



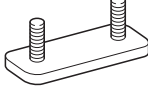
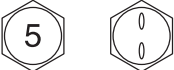





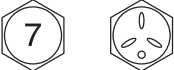













STANDARD BOLT

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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

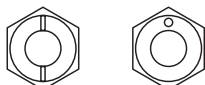

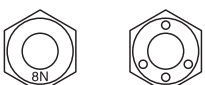





SPECIFIED TORQUE FOR STANDARD BOLTS

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

1NZ-FXE ENGINE CONTROL SYSTEM

SERVICE DATA

Camshaft timing oil control valve - Standard resistance	Terminals 1 - 2 at 20°C (68°F)	-	6.9 to 7.9 Ω
Camshaft position sensor - Standard resistance	Terminals 1 - 2 Cold	The terms "Cold" and "Hot" refer to the temperature of the sensor. "Cold" means approximately -10 to 50°C (14 to 122°F). "Hot" means approximately 50 to 100°C (122 to 212°F).	1,630 to 2,740 Ω
	Terminals 1 - 2 Hot		2,065 to 3,225 Ω
Crankshaft position sensor - Standard resistance	Terminals 1 - 2 Cold	The terms "Cold" and "Hot" refer to the temperature of the sensor. "Cold" means approximately -10 to 50°C (14 to 122°F). "Hot" means approximately 50 to 100°C (122 to 212°F).	985 to 1,600 Ω
	Terminals 1 - 2 Hot		1,265 to 1,890 Ω
Engine coolant temperature sensor - Standard resistance	Terminals 1 - 2 at 20°C (68°F)	-	2.32 to 2.59 Ω
	Terminals 1 - 2 at 80°C (176°F)	-	0.310 to 0.326 Ω
Throttle body (throttle control motor) - Standard resistance	Terminals 1 - 2 at 25 °C (77°F)	-	50 MΩ or more
Throttle body (throttle position sensor) - Standard resistance	Terminals 1 - 4 at 25 °C (77°F)	-	1.2 to 3.5 kΩ
Knock sensor - Standard resistance	Terminals 1 - 2 at 20°C (68°F)	-	120 to 280 kΩ
EFI relay - Standard resistance	Terminals 3I-5 - 3I-8	-	10 kΩ or higher
	Terminals 3I-5 - 3I-8	When battery voltage is applied to terminals 3I-6 and 3I-7)	Below 1 Ω
Circuit opening relay - Standard resistance	Terminals 3G-5 - 3G-8	-	10 kΩ or higher
	Terminals 3G-5 - 3G-8	When battery voltage is applied to terminals 3G-6 and 3G-7)	Below 1 Ω

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TORQUE SPECIFICATIONS

Camshaft timing oil control valve

Part Tightened	N*m	kgf*cm	ft.*lbf
Camshaft timing oil control valve x Cylinder head	7.5	76	66 in.*lbf

Camshaft position sensor

Part Tightened	N*m	kgf*cm	ft.*lbf
Camshaft position sensor x Cylinder head	7.5	76	66 in.*lbf

Crankshaft position sensor

Part Tightened	N*m	kgf*cm	ft.*lbf
Crankshaft position sensor x Cylinder block	7.5	76	66 in.*lbf

Engine coolant temperature sensor

Part Tightened	N*m	kgf*cm	ft.*lbf
Engine coolant temperature sensor x Cylinder head	20	204	15

Throttle body

Part Tightened	N*m	kgf*cm	ft.*lbf
Throttle with motor body x Intake manifold	20	204	15
Air cleaner x Cylinder head cover	7.0	71	62 in.*lbf
Air cleaner x Throttle with motor	3.0	31	27 in.*lbf
No. 1 air cleaner inlet x Air cleaner	3.0	31	27 in.*lbf

Knock sensor

Part Tightened	N*m	kgf*cm	ft.*lbf
knock sensor x Cylinder block	20	204	15
Intake manifold x Cylinder head	20	204	15
Harness clamp x Intake manifold	9.0	92	80 in.*lbf
Oil dipstick guide x Intake manifold	9.0	92	80 in.*lbf

ECM

Part Tightened	N*m	kgf*cm	ft.*lbf
ECM x Hybrid vehicle control ECU	3.0	31	80 in.*lbf
ECM x Body	3.0	31	80 in.*lbf

1NZ-FXE ENGINE MECHANICAL

SERVICE DATA

Drive belt	New drive belt deflection : Pressing force: 98 N (10 kgf, 22lbf)	9.0 to 12.0 mm (0.35 to 0.47 in.)
	Used drive belt deflection : Pressing force: 98 N (10 kgf, 22lbf)	11.0 to 15.0 mm (0.43 to 0.59 in.)
	New drive belt tension	392 to 588 N (40 to 60 kgf, 88 to 132 lb)
	Used drive belt tension	196 to 392 N (20 to 40 kgf, 44 to 88 lb)
Ignition timing		8 to 12° BTDC
Idle speed		950 to 1050 rpm
Compression	Standard pressure	882 kPa (9.0 kgf/cm ² 128 psi)
	Minimum pressure	686 kPa (7.0 kgf/cm ² 99 psi)
	Difference between each cylinder	Within 98 kPa (1.0kgf/cm ² 14 psi)
Valve clearance (cold)	Intake	0.17 to 0.23 mm (0.007 to 0.009 in.)
	Exhaust	0.27 to 0.33 mm (0.011 to 0.013 in.)
Chain	Maximum elongation chain length at 16 links	124.2 mm (4.890 in.)
Camshaft timing gear	Minimum diameter (w / chain)	96.2 mm (3.787 in.)
Camshaft timing sprocket	Minimum diameter (w / chain)	96.2 mm (3.787 in.)
Chain tensioner slipper	Maximum wear	1.0 mm (0.039 in.)
Chain vibration damper	Maximum wear	1.0 mm (0.039 in.)
Cylinder head bolt	Standard length	142.8 to 144.2 mm (5.622 to 5.677 in.)
	Maximum length	147.1 mm (5.791 in.)
Cylinder head	Maximum Cylinder block side warpage	0.05 mm (0.0020 in.)
	Intake manifold side warpage	0.10 mm (0.0039 in.)
	Exhaust manifold side warpage	0.10 mm (0.0039 in.)
	Camshaft bearing cap setting ring pin protrusion height	8.5 to 9.5 mm (0.335 to 0.374 in.)
Intake valve	Standard overall length	89.25 mm (3.5138 in.)
	Minimum overall length	88.95 mm (3.5020 in.)
	Standard valve stem diameter	4.970 to 4.985 mm (0.1957 to 0.1963 in.)
	Standard valve margin thickness	1.0 mm (0.039 in.)
	Minimum valve margin thickness	0.7 mm (0.028 in.)
Exhaust valve	Standard overall length	87.90 mm (3.4606 in.)
	Minimum overall length	87.60 mm (3.4488 in.)
	Standard valve stem diameter	4.965 to 4.980 mm (0.1955 to 0.1961 in.)
	Standard valve margin thickness	1.15 mm (0.0453 in.)
	Minimum valve margin thickness	0.85 mm (0.0335 in.)
Valve spring	Standard free length	59.77 mm (2.3531 in.)
	Maximum spring deviation	1.6 mm (0.063 in.)
	Maximum spring angle (reference)	2°
	Standard spring installed tension at 32.5 mm (1.280 in.)	140 to 154 N (14.2 to 15.7 kgf, 31.5 to 34.6 lbf)
	Maximum spring working tension at 25.1 mm (0.988 in.)	180 to 198 N (18.4 to 20.2 kgf, 40.5 to 44.5 lbf)

