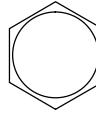
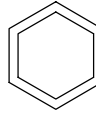
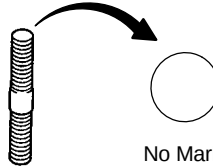
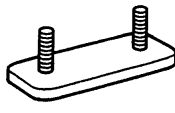
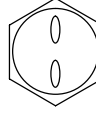
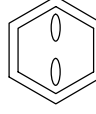
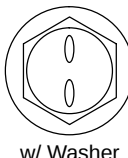
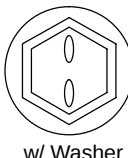
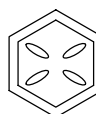
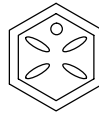
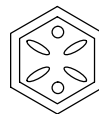


STANDARD BOLT

HOW TO DETERMINE BOLT STRENGTH

0307K-02

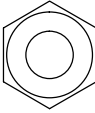
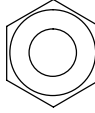
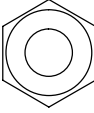
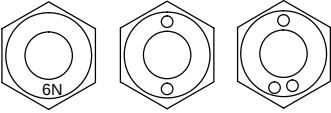
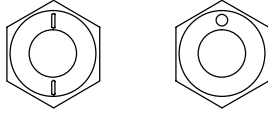
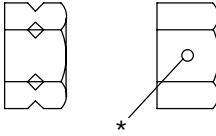
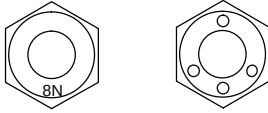
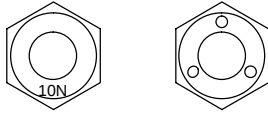
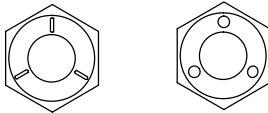
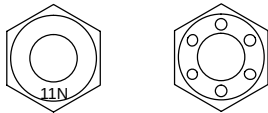
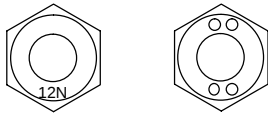
Bolt Type				Class
Hexagon Head Bolt		Stud Bolt	Weld Bolt	
Normal Recess Bolt	Deep Recess Bolt			
  No Mark	 No Mark	 No Mark		4T
 				5T
  w/ Washer	 w/ Washer			6T
 	 			7T
		 		8T
				9T
	 			10T
	 			11T

B06431

SPECIFIED TORQUE FOR STANDARD BOLTS

Class	Diameter mm	Pitch mm	Specified torque					
			Hexagon head bolt			Hexagon flange bolt		
			N·m	kgf·cm	ft·lbf	N·m	kgf·cm	ft·lbf
4T	6	1	5	55	48 in.·lbf	6	60	52 in.·lbf
	8	1.25	12.5	130	9	14	145	10
	10	1.25	26	260	19	29	290	21
	12	1.25	47	480	35	53	540	39
	14	1.5	74	760	55	84	850	61
	16	1.5	115	1,150	83	–	–	–
5T	6	1	6.5	65	56 in.·lbf	7.5	75	65 in.·lbf
	8	1.25	15.5	160	12	17.5	175	13
	10	1.25	32	330	24	36	360	26
	12	1.25	59	600	43	65	670	48
	14	1.5	91	930	67	100	1,050	76
	16	1.5	140	1,400	101	–	–	–
6T	6	1	8	80	69 in.·lbf	9	90	78 in.·lbf
	8	1.25	19	195	14	21	210	15
	10	1.25	39	400	29	44	440	32
	12	1.25	71	730	53	80	810	59
	14	1.5	110	1,100	80	125	1,250	90
	16	1.5	170	1,750	127	–	–	–
7T	6	1	10.5	110	8	12	120	9
	8	1.25	25	260	19	28	290	21
	10	1.25	52	530	38	58	590	43
	12	1.25	95	970	70	105	1,050	76
	14	1.5	145	1,500	108	165	1,700	123
	16	1.5	230	2,300	166	–	–	–
8T	8	1.25	29	300	22	33	330	24
	10	1.25	61	620	45	68	690	50
	12	1.25	110	1,100	80	120	1,250	90
9T	8	1.25	34	340	25	37	380	27
	10	1.25	70	710	51	78	790	57
	12	1.25	125	1,300	94	140	1,450	105
10T	8	1.25	38	390	28	42	430	31
	10	1.25	78	800	58	88	890	64
	12	1.25	140	1,450	105	155	1,600	116
11T	8	1.25	42	430	31	47	480	35
	10	1.25	87	890	64	97	990	72
	12	1.25	155	1,600	116	175	1,800	130

HOW TO DETERMINE NUT STRENGTH

Nut Type			Class
Present Standard Hexagon Nut	Old Standard Hexagon Nut		
	Cold Forging Nut	Cutting Processed Nut	
 No Mark			4N
 No Mark (w/ Washer)	 No Mark (w/ Washer)	 No Mark	5N (4T)
			6N
			7N (5T)
			8N
		 No Mark	10N (7T)
			11N
			12N

*: Nut with 1 or more marks on one side surface of the nut.

B06432

HINT:

Use the nut with the same number of the nut strength classification or the greater than the bolt strength classification number when tightening parts with a bolt and nut.

Example: Bolt = 4T

Nut = 4N or more

2002 CAMRY REPAIR MANUAL (RM881U)

ENGINE CONTROL SYSTEM

030EL-01

SERVICE DATA

2AZ-FE

Throttle body	Standard throttle valve opening percentage	60 % or more
Accelerator pedal position sensor	Standard voltage	0.6 – 1.0 V
Camshaft timing oil control valve assy	VVT system is OFF (OCV is OFF)	Normal engine speed
Standard	VVT system is ON (OCV is ON)	Rough idle or engine stalled
Intake air flow meter sub-assy		
Resistance	at -20°C(-4°F)	13.6 – 18.4 kΩ
	at 20°C(68°F)	2.21 – 2.69 kΩ
	at 60°C(140°F)	0.493 – 0.667 kΩ
Camshaft timing oil control valve assy		
Resistance	at 20 °C (68 °F)	6.9 – 7.9 Ω
Accelerator pedal assy		
Resistance	2 (VPA2) – 3 (EP1)	5.0 kΩ or less
	5 (VPA1) – 1 (EP2)	5.0 kΩ or less
	6 (VCP1) – 3 (EP1)	2.25 – 4.75 kΩ
	4 (VCP2) – 1 (EP2)	2.25 – 4.75 kΩ
Throttle body assy		
	3 (VC) – 6 (GND)	1.2 – 3.2 kΩ at 20 °C (68 °F)
	2 (M+) – 1 (M-)	0.3 – 100 kΩ at 20 °C (68 °F)
E.F.I. Engine coolant temperature sensor		
Resistance	Approx. 20°C (68°F)	2.29 – 2.6 kΩ
	Approx. 80°C (176°F)	0.300 – 0.327 kΩ
E.F.I. Circuit opening relay assy		
Specified condition	1 – 2	Continuity
	3 – 5	No continuity

1MZ-FE

Throttle body	Standard throttle valve opening percentage	60 % or more
Accelerator pedal position sensor	Standard voltage	0.6 – 1.0 V
Intake air flow meter assy		
Resistance	at -20°C(-4°F)	13.6 – 18.4 kΩ
	at 20°C(68°F)	2.21 – 2.69 kΩ
	at 60°C(140°F)	0.493 – 0.667 kΩ
Accelerator pedal assy		
Resistance	2 (VPA2) – 3 (EP1)	5.0 kΩ or less
	5 (VPA1) – 1 (EP2)	5.0 kΩ or less
	6 (VCP1) – 3 (EP1)	2.25 – 4.75 kΩ
	4 (VCP2) – 1 (EP2)	2.25 – 4.75 kΩ
Throttle body assy		
	M+ – M-	0.3 – 100 kΩ at 20 °C (68 °F)
Throttle position sensor		
Resistance	VC – E2	1.2 – 3.2 kΩ
Coolant temperature sensor		
Resistance	Approx. 20°C (68°F)	2.32 – 2.59 kΩ
	Approx. 80°C (176°F)	0.310 – 0.326 kΩ

TORQUE SPECIFICATION

2AZ-FE

Part Tightened	N·m	kgf·cm	ft·lbf
Throttle body assy x Intake manifold	30	305	22

1MZ-FE

Part Tightened	N·m	kgf·cm	ft·lbf
Throttle position sensor x Throttle body	2.0	20	17 in·lbf
Throttle body assy x Intake air surge tank	20	199	14

FUEL

SERVICE DATA

030EN-01

2AZ-FE

Fuel pressure		304 – 343 kPa (3.1 – 3.5 kgf/cm ² , 44 – 50 psi)
Fuel pressure		147 kPa (1.5 kgf/cm ² , 21 psi) or more
Fuel injector Resistance	at 20°C (68°F)	13.4 – 14.2Ω
Injection volume		68 – 82 cm ³ (4.1 – 4.9 cu in.) per 15 seconds
Difference between each cylinder		14 cm ³ (0.9 cu in.) or less
Fuel leakage		1 drop or less per 12 minutes
Fuel pump Resistance	at 20°C (68°F)	0.2 – 3.0 Ω

1MZ-FE

Fuel pressure		304 – 343 kPa (3.1 – 3.5 kgf/cm ² , 44 – 50 psi)
Fuel pressure		147 kPa (1.5 kgf/cm ² , 21 psi) or more
Fuel injector Resistance	at 20°C (68°F)	13.4 – 14.2Ω
Injection volume		60 – 73 cm ³ (3.7 – 4.5 cu in.) per 15 seconds
Difference between each cylinder		13 cm ³ (0.8 cu in.) or less
Fuel leakage		1 drop or less per 12 minutes
Fuel pump Resistance	at 20°C (68°F)	0.2 – 3.0 Ω

TORQUE SPECIFICATION

2AZ-FE

Part Tightened	N·m	kgf·cm	ft·lbf
Delivery pipe x Cylinder head	20	204	15
Fuel tank vent tube set plate x Fuel tank	3.5	36	31
Fuel main tube support x Fuel tank assy	5.4	55	48 in.·lbf
Fuel tank assy x Body	39	400	29
Fuel tank protector lower center x Fuel tank assy	5.4	55	48 in.·lbf
Parking brake cable assy No. 3 x Body	5.4	55	48 in.·lbf
Parking brake cable assy No. 2 x Body	5.4	55	48 in.·lbf

1MZ-FE

Part Tightened	N·m	kgf·cm	ft·lbf
Delivery pipe x Cylinder head	10	102	7
Pulsation damper x Delivery pipe	33	336	24
Fuel pipe x Delivery pipe	33	336	24
Fuel pipe x Intake manifold	20	204	15
Front suspension brace sub-assy upper center x Body	80	816	59
Fuel tank vent tube set plate x Fuel tank	3.5	36	31 in.·lbf
Fuel main tube support x Fuel tank	5.4	55	48 in.·lbf
Fuel tank x Body	39	400	29
Fuel tank protector lower center x Fuel tank	5.4	55	48 in.·lbf
Parking brake cable assy No.2 x Body	5.4	55	48 in.·lbf
Parking brake cable assy No.3 x Body	5.4	55	48 in.·lbf

EMISSION CONTROL

030EP-01

SERVICE DATA

2AZ-FE

VSV for Pressure switching valve Resistance	at 20°C (68°F)	30 – 36 Ω
Vacuum switching valve assy No. 1 Resistance	at 20°C (68°F)	30 – 34 Ω
VSV for Canister closed valve Resistance	at 20°C (68°F)	24 – 30 Ω
Oxygen sensor Resistance	1 (HT) – 2 (+B)	11 – 16 Ω at 20°C (68°F)
Resistance	1 (HT) – 4 (E1)	No continuity
Air fuel ratio sensor Resistance	1 (HT) – 2 (+B)	1.8 – 3.4 Ω at 20°C (68°F)
	1 (HT) – 2 (+B)	5.0 – 7.5 Ω at 500°C (932°F)
	1 (HT) – 4 (E1)	No continuity

1MZ-FE

VSV for pressure switching valve Resistance	at 20 °C (68 °F) at 120 °C (248 °F)	37 – 44 Ω 51 – 62 Ω
VSV for EVAP Resistance	at 20 °C (68 °F)	27 – 33 Ω
VSV for canister closed valve Resistance	at 20 °C (68 °F)	25 – 30 Ω
Oxygen sensor Resistance	at 20 °C (68 °F)	11 – 16 Ω
A/F sensor Resistance	at 20 °C (68 °F) at 800 °C (1,472 °F)	0.8 – 1.4 Ω 1.8 – 3.2 Ω
EGR valve position sensor Resistance	VC – E2	1.5 – 4.3 kΩ
Power source voltage	VC – E2	4.5 – 5.5 V
Power output voltage	EGLS – E2 at vacuum (17.3 kPa, 130 mmHg, 5.1 in.Hg) at no vacuum	3.2 – 5.1 V 0.4 – 1.6 V
EGR gas temperature sensor Resistance	at 20 °C (68 °F) at 100 °C (212 °F) at 150 °C (302 °F)	69.4 – 88.5 Ω 11.89 – 14.37 Ω 2.79 – 3.59 Ω
Vacuum switching valve No.1 Resistance	at 20 °C (68 °F)	27 – 33 Ω

TORQUE SPECIFICATION

1MZ-FE

Part Tightened	N·m	kgf·cm	ft·lbf
EGR gas temperature sensor x EGR valve	20	200	14
EGR valve x Intake air surge tank	12	120	9
EGR pipe No.2 x EGR valve	12	120	9
EGR pipe No.2 x EGR cooler	12	120	9

