SERVICE SPECIFICATIONS

ENGINE MECHANICAL

Specifications

Engine tune-up	Engine coolant capacity (w/ Heater)		
	HJ60, 61 series	15.4 liters	16.3 US qts 13.6 Imp. qts
	HJ75 series	14.2 liters	15.0 US qts 12.5 Imp. qts
	Engine oil capacity		
	Drain and refill		
	w/o Oil filter change	8.1 liters	8.6 US qts 7.1 Imp. qts
	w/ Oil filter change	9.7 liters	10.3 US qts 8.5 Imp. qts
	Dry fill	10.3 liters	10.9 US qts 9.1 Imp. qts
	Battery specific gravity		
	12V type	1.25 – 1.27 when fully charged at 20°C (68°F)	
	24V type NX series	1.27 – 1.29 when fully charged at 20°C (68°F)	
	Others	1.25 – 1.27 when fully charged at 20°C (68°F)	
	Drive belt		
	Tension (Canada) Used belt	115 ± 15 lb	
	New belt	125 ± 25 lb	
	Deflection (Others) Used belt	10 – 13 mm	0.39 – 0.51 in.
	New belt	8 – 9 mm	0.31 – 0.35 in.
	Injection nozzle opening pressure		
	2H Reused nozzle	105 – 125 kg/cm² (1,493 – 1,778 psi, 10,296 – 12,258 kPa)	
	New nozzle	115 – 125 kg/cm² (1,636 – 1,778 psi, 11,278 – 12,258 kPa)	
	12H-T Reused nozzle	180 – 210 kg/cm² (2,560 – 2,987 psi, 17,652 – 20,594 kPa)	
	New nozzle	200 – 210 kg/cm² (2,845 – 2,987 psi, 19,613 – 20,594 kPa)	
	Valve clearance (Hot) IN	0.20 mm	0.008 in.
	EX	0.36 mm	0.014 in.
	Injection timing		
	2H	18° BTDC	
	12H-T	11° BTDC	
	Injection order	1-4-2-6-3-5	
	Idle speed		
	2H M/T	650 rpm	
	A/T	750 rpm	
	12H-T M/T	650 rpm	
	A/T	770 rpm	
	Maximum speed		
	2H w/ Fluid coupling	4,170 rpm	
	w/o Fluid coupling	4,100 rpm	
	12H-T	4,170 rpm	
	PS idle-up setting speed (12H-T A/T)	820 rpm	
	A/C idle-up setting speed M/T	950 rpm (Transmission in neutral)	
	A/T	800 rpm (Transmission in D range)	

Specifications (Cont'd)

Compression pressure	Engine revolution at 250 rpm			
		STD	2H	28.0 kg/cm² (398 psi, 2,746 kPa) or more
			12H-T	30.0 kg/cm² (427 psi, 2,942 kPa) or more
		Limit		20.0 kg/cm² 284 psi 1,961 kPa
	Difference of pressure between each cylinder			2.0 kg/cm² (28 psi, 196 kPa) or less
Turbocharger	Turbocharging pressure			0.39 – 0.53 kg/cm² (5.5 – 7.3 psi, 38 – 52 kPa)
	Impeller wheel axial play			0.13 mm (0.0051 in.) or less
Cylinder head	Cylinder block side warpage	Limit		0.20 mm 0.0079 in.
	Manifold side warpage	Limit		0.20 mm 0.0079 in.
	Valve seat			
	Refacing angle	12H-T	IN	30°, 45°, 60°
		Others		30°, 45°, 75°
	Contacting angle			45°
	Contacting width			1.4 – 2.0 mm 0.055 – 0.079 in.
Valve guide busing	Inner diameter			9.010 – 9.030 mm 0.3547 – 0.3555 in.
	Outer diameter			14.023 – 14.041 mm 0.5521 – 0.5528 in.
Valve	Valve overall length	STD	IN	120.7 mm 4.752 in.
			EX	120.6 mm 4.748 in.
		Limit	IN	120.2 mm 4.732 in.
			EX	120.1 mm 4.728 in.
	Valve face angle		IN & EX	44.5°
	Stem diameter		IN	8.973 – 8.989 mm 0.3533 – 0.3539 in.
			EX	8.954 – 8.970 mm 0.3525 – 0.3531 in.
	Stem oil clearance	STD	IN	0.021 – 0.057 mm 0.0008 – 0.0022 in.
			EX	0.040 – 0.076 mm 0.0016 – 0.0030 in.
		Limit	IN	0.10 mm 0.0039 in.
			EX	0.12 mm 0.0047 in.
	Margin thickness	STD	IN	1.4 mm 0.055 in.
			EX	1.8 mm 0.071 in.
		Limit	IN	0.9 mm 0.035 in.
			EX	1.3 mm 0.051 in.
Valve spring	Free length	Inner		44.3 mm 1.744 in.
		Outer		48.1 mm 1.894 in.
	Installed tension			
	Inner at 36.0 mm (1.417 in.)			7.6 kg 16.9 lb 75 N
	Outer at 40.0 mm (1.575 in.)			22.5 kg 49.6 lb 221 N
	Squareness			2.0 mm 0.079 in.
Rocker arm and shaft	Rocker arm inside diameter			18.500 – 18.521 mm 0.7283 – 0.7292 in.
	Rocker shaft diameter			18.472 – 18.493 mm 0.7272 – 0.7281 in.
	Rocker arm to shaft oil clearance			
		STD		0.007 – 0.049 mm 0.0003 – 0.0019 in.
		Limit		0.10 mm 0.0039 in.
Push rod	Circle runout			0.50 mm 0.0197 in.

Specifications (Cont'd)

Intake and exhaust manifold	Manifold surface warpage				
	2H	Limit	IN	0.50 mm	0.0197 in.
			EX (Front)	0.30 mm	0.0118 in.
			EX (Rear)	0.30 mm	0.0118 in.
	12H-T	Limit	IN	0.50 mm	0.0197 in.
			EX (Front)	0.30 mm	0.0118 in.
			EX (Rear)	0.20 mm	0.0079 in.
Combustion chamber (2H)	Protrusion			0 – 0.10 mm	0 – 0.0039 in.
Camshaft	Circle runout	Limit		0.30 mm	0.0118 in.
	Cam lobe height				
	2H	STD	IN	41.900 mm	1.6496 in.
			EX	42.298 mm	1.6653 in.
		Limit	IN	41.4 mm	1.630 in.
			EX	41.8 mm	1.646 in.
	12H-T	STD	IN	41.713 mm	1.6422 in.
			EX	42.758 mm	1.6834 in.
		Limit	IN	41.2 mm	1.622 in.
			EX	42.3 mm	1.665 in.
	Journal diameter	STD	No. 1	51.151 – 51.170 mm	2.0138 – 2.0146 in.
			No. 2	50.951 – 50.970 mm	2.0059 – 2.0067 in.
			No. 3	50.751 – 50.770 mm	1.9981 – 1.9988 in.
			No. 4	50.551 – 50.570 mm	1.9902 – 1.9901 in.
		U/S 0.125	No. 1	51.025 – 51.035 mm	2.0089 – 2.0092 in.
			No. 2	50.825 – 50.835 mm	2.0010 – 2.0014 in.
			No. 3	50.625 – 50.635 mm	1.9931 – 1.9935 in.
			No. 4	50.425 – 50.435 mm	1.9852 – 1.9856 in.
		U/S 0.25	No. 1	50.900 – 50.910 mm	2.0039 – 2.0043 in.
			No. 2	50.700 – 50.710 mm	1.9961 – 1.9965 in.
			No. 3	50.500 – 50.510 mm	1.9882 – 1.9886 in.
			No. 4	50.300 – 50.310 mm	1.9803 – 1.9807 in.
	Bearing inside diameter	STD	No. 1	51.200 – 51.230 mm	2.0157 – 2.0169 in.
			No. 2	51.000 – 51.030 mm	2.0079 – 2.0091 in.
			No. 3	50.800 – 50.830 mm	2.0000 – 2.0012 in.
			No. 4	50.600 – 50.630 mm	1.9921 – 1.9933 in.
		U/S 0.125	No. 1	51.074 – 51.139 mm	2.0108 – 2.0133 in.
			No. 2	50.874 – 50.939 mm	2.0029 – 2.0055 in.
			No. 3	50.674 – 50.739 mm	1.9950 – 1.9976 in.
			No. 4	50.474 – 50.539 mm	1.9872 – 1.9897 in.
		U/S 0.25	No. 1	50.950 – 51.015 mm	2.0059 – 2.0085 in.
			No. 2	50.750 – 50.815 mm	1.9980 – 2.0006 in.
			No. 3	50.550 – 50.615 mm	1.9902 – 1.9927 in.
			No. 4	50.350 – 50.415 mm	1.9823 – 1.9848 in.
	Journal oil clearance	STD	STD	0.030 – 0.079 mm	0.0012 – 0.0031 in.
			U/S 0.125	0.039 – 0.114 mm	0.0015 – 0.0045 in.
			U/S 0.250	0.040 – 0.115 mm	0.0016 – 0.0045 in.
		Limit		0.15 mm	0.0059 in.
	Thrust clearance	STD		0.060 – 0.130 mm	0.0024 – 0.0051 in.
		Limit		0.30 mm	0.0118 in.

