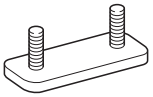
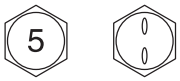
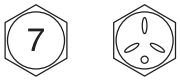
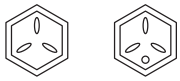
# STANDARD BOLT

## 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  |  | 4T |
|  | |  | | | 5T |
|  | w/ Washer  | w/ Washer  |  | | 6T |
|  | |  | | | 7T |
|  | |  |  | | 8T |
|  | |  | | | 9T |
|  | |  | | | 10T |
|  | |  | | | 11T |

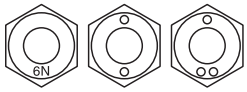
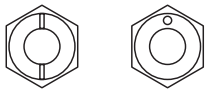
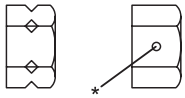
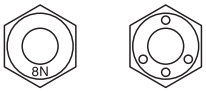
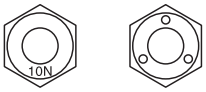
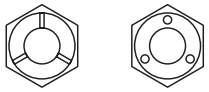
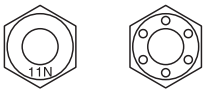
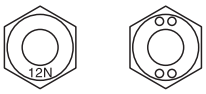
SS

# SPECIFIED TORQUE FOR STANDARD BOLTS

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

# HOW TO DETERMINE NUT STRENGTH

**Nut Type**

| 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 |

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<br>- Standard resistance | Terminals 1 - 2<br>at 20°C (68°F) | - | 6.9 to 7.9 Ω |
| Camshaft position sensor<br>- Standard resistance | Terminals 1 - 2<br>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<br>Hot | | 2,065 to 3,225 Ω |
| Crankshaft position sensor<br>- Standard resistance | Terminals 1 - 2<br>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<br>Hot | | 1,265 to 1,890 Ω |
| Engine coolant temperature sensor<br>- Standard resistance | Terminals 1 - 2<br>at 20°C (68°F) | - | 2.32 to 2.59 Ω |
| | Terminals 1 - 2<br>at 80°C (176°F) | - | 0.310 to 0.326 Ω |
| Throttle body (throttle control motor)<br>- Standard resistance | Terminals 1 - 2<br>at 25 °C (77°F) | - | 50 MΩ or more |
| Throttle body (throttle position sensor)<br>- Standard resistance | Terminals 1 - 4<br>at 25 °C (77°F) | - | 1.2 to 3.5 kΩ |
| Knock sensor<br>- Standard resistance | Terminals 1 - 2<br>at 20°C (68°F) | - | 120 to 280 kΩ |
| EFI relay<br>- Standard resistance | Terminals 3I-5 - 3I-8 | - | 10 kΩor higher |
| | Terminals 3I-5 - 3I-8 | When battery voltage is applied to terminals 3I-6 and 3I-7) | Below 1 Ω |
| Circuit opening relay<br>- 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 |

