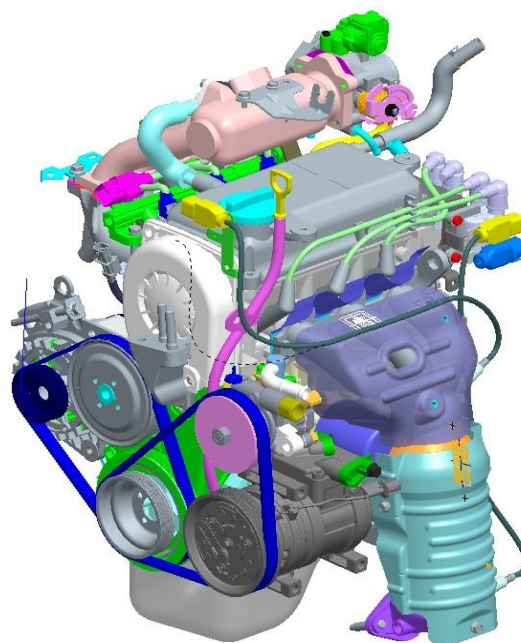


Engine

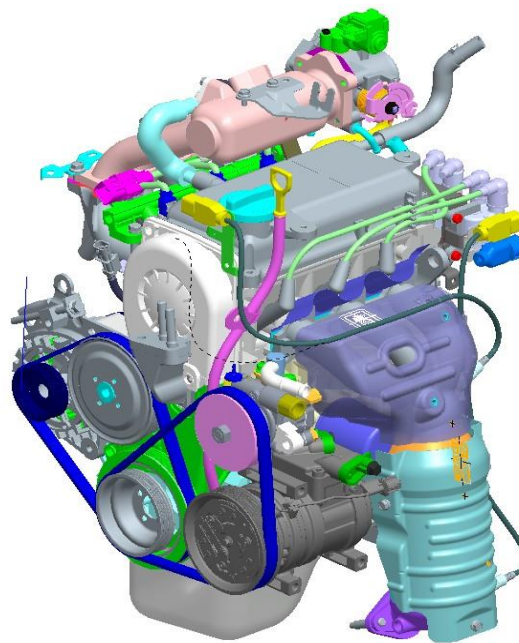


Application

Engine			T/M		Area		
Model	Volume [cc]	Performance [PS/kgf.m]	M/T	A/T	India	Europe	General
ε-1.1	1,086	64/9.9	M5EF2	A4CF0	●	●	●
U-1.1	1,120	75/15.5	M5CF1	-	-	●	-

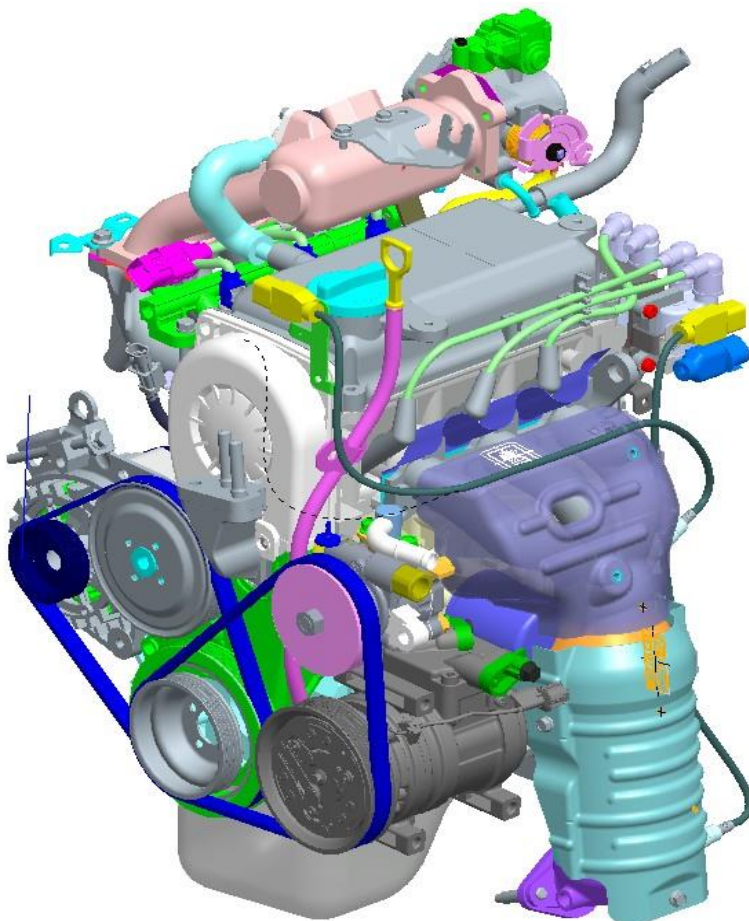
- Epsilon 1.1L engine is already used for Santro(Atoz)
- Kappa 1.2L engine, which is newly developed, will be applied in 2008.
- Common Rail U-1.1L engine is only for EU market with manual transaxle.
- Common Rail U-1.1L engine has 3 cylinders

Epsilon Engine



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Epsilon engine



Engine	ε-1.1
Displacement (cc)	1086
Max. Power (PS / RPM)	64 / 5,500
Max. Torque (kgf·m / RPM)	9.8 / 2,800
Feature	<ul style="list-style-type: none"> • SOHC In-line 4 cylinders (12 valves) • One Timing Belt • DLI • BOSCH PCM • Return-less fuel system • ROSA type ISA

Tightening Torque



-When cold : 60 ~ 70 Nm

-When hot : 70 ~ 75 Nm

Traditional torque method is used. To keep proper installation, mentioned torque should be tightened with right procedure.

Rocker Arm



■ Adjustment Specification

	Intake	Exhaust
Standard Clearance (Intake, mm)	0.2	0.25
Standard Clearance (Exhaust, mm)	0.1	0.17



No.1's
TDC

Camshaft



■ Target Wheel

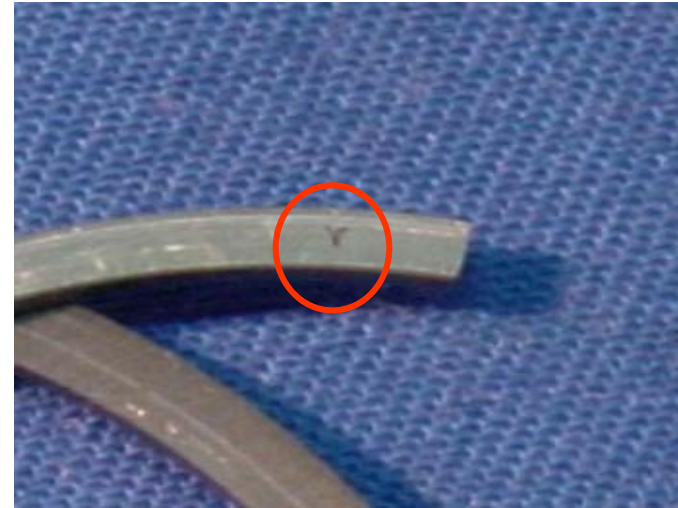


Be sure to remove camshaft from front side to rear side(fly wheel side).

Piston



■ Upside Mark



Top ring and second ring have unique up side mark. Be sure to keep this mark when you assemble piston ring to piston.

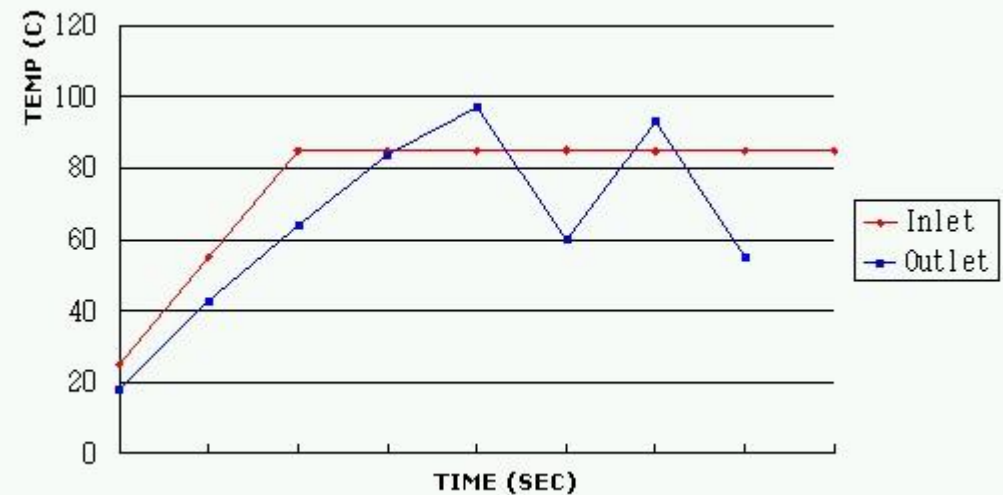
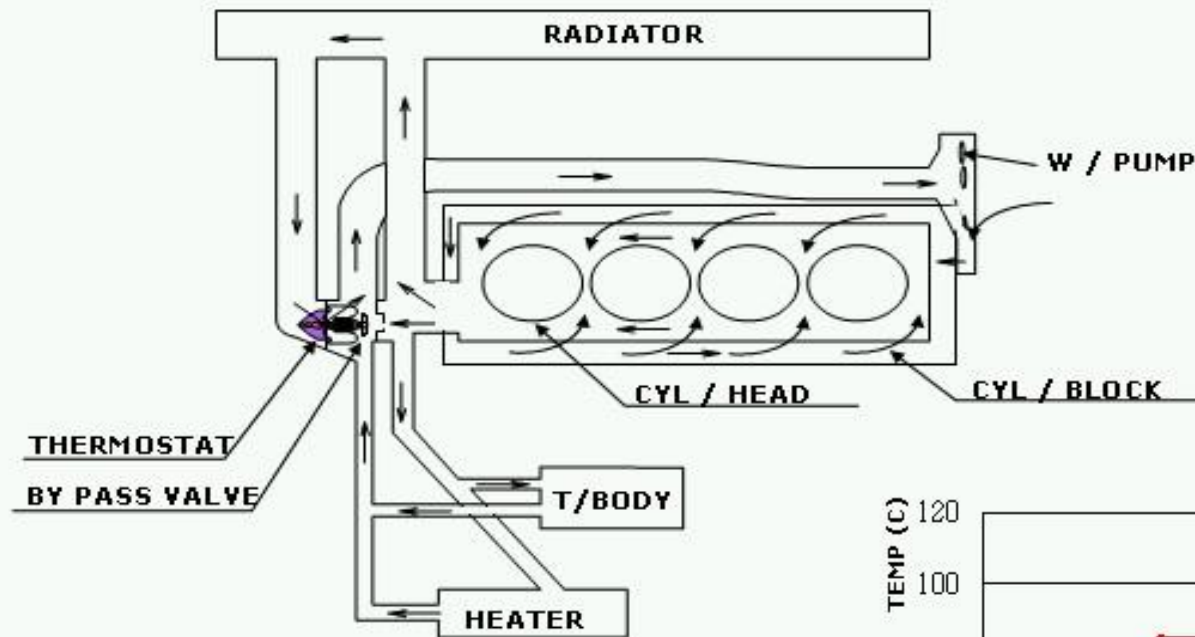
To assemble piston pin to piston [SST\(09324-33001\)](#) is needed.

Timing



Inlet Cooling System

INLET CONTROL TYPE DIAGRAM



Thermostat opening temperature is 82°C.
When it fully opens, it becomes 95°C.

