

ENGINE - SPECS**COMMON SPECS & PROCEDURES**

FORESTER COMMON SPECIFICATIONS & PROCEDURES

System		Specification/Procedure
Air Conditioning		
Service		SPECIFICATION
Torque		See Torque Specifications in text or applicable graphics under COMPONENT
Axle Shaft Nut (Front)		162 Ft. Lbs. (22.4 kgf-m, 220 N.m)
Axle Shaft Nut (Rear)		140 Ft. Lbs. (19.4 kgf-m, 190 N.m)
Battery		BATTERY
Brakes		
Bleeding Sequence		RR, LR, RF, LF AIR BLEEDING
Disc Brakes		
Front	FRONT DISC BRAKE ASSEMBLY	See Torque Specifications in text or applicable graphics under
Rear	REAR DISC BRAKE ASSEMBLY	
Torque		
Front	FRONT DISC BRAKE ASSEMBLY	
Rear	REAR DISC BRAKE ASSEMBLY	
Charging		
Generator		GENERATOR
Drive Belts		
Belt Routing & Adjustment		
H4DO	V-BELT	V-BELT
H4DOTC		

Engine Cooling	
H4DO	
General Service Specifications	SPECIFICATION
Radiator Cap Pressure	14-18 psi (.95-1.25 kg/cm ²)
Thermostat R & I	THERMOSTAT
Water Pump R & I	WATER PUMP
H4DOTC (Turbocharged)	
General Service Specifications	SPECIFICATION
Radiator Cap Pressure	14-18 psi (.95-1.25 kg/cm ²)
Thermostat R & I	THERMOSTAT
Water Pump R & I	WATER PUMP
Engine Mechanical	
Compression (at 200-300 RPM)	
H4DO	152-203 psi (1050-1400 kPa, 11-14 kgf/cm ²)
H4DOTC	142-171 psi (981-1177 kPa, 10-12 kgf/cm ²)
Oil Pressure	At Idle Speed: 7 psi (.5 kg/cm ²) or more At 6000 RPM: 51 psi (3.6 kg/cm ² or more
Overhaul	
H4DO	PREPARATION FOR OVERHAUL
H4DOTC	PREPARATION FOR OVERHAUL
Torque	See Torque Specifications in text or applicable graphics under.
H4DO	ENGINE MECHANICAL (H4DO)
H4DOTC	ENGINE MECHANICAL (H4DOTC)
Fluid Specifications	See FLUIDS under MAINTENANCE tab. From within Manager or Service Writer, click the "30/60/90 Interval" or "Maint."

		button.
Flywheel/Flex Plate (Drive Plate) Torque		22.1 Ft. Lbs. (30 N.m) Plus additional 30-35 degrees
Fuel System		
Fuel Pressure Test Procedure		
H4DO	INSPECTION	
H4DOTC	INSPECTION	
Fuel Pressure Specification		49-58 psi (340-400 kPa)
Fuel Filter Location		In-Tank Type as part of Fuel Pump Module
Fuel Filter R & I		
H4DO	FUEL FILTER	
H4DOTC	FUEL FILTER	
Ignition		
Firing Order & Cylinder Identification		FIRING ORDER & CYLINDER IDENTIFICATION
Spark Plug		
H4DO		
Type		NGK: SILZKAR7B11
Gap		0.039-0.043 in. (1.0-1.1 mm)
Torque		12.9 Ft. Lbs. (17.5 N.m)
H4DOTC		
Type	NGK: ILKAR8H6	
Gap	0.020-0.022 in. (0.50-0.55 mm)	
Torque	12.9 Ft. Lbs. (17.5 N.m)	
Starting		
Starter		STARTER
Torque		INSTALLATION
Wheel Alignment		
Adjustment Specifications		
Front		WHEEL ALIGNMENT
Rear		WHEEL ALIGNMENT
Torque		

Front	FRONT SUSPENSION
Rear	REAR SUSPENSION
Wheel & Tire	
Wheel Lug Nut Torque	88.5 Ft. Lbs. (120 N.m)

