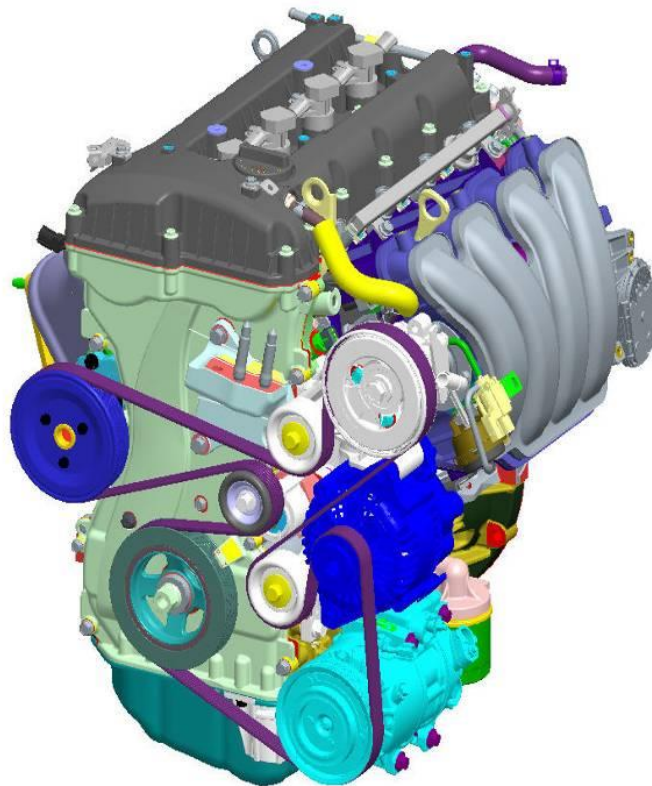


Tucson
ix35

Theta – II Engine

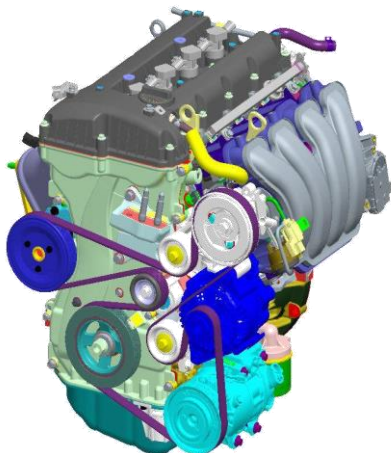


Power-train application

Category			Plant	Ulsan (#5)										KMS		BHMC(#2)	
			Area	DOM('09.8)		NA('09.10)		GEN('09.10)		Aust.('09.10)		GEN('10.4)		EU('10.2)		China('10.4)	
			Spec.	DOM		NA		GEN		Aust.		EU		EL(ix35)		China	
Engine			T/M	2WD	4WD	2WD	4WD	2WD	4WD	2WD	4WD	2WD	4WD	2WD	4WD	2WD	4WD
GSL	γ 1.6 GDI (Hwasong)	140/17.0 (PS/kg.m)	M5CF1-1 (HMMC)											● ('10.11~)			
	Θ-II 2.0 MPI (Asan)	161/19.8 (PS/kg.m)	M5GF1 (Ulsan)			○ ('10.4~)		●	●	●		●	●	●	●	●	
			A6MF1 (HPT)	●		○ ('10.4~)		●	●	●		●	●	●	●	●	●
	Θ-II 2.4 MPI (Asan)	174/23.0 (PS/kg.m)	M6GF2 (Ulsan)			●	●										
A6MF1 (HPT)					●	●		●		●		●				●	●
DSL	U2-1.7 VGT (Hwasong)	115/26.0 (PS/kg.m)	M6CF3-1 (HMMC)											● ('10.11~)			
	R-2.0 VGT (H) (Ulsan)	173/38.0 (PS/kg.m)	M6GF2 (Hwasong)	●	●			●	●			●	●	● (~'10.10)	● (~'10.10)		
			A6LF2 (HPT)	●	●			●		●		●			● (~'10.10)		
	R-2.0 VGT (L) (Ulsan)	136/32.0 (PS/kg.m)	M6GF2 (Hwasong)											●	●		
A6LF2 (HPT)															● ('10.11~)		
Emission				06EM (GSL) EURO-5 (DSL)		2-ULEV SULEV		EURO-2/3/4 (GSL) EURO-3/5 (DSL)		EURO-4 (GSL) EURO-5 (DSL)		EURO-5		EURO-4/5 (GSL) EURO-3/4/5 (DSL)		EURO-4	

