

STANDARD BOLT

HOW TO DETERMINE BOLT STRENGTH

Bolt Type

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

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

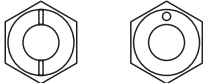

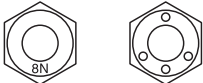
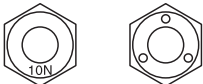


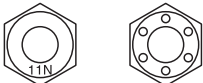
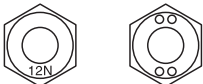
SPECIFIED TORQUE FOR STANDARD BOLTS

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

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HOW TO DETERMINE NUT STRENGTH

Nut Type

Present Standard Hexagon Nut	Old Standard Hexagon Nut		Class
	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

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HINT:

- *: Nut with 1 or more marks on one side surface of the nut.
- Use the nut with the same number of the nut strength classification or greater than the bolt strength classification number when tightening parts with a bolt and nut.

Example:

- Bolt = 4T
- Nut = 4N or more

2GR-FE ENGINE CONTROL SYSTEM

SERVICE DATA

Throttle body		
	Standard throttle valve opening percentage	60% or more
Intake air flow meter assembly		
Resistance	4 (THA) - 5 (E2)	
	at -20°C (-4°F)	13.6 to 18.4 kΩ
	at 20°C (68°F)	2.21 to 2.69 kΩ
	at 60°C (140°F)	0.493 to 0.667 kΩ
Camshaft timing oil control valve assembly		
Resistance	at 20°C (68°F)	6.9 to 7.9 Ω
Throttle body assembly		
Resistance	at 20°C (68°F)	
	2 (M+) - 1 (M-)	0.3 to 100 kΩ
	5 (VC) - 3 (E2)	1.2 to 3.2 kΩ
E.F.I. engine coolant temperature sensor		
Resistance	Approx. 20°C (68°F)	2.32 to 2.59 kΩ
	Approx. 80°C (176°F)	0.310 to 0.326 kΩ
Knock sensor		
Resistance	at 20°C (68°F)	120 to 280 kΩ
Circuit opening relay (engine room junction block assembly)		
Specified condition	1D-5 - 1D-3	10 kΩ or higher
	1D-5 - 1D-3	Below 1 Ω
		(when battery voltage is applied to terminals 1G-5 and 1H-9)
EFI relay (engine room junction block assembly)		
Specified condition	1D-4 - 1D-6	10 kΩ or higher
	1D-4 - 1D-6	Below 1 Ω
		(when battery voltage is applied to terminals 1H-10 and 1H-2)
A/F relay (engine room junction block assembly)		
Specified condition	1F-1 - 1C-6	10 kΩ or higher
	1F-1 - 1C-6	Below 1 Ω
		(when battery voltage is applied to terminals 1D-5 and 1H-2)

TORQUE SPECIFICATIONS

Part Tightened	N*m	kgf*cm	ft.*lbf
Throttle body assembly x Intake air surge tank	10	102	7
Knock sensor x Cylinder block sub-assembly	20	199	14
Water outlet x Cylinder head sub-assembly	15	153	11
ECM x Instrument panel reinforcement	5.5	56	49 in.*lbf
ECM x Blower assembly	5.5	56	49 in.*lbf
Accelerator pedal rod assembly x Body	5.4	55	48 in.*lbf

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2GR-FE ENGINE MECHANICAL

SERVICE DATA

Ignition timing	Terminals TC and CG of DLC3 connected	10 +/- 2° BTDC at idle (Transmission in neutral)
	Terminals TC and CG of DLC3 disconnected	5 to 15° BTDC at idle (Transmission in neutral)
Idle speed		650 +/- 50 rpm (Transmission in neutral)
Compression	Compression pressure	1.4 MPa (14 kgf/cm ² , 199 psi) or more
	Minimum pressure	0.98 MPa (10 kgf/cm ² , 142 psi)
	Difference between each cylinder	0.1 MPa (1.0 kgf/cm ² , 15 psi) or less
Cylinder head set bolt		
Outside diameter	Standard	10.85 to 11.00 mm (0.4272 to 0.4331 in.)
	Minimum	10.70 mm (0.4213 in.)
Chain		
Elongation	Maximum	136.9 mm (5.390 in.)
No. 2 chain		
Elongation	Maximum	137.6 mm (5.417 in.)
Crankshaft timing gear		
Diameter (w/ chain)	Minimum	61.4 mm (2.417 in.)
Idle sprocket		
Diameter (w/ chain)	Minimum	61.4 mm (2.417 in.)
Idle gear shaft		
Idle gear shaft diameter		30.000 to 30.013 mm (1.1811 to 1.1816 in.)
Idle gear inside diameter		30.020 to 30.033 mm (1.1819 to 1.1824 in.)
Oil clearance	Standard	0.007 to 0.033 mm (0.0003 to 0.0013 in.)
	Maximum	0.083 mm (0.0033 in.)
Chain tensioner assembly No. 2		
Worn depth	Maximum	0.9 mm (0.035 in.)
Chain tensioner assembly No. 3		
Worn depth	Maximum	0.9 mm (0.035 in.)
Chain tensioner slipper		
Worn depth	Maximum	1.0 mm (0.039 in.)
Chain vibration damper No. 1		
Worn depth	Maximum	1.0 mm (0.039 in.)
Chain vibration damper No. 2		
Worn depth	Maximum	1.0 mm (0.039 in.)
Cylinder head sub-assembly		
	Cylinder head lower	0.05 mm (0.0020 in.)
	Intake	0.08 mm (0.0031 in.)
	Exhaust	0.08 mm (0.0031 in.)
Warpage	Maximum	0.10 mm (0.0039 in.)
Intake valve		
Valve stem diameter		5.470 to 5.485 mm (0.2154 to 0.2159 in.)
Margin thickness	Standard	1.0 mm (0.039 in.)
	Maximum	0.5 mm (0.0197 in.)
Overall length	Standard	105.85 mm (4.1673 in.)
	Maximum	105.35 mm (4.1476 in.)
Exhaust valve		
Valve stem diameter		5.465 to 5.480 mm (0.2152 to 0.2158 in.)

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Margin thickness	Standard	1.0 mm (0.0394 in.)
	Maximum	0.5 mm (0.0197 in.)
Overall length	Standard	111.40 mm (4.3858 in.)
	Maximum	109.90 mm (4.3268 in.)
Inner compression spring		
Free length		45.46 mm (1.7898 in.)
Deviation	Maximum	1.0 mm (0.039 in.)
Angle (reference)	Maximum	2°
Intake valve guide bush		
Inside diameter		5.510 to 5.530 mm (0.2169 to 0.2177 in.)
Oil clearance	Standard	0.025 to 0.060 mm (0.0010 to 0.0024 in.)
	Maximum	0.08 mm (0.0031 in.)
Bush bore diameter	Use STD	10.285 to 10.306 mm (0.4049 to 0.4057 in.)
	Use O/S 0.05	10.335 to 10.356 mm (0.4069 to 0.4077 in.)
Protrusion height		9.3 to 9.7 mm (0.3661 to 0.3819 in.)
Exhaust valve guide bush		
Inside diameter		5.510 to 5.530 mm (0.2169 to 0.2177 in.)
Oil clearance	Standard	0.030 to 0.065 mm (0.0012 to 0.0026 in.)
	Maximum	0.10 mm (0.0039 in.)
Bush bore diameter	Use STD	10.285 to 10.306 mm (0.4049 to 0.4057 in.)
	Use O/S 0.05	10.335 to 10.356 mm (0.4069 to 0.4077 in.)
Protrusion height		9.30 to 9.70 mm (0.3661 to 0.3819 in.)
No. 1 camshaft		
Journal diameter	No. 1 journal	35.946 to 35.960 mm (1.4152 to 1.4157 in.)
	Other journals	25.959 to 25.975 mm (1.0220 to 1.0226 in.)
Circuit runout	Maximum	0.04 mm (0.0016 in.)
Cam lobe height	Standard	44.316 to 44.416 mm (1.7447 to 1.7487 in.)
	Maximum	44.166 mm (1.7388 in.)
Oil clearance	Standard No. 1 journal	0.040 to 0.079 mm (0.0016 to 0.0031 in.)
	Other journals	0.025 to 0.062 mm (0.0010 to 0.0024 in.)
	Maximum No. 1 journal	0.10 mm (0.0039 in.)
	Other journals	0.09 mm (0.0035 in.)
Thrust clearance	Standard	0.08 to 0.13 mm (0.0031 to 0.0051 in.)
	Maximum	0.15 mm
No. 2 camshaft		
Journal diameter	No. 1 journal	35.946 to 35.960 mm (1.4152 to 1.4157 in.)
	Other journals	25.959 to 25.975 mm (1.0220 to 1.0226 in.)
Circuit runout	Maximum	0.04 mm (0.0016 in.)
Cam lobe height	Standard	44.262 to 44.362 mm (1.7426 to 1.7465 in.)
	Maximum	44.112 mm (1.7367 in.)
Oil clearance	Standard No. 1 journal	0.040 to 0.079 mm (0.0016 to 0.0031 in.)
	Other journals	0.025 to 0.062 mm (0.0010 to 0.0024 in.)
	Maximum No. 1 journal	0.10 mm (0.0039 in.)
	Other journals	0.09 mm (0.0035 in.)
Thrust clearance	Standard	0.08 to 0.13 mm (0.0031 to 0.0051 in.)
	Maximum	0.15 mm
No. 3 camshaft		
Journal diameter	No. 1 journal	35.946 to 35.960 mm (1.4152 to 1.4157 in.)
	Other journals	25.959 to 25.975 mm (1.0220 to 1.0226 in.)
Circuit runout	Maximum	0.04 mm (0.0016 in.)

