# ENGINE MECHANICAL

## SERVICE DATA

031VQ–01

| | | |
|---|---|---|
| New drive belt deflection<br>Pressing force: 98 N (10 kgf, 22lbf)<br><br>Used drive belt deflection<br>Pressing force: 98 N (10 kgf, 22lbf) | | <br>9.0 to 12.0 mm (0.35 to 0.47 in.)<br><br><br>11.0 to 15.0 mm (0.43 to 0.59 in.) |
| New drive belt tension<br>Used drive belt tension | | 392 to 588 N (40 to 60 kgf, 88 to 132 lb)<br>196 to 392 N (20 to 40 kgf, 44 to 88 lb) |
| Ignition timing | | 8 to 12 ° BTDC |
| Idle speed | | 950 ± 1050 rpm |
| Compression pressure | | 882 kPa (9.0 kgf/cm$^2$ 128 psi) |
| Minimum pressure | | 686 kPa (7.0 kgf/cm$^2$ 99 psi) |
| Difference between each cylinder | | 98 kPa (1.0kgf/cm$^2$ 14 psi) |
| Valve clearance (cold) | Intake<br>Exhaust | 0.17 to 0.23 mm (0.007 to 0.009 in.)<br>0.27 to 0.33 mm (0.011 to 0.013 in.) |
| Chain elongation chain length at 16 links | Maximum | 124.2 mm (4.890 in.) |
| Camshaft timing gear diameter (w / chain) | Minimum | 96.2 mm (3.787 in.) |
| Camshaft timing sprocket diameter (w / chain) | Minimum | 96.2 mm (3.787 in.) |
| Chain tensioner slipper wear | Maximum | 1.0 mm (0.039 in.) |
| Chain vibration damper wear | Maximum | 1.0 mm (0.039 in.) |
| Cylinder head bolt length | Standard<br>Maximum | 142.8 to 144.2 mm (5.622 to 5.677 in.)<br>147.1 mm (5.791 in.) |
| Cylinder head warpage | Maximum Cylinder block side<br>Intake manifold side<br>Exhaust manifold side | 0.05 mm (0.0020 in.)<br>0.10 mm (0.0039 in.)<br>0.10 mm (0.0039 in.) |
| Intake valve overall length<br><br>Intake valve stem diameter<br>Intake valve margin thickness | Standard<br>Minimum<br><br>Standard<br>Minimum | 89.25 mm (3.5138 in.)<br>88.95 mm (3.5020 in.)<br>4.970 to 4.985 mm (0.1957 to 0.1963 in.)<br>1.0 mm (0.039 in.)<br>0.7 mm (0.028 in.) |
| Exhaust valve overall length<br><br>Exhaust valve stem diameter<br>Exhaust valve margin thickness | Standard<br>Minimum<br><br>Standard<br>Minimum | 87.90 mm (3.4606 in.)<br>87.60 mm (3.4488 in.)<br>4.965 to 4.980 mm (0.1955 to 0.1961 in.)<br>1.15 mm (0.0453 in.)<br>0.85 mm (0.0335 in.) |
| Valve spring free length<br>Valve spring deviation<br>Valve spring angle (reference)<br>Valve spring installed tension at 32.5 mm (1.280 in.)<br>Valve spring working tension at 25.1 mm (0.988 in.) | <br>Maximum<br>Maximum<br><br>Maximum | 59.77 mm (2.3531 in.)<br>1.6 mm (0.063 in.)<br>2°<br>140 to 154 N (14.2 to 15.7 kgf, 31.5 to 34.6 lbf)<br>180 to 198 N (18.4 to 20.2 kgf, 40.5 to 44.5 lbf) |
| Bushing inside diameter<br>Valve guide bushing oil clearance<br><br><br><br><br>Valve guide bush diameter<br><br>Bushing Protrusion height | <br>Standard Intake<br>Exhaust<br>Maximum Intake<br>Exhaust<br>Standard<br>O/S<br> | 5.010 to 5.030 mm (0.1972 to 0.1980 in.)<br>0.025 to 0.060 mm ( 0.0010 to 0.0024 in.)<br>0.030 to 0.065 mm (0.0012 to 0.0026 in.)<br>0.08 mm (0.0031 in.)<br>0.10 mm (0.0039 in.)<br>9.685 to 9.706 mm (0.3813 to 0.3821 in.)<br>9.735 to 9.755 mm (0.3833 to 0.3841 in.)<br>9.0 to 9.4 mm (0.354 to 0.370 in.) |
| Lifter diameter<br>Lifter bore diameter<br>Oil clearance | <br><br>Standard<br>Maximum | 30.966 to 30.976 mm (1.2191 to 1.2195 in.)<br>31.009 to 31.025 mm (1.2208 to 1.2215 in.)<br>0.033 to 0.059 mm (0.0013 to 0.0023 in.)<br>0.10 mm (0.0039 in.) |

