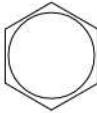
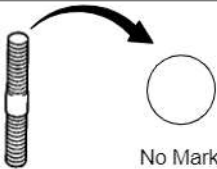
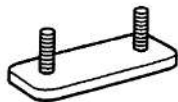


STANDARD BOLT

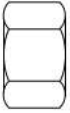
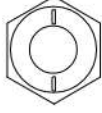
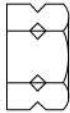
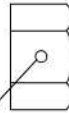
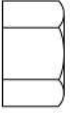
HOW TO DETERMINE BOLT STRENGTH

03055-04

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

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

2005 HIGHLANDER REPAIR MANUAL (RM1144U)

COOLING

SERVICE DATA

030411-04

2AZ-FE

Thermostat		
Valve opening temperature		80 to 84°C (176 to 183°F)
Valve lift	at 95°C (203°F)	10 mm (0.39 in.) or more
Radiator cap sub-assy		
Standard opening pressure		93 to 122 kPa (0.95 to 1.25 kgf/cm ² , 13.4 to 17.6 psi)
Minimum opening pressure		78 kPa (0.8 kgf/cm ² , 11.4 psi)
Cooling fan		
Standard amperage (80W TYPE)	at 20°C (68°F)	5.2 to 8.2 A
Standard amperage (120W TYPE)	at 20°C (68°F)	8.0 to 11.0 A

3MZ-FE

Thermostat		
Valve opening temperature		80 to 84°C (176 to 183°F)
Valve lift	at 95°C (203°F)	10 mm (0.39 in.) or more
Radiator cap sub-assy		
Standard opening pressure		93 to 122 kPa (0.95 to 1.25 kgf/cm ² , 13.4 to 17.6 psi)
Minimum opening pressure		78 kPa (0.8 kgf/cm ² , 11.4 psi)
Cooling fan		
Standard amperage	at 20°C (68°F)	8.5 to 11.5 A

FRONT SUSPENSION

03052-03

SERVICE DATA

Front wheel alignment	Vehicle height		
	FF	Front: A - B:	120.1 mm (4.73 in.)
		Rear: D - C:	40.5 mm (1.59 in.)
	4WD	Front: A - B:	110.1 mm (4.33 in.)
		Rear: D - C:	30.5 mm (1.20 in.)
	Toe-in (total)		0° ± 10' (0° ± 0.16°, 0 ± 2 mm, 0 ± 0.08 in.)
		Rack end length difference	1.5 mm (0.059 in.) or less
Front wheel alignment	Wheel angle		
	FF	Inside wheel:	35°28' ± 2° (35.47° ± 2°)
		Outside wheel: Reference:	31°13' (31.22°)
	4WD	Inside wheel:	35°41' ± 2° (35.68° ± 2°)
		Outside wheel: Reference:	31°22' (31.37°)
	Camber		
		FF:	-0°40' ± 45' (-0.67° ± 0.75°)
Front wheel alignment		4WD:	-0°35' ± 45' (-0.58° ± 0.75°)
		Right-left error	45' (0.75°) or less
	Caster		
			2°45' ± 45' (2.75° ± 0.75°)
		Right-left error	45' (0.75°) or less
	Steering axis inclination		
		FF:	10°45' ± 45' (10.75° ± 0.75°)
Front suspension		4WD:	10°35' ± 45' (10.58° ± 0.75°)
		Right-left error	45' (0.75°) or less
	Lower ball joint turning torque		0.98 to 3.43 N·m (10 to 35 kgf·cm, 8.7 to 30 in.-lbf)
	Stabilizer bar link ball joint turning torque		0.05 to 1.96 N·m (0.5 to 20 kgf·cm, 0.4 to 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

HEATER & AIR CONDITIONER

SERVICE DATA

031WE-01

Refrigerant charge volume	Standard: 650 ± 50 g (22.93 ± 1.76 oz.)	
V(cooler compressor to crankshaft pulley) belt No.. 1 tension	New belt:	160 to 180 lbf
	Used belt:	115 to 135 lbf

TIRE & WHEEL

SERVICE DATA

03050-02

Tire size: P225/70R16 101S	Front, Rear	210 kPa (2.1 kgf/cm ² , 30 psi)
Tire runout		1.4 mm (0.055 in.) or less
Imbalance after adjustment		8.0 g (0.018 lb) or less

PARKING BRAKE

0305C-02

SERVICE DATA

Parking brake pedal travel at 300 N (31 kgf, 67.46 lbf):		5 to 7 clicks
Rear brake disc inside diameter	Standard	190 mm (7.480 in.)
	Maximum	191 mm (7.520 in.)
Parking brake shoe lining thickness	Standard	2.5 mm (0.098 in.)
	Maximum	1.0 mm (0.039 in.)
Parking brake shoe clearance between rear shoe and lever		Less than 0.35 mm (0.014 in.)

LUBRICATION

SERVICE DATA

0304J-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 kPa (2.5 kgf·cm ² , 36 psi) or more
Oil pump		
Side clearance	Standard Maximum	0.030 to 0.085 mm (0.0012 to 0.0033 in.) 0.16 mm (0.0063 in.)
Tip clearance	Standard Maximum	0.080 to 0.160 mm (0.0031 to 0.0063 in.) 0.35 mm (0.0138 in.)
Body clearance	Standard Maximum	0.100 to 0.170 mm (0.00394 to 0.00669 in.) 0.325 mm (0.01280 in.)

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		
Side clearance	Standard Maximum	0.03 to 0.09 mm (0.0012 to 0.0035 in.) 0.15 mm (0.0059 in.)
Tip clearance	Standard Maximum	0.11 to 0.24 mm (0.0043 to 0.0094 in.) 0.35 mm (0.0138 in.)
Body clearance	Standard Maximum	0.125 to 0.162 mm (0.0050 to 0.0064 in.) 0.30 mm (0.0118 in.)

STEERING COLUMN

SERVICE DATA

0304Y-03

Steering wheel freeplay	Maximum	30 mm (1.18 in.)
Steering main shaft length	Standard length	504.5 ± 1 mm (19.862 ± 0.039 in.)

IGNITION

SERVICE DATA

0304L-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.) 1.3mm (0.051 in.)
Camshaft position sensor Resistance	at cold at hot	835-1400Ω 1060-1645Ω
Crank position sensor Resistance	at cold at hot	985-1600Ω 1265-1890Ω

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.)
Crank position sensor Resistance	at cold at hot	835-1400Ω 1060-1645Ω
Crank position sensor Resistance	at cold at hot	1630-2740Ω 2065-3225Ω

POWER STEERING

SERVICE DATA

0304W-05

POWER STEERING FLUID		
Fluid level rise	Maximum	5 mm (0.20 in.)
Fluid pressure at idle speed with valve closed		7,800 to 8,300 kPa (80 to 85 kgf/cm ² , 1,131 to 1,204 psi)
STEERING WHEEL		
Steering effort at idle speed	(Reference)	6.0 N·m (60 kgf·cm, 53 in.-lbf)
VANE PUMP ASSY (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 bush clearance	Maximum	0.07 mm (0.0028 in.)
Vane plate thickness	Minimum	1.405 to 1.411 mm (0.05531 to 0.05555 in.)
Vane plate and vane rotor groove clearance	Maximum	0.03 mm (0.0012 in.)
Spring free length	Minimum	30.3 mm (1.193 in.)
VANE PUMP ASSY (3MZ-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 to 0.054 mm (0.00106 to 0.00213 in.) 0.07 mm (0.0028 in.)
Vane plate thickness	Minimum	1.397 to 1.403 mm (0.0550 to 0.0552 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 LINK ASSY		
Steering rack runout	Maximum	0.3 mm (0.0118 in.)
Tie rod assy stad bolt torque	(Turning)	0.49 to 3.43 N·m (5.0 to 35.0 kgf·cm, 4.3 to 30.4 in.-lbf)
Total preload (Control valve rotating torque)	(Turning)	1.2 to 1.5 N·m (12.2 to 15.3 kgf·cm, 10.6 to 13.3 in.-lbf)
Rack boot clamp clearance		3.0 mm (0.118 in.) or less

STARTING & CHARGING

SERVICE DATA

0304N-04

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	1 MΩ 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.)

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	1 MΩ 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.)

BRAKE

SERVICE DATA

031IB-04

Brake pedal height (from asphalt sheet)		150.0 - 160.0 mm (5.906 - 6.299 in.)
Brake Pedal free play		2.0 - 3.0 mm (0.079 - 0.118 in.)
Stop lamp switch clearance		0.5 - 2.6 mm (0.020 - 0.102 in.)
Pedal reserve distance from asphalt sheet at 490 N (50 kgf, 110 lbf)		More than 80 mm (3.1 in.)
Brake booster push rod to piston clearance (w/ SST)		0 mm (0 in.)
Front brake pad thickness	Standard: Minimum:	11.0 mm (0.433 in.) 1.0 mm (0.039 in.)
Front brake disc thickness	Standard: Minimum:	28.0 mm (1.102 in.) 26.0 mm (1.024 in.)
Front brake disc runout	Maximum:	0.05 mm (0.0020 in.)
Rear brake pad thickness	Standard: Minimum:	10.0 mm (0.394 in.) 1.0 mm (0.039 in.)
Rear brake disc thickness	Standard: Maximum:	10.0 mm (0.394 in.) 8.5 mm (0.335 in.)
Rear brake disc runout	Maximum:	0.15 mm (0.0059 in.)

ENGINE CONTROL SYSTEM

03048-02

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
Throttle body assy Resistance	at 20°C (68°F) 2 (M+) - 1 (M-)	0.3 to 100 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)

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
Throttle body assy Resistance	at 20°C (68°F) 2 (M+) - 1 (M-)	0.3 to 100 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)

TRANSFER

SERVICE DATA

0310F-03

Driven pinion preload (For use with SST(s))	New bearing	1.1 to 1.6 N·m (11 to 16 kgf·cm, 9.7 to 14.2 in.-lbf)
	Used bearing	0.9 to 1.4 N·m (9 to 14 kgf·cm, 8.0 to 12.4 in.-lbf)
Total preload (For use with SST(s))	New bearing	1.30 to 1.98 N·m (13.3 to 20.2 kgf·cm, 11.5 to 17.5 in.-lbf)
	Used bearing	1.07 to 1.68 N·m (10.9 to 17.1 kgf·cm, 9.5 to 14.9 in.-lbf)
Ring gear	Backlash	0.10 to 0.15 mm (0.0039 to 0.0059 in.)
Ring gear runout	Maximum	0.1 mm (0.004 in.)
Transfer ring gear mounting case	Maximum	0.03 mm (0.0012 in.)
Washer thickness LH side	Mark	
	AA	2.07 mm (0.0814 in.)
	AB	2.10 mm (0.0826 in.)
	AC	2.13 mm (0.0838 in.)
	BA	2.16 mm (0.0850 in.)
	BB	2.19 mm (0.0862 in.)
	BC	2.22 mm (0.0874 in.)
	CA	2.25 mm (0.0885 in.)
	CB	2.28 mm (0.0897 in.)
	CC	2.31 mm (0.0909 in.)
	DA	2.34 mm (0.0921 in.)
	DB	2.37 mm (0.0933 in.)
	DC	2.40 mm (0.0944 in.)
	EA	2.43 mm (0.0956 in.)
	EB	2.46 mm (0.0968 in.)
	EC	2.49 mm (0.0980 in.)
	FA	2.52 mm (0.0992 in.)
	FB	2.55 mm (0.1003 in.)
	FC	2.58 mm (0.1015 in.)
	GA	2.61 mm (0.1027 in.)
	GB	2.64 mm (0.1039 in.)
	GC	2.67 mm (0.1051 in.)
	HA	2.70 mm (0.1062 in.)
	HB	2.73 mm (0.1074 in.)
	HC	2.76 mm (0.1086 in.)
	JA	2.79 mm (0.1098 in.)
	JB	2.82 mm (0.1110 in.)
	JC	2.85 mm (0.1122 in.)
	KA	2.88 mm (0.1133 in.)
	KB	2.91 mm (0.1145 in.)
	KC	2.94 mm (0.1157 in.)
	LA	2.97 mm (0.1169 in.)
	LB	3.00 mm (0.1181 in.)