Cam lobe height	Standard	44.316 to 44.416 mm (1.7447 to 1.7487 in.)
	Maximum	44.166 mm (1.7388 in.)
Oil clearance	Standard No. 1 journal	0.040 to 0.079 mm (0.0016 to 0.0031 in.)
	Other journals	0.025 to 0.062 mm (0.0010 to 0.0024 in.)
	Maximum No. 1 journal	0.10 mm (0.0039 in.)
	Other journals	0.09 mm (0.0035 in.)
Thrust clearance	Standard	0.08 to 0.13 mm (0.0031 to 0.0051 in.)
	Maximum	0.15 mm
No. 4 camshaft		
Journal diameter	No. 1 journal	35.946 to 35.960 mm (1.4152 to 1.4157 in.)
	Other journals	25.959 to 25.975 mm (1.0220 to 1.0226 in.)
Circuit runout	Maximum	0.04 mm (0.0016 in.)
Cam lobe height	Standard	44.262 to 44.362 mm (1.7426 to 1.7465 in.)
	Maximum	44.112 mm (1.7367 in.)
Oil clearance	Standard No. 1 journal	0.040 to 0.079 mm (0.0016 to 0.0031 in.)
	Other journals	0.025 to 0.062 mm (0.0010 to 0.0024 in.)
	Maximum No. 1 journal	0.10 mm (0.0039 in.)
	Other journals	0.09 mm (0.0035 in.)
Thrust clearance	Standard	0.08 to 0.13 mm (0.0031 to 0.0051 in.)
	Maximum	0.15 mm
Ring pin for cylinder head sub-assembly		
Protrusion height		2.5 to 3.8 mm (0.098 to 0.150 in.)
Straight pin for cylinder head sub-assembly		
Protrusion height		17.5 to 19.5 mm (0.689 to 0.768 in.)
Connecting rod thrust clearance	Standard	0.15 to 0.40 mm (0.0059 to 0.0157 in.)
	Maximum	0.50 mm (0.020 in.)
Connecting rod oil clearance	Standard	0.045 to 0.067 mm (0.0018 to 0.0026 in.)
	Maximum	0.070 mm (0.0028 in.)
Crankshaft thrust clearance	Standard	0.04 to 0.24 mm (0.0016 to 0.0094 in.)
	Maximum	0.30 mm (0.0118 in.)
	Thrust washer thickness	2.43 to 2.48 mm (0.0957 to 0.0976 in.)
Cylinder block warpage	Maximum	0.07 mm (0.0028 in.)
Cylinder bore diameter	Standard	94.000 to 94.012 mm (3.7008 to 3.7013 in.)
	Maximum	94.200 mm (3.7087 in.)
Piston diameter		
	Distance	9.8 mm (0.3858 in.)
	Standard	93.960 to 93.980 mm (3.6992 to 3.7000 in.)
	Maximum	93.830 mm (3.6941 in.)
Oil clearance	Standard	0.02 to 0.052 mm (0.0008 to 0.0020 in.)
	Maximum	0.06 mm
Connecting rod out-of alignment	Maximum	0.05 mm (0.0020 in.) per 100 mm (3.94 in.)
Connecting rod twist	Maximum	0.15 mm (0.0059 in.) per 100 mm (3.94 in.)
Piston pin hole inside diameter		22.001 to 22.010 mm (0.8662 to 0.8665 in.)
Piston pin diameter		21.997 to 22.006 mm (0.8660 to 0.8664 in.)
Oil clearance	Standard	0.001 to 0.007 mm (0.00002 to 0.0003 in.)
	Maximum	0.015 mm (0.0006 in.)
Connecting rod bushing inside diameter		22.005 to 22.014 mm (0.8663 to 0.8667 in.)
Oil clearance	Standard	0.005 to 0.011 mm (0.0002 to 0.0004 in.)
	Maximum	0.03 mm (0.0012 in.)

Piston ring groove clearance	No. 1	0.020 to 0.070 mm (0.0008 to 0.0028 in.)
	No. 2	0.020 to 0.060 mm (0.0008 to 0.0024 in.)
	Oil	0.070 to 0.150 mm (0.0028 to 0.0059 in.)
Piston ring end gap	Standard No. 1	0.25 to 0.35 mm (0.0098 to 0.0138 in.)
	No. 2	0.50 to 0.60 mm (0.0197 to 0.0236 in.)
	Oil (Side rail)	0.10 to 0.40 mm (0.0039 to 0.0157 in.)
	Maximum No. 1	0.50 mm (0.0197 in.)
	No. 2	0.85 mm (0.0335 in.)
	Oil (Side rail)	0.60 mm (0.0236 in.)
Connecting rod bolt diameter	Standard	7.2 to 7.3 mm (0.283 to 0.287 in.)
	Maximum	7.0 mm (0.276 in.)
Crankshaft bearing cap set bolt diameter	Standard	10.8 to 11.0 mm (0.4252 to 0.4331 in.)
	Maximum	10.7 mm (0.4213 in.)
Crankshaft circle runout	Maximum	0.06 mm (0.0024 in.)
Main journal diameter		60.988 to 61.000 mm (2.4011 to 2.4016 in.)
Main journal taper and out-of-round	Maximum	0.02 mm (0.0008 in.)
Crank pin diameter		52.992 to 53.000 mm (2.0863 to 2.0866 in.)
Crank pin taper and out-of-round	Maximum	0.02 mm (0.0008 in.)
Crankshaft oil clearance	Standard	0.026 to 0.047 mm (0.0010 to 0.0019 in.)
	Maximum	0.050 mm (0.0020 in.)
Straight pin for cylinder block sub-assembly		
Protrusion height	Pin A	23 mm (0.906 in.)
	Pin B	6 mm (0.236 in.)
	Pin C	11 mm (0.433 in.)
	Pin D	9 mm (0.354 in.)
Tight plug for cylinder block	Depth	0.2 to 1.2 mm (0.007 to 0.047 in.)

