

1999 ENGINE PERFORMANCE**On-Vehicle Adjustments - 4-Cylinder****ENGINE MECHANICAL**

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

VALVE CLEARANCE

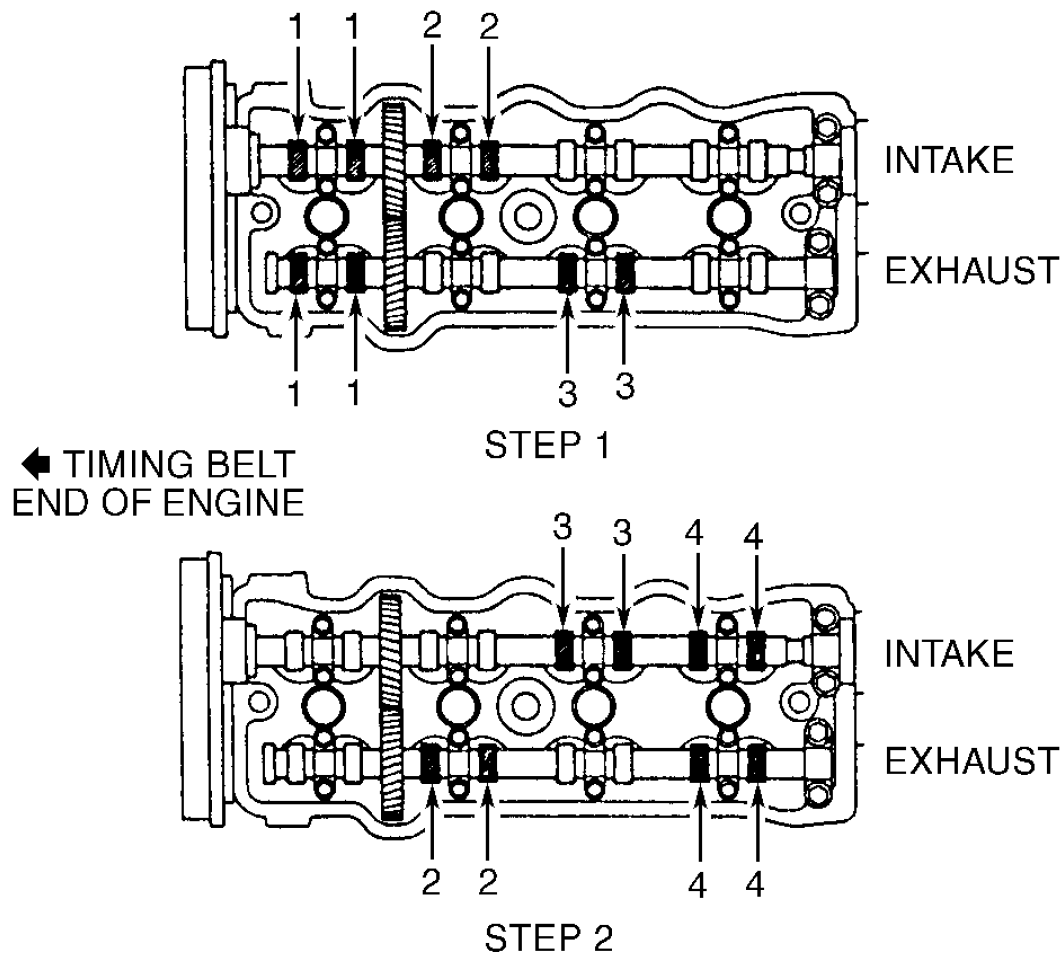
NOTE: Check and adjust valve clearance with engine cold.

Camry, Camry Solara, Celica & RAV4

1. Disconnect spark plug wires from spark plugs and valve cover. Disconnect necessary hoses, control cables and engine wiring clamps for removal of valve cover.
2. Disconnect engine wiring protector from rear of upper timing belt cover for access to valve cover if necessary. Engine wiring protector is attached to bolts for upper timing belt cover. Remove engine wiring protector from upper timing belt cover bolt on intake side of engine first, and then from upper timing belt cover bolt on exhaust side of engine.
3. Note location of grommets between valve cover nuts and valve cover for installation reference. Grommets should be installed in original location to prevent oil leakage. Remove valve cover nuts, grommets, valve cover and gasket.
4. Rotate crankshaft clockwise (viewed from timing belt end of engine) until timing mark (groove) on crankshaft pulley aligns with "0" mark on timing belt cover and cylinder No. 1 is at TDC on compression stroke. Cylinder No. 1 is front cylinder at timing belt end of engine.
5. Ensure valve lifters on cylinder No. 1 are loose and valve lifters on cylinder No. 4 are tight. If valve lifters are not as specified, rotate crankshaft clockwise one full revolution (360 degrees) and realign crankshaft pulley timing mark (groove) with "0" mark on timing belt cover.
6. With cylinder No. 1 at TDC on compression stroke, use feeler gauge to check valve clearance between valve lifter and camshaft on specified valves. Perform STEP 1. See **Fig. 1** . Record valve clearance.
7. To check remaining valves, rotate crankshaft clockwise one full revolution (360 degrees) and realign crankshaft pulley timing mark (groove) with "0" mark on timing belt cover. Using feeler gauge, measure valve clearance on specified valves. Perform STEP 2. See **Fig. 1** . Record valve clearance.
8. Ensure valve clearance is within specification. See **VALVE CLEARANCE SPECIFICATIONS (CAMRY, CAMRY SOLARA, CELICA & RAV4)** table.

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Fig. 1: Identifying Cylinder Numbers & Checking Valve Clearance (Camry, Camry Solara, Celica & RAV4)

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

VALVE CLEARANCE SPECIFICATIONS (CAMRY, CAMRY SOLARA, CELICA & RAV4)

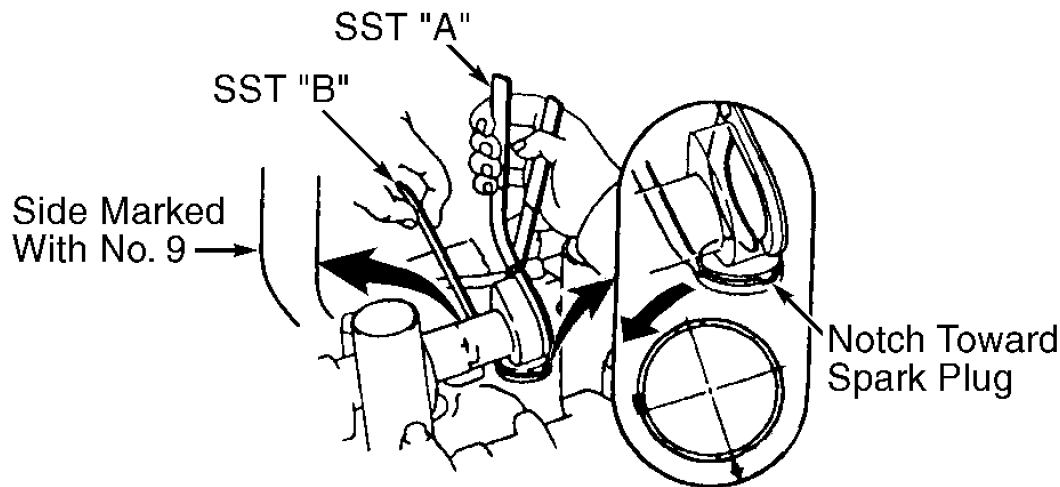
Application	(1) In. (mm)
Intake	.007-.011 (.19-.29)
Exhaust	.011-.015 (.29-.38)
(1) Adjust valve clearance with engine cold.	

- 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.
- Valve Clearance Adjuster (SST 09248-55040) is used to remove adjusting shim. Using SST "A" of valve

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clearance adjuster, press valve lifter downward. See **Fig. 2** . Install SST "B" between camshaft and valve lifter with side marked with No. 9 at designated position. See **Fig. 2** . Remove SST "A".



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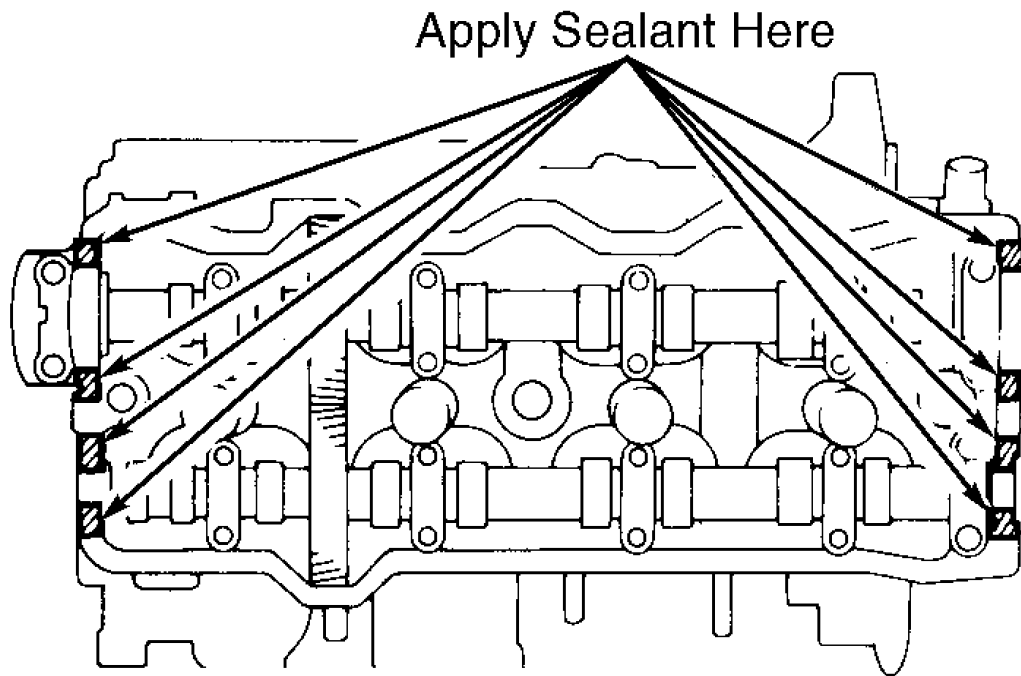
Fig. 2: Removing & Installing Valve Clearance Adjusting Shim (Camry, Camry Solara, Celica & RAV4)

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

11. Using small screwdriver and magnet, remove adjusting shim. Using micrometer, measure thickness of adjusting shim removed. Using measured clearance and adjusting shim thickness, determine correct thickness of adjusting shim to be used. See **Fig. 5** and **Fig. 6** . Install replacement adjusting shim. Recheck valve clearance.
12. Before installing valve cover and gasket, apply sealant at specified areas on cylinder head. See **Fig. 3** . Install gasket and valve cover.
13. Install grommets in original location with marking on grommet aligned in designated area. See **Fig. 4** . Install and tighten valve cover nuts to specification. See **TORQUE SPECIFICATIONS** . To install remaining components, reverse removal procedure.

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Fig. 3: Locating Valve Cover Sealant Application Areas (Camry, Camry Solara, Celica & RAV4)
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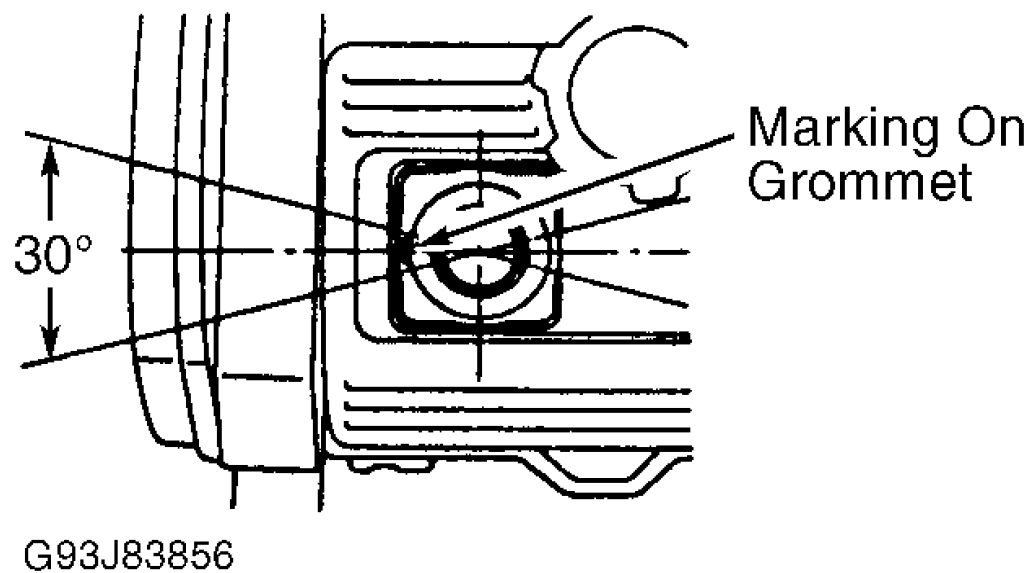


