

Special Features

- For SKYACTIV-G 2.0 is the following have been adopted to lower fuel consumption.
 - Mechanical resistance loss improvement from:
 - Narrowed down crankshaft journal
 - Optimized piston skirt shape
 - Lowered piston ring tension
 - Reduction of valve spring load
 - Stabilization of timing chain behavior
 - Optimized engine coolant passage
 - Optimized water pump impeller shape
 - Lowered drive belt tension
 - Optimized oil passage
 - Optimized oil pump shape
 - Oil pump discharging pressure control has been adopted.
 - Pumping loss improvement from:
 - Variable valve timing mechanism adopted on both sides of intake and exhaust.
 - Cooling loss improvement
 - Piston cavity has been adopted.
 - Combustion efficiency improvement
 - Multiple hole-type fuel injectors adopted
- L-jetronic^{*1} and D-jetronic^{*2} type detectors have been combined for intake air amount detection, improving the accuracy of the intake air amount measurement.
 - MAF sensor adopted
 - MAP sensor adopted
 - IAT sensor No.1 and No.2 adopted
- Valve timing control has been adopted on both sides of the intake and exhaust, improving fuel economy and emission performance.
 - Intake side: Electric variable valve timing control**
 - Intake CMP sensor adopted
 - Electric variable valve timing motor/driver adopted
 - Electric variable valve timing relay adopted
 - Exhaust side: Hydraulic variable valve timing control**
 - Exhaust CMP sensor adopted
- Engine oil control has been adopted reducing engine load.
 - Engine oil solenoid valve adopted
- With the adoption of fuel pump control, fuel pump power consumption has been reduced, improving fuel economy.
 - Fuel pump control module adopted
- Generator output control adopted, fuel economy/idling stability improved.
 - Current sensor adopted
- DC-DC converter control has been adopted for improved power supply stability. (Without i-ELOOP)
 - DC-DC converter adopted
- With the adoption of the i-ELOOP, charging efficiency during deceleration is improved. (See i-ELOOP [i-ELOOP].) (With i-ELOOP)
 - DC-DC converter (i-ELOOP) adopted
- With the adoption of the ion sensor, which detects pre-ignition, engine reliability has been improved.
- LIN communication has been adopted to the current sensor and DC-DC converter for simplified wiring harnesses. (Without i-ELOOP)
- i-stop control has been adopted for improved fuel efficiency, reduced exhaust gas emissions, and reduced idling noise. (With i-stop control)

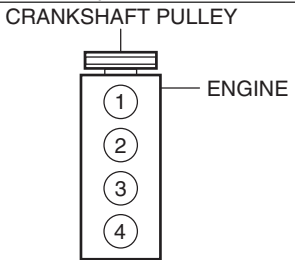
*1 : Measures the intake air amount directly using the MAF sensor.

*2 : Measures the intake air pressure introduced into the cylinder using the MAP sensor and calculates the intake air amount indirectly.

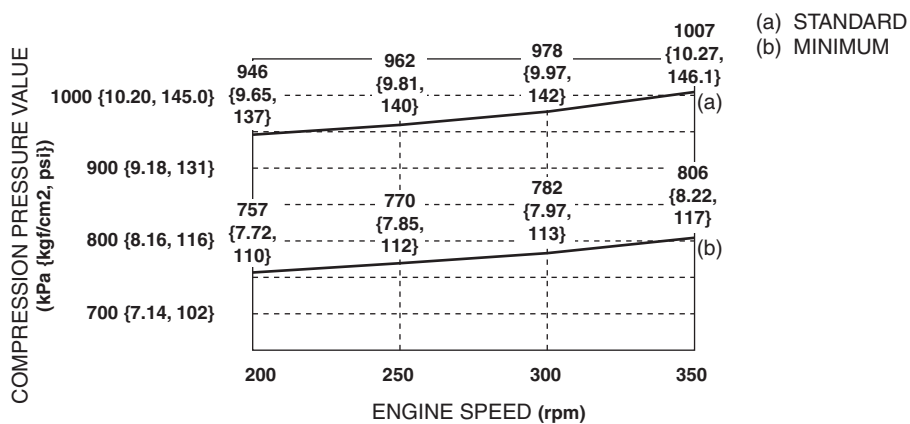
Specification

Item	Specification
MECHANICAL	
Type	Gasoline, 4-cycle
Cylinder arrangement and number	In-line, 4-cylinder
Combustion chamber	Pentroof
Valve system	DOHC, timing chain driven, 16 valves
Displacement	(ml {cc}) 1,998 {1,998}

