

AIR CONDITIONING

SERVICE DATA

SS05V-08

Refrigerant charge volume	600 ± 50 g (21.16 ± 1.76 oz.)
Drive belt tension	-
New belt	165 ± 22lbf
Used belt	88 ± 22 lbf
Idle-up speed	-
Magnetic clutch not engaged	700 ± 50 rpm
Magnetic clutch engaged	700 ± 50 rpm
Magnetic clutch clearance	0.5 ± 0.15 mm (0.020 ± 0.0059 in.)

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
Compressor x Discharge hose	10	100	7
Compressor x Suction hose	10	100	7
Condenser x Discharge hose	5.4	55	48 in.·lbf
Condenser x Liquid tube	5.4	55	48 in.·lbf
Expansion valve x Evaporator	5.4	55	48 in.·lbf
Compressor x Engine	25	250	18
Compressor x Compressor bracket	25	250	18
Drive belt adjusting bar bracket x Compressor	25	250	18
Pivot bolt	56	560	41
Adjusting lock bolt	18	185	13
Pressure switch x Liquid tube	10	100	7
Pressure plate x Compressor	13.2	135	9

AUTOMATIC TRANSAXLE

SERVICE DATA

SS0BL-04

Line pressure (wheel locked)	Engine idling	
	D position	401 - 461 kPa (4.1 - 4.7 kgf/cm ² , 58 - 66 psi)
	R position	804 - 882 kPa (8.2 - 9.0 kgf/cm ² , 117 - 128 psi)
at stall (Throttle valve fully opened)	D position	1,138 - 1,236 kPa (11.6 - 12.6 kgf/cm ² , 165 - 179 psi)
	R position	1,716 - 1,854 kPa (17.5 - 18.9 kgf/cm ² , 249 - 269 psi)
Engine stall revolution		2,325 – 2,775 rpm
Time lag	N → D position	Less than 1.2 seconds
	N → R position	Less than 1.5 seconds
Engine idle speed (A/C OFF)	N position	700 ± 50 rpm
Throttle cable adjustment (Throttle valve fully opened)		Between boot and face and inner cable stopper 0 - 1 mm (0 - 0.04 in.)
Drive plate runout	Max.	0.3 mm (0.0118 in.)
Torque converter clutch runout	Max.	0.20 mm (0.0079 in.)
Torque converter clutch installation distance		More than 13.7 mm (0.539 in.)
Lock-up point (Throttle valve opening 5%)		
3rd gear (O/D main switch OFF)	Lock-up ON	65 - 70 km/h (40 - 43 mph)
	Lock-up OFF	57 - 62 km/h (35 - 39 mph)
O/D gear	Lock-up ON	65 - 70 km/h (40 - 43 mph)
	Lock-up OFF	57 - 62 km/h (35 - 39 mph)
Shift schedule		
D position		
(Throttle valve fully opened)	1 → 2	65 - 71 km/h (40 - 44 mph)
	2 → 3	122 - 131 km/h (76 - 81 mph)
	3 → O/D	188 - 198 km/h (117 - 123 mph)
	O/D → 3	181 - 191 km/h (112 - 119 mph)
	3 → 2	113 - 122 km/h (70 - 76 mph)
	2 → 1	54 - 59 km/h (34 - 37 mph)
(Throttle valve fully closed)	3 → O/D	38 - 43 km/h (24 - 27 mph)
	O/D → 3	22 - 27 km/h (14 - 17 mph)
2 position		
(Throttle valve fully opened)	1 → 2	65 - 71 km/h (40 - 44 mph)
	3 → 2	132 - 141 km/h (82 - 88 mph)
	2 → 1	54 - 59 km/h (34 - 37 mph)
L position		
(Throttle valve fully opened)	3 → 2	115 - 124 km/h (71 - 77 mph)
	2 → 1	59 - 64 km/h (37 - 40 mph)

TORQUE SPECIFICATION

Part tightened		N·m	kgf·cm	ft·lbf
Front side engine mounting insulator x Front frame assembly		80	820	59
Rear engine mounting insulator x Front frame assembly		66	670	48
LH transaxle mounting insulator x Front frame assembly		80	820	59
Engine mounting insulator x Front frame assembly		48	490	35
Transaxle x Engine	17 mm bolt	66	670	48
	14 mm bolt	48	490	35
Torque converter clutch x Drive plate		41	420	30
Valve body x Transaxle case		11	110	8
Oil strainer x Valve body (See page AX-35)	Bolt A	10	100	7
	Bolt B	11	110	8
Oil pan x Transaxle case		7.8	80	69 in.·lbf
Oil pan drain plug		49	500	36
Park/Neutral position switch x Transaxle case	Bolt	5.4	55	48 in.·lbf
	Nut	6.9	70	61 in.·lbf
Connector clamp x Valve body		6.6	67	58 in.·lbf
Manual valve body x Transaxle case		11	110	8
Line pressure test plug x Transaxle case		7.5	80	69 in.·lbf
Detent spring x Manual valve body		11	110	8
Oil pipe bracket x Transaxle case		10	100	7
Steering gear housing x Front frame assembly		181	1,850	134
Stabilizer bar bracket x Front frame assembly		19	195	14
Stabilizer bar link x Stabilizer bar		39	400	29
Lower suspension arm x Lower ball joint		127	1,300	94
Tie rod end x Steering knuckle		49	500	36
Drive shaft lock nut		294	3,000	217
Direct clutch speed sensor x Transaxle case		11	110	8
Exhaust manifold bracket x Transaxle case		20	200	15
Exhaust manifold plate		20	200	15
Front frame assembly x Body	19 mm bolt	181	1,850	134
	14 mm bolt	32	330	24
	Nut	36	370	27
Front exhaust pipe x Exhaust center pipe		43	440	32
Exhaust manifold x Front exhaust pipe		62	630	46
Exhaust front pipe support stay x Exhaust front pipe support bracket		33	330	24
Starter x Torque converter clutch housing		39	400	29
Transaxle control shaft lever x Park/neutral position switch		15	150	11
Throttle cable adjusting nut		15	150	11
Drive plate x Crankshaft		83	850	61
Shift control cable x Transaxle control shaft lever		15	150	11
Throttle cable retaining plate set bolt		5.4	55	48 in.·lbf
Shift solenoid valve No. 1, No. 2, SL, SLN x Valve body		6.6	67	58 in.·lbf
Front wheel nut		103	1,050	76
Exhaust front pipe support bracket x Body		21	210	15
PS reservoir pipe x Front frame		10	100	7

Engine hood x Hood hinge	26	265	19
Engine hanger x Engine	20	200	14
Cruise control actuator x Body	13	130	9
RH drive shaft x Rear side engine mounting insulator	32	330	24
Hole cover x Torque converter clutch housing	41	420	30
Floor shift assembly x Body	12	120	9

