

SST & SERVICE SPECIFICATIONS

Page

SST (SPECIAL SERVICE TOOL)	9-2
STANDARD BOLT TIGHTENING TORQUE	9-4
MAIN PARTS TIGHTENING TORQUE	9-5
ENGINE SPECIFICATIONS	9-6
SERVICE SPECIFICATIONS	9-6

SST (SPECIAL SERVICE TOOL)

1



2



3



4



5

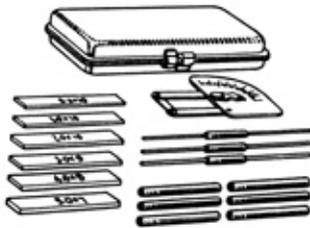


6



7

- | | | |
|----|-------------|---|
| 1. | 09201-60011 | Valve stem guide remover and replacer |
| 2. | 09213-31020 | Crankshaft pulley puller |
| 3. | 09213-36010 | Timing gear remover |
| 4. | 09222-30010 | Connecting rod bushing remover and replacer |
| 5. | 09223-41010 | Crankshaft rear oil seal replacer |
| 6. | 09223-50010 | Crankshaft front oil seal replacer |
| 7. | 09228-44010 | Oil filter wrench |



8



9



10



11



12



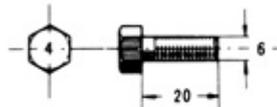
13

- | | | |
|-----|-------------|---|
| 8. | 09240-00011 | Carburetor adjusting gauge set |
| 9. | 09286-46011 | Injection pump spline shaft puller (for alternator) |
| 10. | 09303-35010 | Input shaft front bearing puller |
| 11. | 09304-30012 | Input shaft front bearing replacer |
| 12. | 09325-12010 | Transmission plug (for alternator) |
| 13. | 09860-11010 | Carburetor driver set |

STANDARD BOLT TIGHTENING TORQUE

STANDARD BOLT CLASSIFICATION

91111-40620 — Parts Number
 Length of Bolt: 20 mm
 Basic Major Dia. of Thread: 6mm
 Bolt Head Mark*



* Bolt Head Mark has the following indications.

Mark on head of bolt	4	5	7
Toyota Standard Classification	4T	5T	7T
Tensile Strength (kg/mm ²)	more than 42	more than 55	more than 75
Brinell Hardness Number	121 to 209	147 to 227	227 to 271
Rockwell Hardness Number	B70 to 95	B89 to 98	C20 to 28
Yield Point (kg/mm ²)	more than 30	more than 45	more than 60

STANDARD BOLT TIGHTENING TORQUE

Class	Basic Dia.	Pitch	Standard Torque kg-m (ft-lb)	Torque Limit	
				kg-m	(ft-lb)
4T	6	1	0.47 (3.4)	0.4 to 0.7	(2.9 to 5.0)
	8	1.25	1.11 (8.0)	1.0 to 1.6	(7.3 to 11.6)
	10	1.25	2.25 (16.3)	1.9 to 3.1	(13.7 to 22.4)
	10	1.5	2.14 (15.5)	1.8 to 3.0	(13.0 to 21.7)
	12	1.25 (ISO)	4.40 (31.8)	3.5 to 5.5	(25.3 to 39.8)
	12	1.5	3.89 (28.1)	3.5 to 5.5	(25.3 to 39.8)
	12	1.75	3.74 (27.0)	3.0 to 5.0	(21.7 to 36.2)
	13	1.5	5.08 (36.8)	4.5 to 7.0	(32.5 to 50.6)
	14	1.5	6.33 (45.8)	5.0 to 8.0	(36.2 to 57.8)
	14	2	5.93 (42.8)	4.7 to 7.7	(34.0 to 55.7)
	16	1.5	9.57 (69.2)	7.5 to 11.0	(54.2 to 79.6)
	16	2	9.10 (65.8)	7.1 to 10.6	(51.3 to 76.7)
5T	6	1	0.71 (5.1)	0.6 to 0.9	(4.4 to 6.5)
	8	1.25	1.66 (12.0)	1.5 to 2.2	(10.9 to 15.9)
	10	1.25	3.34 (24.1)	3.0 to 4.5	(21.7 to 32.5)
	10	1.5	3.22 (23.3)	2.7 to 4.2	(19.5 to 30.4)
	12	1.25 (ISO)	6.60 (47.7)	5.0 to 8.0	(36.2 to 57.8)
	12	1.5	5.84 (42.2)	5.0 to 7.0	(36.2 to 50.6)
	12	1.75	5.61 (40.6)	4.8 to 6.8	(34.7 to 49.2)
	13	1.5	7.63 (55.2)	6.5 to 9.0	(47.0 to 65.1)
	14	1.5	8.90 (65.3)	7.5 to 11.0	(54.2 to 79.6)
	14	2	9.50 (68.7)	7.0 to 10.5	(50.6 to 75.9)
	16	1.5	14.36 (103.8)	12.0 to 17.0	(86.8 to 123.0)
	16	2	13.58 (98.1)	11.5 to 16.5	(83.2 to 119.2)

