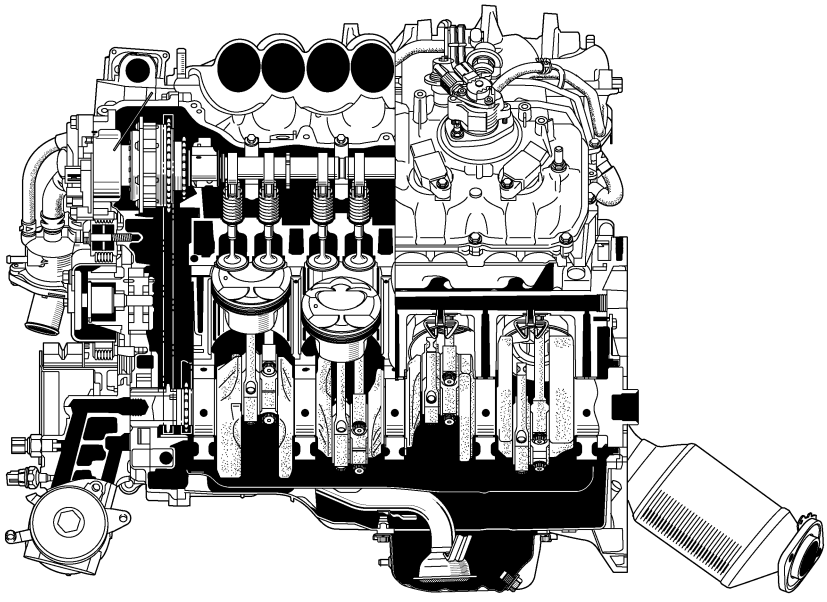
ENGINE

2UR-GSE ENGINE

■ DESCRIPTION

The 2UR-GSE is a 5.0-liter, 32-valve DOHC V8 engine. The engine adopts the dual VVT-i (Variable Valve Timing-intelligent) system which realizes optimal valve timing by using an electric motors to actuate the intake camshaft actuators and engine oil pressure to actuate the exhaust camshaft actuators. In addition, this engine uses the D-4S (Direct injection 4-stroke gasoline engine Superior version) which uses both the direct injection and port injection systems, DIS (Direct Ignition System) , and ETCS-i (Electronic Throttle Control System-intelligent). These systems achieve improved engine performance, quietness, fuel economy, and clean emissions.



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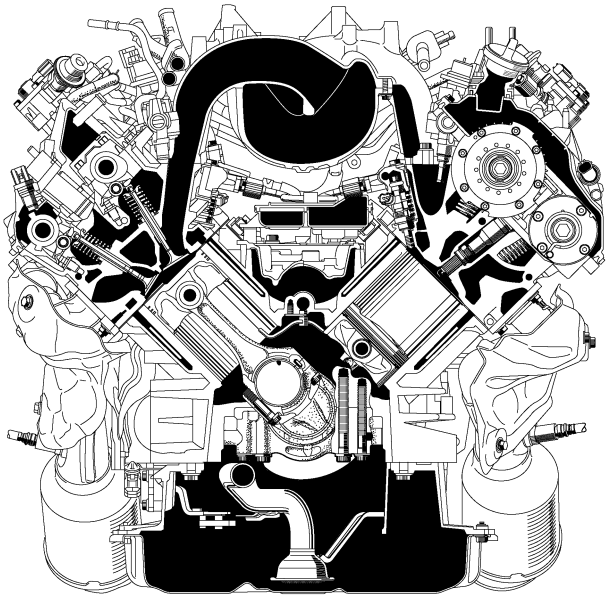