Fig. 4: Aligning Typical Grommets On Valve Cover (Camry, Camry Solara, Celica & RAV4)
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Installed shim thickness mm (in.)	Measured clearance mm (in.)	2.500 (0.0864)	2.520 (0.0892)	2.540 (0.1000)	2.560 (0.1004)	2.580 (0.1016)	2.600 (0.1024)	2.620 (0.1031)	2.640 (0.1038)	2.660 (0.1043)	2.680 (0.1053)	2.700 (0.1063)	2.720 (0.1073)	2.740 (0.1079)	2.760 (0.1083)	2.780 (0.1089)	2.800 (0.1094)	2.820 (0.1098)	2.840 (0.1103)	2.860 (0.1108)	2.880 (0.1114)	2.900 (0.1118)	2.920 (0.1122)	2.940 (0.1126)	2.960 (0.1130)	2.980 (0.1134)	3.000 (0.1138)	3.020 (0.1142)	3.040 (0.1146)	3.060 (0.1150)	3.080 (0.1154)	3.100 (0.1157)	3.120 (0.1161)	3.140 (0.1164)	3.160 (0.1167)	3.180 (0.1171)	3.200 (0.1174)	3.220 (0.1177)	3.240 (0.1181)	3.260 (0.1184)	3.280 (0.1187)	3.300 (0.1191)	3.320 (0.1194)	3.340 (0.1197)	3.360 (0.1201)	3.380 (0.1204)	3.400 (0.1207)	3.420 (0.1210)	3.440 (0.1213)	3.460 (0.1216)	3.480 (0.1219)	3.500 (0.1222)	3.520 (0.1225)	3.540 (0.1228)	3.560 (0.1231)	3.580 (0.1234)	3.600 (0.1237)	3.620 (0.1240)	3.640 (0.1243)	3.660 (0.1246)	3.680 (0.1249)	3.700 (0.1252)	3.720 (0.1255)	3.740 (0.1258)	3.760 (0.1261)	3.780 (0.1264)	3.800 (0.1267)	3.820 (0.1270)	3.840 (0.1273)	3.860 (0.1276)	3.880 (0.1279)	3.900 (0.1282)	3.920 (0.1285)	3.940 (0.1288)	3.960 (0.1291)	3.980 (0.1294)	4.000 (0.1297)	4.020 (0.1300)	4.040 (0.1303)	4.060 (0.1306)	4.080 (0.1309)	4.100 (0.1312)	4.120 (0.1315)	4.140 (0.1318)	4.160 (0.1321)	4.180 (0.1324)	4.200 (0.1327)	4.220 (0.1330)	4.240 (0.1333)	4.260 (0.1336)	4.280 (0.1339)	4.300 (0.1342)	4.320 (0.1345)	4.340 (0.1348)	4.360 (0.1351)	4.380 (0.1354)	4.400 (0.1357)	4.420 (0.1360)	4.440 (0.1363)	4.460 (0.1366)	4.480 (0.1369)	4.500 (0.1372)	4.520 (0.1375)	4.540 (0.1378)	4.560 (0.1381)	4.580 (0.1384)	4.600 (0.1387)	4.620 (0.1390)	4.640 (0.1393)	4.660 (0.1396)	4.680 (0.1399)	4.700 (0.1402)	4.720 (0.1405)	4.740 (0.1408)	4.760 (0.1411)	4.780 (0.1414)	4.800 (0.1417)	4.820 (0.1420)	4.840 (0.1423)	4.860 (0.1426)	4.880 (0.1429)	4.900 (0.1432)	4.920 (0.1435)	4.940 (0.1438)	4.960 (0.1441)	4.980 (0.1444)	5.000 (0.1447)	5.020 (0.1450)	5.040 (0.1453)	5.060 (0.1456)	5.080 (0.1459)	5.100 (0.1462)	5.120 (0.1465)	5.140 (0.1468)	5.160 (0.1471)	5.180 (0.1474)	5.200 (0.1477)	5.220 (0.1480)	5.240 (0.1483)	5.260 (0.1486)	5.280 (0.1489)	5.300 (0.1492)	5.320 (0.1495)	5.340 (0.1498)	5.360 (0.1501)	5.380 (0.1504)	5.400 (0.1507)	5.420 (0.1510)	5.440 (0.1513)	5.460 (0.1516)	5.480 (0.1519)	5.500 (0.1522)	5.520 (0.1525)	5.540 (0.1528)	5.560 (0.1531)	5.580 (0.1534)	5.600 (0.1537)	5.620 (0.1540)	5.640 (0.1543)	5.660 (0.1546)	5.680 (0.1549)	5.700 (0.1552)	5.720 (0.1555)	5.740 (0.1558)	5.760 (0.1561)	5.780 (0.1564)	5.800 (0.1567)	5.820 (0.1570)	5.840 (0.1573)	5.860 (0.1576)	5.880 (0.1579)	5.900 (0.1582)	5.920 (0.1585)	5.940 (0.1588)	5.960 (0.1591)	5.980 (0.1594)	6.000 (0.1597)	6.020 (0.1600)	6.040 (0.1603)	6.060 (0.1606)	6.080 (0.1609)	6.100 (0.1612)	6.120 (0.1615)	6.140 (0.1618)	6.160 (0.1621)	6.180 (0.1624)	6.200 (0.1627)	6.220 (0.1630)	6.240 (0.1633)	6.260 (0.1636)	6.280 (0.1639)	6.300 (0.1642)	6.320 (0.1645)	6.340 (0.1648)	6.360 (0.1651)	6.380 (0.1654)	6.400 (0.1657)	6.420 (0.1660)	6.440 (0.1663)	6.460 (0.1666)	6.480 (0.1669)	6.500 (0.1672)	6.520 (0.1675)	6.540 (0.1678)	6.560 (0.1681)	6.580 (0.1684)	6.600 (0.1687)	6.620 (0.1690)	6.640 (0.1693)	6.660 (0.1696)	6.680 (0.1699)	6.700 (0.1702)	6.720 (0.1705)	6.740 (0.1708)	6.760 (0.1711)	6.780 (0.1714)	6.800 (0.1717)	6.820 (0.1720)	6.840 (0.1723)	6.860 (0.1726)	6.880 (0.1729)	6.900 (0.1732)	6.920 (0.1735)	6.940 (0.1738)	6.960 (0.1741)	6.980 (0.1744)	7.000 (0.1747)	7.020 (0.1750)	7.040 (0.1753)	7.060 (0.1756)	7.080 (0.1759)	7.100 (0.1762)	7.120 (0.1765)	7.140 (0.1768)	7.160 (0.1771)	7.180 (0.1774)	7.200 (0.1777)	7.220 (0.1780)	7.240
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EXAMPLE: A 0.1102" (2.800 mm) shim is installed and measured clearance is 0.0177" (0.450 mm). Replace 0.1102" (2.800 mm) shim with a No. 11 shim.

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Fig. 5: Intake Valve Adjusting Shim Selection Chart (Camry, Camry Solara, Celica & RAV4)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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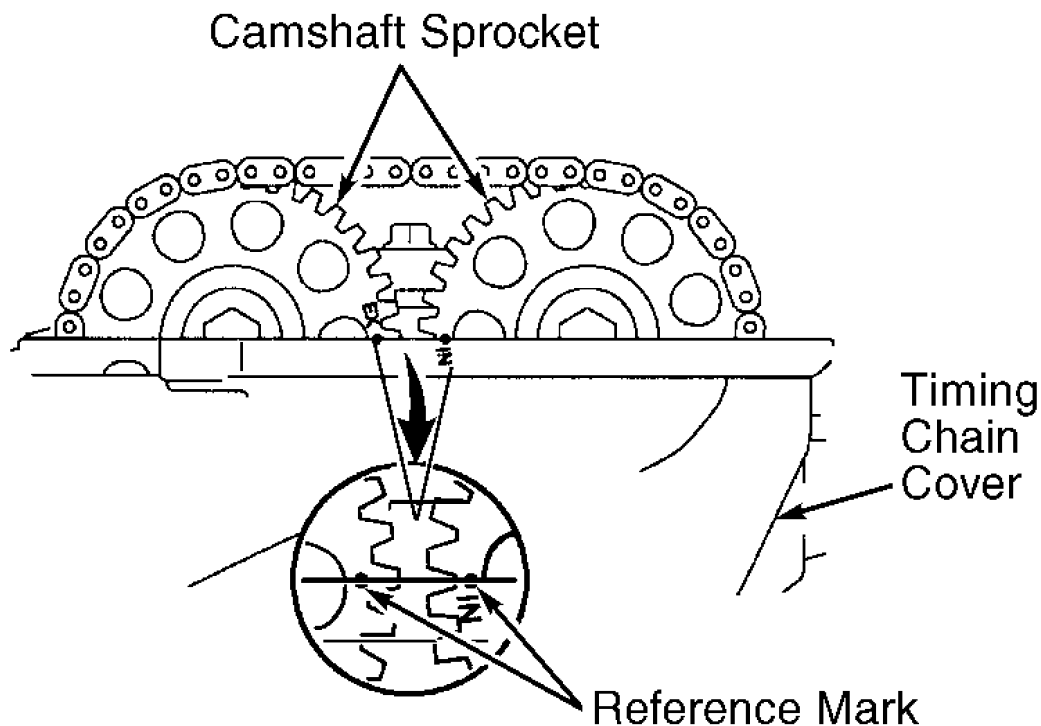
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EXAMPLE: A 0.1102" (2.800 mm) shim is installed and measured clearance is 0.0177" (0.450 mm). Replace 0.1102" (2.800 mm) shim with a No. 9 shim.

Fig. 6: Exhaust Valve Adjusting Shim Selection Chart (Camry, Camry Solara, Celica & RAV4)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Corolla

1. Disconnect spark plug wires from spark plugs and valve cover. Disconnect necessary hoses and engine wiring cover for removal of valve cover.
2. Remove valve cover bolts/nuts, seal washers, cable bracket, valve cover and gasket. Rotate crankshaft clockwise (viewed from timing chain end of engine) until crankshaft pulley timing mark (groove) aligns with "0" mark on timing chain cover and cylinder No. 1 is at TDC on compression stroke. Cylinder No. 1 is front cylinder at timing chain end of engine.
3. Ensure reference marks on camshaft sprockets are aligned and positioned in a straight line at top surface on timing chain cover. See **Fig. 7** . If reference marks are not as specified, rotate crankshaft clockwise one full revolution (360 degrees) and realign crankshaft pulley timing mark (groove) with "0" mark on timing chain cover and then recheck reference mark alignment.



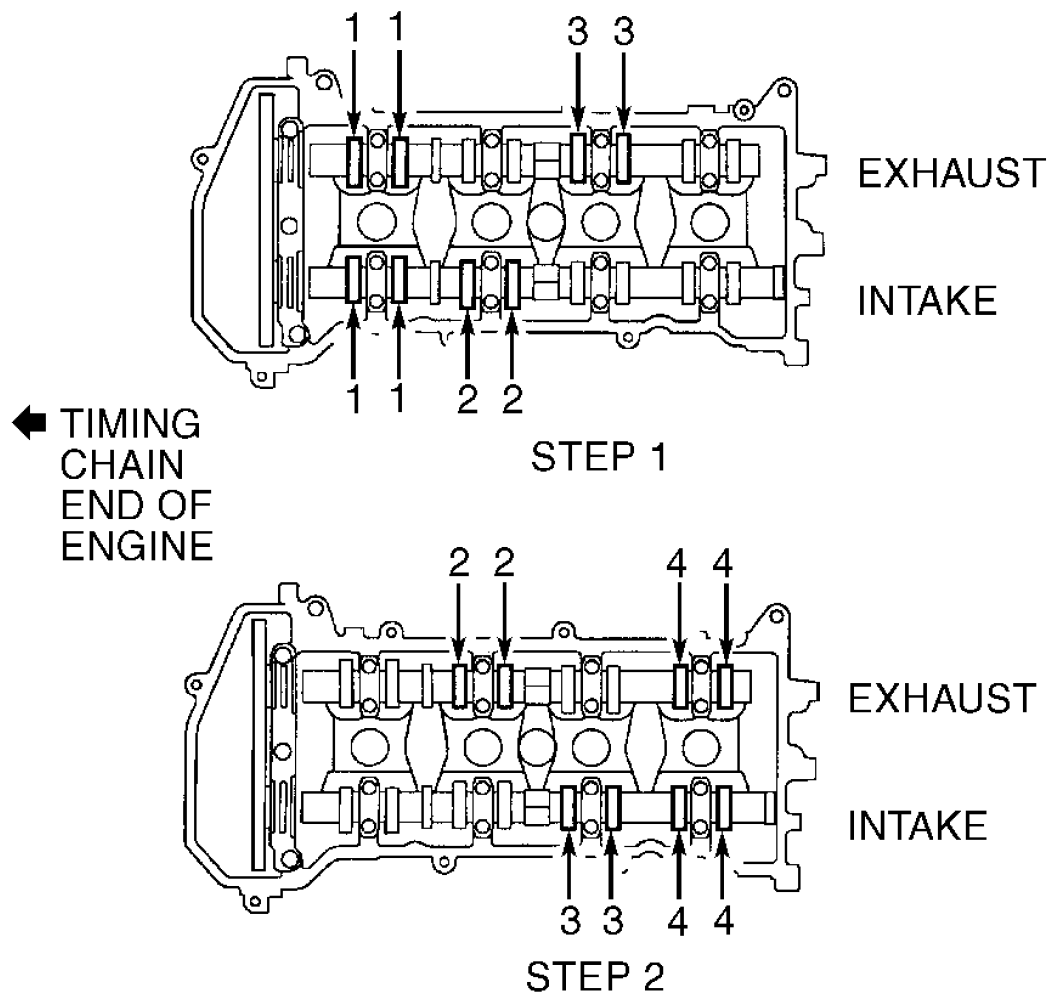
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Fig. 7: Checking Reference Mark Alignment (Corolla)
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4. With cylinder No. 1 at TDC on compression stroke, use feeler gauge to check valve clearance between valve lifter and camshaft on specified valves. Perform STEP 1. See **Fig. 8** . Record valve clearance.
5. To check remaining valves, rotate crankshaft clockwise one full revolution (360 degrees) and realign crankshaft pulley timing mark (groove) with "0" mark on timing chain cover. Using feeler gauge, measure valve clearance on specified valves. Perform STEP 2. See **Fig. 8** . Record valve clearance.



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Fig. 8: Identifying Cylinder Numbers & Checking Valve Clearance (Corolla)
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6. Ensure valve clearance is within specification. See **VALVE CLEARANCE SPECIFICATIONS (COROLLA)** table.

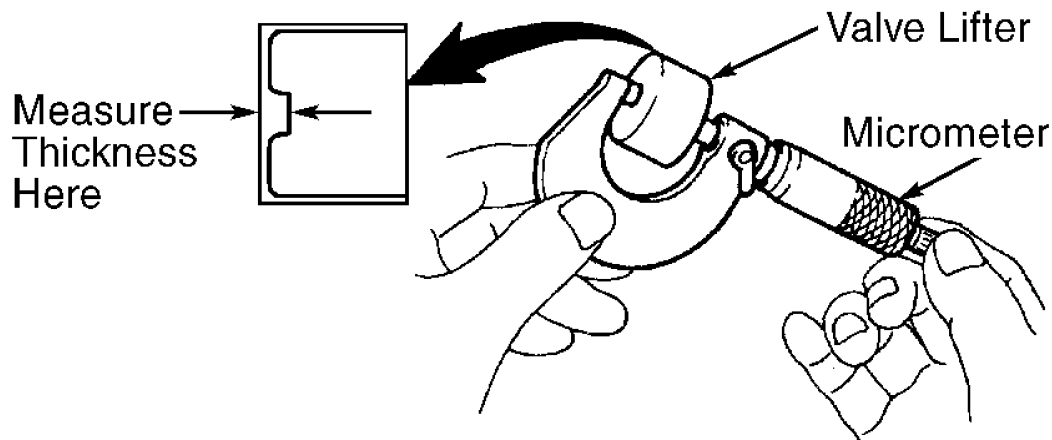
VALVE CLEARANCE SPECIFICATIONS (COROLLA)

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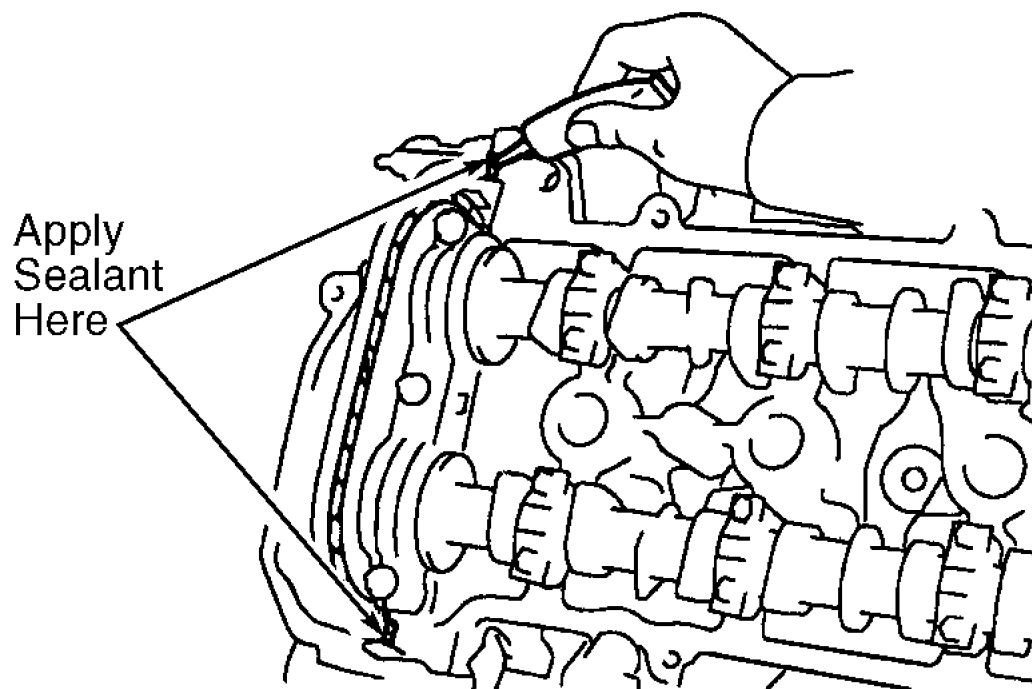
Application	(1) In. (mm)
Intake	.006-.010 (.15-.25)
Exhaust	.010-.014 (.25-.35)
(1) Adjust valve clearance with engine cold.	