Specifications (Cont'd)

Timing Gear	Gear backlash			
	Automatic timer drive gear			
		STD	0.050 – 0.111 mm	0.0019 – 0.0043 in.
		Limit	0.30 mm	0.0118 in.
	Camshaft timing gear	STD	0.050 – 0.113 mm	0.0019 – 0.0044 in.
		Limit	0.30 mm	0.0118 in.
	No. 1 idle gear	STD	0.050 – 0.116 mm	0.0019 – 0.0045 in.
		Limit	0.30 mm	0.0118 in.
	No. 2 idle gear	STD	0.050 – 0.113 mm	0.0019 – 0.0044 in.
		Limit	0.30 mm	0.0118 in.
	Idle gear thrust clearance (No. 1 and No. 2)			
		STD	0.050 – 0.150 mm	0.0019 – 0.0059 in.
		Limit	0.30 mm	0.0118 in.
	Idle gear inside diameter (No. 1 and No. 2)		45.000 – 45.025 mm	1.7717 – 1.7726 in.
	Idle gear shaft diameter (No. 1 and No. 2)		44.950 – 44.975 mm	1.7697 – 1.7707 in.
	Idle gear oil clearance (No. 1 and No. 2)			
		STD	0.025 – 0.075 mm	0.0010 – 0.0030 in.
		Limit	0.20 mm	0.0079 in.
Valve lifter	Cylinder block lifter bore diameter		22.200 – 22.221 mm	0.8746 – 0.8748 in.
	Lifter diameter	STD	22.17 – 22.19 mm	0.8728 – 0.8736 in.
		O/S 0.05	22.22 – 22.24 mm	0.8748 – 0.8756 in.
Cylinder block	Warpage	Limit	0.20 mm	0.0079 in.
	Cylinder bore diameter	STD	91.000 – 91.030 mm	3.7008 – 3.7020 in.
		Limit STD	91.23 mm	6.5686 in.
		O/S 0.50	91.73 mm	6.6046 in.
Piston and piston ring	Piston diameter			
	2H	STD	90.930 – 90.960 mm	3.5799 – 3.5811 in.
		O/S 0.50	91.430 – 91.460 mm	3.5996 – 3.6008 in.
	12H-T	STD	90.940 – 90.970 mm	3.5803 – 3.5815 in.
		O/S 0.50	91.440 – 91.470 mm	3.6000 – 3.6012 in.
	Piston oil clearance			
	2H		0.060 – 0.080 mm	0.0024 – 0.0032 in.
	12H-T		0.050 – 0.070 mm	0.0020 – 0.0028 in.
	Piston ring groove clearance			
	2H	No. 1	0.097 – 0.137 mm	0.0038 – 0.0054 in.
		No. 2	0.060 – 0.100 mm	0.0024 – 0.0039 in.
		Oil	0.020 – 0.060 mm	0.0008 – 0.0024 in.
	12H-T	No. 1	0.139 – 0.204 mm	0.0055 – 0.0080 in.
		No. 2	0.060 – 0.100 mm	0.0024 – 0.0039 in.
		Oil	0.020 – 0.060 mm	0.0008 – 0.0024 in.
	Piston ring end gap			
	2H STD	No. 1	0.200 – 0.440 mm	0.0079 – 0.0173 in.
		No. 2	0.200 – 0.440 mm	0.0079 – 0.0173 in.
		Oil	0.150 – 0.490 mm	0.0059 – 0.0193 in.
	Limit	No. 1	1.24 mm	0.0488 in.
		No. 2	1.24 mm	0.0488 in.
		Oil	1.29 mm	0.0508 in.

Specifications (Cont'd)

Piston and piston ring (Cont'd)	Piston ring end gap (Cont'd)				
	12H-T	STD	No. 1	0.200 – 0.470 mm	0.0079 – 0.0185 in.
			No. 2	0.200 – 0.440 mm	0.0079 – 0.0173 in.
			Oil	0.150 – 0.490 mm	0.0059 – 0.0193 in.
		Limit	No. 1	1.27 mm	0.0500 in.
			No. 2	1.24 mm	0.0488 in.
			Oil	1.29 mm	0.0508 in.
Connecting rod	Thrust clearance	STD		0.200 – 0.340 mm	0.0079 – 0.0134 in.
		Limit		0.40 mm	0.0157 in.
	Bushing inside diameter				
	2H			29.008 – 29.020 mm	1.1420 – 1.1425 in.
	12H-T			32.008 – 32.020 mm	1.2602 – 1.2606 in.
	Piston pin diameter				
	2H			29.000 – 29.012 mm	1.1417 – 1.1422 in.
	12H-T			32.000 – 32.012 mm	1.2598 – 1.2603 in.
	Piston pin oil clearance	STD		0.004 – 0.012 mm	0.0002 – 0.0005 in.
		Limit		0.03 mm	0.0012 in.
	Connecting rod oil clearance				
	STD			0.030 – 0.070 mm	0.0012 – 0.0028 in.
	U/S 0.25, 0.50, 0.75 and 1.00			0.030 – 0.072 mm	0.0012 – 0.0028 in.
	Limit			0.10 mm	0.0039 in.
	Connecting rod bearing center wall thickness				
		STD Mark 1		1.480 – 1.485 mm	0.0583 – 0.0585 in.
		STD Mark 2		1.485 – 1.490 mm	0.0585 – 0.0587 in.
	Bend	Limit	per 100 mm (3.94 in.)	0.05 mm	0.0020 in.
	Twist	Limit	per 100 mm (3.94 in.)	0.05 mm	0.0020 in.
Crankshaft	Thrust clearance	STD		0.040 –0.240 mm	0.0016 – 0.0094 in.
		Limit		0.30 mm	0.0118 in.
	Thrust washer thickness	STD		2.930 – 2.980 mm	0.1154 – 0.1173 in.
		O/S 0.125		2.993 – 3.043 mm	0.1178 – 0.1198 in.
		O/S 0.250		3.055 – 3.105 mm	0.1203 – 0.1222 in.
	Main journal diameter	STD		69.980 – 70.000 mm	2.7551 – 2.7559 in.
		U/S 0.25		69.730 – 69.740 mm	2.7453 – 2.7457 in.
		U/S 0.50		69.480 – 69.490 mm	2.7354 – 2.7358 in.
		U/S 0.75		69.230 – 69.240 mm	2.7256 – 2.7260 in.
		U/S 1.00		68.980 – 68.990 mm	2.7157 – 2.7161 in.
	Main journal oil clearance				
	STD			0.032 – 0.068 mm	0.0013 – 0.0027 in.
	U/S 0.25, 0.50, 0.75 and 1.00			0.030 – 0.074 mm	0.0012 – 0.0029 in.
	Limit			0.10 mm	0.0039 in.
	Main bearing center wall thickness				
		STD Mark 1		1.981 – 1.985 mm	0.0780 – 0.0781 in.
		STD Mark 2		1.985 – 1.989 mm	0.0781 – 0.0783 in.
		STD Mark 3		1.989 – 1.993 mm	0.0783 – 0.0785 in.
	Crank pin diameter	STD		54.980 – 55.000 mm	2.1646 – 2.1654 in.
		U/S 0.25		54.730 – 54.740 mm	2.1547 – 2.1551 in.
		U/S 0.50		54.480 – 54.490 mm	2.1449 – 2.1453 in.
		U/S 0.75		54.230 – 54.240 mm	2.1350 – 2.1354 in.
		U/S 1.00		53.980 – 53.990 mm	2.1252 – 2.1259 in.
	Circle runout	Limit		0.06 mm	0.0024 in.
	Taper and out-of round				
	Main journal and crank pin	Limit		0.02 mm	0.0008 in.

