

ENGINE - SPECS**COMMON SPECS & PROCEDURES**

IMPREZA (EXCEPT WRX) & XV CROSSTREK COMMON SPECIFICATIONS & PROCEDURES

System		Specification/Procedure
Air Conditioning		
Service		AIR CONDITIONING SYSTEM
Torque		See Torque Specifications in Text and applicable graphics under HVAC SYSTEM HEATER, VENTILATOR AND A/C (SERVICE INFORMATION)
Axle Shaft Nut (Front)		162 Ft. lb. (220 N.m)
Axle Shaft Nut (Rear)		140 Ft. lb. (190 N.m)
Battery		
Except Hybrid		BATTERY
Hybrid		BATTERY
Brakes		
Bleeding Sequence		RR, LR, RF, LF AIR BLEEDING
Disc Brakes		
Front Disc Brakes	FRONT DISC BRAKE ASSEMBLY	
Rear Disc Brakes	REAR DISC BRAKE ASSEMBLY	
Torque		See Torque Specifications in Text or applicable graphics under BRAKE SYSTEM
Charging		
Generator		
Except Hybrid	GENERATOR	
Hybrid	INTEGRATED STARTER GENERATOR (ISG)	

Torque		See Torque Specifications in Text or applicable graphics under:
Except Hybrid	INSTALLATION	
Hybrid	INSTALLATION	
Drive Belts		
Belt Routing & Adjustment		V-BELT
Engine Cooling		
General Service Specifications		ENGINE COOLING SYSTEM
Radiator Cap Pressure		14-18 psi (.95-1.25 kg/cm ²)
Thermostat R & I		THERMOSTAT
Water Pump R & I		WATER PUMP
Engine Mechanical (2.0L)		
Compression		
Test Procedure	INSPECTION	
Standard	152-203 psi (1050-1400 kPa, 11-14 kgf/cm ²)	
Difference Between Cylinders	14 psi (100 kPa (0.5 kgf/cm ²) or less	
Oil Pressure		OIL PRESSURE SYSTEM
At Idle Speed	7 psi (50 kPa, 0.5 kg/cm ²) Or More	
At 6000 RPM	51 psi (350 kPa, 3.6 kg/cm ²) Or More	
Overhaul		PREPARATION FOR OVERHAUL
Torque		See Torque Specifications in Text or applicable graphics under ENGINE MECHANICAL
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. lb. (30 N.m)

		Plus Additional 30-35 Degrees
Fuel System		
Fuel Pressure Test Procedure		FUEL PRESSURE
Fuel Pressure Specification	49-58 psi (340-400 kPa, 3.5 - 4.1 kgf/cm ²)	
Fuel Filter Location		Attached to fuel pump unit.
Fuel Filter R & I		
Except Hybrid	FUEL FILTER	
Hybrid	FUEL FILTER	
Ignition		
Firing Order & Cylinder Identification		FIRING ORDER & CYLINDER IDENTIFICATION
Ignition Wires (Resistance)		Engine has coil-on-plug ignition.
Ignition Wires (Routing)		Engine has coil-on-plug ignition.
Spark Plug		SPARK PLUG
Starting		
Starter		
Except Hybrid	STARTER	
Hybrid	STARTER	
Torque		37 Ft. lb. (50 N.m)
Wheel Alignment		
Adjustment Specifications		
Front	WHEEL ALIGNMENT	
Rear	WHEEL ALIGNMENT	
Torque		
Front	See Torque Specifications in text under FRONT SUSPENSION	
Rear	See Torque Specifications in text under REAR SUSPENSION	

Wheel & Tire	
Wheel Lug Nut Torque	88.5 Ft. lb. (120 N.m)

SPECIFICATION [2.5 L Non-Turbo Engine (FROM '10MY)]

The following shows the comparison between new and existing engines.

	New engine	Existing engine
Displacement	2.5 L	2.5 L
Engine	Longitudinally-positioned, horizontally opposed 4-cylinder	Longitudinally-positioned, horizontally opposed 4-cylinder
Transmission	Lineartronic™, 6MT	4AT, 5MT
Bore x stroke mm (in)	99.5 x 79.0 (3.917 x 3.110)	99.5 x 79.0 (3.917 x 3.110)
Total displacement cm ³ (cu in)	2, 457 (149.93)	2, 457 (149.93)
Valve driving method	SOHC + intake i-AVLS	SOHC + intake i-AVLS
Compression ratio	10.0	10.0
Maximum output kW (HP)/rpm	127 (170)/5, 600	127 (170)/6, 000
Maximum torque N.m (kgf-m, ft-lb)/rpm	230 (23.5, 170)/4, 000	230 (23.5, 170)/4, 400
Designated gasoline	87AKI	87AKI

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.>

SPECIFICATION [2.5 L Turbo Engine (FROM '10MY)]

The following shows the comparison between new and existing engines.

