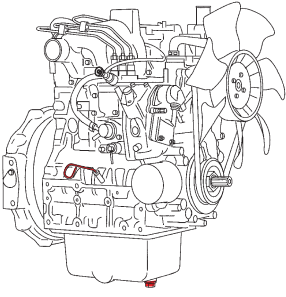
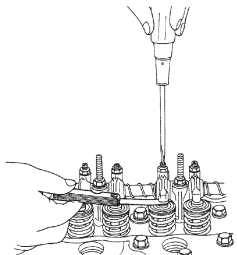
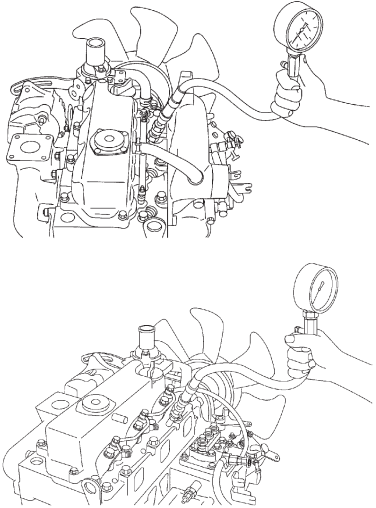
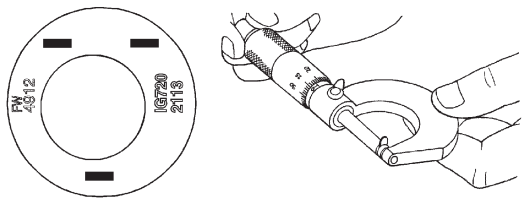
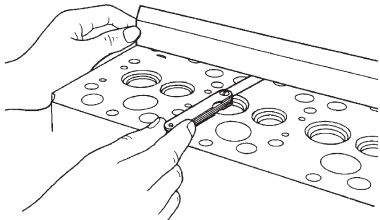
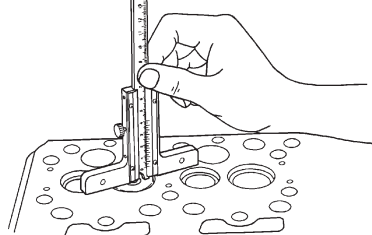
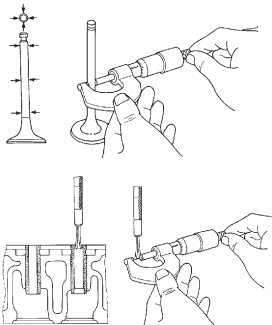
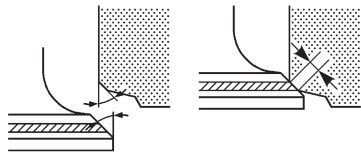
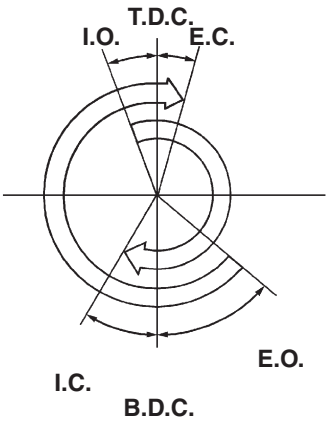
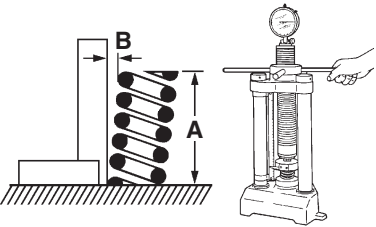
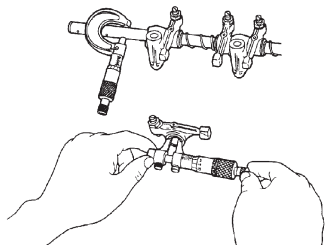
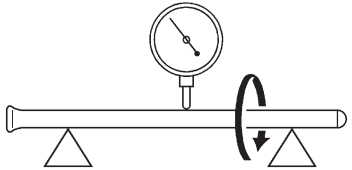
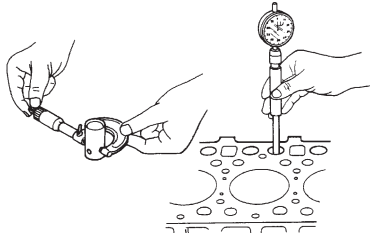


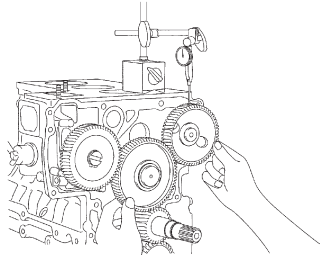
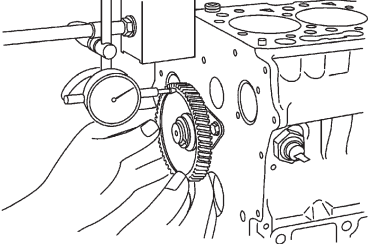
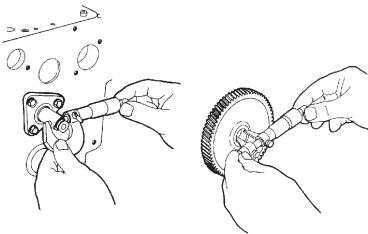
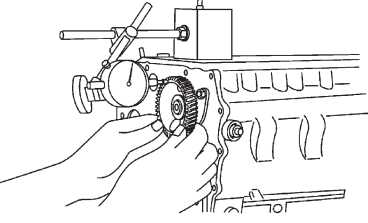
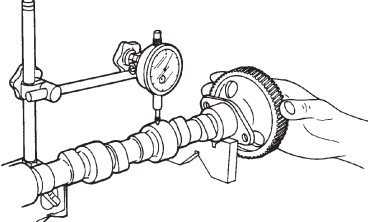
# SERVICING SPECIFICATIONS