Class	Basic Dia.	Pitch	Standard Torque		Torque Limit	
			kg-m	(ft-lb)	kg-m	(ft-lb)
7T	6	1	0.95	(6.9)	0.8 to 1.2	(5.8 to 8.6)
	8	1.25	2.21	(16.1)	2.0 to 3.0	(14.5 to 21.7)
	10	1.25	4.49	(32.5)	4.0 to 5.5	(28.9 to 39.8)
	10	1.5	4.29	(31.0)	3.7 to 5.2	(26.8 to 37.6)
	12	1.25	8.80	(63.5)	7.5 to 10.5	(54.1 to 75.8)
	12	1.5	7.78	(56.2)	7.0 to 9.0	(50.6 to 65.1)
	12	1.75	7.48	(54.1)	6.0 to 8.5	(43.3 to 61.4)
	13	1.5	10.17	(73.5)	8.0 to 12.0	(57.8 to 86.8)
	14	1.5	12.67	(91.6)	10.0 to 15.0	(72.3 to 108.5)
	14	2	11.86	(85.8)	9.5 to 14.0	(68.7 to 101.2)
	16	1.5	19.15	(138.5)	15.0 to 23.0	(108.5 to 166.2)
	16	2	18.11	(131.0)	14.0 to 22.0	(101.2 to 159.0)

Note: The above specified tightening torque is applicable only for female threads cut into a steel material.

If the female threads are cut in other materials than steel, and also tightening surfaces are encountered to heat or vibrations, these specified tightening torques must be reconsidered.

MAIN PARTS TIGHTENING TORQUE

Tightening Parts	Tightening Torque kg-m (ft-lb)	
Cylinder head bolt	7.2 to 8.8	(52.1 to 63.7)
Camshaft bearing cap	1.7 to 2.3	(12.3 to 16.6)
Camshaft sprocket	7 to 9	(50.6 to 65.1)
Crankshaft bearing cap	9.5 to 11.5	(68.7 to 83.2)
Connecting rod cap	5.4 to 6.6	(39.1 to 47.7)
Crankshaft pulley	11 to 13	(79.6 to 94.0)
Flywheel	8.5 to 9.5	(61.5 to 68.7)
Drive plate (for Automatic transmission)	8 to 9	(57.9 to 65.1)

ENGINE SPECIFICATIONS

Engine model		20R
Type		4 cylinder, In-line, SOHC
Bore x stroke	mm (in)	88.5 x 89.0 (3.48 x 3.50)
Displacement	cc (cu.in.)	2189 (133.6)
Compression ratio		8.4 to 1
Firing Order		1-3-4-2

SERVICE SPECIFICATIONS**ENGINE TUNE-UP**

Drive belt tension at 10kg (22 lb)	Fan pulley — Alternator	mm (in)	8 to 13 (0.31 to 0.51)
	Air pump — Crankshaft pulley		8 to 13 (0.31 to 0.51)
	A/C compressor — Crankshaft pulley		11 to 13 (0.43 to 0.51)
Battery specific gravity			1.25 to 1.27
Coolant capacity (W/Heater)		Liter (USqt.)	7 (7.4)
Engine oil capacity	Total	RA, RT	Liter (USqt.) 5.0 (5.3)
		RN	4.5 (4.8)
	Crankcase	RA, RT	Liter (USqt.) 4.2 (4.4)
		RN	3.7 (3.9)
Spark plug	Recommended spark plug		ND:W16EP NGK:BP5ES-L
	Spark plug gap	mm (in)	0.8 (0.031)
Distributor	Dwell angle	Degree	50 to 54
	Point gap	mm (in)	0.45 (0.018)
Valve clearance (Hot)	Intake	mm (in)	0.2 (0.008)
	Exhaust		0.3 (0.012)
Ignition timing		Degree	8 BTDC
Initial idle speed at transmission in "N"		rpm	850
Fast idle speed		rpm	2400 W/O EGR
Compression pressure at 250 rpm	STD	kg/cm ² (psi)	11 (156)
	Limit		9 (128)

