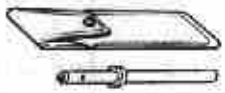
SST & SPECIFICATION

SST (SPECIAL SERVICE TOOL)

Illustration	Tool Number	18R	18R-G	Tool Name
1 	09081-00011	○	○	Alternator Checker
2 	09201-60011	○	○	Valve Stem Guide Remover & Replacer
3 	09202-43013	○	○	Valve Spring Compressor
4 	09213-31021	○	○	Crankshaft Pulley & Gear Puller
5 	09213-36020	○	○	Timing Gear Remover
6 	09214-60010	○	○	Crankshaft Pulley & Gear Replacer
7 	09222-30010	○	○	Connecting Rod Bushing Remover & Replacer
8 	09223-41020	○	○	Crankshaft Rear Oil Seal Replacer
9 	09223-50010	○	○	Crankshaft Front Oil Seal Replacer
10 	09228-22020	○		Oil Filter Wrench
11 	09228-34010		○	
12 	09233-33010	○	○	Pump Drive Shaft Bearing Replacer
13 	09236-00100	○	○	Water Pump Overhaul Tool Set (For Fluid Coupling Service)

Illustration	Tool Number	18R	18R-G	Tool Name
14 	09240-00014	○	○	Carburetor Adjusting Gauge Set
15 	09240-00020	○	○	Wire Gauge Set
16 	09240-27010		○	Float Level Gauge (Before Sept., 1979)
	09240-27020		○	Float Level Gauge (After Sept., 1979)
17 	09243-00020	○	○	Idle Mixture Adjusting Screw Wrench
18 	09248-27010		○	Valve Timing Adjusting Gauge
19 	09286-46011	○	○	Injection Pump Spline Shaft Puller (For Alternator Service)
20 	09303-35011	○	○	Input Shaft Front Bearing Puller
21 	09304-30012	○	○	Input Shaft Front Bearing Replacer
22 	09308-10010	○	○	Oil Seal Puller
23 	09612-22010	○	○	Tilt Steering Bearing Replacer
24 	09816-30010	○	○	Oil Pressure Switch Socket
25 	09860-11011	○	○	Carburetor Drive Set
26 	09992-00010		○	Dual Vacuum Gauge

STANDARD BOLT TIGHTENING TORQUE

STANDARD BOLT CLASSIFICATION

Class	Basic diameter mm	Pitch mm	Standard Torque		Torque Limit	
			kg-m	ft-lb	kg-m	ft-lb
4T	6	1	0.47	3.4	0.4 – 0.7	2.9 – 5.1
	8	1.25	1.11	8.0	1.0 – 1.6	7.2 – 11.6
	10	1.25	2.25	16.3	1.9 – 3.1	13.7 – 22.4
	10	1.5	2.14	15.5	1.8 – 3.0	13.0 – 21.7
	12	1.25 (ISO)	4.40	31.8	3.5 – 5.5	25.3 – 39.8
	12	1.5	3.89	28.1	3.5 – 5.5	25.3 – 39.8
	12	1.75	3.74	27.0	3.0 – 5.0	21.7 – 36.2
	13	1.5	5.08	36.8	4.5 – 7.0	32.5 – 50.6
	14	1.5	6.33	45.8	5.0 – 8.0	36.2 – 57.9
	14	2	5.83	42.8	4.7 – 7.7	34.0 – 55.7
	16	1.5	9.57	69.2	7.5 – 11.0	54.2 – 79.6
	16	2	9.10	65.8	7.1 – 10.6	51.3 – 76.7
5T	6	1	0.71	5.1	0.6 – 0.9	4.3 – 6.5
	8	1.25	1.66	12.0	1.5 – 2.2	10.9 – 15.9
	10	1.25	3.34	24.1	3.0 – 4.5	21.7 – 32.5
	10	1.5	3.22	23.3	2.7 – 4.2	19.5 – 30.4
	12	1.25 (ISO)	6.60	47.7	5.0 – 8.0	36.2 – 57.9
	12	1.5	5.84	42.2	5.0 – 7.0	36.2 – 50.6
	12	1.75	5.61	40.6	4.8 – 6.8	34.7 – 49.2
	13	1.5	7.63	55.2	6.5 – 9.0	47.0 – 65.1
	14	1.5	9.50	68.7	7.5 – 11.0	54.2 – 79.6
	14	2	8.90	65.3	7.0 – 10.5	50.6 – 75.9
	16	1.5	14.36	103.8	12.0 – 17.0	86.8 – 123.0
	16	2	13.58	98.1	11.5 – 16.5	83.2 – 119.2
6T	6	1	0.71	5.1	0.6 – 0.9	4.3 – 6.5
	8	1.25	1.66	12.0	1.5 – 2.2	10.9 – 15.9
	10	1.25	3.37	24.0	3.0 – 4.5	21.7 – 32.5
	10	1.5	3.20	23.1	2.7 – 4.2	19.5 – 30.4
	12	1.25 (ISO)	6.60	47.7	5.0 – 8.0	36.2 – 57.9
	12	1.5	5.84	42.2	5.0 – 7.0	36.2 – 50.6
	12	1.75	5.61	40.6	4.8 – 6.8	34.7 – 49.2