Valve guide bushing	Standard inside diameter	5.010 to 5.030 mm (0.1972 to 0.1980 in.)
	Intake: Standard oil clearance	0.025 to 0.060 mm (0.0010 to 0.0024 in.)
	Intake: Maximum oil clearance	0.08 mm (0.0031 in.)
	Exhaust: Standard oil clearance	0.030 to 0.065 mm (0.0012 to 0.0026 in.)
	Exhaust: Maximum oil clearance	0.10 mm (0.0039 in.)
	Standard: Standard guide bush diameter	9.685 to 9.706 mm (0.3813 to 0.3821 in.)
	O/S: Standard guide bush diameter	9.735 to 9.755 mm (0.3833 to 0.3841 in.)
	Protrusion height	9.0 to 9.4 mm (0.354 to 0.370 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	0.10 mm (0.0039 in.)
Camshaft	Maximum circle runout	0.03 mm (0.0012 in.)
	Standard cam lobe height	42.310 to 42.410 mm (1.6657 to 1.6697 in.)
	Minimum cam lobe height	42.16 mm (1.6598 in.)
	No. 1 journal diameter	34.449 to 34.465 mm (1.3563 to 1.3569 in.)
	Other journals diameter	22.949 to 22.965 mm (0.9035 to 0.9041 in.)
	Standard thrust clearance	0.040 to 0.095 mm (0.0016 to 0.0037 in.)
	Maximum thrust clearance	0.11 mm (0.0043 in.)
	Standard oil clearance	0.040 to 0.095 mm (0.0016 to 0.0037 in.)
	Maximum oil clearance	0.115 mm (0.0045 in.)
No. 2 camshaft	Maximum circle runout	0.03 mm (0.0012 in.)
	Standard cam lobe height	44.046 to 44.146 mm (1.7341 to 1.7380 in.)
	Minimum cam lobe height	43.90 mm (1.7283 in.)
	No. 1 journal diameter	34.449 to 34.465 mm (1.3563 to 1.3569 in.)
	Other journals diameter	22.949 to 22.965 mm (0.9035 to 0.9041 in.)
	Standard thrust clearance	0.040 to 0.095 mm (0.0016 to 0.0037 in.)
	Maximum thrust clearance	0.11 mm (0.0043 in.)
	Standard oil clearance	0.040 to 0.095 mm (0.0016 to 0.0037 in.)
	Maximum oil clearance	0.115 mm (0.0045 in.)
Cylinder block	Maximum warpage	0.05 mm (0.0020 in.)
	Standard bore diameter	75.000 to 75.133 mm (2.9528 to 2.9580 in.)
	End plate straight pin protrusion	11.5 to 12.5 mm (0.453 to 0.492 in.)
	Oil pan straight pin protrusion	8.5 to 9.5 mm (0.335 to 0.374 in.)
	Cylinder head set straight pin protrusion	8.5 to 9.5 mm (0.335 to 0.374 in.)
	Chain tensioner straight pin protrusion	18.5 to 19.5 mm (0.728 to 0.768 in.)
	Oil pump set ring pin protrusion	3.5 to 4.5 mm (0.138 to 0.177 in.)
Connecting rod	Standard thrust clearance	0.16 to 0.36 mm (0.0063 to 0.0142 in.)
	Maximum thrust clearance	0.36 mm (0.0142 in.)
	Standard oil clearance	0.016 to 0.040 mm (0.0006 to 0.0016 in.)
	Maximum oil clearance	0.06 mm (0.0024 in.)
	Maximum out-of alignment	0.05 mm (0.0020 in.) per 100 mm (3.94 in.)
	Maximum twist	0.05 mm (0.0020 in.) per 100 mm (3.94 in.)
Inside diameter	17.965 to 17.985 mm (0.7073 to 0.7081 in.)	

Piston	Diameter	74.941 to 74.979 mm (2.9504 to 2.9519 in.)
	Pin hole diameter at 20 °C (68°F)	18.013 to 18.016 mm (0.7092 to 0.7093 in.)
	Pin diameter	18.001 to 18.004 mm (0.7087 to 0.7088 in.)
	Standard pin oil clearance	0.009 to 0.015 mm (0.0004 to 0.0006 in.)
	Maximum pin oil clearance	0.050 mm (0.0020 in.)
	Standard piston clearance	0.045 to 0.068 mm (0.0018 to 0.0027 in.)
	Maximum piston clearance	0.08 mm (0.0032 in.)
Piston ring	No. 1: Groove clearance	0.02 to 0.07 mm (0.0008 to 0.0028 in.)
	No. 2: Groove clearance	0.02 to 0.06 mm (0.0008 to 0.0024 in.)
	Oil: Groove clearance	0.02 to 0.06 mm (0.0008 to 0.0024 in.)
	No. 1: Standard end gap	0.20 to 0.30 mm (0.0079 to 0.0118 in.)
	No. 1: Maximum end gap	0.61 mm (0.0240 in.)
	No. 2: Standard end gap	0.30 to 0.45 mm (0.0118 to 0.0177 in.)
	No. 2: Maximum end gap	1.20 mm (0.0472 in.)
	Oil: Standard end gap	0.10 to 0.40 mm (0.0039 to 0.0158 in.)
	Oil: Maximum end gap	1.15 mm (0.0453 in.)
Connecting rod bolt	Standard diameter	6.6 to 6.7 mm (0.260 to 0.264 in.)
	Maximum diameter	6.4 mm (0.252 in.)
Crankshaft	Maximum circle runout	0.03 mm (0.0012 in.)
	Main journal diameter	45.988 to 46.000 mm (1.8106 to 1.8110 in.)
	Main journal taper and out-of-round	0.02 mm (0.0008 in.)
	Crank pin diameter	39.992 to 40.000 mm (1.5745 to 1.5748 in.)
	Maximum crank pin taper and out-of-round	0.02 mm (0.0008 in.)
	Standard: Crankshaft timing sprocket diameter (w/ chain)	51.72 mm (2.0362 in.)
	Maximum: Crankshaft timing sprocket diameter (w/ chain)	50.5 mm (1.988 in.)
	Standard oil clearance	0.01 to 0.023 mm (0.0004 to 0.0009 in.)
	Maximum oil clearance	0.07 mm (0.0028 in.)
Crankshaft bearing cap set bolt	Standard diameter	7.3 to 7.5 mm (0.287 to 0.295 in.)
	Minimum diameter	7.3 mm (0.287 in.)

TORQUE SPECIFICATIONS

Part Tightened	N*m	kgf*cm	ft.*lbf
Spark plug x Cylinder head	18	184	13
Ignition coil x Cylinder head cover	9.0	92	80 in.*lbf
Idler pulley x Adjust bolt	40	408	30
No. 1 air cleaner inlet x Clamp	3.0	31	27
No. 2 camshaft bearing cap x Cylinder head	13	130	9.6
No. 1 camshaft bearing cap x Cylinder head	23	235	17
Camshaft timing sprocket x No. 2 camshaft	64	653	47
Screw plug x Timing chain cover	15	153	11
Chain vibration damper x Cylinder block	9.0	92	80 in.*lbf
Chain tensioner slipper x Cylinder block	9.0	92	80 in.*lbf
Chain tensioner x Cylinder block	9.0	92	80 in.*lbf
Engine mounting bracket x Timing chain cover	55	561	41
Engine mounting spacer x Body	55	561	41
Engine mounting insulator RH x Engine mounting bracket	52	530	38
Crankshaft pulley x Crankshaft	128	1,305	95
Cylinder head cover x Cylinder head	10	102	74
Wire harness x Cylinder head cover	9.0	92	80 in.*lbf
Windshield washer jar x Body Bolt A:	4.9	50	43 in.*lbf
Windshield washer jar x Body Bolt B:	14	143	10
Windshield washer jar x Body Nut:	5.5	56	49 in.*lbf
Reservoir bracket x Body	8.5	87	75 in.*lbf
Brake master cylinder reservoir x Reservoir bracket	8.5	87	75 in.*lbf
Air cleaner assembly x Cylinder head cover Bolt:	7.0	71	62 in.*lbf
Air cleaner assembly x Cylinder head cover Clamp:	3.0	31	27 in.*lbf
Oil control valve filter x Cylinder head	30	306	22
No. 1 taper screw plug x Cylinder head	44	449	33
Cylinder head x Cylinder block	1st: 29 2nd: 90° 3rd: 90°	1st: 296 2nd: 90° 3rd: 90°	1st: 21 2nd: 90° 3rd: 90°
Oil dipstick guide x Intake manifold	9.0	92	80 in.*lbf
Water bypass pipe x Cylinder head	9.0	92	80 in.*lbf
Engine coolant temperature sensor x Cylinder head	20	204	15
Noise filter x Cylinder head	9.0	92	80 in.*lbf
Exhaust manifold x Cylinder head	27	275	20
No. 1 exhaust manifold heat insulator x Exhaust manifold	8.0	82	71 in.*lbf
Knock sensor wire bracket x Cylinder head	9.0	92	80
Flywheel x Crankshaft	49	500	36
Transmission input damper x Flywheel	20	204	15
Starter hole insulator x Hybrid vehicle transaxle	32	326	24
Engine mounting insulator bracket LH x Engine mounting insulator LH	80	816	59
Front suspension crossmember x Body Bolt A:	113	1,152	83
Front suspension crossmember x Body Bolt B:	157	1,602	116

