

SST & SERVICE SPECIFICATIONS

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10-2 SST & SERVICE SPECIFICATIONS – SST

SST (SPECIAL SERVICE TOOL)**ENGINE TUNE-UP****Oil Filter**

Illustration	Tool No.	Tool Name
	09228-44010	Oil Filter Wrench

Fuel Filter

Illustration	Tool No.	Tool Name
	09228-34010	Oil Filter Wrench

Compression Pressure

Illustration	Tool No.	Tool Name
	09992-00020	Cylinder Compression Check Gage Set

ENGINE SERVICE**Cylinder Head**

Illustration	Tool No.	Tool Name
	09201-60011	Valve Stem Guide Remover & Replacer

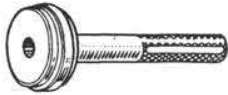
SST & SERVICE SPECIFICATIONS – SST**10–3****Cylinder Head (Cont'd)**

Illustration	Tool No.	Tool Name
	09202-43011	Valve Spring Compressor
	09208-48010	Precombustion Chamber Remover
	09260-46011	Injection Pump Tool Set
	(09268-46011)	(Nozzle Holder Body Wrench)

Timing Gear

Illustration	Tool No.	Tool Name
	09213-31021	Crankshaft Pulley Puller
	09213-60015	Crankshaft Pulley & Gear Puller
	09214-60010	Crankshaft Pulley & Gear Replacer
	09223-46010	Crankshaft Front Oil Seal Replacer

10-4 **SST & SERVICE SPECIFICATIONS – SST****Cylinder Block**

Illustration	Tool No.	Tool Name
	09215-56010	Camshaft Bearing Remover & Replacer
	09218-56010	Cylinder Liner Remover & Replacer
	09221-46010	Piston Pin Remover & Replacer
	09222-66010	Connecting Rod Bushing Remover & Replacer
	09223-56010	Crankshaft Rear Oil Seal Replacer
	09303-35010	Input Shaft Front Bearing Puller
	09304-30012	Input Shaft Front Bearing Replacer

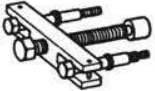
LUBRICATION SYSTEM**Oil Filter**

Illustration	Tool No.	Tool Name
	09228-44010	Oil Filter Wrench

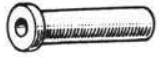
SST & SERVICE SPECIFICATIONS – SST

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Oil Pump

Illustration	Tool No.	Tool Name
	09213-31021	Crankshaft Pulley Puller
	09213-60015	Crankshaft Pulley & Gear Puller
	09214-60010	Crankshaft Pulley & Gear Replacer

COOLING SYSTEM**Water Pump**

Illustration	Tool No.	Tool Name
	09235-60010	Water Pump Pulley Seat Puller
	09236-36010	Water Pump Overhaul Tool
	09238-48010	Water Pump Bearing Remover & Replacer

FUEL SYSTEM**Fuel Filter**

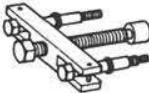
Illustration	Tool No.	Tool Name
	09228-34010	Oil Filter Wrench

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SST & SERVICE SPECIFICATIONS – SST**Injection Nozzle**

Illustration	Tool No.	Tool Name
	09260-46011	Injection Pump Tool Set
	(09268-46011)	(Nozzle Holder Body Wrench)
	(09268-46021)	(Nozzle Holder Retaining Nut Wrench)

Automatic Timer

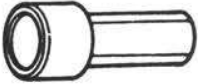
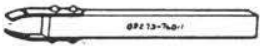
Illustration	Tool No.	Tool Name
	09213-31021	Crankshaft Pulley Puller
	09213-36010	Timing Gear Remover
	09214-60010	Crankshaft Pulley & Gear Replacer
	09238-76010	Water Pump Bearing Replacer
 	09260-76015 (09280-76010)	Injection Pump Tool Set (Automatic Timer Spring Holder)

SST & SERVICE SPECIFICATIONS – SST**10–7****Injection Pump**

Illustration	Tool No.	Tool Name
	09241-76021	Injection Pump Stand Set
	09260-46011	Injection Pump Tool Set
	(09266-46011)	(Round Nut Wrench)
	(09274-46010)	(Tappet Insert)
	(09275-46010)	(Plunger Clamp)
	(09278-46010)	(Spline Shaft Holding Tool)
	(09280-46010)	(Plunger Spring Holder)
	(09283-46010)	(Tappet Holder Attachment Gage)

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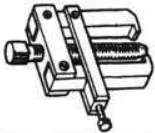
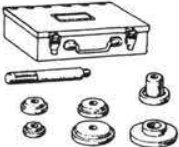
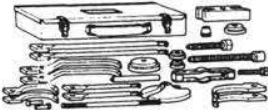
SST & SERVICE SPECIFICATIONS – SST**Injection Pump (Cont'd)**

Illustration	Tool No.	Tool Name
	09260-76015	Injection Pump Tool Set
	(09262-76010)	(Delivery Valve Gasket Replacer)
	(09266-67011)	(Fly Weight Round Nut Wrench)
	(09267-76011)	(Automatic Timer Extractor)
	(09271-76011)	(Delivery Valve Extractor)
	(09272-76011)	(Tappet Roller Clamp)
	(09273-76011)	(Tappet Clamp)
	(09276-76010)	(T Type Box Wrench)
	(09282-76010)	(Idling Adjust Wrench)
	09285-76010	Injection Camshaft Bearing Cone Replacer

SST & SERVICE SPECIFICATIONS – SST

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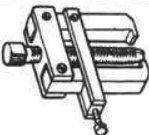
Injection Pump (Cont'd)