Class	Basic diameter mm	Pitch mm	Standard Torque		Torque Limit	
			kg-m	ft-lb	kg-m	ft-lb
7T	6	1	0.95	6.5	0.8 – 1.2	5.8 – 8.6
	8	1.25	2.21	16.1	2.0 – 3.0	14.5 – 21.7
	10	1.25	4.49	32.5	4.0 – 5.5	28.9 – 39.8
	10	1.5	4.29	31.0	3.7 – 5.2	26.8 – 37.6
	12	1.25 (ISO)	8.80	63.6	7.5 – 10.5	54.2 – 75.9
	12	1.5	7.78	56.2	7.0 – 9.0	50.6 – 65.1
	12	1.75	7.48	54.1	6.0 – 8.5	43.3 – 61.4
	13	1.5	10.17	73.5	8.0 – 12.0	57.9 – 86.8
	14	1.5	12.67	91.6	10.0 – 15.0	72.3 – 108.5
	14	2	11.86	85.8	9.5 – 14.0	68.7 – 101.2
	16	1.5	19.15	138.5	15.0 – 23.0	108.5 – 166.2
	16	2	18.11	131.0	14.0 – 22.0	101.2 – 159.0

– Note –

The above specified tightening torque is applicable only for female threads in steel material. If the female threads are for materials other than steel and/or the tightening surface are subjected to heat or vibrations, must be reconsidered.

18R ENGINE TIGHTENING TORQUE FOR MAIN PARTS

Tightening Part	Tightening Torque	
	kg-m	ft-lb
Cylinder head	10.0 – 12.0	72.3 – 86.8
Valve rocker support	1.7 – 2.3	12.3 – 16.6
Manifold	4.5 – 5.0	32.6 – 36.2
Camshaft bearing cap	1.7 – 2.3	12.3 – 16.6
Camshaft timing gear	1.7 – 2.3	12.3 – 16.6
Camshaft drive gear	8.0 – 10.0	57.7 – 72.3
Crankshaft bearing cap	9.5 – 11.5	68.7 – 83.2
Connecting rod cap	5.4 – 6.6	39.1 – 47.7
Oil pan	0.4 – 0.8	2.9 – 5.8
Crankshaft pulley	12.0 – 15.0	86.8 – 108.5
Flywheel	8.0 – 9.0	57.7 – 65.1
Pump shaft sprocket	8.0 – 10.0	57.7 – 72.3
Pump shaft thrust plate	1.5 – 2.1	10.8 – 15.2

18R SERVICE SPECIFICATION

18R ENGINE TUNE-UP

Drive belt tension at 10 kg (22 lb)					
Fan – Alternator		New	5 – 6 mm		0.20 – 0.24 in
		Used	7 – 8 mm		0.28 – 0.31 in
A/C Compressor – Crankshaft			15 – 18 mm		0.59 – 0.71 in
Battery specific gravity at 20°C (70°F)			1.25 – 1.27		
Engine oil capacity					
Dry refill	w/Oil filter	RX, RT	4.2 liters	4.4 US qt	3.7 Imp.qt
		RH	5.4 liters	5.7 US qt	4.8 Imp.qt
		RN	4.4 liters	4.7 US qt	3.9 Imp.qt
		RN4WD	5.5 liters	5.8 US qt	4.8 Imp.qt
Drain & refill	w/Oil filter	RX, RT	3.8 liters	4.0 US qt	3.3 Imp.qt
		RH	5.0 liters	5.3 US qt	4.4 Imp.qt
		RN	3.8 liters	4.0 US qt	3.3 Imp.qt
		RN4WD	5.1 liters	5.4 US qt	4.5 Impqt
	w/o Oil filter	RX, RT	3.2 liters	3.4 US qt	2.8 Imp.qt
		RH	4.4 liters	4.7 US qt	3.9 Imp.qt
		RN	3.2 liters	3.4 US qt	2.8 Imp.qt
		RN4WD	4.5 liters	4.8 US qt	4.0 Imp.qt
Coolant capacity	w/Heater	RX, RT	8.0 liters	8.5 US qt	7.0 Imp.qt
		RH	9.6 liters	10.1 US qt	8.4 Imp.qt
		RN	9.0 liters	9.5 US qt	8.0 Imp.qt
Spark plug heat range					
ND			W16EX-U, W16EXR-U		
NGK			BP5EA-L	BPR5EA-L	
Spark plug gap			0.8 mm		0.03 in
Distributor					
Dwell angle			50 – 54°		
Heel gap			0.4 – 0.5 mm		0.016 – 0.020 in
Damping spring gap			0.1 – 0.4 mm		0.004 – 0.168 in
Ignition timing			7° BTDC/650 rpm		
Firing order			1 – 3 – 4 – 2		
Valve clearance (Hot)					
Intake			0.20 mm		0.0079 in
Exhaust			0.36 mm		0.0141 in
Initical idle speed					
M/T & A/T			750 ± 50 rpm		
Manifold vacuum (at idle speed)					
Manual transmission			More than 420 mm Hg		16.5 in Hg
Automatic transmission			More than 350 mm Hg		13.8 in Hg
CO Concentration			1 – 3%		
Fast idle speed			2600 ± 200 rpm		
Compression pressure (at 250 rpm)					
STD			11.5 kg/cm²		163.0 psi
Limit			9.0 kg/cm²		127.8 psi
Difference of pressure between cylinders			Less than 1.0 kg/cm²		14.2 psi

