


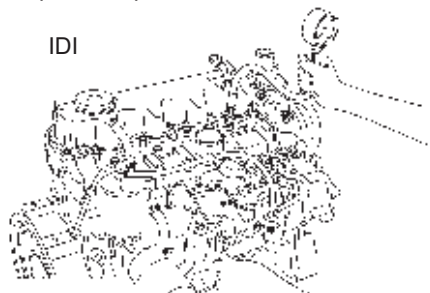
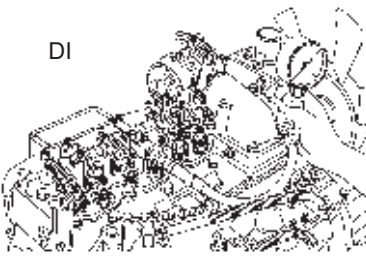
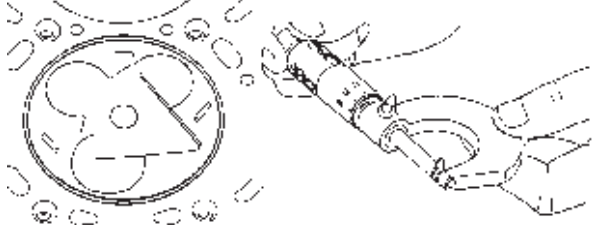
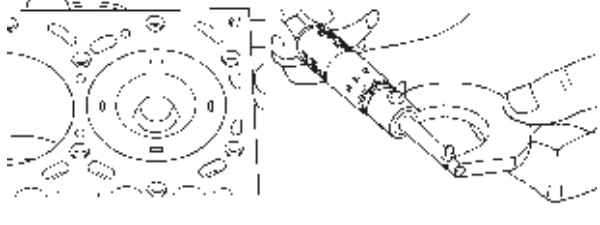
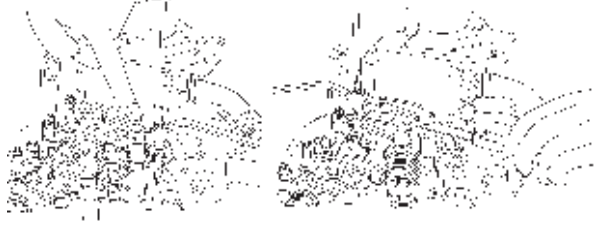

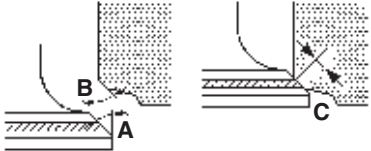



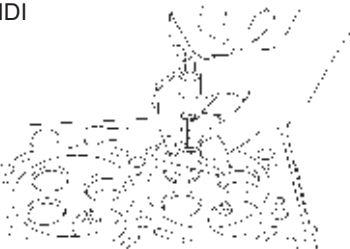
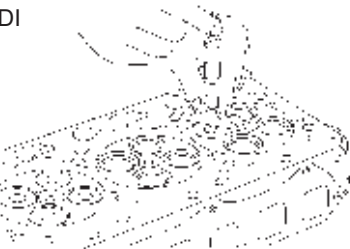
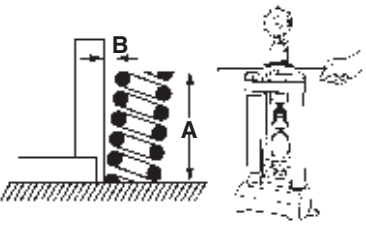
SERVICING SPECIFICATIONS

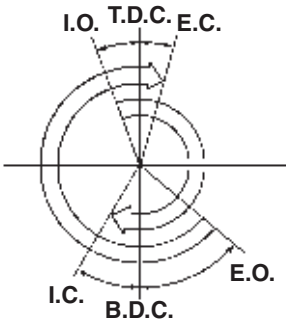
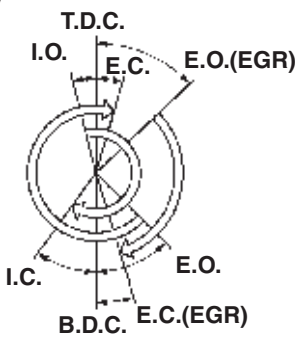
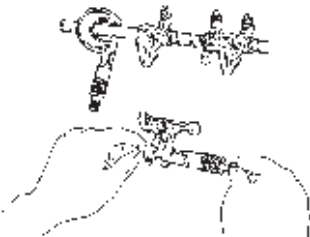
(1) ENGINE BODY

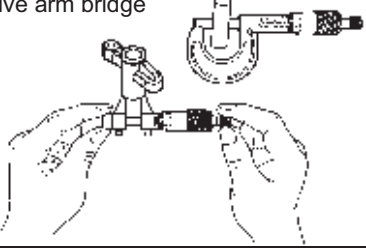
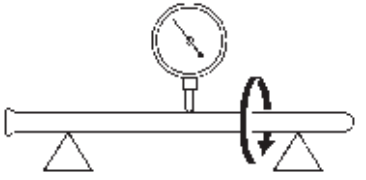
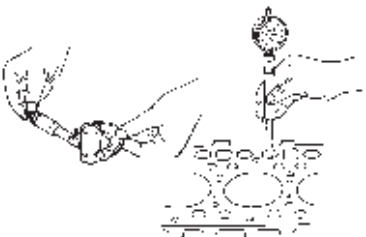
Item		Factory Specification	Allowable Limit
Lubricating oil capacity 		All models 13.2 L 3.49 U.S.gals. 2.90 Imp.gals.	—
Cylinder head surface IDI  DI 	Flatness	All models	— 0.05 mm / 500 mm 0.002 in. / 19.7 in.
Compression pressure IDI  DI 		V3600-E3B V3600-E3CB V3300-E3BG 4.31 MPa / 250 min ⁻¹ (rpm) 44.0 kgf/cm ² / 250 min ⁻¹ (rpm) 626 psi / 250 min ⁻¹ (rpm)	3.26 MPa / 250 min ⁻¹ (rpm) 33.2 kgf/cm ² / 250 min ⁻¹ (rpm) 472 psi / 250 min ⁻¹ (rpm)
		V3600-T-E3B V3600-T-E3CB V3600-T-E3BG 3.92 MPa / 250 min ⁻¹ (rpm) 40.0 kgf/cm ² / 250 min ⁻¹ (rpm) 569 psi / 250 min ⁻¹ (rpm)	2.99 MPa / 250 min ⁻¹ (rpm) 30.5 kgf/cm ² / 250 min ⁻¹ (rpm) 434 psi / 250 min ⁻¹ (rpm)
		V3800DI-T-E3B V3800DI-T-E3CB V3800DI-T-E3BG 3.47 MPa / 250 min ⁻¹ (rpm) 35.4 kgf/cm ² / 250 min ⁻¹ (rpm) 504 psi / 250 min ⁻¹ (rpm)	2.56 MPa / 250 min ⁻¹ (rpm) 26.1 kgf/cm ² / 250 min ⁻¹ (rpm) 371 psi / 250 min ⁻¹ (rpm)



Item	Factory Specification	Allowable Limit
<p>Top clearance</p> <p>IDI</p>  <p>DI</p> 	<p>V3600-E3B V3600-T-E3B V3600-E3CB V3600-T-E3CB V3600-T-E3BG</p> <p>1.05 to 1.27 mm 0.0414 to 0.0500 in.</p> <p>V3300-E3BG</p> <p>0.72 to 0.90 mm 0.0283 to 0.0354 in.</p> <p>V3800DI-T-E3B V3800DI-T-E3CB V3800DI-T-E3BG</p> <p>0.701 to 0.930 mm 0.0276 to 0.0366 in.</p>	<p>—</p> <p>—</p> <p>—</p>
<p>Valve clearance (When cold)</p> <p>IDI</p>  <p>DI</p> 	<p>All models</p> <p>0.23 to 0.27 mm 0.0091 to 0.010 in.</p>	<p>—</p>



