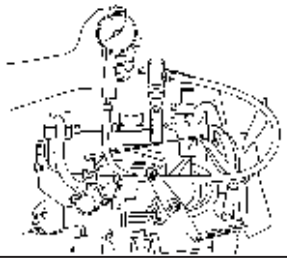
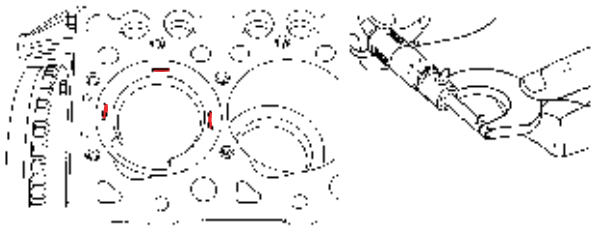
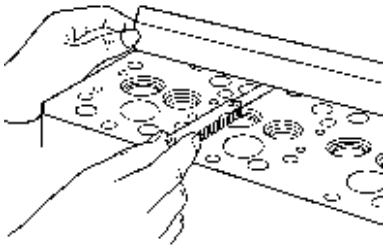
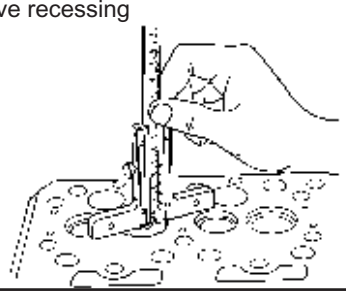
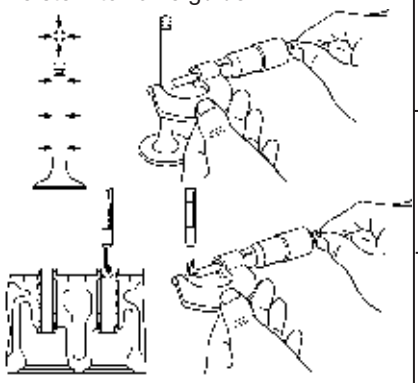
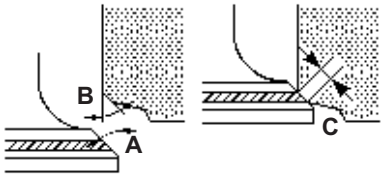
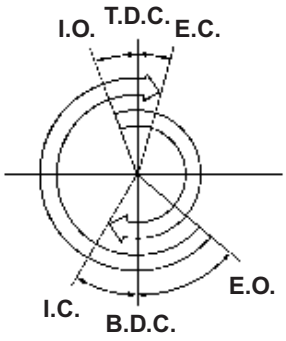
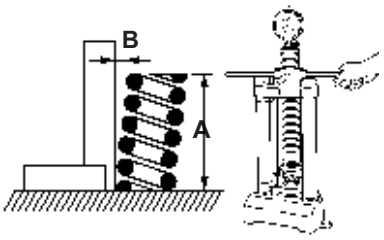
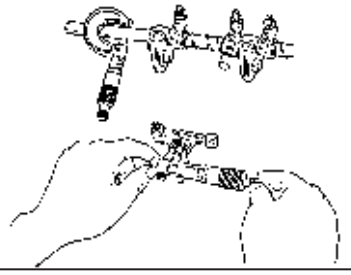
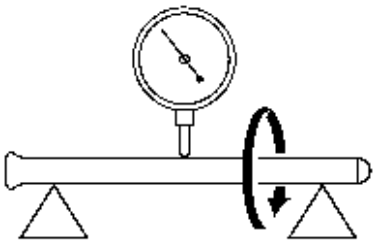
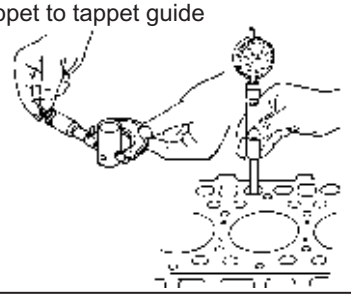
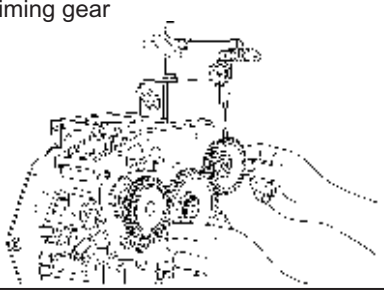
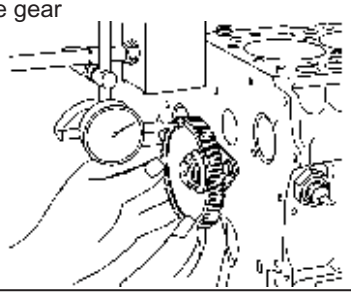
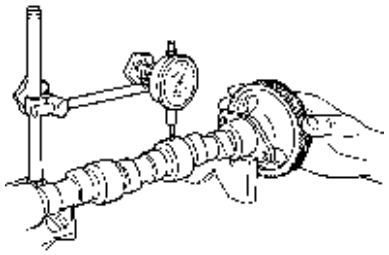
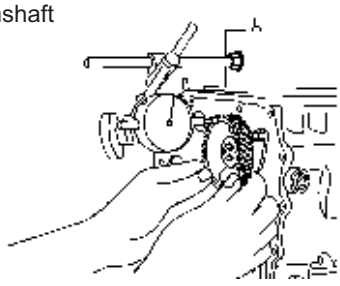
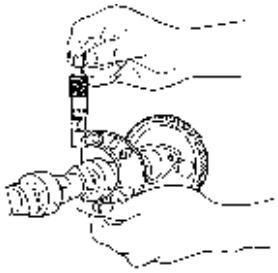
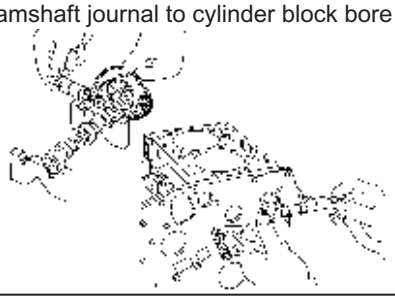
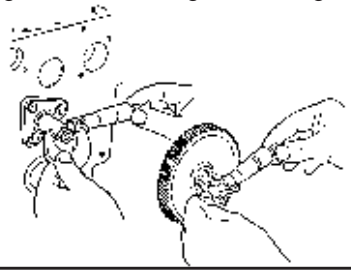
SERVICING SPECIFICATIONS