TORQUE SPECIFICATIONS

Part Tightened		N*m	kgf*cm	ft.*lbf
Ignition coil assembly x Cylinder head cover sub-assembly		10	102	7
Engine hanger No. 1 x Cylinder head sub-assembly RH		33	337	24
Engine hanger No. 2 x Cylinder head sub-assembly LH		33	337	24
Engine mounting bracket RH x Cylinder block sub-assembly		54	551	40
Chain vibration damper No. 1 x Cylinder block sub-assembly		23	229	17
Oil level gauge guide x Cylinder head sub-assembly		21	214	15
Idle pulley sub-assembly No. 2 x Timing chain cover sub-assembly		43	438	32
V-ribbed belt tensioner assembly x Cylinder block sub-assembly		43	438	32
Intake manifold x Cylinder head sub-assembly		21	214	15
Exhaust manifold sub-assembly RH x Cylinder head sub-assembly RH		21	214	15
Exhaust manifold sub-assembly LH x Cylinder head sub-assembly LH		21	214	15
Drive plate & ring gear sub-assembly x Crankshaft		83	850	61
Air cleaner case x Body		5.0	51	44 in.*lbf
E.F.I engine coolant temperature x water by-pass joint RR		20	200	14
Engine assembly w/ Transaxle x Body	Bolt A	85	867	63
	Bolt B	32	329	24
Manifold stay No. 2 x Exhaust manifold sub-assembly LH		34	347	25
Air cleaner inlet No. 1 x Body		5.0	51	44 in.*lbf
Air cleaner inlet No. 2 x Body		5.0	51	44 in.*lbf
Battery clamp x Body		9.0	92	80 in.*lbf
Steering intermediate shaft x Steering gear		35	360	26
Stabilizer link x Shock absorber		74	755	55
Tie rod assembly x Steering gear		49	500	36
Speed sensor front x Front axle		8.0	82	71 in.*lbf
Front axle hub nut x Front drive shaft		294	2,998	217
Cooler compressor x V-ribbed belt tensioner		25	250	18
Engine mounting control bracket x Engine mounting bracket front No. 1 LH				
	Bolt A	44	450	32
	Bolt B	38	387	28
Engine assembly w/ Transaxle x Front frame assembly	Nut	23	235	17
	Bolt	87	887	64
	Nut	95	969	70
Drive shaft bearing bracket x Cylinder block sub-assembly		64	650	47
Exhaust manifold heat insulator No. 2 x Exhaust manifold sub-assembly LH		8.5	87	75 in.*lbf
Oil pressure switch x Oil pan sub-assembly		21	210	15
Engine mounting stay No. 2 RH x Intake manifold		21	214	15
Timing gear cover No. 2 x Chain cover sub-assembly		6.0	61	53 in.*lbf
Engine mounting bracket front No. 1 LH x Chain cover		54	551	40
Camshaft bearing cap x Camshaft housing	1st	10	102	7
	2nd	16	163	12
Camshaft housing x Cylinder head sub-assembly		25	255	18
Chain tensioner No. 1 x Cylinder head sub-assembly		10	102	7
Chain tensioner No. 2 x Cylinder head sub-assembly		21	214	15
Chain tensioner No. 3 x Cylinder head sub-assembly		21	214	15
Camshaft timing gear assembly x Camshaft		100	1,020	74
Camshaft timing exhaust gear assembly x Camshaft		100	1,020	74

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Part Tightened		N*m	kgf*cm	ft.*lbf
Engine rear oil seal retainer x Cylinder block sub-assembly		10	102	7
Knock sensor x Cylinder block sub-assembly		20	204	15
Water inlet pipe x Cylinder block sub-assembly		10	102	7
Cylinder head RH x Cylinder block sub-assembly	1st	36	367	27
	2nd	Turn 90°	Turn 90°	Turn 90°
	3rd	Turn 90°	Turn 90°	Turn 90°
Cylinder head sub-assembly LH x Cylinder block sub-assembly	Recessed head 1st	36	367	27
	2nd	Turn 90°	Turn 90°	Turn 90°
	3rd	Turn 90°	Turn 90°	Turn 90°
	14 mm (0.55 in.) head	30	306	22
Chain vibration damper No. 1 x Cylinder block sub-assembly		23	230	17
Idle gear No. 1 x Cylinder block sub-assembly		60	612	44
Timing chain cover plate x Timing chain cover sub-assembly		9.1	93	81 in.*lbf
Timing chain cover sub-assembly x Cylinder head and block	Areas 1: Bolt	21	214	15
	Areas 2: Bolt	21	214	15
	Areas 3: Bolt and Nut	21	214	15
	Areas 4: Bolt A	43	438	32
	Areas 4: Except Bolt A	21	214	15
Water pump assembly x Timing chain cover sub-assembly		9.1	93	81 in.*lbf
Oil pan baffle plate x Cylinder block sub-assembly		10	102	7
Oil pan sub-assembly x Cylinder block and timing chain cover sub-assembly		10	102	7
Oil pan stud bolt x Oil pan sub-assembly		4.0	41	35 in.*lbf
Oil strainer stud bolt x Timing chain cover sub-assembly		4.0	41	35 in.*lbf
Oil strainer sub-assembly x Cylinder block and timing chain cover sub-assembly		10	102	7
Oil pan sub-assembly x Cylinder block and timing chain cover sub-assembly	bolt A	10	102	7
	except bolt A	21	214	15
Oil pan sub-assembly No. 2 x Oil pan sub-assembly		10	102	7
Oil pan drain plug x Oil pan sub-assembly No. 2		40	408	30
Crankshaft pulley x Crankshaft		250	2,550	184
Cylinder head cover sub-assembly x Cylinder head sub-assembly RH	bolt A	21	214	15
	except bolt A	10	102	7
Cylinder head cover sub-assembly LH x Cylinder head sub-assembly LH	bolt A	21	214	15
	except bolt A	10	102	7
Water outlet x Cylinder head sub-assembly	bolt	10	102	7
	nut	10	104	8
Water inlet housing set nut		10	102	7
Water inlet set bolt and nut		10	102	7
Oil filter cap x Oil pan		25	255	18
Camshaft position sensor		10	102	7
Ventilation valve x Cylinder head cover sub-assembly LH		27	275	20
Oil pipe union x Cylinder block sub-assembly		57	581	42

Part Tightened		N*m	kgf*cm	ft.*lbf
Oil pipe union x Cylinder head cover sub-assembly		57	581	42
Oil pipe x Cylinder head sub-assembly		10	102	7
Crankshaft position sensor x Cylinder block sub-assembly		10	102	7
Camshaft timing oil control valve assembly x Cylinder head cover		10	102	7
Cylinder block water drain cock sub-assembly x Cylinder block sub-assembly		25	255	18
Water drain cock plug x Water drain cock sub-assembly		13	130	9
Spark plug x Cylinder head sub-assembly		18	184	13
Stud bolt x Cylinder head sub-assembly	For A and B bolts	10	102	7
	For C bolts	4.0	41	35 in.*lbf
W/ head screw plug x Cylinder head sub-assembly		44	449	32
W/ head screw plug No. 2 x Cylinder head sub-assembly		80	816	59
Main bearing cap x Cylinder block sub-assembly	16 pointed head 1st	61	622	45
	2nd	Turn 90°	Turn 90°	Turn 90°
	14 mm head	52	525	38
Connecting rod cap x Connecting rod	1st	25	255	18
	2nd	Turn 90°	Turn 90°	Turn 90°
Stud bolt x Cylinder block sub-assembly		10	102	7
Sub-assembly oil nozzle No. 1 x Cylinder block sub-assembly		9.0	92	80 in.*lbf

SS

2GR-FE FUEL**SERVICE DATA**

Fuel pressure		304 to 343 kPa (3.1 to 3.5 kgf/cm ² , 44.1 to 49.7 psi)
Fuel pressure		147 kPa (1.5 kgf/cm ² , 21 psi) or more
Fuel injector		
Resistance	at 20°C (68°F)	11.6 to 12.4 Ω
Injection volume		84 to 100 cm ³ (5.1 to 6.0 cu in.) per 15 seconds
Difference between each cylinder		16 cm ³ (0.96 cu in.) or less
Fuel leakage		1 drop or less per 16 minutes
Fuel pump		
Resistance	at 20°C (68°F)	0.2 to 3.0 Ω