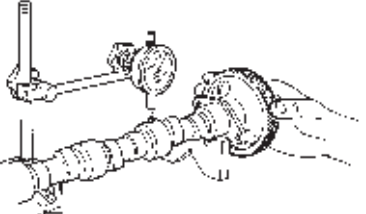
Item		Factory Specification	Allowable Limit		
Valve & valve seat 	Face angle (A) (Intake)	All models	1.0 rad 60°	—	
	Face angle (A) (Exhaust)	All models	0.79 rad 45°	—	
	Seat angle (B) (Intake)	All models	1.0 rad 60°	—	
	Seat angle (B) (Exhaust)	All models	0.79 rad 45°	—	
	Seat width (C) (Intake)	V3600-E3B V3600-T-E3B V3600-E3CB V3600-T-E3CB V3300-E3BG V3600-T-E3BG		2.12 mm 0.0835 in.	—
		V3800DI-T-E3B V3800DI-T-E3CB V3800DI-T-E3BG		1.6 to 2.0 mm 0.063 to 0.078 in.	—
	Seat width (C) (Exhaust)	V3600-E3B V3600-T-E3B V3600-E3CB V3600-T-E3CB V3300-E3BG V3600-T-E3BG		2.12 mm 0.0835 in.	—
		V3800DI-T-E3B V3800DI-T-E3CB V3800DI-T-E3BG		2.3 to 2.6 mm 0.091 to 0.10 in.	—
Valve stem to valve guide 	Clearance (Intake)	All models	0.055 to 0.085 mm 0.0022 to 0.0033 in.	0.1 mm 0.004 in.	
	Clearance (Exhaust)	V3600-E3B V3600-T-E3B V3600-E3CB V3600-T-E3CB V3300-E3BG V3600-T-E3BG		0.040 to 0.070 mm 0.0016 to 0.0027 in.	0.1 mm 0.004 in.
		V3800DI-T-E3B V3800DI-T-E3CB V3800DI-T-E3BG		0.055 to 0.085 mm 0.0022 to 0.0033 in.	0.1 mm 0.004 in.
	Valve stem O.D. (Intake)	All models	6.960 to 6.975 mm 0.2741 to 0.2746 in.	—	
	Valve stem O.D. (Exhaust)	V3600-E3B V3600-T-E3B V3600-E3CB V3600-T-E3CB V3300-E3BG V3600-T-E3BG		7.960 to 7.975 mm 0.3134 to 0.3139 in.	—
		V3800DI-T-E3B V3800DI-T-E3CB V3800DI-T-E3BG		6.960 to 6.975 mm 0.2741 to 0.2746 in.	—
	Valve guide I.D. (Intake)	All models	7.030 to 7.045 mm 0.2768 to 0.2773 in.	—	
	Valve guide I.D. (Exhaust)	V3600-E3B V3600-T-E3B V3600-E3CB V3600-T-E3CB V3300-E3BG V3600-T-E3BG		8.015 to 8.030 mm 0.3156 to 0.3161 in.	—
V3800DI-T-E3B V3800DI-T-E3CB V3800DI-T-E3BG			7.030 to 7.045 mm 0.2768 to 0.2773 in.	—	


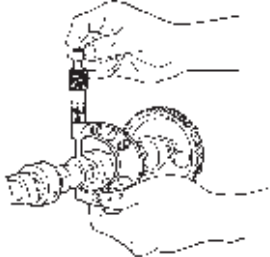

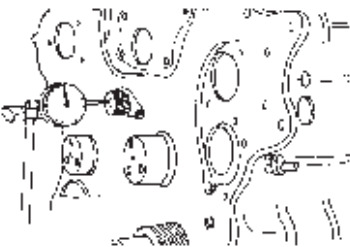

Item		Factory Specification	Allowable Limit	
Valve recessing IDI  DI 	Intake valve	V3600-E3B V3600-T-E3B V3600-E3CB V3600-T-E3CB V3300-E3BG V3600-T-E3BG	0 mm (Protrusion) to 0.2 mm (Recessing) 0 in. (Protrusion) to 0.007 in. (Recessing)	0.4 mm (Recessing) 0.02 in. (Recessing)
		V3800DI-T-E3B V3800DI-T-E3CB V3800DI-T-E3BG	0.60 to 0.80 mm (Recessing) 0.024 to 0.031 in. (Recessing)	1.2 mm (Recessing) 0.047 in. (Recessing)
	Exhaust valve	V3600-E3B V3600-T-E3B V3600-E3CB V3600-T-E3CB V3300-E3BG V3600-T-E3BG	0.15 mm (Protrusion) to 0.05 mm (Recessing) 0.0059 in. (Protrusion) to 0.0019 in. (Recessing)	0.4 mm (Recessing) 0.02 in. (Recessing)
		V3800DI-T-E3B V3800DI-T-E3CB V3800DI-T-E3BG	0.85 to 1.05 mm (Recessing) 0.0335 to 0.0413 in. (Recessing)	1.2 mm (Recessing) 0.047 in. (Recessing)
Valve spring 	Free length (A) (Intake)	All models	35.1 to 35.6 mm 1.39 to 1.40 in.	34.6 mm 1.36 in.
	Free length (A) (Exhaust)	V3600-E3B V3600-T-E3B V3600-E3CB V3600-T-E3CB V3300-E3BG V3600-T-E3BG	41.7 to 42.2 mm 1.65 to 1.66 in.	41.2 mm 1.62 in.
		V3800DI-T-E3B V3800DI-T-E3CB V3800DI-T-E3BG	35.1 to 35.6 mm 1.39 to 1.40 in.	34.6 mm 1.36 in.
	Tilt (B) (Intake)	All models	—	1.0 mm 0.039 in.
	Tilt (B) (Exhaust)	All models	—	1.0 mm 0.039 in.
	Setting load / Setting length (Intake)	All models	63.5 N / 31.5 mm 6.48 kgf / 31.5 mm 14.3 lbs / 1.24 in.	45.9 N / 31.5 mm 4.68 kgf / 31.5 mm 10.3 lbs / 1.24 in.
	Setting load / Setting length (Exhaust)	V3600-E3B V3600-T-E3B V3600-E3CB V3600-T-E3CB V3300-E3BG V3600-T-E3BG	118 N / 35.0 mm 12.0 kgf / 35.0 mm 26.5 lbs / 1.3780 in.	100 N / 35.0 mm 10.2 kgf / 35.0 mm 22.5 lbs / 1.38 in.
V3800DI-T-E3B V3800DI-T-E3CB V3800DI-T-E3BG		63.5 N / 31.5 mm 6.48 kgf / 31.5 mm 14.3 lbs / 1.24 in.	45.9 N / 31.5 mm 4.68 kgf / 31.5 mm 10.3 lbs / 1.24 in.	