Torque Specifications

Part tightened	kg-cm	ft-lb	N·m
Turbine outlet elbow x Turbocharger (12H-T)	530	38	52
No. 2 water by-pass pipe x Turbocharger (12H-T)	75	65 in.-lb	7.1
Turbocharger x Exhaust manifold (12H-T)	530	38	52
Turbocharger oil pipe x Cylinder block (12H-T)	185	13	18
Turbocharger oil pipe x Turbocharger (12H-T)	185	13	18
Turbocharger oil pipe union bolt (12H-T)	250	18	25
No. 1 water by-pass pipe x Cylinder block (12H-T)	175	13	17
No. 1 water by-pass pipe x Turbocharger (12H-T)	75	65 in.-lb	7.1
Turbocharger stay x Cylinder block (12H-T)	700	51	69
Turbocharger stay x Turbocharger (12H-T)	700	51	69
PCV pipe x Intake air connector (12H-T)	185	13	18
Cylinder head x Cylinder block	1,150	83	113
Valve rocker support x Cylinder head	185	13	18
Cylinder head cover x Cylinder head	70	69 in.-lb	6.9
Water outlet housing x Cylinder head	375	27	37
Exhaust manifold x Cylinder head	210	15	21
Intake manifold x Cylinder head	185	13	18
Fuel filter bracket x Cylinder head	375	27	37
Fuel pipe x Injection pump	280	20	28
Fuel hose x Injection pump (12H-T)	280	20	28
Glow plug x Cylinder head (2H)	125	9	12
Camshaft timing gear x Camshaft	450	33	44
Automatic timer drive gear x Automatic timer (12H-T)	230	17	23
No. 1 idle gear x Cylinder block	475	34	47
No. 2 idle gear x Cylinder block	475	34	47
Camshaft thrust plate x Cylinder block	375	27	37
Automatic timer x Injection pump	750	54	74
Timing gear cover x Timing gear case	250	18	25
Timing gear cover x Cylinder block	250	18	25
Injection pump retainer x Timing gear case	250	18	25
Oil pipe union bolt	185	13	25
Crankshaft pulley x Crankshaft	4,500	325	441
Push rod cover x Cylinder block	130	9	13
Connecting rod cap x Connecting rod	900	65	88
Main bearing cap x Cylinder block	1,390	100	136
Rear oil seal retainer x Cylinder block	185	13	18
Rear end plate x Cylinder block 12 mm head bolt	185	13	18
17 mm head bolt	650	47	64
Flywheel x Crankshaft (M/T)	1,200	87	118
Drive plate x Crankshaft (A/T)	1,000	72	98

FUEL SYSTEM

Specifications

Injection nozzle (2H)	Nozzle type	DN-NDOSDND 177	
	Nozzle opening pressure	See page A-2	
	Pressure adjusting shim thickness	1.00 mm	0.0394 in.
		1.05 mm	0.0413 in.
		1.10 mm	0.0433 in.
		1.15 mm	0.0453 in.
		1.20 mm	0.0472 in.
		1.25 mm	0.0492 in.
		1.30 mm	0.0512 in.
		1.35 mm	0.0531 in.
		1.40 mm	0.0551 in.
		1.45 mm	0.0571 in.
		1.50 mm	0.0591 in.
		1.55 mm	0.0610 in.
		1.60 mm	0.0630 in.
		1.65 mm	0.0650 in.
		1.70 mm	0.0669 in.
		1.75 mm	0.0689 in.
		1.80 mm	0.0709 in.
		1.85 mm	0.0728 in.
		1.90 mm	0.0748 in.
		1.95 mm	0.0768 in.
Injection Nozzle (12H-T)	Nozzle type	DN-DLLA 150P 24	
	Nozzle opening pressure	See page A-2	
	Pressure adjusting shim thickness	0.700 mm	0.0276 in.
		0.750 mm	0.0295 in.
		0.800 mm	0.0315 in.
		0.850 mm	0.0335 in.
		0.900 mm	0.0354 in.
		0.950 mm	0.0374 in.
		0.975 mm	0.0384 in.
		1.000 mm	0.0394 in.
		1.025 mm	0.0404 in.
		1.050 mm	0.0413 in.
		1.075 mm	0.0423 in.
		1.100 mm	0.0433 in.
		1.125 mm	0.0443 in.
		1.150 mm	0.0453 in.
		1.175 mm	0.0463 in.
		1.200 mm	0.0472 in.
		1.225 mm	0.0482 in.
		1.250 mm	0.0492 in.
		1.275 mm	0.0502 in.
		1.300 mm	0.0512 in.
		1.325 mm	0.0522 in.
		1.350 mm	0.0531 in.
		1.375 mm	0.0541 in.
		1.400 mm	0.0551 in.