BODY ELECTRICAL

SERVICE DATA

SS05U-04

AUTOMATIC LIGHT CONTROL SENSOR	
(Connector disconnected)	
1 - Ground Ignition switch LOCK or ACC)	No voltage
1 - Ground (Ignition switch ON)	Battery positive voltage
4 - Ground Ignition switch LOCK or ACC)	No voltage
4 - Ground (Ignition switch ON)	5.2 - 9.0V
SPEEDOMETER (ON-VEHICLE)	
USA:	
Standard indication (mph)	Allowable range (mph)
20	18 - 24
40	38 - 44
60	56 - 66
80	78 - 88
100	98 - 110
120	118 - 132
CANADA:	
Standard indication (km/h)	Allowable range (km/h)
20	17 - 24
40	38 - 46
60	57.5 - 67
80	77 - 88
100	96 - 109
120	115 - 130
140	134 - 151.5
160	153 - 173
TACHOMETER (ON-VEHICLE)/ DC 13.5 V 25 °C at (77 °F)	
Standard indication	Allowable range
700	630 - 770
1,000	900 - 1,100
2,000	1,850 - 2,150
3,000	2,800 - 3,200
4,000	3,800 - 4,200
5,000	4,800 - 5,200
6,000	5,750 - 6,250
7,000	6,700 - 7,300
FUEL RECEIVER GAUGE	
A - B	Approx. 250 Ω
C - D	Approx. 250 Ω
FUEL SENDER GAUGE	
Float position mm (in.)	Resistance (Ω)
F: Approx. 91.1 (1.36) ± 3.0 (0.12)	Approx. 2.0±1.0
1/2: Approx. 34.1 (2.06) ± 3.0 (0.12)	Approx. 26.1±3.0
E: Approx. 30.8 (5.31) ± 3.0 (0.12)	Approx. 48.7±1.0

2001 AVALON (RM808U)

ENGINE COOLANT TEMPERATURE SENDER GAUGE (Resistance)	
Temperature °C (°F)	Resistance (Ω)
A - B	Approx. 250 Ω
C - D	Approx. 250 Ω
LIGHT FAILURE RELAY (Wire Harness Side)	
3 - Ground (Light control switch OFF)	No voltage
3 - Ground (Light control switch TAIL or HEAD)	Battery positive voltage
4 - Ground (Ignition switch LOCK or ACC)	No voltage
4 - Ground (Ignition switch ON)	Battery positive voltage
7 - Ground (Stop light switch OFF)	No voltage
7 - Ground (Stop light switch ON)	Battery positive voltage
8 - Ground (Ignition switch LOCK or ACC)	No voltage
8 - Ground (Ignition switch ON)	Battery positive voltage
SLIDING ROOF CONTROL RELAY AND SWITCH (Wire Harness Side)	
8 - Ground (Ignition switch LOCK or ACC)	* No voltage
8 - Ground (Ignition switch ON)	Battery positive voltage
5 - Ground (Constant)	Battery positive voltage

*: Exceptions: For 60 seconds after the ignition switch ON→OFF (ACC) or until driver or passenger door is opened after the ignition switch ON→OFF (ACC).

BODY

TORQUE SPECIFICATION

SS0G3-06

Part tightened	N·m	kgf·cm	ft·lbf
FRONT BUMPER	-	-	-
Front bumper upper reinforcement x Body	11	115	8
Front bumper upper reinforcement x Side support	5.4	55	48 in.·lbf
Side support x Body	11	115	8
Front bumper reinforcement x Body	13	130	9
Front bumper cover x Body	5.4	55	48 in.·lbf
Fog light assembly x Front bumper cover	8.3	85	74 in.·lbf
REAR BUMPER	-	-	-
Rear bumper arm mounting bracket x Body	33	340	25
Rear bumper reinforcement x Rear bumper arm mounting bracket	33	340	25
Rear bumper cover x Body	5.4	55	48 in.·lbf
HOOD	-	-	-
Hood x Hood hinge	13	130	9
Hood lock x Body	6.9	70	61 in.·lbf
HOOD SUPPORT	-	-	-
Hood support x Hood	17	175	13
Hood support x Body	17	175	13
FRONT DOOR	-	-	-
Outside rear view mirror x Door panel	7.8	80	69 in.·lbf
Door check x Body	25	260	19
Door glass x Window regulator assembly	5.4	55	48 in.·lbf
Window regulator assembly x Door panel	5.4	55	48 in.·lbf
Door lock x Door panel Bolt:	4.9	50	43 in.·lbf
Door lock x Door panel Nut:	5.4	55	48 in.·lbf
Outside handle x Door panel	5.4	55	48 in.·lbf
Outside handle x Key cylinder	5.4	55	48 in.·lbf
Door hinge x Body	25	260	19
Door hinge x Door panel	25	260	19
REAR DOOR	-	-	-
Door check x Body	25	260	19
Door glass x Window regulator assembly	5.4	55	48 in.·lbf
Window regulator assembly x Door panel	5.4	55	48 in.·lbf
Door lock x Door panel	5.4	55	48 in.·lbf
Outside handle x Door panel	5.4	55	48 in.·lbf
Door hinge x Body	25	260	19
Door hinge x Door panel	25	260	19
LUGGAGE COMPARTMENT DOOR AND HINGE	-	-	-
Luggage compartment door x Door hinge arm	7.8	80	69 in.·lbf
Door lock x Luggage compartment door	5.4	55	48 in.·lbf
Door lock striker x Body	5.4	55	48 in.·lbf

FRONT WIPER AND WASHER	-	-	-
Wiper arm x Wiper motor and link assembly	24	248	18
Wiper motor and link assembly x Body	7.0	71	62 in.·lbf
Wiper motor x Wiper link	7.5	76	66 in.·lbf
SLIDING ROOF	-	-	-
Sliding roof glass assembly x Drive cable	4.0	41	35 in.·lbf
Drive gear x Body	5.4	55	48 in.·lbf
Sliding roof bracket x Body	5.4	55	48 in.·lbf
Sliding roof bracket x Sliding roof assembly	5.4	55	48 in.·lbf
Sliding roof assembly x Body	5.4	55	48 in.·lbf
INSTRUMENT PANEL	-	-	-
Front passenger airbag assembly x Instrument panel reinforcement	20	204	15
Steering wheel set nut	50	510	37
FRONT SEAT	-	-	-
Front seat assembly x Body	37	375	27
Front seat cushion x Front seat adjuster	18	185	13
Front seatback x Front seat adjuster	43	440	32
Front seatback x Center armrest	41	420	30
REAR SEAT	-	-	-
Rear seatback x Center armrest	5.9	60	52 in.·lbf
Rear seatback x Body Center	41	420	30
Rear seatback x Body LH, RH Side	18	185	13
SEAT BELT	-	-	-
Front seat outer belt shoulder anchor x Adjuster anchor	41	420	30
Front seat outer belt floor anchor x Body	41	420	30
Front seat outer belt retractor x Body Upper bolt	7.5	76	66 in.·lbf
Front seat outer belt retractor x Body Lower bolt	41	420	30
Front seat adjustable anchor x Body	41	420	30
Front seat inner belt x Seat adjuster	41	420	30
Front seat center belt x Seat adjuster	41	420	30
Rear seat outer belt floor anchor x Body	41	420	30
Rear seat outer belt retractor x Body	41	420	30