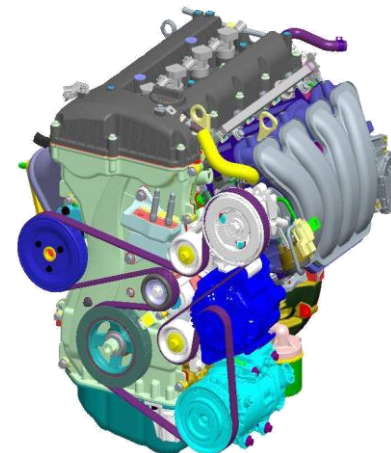
Application

Theta-II 2.0 MPI engine



Volume	1,998 cc
Power	161ps / 6,200rpm
Torque	19.8kgf·m / 4,500rpm
Main features	<ul style="list-style-type: none"> ▪ CVVT ▪ VIS ▪ Integrated CCC ▪ Linear Type oxygen sensor

Theta-II 2.4 MPI engine

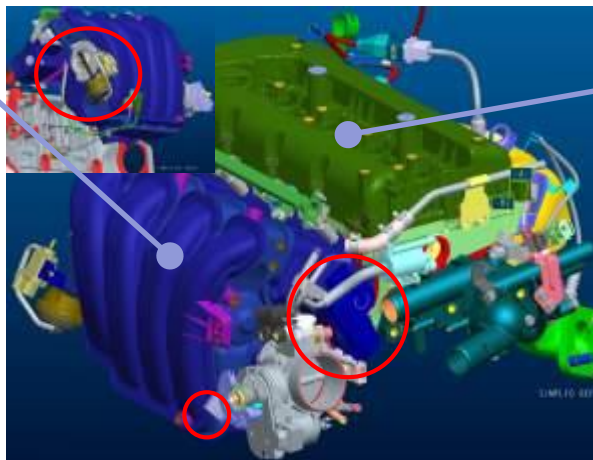


Volume	2,359 cc
Power	174ps / 6,000rpm
Torque	23.0kgf·m / 4,000rpm
Main features	<ul style="list-style-type: none"> ▪ CVVT ▪ VIS ▪ Integrated CCC ▪ Linear Type oxygen sensor

Main Feature (θ-II)

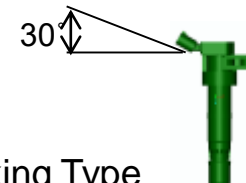
Intake System

- ◆ VIS applied (2-STEP)
- ◆ MAF -> MAP
- ◆ ETC applied in 2.0L



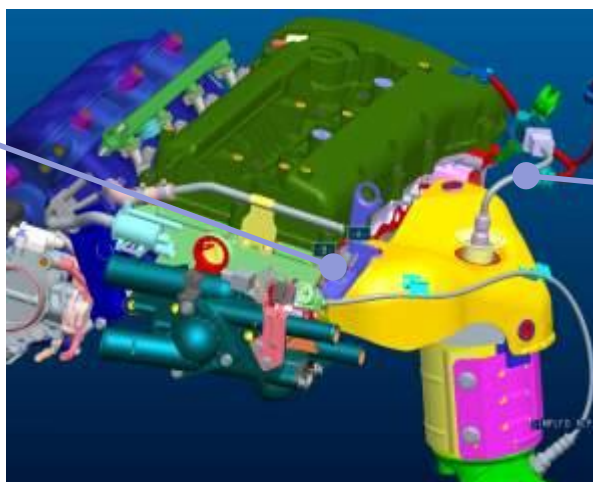
Ignition System

- ◆ Connector Direction Changed
- ◆ Connector locking Type Changed (Side lock -> Center lock)
- ◆ Ignition coil common use (theta II, Tau)
- ◆ Long Reach Spark Plug



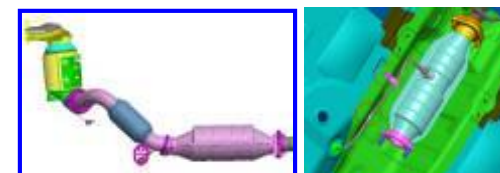
Management

- ◆ Dual CVVT applied
- ◆ EPMS (Electrical Power Management System) - Alternator controlled by ECM and battery Sensor
- ◆ OTS is eliminated
- ◆ ECM : VIS, VCM, Linear O₂, MAP Sensor (SULEV)