ENGINE**Cylinder Head**

Head surface warpage limit	mm (in)	0.15	(0.0059)
Manifold surface warpage limit	mm (in)	0.2	(0.008)
Valve seat contacting surface angle	Degree	45	
Valve seat contacting width	mm (in)	1.2 to 1.6	(0.047 to 0.063)

Valve Guide Bushing

Inner diameter	Intake	mm (in)	8.00 to 8.03	(0.315 to 0.316)
	Exhaust	mm (in)	8.01 to 8.03	(0.315 to 0.316)
Installed height		mm (in)	19	(0.75)

Valve

Valve face angle		Degree	45	
Stem diameter	Intake	mm (in)	7.97 to 7.99	(0.3138 to 0.3144)
	Exhaust	mm (in)	7.97 to 7.98	(0.3136 to 0.3142)
Stem oil clearance	Intake	mm (in)	0.02 to 0.06	(0.0006 to 0.0024)
	Exhaust	mm (in)	0.03 to 0.07	(0.0012 to 0.0026)
Stem oil clearance limit	Intake	mm (in)	0.08	(0.0031)
	Exhaust	mm (in)	0.10	(0.0039)
Margin limit		mm (in)	0.6	(0.024)
Valve tip correcting limit		mm (in)	0.5	(0.020)

Valve Spring

Free height	mm (in)	45.6	(1.795)
Installed height	mm (in)	40.5	(1.594)
Installed load	kg (lb)	27.2	(60.0)
Installed load limit	kg (lb)	24.5	(54.0)
Squareness	mm (in)	1.9	(0.075)

Camshaft

Thrust clearance		mm (in)	0.08 to 0.18	(0.0031 to 0.0071)
Thrust clearance limit		mm (in)	0.25	(0.0098)
Journal oil clearance		mm (in)	0.01 to 0.05	(0.0004 to 0.0020)
Journal oil clearance limit		mm (in)	0.1	(0.004)
Journal diameter		mm (in)	32.98 to 33.00	(1.2984 to 1.2990)
Runout limit		mm (in)	0.2	(0.008)
Lobe height	Intake	mm (in)	42.63 to 42.72	(1.6783 to 1.6819)
	Exhaust	mm (in)	42.69 to 42.78	(1.6806 to 1.6841)

Rocker Arm and Shaft

Rocker shaft diameter		mm (in)	15.97 to 15.99	(1.6287 to 1.6295)
Shaft to arm clearance		mm (in)	0.01 to 0.05	(0.0004 to 0.0020)

Chain and Sprocket

Crankshaft sprocket wear limit		mm (in)	59.4	(2.339)
Camshaft sprocket wear limit		mm (in)	113.8	(4.480)

Tensioner and Damper

Tensioner head thickness limit		mm (in)	11	(0.43)
Damper No. 1 thickness limit		mm (in)	5	(0.20)
Damper No. 2 thickness limit		mm (in)	4.5	(0.18)

Intake and Exhaust Manifold

Manifold surface warpage limit		mm (in)		
	Intake		0.2	(0.008)
	Exhaust		0.3	(0.012)

Cylinder Block

Cylinder bore diameter	STD	mm (in)	88.50 to 88.53(3.4842 to 3.4854)
Wear limit		mm (in)	0.2 (0.008)
Honing amount		mm (in)	Less than 0.02 (0.0008)
Taper, out-of-round limit		mm (in)	0.02 (0.0008)

