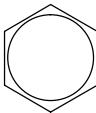
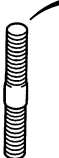
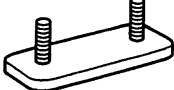
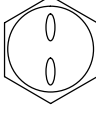

SERVICE SPECIFICATIONS

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STANDARD BOLT

HOW TO DETERMINE BOLT STRENGTH

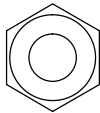
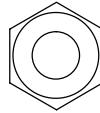
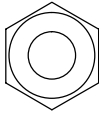
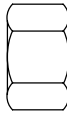
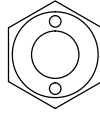
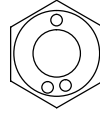
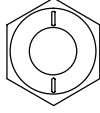
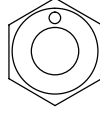
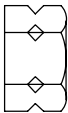
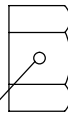
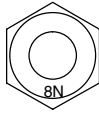
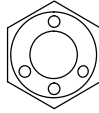
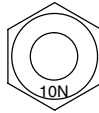
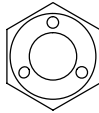
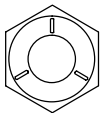
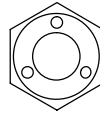
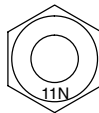
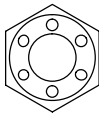
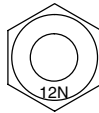
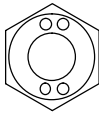
SS02S-01

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

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			Class
Present Standard Hexagon Nut	Old Standard Hexagon Nut		
	Cold Forging Nut	Cutting Processed Nut	
 No Mark			4N
 No Mark (w/ Washer)	 No Mark (w/ Washer)	 No Mark	5N (4T)
  			6N
	 	  *	7N (5T)
 			8N
 	 	 No Mark	10N (7T)
 			11N
 			12N

*: Nut with 1 or more marks on one side surface of the nut.

B06432

HINT:

Use the nut with the same number of the nut strength classification or the greater than the bolt strength classification number when tightening parts with a bolt and nut.

Example: Bolt = 4T

Nut = 4N or more

ENGINE MECHANICAL

SERVICE DATA

SS0JM-02

Compression pressure	at 250 rpm Minimum Difference of pressure between each cylinder	2,746 kPa (28.0 kgf/cm ² , 398 psi) or more 2,256 kPa (23.0 kgf/cm ² , 327 psi) or more 490 kPa (5.0 kgf/cm ² , 71 psi) or less
Valve clearance	at cold Intake Exhaust Adjusting shim thickness Mark 2.500 Mark 2.550 Mark 2.600 Mark 2.650 Mark 2.700 Mark 2.750 Mark 2.800 Mark 2.850 Mark 2.900 Mark 2.950 Mark 3.000 Mark 3.050 Mark 3.100 Mark 3.150 Mark 3.200 Mark 3.250 Mark 3.300	0.20 – 0.30 mm (0.008 – 0.012 in.) 0.35 – 0.45 mm (0.014 – 0.018 in.) 2.500 mm (0.0984 in.) 2.550 mm (0.1004 in.) 2.600 mm (0.1024 in.) 2.650 mm (0.1043 in.) 2.700 mm (0.1063 in.) 2.750 mm (0.1083 in.) 2.800 mm (0.1102 in.) 2.850 mm (0.1122 in.) 2.900 mm (0.1142 in.) 2.950 mm (0.1161 in.) 3.000 mm (0.1181 in.) 3.050 mm (0.1201 in.) 3.100 mm (0.1220 in.) 3.150 mm (0.1240 in.) 3.200 mm (0.1260 in.) 3.250 mm (0.1280 in.) 3.300 mm (0.1299 in.)
Idle speed	–	700 – 800 rpm
Maximum speed	–	5,100 – 5,250 rpm
Timing belt tensioner	Protrusion from housing end	9.8 – 10.6 mm (0.354 – 0.417 in.)
Cylinder head	Warpage Valve seat Refacing angle Contacting angle Contacting width Valve guide bushing bore diameter Cylinder head bolt thread inside diameter New cylinder head gasket thickness	Maximum Cylinder block side Manifold side Intake Exhaust Intake Exhaust STD O/S 0.05 STD Minimum A B C D E 0.08 mm (0.0031 in.) 0.20 mm (0.0079 in.) 25°, 45°, 70° 25°, 45°, 65° 45° 1.2 – 1.6 mm (0.047 – 0.063 in.) 1.6 – 2.0 mm (0.063 – 0.079 in.) 10.985 – 11.006 mm (0.4325 – 0.4333 in.) 11.035 – 11.056 mm (0.4344 – 0.4353 in.) 10.75 – 11.00 mm (0.4232 – 0.4331 in.) 10.40 mm (0.4094 in.) 0.85 – 0.95 mm (0.0335 – 0.0374 in.) 0.90 – 1.00 mm (0.0354 – 0.0394 in.) 0.95 – 1.05 mm (0.0374 – 0.0413 in.) 1.00 – 1.10 mm (0.0394 – 0.0433 in.) 0.95 – 1.05 mm (0.0413 – 0.0453 in.)
Valve guide Bushing	Inside diameter Outside diameter for repair part STD O/S 0.05	6.010 – 6.030 mm (0.2366 – 0.2374 in.) 11.033 – 11.044 mm (0.4344 – 0.4110 in.) 11.083 – 11.094 mm (0.4363 – 0.4368 in.)