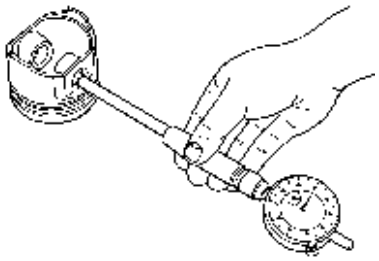
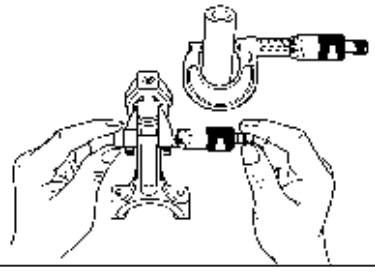
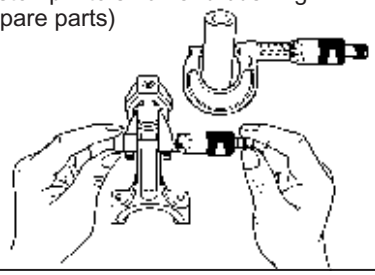
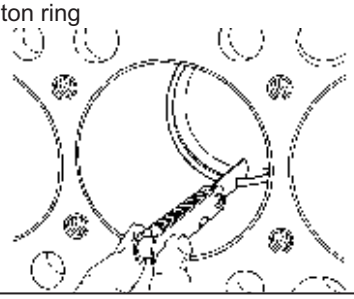
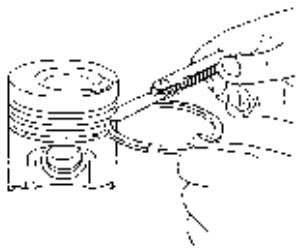
(1) ENGINE BODY

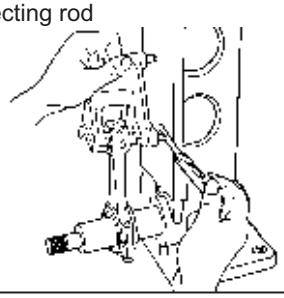
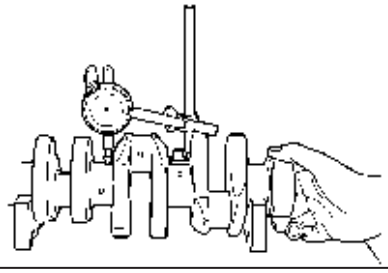
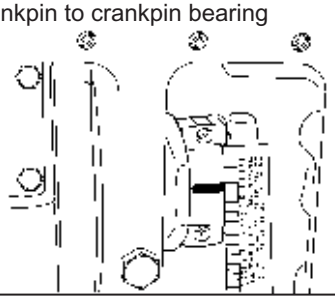
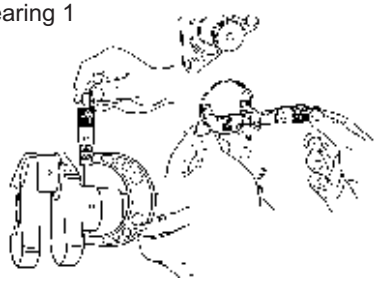
Item			Factory Specification	Allowable Limit
Lubricating oil capacity 		All models	3.4 L 0.90 U.S.gals. 0.75 Imp.gals.	—
Valve clearance (When cold) 		All models	0.145 to 0.185 mm 0.00571 to 0.00728 in.	—
Compression pressure 		All models	3.53 to 4.02 MPa 36.0 to 41.0 kgf/cm^2 512 to 583 psi	2.55 MPa 26.0 kgf/cm^2 370 psi
Top clearance 		All models	1.35 to 1.65 mm 0.0531 to 0.0650 in.	—
Cylinder head surface 	Flatness	All models	—	0.05 mm / 500 mm 0.0020 in. / 19.69 in.