Specifications (Cont'd)

Injection nozzle (12H-T) (Cont'd)	Pressure adjusting shim thickness		1.425 mm 1.450 mm 1.475 mm 1.500 mm 1.550 mm 1.600 mm 1.650 mm 1.700 mm 1.750 mm 1.800 mm	0.0561 in. 0.0571 in. 0.0581 in. 0.0591 in. 0.0610 in. 0.0630 in. 0.0650 in. 0.0669 in. 0.0689 in. 0.0709 in.
Feed pump	Suction test			
	Suction pipe	Inner diameter	8 mm	0.31 in.
		length	2 m	78.7 in.
		Suction height	1 m	39.4 in.
	Priming pump	at 60 stroke/ min.	Fuel must discharge within 25 strokes	
	Feed pump	at 150 rpm	Fuel must discharge within 40 seconds	
	Discharge test			
	Pressure	at 600 rpm	1.8 – 2.2 kg/cm^2 (26 – 31 psi, 177 – 216 kPa)	
	Discharge nozzle diameter		1.54 mm	0.0606 in.
	Volume	at 1,000 rpm	900 cc/min. (54.9 cu in./min.) or more	
Automatic timer (2H)	Drive gear thrust clearance			
		STD	0.010 – 0.200 mm	0.0004 – 0.0079 in.
		Limit	0.30 mm	0.0118 in.
	Drive gear thrust washer thickness		0.1 mm 0.2 mm	0.0004 in. 0.0008 in.
	Timer spring free length			
		Inner	37.8 mm	1.488 in.
		Outer	41.2 mm	1.622 in.
	Timer advance angle	at 640 rpm	0.5° or less	
		at 800 rpm	0.2 – 1.2°	
		at 1,100 rpm	1.5 – 2.5°	
		at 1,400 rpm	2.7 – 3.7°	
		at 1,680 rpm	4.0 – 5.0°	
	Timer adjusting shim thickness		0.1 mm 0.2 mm 0.3 mm 0.5 mm 1.0 mm	0.004 in. 0.008 in. 0.012 in. 0.020 in. 0.039 in.

Specifications (Cont'd)

Automatic timer (12H-T)	Drive gear thrust clearance		
	STD	0.010 – 0.200 mm	0.0004 – 0.0079 in.
	Limit	0.30 mm	0.0118 in.
	Drive gear thrust washer thickness	0.1 mm	0.004 in.
		0.35 mm	0.014 in.
		0.5 mm	0.020 in.
	Timer spring free length	58.8 mm	2.315 in.
	Timer advance angle at 1,450 rpm	0.5° or less	
	at 1,700 rpm	5.5 – 6.5°	
	Timer adjusting shim thickness	0.5 mm	0.020 in.
		0.6 mm	0.024 in.
		0.7 mm	0.028 in.
		0.8 mm	0.031 in.
		0.9 mm	0.035 in.
		1.0 mm	0.039 in.
Injection pump (2H M/T)	Direction of rotation	Clockwise as seen from drive side	
	Camshaft thrust clearance		
	STD	0.03 – 0.05 mm	0.0012 – 0.0020 in.
	Limit	0.1 mm	0.004 in.
	Camshaft thrust washer thickness	0.10 mm	0.0039 in.
		0.12 mm	0.0047 in.
		0.14 mm	0.0055 in.
		0.16 mm	0.0063 in.
		0.18 mm	0.0071 in.
		0.50 mm	0.0197 in.
	Control rack sliding resistance	120 g (4.2 oz) or less	
	Delivery valve spring free length	36.8 mm	1.449 in.
	Plunger spring free length	49.4 mm	1.945 in.
	Governor main spring free length	43.5 mm	1.713 in.
	Speed control spring free length	38.0 mm	1.496 in.
	HAC push rod stroke (w/ HAC)	3.1 – 3.6 mm	0.122 – 0.142 in.
Injection pump (2H A/T and 12H-T)	Direction of rotation	Clockwise as seen from drive side	
	Full stop cam thrust clearance	0.03 – 0.08 mm	0.0012 – 0.0032 in.
	Full stop cam thrust washer thickness	0.05 mm	0.0020 in.
		0.10 mm	0.0039 in.
		0.20 mm	0.0079 in.
	Steering lever thrust clearance	0.05 – 0.20 mm	0.0020 – 0.0079 in.
	Steering lever thrust washer thickness	0.50 mm	0.0197 in.
		0.55 mm	0.0217 in.
		0.60 mm	0.0236 in.
		0.65 mm	0.0256 in.
		0.70 mm	0.0276 in.
		0.75 mm	0.0295 in.
		0.80 mm	0.0315 in.
	Cam plate thrust clearance	0.08 – 0.12 mm	0.0031 – 0.0047 in.
	Cam plate thrust washer thickness	0.2 mm	0.008 in.
		0.3 mm	0.012 in.
		0.4 mm	0.016 in.
		0.5 mm	0.020 in.
	Floating arm thrust clearance	0.05 – 0.12 mm	0.0020 – 0.0047 in.
	Floating arm thrust washer thickness	0.05 mm	0.0020 in.
		0.10 mm	0.0039 in.
		0.20 mm	0.0079 in.
		0.40 mm	0.0157 in.

Specifications (Cont'd)

Injection pump 2H A/T and 12H-T (Cont'd)	Jointing bolt thrust clearance	1.5 – 2.0 mm	0.059 – 0.079 in.
	Sliding weight shaft fitting dimension	49.7 – 50.1 mm	1.957 – 1.972 in.
	Sliding weight shaft length	30.7 mm	1.209 in.
		30.9 mm	1.217 in.
		31.1 mm	1.224 in.
		31.3 mm	1.232 in.
		31.5 mm	1.240 in.
		31.7 mm	1.248 in.
		31.9 mm	1.256 in.
	Flyweight thrust clearance (12H-T M/T)	0.02 – 0.10 mm	0.0008 – 0.0039 in.
	Flyweight thrust washer thickness (12H-T M/T)	1.60 mm	0.0630 in.
		1.65 mm	0.0650 in.
		1.70 mm	0.0670 in.
		1.75 mm	0.0689 in.
		1.80 mm	0.0709 in.
		1.85 mm	0.0728 in.
		1.90 mm	0.0748 in.
		1.95 mm	0.0768 in.
		2.00 mm	0.0787 in.
		2.10 mm	0.0827 in.
		2.20 mm	0.0866 in.
		2.30 mm	0.0906 in.
	Stopper arm thrust clearance	0.05 – 0.20 mm	0.0020 – 0.0079 in.
	Stopper arm thrust washer thickness	0.1 mm	0.004 in.
		0.2 mm	0.008 in.
		0.5 mm	0.020 in.
	Camshaft thrust clearance STD	0.03 – 0.05 mm	0.0012 – 0.0020 in.
	Limit	0.1 mm	0.004 in.
	Camshaft thrust washer thickness		
	2H (Front and rear) and 12H-T (Rear)	0.10 mm	0.0039 in.
		0.12 mm	0.0047 in.
		0.14 mm	0.0055 in.
		0.16 mm	0.0063 in.
		0.18 mm	0.0071 in.
		0.50 mm	0.0197 in.
	12H-T (Front)	0.10 mm	0.0039 in.
		0.15 mm	0.0059 in.
		0.30 mm	0.0118 in.
		0.50 mm	0.0197 in.
		1.00 mm	0.0394 in.
		1.50 mm	0.0591 in.
	Control rack sliding resistance	120 g (4.2 oz.) or less	
	Delivery valve spring free length		
	2H	36.8 mm	1.449 in.
	12H-T	19.8 mm	0.780 in.
	Plunger spring free length	49.4 mm	1.945 in.
	Mechanical governor spring free length	10.2 mm	0.402 in.
	Speed control spring free length	24.0 mm	0.945 in.
	Inner idle spring free length	25.7 mm	1.012 in.
	Outer idle spring free length	23.8 mm	0.937 in.

Specifications (Cont'd)

Injection pump 2H A/T and 12H-T (Cont'd)	Boost compensator push rod stroke (12H-T)	4.0 – 5.0 mm 0.158 – 0.197 in.
	Boost compensator pressure drop (12H-T)	10 seconds or more
	Full-load stopper pre-setting	
	Stop cam to stopper housing distance	
	2H	Approx. 30.5 mm (1.201 in.)
	12H-T	Approx. 23.5 mm (0.925 in.)