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Part Tightened	N*m	kgf*cm	ft.*lbf
Engine moving control rod x Front suspension crossmember	56	571	41
Engine moving control rod x Hybrid vehicle transaxle	100	1,020	74
Steering sliding yoke x Steering gear	35	357	26
Compressor x Cylinder block	25	255	18
Purge VSV x Engine mounting insulator RH	7.5	76	5.5 in.*lbf
Front wheel x Front axle	103	1,050	76
Connecting rod cap x Connecting rod	1st: 15 2nd: 90°	1st: 153 2nd: 90°	1st: 11 2nd: 90°
Crankshaft bearing cap x Cylinder block	1st: 22 2nd: 90°	1st: 224 2nd: 90°	1st: 16 2nd: 90°
Stud bolt x Cylinder block	5.0	51	44
Oil pan x Cylinder block	24	245	18
Oil strainer x Oil pan	11	112	8.1
No. 2 oil pan x Oil pan	9.0	92	80 in.*lbf
Drain plug x No. 2 oil pan	37.5	382	28
Oil filter union x Oil pan	30	306	22
Oil filter x Oil filter union	17.5	178	13
Camshaft timing gear x Camshaft	64	653	47
Camshaft position sensor x Cylinder head	8.0	82	71 in.*lbf
Timing chain cover x Cylinder head and cylinder block	Bolt A: 24 Bolt B: 11 Bolt C: 11 Nut D: 24 Bolt E: 24	Bolt A: 245 Bolt B: 112 Bolt C: 112 Nut D: 245 Bolt E: 245	Bolt A: 18 Bolt B: 8.1 Bolt C: 8.1 Nut D: 18 Bolt E: 18
Water pump x Timing chain cover	11	112	8
Engine mounting bracket x Timing chain cover	55	561	41
Water pump pulley x Water pump	15	153	11
Fuel delivery pipe x Cylinder head	Bolt A: 19 Bolt B: 9.0	Bolt A: 194 Bolt B: 92	Bolt A: 14 Bolt B: 80 in.*lbf
Camshaft timing control valve x Cylinder head	7.5	76	66
Cylinder head cover x Cylinder head	10	102	7
Ventilation valve x Cylinder head cover	27	275	20
Crankshaft position sensor x Timing chain cover	7.5	76	20
Water inlet x Cylinder block	9.0	92	80

1NZ-FXE FUEL

SERVICE DATA

Fuel injector	Standard resistance	13.45 to 14.15 Ω at 21°C (68°F)
	Standard injection volume (Injection volume: 36 to 46 cm ³ (2.1 to 2.8 cu in.))	Difference between each fuel injector 10 cm ³ (0.6 cu in.) or less

TORQUE SPECIFICATIONS

Fuel injector

Part Tightened		N*m	kgf*cm	ft.*lbf
Fuel delivery pipe x Cylinder head	Bolt A	19	194	14
	Bolt B	9.0	92	80 in.*lbf
Reservoir bracket x Body		8.5	87	75 in.*lbf
Brake master cylinder reservoir x Reservoir bracket		8.5	87	75 in.*lbf
Front outer cowl top panel x Body		6.4	65	57 in.*lbf
No. 2 engine room relay block x Body		8.4	86	74 in.*lbf

Fuel tank

Part Tightened	N*m	kgf*cm	ft.*lbf
Canister x Fuel tank	6.0	61	53 in.*lbf
Trap canister with pump module x Fuel tank	6.0	61	53 in.*lbf
Fuel tank bracket x Fuel tank	6.0	61	53 in.*lbf
Fuel tank x Body	39	400	29

1NZ-FXE EMISSION CONTROL

SERVICE DATA

Air fuel ratio sensor	Voltage	E5-23 (A1A+) - E5-28 (E1) E5-23 (A1A+) - E5-28 (E1)	3.0 to 3.6 V 2.7 to 3.3 V
	Resistance at 20°C(68°F)	1 (HT) - 2 (+B) 2 (+B) - 4 (AF-)	1.8 to 3.4 Ω 10 KΩ or higher
Fuel tank pressure sensor	Voltage	1 - 3	4.5 to 5.5 V
		2 - 3	3.0 to 3.6 V
Purge VSV	Resistance	1 - 2	26 to 30 Ω at 20°C(68°F)
Heated oxygen sensor	Resistance	1 (HT) - 2 (+B)	11 to 16 Ω at 20°C(68°F)
		1 (HT) - 4 (E)	10 KΩ or higher
Canister pressure switching valve	Resistance	1 - 2	36 to 42 Ω at 20°C(68°F)
		1 - body	10 KΩ or higher
		2 - body	10 KΩ or higher

SS

TORQUE SPECIFICATIONS

Part Tightened	N*m	kgf*cm	ft.*lbf
Canister x Fuel tank sub-assembly	6.0	61	53 in.*lbf
Trap canister x Fuel tank sub-assembly	6.0	61	53 in.*lbf
Purge VSV x Engine mounting insulator sub-assembly RH	7.5	76	66 in.*lbf
Canister pressure switching valve x Canister	2.9	30	26 in.*lbf
Ventilation valve x Cylinder head cover	27	275	20
Air fuel ratio sensor x Exhaust manifold : for use with SST	44	449	32
Air fuel ratio sensor x Exhaust manifold : for use without SST	40	408	30
Heated oxygen sensor x Exhaust manifold : for use with SST	44	449	32
Heated oxygen sensor x Exhaust manifold : for use without SST	40	408	30

SS

1NZ-FXE EXHAUST

SERVICE DATA

Compression spring minimum length	Front exhaust pipe assembly x Exhaust manifold	40.5 mm (1.594 in.)
	Tailpipe assembly x Front exhaust pipe assembly	38.5 mm (1.516 in.)



TORQUE SPECIFICATIONS

Part tightened	N*m	kgf*cm	ft.*lbf
Front exhaust pipe x Exhaust manifold	43	440	32
Tail pipe x Front exhaust pipe	43	440	32
Front floor panel brace x Body	30	302	22

1NZ-FXE COOLING**SERVICE DATA**

Thermostat	Valve opening temperature		80 to 84°C (176 to 183°F)
	Valve lift	at 95°C (203°F)	8.5 mm (0.33 in.) or more
Radiator cap	Standard opening pressure		74 to 103 kPa (0.75 to 1.05 kgf*cm ² , 10.7 to 14.9 psi)
	Minimum opening pressure		59 kPa (0.6 kgf*cm ² , 8.5 psi)
Fan	Standard amperage	at 20°C (68°F)	9.2 to 11.0 A
Integration relay	Resistance	B1 - B4	10 kΩ or higher
			Below 1 Ω (when battery voltage is applied to terminals 2 and 3)
No. 1 Cooling fan relay	Resistance	3 - 5	10 kΩ or higher
		3 - 5	Below 1 Ω (when battery voltage is applied to terminals 1 and 2)
No. 2 cooling fan relay	Resistance	3 - 4	Below 1 Ω
		3 - 5	10 kΩ or higher
		3 - 4	10 kΩ or higher (when battery voltage is applied to terminals 1 and 2)
		3 - 5	Below 1 Ω (when battery voltage is applied to terminals 1 and 2)

SS

TORQUE SPECIFICATIONS

Part Tightened		N*m	kgf*cm	ft.*lbf
Fan x Fan motor		6.2	63	55 in.*lbf
Fan shroud x Radiator		7.5	76	66 in.*lbf
Radiator support x body		5.0	51	44 in.*lbf
Water pump x Cylinder block		11	112	8
Water pump pulley x Water pump		15	153	11
Cooler bracket x Radiator support	Bolt A	20	204	15
Cooler bracket x Suction hose	Bolt B	8.5	87	75 in.*lbf
Inverter bracket x Radiator support	Bolt A	21	214	16
Inverter bracket x Inverter	Bolt B	25	255	18
Radiator temperature switch x Radiator		7.0	71	62 in.*lbf
Radiator support lower LH x Radiator	Bolt A	5.0	51	44 in.*lbf
	Bolt B	3.9	40	35 in.*lbf
Radiator support lower RH x Radiator	Bolt A	5.0	51	44 in.*lbf
	Bolt B	3.9	40	35 in.*lbf
Radiator support upper LH x Radiator	Bolt A	5.0	51	44 in.*lbf
	Bolt B	3.9	40	35 in.*lbf
Radiator support upper RH x Radiator	Bolt A	5.0	51	44 in.*lbf
	Bolt B	3.9	40	35 in.*lbf
Radiator Drain Plug sub-assembly x Radiator		13	129	9.4
Radiator bleeder plug x Radiator		1.5	15	13 in.*lbf
Coolant heat storage tank x Body		19	194	14
Coolant heat storage tank x Coolant heat storage water pump		6.0	61	53 in.*lbf

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1NZ-FXE LUBRICATION

SERVICE DATA

Oil pressure	at idle speed at 2,500 rpm	59 kPa (0.6 kgf/cm ² , 4.2 psi) 150 to 550 kPa (1.5 to 56 kgf/cm ² , 22 to 80 psi)
	Standard	0.060 to 0.180 mm (0.0024 to 0.0071 in.)
Oil pump tip clearance	Maximum	0.28 mm (0.0110 in.)
	Standard	0.250 to 0.325 mm (0.0098 to 0.0128 in.)
Oil body tip clearance	Maximum	0.425 mm (0.0167 in.)