SERVICE SPECIFICATIONS – ENGINE MECHANICAL

Valve	Valve overall length	STD Intake	102.53 mm (4.0366 in.)
		Exhaust	101.97 mm (4.0146 in.)
	Minimum Intake	Exhaust	101.55 mm (3.9980 in.)
		Intake	5.970 – 5.985 mm (0.1957 – 0.1963 in.)
	Stem diameter	Exhaust	5.960 – 5.975 mm (0.2346 – 0.2352 in.)
		STD Intake	0/025 – 0.060 mm (0.0010 – 0.0024 in.)
	Stem oil clearance	Exhaust	0.035 – 0.070 mm (0.0014 – 0.0028 in.)
		Maximum Intake	0.08 mm (0.0031 in.)
	Margin thickness	Exhaust	0.10 mm (0.0039 in.)
		STD	0.9 mm (0.035 in.)
Valve spring	Deviation	Maximum	2.0 mm (0.079 in.)
		Free length	40.45 mm (1.5925 in.)
		Installed tension at 31.1 mm (1.224 in.)	177 – 195 N (18.0 – 19.9 kgf, 39.7 – 44.1 lbf)
Valve lifter	Cylinder head lifter bore diameter		28.010 – 28.031 mm (1.1028 – 1.1036 in.)
	Lifter diameter		27.975 – 27.985 mm (1.1014 – 1.1018 in.)
	Oil clearance	STD	0.025 – 0.056 mm (0.0010 – 0.0022 in.)
		Maximum	0.08 mm (0.0031 in.)
Camshaft	Thrust clearance		0.035 – 0.110 mm (0.0014 – 0.0043 in.)
	Journal oil clearance	STD	0.025 – 0.062 mm (0.0010 – 0.0024 in.)
		Maximum	0.08 mm (0.0031 in.)
	Journal diameter		26.969 – 26.985 mm (1.0618 – 1.0624 in.)
	Circle runout		0.06 mm (0.0024 in.)
	Cam lobe height	STD Intake	46.57 – 46.67 mm (1.8335 – 1.8374 in.)
		Exhaust	47.52 – 47.62 mm (1.8709 – 1.8748 in.)
	Camshaft gear backlash	Minimum Intake	46.10 mm (1.8150 in.)
		Exhaust	47.05 mm (1.8524 in.)
		STD	0.014 – 0.070 mm (0.0006 – 0.0028 in.)
		Maximum	0.17 mm (0.0067 in.)
Manifold	Warpage	Maximum Intake	0.1 mm (0.004 in.)
		Exhaust	0.4 mm (0.016 in.)
Cylinder block	Cylinder head surface warpage	Maximum	0.20 mm (0.0079 in.)
		STD	82.200 – 82.213 mm (3.2362 – 3.2367 in.)
		Maximum STD	86.40 mm (3.2441 in.)
		O/S 0.50	86.90 mm (3.4213 in.)
Piston and piston ring	Piston diameter	STD	82.148 – 82.182 mm (3.2341 – 3.2355 in.)
		Minimum	0.018 – 0.065 mm (0.0007 – 0.0026 in.)
	Piston oil clearance	STD No.1	0.08 – 0.12 mm (0.0031 – 0.0047 in.)
		No.2	0.06 – 0.10 mm (0.0024 – 0.0039 in.)
		Oil	0.03 – 0.07 mm (0.0012 – 0.0028 in.)
	Piston ring groove clearance	STD No.1	0.27 – 0.43 mm (0.0106 – 0.0169 in.)
		No.2	0.39 – 0.58 mm (0.0154 – 0.0228 in.)
		Oil	0.20 – 0.44 mm (0.0079 – 0.0173 in.)
		Maximum No.1	0.82 mm (0.0323 in.)
		No.2	1.00 mm (0.0394 in.)
	Piston ring end gap	Oil	0.90 mm (0.0354 in.)

