

ENGINE MECHANICAL (1UZ-FE)

SS0HU-03

SERVICE DATA

Valve clearance	Valve clearance (Cold)	Intake	0.15 – 0.25 mm (0.006 – 0.010 in.)
		Exhaust	0.25 – 0.35 mm (0.010 – 0.014 in.)
	Valve clearance adjusting shim	No.01	2.500 mm (0.0984 in.)
		No.62	2.525 mm (0.0994 in.)
		No.63	2.550 mm (0.1004 in.)
		No.64	2.575 mm (0.1014 in.)
		No.06	2.600 mm (0.1024 in.)
		No.65	2.625 mm (0.1033 in.)
		No.66	2.650 mm (0.1043 in.)
		No.67	2.675 mm (0.1053 in.)
		No.13	2.700 mm (0.1063 in.)
		No.68	2.725 mm (0.1073 in.)
		No.18	2.750 mm (0.1083in.)
		No.19	2.775 mm (0.1093 in.)
		No.23	2.800 mm (0.1102 in.)
		No.70	2.825 mm (0.1112 in.)
		No.28	2.850 mm (0.1122 in.)
		No.71	2.875 mm (0.1132 in.)
		No.33	2.900 mm (0.1142 in.)
		No.72	2.925 mm (0.1152 in.)
		No.38	2.950 mm (0.1161 in.)
		No.73	2.975 mm (0.1171 in.)
		No.43	3.000 mm (0.1181 in.)
		No.74	3.025 mm (0.1191 in.)
		No.48	3.050 mm (0.1201 in.)
		No.75	3.075 mm (0.1211 in.)
		No.51	3.100 mm (0.1220 in.)
		No.76	3.125 mm (0.1230 in.)
		No.77	3.150 mm (0.1240 in.)
		No.78	3.175 mm (0.1250 in.)
		No.56	3.200 mm (0.1260 in.)
		No.79	3.225 mm (0.1270 in.)
	No.80	3.250 mm (0.1280 in.)	
	No.81	3.275 mm (0.1289 in.)	
	No.61	3.300 mm (0.1299 in.)	
Ignition timing	–		8 –12° BTDC @ idle (w/ Terminals TC and E1 connected of DLC1)
Idle speed	–		700 ± 50 rpm
Compression	at 250 rpm	STD	1,226 kPa (12.5 kgf/cm ² , 178 psi) or more
		Minimum	981 kPa (10.0 kgf/cm ² , 142 psi)
	Difference of pressure between each cylinder		98 kPa (1.0 kgf/cm ² , 14 psi) or less
Timing belt tensioner	Protrusion from housing end		10.5 – 11.5 mm (0.413 – 0.453 in.)
Cylinder head	Warpage	Maximum	0.10 mm (0.039 in.)
	Valve seat		
	Refacing angle		30°, 45°, 75°
	Contacting angle		45°
	Contacting width		1.0 – 1.4 mm (0.039 – 0.055 in.)
	Valve guide bushing bore diameter	STD	11.033 – 11.044 mm (0.4344 – 0.4348 in.)
		O/S 0.05	11.083 – 11.094 mm (0.4363 – 0.4368 in.)
	Cylinder head bolt thread inside diameter	STD	9.770 – 9.960 mm (0.3846 – 0.3921 in.)
		Minimum	9.60 mm (0.3780 in.)