# 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<br>: Pressing force: 98 N (10 kgf, 22lbf) | 9.0 to 12.0 mm (0.35 to 0.47 in.) |
| | Used drive belt deflection<br>: 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:<br>Standard oil clearance | 0.025 to 0.060 mm ( 0.0010 to 0.0024 in.) |
| | Intake:<br>Maximum oil clearance | 0.08 mm (0.0031 in.) |
| | Exhaust:<br>Standard oil clearance | 0.030 to 0.065 mm (0.0012 to 0.0026 in.) |
| | Exhaust:<br>Maximum oil clearance | 0.10 mm (0.0039 in.) |
| | Standard:<br>Standard guide bush diameter | 9.685 to 9.706 mm (0.3813 to 0.3821 in.) |
| | O/S:<br>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:<br>Groove clearance | 0.02 to 0.07 mm (0.0008 to 0.0028 in.) |
| | No. 2:<br>Groove clearance | 0.02 to 0.06 mm (0.0008 to 0.0024 in.) |
| | Oil:<br>Groove clearance | 0.02 to 0.06 mm (0.0008 to 0.0024 in.) |
| | No. 1:<br>Standard end gap | 0.20 to 0.30 mm (0.0079 to 0.0118 in.) |
| | No. 1:<br>Maximum end gap | 0.61 mm (0.0240 in.) |
| | No. 2:<br>Standard end gap | 0.30 to 0.45 mm (0.0118 to 0.0177 in.) |
| | No. 2:<br>Maximum end gap | 1.20 mm (0.0472 in.) |
| | Oil:<br>Standard end gap | 0.10 to 0.40 mm (0.0039 to 0.0158 in.) |
| | Oil:<br>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:<br>Crankshaft timing sprocket diameter (w/ chain) | 51.72 mm (2.0362 in.) |
| | Maximum:<br>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 | 80in.*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<br>Bolt A: | 4.9 | 50 | 43 in.*lbf |
| Windshield washer jar x Body<br>Bolt B: | 14 | 143 | 10 |
| Windshield washer jar x Body<br>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<br>Bolt: | 7.0 | 71 | 62 in.*lbf |
| Air cleaner assembly x Cylinder head cover<br>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<br>2nd: 90°<br>3rd: 90° | 1st: 296<br>2nd: 90°<br>3rd: 90° | 1st: 21<br>2nd: 90°<br>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<br>Bolt A: | 113 | 1,152 | 83 |
| Front suspension crossmember x Body<br>Bolt B: | 157 | 1,602 | 116 |

| 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<br>2nd: 90° | 1st: 153<br>2nd: 90° | 1st: 11<br>2nd: 90° |
| Crankshaft bearing cap x Cylinder block | 1st: 22<br>2nd: 90° | 1st: 224<br>2nd: 90° | 1st: 16<br>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<br>Bolt B: 11<br>Bolt C: 11<br>Nut D: 24<br>Bolt E: 24 | Bolt A: 245<br>Bolt B: 112<br>Bolt C: 112<br>Nut D: 245<br>Bolt E: 245 | Bolt A: 18<br>Bolt B: 8.1<br>Bolt C: 8.1<br>Nut D: 18<br>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<br>Bolt B: 9.0 | Bolt A: 194<br>Bolt B: 92 | Bolt A: 14<br>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<br>(Injection volume: 36 to 46 $cm^3$ (2.1 to 2.8 cu in.)) | Difference between each fuel injector<br>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 |

SS

## 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)<br>E5-23 (A1A+) - E5-28 (E1) | 3.0 to 3.6 V<br>2.7 to 3.3 V |
| | Resistance at 20°C(68°F) | 1 (HT) - 2 (+B)<br>2 (+B) - 4 (AF-) | 1.8 to 3.4 Ω<br>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)<br>1 (HT) - 4 (E) | 11 to 16 Ω at 20°C(68°F)<br>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 |

# 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<br>: for use with SST | 44 | 449 | 32 |
| Air fuel ratio sensor x Exhaust manifold<br>: for use without SST | 40 | 408 | 30 |
| Heated oxygen sensor x Exhaust manifold<br>: for use with SST | 44 | 449 | 32 |
| Heated oxygen sensor x Exhaust manifold<br>: for use without SST | 40 | 408 | 30 |

# 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) |

# 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 |

# 1NZ-FXE LUBRICATION

## SERVICE DATA

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

# 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<br>Bolt B<br>Bolt C<br>Nut D<br>Bolt E | 32<br>11<br>11<br>24<br>24 | 326<br>112<br>112<br>245<br>245 | 24<br>8<br>8<br>18<br>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<br>Screw | 8.8<br>10 | 90<br>102 | 78 in.*lbf<br>7 |
| Windshield washer jar assembly x Body | Bolt A<br>Bolt B<br>Nut | 4.9<br>14<br>5.5 | 50<br>143<br>56 | 43 in.*lbf<br>10<br>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<br>Clamp | 7.0<br>3.0 | 71<br>31 | 62 in.*lbf<br>27 in.*lbf |
| Front wheel RH x Front axle | | 103 | 1,050 | 76 |