Illustration	Tool No.	Tool Name
	09286-46011	Injection Pump Spline Shaft Puller
	09286-76011	Injection Pump Camshaft Bearing Cup Puller
	09287-76010	Injection Pump Camshaft End Play Micrometer
	09288-46011	Tappet Adjusting Gage
	09608-12010	Front Hub & Drive Pinion Bearing Replacer
	09950-20011	Universal Puller

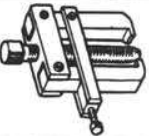
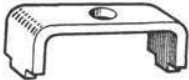
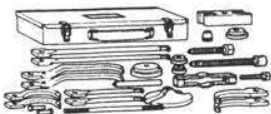
STARTING SYSTEM**Starter**

Illustration	Tool No.	Tool Name
	09285-76010	Injection Camshaft Bearing Cone Replacer

10-10 SST & SERVICE SPECIFICATIONS – SST
Starter (Cont'd)

Illustration	Tool No.	Tool Name
	09286-46011	Injection Pump Spline Shaft Puller

CHARGING SYSTEM
Alternator (Conventional Type)

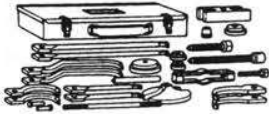
Illustration	Tool No.	Tool Name
	09286-46011	Injection Pump Spline Shaft Puller
	09333-55011	Wrench (55 x 32 mm)
	09841-56010	Alternator Stand
	09950-20011	Universal Puller

Alternator (Heavy Duty Type)

Illustration	Tool No.	Tool Name
	09325-12010	Transmission Oil Plug

SST & SERVICE SPECIFICATIONS – SST 10–11

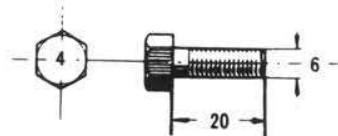
Alternator (Heavy Duty Type)

Illustration	Tool No.	Tool Name
	09950-20011	Universal Puller

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SST & SERVICE SPECIFICATIONS – Standard Bolt Tightening Torque**STANDARD BOLT TIGHTENING TORQUE**

9 1 1 1 1 - 4 0 6 2 0 ————— Part Number
 ————— Length of Bolt: 20 mm
 ————— Basic Major Dia. of Thread:
 6 mm
 ————— Bolt Head Mark *



* Bolt Head Mark has the following indications.

SPECIFIED TORQUE FOR STANDARD BOLT

Class	Basic Dia. mm	Pitch mm	Torque Limit kg-m (ft-lb)
4T	6	1	0.4 – 0.6 (3 – 4)
	8	1.25	1.0 – 1.6 (8 – 11)
	10	1.25	1.9 – 3.1 (14 – 22)
	10	1.5	1.8 – 3.0 (14 – 21)
	12	1.25 (ISO)	3.5 – 5.5 (26 – 39)
	12	1.5	3.5 – 5.0 (26 – 36)
	12	1.75	3.0 – 5.0 (22 – 36)
	13	1.5	4.5 – 7.0 (33 – 50)
	14	1.5	5.0 – 8.0 (37 – 57)
	14	2	4.7 – 7.7 (34 – 55)
	16	1.5	7.5 – 11.0 (55 – 79)
5T	16	2	7.1 – 10.6 (52 – 76)
	6	1	0.6 – 0.9 (5 – 6)
	8	1.25	1.5 – 2.2 (11 – 15)
	10	1.25	3.0 – 4.5 (22 – 32)
	10	1.5	2.7 – 4.2 (20 – 30)
	12	1.25 (ISO)	5.0 – 8.0 (37 – 57)
	12	1.5	5.0 – 7.0 (37 – 50)
	12	1.75	4.8 – 6.8 (35 – 49)
	13	1.5	6.5 – 9.0 (48 – 65)
	14	1.5	7.5 – 11.0 (55 – 79)
	14	2	7.0 – 10.5 (51 – 75)
6T	16	1.5	12.0 – 17.0 (87 – 122)
	16	2	11.5 – 16.5 (84 – 119)
	6	1	0.6 – 0.9 (5 – 6)
	8	1.25	1.5 – 2.2 (11 – 15)
	10	1.25	3.0 – 4.5 (22 – 32)
	10	1.5	2.7 – 4.2 (20 – 30)
	12	1.25 (ISO)	5.0 – 8.0 (37 – 57)
	12	1.5	5.0 – 7.0 (37 – 50)
	12	1.75	4.8 – 6.8 (35 – 49)

SST & SERVICE SPECIFICATIONS – Standard Bolt Tightening Torque

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SPECIFIED TORQUE FOR STANDARD BOLT (Cont'd)

Class	Basic Dia. mm	Pitch mm	Torque Limit kg-m (ft-lb)
7T	6	1	0.8 – 1.2 (6 – 8)
	8	1.25	2.0 – 3.0 (15 – 21)
	10	1.25	4.0 – 5.5 (29 – 39)
	10	1.5	3.7 – 5.2 (27 – 37)
	12	1.25 (ISO)	7.5 – 10.5 (55 – 75)
	12	1.5	7.0 – 9.0 (51 – 65)
	12	1.75	6.0 – 8.5 (44 – 61)
	13	1.5	8.0 – 12.0 (58 – 86)
	14	1.5	10.0 – 15.0 (73 – 108)
	14	2	9.5 – 14.0 (69 – 101)
	16	1.5	15.0 – 23.0 (109 – 166)
	16	2	14.0 – 22.0 (102 – 159)

– Note –

The above specified tightening torque is applicable only for female threads cut into a steel material.

If the female threads are cut into materials other than steel, and tightening surface is subjected to heat or vibrations, these specified tightening torque values would not be applicable.