7. If valve clearance requires adjustment, camshafts must be removed for access to valve lifters. Different thickness valve lifters are used. Manufacturer recommends placing reference mark on timing chain and camshaft sprockets, removing timing chain tensioner and then removing camshaft sprockets and camshafts for access to valve lifter while supporting timing chain. To remove camshafts, see appropriate article in ENGINES.
8. Remove valve lifter from cylinder head. Using micrometer, measure thickness of valve lifter. See **Fig. 9** . Using measured clearance and valve lifter thickness, determine correct thickness of valve lifter to be used. See **Fig. 12** and **Fig. 13** . Install replacement valve lifter, camshafts and timing chain. Recheck valve clearance.
9. Before installing valve cover and gasket, apply sealant at specified areas on cylinder head. See **Fig. 10** . Install gasket, valve cover, seal washers, bolts and nuts. Tighten valve cover bolts/nuts to specification in sequence. See **Fig. 11** . See **TORQUE SPECIFICATIONS** . To install remaining components, reverse removal procedure.



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Fig. 9: Measuring Valve Lifter Thickness (Corolla)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

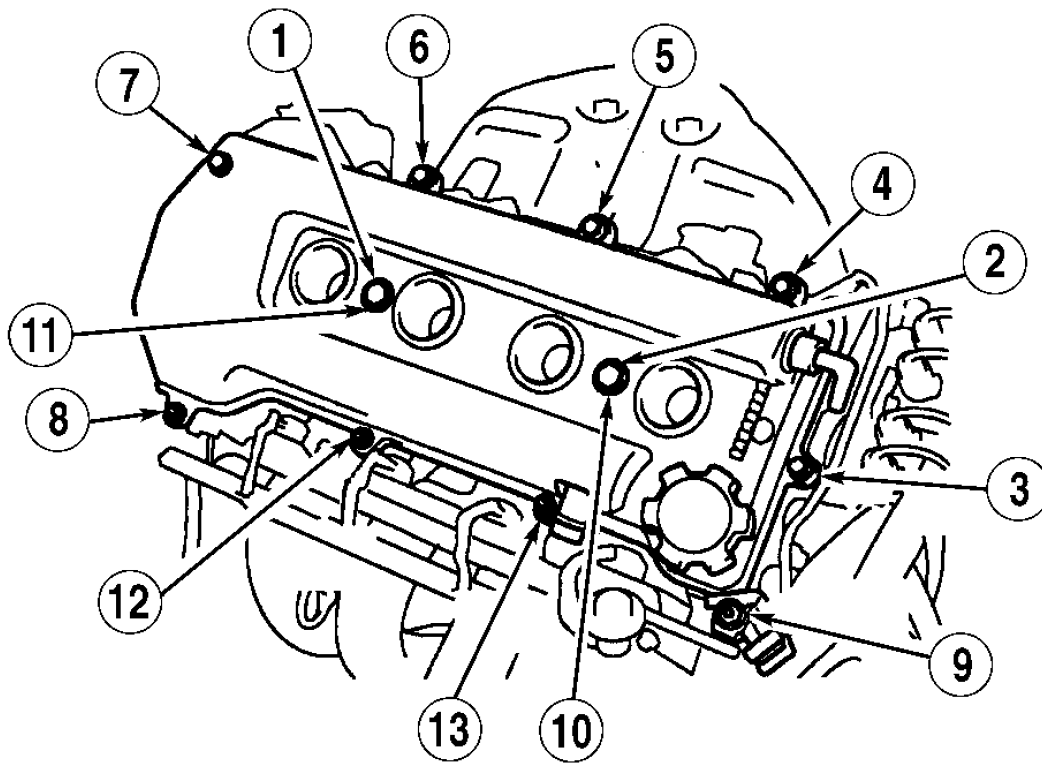


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Fig. 10: Locating Valve Cover Sealant Application Areas (Corolla)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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Fig. 11: Valve Cover Bolt/Nut Tightening Sequence (Corolla)
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Installed lifter thickness mm (in.)	Measured clearance mm (in.)	0.006 (0.0002)	0.008 (0.0003)	0.010 (0.0004)	0.012 (0.0005)	0.014 (0.0005)	0.016 (0.0006)	0.018 (0.0007)	0.020 (0.0008)	0.022 (0.0009)	0.024 (0.0009)	0.026 (0.0010)	0.028 (0.0011)	0.030 (0.0012)	0.032 (0.0013)	0.034 (0.0013)	0.036 (0.0014)	0.038 (0.0015)	0.040 (0.0016)	0.042 (0.0016)	0.044 (0.0017)	0.046 (0.0018)	0.048 (0.0019)	0.050 (0.0020)	0.052 (0.0021)	0.054 (0.0021)	0.056 (0.0022)	0.058 (0.0023)	0.060 (0.0024)	0.062 (0.0025)	0.064 (0.0025)	0.066 (0.0026)	0.068 (0.0027)	0.070 (0.0028)	0.072 (0.0028)	0.074 (0.0029)	0.076 (0.0030)	0.078 (0.0031)	0.080 (0.0031)	0.082 (0.0032)	0.084 (0.0033)	0.086 (0.0034)	0.088 (0.0034)	0.090 (0.0035)	0.092 (0.0036)	0.094 (0.0037)	0.096 (0.0037)	0.098 (0.0038)	0.100 (0.0039)	0.102 (0.0040)	0.104 (0.0041)	0.106 (0.0042)	0.108 (0.0043)	0.110 (0.0043)	0.112 (0.0044)	0.114 (0.0045)	0.116 (0.0046)	0.118 (0.0047)	0.120 (0.0047)	0.122 (0.0048)	0.124 (0.0049)	0.126 (0.0050)	0.128 (0.0051)	0.130 (0.0052)	0.132 (0.0052)	0.134 (0.0053)	0.136 (0.0054)	0.138 (0.0055)	0.140 (0.0056)	0.142 (0.0056)	0.144 (0.0057)	0.146 (0.0058)	0.148 (0.0059)	0.150 (0.0060)	0.152 (0.0061)	0.154 (0.0062)	0.156 (0.0062)	0.158 (0.0063)	0.160 (0.0064)	0.162 (0.0065)	0.164 (0.0066)	0.166 (0.0066)	0.168 (0.0067)	0.170 (0.0068)	0.172 (0.0069)	0.174 (0.0070)	0.176 (0.0070)	0.178 (0.0071)	0.180 (0.0072)	0.182 (0.0073)	0.184 (0.0073)	0.186 (0.0074)	0.188 (0.0075)	0.190 (0.0076)	0.192 (0.0076)	0.194 (0.0077)	0.196 (0.0078)	0.198 (0.0079)	0.200 (0.0080)	0.202 (0.0081)	0.204 (0.0081)	0.206 (0.0082)	0.208 (0.0083)	0.210 (0.0084)	0.212 (0.0084)	0.214 (0.0085)	0.216 (0.0086)	0.218 (0.0087)	0.220 (0.0087)	0.222 (0.0088)	0.224 (0.0089)	0.226 (0.0090)	0.228 (0.0090)	0.230 (0.0091)	0.232 (0.0092)	0.234 (0.0093)	0.236 (0.0093)	0.238 (0.0094)	0.240 (0.0095)	0.242 (0.0096)	0.244 (0.0096)	0.246 (0.0097)	0.248 (0.0098)	0.250 (0.0099)	0.252 (0.0100)	0.254 (0.0100)	0.256 (0.0101)	0.258 (0.0102)	0.260 (0.0103)	0.262 (0.0103)	0.264 (0.0104)	0.266 (0.0105)	0.268 (0.0106)	0.270 (0.0106)	0.272 (0.0107)	0.274 (0.0108)	0.276 (0.0109)	0.278 (0.0110)	0.280 (0.0110)	0.282 (0.0111)	0.284 (0.0112)	0.286 (0.0113)	0.288 (0.0113)	0.290 (0.0114)	0.292 (0.0115)	0.294 (0.0116)	0.296 (0.0117)	0.298 (0.0117)	0.300 (0.0118)	0.302 (0.0119)	0.304 (0.0120)	0.306 (0.0120)	0.308 (0.0121)	0.310 (0.0122)	0.312 (0.0123)	0.314 (0.0123)	0.316 (0.0124)	0.318 (0.0125)	0.320 (0.0126)	0.322 (0.0126)	0.324 (0.0127)	0.326 (0.0128)	0.328 (0.0129)	0.330 (0.0129)	0.332 (0.0130)	0.334 (0.0131)	0.336 (0.0132)	0.338 (0.0132)	0.340 (0.0133)	0.342 (0.0134)	0.344 (0.0135)	0.346 (0.0135)	0.348 (0.0136)	0.350 (0.0137)	0.352 (0.0138)	0.354 (0.0138)	0.356 (0.0139)	0.358 (0.0140)	0.360 (0.0141)	0.362 (0.0141)	0.364 (0.0142)	0.366 (0.0143)	0.368 (0.0144)	0.370 (0.0144)	0.372 (0.0145)	0.374 (0.0146)	0.376 (0.0147)	0.378 (0.0147)	0.380 (0.0148)	0.382 (0.0149)	0.384 (0.0150)	0.386 (0.0150)	0.388 (0.0151)	0.390 (0.0152)	0.392 (0.0153)	0.394 (0.0153)	0.396 (0.0154)	0.398 (0.0155)	0.400 (0.0156)	0.402 (0.0156)	0.404 (0.0157)	0.406 (0.0158)	0.408 (0.0159)	0.410 (0.0159)	0.412 (0.0160)	0.414 (0.0161)	0.416 (0.0162)	0.418 (0.0162)	0.420 (0.0163)	0.422 (0.0164)	0.424 (0.0165)	0.426 (0.0165)	0.428 (0.0166)	0.430 (0.0167)	0.432 (0.0168)	0.434 (0.0168)	0.436 (0.0169)	0.438 (0.0170)	0.440 (0.0171)	0.442 (0.0171)	0.444 (0.0172)	0.446 (0.0173)	0.448 (0.0174)	0.450 (0.0174)	0.452 (0.0175)	0.454 (0.0176)	0.456 (0.0176)	0.458 (0.0177)	0.460 (0.0178)	0.462 (0.0179)	0.464 (0.0179)	0.466 (0.0180)	0.468 (0.0181)	0.470 (0.0182)	0.472 (0.0182)	0.474 (0.0183)	0.476 (0.0184)	0.478 (0.0185)	0.480 (0.0185)	0.482 (0.0186)	0.484 (0.0187)	0.486 (0.0188)	0.488 (0.0188)	0.490 (0.0189)	0.492 (0.0190)	0.494 (0.0191)	0.496 (0.0191)	0.498 (0.0192)	0.500 (0.0193)	0.502 (0.0194)	0.504 (0.0194)	0.506 (0.0195)	0.508 (0.0196)	0.510 (0.0197)	0.512 (0.0197)	0.514 (0.0198)	0.516 (0.0199)	0.518 (0.0200)	0.520 (0.0200)	0.522 (0.0201)	0.524 (0.0202)	0.526 (0.0203)	0.528 (0.0203)	0.530 (0.0204)	0.532 (0.0205)	0.534 (0.0206)	0.536 (0.0206)	0.538 (0.0207)	0.540 (0.0208)	0.542 (0.0209)	0.544 (0.0209)	0.546 (0.0210)	0.548 (0.0211)	0.550 (0.0212)	0.552 (0.0212)	0.554 (0.0213)	0.556 (0.0214)	0.558 (0.0215)	0.560 (0.0215)	0.562 (0.0216)	0.564 (0.0217)	0.566 (0.0217)	0.568 (0.0218)	0.570 (0.0219)	0.572 (0.0220)	0.574 (0.0220)	0.576 (0.0221)	0.578 (0.0222)	0.580 (0.0223)	0.582 (0.0223)	0.584 (0.0224)	0.586 (0.0225)	0.588 (0.0226)	0.590 (0.0226)	0.592 (0.0227)	0.594 (0.0228)	0.596 (0.0229)	0.598 (0.0229)	0.600 (0.0230)	0.602 (0.0231)	0.604 (0.0232)	0.606 (0.0232)	0.608 (0.0233)	0.610 (0.0234)	0.612 (0.0235)	0.614 (0.0235)	0.616 (0.0236)	0.618 (0.0237)	0.620 (0.0238)	0.622 (0.0238)	0.624 (0.0239)	0.626 (0.0240)	0.628 (0.0241)	0.630 (0.0241)	0.632 (0.0242)	0.634 (0.0243)	0.636 (0.0244)	0.638 (0.0244)	0.640 (0.0245)	0.642 (0.0246)	0.644 (0.0247)	0.646 (0.0247)	0.648 (0.0248)	0.650 (0.0249)	0.652 (0.0250)	0.654 (0.0250)	0.656 (0.0251)	0.658 (0.0252)	0.660 (0.0253)	0.662 (0.0253)	0.664 (0.0254)	0.666 (0.0255)	0.668 (0.0256)	0.670 (0.0256)	0.672 (0.0257)	0.674 (0.0258)	0.676 (0.0258)	0.678 (0.0259)	0.680 (0.0260)	0.682 (0.0261)	0.684 (0.0261)	0.686 (0.0262)	0.688 (0.0263)	0.690 (0.0264)	0.692 (0.0264)	0.694 (0.0265)	0.696 (0.0266)	0.698 (0.0267)	0.700 (0.0267)	0.702 (0.0268)	0.704 (0.0269)	0.706 (0.0269)	0.708 (0.0270)	0.710 (0.0271)	0.712 (0.0272)	0.714 (0.0272)	0.716 (0.0273)	0.718 (0.0274)	0.720 (0.0274)	0.722 (0.0275)	0.724 (0.0276)	0.726 (0.0276)	0.728 (0.0277)	0.730 (0.0278)	0.732 (0.0278)	0.734 (0.0279)	0.736 (0.0280)	0.738 (0.0280)	0.740 (0.0281)	0.742 (0.0282)	0.744 (0.0282)	0.746 (0.0283)	0.748 (0.0284)	0.750 (0.0285)	0.752 (0.0285)	0.754 (0.0286)	0.756 (0.0287)	0.758 (0.0287)	0.760 (0.0288)	0.762 (0.0289)	0.764 (0.0289)	0.766 (0.0290)	0.768 (0.0291)	0.770 (0.0291)	0.772 (0.0292)	0.774 (0.0293)	0.776 (0.0293)	0.778 (0.0294)	0.780 (0.0295)	0.782 (0.0295)	0.784 (0.0296)	0.786 (0.0297)	0.788 (0.0297)	0.790 (0.0298)	0.792 (0.0299)	0.794 (0.0299)	0.796 (0.0300)	0.798 (0.0301)	0.800 (0.0301)	0.802 (0.0302)	0.804 (0.0303)	0.806 (0.0303)	0.808 (0.0304)	0.810 (0.0305)	0.812 (0.0305)	0.814 (0.0306)	0.816 (0.0307)	0.818 (0.0307)	0.820 (0.0308)	0.822 (0.0309)	0.824 (0.0309)	0.826 (0.0310)	0.828 (0.0311)	0.830 (0.0311)	0.832 (0.0312)	0.834 (0.0313)	0.836 (0.0313)	0.838 (0.0314)	0.840 (0.0315)	0.842 (0.0315)	0.844 (0.0316)	0.846 (0.0317)	0.848 (0.0317)	0.850 (0.0318)	0.852 (0.0319)	0.854 (0.0319)	0.856 (0.0320)	0.858 (0.0321)	0.860 (0.0321)	0.862 (0.0322)	0.864 (0.0323)	0.866 (0.0323)	0.868 (0.0324)	0.870 (0.0325)	0.872 (0.0325)	0.874 (0.0326)	0.876 (0.0327)	0.878 (0.0327)	0.880 (0.0328)	0.882 (0.0329)	0.884 (0.0329)	0.886 (0.0330)	0.888 (0.0331)	0.890 (0.0331)	0.892 (0.0332)	0.894 (0.0333)	0.896 (0.0333)	0.898 (0.0334)	0.900 (0.0335)	0.902 (0.0335)	0.904 (0.0336)	0.906 (0.0337)	0.908 (0.0337)	0.910 (0.0338)	0.912 (0.0339)	0.914 (0.0339)	0.916 (0.0340)	0.918 (0.0341)	0.920 (0.0341)	0.922 (0.0342)	0.924 (0.0343)	0.926 (0.0343)	0.928 (0.0344)	0.930 (0.0345)	0.932 (0.0345)	0.934 (0.0346)	0.936 (0.0347)	0.938 (0.0347)	0.940 (0.0348)	0.942 (0.0349)	0.944 (0.0349)	0.946 (0.0350)	0.948 (0.0351)	0.950 (0.0351)	0.952 (0.0352)	0.954 (0.0353)	0.956 (0.0353)	0.958 (0.0354)	0.960 (0.0355)	0.962 (0.0355)	0.964 (0.0356)	0.966 (0.0357)	0.968 (0.0357)	0.970 (0.0358)	0.972 (0.0359)	0.974 (0.0359)	0.976 (0.0360)	0.978 (0.0361)	0.980 (0.0361)	0.982 (0.0362)	0.984 (0.0363)	0.986 (0.0363)	0.988 (0.0364)	0.990 (0.0365)	0.992 (0.0365)	0.994 (0.0366)	0.996 (0.0367)	0.998 (0.0367)	1.000 (0.0368)	1.002 (0.0369)	1.004 (0.0369)	1.006 (0.0370)	1.008 (0.0371)	1.010 (0.0371)	1.012 (0.0372)	1.014 (0.0373)	1.016 (0.0373)	1.018 (0.0374)	1.020 (0.0375)	1.022 (0.0375)	1.024 (0.0376)	1.026 (0.0377)	1.028 (0.0377)	1.030 (0.0378)	1.032 (0.0379)	1.034 (0.0379)	1.036 (0.0380)	1.038 (0.0381)	1.040 (0.0381)	1.042 (0.0382)	1.044 (0.0383)	1.046 (0.0383)	1.048 (0.0384)	1.050 (0.0385)	1.052 (0.0385)	1.054 (0.0386)	1.056 (0.0387)	1.058 (0.0387)	1.060 (0.0388)	1.062 (0.0389)	1.064 (0.0389)	1.066 (0.0390)	1.068 (0.0391)	1.070 (0.0391)	1.072 (0.0392)	1.074 (0.0393)	1.076 (0.0393)	1.078 (0.0394)	1.080 (0.0395)	1.082 (0.0395)	1.084 (0.0396)	1.086 (0.0397)	1.088 (0.0397)	1.090 (0.0398)	1.092 (0.0399)	1.094 (0.0399)	1.096 (0.0400)	1.098 (0.0401)	1.100 (0.0401)	1.102 (0.0402)	1.104 (0.0403)	1.106 (0.0403)	1.108 (0.0404)	1.110 (0.0405)	1.112 (0.0405)	1.114 (0.0406)	1.116 (0.0407)	1.118 (0.0407)	1.120 (0.0408)	1.122 (0.0409)	1.124 (0.0409)	1.126 (0.0410)	1.128 (0.0411)	1.130 (0.0411)	1.132 (0.0412)	1.134 (0.0413)	1.136 (0.0413)	1.138 (0.0414)	1.140 (0.0415)	1.142 (0.0415)	1.144 (0.0416)	1.146 (0.0417)	1.148 (0.0417)	1.150 (0.0418)	1.152 (0.0419)	1.154 (0.0419)	1.156 (0.0420)	1.158 (0.0421)	1.160 (0.0421)	1.162 (0.0422)	1.164 (0.0423)	1.166 (0.0423)	1.168 (0.0424)	1.170 (0.0425)	1.172 (0.0425)	1.174 (0.0426)	1.176 (0.0427)	1.178 (0.0427)	1.180 (0.0428)	1.182 (0.0429)	1.184 (0.0429)	1.186 (0.0430)	1.188 (0.0431)	1.190 (0.0431)	1.192 (0.0432)	1.194 (0.0433)	1.196 (0.0433)	1.198 (0.0434)	1.200 (0.0435)	1.202 (0.0435)	1.204 (0.0436)	1.206 (0.0437)	1.208 (0.0437)	1.210 (0.0438)	1.212 (0.0439)	1.214 (0.0439)	1.216 (0.0440)	1.218 (0.0441)	1.220 (0.0441)	1.222 (0.0442)	1.224 (0.0443)	1.226 (0.0443)	1.228 (0.0444)	1.230 (0.0445)	1.232 (0.0445)	1.234 (0.0446)	1.236 (0.0447)	1.238 (0.0447)	1.240 (0.0448)	1.242 (0.0449)	1.244 (0.0449)	1.246 (0.0450)	1.248 (0.0451)	1.250 (0.0451)	1.252 (0.0452)	1.254 (0.0453)	1.256 (0.0453)	1.258 (0.0454)	1.260 (0.0455)	1.262 (0.0455)	1.264 (0.0456)	1.266 (0.0457)	1.268 (0.0457)	1.270 (0.0458)	1.272 (0.0459)	1.274 (0.0459)	1.276 (0.0460)	1.278 (0.0461)	1.280 (0.0461)	1.282 (0.0462)	1.284 (0.0463)	1.286 (0.0463)	1.288 (0.0464)	1.290 (0.0465)	1.292 (0.0465)	1.294 (0.0466)	1.296 (0.0467)	1.298 (0.0467)	1.300 (0.0468)	1.302 (0.0469)	1.304 (0.0469)	1.306 (0.0470)	1.308 (0.0471)	1.310 (0.0471)	1.312 (0.0472)	1.314 (0.0473)	1.316 (0.0473)	1.318 (0.0474)	1.320 (0.0475)	1.322 (0.0475)	1.324 (0.0476)	1.326 (0.0477)	1.328 (0.0477)	1.330 (0.0478)	1.332 (0.0479)	1.334 (0.0479)	1.336 (0.0480)	1.338 (0.0481)	1.340 (0.0481)	1.342 (0.0482)	1.344 (0.0483)	1.346 (0.0483)	1.348 (0.0484)	1.350 (0.0485)	1.352 (0.0485)	1.354 (0.0486)	1.356 (0.0487)	1.358 (0.0487)	1.360 (0.0488)	1.362 (0.0489)	1.364 (0.0489)	1.366 (0.0490)	1.368 (0.0491)	1.370 (0.0491)	1.372 (0.0492)	1.374 (0.0493)	1.376 (0.0493)	1.378 (0.0494)	1.380 (0.0495)	1.382 (0.0495)	1.384 (0.0496)	1.386 (0.0497)	1.388 (0.0497)	1.390 (0.0498)	1.392 (0.0499)	1.394 (0.0499)	1.396 (0.0500)	1.398 (0.0501)	1.400 (0.0501)	1.402 (0.0502)	1.404 (0.0503)	1.406 (0.0503)	1.408 (0.0504)	1.410 (0.0505)	1.412 (0.0505)	1.414 (0.0506)	1.416 (0.0507)	1.418 (0.0507)	1.420 (0.0508)	1.422 (0.0509)	1.424 (0.0509)	1.426 (0.0510)	1.428 (0.0511)	1.430 (0.0511)	1.432 (0.0512)	1.434 (0.0513)	1.436 (0.0513)	1.438 (0.0514)	1.440 (0.0515)	1.442 (0.0515)
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1999 ENGINE PERFORMANCE On-Vehicle Adjustments - 4-Cylinder