Connecting rod	Thrust clearance	STD	0.08 – 0.30 mm (0.0031 – 0.0118 in.)
		Maximum	0.40 mm (0.0157 in.)
	Connecting rod oil clearance	STD	0.038 – 0.056 mm (0.0015 – 0.0022 in.)
		Maximum	0.10 mm (0.0039 in.)
	Connecting rod bearing center wall thickness (Reference)	STD Mark 1	1.478 – 1.481 mm (0.0582 – 0.0583 in.)
		Mark 2	1.481 – 1.484 mm (0.0583 – 0.0584 in.)
		Mark 3	1.484 – 1.487 mm (0.0584 – 0.0585 in.)
		Mark 4	1.487 – 1.490 mm (0.0585 – 0.0587 in.)
		Mark 5	1.490 – 1.493 mm (0.0587 – 0.0588 in.)
	Rod bend	Maximum per 100 mm (3.94 in.)	0.05 mm (0.0020 in.)
	Rod twist	Maximum per 100 mm (3.94 in.)	0.15 mm (0.0059 in.)
	Bushing inside diameter		31.015 – 31.027 mm (1.2211 – 1.2215 in.)
	Piston pin diameter		31.000 – 31.012 mm (1.2205 – 1.2209 in.)
	Piston pin oil clearance	STD	0.011 – 0.019 mm (0.0004 – 0.0007 in.)
Crankshaft		Maximum	0.025 mm (0.0010 in.)
	Connecting rod bolt tension portion diameter	STD	8.2 – 8.3 mm (0.323 – 0.327 in.)
		Minimum	8.0 mm (0.315 in.)
	Thrust clearance	STD	0.040 – 0.240 mm (0.0016 – 0.0094 in.)
		Maximum	0.30 mm (0.0118 in.)
	Thrust washer thickness	STD	2.680 – 2.730 mm (0.1055 – 0.1075 in.)
		U/S 0.125	2.743 – 2.793 mm (0.1080 – 0.1100 in.)
		U/S 0.250	2.805 – 2.855 mm (0.1104 – 0.1124 in.)
	Main journal oil clearance	STD	0.032 – 0.056 mm (0.0013 – 0.0022 in.)
		Maximum	0.10 mm (0.0039 in.)
	Main journal diameter		56.992 – 57.010 mm (2.2438 – 2.2445 in.)
	Main bearing center wall thickness (Reference)	STD Mark 1	1.976 – 1.979 mm (0.0778 – 0.0779 in.)
		Mark 2	1.979 – 1.982 mm (0.0779 – 0.0780 in.)
		Mark 3	1.982 – 1.985 mm (0.07880 – 0.0781 in.)
		Mark 4	1.985 – 1.988 mm (0.0781 – 0.0783 in.)
		Mark 5	1.988 – 1.991 mm (0.07853 – 0.07874 in.)
	Crank pin diameter		50.482 – 50.500 mm (1.9875 – 1.9882 in.)
	Circle runout	Maximum	0.025 mm (0.0010 in.)
	Main journal taper and out-of-round	Maximum	0.01 mm (0.0004 in.)
	Crank pin taper and out-of-round	Maximum	0.021 mm (0.0004 in.)