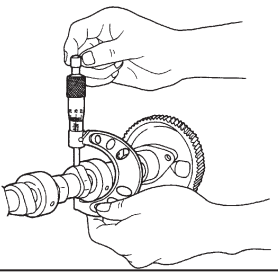
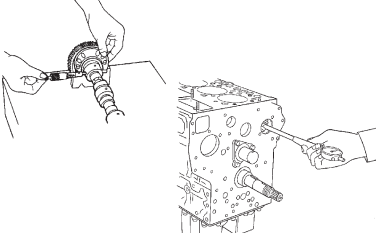
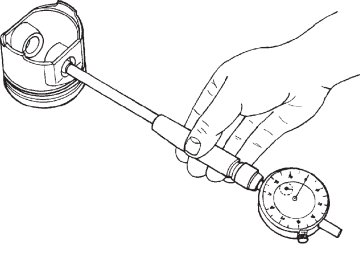
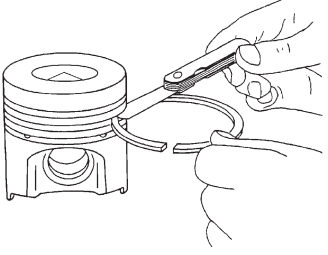
## (1) ENGINE BODY

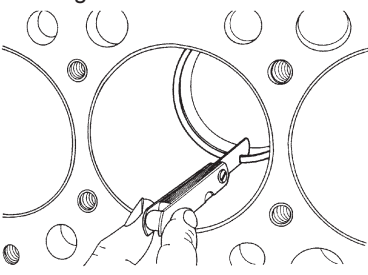
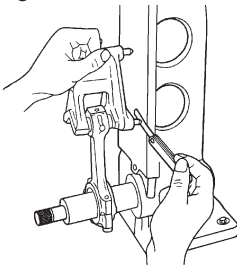
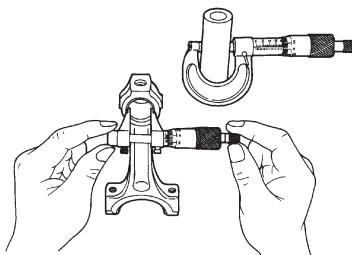
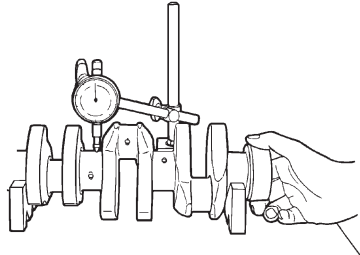
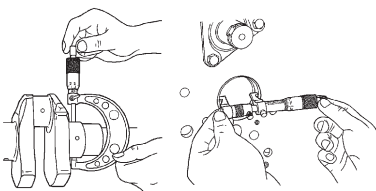
Item		Factory Specification	Allowable Limit	
Lubricating oil capacity 	Oil pan depth 124 mm (4.88 in.)	D1803-CR-E4 D1803-CR-TE4 D1803-CR-TIE4	7.0 L 1.8 U.S.gals	—
		V2403-CR-E4 V2403-CR-TE4 V2403-CR-TIE4	9.5 L 2.5 U.S.gals	—
	Oil pan depth 90 mm (3.5 in.)	D1803-CR-E4 D1803-CR-TE4 D1803-CR-TIE4	5.6 L 1.5 U.S.gals	—
		V2403-CR-E4 V2403-CR-TE4 V2403-CR-TIE4	7.6 L 2.0 U.S.gals	—
Valve clearance (When cold) 	All models	0.18 to 0.22 mm 0.0071 to 0.0086 in.	—	
Compression pressure 	All models	2.95 to 3.23 MPa / 290 min <sup>-1</sup> (rpm) 30.0 to 33.0 kgf/cm <sup>2</sup> / 290 min <sup>-1</sup> (rpm) 427 to 469 psi / 290 min <sup>-1</sup> (rpm)	2.35 MPa / 290 min <sup>-1</sup> (rpm) 24.0 kgf/cm <sup>2</sup> / 290 min <sup>-1</sup> (rpm) 341 psi / 290 min <sup>-1</sup> (rpm)	
Top clearance 	All models	0.60 to 0.70 mm 0.024 to 0.027 in.	—	

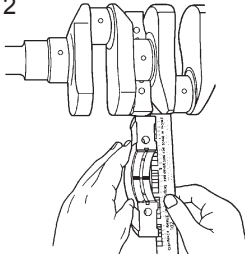
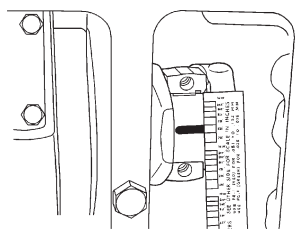
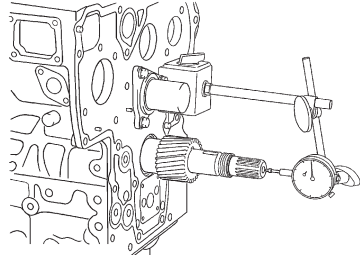
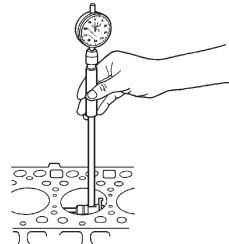
Item			Factory Specification	Allowable Limit
Cylinder head surface 	Flatness	All models	—	0.05 mm / 500 mm 0.002 in. / 19.7 in.
Valve recessing 	Recessing	All models	0.65 to 0.85 mm 0.026 to 0.033 in.	—
Valve stem to valve guide 	Clearance	All models	0.040 to 0.070 mm 0.0016 to 0.0027 in.	0.10 mm 0.0039 in.
	Valve stem O.D.	All models	7.960 to 7.975 mm 0.3134 to 0.3139 in.	—
	Valve guide I.D.	All models	8.015 to 8.030 mm 0.3156 to 0.3161 in.	—
Valve & valve seat 	Face angle (A) (Intake)	All models	0.79 rad 45°	—
	Face angle (A) (Exhaust)	All models	0.79 rad 45°	—
	Seat angle (B) (Intake)	All models	0.79 rad 45°	—
	Seat angle (B) (Exhaust)	All models	0.79 rad 45°	—
	Seat width (C) (Intake)	All models	2.12 mm 0.0835 in.	—
	Seat width (C) (Exhaust)	All models	2.12 mm 0.0835 in.	—