Exhaust System

- ◆ For NA ULEV/SULEV : Linear O₂ Sensor
- ◆ Catalytic converter
 - SULEV : WCC+UCC
 - ULEV-II, EURO4: Integrated CCC

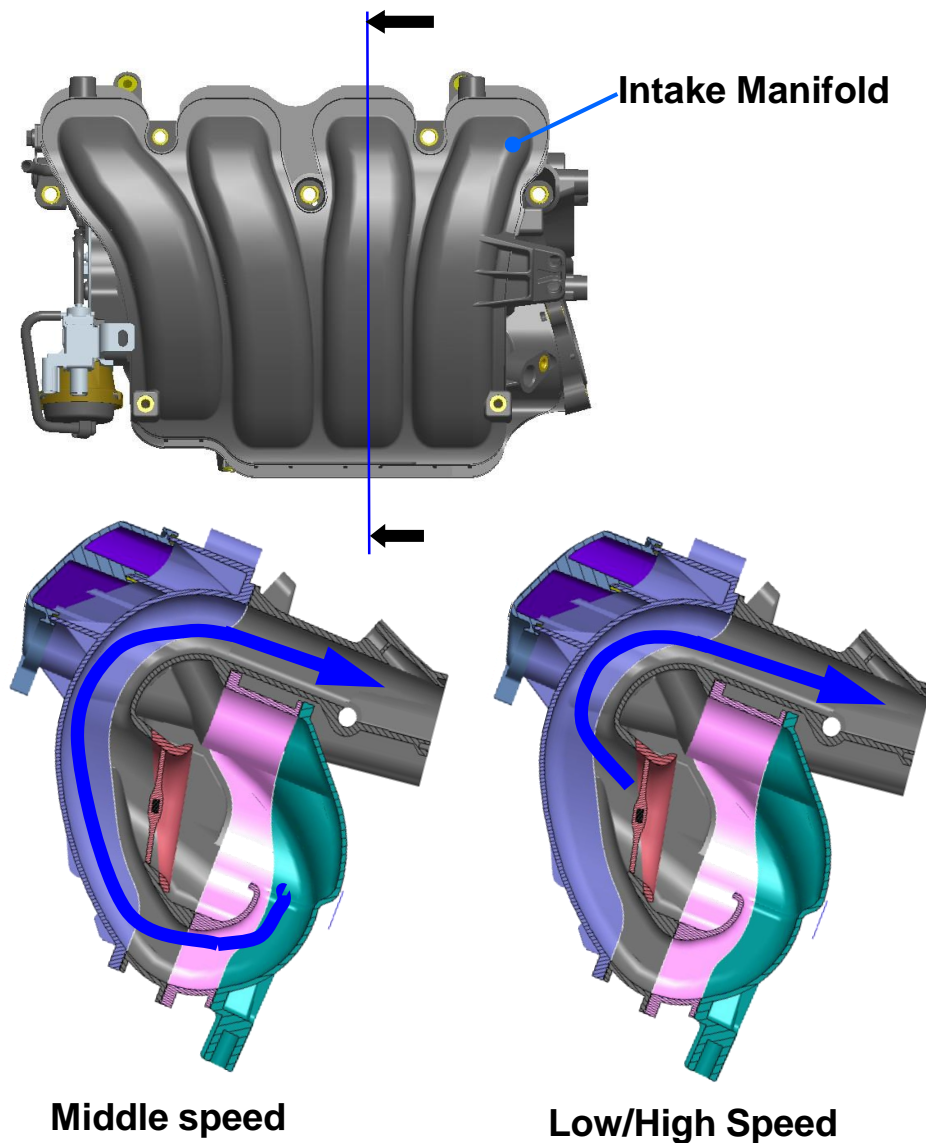


<WCC+UCC>

<Int' CCC>

VIS (Variable Intake System)