SS

TORQUE SPECIFICATIONS

Part Tightened		N*m	kgf*cm	ft.*lbf
Fuel delivery pipe sub-assembly x Intake manifold		21	214	15
Intake air surge tank x Intake manifold	Bolt	18	184	13
	Nut	16	163	12
Intake air surge tank x Cylinder head		21	214	15
Vacuum hose clamp set bolt		5.4	55	48 in.*lbf
Air cleaner hose clamp x Throttle w/ motor body assembly		5.0	51	44 in.*lbf
Fuel tank bent tube set plate x Fuel tank assembly		5.9	60	52 in.*lbf
Fuel main tube support x Fuel tank assembly		5.4	55	48 in.*lbf
Fuel tank band sub-assembly No. 1 RH x Body		39	400	29
Fuel tank band sub-assembly No. 1 LH x Body		39	400	29
Fuel tank protector lower center x Fuel tank assembly		5.4	55	48 in.*lbf
Parking brake cable assembly No. 2 x Body	Bolt	6.0	61	53 in.*lbf
	Nut	8.5	87	75 in.*lbf
Parking brake cable assembly No. 3 x Body	Bolt	6.0	61	53 in.*lbf
	Nut	8.5	87	75 in.*lbf

SS

2GR-FE EMISSION CONTROL

SERVICE DATA

Vacuum switching valve No. 1		
Resistance	at 20°C (68°F)	26 to 30 Ω
	at 100°C (212°F)	32 to 40 Ω
VSV for EVAP		
Resistance	1 - 2	26 to 30 Ω at 20°C (68°F)
	1 - Body ground	10 kΩ or higher
	2 - Body ground	10 kΩ or higher
Air fuel ratio sensor		
Resistance	1 (HT) - 2 (+B)	0.8 to 1.4 Ω at 20°C (68°F)
Oxygen sensor		
Resistance	1 (HT) - 2 (+B)	11 to 16 Ω at 20°C (68°F)

SS

TORQUE SPECIFICATIONS

Part Tightened		N*m	kgf*cm	ft.*lbf
Charcoal canister assembly x Body		36	367	27
Air fuel ratio sensor x Front pipe assembly		44	449	32
	with SST	40	408	30
Oxygen sensor x Front pipe assembly		44	449	32
	with SST	40	408	30

SS

2GR-FE INTAKE**SERVICE DATA**

Vacuum switching valve assembly		
Resistance	1 - 2	37 to 44 Ω at 20°C (68°F)
	1 - Body ground	10 k Ω or higher
	2 - Body ground	10 k Ω or higher

2GR-FE EXHAUST

TORQUE SPECIFICATIONS

2GR-FE

Part Tightened	N*m	kgf*cm	ft.*lbf
Exhaust pipe assembly center x Exhaust pipe assembly tail	43	438	32
Exhaust pipe assembly front x Exhaust manifold RH	62	632	46
Exhaust pipe assembly front x Exhaust manifold LH	62	632	46
Exhaust pipe assembly front x Exhaust pipe assembly center	56	571	41
Exhaust pipe damper x Exhaust pipe assembly center	19	194	14
Exhaust pipe No. 1 support bracket x Body	33	337	24
Front exhaust pipe No. 1 support bracket x Body	33	337	24
Rear exhaust pipe No. 1 support bracket x Body	33	337	24
Exhaust pipe support No. 4 x Body	33	337	24
Exhaust pipe No. 4 support bracket sub-assembly x Body	39	398	29
Exhaust pipe No. 4 support bracket sub-assembly x Body	39	398	29
Heated oxygen sensor (Bank 1 Sensor 2) x Exhaust pipe assembly front	44	449	32
Heated oxygen sensor (Bank 2 Sensor 2) x Exhaust pipe assembly front	44	449	32

SS

2GR-FE COOLING**SERVICE DATA****2GR-FE**

Thermostat		
Valve opening temperature		80 to 84 °C (176 to 183 °F)
Valve lift	at 95 °C (203 °F)	10 mm (0.394 in.) or more
Radiator cap sub-assembly		
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

SS

TORQUE SPECIFICATIONS

2GR-FE

Part Tightened		N*m	kgf*cm	ft.*lbf
Cylinder block drain cock plug x Drain cock		13	130	10
Water pump assembly x Cylinder block	A bolt	21	214	15
	B, C bolt	9.1	93	81 in.*lbf
Water pump pulley x Cylinder block		10	102	7
Idler pulley sub-assembly No.2 x Cylinder block		43	438	32
Water inlet housing x Cylinder block		10	102	7
Water inlet x Water inlet housing		10	102	7
Radiator support upper x Body		7.0	71	62 in.*lbf
hood lock assembly x Body		8.0	82	71 in.*lbf
Air cleaner inlet No.1 x Body		5.0	51	44 in.*lbf
Air cleaner inlet No.2 x Body		5.0	51	44 in.*lbf
Oil cooler assembly x Radiator tank lower		8.3	85	74 in.*lbf
Oil cooler pipe x Oil cooler assembly		15	150	11
Condenser assembly x Radiator assembly		5.4	55	48 in.*lbf

SS

2GR-FE COOLING**SERVICE DATA****2GR-FE**

Thermostat		
Valve opening temperature		80 to 84 °C (176 to 183 °F)
Valve lift	at 95 °C (203 °F)	10 mm (0.394 in.) or more
Radiator cap sub-assembly		
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

SS

TORQUE SPECIFICATIONS

2GR-FE

Part Tightened		N*m	kgf*cm	ft.*lbf
Cylinder block drain cock plug x Drain cock		13	130	10
Water pump assembly x Cylinder block	A bolt	21	214	15
	B, C bolt	9.1	93	81 in.*lbf
Water pump pulley x Cylinder block		10	102	7
Idler pulley sub-assembly No.2 x Cylinder block		43	438	32
Water inlet housing x Cylinder block		10	102	7
Water inlet x Water inlet housing		10	102	7
Radiator support upper x Body		7.0	71	62 in.*lbf
hood lock assembly x Body		8.0	82	71 in.*lbf
Air cleaner inlet No.1 x Body		5.0	51	44 in.*lbf
Air cleaner inlet No.2 x Body		5.0	51	44 in.*lbf
Oil cooler assembly x Radiator tank lower		8.3	85	74 in.*lbf
Oil cooler pipe x Oil cooler assembly		15	150	11
Condenser assembly x Radiator assembly		5.4	55	48 in.*lbf

SS

2GR-FE LUBRICATION

SERVICE DATA

Oil pressure		
	at idle speed	80 kPa (0.8 kgf/cm ² , 11.6 psi) or more
	at 6,000 rpm	380 kPa (3.9 kgf/cm ² , 55.5 psi) or more
Oil pump		
Tip clearance	Standard	0.060 to 0.160 mm (0.0024 to 0.0063 in.)
	Maximum	0.16 mm (0.0063 in.)
Side clearance	Standard	0.030 to 0.090 mm (0.0012 to 0.0035 in.)
	Maximum	0.09 mm (0.0035 in.)
Body clearance	Standard	0.250 to 0.325 mm (0.0098 to 0.0128 in.)
	Maximum	0.325 mm (0.0128 in.)