INTAKE

SERVICE DATA

030ER-01

1MZ-FE

Intake air control valve No.3 (VSV) Resistance	at 20°C (68°F)	37 – 44 Ω
Vacuum switching valve assy No.1 Resistance	at 20°C (68°F)	33 – 39 Ω

030ES-01

Part Tightened	N·m	kgf·cm	ft·lbf
Intake air control valve assy x Intake air surge tank	15	153	11

ENGINE MECHANICAL

030ET-01

SERVICE DATA

2AZ-FE

Battery specific gravity	at 20°C (68°F)	1.25~1.29
Ignition timing	w/ Terminals TC and CG of DLC3 connected w/ Terminals TC and CG of DLC3 disconnected	8 – 12° BTDC 5 – 15° BTDC
Idle speed	A/T M/T	610 – 710 r/min. 650 – 750 r/min.
Compression	Compression pressure Minimum pressure Difference between each cylinder	1.360 MPa (13.9 kgf/cm ² , 198 psi) 0.98 MPa (10 kgf/cm ² , 142 psi) 100 kPa (1.0 kgf/cm ² , 14 psi)
Balance shaft		
Thrust clearance	Standard Maximum	0.050 – 0.090 mm (0.0020 – 0.0035 in.) 0.090 mm (0.0035 in.)
Oil clearance	Standard Maximum	0.004 – 0.031 mm (0.0002 – 0.0012 in.) 0.031 mm (0.0012 in.)
Housing journal bore diameter	Mark 1 Mark 2 Mark 3	26.000 – 26.006 mm (1.0236 – 1.0239 in.) 26.007 – 26.012 mm (1.0239 – 1.0241 in.) 26.013 – 26.018 mm (1.0241 – 1.0243 in.)
Journal diameter		22.985 – 23.000 mm (0.9049 – 0.9055 in.)
Bearing center wall thickness	Mark 1 Mark 2 Mark 3	1.486 – 1.489 mm (0.0585 – 0.0586 in.) 1.489 – 1.492 mm (0.0586 – 0.0587 in.) 1.492 – 1.495 mm (0.0587 – 0.0589 in.)
Oil pump drive gear		
Gear diameter (w/chain)	Minimum	48.2 mm (1.898 in.)
Oil pump drive shaft gear		
Gear diameter (w/chain)	Minimum	48.2 mm (1.898 in.)
Crankshaft timing gear or sprocket		
Gear diameter (w/chain)	Minimum	51.6 mm (2.031 in.)
Chain tensioner slipper		
Wear	Maximum	1.0 mm (0.039 in.)
Chain vibration damper No.1		
Wear	Maximum	1.0 mm (0.039 in.)
Cylinder head set bolt		
Bolt length	Standard Maximum	161.3 – 162.7 mm (6.350 – 6.406 in.) 164.2 mm (6.465 in.)
Chain sub-assy		
Elongation	Maximum	115.4 mm (4.543 in.)
Camshaft timing gear or sprocket		
Sprocket diameter (w/chain)	Minimum	97.3 mm (3.831 in.)

SERVICE SPECIFICATIONS – ENGINE MECHANICAL

Camshaft		
Circle runout	Maximum	0.03 mm (0.0012 in.)
Cam lobe height	Standard	46.495 – 46.595 mm (1.8305 – 1.8345 in.)
	Minimum	46.385 mm (1.8262 in.)
Camshaft No.2		
Circle runout	Maximum	0.03 mm (0.0012 in.)
Cam lobe height	Standard	45.983 – 46.083 mm (1.8104 – 1.8143 in.)
	Minimum	45.873 mm (1.8060 in.)
No. 1 journal diameter		35.971 – 35.985 mm (1.4165 – 1.4167 in.)
Other journal diameter		22.959 – 22.975 mm (0.9039 – 0.9045 in.)
Thrust clearance		
Intake	Standard	0.040 – 0.095 mm (0.0016 – 0.0037 in.)
	Maximum	0.11 mm (0.0043 in.)
Exhaust	Standard	0.080 – 0.135 mm (0.0032 – 0.0053 in.)
	Maximum	0.15 mm (0.0059 in.)
Oil clearance		
Intake No. 1 journal bearing mark 1	Standard	0.007 – 0.038 mm (0.0028 – 0.00150 in.)
Intake No. 1 journal bearing mark 2	Standard	0.008 – 0.038 mm (0.0031 – 0.00150 in.)
Intake No. 1 journal bearing mark 3	Standard	0.008 – 0.038 mm (0.0031 – 0.00150 in.)
Exhaust No. 1 journal	Standard	0.040 – 0.079 mm (0.00157 – 0.00311 in.)
Other journals	Standard	0.025 – 0.062 mm (0.00098 – 0.00244 in.)
Intake No. 1 journal	Maximum	0.07 mm (0.0028 in.)
Other journals	Maximum	0.10 mm (0.0039 in.)
Valve clearance		
Intake	(cold)	0.19 – 0.29 mm (0.0075 – 0.0114 in.)
Exhaust		0.30 – 0.40 mm (0.0118 – 0.0157 in.)
Cylinder head		
Warp	Maximum	
Cylinder block side		0.05 mm (0.0020 in.)
Intake manifold side		0.08 mm (0.0031 in.)
Exhaust manifold side		0.08 mm (0.0031 in.)
Inner compression spring		
Free length		45.7 mm (1.799 in.)
Deviation	Maximum	1.6 mm (0.063 in.)
Angle (reference)	Maximum	2°
Intake valve		
Overall length	Standard	101.71 mm (4.0043 in.)
	Minimum	101.21 mm (3.9846 in.)
Valve stem diameter		5.470 – 5.485 mm (0.2154 – 0.2159 in.)
Margin thickness	Standard	1.05 – 1.45 mm (0.041 – 0.057 in.)
	Minimum	0.5 mm (0.020 in.)
Exhaust valve		
Overall length	Standard	101.15 mm (3.9823 in.)
	Minimum	100.70 mm (3.9646 in.)
Valve stem diameter		5.465 – 5.480 mm (0.2152 – 0.2157 in.)
Margin thickness	Standard	1.2 – 1.6 mm (0.047 – 0.063 in.)
	Minimum	0.5 mm (0.020 in.)
Intake valve guide bush		
Bushing inside diameter		5.510 – 5.530 mm (0.2169 – 0.2177 in.)
Oil clearance	Standard	0.025 – 0.060 mm (0.0098 – 0.00236 in.)
	Maximum	0.08 mm (0.0031 in.)
Diameter		10.285 – 10.306 mm (0.4049 – 0.4057 in.)
Protrusion height		9.6 – 10.0 mm (0.3779 – 0.3937 in.)
Exhaust valve guide bush		
Bushing inside diameter		5.510 – 5.530 mm (0.2169 – 0.2177 in.)
Oil clearance	Standard	0.030 – 0.065 mm (0.0012 – 0.0026 in.)
	Maximum	0.10 mm (0.0039 in.)
Diameter		10.285 – 10.306 mm (0.4049 – 0.4057 in.)
Protrusion height		9.6 – 10.0 mm (0.3779 – 0.3937 in.)

Valve lifter		
Lifter diameter		30.966 – 30.976 mm (1.2191 – 1.2195 in.)
Lifter bore diameter		31.009 – 31.025 mm (1.2208 – 1.2215 in.)
Oil clearance	Standard	0.033 – 0.059 mm (0.0013 – 0.0023 in.)
	Maximum	0.07 mm (0.0028 in.)
Ring w/head pin		
Protrusion height		3 mm (0.12 in.)
Connecting rod		
Thrust clearance	Standard	0.160 – 0.362 mm (0.0063 – 0.0143 in.)
	Maximum	0.362 mm (0.0143 in.)
Oil clearance	Standard	0.024 – 0.048 mm (0.0009 – 0.0019 in.)
	Maximum	0.08 mm (0.0031 in.)
Bushing inside diameter		22.005 – 22.014 mm (0.8663 – 0.8667 in.)
Oil clearance	Standard	0.001 – 0.007 mm (0.00004 – 0.00028 in.)
	Maximum	0.010 mm (0.0020 in.)
Out-of-alignment	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.)
Cylinder block		
Warp	Maximum	0.05 mm (0.0020 in.)
Bore diameter	Standard	88.500 – 88.513 mm (3.4843 – 3.4848 in.)
Piston		
Piston diameter		88.439 – 88.449 mm (3.4818 – 3.4822 in.)
Piston oil clearance	Standard	0.051 – 0.074 mm (0.0020 – 0.0029 in.)
	Maximum	0.1 mm (0.0039 in.)
Piston ring		
Ring groove clearance		0.030 – 0.070 mm (0.0012 – 0.0028 in.)
End gap	Standard No. 1	0.22 – 0.32 mm (0.0087 – 0.0126 in.)
	No. 2	0.50 – 0.60 mm (0.0197 – 0.0236 in.)
	Oil (side rail)	0.10 – 0.35 mm (0.0039 – 0.0138 in.)
	Maximum No. 1	0.89 mm (0.0350 in.)
	No. 2	1.35 mm (0.0531 in.)
	Oil (side rail)	0.73 mm (0.0287 in.)
Piston pin		
Bushing inside diameter		22.001 – 22.010 mm (0.8662 – 0.8665 in.)
Piston pin diameter		21.997 – 22.006 mm (0.8660 – 0.8664 in.)
Oil clearance	Standard	0.005 – 0.011 mm (0.0002 – 0.0004 in.)
	Maximum	0.010 mm (0.0020 in.)
Connecting rod bolt		
Diameter	Standard	7.2 – 7.3 mm (0.283 – 0.287 in.)
	Minimum	7.0 mm (0.276 in.)
Crankshaft		
Thrust clearance	Standard	0.040 – 0.240 mm (0.0016 – 0.0094 in.)
	Maximum	0.30 mm (0.0118 in.)
Thrust washer thickness		1.930 – 1.980 mm (0.0760 – 0.0780 in.)
Circle runout	Maximum	0.03 mm (0.0012 in.)
Main journal diameter		54.988 – 55.000 (2.1648 – 2.06535 in.)
Oil clearance	Standard	0.017 – 0.040 mm (0.0007 – 0.0016 in.)
	Maximum	0.07 mm (0.0028 in.)
Crank pin taper and out- of -round	Maximum	0.003 mm (0.0001 in.)
Crank pin diameter		47.990 – 48.000 mm (1.8894 – 1.8898 in.)
Crankshaft bearing cap set bolt		
Diameter	Standard	7.5 – 7.6 mm (0.295 – 0.299 in.)
	Minimum	7.2 mm (0.283 in.)

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Battery specific gravity	at 20°C (68°F)	1.25~1.29
New drive belt deflection	Pressing force: 98 N (10 kgf, 22 lbf) For fan and generator For vane pump	9.1 – 10.5 mm (0.358 – 0.413 in.) 7.0 – 9.0 mm (0.276 – 0.354 in.)
Used drive belt deflection	Pressing force: 98 N (10 kgf, 22 lbf) For fan and generator For vane pump	11.0 – 13.5 mm (0.433 – 0.531 in.) 10.0 – 12.0 mm (0.394 – 0.472 in.)
New drive belt tension	For fan and generator For vane pump	617 – 853 N (63 – 87 kgf, 139 – 192 lbf) 647 – 843 N (66 – 86 kgf, 146 – 190 lbf)
Used drive belt tension	For fan and generator For vane pump	294 – 490 N (30 – 50 kgf, 66 – 110 lbf) 323 – 519 N (33 – 53 kgf, 73 – 117 lbf)
Ignition timing	w/ Terminals TC and CG of DLC3 connected w/ Terminals TC and CG of DLC3 disconnected	8 – 12° BTDC 7 – 25° BTDC
Idle speed		550 – 650 r/min.
Compression pressure		1.47 MPa (15 kgf/cm ² , 213 psi)
Minimum pressure		0.98 MPa (10 kgf/cm ² , 142 psi)
Difference between each cylinder		100 kPa (1.0 kgf/cm ² , 14 psi)
Camshaft circle runout	Maximum	0.06 mm (0.0024 in.)
Camshaft cam lobe height	Standard Intake Exhaust Minimum Intake Exhaust	42.11 – 42.21 mm (1.6579 – 1.6618 in.) 41.96 – 42.06 mm (1.6520 – 1.6559 in.) 41.96 mm (1.6520 in.) 41.81 mm (1.6461 in.)
Camshaft Journal diameter		26.959 – 26.975 mm (1.0614 – 1.0620 in.)
12 pointed head cylinder head set bolt diameter at tension portion	Standard Minimum	8.95 – 9.05 mm (0.3524 – 0.3563 in.) 8.75 mm (0.3775 in.)
Valve clearance at cold	Intake Exhaust	0.15 – 0.25 mm (0.006 – 0.010 in.) 0.25 – 0.35 mm (0.010 – 0.014 in.)
Cylinder head warpage	Maximum Cylinder block side Intake manifold side Exhaust manifold side	0.05 mm (0.0020 in.) 0.10 mm (0.0039 in.) 0.10 mm (0.0039 in.)
Intake valve overall length	Standard Minimum	95.45 mm (3.7579 in.) 94.95 mm (3.7382 in.)
Intake valve stem diameter	Standard	5.470 – 5.485 mm (0.2154 – 0.2159 in.)
Intake valve margin thickness	Standard Minimum	1.0 mm (0.039 in.) 0.5 mm (0.020 in.)
Exhaust valve overall length	Standard Minimum	95.40 mm (3.7559 in.) 94.90 mm (3.7362 in.)
Exhaust valve stem diameter	Standard	5.465 – 5.480 mm (0.2152 – 0.2157 in.)
Exhaust valve margin thickness	Standard Minimum	1.0 mm (0.039 in.) 0.5 mm (0.020 in.)
Valve spring free length		45.50 mm (1.7913 in.)
Valve spring deviation	Maximum	2.0 mm (0.079 in.)
Valve spring installed tension at 33.8 mm (1.331 in.)		186 – 206 N (19.0 – 21.0 kgf, 41.9 – 46.3 lbf)