▶ Operation Range

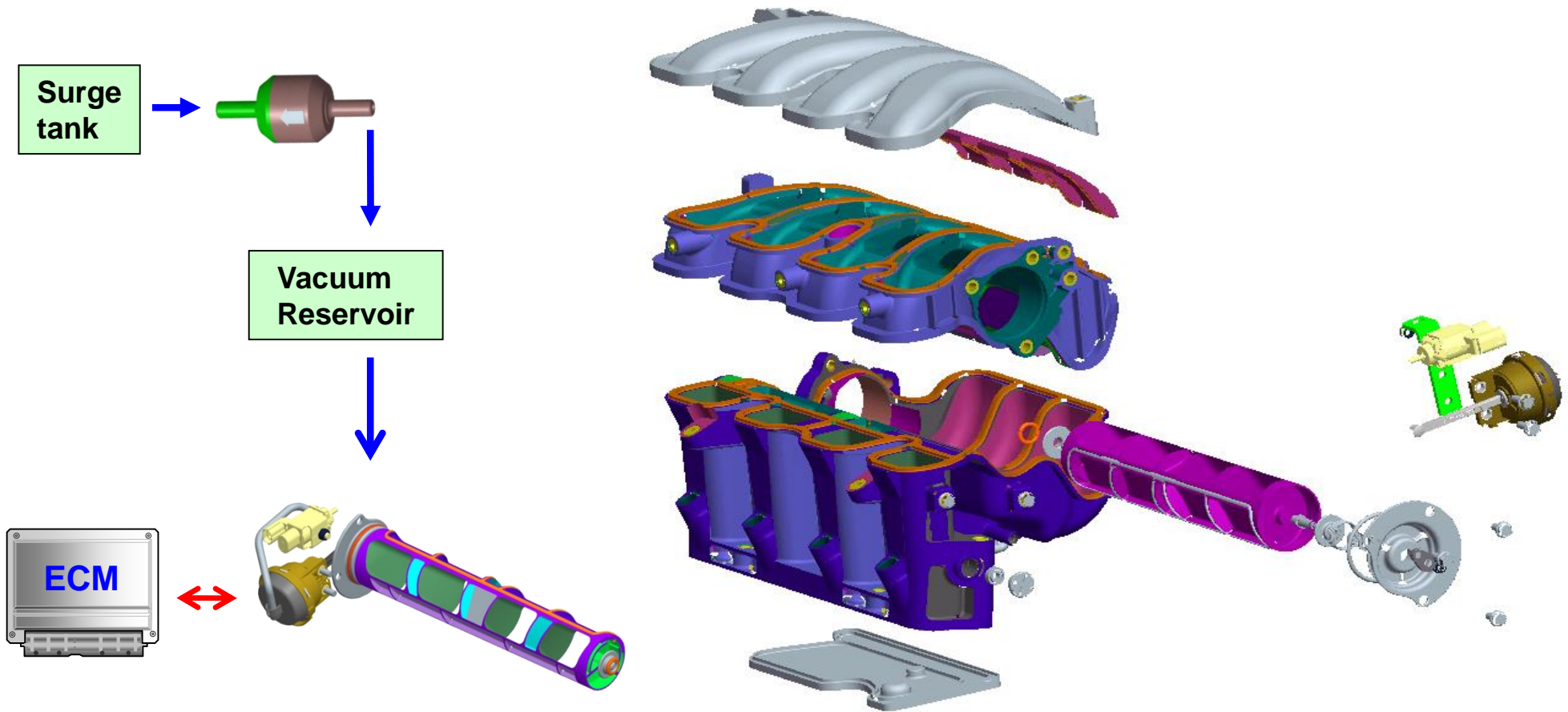


2.0L	Engine load (%)	OFF	VIS Solenoid ON (Long)	OFF
	77	OFF	VIS Solenoid OFF (Short)	OFF
		3100	4800	Engine rpm
2.4L	Engine load (%)	OFF	VIS Solenoid ON (Long)	OFF
	77	OFF	VIS Solenoid OFF (Short)	OFF
		2800	4800	Engine rpm