Piston and Piston Ring

Piston diameter		mm (in)	
	STD		88.46 to 88.49(3.4827 to 3.4839)
	O/S 0.50		88.96 to 88.99(3.5024 to 3.5035)
	O/S 1.00		89.46 to 89.49(3.5220 to 3.5232)
Piston to cylinder clearance		mm (in)	0.03 to 0.05 (0.0012 to 0.0020)
Piston pin installing temperature		°C (°F)	80 (176)
Piston ring end gap (Compression)		mm (in)	0.1 to 0.3 (0.004 to 0.012)
Ring to ring land clearance limit		mm (in)	0.2 (0.008)

Connecting Rod and Bearing

Thrust clearance		mm (in)	0.16 to 0.26 (0.0063 to 0.0102)
Thrust clearance limit		mm (in)	0.3 (0.012)
Bearing oil clearance		mm (in)	0.025 to 0.055(0.0010 to 0.0022)
Rod bend and twist limit		mm (in)	0.05 (0.0020)
Pin to bushing oil clearance		mm (in)	0.005 to 0.011(0.0002 to 0.0004)
Pin to bushing oil clearance limit		mm (in)	0.015 (0.0006)

Crankshaft

Thrust clearance		mm (in)	0.02 to 0.20 (0.0008 to 0.0079)
Thrust clearance limit		mm (in)	0.3 (0.012)
Thrust washer thickness		mm (in)	
	STD		2.00 (0.0787)
	O/S 0.125		2.06 (0.0811)
	O/S 0.25		2.13 (0.0839)

Crankshaft (Cont'd)

Runout limit		mm (in)	0.1	(0.004)
Main journal finished diameter		mm (in)		
	STD		59.98 to 60.00	(2.3614 to 2.3622)
	U/S 0.25		59.70 to 59.71	(2.3504 to 2.3508)
Main journal oil clearance		mm (in)	0.025 to 0.055	(0.0010 to 0.0022)
Rod journal finished diameter		mm (in)		
	STD		52.99 to 53.00	(2.0862 to 2.0866)
	U/S 0.25		52.70 to 52.71	(2.0748 to 2.0752)

Flywheel

Runout limit		mm (in)	0.2	(0.008)
--------------	--	---------	-----	---------

FUEL SYSTEM**Fuel Pump**

Discharge capacity	Liter (USqt.)/min	Over 1.2	(1.3)
Discharge pressure	kg/cm ² (psi)	0.15 to 0.3	(2.1 to 4.3)

Carburetor

Carburetor part number			21100-38010 21100-38020 21100-38040	21100-38030 21100-38060
Main jet diameter	Primary	mm (in)	1.21 (0.0476)	1.19 (0.0469)
	Secondary	mm (in)	1.77 (0.0697)	←
Primary slow jet diameter		mm (in)	0.51 (0.0201)	←
Power jet diameter		mm (in)	0.5 (0.020)	←
Pump jet diameter		mm (in)	0.5 (0.020)	←

Carburetor (Cont'd)

Part number		21100-38010	21100-38040
		21100-38020	21100-38060
		21100-38030	
Float raised position	mm (in)	5	(0.20)
Float lowered position	mm (in)	1	(0.04)
Primary throttle valve full open angle	Degree	90	
Secondary throttle valve full open angle	Degree	90	
Kick up	mm (in)	0.2	(0.008)
Fast idle	mm (in)	1.2	(0.047)
Unloader	Degree	50	
Choke opener	Degree	55	
Choke breaker	Degree	40	
Throttle positioner	M/T	mm (in)	0.6 (0.024)
	A/T	mm (in)	0.5 (0.020)
Idle mixture adjusting screw initial setting			Screw out 1¼ turn
Accelerating pump stroke	mm (in)	4.5	(0.177)

LUBRICATING SYSTEM**Oil Pump**

Body clearance	mm (in)	0.06 to 0.15	(0.0024 to 0.0059)
Body clearance limit	mm (in)	0.2	(0.008)
Tip clearance	mm (in)		
Driven gear to crescent		0.15 to 0.21	(0.0059 to 0.0083)
Drive gear to crescent		0.22 to 0.25	(0.0087 to 0.0098)
Tip clearance limit	mm (in)		
Driven gear to crescent		0.3	(0.012)
Drive gear to crescent		0.3	(0.012)
Side clearance	mm (in)	0.03 to 0.09	(0.0012 to 0.0034)
Side clearance limit	mm (in)	0.15	(0.0059)
Relief valve operating pressure	kg/cm ² (psi)	4.5	(64.0)