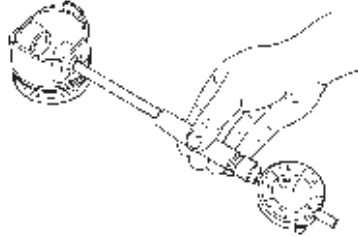
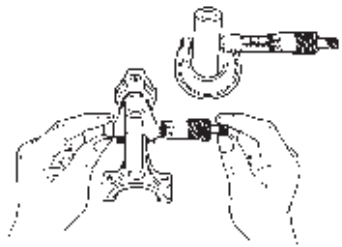

Item		Factory Specification	Allowable Limit	
Valve timing  V3600-T only 	Open (Intake valve)	V3600-E3B V3600-E3CB	0.17 rad. before T.D.C. (10° before T.D.C.)	—
		V3600-T-E3B V3800DI-T-E3B V3600-T-E3CB V3800DI-T-E3CB V3300-E3BG V3600-T-E3BG V3800DI-T-E3BG	0.24 rad. before T.D.C. (14° before T.D.C.)	—
	Close (Intake valve)	All models	0.63 rad. after T.D.C. (36° after T.D.C.)	—
	Open (Exhaust valve)	All models	0.79 rad. before B.D.C. (45° before B.D.C.)	—
	Close (Exhaust valve)	V3600-E3B V3600-E3CB	0.09 rad. after T.D.C. (5° after T.D.C.)	—
		V3600-T-E3B V3800DI-T-E3B V3600-T-E3CB V3800DI-T-E3CB V3300-E3BG V3600-T-E3BG V3800DI-T-E3BG	0.30 rad. after T.D.C. (17° after T.D.C.)	—
		Internal EGR Open (Exhaust valve)	V3600-T-E3B V3600-T-E3CB V3600-T-E3BG	0.82 rad. after T.D.C. (47° after T.D.C.)
	Internal EGR Close (Exhaust valve)		0.30 rad. before B.D.C. (17° before B.D.C.)	—
Rocker arm shaft to rocker arm 	Clearance	All models	0.016 to 0.045 mm 0.00063 to 0.0017 in.	0.15 mm 0.0059 in.
	Rocker arm shaft O.D.	All models	15.973 to 15.984 mm 0.62886 to 0.62929 in.	—
	Rocker arm I.D.	All models	16.000 to 16.018 mm 0.62993 to 0.63062 in.	—

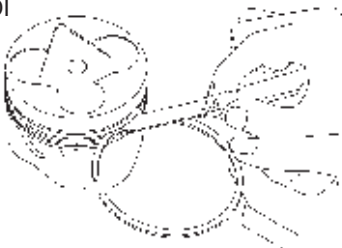
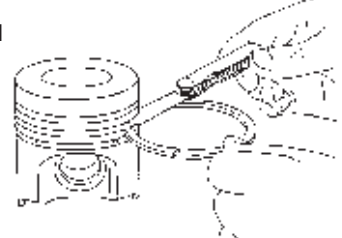

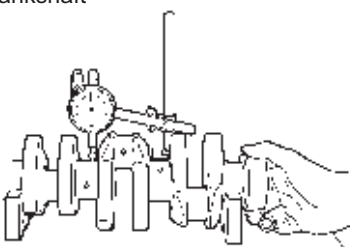

Item		Factory Specification	Allowable Limit
Valve arm bridge shaft to valve arm bridge 	Clearance	All models 0.018 to 0.042 mm 0.00071 to 0.0016 in.	0.15 mm 0.0059 in.
	Valve arm bridge shaft O.D.	All models 9.023 to 9.032 mm 0.3552 to 0.3555 in.	—
	Valve arm bridge I.D.	All models 9.050 to 9.065 mm 0.3563 to 0.3568 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.	—

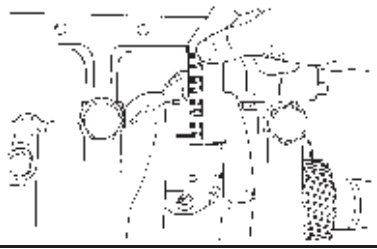

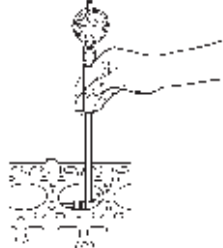
Item		Factory Specification	Allowable Limit	
Timing gear V3600-E3B V3600-T-E3B V3800DI-T-E3B V3300-E3BG V3600-T-E3BG V3800DI-T-E3BG 	Backlash (Crank gear to idle gear 1)	V3600-E3B V3600-T-E3B V3800DI-T-E3B V3300-E3BG V3600-T-E3BG V3800DI-T-E3BG 0.0490 to 0.193 mm 0.00193 to 0.00759 in.	0.22 mm 0.0087 in.	
	Backlash (Idle gear 1 to cam gear)	V3600-E3B V3600-T-E3B V3800DI-T-E3B V3300-E3BG V3600-T-E3BG V3800DI-T-E3BG 0.0490 to 0.189 mm 0.00193 to 0.00744 in.	0.22 mm 0.0087 in.	
	Backlash (Idle gear 1 to idle gear 2)	V3600-E3B V3600-T-E3B V3800DI-T-E3B V3300-E3BG V3600-T-E3BG V3800DI-T-E3BG 0.0440 to 0.185 mm 0.00174 to 0.00728 in.	0.22 mm 0.0087 in.	
	Backlash (Idle gear 2 to injection pump gear)	V3600-E3B V3600-T-E3B V3800DI-T-E3B V3300-E3BG V3600-T-E3BG V3800DI-T-E3BG 0.0440 to 0.177 mm 0.00174 to 0.00696 in.	0.22 mm 0.0087 in.	
	Backlash (Cam gear to balancer gear 1)	Balancer model only 0.0470 to 0.182 mm 0.00185 to 0.00716 in.	0.22 mm 0.0087 in.	
	Backlash (Idle gear 1 to balancer gear 2)	Balancer model only 0.0440 to 0.183 mm 0.00174 to 0.00720 in.	0.22 mm 0.0087 in.	
		Backlash (Crank gear to idle gear)	V3600-E3CB V3600-T-E3CB V3800DI-T-E3CB 0.0490 to 0.193 mm 0.00193 to 0.00759 in.	0.22 mm 0.0087 in.
		Backlash (Idle gear to cam gear)	V3600-E3CB V3600-T-E3CB V3800DI-T-E3CB 0.0490 to 0.189 mm 0.00193 to 0.0074 in.	0.22 mm 0.0087 in.
		Backlash (Idle gear to injection pump gear)	V3600-E3CB V3600-T-E3CB V3800DI-T-E3CB 0.0300 to 0.165 mm 0.00119 to 0.00649 in.	0.22 mm 0.0087 in.

Item			Factory Specification	Allowable Limit
Idle gear 	Side clearance	All models	0.15 to 0.30 mm 0.0059 to 0.011 in.	0.9 mm 0.04 in.
Idle gear shaft to idle gear bushing 	Clearance	All models	0.050 to 0.091 mm 0.0020 to 0.0035 in.	0.10 mm 0.0039 in.
	Idle gear shaft 1 O.D.	All models	44.959 to 44.975 mm 1.7701 to 1.7706 in.	—
	Idle gear shaft 2 O.D.	V3600-E3B V3600-T-E3B V3800DI-T-E3B V3300-E3BG V3600-T-E3BG V3800DI-T-E3BG	44.959 to 44.975 mm 1.7701 to 1.7706 in.	—
	Idle gear bushing I.D.	All models	45.025 to 45.050 mm 1.7727 to 1.7736 in.	—
Camshaft 	Alignment	All models	—	0.01 mm 0.0004 in.



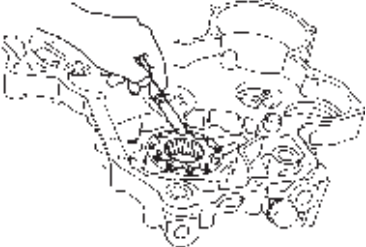

Item			Factory Specification	Allowable Limit
Camshaft 	Side clearance	All models	0.070 to 0.22 mm 0.0028 to 0.0086 in.	0.30 mm 0.012 in.
Cam 	Height (Intake)	All models	37.63 mm 1.481 in.	37.13 mm 1.462 in.
	Height (Exhaust)	All models	38.96 mm 1.534 in.	38.46 mm 1.514 in.
	Height (Exhaust) EGR	V3600-T-E3B V3600-T-E3CB V3600-T-E3BG	33.86 mm 1.333 in.	33.36 mm 1.313 in.
Camshaft journal to camshaft bearing 	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	45.934 to 45.950 mm 1.8085 to 1.8090 in.	—
	Camshaft bearing I.D.	All models	46.000 to 46.025 mm 1.8111 to 1.8120 in.	—
Balancer shaft 	Side clearance	Balancer model only	0.070 to 0.22 mm 0.0028 to 0.0086 in.	0.3 mm 0.01 in.
Balancer shaft 	Alignment	Balancer model only	—	0.02 mm 0.0008 in.