SERVICE SPECIFICATIONS - TRANSFER

Driven pinion bearing waasher thickness front side	Mark	
	AA	1.20 mm (0.0472 in.)
	AC	1.22 mm (0.0480 in.)
	BB	1.24 mm (0.0488 in.)
	CA	1.26 mm (0.0496 in.)
	CC	1.28 mm (0.0503 in.)
	DB	1.30 mm (0.0511 in.)
	EA	1.32 mm (0.0519 in.)
	EC	1.34 mm (0.0527 in.)
	FB	1.36 mm (0.0535 in.)
	GA	1.38 mm (0.0543 in.)
	GC	1.40 mm (0.0551 in.)
	HB	1.42 mm (0.0559 in.)
	JA	1.44 mm (0.0566 in.)
	JC	1.46 mm (0.0574 in.)
	KB	1.48 mm (0.0582 in.)
	LA	1.50 mm (0.0590 in.)
	LC	1.52 mm (0.0598 in.)
	MB	1.54 mm (0.0606 in.)
	NA	1.56 mm (0.0614 in.)
Washer thickness RH side	NC	1.58 mm (0.0622 in.)
	PB	1.60 mm (0.0629 in.)
	QA	1.62 mm (0.0637 in.)
	QC	1.64 mm (0.0645 in.)
	Mark	
	AA	1.47 mm (0.0578 in.)
	AB	1.50 mm (0.0590 in.)
	AC	1.53 mm (0.0602 in.)
	BA	1.56 mm (0.0614 in.)
	BB	1.59 mm (0.0625 in.)
	BC	1.62 mm (0.0637 in.)
	CA	1.65 mm (0.0649 in.)
	CB	1.68 mm (0.0661 in.)
	CC	1.71 mm (0.0673 in.)
	DA	1.74 mm (0.0685 in.)
	DB	1.77 mm (0.0696 in.)
	DC	1.80 mm (0.0708 in.)
	EA	1.83 mm (0.0720 in.)
	EB	1.86 mm (0.0732 in.)
	EC	1.89 mm (0.0744 in.)
	FA	1.92 mm (0.0755 in.)
	FB	1.95 mm (0.0767 in.)
	FC	1.98 mm (0.0779 in.)
	GA	2.01 mm (0.0790 in.)
	GB	2.04 mm (0.0803 in.)
	GC	2.07 mm (0.0814 in.)
	HA	2.10 mm (0.0826 in.)
	HB	2.13 mm (0.0838 in.)
	HC	2.16 mm (0.0850 in.)
	JA	2.19 mm (0.0862 in.)
	JB	2.22 mm (0.0874 in.)
	JC	2.25 mm (0.0885 in.)
	KA	2.28 mm (0.0897 in.)
	KB	2.31 mm (0.0909 in.)
	KC	2.34 mm (0.0921 in.)
	LA	2.37 mm (0.0933 in.)
	LB	2.40 mm (0.0944 in.)
	LC	2.43 mm (0.0956 in.)
	MA	2.46 mm (0.0968 in.)
	MB	2.49 mm (0.0980 in.)
	MC	2.52 mm (0.0992 in.)
	NA	2.55 mm (0.1003 in.)
	NB	2.58 mm (0.1015 in.)

FUEL

SERVICE DATA

0304A-02

2AZ-FE:

Fuel pressure		304 to 343 kPa (3.1 to 3.5 kgf/cm ² , 44 to 50 psi)
Fuel injector		
Resistance	at 20°C (68°F)	11.6 to 12.4 Ω
Injection volume		76 to 92 cm ³ (4.6 to 5.6 cu in.) per 15 seconds
Difference between each cylinder		16 cm ³ (1.0 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

3MZ-FE:

Fuel pressure		304 to 343 kPa (3.1 to 3.5 kgf/cm ² , 44 to 50 psi)
Fuel injector		
Resistance	at 20°C (68°F)	13.4 to 14.2 Ω
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

DIFFERENTIAL

SERVICE DATA

031FB-03

Rear differential	Carrier oil seal drive in depth	2.0 ± 0.3 mm (0.079 ± 0.012 in.)
	Side gear shaft oil seal drive in depth	0 ± 0.5mm (0 ± 0.019 in.)
	Companion flange vertical runout	0.10 mm (0.0039 in.) or less
	Companion flange horizontal runout	0.10 mm (0.0039 in.) or less
	Ring gear runout	0.07 mm (0.0028 in.) or less
	Side gear backlash	0.05 to 0.20 mm (0.0020 to 0.0079 in.)
	Drive pinion to ring gear backlash	0.13 to 0.18 mm (0.0051 to 0.0071 in.)
	Drive pinion preload (at starting)	New bearing Reused bearing
		1.1 to 1.7 N·m (11 to 17 kgf·cm, 9.6 to 14.8 in.-lbf) 0.6 to 0.9 N·m (6 to 9 kgf·cm, 5.2 to 7.8 in.-lbf)
	Total preload (Drive pinion preload plus)	0.3 to 0.5 N·m (3 to 5 kgf·cm, 2.6 to 4.3 in.-lbf)
	Side gear thrust washer thickness	mm (in.)
		0.93 to 0.97 (0.0366 to 0.0382) 0.98 to 1.02 (0.0386 to 0.0402) 1.03 to 1.07 (0.0406 to 0.0421) 1.08 to 1.12 (0.0425 to 0.0441) 1.13 to 1.17 (0.0445 to 0.0461) 1.18 to 1.22 (0.0465 to 0.0480) 1.23 to 1.27 (0.0484 to 0.0500) 1.28 to 1.32 (0.0504 to 0.0520) 1.33 to 1.37 (0.0524 to 0.0539) 1.38 to 1.42 (0.0543 to 0.0559)
	Drive pinion plate washer thickness	mm (in.)
		2.26 to 2.28 (0.0890 to 0.0898) 2.29 to 2.31 (0.0902 to 0.0909) 2.32 to 2.34 (0.0913 to 0.0921) 2.35 to 2.37 (0.0925 to 0.0933) 2.38 to 2.40 (0.0937 to 0.0945) 2.41 to 2.43 (0.0949 to 0.0957) 2.44 to 2.46 (0.0961 to 0.0969) 2.47 to 2.49 (0.0972 to 0.0980) 2.50 to 2.52 (0.0984 to 0.0992) 2.53 to 2.55 (0.0996 to 0.1004) 2.56 to 2.58 (0.1008 to 0.1016) 2.59 to 2.61 (0.1020 to 0.1028) 2.62 to 2.64 (0.1031 to 0.1039) 2.65 to 2.67 (0.1043 to 0.1051) 2.68 to 2.70 (0.1055 to 0.1063)

Rear differential	Side gear shaft plate washer thickness	mm (in.)	2.21 to 2.23 (0.0870 to 0.0878) 2.24 to 2.26 (0.0882 to 0.0890) 2.27 to 2.29 (0.0894 to 0.0902) 2.30 to 2.32 (0.0906 to 0.0913) 2.33 to 2.35 (0.0917 to 0.0925) 2.36 to 2.38 (0.0929 to 0.0937) 2.39 to 2.41 (0.0941 to 0.0949) 2.42 to 2.44 (0.0953 to 0.0961) 2.45 to 2.47 (0.0965 to 0.0972) 2.48 to 2.50 (0.0976 to 0.0984) 2.51 to 2.53 (0.0988 to 0.0996) 2.54 to 2.56 (0.1000 to 0.1008) 2.57 to 2.59 (0.1012 to 0.1020) 2.60 to 2.62 (0.1024 to 0.1031) 2.63 to 2.65 (0.1035 to 0.1043) 2.66 to 2.68 (0.1047 to 0.1055) 2.69 to 2.71 (0.1059 to 0.1067) 2.72 to 2.74 (0.1071 to 0.1079) 2.75 to 2.77 (0.1083 to 0.1091) 2.78 to 2.80 (0.1094 to 0.1102) 2.81 to 2.83 (0.1106 to 0.1114) 2.84 to 2.86 (0.1118 to 0.1126) 2.87 to 2.89 (0.1130 to 0.1138) 2.90 to 2.92 (0.1142 to 0.1150) 2.93 to 2.95 (0.1154 to 0.1161) 2.96 to 2.98 (0.1165 to 0.1173) 2.99 to 3.01 (0.1177 to 0.1185) 3.02 to 3.04 (0.1189 to 0.1197) 3.05 to 3.07 (0.1201 to 0.1209) 3.08 to 3.10 (0.1213 to 0.1220) 3.11 to 3.13 (0.1224 to 0.1232) 3.14 to 3.16 (0.1236 to 0.1244) 3.17 to 3.19 (0.1248 to 0.1256) 3.20 to 3.22 (0.1260 to 0.1268)
-------------------	--	----------	--

EMISSION CONTROL

0304C-02

SERVICE DATA

2AZ-FE

A/F sensor (bank 1 sensor 1) resistance	at 20°C (68°F) at 800°C (1,472°F)	0.8 to 1.4 Ω 1.8 to 3.2 Ω
Oxygen sensor (bank 1 sensor 2) resistance	at 20°C (68°F) at 800°C (1,472°F)	11 to 16 Ω 23 to 32 Ω
VSV for EVAP resistance	at 20°C (68°F)	26 to 30 Ω

3MZ-FE

A/F sensor (bank 1 sensor 1) resistance	at 20°C (68°F) at 800°C (1,472°F)	0.8 to 1.4 Ω 1.8 to 3.2 Ω
A/F sensor (bank 2 sensor 1) resistance	at 20°C (68°F) at 800°C (1,472°F)	0.8 to 1.4 Ω 1.8 to 3.2 Ω
Oxygen sensor (bank 1 sensor 2) resistance	at 20°C (68°F) at 800°C (1,472°F)	11 to 16 Ω 23 to 32 Ω
Oxygen sensor (bank 2 sensor 2) resistance	at 20°C (68°F) at 800°C (1,472°F)	11 to 16 Ω 23 to 32 Ω
VSV for CCV resistance	at 20°C (68°F) at 100°C (212°F)	25 to 30 Ω 32 to 40 Ω
VSV for EVAP resistance	at 20°C (68°F)	26 to 30 Ω

INTAKE
SERVICE DATA
3MZ-FE

0304D-02

Vacuum switching valve assy for IAC valve No.2	
Resistance	at 20°C (68°F) 33 to 39 Ω

AUTOMATIC TRANSMISSION / TRANSAXLE

SERVICE DATA

03117-02

U241E		
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) 932 - 1,000 kPa (9.5 - 10.5 kgf-cm ² , 135 - 149 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	2,350 ± 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	56 - 63 km/h (35 - 39 mph) 104 - 112 km/h (65 - 70 mph) 168 - 181 km/h (104 - 112 mph) 159 - 173 km/h (99 - 108 mph) 98 - 106 km/h (61 - 66 mph) 47 - 53 km/h (29 - 33 mph)
(Throttle valve fully closed)	3 → 4 4 → 3	42 - 48 km/h (26 - 30 mph) 17 - 23 km/h (11 - 14 mph)
2 position (Throttle valve fully opened)	1 → 2 3 → 2 2 → 1	56 - 63 km/h (35 - 39 mph) 104 - 112 km/h (65 - 70 mph) 47 - 53 km/h (29 - 33 mph)
L position (Throttle valve fully opened)	3 → 2 2 → 1	104 - 112 km/h (65 - 70 mph) 51 - 58 km/h (32 - 36 mph)
Lock-up point	Throttle valve opening 5 %	
3rd gear	Lock-up ON	97 - 105 km/h (60 - 65 mph)
	Lock-up OFF	95 - 102 km/h (59 - 63 mph)
O/D gear	Lock-up ON	63 - 70 km/h (39 - 43 mph)
	Lock-up OFF	61 - 67 km/h (32 - 42 mph)
U140F		
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) 932 - 1,000 kPa (9.5 - 10.5 kgf-cm ² , 135 - 149 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	2,650 ± 150 rpm
Time lag	N → D position N → R position	Less than 1.2 seconds Less than 1.2 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.) 6 ± 0.5 mm (0.236 ± 0.020 in.)