Injection Pump Adjustment (Pump Body)

Preparations of pump tester	Test nozzle type		
	2H		DN 4 SD 24 A
	12H-T		DN 12 SD 12 A
	Test nozzle opening pressure		
	2H		115 – 125 kg/cm² (1,636 – 1,778 psi, 11,278 – 12,258 kPa)
	12H-T		170 – 180 kg/cm² (2,418 – 2,560 psi, 16,671 – 17,651 kPa)
	Injection pipe	Outer diameter	6.0 mm 0.236 in.
		Inner diameter	2.0 mm 0.079 in.
		Length	600 mm 23.6 in.
		Minimum bending radius	25 mm (0.98 in.) or more
	Fuel temperature		40 – 45°C 104 – 113°F
	Fuel feeding pressure		
	2H		0.5 kg/cm² 7.1 psi 49 kPa
	12H-T		2.0 kg/cm² 28.4 psi 196 kPa
Control Rack	Sliding resistance	Pump at 0 rpm	120 g (4.2 oz) or less
		Pump at 1,000 rpm	50 g (1.8 oz) or less
Injecting timing	Pre-stroke		
	2H		1.90 – 2.00 mm 0.0748 – 0.0787 in.
	12H-T		3.55 – 3.65 mm 0.1398 – 0.1437 in.
	Injection interval		59°30′ – 60°30′
	Tappet clearance		0.2 mm (0.008 in.) or more
	Adjusting shim thickness		0.10 mm 0.0039 in.
			0.15 mm 0.0059 in.
			0.20 mm 0.0079 in.
			0.30 mm 0.0118 in.
			0.40 mm 0.0158 in.
			0.50 mm 0.0197 in.
			0.60 mm 0.0236 in.
			0.70 mm 0.0276 in.
			0.80 mm 0.0315 in.
			0.90 mm 0.0354 in.
			1.00 mm 0.0394 in.

Injection Pump Adjustment (Pump Body) (Cont'd)

Injection timing (Cont'd)	Adjusting shim thickness (Cont'd)			1.10 mm 0.0433 in. 1.20 mm 0.0472 in. 1.30 mm 0.0519 in. 1.40 mm 0.0551 in.		
Injection volume	Item	Rack position mm (in.)	Pump rpm	Measuring strokes	Injection volume cc (cu in.)	Variation limit cc (cu in.)
	2H M/T (Cold weather spec. and Canada)	16.0 (0.630)	100	200	12.8 – 15.0 (0.78 – 0.92)	1.8 (0.11)
		8.0 (0.315)	1,000	200	4.1 – 5.3 (0.25 – 0.32)	0.6 (0.04)
		10.6 (0.417)	1,100	200	8.2 – 9.2 (0.50 – 0.56)	0.6 (0.04)
		10.6 (0.417)	1,700	200	8.5 – 10.1 (0.52 – 0.62)	0.9 (0.05)
		6.5 (0.256)	325	500	2.0 – 5.0 (0.12 – 0.31)	1.5 (0.09)
	2H M/T (Others)	16.0 (0.630)	100	200	9.8 – 12.0 (0.60 – 0.73)	1.8 (0.11)
		8.0 (0.315)	1,000	200	4.1 – 5.3 (0.25 – 0.32)	0.6 (0.04)
		10.6 (0.417)	1,100	200	8.2 – 9.2 (0.50 – 0.56)	0.6 (0.04)
		10.6 (0.417)	1 700	200	8.5 – 10.1 (0.52 – 0.62)	0.9 (0.05)
		6.5 (0.256)	325	500	2.0 – 5.0 (0.12 – 0.31)	1.5 (0.09)
	2H A/T (Cold weather spec. and Canada)	16.0 (0.630)	100	200	14.9 – 17.1 (0.91 – 1.04)	1.8 (0.11)
		11.3 (0.445)	1,100	200	8.8 – 9.8 (0.53 – 0.60)	0.6 (0.04)
		11.3 (0.445)	1,750	200	9.2 – 10.8 (0.56 – 0.66)	0.9 (0.05)
		7.9 (0.311)	390	500	2.5 – 5.5 (0.15 – 0.34)	1.5 (0.09)
	2H A/T (Others)	16.0 (0.630)	100	200	8.6 – 10.8 (0.52 – 0.60)	1.8 (0.11)
		11.3 (0.445)	1,100	200	8.8 – 9.8 (0.53 – 0.60)	0.6 (0.04)
		11.3 (0.445)	1,750	200	9.2 – 10.8 (0.56 – 0.66)	0.9 (0.05)
		7.9 (0.311)	390	500	2.5 – 5.5 (0.15 – 0.34)	1.5 (0.09)
	12H-T M/T (Cold weather spec.)	16.0 (0.630)	100	200	14.0 – 18.0 (0.85 – 1.10)	1.6 (0.10)
		10.7 (0.421)	1,100	200	11.3 – 12.3 (0.69 – 0.75)	0.9 (0.05)
		10.7 (0.421)	1,750	200	11.3 – 12.5 (0.69 – 0.76)	1.2 (0.07)
		8.9 (0.350)	340	500	3.0 – 6.5 (0.18 – 0.40)	1.5 (0.09)

Injection Pump Adjustment (Pump Body) (Cont'd)

Injection volume (Cont'd)	Item	Rack position mm (in.)	Pump rpm	Measuring strokes	Injection volume cc (cu in.)	Variation limit cc (cu in.)
	12H-T M/T (Others)	16.0 (0.630)	100	200	9.0 – 13.0 (0.55 – 0.79)	1.6 (0.10)
		10.7 (0.421)	1,100	200	11.3 – 12.3 (0.69 – 0.75)	0.9 (0.05)
		10.7 (0.421)	1,750	200	11.3 – 12.5 (0.69 – 0.76)	1.2 (0.07)
		8.9 (0.350)	340	500	3.0 – 6.5 (0.18 – 0.40)	1.5 (0.09)
	12H-T A/T	16.0 (0.630)	100	200	9.0 – 13.0 (0.55 – 0.79)	1.6 (0.10)
		10.7 (0.421)	1,100	200	11.3 – 12.3 (0.69 – 0.75)	0.9 (0.05)
		10.7 (0.421)	1,750	200	11.3 – 12.5 (0.69 – 0.76)	1.2 (0.07)
		8.9 (0.350)	390	500	0.75 – 4.75 (0.05 – 0.29)	1.5 (0.09)

Injection Pump Adjustment (Governor 2H M/T)

Vacuum chamber	Pressure drop		10 seconds or more
Main spring	Pump rpm	Vacuum mmH_2O ($in.H_2O$, kPa)	Rack position mm (in.)
	600	600 (23.62, 5.88)	10.3 – 10.9 (0.406 – 0.429)
	600	630 (24.80, 6.18)	10.1 – 10.7 (0.398 – 0.421)
	600	750 (29.53, 7.35)	7.3 – 8.9 (0.287 – 0.350)
	Adjusting shim thickness		0.5 mm 0.020 in. 1.0 mm 0.039 in. 2.0 mm 0.079 in. 3.0 mm 0.118 in.
Speed control spring	Pump rpm	Vacuum mmH_2O ($in.H_2O$, kPa)	Rack position mm (in.)
	1,920	450 (17.72, 4.41)	10.4 – 10.8 (0.409 – 0.425)
	2,000	450 (17.72, 4.41)	9.6 – 10.4 (0.378 – 0.409)
	2,050	450 (17.72, 4.41)	8.6 – 9.8 (0.339 – 0.386)
	2,100	530 (20.87, 5.20)	7.5 (0.295) or less
Idle spring	2,100	530 (20.87, 5.20)	8.0 (0.315)

