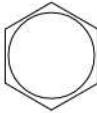
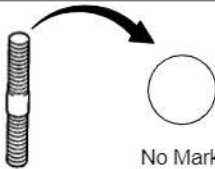
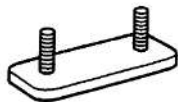
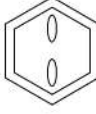
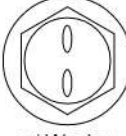


STANDARD BOLT

HOW TO DETERMINE BOLT STRENGTH

0307K-02

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

B06431

TORQUE SPECIFICATION

2AZ-FE:

Part Tightened	N·m	kgf·cm	ft·lbf
Charcoal canister assy x Body	39.2	400	29
Ventilation valve sub-assy x Cylinder head cover	19	193	9

1MZ-FE/3MZ-FE:

Part Tightened	N·m	kgf·cm	ft·lbf
Charcoal canister assy x Body	39.2	400	29
Ventilation valve sub-assy x Cylinder head cover	19	193	9

INTAKE
SERVICE DATA
2AZ-FE

030ER-04

Intake manifold runner valve assy		
Standard voltage	IAC valve open	3.0 to 4.2 V
	IAC valve close	0.3 to 1.0 V
Resistance	Terminals 4 and 5 at 20°C (68°F)	3.0 to 10 Ω

1MZ-FE/3MZ-FE

Vacuum switching valve assy for No. 1 (1MZ-FE only) and No. 2		
Resistance	at 20°C (68°F)	33 to 39 Ω
Vacuum switching valve assy for No. 3		
Resistance	at 20°C (68°F)	37 to 44 Ω

TORQUE SPECIFICATION

2AZ-FE

Part Tightened	N·m	kgf·cm	ft·lbf
Intake manifold x Cylinder head	30	306	22
Air cleaner cap sub-assy x Air cleaner case sub-assy	5.0	51	44 in·lbf
Engine cover sub-assy No. 1 x Cylinder head cover sub-assy	7.0	71	62 in·lbf

1MZ-FE/3MZ-FE

Part Tightened	N·m	kgf·cm	ft·lbf
Intake air control valve assy x Intake air surge tank (see page 13-12)			
Bolt A and nut A	21	214	15
Bolt B	20	204	15
Intake air control valve assy No. 2 x Intake air surge tank	10	102	7

ENGINE MECHANICAL

SERVICE DATA

030ET-04

2AZ-FE

Ignition timing	w/ Terminals TC and CG of DLC3 connected w/ Terminals TC and CG of DLC3 disconnected	8 to 12●BTDC @ idle 5 to 15●BTDC @ idle
Idle speed	M/T A/T	650 to 750 rpm 610 to 710 rpm
Compression		
Compression pressure	PZEV Except PZEV	1.300 MPa (13.3 kgf/cm ² , 189 psi) 1.360 MPa (13.9 kgf/cm ² , 198 psi)
Minimum pressure	PZEV Except PZEV	1.000 MPa (10.2 kgf/cm ² , 145 psi) 0.98 MPa (10 kgf/cm ² , 142 psi)
Difference between each cylinder	PZEV Except PZEV	29 kPa (0.3 kgf/cm ² , 4.3 psi) 100 kPa (1.0 kgf/cm ² , 14 psi)
Valve clearance (cold)	Intake Exhaust	0.19 to 0.29 mm (0.008 to 0.011 in.) 0.30 to 0.40 mm (0.012 to 0.016 in.)
Balanceshaft		
Specified thrust clearance		0.050 to 0.090 mm (0.0020 to 0.0035 in.)
Specified oil clearance		0.004 to 0.031 mm (0.0002 to 0.0012 in.)
Housing journal bore diameter	Mark 1 Mark 2 Mark 3	26.000 to 26.006 mm (1.0236 to 1.0239 in.) 26.006 to 26.012 mm (1.0239 to 1.0241 in.) 26.012 to 26.018 mm (1.0241 to 1.0243 in.)
Journal diameter		22.985 to 23.000 mm (0.9049 to 0.9055 in.)
Bearing center wall thickness	Mark 1 Mark 2 Mark 3	1.486 to 1.489 mm (0.0585 to 0.0586 in.) 1.489 to 1.492 mm (0.0586 to 0.0587 in.) 1.492 to 1.495 mm (0.0587 to 0.0589 in.)
Oil pump drive sprocket		
Minimum sprocket diameter (w/ chain)		48.2 mm (1.898 in.)
Oil pump drive shaft sprocket		
Minimum sprocket diameter (w/ chain)		48.2 mm (1.898 in.)
Crankshaft timing sprocket		
Minimum sprocket diameter (w/ chain)		51.6 mm (2.031 in.)
Chain tensioner slipper		
Maximum wear		1.0 mm (0.039 in.)
Chain vibration damper No. 1		
Maximum wear		1.0 mm (0.039 in.)
Cylinder head set bolt		
Specified bolt length		161.3 to 164.2 mm (6.350 to 6.465 in.)
Chain sub-assy		
Maximum chain elongation		115.4 mm (4.543 in.)
Camshaft timing gear or sprocket		
Minimum gear or sprocket diameter (w/ chain)		97.3 mm (3.831 in.)
Intake manifold		
Maximum warpage		0.20 mm (0.0079 in.)
Exhaust manifold		
Maximum warpage		0.70 mm (0.0276 in.)

Camshaft (Intake)		
Maximum circle runout		0.03 mm (0.0012 in.)
Specified cam lobe height		46.599 to 46.809 mm (1.8346 to 1.8429 in.)
No. 1 journal diameter		35.971 to 35.985 mm (1.4162 to 1.4167 in.)
Other journal diameter		22.959 to 22.975 mm (0.9039 to 0.9045 in.)
Specified journal thrust clearance		0.040 to 0.110 mm (0.0016 to 0.0043 in.)
Specified journal oil clearance	No. 1 journal bearing mark 1	0.007 to 0.070 mm (0.0003 to 0.0028 in.)
	No. 1 journal bearing mark 2	0.008 to 0.070 mm (0.0003 to 0.0028 in.)
	No. 1 journal bearing mark 3	0.008 to 0.070 mm (0.0003 to 0.0028 in.)
	Other journals	0.025 to 0.100 mm (0.0010 to 0.0039 in.)
Cylinder head journal bore diameter	Mark 1	40.000 to 40.009 mm (1.5748 to 1.5752 in.)
	Mark 2	40.009 to 40.017 mm (1.5752 to 1.5755 in.)
	Mark 3	40.017 to 40.025 mm (1.5755 to 1.5758 in.)
Standard bearing center wall thickness	Mark 1	2.000 to 2.004 mm (0.0787 to 0.0789 in.)
	Mark 2	2.004 to 2.008 mm (0.0789 to 0.0791 in.)
	Mark 3	2.008 to 2.012 mm (0.0791 to 0.0792 in.)
Camshaft journal diameter		35.971 to 35.985 mm (1.4162 to 1.4167 in.)
Camshaft No. 2 (Exhaust)		
Maximum circle runout		0.03 mm (0.0012 in.)
Specified cam lobe height		46.599 to 46.809 mm (1.8346 to 1.8429 in.)
No. 1 journal diameter		35.971 to 35.985 mm (1.4162 to 1.4167 in.)
Other journal diameter		22.959 to 22.975 mm (0.9039 to 0.9045 in.)
Specified thrust clearance		0.080 to 0.150 mm (0.0032 to 0.0059 in.)
Specified journal oil clearance	No. 1 journal	0.040 to 0.100 mm (0.0016 to 0.0039 in.)
	Other journals	0.025 to 0.100 mm (0.0010 to 0.0039 in.)
Cylinder head journal bore diameter	Mark 1	40.000 to 40.009 mm (1.5748 to 1.5752 in.)
	Mark 2	40.009 to 40.017 mm (1.5752 to 1.5755 in.)
	Mark 3	40.017 to 40.025 mm (1.5755 to 1.5758 in.)
Standard bearing center wall thickness	Mark 1	2.000 to 2.004 mm (0.0787 to 0.0789 in.)
	Mark 2	2.004 to 2.008 mm (0.0789 to 0.0791 in.)
	Mark 3	2.008 to 2.012 mm (0.0791 to 0.0792 in.)
Camshaft journal diameter		35.971 to 35.985 mm (1.4162 to 1.4167 in.)
Cylinder head		
Maximum warpage	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.)
Maximum deviation		1.6 mm (0.063 in.)
Intake valve		
Specified overall length		101.21 to 101.71 mm (3.9846 to 4.0043 in.)
Valve stem diameter		5.470 to 5.485 mm (0.2154 to 0.2159 in.)
Minimum margin thickness		0.50 to 1.45 mm (0.0197 to 0.0571 in.)
Exhaust valve		
Specified overall length		100.70 to 101.15 mm (3.9646 to 3.9823 in.)
Valve stem diameter		5.465 to 5.480 mm (0.2152 to 0.2157 in.)
Minimum margin thickness		0.50 to 1.60 mm (0.0197 to 0.0630 in.)
Intake valve guide bush		
Bush inside diameter		5.510 to 5.530 mm (0.2169 to 0.2177 in.)
Specified bush oil clearance		0.025 to 0.080 mm (0.0010 to 0.0031 in.)
Exhaust valve guide bush		
Bush inside diameter		5.510 to 5.530 mm (0.2169 to 0.2177 in.)
Specified bush oil clearance		0.030 to 0.100 mm (0.0012 to 0.0039 in.)
Valve lifter		
Lifter diameter		30.966 to 30.976 mm (1.2191 to 1.2195 in.)
Lifter bore diameter		31.009 to 31.025 mm (1.2208 to 1.2215 in.)
Specified oil clearance		0.033 to 0.070 mm (0.0013 to 0.0028 in.)
Cylinder block		
Maximum warpage		0.05 mm (0.0020 in.)
Specified cylinder bore diameter		88.500 to 88.633 mm (3.4843 to 3.4894 in.)