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SST & SERVICE SPECIFICATIONS – Main Parts Tightening Torque, Service Specifications

MAIN PARTS TIGHTENING TORQUE

Tightening Parts	Torque	
	kg-m	ft-lb
Cylinder head	11.5 – 12.0	84 – 87
Valve rocker support	1.0 – 1.6	8 – 11
Manifold	1.5 – 2.2	11 – 15
Camshaft x Camshaft gear	3.0 – 4.5	22 – 32
Camshaft thrust plate	1.0 – 1.6	8 – 11
Idle gear	4.0 – 5.5	29 – 39
Timing gear cover	8 mm bolt	11 – 15
	10 mm bolt	22 – 32
Crankshaft pulley	20.0 – 24.0	145 – 173
Crankshaft bearing cap	9.8 – 11.2	71 – 81
Connecting rod cap	6.5 – 7.5	48 – 54
Flywheel	11.5 – 12.5	84 – 90
Nozzle holder x Cylinder head	6.0 – 8.0	44 – 57
Nozzle retaining nut	6.0 – 8.0	44 – 57
Injection pipe union nut	1.0 – 1.6	8 – 11
Delivery valve holder	2.5 – 3.5	19 – 25

SERVICE SPECIFICATIONS

ENGINE TUNE-UP

Coolant capacity (W/Heater)				
	B engine	13.0 ℓ	13.7 US qt	11.4 Imp.qt
	2B engine	14.0 ℓ	14.8 US qt	12.3 Imp.qt
Drive belt deflection (Crank pulley x Alternator)				
	B engine	10 – 13 mm (0.4 – 0.5 in.) at 10 kg (22 lb)		
	2B engine	8 – 11 mm (0.3 – 0.4 in.) at 10 kg (22 lb)		
Battery specific gravity		1.25 – 1.27 at 20°C (68°F)		
Engine oil capacity	Total	7.3 ℓ	7.7 US qt	6.4 Imp.qt
	Crankcase	5.4 ℓ	5.7 US qt	4.8 Imp.qt
Engine oil pressure (Idling)		0.8 kg/cm ²		11.4 psi
Compression pressure	STD	30.0 kg/cm ²		427 psi
	Limit	20.0 kg/cm ²		284 psi
	Variation limit between cylinders	2.0 kg/cm ²		28 psi
Injection order		1 – 3 – 4 – 2		
Injection timing (Stationary)		10°BTDC		
Valve clearance (Hot)	Intake	0.20 mm		0.008 in.
	Exhaust	0.36 mm		0.014 in.
Idle speed		625 – 675 rpm		
Maximum speed (No load)		4050 – 4100 rpm		

SST & SERVICE SPECIFICATIONS – Service Specifications**10–15****ENGINE****Cylinder Head**

Underside surface warpage limit	0.05 mm	0.0020 in.
Manifold mounting surface warpage limit	0.2 mm	0.008 in.
Valve seat	Contact width	1.2 – 1.6 mm
	Contact angle	45°
	Refacing angles	15°, 45°, 75°

Valve Guide Bushing

Overall length	62 mm	2.44 in.
Projected length (From valve spring contact surface)	16.6 – 17.4 mm	0.654 – 0.685 in.
Valve guide inside diameter	9.01 – 9.03 mm	0.3547 – 0.3555 in.
Valve stem to guide bushing clearance (Oil clearance)		
	Limit	Intake
		Exhaust
	STD	Intake
		Exhaust

Valve

Head outside diameter	Intake	44.8 – 45.2 mm	1.764 – 1.780 in.
	Exhaust	37.3 – 37.7 mm	1.469 – 1.484 in.
Overall length	Intake	127.95 mm	5.0374 in.
	Exhaust	127.75 mm	5.0295 in.
Stem tip resurfacing limit		0.5 mm	0.020 in.
Stem outside diameter	Intake	8.97 – 8.99 mm	0.3531 – 0.3539 in.
	Exhaust	8.95 – 8.97 mm	0.3524 – 0.3531 in.
Valve face angle		45°	
Head margin thickness limit	Intake	0.9 mm	0.035 in.
	Exhaust	1.0 mm	0.039 in.

Valve Spring

Free height		45.5 mm	1.791 in.
Installed height	Intake	39.6 mm	1.559 in.
	Exhaust	39.5 mm	1.555 in.
Installed tension	Limit	23.1 kg	50.9 lb
	STD	Intake	25.5 kg
		Exhaust	26.0 kg
Tilt limit		2.0 mm	0.079 in.

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SST & SERVICE SPECIFICATIONS – Service Specifications**Valve Rocker Shaft & Arm**

Shaft diameter limit		18.44 mm	0.7260 in.
Rocker arm bore limit		18.60 mm	0.7323 in.
Oil clearance	Limit	0.1 mm	0.004 in.
	STD	0.02 – 0.06 mm	0.0008 – 0.0024 in.

Manifold

Cylinder head mounting surface warpage limit		0.4 mm	0.016 in.
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Combustion Chamber

Protrusion amount		0 – 0.10 mm	0 – 0.0039 in.
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Timing & Idle Gear

Gear backlash			
Idle gear to cam gear, timer drive gear	Limit	0.3 mm	0.012 in.
	STD	0.06 – 0.09 mm	0.0024 – 0.0035 in.
Crankshaft gear to idle gear	Limit	0.3 mm	0.012 in.
	STD	0.06 – 0.10 mm	0.0024 – 0.0039 in.
Idle gear thrust clearance	Limit	0.3 mm	0.012 in.
	STD	0.08 – 0.20 mm	0.0031 – 0.0079 in.
Idle gear oil clearance	Limit	0.3 mm	0.012 in.
	STD	0.04 – 0.09 mm	0.0016 – 0.0035 in.
Idle gear bore	STD	45.00 – 45.03 mm	1.7717 – 1.7728 in.
Idle gear shaft diameter	Limit	44.91 mm	1.7681 in.
	STD	44.94 – 44.96 mm	1.7693 – 1.7701 in.