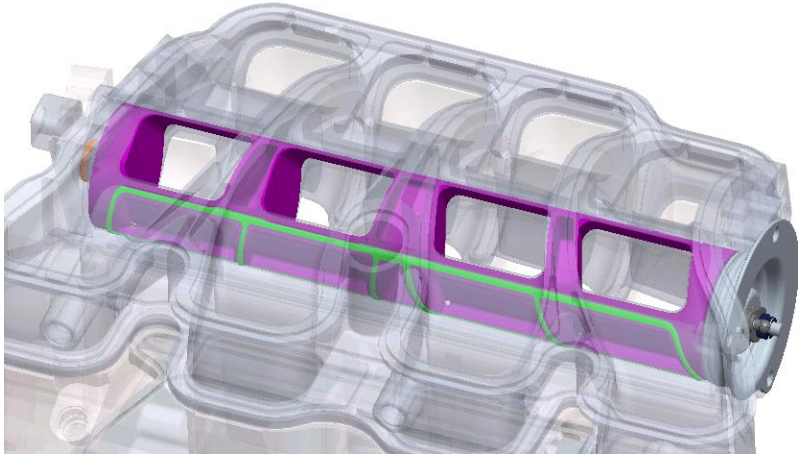
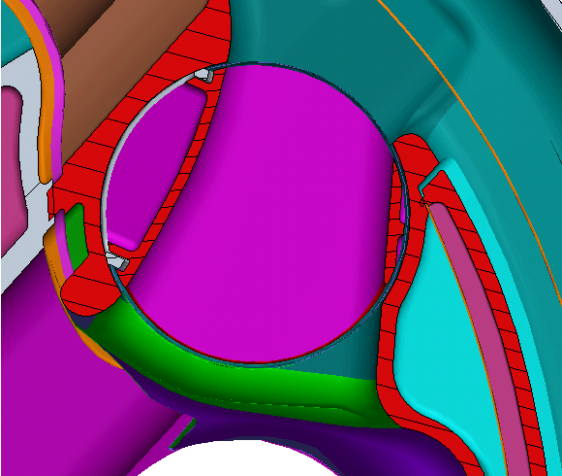
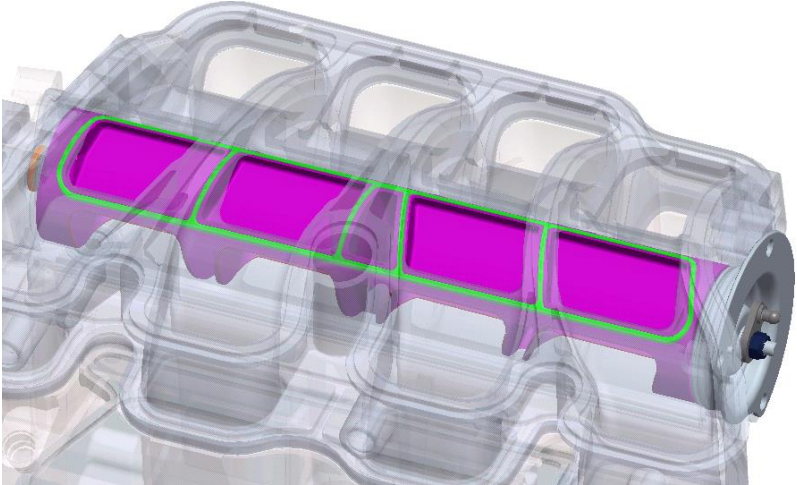
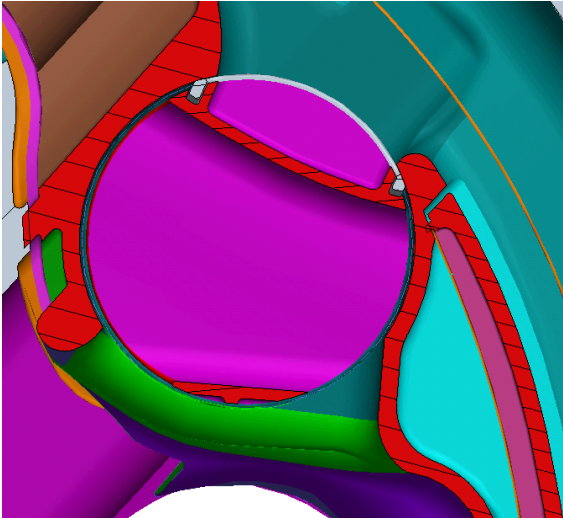
- 2 Step (Long/Short runner) type
- Depend on engine load and rpm
- 1 Solenoid valve / 1 actuators

Theta - II Engine

VIS (Variable Intake System)