Extension housing oil seal drive in depth		1.5 ± 0.4 mm (0.059 ± 0.016 in.)
Shift schedule		
D position		
(Throttle valve fully opened)		
	1 → 2	55 - 62 km/h (34 - 39 mph)
	2 → 3	103 - 111 km/h (64 - 69 mph)
	3 → 4	157 - 170 km/h (98 - 106 mph)
	4 → 3	148 - 161 km/h (92 - 100 mph)
	3 → 2	96 - 103 km/h (60 - 64 mph)
(Throttle valve fully closed)		
	2 → 1	43 - 49 km/h (27 - 30 mph)
	3 → 4	31 - 37 km/h (19 - 23 mph)
	4 → 3	17 - 23 km/h (11 - 14 mph)
2 position		
(Throttle valve fully opened)		
	1 → 2	55 - 62 km/h (34 - 39 mph)
	3 → 2	106 - 113 km/h (66 - 70 mph)
	2 → 1	43 - 49 km/h (27 - 30 mph)
L position		
(Throttle valve fully opened)		
	3 → 2	106 - 113 km/h (66 - 70 mph)
	2 → 1	48 - 54 km/h (30 - 34 mph)
Lock-up point		Throttle valve opening 5 %
3rd gear		Lock-up ON 157 - 170 km/h (98 - 106 mph)
		Lock-up OFF 148 - 161 km/h (92 - 100 mph)
O/D gear		Lock-up ON 76 - 83 km/h (47 - 52 mph)
		Lock-up OFF 71 - 78 km/h (44 - 48 mph)
U151E		
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 (6.9 to 7.6 kgf·cm ² , 97 to 108 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 20.1 kgf·cm ² , 256 to 285 psi)
Engine stall revolution		D and R positions 2,100 ± 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 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		0 ± 0.5 mm (0 ± 0.020 in.)
RH side		0 ± 0.5 mm (0 ± 0.020 in.)

U151E		
Shift schedule (Shift lever with Multi-mode automatic transmission & Gate shift type)		
D position		
(Throttle valve fully opened)	1 → 2	39 to 48 km/h (24 to 30 mph)
	2 → 3	79 to 90 km/h (49 to 56 mph)
	3 → 4	129 to 147 km/h (80 to 91 mph)
	4 → 5	191 to 213 km/h (119 to 132 mph)
	5 → 4	184 to 205 km/h (114 to 127 mph)
	4 → 3	125 to 142 km/h (78 to 88 mph)
	3 → 2	74 to 84 km/h (46 to 52 mph)
	2 → 1	36 to 43 km/h (22 to 27 mph)
(Throttle valve fully closed)	4 → 5	45 to 53 km/h (28 to 33 mph)
	5 → 4	35 to 42 km/h (22 to 26 mph)
Lock-up point	Throttle valve opening 5 %	
D position		
5th gear	Lock-up ON	80 to 90 km/h (50 to 56 mph)
	Lock-up OFF	79 to 89 km/h (49 to 55 mph)
4th gear	Lock-up ON	98 to 110 km/h (61 to 68 mph)
	Lock-up OFF	95 to 107 km/h (59 to 66 mph)
3th gear	Lock-up ON	64 to 74 km/h (40 to 46 mph)
	Lock-up OFF	61 to 70 km/h (38 to 43 mph)
U151F		
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 (6.9 to 7.6 kgf-cm ² , 97 to 108 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 20.1 kgf-cm ² , 256 to 285 psi)
Engine stall revolution	D and R positions	2,550 ± 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	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	0 ± 0.5 mm (0 ± 0.020 in.)
	RH side	6.0 ± 0.5 mm (0.236 ± 0.020 in.)
Shift schedule (Shift lever with Multi-mode automatic transmission & Gate shift type)		
D position		
(Throttle valve fully opened)	1 → 2	42 to 49 km/h (26 to 30 mph)
	2 → 3	81 to 88 km/h (50 to 55 mph)
	3 → 4	132 to 143 km/h (82 to 89 mph)
	4 → 5	195 to 207 km/h (121 to 129 mph)
	5 → 4	187 to 200 km/h (116 to 124 mph)
	4 → 3	128 to 139 km/h (80 to 86 mph)
	3 → 2	76 to 82 km/h (47 to 51 mph)
	2 → 1	36 to 42 km/h (22 to 26 mph)
(Throttle valve fully closed)	4 → 5	46 to 51 km/h (29 to 32 mph)
	5 → 4	35 to 41 km/h (22 to 25 mph)
Lock-up point	Throttle valve opening 5 %	
D position		
5th gear	Lock-up ON	83 to 90 km/h (52 to 56 mph)
	Lock-up OFF	81 to 87 km/h (50 to 54 mph)
4th gear	Lock-up ON	100 to 107 km/h (62 to 66 mph)
	Lock-up OFF	97 to 104 km/h (60 to 65 mph)
3th gear	Lock-up ON	65 to 72 km/h (40 to 45 mph)
	Lock-up OFF	62 to 68 km/h (39 to 42 mph)

ENGINE MECHANICAL

SERVICE DATA

0304P-02

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	A/T	610 to 710 rpm
Compression	Compression pressure Minimum pressure Difference between each cylinder	1.360 kPa (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)
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		
Standard thrust clearance		0.050 to 0.090 mm (0.0020 to 0.0035 in.)
Maximum thrust clearance		0.090 mm (0.0035 in.)
Standard oil clearance		0.031 mm (0.0012 in.)
Maximum oil clearance		0.004 to 0.031 mm (0.0002 to 0.0012 in.)
Housing journal bore diameter	Mark 1	26.000 to 26.006 mm (1.0236 to 1.0239 in.)
	Mark 2	26.007 to 26.012 mm (1.0239 to 1.0241 in.)
	Mark 3	26.013 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	1.486 to 1.489 mm (0.0585 to 0.0586 in.)
	Mark 2	1.489 to 1.492 mm (0.0586 to 0.0587 in.)
	Mark 3	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.)
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 162.7 mm (6.3503 to 6.4055 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.)
Camshaft (Intake)		
Maximum circle runout		0.03 mm (0.0012 in.)
Standard cam lobe height		46.495 to 46.595 mm (1.8305 to 1.8344 in.)
Minimum cam lobe height		46.385 mm (1.8262 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.)
Standard journal thrust clearance		0.040 to 0.095 mm (0.0016 to 0.0037 in.)
Maximum journal thrust clearance		0.11 mm (0.0043 in.)
Standard journal oil clearance	No. 1 journal bearing mark 1	0.007 to 0.038 mm (0.0028 to 0.0015 in.)
	No. 1 journal bearing mark 2	0.008 to 0.038 mm (0.0031 to 0.0015 in.)
	No. 1 journal bearing mark 3	0.008 to 0.038 mm (0.0031 to 0.0015 in.)
	Other journals	0.025 to 0.062 mm (0.00098 to 0.00244 in.)
Maximum journal oil clearance	No. 1 journal	0.07 mm (0.0028 in.)
	Other journals	0.10 mm (0.0039 in.)
Cylinder head journal bore diameter	Mark 1	40.000 to 40.008 mm (1.57480 to 1.57511 in.)
	Mark 2	40.009 to 40.017 mm (1.57515 to 1.57547 in.)
	Mark 3	40.018 to 40.025 mm (1.57551 to 1.57578 in.)
Standard bearing center wall thickness	Mark 1	2.000 to 2.004 mm (0.07874 to 0.07890 in.)
	Mark 2	2.004 to 2.008 mm (0.07894 to 0.07905 in.)
	Mark 3	2.009 to 2.012 mm (0.07909 to 0.07921 in.)
Camshaft journal diameter		35.971 to 35.985 mm (1.41618 to 1.41673 in.)

Camshaft No. 2 (Exhaust)		
Maximum circle runout		0.03 mm (0.0012 in.)
Standard cam lobe height		46.873 to 46.083 mm (1.8060 to 1.8143 in.)
Minimum cam lobe height		45.873 mm (1.8060 in.)
No. 1 journal diameter		35.971 to 35.985 mm (1.41618 to 1.41673 in.)
Other journal diameter		22.959 to 22.975 mm (0.9039 to 0.9045 in.)
Standard thrust clearance		0.080 to 0.135 mm (0.0032 to 0.0053 in.)
Maximum thrust clearance		0.15 mm (0.0059 in.)
Standard journal oil clearance	No. 1 journal	0.040 to 0.079 mm (0.00157 to 0.00311 in.)
	Other journals	0.025 to 0.062 mm (0.00098 to 0.00244 in.)
Cylinder head journal bore diameter	Mark 1	40.000 to 40.008 mm (1.57480 to 1.57511 in.)
	Mark 2	40.009 to 40.017 mm (1.57515 to 1.57547 in.)
	Mark 3	40.018 to 40.025 mm (1.57551 to 1.57578 in.)
Standard bearing center wall thickness	Mark 1	2.000 to 2.004 mm (0.07874 to 0.07890 in.)
	Mark 2	2.004 to 2.008 mm (0.07894 to 0.07905 in.)
	Mark 3	2.009 to 2.012 mm (0.07909 to 0.07921 in.)
Camshaft journal diameter		35.971 to 35.985 mm (1.4162 to 1.4167 in.)
Intake manifold		
Maximum warpage		0.20 mm (0.079 in.)
Exhaust manifold		
Maximum warpage		0.70 mm (0.0276 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		
Standard overall length		101.71 mm (4.0043 in.)
Minimum overall length		101.21 mm (3.9846 in.)
Valve stem diameter		5.470 to 5.485 mm (0.2154 to 0.2159 in.)
Standard margin thickness		1.05 to 1.45 mm (0.0413 to 0.0571 in.)
Minimum margin thickness		0.50 to (0.0197 in.)
Exhaust valve		
Standard overall length		101.15 mm (3.9823 in.)
Minimum overall length		100.70 mm (3.9646 in.)
Valve stem diameter		5.465 to 5.480 mm (0.2152 to 0.2157 in.)
Standard margin thickness		1.20 to 1.60 mm (0.0470 to 0.0630 in.)
Minimum margin thickness		0.50 mm (0.020 in.)
Intake valve guide bush		
Bush inside diameter		5.510 to 5.530 mm (0.2169 to 0.2177 in.)
standard oil clearance		0.025 to 0.060 mm (0.0010 to 0.0024 in.)
Maximum oil clearance		0.08 mm (0.0031 in.)
Exhaust valve guide bush		
Bush inside diameter		5.510 to 5.530 mm (0.2169 to 0.2177 in.)
Standard oil clearance		0.030 to 0.065 mm (0.0012 to 0.0026 in.)
Maximum oil clearance		0.10 mm (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.)
Standard oil clearance		0.033 to 0.059 mm (0.0013 to 0.0023 in.)
Maximum oil clearance		0.07 mm (0.0028 in.)