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TORQUE SPECIFICATIONS

Part Tightened		N*m	kgf*cm	ft.*lbf
Oil pressure switch x Cylinder block		15	153	11
Stud bolt x Cylinder head		10	102	7
Oil pump assembly x Cylinder head and block	Bolt A	32	326	24
	Bolt B	11	112	8
	Bolt C	11	112	8
	Nut D	24	245	18
	Bolt E	24	245	18
Camshaft timing oil control valve assembly x Cylinder head		7.5	76	66 in.*lbf
Engine mounting bracket x Cylinder block		55	561	41
Engine mounting bracket x Engine mounting insulator sub-assembly RH		52	530	38
Crankshaft pulley x Crankshaft		128	1,305	95
Cylinder head cover x Cylinder head		10	102	7
Ignition coil x Cylinder head cover		9.0	92	80 in.*lbf
Brake master cylinder reservoir cover x Cylinder head cover		9.0	92	80 in.*lbf
Oil pan drain plug x No. 2 oil pan		38	387	28
Oil pump cover x Oil pump assembly	Bolt	8.8	90	78 in.*lbf
	Screw	10	102	7
Windshield washer jar assembly x Body	Bolt A	4.9	50	43 in.*lbf
	Bolt B	14	143	10
	Nut	5.5	56	49 in.*lbf
Brake master cylinder reservoir cover x Reservoir bracket and reservoir		8.5	87	75 in.*lbf
Reservoir bracket x Body		8.5	87	75 in.*lbf
Air cleaner assembly x Cylinder head cover	Bolt	7.0	71	62 in.*lbf
	Clamp	3.0	31	27 in.*lbf
Front wheel RH x Front axle		103	1,050	76

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1NZ-FXE IGNITION**SERVICE DATA**

Spark plug	Standard electrode gap	1.0 to 1.1 mm (0.039 to 0.043 in.)
	Maximum electrode gap	1.2 mm (0.047 in.)
	DENSO	SK16R11
	NGK	IFR5A11

TORQUE SPECIFICATIONS

Part Tightened	N*m	kgf*cm	ft.*lbf
Engine No. 2 relay block x Cowl top panel sub assembly	8.4	86	74 in.*lbf
Ignition coil assembly x Cylinder head cover	9.0	92	80 in.*lbf

1NZ-FXE STARTING**SERVICE DATA**

Power switch (Indicator condition)	OFF	OFF
	ON (ACC)	Green illumination
	ON (IG)	Amber illumination
	Hybrid system ON	OFF
	Push button start system malfunctioning	Flashes continuously in amber
Power switch	Pushed: 7 (SS2) - 6 (GND)	Below 1 Ω
	Pushed: 5 (SS1) - 6 (GND)	Below 1 Ω
	Released: 7 (SS2) - 6 (GND)	10 k Ω or higher
	Released: 5 (SS1) - 6 (GND)	10 k Ω or higher
Key slot	Key is in key slot: 3(KSW2) - 2(COM)	10 k Ω or higher

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1NZ-FXE CHARGING

TORQUE SPECIFICATIONS

Part Tightened	N*m	kgf*cm	ft.*lbf
Battery hold down clamp x Body	5.4	55	48 in.*lbf
Battery hold down clamp x Battery tray	5.4	55	48 in.*lbf
Fusible link block x Battery	6.0	61	53 in.*lbf
No. 2 quarter vent duct x Body	4.0	41	35 in.*lbf
Battery negative terminal x Battery	6.0	61	53 in.*lbf

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P112 HYBRID VEHICLE CONTROL

SERVICE DATA

Inverter	A-2 (GIVA) - A-16 (GINV)	HV Approximately 0 V
	A-3 (GIVB) - A-16 (GINV)	Approximately 0 V
	A-4 (GUU) - A-16 (GINV)	Approximately 14 to 16 V
	A-5 (GVU) - A-16 (GINV)	Approximately 14 to 16 V
	A-6 (GWU) - A-16 (GINV)	Approximately 14 to 16 V
	A-7 (MIVA) - A-16 (GINV)	Approximately 0 V
	A-8 (MIVB) - A-16 (GINV)	Approximately 0 V
	A-9 (MUU) - A-16 (GINV)	Approximately 14 to 16 V
	A-10 (MVU) - A-16 (GINV)	Approximately 14 to 16 V
	A-11 (MWU) - A-16 (GINV)	Approximately 14 to 16 V
	A-12 (VH) - A-16 (GINV)	Approximately 0.5 V
	A-13 (CPWM) - A-32 (GCNV)	Approximately 0 V
	A-14 (GSDN) - A-32 (GCNV)	Approximately 2 to 4.5 V
	A-15 (VL) - A-32 (GCNV)	Approximately 0.5 V
	A-16 (GINV) - C-2 (GND)	Approximately 0 V
	A-18 (GIWA) - A-16 (GINV)	Approximately 0 V
	A-19 (GIWB) - A-16 (GINV)	Approximately 0 V
	A-20 (CT) - A-16 (GINV)	Approximately 0 V
	A-21 (GIVT) - A-16 (GINV)	Approximately 2 to 4.5 V
	A-22 (GFIV) - A-16 (GINV)	Approximately 5 to 8 V
	A-23 (MIWA) - A-16 (GINV)	Approximately 0 V
	A-24 (MIWB) - A-16 (GINV)	Approximately 0 V
	A-25 (MSDN) - A-16 (GINV)	Approximately 0 V
	A-26 (MIVT) - A-16 (GINV)	Approximately 2 to 4.5 V
	A-27 (MFIV) - A-16 (GINV)	Approximately 5 to 8 V
	A-28 (OVH) - A-16 (GINV)	Approximately 5 to 8 V
	A-29 (CSDN) - A-32 (GCNV)	Approximately 0 V
	A-30 (FCV) - A-32 (GCNV)	Approximately 13.5 to 16.5 V
	A-31 (OVL) - A-32 (GCNV)	Approximately 13.5 to 16.5 V
	A-32 (GCNV) - C-2 (GND)	Approximately 0 V
	B-1 (ILK) - Body ground After installing the probe to the terminal, temporarily install the inverter cover. It does not have to be tightened with the bolts at this point.	Below 1 Ω
	C-1 (IGCT) - C-2 (GND)	Approximately 8 to 16 V
	C-2 (GND) - Body ground	Below 1 Ω
Converter operation	Auxiliary battery voltage : READY light ON	14 V
	Auxiliary battery voltage : READY light OFF	12 V
	Output current : READY light ON	Approximately 80 A or less
Water pump with motor	Battery positive terminal to terminal 1 and the battery negative terminal to terminal 2	Water pump motor operates properly

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IGCT relay	7J-1 - 7J-4	HV 10 kΩ or higher
	7J-1 - 7K-4	Below 1 Ω
	7J-2 - 7J-3	Below 1 Ω
	7J-4 - 7K-1	10 kΩ or higher
	7J-1 - 7J-4 : When battery voltage is applied to terminals 7J-2 and 7J-3	Below 1 Ω
	7J-1 - 7K-1 : When battery voltage is applied to terminals 7J-2 and 7J-3	Below 1 Ω