Item			Factory Specification	Allowable Limit
Valve timing 	Open (Intake valve)	All models	0.2 rad before T.D.C. 9° before T.D.C.	—
	Close (Intake valve)	All models	0.68 rad after B.D.C. 39° after B.D.C.	—
	Open (Exhaust valve)	All models	0.72 rad before B.D.C. 41° before B.D.C.	—
	Close (Exhaust valve)	All models	0.2 rad after T.D.C. 9° after T.D.C.	—
Valve spring 	Free length (A)	All models	41.7 to 42.2 mm 1.65 to 1.66 in.	41.2 mm 1.62 in.
	Tilt (B)	All models	—	1.0 mm 0.039 in.
	Setting load / Setting length	All models	118 N / 35.0 mm 12.0 kgf / 35.0 mm 26.5 lbf / 1.38 in.	100 N / 35.0 mm 10.2 kgf / 35.0 mm 22.5 lbf / 1.38 in.
Rocker arm shaft to rocker arm 	Clearance	All models	0.016 to 0.045 mm 0.00063 to 0.0017 in.	0.10 mm 0.0039 in.
	Rocker arm shaft O.D.	All models	13.973 to 13.984 mm 0.55012 to 0.55055 in.	—
	Rocker arm I.D.	All models	14.000 to 14.018 mm 0.55119 to 0.55188 in.	—
Push rod 	Alignment	All models	—	0.25 mm 0.0098 in.
Tappet to tappet guide 	Clearance	All models	0.020 to 0.062 mm 0.00079 to 0.0024 in.	0.07 mm 0.003 in.
	Tappet O.D.	All models	23.959 to 23.980 mm 0.94327 to 0.94409 in.	—
	Tappet guide I.D.	All models	24.000 to 24.021 mm 0.94489 to 0.94570 in.	—

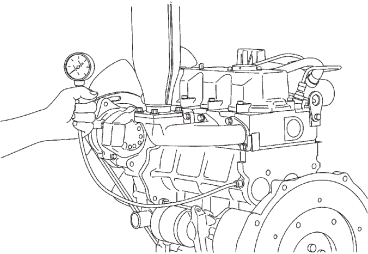
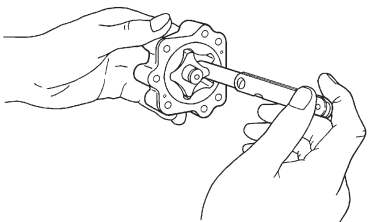
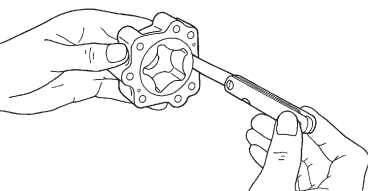
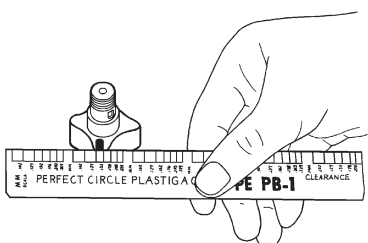
Item		Factory Specification	Allowable Limit
<b>Timing gear</b> 	Backlash (Crank gear to idle gear)	All models 0.04150 to 0.1122 mm 0.001634 to 0.004417 in.	0.15 mm 0.0059 in.
	Backlash (Idle gear to cam gear)	All models 0.04150 to 0.1154 mm 0.001634 to 0.004543 in.	0.15 mm 0.0059 in.
	Backlash (Idle gear to injection pump gear)	All models 0.04150 to 0.1154 mm 0.001634 to 0.004543 in.	0.15 mm 0.0059 in.
	Backlash (Crank gear to oil pump gear)	All models 0.04150 to 0.1090 mm 0.001634 to 0.004291 in.	0.15 mm 0.0059 in.
<b>Idle gear</b> 	Side clearance	All models 0.15 to 0.25 mm 0.0059 to 0.0098 in.	0.9 mm 0.04 in.
<b>Idle gear shaft to idle gear bushing</b> 	Clearance	All models 0.025 to 0.066 mm 0.00099 to 0.0025 in.	0.10 mm 0.0039 in.
	Idle gear shaft O.D.	All models 37.959 to 37.975 mm 1.4945 to 1.4950 in.	—
	Idle gear bushing I.D.	All models 38.000 to 38.025 mm 1.4961 to 1.4970 in.	—
<b>Camshaft</b> 	Side clearance	All models 0.070 to 0.22 mm 0.0028 to 0.0086 in.	0.30 mm 0.012 in.
<b>Camshaft</b> 	Alignment	All models —	0.01 mm 0.0004 in.