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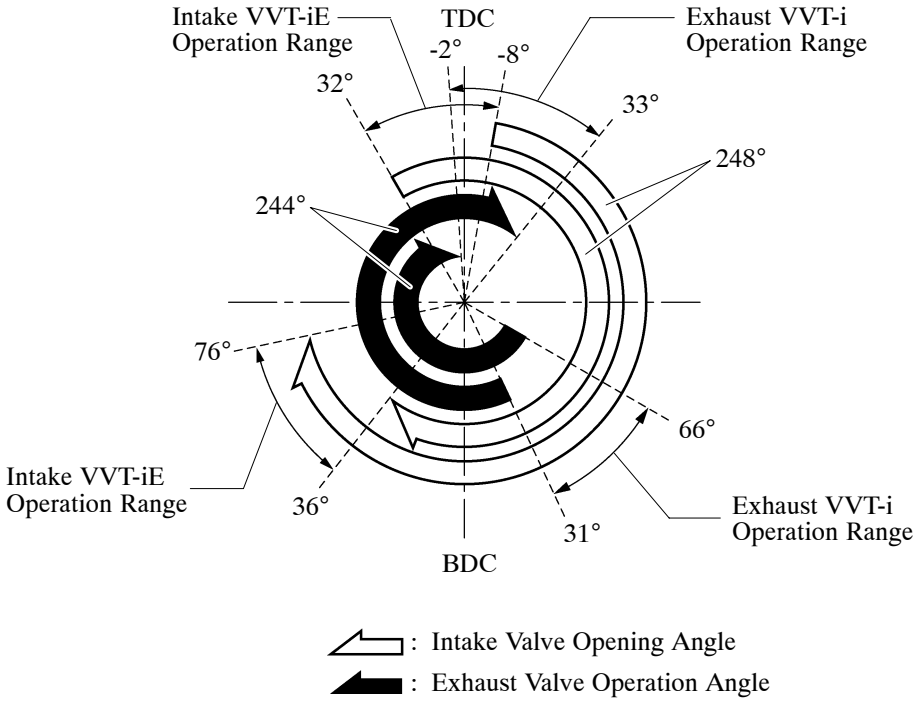
▶ Engine Specifications ◀

Engine Type			2UR-GSE
No. of Cyls. & Arrangement			8-Cylinder, V Type
Valve Mechanism			32-Valve DOHC, Chain Drive (with Dual VVT-i)
Combustion Chamber			Pentroof Type
Flow of Intake and Exhaust Gasses			Cross-Flow
Fuel System			EFI D-4S
Ignition System			DIS
Displacement cm^3 (cu. in.)			4969 (303.2)
Bore × Stroke mm (in.)			94.0 × 89.5 (3.70 × 3.52)
Compression Ratio			11.8 : 1
Max. Output			311 kW @ 6600 rpm
Max. Torque			505 N·m @ 5200 rpm
Valve Timing	Intake	Open (BTDC)	-8° to 32°
		Close (ABDC)	76° to 36°
	Exhaust	Open (BBDC)	31° to 66°
		Close (ATDC)	33° to -2°
Firing Order			1-8-7-3-6-5-4-2
Oil Grade			API grade SL "Energy-Conserving", SM "Energy-Conserving" or ILSAC
Research Octane Number (RON)			95 or higher*1
Emission Regulation			EURO IV
Engine Service Mass*2 (Reference) kg (lb)			226.7 (500)

*1: Premium unleaded gasoline with a Research Octane Number 95 or higher required for optimum engine performance. If 95 octane cannot be obtained, you may use unleaded gasoline with a Research Octane Number as low as 91. Use of unleaded fuel with a Research Octane Number lower than 95 may result in engine knocking and significantly reduced performance. Persistent knocking can lead to engine damage and should be corrected by refueling with higher octane unleaded gasoline.

*2: Weight shows the figure with the oil and engine coolant fully filled.

▶ Valve Timing ◀



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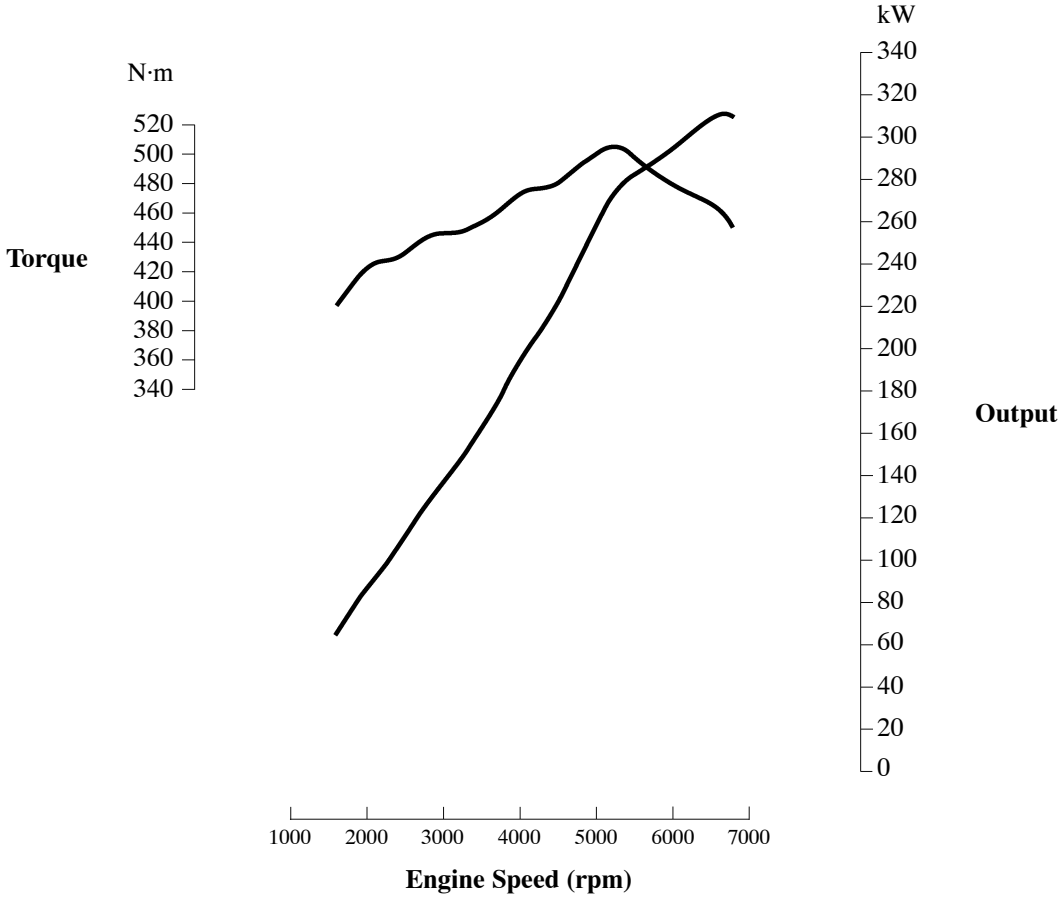
▶ Performance Curve ◀



