# ENGINE MECHANICAL

## SERVICE DATA

031EB–05

| | | |
|---|---|---|
| Timing chain | | |
| Chain elongation | Maximum | 147.5 mm (5.807 in.) |
| Camshaft sprocket diameter (w/ chain) | Maximum | 113.8 mm (4.480 in.) |
| Crankshaft sprocket diameter (w/ chain) | Maximum | 59.4 mm (2.339 in.) |
| Sprocket worn distance | Minimum | 1.0 mm (0.039 in.) |
| Tensioner slipper wear | Maximum | 2.0 mm (0.079 in.) |
| Vibration damper wear | Maximum | 2.0 mm (0.079 in.) |
| Guide wear | Maximum | 0.5 mm (0.020 in.) |
| Timing chain No .2 | | |
| Chain elongation No .2 | Maximum | 123.6 mm (4.866 in.) |
| Camshaft sprocket No .2 diameter (w/ chain) | Maximum | 96.7 mm (3.807 in.) |
| Balanceshaft drive gear No .2 diameter (w/ chain) | Maximum | 75.9 mm (2.988 in.) |
| Vibration damper No .2 wear | Minimum | 1.0 mm (0.039 in.) |
| Vibration damper No .3 wear | Maximum | 1.0 mm (0.039 in.) |
| Vibration damper No .4 wear | Maximum | 1.0 mm (0.039 in.) |
| Cylinder head | | |
| Cylinder block surface warpage | Maximum | 0.05 mm (0.0020 in.) |
| Intake manifold surface warpage | Maximum | 0.05 mm (0.0020 in.) |
| Exhaust manifold surface warpage | Maximum | 0.05 mm (0.0020 in.) |
| Valve seat | Refacing angle | 30°, 45°, 60° |
| | Contacting angle | 45° |
| | Contacting width | 1.0 to 1.4 mm (0.039 to 0.055 in.) |
| Valve guide bush bore diameter | STD | 10.285 to 10.306 mm (0.4049 to 0.4057 in.) |
| | O/S 0.05 | 10.335 to 10.356 mm (0.4069 to 0.4077 in.) |
| Cylinder head set bolt outside diameter | STD | 10.76 to 10.97 mm (0.4236 to 0.4319 in.) |
| | Minimum | 10.40 mm (0.4094 in.) |
| Valve guide bush | | |
| Inside diameter | | 5.510 to 5.530 mm (0.2169 to 0.2177 in.) |
| Outside diameter (for repair part) | STD | 10.285 to 10.306 mm (0.4049 to 0.4057 in.) |
| | O/S 0.05 | 10.335 to 10.356 mm (0.4069 to 0.4077 in.) |
| Valve | | |
| Valve overall length | STD Intake | 106.26 mm (4.1835 in.) |
| | STD Exhaust | 106.74 mm (4.2024 in.) |
| | Minimum Intake | 105.96 mm (4.1716 in.) |
| | Minimum Exhaust | 106.44 mm (4.1905 in.) |
| Stem diameter | Intake | 5.470 to 5.485 mm (0.2154 to 0.2159 in.) |
| | Exhaust | 5.465 to 5.480 mm (0.2151 to 0.2157 in.) |
| Stem oil clearance | STD Intake | 0.025 to 0.060 mm (0.0010 to 0.0024 in.) |
| | STD Exhaust | 0.030 to 0.065 mm (0.0012 to 0.0026 in.) |
| | Maximum Intake | 0.08 mm (0.0032 in.) |
| | Maximum Exhaust | 0.10 mm (0.0039 in.) |
| Margin thickness | STD Intake | 1.05 to 1.45 mm (0.0413 to 0.0571 in.) |
| | STD Exhaust | 1.2 to 1.6 mm (0.0472 to 0.0630 in.) |
| | Minimum Intake | 0.50 mm (0.0197 in.) |
| | Minimum Exhaust | 0.50 mm (0.0197 in.) |
| Valve compression spring | | |
| Deviation | Maximum | 1.5 mm (0.059 in.) |
| Free length | | 48.53 mm (1.9106 in.) |