SERVICE SPECIFICATIONS - ENGINE MECHANICAL

Connecting rod		
Standard thrust clearance		0.160 to 0.362 mm (0.0063 to 0.0143 in.)
Maximum thrust clearance		0.362 mm (0.0143 in.)
Standard oil clearance		0.024 to 0.048 mm (0.0009 to 0.0019 in.)
Maximum oil clearance		0.08 mm (0.0031 in.)
Connecting rod bearing center wall thickness (Reference)	Mark 1	1.485 to 1.488 mm (0.05854 to 0.05858 in.)
	Mark 2	1.489 to 1.491 mm (0.05862 to 0.05870 in.)
	Mark 3	1.492 to 1.494 mm (0.05874 to 0.05881 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.)
Cylinder block		
Maximum warpage		0.05 mm (0.0020 in.)
Standard cylinder bore diameter		88.500 to 88.513 mm (3.4842 to 3.4848 in.)
Maximum cylinder bore diameter		88.633 mm (3.4895 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 A	22.001 to 22.004 mm (0.86618 to 0.86630 in.)
	Mark B	22.005 to 22.007 mm (0.86634 to 0.86612 in.)
	Mark C	22.008 to 22.010 mm (0.86645 to 0.86653 in.)
Piston ring		
Ring groove clearance	No. 1	0.22 to 0.32 mm (0.0087 to 0.0126 in.)
Standard end gap	No. 2	0.50 to 0.60 mm (0.0197 to 0.0236 in.)
	Oil (side rail)	0.10 to 0.35 mm (0.0039 to 0.0138 in.)
Maximum end gap	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		
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 (0.86602 to 0.86614 in.)
	Mark B	22.001 to 22.003 mm (0.86618 to 0.86626 in.)
	Mark C	22.004 to 22.006 mm (0.86630 to 0.86638 in.)
Standard oil clearance		0.001 to 0.007 mm (0.00004 to 0.00028 in.)
Maximum oil clearance		0.010 mm (0.0020 in.)
Connecting rod bolt		
Standard diameter		7.2 to 7.3 mm (0.283 to 0.287 in.)
Minimum diameter		7.0 mm (0.276 in.)

Crankshaft		
Standard thrust clearance		0.040 to 0.240 mm (0.0016 to 0.0094 in.)
Maximum thrust clearance		0.30 mm (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 (2.32283 to 2.32291 in.)
	Mark 1	59.003 to 59.004 mm (2.32294 to 2.32299 in.)
	Mark 2	59.005 to 59.006 mm (2.32303 to 2.32307 in.)
	Mark 3	59.007 to 59.009 mm (2.32311 to 2.32318 in.)
	Mark 4	59.009 to 59.011 mm (2.32322 to 2.32326 in.)
	Mark 5	59.012 to 59.013 mm (2.32330 to 2.32334 in.)
	Mark 6	59.014 to 59.016 mm (2.32338 to 2.32346 in.)
Main journal diameter		54.988 to 55.000 mm (2.1648 to 2.1654 in.)
Main journal diameter (Reference)	Mark 0	54.999 to 55.000 mm (2.16531 to 2.16535 in.)
	Mark 1	54.997 to 54.998 mm (2.16523 to 2.16527 in.)
	Mark 2	54.995 to 54.996 mm (2.16515 to 2.16519 in.)
	Mark 3	54.993 to 54.994 mm (2.16507 to 2.16511 in.)
	Mark 4	54.991 to 54.992 mm (2.16500 to 2.16504 in.)
	Mark 5	54.989 to 54.990 mm (2.16489 to 2.16496 in.)
Standard main bearing center wall thickness (Reference)	Mark 1	1.993 to 1.996 mm (0.07846 to 0.07858 in.)
	Mark 2	1.997 to 1.999 mm (0.07862 to 0.07870 in.)
	Mark 3	2.000 to 2.002 mm (0.07874 to 0.07882 in.)
	Mark 4	2.003 to 2.005 mm (0.07886 to 0.07894 in.)
Maximum circle runout		0.03 mm (0.0012 in.)
Standard main journal oil clearance		0.024 to 0.048 mm (0.00094 to 0.00189 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		
Standard diameter		7.3 to 7.6 mm (0.287 to 0.299 in.)
Minimum diameter		7.2 mm (0.283 in.)

3MZ-FE

New V-ribbed belt tension	For fan and generator	143 to 165 lbf
	For vane pump	132 to 154 lbf
Used V-ribbed belt tension	For fan and generator	80 to 132 lbf
	For vane pump	55 to 88 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		650 to 750 rpm
Compression	Compression pressure	1.5 MPa (15.3 kgf/cm ² , 218 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	0.15 mm (0.0059 in.)
	Cylinder head side	0.08 mm (0.0031 in.)
Exhaust manifold Maximum warpage		0.50 mm (0.0196 in.)
Camshaft Maximum circle runout Specified cam lobe height	Intake Exhaust	0.06 mm (0.0024 in.)
		42.980 to 43.232 mm (1.6921 to 1.7020 in.)
Camshaft Journal diameter Specified gear backlash Specified journal thrust clearance Specified journal oil clearance	Intake Exhaust	42.960 to 43.110 mm (1.6874 to 1.6972 in.)
		26.959 to 26.975 mm (1.0614 to 1.0620 in.)
Cylinder head set bolt Specified outside diameter at tension portion	Intake Exhaust	0.020 to 0.300 mm (0.0008 to 0.0118 in.)
		0.040 to 0.120 mm (0.0016 to 0.0047 in.)
Cylinder head Maximum warpage	Intake Exhaust	0.025 to 0.100 mm (0.0010 to 0.0039 in.)
		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.)
Intake valve Specified overall length Valve stem diameter Minimum margin thickness	Exhaust manifold side	0.10 mm (0.0039 in.)
Exhaust valve Specified overall length Valve stem diameter Minimum margin thickness		94.95 to 95.45 mm (3.7382 to 3.7579 in.)
		5.470 to 5.485 mm (0.2154 to 0.2159 in.)
Inner compression spring Free length Maximum deviation Installed tension at 33.8 mm (1.331 in.)		0.5 to 1.0 mm (0.020 to 0.039 in.)
Valve guide bush Bush inside diameter Specified bush oil clearance	Intake Exhaust	94.90 to 95.40 mm (3.7362 to 3.7559 in.)
		5.465 to 5.480 mm (0.2152 to 0.2157 in.)
Cylinder head valve guide bush bore diameter	STD O/S 0.05	0.5 to 1.0 mm (0.020 to 0.039 in.)
Bush diameter	STD O/S 0.05	45.50 mm (1.7913 in.)
		2.0 mm (0.079 in.)
Valve lifter Lifter diameter Lifter bore diameter Specified oil clearance	STD O/S 0.05	186 to 206 N (19.0 to 21.0 kgf, 41.9 to 46.3 lbf)
Valve lifter Lifter diameter Lifter bore diameter Specified oil clearance	STD O/S 0.05	5.510 to 5.530 mm (0.2169 to 0.2177 in.)
		0.025 to 0.080 mm (0.0010 to 0.0031 in.)
Valve lifter Lifter diameter Lifter bore diameter Specified oil clearance	STD O/S 0.05	0.030 to 0.100 mm (0.0012 to 0.0039 in.)
Valve lifter Lifter diameter Lifter bore diameter Specified oil clearance	STD O/S 0.05	10.295 to 10.313 mm (0.4053 to 0.4060 in.)
		10.345 to 10.363 mm (0.4073 to 0.4080 in.)
Valve lifter Lifter diameter Lifter bore diameter Specified oil clearance	STD O/S 0.05	10.333 to 10.344 mm (0.4068 to 0.4072 in.)
		10.383 to 10.394 mm (0.4088 to 0.4092 in.)
Valve lifter Lifter diameter Lifter bore diameter Specified oil clearance	STD O/S 0.05	30.966 to 30.976 mm (1.2191 to 1.2195 in.)
		31.009 to 31.025 mm (1.2208 to 1.2215 in.)
Valve lifter Lifter diameter Lifter bore diameter Specified oil clearance	STD O/S 0.05	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 1.486 mm (0.0584 to 0.0585 in.)
	Mark 2	1.487 to 1.489 mm (0.0585 to 0.0586 in.)
	Mark 3	1.490 to 1.492 mm (0.0587 to 0.0587 in.)
	Mark 4	1.493 to 1.495 mm (0.0588 to 0.0588 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.)
Standard main bearing center wall thickness (Reference)	Mark 12	2.486 to 2.489 mm (0.0979 to 0.0980 in.)
	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.)
Maximum circle runout	Mark 7	0.06 mm (0.0024 in.)
		60.988 to 61.000 mm (2.4011 to 2.4016 in.)
		0.02 mm (0.0008 in.)
		52.992 to 53.000 mm (2.0863 to 2.0866 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		92.000 to 92.132 mm (3.6220 to 3.6272 in.)
Piston		
Piston diameter		91.953 to 91.967 mm (3.6202 to 3.6207 in.)
Specified oil clearance		0.033 to 0.130 mm (0.0013 to 0.0051 in.)

SERVICE SPECIFICATIONS - ENGINE MECHANICAL

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	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 (0.0011 to 0.0043 in.)
	No. 1	0.30 to 0.95 mm (0.0118 to 0.0031 in.)
	No. 2	0.50 to 1.05 mm (0.0008 to 0.0024 in.)
Specified end gap	Oil (Side rail)	0.15 to 1.00 mm (0.0012 to 0.0043 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.)

DRIVE SHAFT / PROPELLER SHAFT / AXLE

03119-02

SERVICE DATA

Propeller shaft assy swing	Maximum: 0.8 mm (0.031 in.)
Propeller shaft assy rear swing	Maximum: 0.8 mm (0.031 in.)
Intermediate shaft runout	Maximum: 0.8 mm (0.031 in.)
Intermediate shaft front flange runout	Maximum: 0.1 mm (0.004 in.)
Intermediate shaft rear flange runout (horizontal direction)	Maximum: 0.1 mm (0.004 in.)
Intermediate shaft rear flange runout (vertical direction)	Maximum: 0.1 mm (0.004 in.)
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: 0.08 mm (0.0031 in.)

EXHAUST

SERVICE DATA

0304F-02

2AZ-FE

Compression spring Free length	Exhaust pipe assy center x Exhaust pipe assy tail	42 mm (1.6535 in.)
Compression spring Free length	Exhaust pipe assy front x Exhaust manifold converter	43 mm (1.6929 in.)

3MZ-FE

Compression spring Free length	Exhaust pipe assy center x Exhaust pipe assy tail	42 mm (1.6535 in.)
Compression spring Free length	Exhaust pipe sub-assy front No. 3 x Exhaust pipe assy center	43 mm (1.6929 in.)