BRAKE

SS0FS-03

SERVICE DATA

Brake pedal height (from asphalt sheet)		153.3 - 163.3 mm (6.035 - 6.429 in.)
Brake pedal freeplay		1 - 6 mm (0.04 - 0.24 in.)
Brake pedal reserve distance at 490 N (50 kgf, 110.2 lbf)		More than 75 mm (3.0 in.)
Brake booster push rod to piston clearance (w/ SST)		0 mm (0 in.)
Front brake pad thickness	STD Minimum	11.0 mm (0.433 in.) 1.0 mm (0.039 in.)
Front brake disc thickness	STD Minimum	28.0 mm (1.102 in.) 26.0 mm (1.024 in.)
Front brake disc runout	Maximum	0.05 mm (0.0020 in.)
Rear brake pad thickness	STD Minimum	10.0 mm (0.394 in.) 1.0 mm (0.039 in.)
Rear brake disc thickness	STD Minimum	12.0 mm (0.472 in.) 10.5 mm (0.413 in.)
Rear brake disc runout	Maximum	0.15 mm (0.0059 in.)
Rear brake disc inside diameter	STD Maximum	170 mm (6.69 in.) 171 mm (6.73 in.)
Parking brake shoe lining thickness	STD Minimum	2.0 mm (0.079 in.) 1.0 mm (0.039 in.)
Parking brake pedal travel at 294 N (30 kgf, 66 lbf)		3 - 6 clicks
Parking brake clearance between rear shoe and lever		Less than 0.35 mm (0.0138 in.)
Parking brake adjusting shim thickness		0.3 mm (0.012 in.) 0.6 mm (0.024 in.) 0.9 mm (0.035 in.)

TORQUE SPECIFICATION

Part tightened		N·m	kgf·cm	ft·lbf
Master cylinder x Piston stopper bolt	w/o VSC	10	100	7
Master cylinder x Reservoir		1.7	17.5	15.2 in.·lbf
Master cylinder x Brake booster		13	130	9
Brake line union nut	10 mm 12 mm	15 20	155 200	11 15
Brake booster clevis lock nut		25	260	19
Brake booster x Pedal bracket		13	130	9
Brake pedal x Pedal bracket		39	400	29
Front brake caliper installation bolt		34	350	25
Bleeder plug		8.3	85	74 in.·lbf
Front brake torque plate x Steering knuckle		107	1,090	79
Front brake caliper x Flexible hose		29	300	22
Flexible hose x Shock absorber bracket		29	300	22
Rear brake caliper installation bolt		34	350	25
Rear brake caliper x Flexible hose		29	300	22
Rear brake torque plate x Rear axle carrier		47	475	34
Parking brake pedal bracket x Body		61	620	45
ABS actuator x ABS actuator bracket		13	130	9
ABS actuator x ECU		3.0	31	27 in.·lbf
ABS & VSC actuator x Actuator bracket		13	130	9
ABS (& VSC) actuator bracket x Body		19	195	14
Front speed sensor installation bolt		8.0	82	71 in.·lbf
Rear speed sensor installation bolt		8.0	82	71 in.·lbf
ABS speed sensor harness clamp bolt		5.4	55	48 in.·lbf
Precharge pump x Precharge pump bracket	Bolt Nut	8.0 13	82 130	71 in.·lbf 9
Precharge pump brack x Body		19	195	14
Precharge pump x Master cylinder pressure sensor		81	830	60

CHARGING

SERVICE DATA

SS0ET-02

Battery	Specific gravity (Except maintenance-free battery) at 20° C (68° F)	1.25 - 1.29
	Voltage (Maintenance-free battery) at 20° C (68° F)	12.5 - 12.9 V
Drive belt	Tension	
	New belt Used belt	175 ± 5 lbf 115 ± 20 lbf
Generator	Rated output	12 V 100 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	10.5 mm (0.413 in.)
	Minimum	1.5 mm (0.059 in.)
Voltage regulator	Regulating voltage	13.2 - 14.8 V

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
Bearing retainer x Drive end frame	3.0	31	27 in·lbf
Rectifier end frame x Drive end frame	4.5	46	40 in·lbf
Cord clamp x Rectifier end frame	5.4	55	48 in·lbf
Generator pulley x Rotor	110.5	1,125	81
Rectifier holder x Coil lead on rectifier end frame	2.9	30	26 in·lbf
Voltage regulator and brush holder x Rectifier end frame	2.0	20	18 in·lbf
Plate terminal x Rectifier holder	3.9	39	35 in·lbf
Rear end cover x Rectifier holder	4.4	45	39 in·lbf
Terminal insulator x Rectifier holder	4.1	42	36 in·lbf
Generator x Generator bracket	56	570	41
Generator x Adjusting bar	18	180	13
Generator wire x Generator	9.8	100	86 in·lbf

COOLING

SERVICE DATA

SS0EL-01

Thermostat	Valve opening pressure Valve lift at 95°C (203°F)	80 - 84°C (176 - 183°F) 10.0 mm (0.394 in.) or more
Radiator cap	Relief valve opening pressure STD Minimum	83 - 113 kPa (0.85 - 1.15 kgf/cm ² , 12.1 - 16.4 psi) 69 kPa (0.7 kgf/cm ² , 10.0 psi)
Cooling fan	Rotating amperage at 20°C (68°F) No.1 No.2	5.1 - 6.3 A 9.2 - 11.0 A

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
RH engine drain plug x EGR cooler	7	70	61 in·lbf
LH engine drain plug x Union on cylinder block	13	130	9
Water pump x Cylinder block	6	60	53 in·lbf
Water inlet x Water inlet housing	8	80	69 in·lbf
Water inlet pipe x LH cylinder head	19.5	200	14
Radiator support x Body	12.8	130	9
No.1 cooling fan shroud x Radiator	5.0	50	44 in·lbf
No.1 cooling fan x Cooling fan motor	6.2	63	55 in·lbf
No.2 cooling fan shroud x Radiator	5.0	50	44 in·lbf

EMISSION CONTROL

TORQUE SPECIFICATION

SS0EI-02

Part tightened	N·m	kgf·cm	ft·lbf
Charcoal canister x Body	39.2	400	29
LH exhaust manifold x Cylinder head	49	500	63
LH exhaust manifold x A/F sensor	44	450	33
Front exhaust pipe x Exhaust manifold	62	630	46
Front exhaust pipe x Center exhaust pipe	56	570	41
Front exhaust pipe stay x Front exhaust pipe support bracket	33	330	24
Center exhaust pipe x Tail pipe	43	440	32
Heated oxygen sensor x Front exhaust pipe	44	450	33

