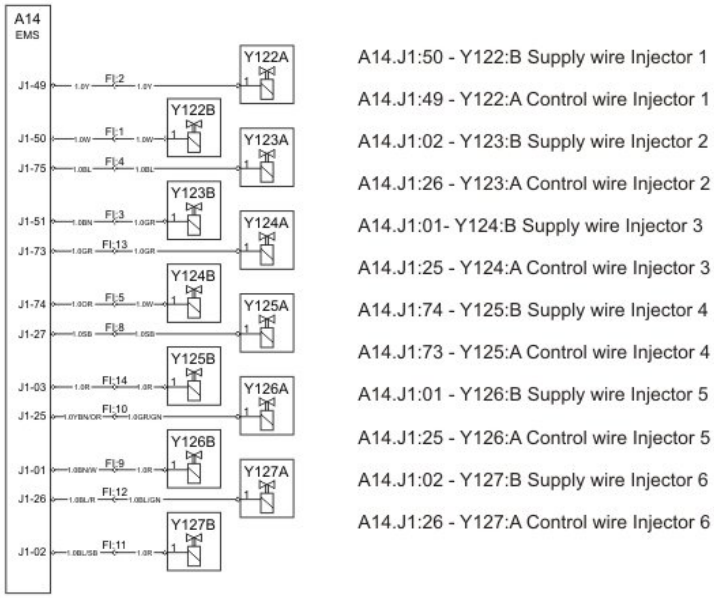
P02CC - Cylinder 1 Fuel Injector Offset Learning at Min Limit

Y122: Injector.	Schematics:
	

Fault type	Condition for Fault	Observable Symptoms	Possible cause
P02CC FTB 00	• Injector activated. • Cylinder balancing data too high	• Low power. • Abnormal noise. • Uneven operation.	• Nozzle. • Camshaft • Low compression.

Connect the TECHTOOL and execute the operation — ***23016-3 Cylinder balancing***

Note: If the above test does not works as expected then test the below operation.

Connect the TECHTOOL and execute the operation ***21006-3 Cylinder compression*** .

Carbon monoxide in coolant check:

Purpose:	Action:	Evaluation:
Check the cooling system for exhaust leakage.	Prepare the carbon monoxide tester per instructions. • Open the filler cap of the expansion tank. • Hold the meter (9808038) over the filler port and draw in air into the meter *Note: Fluid must not be drawn in to the tool since it destroys the indication fluid*	• The indication fluid will change colour from blue-green to yellow if there is carbon monoxide in the tested fluid. • The indication of carbon monoxide shows that exhaust fumes leak into the system.
If there is a indication of carbon monoxide then test the below steps		
Check for leakage at the attachment point of the injector.	1. Remove the injector. 2. Check the seal and make sure that it is fault free. 3. Check that the o-rings are undamaged. 4. Repeat the checks for all injectors	Leakage by the injector may result in low compression and exhaust fumes may enter the coolant system.
Check the sleeve for cracks and damages.	1. Remove the injector. 2. Check Injector sleeve. 3. Check that the o-rings are undamaged. 4. Check if the cylinder head is free from damage or cracks. 5. Repeat the checks for all injectors.	• If there is carbon monoxide in the fuel, it means that combustion gases leaks into the fuel system. • Damage on the sleeve may result in low compression. • Damage on the sleeve will result in exhaust fumes entering the cooling system or Fuel system. • Damage on the sleeve will result in coolant entering the combustion chamber.

Check if the cylinder head, cylinder liner & gasket is free from cracks and damages.	1. Remove the cylinder head. 2. Check the cylinder head gasket.	• Damage to the cylinder head can result in low compression. • Damage to the cylinder head can result in exhaust leakage into the cooling system. • Damage to the cylinder head can result in oil leakage into the combustion chamber. • Damage to the cylinder head can result in coolant leakage into the combustion chamber. • Damages to the cylinder head can cause combustion gas leakage into the fuel system • Excessive wear or damage to this component can cause engine oil contamination due to internal leakage
If there is no indication for carbon monoxide then check the below step		
• Check for coolant leakage in air drier and air tank.	• Drain the coolant until the expansion tank is empty. • Air drier, check	Leakage can be suspected if coolant needs to be refilled more often than normal.