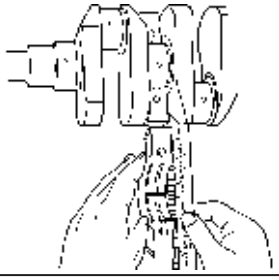
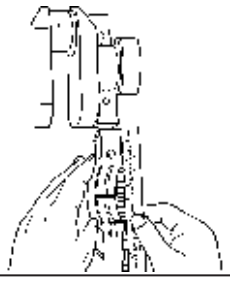
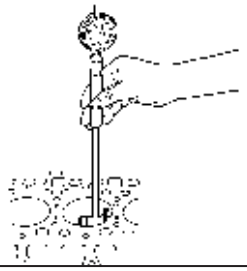
Item			Factory Specification	Allowable Limit
Valve recessing 		All models	-0.10 mm (Protrusion) to 0.10 mm (Recessing) -0.0039 in. (Protrusion) to 0.0039 in. (Recessing)	0.3 mm (Recessing) 0.0118 in. (Recessing)
Valve stem to valve guide 	Clearance	All models	0.030 to 0.057 mm 0.00118 to 0.00224 in.	0.1 mm 0.0039 in.
	Valve stem O.D.	All models	5.968 to 5.980 mm 0.23496 to 0.23543 in.	—
	Valve guide I.D.	All models	6.010 to 6.025 mm 0.23661 to 0.23720 in.	—
Valve & valve seat 	Face angle **(A)**	All models	0.785 rad 45°	—
	Seat angle **(B)**	All models	0.785 rad 45°	—
	Seat width **(C)**	All models	2.12 mm 0.0835 in.	—
Valve timing 	Open (Intake valve)	All models	0.35 rad before T.D.C. 20° before T.D.C.	—
	Close (Intake valve)	All models	0.79 rad after B.D.C. 45° after B.D.C.	—
	Open (Exhaust valve)	All models	0.87 rad before B.D.C. 50° before B.D.C.	—
	Close (Exhaust valve)	All models	0.26 rad after T.D.C. 15° after T.D.C.	—
Valve spring 	Free length **(A)**	All models	31.3 to 31.8 mm 1.232 to 1.252 in.	28.4 mm 1.118 in.
	Tilt **(B)**	All models	—	1.2 mm 0.047 in.
	Setting load / Setting length	All models	64.7 N / 27.0 mm 6.6 kgf / 27.0 mm 14.6 lbs / 1.063 in.	54.9 N / 27.0 mm 5.6 kgf / 27.0 mm 12.3 lbs / 1.063 in.

Item			Factory Specification	Allowable Limit
Rocker arm shaft to rocker arm 	Oil clearance	All models	0.016 to 0.045 mm 0.00063 to 0.00177 in.	0.15 mm 0.0059 in.
	Rocker arm shaft O.D.	All models	10.473 to 10.484 mm 0.41232 to 0.41276 in.	—
	Rocker arm I.D.	All models	10.500 to 10.518 mm 0.41339 to 0.41410 in.	—
Push rod 	Alignment	All models	—	0.25 mm 0.0098 in.
Tappet to tappet guide 	Oil clearance	All models	0.016 to 0.052 mm 0.00063 to 0.00205 in.	0.10 mm 0.0039 in.
	Tappet O.D.	All models	17.966 to 17.984 mm 0.70732 to 0.70803 in.	—
	Tappet guide I.D.	All models	18.000 to 18.018 mm 0.70866 to 0.70937 in.	—
Timing gear 	Backlash (Crank gear to idle gear)	All models	0.043 to 0.124 mm 0.00169 to 0.00488 in.	0.15 mm 0.0059 in.
	Backlash (Idle gear to cam gear)	All models	0.047 to 0.123 mm 0.00185 to 0.00484 in.	0.15 mm 0.0059 in.
	Backlash (Idle gear to injection pump gear)	All models	0.046 to 0.124 mm 0.00181 to 0.00488 in.	0.15 mm 0.0059 in.
	Backlash (Crank gear to oil pump drive gear)	All models	0.041 to 0.123mm 0.00161 to 0.00484 in.	0.15 mm 0.0059 in.
Idle gear 	Side clearance	All models	0.20 to 0.51 mm 0.0079 to 0.0201 in.	0.8 mm 0.0315 in.

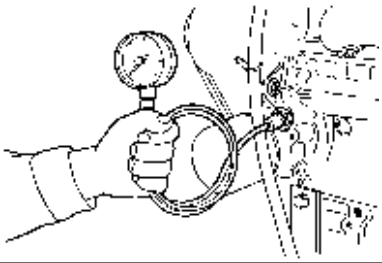
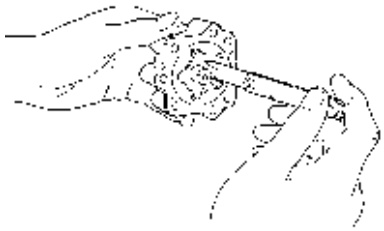
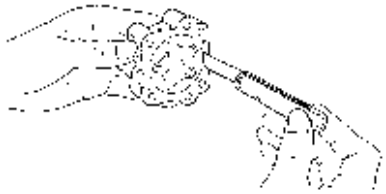
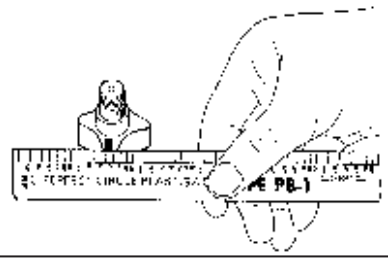
Item			Factory Specification	Allowable Limit
Camshaft 	Alignment	All models	—	0.01 mm 0.0004 in.
Camshaft 	Side clearance	All models	0.15 to 0.31 mm 0.0059 to 0.0122 in.	0.5 mm 0.0197 in.
Cam 	Height (Intake and Exhaust)	All models	26.88 mm 1.0583 in.	26.83 mm 1.0563 in.
Camshaft journal to cylinder block bore 	Oil clearance	All models	0.050 to 0.091 mm 0.00197 to 0.00358 in.	0.15 mm 0.0059 in.
	Camshaft journal O.D.	All models	32.934 to 32.950 mm 1.29661 to 1.29724 in.	—
	Cylinder block bore I.D.	All models	33.000 to 33.025 mm 1.29921 to 1.30020 in.	—
Idle gear shaft to idle gear bushing 	Oil clearance	All models	0.020 to 0.084 mm 0.00079 to 0.00331 in.	0.10 mm 0.0039 in.
	Idle gear shaft O.D.	All models	19.967 to 19.980 mm 0.78610 to 0.78661 in.	—
	Idle gear bushing I.D.	All models	20.000 to 20.051 mm 0.78740 to 0.78941 in.	—