Bushing inside diameter		5.510 – 5.530 mm (0.2169 – 0.2177 in.)
Valve guide bushing oil clearance	Standard 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.)
Cylinder head valve guide bushing bore diameter	Exhaust	0.10 mm (0.0039 in.)
	STD	10.295 – 10.313 mm (0.4053 – 0.4060 in.)
	O/S 0.05	10.345 – 10.363 mm (0.4073 – 0.4080 in.)
Bushing diameter	STD	10.333 – 10.344 mm (0.4068 – 0.4072 in.)
	O/S 0.05	10.383 – 10.394 mm (0.4088 – 0.4092 in.)
Bushing length	Intake	34.5 mm (1.358 in.)
	Exhaust	40.5 mm (1.594 in.)
Bushing protrusion height	Intake	11.1 – 11.5 mm (0.437 – 0.453 in.)
	Exhaust	8.9 – 9.3 mm (0.350 – 0.366 in.)
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	Standard	0.024 – 0.050 mm (0.0009 – 0.0021 in.)
	Maximum	0.07 mm (0.0028 in.)
Camshaft gear backlash	Standard	0.020 – 0.200 mm (0.0008 – 0.0079 in.)
	Maximum	0.30 mm (0.0118 in.)
Camshaft thrust clearance	Standard	0.040 – 0.090 mm (0.0016 – 0.0035 in.)
	Maximum	0.12 mm (0.0047 in.)
Camshaft oil clearance	Standard Intake #4, #5 journals	0.025 – 0.057 mm (0.0010 – 0.0022 in.)
	Other journals	0.025 – 0.062 mm (0.0010 – 0.0024 in.)
	Maximum	0.10 mm (0.0039 in.)
Connecting rod thrust clearance	Standard	0.15 – 0.30 mm (0.0059 – 0.0118 in.)
	Maximum	0.35 mm (0.0138 in.)
Connecting rod oil clearance	Standard	0.038 – 0.066 mm (0.0015 – 0.0026 in.)
	Maximum	0.08 mm (0.0031 in.)
Crankshaft thrust clearance	Standard	0.04 – 0.24 mm (0.0016 – 0.0094 in.)
	Maximum	0.30 mm (0.0118 in.)
Cylinder block warpage	Maximum	0.05 mm (0.0020 in.)
Cylinder bore diameter	Standard	87.500 – 87.512 mm (3.4449 – 3.4453 in.)
	Maximum	87.52 mm (3.4457 in.)
Piston diameter		87.406 – 87.416 mm (3.4412 – 3.4416 in.)
Oil clearance	Standard	0.084 – 0.106 mm (0.0033 – 0.0042 in.)
	Maximum	0.13 mm (0.0051 in.)
Connecting rod out-of alignment	Maximum	0.05 mm (0.0020 in.) per 100 mm (3.94 in.)
Connecting rod twist	Maximum	0.15 mm (0.0059 in.) per 100 mm (3.94 in.)
Connecting rod 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.)
Oil clearance	Standard	0.005 – 0.011 mm (0.0002 – 0.0004 in.)
	Maximum	0.05 mm (0.0020 in.)
Piston ring groove clearance	No.1	0.02 – 0.07 mm (0.0008 – 0.0028 in.)
	No.2	0.02 – 0.06 mm (0.0008 – 0.0024 in.)
	Oil	0.03 – 0.11 mm (0.0011 – 0.0043 in.)
Piston ring end gap	Standard No.1	0.25 – 0.35 mm (0.0098 – 0.0138 in.)
	No.2	0.35 – 0.45 mm (0.0138 – 0.0177 in.)
	Oil (Side rail)	0.15 – 0.40 mm (0.0059 – 0.0157 in.)
	Maximum No. 1	0.95 mm (0.0374 in.)
	No.2	1.05 mm (0.0413 in.)
	Oil (Side rail)	1.00 mm (0.0394 in.)
Connecting rod bolt diameter	Standard	7.2 – 7.3 mm (0.283 – 0.287 in.)
	Minimum	7.0 mm (0.276 in.)
Crankshaft bearing cap set bolt diameter	Standard	7.5 – 7.6 mm (0.295 – 0.299 in.)
	Minimum	7.2 mm (0.283 in.)

SERVICE SPECIFICATIONS – ENGINE MECHANICAL

Crankshaft circle runout	Maximum	0.06 mm (0.0024 in.)
Main journal diameter		60.988 – 61.000 mm (2.4011 – 2.4016 in.)
Main journal taper and out-of-round	Maximum	0.02 mm (0.0008 in.)
Crank pin diameter		52.992 – 53.000 mm (2.0863 – 2.0866 in.)
Crank pin taper and out-of-round	Maximum	0.02 mm (0.0008 in.)
Crankshaft oil clearance	Standard No. 1 and No. 4 journals	0.014 – 0.034 mm (0.0006 – 0.0013 in.)
	No. 2 and No. 3 journals	0.026 – 0.046 mm (0.0010 – 0.0018 in.)
	Maximum No. 1 and No. 4 journals	0.05 mm (0.0020 in.)
	No. 2 and No. 3 journals	0.06 mm (0.0024 in.)

TORQUE SPECIFICATION

2AZ-FE

Part Tightened	N·m	kgf·cm	ft·lbf
Engine mounting bracket No.2 RH x Timing chain cover	52	531	38
Engine moving control rod w/ bracket x Engine mounting bracket No.2 RH	64	653	47
Engine moving control rod w/ bracket x Fender apron RH	64	653	47
Engine mounting stay No.2 RH x Cylinder head	64	653	47
Engine mounting stay No.2 RH x Engine mounting bracket No.2 RH	64	653	47
Front wheel RH	103	1,050	76
Drain plug (Automatic transaxle)	49	500	36
Drain plug (Manual transaxle)	49	500	36
Engine hanger No.1 x Cylinder head	38	387	28
Engine hanger No.2 x Cylinder head	38	387	28
E.F.I. Engine coolant temperature sensor x Cylinder head	20	208	15
Knock control sensor x Cylinder block	39	398	29
Engine oil pressure switch assy x Cylinder head	15	153	11
Water by-pass pipe No.1 x Cylinder block	9.0	92	80 in.·lbf
Transverse engine engine mounting bracket x Cylinder block	54	551	40
Drive shaft bearing bracket x Cylinder block	64	653	47
V-ribbed belt tensioner assy x Timing chain cover	59.5	607	44
Ignition coil assy x Cylinder head	9.0	92	80 in.·lbf
Water inlet x Cylinder block	9.0	92	80 in.·lbf
Exhaust manifold converter x Cylinder head	37	378	27
Exhaust manifold stay x Exhaust manifold converter	44	449	32
Manifold converter insulator No. 1 x Exhaust manifold converter	12	122	9
Oil level gauge guide x Water by-pass pipe No. 1	9.0	92	80 in.·lbf
Intake manifold x Cylinder head	30	306	22
Drive plate & ring gear (Automatic transaxle) x Crankshaft	98	1,000	72
Flywheel sub-assy (Manual transaxle) x Crankshaft	130	1,330	96
Starter assy x Automatic transaxle assy	39	398	29
Starter assy x Manual transaxle assy	39	398	29
Engine mounting insulator LH x Automatic transaxle assy	95	969	70
Engine mounting insulator LH x Manual transaxle assy	143	1,459	106
Engine mounting insulator RH x Transverse engine engine mounting bracket	95	969	70
Engine mounting insulator FR x Engine mounting bracket FR	87	888	64
Engine mounting bracket rear No. 2 x Engine lateral control rod(Manual transaxle)	89	910	69
Vane pump assy x Timing chain cover	43	439	31
Frame side plate x Front frame assy Bolt A	85	867	63
Frame side plate x Body Bolt B	32	326	24
Front suspension member brace rear x Front frame assy Bolt C	85	867	63
Front suspension member brace rear x Body Bolt D	32	326	24
Steering intermediate shaft	35	357	26
Drive plate & ring gear x Torque converter	41	418	30
Front suspension arm sub-assy lower No. 1 x Lower ball joint	127	1,296	94
Tie rod assy x Steering knuckle	49	500	36
Speed sensor front LH (w/ ABS) x Steering knuckle	8.0	82	71 in.·lbf
Speed sensor front RH (w/ ABS) x Steering knuckle	8.0	82	71 in.·lbf
Front axle hub LH nut x Front drive shaft	294	3,000	217
Front stabilizer link assy x Front suspension	74	755	55
Air cleaner assy x Body	5.0	51	44 in.·lbf

SERVICE SPECIFICATIONS – ENGINE MECHANICAL

Part Tightened		N·m	kgf·cm	ft·lbf
Balance shaft housing x Stiffening crankcase assy	1st	22	220	16
	2nd	Turn 90°	Turn 90°	Turn 90°
Stiffening crankcase assy x Cylinder block		33	332	24
w/ head taper screw plug No. 1 x Cylinder block		26	265	19
Oil control valve filter x Cylinder block		30	306	22
Cylinder block water drain cock x Stiffening crankcase assy		25	255	18
Cylinder head x Cylinder block	1st	79	806	58
	2nd	Turn 90°	Turn 90°	Turn 90°
Camshaft timing gear assy x Camshaft		54	551	40
Camshaft timing sprocket x Camshaft		54	551	40
Camshaft bearing cap No. 1 x Cylinder head		30	301	22
Camshaft bearing cap No. 2 x Cylinder head		30	301	22
Camshaft bearing cap No. 3 x Cylinder head		9.0	92	80 in.·lbf
Oil pump assy x Stiffening crankcase assy		19	194	14
Chain tensioner plate x Stiffening crankcase assy		12	122	9
Oil pump drive sprocket x Oil pump		30	301	22
Chain vibration damper No. 1 x Cylinder head		9.0	92	80 in.·lbf
Chain vibration damper No. 1 x Cylinder block		9.0	92	80 in.·lbf
Chain tensioner slipper x Cylinder block		19	194	14
Timing chain guide x Crankshaft bearing cap No. 1		9.0	92	80 in.·lbf
Timing chain cover (See page14-41)	Bolt A	9.0	92	80 in.·lbf
	Bolt B	21	214	15
	Bolt C	43	438	32
	Nut	9.0	92	80 in.·lbf
Oil pan x Stiffening crankcase assy		9.0	92	80 in.·lbf
Oil pan drain plug x Oil pan		25	250	18
Water pump assy x Cylinder block		9.0	92	80 in.·lbf
Water pump pulley x Water pump assy		26	265	19
Crank position sensor x Timing chain cover		9.0	92	80 in.·lbf
Crankshaft pulley x Crankshaft		170	1,733	125
Chain tensioner assy No. 1 x Timing chain cover		9.0	92	80 in.·lbf
Camshaft position sensor x Cylinder head		9.0	92	80 in.·lbf
Cylinder head cover x Cylinder head		11	110	8
Oil filter union x Stiffening crankcase assy		30	306	22
Spark plug x Cylinder head		19	194	14
Ventilation valve x Cylinder head cover		19	194	14
Stud bolt (See page14-107)	Bolt A	5	51	44 in.·lbf
	Bolt B	5	51	44 in.·lbf
	Bolt C	10	97	84 in.·lbf
	Bolt D	10	97	84 in.·lbf
Front suspension brace x Body		80	816	59
Connecting rod cap x Connecting rod	1st	25	250	18
	2nd	Turn 90°	Turn 90°	Turn 90°
Crankshaft bearing cap x Cylinder block	1st	20	204	15
	2nd	40	408	29
Stud bolt (See page14-119)	Stud bolt A	5.0	51	44 in.·lbf
	Stud bolt B	10	97	84 in.·lbf
	Stud bolt C	5.0	51	44 in.·lbf

1MZ-FE

Part Tightened		N·m	kgf·cm	ft·lbf
Engine hanger No. 2 x Cylinder head		20	199	14
Knock control sensor x Cylinder block		39	398	29
Oil pressure switch assy x Cylinder block		15	152	11

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Part Tightened		N·m	kgf·cm	ft·lbf
Compressor mounting bracket No.1 x Cylinder block		25	255	18
Generator bracket No.1 x Cylinder block		58	591	43
Pump bracket x Cylinder head		32	326	24
Drive shaft bearing bracket x Cylinder block		64	653	47
Exhaust manifold LH x Cylinder head		49	500	36
Exhaust manifold RH x Cylinder head		49	500	36
Ignition coil assy x Cylinder head cover		8.0	82	71 in.·lbf
Surge tank stay No.1 x Cylinder head		20	199	14
Surge tank stay No.1 x Intake air surge tank		20	199	14
Engine hanger No. 1 x Cylinder head		39	398	29
Engine hanger No. 1 x Intake air surge tank		39	398	29
Manifold stay No. 2 x Exhaust manifold LH		34	347	25
Manifold stay No. 2 x Automatic transaxle assy		34	347	25
Engine mounting insulator RH x Engine mounting bracket		95	969	70
Engine mounting insulator LH x Automatic transaxle assy		95	969	70
Engine mounting insulator FR x Automatic transaxle assy		87	887	64
Vane pump assy x Pump bracket		43	439	32
Vane pump assy x Engine mounting bracket		43	439	32
Frame side rail plate sub-assembly x Front frame assy (See page 14-155)	Bolt A	85	867	63
	Bolt B	32	326	24
	Nut	32	326	24
Front suspension member brace rear x Front frame assy (See page 14-155)	Bolt C	85	867	63
	Bolt D	32	326	24
	Nut	32	326	24
Compressor and magnetic clutch x Compressor mounting bracket No.1 (See page 14-155)	Bolt	25	250	18
	Nut	26	260	19
Generator belt adjusting bar x Cylinder block (See page 14-155)	Nut A	43	438	32
	Bolt B	18	184	13
	Bolt C	8.0	82	71 in.·lbf
Generator bracket No. 2 x Transverse engine engine mounting bracket		28	286	21
Intermediate shaft sub-assy		35	357	26
Drive plate & ring gear x Torque converter		41	418	30
Flywheel housing under cover x Automatic transaxle assy		7.8	80	69 in.·lbf
Front suspension arm x Lower ball joint		127	1,295	94
Tie rod end x Steering knuckle		49	500	36
Front axle hub nut x Front drive shaft		294	2,998	217
Front stabilizer link assy x Front suspension		74	755	55
V-bank cover x Cylinder head cover		7.9	81	70 in.·lbf
Engine mounting stay No. 2 RH x Transverse engine engine mounting bracket		64	653	47
Engine moving control rod (See page 14-155)	Bolt A	64	653	47
	Bolt B	23	235	17
Front wheel		103	1,050	76
Camshaft sub-gear x Main gear		5.4	55	48 in.·lbf
Engine rear oil seal retainer x Cylinder block		8.0	82	71 in.·lbf
Oil pump assy x Cylinder block (See page 14-173)	10 mm head	8.0	82	71 in.·lbf
	12 mm head	20	199	14
	14 mm head	43	439	32
Crank position sensor x Oil pump assy		8.0	82	71 in.·lbf
Oil pan baffle plate x Oil pan sub-assy		8.0	82	71 in.·lbf