ENGINE MECHANICAL

SERVICE DATA

SS0EF-02

Compression pressure	at 250 rpm STD Minimum Difference of pressure between each cylinder	1,500 kPa (15.3 kgf/cm ² , 218 psi) 1,000 kPa (10.2 kgf/cm ² , 145 psi) 100 kPa (1.0 kgf/cm ² , 15 psi) or less
Valve clearance	at cold Intake Exhaust Adjusting shim for repair part 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	0.15 - 0.25 mm (0.006 - 0.010 in.) 0.25 - 0.35 mm (0.010 - 0.014 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.)
Ignition timing	w/ Terminals TE1 and E1 connected of DLC1	8 - 12° BTDC @ idle
Idle speed	-	650 ± 50 rpm
Timing belt tensioner	Protrusion from housing side	10.0 - 10.8 mm (0.394 - 0.425 in.)
Cylinder head	Warpage Maximum Valve seat Refacing angle Contacting angle Contacting width Valve guide bushing bore diameter STD O/S 0.05 12 pointed head cylinder head bolt diameter at tension portion STD Minimum	0.10 mm (0.039 in.) 30°, 45°, 75° 45° 1.0 - 1.4 mm (0.039 - 0.055 in.) 10.295 - 10.313 mm (0.4053 - 0.4080 in.) 10.345 - 10.363 mm (0.4073 - 0.4080 in.) 8.95 - 9.05 mm (0.3524 - 0.3563 in.) 8.75 mm (0.3445 in.)
Valve guide bushing	Inside diameter Outside diameter for repair part STD O/S 0.05	5.510 - 5.530 mm (0.2169 - 0.2177 in.) 10.333 - 10.344 mm (0.4068 - 0.4072 in.) 10.383 - 10.394 mm (0.4088 - 0.4092 in.)
Valve	Valve overall length STD Intake Exhaust Minimum Intake Exhaust Valve face angle Stem diameter Intake Exhaust Stem oil clearance STD Intake Exhaust Maximum Intake Exhaust Margin thickness STD Maximum	95.45 mm (3.5779 in.) 95.40 mm (3.7559 in.) 94.95 mm (3.7382 in.) 94.90 mm (3.7362 in.) 44.5° 5.470 - 5.485 mm (0.2154 - 0.2159 in.) 5.465 - 5.480 mm (0.2152 - 0.2157 in.) 0.025 - 0.060 mm (0.0010 - 0.0024 in.) 0.030 - 0.065 mm (0.0012 - 0.0026 in.) 0.08 mm (0.0031 in.) 0.10 mm (0.0039 in.) 1.0 mm (0.039 in.) 0.5 mm (0.020 in.)

SERVICE SPECIFICATIONS - ENGINE MECHANICAL

Valve spring	Deviation Free length Installed tension at 33.8 mm (1.331 in.)	Maximum	2.0 mm (0.079 in.) 45.50 mm (1.7913 in.) 186 - 206 N (19.0 - 21.0 kgf, 41.9 - 46.3 lbf)
Valve lifter	Lifter diameter Lifter bore diameter Oil clearance	STD Maximum	30.966 - 30.976 mm (1.2191 - 2.2195 in.) 31.000 - 31.016 mm (1.2205 - 1.2211 in.) 0.024 - 0.050 mm (0.0009 - 0.0020 in.) 0.07 mm (0.0028 in.)
Camshaft	Thrust clearance Journal oil clearance Journal diameter Circle runout Cam lobe height Camshaft gear backlash Camshaft gear spring end free distance	STD Maximum STD Intake Exhaust Maximum Intake Exhaust STD Intake Exhaust Minimum Intake Exhaust STD Maximum	0.040 - 0.090 mm (0.0016 - 0.0035 in.) 0.12 mm (0.0047 in.) 0.035 - 0.072 mm (0.0014 - 0.0028 in.) 0.025 - 0.062 mm (0.0010 - 0.0024 in.) 0.10 mm (0.0039 in.) 0.09 mm (0.0035 in.) 26.949 - 26.965 mm (1.0610 - 1.0616 in.) 0.06 mm (0.0024 in.) 42.11 - 42.21 mm (1.6579 - 1.6618 in.) 41.96 - 42.06 mm (1.6520 - 1.6559 in.) 41.96 mm (1.6520 in.) 41.81 mm (1.6461 in.) 0.020 - 0.200 mm (0.0008 - 0.0079 in.) 0.30 mm (0.0188 in.) 18.2 - 18.8 mm (0.712 - 0.740 in.)
Air intake chamber	Warpage	Maximum	0.10 mm (0.0039 in.)
Intake manifold	Warpage Air intake chamber side Cylinder head side	Maximum Maximum	0.15 mm (0.0059 in.) 0.08 mm (0.0031 in.)
Exhaust manifold	Warpage	Maximum	0.50 mm (0.0196 in.)
Cylinder block	Cylinder head surface warpage Cylinder bore diameter 12 pointed head main bearing cap bolt diameter at tension portion STD Minimum	Maximum Maximum	0.07 mm (0.0028 in.) 87.500 - 87.512 mm (3.4449 - 3.4453 in.) 87.52 mm (3.4457 in.) 7.500 - 7.600 mm (0.2953 - 0.2992 in.) 7.20 mm (0.2835 in.)
Piston and piston ring	Piston diameter AISIN made at 23.2 mm (0.913 in.) from the piston head MAHLE made at 41.2 mm (1.622 in.) from the piston head Piston oil clearance AISIN made STD Maximum MAHLE made STD Maximum Piston ring groove clearance No.1 No.2 Piston ring end gap STD No.1 No.2 Oil Maximum No.1 No.2 Oil		87.406 - 87.416 mm (3.4412 - 3.4416 in.) 87.453 - 87.467 mm (3.4430 - 3.4436 in.) 0.084 - 0.106 mm (0.0033 - 0.0042) 0.13 mm (0.0051 in.) 0.033 - 0.059 mm (0.0013 - 0.0023) 0.08 mm (0.0031 in.) 0.020 - 0.070 mm (0.0008 - 0.0028 in.) 0.020 - 0.060 mm (0.0008 - 0.0024 in.) 0.25 - 0.35 mm (0.0098 - 0.0138 in.) 0.35 - 0.45 mm (0.0138 - 0.0177 in.) 0.15 - 0.40 mm (0.0059 - 0.0157 in.) 0.95 mm (0.0374 in.) 1.05 mm (0.0413 in.) 1.00 mm (0.0394 in.)