Item			Factory Specification	Allowable Limit
Piston pin bore 	Piston pin bore I.D.	All models	20.000 to 20.013 mm 0.78740 to 0.78791 in.	20.05 mm 0.7894 in.
Piston pin to small end bushing 	Oil clearance	All models	0.014 to 0.038 mm 0.00055 to 0.00150 in.	0.10 mm 0.0039 in.
	Piston pin O.D.	All models	20.002 to 20.011 mm 0.78748 to 0.78783 in.	—
	Small end bushing I.D.	All models	20.025 to 20.040 mm 0.78839 to 0.78897 in.	—
Piston pin to small end bushing (Spare parts) 	Oil clearance	All models	0.015 to 0.075 mm 0.00059 to 0.00295 in.	0.15 mm 0.0059 in.
	Small end bushing I.D.	All models	20.026 to 20.077 mm 0.78843 to 0.79043 in.	—
Piston ring 	Ring gap (Top ring)	All models	0.15 to 0.35 mm 0.0059 to 0.0138 in.	1.25 mm 0.0492 in.
	Ring gap (Second ring)	All models	0.30 to 0.45 mm 0.0118 to 0.0177 in.	1.25 mm 0.0492 in.
	Ring gap (Oil ring)	All models	0.20 to 0.70 mm 0.0079 to 0.0276 in.	1.25 mm 0.0492 in.
Piston ring groove to piston ring 	Clearance (Top ring) (Second ring)	All models	0.080 to 0.120 mm 0.00315 to 0.00472 in.	0.15 mm 0.0059 in.
	Clearance (Oil ring)	All models	0.065 to 0.10 mm 0.0026 to 0.0039 in.	0.15 mm 0.0059 in.

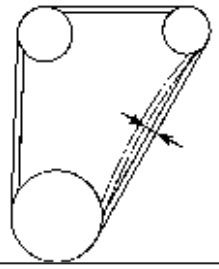
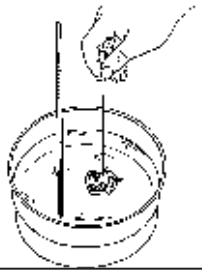
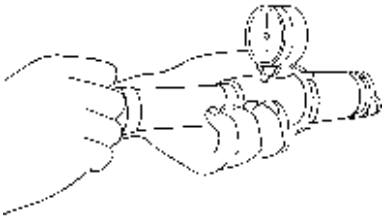
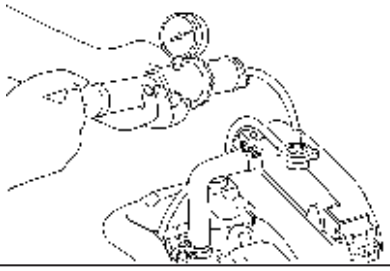
Item			Factory Specification	Allowable Limit
Connecting rod 	Alignment	All models	—	0.05 mm 0.0020 in.
Crankshaft 	Alignment	All models	—	0.02 mm 0.0008 in.
Crankshaft 	Side clearance	All models	0.15 to 0.31 mm 0.0059 to 0.0122 in.	0.50 mm 0.0197 in.
Crankpin to crankpin bearing 	Oil clearance	All models	0.020 to 0.051 mm 0.00079 to 0.00201 in.	0.15 mm 0.0059 in.
	Crankpin O.D.	All models	33.959 to 33.975 mm 1.33697 to 1.33760 in.	—
	Crankshaft bearing I.D.	All models	33.995 to 34.010 mm 1.33840 to 1.33898 in.	—
Crankshaft journal to crankshaft bearing 1 	Oil clearance	All models	0.034 to 0.106 mm 0.00134 to 0.00417 in.	0.20 mm 0.0079 in.
	Crankshaft journal O.D.	All models	43.934 to 43.950 mm 1.72968 to 1.73031 in.	—
	Crankshaft bearing 1 I.D.	All models	43.984 to 44.040 mm 1.73165 to 1.73386 in.	—

Item			Factory Specification	Allowable Limit
Crankshaft journal to crankshaft bearing 3 (Intermediate) 	Oil clearance	All models	0.028 to 0.059 mm 0.00110 to 0.00232 in.	0.20 mm 0.0079 in.
	Crankshaft journal O.D.	All models	43.934 to 43.950 mm 1.72968 to 1.73031 in.	—
	Crankshaft bearing 3 I.D.	All models	43.978 to 43.993 mm 1.73142 to 1.73201 in.	—
Crankshaft journal to crankshaft bearing 2 (Flywheel side) 	Oil clearance	All models	0.028 to 0.059 mm 0.00110 to 0.00232 in.	0.20 mm 0.0059 in.
	Crankshaft journal O.D.	All models	43.934 to 43.950 mm 1.72968 to 1.73031 in.	—
	Crankshaft bearing 2 I.D.	All models	43.978 to 43.993 mm 1.73142 to 1.73201 in.	—
Cylinder 	Bore I.D. (Standard size)	All models	72.000 to 72.019 mm 2.83464 to 2.83539 in.	72.169 mm 2.84130 in.
	Bore I.D. (Oversize)	All models	72.500 to 72.519 mm 2.85433 to 2.85507 in.	72.669 mm 2.86098 in.