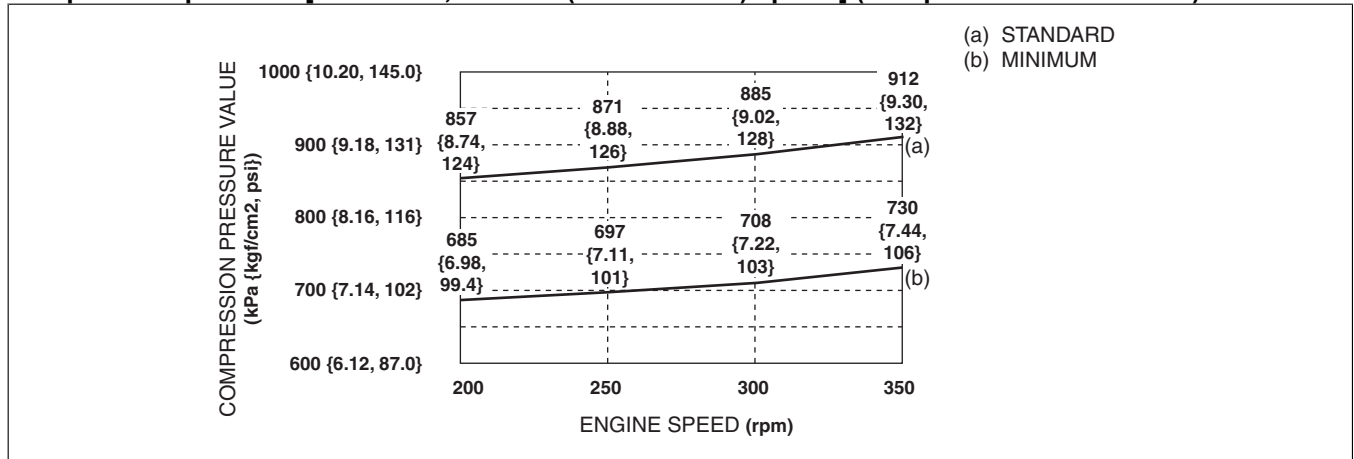
Item		Specification	
Bore × stroke		(mm {in})	83.5 × 91.2{3.29 × 3.59}
Compression ratio			Piston set part number: PEY2-11SA0 13.0:1 Piston set part number: PEY3-11SA0/ PEY8-11SA0 14.0:1
Valve timing	IN	Open	(°) BTDC 42—ATDC 32
		Close	(°) ABDC 36—ABDC 110
	EX	Open	(°) BBDC 54—BBDC 9
		Close	(°) ATDC 7—ATDC 52
LUBRICATION SYSTEM			
Type		Force-fed type	
Oil pressure (reference value) [Water temperature: 80—90 °C {176—194 °F}]		(kPa {kgf/cm ² , psi} [rpm])	Low oil pressure: 110—175 {1.13—1.78, 16.0— 25.3}{3,000} High oil pressure: 300—430 {3.06—4.38, 43.6— 62.3}{3,000}
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})	Without oil cooler: 5.0 {5.3, 4.4} With oil cooler: 4.9 {5.2, 4.3}}
	Oil replacement	(L {US qt, Imp qt})	4.0 {4.2, 3.5}
	Oil and oil filter replacement	(L {US qt, Imp qt})	4.2 {4.4, 3.7}
COOLING SYSTEM			
Type		Water-cooled, Electromotive	
Water pump	Type	Centrifugal, V-ribbed belt-driven	
Thermostat	Type	Wax type	
	Opening temperature	(°C {°F})	86.5—89.5 {188—193}
	Full-open temperature	(°C {°F})	100 {212}
	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}
Cooling fan type	Type	Electric type	
	Number of blades	7	
	Outer diameter	(mm {in})	340 {13.4}
	Cooling fan motor output	(W)	240
FUEL SYSTEM			
Fuel injector	Type	High resistance	
	Fuel supply method	Top-feed	
	Drive types	Electronic type	
Pressure regulator control pressure	(kPa {kgf/cm ² , psi})	Approx. 450 {4.59, 65.3}	
Fuel pump	Type	Electric	
Fuel tank	Capacity	(L {US gal, Imp gal})	2WD: 48 {51.0, 42.0} 4WD: 44 {46.0, 39.0}
EMISSION SYSTEM			
Catalyst	Type	WU-TWC (monolith) TWC (monolith)	
EVAP control system	Type	Charcoal canister type	
PCV system	Type	Closed type	
CHARGING SYSTEM			
Battery	Voltage	(V)	12
	Type (with i-stop)	Without i-ELOOP: Q-85 With i-ELOOP: N-55	
	Type and capacity (without i-stop)	(A·h/20HR)	55D23L (55), 75D23L (65)
Generator	Output	(V-A)	Without i-ELOOP: 12-100 With i-ELOOP: 12-150
IGNITION SYSTEM			