	New engine	Existing engine
Displacement	2.5 L	2.5 L
Engine	Longitudinally-positioned, horizontally opposed 4-cylinder	Longitudinally-positioned, horizontally opposed 4-cylinder
Transmission	6MT	5AT, 5MT, 6MT
Bore x stroke mm (in)	99.5 x 79.0 (3.917 x 3.110)	99.5 x 79.0 (3.917 x 3.110)
Total displacement cm ³ (cu in)	2, 457 (149.93)	2, 457 (149.93)
Valve driving method	DOHC + intake/exhaust AVCS	DOHC + exhaust AVCS
Compression ratio	8.4	8.4

Maximum output kW (HP)/rpm	198 (265)/5, 600	182 (243)/6, 000
Maximum torque N.m (kgf-m, ft-lb)/rpm	350 (35.7, 258)/2, 000 to 5, 200	327 (33.3, 241)/3, 600
Designated gasoline	93AKI	93AKI

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 [General Description]

Model		2.0 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)	84.0 x 90.0 (3.31 x 3.54)	
Displacement	cm ³ (cu in)	1, 995 (121.73)	
Compression ratio		Gasoline engine model: 10.5 HEV model: 10.8	
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	
		Open	Max. retard
			Min.
		ATDC 25°	

Engine	Intake valve timing			advance	BTDC 43°	
			Close	Max. retard Min. advance	ABDC 85° ABDC 17°	
	Exhaust valve timing			Open	Max. retard Min. advance	ABDC 3° BBDC 52°
			Close	Max. retard Min. advance	ATDC 47° BTDC 8°	
	Cam clearance		mm (in)	Intake Exhaust	Standard Standard	0.13 ^{+0.02} (0.0051 ^{+0.0008-0.03} _{-0.0012}) 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	650±100 600±50
	Ignition order					Gasoline engine
Ignition timing			BTDC/rpm	Standard	model: 16°±10°/650 HEV model: 10°±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 (1.588 - 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)
			mm		0.068 - 0.116 (0.0027)

	Thrust clearance		(in)	Standard	- 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	0.035 (0.0014)	
	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 & valve guide	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 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 - 0.067 (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 (0.2144 - 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 Gasoline engine model: 41.06 (1.617) HEV model: 41.68 (1.641)
	Tension/spring height	N (kgf, lb)/mm (in)	Set	Standard 182 - 210 (18.56 - 21.41), 40.92 - 42.2 (3.0 - 3.299) Gasoline engine model: 552 - 610 (56.29 - 62.20, 124.11 - 137.15)/22.0 (0.866)
			Lift	Standard
	Squareness			Standard 2.5° - 1.8 mm (0.071 in) or less HEV model: 502 - 554 (51.19 - 56.49, 112.87 - 124.56)/22.0 (0.866)
Cylinder block & piston	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)
	Height of cylinder block		mm (in)	Standard 205.0 (8.071)
	Inner diameter of cylinder liner	mm (in)	Cylinder bore size mark A	Standard 84.005 - 84.015 (3.3073 - 3.3077)
			Cylinder bore size mark B	Standard 83.995 - 84.005 (3.3069 - 3.3073)
	Cylindricity of cylinder liner		mm (in)	Limit 0.015 (0.0006)
	Out-of-roundness of cylinder liner		mm (in)	Limit 0.010 (0.0004)
	Piston grade point			mm (in) 38.0 (1.50)
	Piston outer diameter	mm (in)	Standard Size	Grade A Standard 83.975 - 83.985 (3.3061 - 3.3065) Grade B Standard 83.965 - 83.975 (3.3057 - 3.3061)
			0.25 (0.0098) OS	Standard 84.215 - 84.235 (3.3155 - 3.3163)

				0.50 (0.0197) OS	Standard	84.465 - 84.485 (3.3254 - 3.3262)	
	Clearance between cylinder liner and piston			mm (in)	Standard	0.020 - 0.040 (0.00079 - 0.00158)	
	Inner diameter of cylinder liner boring limit (diameter)				mm (in)	To 84.505 (3.3270)	
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 - 0.35 (0.0079 - 0.0138)	
				Second ring	Standard	0.40 - 0.50 (0.0157 - 0.0197)	
			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)	
Connecting rod and connecting rod bearing	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 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 and crankshaft bearing	Crankshaft pin	Cylindricity	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	Cylindricity	mm (in)	Limit	0.006 (0.0002)
		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)
	Crankshaft journal outer diameter	mm (in)	Standard size	Standard	67.985 - 68.009 (2.6766 - 2.6775)
			0.03 (0.0012) US	Standard	67.955 - 67.979 (2.6754 - 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)	#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)