SERVICE SPECIFICATIONS – ENGINE MECHANICAL

Connecting rod		
Specified thrust clearance		0.160 to 0.362 mm (0.0063 to 0.0143 in.)
Specified oil clearance		0.024 to 0.080 mm (0.0009 to 0.0031 in.)
Connecting rod bearing center wall thickness (Reference)	Mark 1	1.485 to 1.488 mm (0.0585 to 0.0586 in.)
	Mark 2	1.488 to 1.491 mm (0.0586 to 0.0587 in.)
	Mark 3	1.491 to 1.494 mm (0.0587 to 0.0588 in.)
Bush inside diameter		22.005 to 22.014 mm (0.8663 to 0.8667 in.)
Bush inside diameter (Reference)	Mark A	22.005 to 22.008 mm (0.8663 to 0.8665 in.)
	Mark B	22.008 to 22.011 mm (0.8665 to 0.8666 in.)
	Mark C	22.011 to 22.014 mm (0.8666 to 0.8667 in.)
Maximum rod out-of-alignment per 100 mm (3.94 in.)		0.05 mm (0.0020 in.)
Maximum rod twist per 100 mm (3.94 in.)		0.15 mm (0.0059 in.)
Piston		
Piston diameter		88.439 to 88.449 mm (3.4818 to 3.4822 in.)
Specified piston oil clearance		0.051 to 0.100 mm (0.0020 to 0.0039 in.)
Piston pin hole bush inside diameter		22.001 to 22.010 mm (0.8662 to 0.8665 in.)
Piston pin hole bush inside diameter (Reference)	Mark 1	22.001 to 22.004 mm (0.8662 to 0.8663 in.)
	Mark 2	22.004 to 22.007 mm (0.8663 to 0.8664 in.)
	Mark 3	22.007 to 22.010 mm (0.8664 to 0.8665 in.)
Piston ring		
Ring groove clearance		0.030 to 0.070 mm (0.0012 to 0.0028 in.)
Specified end gap	No. 1	0.22 to 0.892 mm (0.0087 to 0.0350 in.)
	No. 2	0.50 to 1.35 mm (0.0197 to 0.0531 in.)
	Oil (side rail)	0.10 to 0.73 mm (0.0039 to 0.0287 in.)
Piston pin		
Piston pin diameter		21.997 to 22.009 mm (0.8660 to 0.8665 in.)
Piston pin diameter (Reference)	Mark A	21.997 to 22.000 mm (0.8660 to 0.8661 in.)
	Mark B	22.000 to 22.003 mm (0.8661 to 0.8663 in.)
	Mark C	22.003 to 22.006 mm (0.8663 to 0.8664 in.)
	Mark D	22.006 to 22.009 mm (0.8664 to 0.8665 in.)
Specified oil clearance		0.001 – 0.010 mm (0.00004 – 0.00039 in.)
Connecting rod bolt		
Specified diameter		7.0 to 7.3 mm (0.276 to 0.287 in.)
Crankshaft		
Specified thrust clearance		0.040 to 0.300 mm (0.0016 to 0.0118 in.)
Thrust washer thickness		1.930 to 1.980 mm (0.0760 to 0.0780 in.)
Cylinder block main journal bore diameter (Reference)	Mark 0	59.000 to 59.002 mm (2.3228 to 2.3229 in.)
	Mark 1	59.002 to 59.004 mm (2.3229 to 2.3230 in.)
	Mark 2	59.004 to 59.006 mm (2.3230 to 2.3231 in.)
	Mark 3	59.006 to 59.009 mm (2.3231 to 2.3232 in.)
	Mark 4	59.009 to 59.011 mm (2.3232 to 2.3233 in.)
	Mark 5	59.011 to 59.013 mm (2.3233 to 2.3233 in.)
	Mark 6	59.013 to 59.016 mm (2.3233 to 2.3235 in.)
Main journal diameter		54.988 to 55.000 mm (2.1648 to 2.1654 in.)
Main journal diameter (Reference)	Mark 0	54.998 to 55.000 mm (2.1653 to 2.1654 in.)
	Mark 1	54.996 to 54.998 mm (2.1652 to 2.1653 in.)
	Mark 2	54.994 to 54.996 mm (2.1651 to 2.1652 in.)
	Mark 3	54.992 to 54.994 mm (2.1650 to 2.1651 in.)
	Mark 4	54.990 to 54.992 mm (2.1650 to 2.1650 in.)
	Mark 5	54.988 to 54.990 mm (2.1649 to 2.1650 in.)
Standard main bearing center wall thickness (Reference)	Mark 1	1.993 to 1.996 mm (0.0785 to 0.0786 in.)
	Mark 2	1.996 to 1.999 mm (0.0786 to 0.0787 in.)
	Mark 3	1.999 to 2.002 mm (0.0787 to 0.0788 in.)
	Mark 4	2.002 to 2.005 mm (0.0788 to 0.0789 in.)
Maximum circle runout		0.03 mm (0.0012 in.)
Specified main journal oil clearance		0.008 to 0.024 mm (0.00031 to 0.00094 in.)
Maximum main journal taper and out-of-round		0.003 mm (0.0001 in.)
Maximum crank pin taper and out-of-round		0.003 mm (0.0001 in.)
Crank pin diameter		47.990 to 48.000 mm (1.8894 to 1.8898 in.)
Crankshaft bearing cap set bolt		
Specified diameter		7.2 to 7.6 mm (0.283 to 0.299 in.)

1MZ-FE/3MZ-FE

V-Rebbed belt		
New drive belt tension	Cooler compressor to crankshaft	139 to 192 lbf
	Vane pump	154 to 176 lbf
Used drive belt tension	Cooler compressor to crankshaft	66 to 110 lbf
	Vane pump	77 to 110 lbf
Ignition timing	w/ Terminals TC and CG of DLC3 connected	8 to 12●BTDC @ idle
	w/ Terminals TC and CG of DLC3 disconnected	7 to 24●BTDC @ idle
Idle speed	1MZ-FE	550 – 650 rpm
	3MZ-FE	630 – 730 rpm
Compression	Compression pressure	1.47 MPa (15 kgf/cm ² , 213 psi)
	Minimum pressure	1.0 MPa (10.2 kgf/cm ² , 145 psi)
	Difference between each cylinder	100 kPa (1.0 kgf/cm ² , 15 psi)
Valve clearance (cold)	Intake	0.15 to 0.25 mm (0.006 to 0.010 in.)
	Exhaust	0.25 to 0.35 mm (0.010 to 0.014 in.)
Intake air surge tank		
Maximum warpage		0.10 mm (0.0039 in.)
Intake manifold		
	Maximum warpage	Air intake surge tank side Cylinder head side
		0.15 mm (0.0059 in.) 0.08 mm (0.0031 in.)
Exhaust manifold		
Maximum warpage		0.50 mm (0.0196 in.)
Camshaft		
Maximum circle runout		0.06 mm (0.0024 in.)
Specified cam lobe height	1MZ-FE Intake	42.780 to 43.032 mm (1.6842 to 1.6942 in.)
	Exhaust	42.610 to 42.864 mm (1.6776 to 1.6876 in.)
	3MZ-FE Intake	42.980 to 43.232 mm (1.6921 to 1.7020 in.)
	Exhaust	42.960 to 43.110 mm (1.6874 to 1.6972 in.)
Camshaft Journal diameter		26.959 to 26.975 mm (1.0614 to 1.0620 in.)
Specified gear backlash		0.020 to 0.300 mm (0.0008 to 0.0118 in.)
Specified journal thrust clearance		0.040 to 0.120 mm (0.0016 to 0.0047 in.)
Specified journal oil clearance		0.025 to 0.100 mm (0.0010 to 0.0039 in.)
Cylinder head set bolt		
Specified outside diameter at tension portion		8.75 to 9.05 mm (0.3445 to 0.3563 in.)
Cylinder head		
Maximum warpage	Cylinder block side	0.05 mm (0.0020 in.)
	Intake manifold side	0.10 mm (0.0039 in.)
	Exhaust manifold side	0.10 mm (0.0039 in.)
Intake valve		
Specified overall length		94.95 to 95.45 mm (3.7382 to 3.7579 in.)
Valve stem diameter		5.470 to 5.485 mm (0.2154 to 0.2159 in.)
Minimum margin thickness		0.5 to 1.0 mm (0.020 to 0.039 in.)
Exhaust valve		
Specified overall length		94.90 to 95.40 mm (3.7362 to 3.7559 in.)
Valve stem diameter		5.465 to 5.480 mm (0.2152 to 0.2157 in.)
Minimum margin thickness		0.5 to 1.0 mm (0.020 to 0.039 in.)
Inner compression spring		
Free length		45.50 mm (1.7913 in.)
Maximum deviation		2.0 mm (0.079 in.)
Installed tension at 33.8 mm (1.331 in.)		186 to 206 N (19.0 to 21.0 kgf, 41.9 to 46.3 lbf)
Valve guide bush		
Bush inside diameter		5.510 to 5.530 mm (0.2169 to 0.2177 in.)
Specified bush oil clearance	Intake	0.025 to 0.080 mm (0.0010 to 0.0031 in.)
	Exhaust	0.030 to 0.100 mm (0.0012 to 0.0039 in.)
Cylinder head valve guide bush bore diameter	STD	10.295 to 10.313 mm (0.4053 to 0.4060 in.)
	O/S 0.05	10.345 to 10.363 mm (0.4073 to 0.4080 in.)
	STD	10.333 to 10.344 mm (0.4068 to 0.4072 in.)
Bush diameter	STD	10.333 to 10.344 mm (0.4068 to 0.4072 in.)
	O/S 0.05	10.383 to 10.394 mm (0.4088 to 0.4092 in.)

