

# ENGINE MECHANICAL

## SERVICE DATA

SS1EO-04

|                      |                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Compression pressure | at 250 rpm STD<br>Minimum<br>Difference of pressure between each cylinder                                                                                      | 1,176 kPa (12.0 kgf/cm <sup>2</sup> , 171 psi) or more<br>883 kPa (9.0 kgf/cm <sup>2</sup> , 128 psi)<br>98 kPa (1.0 kgf/cm <sup>2</sup> , 14 psi) or less                                                                                                                                                                                                                                                                                                                                                               |
| Valve clearance      | at cold Intake<br>Exhaust                                                                                                                                      | 0.15 - 0.25 mm (0.006 - 0.010 in.)<br>0.25 - 0.35 mm (0.010 - 0.014 in.)                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Ignition timing      | w/ Terminals TE1 and E1 connected                                                                                                                              | 3° BTDC @ idle                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Idle speed           | -                                                                                                                                                              | 650 ± 50 rpm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Cylinder head        | Warpage<br>Cylinder block side<br>Manifold side<br>Valve seat<br>Refacing angle<br>Contacting angle<br>Contacting width<br>Cylinder head bolt outside diameter | Maximum<br>Maximum<br>Intake<br>Exhaust<br>Intake<br>Exhaust<br>STD<br>Minimum<br>0.15 mm (0.0059 in.)<br>0.10 mm (0.0039 in.)<br>30°, 45°, 75°<br>45°, 75°<br>45°<br>1.2 - 1.6 mm (0.047 - 0.063 in.)<br>1.0 - 1.4 mm (0.039 - 0.055 in.)<br>10.85 - 11.00 mm (0.4272 - 0.4331 in.)<br>10.6 mm (0.417 in.)                                                                                                                                                                                                              |
| Valve guide bushing  | Inside diameter<br>Outside diameter (for repair part)<br>Protrusion height                                                                                     | STD<br>O/S 0.05<br>7.010 - 7.030 mm (0.2760 - 0.2768 in.)<br>11.492 - 11.513 mm (0.4524 - 0.4533 in.)<br>11.542 - 11.563 mm (0.4544 - 0.4522 in.)<br>8.2 - 8.6 mm (0.323 - 0.339 in.)                                                                                                                                                                                                                                                                                                                                    |
| Valve                | Valve overall length<br>Valve face angle<br>Stem diameter<br>Stem oil clearance<br>Margin thickness                                                            | STD Intake<br>Exhaust<br>Minimum Intake<br>Exhaust<br>44.5°<br>Intake<br>Exhaust<br>STD Intake<br>Exhaust<br>Maximum Intake<br>Exhaust<br>STD<br>Minimum<br>98.4 mm (3.874 in.)<br>97.9 mm (3.854 in.)<br>97.9 mm (3.854 in.)<br>97.4 mm (3.835 in.)<br>6.970 - 6.985 mm (0.2744 - 0.2750 in.)<br>6.965 - 6.980 mm (0.2742 - 0.2748 in.)<br>0.025 - 0.060 mm (0.0010 - 0.0024 in.)<br>0.030 - 0.065 mm (0.0012 - 0.0026 in.)<br>0.08 mm (0.0031 in.)<br>0.10 mm (0.0039 in.)<br>1.2 mm (0.047 in.)<br>1.0 mm (0.039 in.) |
| Valve spring         | Deviation<br>Free length<br>Installed tension at 36.5 mm (1.437 in.)                                                                                           | Maximum<br>43.94 - 45.06 mm (1.7299 - 1.7740 in.)<br>214 - 238 N (21.8 - 24.2 kgf, 48.1 - 53.4 lbf)                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Valve lifter         | Lifter diameter<br>Lifter bore diameter<br>Oil clearance                                                                                                       | STD<br>Maximum<br>33.966 - 33.976 mm (1.3372 - 1.3376 in.)<br>34.000 - 34.021 mm (1.3386 - 1.3394 in.)<br>0.024 - 0.055 mm (0.0009 - 0.0022 in.)<br>0.07 mm (0.0028 in.)                                                                                                                                                                                                                                                                                                                                                 |
| Manifold             | Warpage                                                                                                                                                        | Maximum<br>0.30 mm (0.0118 in.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Air intake chamber   | Warpage                                                                                                                                                        | Maximum<br>0.30 mm (0.0118 in.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