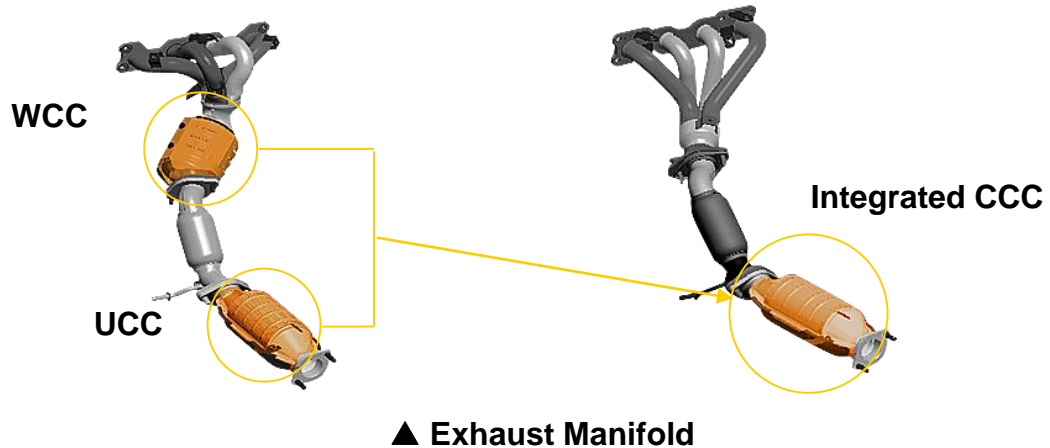


VIS (Variable Intake System)

<p>Valve open</p>		
<p>Valve close</p>		

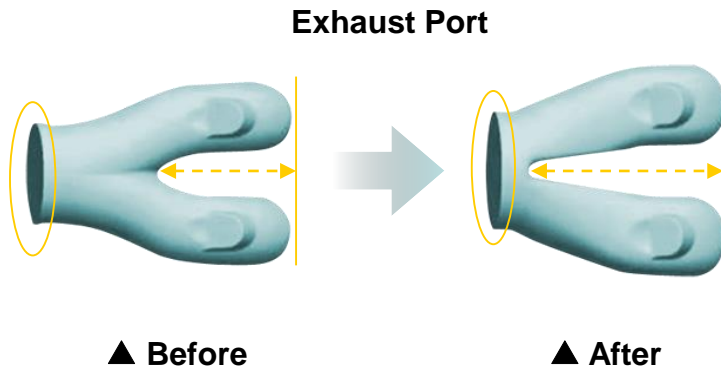
Changed Items

- Integrated CCC (ULEV-II, Euro 4)



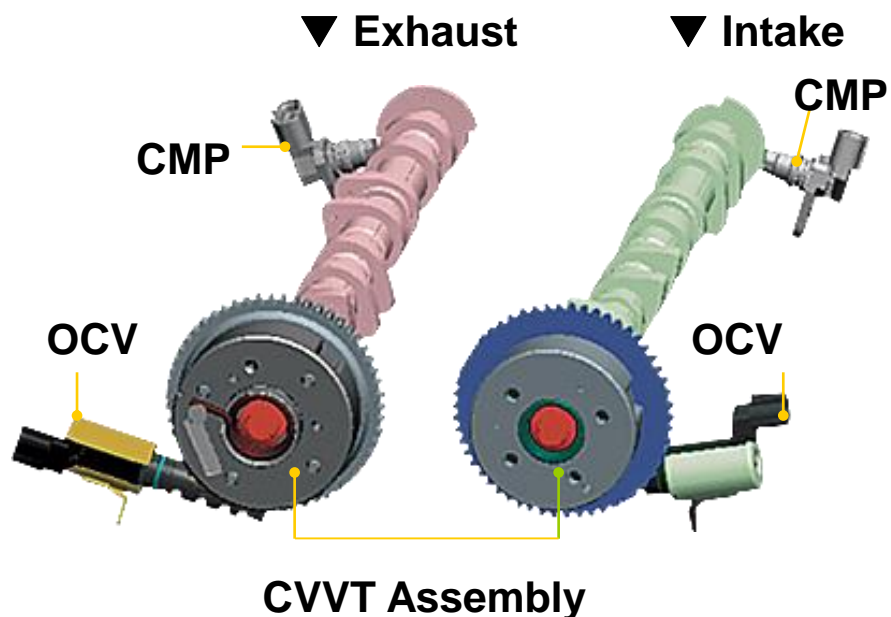
- Improved performance (1~2%)
- Reduced resistance and length from cylinder head to catalytic converter