SERVICE SPECIFICATIONS - ENGINE MECHANICAL

Valve lifter		
Lifter diameter		30.966 to 30.976 mm (1.2191 to 1.2195 in.)
Lifter bore diameter		31.009 to 31.025 mm (1.2208 to 1.2215 in.)
Specified oil clearance	Standard	0.033 to 0.070 mm (0.0013 to 0.0028 in.)
Connecting rod		
Specified thrust clearance		0.15 to 0.35 mm (0.0059 to 0.0138 in.)
Connecting rod thickness		20.80 to 20.85 mm (0.8189 to 0.8209 in.)
Specified connecting rod oil clearance		0.038 to 0.080 mm (0.0015 to 0.0031 in.)
Connecting rod bearing center wall thickness	Mark 1	1.484 to 1.487 mm (0.0584 to 0.0585 in.)
	Mark 2	1.487 to 1.490 mm (0.0585 to 0.0587 in.)
	Mark 3	1.490 to 1.493 mm (0.0587 to 0.0588 in.)
	Mark 4	1.493 to 1.496 mm (0.0588 to 0.0589 in.)
Crankshaft		
Crankshaft thrust clearance		0.04 to 0.30 mm (0.0016 to 0.0118 in.)
Thrust washer thickness		1.93 to 1.98 mm (0.0760 to 0.0780 in.)
Specified main journal oil clearance	No. 1 and No. 4 journals	0.014 to 0.050 mm (0.0006 to 0.0020 in.)
	No. 2 and No. 3 journals	0.026 to 0.060 mm (0.0010 to 0.0024 in.)
Cylinder block main journal bore diameter (Reference)	Mark 00	66.000 mm (2.5984 in.)
	Mark 01	66.001 mm (2.5985 in.)
	Mark 02	66.002 mm (2.5985 in.)
	Mark 03	66.003 mm (2.5985 in.)
	Mark 04	66.004 mm (2.5986 in.)
	Mark 05	66.005 mm (2.5986 in.)
	Mark 06	66.006 mm (2.5987 in.)
	Mark 07	66.007 mm (2.5987 in.)
	Mark 08	66.008 mm (2.5987 in.)
	Mark 09	66.009 mm (2.5988 in.)
	Mark 10	66.010 mm (2.5988 in.)
	Mark 11	66.011 mm (2.5989 in.)
	Mark 12	66.012 mm (2.5989 in.)
	Mark 13	66.013 mm (2.5989 in.)
	Mark 14	66.014 mm (2.5990 in.)
	Mark 15	66.015 mm (2.5990 in.)
	Mark 16	66.016 mm (2.5990 in.)
Main journal diameter		61.000 mm (4.1016 in.)
Main journal diameter (Reference)	Mark 00	60.999 mm (4.4015 in.)
	Mark 01	60.998 mm (4.4015 in.)
	Mark 02	60.997 mm (4.4015 in.)
	Mark 03	60.996 mm (4.4014 in.)
	Mark 04	60.995 mm (4.4014 in.)
	Mark 05	60.994 mm (4.4013 in.)
	Mark 06	60.993 mm (4.4012 in.)
	Mark 07	60.992 mm (4.4012 in.)
	Mark 08	60.991 mm (4.4012 in.)
	Mark 09	60.990 mm (4.4012 in.)
	Mark 10	60.989 mm (4.4011 in.)
	Mark 11	60.988 mm (4.4011 in.)
	Mark 12	2.486 to 2.489 mm (0.0979 to 0.0980 in.)
Standard main bearing center wall thickness (Reference)	Mark 1	2.489 to 2.492 mm (0.0980 to 0.0981 in.)
	Mark 2	2.492 to 2.495 mm (0.0981 to 0.0982 in.)
	Mark 3	2.495 to 2.498 mm (0.0982 to 0.0983 in.)
	Mark 4	2.498 to 2.501 mm (0.0983 to 0.0985 in.)
	Mark 5	2.501 to 2.504 mm (0.0985 to 0.0986 in.)
	Mark 6	2.504 to 2.507 mm (0.0986 to 0.0987 in.)
	Mark 7	0.06 mm (0.0024 in.)
Maximum circle runout		60.988 to 61.000 mm (2.4011 to 2.4016 in.)
Main journal taper and out-of-round		0.02 mm (0.0008 in.)
Crank pin diameter		52.992 to 53.000 mm (2.0863 to 2.0866 in.)
Maximum crank pin taper and out-of-round		0.02 mm (0.0008 in.)
Cylinder block		
Maximum warpage		0.05 mm (0.0020 in.)
Specified cylinder bore diameter	1MZ-FE	87.500 to 87.632 mm (3.4449 to 3.4501 in.)
	3MZ-FE	92.000 to 92.132 mm (3.6220 to 3.6272 in.)

Piston			
Piston diameter	1MZ-FE for AISIN made	87.106 to 87.416 mm (3.4412 to 3.4416 in.)	
	1MZ-FE for MAHLE made	87.453 to 87.467 mm (3.4430 to 3.4436 in.)	
	3MZ-FE	91.983 to 91.967 mm (3.6202 to 3.6207 in.)	
Specified oil clearance	1MZ-FE for AISIN made	0.084 to 0.130 mm (0.0033 to 0.0051 in.)	
	1MZ-FE for MAHLE made	0.033 to 0.130 mm (0.0013 to 0.0051 in.)	
	3MZ-FE	0.033 to 0.130 mm (0.0013 to 0.0051 in.)	
Connecting rod			
Maximum misalignment per 100 mm (3.94 in.)		0.05 mm (0.0020 in.) per 100 mm (3.94 in.)	
Maximum rod twist per 100 mm (3.94 in.)		0.15 mm (0.0059 in.) per 100 mm (3.94 in.)	
Bush inside diameter		22.005 to 22.014 mm (0.8663 to 0.8667 in.)	
Piston pin			
Piston pin diameter		21.997 to 22.006 mm (0.8660 to 0.8664 in.)	
Pecified oil clearance		0.005 to 0.050 mm (0.0002 to 0.0020 in.)	
Piston ring			
Piston ring groove clearance	1MZ-FE No. 1	0.02 to 0.07 mm (0.0008 to 0.0028 in.)	
	No. 2	0.02 to 0.06 mm (0.0008 to 0.0024 in.)	
	Oil	0.04 to 0.12 mm (0.0016 to 0.0047 in.)	
	3MZ-FE No. 1	0.03 to 0.08 mm (0.0012 to 0.0031 in.)	
	No. 2	0.02 to 0.06 mm (0.0008 to 0.0024 in.)	
	Oil	0.03 to 0.11 mm (0.0012 to 0.0043 in.)	
Specified end gap	1MZ-FE No. 1	0.25 to 0.95 mm (0.0098 to 0.0374 in.)	
	No. 2	0.35 to 1.05 mm (0.0138 to 0.0413 in.)	
	Oil (Side rail)	0.15 to 1.00 mm (0.0059 to 0.0394 in.)	
	3MZ-FE No. 1	0.30 to 0.95 mm (0.0118 to 0.0374 in.)	
	No. 2	0.50 to 1.05 mm (0.0197 to 0.0413 in.)	
	Oil	0.15 to 1.00 mm (0.0059 to 0.0394 in.)	
Connecting rod bolt			
Specified diameter		7.0 to 7.3 mm (0.276 to 0.287 in.)	
Crankshaft bearing cap set bolt			
Specified diameter		7.2 to 7.6 mm (0.283 to 0.299 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
Drain plug (A/T)	49	500	36
Drain plug (M/T)	49	500	36
Engine hanger No. 1 x Cylinder head	38	387	28
Engine hanger No. 2 x Cylinder head	38	387	28
ECT sensor x Cylinder head	20	204	15
Knock 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 gage 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 (A/T) x Crankshaft	98	1,000	72
Flywheel sub-assy (M/T) 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	105
Engine mounting insulator RH x Engine mounting bracket RH	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 (M/T)	89	910	66
Vane pump assy x Timing chain cover	43	439	32
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	75	764	55
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
Balanceshaft 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

Part Tightened		N·m	kgf·cm	ft·lbf
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 page 14-75)	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
Crankshaft 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
Front suspension brace x Body		80	816	59
Stud bolt (See page 14-108)	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
Stud bolt (See page 14-120)	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
Crankshaft bearing cap x Cylinder block	1st	20	204	15
	2nd	40	408	29
Connecting rod cap x Connecting rod	1st	25	250	18
	2nd	Turn 90●	Turn 90●	Turn 90●

1MZ-FE/3MZ-FE

Part Tightened		N·m	kgf·cm	ft·lbf
Engine hanger No. 2 x Cylinder head		20	204	15
Knock sensor x Cylinder block	1MZ-FE	39	398	39
	3MZ-FE	20	204	15
Oil pressure switch Assy x Cylinder block		15	152	11
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 converter sub-assy No. 2 x Cylinder head		49	500	36
Exhaust manifold heat insulator No. 2 x Cylinder head		8.5	87	75 in.·lbf
Exhaust manifold converter sub-assy RH x Cylinder head		49	500	36
Intake manifold x Cylinder head		15	153	11
Ignition coil Assy x Cylinder head cover		8.0	82	71 in.·lbf
Intake air surge tank x Intake manifold		28	286	21
Surge tank stay bolt		20	204	15
Engine hanger No. 2 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 converter sub-assy		49	500	36
Manifold stay No. 2 x Automatic transaxle Assy		49	500	36
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 14-164)	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 14-164)	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 14-164)	Bolt	25	250	18
	Nut	26	260	19
Generator belt adjusting bar x Cylinder block (See page 14-164)	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		75	764	55
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 Engine engine mounting bracket		64	653	47
Engine moving control rod (See page 14-164)	Bolt A	64	653	47
	Bolt B	23	235	17
Camshaft sub-gear x Main gear		5.4	55	48 in.·lbf

Part Tightened		N·m	kgf·cm	ft·lbf
Engine rear oil seal retainer x Cylinder block		8.0	82	71 in.·lbf
Oil pump Assy x Cylinder block (See page 14-186)	10 mm head	8.0	82	71 in.·lbf
	12 mm head	20	204	15
	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
Oil pan sub-assy x Cylinder block (See page 14-186)	10 mm head	8.0	82	71 in.·lbf
	12 mm head	20	204	15
Oil strainer sub-assy x Oil pan sub-assy		8.0	82	71 in.·lbf
Oil pan sub-assy No. 2 x Oil pan sub-assy		8.0	82	71 in.·lbf
Oil pan drain plug x Oil pan sub-assy No. 2		45	459	33
Water inlet housing x Cylinder block		8.0	82	71 in.·lbf
Cylinder head x Cylinder block	12 pointed head 1st	54	551	40
	2nd	Turn 90●	Turn 90●	Turn 90●
	Recessed head	19	189	14
Camshaft bearing cap x Cylinder head		16	163	12
Timing belt plate x Oil pump Assy		8.0	82	71 in.·lbf
Water pump Assy x Cylinder block		8.0	82	71 in.·lbf
Oil level gage guide x Cylinder block		8.0	82	71 in.·lbf
Oil filter union x Cylinder block		30	306	22
Timing belt idler bracket x Cylinder block		28	286	21
Timing belt No. 3 cover x Cylinder head		8.5	87	76 in.·lbf
Camshaft timing pulley x Camshaft		125	1,275	92
Timing belt idler sub-assy No. 2 x Timing belt idler bracket		43	438	32
Timing belt idler sub-assy No. 1 x Cylinder block		34	347	25
Chain tensioner Assy No. 1 x Oil pump Assy		27	280	20
Transverse engine engine mounting bracket x Cylinder block		28	286	21
Timing belt No. 2 cover x Timing belt No. 3 cover		8.5	87	76 in.·lbf
Timing belt No. 1 cover x Oil pump Assy		8.5	87	76 in.·lbf
Crankshaft pulley x Crankshaft		215	2,192	159
Camshaft position sensor x Cylinder head		8.0	82	71 in.·lbf
Cylinder head cover x Cylinder head		8.0	82	71 in.·lbf
Spark plug x Cylinder head		18	184	13
Vane pump Assy x Adjusting strut		43	439	32
Generator x Generator bracket		58	591	43
Generator x Adjusting bar		18	184	13
Front suspension brace upper x Body		80	816	59
Water outlet x Cylinder head		15	153	11
Exhaust manifold heat insulator No. 2 x Exhaust manifold LH		8.5	87	55 in.·lbf
Exhaust pipe support bracket No. 1 x Automatic transaxle Assy		21	214	15
Drive plate & ring gear sub-assy x Crankshaft		83	846	61
w/ head straight screw plug No. 1 x Cylinder head		44	449	32
w/ head straight screw plug No. 2 x Cylinder head		44	449	32
Main bearing cap x Cylinder block	12 pointed head 1st	22	224	16
	2nd	Turn 90●	Turn 90●	Turn 90●
	6 pointed head	27	275	20
Connecting rod cap x Connecting rod	1st	25	250	18
	2nd	Turn 90●	Turn 90●	Turn 90●
Cylinder block w/ head straight screw No. 1 plug x Cylinder block		30	306	22
Cylinder block w/ head straight screw No. 2 plug x Cylinder block		50	510	37
Cylinder block w/head straight screw No. 3 plug x Cylinder block		30	306	22