Injection Pump Adjustment (Governor 2H M/T) (Cont'd)

Total injection volume	Item	Pump rpm	Vacuum mm H_2O (in. H_2O, kPa)	Measuring stroke	Total injection of each cylinder volume cc(cu in.)
	w/o HAC	700	60 (2.36, 0.59)	1,000	237 – 261 (14.5 – 15.9)
		1,100	150 (5.91, 1.47)	1,000	255 – 267 (15.6 – 16.3)
		1,700	400 (15.75, 3.92)	1,000	267 – 291 (16.3 – 17.8)
	w/ HAC	700	60 (2.36, 0.59)	1,000	237 – 261 (14.5 – 15.9)
		1,100	150 (5.91, 1.47)	1,000	255 – 267 (15.6 – 16.3)
		1,700	400 (15.75, 3.92)	1,000	258 – 282 (15.7 – 17.2)

Injection Pump Adjustment (Governor 2H A/T and 12H-T)

Idle speed control	Item	Adjusting lever position	Pump rpm	Rack position mm (in.)
	2H A/T	Idle	100	11.3 (0.445) or more
			390	7.7 – 7.9 (0.303 – 0.311)
			600	5.6 – 6.6 (0.220 – 0.260)
			800	5.1 – 5.9 (0.201 – 0.232)
			1,200	3.4 – 4.8 (0.134 – 0.189)
	12H-T M/T	Idle	100	12.9 – 13.7 (0.508 – 0.539)
			340	8.6 – 9.2 (0.339 – 0.362)
			500	6.9 – 8.3 (0.272 – 0.327)
			800	6.0 – 6.8 (0.236 – 0.268)
			1,200	4.3 – 5.7 (0.169 – 0.224)
	12H-T A/T	Idle	100	12.4 – 13.0 (0.488 – 0.512)
			390	8.7 – 9.3 (0.343 – 0.366)
			500	7.6 – 9.0 (0.299 – 0.354)
			800	5.4 – 6.2 (0.213 – 0.244)
			1,200	3.7 – 5.1 (0.146 – 0.201)
	Adjusting washer thickness		Inner	0.4 mm 0.016 in. 0.55 mm 0.022 in. 0.6 mm 0.024 in.
			Outer	0.2 mm 0.008 in. 0.4 mm 0.016 in. 0.5 mm 0.020 in. 0.6 mm 0.024 in.

Medium speed control	Item	Adjusting lever position	Pump rpm	Rack position mm (in.)
	2H A/T	Maximum	500	11.0 – 11.6 (0.433 – 0.457)
			1,100	11.1 – 11.5 (0.437 – 0.453)
			1,750	11.0 – 11.6 (0.433 – 0.457)
			1,900	11.4 – 11.2 (0.409 – 0.441)

Injection Pump Adjustment (Governor 2H A/T and 12H-T) (Cont'd)

Medium speed control (Cont'd)	Item	Adjusting lever position	Pump rpm	Rack position mm (in.)
	12H-T M/T	Maximum	500	10.3 – 11.1 (0.406 – 0.437)
			700	10.1 – 10.9 (0.398 – 0.429)
			1,100	10.4 – 11.0 (0.409 – 0.433)
			1,750	10.3 – 11.1 (0.406 – 0.437)
			1,900	9.8 – 10.6 (0.386 – 0.417)
	12H-T A/T	Maximum	500	10.3 – 11.1 (0.406 – 0.437)
			700	10.1 – 10.9 (0.398 – 0.429)
			1,100	10.4 – 11.0 (0.409 – 0.433)
			1,750	10.3 – 11.1 (0.406 – 0.437)
			1,900	10.1 – 10.9 (0.398 – 0.429)
Maximum speed control	2H A/T	Maximum	2,075	8.2 – 8.8 (0.323 – 0.346)
			2,200	5.5 (0.217) or less
	12H-T	Maximum	2,050	8.0 – 9.4 (0.315 – 0.370)
			2,200	6.4 (0.252) or less

Boost compensator (12H-T)	Adjusting lever position	Pump rpm	Boost compensator pressure kg/cm² (psi, kPa)	Rack position mm (in.)
	Maximum	500	0	9.8 – 10.4 (0.386 – 0.409)
			0.12 (1.7, 12)	10.3 – 11.1 (0.406 – 0.437)

Total injection volume	Item	Adjusting lever position	Boot compensator Pressure kg/cm² (psi, kPa)	Pump rpm	Measuring strokes	Total injection volume of each cylinder cc (cu in.)
	2H A/T	Maximum	—	500	1,000	210.0 – 264.0 (12.82 – 16.11)
				1,100	1,000	270.0 – 282.0 (16.48 – 17.21)
				1,750	1,000	288.0 – 318.0 (17.57 – 19.41)
	12H-T	Maximum	0.27 (3.9, 26)	500	1,000	198.0 – 234.0 (12.08 – 14.28)
			0.27 (3.9, 26)	1,100	1,000	345.0 – 363.0 (21.05 – 22.15)
			0.27 (3.9, 26)	1,750	1,000	339.0 – 375.0 (20.69 – 22.88)
			0	500	1,000	156.0 – 174.0 (9.52 – 10.62)

Stop lever	Item	Adjusting lever position	Pump rpm	Rack position mm (in.)
	2H A/T	Idle	0	2.0 (0.079) or less
	12H-T	Idle	0	7.5 (0.295) or less

Torque Specifications

Part tightened		kg-cm	ft-lb	N·m
Nozzle holder retaining nut x Nozzle holder body	2H	700	51	69
	12H-T	350	25	34
Injection nozzle x Cylinder head	2H	700	51	69
	12H-T	185	13	18
Nozzle leakage pipe x Injection nozzle	2H	500	36	49
	12H-T	125	9	12
Injection pipe x Injection nozzle		300	22	29
Chamber plug x Feed pump housing	19 mm bolt head	500	36	49
	32 mm bolt head	1,500	109	147
Priming pump x Feed pump housing		500	36	49
Feed pump x Injection pump		95	82 in.-lb	9.3
Fuel pipe x Feed pump		280	20	27
Automatic timer x Injection pump		750	54	74
Steel ball guide x Camshaft (2H M/T)		550	40	54
Flyweight x Camshaft (2H A/T and 12H-T)		550	40	54
Injection pump retainer x Injection pump		375	27	37
Injection pump x Timing gear case		250	18	25
Fuel pipe x Injection pump		280	20	27
Fuel hose x Injection pump (12H-T)		280	20	27
Oil pipe union bolt		185	13	18

COOLING SYSTEM

Specifications

Engine coolant capacity		See page A-2
Thermostat	Valve opening temperature	
	82°C type	80 – 84°C 176 – 183°F
	88°C type	86 – 90°C 187 – 194°F
	Valve opening travel	
	82°C type at 95°C (203°F)	10 mm (0.39 in.) or more
	88°C type at 100°C (212°F)	10 mm (0.39 in.) or more
Radiator	Relief valve opening pressure	
	STD	0.75 – 1.05 kg/cm² (10.7 – 14.9 psi, 74 – 103 kPa)
	Limit	0.6 kg/cm² 8.5 psi 59 kPa

Torque Specifications

Part tightened	kg-cm	ft-lb	N·m
Water pump cover x Water pump body	185	13	18
Water pump x Cylinder block	375	27	37
Water outlet x Water outlet housing	185	13	18

LUBRICATION SYSTEM

Specifications

Engine oil capacity			See page A-2	
Oil pressure		at idle	0.3 kg/cm² (4.3 psi, 29 kPa) or more	
		at 3,000 rpm	2.5 – 6.0 kg/cm² (36 – 85 psi, 245 – 588 kPa)	
Oil Pump	Rotor body clearance	STD	0.144 – 0.219 mm	0.0057 – 0.0086 in.
		Limit	0.40 mm	0.0157 in.
	Rotor side clearance	STD	0.035 – 0.090 mm	0.0014 – 0.0035 in.
		Limit	0.15 mm	0.0059 in.
	Rotor tip clearance	STD	0.110 – 0.240 mm	0.0043 – 0.0094 in.
		Limit	0.30 mm	0.0118 in.
	Drive spline to rotor backlash			
		STD	0.541 – 0.790 mm	0.0213 – 0.0311 in.
		limit	1.00 mm	0.0394 in.