Oil Pump and Oil Pressure Switch

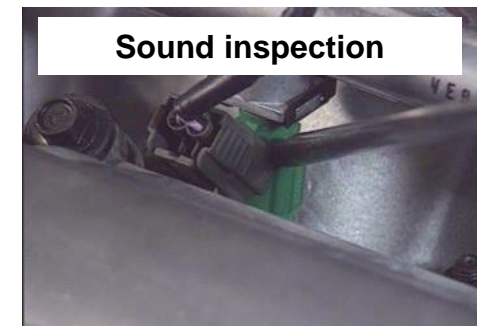
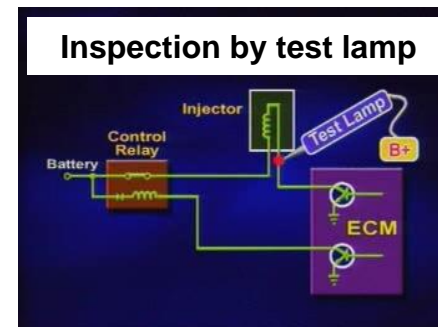
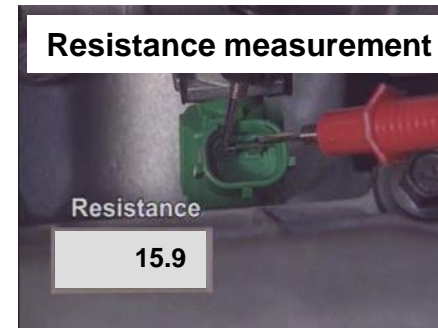
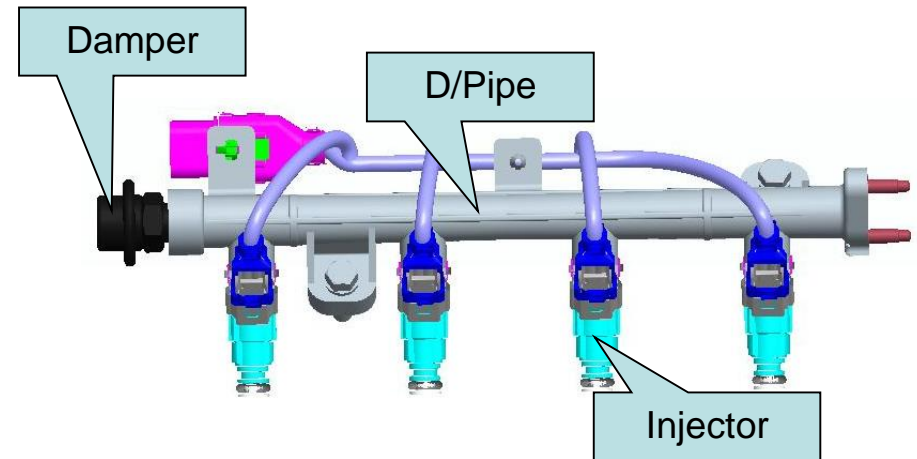
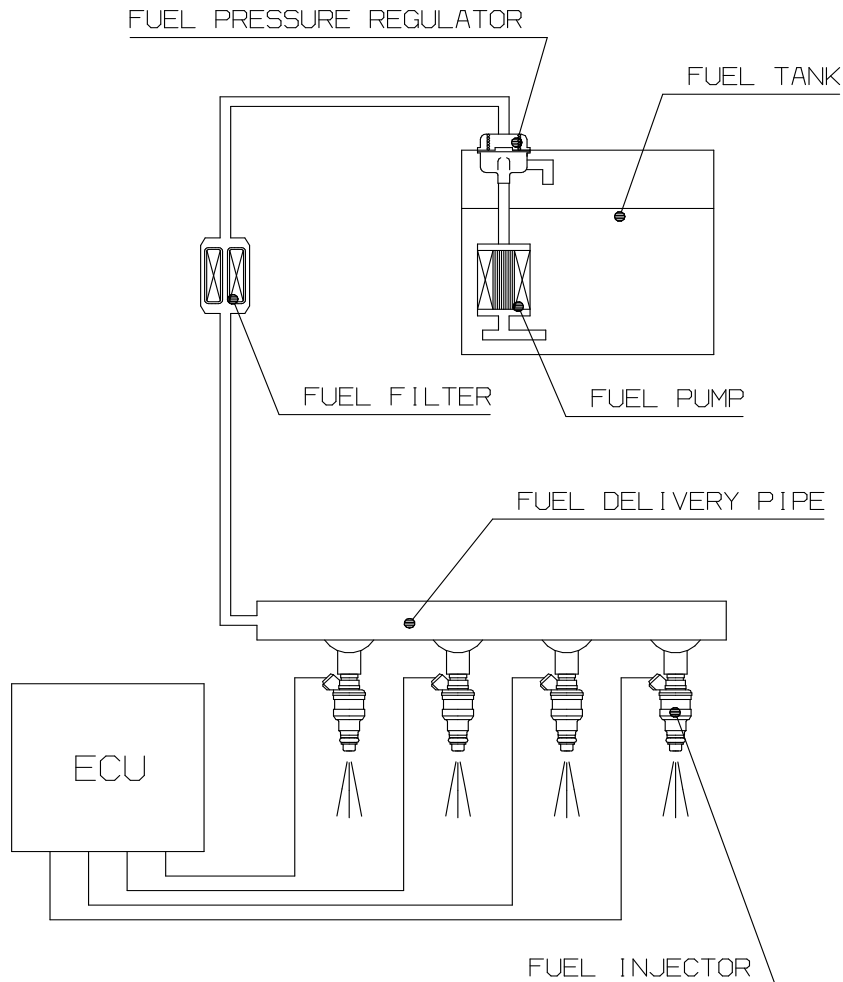


Oil pressure switch is screwed near engine oil filter. When the oil pressure goes down less than 0.5kg/cm^2 , oil pressure warning lamp turns on.

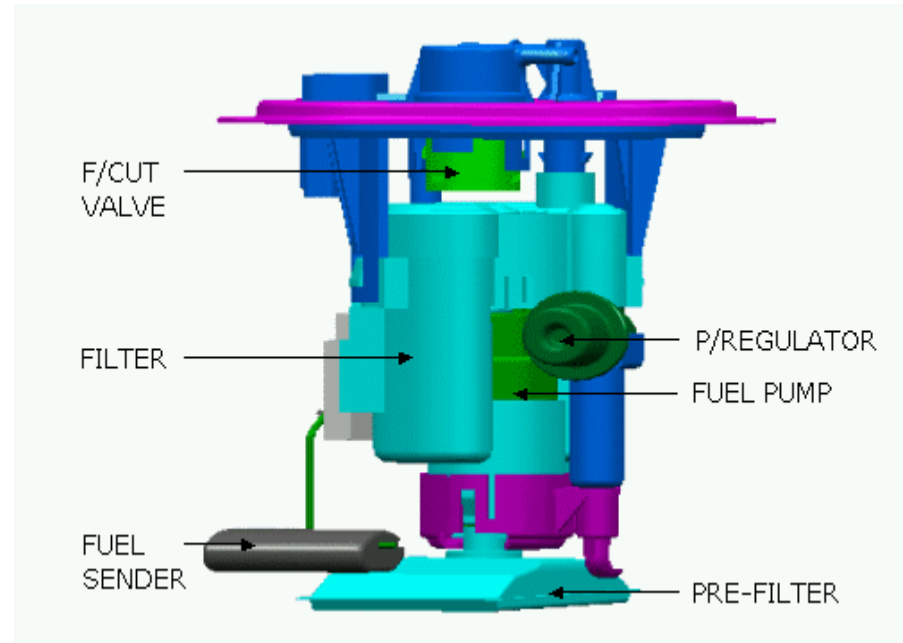
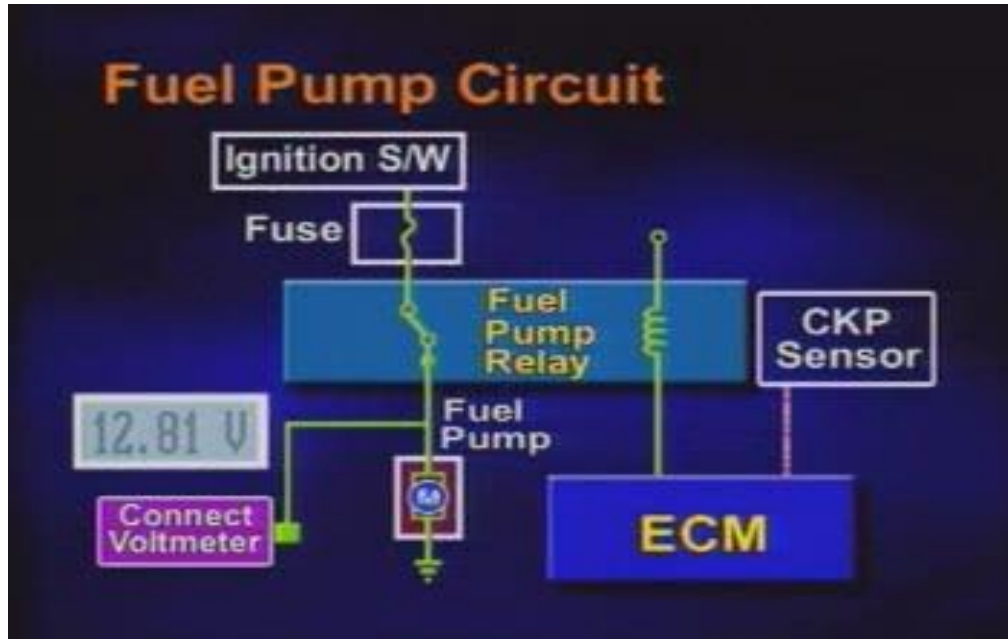
At engine idle condition after warm up, normally oil pressure reaches $147\text{kpa}(1.5\text{kg/cm}^2)$



Return Less Fuel System (RLFS)