Item		Factory Specification	Allowable Limit
Balancer shaft journal to balancer shaft bearing 	Oil clearance	Balancer model only 0.0700 to 0.159 mm 0.00276 to 0.00625 in.	0.2 mm 0.008 in.
	Balancer shaft journal O.D.	Balancer model only 50.920 to 50.940 mm 2.0048 to 2.0055 in.	—
	Balancer shaft bearing I.D. (A and B)	Balancer model only 51.01 to 51.08 mm 2.008 to 2.011 in.	—
Piston pin bore 	Piston pin bore I.D.	All models 30.000 to 30.013 mm 1.1811 to 1.1816 in.	30.05 mm 1.183 in.
Piston pin to small end bushing 	Clearance	All models 0.020 to 0.040 mm 0.00079 to 0.0015 in.	0.15 mm 0.0059 in.
	Piston pin O.D.	All models 30.006 to 30.011 mm 1.1814 to 1.1815 in.	—
	Small end bushing I.D.	All models 30.031 to 30.046 mm 1.1824 to 1.1829 in.	—
Piston ring 	Ring gap (Top ring)	All models 0.30 to 0.45 mm 0.012 to 0.017 in.	1.25 mm 0.0492 in.
	Ring gap (Second ring)	All models 0.30 to 0.45 mm 0.012 to 0.017 in.	1.25 mm 0.0492 in.
	Ring gap (Oil ring)	All models 0.25 to 0.45 mm 0.0099 to 0.017 in.	1.25 mm 0.0492 in.

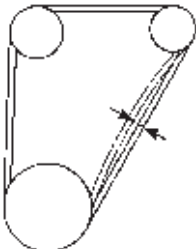
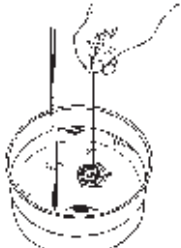
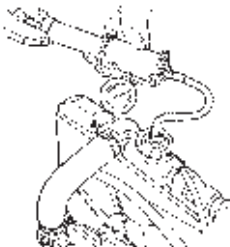
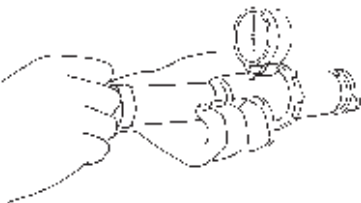
Item			Factory Specification	Allowable Limit
Piston ring groove to piston ring IDI  DI 	Clearance (Top ring)	V3800DI-T-E3B V3800DI-T-E3CB V3800DI-T-E3BG	0.05 to 0.09 mm 0.002 to 0.003 in.	0.15 mm 0.0059 in.
	Clearance (Second ring)	All models	0.0930 to 0.120 mm 0.00367 to 0.00472 in.	0.20 mm 0.0079 in.
	Clearance (Oil ring)	All models	0.020 to 0.060 mm 0.00079 to 0.0023 in.	0.15 mm 0.0059 in.
Connecting rod 	Alignment	All models	—	0.05 mm 0.002 in.
Crankshaft 	Alignment	All models	—	0.02 mm 0.0008 in.
Crankshaft journal to crankshaft bearing 	Oil clearance	All models	0.018 to 0.062 mm 0.00071 to 0.0024 in.	0.20 mm 0.0079 in.
	Crankshaft journal O.D.	All models	74.977 to 74.990 mm 2.9519 to 2.9523 in.	—

Item		Factory Specification	Allowable Limit	
Crankpin to crankpin bearing 	Oil clearance	All models 0.018 to 0.051 mm 0.00071 to 0.0020 in.	0.20 mm 0.0079 in.	
	Crankpin O.D.	All models 52.977 to 52.990 mm 2.0857 to 2.0862 in.	—	
Crankshaft 	Side clearance	All models 0.15 to 0.31 mm 0.0059 to 0.012 in.	0.50 mm 0.020 in.	
Cylinder 	Bore I.D. (Standard size)	V3600-E3B V3600-T-E3B V3600-E3CB V3600-T-E3CB V3300-E3BG V3600-T-E3BG	98.000 to 98.022 mm 3.8583 to 3.8591 in.	98.150 mm 3.8642 in.
		V3800DI-T-E3B V3800DI-T-E3CB V3800DI-T-E3BG	100.000 to 100.022 mm 3.93701 to 3.93787 in.	100.150 mm 3.9429 in.
	Bore I.D. (Oversize)	V3600-E3B V3600-T-E3B V3600-E3CB V3600-T-E3CB V3300-E3BG V3600-T-E3BG	98.500 to 98.522 mm 3.8780 to 3.8788 in.	98.650 mm 3.8839 in.
		V3800DI-T-E3B V3800DI-T-E3CB V3800DI-T-E3BG	100.500 to 100.522 mm 3.95670 to 3.95755 in.	100.65 mm 3.96260 in.

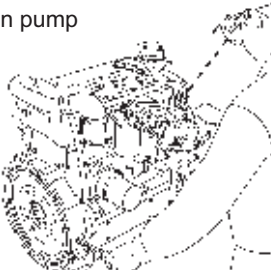
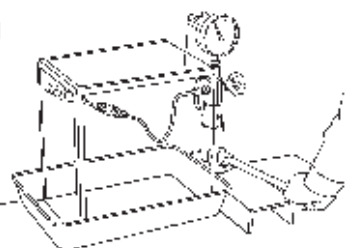
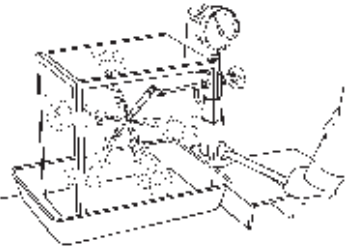
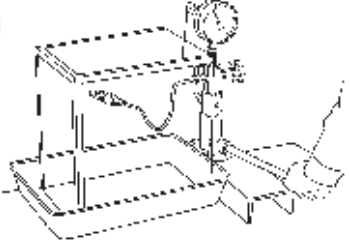
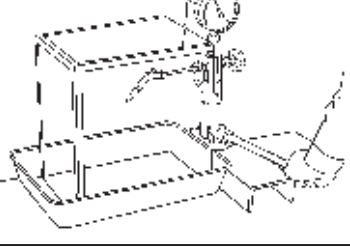
(2) LUBRICATING SYSTEM

Item		Factory Specification	Allowable Limit
Engine oil pressure 	Engine oil pressure (At idle speed)	All models —	50 kPa 0.5 kgf/cm ² 7 psi
	Engine oil pressure (At rated speed)	All models 200 to 390 kPa 2.0 to 4.0 kgf/cm ² 29 to 56 psi	150 kPa 1.5 kgf/cm ² 21 psi
Inner rotor to outer rotor (Oil pump) 	Clearance	All models 0.040 to 0.16 mm 0.0016 to 0.0062 in.	0.3 mm 0.01 in.
Outer rotor to pump body (Oil pump) 	Clearance	All models 0.100 to 0.184 mm 0.00394 to 0.00724 in.	0.3 mm 0.01 in.
Inner rotor to cover (Oil pump) 	Clearance	All models 0.025 to 0.075 mm 0.00099 to 0.0029 in.	0.225 mm 0.00886 in.