COOLING SYSTEM**Radiator**

Cap valve opening pressure	kg/cm ² (psi)	0.9	(12.8)
Cap valve opening pressure limit	kg/cm ² (psi)	0.6	(8.5)

Fluid Coupling

Silicone oil viscosity	cst	'75 Model	'76 Model
RT w/o Air conditioner		1000	3000
RT W/Air conditioner		3000	
RA		6000	
RN		3000	

Thermostat

Valve opening temperature	°C (°F)		
Start to open at		82	(179.6)
Fully opens at		95	(203)
Valve opening travel	mm (in)	8	(0.31)

ENGINE ELECTRICAL**Starter**

Part number		28100-33020 28100-36050	28100-34041
Type		Conventional type	Reduction type
Rating	second	30	30
No load characteristics		Less than 50A, More than 5000rpm At 11V	Less than 80A, More than 3500rpm At 11.5V
Armature shaft to bushing clearance	mm (in)	0.05 (0.0020)	—
Armature shaft to bushing clearance limit	mm (in)	0.2 (0.008)	—
Armature shaft thrust clearance	mm (in)	0.05 to 0.6 (0.0020 to 0.024)	—
Brush length	mm (in)	19 (0.75)	14.5 (0.571)
Brush length limit	mm (in)	12 (0.47)	10 (0.39)

Starter (Cont'd)

Part number		28100-33020 28100-36050	28100-34041
Commutator runout	mm (in)	Less than 0.05 (0.0020)	Less than 0.05 (0.0020)
Commutator runout limit	mm (in)	0.3 (0.012)	—
Commutator diameter	mm (in)	32.7 (1.287)	30 (1.18)
Commutator diameter limit	mm (in)	31 (1.22)	29 (1.14)
Mica depth	mm (in)	0.5 to 0.8 (0.020 to 0.031)	0.6 to 0.9 (0.024 to 0.035)
Mica depth limit	mm (in)	0.2 (0.008)	0.2 (0.008)
Pinion end to stop collar clearance	mm (in)	0.2 to 4.0 (0.008 to 0.157)	—

Distributor

Part number	19100-38010	
Point gap	mm (in)	0.45 (0.018)
Damping spring gap	mm (in)	0.05 to 0.45 (0.002 to 0.018)
Dwell angle	Degree	50 to 54
Advance characteristics		
Distributor vacuum advance angle	Vacuum mmHg (inHg)	Dis. advance angle Degree
	86 to 114 (3.39 to 4.49)	Advance begins
	140 (5.51)	1.7 to 4.3
	220 (8.66)	6.5 to 7.5
	300 (11.81)	9 to 11
Distributor governor advance angle	Distributor rpm	Dis. advance angle Degree
	480 to 620	Advance begins
	1350	7.8 to 9.3
	2500	11.5 to 13.5
	3000	11.2 to 13.2

Ignition Coil

Part number	90919-02058	
Primary coil resistance	Ohm	1.3 to 1.5
Secondary coil resistance	Ohm	6500 to 10500
External resistor resistance	Ohm	1.3 to 1.7
Insulation resistance at 500V	Megohm	Over 10

High Tension Cords

End to end resistance limit	Kilohm	25
-----------------------------	--------	----

Spark Plugs

Thread reach	mm (in)	19	(0.75)
Thread size	mm (in)	14	(0.55)
Plug gap	mm (in)	0.8	(0.03)
Recommended spark plug	ND: W16EP NGK: BP5ES-L		

Alternator

Part number	27020-34030		27020-38010
Maximum output	Ampere	45	40
Brush exposed length	mm (in)	12.5 (0.492)	←
Brush exposed length limit	mm (in)	5.5 (0.217)	←

Alternator Regulator

Regulating voltage	Volt	13.8 to 14.8
Relay operating voltage	Volt	4.0 to 5.8

Prepared by

TOYOTA MOTOR SALES CO., LTD.

Export-Technical Department
Haruhi Center

Haruhi-mura, Nishikasugai-gun
Aichi Pref., Japan

First Printing August 1974
8th Printing December 1977

Publication No. 98116

Printed in Japan

