

D - ADJUSTMENTS - 4-CYL

1993 Toyota Celica

1993 ENGINE PERFORMANCE
Toyota 4-Cylinder On-Vehicle Adjustments
Celica

ENGINE MECHANICAL

Before performing any on-vehicle adjustments to fuel or ignition systems, ensure engine mechanical condition is okay.

VALVE CLEARANCE

NOTE: Adjust valve clearance with engine cold.

NOTE: If valve cover uses grommets below retaining nuts or bolts, keep grommets in order so they are installed in original locations during reassembly.

1) Remove valve cover(s) and gasket(s). Rotate crankshaft so timing mark on crankshaft pulley aligns with "0" mark on front cover and cylinder No. 1 (front cylinder) is at TDC of compression stroke.

2) Ensure valves on cylinder No. 1 are closed. With cylinder No. 1 at TDC, check clearance on specified valves. See VALVE CLEARANCE ADJUSTMENT SEQUENCE table. See Fig. 1.

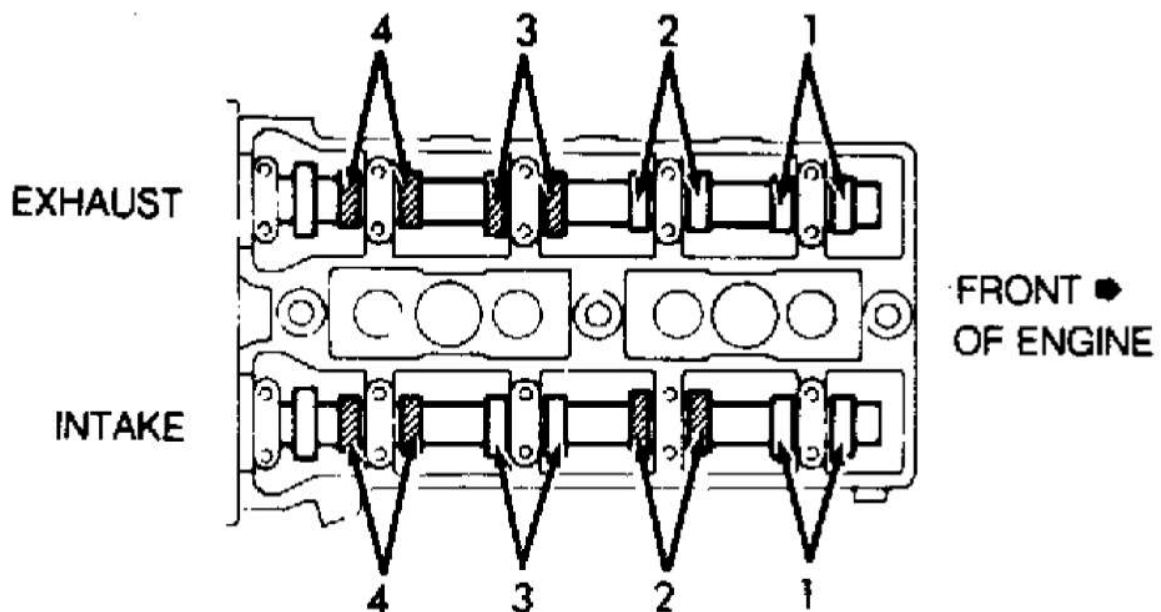


Fig. 1: Valve Arrangement ID
Courtesy of Toyota Motor Sales, U.S.A., Inc.

3) Using feeler gauge, measure and record clearance between valve lifter and camshaft. Ensure valve clearance is within

specification. See VALVE CLEARANCE SPECIFICATIONS table.

4) To check remaining valves, rotate crankshaft 360 degrees (one full revolution) until cylinder No. 4 is at TDC of compression stroke. Measure valve clearance on specified valves. See VALVE CLEARANCE ADJUSTMENT SEQUENCE table.