[illegible]

EXAMPLE: A 0.2102" (5.340 mm) lifter is installed and measured clearance is 0.0173" (0.440 mm). Replace 0.2102" (5.340 mm) lifter with a No. 48 lifter.

EXHAUST VALVES

New litter thickness: mm (in.)

Lifter No.	Thickness	Lifter No.	Thickness	Lifter No.	Thickness
06	5.060 (0.1992)	30	5.300 (0.2087)	54	5.540 (0.218)
08	5.080 (0.2000)	32	5.320 (0.2094)	56	5.560 (0.218)
10	5.100 (0.2008)	34	5.340 (0.2102)	58	5.580 (0.219)
12	5.120 (0.2016)	36	5.360 (0.2110)	60	5.600 (0.220)
14	5.140 (0.2024)	38	5.380 (0.2118)	62	5.620 (0.221)
16	5.160 (0.2031)	40	5.400 (0.2126)	64	5.640 (0.222)
18	5.180 (0.2039)	42	5.420 (0.2134)	66	5.660 (0.222)
20	5.200 (0.2047)	44	5.440 (0.2142)	68	5.680 (0.223)
22	5.220 (0.2055)	46	5.460 (0.2150)	70	5.700 (0.224)
24	5.240 (0.2063)	48	5.480 (0.2157)	72	5.720 (0.225)
26	5.260 (0.2071)	50	5.500 (0.2165)	74	5.740 (0.226)
28	5.280 (0.2079)	52	5.520 (0.2173)		

Fig. 13: Exhaust Valve Lifter Selection Chart (Corolla)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Tacoma & 4Runner

1. Remove air cleaner hose along with upper cap on air cleaner and mass airflow meter. Remove intake air connector for access to valve cover. Intake air connector fits between air cleaner hose and throttle body.
2. Disconnect spark plug wires from spark plugs. Disconnect engine wiring, clamps and PCV hose for access to valve cover. Remove bolts, seal washers, valve cover and gasket.
3. Rotate crankshaft clockwise until crankshaft pulley timing mark (groove) aligns with "0" mark on timing chain cover and cylinder No. 1 is at TDC on compression stroke. Cylinder No. 1 is front cylinder at timing chain end of engine.
4. Ensure 1-dot and 2-dot timing marks on camshaft sprockets are aligned. See **Fig. 14** . If timing marks are not aligned, rotate crankshaft clockwise one full revolution (360 degrees) and realign crankshaft pulley timing mark (groove) with "0" mark on timing chain cover.

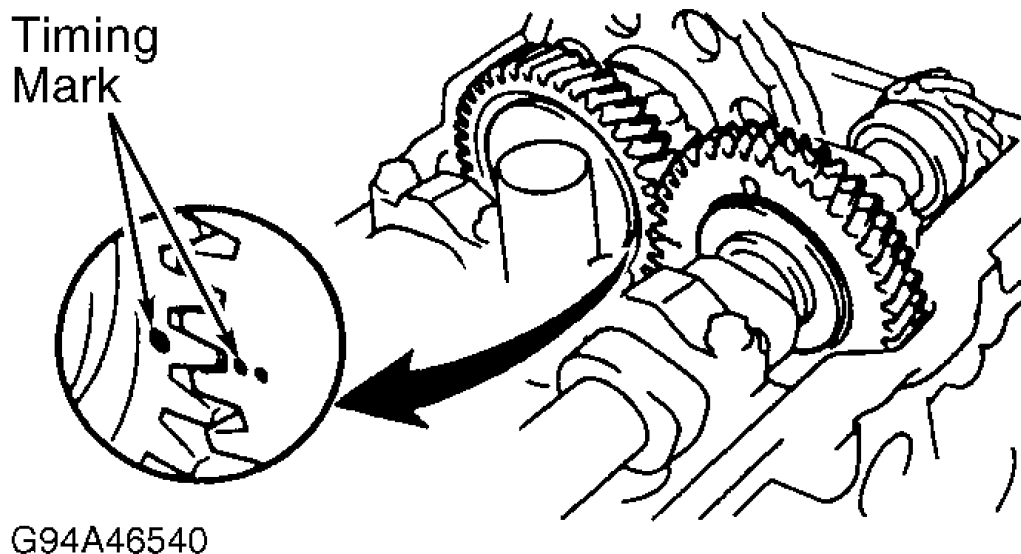
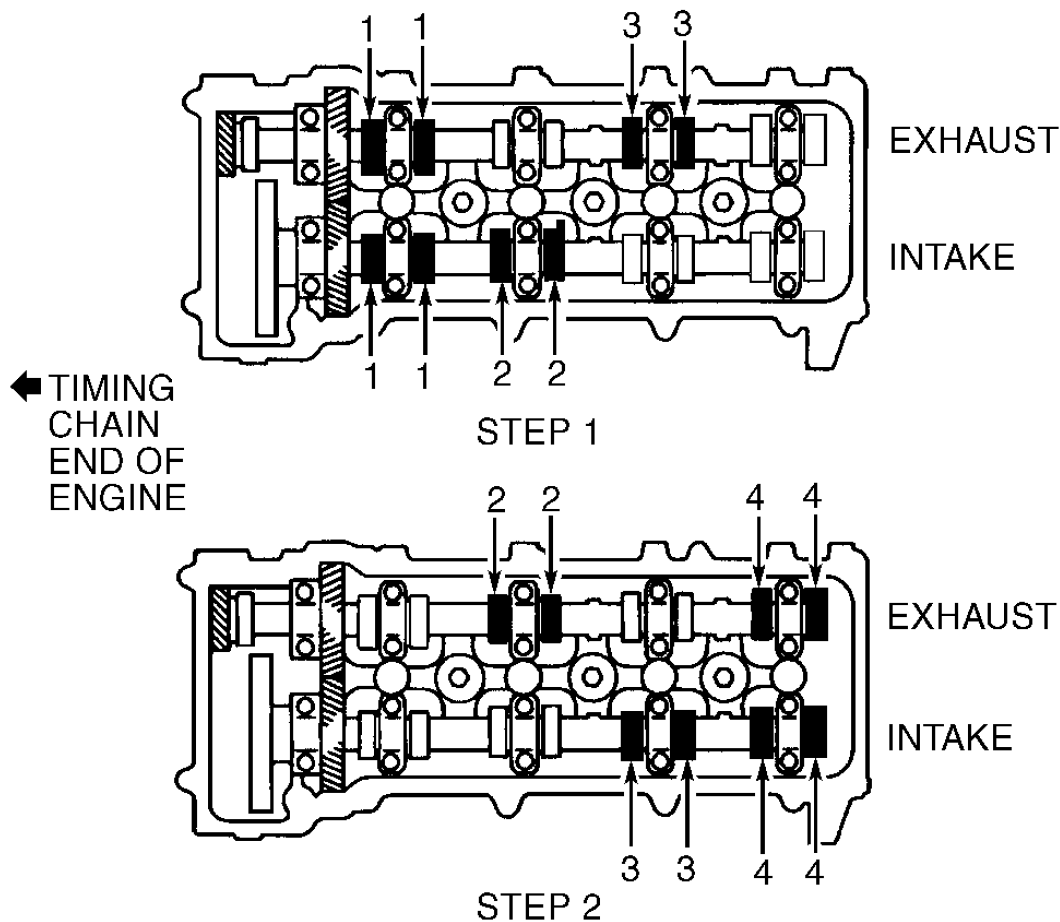


Fig. 14: Aligning Camshaft Sprocket Timing Marks (Tacoma & 4Runner)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

5. With cylinder No. 1 at TDC on compression stroke, use feeler gauge to measure valve clearance between valve lifter and camshaft on specified valves. Perform STEP 1. See **Fig. 15** . Record valve clearance.
6. To check remaining valves, rotate crankshaft clockwise one full revolution (360 degrees) and realign crankshaft pulley timing mark (groove) with "0" mark on timing chain cover. Using feeler gauge, measure valve clearance on specified valves. Perform STEP 2. See **Fig. 15** . Record valve clearance.