SS

TORQUE SPECIFICATIONS

Part Tightened	N*m	kgf*cm	ft.*lbf
MG 1 power cable x MG 1 power cable terminal	8.0	82	71 in.*lbf
MG 2 power cable x MG 2 power cable terminal	8.0	82	71 in.*lbf
No. 1 circuit breaker sensor x Inverter with converter assembly	8.0	82	71 in.*lbf
No. 2 inverter bracket x Inverter with converter assembly	25	255	18
No. 1 inverter bracket x Inverter with converter assembly	25	255	18
Connector bracket x Inverter with converter assembly	8.0	82	71 in.*lbf
Inverter with converter assembly x Body	21	214	16
Inverter cover x Inverter with converter	11	112	8.1
Hybrid control ECU x ECM	5.5	56	49 in.*lbf
Water pump with motor assembly x Body	7.0	71	62 in.*lbf
Frame wire x Floor panel	9.0	92	80 in.*lbf
Suspension crossmember x Body	Bolt A: 113	1,152	83
	Bolt B: 157	1,601	116
No. 1 wire harness protector x Body	9.0	92	80 in.*lbf
Frame wire x Engine room relay block	9.0	92	80 in.*lbf
Frame wire x No. 2 system main relay	5.6	57	50 in.*lbf
Frame wire x No. 3 system main relay	5.6	57	50 in.*lbf
Accelerator pedal rod x Body	7.5	77	66 in.*lbf

SS

P112 HYBRID BATTERY CONTROL

SERVICE DATA

Battery plug	Resistance between terminals	10 k Ω or higher
	Install the service grip: Resistance between terminals	Below 1 Ω
No. 1 system main relay	Positive terminal - Negative terminal	10 k Ω or higher
	A-2 (CONT2) - B-2 (CONT2)	Below 1 Ω
	A-3 (CONT3) - C-2 (CONT3)	Below 1 Ω
	B-1 (GND) - GND	Below 1 Ω
	C-1 (GND) - GND	Below 1 Ω
	Apply battery voltage between the GND terminal and CONT1 terminal of the connector A: Positive terminal - Negative terminal	Below 1 Ω
	A-1 (CONT1) - GND	70 to 160 k Ω
No. 2 system main relay	Positive terminal - Negative terminal	10 k Ω or higher
	Apply battery voltage between the connector terminals: Positive terminal - Negative terminal	Below 1 Ω
	Resistance between the connector terminals	20 to 50 k Ω
No. 3 system main relay	Positive terminal - Negative terminal	10 k Ω or higher
	Apply battery voltage between the connector terminals: Positive terminal - Negative terminal	Below 1 Ω
	Resistance between the connector terminals	20 to 50 k Ω
System main resistor	Resistance between terminals	18 to 22 Ω
Battery blower relay	3 - 5	10 k Ω or higher
	When battery voltage is applied to terminals 1 and 2: 3 - 5	Below 1 Ω
Battery current sensor	Positive probe to terminal 1 (VIB) Negative probe to terminal 2 (GIB)	3.5 to 4.5 k Ω
	Positive probe to terminal 2 (GIB) Negative probe to terminal 1 (VIB)	5 to 7 k Ω
	Positive probe to terminal 1 (VIB) Negative probe to terminal 3 (IB) A083579E02	3.5 to 4.5 k Ω
	Positive probe to terminal 1 (VIB) Negative probe to terminal 3 (IB)	5 to 7 k Ω

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TORQUE SPECIFICATIONS

Part Tightened	N*m	kgf*cm	ft.*lbf
Upper battery carrier x HV battery	5.5	56	49 in.*lbf
Battery cover x HV battery	8.0	82	71 in.*lbf
HV battery x Body	19	194	14
Frame wire x No. 2 system main relay	5.6	57	50 in.*lbf
Frame wire x No. 3 system main relay	5.6	57	50 in.*lbf
No. 6 battery carrier panel x HV battery assembly	7.5	76	66 in.*lbf
Quarter vent duct x Body	4.0	41	35 in.*lbf
Battery bracket reinforcement x Body	28	286	21
Battery bracket reinforcement x HV battery assembly	28	286	21
Battery carrier bracket x Body	28	286	21
Battery carrier bracket x HV battery assembly	28	286	21
No. 2 main battery cable x No. 2 frame wire	5.4	55	48 in.*lbf
No. 2 main battery cable x No. 2 system main relay	5.6	57	50 in.*lbf
Main battery cable x No. 2 frame wire	5.4	55	48 in.*lbf
Main battery cable x No. 3 system main relay	5.6	57	50 in.*lbf
Aluminum shield wire x HV battery	3.3	34	29 in.*lbf
No. 2 frame wire x HV battery	5.4	55	48 in.*lbf
Battery plug x Upper battery carrier	5.4	55	48 in.*lbf
Junction block x HV battery	5.4	55	48 in.*lbf
No. 1 system main relay x Upper battery carrier	3.4	35	30 in.*lbf
Ground terminal x Upper battery carrier	5.6	57	50 in.*lbf
No. 3 system main relay x Upper battery carrier	3.4	35	30 in.*lbf
No. 2 system main relay x Upper battery carrier	3.4	35	30 in.*lbf
System main resistor x Upper battery carrier	3.4	35	30 in.*lbf
Battery current sensor x Upper battery carrier	1.4	14	12 in.*lbf
Battery ECU x Upper battery carrier	3.3	34	29 in.*lbf
Electric vehicle fuse x Service grip	5.4	55	48 in.*lbf
Battery blower x Body	5.0	51	44 in.*lbf

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HYBRID TRANSAXLE

SERVICE DATA

Differential case side bearing preload (Starting torque)	New bearing	0.98 to 1.57 N*m (9.99 to 16.01 kgf*cm, 8.67 to 13.90 in.*lbf)
	Reused bearing	0.49 to 0.78 N*m (5.00 to 7.95 kgf*cm, 4.43 to 6.90 in.*lbf)
Differential case side bearing preload (Turning torque 20 rpm)		0.61 to 1.35 N*m (6.2 to 13.77 kgf*cm, 5.4 to 11.95 in.*lbf)
Differential preload adjusting shim thickness	Mark 1	1.80 mm (0.0709 in.)
	Mark 2	1.83 mm (0.0720 in.)
	Mark 3	1.86 mm (0.0732 in.)
	Mark 4	1.89 mm (0.0744 in.)
	Mark 50	1.92 mm (0.0756 in.)
	Mark 51	1.94 mm (0.0764 in.)
	Mark 52	1.96 mm (0.0772 in.)
	Mark 53	1.98 mm (0.0780 in.)
	Mark 54	2.00 mm (0.0787 in.)
	Mark 55	2.02 mm (0.0795 in.)
	Mark 56	2.04 mm (0.0803 in.)
	Mark 57	2.06 mm (0.0811 in.)
	Mark 58	2.08 mm (0.0819 in.)
	Mark 59	2.10 mm (0.0827 in.)
	Mark 60	2.12 mm (0.0835 in.)
	Mark 61	2.14 mm (0.0843 in.)
	Mark 62	2.16 mm (0.0850 in.)
	Mark 63	2.18 mm (0.0858 in.)
	Mark 64	2.20 mm (0.0866 in.)
	Mark 65	2.22 mm (0.0874 in.)
	Mark 66	2.24 mm (0.0882 in.)
	Mark 67	2.26 mm (0.0890 in.)
	Mark 68	2.28 mm (0.0898 in.)
	Mark 69	2.30 mm (0.0906 in.)
Mark 70	2.32 mm (0.0913 in.)	
Mark 19	2.34 mm (0.0921 in.)	
Mark 20	2.37 mm (0.0933 in.)	
-	2.40 mm (0.0945 in.)	
Mark 22	2.43 mm (0.0957 in.)	
Mark 23	2.46 mm (0.0969 in.)	

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Input shaft shim thickness	Mark 1	1.00 mm (0.0394 in.)
	Mark 2	1.20 mm (0.0472 in.)
	Mark 3	1.40 mm (0.0551 in.)
	Mark 4	1.60 mm (0.0630 in.)
	Mark 5	1.80 mm (0.0709 in.)
	Mark 6	2.00 mm (0.0787 in.)
	Mark 7	2.20 mm (0.0866 in.)
	Mark 8	2.40 mm (0.0945 in.)
	Mark 9	2.60 mm (0.1024 in.)
	Mark 10	2.80 mm (0.1102 in.)
	Mark 11	3.00 mm (0.1181 in.)
	Mark 12	3.20 mm (0.1260 in.)
Counter drive gear shim thickness	Mark A	2.20 mm (0.0866 in.)
	Mark B	2.25 mm (0.0886 in.)
	Mark C	2.30 mm (0.0906 in.)
	Mark D	2.35 mm (0.0925 in.)
	Mark E	2.40 mm (0.0945 in.)
	Mark F	2.45 mm (0.0965 in.)
	Mark G	2.50 mm (0.0984 in.)
	Mark H	2.55 mm (0.1003 in.)
	Mark J	2.60 mm (0.1024 in.)
	Mark K	2.65 mm (0.1043 in.)
	Mark L	2.70 mm (0.1063 in.)
	Mark M	2.75 mm (0.1083 in.)
Mark N	2.80 mm (0.1102 in.)	
Differential oil seal LH and RH drive in depth		2.7 +0.5 mm (0.11 +-0.02 in.)
Oil pressure		9.8 kPa (0.1 kgf/cm ² , 1.4 pst)
Differential side gear backlash	Standard	0.05 to 0.20 mm (0.0020 to 0.0079 in.)
Differential side gear washer thickness		0.95 mm (0.0374 in.)
		1.00 mm (0.0394 in.)
		1.05 mm (0.0414 in.)
		1.10 mm (0.0433 in.)
		1.15 mm (0.0453 in.)
Sun gear bush diameter		25.525 to 25.546 mm (1.00492 to 1.00575 in.)
		Maximum