# 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:<br>7 (SS2) - 6 (GND) | Below 1 Ω |
| | Pushed:<br>5 (SS1) - 6 (GND) | Below 1 Ω |
| | Released:<br>7 (SS2) - 6 (GND) | 10 kΩ or higher |
| | Released:<br>5 (SS1) - 6 (GND) | 10 kΩ or higher |
| Key slot | Key is in key slot:<br>3(KSW2) - 2(COM) | 10 kΩ or higher |

# 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 |

# 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) | Approximately14 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<br>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<br>: READY light ON | 14 V |
| | Auxiliary battery voltage<br>: READY light OFF | 12 V |
| | Output current<br>: 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 |

| | | |
|---|---|---|
| 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<br>: When battery voltage is applied to terminals 7J-2 and 7J-3 | Below 1 Ω |
| | 7J-1 - 7K-1<br>: When battery voltage is applied to terminals 7J-2 and 7J-3 | Below 1 Ω |

# 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:<br>113 | 1,152 | 83 |
| | Bolt B:<br>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 |

# P112 HYBRID BATTERY CONTROL

## SERVICE DATA

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

# 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 |

# 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.) |

| | | |
|---|---|---|
| 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.) |
| | | 1.20 mm (0.0472 in.) |
| Sun gear bush diameter | Standard | 25.525 to 25.546 mm (1.00492 to 1.00575 in.) |
| | Maximum | 25.596 mm (1.00771 in.) |

# 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 |

# 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 |

# 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 |

# SUSPENSION

## SERVICE DATA

| | | | |
|---|---|---|---|
| Front wheel alignment | Vehicle height | | |
| | A-B:<br>D-C: | | 95 mm (3.74 in.)<br>62 mm (2.40 in.) |
| | Toe-in (total)<br>Rack end length difference | | 0° +-12' (0° +-0.2°, 0 +-2 mm, 0 +-0.08 in.)<br>1.5 mm (0.059 in.) or less |
| | Wheel angle | Inside wheel | 40° 35' +-2° |
| | | | (40.58° +-2°) |
| | | Outside wheel: Reference | 34°15'<br>(34.25°) |
| | Camber<br>Right-left error | | -0° 35' +-45' (-0.58° +-0.75°)<br>45' (0.75°) or less |
| | Caster<br>Right-left error | | 3°10' +-45' (3.17° +-0.75°)<br>45' (0.75°) or less |
| | Steering axis inclination<br>Right-left error | | 12°35' +-45' (12.58° +-0.75°)<br>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<br>Right-left error | | -1°30' +-30' (-1.50 +-0.5°)<br>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 |

# TIRE AND WHEEL

## SERVICE DATA

| | | |
|---|---|---|
| Cold tire inflation pressure | | |
| 185/65R15 86S | Front: | 240 kPa (2.4 kgf/cm2, 35 psi) |
| | Rear: | 230 kPa (2.3 kgf/cm2, 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 |

# 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.) |

# 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 |

## 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 |

# 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 |

# STEERING COLUMN

## SERVICE DATA

| | |
|---|---|
| Steering wheel free play<br>Maximum | 30 mm (1.18 in.) |

# 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 |

# POWER STEERING

## SERVICE DATA

| | |
|---|---|
| STEERING WHEEL | |
| Steering effort<br>(Reference) | 5.5 N*m (56 kgf*cm, 49 in.*lbf) |
| Steering wheel free play<br>Maximum | 30 mm (1.18 in.) |
| POWER STEERING GEAR | |
| Tie rod end sub-assembly total preload<br>(Turning) | 2.0 N*m (20.4 kgf*cm, 18 in.*lbf) or less |
| Steering gear assembly total preload<br>(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 |

# 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

# AIR CONDITIONING

## SERVICE DATA

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

# 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 |

# 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 |

# 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 |

# 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 |

# 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 |

# 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 |

# 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 |

# 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 |

# 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 |