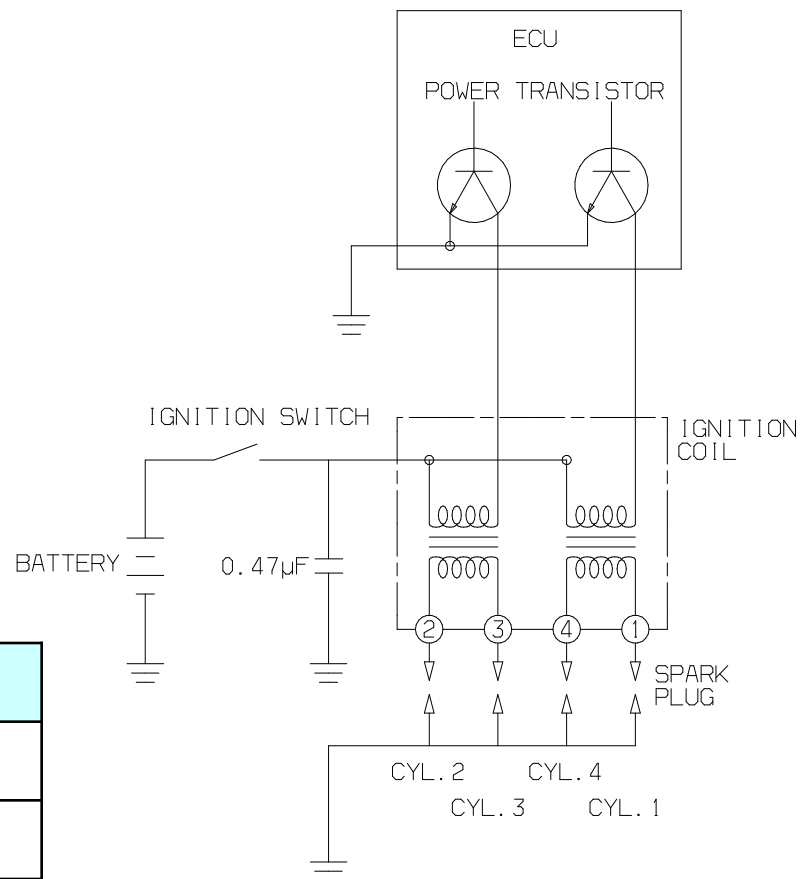
Fuel Pump



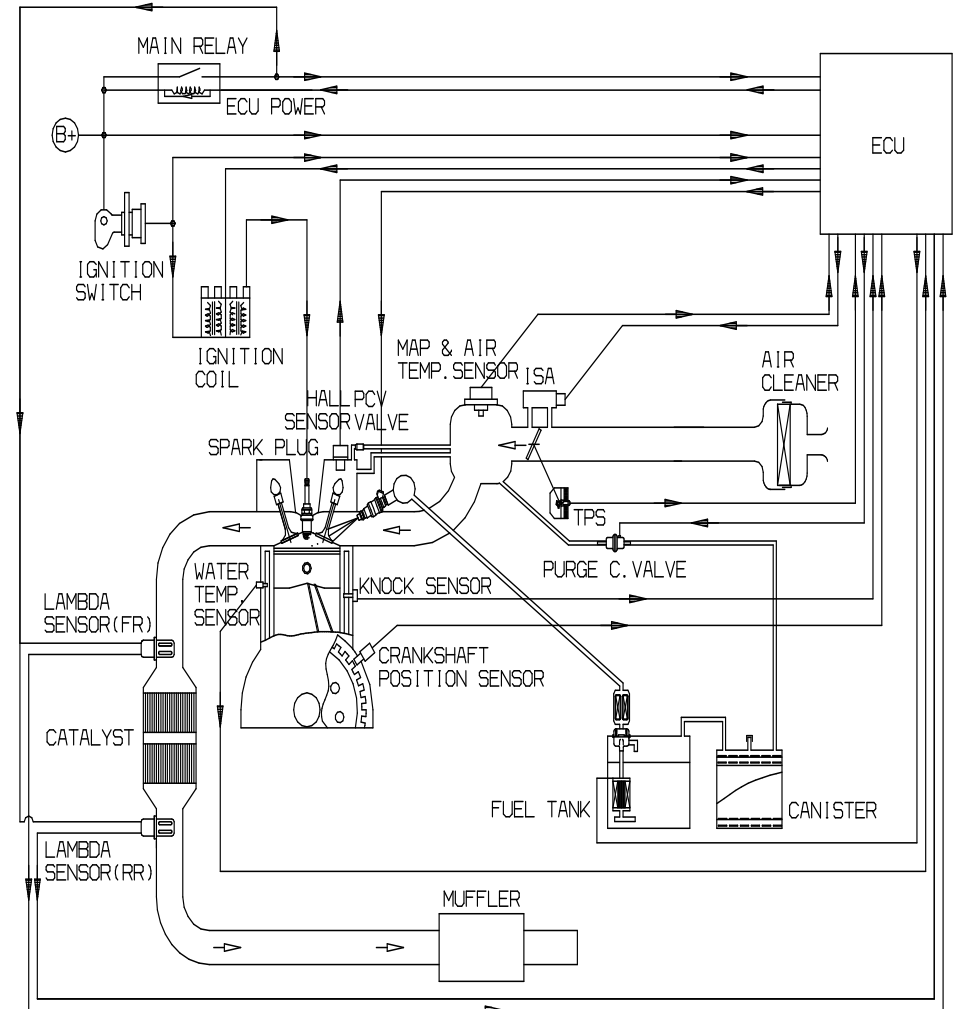
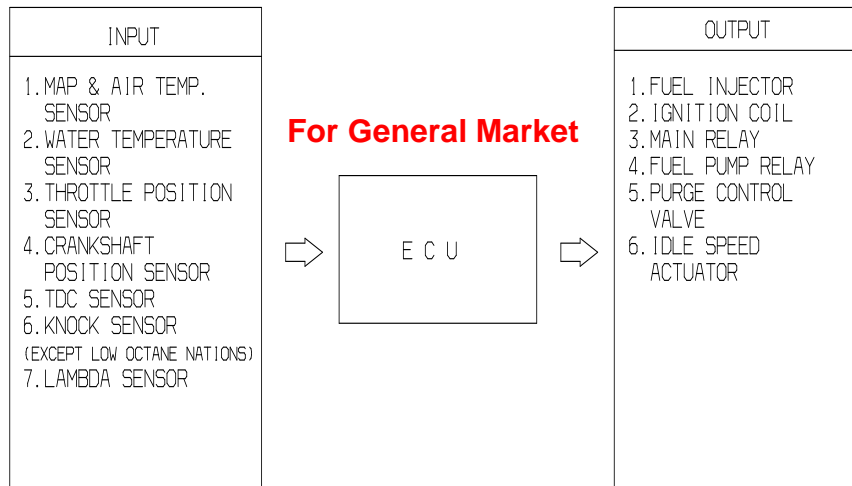
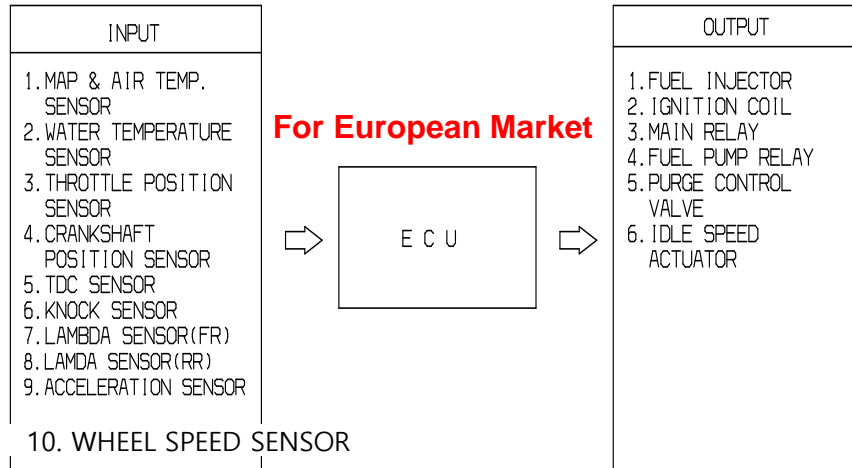
Ignition Coil and Spark Plug



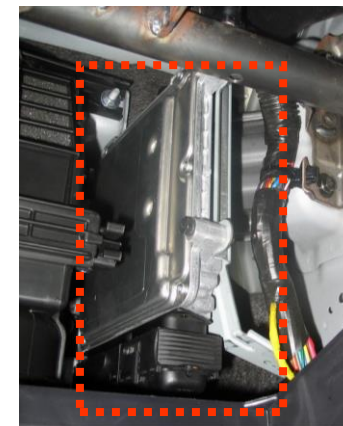
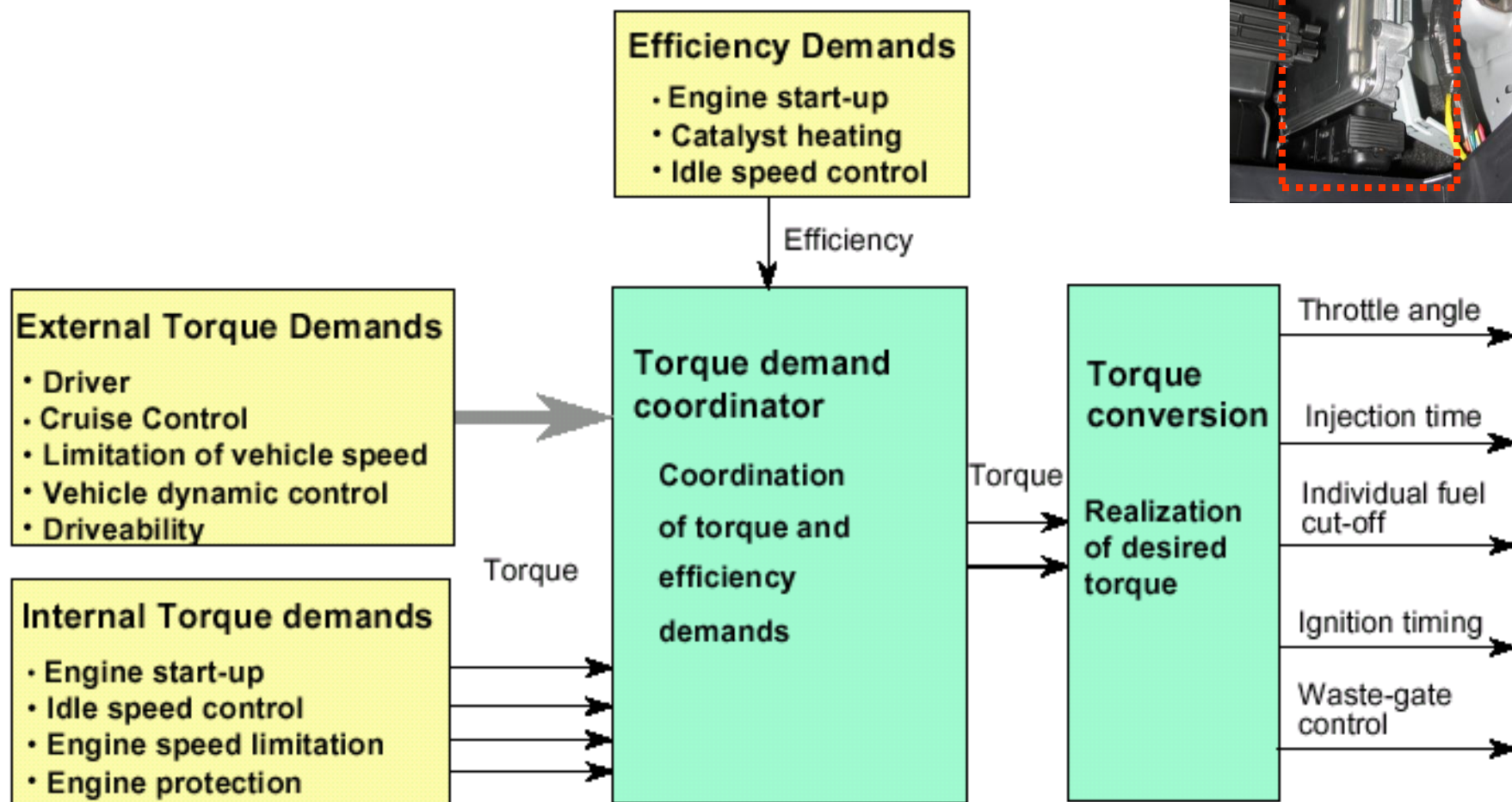
Item		Specification	
Ignition Coil	Type	Mold Dual Coil	
	Resistance	Primary	$0.82\Omega \pm 10\%$
		Secondary	$15.5K\Omega \pm 10\%$



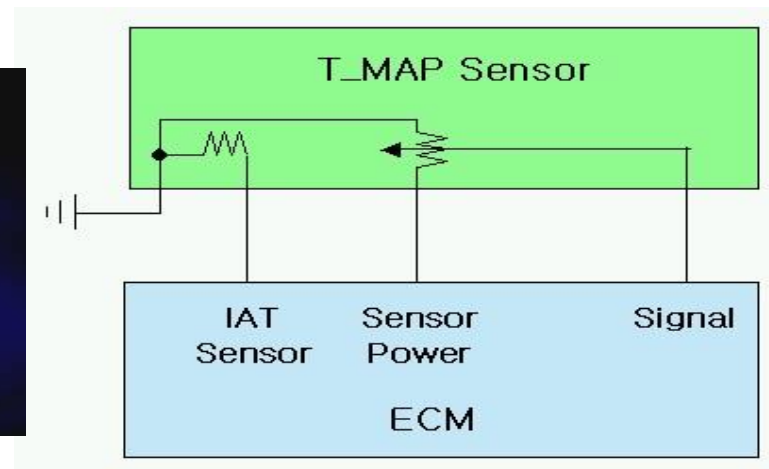
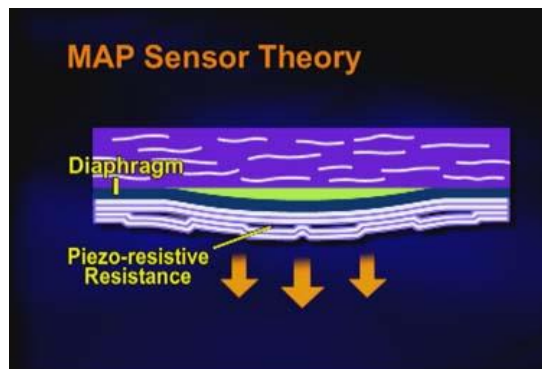
Input & Output



Bosch M7.9.8



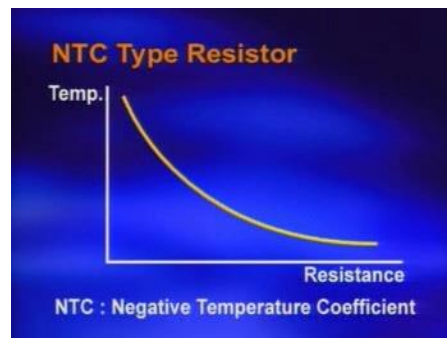
T_MAP Sensor



Intake air temperature sensor is integrated with T_MAP sensor. It produces 0.3 ~ 4.8 voltage range as signal.

At ignition on condition, it shows 3.8 ~ 4.2 V which is converted to atmospheric pressure.