Valve Lifter & Push Rod

Lifter diameter	STD	23.96 – 23.98 mm	0.9433 – 0.9441 in.
Lifter to block bore clearance	Limit	0.1 mm	0.004 in.
(Oil clearance)	STD	0.02 – 0.06 mm	0.0008 – 0.0024 in.
Push rod bend limit		0.5 mm	0.020 in.

SST & SERVICE SPECIFICATIONS – Service Specifications**10–17****Camshaft & Bearing**

Circle run out limit		0.04 mm	0.0016 in.
Thrust clearance	Limit	0.3 mm	0.012 in.
	STD	0.06 – 0.13 mm	0.0024 – 0.0051 in.
Oil clearance	Limit	0.1 mm	0.004 in.
	STD	0.03 – 0.07 mm	0.0012 – 0.0028 in.
Cam height	Limit	39.0 mm	1.535 in.
	STD	39.47 – 39.56 mm	1.5539 – 1.5575 in.
Journal diameter	No.1	47.16 – 47.18 mm	1.8567 – 1.8575 in.
	No.2	46.96 – 46.98 mm	1.8488 – 1.8496 in.
	No.3	46.76 – 46.78 mm	1.8409 – 1.8417 in.

Cylinder Block

Upperside surface warpage limit		0.05 mm	0.0020 in.	
Valve lifter bore	STD	24.00 – 24.02 mm	0.9449 – 0.9457 in.	
Cylinder bore	STD	B Engine	95.00 – 95.03 mm	3.7402 – 3.7413 in.
		2B Engine	98.00 – 98.03 mm	3.8583 – 3.8594 in.
Liner	Max. wear limit	0.3 mm	0.012 in.	
	Pressing force	5000 kg	11000 lb	
	Protrusion	0.01 – 0.10 mm	0.0004 – 0.0039 in.	
	Shim thickness	0.05 mm	0.002 in.	
		0.10 mm	0.004 in.	

Piston, Piston Pin & Piston Ring

Piston diameter	STD	B Engine	94.88 – 94.91 mm	3.7354 – 3.7366 in.
		2B Engine	97.88 – 97.91 mm	3.8535 – 3.8547 in.
	O/S 1.00	B Engine	95.88 – 95.91 mm	3.7748 – 3.7760 in.
		2B Engine	98.88 – 98.91 mm	3.8929 – 3.8941 in.
Piston to cylinder clearance			0.11 – 0.13 mm	0.0043 – 0.0051 in.
Piston pin diameter			29.00 – 29.01 mm	1.1417 – 1.1421 in.
Piston pin fitting temperature			60°C	140°F
Piston ring end gap	No.1	B Engine	0.35 – 0.55 mm	0.0138 – 0.0217 in.
		2B Engine	0.40 – 0.60 mm	0.0157 – 0.0236 in.
	No.2		0.30 – 0.50 mm	0.0118 – 0.0197 in.
	Oil ring		0.30 – 0.50 mm	0.0118 – 0.0197 in.
Piston ring to groove clearance	No.1		0.03 – 0.07 mm	0.0012 – 0.0028 in.
	No.2		0.04 – 0.08 mm	0.0016 – 0.0031 in.
	Oil ring		0.03 – 0.07 mm	0.0012 – 0.0028 in.

10-18 SST & SERVICE SPECIFICATIONS – Service Specifications**Connecting Rod**

Large end thrust clearance	Limit	0.3 mm	0.012 in.
	STD	0.08 – 0.20 mm	0.0031 – 0.0079 in.
Bushing to pin clearance	Limit	0.05 mm	0.0020 in.
	STD	0.004 – 0.012 mm	0.0002 – 0.0005 in.

Crankshaft

Circle run out limit		0.06 mm	0.0024 in.
Thrust clearance	Limit	0.3 mm	0.012 in.
	STD	0.07 – 0.18 mm	0.0028 – 0.0071 in.
Main journal oil clearance	Limit	0.1 mm	0.004 in.
	STD	0.03 – 0.07 mm	0.0012 – 0.0028 in.
Journal diameter	STD	69.98 – 70.00 mm	2.7551 – 2.7559 in.
	U/S 0.25	69.74 – 69.75 mm	2.7457 – 2.7461 in.
	U/S 0.50	69.49 – 69.50 mm	2.7358 – 2.7362 in.
	U/S 1.00	68.99 – 69.00 mm	2.7161 – 2.7165 in.
Journal and crankpin	Tapered limit	0.02 mm	0.0008 in.
	Out-of-round limit	0.02 mm	0.0008 in.
Crankpin oil clearance	Limit	0.1 mm	0.004 in.
	STD	0.03 – 0.07 mm	0.0012 – 0.0028 in.
Crankpin diameter	STD	58.98 – 59.00 mm	2.3220 – 2.3228 in.
	U/S 0.25	58.74 – 58.75 mm	2.3126 – 2.3130 in.
	U/S 0.50	58.49 – 58.50 mm	2.3028 – 2.3031 in.
	U/S 1.00	57.99 – 58.00 mm	2.2831 – 2.2835 in.