TORQUE SPECIFICATIONS

Part Tightened	N*m	kgf*cm	ft.*lbf
Oil pump cover x MG2 assembly	5.5	56	49 in.*lbf
Transaxle oil drain plug	39	400	29
Hybrid transaxle assembly x Engine	33	332	24
Coolant drain plug x MG1 assembly	39	400	29
Screw plug x MG1 assembly	55	561	41
Set plug x MG2 assembly	39	400	29
Filler plug x MG2 assembly	39	400	29
MG1 assembly x MG2 assembly	25	250	18
Oil strainer x MG2 assembly	7.9	81	70 in.*lbf
Motor water jacket cover x MG2 assembly	5.5	56	49
Housing tube x MG1 assembly	15	155	11
Detent spring set bolt	9.8	100	86 in.*lbf
Parking cover x MG2 assembly	5.5	56	49 in.*lbf
Parking shaft cover x MG2 assembly	5.5	56	49 in.*lbf
Oil pump cover x plug	7.4	75	65 in.*lbf
Power cable cover x MG1 assembly	4.8	48	42 in.*lbf
Mounting bracket x MG2 assembly	52	530	38
Shift lever assembly x Steering column	8	80	71 in.*lbf
Generator cable x Converter and inverter	5.5	56	49 in.*lbf
Generator cable x MG1 cable cover	5.8	59	51 in.*lbf
Generator cable x MG1 assembly	8.5	87	75 in.*lbf
Connector x MG1 assembly	5.8	59	51 in.*lbf
Connector x MG2 assembly	5.8	59	51 in.*lbf
Transmission case cover x MG2 assembly	7.0	71	62 in.*lbf
Shift control actuator x MG2 assembly	16	160	12
Shift lever assembly x Body	12	122	9
Engine hanger x Hybrid transaxle assembly	38	387	28
Stay x Hybrid transaxle assembly	9.0	92	80 in.*lbf
Engine mounting bracket No.3 x Hybrid transaxle assembly	52	530	38
Housing side cover x Hybrid transaxle assembly	32	326	23
Engine mounting insulator x Hybrid transaxle assembly	80	816	59
Earth wire x Hybrid transaxle assembly	9.0	92	80 in.*lbf
Set plug x MG2 assembly	39	400	29
Screw plug x MG2 assembly	13	130	9
Nut x Baring	280	2860	207

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DRIVE SHAFT

TORQUE SPECIFICATIONS

Part Tightened	N.m	kgf.cm	ft.lbf
Front axle hub nut	216	2200	159
Front wheel set nut	103	1050	76
transaxle x drain plug	39	398	29
Flexible hose and speed sensor front x Shock absorber assembly front	29	300	22
Speed sensor front x Steering knuckle	8.0	82	71 in.lbf
Tie rod end sub-assembly x Steering knuckle	49	500	36
Suspension arm sub-assembly lower No.1 x Steering knuckle	89	908	66

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AXLE

SERVICE DATA

Front axle hub bearing: Backlash	Maximum: 0.05 mm (0.0020 in.)
Front axle hub sub-assembly: Deviation	Maximum: 0.05 mm (0.0020 in.)
Rear axle hub & bearing assembly: Backlash	Maximum: 0.05 mm (0.0020 in.)
Rear axle hub & bearing assembly: Deviation	Maximum: 0.07 mm (0.0028 in.)

TORQUE SPECIFICATIONS

Part Tightened	N.m	kgf.cm	ft.lbf
Front axle hub nut	216	2200	159
Front wheel set nut	103	1050	76
Rear wheel set nut	103	1050	76
Front axle assembly x Shock absorber assembly front	153	1560	113
Speed sensor front x Steering knuckle	8.0	82	71 in.lbf
Tie rod end sub-assembly x Steering knuckle	49	500	36
Suspension arm sub-assembly lower No.1 x Steering knuckle	89	908	66
Front disc brake caliper assembly x Steering knuckle	109	1114	81
Rear axle hub & bearing assembly x Rear axle beam	61	622	45
Steering knuckle x Lower ball joint assembly	71	724	52
Steering knuckle x Front axle hub	56	571	41

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SUSPENSION**SERVICE DATA**

Front wheel alignment	Vehicle height		
	A-B:		95 mm (3.74 in.)
	D-C:		62 mm (2.40 in.)
	Toe-in (total) Rack end length difference		0° +12' (0° +0.2°, 0 +2 mm, 0 +0.08 in.) 1.5 mm (0.059 in.) or less
	Wheel angle	Inside wheel	40° 35' +2° (40.58° +2°)
		Outside wheel: Reference	34°15' (34.25°)
	Camber Right-left error		-0° 35' +-45' (-0.58° +-0.75°) 45' (0.75°) or less
	Caster Right-left error		3°10' +-45' (3.17° +-0.75°) 45' (0.75°) or less
Steering axis inclination Right-left error		12°35' +-45' (12.58° +-0.75°) 45' (0.75°) or less	
Rear wheel alignment	Toe-in (total)		0°18' +-15' (0.30° +-0.25°, 3.0 +-2.5 mm, 0.12 +-0.10 in.)
	Camber Right-left error		-1°30' +-30' (-1.50 +-0.5°) 30' (0.5°) or less
Front suspension	Lower ball joint turning torque		0.98 to 4.90 N*m (10 to 50 kgf*cm, 8.7 to 43 in.*lbf)
	Stabilizer link 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 arm No.1 set bolt center
- C:**
Ground clearance of rear axle carrier bush set bolt center
- D:**
Ground clearance of rear wheel center

TORQUE SPECIFICATIONS

Part Tightened	N*m	kgf*cm	ft.*lbf
Tie rod end lock nut	74	755	55
Steering knuckle x Shock absorber	153	1,560	113
Front wheel hub nut	103	1,050	76
Suspension support x Piston rod	47	479	35
Suspension support x Body	39	398	29
ABS speed sensor wire harness bracket set bolt	19	192	14
Steering gear x Suspension cross member	58	591	43
Stabilizer link x Shock absorber with coil spring	74	755	55
Steering knuckle x Lower ball joint	71	724	52
Lower suspension arm x Suspension cross member	137	1,400	101
Stabilizer bracket No.1 x Suspension cross member	19	194	14
Rear wheel hub nut	103	1,050	76
Piston rod set nut	56	571	41
Shock absorber with coil spring x Body	80	816	59
Shock absorber with coil spring x Rear axle beam	80	816	59
Parking brake cable set bolt	5.4	55	48 in.*lbf
Rear axle hub set bolt	61	622	45
Skid control sensor wire set bolt	5.0	51	44 in.*lbf
Rear axle beam x Body	85	867	63
Stabilizer bar x Rear axle beam	149	1,520	110

SS

TIRE AND WHEEL**SERVICE DATA**

Cold tire inflation pressure		
185/65R15 86S	Front:	240 kPa (2.4 kgf/cm ² , 35 psi)
	Rear:	230 kPa (2.3 kgf/cm ² , 33 psi)
Tire runout		1.4 mm (0.055 in.) or less
Imbalance after adjustment		8.0 g (0.018 lb) or less

TORQUE SPECIFICATIONS

Part Tightened	N*m	kgf*cm	ft.*lbf
Tire pressure warning receiver x Body	7.5	76	66 in.*lbf
Tire pressure warning valve set nut	4.0	41	35 in.*lbf
Tire pressure warning ECU set bolt	7.5	76	66 in.*lbf

BRAKE CONTROL**SERVICE DATA**

Brake pedal stroke sensor	0.8 to 1.2 V
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TORQUE SPECIFICATIONS