Item		Specification
Ignition system	Type	SEI
	Spark advance	Electronic
	Firing order	1—3—4—2 (all cylinders independent firing)  CYLINDER NUMBER
Spark plug	Type	PE5R-18-110 PE5S-18-110
STARTING SYSTEM		
Starter	Type	Coaxial reduction
	Output (kW)	Without i-stop: 1.0 With i-stop: 1.4
CONTROL SYSTEM		
i-stop OFF switch		ON/OFF
Neutral switch		ON/OFF
CPP switch		ON/OFF
MAF sensor		Hot film
IAT sensor		Cold resistor
MAP sensor		Sealant diaphragm
TP sensor		Hall element
APP sensor		Electromagnetic induction
CKP sensor		MR element
CMP sensor		GMR element
ECT sensor		Thermistor
BARO sensor		Piezoelectric element
Fuel pressure sensor		Metal diaphragm
KS		Piezoelectric element
Current sensor		Shunt resistance, Thermistor
A/F sensor		Zirconium element
HO2S		Zirconia element
Clutch stroke sensor		Hall element
Power brake unit vacuum sensor		Piezoelectric element

Compression pressure [European (L.H.D. U.K.) specs.]

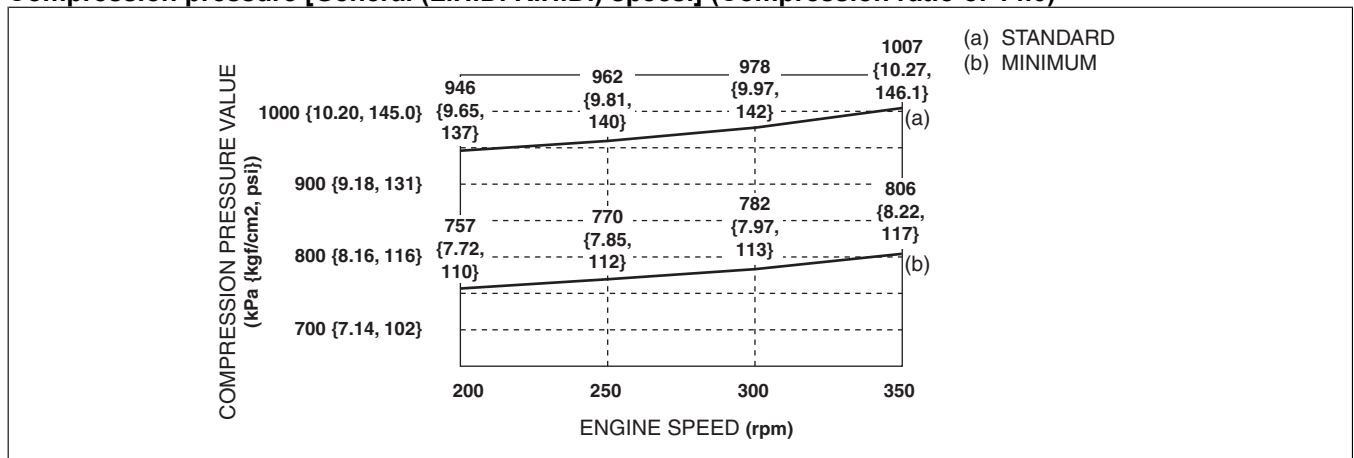


Compression pressure [Australian, General (L.H.D. R.H.D.) specs.] (Compression ratio of 13.0)



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Compression pressure [General (L.H.D. R.H.D.) specs.] (Compression ratio of 14.0)



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Engine oil [European (L.H.D. U.K.) specs.]

Recommended engine oil		Alternative engine oil
Mazda Original Oil Supra 0W-20	Mazda Original Oil Ultra 5W-30	API SL/SM/SN*1 or ACEA A3/A5 0W-20, 5W-30

*1 : Use API SM/SN in Kazakhstan.

Engine oil [Except European (L.H.D. U.K.), specs.]

Item	Specifications
Grade	API SG/SH/SJ/SL/SM/SN or ILSAC GF-2/GF-3/GF-4/GF-5
Viscosity (SAE)	10W-30, 10W-40, 10W-50, 5W-20*1, 5W-30, 5W-40, 0W-20*1, 0W-30

*1 : Except Thailand

Engine coolant capacity (approx. quantity)