SERVICE SPECIFICATIONS - ENGINE MECHANICAL

Part Tightened	N·m	kgf·cm	ft·lbf
Water seal plate x Cylinder block	18	184	13
Cylinder block water drain cock sub-assy x Cylinder block	39	398	29

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

EXHAUST

TORQUE SPECIFICATION

030EV-03

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 Exhaust pipe assy tail	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
Heated oxygen sensor x Exhaust pipe assy front	44	449	32

1MZ-FE/3MZ-FE

Part Tightened	N·m	kgf·cm	ft·lbf
Exhaust pipe assy center x Exhaust pipe assy tail	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	204	15
Exhaust pipe No. 1 support bracket x Exhaust pipe support bracket No. 1	33	337	24
Heated oxygen sensor x Exhaust pipe assy front	44	449	32

COOLING

SERVICE DATA

2AZ-FE

030EW-03

Thermostat Valve opening temperature Valve lift	at 95°C (203°F)	80 to 84°C (176 to 183°F) 10 mm (0.394 in.) or more
Radiator cap sub-assy Specified opening pressure		78 to 122 kPa (0.80 to 1.25 kgf/cm ² , 11.2 to 17.6 psi)
Cooling fan Standard amperage	at 20°C (68°F)	4.9 to 8.5 A

1MZ-FE/3MZ-FE

Thermostat Valve opening temperature Valve lift	at 95°C (203°F)	80 to 84°C (176 to 183°F) 10 mm (0.394 in.) or more
Radiator cap sub-assy Specified opening pressure		69.0 to 112.8 kPa (0.70 to 1.15 kgf/cm ² , 10.0 to 16.4 psi)
Cooling fan Standard amperage	at 20°C (68°F)	8.0 to 12.0 A

TORQUE SPECIFICATION

2AZ-FE

Part Tightened	N·m	kgf·cm	ft·lbf
Cylinder block drain cock plug x Drain cock	13	130	10
Water pump x Cylinder block	9.0	92	80 in.·lbf
Water pump pulley x Water pump	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
Air cleaner inlet x Body	5.0	51	44 in.·lbf
Oil cooler assy x Radiator tank lower	8.3	85	73 in.·lbf
Oil cooler pipe x Oil cooler assy	14.7	150	11

1MZ-FE/3MZ-FE

Part Tightened	N·m	kgf·cm	ft·lbf
Cylinder block drain cock plug x Drain cock	13	130	10
Water pump assy x Cylinder block	8	82	71 in.·lbf
Timing belt Idler sub-assy No.2 x Cylinder block	43	438	32
Engine mounting bracket RH x Cylinder block	28	286	21
Generator bracket No. 2 x Cylinder block	28	286	21
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
Air cleaner inlet x Body	5.0	51	44 in.·lbf
Oil cooler assy x Radiator tank lower	8.3	85	74 in.·lbf
Oil cooler pipe x Oil cooler assy	14.7	150	11

LUBRICATION

SERVICE DATA

030EY-03

2AZ-FE

Oil pressure	at idle speed at 3,000 rpm	29 kPa (0.3 kgf·cm ² , 4.3 psi) or more 245 to 539 kPa (2.5 to 5.5 kgf·cm ² , 36 to 78 psi) or more
Oil pump		
Specified side clearance		0.030 to 0.160 mm (0.0012 to 0.0063 in.)
Specified tip clearance		0.080 to 0.350 mm (0.0031 to 0.0138 in.)
Specified body clearance		0.100 to 0.325 mm (0.0039 to 0.0128 in.)

1MZ-FE/3MZ-FE

Oil pressure	at idle speed at 3,000 rpm	29 kPa (0.3 kgf·cm ² , 4.3 psi) or more 245 to 539 kPa (2.5 to 5.5 kgf·cm ² , 36 to 78 psi)
Oil pump		
Specified side clearance		0.060 to 0.300 mm (0.0024 to 0.0118 in.)
Specified tip clearance		0.250 to 0.500 mm (0.0098 to 0.0128 in.)
Specified body clearance		0.030 to 0.150 mm (0.0012 to 0.0059 in.)

TORQUE SPECIFICATION

2AZ-FE

Part Tightened		N-m	kgf-cm	ft-lbf
Oil pressure switch x Cylinder head		15	152	11
Oil drain plug x Oil pan sub-assy		25	255	18
Oil pump assy x Cylinder block		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 block		9.0	92	80 in.-lbf
Chain tensioner slipper x Cylinder block		19	194	14
Timing chain cover (see page 17-8)	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
V-ribbed belt tensioner assy x Timing chain cover		59.5	607	44
Engine mounting bracket RH x Cylinder block		54	551	40
Engine mounting insulator RH (see page 17-8)	Bolt A	95	969	70
	Bolt B	87	888	64
Steering gear return hose clamp		8.0	80	69 in.-lbf
Engine mounting insulator FR x Engine mounting bracket FR		87	888	64
Engine lateral control rod x Bracket		89	910	66
Oil pan sub-assy x Stiffening crankcase assy		9.0	92	80 in.-lbf
Crankshaft position sensor x Timing chain cover		9.0	92	80 in.-lbf
Crankshaft pulley x Crankshaft		170	1,733	125
Ignition coil assy x Cylinder head		9.0	92	80 in.-lbf
Engine mounting bracket No. 2 RH x Timing chain cover		52	531	38
Engine mounting stay No. 2 RH x Cylinder head		64	653	47
Engine moving control rod w/ bracket x Fender apron RH		64	653	47
Oil pump cover x Oil pump		8.8	90	78 in.-lbf
Oil pump strainer x Oil pump		8.8	90	78 in.-lbf

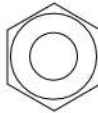
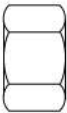
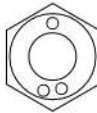
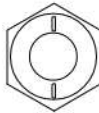
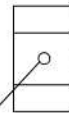
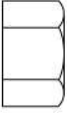
1MZ-FE/3MZ-FE

Part Tightened		N-m	kgf-cm	ft-lbf
Oil pressure switch x Cylinder block		15	152	11
Oil drain plug x Oil pump sub-assy No. 2		25	255	18
Oil pump assy x Cylinder block (see page 17-32)	Bolt A	8	82	71 in.-lbf
	Bolt B	20	199	14
	Bolt C	43	439	32
Crankshaft position sensor x Oil pump assy		8	82	71 in.-lbf
Oil pan sub-assy x Cylinder block	10 mm head	8.0	82	71 in.-lbf
	12 mm head	20	203	15
	14 mm head	37	379	27
Oil strainer sub-assy x Main bearing cap		8	82	71 in.-lbf
Oil pan sub-assy No. 2 x Oil pan sub-assy No. 1		8	82	71 in.-lbf
Engine engine mounting bracket RH (See page 17-32)	Bolt A	54	550	40
	Nut B	54	550	40
	Bolt C	43	439	32
Engine mounting insulator RH (see page 17-32)	Nut A	95	969	70
	Nut B	87	887	64
Engine mounting insulator FR (see page 17-32)	Bolt A	87	887	64
	Nut B	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
Timing belt idler sub-assy No. 1 x Cylinder block		34	347	25

SERVICE SPECIFICATIONS - LUBRICATION

Part Tightened	N·m	kgf·cm	ft·lbf
Compressor and magnetic clutch x Compressor mounting bracket	25	250	18
Generator bracket No. 2 x Transverse engine engine mounting bracket	28	286	21
Front suspension brace upper center x Body	80	816	59
Oil pump cover x Oil pump	10	105	8
Oil pump relief valve x Oil pump	49	500	36

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

IGNITION

SERVICE DATA

030F0-03

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/3MZ-FE

Spark plug Recommended spark plug	DENSO NGK	SK20R11 IFR6A11
Electrode gap	Standard Maximum	1.0–1.1mm (0.039–0.043 in.) 1.3mm (0.051 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/3MZ-FE

Part Tightened	N·m	kgf·cm	ft·lbf
Spark plug x Cylinder head cover	25	255	18.5
Ignition coil x Cylinder head cover	8.0	82	71 in·lbf

STARTING & CHARGING

030F2-03

SERVICE DATA

2AZ-FE:

Starter assy Specified current		90 A or less at 11.5 V
Starter relay Specified condition	3 – 5	10 kΩ or higher
	3 – 5	Below 1 Ω (when battery voltage is applied to terminals 1 and 2)
Starter armature assy Depth	Standard	3.1 mm (0.122 in.)
	Maximum	3.8 mm (0.150 in.)
Starter commutator end frame assy Brush length	Standard	9.0 mm (0.354 in.)
	Minimum	4.0 mm (0.158 in.)
Magnetic switch resistance	Terminal 50 – C	Below 1 Ω
	Terminal 50 – Switch body	Below 2 Ω
Starter armature resistance	Segments	Below 1 Ω
	Commutator – Coil core	10 kΩ or higher
Voltage regulator	Regulating voltage	13.2 to 14.8 V
	Standard amperage	10 A or less
Generator brush holder assy Brush length	Standard	10.5 mm (0.413 in.)
	Minimum	4.5 mm (0.177 in.)
Generator rotor assy Open circuit Slip ring diameter	Resistance	2.3 to 2.7 Ω at 20°C (68°F)
	Standard	14.2 to 14.4 mm (0.559 to 0.567 in.)
	Minimum	14.0 mm (0.551 in.)