Torque Specifications

Part tightened	kg-cm	ft-lb	N·m
Engine drain plug	400	29	39
Plug of oil pump relief valve	500	36	49
Timing gear case x Cylinder block	250	18	25
Timing gear case x Injection pump retainer	250	18	25
Oil strainer x Main bearing cap	185	13	18
Oil strainer x Timing gear case	185	13	18
Oil pipe x Cylinder block	450	33	44
Oil pipe x Timing gear case	185	13	18
Oil pan x Cylinder block	130	9	13
Oil pan x Timing gear case	130	9	13
Oil pan x Rear oil seal retainer	130	9	13
Oil cooler x Oil cooler case	250	18	25
Oil cooler case x Cylinder block	185	13	18
Oil filter bracket x Oil cooler case	185	13	18
Plug of oil cooler relief valve	500	36	49
Oil nozzle x Cylinder block	275	20	27

STARTING SYSTEM

Pre-heating system	Light lighting time			
	2H (Super glow type)	at 20°C (68°F)	Approx. 2 seconds	
	2H (Fixed delay type)		15 – 19.5 seconds	
	12H-T w/ Water temp. sensor disconnected			
		12V type	20 seconds	
		24V type	14 seconds	
Starter	Rated voltage and output power		12 V 2.5 kw	24 V 4.5 kw
	No-load characteristic	Ampere	180 A or less at 11 V	90 A or less at 23 V
		rpm	3,500 rpm or more	←
	Brush length	STD	20.5 mm 0.807 in.	←
		Limit	13.0 mm 0.512 in.	←
	Spring installed load	STD	3.2 – 4.0 kg (7.1 – 8.8 lb, 31 – 39 N)	←
	Commutator			
	Outer diameter	STD	36 mm 1.42 in.	←
		Limit	35 mm 1.38 in.	←
	Undercut depth	STD	0.7 mm 0.028 in.	←
		Limit	0.2 mm 0.008 in.	←
	Circle runout	Limit	0.05 mm 0.0020 in.	←

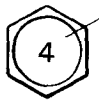
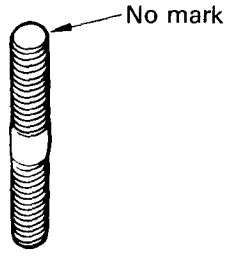
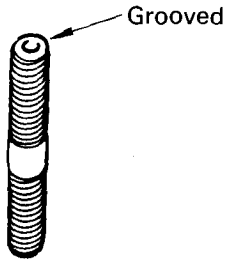
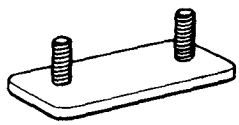
CHARGING SYSTEM

Battery specific gravity			See page A-2	
Drive belt tension or deflection			See page A-2	
Alternator	Rated output		12 V 40 A	
			12 V 55 A	
			12 V 80 A	
			24 V 25 A	
			24 V 30 A	
			24 V 40 A	
	Rotor coil resistance			
	w/o IC regulator	12V type	3.9 – 4.1 Ω	
		24V type	18.8 – 19.2 Ω	
	w/ IC regulator	12V type	2.8 – 3.0 Ω	
		24V type	8.8 – 9.2 Ω	
	Slip ring diameter	STD	32.3 – 32.5 mm	1.272 – 1.280 in.
		Limit	32.1 mm	1.264 in.
	Brush exposed length	STD	20.0 mm	0.787 in.
		Limit	5.5 mm	0.217 in.
Alternator regulator	Regulating voltage at 25°C (77°F)			
	w/o IC regulator	12V type	13.8 – 14.8 V	
		24V type	27.0 – 29.0 V	
	w/ IC regulator	12V type	13.8 – 14.4 V	
		24V type	27.9 – 28.5 V	

STANDARD BOLT TORQUE SPECIFICATIONS

STANDARD BOLT TORQUE SPECIFICATIONS

HOW TO DETERMINE BOLT STRENGTH

	Mark	Class		Mark	Class
Hexagon head bolt	 Bolt head No. 4– 5– 6– 7–	4T 5T 6T 7T	Stud bolt		4T
	 No mark	4T			
Hexagon flange bolt w/washer hexagon bolt	 No mark	4T			6T
Hexagon head bolt	 Two protruding lines	5T			
Hexagon flange bolt w/washer hexagon bolt	 Two protruding lines	6T	Welded bolt		4T
Hexagon head bolt	 Three protruding lines	7T			

SPECIFIED TORQUE FOR STANDARD BOLTS

Class	Diameter mm	Pitch mm	Torque specifications					
			Hexagon head bolt			Hexagon flange bolt		
			kg-cm	ft-lb	N·m	kg-cm	ft-lb	N·m
4T	6	1	55	48 in.-lb	5.4	60	52 in.-lb	5.9
	8	1.25	130	9	13	145	10	14
	10	1.25	260	19	25	290	21	28
	12	1.25	480	35	47	540	39	53
	14	1.5	760	55	75	850	61	83
	16	1.5	1,150	83	113		–	
5T	6	1	65	56 in.-lb	6.4		–	
	8	1.25	160	12	16		–	
	10	1.25	330	24	32		–	
	12	1.25	600	43	59		–	
	14	1.5	930	67	91		–	
	16	1.5	1,400	101	137		–	
6T	6	1	80	69 in.-lb	7.8	90	78 in.-lb	8.8
	8	1.25	195	14	19	215	16	21
	10	1.25	400	29	39	440	32	43
	12	1.25	730	53	72	810	59	79
	14	1.5		–		1,250	90	123
7T	6	1	110	8	11	120	9	12
	8	1.25	260	19	25	290	21	28
	10	1.25	530	38	52	590	43	58
	12	1.25	970	70	95	1,050	76	103
	14	1.5	1,500	108	147	1,700	123	167
	16	1.5	2,300	166	226		–	

SST AND SSM

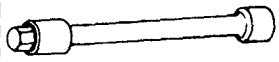
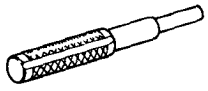
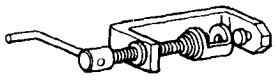
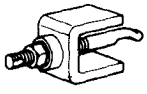
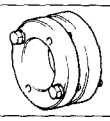
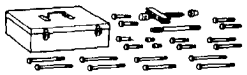
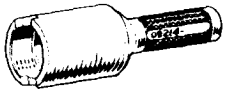
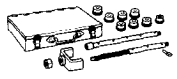
SST (SPECIAL SERVICE TOOLS)

NOTE: Classification

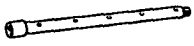
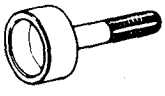
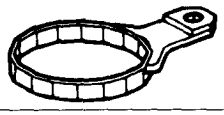
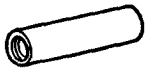
A = SST required for vehicle inspections and minor repairs and multipurpose SST.