- Reduced exhaust gas temperature in cylinder head



- Reduced fuel consumption at high speed. (2~3%)
- Increased length of dividing wall and area of heat transfer.
- Reduced exhaust gas temperature

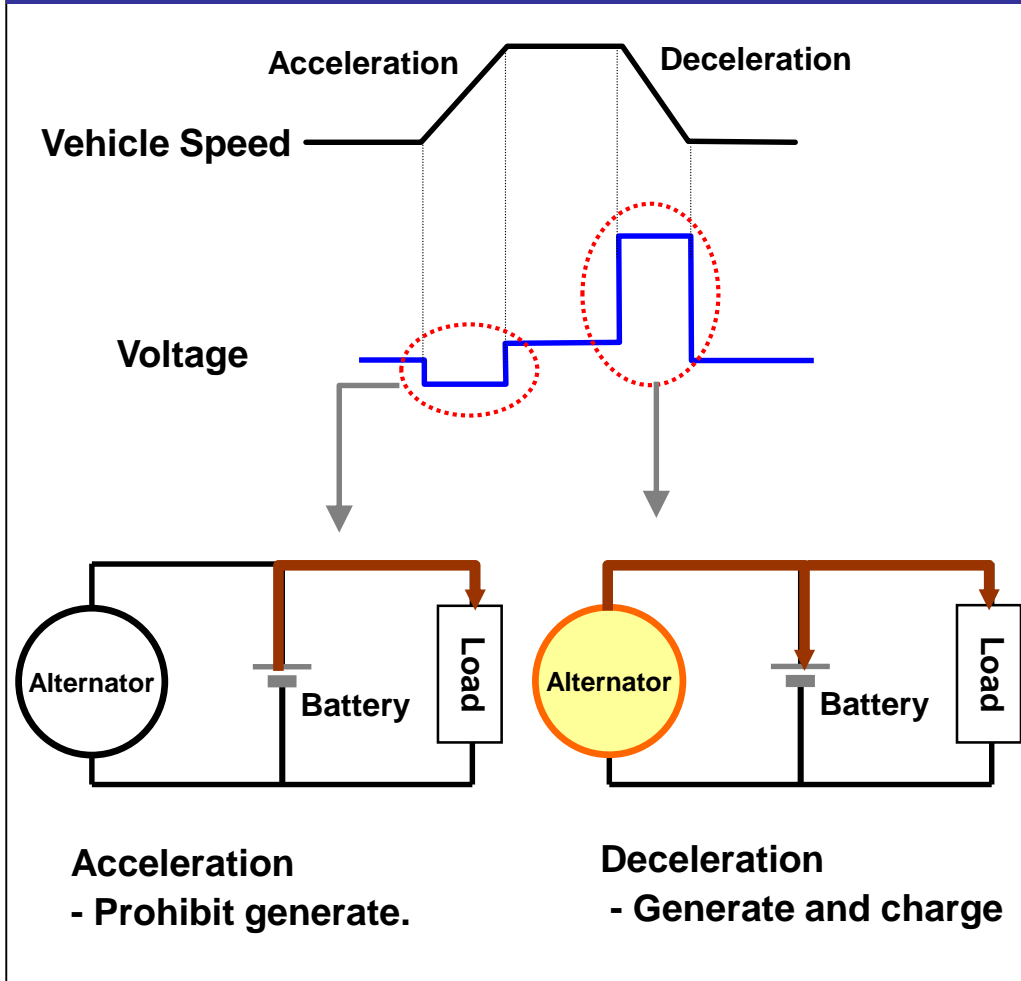
Dual CVVT



Function	Dual CVVT
Concept	To use wider operation range of CVVT, dual control is implemented.
Control system	Read cam edges information from dual (intake / exhaust) CMP sensor → Determine valve opening (target / actual)
Logic	Adjust valve (in/ex) opening timing with PWM control to adjust oil flow through CVVT assembly
Component	Dual VVTI modules, Dual CAM sensors, Dual Oil control valves, ECU pins for dual CVVT inputs & controls
Improvements	To use wider valve overlap range with adjust in/ex opening positions To reduce emission with exhaust valve timing To improve Torque with better optimized valve operation points

EPMS (Electrical Power Management System)

Control load of alternator (depends on driving condition)



Control charge the battery (Maintain battery condition)