1MZ-FE/3MZ-FE:

Starter assy Specified current		90 A or less at 11.5 V
Starter relay Specified condition	3 – 5	10 kΩ or higher
	3 – 5	Below 1 Ω (when battery voltage is applied to terminals 1 and 2)
Starter armature assy Depth	Standard	3.1 mm (0.122 in.)
	Maximum	3.8 mm (0.150 in.)
Starter commutator end frame assy Brush length	Standard	9.0 mm (0.354 in.)
	Minimum	4.0 mm (0.158 in.)
Magnetic switch resistance	Terminal 50 – C	Below 1 Ω
	Terminal 50 – Switch body	Below 2 Ω
Starter armature resistance	Segments	Below 1 Ω
	Commutator – Coil core	10 kΩ or higher
Voltage regulator	Regulating voltage	13.2 to 14.8 V
	Standard amperage	10 A or less
Generator brush holder assy Brush length	Standard	10.5 mm (0.413 in.)
	Minimum	4.5 mm (0.177 in.)
Generator rotor assy Open circuit Slip ring diameter	Resistance	2.3 to 2.7 Ω at 20°C (68°F)
	Standard	14.2 to 14.4 mm (0.559 to 0.567 in.)
	Minimum	14.0 mm (0.551 in.)

TORQUE SPECIFICATION

2AZ-FE:

Part Tightened		N·m	kgf·cm	ft·lbf
Starter x Transaxle housing		39	398	29
Starter wire x Starter assy		13	130	9
Air cleaner inlet x Body		7.0	71	62 in.·lbf
Air cleaner bracket x Body		12	122	9
Air cleaner case sub-assy x Air cleaner bracket		5.0	51	44 in.·lbf
Air cleaner case sub-assy x Body		5.0	51	44 in.·lbf
Air cleaner cap sub-assy x Air cleaner case sub-assy		5.0	51	44 in.·lbf
Battery clamp sub-assy x Body		5.5	56	49 in.·lbf
Battery clamp sub-assy x Battery clamp bolt		5.5	56	49 in.·lbf
Terminal x Battery		3.5	36	31 in.·lbf
Commutator end frame assy x Starter drive housing assy		6.0	61	53 in.·lbf
Magnetic switch assy x Starter drive housing assy		7.5	76	66 in.·lbf
Lead wire x Terminal C		10	102	7
Generator assy x Engine	M8	21	214	15
	M10	52	530	38
Wiring harness clamp		9	92	80 in.·lbf
Generator wire x Generator assy		9.8	100	7
Retainer plate x Drive end frame assy generator		2.3	23	20 in.·lbf
Generator rectifier end frame x Drive end frame assy generator		5.8	59	51 in.·lbf
Generator brush holder assy x Generator rectifier end frame		1.8	18	16 in.·lbf
Generator rear end cover x Generator rectifier end frame		4.6	47	41 in.·lbf
Generator pulley x Generator rotor assy		110	1,122	81

1MZ-FE/3MZ-FE:

Part Tightened		N·m	kgf·cm	ft·lbf
Starter assy x Transaxle housing		37	380	26
Starter wire x Starter assy		9.8	100	7
Air cleaner inlet No. 1 x Body		7.0	71	62 in.·lbf
Air cleaner bracket x Body		12	122	9
Air cleaner case sub-assy x Air cleaner bracket		5.0	51	44 in.·lbf
Air cleaner case sub-assy x Body		5.0	51	44 in.·lbf
Air cleaner cap sub-assy x Air cleaner case sub-assy		5.0	51	44 in.·lbf
Air cleaner inlet No. 2 x Body		7.0	71	62 in.·lbf
Battery clamp sub-assy x Body		5.5	56	49 in.·lbf
Battery clamp sub-assy x Battery clamp bolt		5.5	56	49 in.·lbf
Terminal x Battery		3.5	36	31 in.·lbf
Commutator end frame assy x Starter drive housing assy		6.0	61	53 in.·lbf
Magnetic switch assy x Starter drive housing assy		7.5	76	66 in.·lbf
Lead wire x Terminal C		10	102	7
Generator assy x Generator bracket No. 1		58	592	43
Generator assy x Generator belt adjusting bar		18	184	13
Generator wire x Generator assy		9.8	100	7
Retainer plate x Drive end frame assy generator		2.3	23	20 in.·lbf
Generator rectifier end frame x Drive end frame assy generator		5.8	59	51 in.·lbf
Generator brush holder assy x Generator rectifier end frame		1.8	18	16 in.·lbf
Generator rear end cover x Generator rectifier end frame		4.6	47	41 in.·lbf
Generator pulley x Generator rotor assy		111	1,127	82

FRONT SUSPENSION

032CP-01

SERVICE DATA

Front wheel alignment	Vehicle height		
	1MZ-FE COMFORT	Front: A – B	120 mm (4.72 in.)
		Rear: D – C	46 mm (1.81 in.)
	1MZ-FE PREMIUM (USA, Canada)	Front: A – B	119 mm (4.69 in.)
		Rear: D – C	47 mm (1.85 in.)
	1MZ-FE PREMIUM (Mexico)	Front: A – B	106 mm (4.17 in.)
			*1 101 mm (3.98 in.)
		Rear: D – C	33 mm (1.30 in.)
			*1 25 mm (0.98 in.)
	3MZ-FE SPORT	Front: A – B	120 mm (4.72 in.)
		Rear: D – C	48 mm (1.89 in.)
	2AZ-FE COMFORT (USA, Canada)	Front: A – B	119 mm (4.69 in.)
		Rear: D – C	45 mm (1.77 in.)
	2AZ-FE COMFORT (Mexico)	Front: A – B	106 mm (4.17 in.)
			*1 101 mm (3.98 in.)
		Rear: D – C	33 mm (1.30 in.)
			*1 25 mm (0.98 in.)
	2AZ-FE PREMIUM	Front: A – B	120 mm (4.72 in.)
		Rear: D – C	45 mm (1.77 in.)
	2AZ-FE SPORT	Front: A – B	120 mm (4.72 in.)
		Rear: D – C	48 mm (1.89 in.)
Front wheel alignment	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	39°04' ± 2° (39.07° ± 2°)
		Outside wheel: Reference	33°44' (33.73°)
	15 inch (Mexico)	Inside wheel	39°30' ± 2° (39.50° ± 2°)
		Outside wheel: Reference	34°02' (34.03°)
	16 inch (USA, Canada)	Inside wheel	36°39' ± 2° (36.65° ± 2°)
		Outside wheel: Reference	32°11' (32.18°)
	16 inch (Mexico)	Inside wheel	37°00' ± 2° (37.00° ± 2°)
		Outside wheel: Reference	32°28' (32.47°)
	Camber		
Front wheel alignment	USA, Canada:		-0°43' ± 45' (-0.72° ± 0.75°)
	Mexico:		-0°33' ± 45' (-0.55° ± 0.75°)
	Right-left error		45' (0.75°) or less
	Caster		
	3MZ-FE		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		
Front suspension	USA, Canada:		11°27' ± 45' (11.45° ± 0.75°)
	Mexico:		11°05' ± 45' (11.08° ± 0.75°)
	Right-left error		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)

A: Ground clearance of front wheel center**B: Ground clearance of lower suspension arm No. 2 set bolt center****C: Ground clearance of strut rod set bolt center****D: Ground clearance of rear wheel center*****1: HI UP**

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 TMC made:	80	816	59
Suspension support x Body TMMK made:	85	867	63
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
Stabilizer bar link set nut	74	755	55
Lower ball joint assy x Front suspension arm no.1	75	765	55

REAR SUSPENSION
SERVICE DATA

030FH-02

Rear wheel alignment	Toe-in (total)	0●22' ± 11' (0.3●± 0.2●, 4 ± 2 mm (0.16 ± 0.08 in.)
	No.2 lower suspension arm length difference	1.5 mm (0.06 in.) or less
	Camber	USA, Canada: -1°16' ± 45' (-1.27° ± 0.75°) Mexico: -1°09' ± 45' (-1.15° ± 0.75°)
	Right-left error	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	55	41
	C	38	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

032CR-01

Cold tire inflation pressure	Tire size: P205/65R15 92T	Front, Rear	200 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	
	Tire size: P215/55R17 93V	Front, Rear	210 kPa (2.1 kgf/cm ² , 30 psi)
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-02

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.)

ENGINE CONTROL SYSTEM

030EL-04

SERVICE DATA

2AZ-FE:

Throttle body	Standard throttle valve opening percentage	60% or more
Accelerator pedal position sensor	Standard voltage	0.6 to 1.0 V
Intake air flow meter assy Resistance	4 (THA) - 5 (E2) at -20°C (-4°F) at 20°C (68°F) at 60°C (140°F)	13.6 to 18.4 kΩ 2.21 to 2.69 kΩ 0.493 to 0.667 kΩ
Camshaft timing oil control valve assy Resistance	at 20°C (68°F)	6.9 to 7.9 Ω
Accelerator pedal rod assy Resistance	2 (VPA2) - 3 (EP1) 5 (VPA1) - 1 (EP2) 6 (VCP1) - 3 (EP1) 4 (VCP2) - 1 (EP2)	5.0 kΩ or less 5.0 kΩ or less 2.25 to 4.75 kΩ 2.25 to 4.75 kΩ
Throttle body assy Resistance	at 20°C (68°F) 2 (M+) - 1 (M-) 5 (VC) - 3 (E2)	0.3 to 100 kΩ 1.2 to 3.2 kΩ
E.F.I. engine coolant temperature sensor Resistance	Approx. 20°C (68°F) Approx. 80°C (176°F)	2.32 to 2.59 kΩ 0.310 to 0.326 kΩ
Knock sensor Resistance	at 20°C (68°F)	120 to 280 kΩ
EFI relay Specified condition	3 - 5 3 - 5	10 kΩ or higher Below 1 Ω (when battery voltage is applied to terminals 1 and 2)
C/OPN relay Specified condition	3 - 5 3 - 5	10 kΩ or higher Below 1 Ω (when battery voltage is applied to terminals 1 and 2)

1MZ-FE/3MZ-FE:

Throttle body	Standard throttle valve opening percentage	60% or more
Accelerator pedal position sensor	Standard voltage	0.6 to 1.0 V
Intake air flow meter assy Resistance	4 (THA) - 5 (E2) at -20°C (-4°F) at 20°C (68°F) at 60°C (140°F)	13.6 to 18.4 kΩ 2.21 to 2.69 kΩ 0.493 to 0.667 kΩ
Camshaft timing oil control valve assy Resistance	at 20°C (68°F)	6.9 to 7.9 Ω
Accelerator pedal rod assy Resistance	2 (VPA2) - 3 (EP1) 5 (VPA1) - 1 (EP2) 6 (VCP1) - 3 (EP1) 4 (VCP2) - 1 (EP2)	5.0 kΩ or less 5.0 kΩ or less 2.25 to 4.75 kΩ 2.25 to 4.75 kΩ
Throttle body assy Resistance	at 20°C (68°F) 2 (M+) - 1 (M-) 5 (VC) - 3 (E2)	0.3 to 100 kΩ 2.0 to 4.0 kΩ

SERVICE SPECIFICATIONS - ENGINE CONTROL SYSTEM

E.F.I. engine coolant temperature sensor		2.32 to 2.59 kΩ 0.310 to 0.326 kΩ
Resistance	Approx. 20°C (68°F) Approx. 80°C (176°F)	
Knock sensor (1MZ-FE)	terminal – body	10 kΩ or higher
Resistance		
Knock sensor (3MZ-FE)	at 20°C (68°F)	120 to 280 kΩ
Resistance		
EFI relay	3 – 5 3 – 5	10 kΩ or higher Below 1 Ω (when battery voltage is applied to terminals 1 and 2)
Specified condition		
C/OPN relay	3 – 5 3 – 5	10 kΩ or higher Below 1 Ω (when battery voltage is applied to terminals 1 and 2)
Specified condition		

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	75	765	55
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	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)	19	192	13
Front flexible hose x Shock absorber (w/o ABS)	19	192	13
Rear wheel set nut	103	1,050	76
Rear flexible hose x Shock absorber	19	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)	62	630	46
Rear wheel brake cylinder x Brake tube (Rear drum brake)	15	155	11
Lower ball joint x Steering knuckle	123	1,254	91

BRAKE

SERVICE DATA

030FQ-07

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 (1.102 in.) 26.0 mm (1.024 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 (0.394 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	73 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
Brake pedal support assy x Body Accelerator & brake pedal:	19.1	194	14
Brake pedal support assy x Accelerator pedal assy Accelerator & brake pedal:	12	122	8.8
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
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	300	22
Rear disc brake cylinder mounting set bolt TMC made:	61.8	630	46
TMMK made:	47	475	34
Rear disc brake cylinder slide pin x Rear disc brake cylinder mounting TMC made (Upper side):	34.3	350	25
TMC made (Lower side):	39.2	400	29
TMMK made:	43	440	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 (w/o VSC) DENSO made:	5.4	55	48 in.·lbf
BOSCH made:	8.0	82	71 in.·lbf
Brake actuator bracket x Body	19	194	14
Brake actuator assy x Actuator bracket (w/ VSC)	5.4	55	48 in.·lbf
Brake 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:	5.0	51	44 in.·lbf
Bolt B:	18.8	192	14
Rear axle hub set bolt	80	816	59
Yawrate sensor x Body	12.5	127	9

PARKING BRAKE

SERVICE DATA

030FS-01

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	48 in.·lbf
	Parking lever type:	5.0	51	44 in.·lbf
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-24

U151E (1MZ-FE)		
Line pressure (Wheel locked)	Engine idling	
	D position	372 to 412 kPa (3.8 to 4.2 kgf·cm ² , 54 to 60 psi)
	R position	672 to 742 kPa (6.8 to 7.5 kgf·cm ² , 97 to 106 psi)
	AT stall (Throttle valve fully opened)	
	D position	931 to 1,031 kPa (9.5 to 10.5 kgf·cm ² , 135 to 150 psi)
	R position	1,768 to 1,968 kPa (18.0 to 20 kgf·cm ² , 256 to 285 psi)
Engine stall revolution	D position	2,400 ± 150 rpm
Time lag	N → D position	Less than 1.2 seconds
	N → R position	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	0 ± 0.5 mm (0 ± 0.020 in.)
	RH side	0 ± 0.5 mm (0 ± 0.020 in.)
Shift schedule		
D position		
(Throttle valve fully open)	1 → 2	45 to 52 km/h (28 to 32 mph)
	2 → 3	85 to 94 km/h (53 to 58 mph)
	3 → 4	137 to 151 km/h (85 to 94 mph)
	4 → 5	193 to 209 km/h (120 to 130 mph)
	5 → 4	187 to 203 km/h (116 to 126 mph)
	4 → 3	131 to 145 km/h (81 to 90 mph)
	3 → 2	80 to 88 km/h (50 to 55 mph)
	2 → 1	37 to 44 km/h (23 to 27 mph)
(Throttle valve fully closed)	4 → 5	43 to 49 km/h (27 to 30 mph)
	5 → 4	34 to 40 km/h (21 to 25 mph)
3 position		
(Throttle valve fully open)	1 → 2	45 to 52 km/h (28 to 32 mph)
	2 → 3	85 to 94 km/h (53 to 58 mph)
	4 → 3	136 to 151 km/h (85 to 94 mph)
	3 → 2	80 to 88 km/h (50 to 55 mph)
	2 → 1	37 to 44 km/h (23 to 27 mph)
2 position		
(Throttle valve fully open)	1 → 2	45 to 52 km/h (28 to 32 mph)
	3 → 2	88 to 96 km/h (55 to 60 mph)
	2 → 1	37 to 44 km/h (23 to 27 mph)
L position		
(Throttle valve fully open)	2 → 1	38 to 45 km/h (24 to 28 mph)
Lock-up point	Throttle valve opening 5%	
D position		
5th gear	Lock-up ON	69 to 77 km/h (43 to 48 mph)
	Lock-up OFF	68 to 75 km/h (42 to 47 mph)
4th gear	Lock-up ON	96 to 105 km/h (60 to 65 mph)
	Lock-up OFF	90 to 98 km/h (56 to 61 mph)
U151E (3MZ-FE)		
Line pressure (Wheel locked)	Engine idling	
	D position	372 to 412 kPa (3.8 to 4.2 kgf·cm ² , 54 to 60 psi)
	R position	672 to 742 kPa (6.8 to 7.5 kgf·cm ² , 97 to 106 psi)
	AT stall (Throttle valve fully opened)	
	D position	931 to 1,031 kPa (9.5 to 10.5 kgf·cm ² , 135 to 150 psi)
	R position	1,768 to 1,968 kPa (18.0 to 20 kgf·cm ² , 256 to 285 psi)
Engine stall revolution	D position	2,240 ± 150 rpm

U151E (3MZ-FE)		
Time lag	N → D position	Less than 1.2 seconds
	N → R position	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	0 ± 0.5 mm (0 ± 0.020 in.)
	RH side	0 ± 0.5 mm (0 ± 0.020 in.)
Shift schedule		
D position (Throttle valve fully open)	1 → 2	39 to 47 km/h (24 to 29 mph)
	2 → 3	79 to 88 km/h (49 to 55 mph)
	3 → 4	128 to 143 km/h (80 to 89 mph)
	4 → 5	186 to 203 km/h (116 to 126 mph)
	5 → 4	179 to 196 km/h (111 to 122 mph)
	4 → 3	124 to 138 km/h (77 to 86 mph)
	3 → 2	74 to 83 km/h (46 to 52 mph)
	2 → 1	35 to 41 km/h (22 to 25 mph)
	4 → 5	44 to 50 km/h (27 to 31 mph)
	5 → 4	34 to 40 km/h (21 to 25 mph)
(Throttle valve fully closed)		
3 position (Throttle valve fully open)	1 → 2	39 to 47 km/h (24 to 29 mph)
	2 → 3	79 to 88 km/h (49 to 55 mph)
	4 → 3	127 to 141 km/h (79 to 88 mph)
	3 → 2	74 to 83 km/h (46 to 52 mph)
	2 → 1	35 to 41 km/h (22 to 25 mph)
2 position (Throttle valve fully open)	1 → 2	39 to 47 km/h (24 to 29 mph)
	3 → 2	82 to 90 km/h (51 to 56 mph)
	2 → 1	35 to 41 km/h (22 to 25 mph)
L position (Throttle valve fully open)	2 → 1	38 to 45 km/h (24 to 28 mph)
Lock-up point	Throttle valve opening 5%	
D position		
5th gear	Lock-up ON	70 to 78 km/h (43 to 48 mph)
	Lock-up OFF	68 to 76 km/h (42 to 47 mph)
4th gear	Lock-up ON	96 to 105 km/h (60 to 65 mph)
	Lock-up OFF	93 to 102 km/h (58 to 63 mph)
U250E (2AZ-FE)		
Line pressure (Wheel locked)	Engine idling	
	D position	372 to 412 kpa (3.8 to 4.2 kgf·cm ² , 54 to 60 psi)
	R position	672 to 742 kpa (6.8 to 7.5 kgf·cm ² , 97 to 106 psi)
	AT stall (Throttle valve fully opened)	
	D position	931 to 1,031 kpa (9.5 to 10.5 kgf·cm ² , 135 to 150 psi)
	R position	1,768 to 1,968 kpa (18.0 to 20 kgf·cm ² , 256 to 285 psi)
Engine stall revolution	D position	2,350 ± 150 rpm
Time lag	N → D position	Less than 1.2 seconds
	N → R position	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	0 ± 0.5 mm (0 ± 0.020 in.)
	RH side	0 ± 0.5 mm (0 ± 0.020 in.)