IAT Sensor

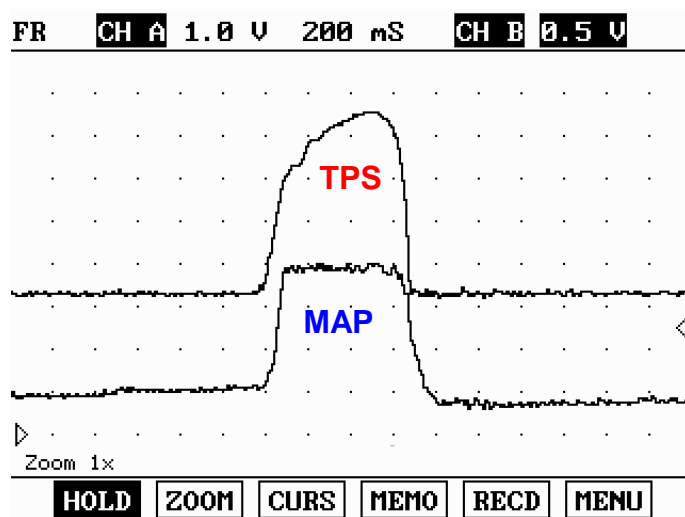
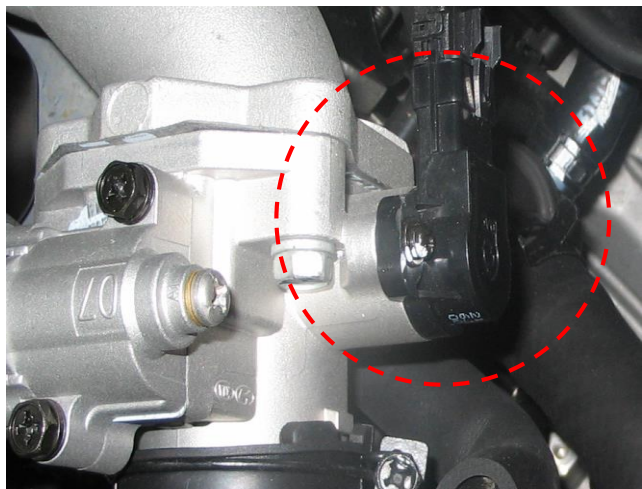


When IAT fault is detected, current data shows -40°C as a default value.

1.4 SIMU-SCAN		
× MAP SENSOR	34.4 kPa	▲
× MAP SENSOR(VOLT)	2.4 V	■
× INT. AIR TEMP. SNSR	39.0 °C	□
× ENGINE SPEED	850 rpm	▼
SIMULATION OF VOLTAGE		
2.26 V		
(CH B ONLY)		
METR	SIML	+ - FIX

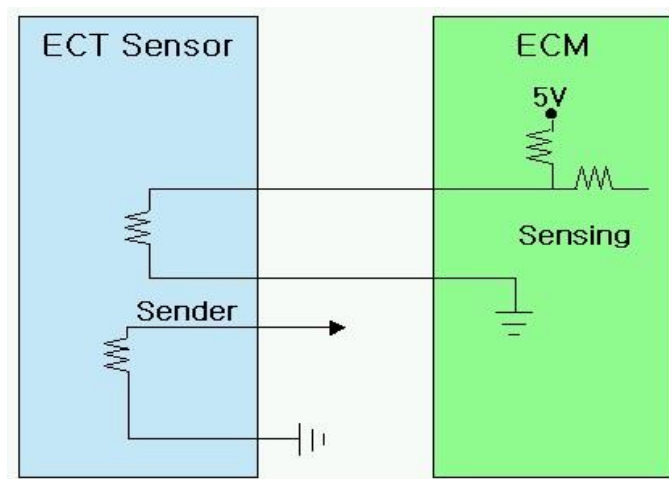
Checking Condition	Temperature	Current Data	Remarks
IG On	0°C	4.0 ~ 4.4V	NTC type
	20°C	3.3 ~ 3.7V	
	40°C	2.5 ~ 2.9V	
	80°C	1.0 ~ 1.4V	

TP Sensor (Lever type)



It's better check TPS waveform with MAP signal's together. Both signals are similar and signal trend has to be compared together.

ECT Sensor



This sensor has 4 terminals. 2 are for ECT sensor. These two terminals are gold coated. Another 2 are for engine temperature indicator in cluster.

1.4 SIMU-SCAN		
* COOLANT TEMP. SENSOR	118.5°C	▲
* TARGET IDLE RPM	850 rpm	■
* A/F CLOSED LOOP	ON	
* FAN-LOW SPEED	ON	▼
SIMULATION OF VOLTAGE		
220 mV		
(CH B ONLY)		
METR	SIML	+ - FIX

Checking Condition	Temperature	Current Data	Resistance (KΩ)
IG On	0°C	4.27±0.3V	5.18 ~ 6.60
	20°C	3.44 ±0.3V	2.27 ~ 2.73
	40°C	2.72±0.3V	1.059 ~ 1.281
	80°C	1.25±0.3V	0.298 ~ 0.322

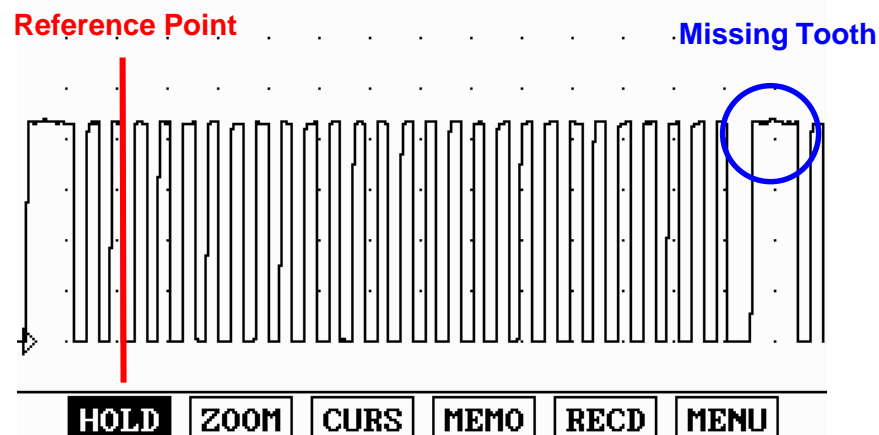
CKP Sensor



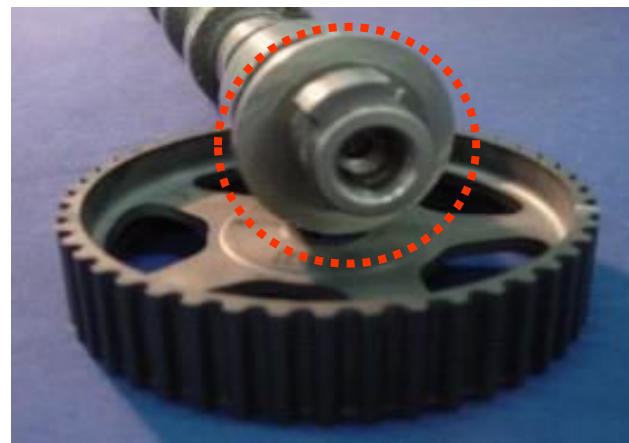
Hall IC type CKP sensor is used. ECM No. 15 is used for sensor signal.

Unlike other general target wheel which is composed with 60 teeth including 2 missing teeth, it has 30 teeth with 2 missing. Except this tooth unit, all logical processing in ECM is the same

FR CH A 2.0 V 5.0 mS CH B 1.0 V
MIN:- 84.0mV AVE: 4.5 V MAX: 8.9 V
FREQ: 400.00 Hz DUTY: 52 %



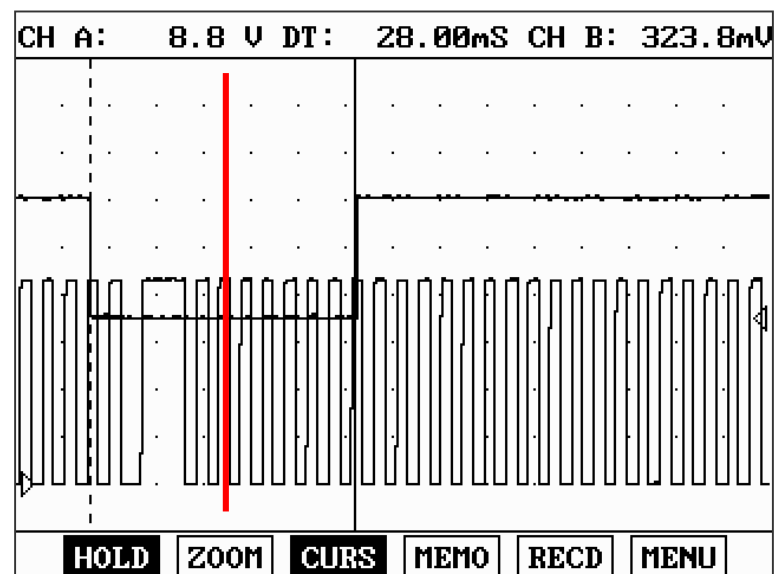
CMP Sensor



CMP sensor is also used from Hall IC.

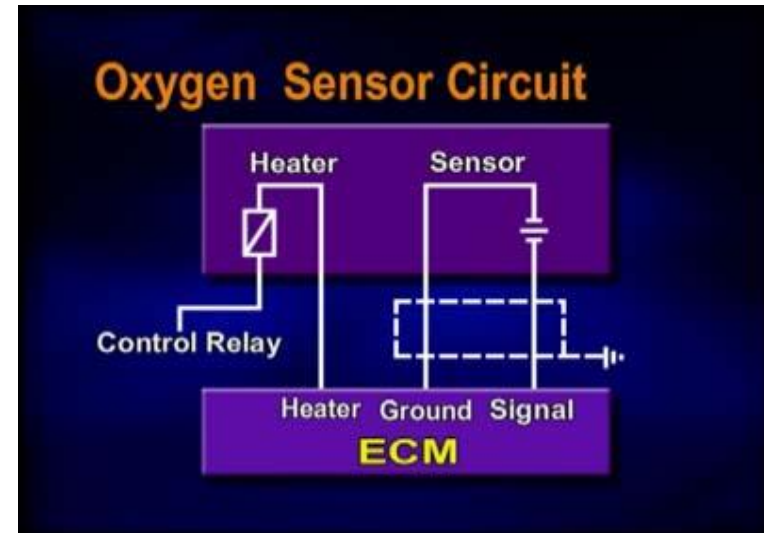
It distinguishes the cylinder No. by comparing with CKP sensor.

It is located near ignition coil. Camshaft target wheel shape is as shown on the picture.



[CMP with CKP Sensor Waveform]

Oxygen Sensor



Zirconia type oxygen sensor is used.

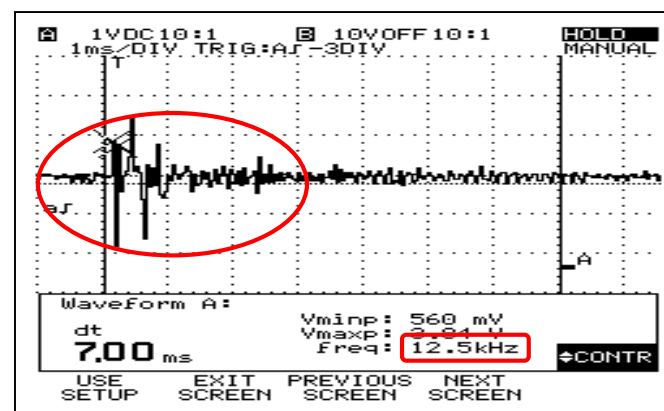
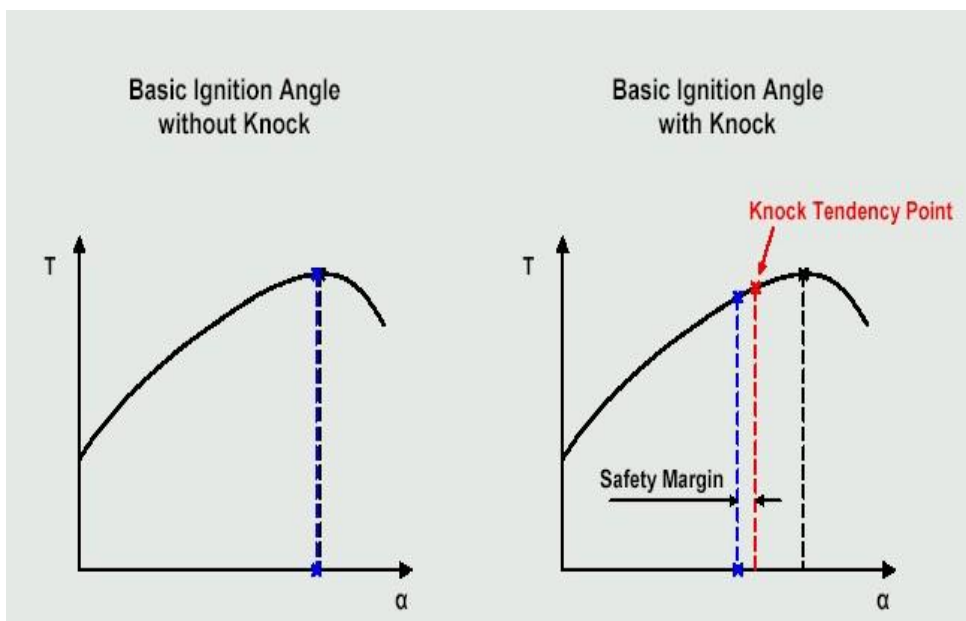
The Zirconia oxygen sensor generates a small voltage depending on the exhaust gas condition.