18R ENGINE

Cylinder Head

Surface warpage limit		0.05 mm	0.0019 in
Maximum reface limit		0.2 mm	0.008 in
Valve	Contacting surface angle	45°	
	Contacting width	1.2 – 1.6 mm	0.047 – 0.063 in
	Refacing angle	30° 45° 60°	

Valve Guide Bushing

Inner diameter		8.01 – 8.03 mm	
Outer diameter	STD	14.023 – 14.041 mm	0.5521 – 0.5528 in
Projection from cylinder head		15.8 – 16.2 mm	0.622 – 0.638 in

Valve

Valve overall length	Intake	STD	113.2 mm	4.457 in
		Limit	112.7 mm	4.437 in
	Exhaust	STD	113.7 mm	4.476 in
		Limit	113.2 mm	4.457 in
Valve head contacting face angle			45.5°	
Valve stem diameter		Intake	7.970 – 7.985 mm	0.3138 – 0.3144 in
		Exhaust	7.960 – 7.975 mm	0.3134 – 0.3140 in
Valve stem oil clearance	STD	Intake	0.025 – 0.060 mm	0.0010 – 0.0024 in
		Exhaust	0.035 – 0.070 mm	0.0014 – 0.0028 in
	Limit	Intake	0.08 mm	0.0032 in
		Exhaust	0.10 mm	0.0039 in
Valve head thickness limit (Both intake and exhaust)			0.6 mm	0.024 in

Valve Spring

Free length		Inner	44.1 mm	1.736 in
		Outer	46.5 mm	1.830 in
Installed length		Inner	36.8 mm	1.449 in
		Outer	40.8 mm	1.606 in
Installed Tension	STD	Inner	7.6 kg	16.8 lb
		Outer	26.3 kg	58.0 lb
	Limit	Inner	6.8 kg	15.0 lb
		Outer	23.9 kg	52.7 lb
Squareness	Limit	Inner	1.6 mm	0.063 in
		Outer	1.6 mm	0.063 in

Camshaft

Bend limit			0.10 mm	0.004 in
Thrust clearance		STD	0.042 – 0.167 mm	0.0017 – 0.0066 in
		Limit	0.25 mm	0.0098 in
Journal oil clearance		STD	0.012 – 0.052 mm	0.0005 – 0.0020 in
		Limit	0.1 mm	0.0039 in
Journal diameter			34.972 – 34.996 mm	1.3768 – 1.3778 in
Bearing U/S Type			0.125, 0.25	
Cam height	STD	Intake	44.04 mm	1.7339 in
		Exhaust	44.14 mm	1.7378 in
	Limit	Intake	43.7 mm	1.720 in
		Exhaust	43.8 mm	1.724 in

Valve Rocker Arm and Shaft

Oil clearance	STD	0.020 – 0.041 mm	0.0008 – 0.0016 in
	Limit	0.08 mm	0.0032 in

Manifold

Manifold surface warpage limit	0.1 mm	0.004 in

Timing Chain

Elongation limit at 5 kg(11 lb)	No.1	291.4 mm	11.47 in
	No.2 (17-Links)	147.0 mm	5.79 in

Timing Gear

Wear limit	Crankshaft gear	60.0 mm	2.362 in
	Pump drive shaft gear	114.5 mm	4.508 in
	Camshaft drive gear	78.2 mm	3.079 in
	Camshaft timing gear	78.2 mm	3.079 in

Chain Tensioner and Vibration Damper

Wear limit	No.1 tensioner	11.5 mm	0.45 in
	No.1 damper	5.0 mm	0.20 in
	No.2 damper	5.7 mm	0.224 in
	Tensioner slipper	6.8 mm	0.26 in

Pump Drive Shaft and Bearing

Thrust clearance	STD	0.06 – 0.13 mm	0.0024 – 0.0051 in
	Limit	0.3 mm	0.012 in
Journal diameter	Front	45.951 – 45.975 mm	1.8091 – 1.8100 in
	Rear	40.959 – 40.975 mm	1.6126 – 1.6132 in
Oil clearance	STD	0.025 – 0.066 mm	0.0010 – 0.0026 in
	Limit	0.08 mm	0.0032 in
Bearing fitting tolerance		0.02 – 0.06 mm	0.0008 – 0.0024 in

Cylinder Block

Warpage limit		0.05 mm	0.0019 in
Cylinder bore	STD	88.50–88.55 mm	3.4842–3.4862 in
Cylinder bore wear limit		0.2 mm	0.008 in
Difference of bore limit between cylinders		0.05 mm	0.002 in
Taper and out-of-round		0.02 mm	0.0008 in