SERVICE SPECIFICATIONS – ENGINE MECHANICAL

Part Tightened	N·m	kgf·cm	ft·lbf
Oil pan sub-assy x Cylinder block (See page 14-173)	10 mm head 12 mm head	8.0 20	71 in.·lbf 14
Oil strainer sub-assy x Oil pan sub-assy		8.0	82
Oil pan sub-assy No. 2 x Oil pan sub-assy		8.0	82
Oil pan drain plug x Oil pan sub-assy No. 2		45	459
Water inlet housing x Cylinder block		8.0	82
Cylinder head x Cylinder block	12 pointed head 1st 2nd Recessed head	54 Turn 90° 19	551 Turn 90° 189
Camshaft bearing cap x Cylinder head		16	163
Timing belt plate x Oil pump assy		8.0	82
Water pump assy x Cylinder block		8.0	82
Oil level gage guide x Cylinder block		8.0	82
Oil filter union x Cylinder block		30	306
Timing belt idler bracket x Cylinder block		28	286
Timing belt No. 3 cover x Cylinder head		8.5	87
Camshaft timing pulley x Camshaft		125	1,275
Timing belt idler sub-assy No. 2 x Timing belt idler bracket		43	438
Timing belt idler sub-assy No. 1 x Cylinder block		34	347
Chain tensioner assy No. 1 x Oil pump assy		27	280
Transverse engine engine mounting bracket x Cylinder block		28	286
Timing belt No. 2 cover x Timing belt No. 3 cover		8.5	87
Timing belt No. 1 cover x Oil pump assy		8.5	87
Crankshaft pulley x Crankshaft		215	2,192
Camshaft position sensor x Cylinder head		8.0	82
Cylinder head cover x Cylinder head		8.0	82
Spark plug x Cylinder head		18	184
W/head straight screw plug No. 1 x Cylinder head		44	449
W/head straight screw plug No. 2 x Cylinder head		44	449
Connecting rod cap x Connecting rod	1st 2nd	25 Turn 90°	250 Turn 90°
Main bearing cap x Cylinder block	12 pointed head 1st 2nd 6 pointed head	22 Turn 90° 27	224 Turn 90° 275
Cylinder block w/head straight screw No. 1 plug x Cylinder block		30	306
Cylinder block w/head straight screw No. 2 plug x Cylinder block		50	510
Cylinder block w/head straight screw No. 3 plug x Cylinder block		30	306
Water seal plate x Cylinder block		18	184
Cylinder block water drain cock sub-assy x Cylinder block		39	398
Vane pump assy x Adjusting strut		43	439
Generator x Generator bracket		58	591
Generator x Adjusting bar		18	184
Intake air surge tank x Intake manifold		43	438
Front suspension brace upper x Body		80	816
Drive plate & ring gear sub-assy x Crankshaft		83	846
Water outlet x Cylinder head		15	153
Intake manifold x Cylinder head		15	153
EGR pipe No.2 x EGR valve		12	120
EGR pipe No.2 x EGR cooler No.1		12	120
Exhaust manifold heat insulator No.2 x Exhaust manifold LH		8.5	87
EGR cooler No.1 x Cylinder block		9.0	92
EGR pipe No.1 x EGR cooler No.1		12	120

Part Tightened	N·m	kgf·cm	ft·lbf
EGR pipe No.1 x Exhaust manifold LH	12	120	9
Exhaust pipe support bracket No.1 x Automatic transaxle assy	21	214	15

EXHAUST

TORQUE SPECIFICATION

030EV-01

2AZ-FE

Part Tightened	N·m	kgf·cm	ft·lbf
Exhaust pipe damper (A/T) x Exhaust pipe assy center	19	194	14
Exhaust pipe assy center x Tail pipe assy	56	571	41
Floor panel brace rear x Body	19.5	199	14
Exhaust pipe assy front x Exhaust pipe assy center	56	571	41
Exhaust pipe assy front x Exhaust manifold converter sub-assy	62	633	46
Exhaust pipe No. 1 support bracket x Exhaust pipe assy front	33	337	24
Exhaust pipe No. 1 support bracket x Exhaust pipe assy front	33	337	24
Oxygen sensor x Exhaust pipe assy front	44	450	33

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Part Tightened	N·m	kgf·cm	ft·lbf
Exhaust pipe assy center x Tail pipe assy	56	571	41
Exhaust pipe assy front x Exhaust manifold RH	62	633	47
Exhaust pipe assy front x Exhaust manifold converter No.2	62	633	47
Exhaust pipe assy front x Exhaust pipe assy center	56	571	41
Exhaust pipe No.1 support bracket x Body	33	337	24
Floor panel brace rear x Body	20	199	14
Exhaust pipe No.1 support bracket x Exhaust pipe support bracket No.1	33	337	24
Oxygen sensor x Exhaust pipe assy front	44	449	32

COOLING

SERVICE DATA

030EW-01

2AZ-FE

Thermostat		
Valve opening temperature		80 – 84°C (176 – 183°F)
Valve lift	at 95°C (203°F)	10 mm (0.394 in.) or more
Radiator cap sub-assy		
Standard opening pressure		93 – 122 kPa (0.95 – 1.25 kgf/cm ² , 13.4 – 17.6 psi)
Minimum opening pressure		78 kPa (0.8 kgf/cm ² , 11.2 psi)
Cooling fan		
Standard amperage	at 20°C (68°F)	4.9 – 8.5 A
Coolant		
Capacity		6.2 liters (6.6 US qts, 5.4 Imp. qts)

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Thermostat		
Valve opening temperature		80 – 84°C (176 – 183°F)
Valve lift	at 95°C (203°F)	10 mm (0.394 in.) or more
Radiator cap sub-assy		
Standard opening pressure		83.4 – 112.8 kPa (0.85 – 1.15 kgf/cm ² , 12.1 – 16.4 psi)
Minimum opening pressure		69 kPa (0.7 kgf/cm ² , 10.0 psi)
Cooling fan		
Standard amperage	at 20°C (68°F)	8.0 – 12.0 A
Coolant		
Capacity		9.2 liters (9.7 US qts, 8.1 Imp. qts)

TORQUE SPECIFICATION

2AZ-FE

Part Tightened	N·m	kgf·cm	ft·lbf
Water pump x Cylinder block	9.0	92	80 in.·lbf
Water pump x Water pump pulley	26	265	19
Water inlet x Cylinder block	9.0	92	80 in.·lbf
Fan assy, w/ motor x Radiator assy	5.0	51	44 in.·lbf
Radiator support upper x body	14	142	10

1MZ-FE

Part Tightened	N·m	kgf·cm	ft·lbf
Water pump assy x Cylinder block	8	82	71 in.·lbf
Idler sub-assy No.2 x Cylinder block	43	438	32
Transverse engine engine mounting bracket x Cylinder block	28	286	21
Generator bracket No.2 x Cylinder block	28	286	21
Front wheel	103	1051	76
Water inlet x Cylinder block	8	82	71 in.·lbf
Water inlet pipe x Water inlet	20	204	15
Fan assy, w/ motor x Radiator assy	5.0	51	44 in.·lbf
Radiator support upper x body	14	142	10

LUBRICATION

SERVICE DATA

030EY-01

2AZ-FE

Oil pressure	at idle speed at 3,000 rpm	29 kPa (0.3 kgf·cm ² , 4.3 psi) or more 245 – 539 kPa (2.5 – 5.5 kgf·cm ² , 36 – 78 psi) or more
Oil pump		
Side clearance	Standard Maximum	0.030–0.085 mm (0.0012–0.0033 in.) 0.16 mm (0.0063 in.)
Tip clearance	Standard Maximum	0.080–0.160 mm (0.0031–0.0063 in.) 0.35 mm (0.0138 in.)
Body clearance	Standard Maximum	0.100–0.170 mm (0.00394–0.00669 in.) 0.325 mm (0.01280 in.)
Engine oil		
Oil capacity	Drain and refill w/ oil filter change Drain and refill w/o oil filter change Dry fill	3.8 liters (4.0 US qts, 3.3 Imp. qts) 3.6 liters (3.8 US qts, 3.2 Imp. qts) 4.5 liters (4.8 US qts, 4.0 Imp. qts)

1MZ-FE

Oil pressure	at idle speed at 3,000 rpm	29 kPa (0.3 kgf·cm ² , 4.3 psi) or more 294 – 539 kPa (3.0 – 5.5 kgf·cm ² , 43 – 78 psi)
Oil pump		
Side clearance	Standard Maximum	0.03 – 0.09 mm (0.0012 – 0.0035 in.) 0.15 mm (0.0059 in.)
Tip clearance	Standard Maximum	0.11 – 0.24 mm (0.0043 – 0.0094 in.) 0.35 mm (0.0138 in.)
Body clearance	Standard Maximum	0.125 – 0.162 mm (0.0050 – 0.0064 in.) 0.30 mm (0.0118 in.)
Engine oil		
Oil capacity	Drain and refill w/ oil filter change Drain and refill w/o oil filter change Dry fill	4.7 liters (5.0 US qts, 4.1 Imp. qts) 4.5 liters (4.8 US qts, 4.0 Imp. qts) 5.5 liters (5.8 US qts, 4.8 Imp. qts)

TORQUE SPECIFICATION

2AZ-FE

Part Tightened	N·m	kgf·cm	ft·lbf
Oil pressure switch x Cylinder head	15	152	11
Oil pump x Cylinder block	19	194	14
Oil pump x Oil pump cover	8.8	90	78 in.·lbf
Oil pump x Oil pump strainer	8.8	90	78 in.·lbf
Oil drain plug x Oil pan sub-assy	25	255	18

1MZ-FE

Part Tightened	N·m	kgf·cm	ft·lbf
Oil pressure switch x Cylinder block	15	152	11
Oil pump rotor set x Oil pump assembly	10	105	8
Oil pump relief valve x Oil pump assembly	24	245	18
Drain plug x Oil pump sub-assembly No.2	45	459	33
Oil pump assembly x Cylinder block (See page 17-10)	10 mm head	8	71 in.·lbf
	12 mm head	20	14
	14 mm head	43	32
Crank position sensor x Oil pump assembly	8	82	71 in.·lbf
Oil pan sub-assembly x Cylinder block (See page 17-10)	10 mm head	8	71 in.·lbf
	12 mm head	20	14
Oil strainer x Main bearing cap	8	82	71 in.·lbf
Oil pan sub-assembly No.2 x Oil pan sub-assembly No.1	8	82	71 in.·lbf
Transverse engine engine mounting bracket x Cylinder block (See page 17-10)	Bolt A	54	40
	Nut B	54	40
Transverse engine engine mounting bracket x PS pump bracket	43	439	32
Engine mounting insulator RH x Engine mounting bracket	95	969	70
Engine mounting insulator RH x Front frame	87	887	64
Engine mounting insulator FR x Cylinder block	87	887	64
Engine mounting insulator FR x Front frame	52	531	38
Oil level gage guide x Cylinder block	8	82	71 in.·lbf
Compressor mounting bracket No.1 x Cylinder block	25	250	18
Generator bracket No.2 x Transverse engine engine mounting bracket	28	286	21
Timing belt idler sub-assembly No.1 x Cylinder block	34	347	25
Compressor and magnetic clutch x Compressor mounting bracket	25	250	18
Front suspension brace sub-assembly upper center x Body	80	816	59
Front wheel	103	1051	76

IGNITION

030F0-01

SERVICE DATA

2AZ-FE

Spark plug Recommended spark plug	DENSO NGK	SK20R11 IFR6A11
Electrode gap	Standard Maximum	1.0 – 1.1mm (0.039 – 0.043 in.) 1.3 mm (0.051 in.)
Camshaft position sensor Resistance	at cold at hot	835 – 1,400Ω 1,060 – 1,645Ω
Crank position sensor Resistance	at cold at hot	985 – 1,600Ω 1,265 – 1,890Ω

1MZ-FE

Spark plug Recommended spark plug	DENSO NGK	SK20R11 IFR6A11
Electrode gap	Standard Maximum	1.0–1.1mm (0.039–0.043 in.) 1.2mm (0.047 in.)
Camshaft position sensor Resistance	at cold at hot	835–1400Ω 1060–1645Ω
Crank position sensor Resistance	at cold at hot	1630–2740Ω 2065–3225Ω

TORQUE SPECIFICATION

2AZ-FE

Part Tightened	N·m	kgf·cm	ft·lbf
Spark plug x Cylinder head cover	19	194	14
Ignition coil x Cylinder head cover	9.0	92	80 in·lbf

1MZ-FE

Part Tightened	N·m	kgf·cm	ft·lbf
Spark plug x Cylinder head cover	18	184	13
Ignition coil x Cylinder head cover	8.0	82	71 in·lbf

STARTING & CHARGING

030F2-01

SERVICE DATA

2AZ-FE

Starter assy		
Specified current		90 A or less at 11.5 V
Circle runout	Standard	0.02 mm (0.0008 in.)
	Maximum	0.05 mm (0.0020 in.)
Commutator length	Standard	3.3 mm (0.1299 in.)
	Minimum	4.0 mm (0.1575 in.)
Brush holder length	Standard	9.0 mm (0.3543 in.)
	Minimum	4.0 mm (0.1575 in.)
Snap ring length	Maximum	5.0 mm (0.1969 in.)
Battery		
Voltage	Standard	12.5 – 12.9 V at 20°C (68°F)
Generator assy		
Rotor coil resistance	at 20°C (68°F)	2.7 – 3.1 Ω
Slip ring diameter	Standard	14.2 – 14.4 mm (0.559 – 0.567 in.)
	Minimum	12.8 mm (0.504 in.)
Brush exposed length	Standard	9.5 – 11.5 mm (0.374 – 0.453 in.)
	Minimum	1.5 mm (0.059 in.)