The normal voltage range is 0.2 ~ 0.8 volts. 0.2 volts indicates a lean mixture and a voltage of 0.8v indicates a richer mixture.

Knock Sensor



Engine knock control is used to constrain the knocking. Knock sensor detects knocking generated in engine and retard ignition timing. The knock sensor is installed at between No2. and No3 cylinder. Like other piezo type sensors, this is made by piezo material. Tightening torque is $20 \pm 5 \text{ Nm}$.



- Maximum Retard Limit : 12°
- When knocking is detected : Initially retard 3° and increase step by step with 0.75°

Wheel Speed Sensor



The main role of wheel speed sensor is detecting the rough load condition which allows misfire monitoring inhibition (EOBD:Euro3/Euro4). When the vehicle is running on rough load condition, the CKP angular speed is affected from this road condition. It can signal to ECM as a misfiring. In this case wheel speed sensor detects this kind of rough load condition and order ECM not to consider this situation as a misfiring.

M/T		Input Variable	ECU PIN NO.
With EOBD	With ABS	ABS Signal	K 64
	Without ABS	Wheel Speed Sensor	K 79, K 58 (K 64 open)
Without EOBD	With ABS	Vehicle Speed Sensor	K 64
	Without ABS		K 64
AT		Input Variable	PCM PIN NO.
With EOBD	With ABS	ABS Signal	K 20
	Without ABS	Wheel Speed Sensor	A 60, A 45
Without EOBD	With ABS	From TCM	K 20
	Without ABS		K 20

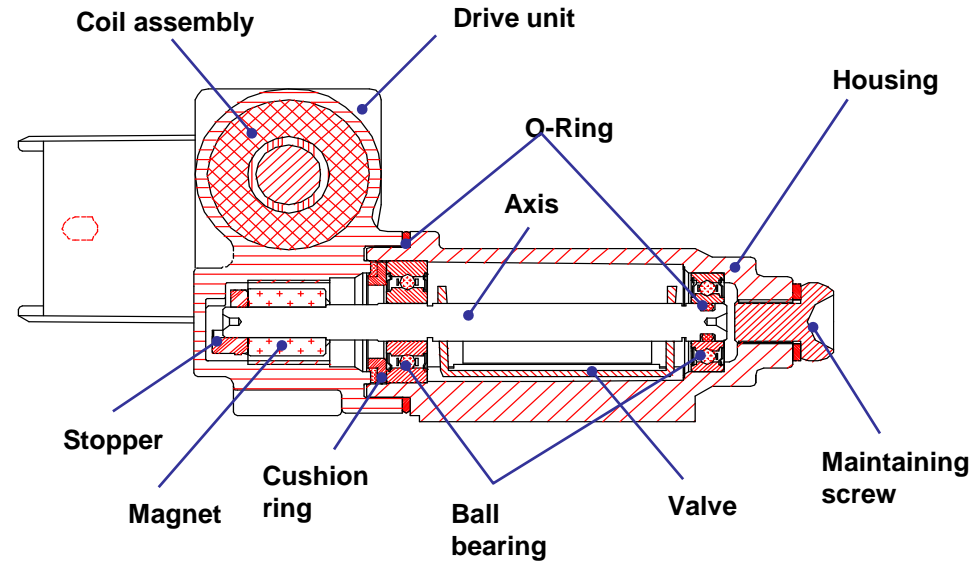
Vehicle Speed Sensor



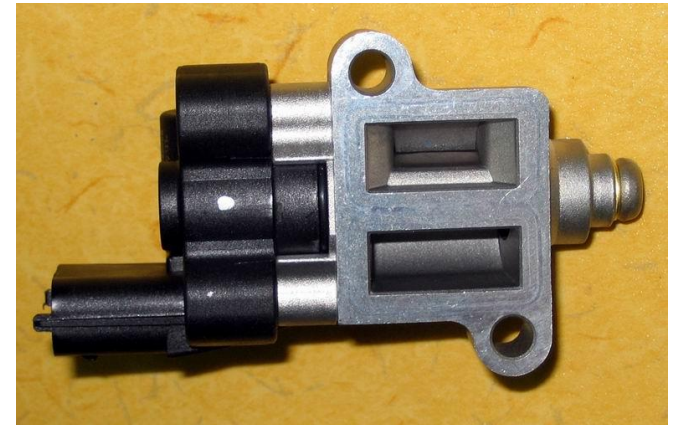
- Vehicle speed sensor is applied on MT only.
- In the case of AT, the vehicle speed sensor is eliminated.
Instead, ECM receives a corresponding vehicle speed from others.
(refer to the table below)

T/M	Type		Vehicle speed from	ECU PIN NO.
MT	With EOBD	With ABS	ABS unit	K64
		Without ABS	Wheel Speed Sensor	K79, K58 (K 64 open)
	Without EOBD	With ABS	Vehicle Speed Sensor	K64
		Without ABS		
AT	With EOBD	With ABS	ABS unit	K20
		Without ABS	Wheel Speed Sensor	K60, K45
	Without EOBD	With ABS	From TCM	K20(from A49)
		Without ABS		

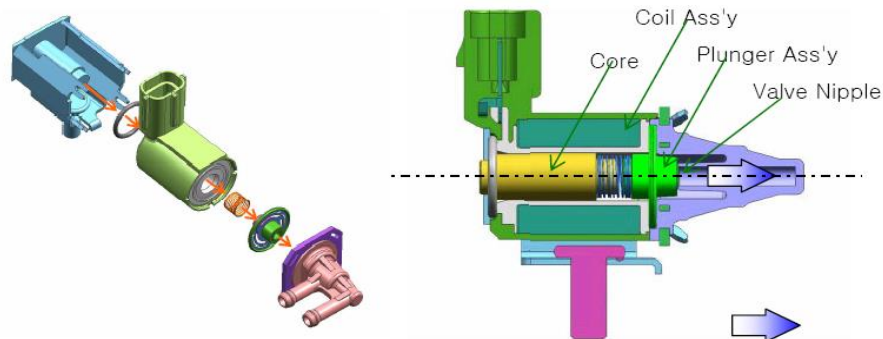
ISA (Idle Speed Actuator)



1. The ISA controls the proper intake air mass in every engine operating conditions.
2. The ECU controls the ISA (double coil of open/close) with frequency of 250Hz.
3. The ISA duty is determined by basic map and compensation of ATS, WTS, altitude and A/CON compressed load etc.

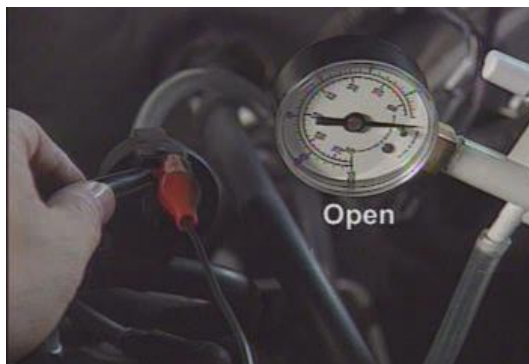
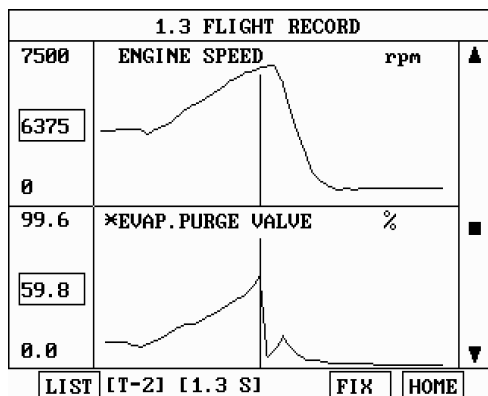
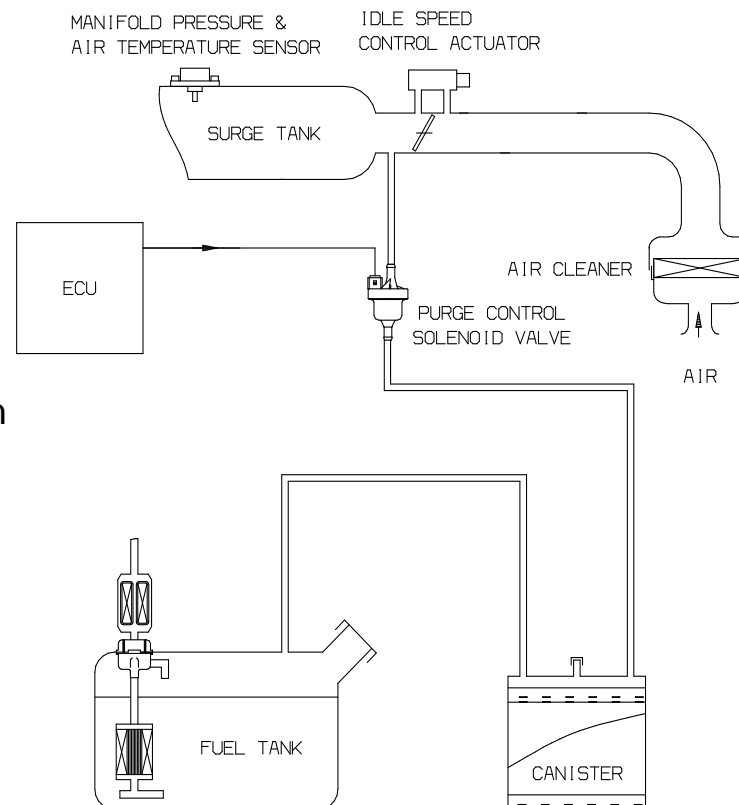


PCSV

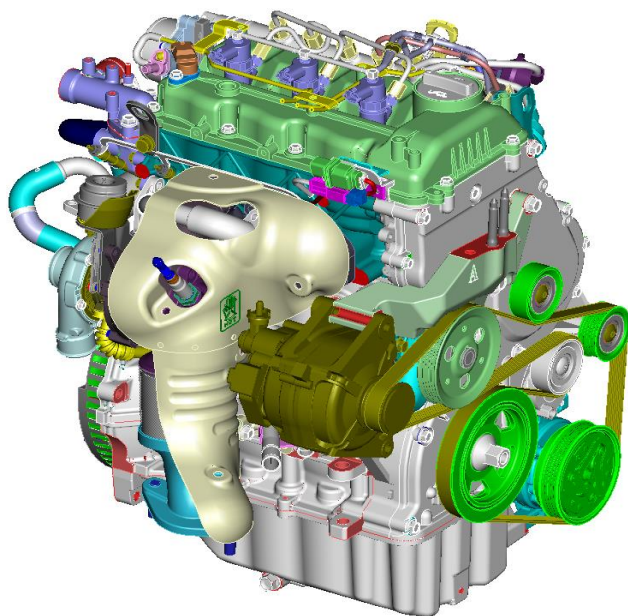


For Evaporative gas monitoring.

PCSV is installed between the canister and the intake manifold, it delivers or shuts the vapor gas to intake manifold, which is stored in the canister. The ECM controls the purge control solenoid valve.