Crankshaft

Bend limit		0.03 mm	0.0012 in
Crank journal taper and out-of-round limit		0.01 mm	0.0004 in
Crank pin journal taper and out-of-round limit		0.01 mm	0.0004 in
Thrust clearance	STD	0.02 – 0.22 mm	0.0008 – 0.0087 in
	Limit	0.3 mm	0.0118 in
Thrust washer thickness	STD	1.94 – 1.99 mm	0.0764 – 0.0783 in
	O/S 0.125	2.003 – 2.053 mm	0.0789 – 0.0808 in
	O/S 0.25	2.065 – 2.115 mm	0.0813 – 0.0833 in
Crank pin journal oil clearance	STD	0.024 – 0.048 mm	0.0009 – 0.0019 in
	Limit	0.08 mm	0.0032 in
Bearing U/S		0.05, 0.25, 0.50	
Journal diameter	STD	52.976 – 53.000 mm	2.0857 – 2.0866 in
	U/S 0.25	52.70 – 52.71 mm	2.0749 – 2.0751 in
	U/S 0.50	52.45 – 52.46 mm	2.0650 – 2.0654 in
Crank journal oil clearance	STD	0.016 – 0.040 mm	0.0006 – 0.0016 in
	Limit	0.08 mm	0.0031 in
Bearing U/S		0.05, 0.25, 0.50	
Journal diameter	STD	59.976 – 60.000 mm	2.3613 – 2.3622 in
	U/S 0.25	59.70 – 59.71 mm	2.3504 – 2.3508 in
	U/S 0.50	59.45 – 59.46 mm	2.3406 – 2.3409 in

Piston and Piston Ring

Piston outer diameter	STD	88.44 – 88.49 mm	3.4819 – 3.4839 in
	O/S	0.50, 0.75, 1.00	
Cylinder to piston clearance		0.05 – 0.07 mm	0.0020 – 0.0028 in
Piston pin installing temperature		100°C	212°F
Piston ring end gap	Compression ring No.1	0.19 – 0.34 mm	0.0075 – 0.0133 in
	Compression ring No.2	0.15 – 0.48 mm	0.0059 – 0.0189 in
	Oil ring	0.20 – 0.88 mm	0.0079 – 0.0346 in
Piston ring to ring groove clearance	Comp. ring No.1	0.02 – 0.06 mm	0.0008 – 0.0024 in
	Comp. ring No.2	0.02 – 0.06 mm	0.0008 – 0.0024 in

Connecting Rod and Bearing

Big end thrust clearance	STD	0.21 – 0.34 mm	0.0083 – 0.0134 in
	Limit	0.4 mm	0.016 in
Bearing oil clearance	STD	0.024 – 0.048 mm	0.0009 – 0.0019 in
	Limit	0.08 mm	0.0031 in
Bearing U/S		0.05, 0.25, 0.50, 0.75, 1.00	
Bushing oil clearance	STD	0.005 – 0.014 mm	0.00020 – 0.00055 in
	Limit	0.02 mm	0.0008 in

Flywheel

Run-out limit	0.3 mm	0.012 in

LUBRICATING SYSTEM

Oil Pump

Tip clearance	STD	0.10 – 0.15 mm	0.0039 – 0.0059 in
	Limit	0.2 mm	0.008 in
Side clearance	STD	0.03 – 0.07 mm	0.0012 – 0.0028 in
	Limit	0.15 mm	0.0059 in
Body clearance	STD	0.10 – 0.16 mm	0.0039 – 0.0063 in
	Limit	0.2 mm	0.008 in

COOLING SYSTEM

Water Pump

Bearing fitting temperature	100°C	212°F

Fluid Coupling

Silicon oil viscosity	for RA, RX A/T (General)	6000 cst
	except RA, RX A/T (General)	3000 cst
Capacity		25 cc
	w/Temperature controled coupling	35 cc

Thermostat

Valve opening temperature			
Starts to open at		88°C	190°F
	except RN, RA, RT (Australia)	82°C	180°F
Valve opening travel	only 18R-C	8 mm	0.31 in
Identification mark		88 punch mark or Red painting mark	
		82 punch mark or Blue painting mark	

Radiator

Relief valve opening pressure	STD	0.9 kg/cm²	12.8 psi
	Limit	0.6 kg/cm²	8.5 psi

FUEL SYSTEM

Carburetor (for South Africa)

Part Number		21100 – 34620	21100 – 34640
Float Level	Raised position	3.5 mm	0.138 in
	Lowered position	1.0 mm	0.040 in
Throttle Valve Fully opened angle (from bore)	Primary	90°	
	Secondary	75°	
Kick up	Secondary Throttle Valve to Body Clearance	0.2 mm	0.008 in
	Primary Throttle Opening Angle (from bore)	64 – 90°	
Fast Idle (Clearance)		0.91 mm	0.036 in
Unloader Angle (from bore)		47°	
Accelerating Pump Stroke		4.5 mm	0.0173 in
Idle Mixture Adjusting Screw Preset Position		Screw out 2½ turns	
Choke Valve Fully Closed Temperature		below 25°C	77°F