Connecting rod	Thrust clearance	STD	0.15 - 0.30 mm (0.0059 - 0.0118 in.)
		Maximum	0.35 mm (0.0138 in.)
	Connecting rod thickness		20.80 - 20.85 mm (0.8189 - 0.8209 in.)
	Connecting rod bearing center wall thickness		
	Reference	Mark 1	1.484 - 1.487 mm (0.0584 - 0.0585 in.)
		Mark 2	1.487 - 1.490 mm (0.0585 - 0.0587 in.)
		Mark 3	1.490 - 1.493 mm (0.0587 - 0.0588 in.)
		Mark 4	1.493 - 1.496 mm (0.0588 - 0.0589 in.)
	Connecting rod oil clearance	STD	0.038 - 0.064 mm (0.0015 - 0.0025 in.)
		Maximum	0.08 mm (0.0031 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		22.005 - 22.014 mm (0.8663 - 0.8667 in.)
	Piston pin diameter		21.997 - 22.006 mm (0.8660 - 0.8664 in.)
Crankshaft	Bushing oil clearance	STD	0.005 - 0.011 mm (0.0002 - 0.0004 in.)
		Maximum	0.05 mm (0.0020 in.)
	Connecting rod bolt diameter		
		at tension portion STD	7.2 - 7.3 mm (0.284 - 0.287 in.)
		Minimum	7.0 mm (0.276 in.)
	Thrust clearance	STD	0.04 - 0.24 mm (0.0016 - 0.0095 in.)
		Maximum	0.30 mm (0.0118 in.)
	Thrust washer thickness		1.930 - 1.980 mm (0.0760 - 0.0780 in.)
	Main journal oil clearance	STD No.1 and No.4	0.016 - 0.036 mm (0.0006 - 0.0014 in.)
		No.2 and No.3	0.028 - 0.048 mm (0.0011 - 0.0019 in.)
		Maximum No.1 and No.4	0.05 mm (0.0020 in.)
		No.2 and No.3	0.06 mm (0.0024 in.)
	Main journal diameter		60.988 - 61.000 mm (2.4011 - 2.4016 in.)
	Main bearing center wall thickness		
	Reference	Mark 1	2.485 - 2.488 mm (0.0978 - 0.0980 in.)
		Mark 2	2.488 - 2.491 mm (0.0980 - 0.0981 in.)
		Mark 3	2.491 - 2.494 mm (0.0981 - 0.0982 in.)
		Mark 4	2.494 - 2.497 mm (0.0982 - 0.0983 in.)
		Mark 5	2.497 - 2.500 mm (0.0983 - 0.0984 in.)
		Mark 6	2.500 - 2.503 mm (0.0984 - 0.0985 in.)
		Mark 7	2.503 - 2.506 mm (0.0985 - 0.0987 in.)
	Crank pin diameter		52.992 - 53.000 mm (2.0863 - 2.0866 in.)
	Circle runout	Maximum	0.06 mm (0.0024 in.)
	Main journal taper and out-of-round	Maximum	0.02 mm (0.0008 in.)
	Crank pin taper and out-of-round	Maximum	0.02 mm (0.0008 in.)

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf	
Timing belt plate x Oil pump	8	80	69 in·lbf	
No.1 idler pulley x Oil pump	34	350	25	
No.2 idler pulley x No.2 idler pulley bracket	43	440	32	
Camshaft timing pulley x Camshaft	125	1,300	94	
for SST	88	900	65	
Timing belt tensioner x Oil pump	27	280	20	
RH engine mounting bracket x Cylinder block	28	290	21	
No.2 timing belt cover x No.3 timing belt cover	8.5	85	74 in·lbf	
No.1 timing belt cover x Oil pump	8.5	85	74 in·lbf	
Crankshaft pulley x Crankshaft	215	2,200	159	
No.2 generator bracket x Engine RH mounting bracket	28	290	21	
Cylinder head x Cylinder block	12 pointed head 1st	54	550	40
	2nd	Turn 90°	Turn 90°	Turn 90°
	Recessed head	18.5	185	13
Camshaft bearing cap x Cylinder head	16	160	12	
Cylinder head cover x Cylinder head	8	80	69 in·lbf	
Exhaust manifold x Cylinder head	49	500	36	
Exhaust manifold stay x Exhaust manifold	California	34	350	25
	Except California	20	200	15
Exhaust manifold stay x Transmission housing	California	34	350	25
	Except California	20	200	15
No.1 EGR pipe x RH exhaust manifold	12	120	9	
No.1 EGR pipe x EGR cooler	12	120	9	
PS pump bracket x RH cylinder head	43	440	32	
Oil dipstick guide x LH cylinder head	8	80	69 in·lbf	
Water inlet pipe x LH cylinder head	19.5	200	14	
Cylinder head rear plate x LH cylinder head	8	80	69 in·lbf	
No.3 timing belt cover x Cylinder head	8.5	85	74 in·lbf	
Water outlet x Intake manifold	15	150	11	
Fuel inlet hose x Fuel filter	29	300	21	
Intake manifold x Cylinder head	15	150	11	
Air intake chamber x Intake manifold	43	440	32	
No.2 EGR pipe x Air intake chamber	12	120	9	
No.2 EGR pipe x EGR cooler	12	120	9	
No.1 engine hanger x Air intake chamber	39	400	29	
No.1 engine hanger x RH cylinder head	39	400	29	
Air intake chamber stay x Air intake chamber	19.5	200	14	
Air intake chamber stay x RH cylinder head	19.5	200	14	
Main bearing cap x Cylinder block	12 pointed head 1st	22	225	16
	2nd	Turn 90°	Turn 90°	Turn 90°
	6 pointed head	27	275	20
Connecting rod cap x Connecting rod	1st	24.5	250	18
	2nd	Turn 90°	Turn 90°	Turn 90°
Rear oil seal retainer x Cylinder block	8	80	69 in·lbf	
EGR cooler x Cylinder block	9	90	78 in·lbf	

2001 AVALON (RM808U)

Author :

Date :

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Engine coolant drain union x Cylinder block	39	400	29
Water seal plate x Cylinder block	18	180	13
Oil filter union x Cylinder block	30	310	22
Water inlet housing x Cylinder block	8	80	69 in.·lbf
Knock sensor x Cylinder block	39	400	29
No.2 idler pulley bracket x Cylinder block	28	290	21
A/C compressor housing bracket x Cylinder block	25	250	18
Generator bracket x Cylinder block	43	440	32
Drive plate x Crankshaft	83	850	61
Transaxle x Engine	64	650	47
No.1 oil pan x Transaxle	37.2	380	27
Drive plate x Torque convertor clutch	41	420	30
Flywheel housing under cover x Transaxle	7.8	80	69 in.·lbf
Rear engine mounting insulator x Cylinder block	64	650	47
Front engine mounting insulator x Cylinder block	64	650	47
Engine moving control rod x RH engine mounting bracket	64	650	47
Engine moving control rod x RH fender apron	64	650	47
RH engine mounting stay x Water outlet	32	320	23
RH engine mounting stay x Engine moving control rod	32	320	23
RH engine mounting stay x No.2 RH engine mounting bracket	32	320	23
Front engine mounting insulator x Front frame	Silver color bolt	44	32
	Green color bolt	66	49
Engine mounting absorber x Front frame	48	490	35
Engine mounting absorber x Transaxle	48	490	35
Rear engine mounting insulator x Front frame	66	670	48
LH engine mounting insulator x Transaxle	64	650	47
PS pump x PS pump bracket	43	440	31
A/C compressor x Housing bracket	25.5	260	19
A/C compressor x No.1 oil pan	25.5	260	19
Generator adjusting bar x Drive belt adjusting bar bracket	18	185	13
Fuel inlet hose x Fuel filter	29	300	21
Front exhaust pipe support bracket x No.1 oil pan	20.6	210	15
Front exhaust pipe x Exhaust manifold	62	630	46
Front exhaust pipe x Center exhaust pipe	56	570	41
Center exhaust pipe x Tailpipe	56	570	41
Front exhaust pipe bracket x Sub frame	33	330	24
Front exhaust pipe support bracket x Front exhaust pipe stay	33	330	24