| | | |
|---|---|---|
| Camshaft circle runout | Maximum | 0.03 mm (0.0012 in.) |
| Camshaft cam lobe height | Standard | 42.310 to 42.410 mm (1.6657 to 1.6697 in.) |
| | Minimum | 42.16 mm (1.6598 in.) |
| Camshaft No. 1 journal diameter | | 34.449 to 34.465 mm (1.3563 to 1.3569 in.) |
| Camshaft other journals diameter | | 22.949 to 22.965 mm (0.9035 to 0.9041 in.) |
| No. 2 camshaft circle runout | Maximum | 0.03 mm ( 0.0012 in.) |
| No. 2 camshaft cam lobe height | Standard | 44.046 to 44.146 mm (1.7341 to 1.7380 in.) |
| | Minimum | 43.90 mm (1.7283 in.) |
| No. 2 camshaft No. 1 journal diameter | | 34.449 to 34.465 mm (1.3563 to 1.3569 in.) |
| No. 2 camshaft other journals diameter | | 22.949 to 22.965 mm (0.9035 to 0.9041 in.) |
| Camshaft thrust clearance | Standard | 0.040 to 0.095 mm (0.0016 to 0.0037 in.) |
| | Maximum | 0.11 mm (0.0043 in.) |
| Camshaft oil clearance | Standard | 0.040 to 0.095 mm (0.0016 to 0.0037 in.) |
| | Maximum | 0.115 mm (0.0045 in.) |
| Camshaft bearing cap setting ring pin protrusion height | | 8.5 to 9.5 mm (0.335 to 0.374 in.) |
| Connecting rod thrust clearance | Standard | 0.16 to 0.36 mm (0.0063 to 0.0142 in.) |
| | Maximum | 0.36 mm (0.0142 in.) |
| Connecting rod oil clearance | Standard | 0.016 to 0.040 mm (0.0006 to 0.0016 in.) |
| | Maximum | 0.06 mm (0.0024 in.) |
| Crankshaft thrust clearance | Standard | 0.09 to 0.19 mm (0.0035 to 0.0075 in.) |
| | Maximum | 0.30 mm (0.0118 in.) |
| Cylinder block warpage | Maximum | 0.05 mm (0.0020 in.) |
| Cylinder bore diameter | Standard | 75.000 to 75.133 mm (2.9528 to 2.9580 in.) |
| Connecting rod out–of alignment | Maximum | 0.05 mm (0.0020 in.) per 100 mm (3.94 in.) |
| Connecting rod twist | Maximum | 0.05 mm (0.0020 in.) per 100 mm (3.94 in.) |
| Piston diameter | | 74.941 to 74.979 mm (2.9504 to 2.9519 in.) |
| Piston pin hole diameter at 20°C (68°F) | | 18.013 to 18.016 mm (0.7092 to 0.7093 in.) |
| Piston pin diameter | | 18.001 to 18.004 mm (0.7087 to 0.7088 in.) |
| Oil clearance | Standard | 0.009 to 0.015 mm (0.0004 to 0.0006 in.) |
| | Maximum | 0.050 mm (0.0020 in.) |
| Piston clearance | Standard | 0.045 to 0.068 mm (0.0018 to 0.0027 in.) |
| | Maximum | 0.08 mm (0.0032 in.) |
| Connecting rod inside diameter | | 17.965 to 17.985 mm (0.7073 to 0.7081 in.) |
| Piston ring groove clearance | No. 1 | 0.02 to 0.07 mm (0.0008 to 0.0028 in.) |
| | No. 2 | 0.02 to 0.06 mm (0.0008 to 0.0024 in.) |
| | Oil | 0.02 to 0.06 mm (0.0008 to 0.0024 in.) |
| Piston ring end gap | Standard No. 1 | 0.20 to 0.30 mm (0.0079 to 0.0118 in.) |
| | No. 2 | 0.30 to 0.45 mm (0.0118 to 0.0177 in.) |
| | Oil | 0.10 to 0.40 mm (0.0039 to 0.0158 in.) |
| | Maximum No. 1 | 0.61 mm (0.0240 in.) |
| | No. 2 | 1.20 mm (0.0472 in.) |
| | Oil | 1.15 mm (0.0453 in.) |
| Connecting rod bolt diameter | Standard | 6.6 to 6.7 mm (0.260 to 0.264 in.) |
| | Maximum | 6.4 mm (0.252 in.) |
| Crankshaft circle runout | Maximum | 0.03 mm (0.0012 in.) |
| Main journal diameter | | 45.988 to 46.000 mm (1.8106 to 1.8110 in.) |
| Main journal taper and out–of–round | Maximum | 0.02 mm (0.0008 in.) |
| Crank pin diameter | | 39.992 to 40.000 mm (1.5745 to 1.5748 in.) |
| Crank pin taper and out–of–round | Maximum | 0.02 mm (0.0008 in.) |
| Crankshaft timing sprocket diameter (w/ chain) | Standard | 51.72 mm (2.0362 in.) |
| | Maximum | 50.5 mm (1.988 in.) |
| Crankshaft bearing cap set bolt diameter | Standard | 7.3 to 7.5 mm (0.287 to 0.295 in.) |
| | Minimum | 7.3 mm (0.287 in.) |
| Crankshaft oil clearance | Standard | 0.01 to 0.023 mm (0.0004 to 0.0009 in.) |
| | Maximum | 0.07 mm (0.0028 in.) |
| End plate straight pin protrusion | | 11.5 to 12.5 mm (0.453 to 0.492 in.) |
| Oil pan straight pin protrusion | | 8.5 to 9.5 mm (0.335 to 0.374 in.) |
| Cylinder head set straight pin protrusion | | 8.5 to 9.5 mm (0.335 to 0.374 in.) |

| | |
|---|---|
| Chain tensioner straight pin protrusion | 18.5 to 19.5 mm (0.728 to 0.768 in.) |
| Oil pump set ring pin protrusion | 3.5 to 4.5 mm (0.138 to 0.177 in.) |