Carburetor (except South Africa)

Float Level	Raised position	10.0 – 11.0 mm	0.39 – 0.43 in
	Lowered position	1.0 – 1.2 mm	0.039 – 0.047 in
Throttle Valve Fully opened angle (from bore)		90°	
Kick up	Secondary Throttle Valve to Body Clearance	0.1 – 0.2 mm	0.004 – 0.008 in
Seco-touch		57 – 61°	
Fast Idle		Automatic Choke	0.81 mm (0.032 in)
First Throttle Valve to Body Clearance nce		Manual Choke	1.01 mm (0.039 in)
Unloader Angle (from bore)		47°	
Accelerating Pump Stroke	Europe	3.7 mm	0.146 in
	Australia, General	3.8 mm	0.150 in
Idle Mixture Adjusting Screw Preset Position		Screw out 3 turns	
Choke Valve Fully Closed Temperature		Below 25°C	77°F
Choke Breaker			
	Automatic Choke	19° + 20°	
	Manual Choke	16° + 20°	

STARTING SYSTEM

Starter

No load characteristics	Ampere	Less than 50 A at 11.5 V	
	RPM	More than 5000 rpm	
Armature shaft to bushing clearance	STD	0.1 – 0.14 mm	0.0039 – 0.0055 in
	Limit	0.2 mm	0.008 in
Armature shaft thrust clearance	STD	0.05 – 0.35 mm	0.002 – 0.014 in
	Limit	0.8 mm	0.032 in
Brush length 1.0 kw	Limit	12 mm	0.47 in
0.8 kw	Limit	10 mm	0.39 in
Commutator runout	STD	Less than 0.05 mm	0.002 in
	Limit	0.4 mm	0.016 in
Commutator diameter	STD	32.7 mm	1.287 in
	Limit	31 mm	1.22 in
Mica depth	STD	0.5 – 0.8 mm	0.020 – 0.031 in
	Limit	0.2 mm	0.008 in
Pinion end to stop collar clearance		1.0 – 4.0 mm	0.04 – 0.16 in
Moving stud length (Reference only)		34 mm	1.34 in

IGNITION SYSTEM

Distributor

Shaft thrust clearance	0.15 – 0.50 mm	0.006 – 0.020 in
Point gap	0.45 mm	0.018 in
Dwell angle	50 – 54°	
Damping spring gap	0.1 – 0.4 mm	0.004 – 0.016 in

Distributor (Cont'd)

	Governor Advance Angle		Vacuum Advance Angle		
	Dis. rpm	Advance Angle	mmHg	inHg	Advance Angle
Distributor advance angle 19100–34290 19100–34250 19100–34260 19100–34230 19100–34220 19100–34221 19100–34214	500 ± 97	Advance begins	80	3.15	Advance begins
	878	2.9 $^{+0.8^\circ}_{-0.7^\circ}$	130	5.12	3.2 $^{+0.7^\circ}_{-0.8^\circ}$
	1600	10.0 $^{+0.8^\circ}_{-0.7^\circ}$	268	10.55	9.2 $^{+0.7^\circ}_{-0.8^\circ}$
	2800	15.0 ± 1.0°	360	14.17	12.0 ± 1.0°
	3000	14.9 ± 1.0°			
Distributor advance angle 19100–34240 19100–34270 19100–34202	600 ± 75	Advance begins	80	3.15	Advance begins
	1500	5.5 ± 0.7°	172	6.77	3.9 $^{+0.7^\circ}_{-0.8^\circ}$
	1600	7.9 $^{+0.8^\circ}_{-0.7^\circ}$	300	11.81	8.0 ± 1.0°
	2600	13.0 ± 1.0°			
	3000	12.9 ± 1.0°			
Distributor advance angle 19100–34310	500 ± 97	Advance begins	80	3.15	Advance begins
	920	2.2 ± 1.0°	178	7.01	4.2 $^{+0.8^\circ}_{-0.7^\circ}$
	1500	6.5 ± 1.0°	300	11.81	8.0 ± 1.0°
	2750	10.5 ± 1.0°	70	2.76	Advance begins
	3000	10.4 ± 1.0°	150	5.91	3.5 ± 1.0°

Ignition Coil

Primary coil resistance	1.2 – 1.5 Ω
Secondary coil resistance	10.2 – 13.8 kΩ
External resistor resistance	1.3 – 1.7 Ω
Insulation resistance at 500 V	Over 10 MΩ

High Tension Cord

End to end resistance	Less than 25 kΩ

Spark Plug

Heat range	ND	W16EX-U W16EXR-U (for E.C.E., Sweden)
	NGK	BP5EA-L BPR5EA-L (for E.C.E., Sweden)
Plug gap		0.8 mm 0.031 in

CHARGING SYSTEM

Alternator

Maximum output ampere		40A	
Rotor coil resistance		4.1 – 4.3 Ω	
Brush length	STD	12.5 mm	0.49 in
	with IC regulator	16.5 mm	0.65 in
	Limit	5.5 mm	0.22 in

