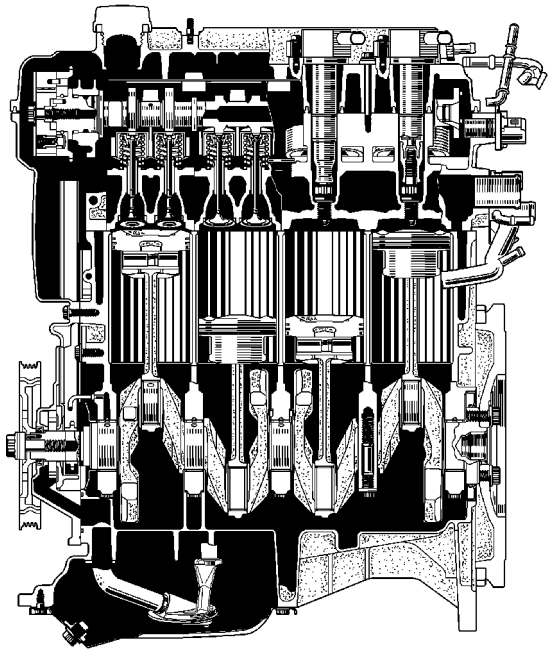
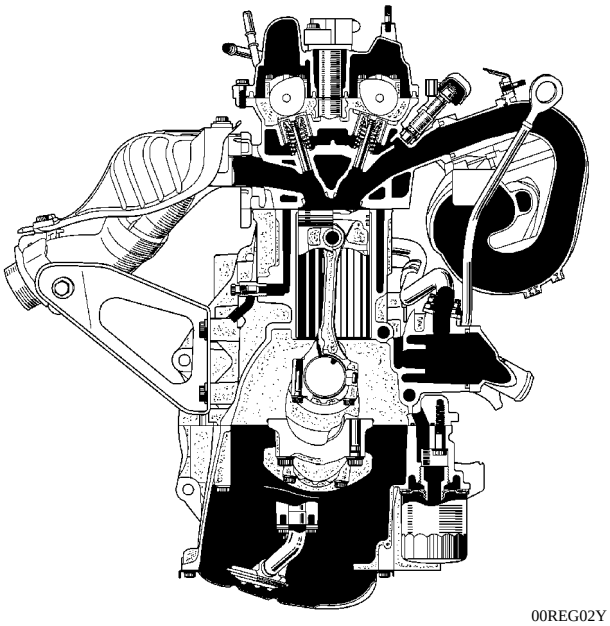
1NZ-FE ENGINE

■DESCRIPTION

The 1NZ-FE engine is a in-line, 4-cylinder, 1.5 liter, 16-valve DOHC engine.
The VVT-i (Variable Valve Timing-intelligent) system, DIS (Direct Ignition System) and ETCS-i (Electronic Throttle Control System-intelligent) are used on this engine in order to realize high performance, quietness, fuel economy and clean emission.



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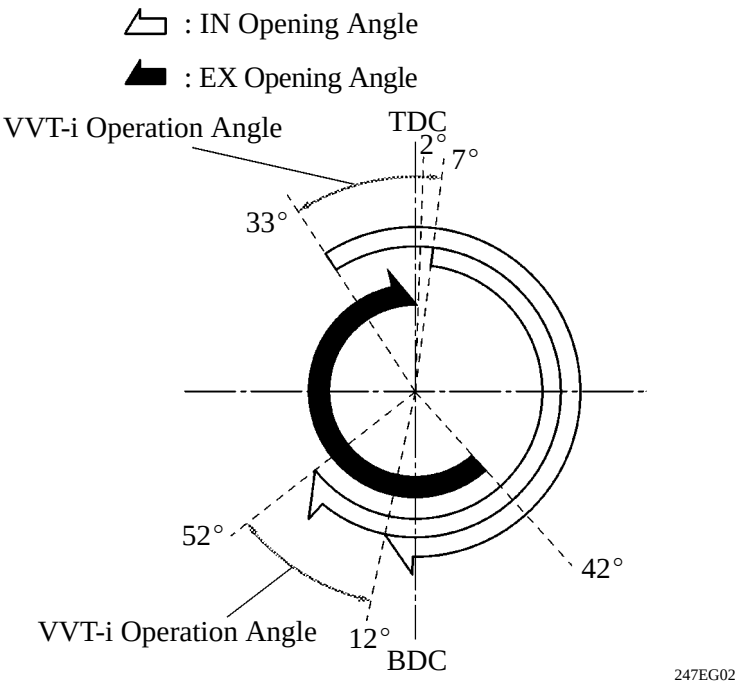
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▶ Engine Specifications ◀