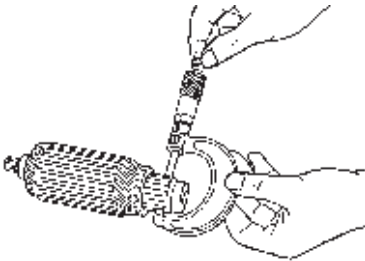
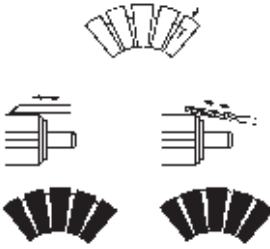
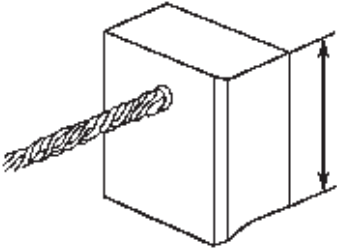

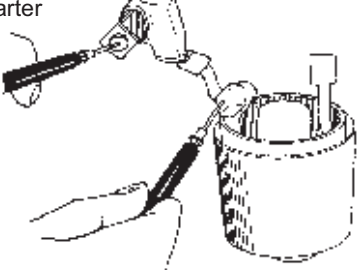
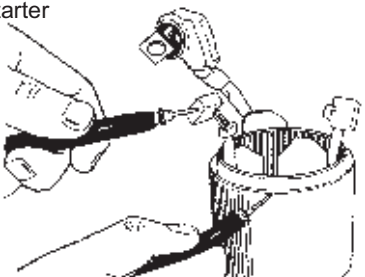
(3) COOLING SYSTEM

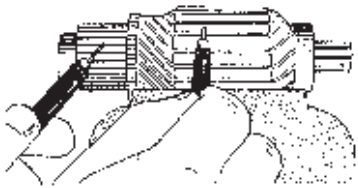
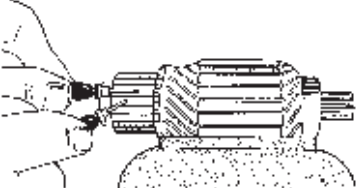
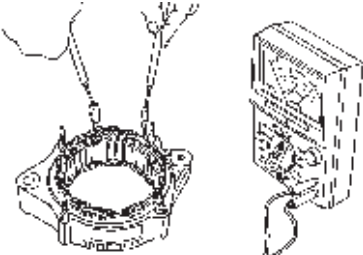
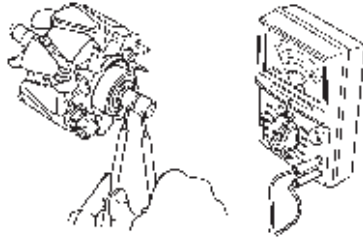
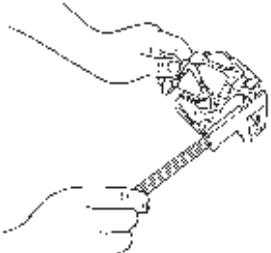
Item			Factory Specification	Allowable Limit
Fan belt 	Tension	All models	10 to 12 mm (0.40 to 0.47 in.) deflection at 98 N (10 kgf, 22 lbs) of force	—
Thermostat 	Valve opening temperature (At beginning)	All models	74.5 to 78.5 °C 166.1 to 173.3 °F	—
	Valve opening temperature (Opened completely)	All models	90 °C 194 °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 ² , from 10 to 9 psi)	—

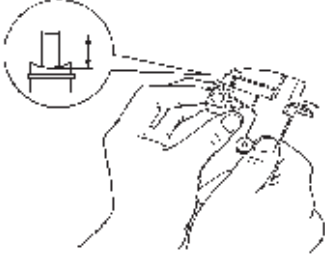
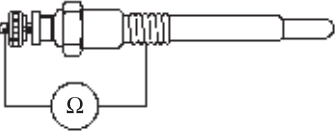
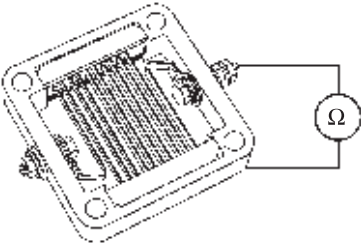
(4) FUEL SYSTEM

Item		Factory Specification	Allowable Limit	
Injection pump 	Injection timing	V3600-E3B V3600-E3CB	0.127 to 0.152 rad before T.D.C. 7.25 to 8.75° before T.D.C.	—
		V3600-T-E3B V3600-T-E3CB V3600-T-E3BG	0.0568 to 0.0829 rad before T.D.C. 3.25 to 4.75° before T.D.C.	—
		V3800DI-T-E3B V3800DI-T-E3CB	0.0917 to 0.117 rad before T.D.C. 5.25 to 6.75° before T.D.C.	—
		V3300-E3BG	0.144 to 0.170 rad before T.D.C. 8.25 to 9.75° before T.D.C.	—
		V3800DI-T-E3BG	0.0829 to 0.109 rad before T.D.C. 4.75 to 6.25° before T.D.C.	—
Injection nozzle IDI  DI 	Injection pressure	V3600-E3B V3600-T-E3B V3600-E3CB V3600-T-E3CB V3300-E3BG V3600-T-E3BG	13.73 to 14.71 MPa 140.0 to 150.0 kgf/cm ² 1992 to 2133 psi	—
		V3800DI-T-E3B V3800DI-T-E3CB V3800DI-T-E3BG	18.63 to 19.61 MPa 190.0 to 200.0 kgf/cm ² 2702 to 2845 psi (1st stage)	—
Injection nozzle IDI  DI 	Valve seat tightness	V3600-E3B V3600-T-E3B V3600-E3CB V3600-T-E3CB V3300-E3BG V3600-T-E3BG	No fuel leak at 12.75 MPa 130.0 kgf/cm ² 1849 psi	—
		V3800DI-T-E3B V3800DI-T-E3CB V3800DI-T-E3BG	No fuel leak at 16.67 MPa 170.0 kgf/cm ² 2418 psi	—

(5) ELECTRICAL SYSTEM

Item			Factory Specification	Allowable Limit
Starter 	Commutator O.D.	All models	32.0 mm 1.26 in.	31.4 mm 1.24 in.
Starter 	Mica under cut	All models	0.5 mm 0.02 in.	0.2 mm 0.008 in.
Starter 	Brush length	All models	18.0 mm 0.709 in.	11.0 mm 0.433 in.
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	—

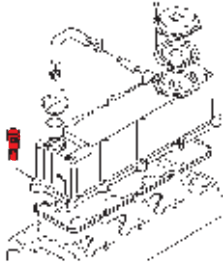
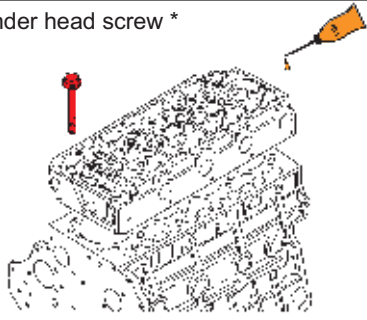
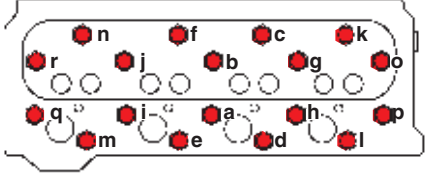

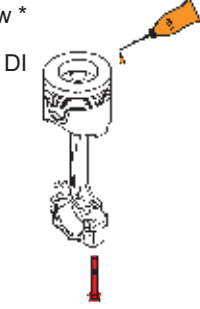
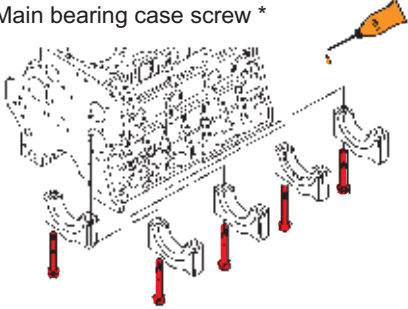
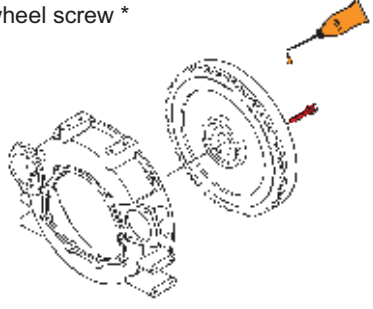
Item			Factory Specification	Allowable Limit
Starter 	Armature coil resistance (Commutator - Armature coil core)	All models	Infinity	—
Starter 	Armature coil resistance (Segment - Segment)	All models	Continuity	—
Alternator 	Stator resistance	All models	Less than 1.0 Ω	—
Alternator 	Rotor resistance	All models	2.8 to 3.3 Ω	—
Alternator 	Slip ring O.D.	All models	22.7 mm 0.894 in.	22.1 mm 0.870 in.