Flywheel

Run out limit	0.2 mm	0.008 in.
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LUBRICATION SYSTEM**Oil Pump**

Body clearance	Limit	0.2 mm	0.008 in.
	STD	0.06 – 0.15 mm	0.0024 – 0.0059 in.
Tip clearance			
Driven gear to crescent	Limit	0.3 mm	0.012 in.
	STD	0.15 – 0.21 mm	0.0059 – 0.0083 in.
Drive gear to crescent	Limit	0.3 mm	0.012 in.
	STD	0.22 – 0.25 mm	0.0087 – 0.0098 in.
Side clearance	Limit	0.15 mm	0.0059 in.
	STD	0.03 – 0.09 mm	0.0012 – 0.0034 in.

SST & SERVICE SPECIFICATIONS – Service Specifications**10–19****COOLING SYSTEM****Water Pump**

Bearing fitting temperature	80°C	176°F
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Radiator

Overall coolant capacity (W/Heater)	B Engine	13.0 ℓ	13.7 US qt	11.4 Imp.qt
	2B Engine	14.0 ℓ	14.8 US qt	12.3 Imp.qt
Coolant capacity		3.3 ℓ	3.5 US qt	2.9 Imp.qt
Radiator cap valve opening pressure	Limit	0.6 kg/cm ²	8.5 psi	
	STD	0.75 – 1.05 kg/cm ²	10.7 – 14.9 psi	

Thermostat

Full open temperature	95°C	203°F	100°C	212°F
Valve opening temperature	80.5° – 83.5°C		86.5° – 89.5°C	
	177° – 182°F		188° – 193°F	
Valve lift	10 mm	0.39 in.	10 mm	0.39 in.

FUEL SYSTEM**Injection Nozzle & Nozzle Holder**

Nozzle opening pressure	New nozzle	115 – 125 kg/cm ²	1636 – 1778 psi
	Reused nozzle	105 – 125 kg/cm ²	1493 – 1778 psi
	Injection angle	About 4°	
Adjusting shim thickness (For adjusting nozzle opening pressure)		1.00 ... 1.95 mm	0.0394 ... 0.0768 in.
		[20 sizes in 0.05 mm (0.0020 in.) increment]	

Fuel Pump Performance Test

Suction test	Suction pipe spec.	Inner dia.	8 mm	0.31 in.
		Length	2 m	78.7 in.
	Suction height		1 m	39.4 in.
	Feed pump		Fuel must discharge within 40 seconds at 150 rpm.	
	Priming pump		Fuel must discharge within 25 strokes at 60 strokes/min.	
Discharge test	Discharge nozzle dia.		1.54 mm	0.0606 in.
	Pressure at 600 rpm		1.8 – 2.2 kg/cm ²	25.6 – 31.3 psi
	Volume at 1000 rpm		More than 900 cc/min.	54.9 cu.in./min.

10-20 SST & SERVICE SPECIFICATIONS – Service Specifications
Fuel Feed Pump

Housing to piston clearance	0.009 – 0.013 mm	0.0004 – 0.0005 in.
Housing to push rod clearance	0.003 – 0.006 mm	0.0001 – 0.0002 in.
Feed pump tappet stroke (Max.)	8 mm	0.31 in.
Priming pump stroke	25 mm	0.98 in.

Automatic Timer

Timer fitting temperature	60°C	140°F
Timer advance angle	Advance begins ($\leq 0.5^\circ$)	
500 rpm	2.0 – 3.0°	
700 rpm	4.5 – 5.5°	
900 rpm	6.0 – 7.0°	
1200 rpm	8.0 – 9.0°	
1600 rpm	8.0 – 9.0°	
1700 rpm	8.0 – 9.0°	
Timer spring adjusting shim thickness (For both inner and outer)	0.1, 0.2, 0.5 mm	0.004, 0.008, 0.020 in.

Injection Pump

Direction of rotation	Clockwise as seen from drive side	
Cam lift	8 mm	0.31 in.
Injection order	1 – 3 – 4 – 2	
Control rack sliding resistance		
Pump stopped	Less than 150 g	5.3 oz
Pump at 1,000 rpm	Less than 50 g	1.8 oz
Pre-stroke	Control rack at 8 mm (0.31 in.)	1.9 – 2.0 mm 0.075 – 0.079 in.
Injection interval	89.5 – 90.5°	
Tappet clearance	More than 0.2 mm	0.008 in.
Tappet adjusting shim thickness	0.1 ... 1.5 mm	0.004 ... 0.059 in. [15 sizes in 0.1 mm (0.004 in.) increment]
Camshaft thrust clearance	Limit	0.1 mm 0.004 in.
	STD	0.03 – 0.05 mm 0.0012 – 0.0020 in.
Camshaft adjusting shim thickness	0.10, 0.12, 0.14, 0.16, 0.18, 0.50 mm 0.0039, 0.0047, 0.0055, 0.0063, 0.0071, 0.0197 in.	
Tappet overall looseness limit	0.3 mm	0.012 in.
Plunger spring	Free length	49.4 mm 1.944 in.
	Installed length	44.0 mm 1.732 in.
	Installed load	15.1 kg 33.3 lb
Delivery valve spring	Free length	37.0 mm 1.457 in.
	Installed length	25.9 mm 1.020 in.
	Installed load	4.42 kg 9.74 lb

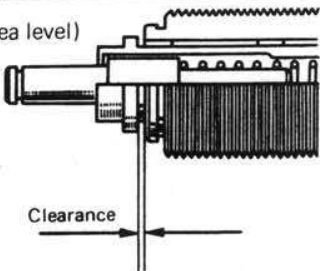
SST & SERVICE SPECIFICATIONS – Service Specifications