## SERVICE SPECIFICATIONS - ENGINE MECHANICAL

|                                              |                                        |               |                                            |
|----------------------------------------------|----------------------------------------|---------------|--------------------------------------------|
| Camshaft                                     | Thrust clearance                       | STD           | 0.030 - 0.080 mm (0.0012 - 0.0031 in.)     |
|                                              |                                        | Maximum       | 0.10 mm (0.0039 in.)                       |
|                                              | Journal oil clearance                  | STD           | 0.025 - 0.062 mm (0.0010 - 0.0024 in.)     |
|                                              |                                        | Maximum       | 0.10 mm (0.0039 in.)                       |
|                                              | Journal diameter                       |               | 26.959 - 26.975 mm (1.0614 - 1.0620 in.)   |
|                                              | Circle runout                          | Maximum       | 0.06 mm (0.0024 in.)                       |
|                                              | Cam lobe height                        | STD           | 50.61 - 50.71 mm (1.9925 - 1.9965 in.)     |
|                                              |                                        | Minimum       | 50.51 mm (1.9886 in.)                      |
|                                              | Camshaft gear backlash                 | STD           | 0.020 - 0.200 mm (0.0008 - 0.0079 in.)     |
|                                              |                                        | Maximum       | 0.30 mm (0.0188 in.)                       |
|                                              | Camshaft gear spring end free distance |               | 18.2 - 18.8 mm (0.712 - 0.740 in.)         |
| Spark plug tube                              | Protrusion                             |               | 45.5 mm (1.791 in.)                        |
| Oil pump drive shaft gear                    | Thrust clearance                       | STD           | 0.040 - 0.160 mm (0.0016 - 0.0063 in.)     |
|                                              |                                        | Maximum       | 0.30 mm (0.0188 in.)                       |
| Chain and timing gear                        | Chain length at 16 links               | Maximum       | 146.6 mm (5.772 in.)                       |
|                                              | Camshaft timing gear wear (w/ Chain)   | Minimum       | 126.0 mm (4.961 in.)                       |
|                                              | Crankshaft timing gear wear (w/ Chain) | Minimum       | 65.4 mm (2.575 in.)                        |
| Chain tensioner slipper and vibration damper | Wear                                   | Maximum       | 1.0 mm (0.039 in.)                         |
| Cylinder block                               | Cylinder head surface warpage          | Maximum       | 0.05 mm (0.0020 in.)                       |
|                                              | Cylinder bore diameter                 | STD Mark 1    | 100.000 - 100.010 mm (3.9370 - 3.9374 in.) |
|                                              |                                        | 2             | 100.010 - 100.020 mm (3.9374 - 3.9378 in.) |
|                                              |                                        | 3             | 100.020 - 100.030 mm (3.9378 - 3.9382 in.) |
|                                              |                                        | Maximum STD   | 100.23 mm (3.9461 in.)                     |
|                                              |                                        | O/S 0.50      | 100.73 mm (3.9658 in.)                     |
|                                              |                                        | O/S 1.00      | 101.23 mm (3.9854 in.)                     |
|                                              | Main bearing bolt outside diameter     | STD           | 10.85 - 11.00 mm (0.4271 - 0.4331 in.)     |
|                                              |                                        | Minimum       | 10.6 mm (0.417 in.)                        |
| Piston and piston ring                       | Piston diameter                        | STD Mark 1    | 99.950 - 99.960 mm (3.9350 - 3.9354 in.)   |
|                                              |                                        | 2             | 99.960 - 99.970 mm (3.9354 - 3.9358 in.)   |
|                                              |                                        | 3             | 99.970 - 99.980 mm (3.9358 - 3.9362 in.)   |
|                                              |                                        | O/S 0.50      | 100.450 - 100.480 mm (3.9547 - 3.9559 in.) |
|                                              |                                        | O/S 1.00      | 100.950 - 100.980 mm (3.9744 - 3.9756 in.) |
|                                              |                                        |               |                                            |
|                                              | Piston oil clearance                   | STD           | 0.040 - 0.060 mm (0.0016 - 0.0024 in.)     |
|                                              | Piston ring groove clearance           | No. 1         | 0.040 - 0.080 mm (0.0016 - 0.0031 in.)     |
|                                              |                                        | No. 2         | 0.300 - 0.070 mm (0.0012 - 0.0028 in.)     |
|                                              | Piston ring end gap                    | STD No. 1     | 0.300 - 0.520 mm (0.0118 - 0.0205 in.)     |
|                                              |                                        | No. 2         | 0.450 - 0.670 mm (0.0177 - 0.0264 in.)     |
|                                              |                                        | Oil           | 0.150 - 0.520 mm (0.0059 - 0.0205 in.)     |
|                                              |                                        | Maximum No. 1 | 1.12 mm (0.0441 in.)                       |
|                                              |                                        | No. 2         | 1.17 mm (0.0461 in.)                       |
|                                              |                                        | Oil           | 1.12 mm (0.0441 in.)                       |