Alternator Regulator

Voltage regulator regulating voltage	13.8 – 14.8 V

18R-G ENGINE TIGHTENING TORQUE FOR MAIN PARTS

Tightening Part		Tightening Torque	
		kg-m	ft-lb
Cylinder head		7.2 – 8.8	52.1 – 63.7
Camshaft bearing cap		1.6 – 2.2	12 – 15
Camshaft timing gear		7.0 – 8.0	50.6 – 57.9
Camshaft drive gear		6.0 – 7.0	43.4 – 50.6
Manifold	Intake	1.0 – 1.6	7.2 – 11.6
	Exhaust	3.5 – 4.5	25.3 – 32.6
Crankshaft bearing cap		10.0 – 11.0	72.3 – 79.6
Connecting rod cap		6.4 – 7.0	46.3 – 50.6
Oil pan		1.0 – 1.6	8 – 11
Crankshaft pulley		12 – 15	87 – 108
Flywheel		8.2 – 8.8	59.3 – 63.7

18R-G ENGINE SERVICE SPECIFICATION

18R-G ENGINE TUNE-UP

Drive belt tension at 10 kg (22 lb)					
	Fan – Alternator	New	5 – 6 mm		0.20 – 0.24 in
		Used	6 – 9 mm		0.24 – 0.35 in
	A/C compressor – Crankshaft		16 – 19 mm		0.63 – 0.75 in
Battery specific gravity at 20°C (70°F)			1.25 – 1.27		
Coolant capacity (w/heater)			8.4 Liter	8.9 US qt	7.4 Imp.qt
Engine oil capacity	Dry refill	w/Oil filter	3.9 Liter	4.1 US qt	3.4 Imp.qt
	Drain & refill	w/Oil filter	3.3 Liter	3.5 US qt	2.9 Imp.qt
		w/o Oil filter	2.9 Liter	3.1 US qt	2.6 Imp.qt
Spark plug heat range	ND		W20EXR-U		
	NGK		BPR6EA, BPR6EY		
Spark plug gap			0.7 – 0.8 mm		0.028 – 0.031 in

18R-G ENGINE TUNE-UP (Cont'd)

Ignition timing	at Idle speed	12° BTDC	
Firing order		1 – 3 – 4 – 2	
Valve clearance (Cold)	Intake	0.24 – 0.34 mm	0.0094 – 0.0134 in
	Exhaust	0.29 – 0.39 mm	0.0114 – 0.0154 in
Initial idle speed		1000 rpm	
Manifold vacuum	at Idle speed	380 mm Hg	15.0 inHg
	Front and rear difference	below 10 mm Hg	0.39 inHg
Compression pressure	STD	12.7 kg/cm²	170 psi
	Limit	10.0 kg/cm²	142 psi
Difference of pressure between cylinders		Lrss than 1.0 kg/cm²	14 psi

18R-G ENGINE

Cylinder Head

Surface warpage limit		0.05 mm	0.002 in
Maximum reface limit		0.2 mm	0.008 in
Valve	Contacting surface angle	45°	
	Contacting width	1.2 – 1.6 mm	0.047 – 0.063 in
	Refacing angle	30° 45°	60°
Valve lifter inner diameter	Black	37.951 – 37.957 mm	1.4941 – 1.4944 in
	Blue	37.957 – 37.963 mm	1.4944 – 1.4946 in
	Yellow	37.963 – 37.969 mm	1.4946 – 1.4948 in
	Red	37.969 – 37.975 mm	1.4948 – 1.4951 in

Valve Guide Bushing

Inner diameter		8.500 – 8.515 mm	0.3346 – 0.3352 in
Outer diameter	STD	14.02 – 14.04 mm	0.5520 – 0.5528 in
	O/S 0.05	14.07 – 14.09 mm	0.5548 – 0.5551 in
Replacing temperature		110 – 130°C	230 – 237°F

Valve

Valve overall length	Intake	106.8 mm	4.205 in
	Exhaust	105.1 mm	4.138 in
Valve head contacting face angle		45.5°	
Valve stem diameter	Intake	8.465 – 8.475 mm	0.3333 – 0.3337 in
	Exhaust	8.455 – 8.470 mm	0.3329 – 0.3335 in
Valve stem oil clearance	Intake	0.025 – 0.055 mm	0.0010 – 0.0022 in
	Exhaust	0.03 – 0.06 mm	0.0012 – 0.0024 in
Limit	Intake	0.08 mm	0.0031 in
	Exhaust	0.10 mm	0.004 in
Valve head thickness limit	Intake	0.5 mm	0.020 in
	Exhaust	0.6 mm	0.024 in

Valve Spring

Free length		Inner	45.9 mm	1.807 in
		Outer	47.4 mm	1.866 in
Installed length		Inner	36.5 mm	1.347 in
		Outer	39.0 mm	1.535 in
Installed tension	STD	Inner	7.3 kg	16.1 lb
		Outer	23.7 kg	52.3 lb
	Limit	Inner	6.7 kg	14.8 lb
		Outer	21.8 kg	48.1 lb
Squareness	Limit	Inner	1.6 mm	0.063 in
		Outer	1.6 mm	0.063 in