1MZ-FE

Starter assy		
Specified current		90 A or less at 11.5 V
Circle runout	Standard	0.02 mm (0.0008 in.)
	Maximum	0.05 mm (0.0020 in.)
Commutator length	Standard	3.3 mm (0.1299 in.)
	Maximum	4.0 mm (0.1575 in.)
Brush holder length	Standard	9.0 mm (0.3543 in.)
	Maximum	4.0 mm (0.1575 in.)
Snap ring length		5.0 mm (0.1969 in.)
Battery		
Voltage	Standard	12.5 – 12.9 V at 20°C (68°F)
Generator assy		
Rotor coil resistance	at 20°C (68°F)	2.7 – 3.1 Ω
Slip ring diameter	Standard	14.2 – 14.4 mm (0.559 – 0.567 in.)
	Minimum	12.8 mm (0.504 in.)
Brush exposed length	Standard	9.5 – 11.5 mm (0.374 – 0.453 in.)
	Minimum	1.5 mm (0.059 in.)

TORQUE SPECIFICATION

2AZ-FE

Part Tightened		N·m	kgf·cm	ft·lbf
Lead wire of field frame x Magnetic switch		5.9	60	52 in.·lbf
Starter x Engine	Bolt Terminal 30	39 13	398 130	29 9
Starter Assy				
Commutator end frame assy x Motor terminal starter kit		6.0	61	53 in.·lbf
Repair service starter kit x Motor terminal starter kit		7.5	77	66 in.·lbf
Lead wire x Terminal C of starter		6.5	66	58 in.·lbf
Generator assy x Engine	M8 M10	21 52	214 530	15 38
Wiring harness clamp		8.4	85	74 in.·lbf
Alternator wire		9.8	100	7
Generator assy				
Rectifire end frame x Drive end frame (See page 19-15)				
	Nut A	4.5	46	39 in.·lbf
	Nut B	5.4	55	47 in.·lbf
Recrifire holder x Coil lead on rectifire end frame		2.9	30	26 in.·lbf
Voltage regulator x Rectifire end frame		2.0	20	18 in.·lbf
Brush holder x Rectifire end frame		2.0	20	18 in.·lbf
Rear end cover x Rectifire holder		4.4	45	39 in.·lbf
Plate terminal x Rectifire holder		3.9	39	35 in.·lbf
Terminal insulator x Rectifire holder		4.1	42	36 in.·lbf
Generator pulley x Rotor		111	1,125	81

1MZ-FE

Part Tightened		N·m	kgf·cm	ft·lbf
Lead wire of field frame x Magnetic switch		5.9	60	52 in.·lbf
Starter x Engine	Bolt Nut	42 9.8	429 100	31 7
Starter Assy				
Commutator end frame assy x Motor terminal starter kit		6.0	61	53 in.·lbf
Repair service starter kit x Motor terminal starter kit		7.5	77	66 in.·lbf
Lead wire x Terminal C of starter		6.5	66	58 in.·lbf
Generator x Engine	Bolt A Bolt B	58 18	592 184	43 13
Alternator wire		9.8	100	7
Generator assy				
Rectifire end frame x Drive end frame				
	For without cord clip	4.5	46	39 in.·lbf
	For with cord clip	5.4	55	47 in.·lbf
Recrifire holder x Coil lead on rectifire end frame		2.9	30	26 in.·lbf
Voltage regulator x Rectifire end frame		2.0	20	18 in.·lbf
Brush holder x Rectifire end frame		2.0	20	18 in.·lbf
Rear end cover x Rectifire holder		4.4	45	39 in.·lbf
Plate terminal x Rectifire holder		3.9	39	35 in.·lbf
Terminal insulator x Rectifire holder		4.1	42	36 in.·lbf
Generator pulley x Rotor		111	1,125	81

FRONT SUSPENSION

SERVICE DATA

030E9-01

Cold tire inflation pressure	Tire size: P205/65R15 92T	Front, Rear	220 kPa (2.0 kgf/cm ² , 29 psi)
	Tire size: P205/65R15 92H	Front, Rear	
	Tire size: 205/65R15 94V	Front, Rear	
	Tire size: P215/60R16 94V	Front, Rear	
Front wheel alignment	Vehicle height		
	1MZ-FE COMFORT	Front: A ^{*1} – B ^{*2} Rear: D ^{*4} – C ^{*3}	120 mm (4.72 in.) 46 mm (1.81 in.)
	1MZ-FE PREMIUM (USA, Canada)	Front: A ^{*1} – B ^{*2} Rear: D ^{*4} – C ^{*3}	119 mm (4.69 in.) 47 mm (1.85 in.)
	1MZ-FE PREMIUM (Mexico)	Front: A ^{*1} – B ^{*2} Rear: D ^{*4} – C ^{*3}	106 mm (4.17 in.) 33 mm (1.30 in.)
	1MZ-FE SPORT	Front: A ^{*1} – B ^{*2} Rear: D ^{*4} – C ^{*3}	120 mm (4.72 in.) 48 mm (1.89 in.)
	2AZ-FE COMFORT (USA, Canada)	Front: A ^{*1} – B ^{*2} Rear: D ^{*4} – C ^{*3}	119 mm (4.69 in.) 45 mm (1.77 in.)
	2AZ-FE COMFORT (Mexico)	Front: A ^{*1} – B ^{*2} Rear: D ^{*4} – C ^{*3}	106 mm (4.17 in.) 33 mm (1.30 in.)
	2AZ-FE PREMIUM	Front: A ^{*1} – B ^{*2} Rear: D ^{*4} – C ^{*3}	120 mm (4.72 in.) 45 mm (1.77 in.)
	2AZ-FE SPORT	Front: A ^{*1} – B ^{*2} Rear: D ^{*4} – C ^{*3}	120 mm (4.72 in.) 48 mm (1.89 in.)
	Toe-in (total)		0° ± 12' (0° ± 0.2°, 0 ± 2 mm, 0 ± 0.08 in.)
	Rack end length difference		1.5 mm (0.059 in.) or less
	Wheel angle		
	15 inch (USA, Canada)	Inside wheel Outside wheel: Reference	39°04' ± 2° (39.07° ± 2°) 33°44' (33.73°)
	15 inch (Mexico)	Inside wheel Outside wheel: Reference	39°30' ± 2° (39.50° ± 2°) 34°02' (34.03°)
	16 inch (USA, Canada)	Inside wheel Outside wheel: Reference	36°39' ± 2° (36.65° ± 2°) 32°11' (32.18°)
	16 inch (Mexico)	Inside wheel Outside wheel: Reference	37°00' ± 2° (37.00° ± 2°) 32°28' (32.47°)
	Camber	USA, Canada: Mexico: Right-left error	-0°43' ± 45' (-0.72° ± 0.75°) -0°33' ± 45' (-0.55° ± 0.75°) 45' (0.75°) or less
	Caster		
	1MZ-FE SPORT		2°39' ± 45' (2.65° ± 0.75°)
	1MZ-FE Except SPORT (USA, Canada)		2°37' ± 45' (2.62° ± 0.75°)
	1MZ-FE Except SPORT (Mexico)		2°33' ± 45' (2.55° ± 0.75°)
	2AZ-FE SPORT		2°43' ± 45' (2.72° ± 0.75°)
	2AZ-FE Except SPORT (USA, Canada)		2°39' ± 45' (2.65° ± 0.75°)
	2AZ-FE Except SPORT (Mexico)		2°36' ± 45' (2.60° ± 0.75°)
	Right-left error		45' (0.75°) or less
	Steering axis inclination	USA, Canada: Mexico: Right-left error	11°27' ± 45' (11.45° ± 0.75°) 11°05' ± 45' (11.08° ± 0.75°) 45' (0.75°) or less
Front suspension	Lower ball joint turning torque		0.98 – 3.43 N·m (10 – 35 kgf·cm, 8.7 – 30 in.·lbf)
	Stabilizer bar link ball joint turning torque		0.05 – 1.96 N·m (0.5 – 20 kgf·cm, 0.4 – 17.4 in.·lbf)

*1: Ground clearance of front wheel center

*2: Ground clearance of lower suspension arm No. 2 set bolt center

*3: Ground clearance of strut rod set bolt center

*4: Ground clearance of rear wheel center

TORQUE SPECIFICATION

Part Tightened	N·m	kgf·cm	ft·lbf
Tie rod end lock nut	74	755	55
Steering knuckle x Shock absorber	210	2,141	155
Hub nut	103	1,050	76
Suspension support x Body	80	816	59
Suspension support x Piston rod	49	500	36
Speed sensor wire harness bracket set bolt (w/ ABS)	18.8	192	14
Flexible hose x Shock absorber (w/o ABS)	18.8	192	14
Lower suspension arm set bolt	Front side:	200	2,039
	Rear side:	206	2,101
Transverse engine engine mounting insulator set nut	87	887	64
Transverse engine engine mounting insulator x Bracket (MT)	64	653	47
Stabilizer bar bracket x Suspension member	19	194	14
Front suspension member dynamic damper x Front frame assy	29	296	21
Stabilizer bar link set nut	74	755	55

REAR SUSPENSION

030FH-01

SERVICE DATA

Rear wheel alignment	Toe-in (total)	$0^{\circ}22' \pm 11'$ ($0.3^{\circ} \pm 0.2^{\circ}$, 4 ± 2 mm, 0.16 ± 0.08 in.)
	No.2 lower suspension arm length difference	1.0 mm (0.039 in.) or less
	Camber	USA, Canada: $-1^{\circ}16' \pm 45'$ ($-1.27^{\circ} \pm 0.75^{\circ}$)
	Mexico: Right-left error	$-1^{\circ}09' \pm 45'$ ($-1.15^{\circ} \pm 0.75^{\circ}$) 45' (0.75°) or less
Rear suspension	Stabilizer bar link ball joint turning torque	0.05 – 1.0 N·m (0.5 – 10 kgf·cm, 0.4 – 8.7 in.-lbf)

TORQUE SPECIFICATION

Part Tightened	N·m	kgf·cm	ft·lbf
Shock absorber x Body	39	400	29
Shock absorber x Rear axle carrier	255	2,600	188
Flexible hose x Shock absorber	19	194	14
ABS speed sensor wire harness x Shock absorber	5.5	56	49 in·lbf
Piston rod set nut	49	500	36
Shock absorber x Stabilizer bar link	39	400	29
Rear suspension member x Rear suspensio arm assy No. 1 LH	100	1,020	74
Rear suspension member x Body A, B C	55	561	41
	38	387	28
Rear suspension arm assy No. 1 x Rear axle carrier	100	1,020	74
Rear suspension arm assy No. 2 x Rear axle carrier	100	1,020	74
Stabilizer bar bracket	19	195	14
Stabilizer bar x Stabilizer bar link	39	400	29
Strut rod x Body	113	1,150	83
Strut rod x Rear axle carrier	113	1,152	83
Parking brake cable x Body	5.4	55	48 in·lbf
Hub nut	103	1,050	76

TIRE & WHEEL

SERVICE DATA

030E6-01

Tire runout	1.0 mm (0.039 in.) or less
Imbalance after adjustment	8.0 g (0.018 lb) or less

DRIVE SHAFT / PROPELLER SHAFT / AXLE

030EJ-01

SERVICE DATA

Front axle hub bearing	Backlash	Maximum: 0.05 mm (0.0020 in.)
Front axle hub bearing	Deviation	Maximum: 0.05 mm (0.0020 in.)
Rear axle hub bearing	Backlash	Maximum: 0.05 mm (0.0020 in.)
Rear axle hub bearing	Deviation	Maximum: 0.07 mm (0.0027 in.)