SS

TORQUE SPECIFICATIONS

Part Tightened	N*m	kgf*cm	ft.*lbf
Oil pressure switch x Oil pan sub-assembly	15	153	11
Timing chain cover sub-assembly x Cylinder head and block	Areas 1: Bolt	21	214
	Area 2: Bolt	21	214
	Area 3: Bolt and Nut	21	214
	Area 4: Bolt A	43	438
	Area 4: Except Bolt A	21	214
Oil filter cap x Oil pan sub-assembly	25	255	18
Oil filter drain plug x Oil filter cap	13	127	10
Oil pump cover x Timing chain cover sub-assembly	9.1	93	81 in.*lbf
Oil pump relief valve x Timing chain cover sub-assembly	49	500	36

SS

2GR-FE IGNITION**SERVICE DATA**

Spark plug		
Require spark plug	DENSO made	FK20HR11
Electrode gap	Correct electrode gap for new spark plug	1.0 to 1.1 mm (0.039 to 0.043 in.)
	Maximum electrode gap for used spark plug	1.4 mm (0.055 in.)
VVT sensor (Intake camshaft Bank1)		
Output voltage	VV1+ - VV1-	3.375 to 4.950 V (Hi)
	VV1+ - VV1-	0.450 to 1.375 V (Lo)
VVT sensor (Intake camshaft Bank2)		
Output voltage	VV2+ - VV2-	3.375 to 4.950 V (Hi)
	VV2+ - VV2-	0.450 to 1.375 V (Lo)
Output voltage VVT sensor (Exhaust camshaft Bank1)		
Output voltage	EV1+ - EV1-	3.375 to 4.950 V (Hi)
	EV1+ - EV1-	0.450 to 1.375 V (Lo)
Output voltage VVT sensor (Exhaust camshaft Bank2)		
Output voltage	EV2+ - EV2-	3.375 to 4.950 V (Hi)
	EV2+ - EV2-	0.450 to 1.375 V (Lo)
Output voltage Crankshaft position sensor		
Resistance	Cold	1,630 to 2,740 Ω
	Hot	2,065 to 3,225 Ω

SS

TORQUE SPECIFICATIONS

Part Tightened	N*m	kgf*cm	ft.*lbf
VVT sensor x Cylinder head cover	10	102	7
Crankshaft position sensor x Cylinder block	10	102	7
Spark plug x Cylinder head	18	184	13
Ignition coil x Cylinder head cover	7.5	76	66 in.*lbf

2GR-FE STARTING

SERVICE DATA

Starter assembly		
Specified current		90 A or less at 11.5 V
Starter relay		
Specified condition	3 - 5	10 k Ω or higher
	3 - 5	Below 1 Ω (when battery voltage is applied to terminals 1 and 2)
Engine switch		
Specified condition	7 - 5	10 k Ω or higher (Engine switch OFF)
	2 - 5	10 k Ω or higher (Engine switch OFF)
	7 - 5	Below 1 Ω (Engine switch ON)
	2 - 5	Below 1 Ω (Engine switch ON)
Ignition or starter switch assembly		
Specified condition		10 k Ω or higher (Switch condition LOCK)
	1 - 3	Below 1 Ω (Switch condition ACC)
	1 - 2	Below 1 Ω (Switch condition ON)
	1 - 3	Below 1 Ω (Switch condition ON)
	5 - 6	Below 1 Ω (Switch condition ON)
	1 - 2	Below 1 Ω (Switch condition START)
	4 - 5	Below 1 Ω (Switch condition START)
	5 - 6	Below 1 Ω (Switch condition START)
Starter assembly		
Starter armature assembly		
Commutator depth	Standard	3.1 mm (0.122 in.)
	Maximum	3.8 mm (0.150 in.)
Resistance (between the segments)	Standard	below 1 Ω
Resistance (between the commutator and armature coil core)	Standard	10 k Ω or higher
Starter commutator end frame assembly		
Brush length	Standard	9.0 mm (0.354 in.)
	Maximum	4.0 mm (0.158 in.)
Resistance	Standard	10 k Ω or higher
Repair starter armature assembly		
Snap ring length	Maximum	5.0 mm (0.197 in.)
Service starter kit		
Resistance (between terminals 50 and C)	Standard	below 1 Ω
Resistance (between terminals 50 and swich body)	Standard	below 2 Ω

SS

TORQUE SPECIFICATIONS

Part Tightened	N*m	kgf*cm	ft.*lbf
Starter assembly x Transaxle housing	37	380	26
Starter wire x Starter assembly	9.8	100	87 in.*lbf
Starter commutator end frame assembly x Motor terminal starter kit	5.9	60	52 in.*lbf
Starter drive housing assembly x Repair service starter kit	7.5	76	66 in.*lbf
Lead wire x Repair service starter kit	9.8	100	87 in.*lbf

2GR-FE CHARGING**SERVICE DATA**

Voltage regulator	Regulating voltage	13.2 to 14.8 V
	Standard amperage	10 A or less
Generator assembly		
Generator brush holder assembly		
Brush length	Standard	10.5 mm (0.413 in.)
	Minimum	4.5 mm (0.177 in.)
Generator rotor assembly		
Resistance (between the slip ring)	at 20 °C (68 °F)	2.3 to 2.7 Ω
Resistance (between the slip ring and rotor)	Standard	1 M Ω or higher
Slip ring diameter	Standard	14.2 to 14.4 mm (0.559 to 0.567 in.)
	Minimum	14.0 mm (0.551 in.)

SS

TORQUE SPECIFICATIONS

Part Tightened	N*m	kgf*cm	ft.*lbf
Generator assembly x Generator Bracket	20	204	15
Generator assembly x Wire harness clamp stay	8.4	86	74 in.*lbf
Generator assembly x Cylinder head assembly	43	438	32
Generator assembly x Cylinder block assembly	43	438	32
Generator Bracket x Cylinder block assembly	20	204	15
Generator wire x Generator assembly	9.8	100	87 in.*lbf
Retainer plate x Drive end frame assembly generator	2.3	23	20 in.*lbf
Generator rectifier end frame x Drive end frame assembly generator	5.8	59	51 in.*lbf
Generator brush holder assembly 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 assembly (100A Generator)	111	1,127	82
Generator brush holder assembly x Generator rectifier end frame	1.8	18	16 in.*lbf
Generator rear end cover x Generator regulator end frame	4.6	47	41 in.*lbf
Generator drive end frame x Generator coil assembly	5.8	59	51 in.*lbf
Generator pulley w/ clutch x Generator rotor assembly		110	1,125
	For use with SST	87	891
Generator drive end frame x Bearing retainer	2.3	23	20 in.*lbf

SS

U151E AUTOMATIC TRANSAXLE

SERVICE DATA

U151E (2GR-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 (6.9 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 20.0 kgf/cm ² , 256 to 285 psi)
Engine stall revolution	D and R position	2,250 +- 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.)
Shift schedule (Shift lever with Multi-mode automatic transmission)		
D position		
(Throttle valve fully opened)	1 → 2	46 to 53 km/h (29 to 33 mph)
	2 → 3	91 to 99 km/h (57 to 62 mph)
	3 → 4	147 to 161 km/h (91 to 100 mph)
	4 → 5	220 to 235 km/h (137 to 146 mph)
	5 → 4	211 to 227 km/h (131 to 141 mph)
	4 → 3	142 to 155 km/h (88 to 96 mph)
	3 → 2	86 to 94 km/h (53 to 58 mph)
	2 → 1	32 to 38 km/h (20 to 24 mph)
(Throttle valve fully closed)	4 → 5	67 to 74 km/h (42 to 46 mph)
	5 → 4	37 to 43 km/h (23 to 27 mph)
Manual down shift speed		
D position		
3rd gear	→ 3	147 to 161 km/h (91 to 100 mph)
2nd gear	→ 2	91 to 99 km/h (57 to 62 mph)
1st gear	→ 1	39 to 45 km/h (24 to 28 mph)
Lock-up point	Throttle valve opening 5 %	
D position		
5th gear	Lock-up ON	67 to 74 km/h (42 to 46 mph)
	Lock-up OFF	64 to 71 km/h (40 to 44 mph)
4th gear	Lock-up ON	98 to 106 km/h (61 to 66 mph)
	Lock-up OFF	95 to 103 km/h (59 to 64 mph)
Frex lock-up point	Throttle valve opening 5 %	
D position		
5th gear	Frex lock-up ON	56 to 63 km/h (35 to 40 mph)
	Frex lock-up OFF	55 to 62 km/h (34 to 39 mph)