(2) LUBRICATING SYSTEM

Item			Factory Specification	Allowable Limit
Engine oil pressure 	Engine oil pressure (At idle speed)	All models	49 kPa 0.5 kgf/cm^2 7 psi	—
	Engine oil pressure (At rated speed)	All models	196 to 441 kPa 2.0 to 4.5 kgf/cm^2 28 to 64 psi	147 kPa 1.5 kgf/cm^2 21 psi
Inner rotor to outer rotor (Oil pump) 	Clearance	All models	0.03 to 0.14 mm 0.0012 to 0.0055 in.	—
Outer rotor to pump body (Oil pump) 	Clearance	All models	0.07 to 0.15 mm 0.0028 to 0.0059 in.	—
Inner rotor to cover (Oil pump) 	Clearance	All models	0.075 to 0.135 mm 0.00295 to 0.00531 in.	—

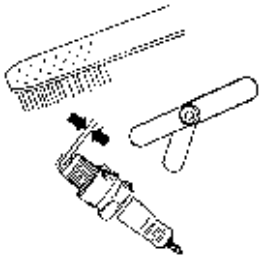
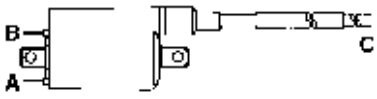
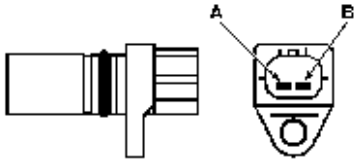
(3) COOLING SYSTEM

Item			Factory Specification	Allowable Limit
Fan belt 	Tension	All models	7.0 to 9.0 mm (0.28 to 0.35 in.) deflection at 98 N (10 kgf, 22 lbs) of force	—
Thermostat 	Valve opening temperature (At beginning)	All models	69.5 to 72.5 °C 157.1 to 162.5 °F	—
	Valve opening temperature (Opened completely)	All models	85 °C 185 °F	—
Radiator cap 	Pressure falling time	All models	10 seconds or more 88 → 59 kPa 0.9 → 0.6 kgf/cm^2, 13 → 9 psi	—
Radiator 	Water tightness	All models	No leaks at specified pressure 157 kPa 1.6 kgf/cm^2 23 psi	—

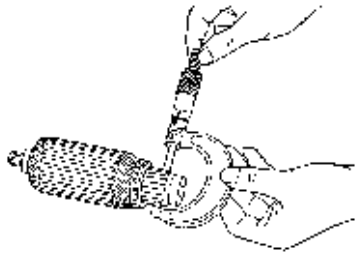
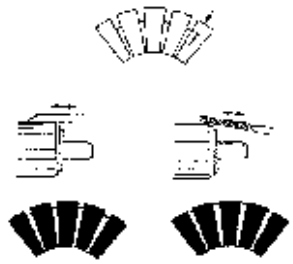
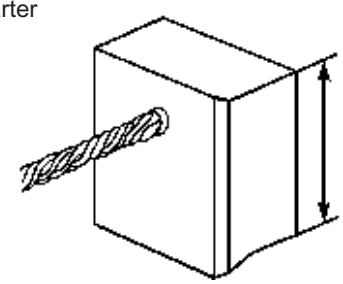
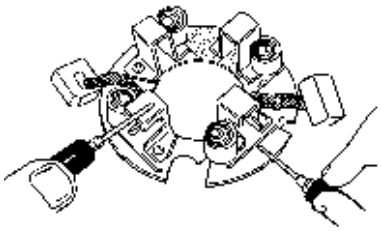
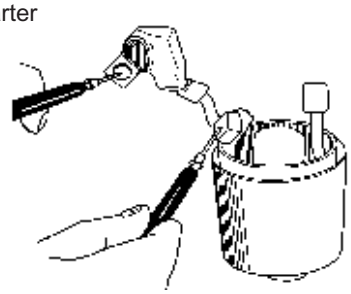
(4) FUEL SYSTEM

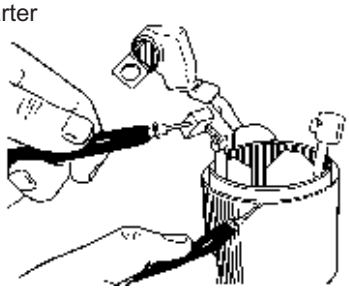
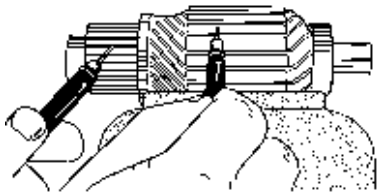
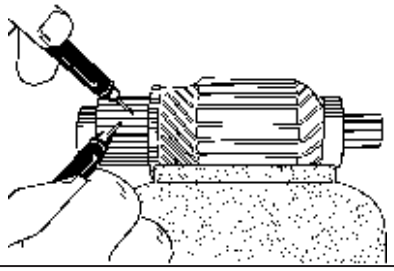
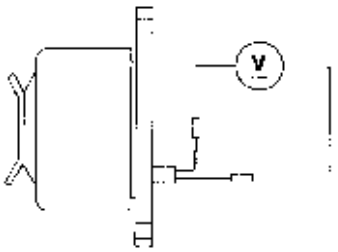
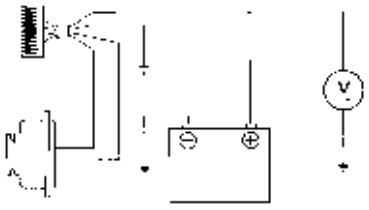
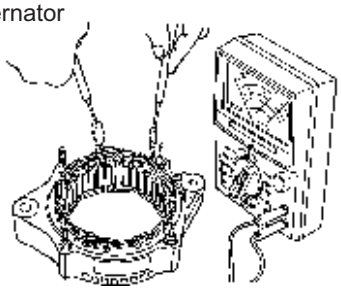
Item			Factory Specification	Allowable Limit
Engine speed 	Lo-idling speed	All models	1500 min^{-1} (rpm) (1400 to 1600 min^{-1} (rpm))	—
Engine speed 	Hi-idling speed	All models	3850 min^{-1} (rpm) (3850 to 3950 min^{-1} (rpm))	—