| | | |
|---|---|---|
| Camshaft | | |
| Thrust clearance | STD | 0.10 to 0.24 mm (0.0039 to 0.009 in.) |
| | Maximum | 0.26 mm (0.010 in.) |
| Journal oil clearance | STD No.1 | 0.035 to 0.072 mm (0.0014 to 0.0029 in.) |
| | Others | 0.025 to 0.062 mm (0.0010 to 0.0024 in.) |
| | Maximum | 0.08 mm (0.003 in.) |
| Journal diameter | STD No.1 | 35.949 to 35.965 mm (1.4153 to 1.4159 in.) |
| | Others | 26.959 to 26.975 mm (1.0614 to 1.0620 in.) |
| Circle runout | Maximum | 0.03 mm (0.0012 in.) |
| Cam lobe height | STD Intake | 42.855 to 42.955 mm (1.6872 to 1.6911 in.) |
| | STD Exhaust | 42.854 to 42.954 mm (1.6872 to 1.6911 in.) |
| | Minimum Intake | 42.855 mm (1.6872 in.) |
| | Minimum Exhaust | 42.854 mm (1.6872 in.) |
| Cylinder block | | |
| Cylinder head surface warpage | Maximum | 0.05 mm (0.0020 in.) |
| Cylinder bore diameter | STD | 94.990 to 95.003 mm (3.7398 to 3.7403 in.) |
| Crankshaft bearing cap bolt outside diameter | STD | 10.76 to 10.97 mm (0.4236 to 0.4319 in.) |
| | Minimum | 10.66 mm (0.4197 in.) |
| Piston and piston ring | | |
| Piston diameter | STD | 94.941 to 94.971 mm (3.7378 to 3.7390 in.) |
| | O/S 0.50 | 95.441 to 95.471 mm (3.7575 to 3.7587 in.) |
| Piston oil clearance | | 0.019 to 0.052 mm (0.0007 to 0.0020 in.) |
| Piston ring groove clearance | No. 1 | 0.020 to 0.075 mm (0.0008 to 0.0030 in.) |
| | No. 2 | 0.020 to 0.065 mm (0.0008 to 0.0026 in.) |
| | Oil | 0.020 to 0.070 mm (0.0008 to 0.0028 in.) |
| Piston ring end gap | STD No. 1 | 0.22 to 0.034 mm (0.0087 to 0.0134 in.) |
| | No. 2 | 0.45 to 0.57 mm (0.0177 to 0.0224 in.) |
| | Oil | 0.10 to 0.40 mm (0.0039 to 0.0157 in.) |
| No. 1 balanceshaft | | |
| Thrust clearance | Standard | 0.07 to 0.13 mm (0.0027 to 0.0051 in.) |
| | Maximum | 0.20 mm (0.0079 in.) |
| Main journal diameter | A | 37.969 to 37.985 mm (1.4948 to 1.4955 in.) |
| | B | 37.449 to 37.465 mm (1.4744 to 1.4750 in.) |
| Bearing inside diameter | A | 38.025 to 38.045 mm (1.4970 to 1.4978 in.) |
| | B | 37.525 to 37.545 mm (1.4774 to 1.4781 in.) |
| Oil clearance | Standard A | 0.040 to 0.076 mm (0.0016 to 0.0030 in.) |
| | B | 0.060 to 0.096 mm (0.0024 to 0.0038 in.) |
| | Maximum | 0.15 mm (0.0059 in.) |
| No. 2 balanceshaft | | |
| Thrust clearance | Standard | 0.07 to 0.13 mm (0.0027 to 0.0051 in.) |
| | Maximum | 0.20 mm (0.0079 in.) |
| Main journal diameter | A | 37.969 to 37.985 mm (1.4948 to 1.4955 in.) |
| | B | 37.449 to 37.465 mm (1.4744 to 1.4750 in.) |
| Bearing inside diameter | A | 38.025 to 38.045 mm (1.4970 to 1.4978 in.) |
| | B | 37.525 to 37.545 mm (1.4774 to 1.4781 in.) |
| Oil clearance | Standard A | 0.040 to 0.076 mm (0.0016 to 0.0030 in.) |
| | B | 0.060 to 0.096 mm (0.0024 to 0.0038 in.) |
| | Maximum | 0.15 mm (0.0059 in.) |
| Crankshaft bearing | | |
| Lower bearing dimension | No. 1, 5 | 3.75 mm (0.1476 in.) |
| | No. 3 | 1.75 mm (0.0689 in.) |
| | No. 2, 4 | 2.75 mm (0.1083 in.) |