Item		Factory Specification	Allowable Limit	
<b>Cam</b> 	Height (Intake)	All models 33.90 mm 1.335 in.	33.85 mm 1.333 in.	
	Height (Exhaust)	All models 33.90 mm 1.335 in.	33.85 mm 1.333 in.	
<b>Camshaft journal to cylinder block bore</b> 	Oil clearance	All models 0.050 to 0.091 mm 0.0020 to 0.0035 in.	0.15 mm 0.0059 in.	
	Camshaft journal O.D.	All models 39.934 to 39.950 mm 1.5722 to 1.5728 in.	—	
	Cylinder block bore I.D.	All models 40.000 to 40.025 mm 1.5748 to 1.5757 in.	—	
<b>Piston pin bore</b> 	Piston pin bore I.D.	All models 25.000 to 25.013 mm 0.98426 to 0.98476 in.	25.05 mm 0.9862 in.	
<b>Piston ring groove to piston ring</b> 	Clearance (Top ring)	D1803-CR-E4 V2403-CR-E4	0.050 to 0.090 mm 0.0020 to 0.0035 in.	0.20 mm 0.0079 in.
		D1803-CR-TE4 D1803-CR-TIE4 V2403-CR-TE4 V2403-CR-TIE4	—	—
	Clearance (Second ring)	D1803-CR-E4 V2403-CR-E4	0.0780 to 0.110 mm 0.00307 to 0.00433 in.	0.20 mm 0.0079 in.
		D1803-CR-TE4 D1803-CR-TIE4 V2403-CR-TE4 V2403-CR-TIE4	0.0930 to 0.128 mm 0.003667 to 0.00503 in.	0.20 mm 0.0079 in.
	Clearance (Oil ring)	D1803-CR-E4 V2403-CR-E4	0.030 to 0.070 mm 0.0012 to 0.0027 in.	0.15 mm 0.0059 in.
		D1803-CR-TE4 D1803-CR-TIE4 V2403-CR-TE4 V2403-CR-TIE4	0.020 to 0.060 mm 0.00079 to 0.0023 in.	0.15 mm 0.0059 in.

Item		Factory Specification	Allowable Limit	
	Ring gap (Top ring)	All models	0.25 to 0.35 mm 0.0099 to 0.013 in.	1.25 mm 0.0492 in.
	Ring gap (Second ring)	D1803-CR-E4 V2403-CR-E4	0.30 to 0.45 mm 0.012 to 0.017 in.	1.25 mm 0.0492 in.
		D1803-CR-TE4 D1803-CR-TIE4 V2403-CR-TE4 V2403-CR-TIE4	0.40 to 0.55 mm 0.016 to 0.021 in.	1.25 mm 0.0492 in.
	Ring gap (Oil ring)	D1803-CR-E4 V2403-CR-E4	0.20 to 0.40 mm 0.0079 to 0.015 in.	1.25 mm 0.0492 in.
D1803-CR-TE4 D1803-CR-TIE4 V2403-CR-TE4 V2403-CR-TIE4		0.25 to 0.45 mm 0.0099 to 0.017 in.	1.25 mm 0.0492 in.	
	Alignment	All models	—	0.05 mm 0.002 in.
	Clearance	All models	0.014 to 0.036 mm 0.00056 to 0.0014 in.	0.15 mm 0.0059 in.
	Piston pin O.D.	All models	25.004 to 25.011 mm 0.98441 to 0.98468 in.	—
	Small end bushing I.D.	All models	25.025 to 25.040 mm 0.98524 to 0.98582 in.	—
	Alignment	All models	—	0.02 mm 0.0008 in.
	Oil clearance	All models	0.040 to 0.118 mm 0.00158 to 0.00464 in.	0.20 mm 0.0079 in.
	Crankshaft journal O.D.	All models	59.921 to 59.940 mm 2.35910 to 2.3598 in.	—
	Crankshaft bearing 1 I.D.	All models	59.980 to 60.039 mm 2.3615 to 2.3637 in.	—

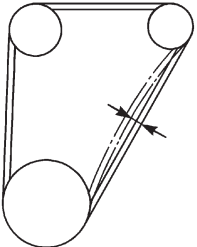
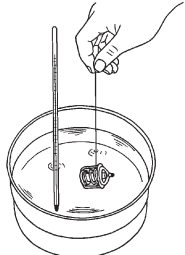
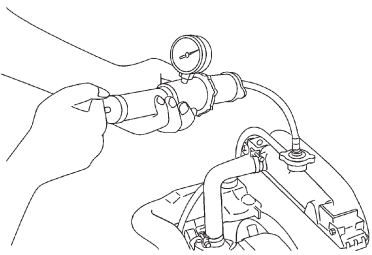
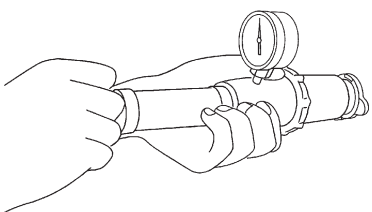
Item			Factory Specification	Allowable Limit
<b>Crankshaft journal to crankshaft bearing 2</b> 	Oil clearance	All models	0.040 to 0.104 mm 0.00157 to 0.00409 in.	0.20 mm 0.0079 in.
	Crankshaft journal O.D.	All models	59.921 to 59.940 mm 2.3591 to 2.3598 in.	—
	Crankshaft bearing 2 I.D.	All models	59.980 to 60.025 mm 2.3615 to 2.3631 in.	—
<b>Crankpin to crankpin bearing</b> 	Oil clearance	All models	0.025 to 0.087 mm 0.00099 to 0.0034 in.	0.20 mm 0.0079 in.
	Crankpin O.D.	All models	46.959 to 46.975 mm 1.8488 to 1.8494 in.	—
	Crankpin bearing I.D.	All models	47.000 to 47.046 mm 1.8504 to 1.8522 in.	—
<b>Crankshaft</b> 	Side clearance	All models	0.15 to 0.31 mm 0.0059 to 0.012 in.	0.5 mm 0.02 in.
<b>Cylinder</b> 	Bore I.D. (Standard size)	All models	87.000 to 87.022 mm 3.4252 to 3.4260 in.	87.170 mm 3.4319 in.
	Bore I.D. (Oversize)	All models	87.250 to 87.272 mm 3.4351 to 3.4359 in.	87.420 mm 3.4417 in.