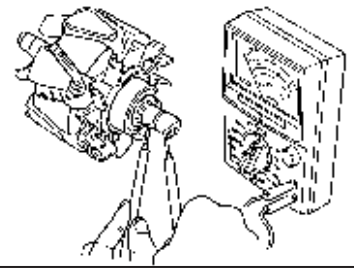
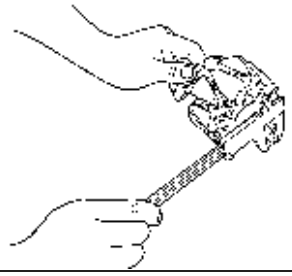
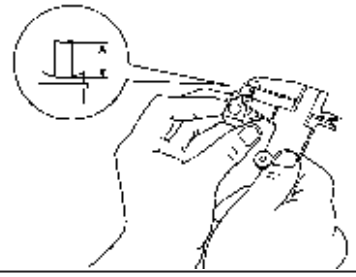
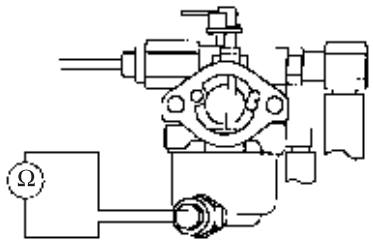
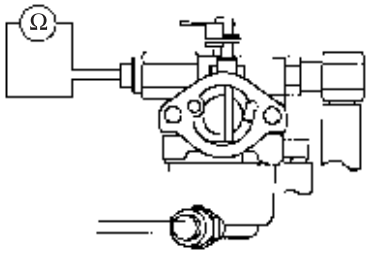
(5) IGNITION SYSTEM

Item			Factory Specification	Allowable Limit
Spark plug gap 		All models	0.6 to 0.7 mm 0.024 to 0.028 in.	—
Ignition coil 	Resistance **A - B** (Primary side)	All models	1.87 to 2.53 Ω at 20 °C (68 °F)	—
	Resistance **A - C** (Secondary side)	All models	10.4 to 15.6 kΩ at 20 °C (68 °F)	—
Pick-up sensor 	Resistance **A - B**	All models	1.85 to 2.45 kΩ at 20 °C (68 °F)	—

(6) ELECTRICAL SYSTEM

Item			Factory Specification	Allowable Limit
Starter 	Commutator O.D.	All models	28.0 mm 1.10 in.	27.0 mm 1.06 in.
	Difference of commutator O.D's	All models	Less than 0.05 mm 0.002 in.	0.40 mm 0.0157 in.
Starter 	Mica under cut	All models	0.50 to 0.80 mm 0.020 to 0.031 in.	0.20 mm 0.0079 in.
Starter 	Brush length	Electromagnetic drive type	16.0 mm 0.630 in.	10.5 mm 0.413 in.
Starter 	Brush holder resistance (Brush holder - Holder support)	All models	Infinity	—
Starter 	Field coil resistance (Lead - Brush)	All models	Continuity	—

Item			Factory Specification	Allowable Limit
Starter 	Field coil resistance (Brush - Yoke)	All models	Infinity	—
Starter 	Armature coil resistance (Commutator - Armature coil core)	All models	Infinity	—
Starter 	Armature coil resistance (Segment - Segment)	All models	Continuity	—
Dynamo 	No-load output	All models	AC 20V or more at 5200 min^{-1} (rpm)	—
Dynamo 	Regurating voltage	All models	14 to 15 V at 5200 min^{-1} (rpm)	—
Alternator 	Stator resistance	All models	Less than 1.0 Ω	—

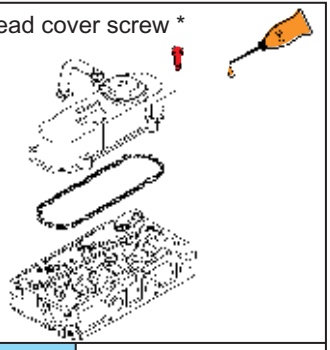
Item			Factory Specification	Allowable Limit
Alternator 	Rotor resistance	All models	2.9 Ω	—
Alternator 	Slip ring O.D.	All models	14.4 mm 0.567 in.	14.0 mm 0.551 in.
Alternator 	Brush length	All models	10.0 mm 0.3937 in.	8.5 mm 0.3346 in.
Fuel cut off solenoid 	Resistance (for Gasoline)	All models	38 Ω at 20 °C (68 °F)	—
Fuel cut off solenoid 	Resistance (for LPG)	DF972-E2	28 Ω at 20 °C (68 °F)	—

TIGHTENING TORQUES

(1) Special Tightening Torques

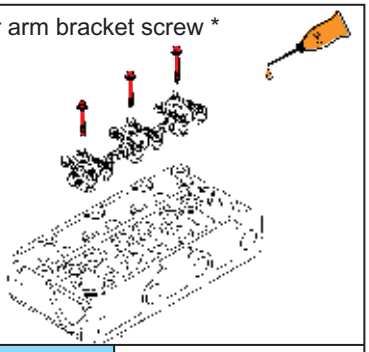
For " * " marked screws, bolts and nuts on under table, apply engine oil to their threads and seats before tightening.