10–21

Combined Governor

Main spring	Free length	45.6 mm	1.795 in.
	Installed length	35.0 mm	1.378 in.
	Installed load	0.95 kg	33.5 oz
Adjusting shim thickness		0.5, 1.0, 2.0, 3.0 mm 0.020, 0.039, 0.079, 0.118 in.	
Speed control spring	Free length	38.0 mm	1.496 in.
	Installing length	27.0 mm	1.063 in.
	Installing load	3.30 kg	7.28 lb

Diesel Altitude Compensator (DAC)

		0.2 – 0.5 mm	0.008 – 0.020 in.
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INJECTION PUMP ADJUSTMENT & TEST**Preparations of Pump Tester**

Nozzle type	DN 4 SD-24		
Nozzle	Opening pressure	120 – 130 kg/cm ²	(1707 – 1849 psi)
Injection pipe	Outer diameter	6 mm	(0.24 in.)
	Inner diameter	2 mm	(0.08 in.)
	Length	600 mm	(23.62 in.)
	Minimum bending radius	More than 25 mm	(0.98 in.)
Fuel temperature	40 – 45°C		
	(104 – 113°F)		
Fuel feeding pressure	0.5 kg/cm ²		
	(7.1 psi)		

Control Rack Sliding Resistance

Pump rpm	Sliding Resistance	
0	Less than 150 g	(5.3 oz)
1000	Less than 50 g	(1.8 oz)

Injection Timing

Pre-stroke	1.9 – 2.0 mm	0.075 – 0.079 in.
	[Control rack position at 8 mm (0.31 in.)]	
Injection Interval	90° ± 30°	
Tappet clearance	More than 0.2 mm	0.008 in.

10-22 SST & SERVICE SPECIFICATIONS – Service Specifications
**Injection Volume Adjustment
(For B Engine)**

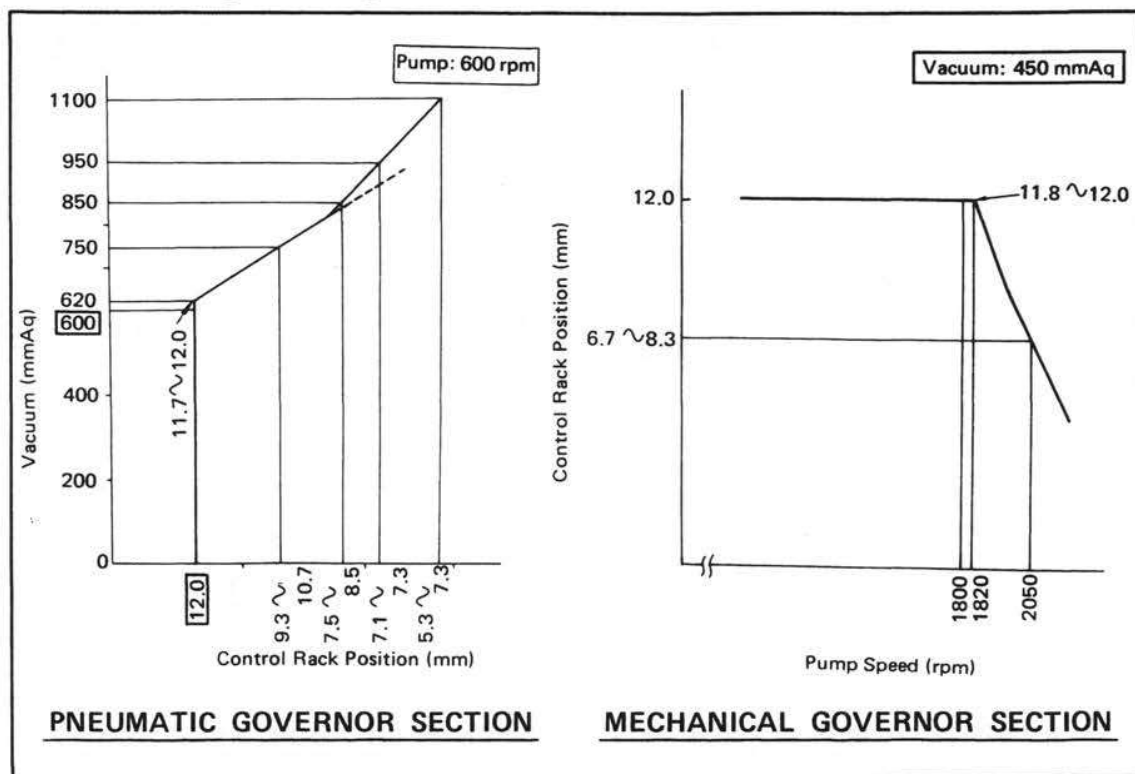
Rack Position	Pump rpm	Measuring Strokes	Injection Volume	Variation Limit
16.0 mm (0.630 in.)	100	200	14.0 – 16.0 cc (0.854 – 0.976 cu.in.)	1.2 cc (0.073 cu.in.)
12.0 mm (0.472 in.)	1100	200	10.6 – 11.2 cc (0.647 – 0.683 cu.in.)	0.4 cc (0.024 cu.in.)
8.6 mm (0.330 in.)	1000	200	4.6 – 5.6 cc (0.281 – 0.342 cu.in.)	0.4 cc (0.024 cu.in.)
6.5 mm (0.256 in.)	300	500	2.5 – 4.5 cc (0.153 – 0.275 cu.in.)	1.0 cc (0.061 cu.in.)

(For 2B Engine)

Rack Position	Pump rpm	Measuring Strokes	Injection Volume	Variation Limit
16.0 mm (0.630 in.)	100	200	14.0 – 16.0 cc (0.854 – 0.976 cu.in.)	1.2 cc (0.073 cu.in.)
11.9 mm (0.469 in.)	1100	200	11.0 – 11.6 cc (0.671 – 0.708 cu.in.)	0.4 cc (0.024 cu.in.)
8.0 mm (0.315 in.)	1000	200	4.3 – 5.1 cc (0.262 – 0.311 cu.in.)	0.4 cc (0.024 cu.in.)
6.5 mm (0.256 in.)	300	500	2.5 – 4.5 cc (0.153 – 0.275 cu.in.)	1.0 cc (0.061 cu.in.)