Carbon monoxide in fuel system, check:

Purpose:	Action:	Evaluation:
Check if there are combustion gases entering the fuel system.	Prepare the carbon monoxide tester per instructions. • Open the fuel tank cap. • Hold the meter (9808038) over the filler port and draw in air into the meter. • Perform the test when the engine is running or directly after the engine has been turned off. *Note: Fluid must not be drawn in to the tool since it destroys the indication fluid.*	• The indication fluid will change colour from blue-green to yellow if there is carbon monoxide in the tested fluid. • If there is carbon monoxide in the fuel, it means that combustion gases leaks into the fuel system

Fuel quality check:

Purpose:	Action:	Evaluation:
• Check that the water separator is free from residue. • Check that the fuel is of good quality.	1. Place a container under the vehicle to avoid fluid spillage. 2. Loosen the water separator bowl under the pre-filter. 3. Smell and look to try to determine if the fuel quality is normal. 4. Check that the water separator is free from residue. 5. Prime the fuel system with the hand pump after the test is finished.	• Water in the fuel can lead to engine failure. • Poor fuel quality can lead to deteriorated combustion and starting problems. • Water and other contaminants in the fuel can damage the injectors.
Note: Some debris can only be seen by draining and removing the component Check that the fuel tank is free from rubbish and other contaminants.	Check inside the fuel tank to see if there is anything that might affect the fuel quality or fuel pressure.	Fuel contamination can affect the fuel quality or fuel pressure.

Air in the fuel system, check:

If there is air in the fuel then test the below step

Purpose:	Action:	Evaluation:
Check for leakage that can cause air in the fuel system.	• Remove the return line on the fuel tank. • Plug the return line. • Remove the supply line from the fuel tank. • Connect manometer 9996662 to the pneumatic system in the workshop. • Attach the pressure gauge to the fuel hose and connect the pressure gauge to the pneumatic system in the workshop. • Set the pressure gauge to 200 kPa with the reduction valve. • Open the tap and adjust the pressure to 200 kPa. • Close the tap. • Leave the system pressurized for 3 minutes. *Note: In case of leakage: Apply soapy water to the lines and connections*	Air in the fuel system • Leakage in fuel hoses and connections can cause air in the fuel system. • Air in the fuel can cause starting problems.

	In order to discover an air leak, it is important that all connections and hoses are covered in soapy water.	

Miscellaneous:

Caution
Protect your eyes. Remove the line carefully, since fuel will be ejected.

- Close the shut-off valve on the pressure gauge.
- Close the reduction valve to decrease the pressure.
- Do not remove the hose until the pressure is 0 kPa.

Parameter codes, injector, check:

Connect the TECHTOOL to the vehicle and run the operation ***17030-3 Parameter, programming***

Valve adjustment:

Purpose:	Action:	Evaluation:
Check and adjustment of valve clearance, inlet and exhaust valves.	Check whether the valves need adjustment or replacement.	• Incorrectly adjusted valves can cause a number of symptoms. • Incorrectly adjusted engine brake can cause weak engine braking effect.

Injector tip, check:

Purpose:	Action:	Evaluation:
Visual inspection.	Remove Injector 1.	• Perform a visual inspection of the injector tip. • Check for damaged spray holes & cracks.

Verification:

Purpose:	Action:	Evaluation:
Verification.	• Ignition key in OFF position. • Wait 5 seconds. • Ignition key in ON position. • Run the engine for 30 seconds.	• If the fault code is not set during the verification the fault may be corrected. • The status of the diagnostic process in the control unit can not be tested without communication with the vehicle. • The fault code may appear later when the vehicle has been returned to service.