Brake actuator

Part Tightened	N*m	kgf*cm	ft.*lbf
Brake line union nut	15	155	11
Brake actuator x No. 2 brake actuator bracket	18	184	13
Brake actuator x Gusset	7.5	76	66 in.*lbf
Brake actuator x bracket	18	184	13
Brake actuator x Brake actuator damper	18	184	13
Brake actuator w/ gusset x Body	20	200	15
Brake actuator x Brake tube clamp bracket	5.0	51	44 in.*lbf
Brake actuator tube set nut	8.5	87	75 in.*lbf
No. 1 front brake tube set bolt	5.0	51	44 in.*lbf
Brake actuator bracket x No. 5 front brake tube bracket	5.0	51	44 in.*lbf
Brake actuator resistor set nut	5.0	51	44 in.*lbf

Front speed sensor

Part Tightened	N*m	kgf*cm	ft.*lbf
Front speed sensor set bolt	8.0	82	71 in.*lbf
Front speed sensor wire clamp x Body	8.0	82	71 in.*lbf
Front speed sensor wire clamp x Shock absorber	19	192	14
Wheel nut	103	1,050	76

Yaw rate sensor

Part Tightened	N*m	kgf*cm	ft.*lbf
Yaw rate sensor set bolt	19	194	14

Skid control ECU

Part Tightened	N*m	kgf*cm	ft.*lbf
Skid control ECU set nut	5.0	51	44 in.*lbf

Brake control power supply

Part Tightened	N*m	kgf*cm	ft.*lbf
Brake control power supply assembly set bolt	19	194	14

Brake pedal stroke sensor

Part Tightened	N*m	kgf*cm	ft.*lbf
Brake pedal stroke sensor set bolt	9.3	95	82 in.*lbf

BRAKE

SERVICE DATA

Brake pedal height from asphalt sheet		138 to 148 mm (5.433 to 5.827 in.)
Brake pedal stroke sensor		0.8 to 1.2 V
Brake pedal free play		0.5 to 4 mm (0.02 to 0.16 in.)
Stop light switch clearance		0.5 to 2.4 mm (0.020 to 0.095 in.)
Brake pedal reserve distance from asphalt sheet at 196 N (20 kgf, 44.1 lbf)		More than 104 mm (4.1 in.)
Front brake pad lining thickness	Standard	11.0 mm (0.433 in.)
	Minimum	1.0 mm (0.039 in.)
Front brake disc thickness	Standard	22.0 mm (0.866 in.)
	Minimum	20.0 mm (0.787 in.)
Front brake disc runout	Maximum	0.05 mm (0.0020 in.)
Rear brake drum inside diameter	Standard	200.0 mm (7.874 in.)
	Maximum	201.0 mm (7.913 in.)
Rear drum brake shoe lining thickness	Standard	4.0 mm (0.157 in.)
	Minimum	1.0 mm (0.039 in.)
Rear brake drum and rear brake shoe clearance		0.6 mm (0.024 in.)

SS

TORQUE SPECIFICATIONS

Brake pedal

Part tightened	N*m	kgf*cm	ft.*lbf
Brake pedal support x Body	13	130	9
Brake pedal support x Instrument panel reinforcement	24	241	18
Brake pedal shaft nut	37	375	27
Stop light switch lock nut	26	265	19
Brake pedal stroke sensor set bolt	9.3	95	82 in.*lbf

SS

Brake master cylinder

Part tightened	N*m	kgf*cm	ft.*lbf
Brake line union nut	15	155	11
No. 1 front brake tube set bolt	5.0	51	44 in.*lbf
No. 5 front brake tube set bolt	5.0	51	44 in.*lbf
No. 1 brake master cylinder union set screw	1.8	18	16 in.*lbf
Push rod clevis lock nut	26	265	19
Brake master cylinder sub-assembly set nut	13	127	9

Brake stroke simulator cylinder

Part tightened	N*m	kgf*cm	ft.*lbf
Brake stroke simulator stud bolt	5.0	51	44 in.*lbf
Brake stroke simulator x Bracket	6.0	61	53 in.*lbf
Brake stroke simulator bracket x Body	8.5	87	75 in.*lbf
Brake stroke simulator x Brake actuator tube assembly	8.5	87	75 in.*lbf
Brake line union nut	15	155	11

Front brake

Part tightened	N*m	kgf*cm	ft.*lbf
Front disc brake cylinder mounting set bolt	109	1,114	81
Front disc brake cylinder x Front disc brake cylinder mounting	34	347	25
Flexible hose union bolt	33	337	24
Bleeder plug	8.4	86	74 in.*lbf
Wheel nut	103	1,050	76

Rear drum brake

Part tightened	N*m	kgf*cm	ft.*lbf
Rear wheel brake cylinder x Backing plate	9.8	100	87 in.*lbf
Brake line union nut	15	155	11
Bleeder plug	8.5	85	73 in.*lbf
Wheel nut	103	1,050	76

PARKING BRAKE
SERVICE DATA

Parking brake pedal travel at 300 N (31 kgf, 68.3 lbf)	6 to 9 clicks
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TORQUE SPECIFICATIONS

Part Tightened	N*m	kgf*cm	ft.*lbf
Parking brake control pedal set bolt and nut	20	204	15
No. 1 parking brake cable lock nut	5.4	55	48 in.*lbf
No. 1 parking brake cable set bolt and nut	14	143	10
No. 2 parking brake cable clamp bolt	5.4	55	48 in.*lbf
No. 2 parking brake cable retainer bolt	6.0	61	53 in.*lbf
No. 2 parking brake cable x Backing plate	8.0	82	71 in.*lbf
No. 3 parking brake cable clamp bolt	5.4	55	48 in.*lbf
No. 3 parking brake cable retainer bolt	6.0	61	53 in.*lbf
No. 3 parking brake cable x Backing plate	8.0	82	71 in.*lbf
Parking brake cable heat insulator set nut	5.4	55	48 in.*lbf
Parking brake intermediate lever adjusting nut	12.5	127	9
Wheel nut	103	1,050	76

SS

STEERING COLUMN**SERVICE DATA**

Steering wheel free play Maximum	30 mm (1.18 in.)
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TORQUE SPECIFICATIONS

Part tightened	N*m	kgf*cm	ft.*lbf
Steering column assembly set bolt	25	255	18
Power steering motor set bolt	18	185	13
Steering intermediate shaft assembly No. 2 x Steering column assembly	35	360	26
Steering intermediate shaft assembly No. 2 x Steering sliding yoke sub-assembly	35	360	26
Steering sliding yoke sub-assembly x Steering intermediate shaft assembly	35	360	26
Steering wheel set nut	50	510	37
Tilt lever bracket set screw	2.0	20	37
Steering wheel pad set screw (Torx screw)	8.8	90	78 in.*lbf
Power steering motor assembly x Steering column assembly	18	185	18 in.*lbf
Power steering ECU assembly	5	50	44 in.*lbf
Tie rod end lock nut	74	750	54

SS

POWER STEERING**SERVICE DATA**

STEERING WHEEL	
Steering effort (Reference)	5.5 N*m (56 kgf*cm, 49 in.*lbf)
Steering wheel free play Maximum	30 mm (1.18 in.)
POWER STEERING GEAR	
Tie rod end sub-assembly total preload (Turning)	2.0 N*m (20.4 kgf*cm, 18 in.*lbf) or less
Steering gear assembly total preload (Turning)	0.6 - 1.2 N*m (6.1 - 12.2 kgf*cm, 5 - 11 in.*lbf)
Steering rack boot clamp clearance	3.0 mm (0.12 in.) or less

SS

TORQUE SPECIFICATIONS

Part tightened	N*m	kgf*cm	ft.*lbf
STEERING WHEEL			
Steering wheel set nut	50	510	37
POWER STEERING GEAR			
Power steering rack x Steering rack end sub-assembly	60 (83)	612 (846)	44 (61)
Tie rod assembly lock nut	74	749	54
Steering gear assembly set bolt	58	591	43
Steering intermediate shaft x Steering gear assembly	35	360	26
Front stabilizer bracket No. 1	19	194	14
Front stabilizer link assembly set nut	74	755	55
Steering sliding yoke sub-assembly set bolt	35	360	26
Tie rod end sub-assembly set nut	74	749	54
Hub nut	103	1,050	76

(): For use without SST

SS

AIR CONDITIONING

SERVICE DATA

Refrigerant charge volume	Standard: 450 +/- 50 g (15.87 +/- 1.76 oz.)
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TORQUE SPECIFICATIONS