Item			Factory Specification	Allowable Limit
Alternator 	Brush length	All models	18.5 mm 0.728 in.	5.0 mm 0.20 in.
Glow plug 	Resistance	V3600-E3B V3600-T-E3B V3600-E3CB V3600-T-E3CB V3300-E3BG V3600-T-E3BG	Approx. 1.0 Ω	—
Intake air heater 	Resistance	V3800DI-T-E3B V3800DI-T-E3CB V3800DI-T-E3BG	Approx. 0.3 Ω	—

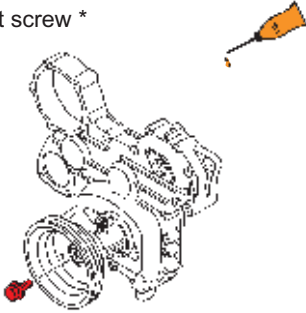
TIGHTENING TORQUES

(1) Special Tightening Torques

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

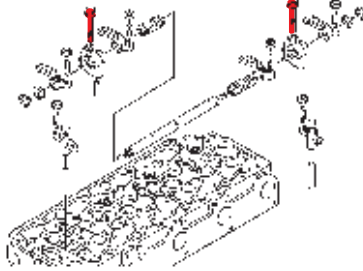
Cylinder head cover screw 		Cylinder head screw * 		Cylinder head tightening order 	
V3600-E3B	6.9 to 11.2 N·m 0.70 to 1.15 kgf·m 5.1 to 8.31 lbf·ft	V3600-E3B	98.1 to 107 N·m 10.0 to 11.0 kgf·m 72.4 to 79.5 lbf·ft	V3600-E3B	a → r
V3600-T-E3B					
V3800DI-T-E3B					
V3600-E3CB					
V3600-T-E3CB					
V3800DI-T-E3CB					
V3300-E3BG					
V3600-T-E3BG					
V3800DI-T-E3BG					
Connecting rod screw * IDI  DI 		Main bearing case screw * 		Flywheel screw * 	
V3600-E3B	79 to 83 N·m 8.0 to 8.5 kgf·m 58 to 61 lbf·ft	V3600-E3B	138 to 147 N·m 14.0 to 15.0 kgf·m 102 to 108 lbf·ft	V3600-E3B	98.1 to 107 N·m 10.0 to 11.0 kgf·m 72.4 to 79.5 lbf·ft
V3600-T-E3B					
V3800DI-T-E3B					
V3600-E3CB					
V3600-T-E3CB					
V3800DI-T-E3CB					
V3300-E3BG					
V3600-T-E3BG					
V3800DI-T-E3BG					

Crankshaft screw *



V3600-E3B	
V3600-T-E3B	
V3800DI-T-E3B	
V3600-E3CB	255 to 274 N·m
V3600-T-E3CB	26.0 to 28.0 kgf·m
V3800DI-T-E3CB	188 to 202 lbf·ft
V3300-E3BG	
V3600-T-E3BG	
V3800DI-T-E3BG	

Rocker arm bracket screw



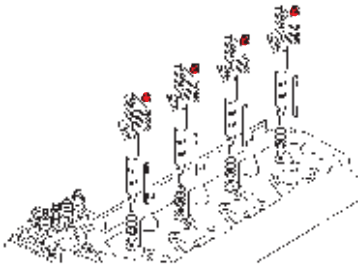
V3600-E3B	
V3600-T-E3B	
V3800DI-T-E3B	
V3600-E3CB	49 to 55 N·m
V3600-T-E3CB	5.0 to 5.7 kgf·m
V3800DI-T-E3CB	37 to 41 lbf·ft
V3300-E3BG	
V3600-T-E3BG	
V3800DI-T-E3BG	

Nozzle holder assembly



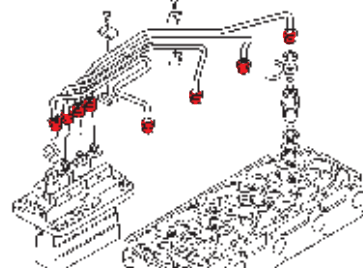
V3600-E3B	
V3600-T-E3B	
V3600-E3CB	49 to 68 N·m
V3600-T-E3CB	5.0 to 7.0 kgf·m
V3600-T-E3CB	37 to 50 lbf·ft
V3300-E3BG	
V3600-T-E3BG	

Nozzle holder clamp nut



V3800DI-T-E3B	
V3800DI-T-E3CB	18 to 20 N·m
	1.8 to 2.1 kgf·m
	13 to 15 lbf·ft
V3800DI-T-E3BG	

Injection pipe retaining nut



V3600-E3B	
V3600-T-E3B	
V3600-E3CB	23 to 36 N·m
V3600-T-E3CB	2.3 to 3.7 kgf·m
V3600-T-E3CB	17 to 26 lbf·ft
V3300-E3BG	
V3600-T-E3BG	

Injection pipe retaining nut



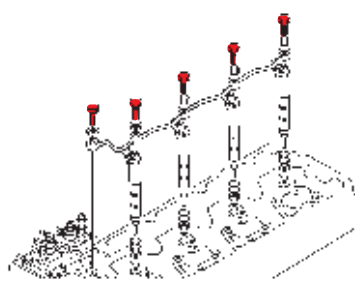
V3800DI-T-E3B	
V3800DI-T-E3CB	23 to 36 N·m
	2.3 to 3.7 kgf·m
	17 to 26 lbf·ft
V3800DI-T-E3BG	

Overflow pipe assembly retaining nut



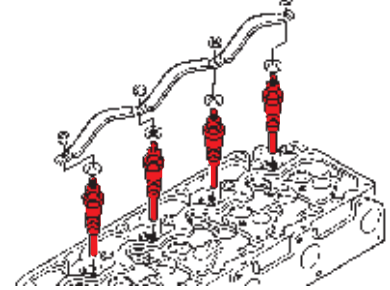
V3600-E3B	20 to 24 N·m 2.0 to 2.5 kgf·m 15 to 18 lbf·ft
V3600-T-E3B	
V3600-E3CB	
V3600-T-E3CB	
V3300-E3BG	
V3600-T-E3BG	

Overflow pipe assembly retaining screw



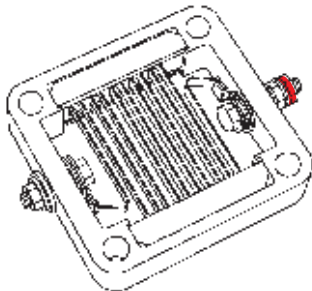
V3800DI-T-E3B	9.8 to 11.2 N·m 1.0 to 1.15 kgf·m 7.24 to 8.31 lbf·ft
V3800DI-T-E3CB	
V3800DI-T-E3BG	
V3800DI-T-E3BG	

Glow plug



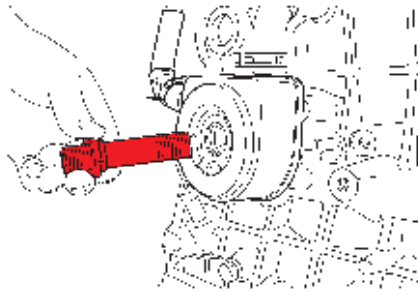
V3600-E3B	20 to 24 N·m 2.0 to 2.5 kgf·m 15 to 18 lbf·ft
V3600-T-E3B	
V3600-E3CB	
V3600-T-E3CB	
V3300-E3BG	
V3600-T-E3BG	