5) If valve clearance requires adjustment, rotate crankshaft so camshaft lobe on valve to be adjusted is facing upward, away from valve lifter. Rotate valve lifter so notch on valve lifter is toward spark plug.

6) Press valve lifter downward using Valve Clearance Adjuster (SST 09248-55020) and SST (A). See Fig. 2. Install SST (B) between camshaft and valve lifter. Remove SST (A).

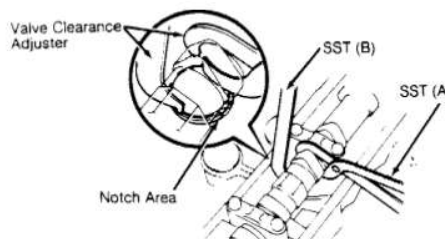
7) Using small screwdriver and magnet, remove adjusting shim. Measure thickness of adjusting shim removed. Using measured clearance and adjusting shim thickness, determine correct thickness of adjusting shim to be used. Shim thickness can be determined by using the following formula: $N = T + A$.

- * N = Thickness of adjuster shim required.
- * T = Thickness of adjuster shim removed.
- * A = Measured clearance minus valve clearance specification.

See appropriate SHIM THICKNESS table for proper shim required.

NOTE: Before installing valve cover gasket, apply sealant at camshaft bearing caps-to-cylinder head surfaces where valve cover gasket seals.

8) Install valve cover and gasket. Reverse removal procedure to install remaining components.



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Fig. 2: Removing Valve Clearance Adjusting Shim
Courtesy of Toyota Motor Sales, U.S.A., Inc.

VALVE CLEARANCE ADJUSTMENT SEQUENCE TABLE

Piston No. On TDC	Adjust Intake Valves	Adjust Exhaust Valves
1	1 & 2	1 & 3
4	3 & 4	2 & 4

VALVE CLEARANCE SPECIFICATIONS TABLE

Application	In. (mm)
1.6L (4A-FE)	
Exhaust	.008-.012 (.20-.30)
Intake	.006-.010 (.15-.25)
2.0L Turbo (3S-GTE)	
Exhaust	.011-.015 (.28-.38)

Intake	.006-.010 (.15-.25)
2.2L (5S-FE)	
Exhaust	.011-.015 (.28-.38)
Intake	.007-.011 (.18-.28)

SHIM THICKNESS TABLE (1.6L)

Thickness mm (in.)	Shim No.
2.50 (0.0984)	02
2.55 (0.1004)	04
2.60 (0.1024)	06
2.65 (0.1043)	08
2.70 (0.1063)	10
2.75 (0.1083)	12
2.80 (0.1102)	14
2.85 (0.1122)	16
2.90 (0.1142)	18
2.95 (0.1161)	20
3.00 (0.1181)	22
3.05 (0.1201)	24
3.10 (0.1220)	26
3.15 (0.1240)	28
3.20 (0.1260)	30
3.25 (0.1280)	32
3.30 (0.1299)	34

SHIM THICKNESS TABLE (2.0L TURBO)

Thickness mm (in.)	Shim No.
2.50 (0.0984)	1
2.55 (0.1004)	2
2.60 (0.1024)	3
2.65 (0.1043)	4
2.70 (0.1063)	5
2.75 (0.1083)	6
2.80 (0.1102)	7
2.85 (0.1122)	8
2.90 (0.1142)	9
2.95 (0.1161)	10
3.00 (0.1181)	11
3.05 (0.1201)	12
3.10 (0.1220)	13
3.15 (0.1240)	14
3.20 (0.1260)	15
3.25 (0.1280)	16
3.30 (0.1299)	17

SHIM THICKNESS TABLE (2.2L)

Thickness mm (in.)	Shim No.
2.50 (0.0984)	1
2.55 (0.1004)	2
2.60 (0.1024)	3
2.65 (0.1043)	4
2.70 (0.1063)	5
2.75 (0.1083)	6
2.80 (0.1102)	7