1999 Toyota RAV4

1999 ENGINE PERFORMANCE On-Vehicle Adjustments - 4-Cylinder



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Fig. 15: Identifying Cylinder Numbers & Checking Valve Clearance (Tacoma & 4Runner)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

7. Ensure valve clearance is within specification. See **VALVE CLEARANCE SPECIFICATIONS (TACOMA & 4RUNNER)** table.

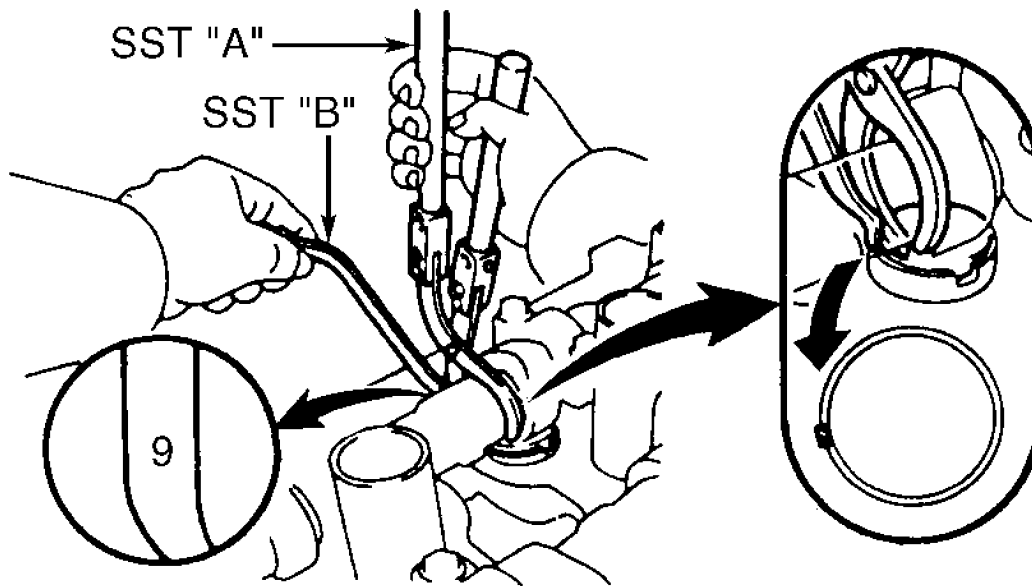
VALVE CLEARANCE SPECIFICATIONS (TACOMA & 4RUNNER)

Application	(1) In. (mm)
Intake	.006-.010 (.15-.25)
Exhaust	.010-.014 (.25-.35)

(1) Adjust valve clearance with engine cold.

8. 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.

9. Valve Clearance Adjuster (SST 09248-55040) is used to remove adjusting shim. Using SST "A" of valve clearance adjuster, press valve lifter downward. See **Fig. 16** . Install SST "B" between camshaft and valve lifter with side marked with No. 9 at designated position. See **Fig. 16** . Remove SST "A".



G94B46541

Fig. 16: Removing & Installing Valve Clearance Adjusting Shim (Tacoma & 4Runner)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

10. Using small screwdriver and magnet, remove adjusting shim. Using micrometer, measure thickness of adjusting shim removed. Using measured clearance and adjusting shim thickness, determine correct thickness of adjusting shim to be used. See **Fig. 17** and **Fig. 18** .
11. Install replacement adjusting shim. Recheck valve clearance. To install remaining components, reverse removal procedure.

1999 ENGINE PERFORMANCE On-Vehicle Adjustments - 4-Cylinder



Fig. 17: Intake Valve Adjusting Shim Selection Chart (Tacoma & 4Runner)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

1999 ENGINE PERFORMANCE On-Vehicle Adjustments - 4-Cylinder

1999 Toyota RAV4

1999 ENGINE PERFORMANCE On-Vehicle Adjustments - 4-Cylinder

Celica

Driver's Side Rear Corner Of Engine
Compartment, Near Brake Booster

4. Apply parking brake. Place transaxle in Neutral. Start engine and maintain engine at 1000-1300 RPM for 5 seconds and then ensure engine returns to idle.
5. Timing marks are located on timing belt cover, near crankshaft pulley. Ensure base timing is within specification at idle with transaxle in Neutral, and with A/C and all accessories off. See **IGNITION TIMING SPECIFICATIONS** table.
6. Remove jumper wire from data link connector No. 1. Ensure ECM controlled timing is within specification. See **IGNITION TIMING SPECIFICATIONS** table. Shut engine off. Remove timing light and scan tool.

Corolla

1. Start engine and warm engine to normal operating temperature. Shut engine off. Connect timing light to spark plug wire on cylinder No. 1. Cylinder No. 1 is front cylinder at timing chain end of engine.
2. Connect scan tool to data link connector No. 3. See **Fig. 22** . Scan tool is used to read engine RPM.
3. Install Jumper Wire (SST 09843-18020) between terminals TE1 and E1 on data link connector No. 1. See **Fig. 29** . Data link connector No. 1 is located at driver's side of engine compartment, near strut tower.
4. Apply parking brake. Place transaxle in Neutral. Start engine and maintain engine at 1000-1300 RPM for 5 seconds and then ensure engine returns to idle.
5. Timing marks are located on timing chain cover, near crankshaft pulley. Ensure base timing is within specification at idle with transaxle in Neutral, and with A/C and all accessories off. See **IGNITION TIMING SPECIFICATIONS** table.
6. Remove jumper wire from data link connector No. 1. Ensure ECM controlled timing is within specification. See **IGNITION TIMING SPECIFICATIONS** table. Shut engine off. Remove timing light and scan tool.

RAV4

1. Start engine and warm engine to normal operating temperature. Shut engine off. Connect timing light to spark plug wire on cylinder No. 1. Cylinder No. 1 is front cylinder at timing belt end of engine.
2. Remove cover from instrument panel and connect scan tool to data link connector No. 3. See **Fig. 23** . Scan tool is used to read engine RPM.
3. Install Jumper Wire (SST 09843-18020) between terminals TE1 and E1 on data link connector No. 1. See **Fig. 30** . Data link connector No. 1 is located on timing belt end of engine, above generator.
4. Apply parking brake. Place transaxle in Neutral. Start engine and allow engine to idle.
5. Timing marks are located on timing belt cover, near crankshaft pulley. Ensure base timing is within specification at idle with transaxle in Neutral, and with A/C and all accessories off. See **IGNITION TIMING SPECIFICATIONS** table.
6. Remove jumper wire from data link connector No. 1. Ensure ECM controlled timing is within specification. See **IGNITION TIMING SPECIFICATIONS** table. Shut engine off. Remove timing light and scan tool.

1999 Toyota RAV4

1999 ENGINE PERFORMANCE On-Vehicle Adjustments - 4-Cylinder

Tacoma & 4Runner

1. Start engine and warm engine to normal operating temperature. Shut engine off. Connect timing light to spark plug wire on cylinder No. 1. Cylinder No. 1 is front cylinder at timing chain end of engine.
2. Connect scan tool to data link connector No. 3. See **Fig. 24** and **Fig. 25** . Scan tool is used to read engine RPM.
3. Install Jumper Wire (SST 09843-18020) between terminals TE1 and E1 on data link connector No. 1. See **Fig. 31** . Data link connector No. 1 is located on end of intake manifold at front of engine.
4. Apply parking brake. Place transmission in Neutral. Start engine. Maintain engine at 1000 RPM for 5 seconds and then ensure engine returns to idle.
5. Timing marks are located on timing chain cover, near crankshaft pulley. Ensure base timing is within specification at idle with transmission in Neutral, and with A/C and all accessories off. See **IGNITION TIMING SPECIFICATIONS** table.
6. Remove jumper wire from data link connector No. 1. Ensure ECM controlled timing is within specification. See **IGNITION TIMING SPECIFICATIONS** table. Shut engine off. Remove timing light and scan tool.

IGNITION TIMING SPECIFICATIONS (Degrees BTDC @ Idle) ⁽¹⁾

Application	(2) Base Timing	(3) ECM Controlled Timing
Camry, Camry Solara & Celica	8-12	0-10
Corolla	8-12	6-15
RAV4	8-12	0-10
Tacoma & 4Runner	3-7	4-17

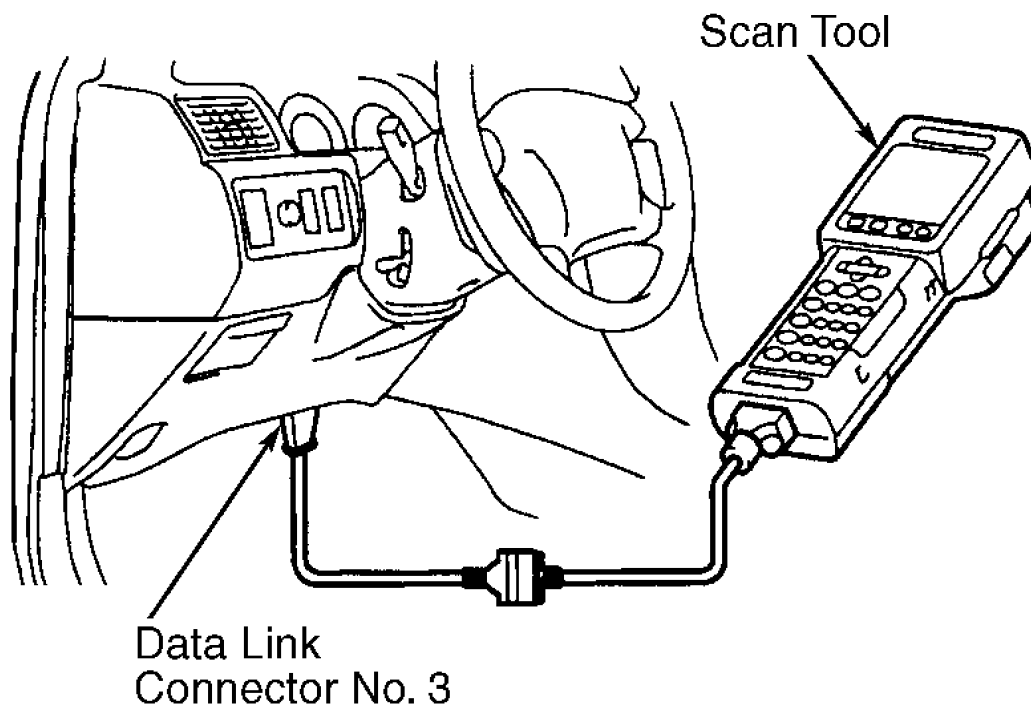
(1) Check with engine at normal operating temperature, transmission/transaxle in Neutral, parking brake applied, and A/C and all accessories off.

(2) With Jumper Wire (SST 09843-18020) installed between terminals TE1 and E1 on data link connector No. 1.

(3) With jumper wire removed from data link connector No. 1.

