

FIGURE 14-1 A stuck-open thermostat. This caused the vehicle to set a diagnostic trouble code P0128 (coolant temperature below thermostat regulating temperature).



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FIGURE 14-2 Use caution if using a steel scraper to remove a gasket from aluminum parts. It is best to use a wood or plastic scraper.



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FIGURE 14-3 An intake manifold gasket that failed and allowed coolant to be drawn into the cylinder(s).



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FIGURE 14-4 The lower intake manifold, attaches to the cylinder heads.



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FIGURE 14-5 The upper intake manifold, often called a plenum, attaches to the lower intake manifold.



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FIGURE 14-6 Many aftermarket replacement intake manifolds have a different appearance from the original manifold.



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FIGURE 14-7 A single overhead camshaft engine with a timing belt that also rotates the water pump.



FIGURE 14-8 A Toyota/Lexus hybrid electric vehicle has a ready light. If the ready light is on, the engine can start at anytime without warming.



FIGURE 14-9 Always use the viscosity of oil as specified on the oil fill cap.



VALVE ADJUSTMENT



1 Before starting the process of adjusting the valves, look up the specifications and exact procedures. The technician is checking this information from a computer CD-ROM-based information system.



2 The tools necessary to adjust the valves on an engine with adjustable rocker arms include basic hand tools, torque wrench, and a torque screwdriver.

VALVE ADJUSTMENT



3 An overall view of the four-cylinder engine that is due for a scheduled valve adjustment according to the vehicle manufacturer's recommendation.



4 Start the valve adjustment procedure by first disconnecting and labeling, if necessary, all vacuum lines that need to be removed to gain access to the valve cover.

VALVE ADJUSTMENT



5 The air intake tube is being removed from the throttle body.



6 With all vacuum lines and the intake tube removed, the valve cover can be removed after removing all retaining bolts.

VALVE ADJUSTMENT



7 Notice how clean the engine appears. This is a testament of proper maintenance and regular oil changes by the owner.



8 To help locate how far the engine is being rotated, the technician is removing the distributor cap to be able to observe the position of the rotor.

VALVE ADJUSTMENT



9 The engine is rotated until the timing marks on the front of the crankshaft line up with zero degree—top dead center (TDC)—with both valves closed on #1 cylinder.



10 With the rocker arms contacting the base circle of the cam, insert a feeler gauge of the specified thickness between the camshaft and the rocker arm. There should be a slight drag on the feeler gauge.

VALVE ADJUSTMENT



11 If the valve clearance (lash) is not correct, loosen the retaining nut and turn the valve adjusting screw with a screwdriver to achieve the proper clearance.



12 After adjusting the valves that are checked, rotate the engine one full rotation until the engine timing marks again align.

VALVE ADJUSTMENT



13 The engine is rotated until the timing marks again align indicating that the compression cylinder will now be in position for valve clearance measurement.



14 On some engines, it is necessary to watch the direction the rotor is pointing to help determine how far to rotate the engine. Always follow the vehicle manufacturer's recommended procedure.

VALVE ADJUSTMENT



15 The technician is using a feeler gauge that is one-thousandth of an inch thinner and another one-thousandth of an inch thicker than the specified clearance as a double-check that the clearance is correct.



16 Adjusting a valve takes both hands—one to hold the wrench to loosen and tighten the lock nut and one to turn the adjusting screw. Always double-check the clearance after an adjustment is made.

VALVE ADJUSTMENT



17 After all valves have been properly measured and adjusted as necessary, start the reassembly process by replacing all gaskets and seals as specified by the vehicle manufacturer.



18 Prior to the valve cover being careful to not pinch a wire or sealant rope between the cover and the cylinder head.

VALVE ADJUSTMENT



19 Use a torque wrench and torque the valve cover retaining bolts to factory specifications.



20 Reinstall the distributor cap.

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VALVE ADJUSTMENT



21 Reinsert the spark plug wires and all brackets that were removed to gain access to the valve cover.



22 Reconnect all vacuum and air filter and hoses. Replace any vacuum hoses that are brittle or contain AED resin ones.

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VALVE ADJUSTMENT



23 Be sure that the gaskets are properly included. Start the engine and check for proper operation.



24 Double-check for any oil or vacuum leaks after starting the engine.

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