|                |                                                          |                               |                                          |
|----------------|----------------------------------------------------------|-------------------------------|------------------------------------------|
| Connecting rod | Thrust clearance                                         | STD                           | 0.160 - 0.262 mm (0.0063 - 0.0103 in.)   |
|                |                                                          | Maximum                       | 0.362 mm (0.0143 in.)                    |
|                | Connecting rod bearing center wall thickness (Reference) |                               |                                          |
|                |                                                          | Mark 2                        | 1.744 - 1.747 mm (0.0687 - 0.0688 in.)   |
|                |                                                          | 3                             | 1.747 - 1.750 mm (0.0688 - 0.0689 in.)   |
|                |                                                          | 4                             | 1.750 - 1.753 mm (0.0689 - 0.0690 in.)   |
|                |                                                          | 5                             | 1.753 - 1.756 mm (0.0690 - 0.0691 in.)   |
|                |                                                          | 6                             | 1.756 - 1.759 mm (0.0691 - 0.0693 in.)   |
|                | Connecting rod oil clearance                             | STD                           | 0.032 - 0.050 mm (0.0013 - 0.0020 in.)   |
|                |                                                          | U/S 0.25                      | 0.033 - 0.073 mm (0.0013 - 0.0029 in.)   |
|                |                                                          | Maximum                       | 0.10 mm (0.0039 in.)                     |
|                | Rod bend                                                 | Maximum per 100 mm (3.94 in.) | 0.05 mm (0.0020 in.)                     |
|                | Rod twist                                                | Maximum per 100 mm (3.94 in.) | 0.015 mm (0.0059 in.)                    |
|                | Bushing inside diameter                                  |                               | 26.008 - 26.020 mm (1.0239 - 1.0244 in.) |
|                | Piston pin diameter                                      |                               | 26.000 - 22.012 mm (1.0236 - 1.0241 in.) |
| Crankshaft     | Piston pin oil clearance                                 | STD                           | 0.004 - 0.012 mm (0.0002 - 0.0005 in.)   |
|                |                                                          | Maximum                       | 0.05 mm (0.0020 in.)                     |
|                | Connecting rod bolt outside diameter                     | STD                           | 8.40 - 8.60 mm (0.3307 - 0.3386 in.)     |
|                |                                                          | Minimum                       | 8.00 mm (0.3150 in.)                     |
|                | Thrust clearance                                         | STD                           | 0.020 - 0.220 mm (0.0008 - 0.0087 in.)   |
|                |                                                          | Maximum                       | 0.30 mm (0.0118 in.)                     |
|                | Thrust washer thickness                                  | STD                           | 2.440 - 2.490 mm (0.0961 - 0.0980 in.)   |
|                |                                                          | O/S 0.125                     | 2.503 - 2.553 mm (0.0985 - 0.1005 in.)   |
|                |                                                          | O/S 0.250                     | 2.565 - 2.615 mm (0.1010 - 0.1030 in.)   |
|                | Main journal oil clearance                               | STD                           | 0.042 - 0.060 mm (0.0017 - 0.0024 in.)   |
|                |                                                          | U/S 0.25                      | 0.041 - 0.081 mm (0.0016 - 0.0032 in.)   |
|                |                                                          | Maximum                       | 0.10 mm (0.0039 in.)                     |
|                | Main journal diameter                                    | STD                           | 68.982 - 69.000 mm (2.7158 - 2.7165 in.) |
|                |                                                          | U/S 0.25                      | 68.745 - 68.755 mm (2.7065 - 2.7069 in.) |
|                | Main bearing center wall thickness (Reference)           | Mark 2                        | 2.489 - 2.492 mm (0.0980 - 0.0981 in.)   |
|                |                                                          | 3                             | 2.492 - 2.495 mm (0.0981 - 0.0982 in.)   |
|                |                                                          | 4                             | 2.495 - 2.498 mm (0.0982 - 0.0983 in.)   |
|                |                                                          | 5                             | 2.498 - 2.501 mm (0.0983 - 0.0985 in.)   |
|                |                                                          | 6                             | 2.501 - 2.504 mm (0.0985 - 0.0986 in.)   |
|                | Crank pin diameter                                       | STD                           | 56.982 - 57.000 mm (2.2434 - 2.2441 in.) |
|                |                                                          | U/S 0.25                      | 56.745 - 56.755 mm (2.2341 - 2.2344 in.) |
|                | Circle runout                                            | Maximum                       | 0.06 mm (0.0024 in.)                     |
|                | Main journal taper and out-of-round                      | Maximum                       | 0.02 mm (0.0008 in.)                     |
|                | Crank pin taper and out-of-round                         | Maximum                       | 0.02 mm (0.0008 in.)                     |