TORQUE SPECIFICATION

Part Tightened	N·m	kgf·cm	ft·lbf
Front wheel set nut	103	1,050	76
Lower ball joint x Lower suspension arm	127	1,295	94
Tie rod end x Steering knuckle	49	500	36
Axle hub x Front drive shaft	294	2,998	217
Front drive shaft center bearing set bolt	32.4	330	24
Front speed sensor set bolt (w/ ABS)	8.0	82	71
Front flexible hose and speed sensor wire harness x Shock absorber (w/ ABS)	18.8	192	14
Front flexible hose x Shock absorber (w/o ABS)	18.8	192	14
Rear wheel set nut	103	1,050	76
Rear flexible hose x Shock absorber	18.8	192	14
Shock absorber x Rear axle carrier	255	2,600	188
Rear axle hub set bolt	80	816	59
Rear axle carrier x Brake caliper (Rear disc brake)	61.8	630	46
Rear wheel brake cylinder x Brake tube (Rear drum brake)	15.2	155	11

BRAKE

SERVICE DATA

030FQ-01

Brake pedal height (from asphalt sheet)		144.1 – 154.1 mm (5.673 – 6.067 in.)
Brake pedal freeplay	Pedal free play:	1 – 6 mm (0.04 – 0.24 in.)
Stop lamp switch clearance		0.5 – 2.5 mm (0.020 – 0.098 in.)
Pedal reserve distance from asphalt sheet at 490 N (50 kgf, 110.2 lbf)		More than 63 mm (2.48 in.)
Brake booster push rod to piston clearance (w/ SST)	Clearance:	0 mm (0 in.)
Front brake pad thickness	Standard thickness: Minimum thickness:	12.0 mm (0.472 in.) 1.0 mm (0.039 in.)
Front brake disc thickness	Standard thickness: Minimum thickness:	28.0 mm (0.433 in.) 26.0 mm (0.039 in.)
Front brake disc runout	Maximum disc runout:	0.05 mm (0.0020 in.)
Rear brake pad thickness	Standard thickness: Minimum thickness:	10.0 mm (0.472 in.) 1.0 mm (0.039 in.)
Rear disc brake thickness	Standard thickness: Minimum thickness:	12.0 mm (0.472 in.) 10.5 mm (0.413 in.)
Rear brake disc runout	Maximum disc runout:	0.15 mm (0.0059 in.)
Rear brake drum inside diameter	Standard inside diameter: Minimum inside diameter:	228.0 mm (8.976 in.) 230.6 mm (9.079 in.)
Rear drum brake shoe lining thickness	Standard thickness: Minimum thickness:	5.0 mm (0.197 in.) 1.0 mm (0.039 in.)

TORQUE SPECIFICATION

Part Tightened	N·m	kgf·cm	ft·lbf
Bleeder plug	8.3	85	74 in.·lbf
Brake booster clevis lock nut	26	265	19
Brake pedal sub-assy set bolt Normal type brake pedal:	37	375	27
Stop lamp lock nut	26	265	19
Brake pedal support assy x Reinforcement	20	204	15
Brake pedal support assy x Body	13	130	9
Master cylinder piston stopper bolt w/o VSC:	10	100	7
Brake master cylinder x Brake booster	13	130	9
Brake line union nut	15	155	11
Vacuum hose bracket set bolt	5.4	55	48 in.·lbf
Charcoal canister bracket set bolt	43	440	32
Wheel nut	103	1,050	76
Front brake cylinder mounting x Steering knuckle	107	1,090	79
Front brake cylinder x Front brake cylinder mounting	34	350	25
Front brake cylinder x Flexible hose	29.4	300	22
Rear disc brake cylinder mounting set bolt TMC made: TMMK made:	61.8 47	630 475	46 34
Rear disc brake cylinder slide pin x Rear disc brake cylinder mounting TMC made (Upper side): TMC made (Lower side): TMMK made:	34.3 39.2 43	350 400 440	25 29 32
Rear disc brake cylinder x Flexible hose	29.4	300	22
Rear drum brake wheel cylinder x Backing plate	10	100	7
Brake actuator assy x Actuator bracket	5.4	55	48 in.·lbf
Brake actuator bracket x Body	19	194	14
ABS & TRAC actuator assy x Actuator bracket	5.4	55	48 in.·lbf
ABS & TRACTION actuator bracket x Body	19	194	14
Proportioning valve assy x Body	5.4	55	48 in.·lbf
Proportioning valve assy x Brake line	15.2	155	11
Front speed sensor x Steering knuckle	8.0	82	71 in.·lbf
Front speed sensor wire harness clamp x shock absorber Bolt A: Bolt B:	5.0 18.8	51 192	44 in.·lbf 14
Rear axle hub set bolt	80	816	59
Yawrate sensor x Body	12.5	127	9
Skid control ECU x Body	5.5	56	49 in.·lbf

PARKING BRAKE

030FS-01

SERVICE DATA

Parking brake pedal travel at 300 N (31 kgf, 68.3 lbf):	3 – 6 clicks
Parking brake lever travel at 200 N (20 kgf, 44.1 lbf):	6 – 9 clicks
Rear brake disc inside diameter	Standard inside diameter: 170 mm (6.69 in.) Maximum inside diameter: 171 mm (6.73 in.)
Parking brake shoe lining thickness	Standard thickness: 2.0 mm (0.079 in.) Minimum thickness: 1.0 mm (0.039 in.)
Parking brake shoe clearance between rear shoe and lever	Less than 0.35 mm (0.0138 in.)

TORQUE SPECIFICATION

Part Tightened	N·m	kgf·cm	ft·lbf
Wheel nut	103	1,050	76
Parking brake cable lock nut	Parking pedal type:	5.4	55
	Parking lever type:	5.0	51
Parking brake lever set bolt	12.5	128	9
Parking brake control pedal set bolt	39	398	29
Console box mounting set bolt	12.5	128	9
Parking brake cable No. 1 x Turn buckle	5.4	55	48 in·lbf
Parking brake cable No. 3 x Backing plate	7.8	80	69 in·lbf
Parking brake cable heart insulator set nut	5.4	55	48 in·lbf
Parking brake cable No. 4 x Body	12.5	128	9

AUTOMATIC TRANSMISSION / TRANSAXLE

SERVICE DATA

0305K-02

U241E (2AZ-FE)		
Line pressure (Wheel locked)	Engine idling D position R position AT stall (Throttle valve fully opened) D position R position	373 – 412 kPa (3.8 – 4.2 kgf-cm ² , 54 – 60 psi) 673 – 742 kPa (7.6 – 7.8 kgf-cm ² , 97 – 111 psi) 931 – 1,031 kPa (9.5 – 10.5 kgf-cm ² , 135 – 150 psi) 1,768 – 1,968 kPa (18.0 – 20.0 kgf-cm ² , 256 – 285 psi)
Engine stall revolution	D and R positions	2,550 ± 150 rpm
Time lag	N → D position N → R position	Less than 1.2 seconds Less than 1.5 seconds
Engine idle speed (A/C OFF)	N position	650 ± 50 rpm
Drive plate runout	Max.	0.20 mm (0.0079 in.)
Torque converter runout	Max.	0.30 mm (0.0118 in.)
Differential oil seal drive in depth	LH side RH side	0 ± 0.5 mm (0 ± 0.020 in.) 0 ± 0.5 mm (0 ± 0.020 in.)
Shift schedule		
D position (Throttle valve fully opened)	1 → 2 2 → 3 3 → 4 4 → 3 3 → 2 2 → 1	57 – 66 km/h (35 – 41 mph) 107 – 117 km/h (66 – 73 mph) 171 – 188 km/h (106 – 117 mph) 163 – 180 km/h (101 – 112 mph) 98 – 108 km/h (61 – 67 mph) 47 – 55 km/h (29 – 34 mph)
(Throttle valve fully closed)	3 → 4 4 → 3	40 – 47 km/h (25 – 29 mph) 18 – 24 km/h (11 – 15 mph)
2 position (Throttle valve fully opened)	1 → 2 3 → 2 2 → 1	57 – 66 km/h (35 – 41 mph) 107 – 117 km/h (66 – 73 mph) 47 – 55 km/h (29 – 34 mph)
L position (Throttle valve fully opened)	3 → 2 2 → 1	107 – 117 km/h (66 – 73 mph) 53 – 60 km/h (33 – 37 mph)
Lock-up point	Throttle valve opening 5 %	
O/D gear	Lock-up ON Lock-up OFF	64 – 72 km/h (40 – 45 mph) 62 – 70 km/h (39 – 43 mph)
U140E (1MZ-FE)		
Line pressure (Wheel locked)	Engine idling D position R position AT stall (Throttle valve fully opened) D position R position	373 – 412 kPa (3.8 – 4.2 kgf-cm ² , 54 – 60 psi) 673 – 742 kPa (7.6 – 7.8 kgf-cm ² , 97 – 111 psi) 931 – 1,031 kPa (9.5 – 10.5 kgf-cm ² , 135 – 150 psi) 1,768 – 1,968 kPa (18.0 – 20.0 kgf-cm ² , 256 – 285 psi)
Engine stall revolution	D and R position	2,680 ± 150 rpm
Time lag	N → D position N → R position	Less than 1.2 seconds Less than 1.5 seconds
Engine idle speed (A/C OFF)	N position	700 ± 50 rpm
Drive plate runout	Max.	0.20 mm (0.0079 in.)
Torque converter runout	Max.	0.30 mm (0.0118 in.)
Differential oil seal drive in depth	LH side RH side	0 ± 0.5 mm (0 ± 0.020 in.) 0 ± 0.5 mm (0 ± 0.020 in.)

U140E (1MZ-FE)		
Shift schedule		
D position		
(Throttle valve fully opened)	1 → 2	57 – 66 km/h (35 – 41 mph)
	2 → 3	108 – 118 km/h (67 – 73 mph)
	3 → 4	165 – 181 km/h (103 – 112 mph)
	4 → 3	154 – 171 km/h (96 – 106 mph)
	3 → 2	101 – 110 km/h (63 – 68 mph)
	2 → 1	43 – 50 km/h (27 – 31 mph)
(Throttle valve fully closed)		
(Throttle valve fully closed)	3 → 4	38 – 45 km/h (24 – 28 mph)
	4 → 3	18 – 24 km/h (11 – 15 mph)
2 position		
(Throttle valve fully opened)		
(Throttle valve fully opened)	1 → 2	57 – 66 km/h (35 – 41 mph)
	3 → 2	111 – 121 km/h (69 – 75 mph)
	2 → 1	43 – 50 km/h (27 – 31 mph)
L position		
(Throttle valve fully opened)		
(Throttle valve fully opened)	3 → 2	111 – 121 km/h (69 – 75 mph)
	2 → 1	50 – 58 km/h (31 – 36 mph)
Lock-up point		
O/D gear	Throttle valve opening 5 %	
	Lock-up ON	55 – 63 km/h (34 – 39 mph)
	Lock-up OFF	49 – 56 km/h (30 – 35 mph)

TORQUE SPECIFICATION

Part Tightened		N·m	kgf·cm	ft·lbf
Park/neutral position switch	Bolt	6.9	70	61 in.·lbf
	Nut	5.4	55	48 in.·lbf
Control shaft lever x Control shaft		12.7	130	9
Shift control cable x Control shaft lever		14.7	150	10
1MZ-FE: Transaxle housing x Engine block	A bolt	64	650	47
	B bolt	44	449	32
2AZ-FE: Transaxle housing x Engine block	A bolt	64	650	47
	B bolt	46	470	34
	C bolt	44	449	32
Torque converter clutch x Drive plate		41	418	30
Engine mounting bracket FR x Transaxle		64	653	47
Oil filler tube x Transaxle		5.5	56	49 in.·lbf
Control cable bracket x Transaxle		11.8	122	9
Oil cooler tube clamp x Control cable bracket		5.4	55	48 in.·lbf
Oil cooler inlet tube x Transaxle		34.3	350	25
Oil cooler outlet tube x Transaxle		34.3	350	25
Starter x Transaxle		37	377	27
Wire harness x Transaxle		25.5	260	19
Control cable clamp x Transaxle		11.8	122	9
Wire harness clamp x Transaxle		8.4	86	74 in.·lbf
Speed sensor x Transaxle		11.3	115	8
Revolution sensor x Transaxle		11.3	115	8
Drain plug x Oil pan		49	500	36
Transmission wire x Transaxle		5.4	55	48 in.·lbf
ATF temperature sensor x Valve body		6.6	67	58 in.·lbf
Oil pan x Transaxle		7.8	80	69 in.·lbf
Solenoid valve x Valve body	A bolt	6.6	67	58 in.·lbf
	B bolt	10.8	110	8
Valve body x transaxle		10.8	110	8
Oil strainer x Valve body		10.8	110	8
Floor shift assy x Body		11.8	122	9
Control cable x Body		4.9	50	43 in.·lbf

MANUAL TRANSMISSION / TRANSAXLE

030FO-01

SERVICE DATA

Transmission case oil seal drive in depth		3.5 ± 0.5 mm (0.138 ± 0.020 in.)
Front transaxle case cover oil seal drive in depth		0 ± 0.5 mm (0 ± 0.020 in.)
Manual transaxle assy		
5th gear thrust clearance	Standard clearance	0.10 – 0.65 mm (0.0039 – 0.0256 in.)
5th gear radial clearance	Standard clearance	0.009 – 0.050 mm (0.0004 – 0.0020 in.)
Reverse idler gear sub-assy inside diameter	Standard inside diameter	20.056 – 20.074 mm (0.7896 – 0.7903 in.)
	Maximum inside diameter	20.074 mm (0.7903 in.)
Reverse idler gear shaft outer diameter	Standard outer diameter	19.984 – 20.000 mm (0.7868 – 0.7874 in.)
	Minimum outer diameter	19.984 mm (0.7868 in.)
Transmission hub sleeve No.3 groove – thickness of the claw part on gear shift fork No.3	Standard clearance	0.15–0.35 mm (0.0059 – 0.0138 in.)
5th gear inside diameter	Standard inside diameter	34.981 – 34.997 mm (1.3772 – 1.3778 in.)
	Maximum inside diameter	34.997 mm (1.3778 in.)
Control shaft cover bimetal formed bush clearance		0.081 – 0.149 mm (0.0032 – 0.0059 in.)
Front transaxle case cover oil seal driven in depth		0 ± 0.5 mm (0 ± 0.020 in.)
Transmission case oil seal driven in depth		3.5 ± 0.5 mm (0.138 ± 0.020 in.)
Output shaft rear bearing clearance		3.8 – 4.4 mm (0.150 – 0.173 in.)
Output shaft bearing preload	New bearing	0.8 – 1.6 N·m (8.16 – 16.32 kgf·cm, 7.1 – 14.2 in.·lbf)
	Used bearing	0.5 – 1.0 N·m (5.10 – 10.20 kgf·cm, 4.4 – 8.9 in.·lbf)
Output shaft rear bearing shim thickness	0	1.30 mm (0.0512 in.)
	1	1.35 mm (0.0531 in.)
	2	1.40 mm (0.0551 in.)
	3	1.45 mm (0.0571 in.)
	4	1.50 mm (0.0591 in.)
	5	1.55 mm (0.0610 in.)
	6	1.60 mm (0.0630 in.)
	7	1.65 mm (0.0650 in.)
	8	1.70 mm (0.0669 in.)
	9	1.75 mm (0.0689 in.)
	A	1.80 mm (0.0709 in.)
	B	1.85 mm (0.0728 in.)
	C	1.90 mm (0.0748 in.)
	D	1.95 mm (0.0768 in.)
	E	2.00 mm (0.0787 in.)
	F	2.05 mm (0.0807 in.)
	G	2.10 mm (0.0827 in.)
	H	2.15 mm (0.0846 in.)
	J	2.20 mm (0.0866 in.)
	K	2.25 mm (0.0886 in.)
	L	2.30 mm (0.0906 in.)
	M	2.35 mm (0.0925 in.)
	N	2.40 mm (0.0945 in.)
	P	2.45 mm (0.0965 in.)
	Q	2.50 mm (0.0984 in.)
Front differential case tapered roller bearing preload	New bearing	0.8 – 1.6 N·m (8.16 – 16.32 kgf·cm, 7.1 – 14.2 in.·lbf)
	Used bearing	0.5 – 1.0 N·m (5.10 – 10.20 kgf·cm, 4.4 – 8.9 in.·lbf)