TORQUE SPECIFICATION

Part tightened		N·m	kgf·cm	ft·lbf
No.2 idler pulley x Oil pump		36.8	375	27
Supply pump drive pulley x Supply pump		103	1,050	76
No.1 idler pulley x Cylinder head		35	350	25
Camshaft timing pulley x Camshaft		88.2	900	65
Timing belt tensioner x Water pump		21	210	15
Timing belt plate x Camshaft oil seal retainer		9	90	78 in.·lbf
Engine mounting bracket x Cylinder block		36.8	375	27
Engine mounting bracket x Water pump		63.7	650	47
Crankshaft pulley x Crankshaft		180	1,800	130
Glow plug for engine x Cylinder head		12.3	125	9
Cylinder head x Cylinder block	1st	45	460	33
	2nd	Turn 90°	Turn 90°	Turn 90°
	3rd	Turn 90°	Turn 90°	Turn 90°
	4th	Turn 90°	Turn 90°	Turn 90°
Camshaft bearing cap x Cylinder head		20	200	15
Camshaft oil seal retainer x Cylinder head		8.8	90	78 in.·lbf
Cylinder head cover x Cylinder head		13.2	135	10
No.2 nozzle leakage pipe x Cylinder head		21	215	15
Glow plug for power heater x Cylinder head		13	130	9
Vacuum pump x Cylinder head		28	280	20
EGR valve x Cylinder head		18.1	185	13
Water outlet x Cylinder head		20.5	210	15
No.3 timing belt cover x Cylinder head		7.4	75	65 in.·lbf
Intake Manifold x Cylinder head		20.5	210	15
Intake air connector with diesel throttle body x Intake manifold		20.5	210	15
Exhaust manifold x Cylinder head		46.5	475	34
Cylinder block oil orifice x Cylinder block		9	90	78 in.·lbf
Oil nozzle x Cylinder block		7.4	75	65 in.·lbf
Main bearing cap x Cylinder block		115	1,150	85
Connecting rod cap x Connecting rod	1st	30	300	22
	2nd	Turn 90°	Turn 90°	Turn 90°
Rear oil seal retainer x Cylinder block		7.4	75	65 in.·lbf
Oil jet pressure valve x Cylinder block		30	310	22
No.1 fuel pipe x Cylinder block	12 mm head	8.8	90	78 in.·lbf
	14 mm head	20.5	210	15
No.1 oil cooler pipe x Cylinder block		56.4	575	42
Engine coolant drain union x Cylinder block		28.5	290	21
Oil cooler union bolt X Cylinder block		171	1,745	126
Alternator bracket x Cylinder block		37	380	27
Drive belt adjusting bar x Oil pump		31.4	320	23
Flywheel x Crankshaft		88.2	900	65

TURBOCHARGING
SERVICE DATA

SS0JO-02

Turbocharger	Turbocharging pressure		58.5 – 78.9 kPa (0.60 – 0.80 kgf/cm ² , 8.5 – 11.4 psi)
	Turbine wheel axial play	Maximum	0.09 mm (0.0035 in.) or less
	Turbine wheel radial play	Maximum	0.16 mm (0.0063 in.) or less

TORQUE SPECIFICATION

Parttightened		N·m	kgf·cm	ft·lbf
G coupling		8.3	85	74 in·lbf
Compressor housing x Bearing housing		4.7	48	42 in·lbf
Turbocharger actuator x Compressor housing		7.8	80	69 in·lbf
Turbo water pipe x Turbocharger		13.2	135	10
No.1 turbo oil pipe x Turbocharger		13.2	135	10
Turbocharger x Exhaust manifold		53	530	39
Turbo oil inlet pipe x Turbocharger, Cylinder block	Union bolt	31	320	23
	Nut	8.8	90	78 in·lbf
Stay on No.1 turbo oil pipe x Cylinder head		8.8	90	78 in·lbf
Exhaust manifold converter x Turbocharger		25	250	18
Exhaust manifold stay x Exhaust manifold converter		61	620	45
Exhaust manifold stay x Cylinder block		61	650	45
Turbocharger stay x Cylinder head		54	550	40
Turbocharger stay x Exhaust manifold converter		54	550	40
No.2 exhaust manifold heat insulator x Turbocharger		12	120	9
No.1 turbo heat insulator x Turbocharger	Bolt	12	120	9
	Nut	18.1	185	13
No.1 turbo heat insulator x Exhaust manifold converter		12	120	9
No.2 turbo heat insulator x Exhaust manifold converter		25	255	18