Valve guide bushing	Inside diameter	6.010 – 6.030 mm (0.2366 – 0.2374 in.)
Valve	Valve overall length	STD (Intake) 95.05 mm (3.7421 in.) (Exhaust) 96.90 mm (3.8150 in.) Minimum (Intake) 94.45 mm (3.7185 in.) (Exhaust) 96.40 mm (3.7953 in.)
	Valve face angle	44.5°
	Stem diameter	Intake 5.970 – 5.985 mm (0.2350 – 0.2356 in.) Exhaust 5.965 – 5.980 mm (0.2348 – 0.2354 in.)
	Stem oil clearance	STD (Intake) 0.025 – 0.060 mm (0.0010 – 0.0024 in.) (Exhaust) 0.030 – 0.065 mm (0.0012 – 0.0026 in.) Maximum (Intake) 0.08 mm (0.0031 in.) (Exhaust) 0.10 mm (0.0039 in.)
		STD 1.0 mm (0.039 in.)
		Minimum 0.5 mm (0.020 in.)
	Margin thickness	STD 1.0 mm (0.039 in.) Minimum 0.5 mm (0.020 in.)
Valve spring	Deviation	Maximum 2.0 mm (0.079 in.)
	Free length	51.8 mm (2.039 in.)
	Installed tension at 32.9 mm (1.295 in.)	186 – 206 N (19.0 – 21.0 kgf·cm, 41.9 – 46.3 lbf)
Valve lifter	Lifter diameter	30.966 – 30.976 mm (1.2191 – 1.2195 in.)
	Lifter bore diameter	31.000 – 31.016 mm (1.2205 – 1.2211 in.)
	Oil clearance	STD 0.024 – 0.050 mm (0.0009 – 0.0020 in.) Maximum 0.07 mm (0.0028 in.)
Camshaft	Thrust clearance	STD 0.040 – 0.090 mm (0.0016 – 0.0035 in.) Maximum 0.12 mm (0.0047 in.)
	Journal oil clearance	
	Exhaust camshaft thrust portion	STD 0.025 – 0.061 mm (0.0010 – 0.0024 in.)
	Others	STD 0.030 – 0.067 mm (0.0012 – 0.0026 in.) Maximum 0.10 mm (0.0039 in.)
	Journal diameter	
	Exhaust camshaft thrust portion	STD 23.959 – 23.975 mm (0.9433 – 0.9539 in.)
	Others	STD 26.954 – 26.970 mm (1.0612 – 1.0618 in.)
	Circle runout	Maximum 0.08 mm (0.0031 in.)
	Cam lobe height	STD (Intake) 42.210 – 42.310 mm (1.6618 – 1.6657 in.) (Exhaust) 41.960 – 42.060 mm (1.6520 – 1.6559 in.) Minimum (Intake) 42.06 mm (1.6559 in.) (Exhaust) 41.81 mm (1.6461 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.)
Air intake chamber	Warpage	Maximum 0.15 mm (0.0059 in.)
Manifold	Warpage	Maximum (Intake) 0.15 mm (0.0059 in.) (Exhaust) 0.50 mm (0.0197 in.)

SERVICE SPECIFICATIONS – ENGINE MECHANICAL (1UZ-FE)

Cylinder block	Cylinder head surface warpage	Maximum	0.07 mm (0.0028 in.)
	Cylinder bore diameter	STD Mark 1	87.500 – 87.510 mm (3.4449 – 3.4453 in.)
		Mark 2	87.510 – 87.520 mm (3.4453 – 3.4457 in.)
		Mark 3	87.520 – 87.530 mm (3.4457 – 3.4461 in.)
	Main journal bore diameter (Referance)	Maximum	87.73 mm (3.4539 in.)
		Mark 00	72.000 mm (2.8346 in.)
		Mark 01	72.001 mm (2.8347 in.)
		Mark 02	72.002 mm (2.8347 in.)
		Mark 03	72.003 mm (2.8348 in.)
		Mark 04	72.004 mm (2.8348 in.)
		Mark 05	72.005 mm (2.8348 in.)
		Mark 06	72.006 mm (2.8349 in.)
		Mark 07	72.007 mm (2.8349 in.)
		Mark 08	72.008 mm (2.8350 in.)
		Mark 09	72.009 mm (2.8350 in.)
		Mark 10	72.010 mm (2.8350 in.)
		Mark 11	72.011 mm (2.8351 in.)
		Mark 12	72.012 mm (2.8351 in.)
		Mark 13	72.013 mm (2.8352 in.)
		Mark 14	72.014 mm (2.8352 in.)
		Mark 15	72.015 mm (2.8352 in.)
		Mark 16	72.016 mm (2.8353 in.)
	Main bearing cap bolt tension portion diameter	STD	7.500 – 7.600 mm (0.2953 – 0.2992 in.)
		Minimum	7.20 mm (0.2835 in.)
Piston and piston ring	Piston diameter	STD (Mark 1)	87.410 – 87.420 mm (3.4413 – 3.4417 in.)
		(Mark 2)	87.420 – 87.430 mm (3.4417 – 3.4421 in.)
		(Mark 3)	87.430 – 87.440 mm (3.4421 – 3.4425 in.)
	Piston oil clearance	STD	0.080 – 0.100 mm (0.0031 – 0.0039 in.)
		Maximum	0.12 mm (0.0047 in.)
	Piston ring groove clearance	No.1 and No.2	0.020 – 0.060 mm (0.0008 – 0.0024 in.)
	Piston ring end gap	STD (No.1)	0.250 – 0.450 mm (0.0098 – 0.0177 in.)
		(No.2)	0.350 – 0.500 mm (0.0138 – 0.0197 in.)
		(Oil)	0.150 – 0.500 mm (0.0059 – 0.0197 in.)
		Maximum (No.1)	1.05 mm (0.0413 in.)
		(No.2)	1.10 mm (0.0433 in.)
		(Oil)	1.15 mm (0.0453 in.)