No. of Cyls. & Arrangement			4-Cylinder, In-line
Valve Mechanism			16-Valve DOHC, Chain Drive (with VVT-i)
Combustion Chamber			Pentroof Type
Manifolds			Cross-Flow
Fuel System			SFI
Ignition System			DIS
Displacement	cm^3 (cu. in.)		1497 (91.3)
Bore x Stroke	mm (in.)		75.0 x 84.7 (2.95 x 3.33)
Compression Ratio			10.5 : 1
Max. Output*1	(SAE-NET)		79 kW @ 6000 rpm (106 HP @ 6000 rpm)
Max. Torque*1	(SAE-NET)		139 N·m @ 4200 rpm (103 ft lbf @ 4200 rpm)
Valve Timing	Intake	Open	-7 ° - 33° BTDC
		Close	52° - 12° ABDC
	Exhaust	Open	42° BBDC
		Close	2° ATDC
Firing Order			1 - 3 - 4 - 2
Research Octane Number			90 or higher
Octane Rating			87 or higher
Oil Grade			ILSAC
Tailpipe Emission Regulation			TIRE2, ULEV-II
Evaporative Emission Regulation			ORVR
Engine Service Mass*2 (Reference)	kg (lb)	M/T	83.2 (183.4)
		A/T	77.8 (171.5)

*1: Maximum output and torque rating is determined by revised SAE J1349 standard.
*2: Weight shows the figure with the oil fully filled.

▶ Valve Timing ◀



■FEATURES OF 1NZ-FE ENGINE

The 1NZ-FE engine has been able to achieve the following performance through the adoption of the items listed below.

(1) High performance and fuel economy

(2) Low noise and vibration

(3) Lightweight and compact design

(4) Good serviceability

(5) Clean emission

Section	Item	(1)	(2)	(3)	(4)	(5)
Engine Proper	A cylinder block made of aluminum is used.			○		
	An offset crankshaft is used.	○	○			○
	The taper squish shape is used for the combustion chamber.	○				○
Valve Mechanism	A timing chain and chain tensioner are used.	○		○	○	
	The VVT-i system is used.	○				○
Intake and Exhaust System	Intake manifold made of plastic is used.			○		
	The linkless-type throttle body is used.			○	○	
	A stainless steel exhaust manifold is used.			○		
	Two TWCs (Three Way Catalytic Converter) are used.					○
	A rearward exhaust layout is used to realize the early activation of the catalyst.					○
Fuel System	12-hole type injector is used.	○				○
	The fuel returnless system is used.			○	○	○
	Quick connectors are used to connect the fuel hose with the fuel pipes.				○	
Ignition System	The long-reach type spark plugs are used.	○				
	The DIS (Direct Ignition system) makes ignition timing adjustment unnecessary.	○			○	○
Engine Control System	The ETCS-i (Electronic Throttle Control System-intelligent) is used.	○				○
	The non-contact sensor is used in the throttle position sensor and accelerator pedal position sensor.	○				
	The cranking hold function is used.	○				
	Evaporative emission control system is used.					○
	The use of an air fuel ratio sensor allows for precise control.					○