IGNITION

SS03U-04

SERVICE DATA

Firing order	-	1 - 2 - 3 - 4 - 5 - 6
Spark plug	Recommended spark plug Correct electrode gap for new plug Maximum electrode gap for used plug	DENSO SK20R11 NGK IFR6A11 1.1 mm (0.043 in.) 1.3 mm (0.051 in.)
Camshaft position sensor	Resistance at cold at hot	835 - 1,400 Ω 1,060 - 1,645 Ω
Crankshaft position sensor	Resistance at cold at hot	1,630 - 2,740 Ω 2,065 - 3,225 Ω

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
Spark plug x Cylinder head	18	180	13
Ignition coil x Cylinder head	8	80	69 in.·lbf
Camshaft position sensor x Cylinder head	8	80	69 in.·lbf
Crankshaft position sensor x Oil pump	8	80	69 in.·lbf

LUBRICATION

SERVICE DATA

SS0EN-01

Oil pressure		at idle speed at 3,000 rpm	29 kPa (0.3 kgf/cm ² , 43 psi) or more 294 - 539 kPa (3.0 - 5.5 kgf/cm ² , 43 - 78 psi)
Oil pump	Side clearance	STD	0.030 - 0.090 mm (0.0012 - 0.0035 in.)
		Maximum	0.15 mm (0.0059 in.)
	Body clearance	STD	0.100 - 0.175 mm (0.0039 - 0.0069 in.)
		Maximum	0.30 mm (0.0118 in.)
	Tip clearance	STD	0.110 - 0.240 mm (0.0043 - 0.0094 in.)
		Maximum	0.35 mm (0.0138 in.)

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
Oil pressure switch x Cylinder block	13	130	9
No.2 oil pan x Drain plug	45	460	33
Oil pump x Relief valve plug	36.8	375	37
Oil pump x Cylinder block	10 mm head	8	69 in.·lbf
	12 mm head	19.5	14
Oil pan baffle plate x No.1 oil pan	8	80	69 in.·lbf
No.1 oil pan x Cylinder block	19.5	200	14
No.1 oil pan x Oil pump	10 mm head	8	69 in.·lbf
	12 mm head	19.5	14
No.1 oil pan x Rear oil seal retainer	8	80	69 in.·lbf
No.1 oil pan x Transaxle	37.2	380	27
Oil strainer x Main bearing cap	8	80	69 in.·lbf
Oil strainer x Oil pump	8	80	69 in.·lbf
No.2 oil pan x No.1 oil pan	8	80	69 in.·lbf
Flywheel housing under cover x Transaxle	7.8	80	69 in.·lbf
A/C compressor housing bracket x Cylinder block	25	250	18
PS pump x PS pump bracket	43.1	440	32
PS pump drive belt adjusting strut x PS pump	43.1	440	32
PS pump drive belt adjusting strut x Oil pump	43.1	440	32
Exhaust pipe bracket x No.1 oil pan	21	210	15

MAINTENANCE
SERVICE DATA

SS0ED-01

Front axle and suspension ball joint vertical play	maximum	0 mm (0 in.)
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TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
Front seat mount bolts	37	375	27
Front suspension member x Body	181	1,850	134
Rear suspension member x Body	51	520	38

SUPPLEMENTAL RESTRAINT SYSTEM

TORQUE SPECIFICATION

SS061-54

Part tightened	N·m	kgf·cm	ft·lbf
Steering wheel	50	510	37
Steering wheel pad	8.8	90	78 in·lbf
Front passenger airbag assembly x Center bracket	20	205	15
Front passenger airbag assembly x Instrument panel reinforcement	20	205	15
Seatback frame assembly x Seat adjuster assembly	43	440	32
Seat cushion assembly x Seat adjuster assembly	19	194	14
Front seat inner belt x Seat adjuster assembly	42	430	31
Seat armrest assembly	41	410	30
Front seat installation bolt	37	375	27
Airbag sensor assembly	20	205	15
Front airbag sensor	20	205	15
Side airbag sensor assembly	20	205	15
Front seat outer belt retractor	Upper bolt	7.4	75
	Lower bolt	41	420

SUSPENSION AND AXLE

SERVICE DATA

SS04W-07

Cold tire inflation pressure	P205/65R15 92H	Front, rear	210 kPa (2.1 kgf/cm ² , 31 psi)
	P205/60R16 91H	Front, rear	220 kPa (2.2 kgf/cm ² , 32 psi)
Front Wheel alignment	Vehicle height	Front* ¹ Rear* ²	213 mm (8.39 in.) 266 mm (10.47 in.)
	Camber	Right-left error	-0° 37' ± 45' (-0.62° ± 0.75°) 45' (0.75°) or less
	Caster	Right-left error	2° 10' ± 45' (2.17° ± 0.75°) 45' (0.75°) or less
	Steering axis inclination	Right-left error	13° 04' ± 45' (13.07° ± 0.75°) 45' (0.75°) or less
	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 Outside wheel: Reference	35° 45' ± 1° (35.75° ± 1°) 31° 23' (31.38°)
Rear wheel alignment	Camber	Right-left error	-0° 43' ± 45' (-0.72° ± 0.75°) 45' (0.75°) or less
	Toe-in (total)	No. 2 lower suspension arm length difference	0° 24' ± 12' (0.4° ± 0.2°, 4 ± 2 mm, 0.16 ± 0.08 in.) 1 mm (0.04 in.) or less
Front axle	Axle bearing backlash	Maximum	0.05 mm (0.0020 in.)
	Axle hub deviation	Maximum	0.05 mm (0.0020 in.)
Front drive shaft	Drive shaft standard length	LH	586.0 ± 2.0 mm (23.071 ± 0.079 in.)
		RH	881.6 ± 2.0 mm (34.709 ± 0.079 in.)
Front suspension	Lower ball joint turning torque		1.0 - 3.4 N·m (10 - 35 kgf·cm, 8.7 - 30 in·lbf)
	Stabilizer bar link ball joint turning torque		0.05 - 1.0 N·m (0.5 - 10 kgf·cm, 0.4 - 8.7 in·lbf)
Rear axle	Axle bearing backlash	Maximum	0.05 mm (0.0020 in.)
	Axle hub deviation	Maximum	0.07 mm (0.0028 in.)
Rear suspension	No. 2 lower suspension arm length		512.3 mm (20.169 in.)
	Stabilizer bar link ball joint turning torque		0.05 - 1.0 N·m (0.5 - 10 kgf·cm, 0.4 - 8.7 in·lbf)

*1: Front measuring point

Measure the distance from the ground to the center of the front side lower suspension arm mounting bolt.