**(2) LUBRICATING SYSTEM**

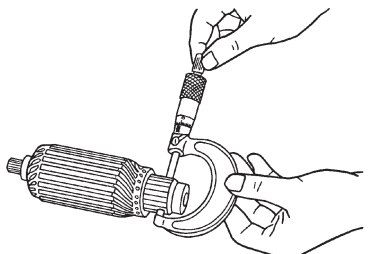
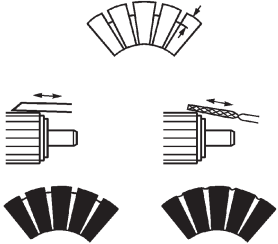
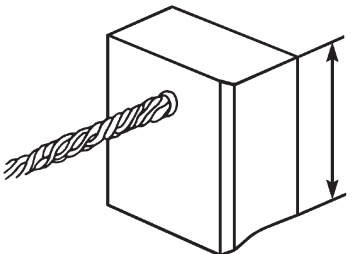
Item		Factory Specification	Allowable Limit
Engine oil pressure 	Engine oil pressure (At idle speed)	All models More than 98 kPa 1.0 kgf/cm <sup>2</sup> 14 psi	50 kPa 0.5 kgf/cm <sup>2</sup> 7 psi
	Engine oil pressure (At rated speed)	All models 300 to 440 kPa 3.0 to 4.5 kgf/cm <sup>2</sup> 43 to 64 psi	250 kPa 2.5 kgf/cm <sup>2</sup> 36 psi
Inner rotor to outer rotor (Oil pump) 	Clearance	All models 0.030 to 0.14 mm 0.0012 to 0.0055 in.	0.2 mm 0.008 in.
Outer rotor to pump body (Oil pump) 	Clearance	All models 0.11 to 0.19 mm 0.0044 to 0.0074 in.	0.25 mm 0.0098 in.
Inner rotor to cover (Oil pump) 	Clearance	All models 0.105 to 0.150 mm 0.00414 to 0.00590 in.	0.2 mm 0.008 in.



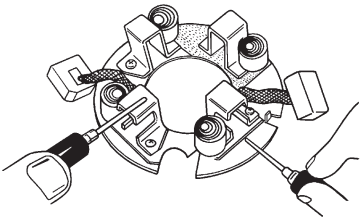
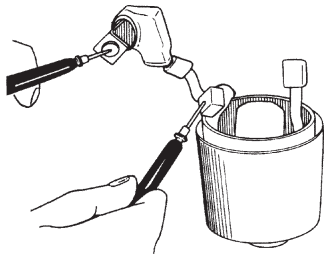
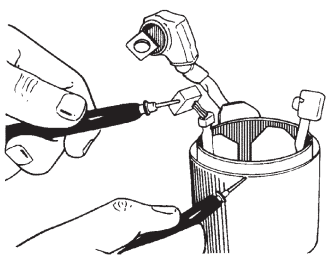
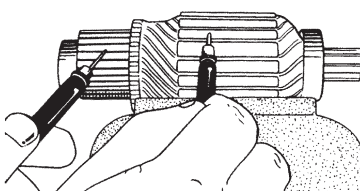
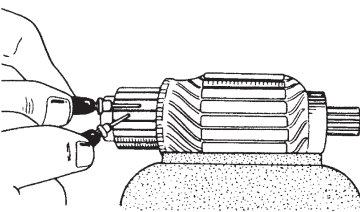
**(3) COOLING SYSTEM**

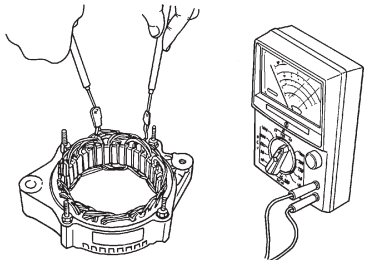
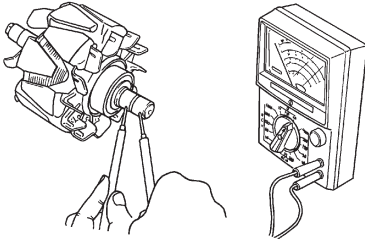
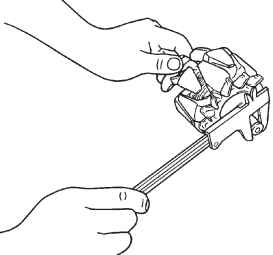
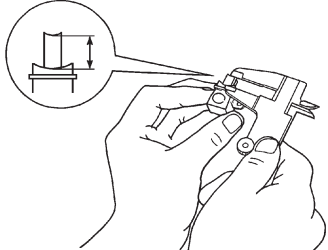
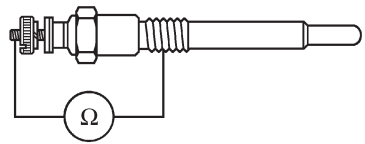
Item			Factory Specification	Allowable Limit
Fan belt 	Tension	All models	7.0 to 9.0 mm (0.28 to 0.35 in.) deflection at 98 N (10 kgf, 22 lbf) of force	—
Thermostat 	Valve opening temperature (At beginning)	All models	80.5 to 83.5 °C 176.9 to 182.3 °F	—
	Valve opening temperature (Opened completely)	All models	95 °C 203 °F	—
Radiator 	Water tightness	All models	No water leak at specified pressure	—
Radiator cap 	Pressure falling time	All models	10 seconds or more for pressure falling from 90 to 60 kPa (from 0.9 to 0.6 kgf/cm <sup>2</sup> , from 10 to 9 psi)	—