REAR SUSPENSION

031WC-01

SERVICE DATA

Rear wheel alignment	Toe-in (total) No.2 lower suspension arm length difference: FF 4WD	0°18' ± 12' (0.3° ± 0.2°, 3 ± 2 mm, 0.12 ± 0.08 in.) 1.5 mm (0.06 in.) or less 1.0 mm (0.04 in.) or less
	Camber FF 4WD Right-left error	-1 °20' ± 45' (-1.33° ± 0.75°) -0 °45' ± 45' (-0.75° ± 0.75°) 45' (0.75°) or less
Rear Suspension	Stabilizer link ball joint turning torque	1.0 N·m (10 kgf·cm, 9 in.-lbf) or less

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

TORQUE SPECIFICATION

Part Tightened	N·m	kgf·cm	ft·lbf
Hub nut	103	1,050	76
Tie rod end lock nut	74	755	55
Steering knuckle x Shock absorber	230	2,350	170
Lower ball joint x Lower suspension arm	127	1,300	94
Suspension support x Body	80	816	59
Suspension support x Piston rod	49	500	36
Flexible hose and ABS speed sensor wire harness bracket x Shock absorber	19	194	14
Lower suspension arm set bolt	Front side:	200	2,040
	Rear side:	206	2,100
Transverse engine engine mounting insulator set nut	87	887	64
Stabilizer bar bracket x Suspension member	16	163	12
Stabilizer bar link set nut	74	755	55
Front axle assy x Front brake caliper assy	104	1060	77
Lower ball joint assy front set nut	123	1250	91

TORQUE SPECIFICATION

Part Tightened		N·m	kgf·cm	ft·lbf
Wheel nut		103	1,050	76
Parking brake cable lock nut		6	61	53 in·lbf
Parking brake control pedal set bolt		39	400	29
Parking brake cable assy No.1 x Body	Bolt	8.5	87	75 in·lbf
	nut	6	61	53 in·lbf
Parking brake cable assy No.3 x Body	Bolt A	8.5	87	75 in·lbf
	Bolt B	39	400	29
	nut	6	61	53 in·lbf
Parking brake cable No.3 x Backing plate		8	82	71 in·lbf

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
Universal joint assy x Main shaft assy	35	360	26
Steering column assembly set bolt and nut	21	210	15
Intermediate shaft sub-assy x Universal joint assembly	35	360	26
Intermediate shaft sub-assy x Control valve shaft	35	360	26
Steering wheel set nut	50	510	37
Steering wheel pad set screw (Torx→ screw)	8.8	90	78 in·lbf

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
VANE PUMP ASSY (2AZ-FE)			
Housing rear x Housing front	22	224	16
Oil pressure switch	21	214	15
Pressure port union	69	704	51
Suction port union set bolt	12	122	9
Pump assy set bolt	37 (26)	264 (377)	19 (27)
Pressure feed tube assy set union bolt	52	525	38
VANE PUMP ASSY (3MZ-FE)			
Pump bracket front x Housing front	43	438	32
Housing rear x Housing front	24	245	18
Pump bracket rear x Housing rear	43	438	32
Pressure port union	83	846	61
Suction port union set bolt	13	133	10
Vane pump pulley set nut	44	449	32
Pump assy set bolt	43	440	32
Pressure feed tube assy set union bolt	52	525	38
Oil pressure switch	21	214	15
POWER STEERING LINK ASSY			
Control valve housing set bolt	21	214	15
Control valve shaft lock nut	25	250	18
Rack housing cap	59	597	43
Rack guide spring cap lock nut	51 (69)	515 (699)	38 (51)
Rack x Rack end sub-assy	60 (84)	616 (851)	45 (62)
Tie rod assy lock nut	74	750	54
Turn pressure tube union nut	11 (13)	116 (127)	8 (9)
Steering link assy set bolt	70	714	52
Pressure feed tube assy union nut	22 (25)	230 (250)	16 (18)
Pressure feed tube clamp set bolt	9.8	100	87 in.·lbf
Return tube clamp set nut	9.8	100	87 in.·lbf
Stabilizer bracket No.1 x Suspension crossmember	16	163	12
Intermediate shaft assy x Steering link assy	35	360	26

(): For use without SST

SUPPLEMENTAL RESTRAINT SYSTEM

TORQUE SPECIFICATION

0305F-03

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
Front passenger airbag assy x Instrument panel reinforcement	20	204	15
Front passenger airbag assy x Instrument panel sub-assy	5.6	57	49 in.·lbf
Curtain shield airbag assy x Body	14	143	10
Airbag sensor assy center x Body	17.5	179	13
Airbag front sensor x Body	9.0	92	80 in.·lbf
Side airbag sensor assy x Body	17.5	179	13
Front seat outer belt assy x Body	7.5	75	67 in.·lbf
Airbag sensor rear x Body	17.5	179	13
Seat position airbag sensor x Front LH seat assy	8.0	82	71 in.·lbf
Front LH seat assy x Body	36.7	374	27

TORQUE SPECIFICATION

2AZ-FE:

Part Tightened	N·m	kgf·cm	ft·lbf
Throttle body Assy x Intake manifold	30	305	22
Knock sensor x Cylinder block sub-assy	20	199	14
Intake manifold x Cylinder head sub-assy	30	305	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	4.9	50	43 in.·lbf

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
Knock sensor x Cylinder block sub-assy	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	4.9	50	43 in.·lbf

TORQUE SPECIFICATION

2AZ-FE:

Part Tightened	N-m	kgf-cm	ft-lbf
Fuel delivery pipe x Cylinder head	20	204	15
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 x Fuel tank assy	5.5	56	49 in.-lbf
Exhaust pipe assy center x Exhaust pipe assy front	48	490	35
Exhaust pipe assy center x Exhaust pipe assy tail	48	490	35

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	82	71 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	5.5	56	49 in.-lbf
Packing brake cable assy No. 2 x Body	5.4	55	48 in.-lbf
Exhaust pipe assy center x Exhaust pipe assy front	48	490	35
Exhaust pipe assy center x Exhaust pipe assy tail	48	490	35

TORQUE SPECIFICATION

3MZ-FE

Part Tightened	N·m	kgf·cm	ft·lbf
Intake air control valve assy No. 2 x Intake air surge tank	10	102	7

TORQUE SPECIFICATION

2AZ-FE

Part Tightened	N-m	kgf-cm	ft-lbf
Engine moving control rod w/bracket x Engine moving control bracket No. 2	64	653	47
Engine moving control rod bracket RH x Cylinder head	64	653	47
Engine mounting bracket RH x Cylinder head	54	551	40
Engine mounting stay No. 2 RH x Engine mounting control rod bracket No. 2	64	653	47
Engine hanger No. 1 x Cylinder head	38	387	28 in.-lbf
Engine hanger No. 2 x Cylinder head	38	387	28 in.-lbf
Knock sensor x Cylinder block	20	204	15
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
Drive shaft bearing bracket (2WD) x Cylinder block	64	653	47
V-ribbed belt tensioner assy x Timing chain cover	60	612	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 sub-assy x Cylinder head	37	377	27
Exhaust manifold stay x Cylinder block	44	449	32
Exhaust manifold stay x Exhaust manifold converter sub-assy	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 sub-assy x Cylinder head assy	30	306	22
Drive plate & ring gear x Crankshaft	98	1,000	72
Starter assy x Automatic transaxle assy	39	398	29
Engine mounting bracket RR (4WD) x Transfer for bolt A	34	347	25
Engine mounting bracket RR (4WD) x Cylinder block for bolt B	64	653	47
Engine mounting insulator LH x Automatic transaxle assy	95	969	70
Engine mounting insulator RH x Engine mounting bracket RH	95	969	70
Engine mounting insulator FR x Engine mounting bracket FR	87	887	64
Engine mounting insulator RR x Engine mounting bracket RR (4WD)	75	765	55
Rack & pinion power steering gear assy (4WD) x Front frame assy	70	714	52
Stabilizer bar front (4WD) x Front frame assy	19	194	14
Vane pump assy x Timing chain cover	43	438	31
Frame side plate x Front frame assy for bolt A	86	877	63
Frame side plate x Body for bolt B	32	326	24
Front suspension member brace rear x Front frame assy for bolt C	86	877	63
Front suspension member brace rear x Body for bolt D	32	326	24
Steering intermediate shaft	35	357	26
Drive plate & ring gear x Torque converter	41	418	30
Front suspension arm x Lower ball joint	127	1,295	94
Tie rod assy x Steering knuckle	49	500	36
Speed sensor front LH x Steering knuckle	8.0	82	71
Speed sensor front RH x Steering knuckle	8.0	82	71
Front axle hub LH nut x Front drive shaft	294	3,000	217
Front stabilizer link assy x Front suspension	74	755	55
Propeller shaft (4WD) x Intermediate shaft	74	755	55
Return tube x body	20	204	15
Engine mounting bracket No. 2 RH x Timing chain cover	20	204	15
Generator assy x Bracket for bolt A	52	530	38
for bolt B	21	214	15
Compressor and magnetic clutch x bracket	25	255	18
Air cleaner assy x Body	5.0	51	44 in.-lbf

SERVICE SPECIFICATIONS - ENGINE MECHANICAL

Part Tightened		N·m	kgf·cm	ft·lbf
Filler plug (Transfer)		49	500	36
Balance shaft housing x Stiffening crankcase assy	1st	22	220	15
	2nd	Turn 90°	Turn 90°	Turn 90°
Stiffening crankcase assy x Cylinder block		33	337	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 gear or sprocket x Camshaft		54	551	40
Camshaft bearing cap No. 1 x Cylinder head		30	306	22
Camshaft bearing cap No. 2 x Cylinder head		30	306	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	306	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 14-68)	for bolt A	9.0	92	80 in.·lbf
	for bolt B	21	214	15
	for bolt C	43	438	32
	for 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	255	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		180	1,835	133
Chain tensioner assy 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 (see page 14-41)	for bolt A	11	112	8
	for bolt B	14	143	10
	for nut	11	112	8
Oil filter union (w/ oil cooler) 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 page 14-92)	for bolt A	5.0	51	44 in.·lbf
	for bolt B	5.0	51	44 in.·lbf
	for bolt C	10	102	7
	for bolt D	10	102	7
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°
Camshaft timing oil control valve x Cylinder head		9.0	92	80 in.·lbf
Crankshaft bearing cap x Cylinder block	1st	20	204	15
	2nd	40	408	30
Stud bolt (see page 14-105)	Stud bolt A	5.0	51	44 in.·lbf
	Stud bolt B	10	102	7
	Stud bolt C	5.0	51	44 in.·lbf

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	20	204	15
Oil pressure switch assy x Cylinder block	15	153	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
Engine mounting bracket RR (2WD) x Cylinder block	64	653	47
Engine mounting bracket RR (2WD) x Front frame assy	64	653	47
Exhaust converter sub-assy x Cylinder head	49	500	36
Exhaust converter sub-assy No. 2 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. 2 x Intake air surge tank	20	199	14
Engine hanger No. 1 x Cylinder head	20	204	15
Engine hanger No. 1 x Intake air surge tank	20	204	15
Manifold stay No. 2 x Exhaust converter sub-assy No. 2	49	500	36
Manifold stay No. 2 x Cylinder block	49	500	36
Manifold stay x Exhaust converter sub-assy	49	500	36
Manifold stay x Cylinder head	49	500	36
Engine mounting bracket (4WD) x Cylinder block (see page 14-149)	for bolt A	34	25
	for bolt B	64	47
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
Engine mounting insulator RR x Transverse engine engine mounting bracket	75	765	55
Rack & pinion power steering gear assy (4WD) x Front frame assy	70	714	52
Stabilizer bar front (4WD) x Front frame assy	29	296	21
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 14-149)	for bolt A	85	63
	for bolt B	32	24
Front suspension member brace rear x Front frame assy (see page 14-149)	for bolt A	85	63
	for bolt B	32	24
	for nut C	32	24
Compressor and magnetic clutch x Compressor mounting bracket No.1 (see page 14-149)	for bolt	25	18
	for nut	26	19
Generator belt adjusting bar x Cylinder block (see page 14-149)	for nut A	43	32
	for bolt B	18	13
	for bolt C	8.0	71 in.-lbf
Generator bracket No. 2 x Transverse engine engine mounting bracket	28	286	21
Intermediate shaft sub-assy	35	357	26
Battery clamp sub-assy x Body	6.0	61	53 in.-lbf
Exhaust manifold heat insulator No. 2 x Exhaust manifold converter sub-assy No. 2	9.0	92	80 in.-lbf
Exhaust manifold heat insulator No. 3 x Exhaust manifold converter sub-assy No. 2	9.0	92	80 in.-lbf
Flywheel housing under cover x Automatic transaxle assy	8.0	82	70 in.-lbf