2.85 (0.1122)	.....	8
2.90 (0.1142)	.....	9
2.95 (0.1161)	.....	10
3.00 (0.1181)	.....	11
3.05 (0.1201)	.....	12
3.10 (0.1220)	.....	13
3.15 (0.1240)	.....	14
3.20 (0.1260)	.....	15
3.25 (0.1280)	.....	16
3.30 (0.1299)	.....	17

IGNITION TIMING

CAUTION: Some tachometers may not be compatible with ignition system. Consult tachometer manufacturer before connecting tachometer to system. To avoid possible damage to ignitor and/or coil, DO NOT allow tachometer terminal to become grounded.

1) Warm engine to normal operating temperature. Shut engine off. Connect timing light. Connect tachometer to proper terminals of data link connector. See Fig. 3.

2) Install Jumper Wire (SST 09843-18020) between terminals TE1 and E1 of data link connector located in engine compartment. See Fig. 4. Start engine. Ensure idle speed is within specification.

3) Ensure base timing is within specification with engine at specified RPM. See IGNITION TIMING table.

NOTE: Timing marks are located on front cover.

4) Adjust ignition timing by rotating distributor. Tighten distributor hold-down bolt. Remove jumper wire from data link connector and ensure advance timing is within specification. See IGNITION TIMING table.

IGNITION TIMING TABLE (Degrees BTDC @ RPM)

Application (1)	(2) Base Timing	(3) Advance Timing
1.6L (4A-FE)	10 @ 800	0-20 @ 800
2.0L Turbo (3S-GTE) .	10 @ 800	12-21 @ 800
2.2L (5S-FE)	10 @ 700	13-22 @ 700

- (1) - With transmission/transaxle in Neutral and parking brake applied.
- (2) - Check with jumper wire installed between data link connector terminals TE1 and E1.
- (3) - Check with jumper wire removed from data link connector.

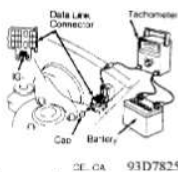
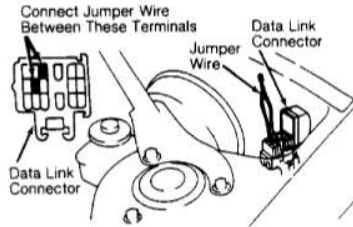


Fig. 3: Connecting Tachometer
Courtesy of Toyota Motor Sales, U.S.A., Inc.



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Fig. 4: Installing Jumper Wire Data Link Connector Terminals
Courtesy of Toyota Motor Sales, U.S.A., Inc.

IDLE SPEED & MIXTURE

NOTE: Mixture adjustment is not possible on any model.

IDLE SPEED

CAUTION: Some tachometers may not be compatible with ignition system. Consult tachometer manufacturer before connecting tachometer to system. To avoid possible damage to ignitor and/or coil, DO NOT allow tachometer terminal to become grounded.

NOTE: Check and adjust idle speed with air cleaner installed, all air intake system hoses and vacuum lines connected, electronic fuel injection system wiring connectors tight, transmission/transaxle in Neutral, all accessories and cooling fan off (if equipped), and engine at normal operating temperature.

1.6L

1) Install tachometer on proper terminals of data link connector. See Fig. 3. Start engine. Operate at 2500 RPM for about 2 minutes. Allow engine to idle.

2) Install Jumper Wire (SST 09843-18020) between terminals TE1 and E1 of data link connector. See Fig. 4.

3) Ensure idle speed is within specification. See IDLE SPEED SPECIFICATIONS table. If idle speed requires adjustment, remove rubber boot (if equipped) from throttle body. See Fig. 5. Adjust idle speed adjusting screw to obtain correct idle speed. Install rubber boot. Remove jumper wire and tachometer.