EMISSION CONTROL

SS14C-01

SERVICE DATA

E-VRV for EGR	Resistance	at 20° C (68° F)	11 – 13 Ω
EGR cut VSV	Resistance	at 20° C (68° F)	33 – 39 Ω

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
EGR x Cylinder head	18.1	185	13
Exhaust manifold converter x Turbocharger assembly	25	255	18
Turbocharger stay x Exhaust manifold converter, Cylinder head	54	551	40
Exhaust manifold stay x Exhaust manifold converter, Cylinder block	61	622	45
Front exhaust pipe x Exhaust manifold converter	62	630	46
Front exhaust pipe x Exhaust tail pipe	44	440	32

SS14E-01

Watertemperature sensor	Resistance	at -20°C (-4°F) at 0°C (0°F) at 20°C (68°F) at 40°C (104°F) at 60°C (140°F) at 80°C (176°F)	10 – 20 Ω 4 – 7 Ω 2 – 3 Ω 0.9 – 1.3 Ω 0.4 – 0.7 Ω 0.2 – 0.4 Ω
Intake air temperature sensor	Resistance	at -20°C (-4°F) at 0°C (0°F) at 20°C (68°F) at 40°C (104°F) at 60°C (140°F) at 80°C (176°F)	10 – 20 Ω 4 – 7 Ω 2 – 3 Ω 0.9 – 1.3 Ω 0.4 – 0.7 Ω 0.2 – 0.4 Ω
Fueltemperature sensor	Resistance	at 40°C (104°F)	0.5 – 3.0 Ω
Fuel pressure sensor	Power source voltage		4.5 – 5.5 V
Camshaft position sensor	Resistance	at Cold at Hot	1,630 – 2,740 Ω 2,065 – 3,225 Ω
Crankshaft position sensor	Resistance	at Cold at Hot	1,630 – 2,740 Ω 2,065 – 3,225 Ω
Air flow mater	Resistance (THA – E2)	at -20°C (-4°F) at 20°C (68°F) at 60°C (140°F)	12.5 – 16.9 kΩ 2.19 – 2.67 kΩ 0.50 – 0.68 kΩ
ECU	Voltage (PCR – E2) Resistance	at 20°C (68°F)	Approx. 1.0 V
		LU+A – +B LU-A – +B LU+B – +B LU-B – +B THOP – E1 THW – E2 THA – E2 THF – E2 G+ – G- G+ – G- NE+ – NE- NE+ – NE- PDL – E1 THAF – E2 MREL – E01 EDUREL – E01 EGR – +B EGRC – +B PA – +B RINJ1 – E01 RINJ2 – E01 RINJ3 – E01 RINJ4 – E01 PCV1 – COM PCV2 – COM	15 – 30 15 – 30 15 – 30 15 – 30 10 or less 0.2 – 0.4 k 2.0 – 3.0 k 2.0 – 3.0 k 1630 – 2740 2065 – 3225 1630 – 2740 2065 – 3225 10 or less 2.0 – 3.0 k 60 – 80 60 – 80 11 – 13 37 – 44 37 – 44 30 – 9600 30 – 9600 30 – 9600 30 – 9600 1.5 – 1.8 1.5 – 1.8

TORQUE SPECIFICATION

Parttightened	N·m	kgf·cm	ft·lbf
Diesel throttle body x Intake air connector	20.5	210	15
Water temperature sensor x Cylinder head	20.4	208	15
Intake air temperature sensor x Intake air connector	34.3	350	25
Camshaft position sensor x Cylinder head	8.8	90	78 in.·lbf
Crankshaft position sensor x Oil pump	8.8	90	78 in.·lbf