**(4) ELECTRICAL SYSTEM**

Item			Factory Specification	Allowable Limit
Starter 	Commutator O.D.	D1803-CR-E4 D1803-CR-TE4	30.0 mm 1.18 in	29.0 mm 1.14 in.
Starter 	Mica under cut	All Models	0.45 to 0.75 mm 0.018 to 0.029 in.	0.20 mm 0.0079 in.
Starter 	Brush length	D1803-CR-E4 D1803-CR-TE4 D1803-CR-TIE4	15.0 mm 0.591 in.	11.0 mm 0.433 in.
		V2403-CR-E4 V2403-CR-TE4 V2403-CR-TIE4	15.0 mm 0.591 in.	9.0 mm 0.35 in.

**(5) ELECTRICAL SYSTEM**

Item			Factory Specification	Allowable Limit
Starter 	Brush holder resistance (Brush holder - Holder support)	All models	Infinity	—
Starter 	Field coil resistance (Lead - Brush)	All models	Continuity	—
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	—

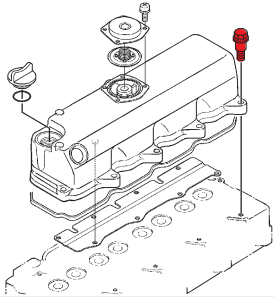
Item			Factory Specification	Allowable Limit
Alternator 	Stator resistance	All models	Less than 1.0 $\Omega$	—
Alternator 	Rotor resistance	All models	2.9 $\Omega$	—
Alternator 	Slip ring O.D.	All models	14.4 mm 0.567 in.	14.0 mm 0.551 in.
Alternator 	Brush length	All models	10.5 mm 0.413 in.	8.4 mm 0.33 in.
Glow plug 	Resistance	All models	Approx. 0.9 $\Omega$	—

# TIGHTENING TORQUES

## (1) Special Tightening Torques

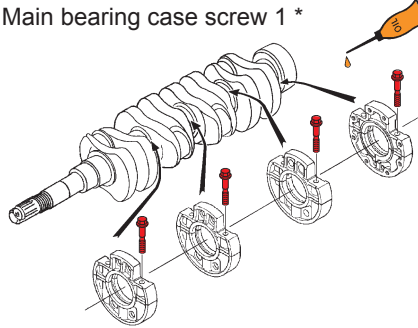
For "\*" marked screws, bolts and nuts on under table, apply engine oil to their threads and seats before tightening.

Cylinder head cover screw



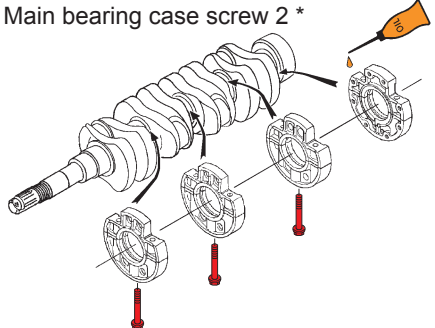
D1803-CR-E4	
D1803-CR-TE4	
D1803-CR-TIE4	6.86 to 11.3 N·m
V2403-CR-E4	0.700 to 1.15 kgf·m
V2403-CR-TE4	5.06 to 8.33 lbf·ft
V2403-CR-TIE4	

Main bearing case screw 1 \*



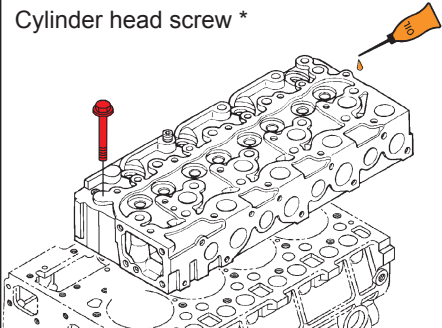
D1803-CR-E4	
D1803-CR-TE4	
D1803-CR-TIE4	46 to 50 N·m
V2403-CR-E4	4.7 to 5.2 kgf·m
V2403-CR-TE4	34 to 37 lbf·ft
V2403-CR-TIE4	

Main bearing case screw 2 \*



D1803-CR-E4	
D1803-CR-TE4	
D1803-CR-TIE4	69 to 73 N·m
V2403-CR-E4	7.0 to 7.5 kgf·m
V2403-CR-TE4	51 to 54 lbf·ft
V2403-CR-TIE4	

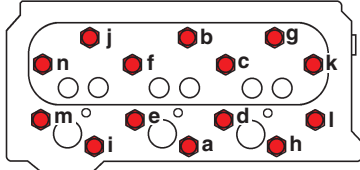
Cylinder head screw \*



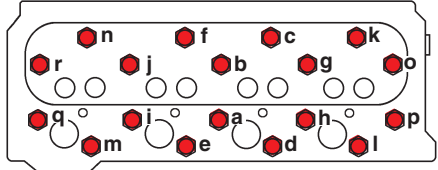
D1803-CR-E4	
D1803-CR-TE4	
D1803-CR-TIE4	93.2 to 98.1 N·m
V2403-CR-E4	9.51 to 10.0 kgf·m
V2403-CR-TE4	68.8 to 72.3 lbf·ft
V2403-CR-TIE4	