SERVICE SPECIFICATIONS - ENGINE MECHANICAL

Part Tightened		N·m	kgf·cm	ft·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
Front propeller shaft (4WD) x Intermediate shaft		74	755	55
V-bank cover x Cylinder head cover		8.0	82	70 in.·lbf
Engine mounting stay No. 2 RH x Engine mounting bracket		64	653	47
Engine moving control rod (see page 14-149)	for bolt A	64	653	47
	for 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 assy (see page 14-173)	for bolt A	8.0	82	71 in.·lbf
	for bolt B	20	199	14
	for bolt C	43	438	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 14-173)	10 mm head	8.0	82	71 in.·lbf
	12 mm head	20	199	14
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 assy x Cylinder block assy	12 pointed head 1st	54	551	40
	2nd	Turn 90°	Turn 90°	Turn 90°
	Recessed head	19	189	14
Oil control valve filter x Cylinder head assy		45	459	33
Cylinder head cover rear x Cylinder head assy		10	102	7
Camshaft timing gear assy (VVT-i) x Camshaft		150	1,530	111
Camshaft bearing cap x Cylinder head assy		16	163	12
Timing belt plate x Oil pump assy		8.0	82	71 in.·lbf
Water pump assy x Cylinder block assy		8.0	82	71 in.·lbf
Oil level gage guide x Cylinder block assy		8.0	82	71 in.·lbf
Oil filter union x Cylinder block assy		30	306	22
Timing belt idler bracket x Cylinder block assy		28	286	21
Timing belt No. 3 cover x Cylinder head assy		9.0	92	80 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 assy		34	348	25
Timing belt tensioner x Oil pump assy		27	280	20
Engine mounting bracket x Cylinder block		28	286	21
Timing belt No. 2 cover x Timing belt No. 3 cover		9.0	92	80 in.·lbf
Timing belt No. 1 cover x Oil pump assy		9.0	92	80 in.·lbf
Crankshaft pulley x Crankshaft		220	2,243	162
VVT sensor No. 1 x Cylinder head assy		8.0	82	71 in.·lbf
Camshaft timing oil control valve assy x Cylinder head assy		8.0	82	71 in.·lbf
Cylinder head cover x Cylinder head assy		8.0	82	71 in.·lbf
Spark plug x Cylinder head assy		25	255	18
W/head straight screw plug No. 1 x Cylinder head assy		44	449	32
W/head straight screw plug No. 2 x Cylinder head assy		44	449	32
Connecting rod cap x Connecting rod	1st	25	255	18
	2nd	Turn 90°	Turn 90°	Turn 90°

Part Tightened	N·m	kgf·cm	ft·lbf
crankshaft bearing cap x Cylinder block assy 12 pointed head 1st 2nd 6 pointed head	22	224	16
	Turn 90°	Turn 90°	Turn 90°
	27	275	20
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
Water seal plate x Cylinder block	18	184	13
Cylinder block water drain cock sub-assy x Cylinder block	39	398	29
Vane pump assy x Adjusting strut	43	439	32
Generator assy x Generator bracket	58	591	43
Generator assy x Adjusting bar	18	184	13
Intake air surge tank x Intake manifold	28	286	21
Front suspension brace sub-assy upper center x Body	80	816	59
Drive plate & ring gear sub-assy x Crankshaft	83	846	61
Water outlet x Cylinder head	15	153	11
Intake manifold x Cylinder head	15	153	11
Cylinder head cover rear x Cylinder head	10	102	7
Air cleaner case x Body	5.0	51	44 in·lbf

TORQUE SPECIFICATION

2AZ-FE

Part Tightened	N·m	kgf·cm	ft·lbf
Front floor heat insulator No. 3 x Body	4.9	50	43 in.·lbf
Exhaust pipe assy front x Exhaust manifold converter sub-assy	48	489	35
Heated oxyten sensor (Bank 1, sensor 2) x Exhaust pipe assy front	44	449	35
Exhaust pipe assy center x Exhaust pipe assy front	56	571	41
Exhaust pipe assy tail x Exhaust pipe assy center	48	489	35

3MZ-FE

Part Tightened	N·m	kgf·cm	ft·lbf
Front floor heat insulator No. 3 x Body	4.9	50	43 in.·lbf
Exhaust pipe support bracket No. 1 x Body	21	214	15
Exhaust pipe assy front x Exhaust manifold converter sub-assy (LH)	56	571	41
Exhaust pipe assy front x Exhaust pipe support bracket No. 1	21	214	15
Heated oxygen sensor (Bank 2, sensor 2) x Exhaust pipe assy front	44	449	35
Exhaust pipe sub-assy front No. 3 x Exhaust pipe assy front	56	571	41
Exhaust pipe sub-assy front No. 3 x Exhaust manifold converter sub-assy (RH)	56	571	41
Heated oxyten sensor (Bank 1, sensor 2) x Exhaust pipe sub-assy front No. 3	44	449	35
Exhaust pipe assy center x Exhaust pipe sub-assy front No. 3	48	489	35
Exhaust pipe assy tail x Exhaust pipe assy center	48	489	35

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

3MZ-FE

Part Tightened	N·m	kgf·cm	ft·lbf
Water pump assy x Cylinder block	8.0	82	71 in.·lbf
Idler sub-assy No. 2 x Cylinder block	34	347	25
Engine mounting bracket RH x Cylinder block	54	551	40
Generator bracket No. 2 x Cylinder block	43	438	32
Water inlet x Cylinder block	8.0	82	71 in.·lbf
Water inlet pipe x Water inlet	20	204	15

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

3MZ-FE

Part Tightened	N·m	kgf·cm	ft·lbf
Spark plug x Cylinder head cover	25	225	18.5
Ignition coil x Cylinder head cover	8.0	82	71 in·lbf

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
Stop lamp switch assy lock nut	17	173	13
Brake pedal support sub-assy x Brake pedal sub-assy	37	375	27
Brake master cylinder x Brake tube	15	155	11
Brake booster x Body	13	130	9
Brake pedal support sub-assy x Body	13	130	9
Brake pedal support sub-assy x Instrument panel reinforcement	20	204	15
Brake master cylinder x Brake booster	13	127	9
Wheel nut	103	1,050	76
Front brake cylinder mounting x Steering knuckle	104	1,061	77
Front brake cylinder x Front brake cylinder mounting	34	350	25
Front disc brake cylinder x Flexible hose	29	300	21
Rear disc brake cylinder mounting x Rear axle	78	799	58
Rear brake cylinder x Rear brake cylinder mounting	43	440	32
Rear disc brake cylinder x Flexible hose	29	300	21
Front speed sensor x Steering knuckle	8.0	82	71 in.·lbf
Front speed sensor wire harness clamp x Shock absorber	29	300	22
Front speed sensor wire harness clamp x Body	5.0	51	44 in.·lbf
Rear speed sensor x Rear axle 4WD:	8.0	82	71 in.·lbf
Rear speed sensor wire harness clamp x Body	5.0	51	44 in.·lbf
Brake actuator with bracket x Body	19	194	14
Brake actuator assy x Brake tube	15	155	11
Brake actuator x Brake actuator bracket assy	5.4	55	48 in.·lbf
Yawrate sensor x Body	14	143	10

TORQUE SPECIFICATION

2AZ-FE

Part Tightened	N·m	kgf·cm	ft·lbf
Oil pressure switch x Cylinder head	15	153	11
Oil pump x Cylinder block	19	194	14
Oil pump x Oil pump cover	8.8	90	79 in.·lbf
Oil pump x Oil pump strainer	8.8	90	79 in.·lbf
Oil cooler x Union	79	800	58
Oil cooler x Cylinder block	9.0	92	80 in.·lbf
Oil filter x Cylinder block	17.5	178	13
Oil drain plug x Oil pan sub-assy	25	255	18
Oil pump driven shaft sprocket x Oil pump assy	30	306	22
Chain tensioner plate x cylinder block	12	122	9.0
Chain vibration damper No. 1 x Cylinder block	9.0	92	80 in.·lbf
Engine mounting bracket RH x Cylinder block	54	551	40
Engine mounting insulator RH x Engine mounting bracket RH Nut A	95	964	70
Engine mounting insulator RH x Engine mounting bracket RH Nut B	87	887	64
Engine mounting insulator FR x Engine mounting insulator bracket	87	887	64
Oil pan sub-assy x Stiffening crankcase assy	9.0	92	80 in.·lbf

3MZ-FE

Part Tightened		N·m	kgf·cm	ft·lbf
Engine drain plug x Oil pan sub-assy		45	459	33
Oil pressure switch x Cylinder block		15	153	11
Oil pump rotor set x Oil pump assembly		10	105	8.0
Oil pump relif valve x Oil pump housing		49	500	36
Oil pump cover x Oil pump housing		10	102	7.0
Oil pump assembly x Cylinder block	Bolt A	8.0	82	71 in·lbf
	Bolt B	20	199	14
	Bolt C	43	438	32
Crank position sensor x Oil pump assembly		8.0	82	71 in·lbf
Oil pan sub-assembly x Cylinder block	10 mm head	8.0	82	71 in·lbf
	12 mm head	20	204	15
Oil strainer x Main bearing cap		8.0	82	71 in·lbf
Oil pan sub-assembly No. 2 x Oil pan sub-assembly No. 1		8.0	82	71 in·lbf
Transverse engine engine mounting bracket x Cylinder block	Bolt A	54	551	40
	Nut B	54	551	40
	Bolt C	43	438	32
Transverse engine engine mounting bracket x PS pump bracket				
Engine mounting insulator RH x Engine mounting bracket	Nut A	95	969	70
Engine mounting insulator RH x Front frame	Nut B	87	887	64
Engine mounting insulator FR x Engine mounting insulator bracket	Bolt A	87	887	64
Engine mounting insulator FR x Front frame	Nut B	52	530	38
Engine moving control rod x body		64	653	47
Compressor mounting bracket No. 1 x Cylinder block		25	255	18
Timing belt idler sub-assembly No. 1 x Cylinder block		34	347	25
Timing belt idler sub-assembly No. 2 x Cylinder block		43	438	32
Compressor and magnetic clutch x Compressor mounting bracket		25	255	18

TORQUE SPECIFICATION

Part Tightened		N·m	kgf·cm	ft·lbf
Transfer gear nut (For use with SST(s))	STD	277	2,820	204
	Max.	378	3,855	279
Ring gear mount set bolt		78	790	57
Transfer case x Transfer RH bearing retainer sub-assy		28	286	21
Transfer case x Transfer extension housing		26	260	19
Transfer case x Transfer & transaxle setting stud bolt		39	400	29
transfer extension housing x Transfer dynamic damper		26	260	19
Transfer case cover No.1 x Transfer case breather oil deflector		6.5	66	57 in.·lbf
Transfer case x Transfer case cover No.1		20	200	14
Transaxle assy x Transfer assy		69	700	51
Transfer case No.1 plug x Transfer case		49	500	36
Transfer case No.2 plug x Transfer Case		49	500	36
Transfer drain plug x Transfer case		49	500	36