SERVICE SPECIFICATIONS – MANUAL TRANSMISSION / TRANSAXLE

Transmission case oil seal drive in depth		3.5 ± 0.5 mm (0.138 ± 0.020 in.)
Front differential case shim RR thickness	0	2.00 mm (0.0787 in.)
	1	2.05 mm (0.0807 in.)
	2	2.10 mm (0.0827 in.)
	3	2.15 mm (0.0846 in.)
	4	2.20 mm (0.0866 in.)
	5	2.25 mm (0.0886 in.)
	6	2.30 mm (0.0906 in.)
	7	2.35 mm (0.0925 in.)
	8	2.40 mm (0.0945 in.)
	9	2.45 mm (0.0965 in.)
	A	2.50 mm (0.0984 in.)
	B	2.55 mm (0.1004 in.)
	C	2.60 mm (0.1024 in.)
	D	2.65 mm (0.1043 in.)
	E	2.70 mm (0.1063 in.)
	F	2.75 mm (0.1083 in.)
	G	2.80 mm (0.1102 in.)
	H	2.85 mm (0.1122 in.)
Front differential case oil seal clearance		1 – 2 mm (0.0394 – 0.0787 in.)
Input shaft front bearing clearance		4.28 – 4.60 mm (0.1685 – 0.1811 in.)
Reverse restrict pin clearance		12.5 – 13.5 mm (0.492 – 0.531 in.)
Transmission clutch hub No.3 snap ring clearance		0.1 mm or less (0.0039 in. or less)
Transmission clutch hub No.3 snap ring thickness	a	1.75 – 1.80 mm (0.0689 – 0.0709 in.)
	b	1.80 – 1.85 mm (0.0709 – 0.0728 in.)
	c	1.85 – 1.90 mm (0.0728 – 0.0748 in.)
	d	1.90 – 1.95 mm (0.0748 – 0.0768 in.)
	e	1.95 – 2.00 mm (0.0768 – 0.0787 in.)
	f	2.00 – 2.05 mm (0.0787 – 0.0807 in.)
	g	2.05 – 2.10 mm (0.0807 – 0.0827 in.)
	h	2.10 – 2.15 mm (0.0827 – 0.0846 in.)
	j	2.15 – 2.20 mm (0.0846 – 0.0866 in.)
5th gear radial clearance	Standard clearance	0.009 – 0.050 mm (0.0004 – 0.0020 in.)
5th gear thrust clearance	Standard clearance	0.10 – 0.65 mm (0.0039 – 0.0260 in.)
Input shaft assy		
4th gear thrust clearance	Standard clearance	0.10 – 0.57 mm (0.0039 – 0.0224 in.)
3rd gear thrust clearance	Standard clearance	0.10 – 0.35 mm (0.0039 – 0.0138 in.)
4th gear radial clearance	KOYO made	0.009 – 0.053 mm (0.0004 – 0.0021 in.)
	NSK made	0.009 – 0.051 mm (0.0004 – 0.0020 in.)
3rd gear radial clearance	KOYO made	0.009 – 0.053 mm (0.0004 – 0.0021 in.)
	NSK made	0.009 – 0.051 mm (0.0004 – 0.0020 in.)
Input shaft run out	Maximum run out:	0.03 mm (0.0012 in.)
Input shaft standard outer diameter	A	35.984 – 36.000 mm (1.4167 – 1.4173 in.)
	B	35.984 – 36.000 mm (1.4167 – 1.4173 in.)
	C	27.957 – 27.972 mm (1.1007 – 1.1013 in.)
Input shaft minimum outer diameter	A	35.984 mm (1.4167 in.)
	B	35.984 mm (1.4167 in.)
	C	27.957 mm (1.1007 in.)
4th gear inside diameter	Standard inside diameter	42.09 – 42.025 mm (1.6539 – 1.6545 in.)
	Maximum inside diameter	42.025 mm (1.6545 in.)
3rd gear inside diameter	Standard inside diameter	43.009 – 43.025 mm (1.6933 – 1.6939 in.)
	Maximum inside diameter	43.025 mm (1.6939 in.)
Between the 4th gear spline end and synchronizer outer ring back clearance		0.75 – 1.65 mm (0.0295 – 0.0650 in.)
Between the 3rd gear spline end and synchronizer outer ring back clearance		0.65 – 1.75 mm (0.0256 – 0.0689 in.)
Transmission hub sleeve No.3 groove – thickness of the claw part on gear shift fork No.1	Standard clearance	0.15 – 0.35 mm (0.0059 – 0.0138 in.)
Transmission clutch hub No.2 snap ring clearance	Standard clearance	0.1 mm or less (0.0039 in. or less)

Transmission case oil seal drive in depth		3.5 ± 0.5 mm (0.138 ± 0.020 in.)
Transmission clutch hub No.2 snap ring thickness	H	2.30 – 2.35 mm (0.0906 – 0.0925 in.)
	J	2.35 – 2.40 mm (0.0925 – 0.0945 in.)
	K	2.40 – 2.45 mm (0.0945 – 0.0965 in.)
	L	2.45 – 2.50 mm (0.0965 – 0.0984 in.)
	M	2.50 – 2.55 mm (0.0984 – 0.1004 in.)
	N	2.55 – 2.60 mm (0.1004 – 0.1024 in.)
	P	2.60 – 2.65 mm (0.1024 – 0.1043 in.)
Input shaft rear radial ball bearing snap ring clearance	Standard clearance	0.1 mm or less (0.0039 in. or less)
Input shaft rear radial ball bearing snap ring thickness	1	2.35 – 2.40 mm (0.0925 – 0.0945 in.)
	2	2.40 – 2.45 mm (0.0945 – 0.0965 in.)
	3	2.45 – 2.50 mm (0.0965 – 0.0984 in.)
	4	2.50 – 2.55 mm (0.0984 – 0.1004 in.)
	5	2.55 – 2.60 mm (0.1004 – 0.1024 in.)
	6	2.60 – 2.65 mm (0.1024 – 0.1043 in.)
	7	2.65 – 2.70 mm (0.1043 – 0.1063 in.)
	8	2.70 – 2.75 mm (0.1063 – 0.1083 in.)
3rd gear radial clearance	KOYO made	0.009 – 0.053 mm (0.0004 – 0.0021 in.)
	NSK made	0.009 – 0.051 mm (0.0004 – 0.0020 in.)
4th gear radial clearance	KOYO made	0.009 – 0.053 mm (0.0004 – 0.0021 in.)
	NSK made	0.009 – 0.051 mm (0.0004 – 0.0020 in.)
3rd gear thrust clearance	Standard clearance	0.10 – 0.35 mm (0.0039 – 0.0138 in.)
4th gear thrust clearance	Standard clearance	0.10 – 0.57 mm (0.0039 – 0.0224 in.)
Output shaft assy		
1st gear thrust clearance	Standard clearance	0.25 – 0.40 mm (0.0098 – 0.0157 in.)
2nd gear thrust clearance	Standard clearance	0.10 – 0.35 mm (0.0039 – 0.0138 in.)
1st gear radial clearance	KOYO made	0.009 – 0.053 mm (0.0004 – 0.0021 in.)
	NSK made	0.009 – 0.051 mm (0.0004 – 0.0020 in.)
2nd gear radial clearance	KOYO made	0.009 – 0.053 mm (0.0004 – 0.0021 in.)
	NSK made	0.009 – 0.051 mm (0.0004 – 0.0020 in.)
Output shaft run out	Maximum run out	0.03 mm (0.0012 in.)
Output shaft standard outer diameter	A	37.610 – 37.626 mm (1.4807 – 1.4813 in.)
	B	34.802 – 34.512 mm (1.3702 – 1.3587 in.)
Output shaft minimum outer diameter	A	37.610 mm (1.4807 in.)
	B	34.802 mm (1.3702 in.)
2nd gear inside diameter	Standard inside diameter	50.009 – 50.025 mm (1.9689 – 1.9695 in.)
	Maximum inside diameter	50.025 mm (1.9695 in.)
1st gear inside diameter	Standard inside diameter	51.009 – 51.025 (2.0082 – 2.0089 in.)
	Maximum inside diameter	51.025 mm (2.0089 in.)
Between the 2nd gear while and synchronizer ring No.2 back clearance		0.70 – 1.45 mm (0.0276 – 0.0571 in.)
Between the 1st gear while and synchronizer ring set No.1 back clearance		0.70 – 1.45 mm (0.0276 – 0.0571 in.)
Reverse gear groove – thickness of the claw part on gear shift fork No.1 clearance	Standard clearance	0.15 – 0.35 mm (0.0059 – 0.0138 in.)
2nd gear radial clearance	KOYO made	0.009 – 0.053 mm (0.0004 – 0.0021 in.)
	NSK made	0.009 – 0.051 mm (0.0004 – 0.0020 in.)
1st gear radial clearance	KOYO made	0.009 – 0.053 mm (0.0004 – 0.0021 in.)
	NSK made	0.009 – 0.051 mm (0.0004 – 0.0020 in.)
2nd gear thrust clearance	Standard clearance	0.10 – 0.35 mm (0.0039 – 0.0138 in.)
1st gear thrust clearance	Standard clearance	0.25 – 0.40 mm (0.0098 – 0.0157 in.)
Differential case assy		
Front differential side gear backlash	Standard backlash	0.05 – 0.20 mm (0.0020 – 0.0079 in.)
Front differential pinion thrust washer thickness	Minimum thickness	0.9 mm (0.035 in.)
Front differential pinion shaft No.1 thickness	Minimum thickness	17.975 mm (0.70768 in.)
Front differential side gear backlash	Standard backlash	0.05 – 0.20 mm (0.0020 – 0.0079 in.)

SERVICE SPECIFICATIONS – MANUAL TRANSMISSION / TRANSAXLE

Transmission case oil seal drive in depth		3.5 ± 0.5 mm (0.138 ± 0.020 in.)
Front differential side gear thrust washer thickness	1	1.00 mm (0.0394 in.)
	2	1.10 mm (0.0433 in.)
	3	1.20 mm (0.0472 in.)
	4	1.30 mm (0.0512 in.)
Shift & select lever shaft assy		
Control shaft cover bimetal formed bush drive in depth		0 ± 0.25 mm (0 ± 0.010 in.)
Control shaft cover oil seal drive in depth		28.5 ± 0.50 mm (1.122 ± 0.020 in.)
Shift lever slotted pin clearance to the shift lever inner assy		–0.5 – 0.5 mm (–0.0197 – 0.0197 in.)
Shift lever slotted pin clearance to the shift lever inner No.2		5.8 – 6.8 mm (0.228 – 0.268 in.)