Cylinder head cover screw *



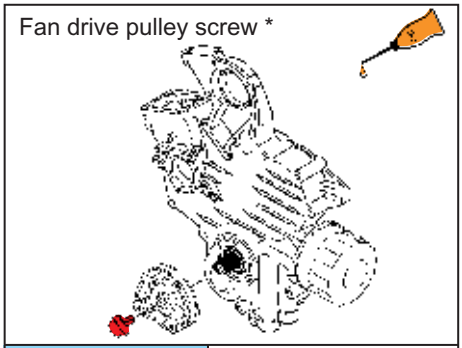
WG972-E2	6.86 to 11.3 N·m 0.7 to 1.15 kgf·m 5.1 to 8.3 ft-lbs
DF972-E2	

Rocker arm bracket screw *



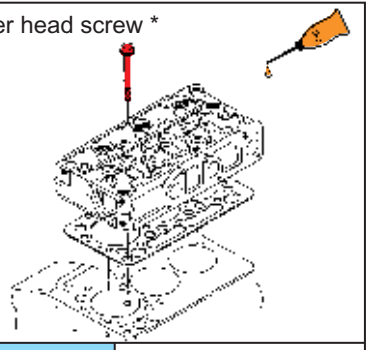
WG972-E2	9.8 to 11.3 N·m 1.00 to 1.15 kgf·m 7.2 to 8.3 ft-lbs
DF972-E2	

Fan drive pulley screw *



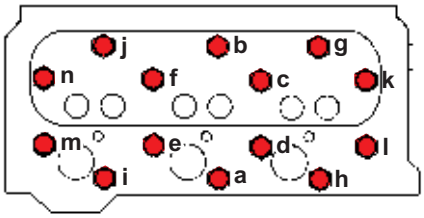
WG972-E2	98.1 to 107.9 N·m 10.0 to 11.0 kgf·m 72.3 to 79.6 ft-lbs
DF972-E2	

Cylinder head screw *



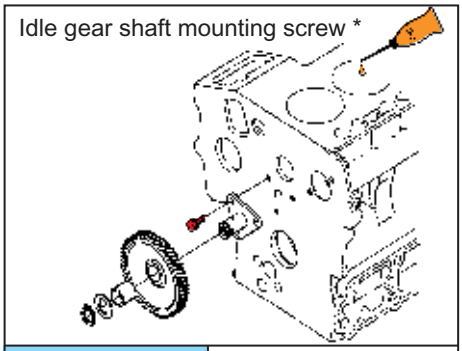
WG972-E2	37.3 to 42.2 N·m 3.8 to 4.3 kgf·m 27.5 to 31.1 ft-lbs
DF972-E2	

Cylinder head tightening order



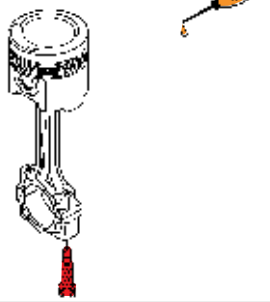
WG972-E2	a → n
DF972-E2	

Idle gear shaft mounting screw *



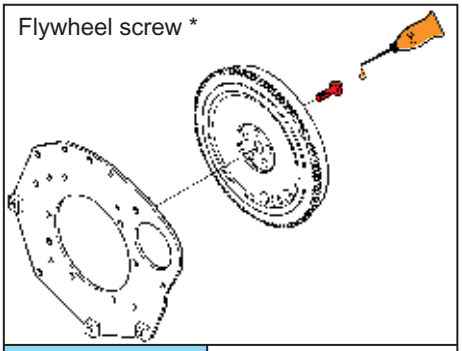
WG972-E2	9.8 to 11.3 N·m 1.00 to 1.15 kgf·m 7.2 to 8.3 ft-lbs
DF972-E2	

Connecting rod screw *



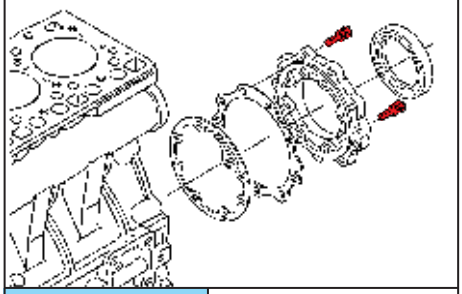
WG972-E2	26.5 to 30.4 N·m 2.7 to 3.1 kgf·m 19.5 to 22.4 ft-lbs
DF972-E2	

Flywheel screw *

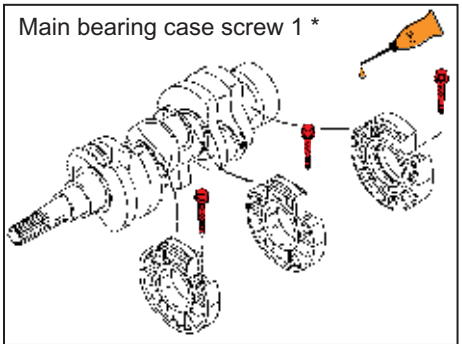


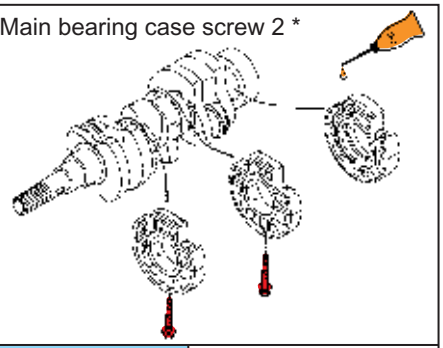
WG972-E2	53.9 to 58.8 N·m 5.5 to 6.0 kgf·m 39.8 to 43.4 ft-lbs
DF972-E2	

