ENGINE [SKYACTIV-D 2.2]

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Special Features

- For SKYACTIV-D 2.2, the following is performed to lower fuel consumption.
  - — Low compression ratio
    - Combustion efficiency by lower compression ration (14.0)
  - — Weight reductions
    - Aluminum alloy cylinder block adopted
    - Exhaust manifold integrated cylinder heads adopted
  - — Weight reduction and mechanical resistance loss improvements
    - Piston shape optimized
    - Narrowed down crankshaft journal
- The SKYACTIV-D 2.2 has adopted an IDEVA for improved ignition stability during cold engine starts.
- Two-step boost control has been adopted which realizes low emissions, low fuel consumption and high torque/ response by the efficient, high air charging obtained in all ranges.
- An exhaust gas recirculation (EGR) system has been adopted for cleaner exhaust emissions and improved fuel efficiency.
- i-stop control has been adopted for improved fuel efficiency, reduced exhaust gas emissions, and reduced idling noise.

Specification

Item				Specification
MECHANICAL				
Type				Diesel, 4-cycle
Cylinder arrangement and number				In-line, 4-cylinder
Combustion chamber				Direct injection
Valve system				DOHC, timing chain driven, 16 valves
Displacement			(ml {cc, cu in})	2,191 {2,191, 133.7}
Bore × stroke			(mm {in})	86.0 × 94.3 {3.39 × 3.71}
Compression ratio				14.0:1
Compression pressure			(kPa {kgf/cm^2, psi} [rpm])	2,255 {22.99, 327.1} [180]
Valve timing	IN	Open	BTDC (°)	9
		Closed	ABDC (°)	36
	EX	Open	BBDC (°)	40 (IDEVA: -276)
		Closed	ATDC (°)	8 (IDEVA: 200)
LUBRICATION SYSTEM				
Type				Force-fed type
Oil pressure (reference value) [Oil temperature 80—90 degrees C, Water temperature 80—90 degrees C]			(kPa {kgf/cm^2, psi} [rpm])	Low oil pressure: 140—190 {1.43—1.93, 20.4—27.5}[1,500] High oil pressure: 300—440 {3.06—4.48, 43.6—63.8}[3,500]
Oil pump	Type			Trochoid gear type
Oil filter	Type			Full-flow, paper element
	Bypass pressure		(kPa {kgf/cm^2, psi})	78—118 {0.80—1.20, 12.0—17.1}
Oil capacity (approx. quantity)	Total (dry engine)		(L {US qt, Imp qt})	6.0 {6.3, 5.3}
	Oil replacement		(L {US qt, Imp qt})	4.8 {5.1, 4.2}
	Oil and oil filter replacement		(L {US qt, Imp qt})	5.1 {5.4, 4.5}
COOLING SYSTEM				
Type				Water-cooled, Electromotive
Coolant capacity (approx. quantity)			(L {US qt, Imp qt})	L.H.D.: 9.0 L {9.5 US qt, 7.9 Imp qt} R.H.D. MTX: 9.0 L {9.5 US qt, 7.9 Imp qt} R.H.D. ATX: 9.1 L {9.6 US qt, 8.0 Imp qt}
Water pump	Type			Centrifugal, V-ribbed belt-driven
Thermostat	Type			Wax type
	Opening temperature		(°C {°F})	80—84 {176—183}
	Full-open temperature		(°C {°F})	95 {203}
	Full-open lift		(mm {in})	8.5 {0.33} or more
Radiator	Type			Corrugated fin type
Cooling system cap	Valve opening pressure		(kPa {kgf/cm^2, psi})	93.2—122.6 {0.951—1.250, 13.6—17.7}

Item			Specification
Cooling fan	Type		Electric type
	Number of blades		Cooling fan No.1: 7 Cooling fan No.2: 9
	Outer diameter	(mm {in})	320 {12.6}
	Cooling fan motor output	(W)	240
FUEL SYSTEM			
Supply pump	Type		Electric control
Fuel injector	Type		Piezo-electric
Fuel tank	Capacity (L {US gal, Imp gal})	2WD	56.0 {14.8, 12.3}
		4WD	58.0 {15.3, 12.8}
Fuel type	Type		EN590 or the equivalent
CHARGING SYSTEM			
Battery	Voltage	(V)	12
	Type and capacity	(A·h/5HR, A·h/20HR)	T-110 (64, 80)
Generator	Output	(V-A)	12-150
	Regulated voltage		Controlled by PCM
	Self diagnosis function		
STARTING SYSTEM			
Starter	Type		Coaxial reduction
	Output	(kW)	1.8
CONTROL SYSTEM			
i-stop OFF switch			ON/OFF
Neutral switch			ON/OFF
CPP switch			ON/OFF
MAF sensor			Hot film
IAT sensor			Thermistor
MAP sensor			Semiconductor strain gauge
APP sensor			Hall element
CKP sensor			MR (Magnetic Resistance) element
CMP sensor			MR (Magnetic Resistance) element
ECT sensor			Thermistor
BARO sensor			Piezoelectric element
Fuel pressure sensor			Piezoelectric element
Current sensor			Shunt resistance, Thermistor
A/F sensor			Zirconia element
Boost air temperature sensor			Thermistor
Fuel temperature sensor			Thermistor
Exhaust gas temperature sensor			Thermistor
Exhaust gas pressure sensor No.1			Semiconductor gauge
Exhaust gas pressure sensor No.2			Semiconductor gauge
Engine oil temperature sensor			Thermistor
Engine oil pressure sensor			Semiconductor gauge
Intake shutter valve position sensor			Hall element
EGR valve position sensor			Hall element
EGR cooler bypass valve position sensor			Hall element
Clutch stroke sensor			Hall element
Power brake unit vacuum sensor			Piezoelectric element

Engine oil [Europe]

Recommended engine oil		Alternative engine oil
Mazda Original Oil Supra DPF 0W-30	Mazda Original Oil Ultra DPF 5W-30	ACEA C3 0W-30, 5W-30

Engine oil [Except Europe]

Item	Specifications	
Grade	ACEA C3	ACEA C1*1 or JASO DL-1*1
Viscosity (SAE)	0W-30, 5W-30	5W-30*1

*1 : Australian specs.