TORQUE SPECIFICATION

Part Tightened	N-m	kgf-cm	ft-lbf	
Hub nut	103	1,050	76	
Floor shift lever assembly x Body	12	122	9	
Floor shift cable transmission control shift clamp x Body	5.0	51	44 in. lbf	
Floor shift cable transmission control shift retainer x Body	5.0	51	44 in. lbf	
Gear shift fork No. 1 set bolt	24	240	17	
Reverse shift arm bracket assy x Manual transaxle case	17	175	13	
Reverse restrict pin plug	13	133	9.6	
Oil receiver pipe No. 1 x Manual transmission case	17	175	13	
Clutch tube bracket set bolt	17	173	13	
Reverse idler gear shaft bolt	30	306	22	
Gear shift fork No. 3 shift fork bolt	24	244	17	
Manual transmission output shaft rear set nut	123	1,250	90	
Drain plug sub-assy	49	500	36	
Manual transmission filler plug	49	500	36	
Back up lamp switch assy x Manual transmission case	40	410	30	
Manual transmission breather plug x Manual transmission case	49	500	36	
Lock ball assy No. 1 x Manual transmission case	29	300	22	
Control shaft cover set bolt	20	200	14	
Control shift lever x Shift & select lever shaft	6.4	65	57 in. lbf	
Selecting ballcrank assy x Manual transmission case	20	200	14	
Release fork support x Manual transaxle case	47.1	480	35	
Manual transaxle x Engine	Bolt A	64	650	47
	Bolt B	46	470	34
	Bolt C	44	449	32
Transverse engine engine mounting insulator x Manual transaxle	64	653	47	
Exhaust pipe support bracket No. 1 x Manual transaxle	8.0	82	71 in. lbf	
Manual transmission case protector x Manual transaxle	18	184	13	
Transverse engine engine mounting bracket x Manual transaxle	64	653	47	
Starter assy x Manual transaxle	37	377	27	
Wire harness clamp x Manual transaxle	8.0	82	71 in. lbf	
Engine wire No. 3 x Manual transaxle	25.5	260	19	
Transmission case x Manual transaxle case	29	296	21	
Manual transaxle case x Transmission case	30	306	22	
Bearing retainer RR x Transmission case	42	428	31	
Manual transaxle case receiver x Manual transaxle case	7	71	62 in. lbf	
Gear shift head No.1 x Gear shift fork shaft No.2	24	245	18	
Gear shift fork No.1 x Gear shift fork shaft No.1	24	245	18	
Reverse shift arm bracket x Manual transaxle case	17	173	13	
Reverse restrict pin plug x Transmission case	13	133	9.6	
Oil receiver pipe No.1 x Transmission case	17	173	13	
Oil receiver pipe No.2 x Transmission case	17	173	13	
Clutch tube bracket x Transmission case	17	173	13	
Reverse idler gear shaft bolt x Transmission case	30	306	22	
Transmission clutch hub No.3 gear shift fork shaft x input shaft	24	245	18	
Manual transmission output rear set nat. x Output shaft	123	1,254	91	
Drain (MTM) plug sub-assy x Transmission case	49	500	36	
Manual transmission filler plug x Transmission case	49	500	36	
Back up lamp switch assy x Transmission case	40	408	30	
Manual transmission breather plug x Transmission case	49	500	36	
Lock ball assy No.1 x Transmission case	29	296	21	

SERVICE SPECIFICATIONS – MANUAL TRANSMISSION / TRANSAXLE

Part Tightened	N·m	kgf·cm	ft·lbf
Control shift cover x Transmission case	20	204	15
Control shift lever x Shift & select lever assy	6.4	65	57 in·lbf
Selecting bell crank assy x Transmission case	20	204	15
Selecting bellcrank support x Selecting bellcrank No.2 plate washer	12	122	9
Release fork support x Manual transaxle case	47.1	480	35
Front differential ring gear x Front differential case	106	1,081	78

CLUTCH

SERVICE DATA

030EF-01

Pedal height from asphalt sheet		159.0 – 169.0 mm (6.260 – 6.654 in.)
Clutch pedal free play		5.0 – 15.0 mm (0.197 – 0.591 in.)
Clutch pedal push rod play at pedal top		1.0 – 5.0 mm (0.039 – 0.197 in.)
Slotted spring pin protrusion	Maximum	1.5 – 3.5 mm (0.059 – 0.138 in.)
Disc rivet head depth	Maximum	0.3 mm (0.012 in.)
Disc runout	Minimum	0.8 mm (0.031 in.)
Diaphragm spring finger wear	Maximum depth:	0.5 mm (0.020 in.)
	Maximum width:	6.0 mm (0.236 in.)
Flywheel runout	Maximum	0.1 mm (0.004 in.)
Diaphragm spring finger wear	Maximum depth	0.5 mm (0.020 in.)
Clutch release point from pedal full stroke end position		25 mm (0.98 in.) or more

TORQUE SPECIFICATION

Part Tightened	N·m	kgf·cm	ft·lbf
Clutch pedal sub-assy x Clutch pedal support	36.8	375	27
Clutch pedal support set bolt x Body	19.1	195	14
Cylinder push rod clevis lock nut	25.5	260	19
Clutch master cylinder assy x Clutch pedal support	11.8	120	9
Clutch master cylinder assy x Flexible hose tube	15.2	155	11
Master cylinder bleeder plug	8.3	85	73 in.·lbf
Release cylinder bleeder plug	8.3	85	73 in.·lbf
Clutch release cylinder assy x Transaxle housing	11.8	120	9
Clutch release cylinder assy x flexible hose tube	15.2	155	11
Clutch cover assy x Flywheel	19.1	195	14
Release fork support x Transaxle assy	47.1	480	35
Clutch start switch assy set nut	15.68	160	12

0304Y-02

Steering wheel freeplay	Maximum	30 mm (1.18 in.)
Steering main shaft length	Standard length	474.5 ± 1 mm (18.681 ± 0.039 in.)

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
Tie rod end lock nut	74	750	54
Universal joint assy x Main shaft assy	35.3	360	26
Steering column assembly set bolt and nut	20.6	210	15
Intermediate shaft sub-assy x Universal joint assembly	35.3	360	26
Intermediate shaft sub-assy x Control valve shaft	35.3	360	26
Steering wheel set nut	50	510	37
Steering wheel pad set screw (Torx screw)	8.8	90	78 in.·lbf

POWER STEERING

SERVICE DATA

030EH-01

POWER STEERING FLUID		
Fluid level rise	Maximum	5 mm (0.20 in.)
Fluid pressure at idle speed with valve closed		7,800 – 8,300 kPa (80 – 85 kgf/cm ² , 1,138 – 1,209 psi)
STEERING WHEEL		
Steering effort at idle speed	(Reference)	6 N·m (60 kgf·cm, 53 in.·lbf)
POWER STEERING VANE PUMP (2AZ-FE)		
Vane pump rotating torque		0.27 N·m (2.8 kgf·cm, 2.4 in.·lbf) or less
Vane pump shaft and vane pump housing seal clearance	STD Maximum	0.009 – 0.031 mm (0.00035 – 0.00122 in.) 0.07 mm (0.0028 in.)
Vane plate height	Minimum	7.7 mm (0.303 in.)
Vane plate thickness	Minimum	1.408 mm (0.05543 in.)
Vane plate length	Minimum	11.993 mm (0.47216 in.)
Vane plate and vane rotor groove clearance	Maximum	0.03 mm (0.0012 in.)
Spring free length	Minimum	35.8 mm (1.409 in.)
POWER STEERING VANE PUMP (1MZ-FE)		
Vane pump rotating torque		0.27 N·m (2.8 kgf·cm, 2.4 in.·lbf) or less
Vane pump shaft and vane pump housing oil clearance	STD Maximum	0.027 – 0.054 mm (0.00106 – 0.00213 in.) 0.07 mm (0.0028 in.)
Vane plate height	Minimum	8.7 mm (0.343 in.)
Vane plate thickness	Minimum	1.4 mm (0.055 in.)
Vane plate length	Minimum	14.991 mm (0.59020 in.)
Clearance between the rotor groove and plate	Maximum	0.03 mm (0.0012 in.)
Spring free length	Minimum	32.24 mm (1.2693 in.)
POWER STEERING GEAR		
Steering rack runout	Maximum	0.3 mm (0.012 in.)
Total preload (Tie rod rotating torque)	(Turning)	0.83 – 3.43 N·m (7.3 – 30.4 kgf·cm, 7.3 – 30.4 in.·lbf)
Total preload (Control valve rotating torque)	(Turning)	1.2 – 1.5 N·m (12.2 – 15.3 kgf·cm, 10.6 – 13.3 in.·lbf)

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
POWER STEERING VANE PUMP (2AZ-FE)			
Vane pump housing rear x Vane pump housing front	22	224	16
Pressure port union	69	704	51
Power steering suction port union set bolt	12	122	9
Power steering oil pressure switch	21	214	15
Pressure feed tube assy x Vane pump assy	51.5	525	38
Vane pump assy set bolt	Bolt A	30 (43)	22 (32)
	Bolt B	43	32
POWER STEERING VANE PUMP (1MZ-FE)			
Vane pump housing rear x Vane pump housing front	24	245	18
Pressure port union	83	846	61
Power steering suction port union set bolt	13	133	10
Pump bracket front x Vane pump bracket rear	(TYPE A VANE PUMP)	43	32
	(TYPE B VANE PUMP)	44	32
Vane pump pulley set nut	(TYPE A VANE PUMP)	44	32
Vane pump assy set bolt	43	438	32
Pressure feed tube assy x Vane pump assy	51.5	525	38
Power steering oil pressure switch	21	214	15
POWER STEERING GEAR			
Control valve housing set bolt	21	214	15
Control valve shaft lock nut	24.5	250	18
Rack housing cap	58.5	597	43
Rack guide spring cap nut	48 (68.5)	489 (699)	35 (51)
Power steering rack x Steering rack end sub-assy	58.5 (83.5)	597 (851)	43 (62)
Tie rod assy lock nut	74	755	55
Turn pressure tube union nut	11.5 (12.5)	117 (127)	8 (9)
Rack & pinion power steering gear assy set bolt and nut	70	714	52
Pressure feed and return tubes x Control valve housing	22.5 (24.5)	229 (250)	17 (18)
Pressure feed tube clamp set bolt	9.8	100	86 in.·lbf
Return tube assy clamp set nut	9.8	100	86 in.·lbf
Front stabilizer bracket	19	194	14
Stabilizer link assy set nut	74	755	55
Tie rod assy set nut	49	500	36
Intermediate shaft sub-assy x Control valve	35.3	360	26
Hub nut	103	1,050	76

(): For use without SST

HEATER & AIR CONDITIONER

030FJ-01

SERVICE DATA

Refrigerant charge volume	Standard: 550 ± 50 g (19.37 ± 1.76 oz.)
V (cooler compressor to crankshaft pulley) belt No. 1 tension	New belt: 165 ± 27 lbf Used belt: 88 ± 22 lbf
Magnetic clutch clearance (1MZ-FE)	0.35 – 0.60 mm (0.014 – 0.024 in.)
Magnetic clutch clearance (2AZ-FE)	0.35 – 0.60 mm (0.014 – 0.024 in.)

TORQUE SPECIFICATION

Part Tightened	N·m	kgf·cm	ft·lbf
V (COOLER COMPRESSOR TO CRANKSHAFT PULLEY) BELT NO.1			
Generator installation bolt Bolt A	17.5	178	12
Generator installation bolt Bolt C	58	591	43
AIR CONDITIONING RADIATOR ASSY			
Air conditioning tube assy x Cooler evaporator sub-assy No. 1	3.5	35	30 in.·lbf
Air conditioning radiator assy x Body	1.5	15	12 in.·lbf
Blower assy x Body	1.5	15	12 in.·lbf
Junction block x Instrument panel reinforcement	8.4	85	73 in.·lbf
Instrument panel brace sub-assy No. 1 x Instrument panel reinforcement Screw	9.8	100	87 in.·lbf
COOLER COMPRESSOR ASSY (1MZ-FE)			
Magnet clutch hub x Cooler compressor assy	18	184	13
Compressor and magnet clutch x Engine Bolt A, B, C, F Nut D	25	250	18
Compressor and magnet clutch x Engine Bolt E	18	184	13
Cooler refrigerant suction hose No.1 x Compressor and magnet clutch	9.8	100	87 in.·lbf
Cooler refrigerant discharge hose No.1 x Compressor and magnet clutch	9.8	100	87 in.·lbf
COOLER COMPRESSOR ASSY (2AZ-FE)			
Magnet clutch hub x Cooler compressor assy	18	184	13
Compressor and magnet clutch x Engine	25	250	18
Cooler refrigerant suction hose No.1 x Compressor and magnet clutch	9.8	100	87 in.·lbf
Cooler refrigerant discharge hose No.1 x Compressor and magnet clutch	9.8	100	87 in.·lbf
COOLER CONDENSER ASSY			
Cap x Cooler condenser assy	12	125	9
Cooler condenser assy x Body	9.8	100	85 in.·lbf
Cooler refrigerant liquid pipe A x Cooler condenser assy	5.4	55	47 in.·lbf
Cooler refrigerant discharge hose No. 1 x Cooler condenser assy	5.4	55	47 in.·lbf

SUPPLEMENTAL RESTRAINT SYSTEM

TORQUE SPECIFICATION

030FN-01

Part Tightened	N·m	kgf·cm	ft·lbf
Horn button assy x Steering wheel assy	8.8	90	78 in·lbf
Steering wheel assy x Steering column assy	50	510	37
Instr pnl pass l/door airbag assy x Instrument panel reinforcement	20	200	14
Curtain shield airbag assy x Body	9.8	100	87 in·lbf
Airbag sensor assy center x Body	17.5	178	13
Airbag front sensor set bolt	17.5	178	13
Side airbag sensor assy LH x Body	20	200	14
Airbag sensor rear LH x Body	Property class 8T:	20	14
	Property class 6T:	17.5	13
Seat position airbag sensor x Front seat	8.0	82	71 in·lbf

WIPER & WASHER

TORQUE SPECIFICATION

030FM-01

Part Tightened	N·m	kgf·cm	ft·lbf
Wind shield wiper motor assy × Wiper link assy	5.4	55	48 in·lbf
Wiper link assy × Body	7.0	71	62 in·lbf
FR Wiper arm RH × Wiper link	20.1	205	15
FR Wiper arm LH × Wiper link	20.1	205	15

INSTRUMENT PANEL/METER

TORQUE SPECIFICATION

030FF-01

Part Tightened		N·m	kgf·cm	ft·lbf
Instrument panel reinforce × Body	Bolt <E>	20	200	14
Front pillar garnish × Body		7.5 – 20	76 – 204	66 – 117 in.·lbf

ENGINE HOOD/DOOR

TORQUE SPECIFICATION

030FL-01

Part Tightened	N·m	kgf·cm	ft·lbf
HOOD	–	–	–
Hood x Hood hinge	26	265	19
FRONT DOOR	–	–	–
Door hinge x Body	26	265	19
Door hinge x Door panel	26	265	19
Door lock striker x Body	23	235	17
REAR DOOR	–	–	–
Door hinge x Body	26	265	19
Door hinge x Door panel	26	265	19
Door lock striker x Body	23	235	17