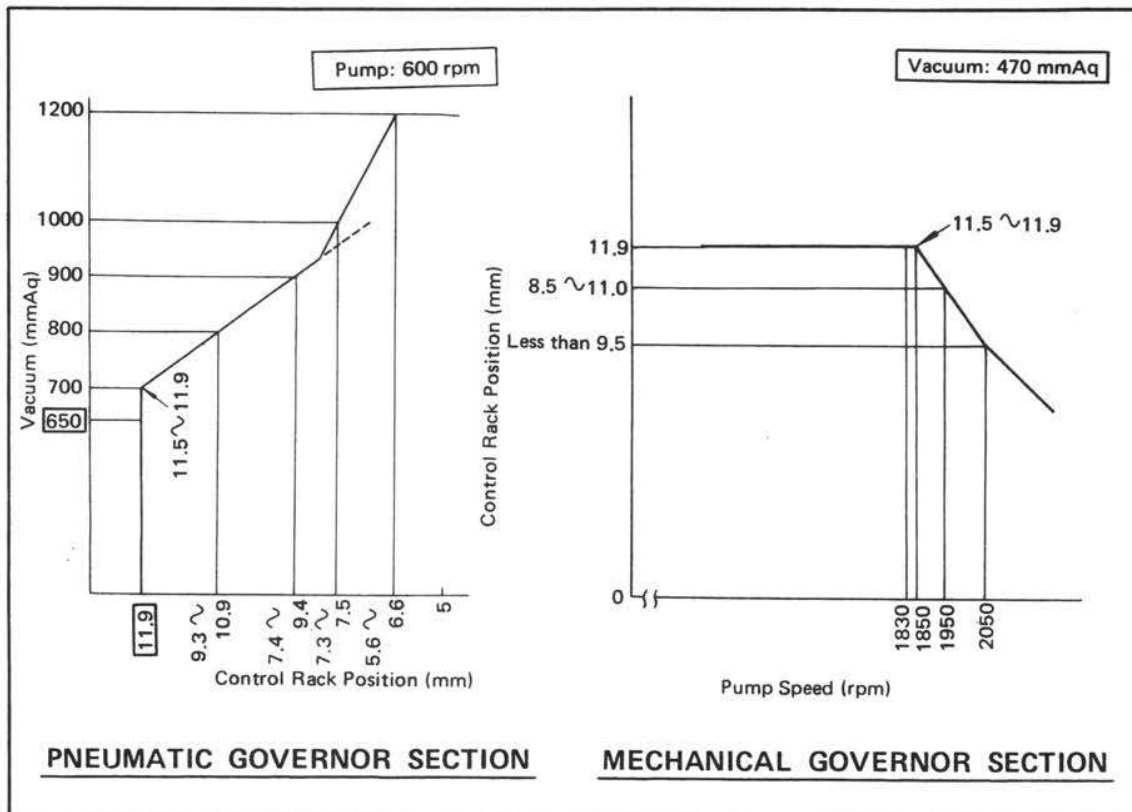
Pressure Test

Plunger pressure	More than 150 kg/cm ² (2133 psi) [Pump speed . . . 200 rpm, Rack position . . . 6.5 mm (0.256 in.)]
Delivery valve pressure	More than 5 seconds for holder internal pressure to drop 10 kg/cm ² (142 psi) [Internal pressure . . . More than 150 kg/cm ² (2133 psi), Rack position . . . 0 mm]

SST & SERVICE SPECIFICATIONS – Service Specifications**10-23****COMBINED GOVERNOR ADJUSTMENT & TEST****Characteristic Diagram (B Engine)****Governor Adjustment (B Engine)**

Tests & Adjustments	Pump Speed rpm	Vacuum mm Aq (in.Aq)	Rack Position mm (in.)	Time second
Governor air tightness	600	500 → 480 (19.69 → 18.90)	—	10 (Minimum)
Control rack initial set	600	600 (23.62)	12.0 (0.472)	—
Main spring	600	620 (24.41) 750 (29.53)	11.7 – 12.0 (0.461 – 0.472) 9.3 – 10.7 (0.366 – 0.421)	—
Idling spring capsule	600	850 (33.46) 950 (37.40) 1100 (43.31)	7.5 – 8.5 (0.295 – 0.335) 7.1 – 7.3 (0.280 – 0.287) 5.3 – 7.3 (0.209 – 0.287)	—
Speed control spring	1800 1820 2050	450 (17.72)	12.0 (0.472) 11.8 – 12.0 (0.465 – 0.472) 6.7 – 8.3 (0.264 – 0.327)	—