1999 Toyota RAV4

1999 ENGINE PERFORMANCE On-Vehicle Adjustments - 4-Cylinder



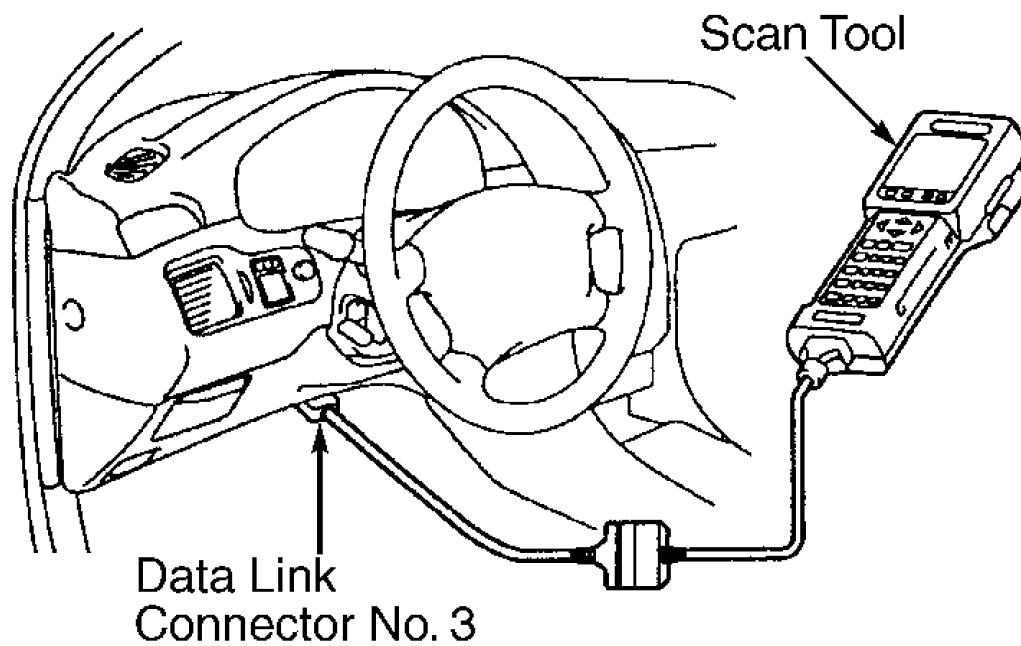
G98B11206

Fig. 19: Connecting Scan Tool (Camry)

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

1999 Toyota RAV4

1999 ENGINE PERFORMANCE On-Vehicle Adjustments - 4-Cylinder



G99J08029

Fig. 20: Connecting Scan Tool (Camry Solara)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

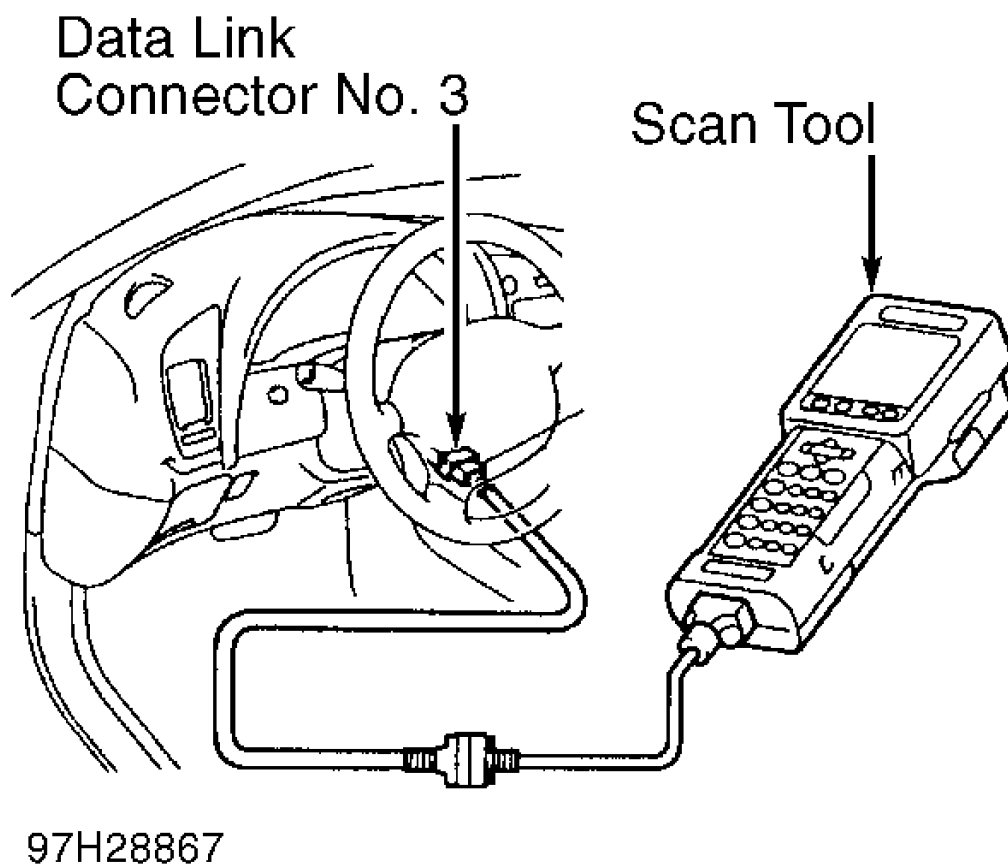


Fig. 21: Connecting Scan Tool (Celica)

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

1999 Toyota RAV4

1999 ENGINE PERFORMANCE On-Vehicle Adjustments - 4-Cylinder

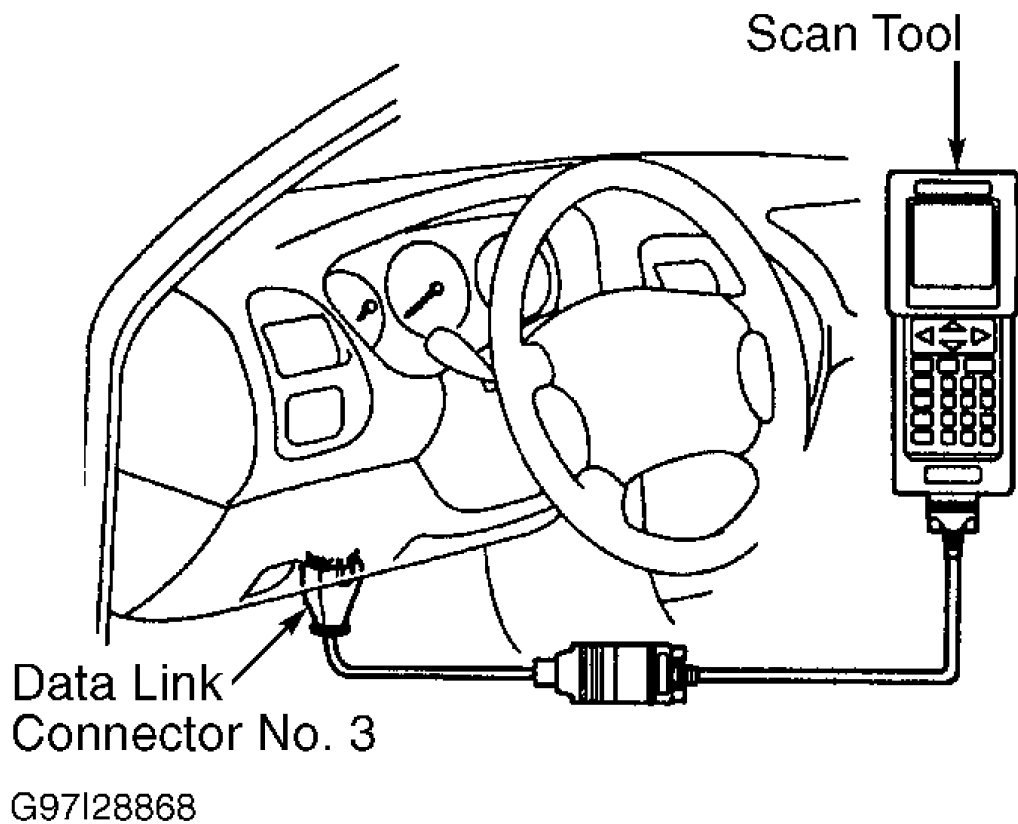


Fig. 22: Connecting Scan Tool (Corolla)

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

1999 Toyota RAV4

1999 ENGINE PERFORMANCE On-Vehicle Adjustments - 4-Cylinder

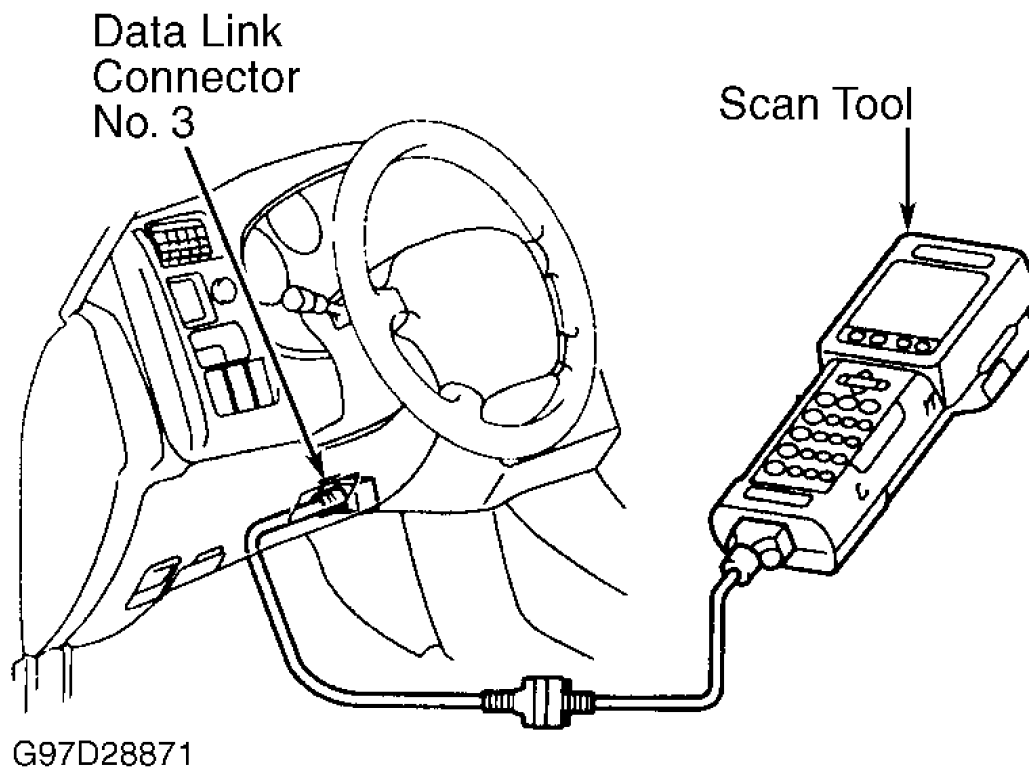
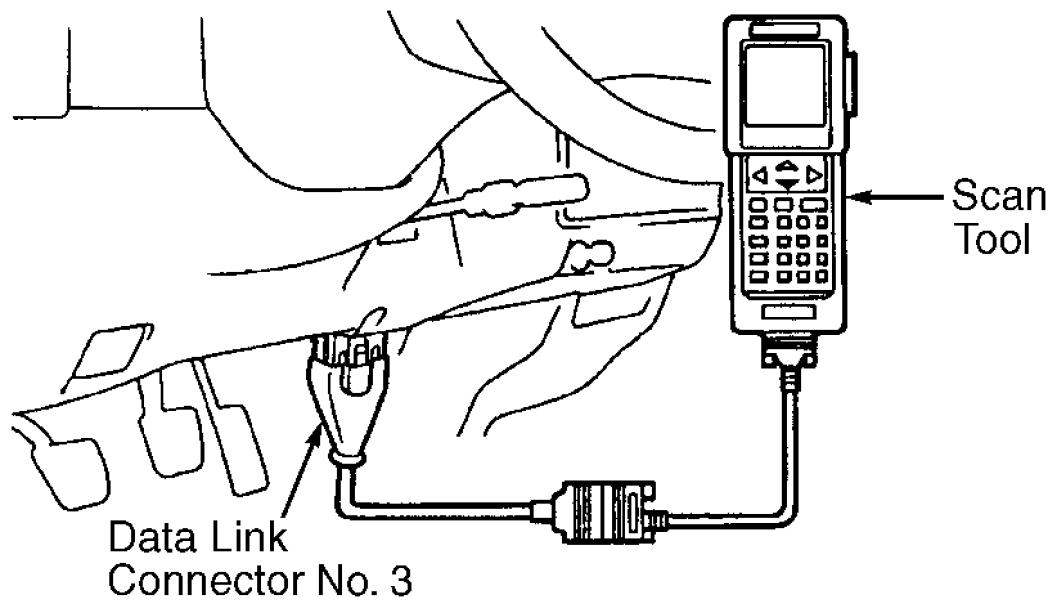


Fig. 23: Connecting Scan Tool (RAV4)

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

1999 Toyota RAV4

1999 ENGINE PERFORMANCE On-Vehicle Adjustments - 4-Cylinder



G97E28872

Fig. 24: Connecting Scan Tool (Tacoma)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

1999 Toyota RAV4

1999 ENGINE PERFORMANCE On-Vehicle Adjustments - 4-Cylinder

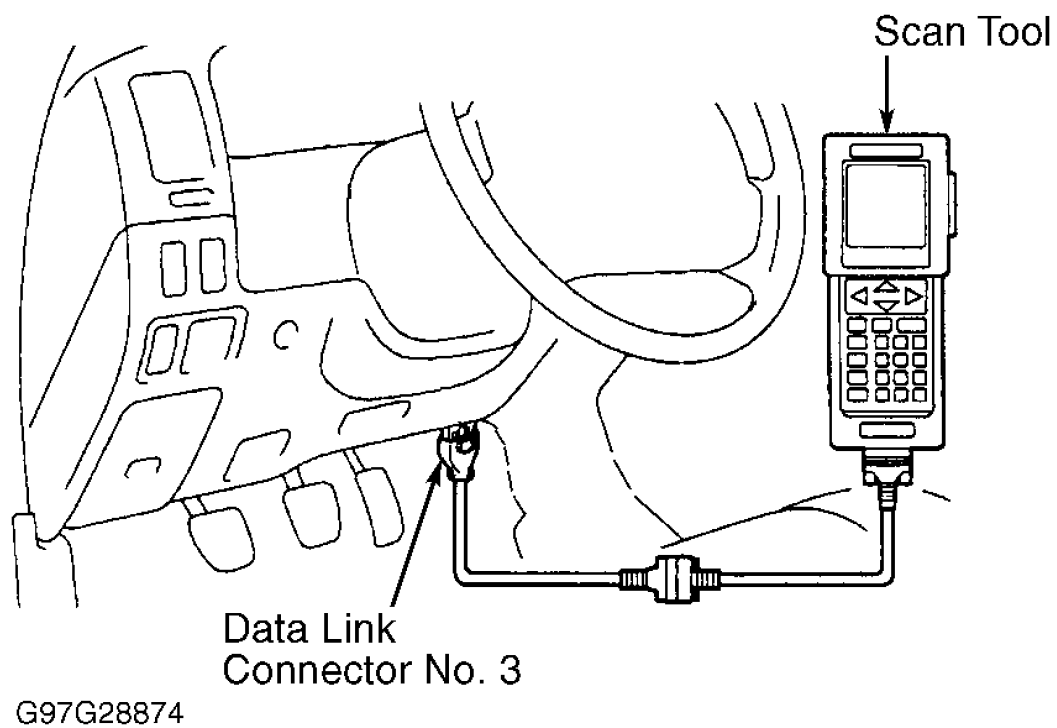
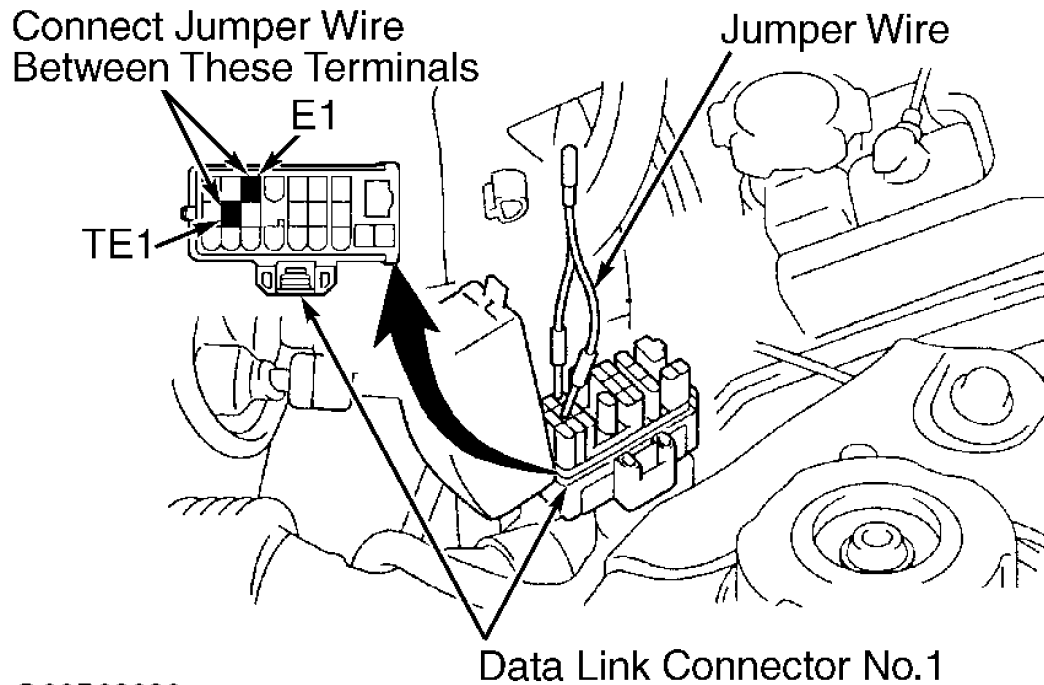


Fig. 25: Connecting Scan Tool (4Runner)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.