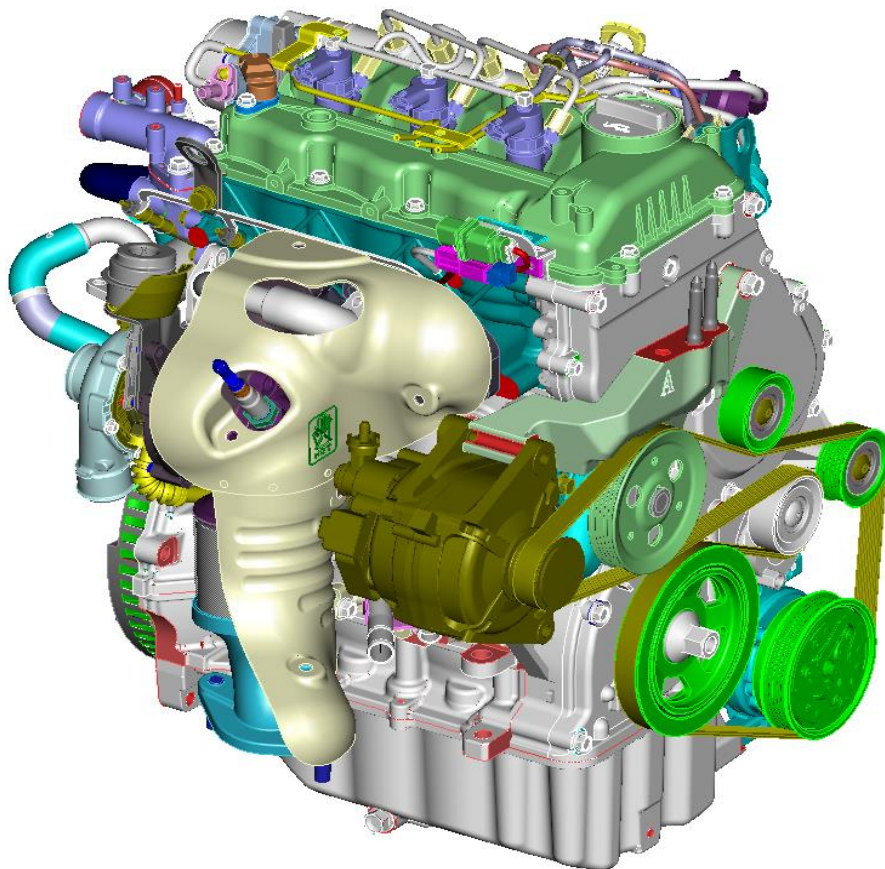


Common Rail U-Engine



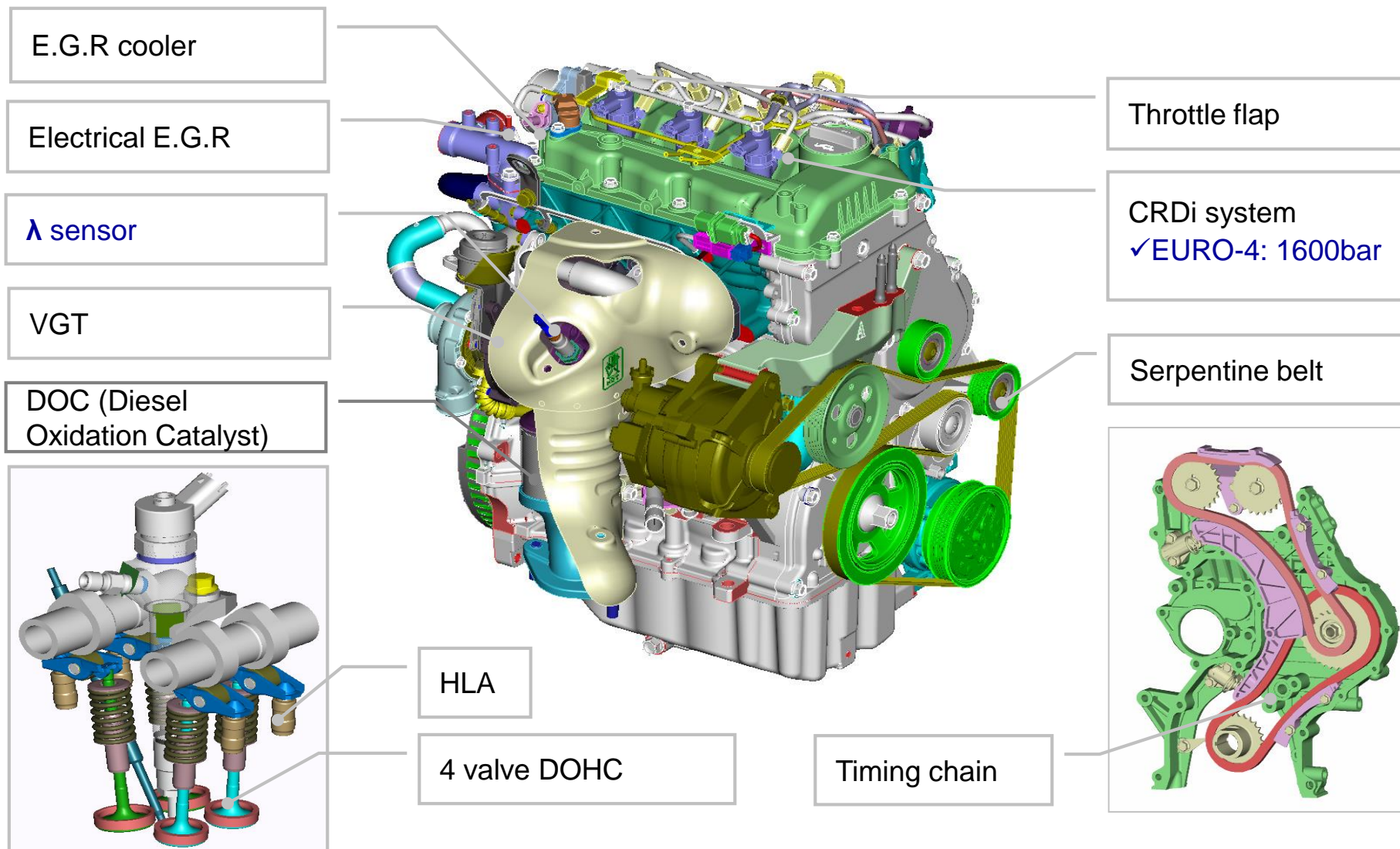
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U engine



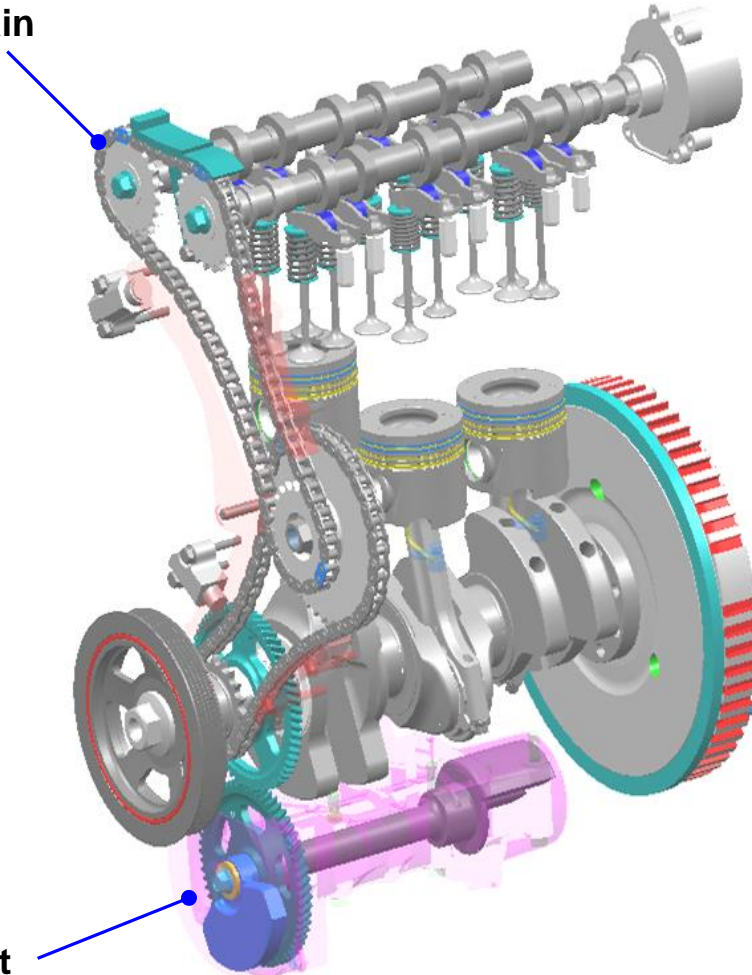
Engine	U - 1.1 VGT
Displacement (cc)	1120
Max. Power (PS / RPM)	75 / 4000
Max. Torque (kgf·m / RPM)	15.5 / 2000
Feature	<ul style="list-style-type: none"> • VGT Turbo Charger • Timing Chain • Electrical EGR & EGR cooler • Lambda Sensor • Throttle flap • Serpentine belt • Bed Plate • In-line 3 cylinders

System Overview



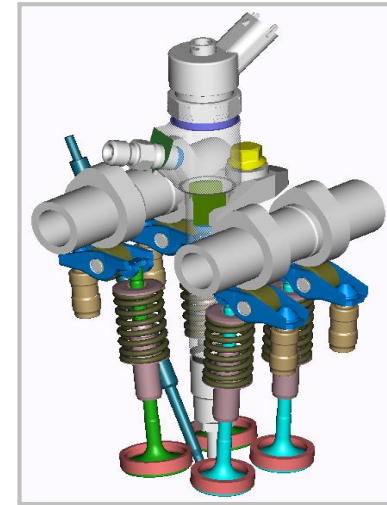
Timing System

Timing Chain



Balance shaft

- ◆ DOHC 4 Valve
- ◆ VALVE operating type:
- END PIVOT ROLLER SWING ARM



- ◆ CAM operating type : 2 Chains
- ◆ Hollow camshaft
- ◆ Balance shaft is operated by gear
-> for reducing vibration

Balance Shaft



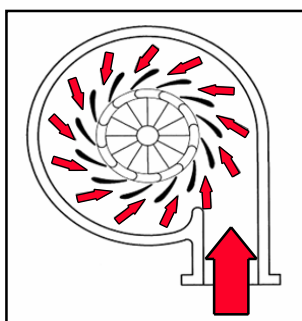
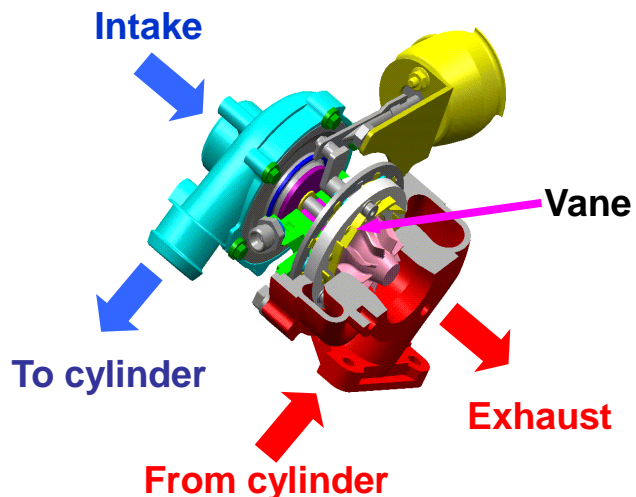
Timing Mark



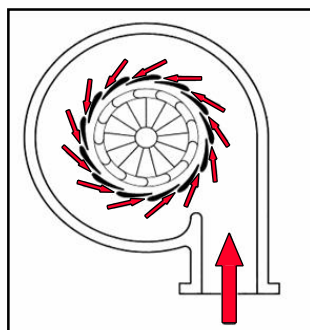
Balance Shaft

Intake / Exhaust manifold

◆ VGT



High Speed



Low Speed

◆ Electrical EGR Valve

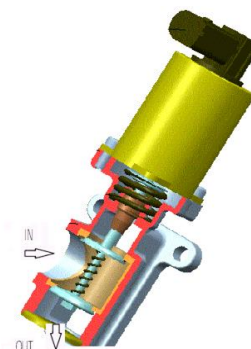
- Valve type : linear solenoid type
- Control voltage : 13.5V (Duty control)
- Coil resistance : 7.3 ~ 8.3 Ω (at 20°C)

◆ EGR COOLER

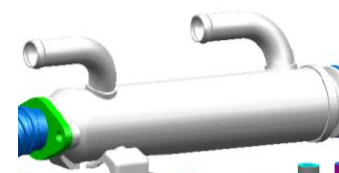
- Coolant cooling type
- Reduced intake air temperature and increased intake air
→ Reduced NOx and PM

◆ WCC (Warm-up Catalytic Converter)