Valve Lifter

Oil clearance	STD	0.02 – 0.03 mm	0.0008 – 0.0012 in
	Limit	0.1 mm	0.004 in
Outer diameter	Black	37.925 – 37.931 mm	1.4931 – 1.4933 in
	Blue	37.931 – 37.937 mm	1.4933 – 1.4936 in
	Yellow	37.937 – 37.943 mm	1.4936 – 1.4938 in
	Red	37.943 – 37.949 mm	1.4938 – 1.4941 in

Camshaft

Bend limit		0.03 mm	0.0012 in
Thrust clearance	STD	0.15 – 0.35 mm	0.0059 – 0.0138 in
	Limit	0.4 mm	0.0158 in
Journal oil clearance	STD	0.03 – 0.07 mm	0.0012 – 0.0028 in
	Limit	0.15 mm	0.0059 in
Journal diameter	STD	31.954 – 31.970 mm	1.2580 – 2.2587 in
Cam height (Both intake and exhaust)	STD	45.37 – 45.47 mm	1.786 – 1.790 in
	Limit	45.0 mm	1.77 in

Manifold

Manifold surface warpage limit (Both intake and exhaust)	0.1 mm	0.0039 in

Timing Chain

Elongation limit	No.1 (at 5 kg)	291.4 mm	11.47 in
	No.2 (17 Links)	147.0 mm	5.79 in

Timing Gear

Wear limit	Crankshaft gear	60.0 mm	2.362 in
	Pump drive shaft gear	114.5 mm	4.503 in
	Camshaft drive gear	78.2 mm	3.079 in
	Camshaft timing gear	78.2 mm	3.079 in

Chain Tensioner and Vibration Damper

Wear limit	No.1 tensioner	11.5 mm	0.453 in
	No.1 damper	5.0 mm	0.197 in
	No.2 damper	5.5 mm	0.217 in
	No.3 damper	6.5 mm	0.256 in
	Tensioner slipper	7.5 mm	0.295 in

Pump Drive Shaft and Bearing

Thrust clearance	STD	0.06 – 0.13 mm	0.0024 – 0.0051 in
	Limit	0.3 mm	0.012 in
Journal diameter	Front	45.96 – 45.98 mm	1.8094 – 1.8102 in
	Rear	40.96 – 40.98 mm	1.6130 – 1.6134 in
Oil clearance	STD	0.03 – 0.07 mm	0.0012 – 0.0028 in
	Limit	0.08 mm	0.0032 in
Bearing fitting tolerance		0.02 – 0.06 mm	0.0008 – 0.0024 in

Cylinder Block

Warpage limit		0.05 mm	0.0020 in
Cylinder bore	STD	88.50 – 88.55 mm	3.484 – 3.486 in
Cylinder bore wear limit		0.2 mm	0.008 in
Difference of bore limit between cylinders		0.05 mm	0.002 in
Taper and out-of-round		0.02 mm	0.0008 in

Crankshaft

Bend limit		0.05 mm	0.0020 in
Crank journal taper and out-of-round limit		0.01 mm	0.0004 in
Crank pin journal taper and out-of-round limit		0.01 mm	0.0004 in
Thrust clearance	STD	0.02 – 0.22 mm	0.0008 – 0.0087 in
	Limit	0.3 mm	0.0118 in
Thrust washer thickness	STD	1.940 – 1.990 mm	0.0764 – 0.0783 in
	O/S 0.125	2.003 – 2.053 mm	0.0789 – 0.0808 in
	O/S 0.25	2.065 – 2.115 mm	0.0813 – 0.0833 in
Crank pin journal oil clearance	STD	0.02 – 0.05 mm	0.0008 – 0.0020 in
	Limit	0.08 mm	0.0032 in
Bearing U/S		0.25	
Journal diameter	STD	52.976 – 53.000 mm	2.0857 – 2.0866 in
	U/S 0.25	52.73 – 52.75 mm	2.0760 – 2.0768 in
Crank journal oil clearance	STD	0.03 – 0.06 mm	0.0012 – 0.0024 in
	Limit	0.08 mm	0.0032 in

Crankshaft (Cont'd)

Bearing U/S		0.25	
Journal diameter	STD	59.976 – 60.000 mm	2.3613 – 2.3622 in
	U/S 0.25	59.73 – 59.75 mm	2.3516 – 2.3524 in

Piston and Piston Ring

Piston outer diameter	STD	88.44 – 88.49 mm	3.4819 – 3.4839 in
	O/S 0.50	88.94 – 88.99 mm	3.5016 – 3.5035 in
	O/S 1.00	89.44 – 89.49 mm	3.5213 – 3.5232 in
Cylinder to piston clearance		0.05 – 0.07 mm	0.0020 – 0.0028 in
Piston pin installing temperature		Approx 80°C	176°F
Piston ring end gap	Compression ring No.1	0.25 – 0.51 mm	0.0098 – 0.0201 in
	Compression ring No.2	0.18 – 0.43 mm	0.0071 – 0.0169 in
	Oil ring	0.15 – 0.40 mm	0.0059 – 0.0157 in
Piston ring to ring groove Clearance	Comp. ring No.1	0.02 – 0.06 mm	0.0008 – 0.0024 in
	Comp. ring No.2	0.02 – 0.06 mm	0.0008 – 0.0024 in