*2: Rear measuring point

Measure the distance from the ground to the center of the front side strut rod mounting bolt.

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
FRONT AXLE			
Hub nut	103	1,050	76
Tie rod end lock nut	74	750	54
Steering knuckle x Shock absorber	211	2,150	156
Steering knuckle x Brake caliper	107	1,090	79
Steering knuckle x Tie rod end	49	500	36
Axle hub x Drive shaft	294	3,000	217
Lower ball joint x Lower suspension arm	127	1,300	94
Lower ball joint x Steering knuckle	123	1,250	90
Steering knuckle x Dust cover	8.3	85	74 in.·lbf
ABS speed sensor set bolt	8.0	82	71 in.·lbf
FRONT DRIVE SHAFT			
Drive shaft center bearing lock bolt	32	330	24
FRONT SUSPENSION			
Suspension support x Body	80	820	59
Suspension support x Piston rod	49	500	36
Flexible hose and ABS speed sensor wire harness x Shock absorber	29	300	22
Lower suspension arm set bolt	206	2,100	152
Stabilizer bar bracket x Suspension member	19	195	14
Stabilizer bar link set nut	39	400	29
REAR AXLE			
Hub nut	103	1,050	76
Brake caliper x Rear axle carrier	47	475	34
Axle hub set bolt	80	820	59
Shock absorber x Rear axle carrier	New nut	255	2,600
	Reused nut (Apply engine oil to the threads.)	196	2,000
No. 1, No. 2 lower suspension arm x Rear axle carrier	181	1,850	134
Strut rod x Rear axle carrier	113	1,150	83
ABS speed sensor set bolt	8.0	82	71 in.·lbf
REAR SUSPENSION			
ABS speed sensor wire harness x Shock absorber	5.4	55	48 in.·lbf
Flexible hose x Shock absorber	29	300	22
Rear seat belt set bolt	41	420	30
Rear seatback set bolt	18	185	13
Suspension support x Body	39	400	29
Suspension support x Piston rod	49	500	36
Center exhaust pipe set bolt	43	440	32
Parking brake cable set bolt	5.4	55	48 in.·lbf
No. 2 lower suspension arm lock nut	56	570	41
No. 1, No. 2 lower suspension arm x Suspension member	181	1,850	134
Strut rod x Body	113	1,150	83
Suspension member x Body	51	520	38
Suspension member lower stopper x Body	38	390	28

SERVICE SPECIFICATIONS - SUSPENSION AND AXLE

Stabilizer bar bracket x Suspension member	19	195	14
Stabilizer bar link set nut	39	400	29

SFI

SS0EJ-02

SERVICE DATA

Fuel pressure regulator	Fuel pressure at no vacuum	301 - 347 kPa (3.1 - 3.5 kgf/cm ² , 44 - 50 psi)
Fuel pump	Resistance at 20°C (68°F)	0.2 - 3.0 Ω
Injector	Resistance Injection volume Difference between each cylinder Fuel leakage at 20°C (68°F)	13.4 - 14.2 Ω 60 - 73 cm ³ (3.4 - 4.5 cu in.) per 15 sec. 13 cm ³ (0.8 cu in.) or less 1 drop or less per 12 minutes
MAF meter	Resistance (THA - E2) at -20°C (-4°F) at 20°C (68°F) at 60°C (140°F)	13.6 - 18.4 kΩ 2.21 - 2.69 kΩ 0.49 - 0.67 kΩ
Throttle body	Throttle opener setting speed	1,100 - 1,700 rpm
Throttle position sensor	Resistance Throttle valve fully closed Throttle valve fully open - VTA - E2 VTA - E2 VC - E2	0.2 - 6.3 kΩ 2.0 - 10.2 kΩ 2.5 - 5.9 kΩ
Camshaft timing oil control valve	Resistance at 20°C (68°F)	6.9 - 7.9 Ω
VSV for EVAP	Resistance at 20°C (68°F)	27 - 33 Ω
VSV for ACIS	Resistance at 20°C (68°F)	33 - 39 Ω
VSV for canister closed valve	Resistance at 20°C (68°F) at 120°C (248°F)	25 - 30 Ω 33 - 42 Ω
VSV for pressure switching valve	Resistance at 20°C (68°F) at 120°C (248°F)	37 - 44 Ω 51 - 62 Ω
Vapor Pressure Sensor	Power source voltage	4.5 - 5.5 V
ECT sensor	Resistance at -20°C (-4°F) at 0°C (32°F) at 20°C (68°F) at 40°C (104°F) at 60°C (140°F) at 80°C (176°F)	10 - 20 kΩ 4 - 7 kΩ 2 - 3 kΩ 0.9 - 1.3 kΩ 0.4 - 0.7 kΩ 0.2 - 0.4 kΩ
A/F sensor	Heater coil resistance at 20°C (68°F) at 800°C (1472°F)	0.8 - 1.4 Ω 1.8 - 3.2 Ω
Heated oxygen sensor	Heater coil resistance at 20°C (68°F) at 800°C (1472°F)	11 - 16 Ω 23 - 32 Ω
Fuel cut rpm	Fuel return rpm	1,200 rpm

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
Fuel line (Union bolt type)	29	300	21
Fuel line (Flare nut type) using SST	28	285	21
Fuel pump assembly x Fuel tank	4	40	35 in.·lbf
Fuel filter x Fuel pump bracket	2.0	20	17 in.·lbf
Fuel pressure regulator x Fuel pump bracket	2.0	20	17 in.·lbf
Delivery pipe x Intake manifold	10	100	7
No.1 fuel pipe x Intake manifold	19.5	200	14
Fuel tank band x Body	39	400	29
Throttle body x Throttle body bracket	19.5	200	14
Throttle body x Air intake chamber	19.5	200	14
Throttle body x No.1 intake air control valve	6.9	70	61 in.·lbf
Camshaft timing oil control valve x Cylinder head	7.5	80	66 in.·lbf
No.2 intake air control valve x Air intake chamber	14.5	145	10
ECT sensor x Water outlet	20	200	14
Knock sensor x Cylinder block	39	400	29
A/F sensor x Exhaust manifold	44	440	32
Heated oxygen sensor x Exhaust pipe	44	440	31