REFRIGERANT LINE

Part Tightened	N*m	kgf*cm	ft.*lbf
Suction hose sub-assembly x Electric inverter compressor assembly	9.8	100	87 in.*lbf
Discharge hose sub-assembly x Electric inverter compressor assembly	9.8	100	87 in.*lbf
Discharge hose sub-assembly x Condenser assembly	5.4	55	49 in.*lbf
Cooler refrigerant liquid pipe Ex Condenser assembly	5.4	55	49 in.*lbf

AIR CONDITIONING UNIT

Part Tightened	N*m	kgf*cm	ft.*lbf
Air conditioning tube and accessory assembly x Air conditioning unit assembly	3.5	35	30 in.*lbf

ELECTRIC INVERTER COMPRESSOR

Part Tightened	N*m	kgf*cm	ft.*lbf
Electric inverter compressor assembly x Engine	25	255	18
Suction hose sub-assembly x Electric inverter compressor assembly	9.8	100	87 in.*lbf
Discharge hose sub-assembly x Electric inverter compressor assembly	9.8	100	87 in.*lbf

CONDENSER

Part Tightened	N*m	kgf*cm	ft.*lbf	
Discharge hose sub-assembly x Condenser assembly	5.4	55	49 in.*lbf	
Cooler refrigerant liquid pipe Ex Condenser assembly	5.4	55	49 in.*lbf	
Radiator support bracket sub-assembly upper RH	Bolt A	5.0	51	44 in.*lbf
	Bolt B	3.9	40	35 in.*lbf
	Bolt C	7.5	76	66 in.*lbf
Radiator support bracket sub-assembly upper RH	Bolt A	5.0	51	44 in.*lbf
	Bolt B	3.9	40	35 in.*lbf
	Bolt C	7.5	76	66 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
Curtain shield airbag assembly set bolt		11	110	8
Front passenger airbag assembly x Body		20	204	15
Center airbag sensor x Body		17.5	178	13
Front airbag sensor x Body	RH Side:	9.0	92	80 in.*lbf
	LH Side:	17.5	178	13
Side airbag sensor x Body		9.0	92	80 in.*lbf
Rear airbag sensor x Body		17.5	178	13
Seat position sensor x Front seat assembly		8.0	82	71 in.*lbf

SS

SEAT BELT

TORQUE SPECIFICATIONS

FRONT SEAT BELT

Part Tightened	N*m	kgf*cm	ft.*lbf
Front seat inner belt assembly x Front seat	42	428	31
Front seat outer belt assembly (Upper part of retractor) x Body	5.0	51	44 in.*lbf
Front seat outer belt assembly (Lower part of retractor) x Body	42	428	31
Front seat outer belt assembly (shoulder anchor) x Body	42	428	31
Front seat outer belt assembly (floor anchor) x Body	42	428	31
Front shoulder belt anchor adjuster assembly x Body	42	428	31

REAR SEAT BELT

Part Tightened	N*m	kgf*cm	ft.*lbf
Child restraint seat anchor bracket sub-assembly x Body	42	428	31
Rear seat inner belt assembly center x Body	42	428	31
Rear seat inner Belt Assembly RH x Body	42	428	31
Rear seat belt assembly outer center (retractor side.) x Body	42	428	31
Rear seat belt assembly outer center (for Floor Anchor) x Body	42	428	31
Rear seat outer belt assembly RH (retractor) x Body	42	428	31
Rear seat outer belt assembly RH (floor anchor side) x Body	42	428	31
Rear seat outer belt RH (floor anchor side.) x Body	42	428	31

SS

WIPER AND WASHER

TORQUE SPECIFICATIONS

Part Tightened	N*m	kgf*cm	ft*lbf
Wiper motor x Wiper link	5.4	5.5	48 in. lbf
Wiper motor x Crank arm	17	175	13
Wiper link x Body	5.5	56	49 in. lbf
Wiper arm x Wiper link	21	214	15
Rear wiper motor x Body	5.5	56	49 in. lbf
Rear wiper motor x Rear wiper arm	5.5	56	49 in. lbf

SS

AUDIO / VISUAL**TORQUE SPECIFICATIONS**

Part Tightened	N*m	kgf*cm	ft*lbf
Antenna holder assembly x antenna nut	5.0	51	44 in. lbf
Antenna cord x bolt	7.0	71	62 in. lbf

SS

HORN

TORQUE SPECIFICATIONS

HORN

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



WINDSHIELD / WINDOWGLASS

TORQUE SPECIFICATIONS

WINDSHIELD/WINDOWGLASS

Part Tightened	N*m	kgf*cm	ft.*lbf
Wiper arm x Body	21	214	15
w/ Rear Wiper Rear wiper arm x Body	5.5	56	49 in.*lbf

SS

MIRROR

TORQUE SPECIFICATIONS

MIRROR

Part Tightened	N*m	kgf*cm	ft.*lbf
Outer rear view mirror assembly x Door panel	5.5	56	49 in.*lbf

INSTRUMENT PANEL**TORQUE SPECIFICATIONS**

Part Tightened	N*m	kgf*cm	ft.*lbf
Instrument panel reinforcement x Passenger airbag	20	204	15

SEAT

TORQUE SPECIFICATIONS

Front Seat Assembly

Part Tightened	N*m	kgf*cm	ft.*lbf
Airbag sensor x Seat adjuster frame	8.0	82	71 in.*lbf
Seatback cover bracket x Seat adjuster frame (w/ front seat side airbag)	5.5	56	49 in.*lbf
Inner belt x Seat adjuster frame	42	428	31
Seat x Body	37	377	27

Rear Seat Assembly

Part Tightened	N*m	kgf*cm	ft.*lbf
Seatback hinge x Seatback frame	36.8	375	27
Seatback center hinge x Seatback frame	36.8	375	27
Seatback hinge x Body	18.1	185	13
Seatback center hinge x Body	18.1	185	13
Seatback lock x Seatback frame	18.1	185	13
Rear seat outer belt center x Seatback frame	42	428	31
Rear seat outer belt center (floor anchor) x Body	42	428	31

SS

ENGINE HOOD / DOOR

TORQUE SPECIFICATIONS

Part tightened	N*m	kgf*cm	ft.*lbf
HOOD			
Hood hinge x Hood	13	133	10
Hood hinge x Body	5.5	56	49 in.*lbf
Hood lock x Hood	8.0	82	71 in.*lbf
FRONT DOOR			
Door check x Body	30	306	22
Door check x Door panel	5.5	56	49 in.*lbf
Door frame sub-assembly rear lower x Door panel	8.0	82	71 in.*lbf
Door glass x Front door window regulator	5.5	56	49 in.*lbf
Door hinge x Body	26	265	19
Door hinge x Door panel	26	265	19
Door lock x Door panel	5.0	51	44 in.*lbf
Door lock striker x Body	23	235	17
Door outside handle cover x Door panel	7.0	71	62 in.*lbf
Door outside handle frame x Door panel	4.0	41	35 in.*lbf
Outer view mirror x Door panel	10	102	7
Window regulator x Door panel	8.0	82	71 in.*lbf
REAR DOOR			
Door check x Body	30	306	22
Door check x Door panel	5.5	56	49 in.*lbf
Door hinge x Body	26	265	19
Door hinge x Door panel	26	265	19
Door lock x Door panel	5.0	51	44 in.*lbf
Door lock striker x Body	23	235	17
Door outside handle cover x Door panel	4.0	41	35 in.*lbf
Door outside handle frame x Door panel	7.0	71	62 in.*lbf
Window division bar sub-assembly x Door panel	5.5	56	49 in.*lbf
BACK DOOR (LIFTBACK MODEL)			
Back door femaie stopper x Door panel	5.5	56	49 in.*lbf
Back door hinge assembly x Body	19.5	200	14
Back door hinge assembly x Door panel	19.5	200	14
Back door lock assembly x Door panel	8.0	82	71 in.*lbf
Back door lock striker x Body	11.5	120	8.0
Back door stay sub-assembly x Body	7.0	71	62 in.*lbf
Back door stay sub-assembly x Door panel	22	224	16
Center stop light assembly x Door panel	5.5	56	49 in.*lbf

SS

EXTERIOR

TORQUE SPECIFICATIONS

Front Bumper

Part tightened	N*m	kgf*cm	ft.*lbf
Front bumper reinforcement x Body	67	683	49
Radiator grille protector x Body	5.0	51	44 in.*lbf

SS

INTERIOR

TORQUE SPECIFICATIONS

Roof Headlining

Part tightened	N*m	kgf*cm	ft.*lbf
Front seat outer belt (floor anchor) x Body	42	430	31
Rear seat 3 point type belt (floor anchor) x Body	42	430	31

SS