Item		Capacity	
MTX		5.6 L {5.9 US qt, 4.9 Imp qt}	
ATX	L.H.D.	Saudi Arabia	6.1 L {6.4 US qt, 5.4 Imp qt}
		Except above	5.8 L {6.1 US qt, 5.1 Imp qt}
	R.H.D.	European, Australia	5.9 L {6.2 US qt, 5.2 Imp qt}
		Except above	Without heater: 5.9 L {6.2 US qt, 5.2 Imp qt} With heater: 5.4 L {5.7 US qt, 4.8 Imp qt}

Fuel type

Fuel	Research Octane Number	Country
Premium unleaded fuel (Conforming to EN 228 and within E10)* ¹	95 or above	New Caledonia, Turkey, Azerbaijan, Armenia, Georgia, Kazakhstan, Canary Islands, Reunion, Morocco, Austria, Greece, Italy, Switzerland, Belgium, Denmark, Finland, Norway, Portugal, Spain, Sweden, Hungary, Germany, Poland, Bulgaria, Croatia, Slovenia, Luxembourg, Slovakia, Latvia, Lithuania, Russia, Belarus, France, Ukraine, Czech, Estonia, Faeroe, Iceland, Romania, The Netherlands, Macedonia, Bosnia and Herzegovina, Serbia, Montenegro, Albania, Moldova, Martinique, F.Guiana, Guadeloupe, Singapore, Hong Kong, Macau, Malaysia, Brunei, Mauritius, South Africa, Bermuda, Jamaica, Barbados, Antigua, Guatemala, Bolivia, Uruguay, Honduras, Nicaragua, Aruba, St. Martin, Cyprus, Malta, Ireland, UK, Taiwan, Tahiti, Vanuatu, UAE, Lebanon, Israel, Algeria, Libya, Tunisia, Madagascar
Premium unleaded fuel (within E85)		Thailand
Regular unleaded fuel (Conforming to Fuel Quality Standards Act 2000)* ²	92 or above	Egypt, Myanmar
	90 or above	Australia, New Zealand, Indonesia, Nepal, Sri Lanka, Fiji, Kenya, Trinidad and Tobago, Chile, El Salvador, Costa Rica, Ecuador, Haiti, Colombia, Dominican Republic (LHD), Panama, Peru, B. Virgin, Curacao, The Philippine, Cambodia, Laos, Vietnam, Kuwait, Oman, Qatar, Saudi Arabia, Bahrain, Jordan, Syria, Ivory Coast, Nigeria, Angola

*1 : Europe

*2 : Australia