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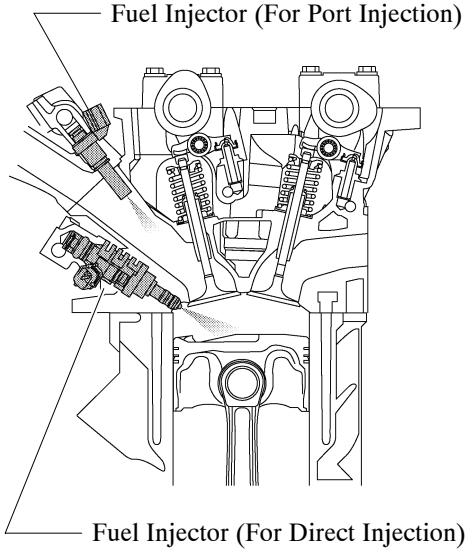
— REFERENCE —

D-4S (Direct injection 4-stroke gasoline engine Superior version) System

- The D-4S system is a system which combines a direct injection system which injects fuel into the combustion chamber and a port injection system which injects fuel to the intake ports. This system optimally controls the two types of fuel injectors according to the driving conditions.
- When the engine is running under a medium or high load at lower speeds, both the direct and port injection systems are used. This control creates a homogeneous air-fuel mixture to stabilize combustion, improve fuel efficiency, and reduce emissions.
- When the engine is running under heavy load, the direct injection system is used. This achieves an intake cooling effect by injecting fuel directly to the combustion chamber. As a result of this cooling effect, the compression ratio of the engine can be made higher as the tendency of the compressed mixture to preignite or detonate is reduced. The increased compression ratio improves engine output and performance.



D-4S

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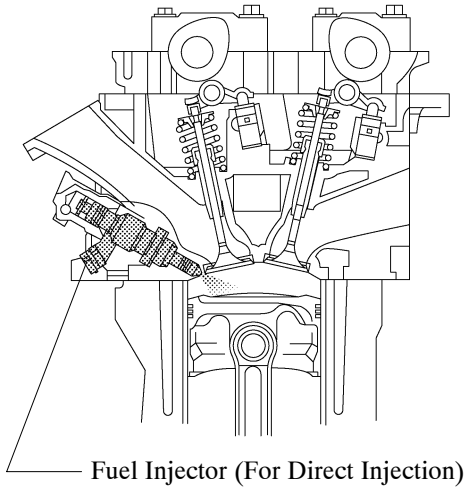

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- The double slit nozzle type injectors for direct injection atomize fuel so that the fuel spreads out widely and finely in a fan shape. Fuel is mixed with intake air efficiently and homogeneously, aiming at ideal combustion under any driving conditions.
- When the engine is cold, fuel is injected from the injectors (for port injection) to create a homogenous lean air-fuel mixture in the combustion chamber. Fuel is also injected from the injectors (for direct injection) during the latter half of the compression stroke to adjust the air-fuel mixture around the spark plug to allow stable combustion of under retarded ignition timing, thus increasing exhaust gas temperature. This promotes rapid warming of the catalysts and achieves cleaner emissions.