STEERING

SERVICE DATA

SS0G9-03

DRIVE BELT		
Drive belt tension*	New belt	120 - 185 lbf
Drive belt tension*	Used belt	95 - 135 lbf
POWER STEERING FLUID		
Fluid level rise	Maximum	5 mm (0.20 in.)
Fluid pressure at idle speed with valve closed	Minimum	7,845 kPa (80 kgf/cm ² , 1,138 psi)
STEERING WHEEL		
Steering wheel freeplay	Maximum	30 mm (1.18 in.)
Steering effort at idle speed	Reference	5.9 N·m (60 kgf·cm, 52 in.·lbf)
POWER STEERING VANE PUMP		
Vane pump rotating torque		0.3 N·m (2.8 kgf·cm, 2.4 in.·lbf) or less
Oil clearance between pump shaft and bushing	STD	0.03 - 0.05 mm (0.0012 - 0.0020 in.)
Oil clearance between pump shaft and bushing	Maximum	0.07 mm (0.0028 in.)
Vane plate height	Minimum	8.6 mm (0.339 in.)
Vane plate thickness	Minimum	1.397 mm (0.0550 in.)
Vane plate length	Minimum	14.991 mm (0.5902 in.)
Clearance between the rotor groove and plate	Maximum	0.035 mm (0.0014 in.)
Vane plate length	Pump rotor and cam ring mark	
	None	14.999 - 15.001 mm (0.59051 - 0.59059 in.)
	1	14.997 - 14.999 mm (0.59043 - 0.59051 in.)
	2	14.995 - 14.997 mm (0.59035 - 0.59043 in.)
	3	14.993 - 14.995 mm (0.59027 - 0.59035 in.)
	4	14.991 - 14.993 mm (0.59020 - 0.59027 in.)
Spring free length	Minimum	32.3 mm (1.272 in.)
POWER STEERING GEAR		
Steering rack runout	Maximum	0.03 mm (0.0012 in.)
Total preload (Control valve rotating torque)		0.8 - 1.4 N·m (8 - 14 kgf·cm, 6.9 - 12.2 in.·lbf)

*: For use with belt tension gauge

TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
TILT STEERING COLUMN			
Tilt lever lock shaft	9.0	90	78 in.·lbf
Turn signal bracket x Steering column upper tube	7.5	75	65 in.·lbf
Shift lever housing x Column tube assembly	10	100	7
Shift lever set bolt	11	110	8
Shift lock solenoid bracket x Shift lever housing	3.4	35	30 in.·lbf
Shift lock switch guide	2.8	29	25 in.·lbf
Universal joint assembly x Main shaft assembly	35	360	26
Steering column assembly set nut	25	260	19
Intermediate shaft sub-assembly x Control valve shaft	35	360	26
Universal joint assembly x Intermediate shaft sub-assembly	35	360	26
Steering wheel set nut	50	510	37
Steering wheel pad set screw (Torx screw)	8.8	90	78 in.·lbf
POWER STEERING VANE PUMP			
Rear housing set bolt	17	170	12
Pressure port union	83	850	62
Suction port union set bolt	13	130	9
Front bracket x Rear bracket	43	440	32
Vane pump pulley set nut	44	450	33
Pressure feed tube x PS vane pump assembly	52	530	38
Oil pressure switch	21	210	15
PS vane pump set bolt A bolt	29 (43)	300 (440)	22 (32)
PS vane pump set bolt B bolt	43	440	32
Pressure feed tube x Pressure feed tube	23 (25)	230 (250)	17 (18)
Clamp plate set nut	7.8	80	69 in.·lbf
POWER STEERING GEAR			
Control valve housing set bolt	18	180	13
Self-locking nut	25	250	18
Rack housing cap	59	600	43
Rack guide spring cap lock nut	50 (69)	510 (700)	37 (51)
Rack x Rack end	60 (83)	610 (850)	45 (61)
Tie rod end lock nut	74	750	54
Turn pressure tube union nut	12 (13)	120 (130)	9 (9)
PS gear assembly set bolt	181	1,850	134
Stabilizer bar set bolt	19	190	14
Pressure feed and return tubes x Control valve housing	28 (25)	290 (250)	21 (18)
Pressure feed tube clamp plate set nut	10	100	7
Intermediate shaft sub-assembly x Control valve shaft	35	360	26
Tie rod end x Steering knuckle	49	500	36

(): For use without SST

STARTING

SERVICE DATA

SS0ER-01

Starter	Rated voltage and output power		12 V 1.4 kW
	No-load characteristics	Current	90 A or less at 11.5 V
		rpm	3,000 rpm or more
	Brush length	STD	15.5 mm (0.610 in.)
		Minimum	10 mm (0.394 in.)
	Spring installed load	STD	17.6 - 23.5 N (1.79 - 2.41 kgf, 4.0 - 5.3 lbf)
		Minimum	11.8 N (1.20 kgf, 2.7 lbf)
	Commutator		
	Diameter	STD	30.0 mm (1.181 in.)
		Minimum	29.0 mm (1.142 in.)
	Undercut depth	STD	0.6 mm (0.024 in.)
		Minimum	0.2 mm (0.008 in.)
	Circle runout	Maximum	0.05 mm (0.0020 in.)
	Magnetic switch		
	Contact plate for wear	Maximum	0.9 mm (0.035 in.)

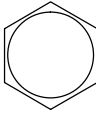
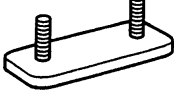
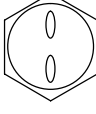
TORQUE SPECIFICATION

Part tightened	N·m	kgf·cm	ft·lbf
End cover x Field frame	1.5	15	13 in.·lbf
Starter housing x Magnetic switch	5.9	60	52 in.·lbf
Field frame x Armature assembly	5.9	60	52 in.·lbf
Lead wire x Terminal C of starter	5.9	60	52 in.·lbf
Starter mounting bolt	39	400	29
Terminal nut x Terminal C of starter	17	173	12
Terminal nut x Terminal 30 of starter	17	173	12
Magnetic switch end cover x Magnetic switch housing	2.5	25	22 in.·lbf

STANDARD BOLT

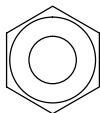
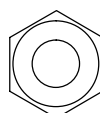
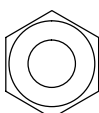
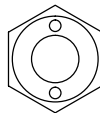
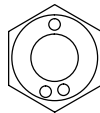
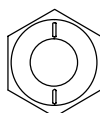
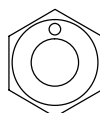
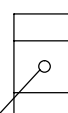
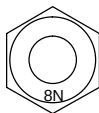
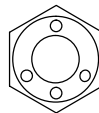
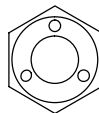
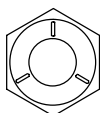
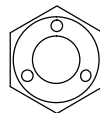
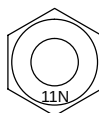
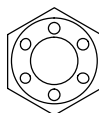
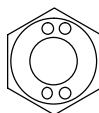
HOW TO DETERMINE BOLT STRENGTH

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

B06431

HOW TO DETERMINE NUT STRENGTH

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

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

B06432

HINT:

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

Example: Bolt = 4T

Nut = 4N or more

2001 AVALON (RM808U)

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