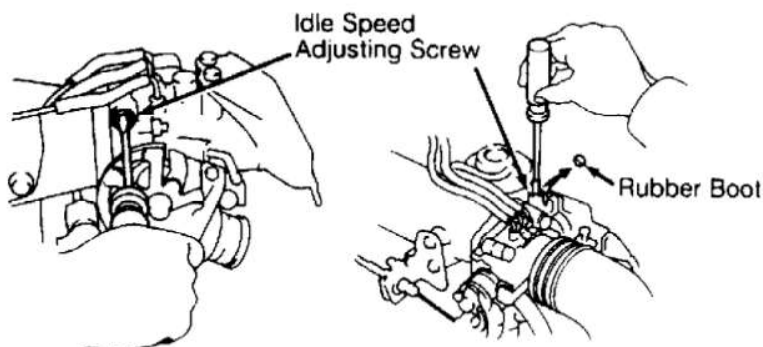


Fig. 5: Idle Speed Adjusting Screw Location ID
Courtesy of Toyota Motor Sales, U.S.A., Inc.

2.0L Turbo & 2.2L

1) Install tachometer on proper terminals of data link

connector. See Fig. 3. Start engine. Operate it at 2500 RPM for about 90 seconds.

2) Allow engine to idle and note if idle speed is within specification. See IDLE SPEED SPECIFICATIONS table. If idle speed is not within specification, check Idle Air Control (IAC) valve, wiring and Electronic Control Module (ECM). See IDLE CONTROL SYSTEM in I - SYS/COMP TESTS article in the ENGINE PERFORMANCE section. Remove tachometer.

IDLE SPEED SPECIFICATIONS TABLE

Application (1)	RPM
1.6L (4A-FE) (2)	800
2.0L Turbo (3S-GTE)	800
2.2L (5S-FE)	700

(1) - With transmission/transaxle in Neutral and parking brake applied.

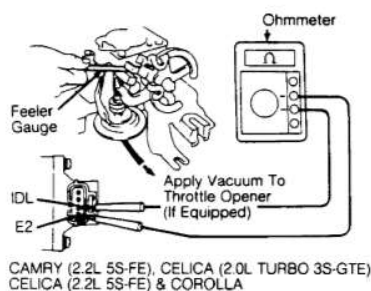
(2) - Check with jumper wire installed between data link connector terminals TE1 and E1.

THROTTLE POSITION SENSOR

1) Disconnect electrical connector from Throttle Position Sensor (TPS). Loosen TPS mounting screws. Connect ohmmeter between terminals IDL and E2. See Fig. 6.

2) Apply vacuum to throttle opener (if equipped). To set initial clearance, insert proper thickness feeler gauge between throttle stop screw and throttle lever. See THROTTLE POSITION SENSOR ADJUSTMENT table.

3) With ohmmeter showing no continuity, rotate TPS clockwise until continuity exists. Tighten TPS mounting screws. Using specified feeler gauge, recheck adjusted clearance. Disconnect ohmmeter. Install electrical connector on TPS.



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Fig. 6: Adjusting Throttle Position Sensor
Courtesy of Toyota Motor Sales, U.S.A., Inc.

THROTTLE POSITION SENSOR ADJUSTMENT TABLE

Application	Initial Clearance In. (mm)	Adjusted Clearance In. (mm)	Ohmmeter Reading
1.6L	.028 (.71)	.024 (.61)	 Continuity
		.031 (.79)	. No Continuity
2.0L Turbo & 2.2L (1)	.024 (.61)	.020 (.51)	 Continuity

.028 (.71) . No Continuity

- (1) - Apply vacuum to throttle opener before checking TPS adjustment.
 - (2) - On California models, apply vacuum to throttle opener before checking TPS adjustment.
 - (3) - On A/T and California models, apply vacuum to throttle opener before checking TPS adjustment.
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DASHPOT & THROTTLE VALVE OPENER CONTROL SYSTEM

For testing and adjustment procedures, see THROTTLE CONTROLS in I - SYS/COMP TESTS article in the ENGINE PERFORMANCE section.