Intake air heater terminal nut



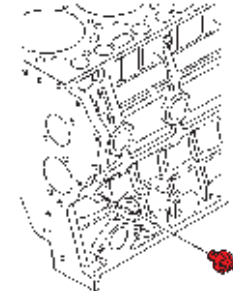
V3800DI-T-E3B	3.5 to 5.3 N·m 0.35 to 0.55 kgf·m 2.6 to 3.9 lbf·ft
V3800DI-T-E3CB	
V3800DI-T-E3BG	

Oil cooler joint screw



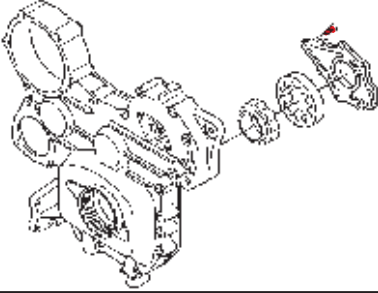
V3600-E3B	40 to 44 N·m 4.0 to 4.5 kgf·m 29 to 32 lbf·ft
V3600-T-E3B	
V3800DI-T-E3B	
V3600-E3CB	
V3600-T-E3CB	
V3800DI-T-E3CB	
V3300-E3BG	
V3600-T-E3BG	
V3800DI-T-E3BG	

Oil switch taper screw



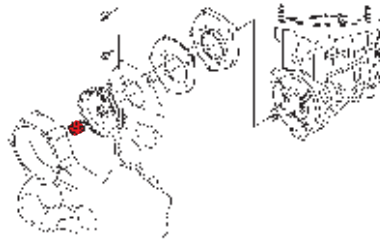
V3600-E3B	15 to 19 N·m 1.5 to 2.0 kgf·m 11 to 14 lbf·ft
V3600-T-E3B	
V3800DI-T-E3B	
V3600-E3CB	
V3600-T-E3CB	
V3800DI-T-E3CB	
V3300-E3BG	
V3600-T-E3BG	
V3800DI-T-E3BG	

Oil pump cover screw



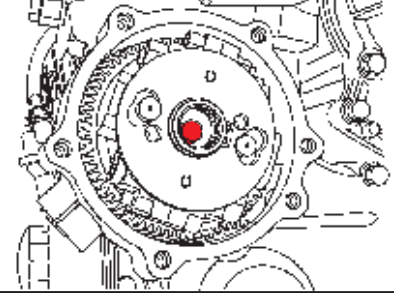
V3600-E3B	
V3600-T-E3B	
V3800DI-T-E3B	
V3600-E3CB	7.9 to 9.3 N·m
V3600-T-E3CB	0.80 to 0.95 kgf·m
V3800DI-T-E3CB	5.8 to 6.8 lbf·ft
V3300-E3BG	
V3600-T-E3BG	
V3800DI-T-E3BG	

Injection pump gear mounting nut



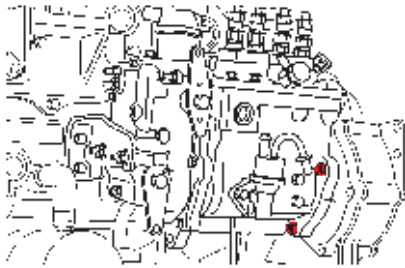
V3600-T-E3B	
V3600-T-E3CB	74 to 83 N·m
	7.5 to 8.5 kgf·m
V3300-E3BG	55 to 61 lbf·ft
V3600-T-E3BG	

Timer gear mounting nut



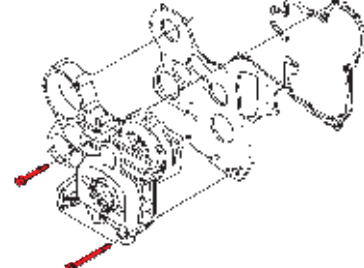
V3600-E3B	
V3600-E3CB	74 to 83 N·m
V3800DI-T-E3B	7.5 to 8.5 kgf·m
	55 to 61 lbf·ft
V3800DI-T-E3CB	
V3800DI-T-E3BG	

Injection pump unit mounting nut



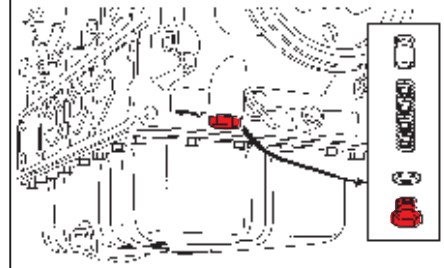
V3600-E3B	
V3600-T-E3B	
V3800DI-T-E3B	
V3600-E3CB	18 to 20 N·m
V3600-T-E3CB	1.8 to 2.1 kgf·m
V3800DI-T-E3CB	13 to 15 lbf·ft
V3300-E3BG	
V3600-T-E3BG	
V3800DI-T-E3BG	

Gear case cover mounting screw



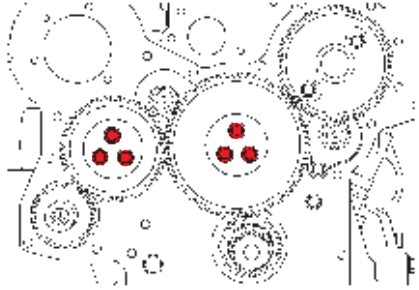
V3600-E3B		
V3600-T-E3B	7T	24 to 27 N·m
V3800DI-T-E3B		2.4 to 2.8 kgf·m
		18 to 20 lbf·ft
V3600-E3CB	10T	33 to 36 N·m
V3600-T-E3CB		3.3 to 3.7 kgf·m
V3800DI-T-E3CB		24 to 26 lbf·ft
V3300-E3BG		
V3600-T-E3BG		
V3800DI-T-E3BG		

Relief valve retaining screw



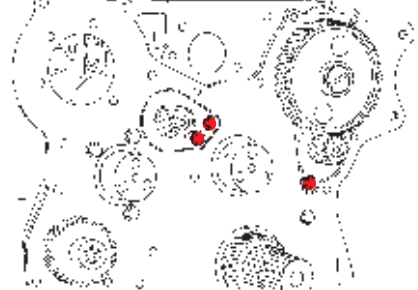
V3600-E3B	
V3600-T-E3B	
V3800DI-T-E3B	
V3600-E3CB	69 to 78 N·m
V3600-T-E3CB	7.0 to 8.0 kgf·m
V3800DI-T-E3CB	51 to 57 lbf·ft
V3300-E3BG	
V3600-T-E3BG	
V3800DI-T-E3BG	

Idle gear mounting screw



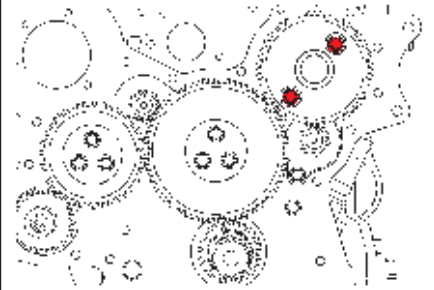
V3600-E3B	
V3600-T-E3B	
V3800DI-T-E3B	
V3600-E3CB	24 to 27 N·m
V3600-T-E3CB	2.4 to 2.8 kgf·m
V3800DI-T-E3CB	18 to 20 lbf·ft
V3300-E3BG	
V3600-T-E3BG	
V3800DI-T-E3BG	

Balancer shaft set screw (Balancer model Only)



V3600-E3B	
V3600-T-E3B	
V3800DI-T-E3B	24 to 27 N·m
V3600-T-E3CB	2.4 to 2.8 kgf·m
V3300-E3BG	18 to 20 lbf·ft
V3600-T-E3BG	
V3800DI-T-E3BG	