TORQUE SPECIFICATION

2AZ-FE

Part Tightened		N·m	kgf·cm	ft·lbf
Starter assy				
Starter assy x Engine		37	377	27
Starter wire x Terminal 30 of starter		9.8	100	7.0
Starter drive housing assy x Magnet switch assy		7.5	76	66 in.·lbf
Starter commutator end frame assy x Starter drive housing assy		6.0	61	53 in.·lbf
Lead wire of starter yoke x Terminal C of magnet switch assy		10	102	7.0
Battery clamp x Battery clamp bolt		5.5	56	49 in.·lbf
Cable x Battery terminal		3.5	36	31 in.·lbf
Generator assy (100A)				
Generator assy x Engine	M8	21	214	15
	M10	52	530	38
Generator wire x Generator assy		9.8	100	7.0
Generator rectifier end frame x Drive end frame assy		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
Retainer plate x Drive end frame assy generator		2.3	23	20 in.·lbf
Generator pulley x Generator rotor assy		110	1,122	81
Generator assy (130A)				
Generator assy x Engine	M8	21	214	15
	M10	52	530	38
Generator wire x Generator assy		9.8	100	7.0
Generator rectifier end frame x Drive end frame assy		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
Retainer plate x Drive end frame assy generator		2.3	23	20 in.·lbf
Generator pulley x Generator rotor assy		110	1,122	81

3MZ-FE

Part Tightened		N·m	kgf·cm	ft·lbf
Starter assy				
Starter assy x Engine		37	377	27
Starter wire x Terminal 30 of starter		9.8	100	7.0
Starter drive housing assy x Magnet switch assy		7.5	76	66 in.·lbf
Starter commutator end frame assy x Starter drive housing assy		6.0	61	53 in.·lbf
Lead wire of starter yoke x Terminal C of magnet switch assy		10	102	7.0
Battery clamp x Battery clamp bolt		5.5	56	49 in.·lbf
Cable x Battery terminal		3.5	36	31 in.·lbf
Generator assy (100A)				
Generator assy x Generator bracket No. 2		58	592	43
Generator assy x Generator belt adjusting bar		18	184	13
Generator wire x Generator assy		9.8	100	7.0
Generator rectifier end frame x Drive end frame assy		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
Retainer plate x Drive end frame assy generator		2.3	23	20 in.·lbf
Generator pulley x Generator rotor assy		110	1,122	81
Generator assy (130A)				
Generator assy x Generator bracket No. 2		58	592	43
Generator assy x Generator belt adjusting bar		18	184	13
Generator wire x Generator assy		9.8	100	7.0

SERVICE SPECIFICATIONS - STARTING & CHARGING

Part Tightened	N·m	kgf·cm	ft·lbf
Generator rectifier end frame x Drive end frame assy	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
Retainer plate x Drive end frame assy generator	2.3	23	20 in·lbf
Generator pulley x Generator rotor assy	110	1,122	81

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
Drain plug	49	500	36
Filler plug	49	500	36
Breather plug	21	210	15
Companion flange x Drive pinion	See page 29-11		
Companion flange x Propeller shaft	74	750	54
Differential case x Ring gear	97	985	71
Differential carrier x Side bearing cap	79	800	58
Differential carrier x Differential carrier cover	47	475	34
Rear differential support No.1 x Differential carrier assy	103	1,050	76
Rear differential support No.1 x Rear suspension member sub-assy	137	1,400	101
Differential carrier assy x Rear suspension member sub-assy	95	970	70

ENGINE HOOD/DOOR

TORQUE SPECIFICATION

03051-03

Part Tightened	N·m	kgf·cm	ft·lbf
HOOD	-	-	-
Hood - Hood hinge	13	130	10
Hood lock - Body	7.0	71	62 in·lbf
FRONT DOOR	-	-	-
Door hinge - Body	23	235	17
Door hinge - Door panel	27	235	17
Door lock - Door panel for 3 torx screw	5.0	50	45 in·lbf
Door lock - Door panel for screw	5.5	56	49 in·lbf
Door lock striker - Body	23	235	17
Handle frame x Door panel	4.0	41	35 in·lbf
Outside handle cover x Door panel	4.0	41	35 in·lbf
Window regulator - Motor	5.4	55	48 in·lbf
Window regulator - Door panel	11	112	8.0
REAR DOOR	-	-	-
Door hinge - Body for Lower hinge	26	265	19
Door hinge - Body for Upper hinge	23	235	17
Door hinge - Door panel	26	265	19
Door lock - Door panel	5.0	50	44 in·lbf
Door lock - Door panel	5.5	56	49 in·lbf
Door lock striker - Body	23	235	17
Handle frame x Door panel	4.0	41	35 in·lbf
Outside handle cover x Door panel	4.0	41	35 in·lbf
Window regulator - Door panel	11	112	8.0
Window regulator - Motor	5.4	55	48 in·lbf
BACK DOOR	-	-	-
Door lock - Door panel	12.5	128	9.0
Door lock striker - Body	23	235	17
Hinge x Body	19.5	199	14
Lock cylinder x Door panel	5.5	56	49 in·lbf
Outside handle x Door panel	5.5	56	49 in·lbf
BACK DOOR STAY	-	-	-
Back door Stay - Body	8.0	82	71 in·lbf
Back door Stay - Door panel	8.0	82	71 in·lbf

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		13	130	9
Transaxle housing x Engine block	A bolt	64	653	47
	B bolt	46	470	34
	C bolt	37	377	27
Torque converter clutch x Drive plate		48	489	35
Flywheel housing under cover x Automatic transaxle		7.8	80	69 in.·lbf
Engine mounting bracket FR x Transaxle		64	653	47
Oil filler tube x Transaxle		5.5	56	49 in.·lbf
Control cable bracket No.1 x Transaxle		12	122	9
Control cable bracket No.2 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	347	25
Oil cooler outlet tube x Transaxle		34	347	25
Starter x Transaxle		37	377	27
Starter wire x Starter		9.8	100	87 in.·lbf
Wire harness x Transaxle		13	133	10
Wire harness clamp x Transaxle		8.4	86	74 in.·lbf
Speed sensor (NC) x Transaxle		11	115	8
Speed sensor (NT) x Transaxle		11	112	8
Air cleaner x Air cleaner hose		5.0	51	44 in.·lbf
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	120	9
Control cable x Body		4.9	50	43 in.·lbf
Transfer x Transaxle (U151F)		78	800	58
Transfer x Transfer stiffener plate RH (U151F)		34	350	25
Engine mount bracket RR x Transfer stiffener, plate RH		34	350	25
Oil cooler assy x Body	Nut bolt	7.0	71	62 in.·lbf

EXTERIOR/INTERIOR TRIM

TORQUE SPECIFICATION

03045-02

Part Tightened		N·m	kgf·cm	ft·lbf
FRONT BUMPER				
Front bumper reinforcement x Body		77	780	57
Front bumper cover x Body		5.5	55	49 in·lbf
REAR BUMPER				
Rear bumper cover	Bolt	3.0	31	27 in·lbf
	Nut	8.0	85	71 in·lbf
Rear bumper reinforcement No. 1 x Body		27	275	20
Rear bumper x Quarter panel mudguard		3.0	31	27 in·lbf
ROOF HEADLINING				
Front seat outer belt shoulder anchor - Body		42.0	420	31
Rear No. 1 seat outer belt floor anchor - Body		42.0	420	31
Rear No. 2 seat outer belt shoulder anchor - Body		42.0	420	31

TORQUE SPECIFICATION

Part Tightened	N·m	kgf·cm	ft·lbf
Intermediate shaft x Center support bearing assy No. 1 (front)			
1st	182	1,850	134
Loosen nut			
2nd	69	700	51
Intermediate shaft x Center support bearing assy No. 1 (rear)			
1st	182	1,850	134
Loosen nut			
2nd	69	700	51
Propeller shaft assy x Front flange	74	750	54
Propeller shaft assy rear x Rear differential	74	750	54
Intermediate shaft rear flange x Propeller shaft assy rear	29	296	21
Center support bearing assy No. 1 (front) x Body	37	375	27
Center support bearing assy No. 1 (rear) x Body	37	375	27
Front wheel set nut	103	1,050	76
Lower ball joint x Lower suspension arm	127	1,300	94
Tie rod end x Steering knuckle	49	500	36
Axle hub x Front drive shaft	294	3,000	217
Front disc brake caliper assy x Steering knuckle	104	1,060	77
Front drive shaft center bearing set bolt 2WD	32	330	24
Front speed sensor set bolt	8.0	82	71 in·lbf
Flexible hose and speed sensor wire harness x Shock absorber	19	192	14
Rear wheel set nut	103	1,050	76
Speed sensor x Rear axle carrier 4WD	8.0	82	71 in·lbf
Axle hub x Rear drive shaft 4WD	294	3,000	217
Rear axle carrier sub-assy x Rear disc brake caliper	78	800	58
Front stabilizer Link assy x Shock absorber	74	755	55
Shock absorber x Steering knuckle	230	2,350	170
Front axle carrier x Lower ball joint	123	1,250	91
Rear axle carrier sub-assy x Rear axle hub & bearing	75	765	55
Transfer extension housing x Transfer dynamic damper	26	260	19
Rear shock absorber x Flexible hose	19	192	14
Rear axle carrier sub-assy x Strut rod assy rear	80	816	59
Rear axle carrier sub-assy x Rear suspension arm assy No.1 LH	112	1,140	83
Rear axle carrier sub-assy x Rear suspension arm assy No.2 LH	112	1,140	83
Disc brake dust cover front x Steering knuckle	8.3	85	74 in·lbf
Rear shock absorber x Rear axle carrier	180	1,840	133

SLIDING ROOF/CONVERTIBLE

TORQUE SPECIFICATION

0304T-02

Part Tightened	N·m	kgf·cm	ft·lbf
Sliding roof housing assembly - Bracket	8.0	82	68 in·lbf
Sliding roof housing assembly - Body	5.0	51	43 in·lbf
Sliding roof housing assembly - Sliding roof drive gear	5.4	55	49 in·lbf

TORQUE SPECIFICATION

Part Tightened		N·m	kgf·cm	ft·lbf
Hub nut		103	1,050	76
Tie rod adjusting tube set nut		56	570	41
Shock absorber with coil spring x Rear axle carrier		180	1,840	133
Shock absorber with coil spring x Body		58	590	43
Support assy rear suspension x Shock absorber piston rod		49	500	36
Flexible hose set bolt		19	192	14
Skid control sensor wire set bolt		5.0	51	44 in·lbf
Speed sensor set bolt		8.0	82	71 in·lbf
Speed sensor wire set bolt		5.0	51	44 in·lbf
Strut rod x Body		80	816	59
Strut rod x Rear axle carrier		80	816	59
Parking brake cable set bolt		39	400	29
Parking brake cable set nut		6.0	61	53 in·lbf
Rear suspension member (4WD) set nut	Front side	115	1,170	85
	Rear side	181	1,850	134
Rear suspension arm assy No.1 x Rear suspension member	FF	120	1,220	89
	4WD	80	816	59
Rear suspension arm assy No.1 x Rear axle carrier	FF	112	1,140	83
	4WD	112	1,140	83
Rear suspension arm assy No.2 x Rear suspension member	FF	120	1,220	89
	4WD	100	1,020	74
Rear suspension arm assy No.2 x Rear axle carrier	FF	112	1,140	83
	4WD	112	1,140	83
Stabilizer link set nut		39	400	29
Stabilizer bar bracket set bolt (FF)		19	194	14
Stabilizer bar set bolt (4WD)	Left side	54	550	40
	Right side	19	194	14

