

## 2TR-FE ENGINE MECHANICAL

### SERVICE DATA

Idling speed		600 to 700 rpm	
Compression		Compression pressure	1,230 kPa (12.5 kgf/cm <sup>2</sup> , 178 psi)
		Minimum pressure	880 kPa (9.0 kgf/cm <sup>2</sup> , 128 psi) or more
		Difference between each cylinder	68 kPa (0.7 kgf/cm <sup>2</sup> , 10 psi) or less
Ignition timing		Terminals TC and CG of DLC3 connected	3 to 7° BTDC idle
Cylinder head set bolt outside diameter		Standard	10.76 to 10.97 mm (0.4236 to 0.4319 in.)
		Minimum	10.40 mm (0.4094 in.)
Timing chain	Chain elongation	Maximum	147.5 mm (5.807 in.)
	Camshaft sprocket diameter (with chain)	Maximum	113.8 mm (4.480 in.)
	Crankshaft sprocket diameter (with 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 (with chain)	Maximum	96.7 mm (3.807 in.)
	Balanceshaft drive gear No. 2 diameter (with 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.)

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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 balancershaft	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 0.0031 in.)
		B	0.060 to 0.096 mm (0.0024 to 0.0038 in.)
		Maximum	0.15 mm (0.0059 in.)
No. 2 balancershaft	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 0.0031 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 (0.0039 in.)	
Connecting rod bolt tension portion diameter	STD	7.2 to 7.3 mm (0.283 to 0.287 in.)	
	Maximum	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 (0.0784 to 0.0785 in.)
		Mark 3	1.943 to 1.996 mm (0.0785 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.)	