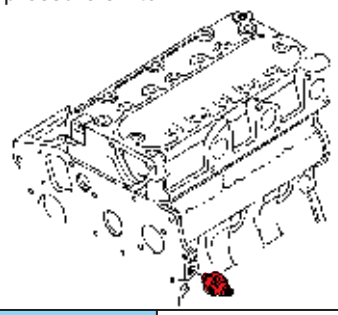
Bearing case cover mounting screw

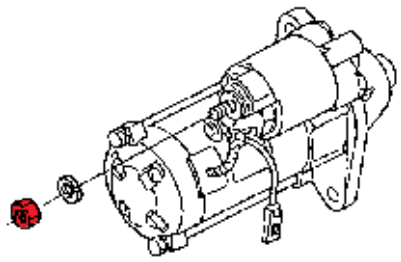


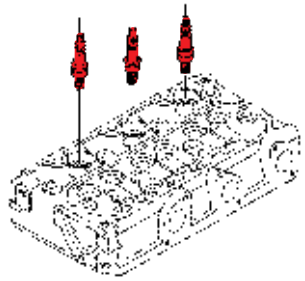
WG972-E2	9.8 to 11.3 N·m 1.00 to 1.15 kgf·m 7.2 to 8.3 ft-lbs
DF972-E2	

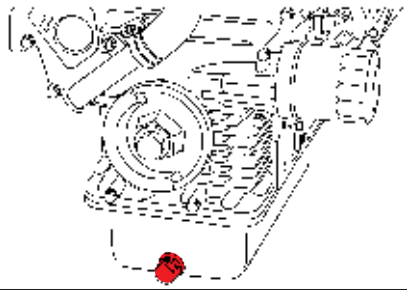
Main bearing case screw 1 *	
	
WG972-E2	12.7 to 15.7 N·m 1.3 to 1.6 kgf·m 9.4 to 11.6 ft-lbs
DF972-E2	

Main bearing case screw 2 *	
	
WG972-E2	26.5 to 30.4 N·m 2.7 to 3.1 kgf·m 19.5 to 22.4 ft-lbs
DF972-E2	

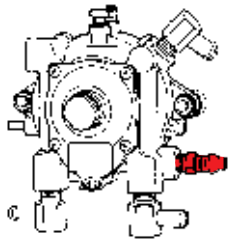
Oil pressure switch	
	
WG972-E2	14.7 to 19.6 N·m 1.5 to 2.0 kgf·m 10.8 to 14.5 ft-lbs
DF972-E2	

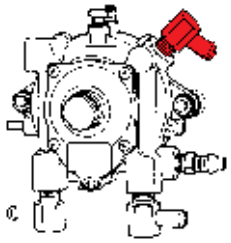
Starter (B terminal nut)	
	
WG972-E2	5.9 to 11.8 N·m 0.6 to 1.2 kgf·m 4.3 to 8.7 ft-lbs
DF972-E2	

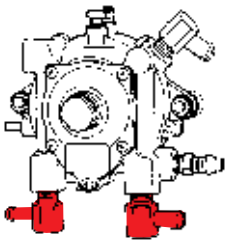
Spark plug	
	
WG972-E2	19.6 to 24.5 N·m 2.0 to 2.5 kgf·m 14.5 to 18.1 ft-lbs
DF972-E2	

Drain plug	
	
WG972-E2	32.4 to 37.3 N·m 3.3 to 3.8 kgf·m 23.9 to 27.5 ft-lbs
DF972-E2	

Carburetor mounting nut	
	
WG972-E2	23.5 to 27.5 N·m 2.4 to 2.8 kgf·m 17.4 to 20.2 ft-lbs
DF972-E2	

Joint for LPG hose of vaporizer	
	
DF972-E2	19.6 to 32.9 N·m 2.0 to 4.0 kgf·m 14.5 to 28.9 ft-lbs

Joint for vapor hose of vaporizer	
	
DF972-E2	29.4 to 58.8 N·m 3.0 to 6.0 kgf·m 21.7 to 43.4 ft-lbs

Joint for water hose of vaporizer	
	
DF972-E2	29.4 to 58.8 N·m 3.0 to 6.0 kgf·m 21.7 to 43.4 ft-lbs

(2) General Tightening Torques

Screw and bolt material grades are shown by numbers punched on the screw and bolt heads.

Prior to tightening, be sure to check out the numbers as shown below.

None or 4 : Standard grade

7 : Special grade

Nominal Diameter	Standard Grade	Special Grade
M6	7.9 to 9.3 N·m 0.80 to 0.95 kgf·m 5.8 to 6.9 ft-lbs	9.8 to 11.3 N·m 1.00 to 1.15 kgf·m 7.23 to 8.32 ft-lbs
M8	17.7 to 20.6 N·m 1.8 to 2.1 kgf·m 13.0 to 15.2 ft-lbs	23.5 to 27.5 N·m 2.4 to 2.8 kgf·m 17.4 to 20.3 ft-lbs
M10	39.2 to 45.1 N·m 4.0 to 4.6 kgf·m 28.9 to 33.3 ft-lbs	48.1 to 55.9 N·m 4.9 to 5.7 kgf·m 35.4 to 41.2 ft-lbs
M12	62.8 to 72.6 N·m 6.4 to 7.4 kgf·m 46.3 to 53.5 ft-lbs	77.5 to 90.2 N·m 7.9 to 9.2 kgf·m 57.1 to 66.5 ft-lbs