SPECIFICATION [General Description]

Engine	Model		2.5 L	
	Cylinder arrangement		Horizontally opposed, liquid cooled, 4-cylinder, 4-stroke gasoline engine	
	Valve system mechanism		Chain driven, double overhead camshaft, 4-valve/cylinder	
	Bore x Stroke	mm (in)	94.0 x 90.0 (3.70 x 3.54)	
	Displacement	cm ³ (cu in)	2, 498 (152.43)	
	Compression ratio		10	
	Compression pressure (at 200 - 300 rpm)	kPa (kg/cm ² , Standard psi)	1, 050 - 1, 400 (11 - 14, 152 - 203)	
	Number of piston rings		Compression ring: 2 Oil ring: 1	
	Intake valve timing	Open	Max. retard	ATDC 16°
			Min. advance	BTDC 39°
		Close	Max. retard	ABDC 80°
			Min. advance	ABDC 25°
	Exhaust valve timing	Open	BBDC 35°	
		Open	ATDC 13°	
	Cam clearance	mm (in)	Intake	Standard 0.13 ^{+0.02} -0.03 (0.0051 ^{+0.0008} -0.0012)
Exhaust			Standard 0.22±0.02 (0.0087±0.0008)	

Idle speed (For CVT model, select lever in "P" or "N" range. For MT model, gear shift lever in neutral position.)	rpm	No load	Standard	CVT model: 675±100 MT model: 650±100
		A/C ON	Standard	850±100
Ignition order				1 → 3 → 2 → 4
Ignition timing		BTDC/rpm	Standard	CVT model: 16° ±10°/675 MT model: 16° ±10°/650

**NOTE:**

OS: Oversize

US: Undersize

Camshaft	Bending		mm (in)	Limit	0.020 (0.00079)
	Cam lobe height	mm (in)	Intake	Standard	40.34 - 40.44 (1.558 - 1.592)
			Exhaust	Standard	39.66 - 39.76 (1.561 - 1.565)
	Cam base circle diameter		mm (in)	Standard	34.0 (1.339)
	Journal outer diameter		mm (in)	Standard	25.946 - 25.963 (1.0215 - 1.0222)
	Thrust clearance		mm (in)	Standard	0.068 - 0.116 (0.0027 - 0.0047)
	Oil clearance		mm (in)	Standard	0.037 - 0.072 (0.0015 - 0.0028)
Cylinder head	Warpage (mating surface with cylinder block)		mm (in)	Limit	0.020 (0.0008)
	Grinding limit			mm (in)	To 98.4 (3.874)
	Height		mm (in)	Standard	98.5 (3.878)
	Valve overall length	mm (in)	Intake		104.95 (4.132)
			Exhaust		96.5 (3.799)
	Valve head edge thickness	mm (in)	Intake	Standard	0.8 - 1.2 (0.031 - 0.047)
			Exhaust	Standard	1.0 - 1.4 (0.039 - 0.055)