| | | |
|---|---|---|
| Connecting rod | | |
| Thrust clearance | STD | 0.150 to 0.350 mm (0.0059 to 0.0138 in.) |
| | Maximum | 0.4 mm (0.016 in.) |
| Connecting rod oil clearance | STD | 0.024 to 0.049 mm (0.0009 to 0.0019 in.) |
| Connecting rod bearing center wall thickness (Reference) | | |
| | Mark 4 | 1.484 to 1.487 mm (0.0584 to 0.0585 in.) |
| | 5 | 1.488 to 1.490 mm (0.0586 to 0.0587 in.) |
| | 6 | 1.491 to 1.493 mm (0.0587 to 0.0588 in.) |
| Rod bend | Maximum per 100 mm (3.94 in.) | 0.03 mm (0.0012 in.) |
| Rod twist | Maximum per 100 mm (3.94 in.) | 0.15 mm (0.0059 in.) |
| Bush inside diameter | | 22.005 to 22.014 mm (0.8663 to 0.8667 in.) |
| Piston pin diameter | Mark A | 21.997 to 22.000 mm (0.8660 to 0.8661 in.) |
| | Mark B | 22.001 to 22.003 mm (0.8662 to 0.8663 in.) |
| | Mark C | 22.004 to 22.006 mm (0.8663 to 0.8664 in.) |
| | Mark D | 22.007 to 22.009 mm (0.8664 to 0.8665 in.) |
| Bush oil clearance | STD | 0.001 to 0.007 mm (0.00004 to 0.00028 in) |
| | Maximum | 0.010 mm (0.004 in.) |
| Connecting rod bolt tension portion diameter | STD | 7.2 to 7.3 mm (0.283 to 0.287 in.) |
| | Minimum | 7.0 mm (0.276 in.) |
| Crankshaft | | |
| Thrust clearance | STD | 0.020 to 0.220 mm (0.0008 to 0.0087 in.) |
| | Maximum | 0.30 mm (0.0118 in.) |
| Thrust washer thickness | | 2.440 to 2.490 mm (0.0961 to 0.0980 in.) |
| Crankshaft journal bore diameter on cylinder block with bearing (Reference) | Mark 1 | 64.004 to 64.010 mm (2.5198 to 2.5201 in.) |
| | Mark 2 | 64.011 to 64.016 mm (2.5201 to 2.5203 in.) |
| | Mark 3 | 64.017 to 64.022 mm (2.5203 to 2.5206 in.) |
| Crankshaft journal oil clearance | STD No. 3 | 0.030 to 0.055 mm (0.0012 to 0.0022 in.) |
| | STD Others | 0.024 to 0.049 mm (0.0009 to 0.0019 in.) |
| | Maximum | 0.10 mm (0.0039 in.) |
| Crankshaft journal diameter | No. 3 | 59.981 to 59.994 mm (2.3615 to 2.3620 in.) |
| | Others | 59.987 to 60.000 mm (2.3619 to 2.3622 in.) |
| Crankshaft bearing center wall thickness (Reference) | | |
| | Mark 1 | 1.987 to 1.990 mm (0.0782 to 0.0783 in.) |
| | Mark 2 | 1.990 to 1.993 mm (0.0783 to 0.0785 in.) |
| | Mark 3 | 1.943 to 1.996 mm (0.0765 to 0.0786 in.) |
| Crank pin diameter | | 52.989 to 53.002 mm (2.0862 to 2.0867 in.) |
| Circle runout | Maximum | 0.03 mm (0.0012 in.) |
| Crankshaft journal taper and out–of–round | Maximum | 0.005 mm (0.0002 in.) |
| Crank pin taper and out–of–round | Maximum | 0.003 mm (0.0001 in.) |