◆ Lambda sensor

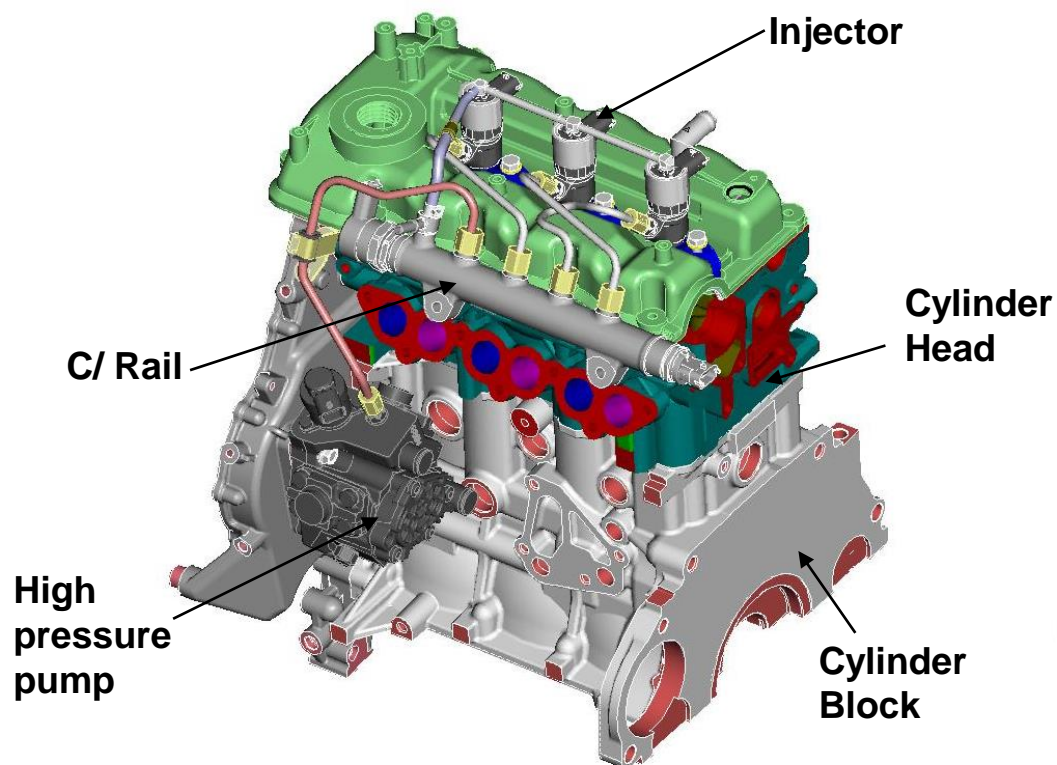


E / EGR Valve



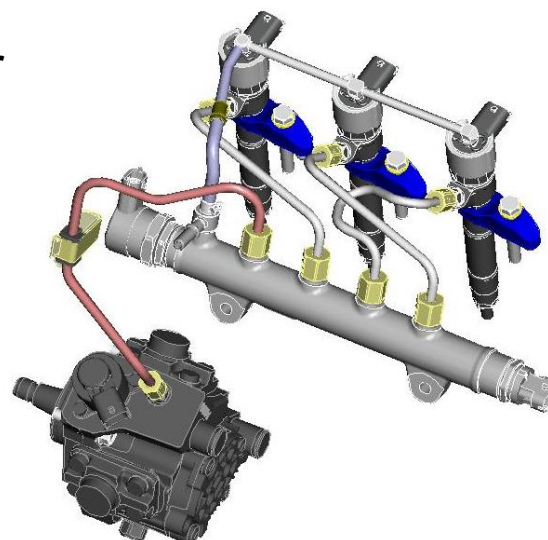
EGR cooler

Fuel system – location / component



◆ Component

- High Pressure Pump
- Common Rail
- Injector



◆ Max. Pressure : 1600 bar

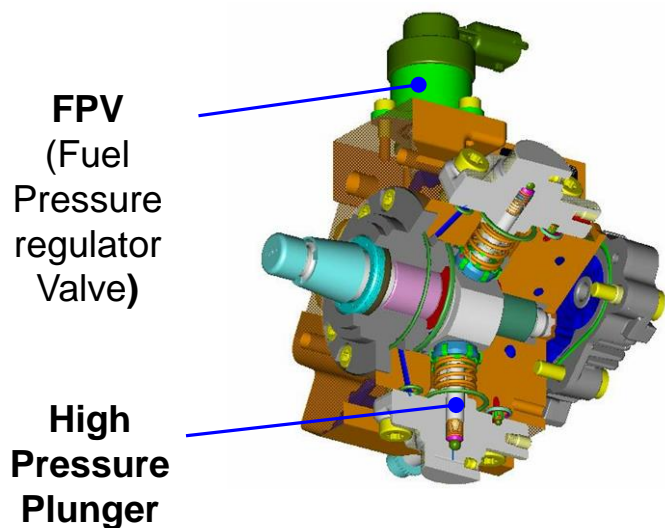
◆ Duel pressure control (2 Governor control) : FPV + RPV

※ FRV : Fuel Pressure regulator Valve , RPV : Rail Pressure regulator Valve

Fuel system – High Pressure Pump / Common Rail

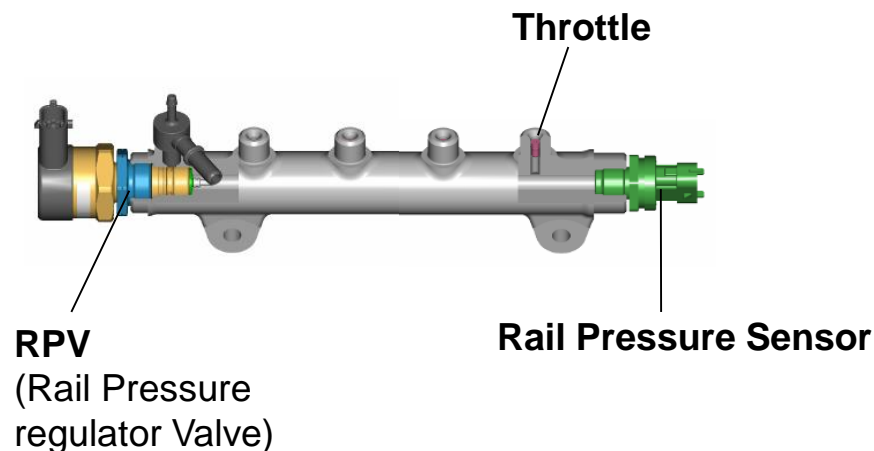
◆ High Pressure Pump

- Type : CP1H
- Max. Pressure : 1600 bar



◆ Common Rail

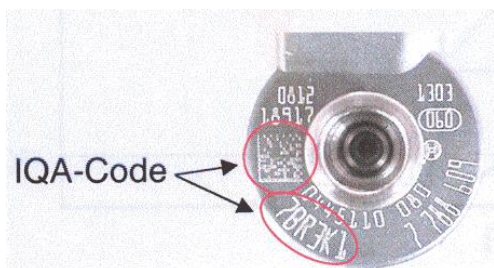
- Allowed pressure : 1,600 bar
- Rail Pressure Sensor
: Max. Measurement : 1,800 bar
- Applied RPV
- Throttle
: Reduced fluctuation of fuel pressure to injector



Fuel system – Injector

◆ Injector

- compensates fuel amount
: Applied IQA (Injector Quantity Adjustment) code for compensating fuel amount of each injectors
- Type : CRI2.2
- Max. Pressure : 1600 bar

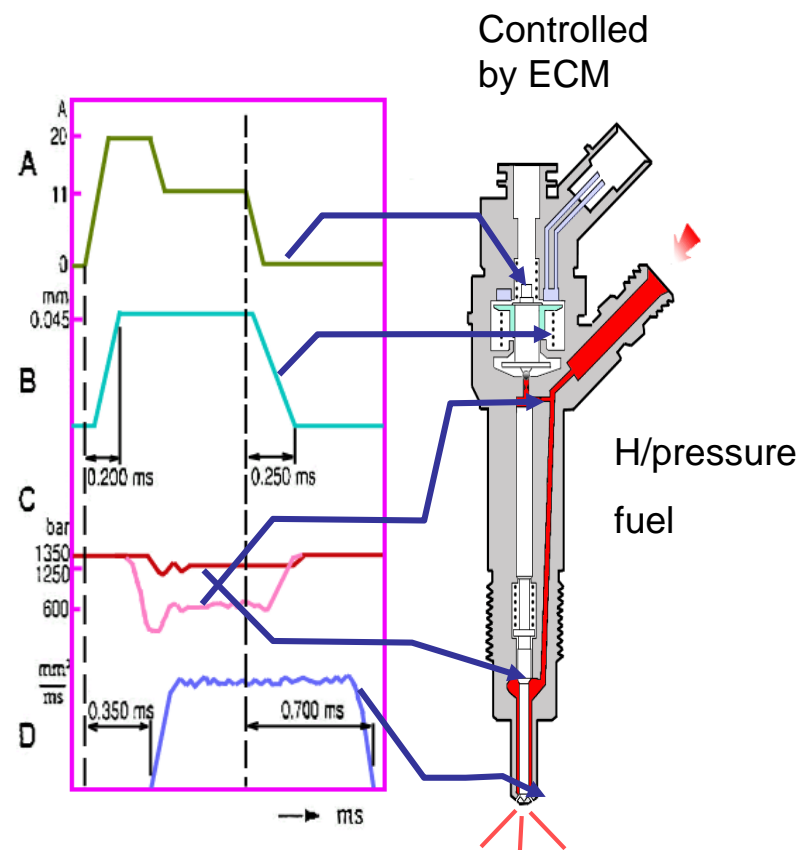


Ampere for solenoid control

Lift of armature

Fuel pressure of injector inside

Injection pattern



Current Data

1.2 CURRENT DATA		01/54
IGNITION SW-IG 2	ON	
BATTERY VOLTAGE	14.1 V	
FUEL QUANTITY	4.7 mm3	
FUEL PRESSURE MEASURED	27 MPa	
FUEL PRESSURE SETPOINT	27 MPa	
RAIL PRESS.REGULATOR	23.5 %	
INJ.PUMP REGULATOR	38.4 %	
FUEL TEMPERATURE	43.14°C	
FIX	SCRN	FULL PART GRPH HELP

Idle condition

1.2 CURRENT DATA		01/54
IGNITION SW-IG 2	ON	
BATTERY VOLTAGE	14.1 V	
FUEL QUANTITY	5.5 mm3	
FUEL PRESSURE MEASURED	45 MPa	
FUEL PRESSURE SETPOINT	45 MPa	
RAIL PRESS.REGULATOR	29.5 %	
INJ.PUMP REGULATOR	38.8 %	
FUEL TEMPERATURE	43.53°C	
FIX	SCRN	FULL PART GRPH HELP

1500 rpm

1.2 CURRENT DATA		01/54
IGNITION SW-IG 2	ON	
BATTERY VOLTAGE	14.2 V	
FUEL QUANTITY	6.7 mm3	
FUEL PRESSURE MEASURED	68 MPa	
FUEL PRESSURE SETPOINT	68 MPa	
RAIL PRESS.REGULATOR	35.1 %	
INJ.PUMP REGULATOR	37.3 %	
FUEL TEMPERATURE	43.92°C	
FIX	SCRN	FULL PART GRPH HELP

3000 rpm

Conditions

- No Electrical Load
- Neutral (Manual Transaxle)
- No DTC

Current Data

1.2 CURRENT DATA		09/54
FUEL TEMP. SENSOR(V)	2647 mV	▲
AIR MASS FLOW	23.5 Kg/h	■
AIR MASS PER CYLINDER	346.9mg/st	
AIR TEMPERRATURE SNSR	43.3 °C	
AIR TEMPE.VOLTAGE	2254 mV	
EGR ACTUATOR	4.8 %	
ATMOSPHERIC PRESS.SNSR	1001 hPa	
WATER TEMP. SENSOR	67.6 °C	▼
FIX	SCRN	FULL PART GRPH HELP

Idle condition

1.2 CURRENT DATA		09/54
FUEL TEMP. SENSOR(V)	2568 mV	▲
AIR MASS FLOW	31.4 Kg/h	■
AIR MASS PER CYLINDER	218.4mg/st	
AIR TEMPERRATURE SNSR	47.3 °C	
AIR TEMPE.VOLTAGE	2117 mV	
EGR ACTUATOR	43.4 %	
ATMOSPHERIC PRESS.SNSR	1001 hPa	
WATER TEMP. SENSOR	73.9 °C	▼
FIX	SCRN	FULL PART GRPH HELP

1500 rpm

1.2 CURRENT DATA		09/54
FUEL TEMP. SENSOR(V)	2509 mV	▲
AIR MASS FLOW	133.3Kg/h	■
AIR MASS PER CYLINDER	488.2mg/st	
AIR TEMPERRATURE SNSR	52.0 °C	
AIR TEMPE.VOLTAGE	1921 mV	
EGR ACTUATOR	34.7 %	
ATMOSPHERIC PRESS.SNSR	1001 hPa	
WATER TEMP. SENSOR	82.5 °C	▼
FIX	SCRN	FULL PART GRPH HELP

3000 rpm

Conditions

- No Electrical Load
- Neutral (Manual Transaxle)
- No DTC

Current Data

1.2 CURRENT DATA		17/54
CLUTCH SWITCH	ON	▲
NEUTRAL OR 1ST GEAR	ON	
REDUNDANT BRAKE SWITCH	OFF	■
BRAKE SWITCH	OFF	
ACCEL PEDAL POS. SNSR	0.0 %	
ACCEL PEDAL VOLT-1	764 mV	
ACCEL PEDAL VOLT-2	352 mV	
STATUS OF SIG APP/BRK	GOOD	▼
FIX	SCRN	FULL PART GRPH HELP