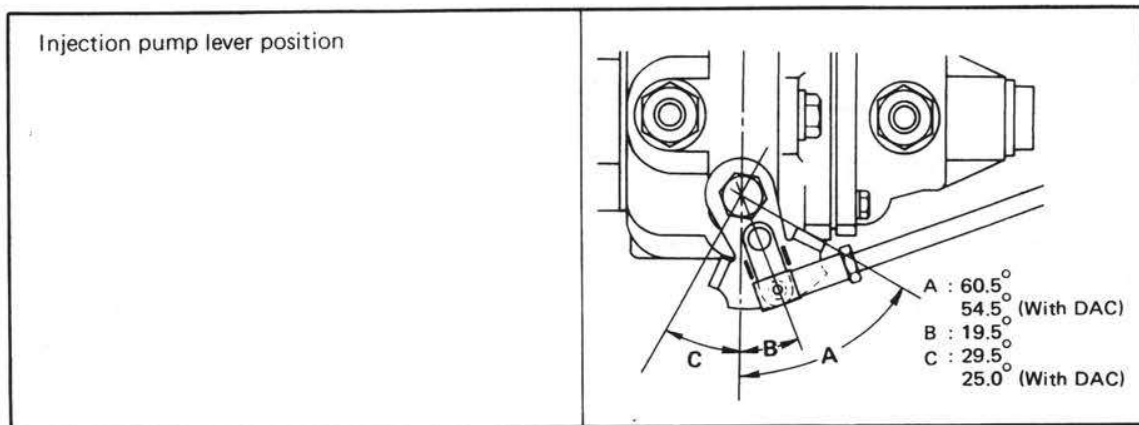
10-24

SST & SERVICE SPECIFICATIONS – Service Specifications**Characteristic Diagram (2B Engine)****Governor Adjustment (2B Engine)**

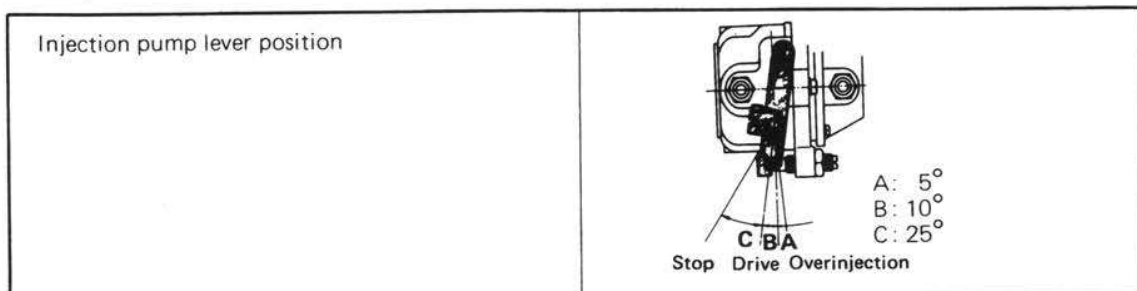
Tests & Adjustments	Pump Speed rpm	Vacuum mm Aq (in. Aq)	Rack Position mm (in.)	Time second
Governor air tightness	600	500 → 480 (19.69 → 18.90)	—	10 (Minimum)
Control rack initial set	600	650 (25.59)	11.9 (0.469)	—
Main spring	600	700 (27.56) 800 (31.50) 900 (35.43)	11.5 – 11.9 (0.453 – 0.469) 9.3 – 10.9 (0.366 – 0.429) 7.4 – 9.4 (0.291 – 0.370)	—
Idling spring capsule	600	1000 (39.37) 1200 (47.24)	7.3 – 7.5 (0.287 – 0.295) 5.6 – 6.6 (0.220 – 0.260)	—
Speed control spring	1830 1850 1950 2050	470 (18.50)	11.9 (0.469) 11.5 – 11.9 (0.453 – 0.469) 8.5 – 11.0 (0.335 – 0.433) ≤ 9.5 (0.374)	—

SST & SERVICE SPECIFICATIONS – Service Specifications**10–25****Total Injection Volume**

Engine Model	Pump rpm	Vacuum	Measuring Strokes	Total Injection Volume
B	1100	120 mm Aq (4.72 in.Aq)	500	106.0 – 110.0 cc (6.47 – 6.71 cu.in.)
B (For ECE)				101.0 – 105.0 cc (6.16 – 6.41 cu.in.)
2B		200 mm Aq (7.87 in.Aq)		111.0 – 115.0 cc (6.77 – 7.02 cu.in.)

EDIC (ELECTORICAL DIESEL INJECTION CONTROL) SYSTEM**Operational Check****STARTING SYSTEM****Preheating System**

Item	12V Type	24V Type
Glow time at 0°C (32°F)	About 20 seconds	About 15 seconds
Load current	7.7 – 10.3 A	4.1 – 5.5 A
Glow plug resistance	0.2 Ω	0.9 Ω

Overinjection Magnet (Operational Check)

10-26 SST & SERVICE SPECIFICATIONS – Service Specifications**Starter**

Type		12V type	24V type
Rated output		2.5 kw	4.5 kw
No load characteristics		180 A max. and 3500 rpm min. at 11V	90 A max. and 3500 rpm min. at 23V
Mica depth	Limit	0.2 mm	0.008 in.
	STD	0.5 – 0.8 mm	0.020 – 0.031 in.
Commutator run out	Limit	0.05 mm	0.002 in.
	STD	Less than 0.02 mm	0.001 in.
Commutator outside diameter	Limit	34 mm	1.34 in.
	STD	35 mm	1.38 in.
Brush length	Limit	13 mm	0.51 in.
	STD	19 mm	0.75 in.
Brush spring tension	STD	3.2 – 4.0 kg	7.1 – 8.8 lb

CHARGING SYSTEM**Alternator**

Type	12V – 35 A	24V – 15A	24V – 20A	24V – 65A
Maximum output	35A, 14V	15A, 28V	20A, 28V	65A, 28V
Rotor coil resistance	4.2 Ω	19.0 Ω	19.0 Ω	19.0 Ω
Brush exposed length	Limit	5.5 mm	0.217 in.	
	STD	12.5 mm	0.492 in.	

Alternator Regulator

Type	12V type	24V type
Regulating voltage	13.8 – 14.8V	27 – 29V
Voltage relay actuating voltage	4 – 5.8V	8 – 11.6V