Connecting Rod and Bearing

Big end thrust clearance	STD	0.16 – 0.26 mm	0.0063 – 0.010 in
	Limit	0.3 mm	0.012 in
Bearing oil clearance	STD	0.02 – 0.05 mm	0.0008 – 0.0020 in
	Limit	0.08 mm	0.0032 in
Bearing U/S		0.25	
Bushing oil clearance	STD	0.005 – 0.014 mm	0.00020 – 0.00055 in
	Limit	0.02 mm	0.0008 in

Flywheel

Run-out limit	0.2 mm	0.008 in

LUBRICATING SYSTEM

Oil Pump

Tip clearance	STD	0.10 – 0.15 mm	0.0039 – 0.0059 in
	Limit	0.2 mm	0.008 in
Side clearance	STD	0.03 – 0.07 mm	0.0012 – 0.0028 in
	Limit	0.15 mm	0.0059 in
Body clearance	STD	0.10 – 0.16 mm	0.0039 – 0.0063 in
	Limit	0.2 mm	0.008 in

COOLING SYSTEM

Water Pump

Bearing fitting temperature	80°C	176°F

Fluid Coupling

Silicon oil viscosity	
w/Tempered fan	3000 cst
Capacity	
w/Tempered fan	35 cc

Thermostat

	Low Temp. Type		High Temp. Type	
Valve opening temperature				
Start to open at	82°C	180°F	88°C	190°F
Fully open at	95°C	203°F	100°C	212°F
Valve opening travel	8 mm	0.31 in	8 mm	0.31 in
Identification mark	"82" punch mark or "Blue" painting mark		"88" punch mark or "Red" painting mark	

Radiator

Relief valve opening pressure	STD	0.9 kg/cm²	12.8 psi
	Limit	0.6 kg/cm²	8.5 psi

FUEL SYSTEM

Carburetor

Model	40 PHH–4	
Float adjusting screw one turn		
Float level adjustment (one turn with float level adjust screw)	1.8 mm	0.07 in
Float level (Use SST) (From Carburetor upper surface)	20 – 21 mm	0.79 – 0.83 in
Accelerating pump		
Discharging time	0.9 – 1.3 second	
Idle mixture adjusting screw preset position	Screw out 2 turn	

STARTING SYSTEM

Starter

No load characteristics		Ampere	Less than 50 A at 11V	
		RPM	More than 5000 rpm	
Armature shaft to bushing clearance		STD	0.1 – 0.14 mm	0.004 – 0.006 in
		Limit	0.2 mm	0.008 in
Armature shaft thrust clearance		STD	0.05 – 0.35 mm	0.002 – 0.014 in
		Limit	0.8 mm	0.031 in
Brush length	0.8 kw	STD	16 mm	0.63 in
		Limit	10 mm	0.39 in
	1.0 kw	STD	19 mm	0.75 in
		Limit	12 mm	0.47 in
Commutator runout		STD	Less than 0.05 mm	0.002 in
		Limit	0.4 mm	0.016 in
Commutator diameter		STD	32.7 mm	1.287 in
		Limit	31 mm	1.22 in
Mica depth		STD	0.5 – 0.8 mm	0.020 – 0.031 in
		Limit	0.2 mm	0.008 in
Pinion end to stop collar clearance			1.0 – 4.0 mm	0.04 – 0.16 in
Moving stud length (Reference only)			34 mm	1.34 in

IGNITION SYSTEM

Distributor

Shaft thrust clearance		0.15 – 0.50 mm	0.006 – 0.020 in
ADVANCE CHARACTERISTICS	Part No. 19100-88233		
Vacuum advance angle	mmHg	inHg	Dis. advance angle Degrees
	65	2.56	Advance begins
	200	7.87	7.5° ± 1.0°
Governor advance angle	Distributor	rpm	Dis. advance angle Degree
	600		Advance begins
	800		3.5 ± 0.5°
	1600		10.0 ± 1.0°
	3000		8.9 ± 1.0°

Ignition Coil

Primary	1.3 – 1.6 Ω
Secondary coil resistance	10.2 – 13.8 kΩ
External resistor resistance	1.3 – 1.5 Ω
Insulation resistance at 500V	Over 10 MΩ

High Tension Cord

End to end resistance	10 – 50 kΩ/meter

Spark Plug

Heat Range	W20EXR-U BPR6EA, BPR6EY	
Plug gap	0.7 – 0.8 mm	0.028 – 0.031 in

CHARGING SYSTEM

Alternator

Maximum output ampere		45A	
Rotor coil resistance		4.1 – 4.3 Ω	
Brush length	STD	12.5 mm	0.49 in
	Limit	5.5 mm	0.22 in

Alternator Regulator

Voltage regulator regulating voltage	13.8 – 14.8 V

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