Camshaft set screw



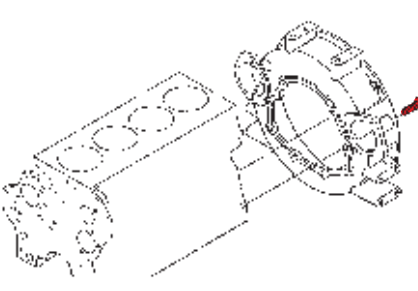
V3600-E3B	
V3600-T-E3B	
V3800DI-T-E3B	
V3600-E3CB	24 to 27 N·m
V3600-T-E3CB	2.4 to 2.8 kgf·m
V3800DI-T-E3CB	18 to 20 lbf·ft
V3300-E3BG	
V3600-T-E3BG	
V3800DI-T-E3BG	

Plate mounting screw



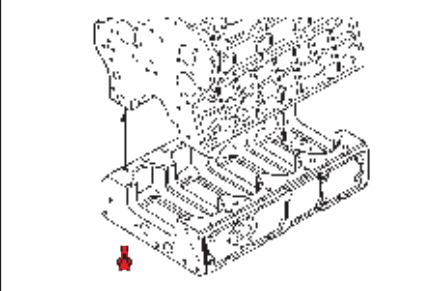
V3600-E3B	
V3600-T-E3B	
V3800DI-T-E3B	24 to 27 N·m
V3600-E3CB	2.4 to 2.8 kgf·m
V3300-E3BG	18 to 20 lbf·ft
V3600-T-E3BG	
V3800DI-T-E3BG	

Flywheel housing mounting screw



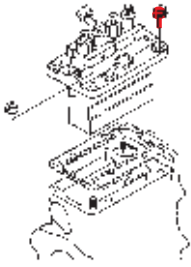
V3600-E3B	
V3600-T-E3B	
V3800DI-T-E3B	
V3600-E3CB	78 to 90 N·m
V3600-T-E3CB	7.9 to 9.2 kgf·m
V3800DI-T-E3CB	58 to 66 lbf·ft
V3300-E3BG	
V3600-T-E3BG	
V3800DI-T-E3BG	

Crankcase 2 mounting screw



V3600-E3B	
V3600-T-E3B	
V3800DI-T-E3B	
V3600-E3CB	49 to 55 N·m
V3600-T-E3CB	5.0 to 5.7 kgf·m
V3800DI-T-E3CB	37 to 41 lbf·ft
V3300-E3BG	
V3600-T-E3BG	
V3800DI-T-E3BG	

Injection pump mounting screw



V3600-E3B	
V3600-T-E3B	
V3800DI-T-E3B	
V3600-E3CB	24 to 27 N·m
V3600-T-E3CB	2.4 to 2.8 kgf·m
V3800DI-T-E3CB	18 to 20 lbf·ft
V3300-E3BG	
V3600-T-E3BG	
V3800DI-T-E3BG	

Injection pump mounting nut



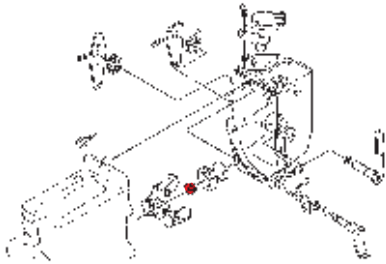
V3600-E3B	
V3600-T-E3B	
V3800DI-T-E3B	
V3600-E3CB	18 to 20 N·m
V3600-T-E3CB	1.8 to 2.1 kgf·m
V3800DI-T-E3CB	13 to 15 lbf·ft
V3300-E3BG	
V3600-T-E3BG	
V3800DI-T-E3BG	

Boost actuator (If equipped)



V3600-T-E3B	
V3800DI-T-E3B	40 to 45 N·m
V3600-T-E3CB	4.0 to 4.6 kgf·m
V3800DI-T-E3CB	29 to 33 lbf·ft

Governor weight mounting nut



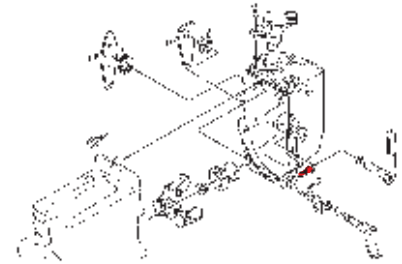
V3600-E3B	
V3600-T-E3B	
V3800DI-T-E3B	
V3600-E3CB	63 to 72 N·m
V3600-T-E3CB	6.4 to 7.4 kgf·m
V3800DI-T-E3CB	47 to 53 lbf·ft
V3300-E3BG	
V3600-T-E3BG	
V3800DI-T-E3BG	

Fuel camshaft stopper mounting screw



V3600-E3B	
V3600-T-E3B	
V3800DI-T-E3B	
V3600-E3CB	7.9 to 9.3 N·m
V3600-T-E3CB	0.80 to 0.95 kgf·m
V3800DI-T-E3CB	5.8 to 6.8 lbf·ft
V3300-E3BG	
V3600-T-E3BG	
V3800DI-T-E3BG	

Governor housing mounting screw



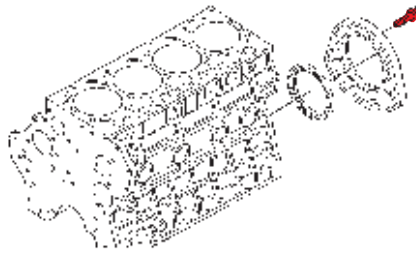
V3600-E3B	
V3600-T-E3B	
V3800DI-T-E3B	
V3600-E3CB	9.8 to 11.2 N·m
V3600-T-E3CB	1.00 to 1.15 kgf·m
V3800DI-T-E3CB	7.24 to 8.31 lbf·ft
V3300-E3BG	
V3600-T-E3BG	
V3800DI-T-E3BG	

Anti-rotation nut



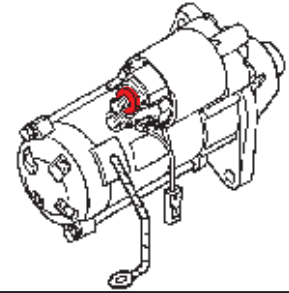
V3600-E3B	
V3600-T-E3B	
V3800DI-T-E3B	
V3600-E3CB	2.8 to 4.0 N·m
V3600-T-E3CB	0.29 to 0.41 kgf·m
V3800DI-T-E3CB	2.1 to 2.9 lbf·ft
V3300-E3BG	
V3600-T-E3BG	
V3800DI-T-E3BG	

Bearing case cover mounting screw



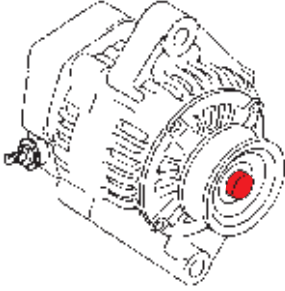
V3600-E3B	
V3600-T-E3B	
V3800DI-T-E3B	
V3600-E3CB	24 to 27 N·m
V3600-T-E3CB	2.4 to 2.8 kgf·m
V3800DI-T-E3CB	18 to 20 lbf·ft
V3300-E3BG	
V3600-T-E3BG	
V3800DI-T-E3BG	

Starter's terminal B mounting nut



V3600-E3B	
V3600-T-E3B	
V3800DI-T-E3B	
V3600-E3CB	9.8 to 11 N·m
V3600-T-E3CB	1.0 to 1.2 kgf·m
V3800DI-T-E3CB	7.3 to 8.6 lbf·ft
V3300-E3BG	
V3600-T-E3BG	
V3800DI-T-E3BG	

Alternator pulley nut



V3600-E3B	
V3600-T-E3B	
V3800DI-T-E3B	
V3600-E3CB	58.4 to 78.9 N·m
V3600-T-E3CB	5.95 to 8.05 kgf·m
V3800DI-T-E3CB	43.1 to 58.2 lbf·ft
V3300-E3BG	
V3600-T-E3BG	
V3800DI-T-E3BG	

(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	48 to 55 N·m 4.9 to 5.7 kgf·m 36 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