Valve & valve guide	Valve stem outer diameter	mm (in)	Intake	Standard	5.455 - 5.470 (0.2148 - 0.2154)
			Exhaust	Standard	5.445 - 5.460 (0.2144 - 0.2150)
	Valve guide inner diameter		mm (in)	Standard	5.500 - 5.512 (0.2165 - 0.2170)
	Clearance between valve and valve guide	mm (in)	Intake	Standard	0.030 - 0.057 (0.0012 - 0.0022)
			Exhaust	Standard	0.040 - 0.065 (0.0016 - 0.0026)
Valve guide protrusion amount			mm (in)	Standard	11.4 - 11.8 (0.449 - 0.465)
Valve & valve shim	Valve stem end outer diameter	mm (in)	Intake	Standard	5.455 - 5.470 (0.2148 - 0.2154)
			Exhaust	Standard	5.445 - 5.460 (0.2148 - 0.2150)
	Valve shim inner diameter		mm (in)	Standard	5.500 - 5.560 (0.2165 - 0.2189)
	Clearance between valve and valve shim	mm (in)	Intake	Standard	0.030 - 0.105 (0.0012 - 0.0041)
			Exhaust	Standard	0.040 - 0.115 (0.0016 - 0.0045)
Valve seat	Seating width between valve and valve seat	mm (in)	Intake	Standard	0.8 - 1.6 (0.031 - 0.063)
			Exhaust	Standard	1.1 - 1.7 (0.043 - 0.067)
	Seating angle between valve and valve seat				45°
Seating position between valve and valve seat				Valve face center	
Valve spring	Free length		mm (in)	Standard	41.68 (1.641)
	Tension/spring height	N (kgf, lb)/mm (in)	Set	Standard	182 - 210 (18.56 - 21.41, 40.92 - 47.22)/33.0 (1.299)
			Lift	Standard	520 - 554 (53.02 - 56.49, 116.92 - 124.56)/22.0 (0.866)
	Squareness			Standard	2.5°, 1.8 mm (0.071 in) or less

	Cylinder block warpage (Mating surface with cylinder head)	mm (in)	Limit	0.025 (0.00098)
	Grinding limit of cylinder block	mm (in)		To 204.9 (8.067)

Cylinder block & piston	Height of cylinder block		mm (in)	Standard	205.0 (8.071)	
	Inner diameter of cylinder liner	mm (in)	Cylinder bore size mark A	Standard	94.005 - 94.015 (3.7010 - 3.7014)	
			Cylinder bore size mark B	Standard	93.995 - 94.005 (3.7006 - 3.7010)	
	Out-of-roundness of cylinder liner		mm (in)	Limit	0.030 (0.0012)	
	Cylindricity of cylinder liner		mm (in)	Limit	0.015 (0.0006)	
	Piston grade point				133 (0.52)	
	Piston outer diameter	mm (in)	Standard Size	Grade A	Standard	93.980 - 93.990 (3.7000 - 3.7004)
				Grade B	Standard	93.970 - 93.980 (3.6996 - 3.7000)
			0.25 (0.0098) OS		Standard	94.220 - 94.240 (3.7094 - 3.7102)
			0.50 (0.0197) OS		Standard	94.470 - 94.490 (3.7193 - 3.7201)
	Clearance between cylinder liner and piston		mm (in)	Standard	0.015 - 0.035 (0.00059 - 0.00138)	
Inner diameter of cylinder liner boring limit (diameter)			mm (in)	To 94.505 (3.7207)		
Piston and piston pin	Degree of fit				Piston pin must be fitted into position with thumb at 20°C (68°F).	
	Clearance between piston and piston pin		mm (in)	Standard	0.004 - 0.008 (0.0002 - 0.0003)	
Piston ring	Closed gap	mm (in)	Compression ring	Top ring	Standard	0.20 - 0.30 (0.0079 - 0.0118)
				Second ring	Standard	0.30 - 0.45 (0.0118 - 0.0177)
			Oil ring (upper rail and lower rail)		Standard	0.20 - 0.50 (0.0079 - 0.0197)
	Clearance between compression ring and piston		mm (in)	Top ring	Standard	0.040 - 0.080 (0.0016 - 0.0031)
		Second ring		Standard	0.030 - 0.070 (0.0012 - 0.0028)	
Bend or twist per 100 mm (3.94 in) in length			mm (in)	Limit	0.10 (0.0039)	
Thrust clearance			mm (in)	Standard	0.070 - 0.330 (0.0028 - 0.0130)	

Connecting rod and connecting rod bearing	Connecting rod bearing thickness (at center)	mm (in)	Standard size	Standard	1.492 - 1.508 (0.0587 - 0.0594)
			0.03 (0.0012) US	Standard	1.511 - 1.515 (0.0595 - 0.0596)
			0.05 (0.0020) US	Standard	1.521 - 1.525 (0.0599 - 0.0600)
			0.25 (0.0098) US	Standard	1.621 - 1.625 (0.0638 - 0.0640)
Oil clearance		mm (in)	Standard	0.017 - 0.047 (0.0007 - 0.0019)	
Piston pin & connecting rod bushing	Clearance between piston pin and connecting rod bushing		mm (in)	Standard	0.004 - 0.026 (0.0002 - 0.0010)

