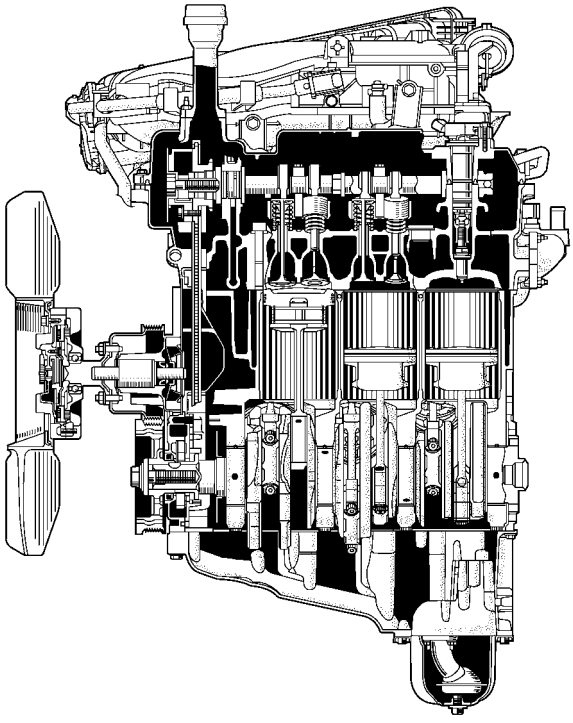
ENGINE

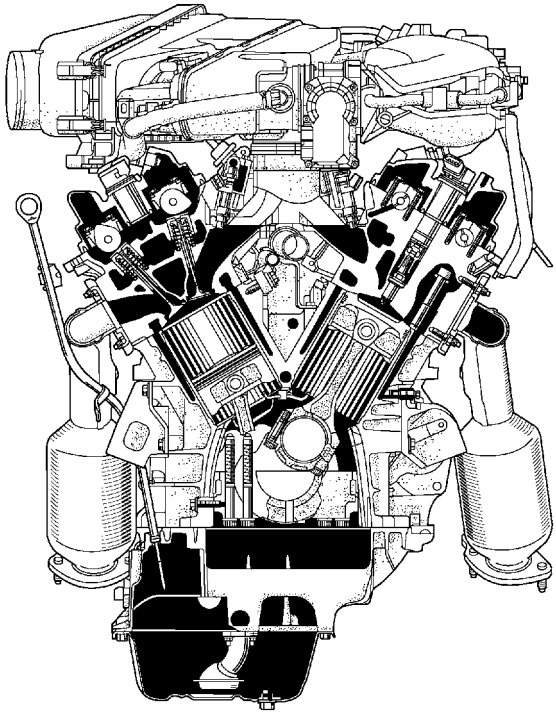
1GR-FE ENGINE

■ DESCRIPTION

The 1GR-FE engine is a 4.0-liter, 24-valve DOHC V6 engine. This engine uses the VVT-i (Variable Valve Timing-intelligent) system, DIS (Direct Ignition System), ACIS (Acoustic Control Induction System), and ETCS-i (Electronic Throttle Control System-intelligent). These control functions achieve improved engine performance, fuel economy, and clean emissions.



238EG01



238EG02

▶ Engine Specification ◀

Engine Type			**1GR-FE**
No. of Cyls. & Arrangement			6-Cylinder, V Type
Valve Mechanism			24-Valve DOHC, Chain Drive (with VVT-i)
Combustion Chamber			Pentroof Type
Flow of Intake and Exhaust Gasses			Cross-Flow
Fuel System			SFI
Ignition System			DIS
Displacement cm^3 (cu. in.)			3956 (241.4)
Bore × Stroke mm (in.)			94.0 × 95.0 (3.70 × 3.74)
Compression Ratio			10.0 : 1
Max. Output (SAE-NET)*1			178 kW @ 5200 rpm (239 HP @ 5200 rpm)
Max. Torque (SAE-NET)*1			377 N·m @ 3700 rpm (278 ft·lbf @ 3700 rpm)
Oil Capacity	Dry		6.0 liters (6.3 US qts, 5.3 Imp. qts)
	With Oil Filter		5.2 liters (5.5 US qts, 4.6 Imp. qts)
	Without Oil Filter		4.9 liters (5.2 US qts, 4.3 Imp. qts)
Oil Grade			ILSAC
Engine Coolant	Type		TOYOTA Genuine Super Long Life Coolant or the following*2
	Capacity	M/T	9.4 liters (9.9 US qts, 8.3 Imp. qts)
		A/T	9.8 liters (10.4 US qts, 8.6 Imp. qts)
Spark Plug	Type	DENSO	K20HR-U11 (Nickel)
		NGK	LFR6C11 (Nickel)
	Plug Gap mm (in.)		1.0 - 1.1 (0.0394 – 0.0433)
Firing Order			1 - 2 - 3 - 4 - 5 - 6
Fuel Octane Rating			91 or higher
Emission Regulation	Tailpipe	California	LEVII, SFTP
		Except California	Tier2-Bin5, SFTP
	Evaporative		LEVII, ORVR
Engine Service Mass*3 (Reference) kg (lb)			166 (366)

*1: Maximum output and torque rating is determined using the revised SAE J1349 procedure.

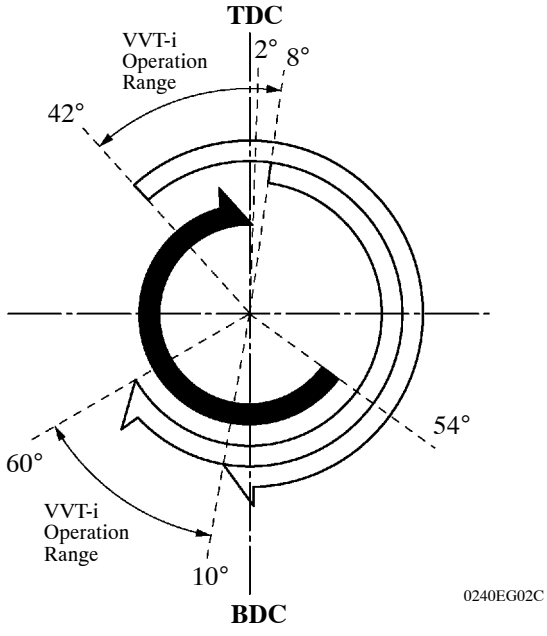
*2: Similar high quality ethylene glycol based non-silicate, non-amine, non-nitrite, and non-borate coolant with long-life hybrid organic acid technology. (Coolant with hybrid organic acid technology consists of a combination of low phosphates and organic acids.)

*3: The figure shown is the weight of the part including the coolant and oil.

▶ Valve Timing ◀

: Intake Valve Opening Angle

: Exhaust Valve Opening Angle



Intake	Open	-8° to 42° BTDC
	Close	60° to 10° ABDC
Exhaust	Open	54° BBDC
	Close	2° ATDC

▶ Performance Curve ◀