U151E (2GR-FE)		
4th gear	Frex lock-up ON	41 to 48 km/h (25 to 30 mph)
	Frex lock-up OFF	40 to 46 km/h (25 to 29 mph)

TORQUE SPECIFICATIONS

Part Tightened		N*m	kgf*cm	ft.*lbf
Park/neutral position switch	Bolt	5.4	55	48 in.*lbf
	Nut	6.9	70	61 in.*lbf
Control shaft lever x Control shaft		13	130	9
Shift control cable x Control shaft lever		15	153	11
Transaxle housing x Engine block	A bolt	64	650	47
	B bolt	46	470	34
	C bolt	43	438	32
Torque converter clutch x Drive plate		41	418	30
Flywheel housing under cover x Transaxle		7.8	80	69 in.*lbf
Engine mounting bracket 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		5.5	56	49 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 assembly		9.8	100	87 in.*lbf
Wire harness x Transaxle		13	139	9
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	115	8
Drain plug x Oil pan		49	500	36
Transmission wire x Transaxle		5.4	55	48 in.*lbf
ATF temperature sensor x Valve body		6.6	67	58 in.*lbf
Oil pan x Transaxle		7.8	80	69 in.*lbf
Solenoid valve x Valve body	A, 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 assembly x Body		12	122	9
Control cable x Body		5.0	50	43 in.*lbf

SS

DRIVE SHAFT**SERVICE DATA**

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

TORQUE SPECIFICATIONS

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	3,000	217
Front drive shaft center bearing set bolt	32	330	24
Front speed sensor set bolt	8.0	82	71 in.*lbf
Front flexible hose and speed sensor wire harness x Shock absorber	19	192	14
Stabilizer link assembly x Shock absorber	74	755	55
Steering knuckle x Front disc brake caliper	107	1,090	79
Automatic transaxle Drain plug x Oil pan (U151E)	49	500	36
Automatic transaxle Drain plug x Oil pan (U241E)	49	500	36

SS

AXLE

SERVICE DATA

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

TORQUE SPECIFICATIONS

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	3,000	217
Front drive shaft center bearing set bolt	32	330	24
Front speed sensor set bolt	8.0	82	71 in.*lbf
Front flexible hose and speed sensor wire harness x Shock absorber	19	192	14
Stabilizer link assembly x Shock absorber	74	755	55
Steering knuckle x Front disc brake caliper	107	1,090	79
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 Rear disc brake caliper	62	632	46

SS

Rear wheel alignment	Toe-in (total)		0°24' 12" (0.40° +- 0.20°), 4 +- 2 mm (0.16 +- 0.08 in.)
	No. 2 lower suspension arm length difference		1.5 mm (0.06 in.) or less
	Camber	XL:	-1°09' +- 45' (-1.15°+- 0.75°)
		TOURING:	-1°13' +- 45' (-1.22° +- 0.75°)
		XLS:	-1°13' +- 45' (-1.22° +- 0.75°)
		LIMITED:	-1°15' +- 45' (-1.25° +- 0.75°)
Right-left error:		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



TORQUE SPECIFICATIONS

Part Tightened	N*m	kgf*cm	ft.*lbf
Tie rod end lock nut	74	755	55
Steering knuckle x Shock absorber	210	2,140	155
Hub nut	103	1,050	76
Suspension support x Body	85	867	63
Suspension support x Piston rod	49	500	36
Speed sensor wire harness bracket set bolt	19	192	14
Lower suspension arm set bolt (Front side)	200	2,040	148
Lower suspension arm set bolt (Rear side)	206	2,100	152
Transverse engine engine mounting insulator set nut	87	887	64
Stabilizer bar bracket x Suspension member	19	194	14
Stabilizer bar link set nut	74	755	55
Lower Ball Joint Assembly Front x Suspension Arm Lower	75	765	55
Shock absorber with coil spring x Body	39	400	29
Shock absorber with coil spring x Rear axle carrier	255	2,600	188
Flexible hose x Shock absorber with coil spring	19	195	14
Skid control sensor wire x Shock absorber with coil spring	5.5	56	49 in.*lbf
Shock absorber piston rod set nut	49	500	36
Shock absorber with coil spring x Stabilizer link	39	400	29
Rear suspension member x Rear suspension arm assembly No. 1	100	1,020	74
Rear suspension member x Rear suspension arm assembly No. 2	100	1,020	74
Rear suspension member x Body (A, B)	55	561	41
Rear suspension member x Body (C)	38	387	28
Rear suspension arm assembly No. 1 x Rear axle carrier	100	1,020	74
Rear suspension arm assembly No. 2 x Rear axle carrier	100	1,020	74
Stabilizer bar bracket set bolt	19	195	14
Stabilizer bar x Stabilizer link	39	400	29
Strut rod x Body	113	1,150	83
Strut rod x Rear axle carrier	113	1,150	83
Parking brake cable x Body	6.0	61	53 in.*lbf
Hub nut	103	1,050	76
Rear suspension arm assembly No. 2 x Lock nut	56	570	41
Rear suspension arm assembly No. 2 x Height control sensor sub-assembly	5.4	55	48 in.*lbf

TIRE AND WHEEL**SERVICE DATA**

Cold tire inflation pressure	Tire size: 215/60R16 93V	Front, Rear	200 kPa (2.0 kgf/cm ² , 29 psi)
	Tire size: 215/55R17 93V	Front, Rear	220 kPa (2.2 kgf/cm ² , 32 psi)

Tire runout	1.4 mm (0.055 in.) or less
Imbalance after adjustment	8.0 g (0.018 lb) or less

BRAKE CONTROL

TORQUE SPECIFICATIONS

Part Tightened	N*m	kgf*cm	ft.*lbf
Brake line union nut	15	155	11
Wheel nut	103	1,050	76
Brake actuator assembly x Actuator bracket (without vsc)	8.0	82	71 in.*lbf
Brake actuator bracket x Body (without vsc)	19	194	14
Brake actuator assembly x Actuator bracket (with vsc)	5.4	55	48 in.*lbf
Brake actuator bracket x Body (with vsc)	19	194	14
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
Front speed sensor wire harness clamp x shock absorber (Bolt B)	19	192	14
Rear axle hub set bolt	80	816	59
Yaw rate sensor x Body	14	143	10

SS

BRAKE**SERVICE DATA**

Brake pedal height (from asphalt sheet)	143.3 to 153.3 mm (5.641 to 6.035 in.)
Brake pedal free play	Pedal free play: 1.0 to 6.0 mm (0.039 to 0.236 in.)
Stop light switch clearance	0.5 to 2.5 mm (0.020 to 0.098 in.)
Pedal reserve distance from asphalt sheet at 490 N (50 kgf, 110 lbf)	More than 77.0 mm (3.0 in.)
Brake booster push rod to piston clearance (with SST)	Clearance: 0 mm (0 in.)
Front brake pad thickness	Standard thickness: 12.0 mm (0.472 in.) Minimum thickness: 1.0 mm (0.039 in.)
Front brake disc thickness	Standard thickness: 28.0 mm (1.102 in.) Minimum thickness: 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: 10.0 mm (0.394 in.) Minimum thickness: 1.0 mm (0.039 in.)
Rear brake disc thickness	Standard thickness: 12.0 mm (0.472 in.) Minimum thickness: 10.5 mm (0.413 in.)
Rear brake disc runout	Maximum disc runout: 0.15 mm (0.0059 in.)