Cylinder head tightening order

(A) 3 cylinder model

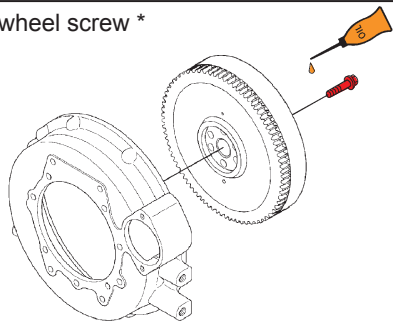


(B) 4 cylinder model



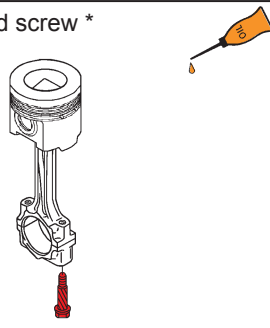
D1803-CR-E4	
D1803-CR-TE4	
D1803-CR-TIE4	(A) 3 cylinder model a → n
V2403-CR-E4	(B) 4 cylinder model a → r
V2403-CR-TE4	
V2403-CR-TIE4	

Flywheel screw \*



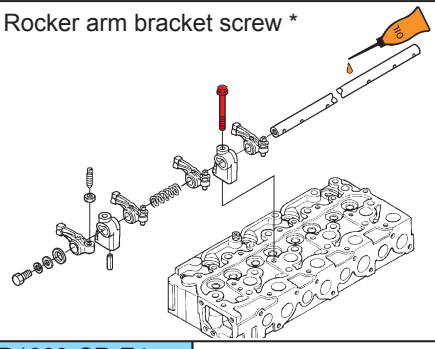
D1803-CR-E4	
D1803-CR-TE4	
D1803-CR-TIE4	98.1 to 107.9 N·m
V2403-CR-E4	10.0 to 11.0 kgf·m
V2403-CR-TE4	72.4 to 79.5 lbf·ft
V2403-CR-TIE4	

Connecting rod screw \*



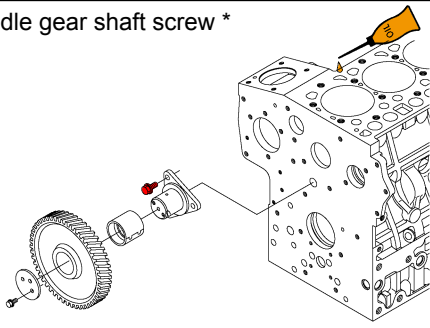
D1803-CR-E4	
D1803-CR-TE4	
D1803-CR-TIE4	40 to 45 N·m
V2403-CR-E4	4.1 to 4.5 kgf·m
V2403-CR-TE4	30 to 33 lbf·ft
V2403-CR-TIE4	

Rocker arm bracket screw \*



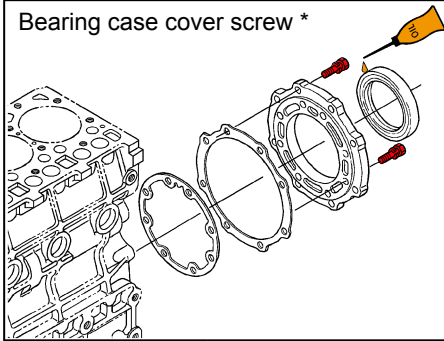
D1803-CR-E4	
D1803-CR-TE4	
D1803-CR-TIE4	24 to 27 N·m
V2403-CR-E4	2.4 to 2.8 kgf·m
V2403-CR-TE4	18 to 20 lbf·ft
V2403-CR-TIE4	

Idle gear shaft screw \*



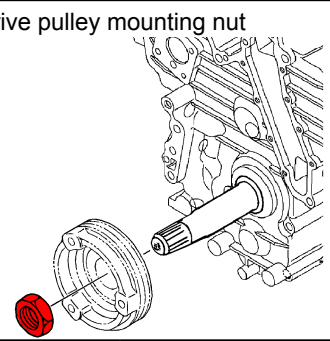
D1803-CR-E4	
D1803-CR-TE4	
D1803-CR-TIE4	24 to 27 N·m
V2403-CR-E4	2.4 to 2.8 kgf·m
V2403-CR-TE4	18 to 20 lbf·ft
V2403-CR-TIE4	

Bearing case cover screw \*



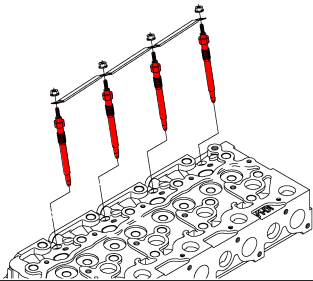
D1803-CR-E4	
D1803-CR-TE4	
D1803-CR-TIE4	24 to 27 N·m
V2403-CR-E4	2.4 to 2.8 kgf·m
V2403-CR-TE4	18 to 20 lbf·ft
V2403-CR-TIE4	

Fan drive pulley mounting nut



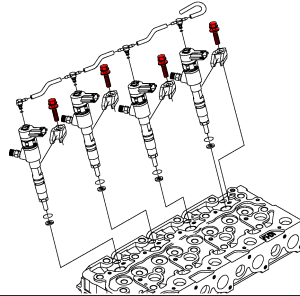
D1803-CR-E4	
D1803-CR-TE4	
D1803-CR-TIE4	138 to 156 N·m
V2403-CR-E4	14.0 to 16.0 kgf·m
V2403-CR-TE4	102 to 115 lbf·ft
V2403-CR-TIE4	