Connecting rod	Thrust clearance	STD	0.160 – 0.290 mm (0.0063 – 0.0138 in.)
		Maximum	0.35 mm (0.0138 in.)
	Connecting rod thickness		22.880 – 22.920 mm (0.9008 – 0.9024 in.)
	Connecting rod big end inside diameter (Reference)		
		Mark 1	55.000 – 55.006 mm (2.1654 – 2.1656 in.)
		Mark 2	55.006 – 55.012 mm (2.1656 – 2.1658 in.)
		Mark 3	55.012 – 55.018 mm (2.1658 – 2.1661 in.)
		Mark 4	55.018 – 55.024 mm (2.1661 – 2.1663 in.)
	Crankshaft crank pin diameter		51.994 – 52.000 mm (2.0470 – 2.0472 in.)
			51.988 – 51.994 mm (2.0468 – 2.0470 in.)
			51.982 – 51.988 mm (2.0465 – 2.0468 in.)
	Connecting rod bearing center wall thickness (Reference)	Mark 2	1.484 – 1.487 mm (0.0584 – 0.0585 in.)
		Mark 3	1.487 – 1.490 mm (0.0585 – 0.0587 in.)
		Mark 4	1.490 – 1.493 mm (0.0587 – 0.0588 in.)
		Mark 5	1.493 – 1.496 mm (0.0588 – 0.0589 in.)
		Mark 6	1.496 – 1.499 mm (0.0589 – 0.0590 in.)
		Mark 7	1.499 – 1.502 mm (0.0590 – 0.0591 in.)
	Connecting rod oil clearance	STD	0.027 – 0.053 mm (0.0011 – 0.0021 in.)
		Maximum	0.065 mm (0.0026 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.)	0.15 mm (0.0059 in.)
Crankshaft	Bushing inside diameter		22.005 – 22.014 mm (0.8663 – 0.8667 in.)
	Piston pin diameter		21.997 – 22.006 mm (0.8660 – 0.8664 in.)
	Bushing oil clearance	STD	0.005 – 0.011 mm (0.0002 – 0.0004 in.)
		Maximum	0.05 mm (0.0020 in.)
	Connecting rod bolt tension portion diameter	STD	7.200 – 7.300 mm (0.2835 – 0.2874 in.)
		Minimum	7.00 mm (0.2756 in.)
	Thrust clearance	STD	0.020 – 0.220 mm (0.0008 – 0.0087 in.)
		Maximum	0.30 mm (0.0118 in.)
	Thrust washer thickness		2.440 – 2.490 mm (0.0961 – 0.0980 in.)
	Main journal bore diameter on cylinder block (with main bearing)		67.026 – 67.033 mm (2.6388 – 2.6391 in.)
	Main journal oil clearance	STD No.1 and No.5	0.014 – 0.033 mm (0.0006 – 0.0013 in.)
		Others	0.026 – 0.045 mm (0.0010 – 0.0018 in.)
		Maximum No.1 and No.5	0.043 mm (0.0017 in.)
		Others	0.055 mm (0.0022 in.)
	Main journal diameter		66.988 – 67.000 mm (2.6373 – 2.6378 in.)
	Main bearing center wall thickness (Reference)		
		No.3 Mark 3	2.492 – 2.495 mm (0.0981 – 0.0982 in.)
		Mark 4	2.495 – 2.498 mm (0.0982 – 0.0983 in.)
		Mark 5	2.498 – 2.501 mm (0.0983 – 0.0985 in.)
		Mark 6	2.501 – 2.504 mm (0.0985 – 0.0986 in.)
		Mark 7	2.504 – 2.507 mm (0.0986 – 0.0987 in.)
		Others Mark 1	2.486 – 2.489 mm (0.0979 – 0.0980 in.)
		Mark 2	2.489 – 2.492 mm (0.0980 – 0.0981 in.)
		Mark 3	2.492 – 2.495 mm (0.0981 – 0.0982 in.)
		Mark 4	2.495 – 2.498 mm (0.0982 – 0.0983 in.)
		Mark 5	2.498 – 2.501 mm (0.0983 – 0.0985 in.)
	Crank pin diameter		51.982 – 52.000 mm (2.0465 – 2.0472 in.)
	Circle runout	Maximum	0.08 mm (0.0031 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.)