	Bending		mm (in)	Limit	0.035 (0.0014)
	Crankshaft pin	Cylindricality	mm (in)	Limit	0.006 (0.0002)
		Out-of-roundness	mm (in)	Limit	0.005 (0.0002)
		Grinding limit (dia.)		mm (in)	To 47.726 (1.8790)
		Crankshaft journal	Cylindricality	mm (in)	Limit
	Out-of-roundness		mm (in)	Limit	0.005 (0.0002)
	Grinding limit (dia.)		mm (in)	To 67.735 (2.6667)	
	Crankshaft pin outer diameter	mm (in)	Standard size	Standard	47.976 - 48.000 (1.8888 - 1.8898)
			0.03 (0.0012) US	Standard	47.946 - 47.970 (1.8876 - 1.8886)
			0.05 (0.0020) US	Standard	47.926 - 47.950 (1.8868 - 1.8878)
			0.25 (0.0098) US	Standard	47.726 - 47.750 (1.8790 - 1.8799)
			Standard size	Standard	67.985 - 68.009 (2.6766 - 2.6775)
			0.03 (0.0012)	Standard	67.955 - 67.979 (2.6754 - 2.6764)

Crankshaft and crankshaft bearing	Crankshaft journal outer diameter		mm (in)	US		- 2.6763)	
				0.05 (0.0020) US	Standard	67.935 - 67.959 (2.6746 - 2.6755)	
				0.25 (0.0098) US		Standard	67.735 - 67.759 (2.6667 - 2.6677)
	Crankshaft bearing thickness (at center)	mm (in)	#1, #2, #3, #4	Standard size	Standard	2.495 - 2.513 (0.0982 - 0.0989)	
				0.03 (0.0012) US		Standard	2.519 - 2.522 (0.0992 - 0.0993)
				0.05 (0.0020) US		Standard	2.529 - 2.532 (0.0996 - 0.0997)
				0.25 (0.0098) US		Standard	2.629 - 2.632 (0.1035 - 0.1036)
			#5	Standard size	Standard	2.493 - 2.511 (0.0981 - 0.0989)	
				0.03 (0.0012) US		Standard	2.517 - 2.520 (0.0991 - 0.0992)
				0.05 (0.0020) US		Standard	2.527 - 2.530 (0.0995 - 0.0996)
				0.25 (0.0098) US		Standard	2.627 - 2.630 (0.1034 - 0.1035)
	Thrust clearance			mm (in)	Standard	0.130 - 0.308 (0.00512 - 0.01213)	
	Oil clearance			mm (in)	Standard	0.013 - 0.031 (0.00051 - 0.00122)	

SPECIFICATION [Crankshaft]

Refer to "Cylinder Block" for removal and installation procedures of the crankshaft. < Ref. to REMOVAL , Cylinder Block. > < Ref. to INSTALLATION , Cylinder Block. >

SPECIFICATION [Piston]

Refer to "Cylinder Block" for removal and installation procedures of pistons. < Ref. to REMOVAL , Cylinder Block. > < Ref. to INSTALLATION , Cylinder Block. >

SPECIFICATION [Connecting Rod]

Refer to "Cylinder Block" for removal and installation procedures of connecting rod.

< Ref. to REMOVAL , Cylinder Block. > < Ref. to INSTALLATION , Cylinder Block. >

SPECIFICATION [Intake And Exhaust Valve]

Refer to "Cylinder Head" for removal and installation procedures of the intake and exhaust valves. < Ref. to REMOVAL , Cylinder Head. > < Ref. to INSTALLATION , Cylinder Head. >