Glow plug



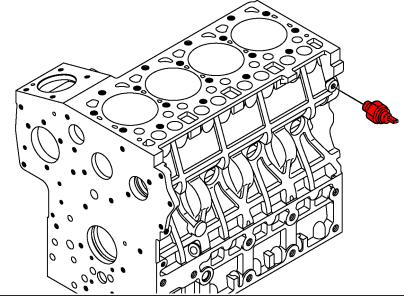
D1803-CR-E4	
D1803-CR-TE4	
D1803-CR-TIE4	15 to 19 N·m
V2403-CR-E4	1.5 to 2.0 kgf·m
V2403-CR-TE4	11 to 14 lbf·ft
V2403-CR-TIE4	

Injector clamp screw



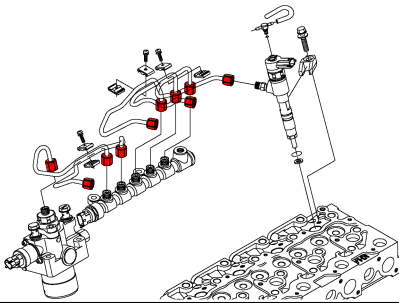
D1803-CR-E4	
D1803-CR-TE4	
D1803-CR-TIE4	24 to 27 N·m
V2403-CR-E4	2.4 to 2.8 kgf·m
V2403-CR-TE4	18 to 20 lbf·ft
V2403-CR-TIE4	

Oil switch taper screw



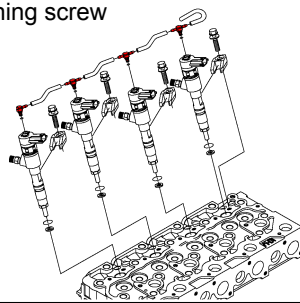
D1803-CR-E4	
D1803-CR-TE4	
D1803-CR-TIE4	15 to 19 N·m
V2403-CR-E4	1.5 to 2.0 kgf·m
V2403-CR-TE4	11 to 14 lbf·ft
V2403-CR-TIE4	

Injection pipe retaining nut



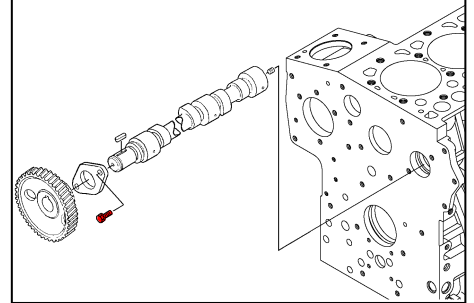
D1803-CR-E4	
D1803-CR-TE4	
D1803-CR-TIE4	15 to 24 N·m
V2403-CR-E4	1.5 to 2.5 kgf·m
V2403-CR-TE4	11 to 18 lbf·ft
V2403-CR-TIE4	

Overflow pipe assembly retaining screw



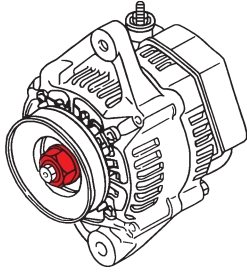
D1803-CR-E4	
D1803-CR-TE4	
D1803-CR-TIE4	9.81 to 11.2 N·m
V2403-CR-E4	1.00 to 1.15 kgf·m
V2403-CR-TE4	7.2 to 8.3 lbf·ft
V2403-CR-TIE4	

Camshaft set screw



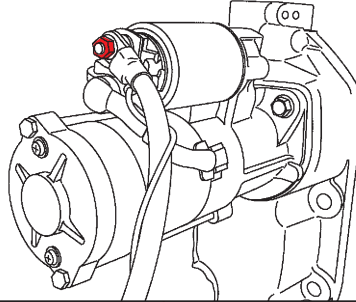
D1803-CR-E4	
D1803-CR-TE4	
D1803-CR-TIE4	24 to 27 N·m
V2403-CR-E4	2.4 to 2.8 kgf·m
V2403-CR-TE4	18 to 20 lbf·ft
V2403-CR-TIE4	

Alternator pulley nut



D1803-CR-E4	58.4 to 78.9 N·m 5.95 to 8.05 kgf·m 43.1 to 58.2 lbf·ft
D1803-CR-TE4	
D1803-CR-TIE4	
V2403-CR-E4	
V2403-CR-TE4	
V2403-CR-TIE4	

Starter's terminal B nut



D1803-CR-E4	5.9 to 11 N·m 0.60 to 1.2 kgf·m 4.4 to 8.6 lbf·ft
D1803-CR-TE4	
D1803-CR-TIE4	
V2403-CR-E4	
V2403-CR-TE4	
V2403-CR-TIE4	

## (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 6.8 lbf·ft	9.81 to 11.2 N·m 1.00 to 1.15 kgf·m 7.24 to 8.31 lbf·ft
M8	18 to 20 N·m 1.8 to 2.1 kgf·m 13 to 15 lbf·ft	24 to 27 N·m 2.4 to 2.8 kgf·m 18 to 20 lbf·ft
M10	40 to 45 N·m 4.0 to 4.6 kgf·m 29 to 33 lbf·ft	49 to 55 N·m 5.0 to 5.7 kgf·m 37 to 41 lbf·ft
M12	63 to 72 N·m 6.4 to 7.4 kgf·m 47 to 53 lbf·ft	78 to 90 N·m 7.9 to 9.2 kgf·m 58 to 66 lbf·ft