INSTRUMENT PANEL/METER

TORQUE SPECIFICATION

031V3-01

Part Tightened	N·m	kgf·cm	ft·lbf
Instrument Panel Reinforcement - Passenger Airbag	20	204	15

SEAT

TORQUE SPECIFICATION

0305V-03

Part Tightened	N·m	kgf·cm	ft·lbf
FRONT SEAT			
Airbag sensor x Seat adjuster assy	8	82	71 in.·lbf
Seat Inner belt assy x Seat adjuster assy	42	428	31
Seatback cover bracket x Seat adjuster assy (w/ Side airbag)	5.6	57	49 in.·lbf
Armrest assy x Seat adjuster assy	37	377	27
Seat assy x Body	36.7	375	27
REAR NO. 1 SEAT LH (w/o REAR NO. 2 SEAT)			
Seat cushion frame No. 1 x Seat track assy inner	42	428	31
Seat cushion frame No. 2 x Seat track assy outer	42	428	31
Seatback frame lower x Seat cushion frame	42	428	31
Seat track stop plate x Seatback frame lower	18	184	13
Reclining control link x Seat track assy	42	428	31
Seatback frame assembly x Seatback frame lower	42	428	31
Seat belt assy Inner x Seatback frame lower	42	428	31
Fold seat stopper band x Seatback frame assy	9	92	80 in.·lbf
Seat cushion frame assy x Reclining control link	18	184	13
Seat cushion frame assy x Seatback frame lower	21	214	15
Seat assy x Body	36.7	375	27
Fold seat stopper band x Body	9	92	80 in.·lbf
REAR NO. 1 SEAT RH (w/o REAR NO. 2 SEAT)			
Seat cushion frame No. 1 x Seat track assy outer	42	428	31
Seat cushion frame No. 2 x Seat track assy inner	42	428	31
Seatback frame lower x Seat cushion frame No. 1	42	428	31
Seatback frame lower x Seat cushion frame No. 2	120	1224	89
Seat track stop plate x Seatback frame lower	18	184	13
Reclining control link x Seatback frame lower Bolt	21	214	15
Reclining control link x Seat track assy Nut	42	428	31
Seatback frame assy x Seatback frame lower Inside Outerside	55	561	41
	42	428	31
Seat belt assy Inner x Seatback frame lower	42	428	31
Seat belt assy outer center x Seatback frame assy	42	428	31
Fold seat stopper band x Seatback frame assy	9	92	80 in.·lbf
Seat cushion frame assy x Reclining control link	18	184	13
Seat cushion frame assy x Seatback frame lower	21	214	15
Armrest assy x Center seatback frame assy	21	214	15
Seatback hinge x Center seatback frame assy	21	214	15
Seat cushion spring No. 2 x Center seatback frame assy	21	214	15
Seatback hinge x Center seatback frame lower	21	214	15
Seat cushion spring No. 2 hinge x Center seatback frame lower	21	214	15
Fold seat stopper band x Seatback frame assy	9	92	80 in.·lbf
Seat assy x Body	36.7	375	27
Fold seat stopper band x Body	9	92	80 in.·lbf
REAR NO. 1 SEAT LH (w/ REAR NO. 2 SEAT)			
Seat cushion frame No. 1 x Seat track assy outer	42	428	31
Seat cushion frame No. 2 x Seat track assy inner	42	428	31
Seatback frame lower x Seat cushion frame No. 1	42	428	31
Seatback frame lower x Seat cushion frame No. 2	120	1224	89
Seat track stop plate x Seatback frame lower	18	184	13

Part Tightened		N·m	kgf·cm	ft·lbf
Reclining control link x Seatback frame lower	Bolt	21	214	15
Reclining control link x Seat track assy	Nut	42	428	31
Seatback frame assy x Seatback frame lower	Inside	55	561	41
	Outside	42	428	31
Seat belt assy Inner x Seatback frame lower		42	428	31
Seat belt assy outer center x Seatback frame assy		42	428	31
Fold seat stopper band x Seatback frame assy		9	92	80 in.·lbf
Seat cushion frame assy x Reclining control link		18	184	13
Seat cushion frame assy x Seatback frame lower		21	214	15
Armrest assy x Center seatback frame assy		21	214	15
Seatback hinge x Center seatback frame assy		21	214	15
Seat cushion spring No. 2 x Center seatback frame assy		21	214	15
Seatback hinge x Center seatback frame lower		21	214	15
Seat cushion spring No. 2 hinge x Center seatback frame lower		21	214	15
Fold seat stopper band x Seatback frame assy		9	92	80 in.·lbf
Seat assy x Body		36.7	375	27
Fold seat stopper band x Body		9	92	80 in.·lbf
REAR NO. 1 SEAT RH (w/ REAR NO. 2 SEAT)				
Seat cushion frame No. 1 x Seat track assy inner		42	428	31
Seat cushion frame No. 2 x Seat track assy outer		42	428	31
Seatback frame lower x Seat cushion frame		42	428	31
Seat track stop plate x Seatback frame lower		18	184	13
Reclining control link x Seat track assy		42	428	31
Seatback frame assembly x Seatback frame lower		42	428	31
Seat belt assy Inner x Seatback frame lower		42	428	31
Fold seat stopper band x Seatback frame assy		9	92	80 in.·lbf
Seat cushion frame assy x Reclining control link		18	184	13
Seat cushion frame assy x Seatback frame lower		21	214	15
Seat assy x Body		36.7	375	27
Fold seat stopper band x Body		9	92	80 in.·lbf
REAR NO. 2 SEAT				
No. 2 seat leg x No.2 seatback frame sub-assy		42	428	31
No. 2 seat leg x No.2 cushion frame sub-assy		21	214	15
No. 2 seat leg x No.2 cushion frame sub-assy		18	184	13
Seat assy x Body		37	377	27

TORQUE SPECIFICATION

Part Tightened		N·m	kgf·cm	ft·lbf
V (COOLER COMPRESSOR TO CRANKSHAFT PULLEY) BELT NO.1				
Generator installation bolt	Bolt A	58	591	43
	Bolt B	18	183	13
AIR CONDITIONING RADIATOR ASSY				
Air conditioner tube assy x Cooler evaporator sub-assy No. 1		5.4	55	48 in.·lbf
Air conditioner unit assy x Body		9.8	100	87 in.·lbf
Instrument panel reinforcement assy x Body		29	300	21
Skid control ECU assy x Reinforcement assy		5.0	50	43 in.·lbf
Instrument panel junction block assy x Reinforcement assy		8.4	86	74 in.·lbf
ECM x Reinforcement assy		5.5	56	49 in.·lbf
Instrument panel brace sub-assy No. 2 x Reinforcement assy		29	300	21
Instrument panel brace sub-assy No. 1 x Reinforcement assy		29	300	21
Floor shift assy x Instrument panel brace sub-assy		12	122	9
Shift cable x Instrument panel brace sub-assy No. 2		20	200	14
Steering column assy x Reinforcement assy		21	210	15
BLOWER ASSY				
Blower assy x Body		9.8	100	87 in.·lbf
ECM x Reinforcement assy		5.5	56	49 in.·lbf
COOLER COMPRESSOR ASSY (3MZ-FE)				
Magnetic clutch x Cooler compressor assy		18	183	13
Compressor and magnetic clutch x Engine		25	250	18
Cooler compressor bracket x Compressor and magnetic clutch	Nut	25	250	18
Cooler compressor bracket x Compressor and magnetic clutch	Bolt (A)	25	250	18
Cooler compressor bracket x Compressor and magnetic clutch	Bolt (B)	18	184	13
Cooler refrigerant discharge hose No. 1 x Cooler compressor assy		9.8	100	87 in.·lbf
Cooler refrigerant suction hose No. 1 x Cooler compressor assy		9.8	100	87 in.·lbf
COOLER COMPRESSOR ASSY (2AZ-FE)				
Magnetic clutch x Cooler compressor assy		18	183	13
Compressor and magnetic clutch x Engine		24.5	250	18
Cooler refrigerant discharge hose No. 1 x Cooler compressor assy		9.8	100	87 in.·lbf
Cooler refrigerant suction hose No. 1 x Cooler compressor assy		9.8	100	87 in.·lbf
COOLER CONDENSER ASSY				
Radiator support x Cooler condenser assy		9.8	100	87 in.·lbf
Radiator upper support x Cross member		9.8	100	87 in.·lbf
Cooler refrigerant liquid pipe A x Cooler condenser assy		5.4	55	47 in.·lbf
Cooler refrigerant discharge pipe A x Cooler condenser assy		5.4	55	47 in.·lbf
REAR HEATER ASSY				
Rear heater blower fan sub-assy x Rear heater blower motor sub-assy		4.0	41	35 in.·lbf
Rear heater assy x Body		9.8	100	87 in.·lbf
Plate x Rear heater assy	Bolt (A)	9.8	100	87 in.·lbf

SEAT BELT

TORQUE SPECIFICATION

031W7-01

Part Tightened	N·m	kgf·cm	ft·lbf
FRONT SEAT BELT (From August, 2003)			
Front seat outer belt assy RH (For upper bolt) x Body	7.5	77	66 in.·lbf
Front seat outer belt assy RH (For lower bolt) x Body	42	428	31
Front seat outer belt (floor anchor) x Body	42	428	31
Front seat outer belt (shoulder anchor) x Body	42	428	31
Front seat inner belt assy RH x Front seat	42	428	31
REAR NO. 1 SEAT BELT (From August, 2003)			
Rear seat outer belt assy x Body (RH and LH)	42	428	31
Front seat outer belt assy (For upper bolt) x Seatback frame (Center)	7.5	77	66 in.·lbf
Rear seat outer belt assy (For lower bolt) x Seatback frame (Center)	42	428	31
Rear seat outer belt assy (floor anchor) x Body (RH and LH)	42	428	31
Rear seat outer belt assy (floor anchor) x Seatback frame (Center)	42	428	31
Rear seat inner belt assy RH x Seat cushion frame	42	428	31
Rear seat inner belt assy LH x Seat cushion frame	42	428	31
Rear seat inner belt assy x Body	42	428	31
REAR NO. 2 SEAT BELT (From August, 2003)			
Rear seat outer belt assy (For upper bolt) x Body	7.5	77	66 in.·lbf
Rear seat outer belt assy (For lower bolt) x Body	42	428	31
Rear seat inner belt assy x Body	42	428	31
Rear seat lap type belt assy RH x Seat cushion frame	42	428	31
Rear seat lap type belt assy LH x Seat cushion frame	42	428	31

WIPER & WASHER

TORQUE SPECIFICATION

031WA-01

Part Tightened	N·m	kgf·cm	ft·lbf
Windshield wiper motor assy x Windshield wiper link assy	5.39	55	48 in.·lbf
Windshield wiper link assy x Body	7.0	71	61 in.·lbf
FR wiper arm & blade assy RH x Windshield wiper link assy	24	245	18
FR wiper arm & blade assy LH x Windshield wiper link assy	24	245	18
Rear wiper motor assy x Body	5.5	56	48 in.·lbf
RR wiper arm & blade assy x Rear wiper motor assy	5.5	56	48 in.·lbf