SS

TORQUE SPECIFICATIONS

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-assembly set bolt	37	375	27
Brake pedal support assembly x Reinforcement	20	204	15
Brake pedal support assembly x Body	13	130	9
Brake master cylinder x Brake booster	13	130	9
Brake line union nut	15	155	11
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	62	630	46
Rear disc brake cylinder side pin x Rear disc brake cylinder mounting	43	440	32
Rear disc brake cylinder x Flexible hose	29	300	22

SS

PARKING BRAKE**SERVICE DATA**

Parking brake pedal travel at 300 N (31 kgf, 67.5 lbf)	9 to 11 notches	
Rear brake disc inside diameter	Standard	170 mm (6.69 in.)
	Maximum	171 mm (6.73 in.)
Parking brake shoe lining thickness	Standard	2.0 mm (0.079 in.)
	Maximum	1.0 mm (0.039 in.)
Parking brake shoe clearance between rear shoe and lever	Less than 0.35 mm (0.0138 in.)	

SS

TORQUE SPECIFICATIONS

Part Tightened		N*m	kgf*cm	ft.*lbf
Wheel nut		103	1,050	76
Parking brake cable No. 1 lock nut		5.4	55	48 in.*lbf
Parking brake control pedal x Body		39	398	29
Parking brake switch set screw		0.9	9	7.8 in.*lbf
Parking brake cable No. 1 x Body	Nut	5.4	55	48 in.*lbf
	Bolt	13	128	9
Parking brake cable No. 1 x Parking brake cable No. 4		5.4	55	48 in.*lbf
Parking brake cable No. 3 x Body	Nut	6.0	61	53 in.*lbf
	Bolt A	8.5	87	75 in.*lbf
	Bolt B	6.0	61	53 in.*lbf
Parking brake cable No. 3 x Backing plate		8.0	82	71 in.*lbf
Rear disc brake caliper assembly LH set bolt		62	630	46

SS

STEERING COLUMN

SERVICE DATA

STEERING SYSTEM		
Steering wheel freeplay	Maximum	30 mm (1.18 in.)



TORQUE SPECIFICATIONS

Part Tightened	N*m	kgf*cm	ft*lbf
Sliding yoke x Steering intermediate shaft	35	360	26
Sliding yoke x Steering column assembly	35	360	26
Steering column assembly set bolt	21	210	15
Steering wheel set nut	50	510	37
Steering wheel pad set screw (Torx screw)	8.8	90	78 in.*lbf

SS

POWER STEERING

SERVICE DATA

POWER STEERING FLUID		
Fluid level rise	Maximum	5 mm (0.20 in.)
Fluid pressure at idle speed with valve closed		7,300 to 7,800 kPa (75 to 80 kgf/cm ² , 1,067 to 1,138 psi)
STEERING WHEEL		
Steering effort at idle speed	(Reference)	6.0 N*m (60 kgf*cm, 53 in.*lbf)
VANE PUMP ASSEMBLY		
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	0.021 to 0.043 mm (0.0008 to 0.017 in.)
	Maximum	0.07 mm (0.0028 in.)
Vane plate thickness	Minimum	1.405 mm (0.0553 in.)
Clearance between the rotor groove and plate	Maximum	0.03 mm (0.0012 in.)
Spring free length	Minimum	36.9 mm (1.453 in.)
RACK & PINION POWER STEERING GEAR ASSEMBLY		
Steering rack runout	Maximum	0.1 mm (0.004 in.)
Tie rod assembly stad bolt torque	(Turning)	0.49 to 3.43 N*m (5.0 to 35.0 kgf*cm, 4.34 to 30.38 in.*lbf)
Total preload (Control valve rotating torque)	(Turning)	1.0 to 1.8 N*m (10 to 18 kgf*cm, 8.6 to 15.7 in.*lbf)
Rack boot clamp clearance		2.0 mm (0.079 in.) or less

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TORQUE SPECIFICATIONS

Part tightened	N*m	kgf*cm	ft*lbf
VANE PUMP ASSEMBLY			
Vane pump housing rear x Vane pump housing front	22	220	16
Power steering oil pressure switch	21	210	15
Pressure port union sub-assembly	69	700	51
Power steering suction port union set bolt	12	120	9
Vane pump assembly x Pump bracket rear	37	380	27
Vane pump assembly set bolt	37	380	27
Pressure feed tube assembly x Vane pump assembly	41 (44)	420 (450)	30 (33)
Pressure feed tube assembly clamp set bolt	7.8	80	69 in.*lbf
RACK & PINION POWER STEERING GEAR ASSEMBLY			
Engine hanger set bolt	38	390	28
Control valve housing set bolt	18	185	13
Control valve shaft lock nut	25	250	18
Rack housing cap	59	600	43
Rack guide spring cap lock nut	43 (59)	400 (600)	32 (43)
Rack x Rack end sub-assembly	62 (83)	630 (850)	46 (61)
Turn pressure tube union nut	12 (13)	120 (130)	9 (9)
Tie rod end sub-assembly lock nut	74	750	54
Rack & pinion power steering gear assembly set bolt (2WD)	58	590	43
Rack & pinion power steering gear assembly set bolt (4WD)	82	835	60
Steering intermediate shaft x Control valve pinion shaft	35	360	26
Front suspension crossmember sub-assembly x Frame (Bolt A)	157	1,600	116
Front suspension crossmember sub-assembly x Frame (Bolt B)	113	1,152	83
Crossmember x Engine mounting insulator RR	52	530	38
Center member x Frame	60	612	44
Center member x Engine mounting insulator FR	52	530	38
Front suspension arm sub-assembly lower No. 1 x Lower ball joint	89	910	66
Front stabilizer link assembly set nut	74	750	55
Pressure feed tube assembly x Rack & pinion steering gear assembly	23 (25)	235 (255)	17 (18)
Steering gear outlet return tube x Rack & pinion steering gear assembly	23 (25)	235 (255)	17 (18)
Pressure feed tube clamp set bolt	7.8	80	69 in.*lbf
Tie rod end sub-assembly x Steering knuckle	49	500	36
Steering intermediate shaft assembly No. 2 set bolts	35	360	26
Front wheel set nut	103	1,050	76

(): For use without SST

AIR CONDITIONING

SERVICE DATA

Refrigerant charge volume	Standard: 450 to 550 (15.9 to 19.4 oz.)
Magnetic clutch clearance	0.26 to 0.60 mm (0.010 to 0.024 in.)

TORQUE SPECIFICATIONS

Part Tightened	N*m	kgf*cm	ft*lbf
AIR CONDITIONING UNIT			
Air conditioner unit assembly x Body	9.8	100	87 in.*lbf
Instrument panel reinforcement assembly x Air conditioner unit assembly	9.8	100	87 in.*lbf
Instrument panel reinforcement assembly x Body (Driver seat)	17	173	13
Instrument panel reinforcement assembly x Body (Passenger seat)	6.0	61	53 in.*lbf
Instrument panel reinforcement assembly x Body (Passenger seat)	20	204	15
Suction Hose sub-assembly x Air conditioner unit assembly	9.8	100	87 in.*lbf
BLOWER UNIT			
Cooler evaporator sub-assembly x Cooler expansion Valve	3.5	35	30 in.*lbf
Air conditioner unit assembly x Body	9.8	100	87 in.*lbf
Instrument panel reinforcement assembly x Air conditioner unit assembly	9.8	100	87 in.*lbf
Instrument panel reinforcement assembly x Body (Driver seat)	17	173	13
Instrument panel reinforcement assembly x Body (Passenger seat)	6.0	61	53 in.*lbf
Instrument panel reinforcement assembly x Body (Passenger seat)	20	204	15
Suction Hose sub-assembly x Air conditioner unit assembly	9.8	100	87 in.*lbf
COMPRESSOR AND MAGNETIC CLUTCH			
Magnet clutch hub x Cooler compressor assembly	18	184	13
Compressor and magnet clutch x Engine	25	250	18
Cooler refrigerant discharge hose No. 1 x Compressor and magnet clutch	9.8	100	87 in.*lbf
Suction hose sub-assembly x Compressor and magnet clutch	9.8	100	87 in.*lbf
CONDENSER			
Radiator assembly x Cooler condenser assembly	5.0	51	44 in.*lbf
Cooler refrigerant discharge hose No. 1 x Cooler condenser assembly	9.8	100	87 in.*lbf
Air conditioner tube & accessory x Cooler condenser assembly	9.8	100	87 in.*lbf