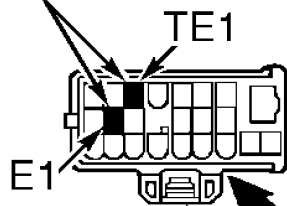
G99B08030

Fig. 26: Installing Jumper Wire Between Data Link Connector No. 1 Terminals (Camry)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

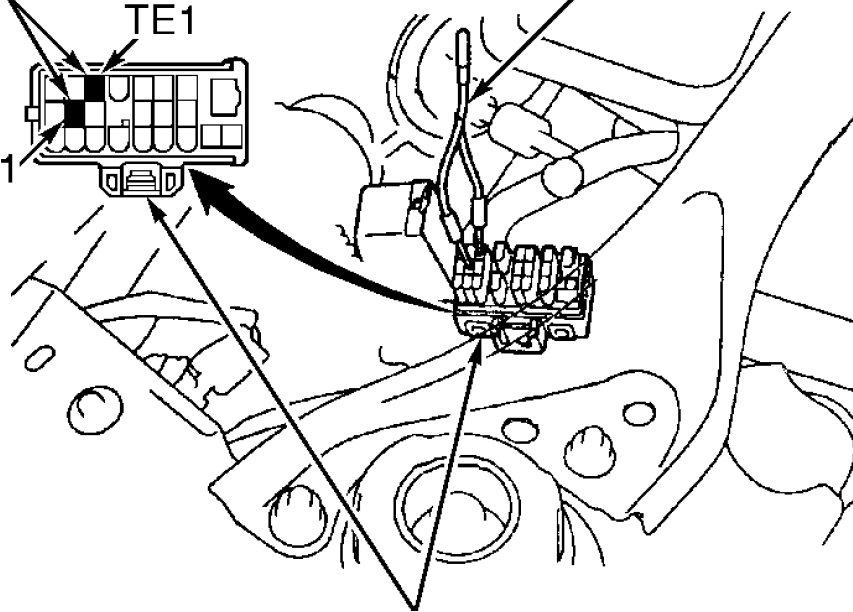
1999 Toyota RAV4

1999 ENGINE PERFORMANCE On-Vehicle Adjustments - 4-Cylinder

Connect Jumper Wire
Between These Terminals



Jumper Wire



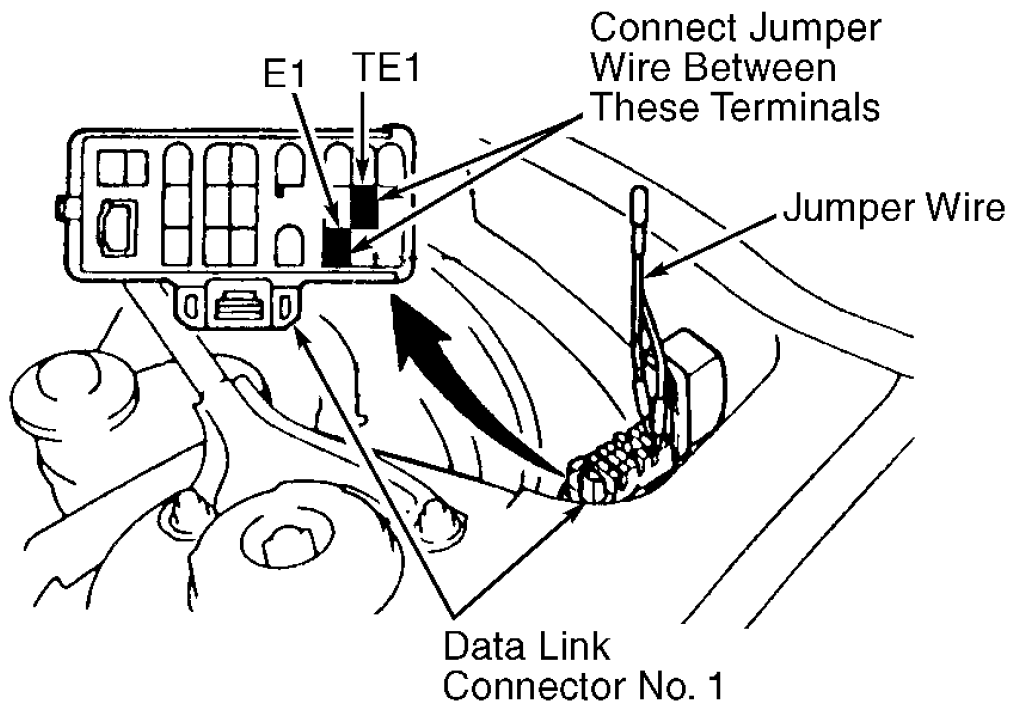
Data Link
Connector No.1

G99D08031

Fig. 27: Installing Jumper Wire Between Data Link Connector No. 1 Terminals (Camry Solara)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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1999 ENGINE PERFORMANCE On-Vehicle Adjustments - 4-Cylinder

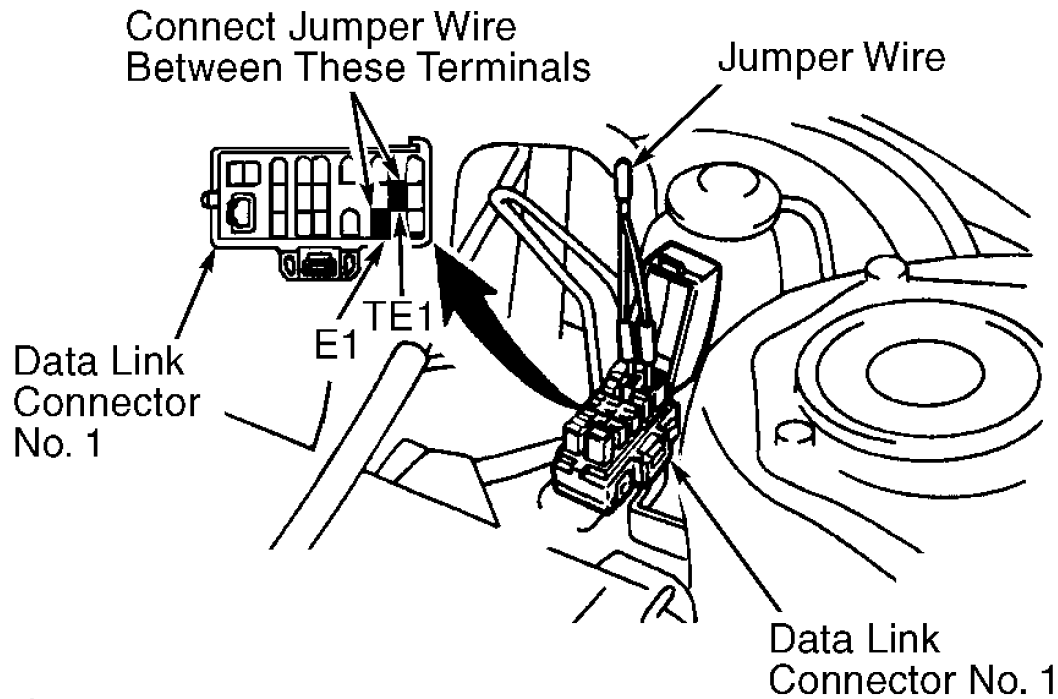


95H30889

Fig. 28: Installing Jumper Wire Between Data Link Connector No. 1 Terminals (Celica)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

1999 Toyota RAV4

1999 ENGINE PERFORMANCE On-Vehicle Adjustments - 4-Cylinder



G98E11225

Fig. 29: Installing Jumper Wire Between Data Link Connector No. 1 Terminals (Corolla)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

1999 Toyota RAV4

1999 ENGINE PERFORMANCE On-Vehicle Adjustments - 4-Cylinder

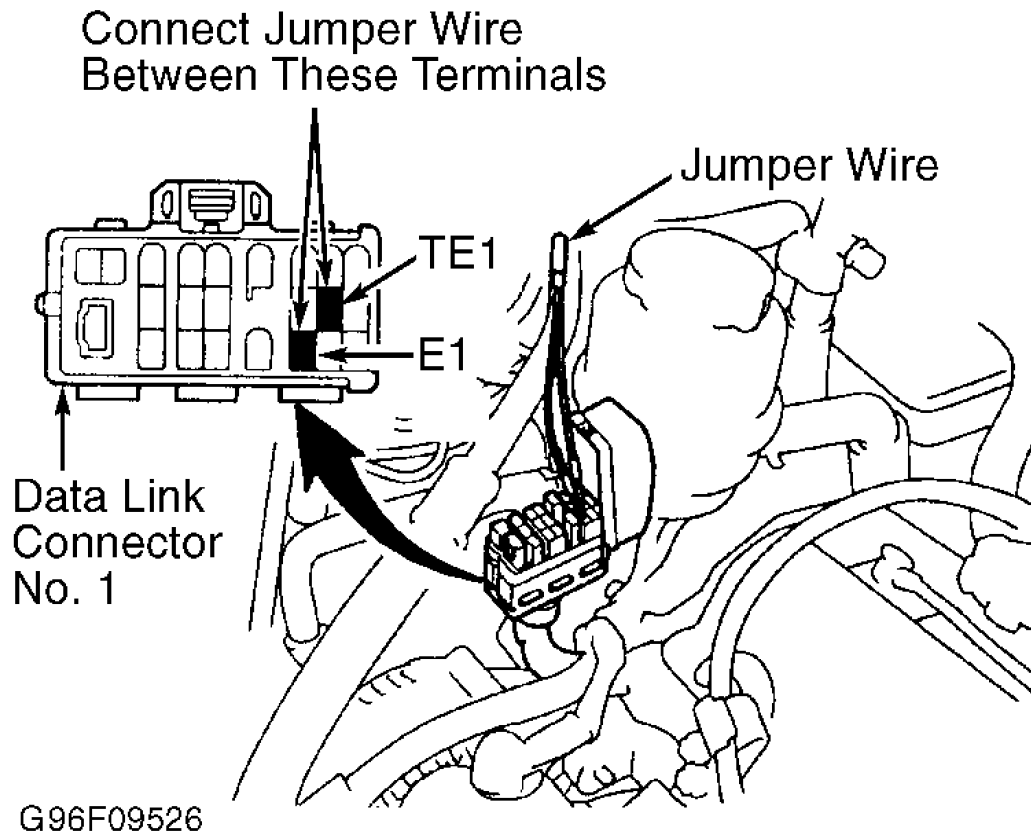
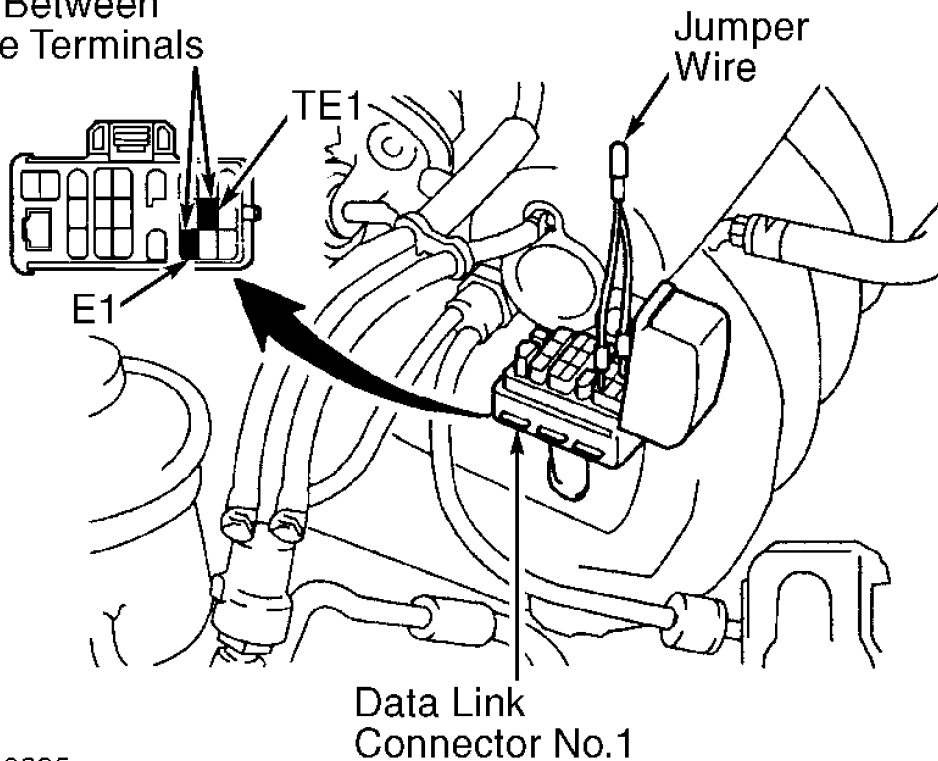


Fig. 30: Installing Jumper Wire Between Data Link Connector No. 1 Terminals (RAV4)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Connect Jumper
Wire Between
These Terminals



G95F30895

Fig. 31: Installing Jumper Wire Between Data Link Connector No. 1 Terminals (Tacoma & 4Runner)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

IDLE SPEED & MIXTURE

4-CYLINDER IDLE SPEED & MIXTURE

NOTE: Mixture adjustment is not possible on any model.

NOTE: Idle speed is controlled by Engine Control Module (ECM) and is not adjustable. Check idle speed with engine at normal operating temperature, transmission/transaxle in Neutral, parking brake applied, air cleaner and all vacuum hoses installed, electronic fuel injection system wiring connectors properly installed, ignition timing properly set, electric cooling fan off (if equipped), and A/C and all accessories off.

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1999 ENGINE PERFORMANCE On-Vehicle Adjustments - 4-Cylinder

1. Start engine and warm engine to normal operating temperature. Shut engine off. Remove cover (if equipped) and connect scan tool to data link connector No. 3. See **Fig. 19 -Fig. 25** . Scan tool is used to read engine RPM.
2. Apply parking brake. Place transmission/transaxle in Neutral. Start engine and maintain engine at 2500 RPM for 90 seconds and then allow engine to idle. Ensure idle speed is within specification. See **IDLE SPEED SPECIFICATIONS** table.
3. If idle speed is not within specification, check air intake system, Idle Air Control (IAC) valve, wiring and Engine Control Module (ECM). See IDLE CONTROL SYSTEM in SYSTEM & COMPONENT TESTING - 4-CYLINDER article. Shut engine off. Remove scan tool.