U250E (2AZ-FE)		
Shift schedule		
D position		
(Throttle valve fully open)	1 → 2	45 to 53 km/h (28 to 33 mph)
	2 → 3	87 to 97 km/h (54 to 60 mph)
	3 → 4	137 to 153 km/h (85 to 95 mph)
	4 → 5	196 to 215 km/h (122 to 134 mph)
	5 → 4	189 to 208 km/h (117 to 129 mph)
	4 → 3	129 to 144 km/h (80 to 89 mph)
	3 → 2	79 to 88 km/h (49 to 55 mph)
	2 → 1	32 to 38 km/h (20 to 24 mph)
(Throttle valve fully closed)	4 → 5	66 to 74 km/h (41 to 46 mph)
	5 → 4	35 to 42 km/h (22 to 26 mph)
3 position		
(Throttle valve fully open)	1 → 2	45 to 53 km/h (28 to 33 mph)
	2 → 3	87 to 97 km/h (54 to 60 mph)
	4 → 3	137 to 153 km/h (85 to 95 mph)
	3 → 2	79 to 88 km/h (49 to 55 mph)
	2 → 1	32 to 38 km/h (20 to 24 mph)
2 position		
(Throttle valve fully open)	1 → 2	45 to 53 km/h (28 to 33 mph)
	3 → 2	87 to 97 km/h (54 to 60 mph)
	2 → 1	32 to 38 km/h (20 to 24 mph)
L position		
(Throttle valve fully open)	2 → 1	39 to 45 km/h (24 to 28 mph)
Lock-up point		
Throttle valve opening 5%		
D position		
5th gear	Lock-up ON	74 to 83 km/h (46 to 52 mph)
	Lock-up OFF	73 to 81 km/h (45 to 50 mph)
4th gear	Lock-up ON	74 to 84 km/h (46 to 52 mph)
	Lock-up OFF	73 to 81 km/h (45 to 50 mph)
Flex lock-up point		
Throttle valve opening 5%		
D position		
5th gear	Lock-up ON	55 to 62 km/h (34 to 39 mph)
	Lock-up OFF	54 to 62 km/h (34 to 39 mph)
4th gear	Lock-up ON	39 to 47 km/h (24 to 29 mph)
	Lock-up OFF	39 to 45 km/h (24 to 28 mph)

TORQUE SPECIFICATION

Part Tightened		N·m	kgf·cm	ft·lbf
Park/neutral position switch	Nut	6.9	70	61 in.·lbf
	Bolt	5.4	55	48 in.·lbf
Control shaft lever x Control shaft		13	130	9
Shift control cable x Control shaft lever		15	150	10
Transaxle housing x Engine block (U151E)	A bolt	64	653	47
	B bolt	46	470	34
	C bolt	37	377	27
Transaxle housing x Engine block (U250E)	A bolt	64	653	47
	B bolt	44	449	32
	C bolt	46	470	34
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		12	122	9
Oil cooler tube clamp x Control cable bracket		5.4	55	48 in.·lbf
Oil cooler inlet tube x Transaxle		34	350	25
Oil cooler outlet tube x Transaxle		34	350	25
Starter x Transaxle		37	377	27
Starter wire x starter		9.8	100	87 in.·lbf
Wire harness x Transaxle		13	139	9
Control cable clamp x Transaxle		12	122	9
Wire harness clamp x Transaxle		8.4	86	74 in.·lbf
Revolution sensor x Transaxle (U151E)		11	110	8
Revolution sensor NC sensor x Transaxle (U250E)		8.8	90	78 in.·lbf
Revolution sensor NT sensor x Transaxle (U250E)		11	110	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, B bolt	11	110	8
	C, D bolt	6.6	67	58 in.·lbf
Valve body x transaxle		11	110	8
Oil strainer x Valve body		11	110	8
Floor shift assy x Body		12	122	9
Control cable x Body		4.9	50	43 in.·lbf
Transmission case cover x Automatic transaxle		12	122	9
Flywheel housing under cover x Automatic transaxle (U151E)	Bolt	7.8	80	69 in.·lbf
	Nut	21	214	16

MANUAL TRANSMISSION / TRANSAXLE

030FQ-03

SERVICE DATA

Transmission case oil seal driven 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 to 0.65 mm (0.0039 to 0.0256 in.)
5th gear radial clearance	Standard clearance	0.009 to 0.050 mm (0.0004 to 0.0020 in.)
Reverse idler gear sub-assy inside diameter	Standard inside diameter	20.056 to 20.074 mm (0.7896 to 0.7903 in.)
	Maximum inside diameter	20.074 mm (0.7903 in.)
Reverse idler gear shaft outer diameter	Standard outer diameter	19.984 to 20.000 mm (0.7868 to 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		0.15 to 0.35 mm (0.0059 to 0.0138 in.)
5th gear inside diameter	Standard inside diameter	34.981 to 34.997 mm (1.3772 to 1.3778 in.)
	Maximum inside diameter	34.997 mm (1.3778 in.)
Control shaft cover bimetal formed bush clearance		0.081 to 0.149 mm (0.0032 to 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 to 4.4 mm (0.150 to 0.173 in.)
Output shaft bearing preload	New bearing	0.8 to 1.6 N·m (8.16 to 16.32 kgf·cm, 7.1 to 14.2 in.-lbf)
	Used bearing	0.5 to 1.0 N·m (5.10 to 10.20 kgf·cm, 4.4 to 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 to 1.6 N·m (8.16 – 16.32 kgf·cm, 7.1 to 14.2 in.-lbf)
	Used bearing	0.5 to 1.0 N·m (5.10 – 10.20 kgf·cm, 4.4 to 8.9 in.-lbf)

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 to 2 mm (0.0394 to 0.0787 in.)
Input shaft front bearing clearance		4.28 to 4.60 mm (0.1685 to 0.1811 in.)
Reverse restrict pin clearance		12.5 to 13.5 mm (0.492 to 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 to 1.80 mm (0.0689 to 0.0709 in.)
	b	1.80 to 1.85 mm (0.0709 to 0.0728 in.)
	c	1.85 to 1.90 mm (0.0728 to 0.0748 in.)
	d	1.90 to 1.95 mm (0.0748 to 0.0768 in.)
	e	1.95 to 2.00 mm (0.0768 to 0.0787 in.)
	f	2.00 to 2.05 mm (0.0787 to 0.0807 in.)
	g	2.05 to 2.10 mm (0.0807 to 0.0827 in.)
	h	2.10 to 2.15 mm (0.0827 to 0.0846 in.)
	j	2.15 to 2.20 mm (0.0846 to 0.0866 in.)
5th gear radial clearance	Standard clearance	0.009 to 0.050 mm (0.0004 to 0.0020 in.)
5th gear thrust clearance	Standard clearance	0.10 to 0.65 mm (0.0039 to 0.0260 in.)
Input shaft assy		
4th gear thrust clearance	Standard clearance	0.10 to 0.57 mm (0.0039 to 0.0224 in.)
3rd gear thrust clearance	Standard clearance	0.10 to 0.35 mm (0.0039 to 0.0138 in.)
4th gear radial clearance	KOYO made	0.009 to 0.053 mm (0.0004 to 0.0021 in.)
	NSK made	0.009 to 0.051 mm (0.0004 to 0.0020 in.)
3rd gear radial clearance	KOYO made	0.009 to 0.053 mm (0.0004 to 0.0021 in.)
	NSK made	0.009 to 0.051 mm (0.0004 to 0.0020 in.)
Input shaft run out	Maximum run out:	0.03 mm (0.0012 in.)
Input shaft standard outer diameter	A	35.984 to 36.000 mm (1.4167 to 1.4173 in.)
	B	35.984 to 36.000 mm (1.4167 to 1.4173 in.)
	C	27.957 to 27.972 mm (1.1007 to 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	42.009 to 42.025 mm (1.6539 to 1.6545 in.)
	Maximum inside diameter	42.025 mm (1.6545 in.)
3rd gear inside diameter	Standard inside diameter	43.009 to 43.025 mm (1.6933 to 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 to 1.65 mm (0.0295 to 0.0650 in.)
Between the 3rd gear spline end and synchronizer outer ring back clearance		0.65 to 1.75 mm (0.0256 to 0.0689 in.)
Transmission hub sleeve No.3 groove – thickness of the claw part on gear shift fork No.1	Standard clearance	0.11 to 0.69 mm (0.0043 to 0.0272 in.)
Transmission clutch hub No.2 snap ring clearance	Standard clearance	0.1 mm or less (0.0039 in. or less)

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Transmission clutch hub No.2 snap ring thickness	H	2.30 to 2.35 mm (0.0906 to 0.0925 in.)
	J	2.35 to 2.40 mm (0.0925 to 0.0945 in.)
	K	2.40 to 2.45 mm (0.0945 to 0.0965 in.)
	L	2.45 to 2.50 mm (0.0965 to 0.0984 in.)
	M	2.50 to 2.55 mm (0.0984 to 0.1004 in.)
	N	2.55 to 2.60 mm (0.1004 to 0.1024 in.)
	P	2.60 to 2.65 mm (0.1024 to 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 to 2.40 mm (0.0925 to 0.0945 in.)
	2	2.40 to 2.45 mm (0.0945 to 0.0965 in.)
	3	2.45 to 2.50 mm (0.0965 to 0.0984 in.)
	4	2.50 to 2.55 mm (0.0984 to 0.1004 in.)
	5	2.55 to 2.60 mm (0.1004 to 0.1024 in.)
	6	2.60 to 2.65 mm (0.1024 to 0.1043 in.)
	7	2.65 to 2.70 mm (0.1043 to 0.1063 in.)
	8	2.70 to 2.75 mm (0.1063 to 0.1083 in.)
3rd gear radial clearance	KOYO made	0.009 to 0.053 mm (0.0004 to 0.0021 in.)
	NSK made	0.009 to 0.051 mm (0.0004 to 0.0020 in.)
4th gear radial clearance	KOYO made	0.009 to 0.053 mm (0.0004 to 0.0021 in.)
	NSK made	0.009 to 0.051 mm (0.0004 to 0.0020 in.)
3rd gear thrust clearance	Standard clearance	0.10 to 0.35 mm (0.0039 to 0.0138 in.)
4th gear thrust clearance	Standard clearance	0.10 to 0.57 mm (0.0039 to 0.0224 in.)
Output shaft assy		
1st gear thrust clearance	Standard clearance	0.25 to 0.40 mm (0.0098 to 0.0157 in.)
2nd gear thrust clearance	Standard clearance	0.10 to 0.35 mm (0.0039 to 0.0138 in.)
1st gear radial clearance	KOYO made	0.009 to 0.053 mm (0.0004 to 0.0021 in.)
	NSK made	0.009 to 0.051 mm (0.0004 to 0.0020 in.)
2nd gear radial clearance	KOYO made	0.009 to 0.053 mm (0.0004 to 0.0021 in.)
	NSK made	0.009 to 0.051 mm (0.0004 to 0.0020 in.)
Output shaft run out	Maximum run out	0.03 mm (0.0012 in.)
Output shaft standard outer diameter	A	37.610 to 37.626 mm (1.4807 to 1.4813 in.)
	B	34.502 to 34.512 mm (1.3583 to 1.3587 in.)
Output shaft minimum outer diameter	A	37.610 mm (1.4807 in.)
	B	34.502 mm (1.3702 in.)
2nd gear inside diameter	Standard inside diameter	50.009 to 50.025 mm (1.9689 to 1.9695 in.)
	Maximum inside diameter	50.025 mm (1.9695 in.)
1st gear inside diameter	Standard inside diameter	51.009 to 51.025 (2.0082 to 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 to 1.45 mm (0.0276 to 0.0571 in.)
Between the 1st gear while and synchronizer ring set No.1 back clearance		0.70 to 1.45 mm (0.0276 to 0.0571 in.)
Reverse gear groove – thickness of the claw part on gear shift fork No.1 clearance	Standard clearance	0.15 to 0.35 mm (0.0059 to 0.0138 in.)
2nd gear radial clearance	KOYO made	0.009 to 0.053 mm (0.0004 to 0.0021 in.)
	NSK made	0.009 to 0.051 mm (0.0004 to 0.0020 in.)
1st gear radial clearance	KOYO made	0.009 to 0.053 mm (0.0004 to 0.0021 in.)
	NSK made	0.009 to 0.051 mm (0.0004 to 0.0020 in.)
2nd gear thrust clearance	Standard clearance	0.10 to 0.35 mm (0.0039 to 0.0138 in.)
1st gear thrust clearance	Standard clearance	0.25 to 0.40 mm (0.0098 to 0.0157 in.)
Differential case assy		
Front differential side gear backlash	Standard backlash	0.10 to 0.20 mm (0.0039 to 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 to 0.20 mm (0.0020 to 0.0079 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 to 0.5 mm (-0.0197 to 0.0197 in.)
Shift lever slotted pin clearance to the shift lever inner No.2	5.8 to 6.8 mm (0.228 to 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	245	18
Reverse shift arm bracket assy x Manual transaxle case		17	173	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	204	15
Release fork support x Manual transaxle case		47	480	35
Manual transaxle x Engine	Bolt A	64	653	47
	Bolt B	46	470	34
	Bolt C	44	449	32
Engine mounting insulator LH x Manual transaxle		64	653	47
Exhaust pipe support bracket No. 1 set bolt		19	194	14
Manual transmission case protector x Manual transaxle		18	184	13
Engine mounting bracket FR x Manual transaxle		64	653	47
Starter assy x Manual transaxle		39	398	29
Wire harness clamp bracket x Manual transaxle		8.4	86	74 in·lbf
Engine wire No. 3 x Manual transaxle		9.6	98	85 in·lbf
Transmission case x Manual transaxle case		29	296	21
Manual transaxle case x Transmission case		29	296	21
Bearing retainer RR x Transmission case		43	438	32
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