ENGINE FUEL
SERVICE DATA

SS14G-01

Fuel heater	Resistance	at 20° C (68° F)	0.5 – 2.0 Ω
Injector	Resistance	at 20° C (68° F)	2.5 – 3.1 Ω
SCV1	Resistance	at 20° C (68° F)	1.5 – 1.7 Ω
SCV2	Resistance	at 20° C (68° F)	1.5 – 1.7 Ω

TORQUE SPECIFICATION

Parttightened	N·m	kgf·cm	ft·lbf	
Fuel heater x Fuel filter	1.96	20	17 in.·lbf	
Nozzle holder clamp x Cylinder head	25.7	262	19	
Nozzle leakage pipe x Injector	Hollow screw	16	163	12
	Union bolt	12.5	128	9
Check valve plug x Overflow screw	9.8	100	87 in.·lbf	
Check valve x Cylinder head	21	214	15	
Injection pipe, Fuel inlet pipe x Common rail	for use with SST	37	377	27
		41	418	30
Injection pipe x Injector	for use with SST	31	316	23
		34	347	25
Injection pipe clamp x Intake manifold	5	51	44 in.·lbf	
Supply pump x Water pump	20.5	210	15	
Supply pump stay x Cylinder block, Supply pump	20.5	210	15	
Fuel inlet pipe x Supply pump	for use with SST	31	316	23
		34	347	25
Fuel inlet pipe clamp x Intake manifold	7.4	75	65 in.·lbf	
Common rail x Cylinder head	43	440	32	

COOLING

SSQJV-02

SERVICE DATA

Thermostat	Valve opening temperature		80 – 84 °C (176 – 183 °F)
	Valve lift	at 95 °C (203 °F)	8.5 mm (0.33 in.) or more
Radiator cap	Relief valve opening pressure	STD	93.3 – 122.7 kPa (0.95 – 1.25 kgf/cm ² , 13.5 – 17.8 psi)
		Minimum	79 kPa (0.8 kgf/cm ² , 11.5 psi)
Electric	Rotating amperage	No.1	Approx. 13.2 A
Cooling fan		No.2	Approx. 9.8 A

TORQUE SPECIFICATION

Parttightened	N·m	kgf·cm	ft·lbf
Engine drain plug x Engine coolant drain union	13	130	9
Water pump x Cylinder block	31.4	320	23
Water pump x Supply pump	20.5	210	15
Water inlet x Cylinder block	8.8	90	78 in.·lbf

LUBRICATION

SERVICE DATA

SSQJX-02

Oil pressure		at idle speed at 4,500 rpm	29 kPa (0.3 kgf/cm ² , 4.2 psi) or more 245 – 588 kPa (2.5 – 6.0 kgf/cm ² , 36 – 85 psi)
Oil pump	Tip clearance	STD	0.08 – 0.16mm (0.0031 – 0.0063 in.)
		Maximum	0.20 mm (0.0079 in.)
	Body clearance	STD	0.10 – 0.17 mm (0.0039 – 0.0067 in.)
		Maximum	(0.20 mm (0.0079 in.)

TORQUE SPECIFICATION

Parttightened	N·m	kgf·cm	ft·lbf
Engine oil drain plug x No. 1 oil pan	34.3	350	25
Relief valve plug x Oil pump body	49	500	36
Oil pump x Cylinder block	31.4	320	23
Crankshaft position sensor x Oil pump	8.8	90	78 in.·lbf
No. 1 oil pan x Cylinder block, Oil pump, Rear oil seal retainer			
10 mm head bolt and nut	8.0	80	69 in.·lbf
12 mm head bolt	20.5	210	15
Oil strainer x No. 1 oil pan			
Bolt	20.5	210	15
Nut	13.2	135	10
Oil strainer x Oil pump	13.2	135	10
No. 1 oil pan x No. 2 oil pan	11.7	120	9
Oil level sensor x No. 1 oil pan	5.4	55	48 in.·lbf
Oil dipstick x Supply pump stay	18	185	13
Drive belt adjusting bar x Oil pump	31.4	320	23
Drive belt adjusting bar x Alternator	18.1	185	13
Vacuum pump oil pipe x Cylinder block	8.8	90	78 in.·lbf
Turbo oil inlet pipe x Turbocharger, Cylinder block, Cylinder head			
Union bolt	31	320	23
Bolt and nut	8.8	90	78 in.·lbf
Oil cooler x Cylinder block	66	670	48
Oil nozzle x Cylinder block	7.4	75	65 in.·lbf
Oil jet pressure valve x Cylinder block	30	310	22