B = SST required for major repairs involving disassembly of components.

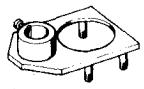
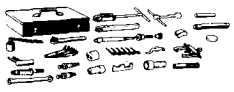
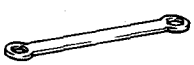
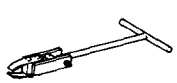
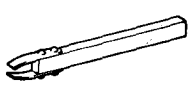
C = SST required for rather special, less frequent work not of classifiable as either A or B.

Section / Classification / Part Name / Part No. / Illustration				EM	FU	CO	LU	ST
	09032-00100	Oil Pan Seal Cutter	A				●	
	09043-38100	Hexagon 10 mm Wrench	A		●			
	09201-60011	Valve Guide Bushing Remover & Replacer	A	●				
	09202-43013	Valve Spring Compressor	A	●				
	09208-48010	Combustion Chamber Remover	B	●				
	09213-58011	Crankshaft Pulley Holding Tool	A	●				
	09213-60017	Crankshaft Pulley Puller	A	●				
	09214-76011	Crankshaft Pulley Replacer	B	●				
	09215-00100	Camshaft Bearing Remover & Replacer	C	●				
	(09215-00120)	(Gate "A")		●				
	(09215-00130)	(Bolt)		●				

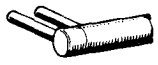
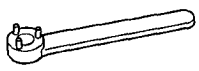
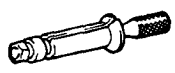
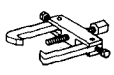
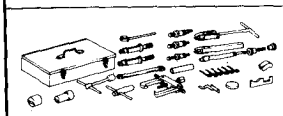
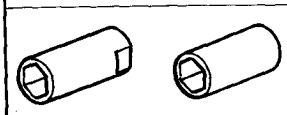
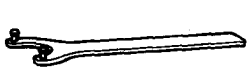
SST (SPECIAL SERVICE TOOLS) (Cont'd)

Section / Classification / Part Name / Part No. / Illustration				EM	FU	CO	LU	ST
	(09215-00140)	(Nut)		●				
	(09215-00150)	(Shaft "A")		●				
	(09215-00160)	(Pin)		●				
	(09215-00210)	(Remover & Replacer)		●				
	(09215-00280)	(Remover & Replacer)		●				
	09222-66010	(Connecting Rod Bushing Remover & Replacer)	B	●				
	09223-56010	(Crankshaft Rear Oil Seal Replacer)	B	●				
	09228-34010	(Oil Filter Wrench)	A		●			
	09228-60010	(Oil Filter Wrench)	A				●	
	09236-00101	(Water Pump Overhaul Tool Set)	B			●		
	(09237-00010)	(Water Pump Bearing Remover & Replacer)				●		
	(09237-00020)	(Bearing Stay)				●		
	(09237-00030)	(Bearing Stay)				●		
	(09237-00040)	(Shaft "A")				●		

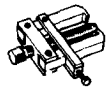
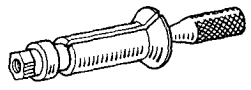
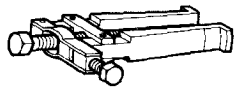
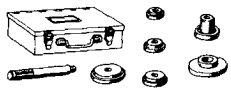
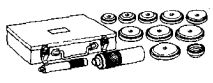
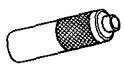
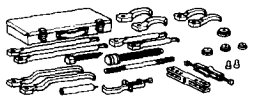
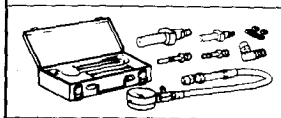
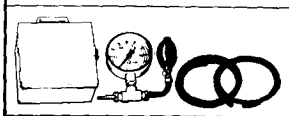
SST (SPECIAL SERVICE TOOLS) (Cont'd)

Section / Classification / Part Name / Part No. / Illustration				EM	FU	CO	LU	ST
	09241-76022	(Injection Pump Stand Set)	C		●			
	09245-78010	(Injection Pump Stand Arm)	C		●			
	09260-47010	(Injection Pump Tool Set)	C	●	●			
	(09260-78010)	(Round Nut Wrench)			●			
	(09260-78020)	(Screw Plug Wrench)			●			
	(09262-76010)	(Delivery Valve Gasket Replacer)			●			
	(09267-76011)	(Automatic Timer Extractor)			●			
	(09267-76020)	(Automatic Timer Remover)		●	●			
	(09270-76010)	(Delivery Valve Holder Wrench)			●			
	(09271-76011)	(Delivery Valve Extractor)			●			
	(09272-76011)	(Tappet Roller Clamp)			●			
	(09273-76011)	(Tappet Clamp)			●			
	(09274-46011)	(Tappet Insert)			●			
	(09275-46010)	(Plunger Clamp)			●			

SST (SPECIAL SERVICE TOOLS) (Cont'd)

Section / Classification / Part Name / Part No. / Illustration			EM	FU	CO	LU	ST
	(09280-46010)	(Plunger Spring Holder)		●			
	(09282-76010)	(Idle Adjusting Wrench)		●			
	(09283-46010)	(Tappet Gauge Holder Attachment)		●			
	(09283-76010)	(Fuel Stop Capsule Lock Nut Wrench)		●			
	(09285-76010)	(Injection Pump Camshaft Bearing Cone Replacer)		●			
	(09286-76011)	(Injection Pump Camshaft Bearing Cup Puller)		●			
	(09287-58010)	(Injection Pump Camshaft Bearing Puller)		●			
	(09288-46011)	(Tappet Adjusting Gauge)		●			
	(09289-00010)	(Injection Pump Camshaft Bearing Cup Replacer)		●			
	09260-58010	(Injection Pump Tool Set)	C	●			
	(09267-76030)	(Camshaft Bushing Remover)		●			
	09268-64010	(Injection Nozzle Wrench Set)	B	●			
	09278-54012	(Drive Shaft Holding Tool)	B	●		●	
	09283-76020	(DHAC Bellows Lock Nut Wrench)	A	●			

SST (SPECIAL SERVICE TOOLS) (Cont'd)

Section / Classification / Part Name / Part No. / Illustration				EM	FU	CO	LU	ST
	09285-76010	(Injection Camshaft Bearing Cone Replacer)	C					●
	09286-46011	(Injection Pump Spline Shaft Puller)	C					●
	09286-78010	(Bearing Cup Remover)	C		●			
	09308-10010	(Oil Seal Puller)	A	●				
	09330-00021	(Companion Flange Holding Tool)	A	●				
	09608-12010	(Front Hub & Drive Pinion Bearing Replacer Set)	B		●			
	(09608-00040)	(Front Hub Outer Bearing Cup Replacer)			●			
	09608-35014	(Axle Hub & Drive Pinion Bearing Tool Set)	B	●			●	
	(09608-06040)	(Front Hub Inner Bearing Cone Replacer)		●			●	
	09950-20017	(Universal Puller)	A	●			●	
	09992-00023	(Cylinder Compression Check Gauge Set)	A	●				
	09992-00241	(Turbocharger Pressure Gauge)	C	●				

SSM (SPECIAL SERVICE MATERIALS)

Part Name	Part No.	Sec.	Use etc.
Seal packing black or equivalent	08826-00080	LU	Engine oil pan and stiffening plate