SUPPLEMENTAL RESTRAINT SYSTEM

TORQUE SPECIFICATIONS

Part Tightened	N*m	kgf*cm	ft*lbf
Steering pad x Steering wheel assembly	8.8	90	78 in.*lbf
Front passenger airbag assembly x Instrument panel reinforcement	20	204	15
Curtain shield airbag assembly x Body	13	133	10
Curtain shield airbag assembly x Body	11	112	8
Driver side knee airbag assembly x Instrument panel reinforcement	10	102	7
Center airbag sensor assembly x Body	17.5	179	13
Front airbag sensor x Body	17.5	179	13
Side airbag sensor x Body	9.0	92	80 in.*lbf
Rear airbag sensor x Body	9.0	92	80 in.*lbf
Seat position airbag sensor x Front LH seat assembly	8.0	82	71 in.*lbf

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SEAT BELT**TORQUE SPECIFICATIONS**

Part Tightened	N*m	kgf*cm	ft.*lbf
Front seat x Body	37	377	27
Front seat inner belt assembly x Front seat	42	428	31
Front seat outer belt assembly (For upper bolt) x Body	5.5	56	49 in.*lbf
Front seat outer belt assembly (For lower bolt) x Body	42	428	31
Front seat outer belt assembly (Shoulder anchor) x Front shoulder belt anchor adjuster assembly	42	428	31
Front seat outer belt assembly (Floor side) x Body	42	428	31
Rear seat x Body	18	184	13
Rear seat inner with center belt assembly RH x Body	42	428	31
Rear seat inner with center belt assembly LH x Body	42	428	31
Rear seat inner with center belt assembly RH (Floor side) x Body	42	428	31
Rear seat outer belt assembly (Floor side) x Body	42	428	31

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CRUISE CONTROL

TORQUE SPECIFICATIONS

Part Tightened	N*m	kgf*cm	ft.*lbf
Distance control ECU x Body	5	51	44 in.*lbf

LIGHTING**TORQUE SPECIFICATIONS**

Part Tightened		N*m	kgf*cm	ft.*lbf
HEIGHT CONTROL SENSOR SUB-ASSEMBLY REAR LH				
Height control sensor sub-assembly rear LH x Rear suspension arm	Nut:	5.4	55	48 in.*lbf
Height control sensor sub-assembly rear LH x Rear suspension member	Nut:	8.0	81	71 in.*lbf

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WIPER AND WASHER

TORQUE SPECIFICATIONS

Part Tightened	N*m	kgf*cm	ft.*lbf
Windshield wiper motor assembly x Windshield wiper link assembly	7.5	76	66 in.*lbf
Windshield wiper motor & link assembly x Body	7.0	71	62 in.*lbf
FR wiper arm & blade assembly LH x Windshield wiper link assembly	20	209	15
FR wiper arm & blade assembly RH x Windshield wiper link assembly	20	209	15

HORN

TORQUE SPECIFICATIONS

Part Tightened	N*m	kgf*cm	ft.*lbf
Low pitched horn x Body	20	204	15
High pitched horn x Body	20	204	15

INSTRUMENT PANEL

TORQUE SPECIFICATIONS

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



SEAT

TORQUE SPECIFICATIONS

Part Tightened	N*m	kgf*cm	ft*lbf
FRONT SEAT ASSEMBLY (POWER SEAT TYPE)			
Seat position airbag sensor x Seat adjuster assembly	8.0	82	71 in.*lbf
Seatback cover bracket x Seat adjuster assembly (w/ Side airbag)	5.5	56	49 in.*lbf
Front seat Inner belt assembly LH x Seat adjuster assembly	42	428	31
Front seat assembly LH x Body	37	377	27
FRONT SEAT ASSEMBLY (MANUAL SEAT TYPE)			
Seat position airbag sensor x Seat adjuster assembly	8.0	82	71 in.*lbf
Seatback cover bracket x Seat adjuster assembly (w/ Side airbag)	5.5	56	49 in.*lbf
Front seat Inner belt assembly RH x Seat adjuster assembly	42	428	31
Front seat assembly RH x Body	37	375	27
REAR SEAT ASSEMBLY			
Reclining adjuster arm sub-assembly RH x Body	18	184	13
Reclining adjuster arm sub-assembly LH x Body	18	184	13
Rear seat center armrest bracket assembly x Rear seat armrest assembly center	8.3	85	74 in.*lbf
Rear seat center armrest bracket assembly x Rear seat armrest assembly center	5.4	55	49 in.*lbf
Rear seatback assembly LH x Body	18	184	13
Rear seatback assembly RH x Body	18	184	13

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ENGINE HOOD / DOOR

TORQUE SPECIFICATIONS

Part Tightened	N*m	kgf*cm	ft*lbf
HOOD			
Hood x Hood hinge	13	133	10
FRONT DOOR			
Front door check assembly (door panel side bolt) x Door panel	5.5	56	49 in.*lbf
Front door outside handle frame sub-assembly x Door panel	4.0	41	35 in.*lbf
Front door lock assembly x Door panel	5.0	51	44 in.*lbf
Front door outside handle cover installation bolt (torx)	4.0	41	35 in.*lbf
Front door frame sub-assembly rear lower x Door panel	6.2	63	55 in.*lbf
Power window regulator motor assembly x Front door window regulator	5.4	55	48 in.*lbf
Front door window regulator sub-assembly x Door panel	8.0	82	71 in.*lbf
Front door glass sub-assembly x Front door window regulator sub-assembly	8.0	82	71 in.*lbf
Front door hinge x Body	26	265	19
Front door hinge x Door panel	26	265	19
Front door lock striker x Body	23	235	17
Outer rear view mirror assembly x Door panel	8.0	82	71 in.*lbf
REAR DOOR			
Power window regulator motor assembly x Rear door window regulator	5.4	55	48 in.*lbf
Rear door check assembly (door panel side bolt) x Door panel	5.5	56	49 in.*lbf
Rear door outside handle frame sub-assembly x Door panel	4.0	41	35 in.*lbf
Rear door outside handle cover installation bolt (torx)	4.0	41	35 in.*lbf
Rear door lock assembly x Door panel	5.0	51	44 in.*lbf
Rear door window regulator sub-assembly x Door panel	8.0	82	71 in.*lbf
Rear Door window division bar x Door panel (Bolt A)	6.2	63	55 in.*lbf
Rear door hinge x Body	26	265	19
Rear door hinge x Door panel	26	265	19
Rear door lock striker x Body	23	235	17
BACK DOOR			
Back door lock assembly x Door panel	7.0	71	62 in.*lbf
Back door outside handle x Door panel	4.0	41	35 in.*lbf
Back door outside garnish sub-assembly x Door panel	4.0	41	35 in.*lbf
Back door hinge x Body	19.5	199	14
Back door hinge x Door panel	19.5	199	14
Back door lock striker x Body	11.5	117	8.5

EXTERIOR**TORQUE SPECIFICATIONS**

Part Tightened	N*m	kgf*cm	ft*lbf
FRONT BUMPER			
Front bumper reinforcement x Body	92	938	68
Front bumper cover x Body	23	235	17
Radiator grille x Body	23	235	17
REAR BUMPER			
Rear bumper mounting bracket x Body	55	560	41
Rear bumper reinforcement x Body	55	560	41
Rear bumper cover x Body	6.0	61	53 in.*lbf

SS

SLIDING ROOF**TORQUE SPECIFICATIONS**

Part Tightened	N*m	kgf*cm	ft*lbf
Sliding roof glass assembly x Drive cable	4.5	46	40 in.*lbf
Sliding roof housing sub-assembly x Body	5.4	55	49 in.*lbf
Sliding roof housing sub-assembly x Sliding roof piece sub-assembly	2.0	20	18 in.*lbf
Sliding roof housing sub-assembly x Sliding roof drive gear sub-assembly	5.4	55	49 in.*lbf