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	480	35
Front differential ring gear x Front differential case	106	1,081	78

CLUTCH

SERVICE DATA

030EF-05

Pedal height from asphalt sheet		159.0 to 169.0 mm (6.260 to 6.654 in.)
Clutch pedal free play		5.0 to 15.0 mm (0.197 to 0.591 in.)
Clutch pedal push rod play at pedal top		1.0 to 5.0 mm (0.039 to 0.197 in.)
Slotted spring pin protrusion	Maximum	1.5 to 3.5 mm (0.059 to 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	39	398	29
Clutch pedal support set bolt x Body	19	195	14
Cylinder push rod clevis lock nut	26	260	19
Clutch master cylinder assy x Clutch pedal support	12	120	9
Clutch master cylinder assy x Flexible hose tube	15	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	12	120	9
Clutch accumulator assy x Clutch release cylinder assy	12	120	9
Clutch release cylinder assy x flexible hose tube	15	155	11
Clutch cover assy x Flywheel	19	195	14
Release fork support x Transaxle assy	47	480	35
Clutch start switch assy set nut	16	160	12

TORQUE SPECIFICATION

2AZ-FE:

Part Tightened	N·m	kgf·cm	ft·lbf
Throttle body Assy x Intake manifold	30	306	22
Knock sensor x Cylinder block sub-assy	20	199	14
Intake manifold x Cylinder head sub-assy	30	306	22
ECM x Instrument panel reinforcement	5.5	56	49 in.·lbf
ECM x Blower Assy	5.5	56	49 in.·lbf
Accelerator pedal rod Assy x Body	7.5	76	66 in.·lbf

1MZ-FE/3MZ-FE:

Part Tightened	N·m	kgf·cm	ft·lbf
Front suspension upper brace center x Body (w/ Performance Rod)	80	815	59
V-bank cover sub-assy x Cylinder head cover sub-assy LH	7.9	81	70 in.·lbf
Throttle body Assy x Intake air connector	11	112	8
Air cleaner cap sub-assy x Air cleaner case sub-assy	5.0	51	44 in.·lbf
Knock sensor x Cylinder block sub-assy 1MZ-FE	39	398	29
Knock sensor x Cylinder block sub-assy 3MZ-FE	20	199	14
Water outlet x Cylinder head sub-assy	15	153	11
Water outlet x Cylinder head LH	15	153	11
Intake manifold x Cylinder head sub-assy	15	153	11
Intake manifold x Cylinder head LH	15	153	11
Ground cable x Intake manifold	8.4	86	74 in.·lbf
ECM x Instrument panel reinforcement	5.5	56	49 in.·lbf
ECM x Blower Assy	5.5	56	49 in.·lbf
Accelerator pedal rod Assy x Body	7.5	76	66 in.·lbf

FUEL

SERVICE DATA

030EN-04

2AZ-FE:

Fuel pressure		304 to 343 kPa (3.1 to 3.5 kgf/cm ² , 44 to 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 to 14.2Ω
Injection volume		76 to 91 cm ³ (4.6 to 5.5 cu in.) per 15 seconds
Difference between each cylinder		15 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 to 3.0 Ω

1MZ-FE/3MZ-FE:

Fuel pressure		304 to 343 kPa (3.1 to 3.5 kgf/cm ² , 44 to 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 to 14.2Ω
Injection volume		60 to 73 cm ³ (3.7 to 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 to 3.0 Ω

TORQUE SPECIFICATION

2AZ-FE:

Part Tightened	N·m	kgf·cm	ft·lbf
Fuel delivery pipe x Cylinder head	20	204	15
Fuel tank bent tube set plate x Fuel tank assy	5.9	60	52 in.·lbf
Fuel main tube support x Fuel tank assy	5.4	55	48 in.·lbf
Fuel tank band sub-assy No. 1 RH x Body	39	400	29
Fuel tank band sub-assy No. 1 LH x Body	39	400	29
Fuel tank protector lower center x Fuel tank assy	5.4	55	48 in.·lbf
Packing brake cable assy No. 2 x Body	5.4	55	48 in.·lbf
Packing brake cable assy No. 3 x Body	5.4	55	48 in.·lbf
Exhaust pipe assy center x Exhaust pipe assy front	56	571	41
Exhaust pipe assy center x Exhaust pipe assy tail	56	571	41
Floor panel brace rear x Body	20	199	14

1MZ-FE/3MZ-FE:

Part Tightened	N·m	kgf·cm	ft·lbf
Fuel delivery pipe sub-assy x Intake manifold	10	102	7
Fuel delivery pipe No. 2 x Intake manifold	10	102	7
Fuel pipe No. 2 union bolt x Fuel delivery pipe No. 2	33	331	24
Fuel pressure pulsation damper assy x Fuel delivery pipe sub-assy	33	331	24
Fuel pipe sub-assy No. 1 x Intake manifold	20	199	14
Surge tank stay No. 2 x Intake air surge tank	20	199	14
Surge tank stay No. 2 x Cylinder head	20	199	14
Surge tank stay No. 1 x Intake air surge tank	20	199	14
Surge tank stay No. 1 x Cylinder head	20	199	14
Engine hunger No. 1 x Intake air surge tank	20	199	14
Engine hunger No. 1 x Cylinder head	20	199	14
Pressure feed tube assy x Engine hunger No. 1	7.8	80	69 in.·lbf
Intake air surge tank x Intake manifold	28	286	21
Emission control valve set x Emission control valve bracket	8.0	80	71 in.·lbf
Fuel tank bent tube set plate x Fuel tank assy	5.9	60	52 in.·lbf
Fuel main tube support x Fuel tank assy	5.4	55	48 in.·lbf
Fuel tank band sub-assy No. 1 RH x Body	39	400	29
Fuel tank band sub-assy No. 1 LH x Body	39	400	29
Fuel tank protector lower center x Fuel tank assy	5.4	55	48 in.·lbf
Packing brake cable assy No. 2 x Body	5.4	55	48 in.·lbf
Packing brake cable assy No. 3 x Body	5.4	55	48 in.·lbf
Exhaust pipe assy center x Exhaust pipe assy front	56	571	41
Exhaust pipe assy center x Exhaust pipe assy tail	56	571	41
Floor panel brace rear x Body	20	199	14

EMISSION CONTROL

030EP-04

SERVICE DATA

2AZ-FE:

VSV for CCV Resistance	at 20  (68  at 100  (212 	25 to 30 Ω 32 to 40 Ω
VSV for EVAP Resistance	1 - 2 1 - Body ground 2 - Body ground	26 to 30 Ω at 20  (68  10 k Ω or higher 10 k Ω or higher
Air fuel ratio sensor Resistance	1 (HT) - 2 (+B) 1 (HT) - 2 (+B)	0.8 to 1.4 Ω at 20  (68  1.8 to 3.2 Ω at 800  (1,472 
Heated oxygen sensor (Bank 1 Sensor 2) Resistance	1 (HT) - 2 (+B) 1 (HT) - 2 (+B)	11 to 16 Ω at 20  (68  23 to 32 Ω at 800  (1,472 

1MZ-FE/3MZ-FE:

VSV for CCV Resistance	at 20  (68  at 100  (212 	25 to 30 Ω 32 to 40 Ω
VSV for EVAP Resistance	1 - 2 1 - Body ground 2 - Body ground	26 to 30 Ω at 20  (68  10 k Ω or higher 10 k Ω or higher
Air fuel ratio sensor Resistance	1 (HT) - 2 (+B) 1 (HT) - 2 (+B)	0.8 to 1.4 Ω at 20  (68  1.8 to 3.2 Ω at 800  (1,472 
Heated oxygen sensor (Bank 1 Sensor 2) Resistance	1 (HT) - 2 (+B) 1 (HT) - 2 (+B)	11 to 16 Ω at 20  (68  23 to 32 Ω at 800  (1,472 
Heated oxygen sensor (Bank 2 Sensor 2) Resistance	1 (HT) - 2 (+B) 1 (HT) - 2 (+B)	11 to 16 Ω at 20  (68  23 to 32 Ω at 800  (1,472 