STARTING
SERVICE DATA

SS0UY-03

Pre-heating System	Light lighting time	at 28° C (82° F)	2.1 seconds
	Glow plug resistance	at 20° C (68° F)	Approx. 0.72 Ω
Starter	Rated voltage and output power		12 V 2.0 kW
	No-load characteristics	Current	160 A or less at 10.5 V
		rpm	3,000 rpm or more
	Brush length	STD	14.5 mm (0.571 in.)
		Minimum	9.0 mm (0.354 in.)
	Commutator		
		Diameter	STD
		Minimum	30.5 mm (1.201 in.)
	Undercut depth	STD	0.9 mm (0.035 in.)
		Minimum	0.3 mm (0.012 in>)
	Circle runout	Maximum	0.03 mm (0.0012 in.)
	Armature thrust clearance	STD	0.3 mm (0.012 in.)
Maximum		0.6 mm (0.024 in.)	
Pinion gear clearance	Maximum	3.9 mm (0.154 in.)	

TORQUE SPECIFICATION

Parttightened	N·m	kgf·cm	ft·lbf
Glow plug x Cylinder head	13	130	10
Commutator end frame x Starter drive housing	6.5	66	58 in.·lbf
Commutator end cover x Brush holder	1.7	17	15 in.·lbf
Starter housing x Magnetic switch	5.0	51	44 in.·lbf
Lead wire x Terminal C of starter	8.0	82	71 in.·lbf

CHARGING

SERVICE DATA

SS0YW-05

Battery	Specific gravity	at 20°C (68°F)	1.25 – 1.29
	Voltage	at 20°C (68°F)	12.5 – 12.9 V
Drive belt	Deflection	New belt	9 – 11 mm (0.35 – 0.43 in.)
		Used belt	12 – 16 mm (0.47 – 0.63 in.)
	Tension	New belt	490 – 686 N (50 – 70 kgf)
		Used belt	245 – 441 N (25 – 45 kgf)
Alternator	Rated output		12 V 120 A
	Rotor coil resistance	at 20°C (68°F)	2.1 – 2.5 Ω
	Slip ring diameter	STD	14.2 – 14.4 mm (0.559 – 0.567 in.)
		Minimum	12.8 mm (0.504 in.)
	Brush exposed length	STD	9.5 – 11.5 mm (0.374 – 0.453 in.)
		Minimum	1.5 mm (0.059 in.)
IC regulator	Regulating voltage	at 115°C (239°F)	13.2 – 14.0 V

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
Retainer x Drive end frame	3.0	31	27 in·lbf
Rectifier end frame x Drive end frame	4.5	46	40 in·lbf
Rectifier end frame without cord clip x Drive end frame	4.5	46	40 in·lbf
Rectifier end frame with cord clip x Drive end frame	5.4	55	48 in·lbf
Alternator pulley x Rotor	110.5	1,125	81
Rectifier holder x Lead wire on rectifier end frame	2.94	30	26 in·lbf
IC regulator x Rectifier end frame	1.96	20	17 in·lbf
IC regulator x Rectifier holder	1.96	20	17 in·lbf
Brush holder x Rectifier holder	1.96	20	17 in·lbf
Brush holder x IC regulator	1.96	20	17 in·lbf
Rear end cover x Rectifier holder	4.4	45	39 in·lbf
Plate terminal x Rectifier holder	3.85	39	34 in·lbf
Terminal insulator x Rectifier holder	4.1	42	36 in·lbf