IDLE SPEED SPECIFICATIONS ⁽¹⁾

Application	RPM
Camry, Camry Solara, Celica & Corolla	650-750
RAV4	700-800
Tacoma & 4Runner	650-750
(1) Check with engine at normal operating temperature, transmission/transaxle in Neutral, parking brake applied, air cleaner and all vacuum hoses installed, electronic fuel injection system wiring connectors properly installed, ignition timing properly set, electric cooling fan off (if equipped), and A/C and all accessories off.	

THROTTLE POSITION SENSOR

4-CYLINDER THROTTLE POSITION SENSOR

Camry & Camry Solara

1. Manufacturer does not list procedure for Throttle Position (TP) sensor adjustment. Only information available is for checking resistance of TP sensor.
2. Disconnect electrical connector from TP sensor. Note electrical terminals on TP sensor. See **Fig. 32** . Apply vacuum to throttle opener.
3. Using ohmmeter, check resistance between specified terminals in relation to throttle position. See **THROTTLE POSITION SENSOR RESISTANCE** table. Replace components as necessary if resistance is not within specification.

Celica

1. Disconnect electrical connector from Throttle Position (TP) sensor. Loosen TP sensor mounting screws. Connect ohmmeter between terminals IDL and E2. See **Fig. 33** .
2. Apply vacuum to throttle opener. To set initial clearance, insert .024" (.60 mm) feeler gauge between throttle stop screw and throttle lever.
3. Gradually rotate TP sensor clockwise until ohmmeter deflects. Tighten TP sensor mounting screws. Remove feeler gauge. Reinsert a .020" (.50 mm) feeler gauge. Continuity should exist between terminals

1999 Toyota RAV4

1999 ENGINE PERFORMANCE On-Vehicle Adjustments - 4-Cylinder

IDL and E2. Remove feeler gauge.

4. Reinsert a .028" (.70 mm) feeler gauge. No continuity should exist between terminals IDL and E2. Remove feeler gauge and ohmmeter. Install electrical connector on TP sensor.

Corolla

1. Manufacturer does not list procedure for Throttle Position (TP) sensor adjustment. Only information available is for checking resistance of TP sensor.
2. Disconnect electrical connector from TP sensor. Note electrical terminals on TP sensor. See **Fig. 34**.
3. Using ohmmeter, check resistance between specified terminals in relation to throttle position. See **THROTTLE POSITION SENSOR RESISTANCE** table. Replace components as necessary if resistance is not within specification.

RAV4

1. Manufacturer does not list procedure for Throttle Position (TP) sensor adjustment. Only information available is for checking resistance of TP sensor.
2. Note location of E2 terminal (Brown wire), VC terminal (Yellow wire) and VTA terminal (Blue/Red wire) on TP sensor. Disconnect electrical connector from TP sensor. Apply vacuum to throttle opener.
3. Using ohmmeter, check resistance between specified terminals in relation to throttle position. See **THROTTLE POSITION SENSOR RESISTANCE** table. Replace components as necessary if resistance is not within specification.

Tacoma & 4Runner

1. Manufacturer does not list procedure for Throttle Position (TP) sensor adjustment. Only information available is for checking resistance of TP sensor.
2. Disconnect electrical connector from TP sensor. Note electrical terminals on TP sensor. See **Fig. 35**. Apply vacuum to throttle opener.
3. Using ohmmeter, check resistance between specified terminals in relation to throttle position. See **THROTTLE POSITION SENSOR RESISTANCE** table. Replace components as necessary if resistance is not within specification.

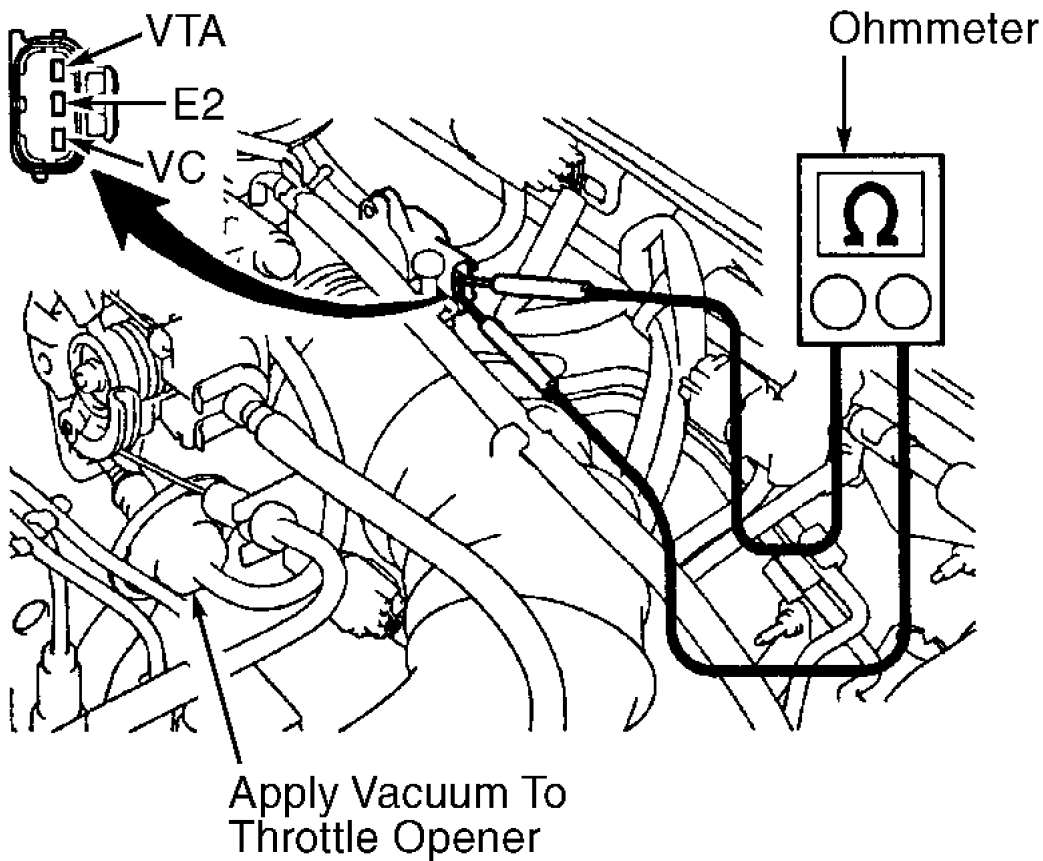
THROTTLE POSITION SENSOR RESISTANCE

Application	Throttle Position	Terminals	Ohms
Camry & Camry Solara ⁽¹⁾	Fully Closed	VTA & E2	200-5700
	Fully Open	VTA & E2	2000-10,200
	VC & E2		2500-5900
Corolla	Fully Closed	VTA & E2	200-5700
	Fully Open	VTA & E2	2000-10,200
	VC & E2		2500-5900
RAV4, Tacoma & 4Runner ⁽¹⁾	Fully Closed	VTA & E2	200-5700

1999 Toyota RAV4

1999 ENGINE PERFORMANCE On-Vehicle Adjustments - 4-Cylinder

Fully Open	VTA & E2	2000-10,200
VC & E2		2500-5900
(1) Apply vacuum to throttle opener before checking TP sensor.		

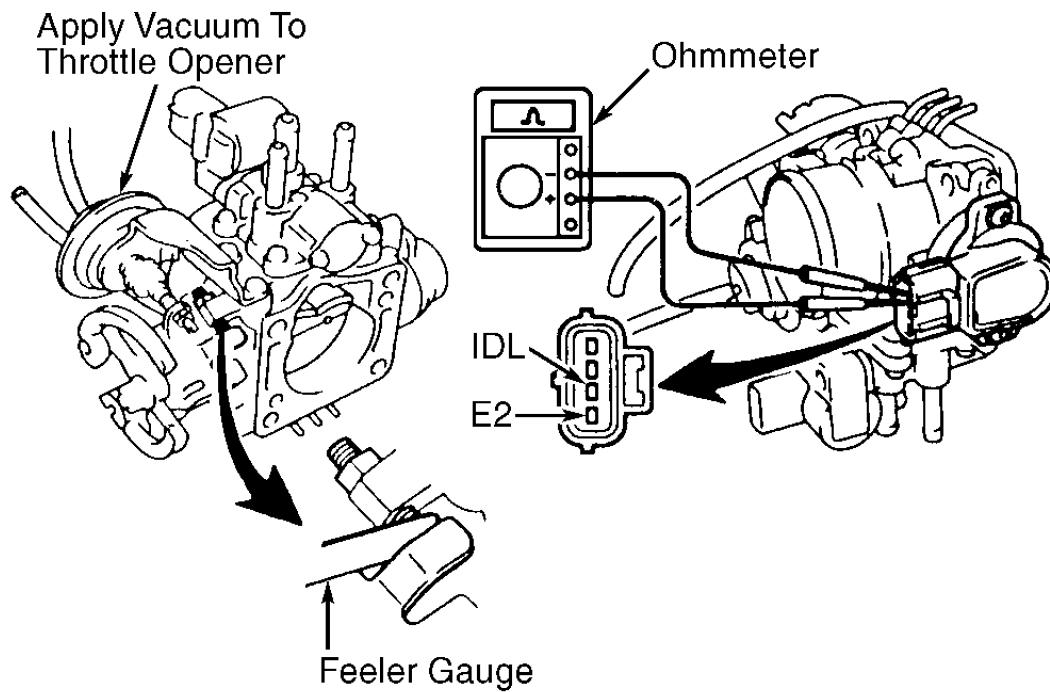


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Fig. 32: Identifying TP Sensor Terminals (Camry & Camry Solara)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

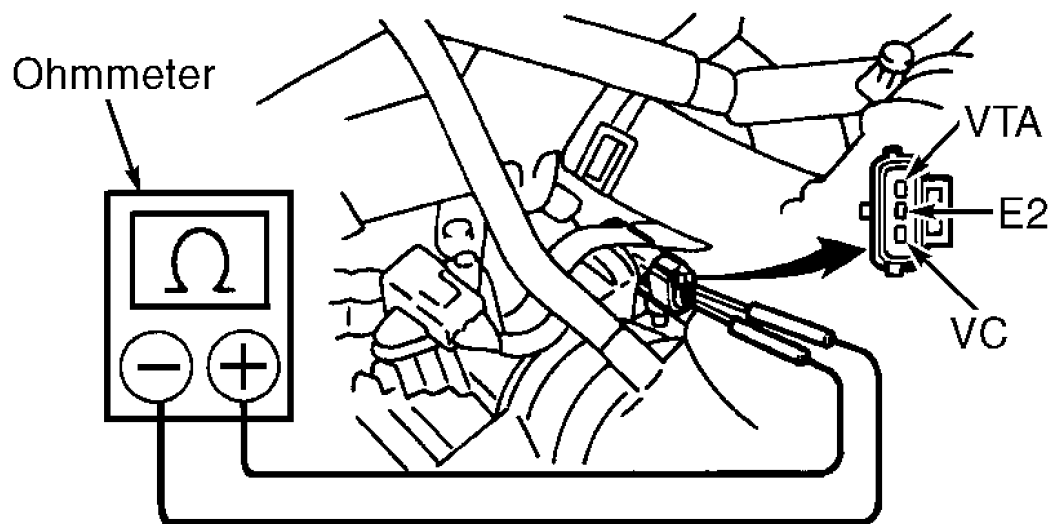
1999 Toyota RAV4

1999 ENGINE PERFORMANCE On-Vehicle Adjustments - 4-Cylinder



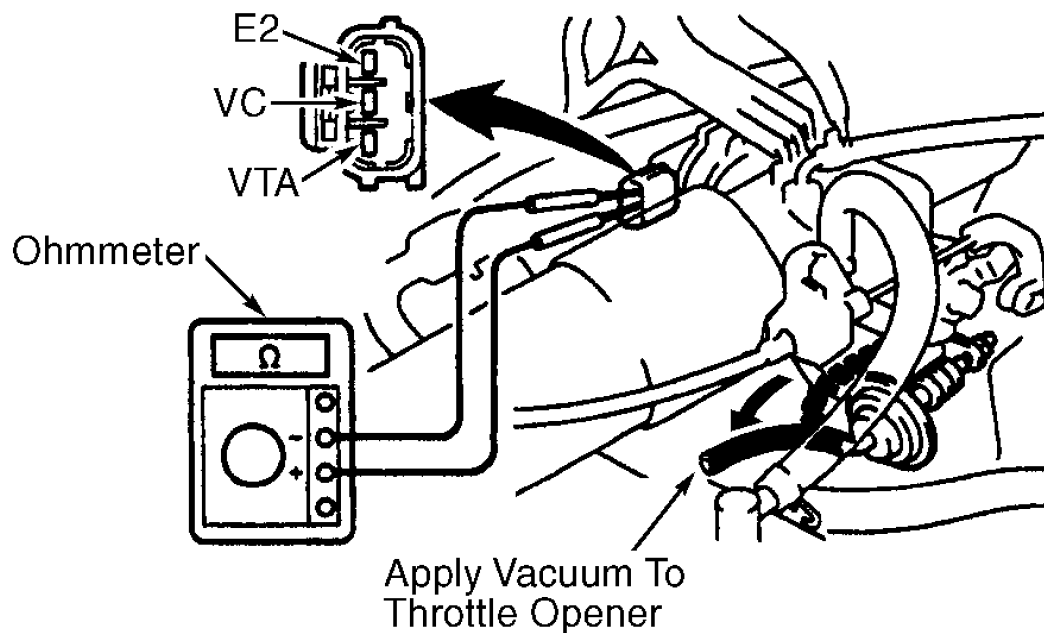
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Fig. 33: Identifying TP Sensor Terminals (Celica)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.



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Fig. 34: Identifying TP Sensor Terminals (Corolla)
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.



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Fig. 35: Identifying TP Sensor Terminals (Tacoma & 4Runner)

Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

THROTTLE OPENER

THROTTLE OPENER

Camry, Camry Solara, Celica, RAV4, Tacoma & 4Runner

For testing and adjustment procedures, see THROTTLE CONTROLS in SYSTEM & COMPONENT TESTING - 4-CYLINDER article.

MISCELLANEOUS CONTROLS

PARK/NEUTRAL POSITION (PNP) SWITCH

For adjustment of PNP switch, see PARK/NEUTRAL POSITION (PNP) SWITCH under ENGINE SENSORS & SWITCHES in REMOVAL, OVERHAUL & INSTALLATION - 4-CYLINDER article.

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS

Application	Ft. Lbs. (N.m)
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1999 Toyota RAV4
1999 ENGINE PERFORMANCE On-Vehicle Adjustments - 4-Cylinder

Valve Cover Bolt Or Nut	
Camry, Camry Solara & Celica	33 (45)
Corolla	(1)
RAV4	33 (45)
Tacoma & 4Runner	(2)
(1) Tighten bolts/nuts with washer to 80 INCH lbs. (9.0 N.m). Tighten bolts/nuts without washer to 97 INCH lbs. (11.0 N.m). Tighten bolts/nuts to specification in sequence. See Fig. 11 .	
(2) Information is not available from manufacturer.	