Idle condition

1.2 CURRENT DATA		17/54
CLUTCH SWITCH	ON	▲
NEUTRAL OR 1ST GEAR	ON	
REDUNDANT BRAKE SWITCH	OFF	■
BRAKE SWITCH	OFF	
ACCEL PEDAL POS. SNSR	12.8 %	
ACCEL PEDAL VOLT-1	1215 mV	
ACCEL PEDAL VOLT-2	588 mV	
STATUS OF SIG APP/BRK	GOOD	▼
FIX	SCRN	FULL PART GRPH HELP

1500 rpm

1.2 CURRENT DATA		17/54
CLUTCH SWITCH	ON	▲
NEUTRAL OR 1ST GEAR	ON	
REDUNDANT BRAKE SWITCH	OFF	■
BRAKE SWITCH	OFF	
ACCEL PEDAL POS. SNSR	13.5 %	
ACCEL PEDAL VOLT-1	1235 mV	
ACCEL PEDAL VOLT-2	607 mV	
STATUS OF SIG APP/BRK	GOOD	▼
FIX	SCRN	FULL PART GRPH HELP

3000 rpm

Conditions

- No Electrical Load
- Neutral (Manual Transaxle)
- No DTC

Current Data

1.2 CURRENT DATA		25/54
A/C ON SIGNAL SWITCH	OFF	▲
A/C COMPRESSOR RELAY	OFF	
A/C PRESSURE SENSOR	1372 mV	
BLOWER SWITCH	OFF	■
FAN-LOW SPEED	OFF	
FAN-HIGH SPEED	OFF	
GLOW RELAY	OFF	
GLOW CONTROL LAMP	OFF	▼
FIX	SCRN	FULL PART GRPH HELP

Idle condition

1.2 CURRENT DATA		25/54
A/C ON SIGNAL SWITCH	OFF	▲
A/C COMPRESSOR RELAY	OFF	
A/C PRESSURE SENSOR	1392 mV	
BLOWER SWITCH	OFF	■
FAN-LOW SPEED	OFF	
FAN-HIGH SPEED	OFF	
GLOW RELAY	OFF	
GLOW CONTROL LAMP	OFF	▼
FIX	SCRN	FULL PART GRPH HELP

1500 rpm

1.2 CURRENT DATA		25/54
A/C ON SIGNAL SWITCH	OFF	▲
A/C COMPRESSOR RELAY	OFF	
A/C PRESSURE SENSOR	1411 mV	
BLOWER SWITCH	OFF	■
FAN-LOW SPEED	OFF	
FAN-HIGH SPEED	OFF	
GLOW RELAY	OFF	
GLOW CONTROL LAMP	OFF	▼
FIX	SCRN	FULL PART GRPH HELP

3000 rpm

Conditions

- No Electrical Load
- Neutral (Manual Transaxle)
- No DTC

Current Data

1.2 CURRENT DATA		33/54
AUXILIARY HEATER	OFF	▲
BOOST PRESSURE SENSOR	974 hPa	
BOOST PRESS.VOLTAGE	1549 mV	
VGI ACTUATOR	71.8 %	
V/SWIRL ACTU.(U/D/S)	0 %	■
INLET THROTTLE ACTU.	94.5 %	
CHECK ENGINE LAMP	OFF	
O2S SUBTRAC.VOLTAGE	0 mV	▼
FIX	SCRN	FULL PART GRPH HELP

Idle condition

1.2 CURRENT DATA		33/54
AUXILIARY HEATER	OFF	▲
BOOST PRESSURE SENSOR	988 hPa	
BOOST PRESS.VOLTAGE	1549 mV	
VGI ACTUATOR	58.8 %	
V/SWIRL ACTU.(U/D/S)	0 %	■
INLET THROTTLE ACTU.	94.9 %	
CHECK ENGINE LAMP	OFF	
O2S SUBTRAC.VOLTAGE	800 mV	▼
FIX	SCRN	FULL PART GRPH HELP

1500 rpm

1.2 CURRENT DATA		33/54
AUXILIARY HEATER	OFF	▲
BOOST PRESSURE SENSOR	1043 hPa	
BOOST PRESS.VOLTAGE	1647 mV	
VGI ACTUATOR	54.1 %	
V/SWIRL ACTU.(U/D/S)	0 %	■
INLET THROTTLE ACTU.	94.9 %	
CHECK ENGINE LAMP	OFF	
O2S SUBTRAC.VOLTAGE	858 mV	▼
FIX	SCRN	FULL PART GRPH HELP

3000 rpm

Conditions

- No Electrical Load
- Neutral (Manual Transaxle)
- No DTC

Current Data

1.2 CURRENT DATA		41/54
LAMDA(O2S)	4	▲
O2S TEMPERATURE	574.7°C	
O2S HEATER DUTY	1.6 %	
O2S STATE OF ADAPTION	ON	
VEHICLE SPEED SENSOR	0 Km/h	
ACTUAL VEHICLE ACCELE.	0.1 m/s ²	
GEAR POSITION	0	■
ENGINE SPEED	880 rpm	▼
FIX	SCRN	FULL PART GRPH HELP

Idle condition

1.2 CURRENT DATA		41/54
LAMDA(O2S)	2	▲
O2S TEMPERATURE	777.2°C	
O2S HEATER DUTY	38.4 %	
O2S STATE OF ADAPTION	ON	
VEHICLE SPEED SENSOR	0 Km/h	
ACTUAL VEHICLE ACCELE.	0.1 m/s ²	
GEAR POSITION	0	■
ENGINE SPEED	1468 rpm	▼
FIX	SCRN	FULL PART GRPH HELP

1500 rpm

1.2 CURRENT DATA		41/54
LAMDA(O2S)	3	▲
O2S TEMPERATURE	777.2°C	
O2S HEATER DUTY	47.1 %	
O2S STATE OF ADAPTION	ON	
VEHICLE SPEED SENSOR	0 Km/h	
ACTUAL VEHICLE ACCELE.	0.1 m/s ²	
GEAR POSITION	0	■
ENGINE SPEED	3057 rpm	▼
FIX	SCRN	FULL PART GRPH HELP

3000 rpm

Conditions

- No Electrical Load
- Neutral (Manual Transaxle)
- No DTC

Current Data

1.2 CURRENT DATA		47/54
GEAR POSITION	0	▲
ENGINE SPEED	881 rpm	
CALCULATED LOAD VALUE	18.0 %	
CURRENT INNER TORQUE	10.6 %	
DESIRED INNER TORQUE	10.6 %	
STATE OF IMMO PRESENCE	ON	
IMMOBILIZER LAMP	OFF	
AT/MT INFORMATION	MT	■ ▼
FIX SCRN FULL PART GRPH HELP		

Idle condition

1.2 CURRENT DATA		47/54
GEAR POSITION	0	▲
ENGINE SPEED	1505 rpm	
CALCULATED LOAD VALUE	39.2 %	
CURRENT INNER TORQUE	12.9 %	
DESIRED INNER TORQUE	12.9 %	
STATE OF IMMO PRESENCE	ON	
IMMOBILIZER LAMP	OFF	
AT/MT INFORMATION	MT	■ ▼
FIX SCRN FULL PART GRPH HELP		

1500 rpm

1.2 CURRENT DATA		47/54
GEAR POSITION	0	▲
ENGINE SPEED	3050 rpm	
CALCULATED LOAD VALUE	27.5 %	
CURRENT INNER TORQUE	14.5 %	
DESIRED INNER TORQUE	14.5 %	
STATE OF IMMO PRESENCE	ON	
IMMOBILIZER LAMP	OFF	
AT/MT INFORMATION	MT	■ ▼
FIX SCRN FULL PART GRPH HELP		

3000 rpm

Conditions

- No Electrical Load
- Neutral (Manual Transaxle)
- No DTC

Injector specific data (IQA)

1. HYUNDAI VEHICLE DIAGNOSIS ▼		
MODEL : PA		
SYSTEM : ENGINE(DIESEL)		
<div>01. DIAGNOSTIC TROUBLE CODES</div> 02. CURRENT DATA 03. FLIGHT RECORD 04. ACTUATION TEST 05. SIMU-SCAN 06. IDENTIFICATION CHECK 07. ENGINE TEST FUNCTION 08. INJECTOR SPECIFIC DATA		

1.8. INJECTOR SPECIFIC DATA					
INJECTOR 1					
INJECTOR 2					
INJECTOR 3					
INJECTOR 4					
- SELECT THE CYLINDER BY SHIFT+ARROW KEY AND INPUT THE DATA BY FI~F6 KEY AND PRESS [ENTER] KEY.					
ABCD	EFGH	IJKL	MNOP	QR-U	VW-Z

1. HYUNDAI VEHICLE DIAGNOSIS ▼		
MODEL : PA		
SYSTEM : ENGINE(DIESEL)		
01. DIAGNOSTIC TROUBLE CODES 02. CURRENT DATA 03. FLIGHT RECORD 04. ACTUATION TEST 05. SIMU-SCAN 06. IDENTIFICATION CHECK 07. ENGINE TEST FUNCTION <div>08. INJECTOR SPECIFIC DATA</div>		

1.8. INJECTOR SPECIFIC DATA					
INJECTOR 1	7YH1CID				
INJECTOR 2	8PANCIF				
INJECTOR 3	7YAT4NE				
INJECTOR 4	AAAAAAA				
- READ IQA CODE OR INPUT THE DATA BY FI~F6 KEY AND PRESS [ENTER] KEY.					
ABCD	EFGH	IJKL	MNOP	QR-U	VW-Z

Engine Test Function

1. HYUNDAI VEHICLE DIAGNOSIS ▼
MODEL : PA
SYSTEM : ENGINE(DIESEL)
01. DIAGNOSTIC TROUBLE CODES
02. CURRENT DATA
03. FLIGHT RECORD
04. ACTUATION TEST
05. SIMU-SCAN
06. IDENTIFICATION CHECK
07. ENGINE TEST FUNCTION
08. INJECTOR SPECIFIC DATA

1.7. COMPRESSION TEST ▼
System Information
ECU H/W:39101-2A810
ROM ID :B0PA4M2EIP1S
THIS FUNCTION IS AVAILABE.
If you ready, Press[ENTER].

Engine Test Function is consist of 3 tests, which are tested by Hi-scan.

Those are test for mechanical condition of engine, mechanical condition of injectors and electrical compensated by ECM

- Compression test
- Idle speed comparison
- Injection quantity comparison

Engine Test Function – compression test

1.7. COMPRESSION TEST

- 01. COMPRESSION TEST
- 02. IDLE SPEED COMPARISON
- 03. INJECT. QUANTITY COMPARISON

7.1 COMPRESSION TEST

This test is used for detecting cylinder specific engine speed without injection.

*Test condition

- Shift level : P or N
- Engine : Stop(IGN. ON)
- Electrical Load : OFF

If you ready, now cranking, and stop cranking when stop message appear on the screen. Press[ENTER].

7.1 COMPRESSION TEST

CYLINDER ENGINE SPEED(RPM)

#1	#2	#3	#4
241	245	243	0
240	245	243	0
240	243	243	0
240	243	242	0
238	243	242	0
238	243	242	0
238	243	243	0

ANALYZE THE TEST RESULT.

ANAL

7.1 COMPRESSION TEST

CYLINDER ENGINE SPEED(RPM)

#1	#2	#3	#4
241	245	243	0
240	245	243	0
240	243	243	0
240	243	242	0
238	243	242	0
238	243	242	0
238	243	243	0

ANALYZE THE TEST RESULT.

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AUG

HELP

CYLINDER ENGINE SPEED(RPM)

SPEED(RPM)	200	250	300	350	AUG.
#1 CYL.					240
#2 CYL.					244
#3 CYL.					243
#4 CYL.					0

PREV

HELP

7.1 COMPRESSION TEST

- *The higher cylinder engine speed:
- >The low compression pressure.
- *It can help to identify the mechanical defects.

PREV

Engine Test Function – Idle speed comparison

1.7. COMPRESSION TEST

- 01. COMPRESSION TEST
- 02. IDLE SPEED COMPARISON**
- 03. INJECT. QUANTITY COMPARISON

7.2 IDLE SPEED COMPARISON

This test is used for detecting cylinder specific engine speed with injector energizing.

(Cylinder balancing function is deactivated.)

*Test condition

- Compression test : Normal
- Shift level : P or N
- Engine : Idle
- Electrical Load : OFF

IF you ready, Press[ENTER].

7.2 IDLE SPEED COMPARISON

CYLINDER ENGINE SPEED(RPM)

#1	#2	#3	#4
888	891	890	0
884	889	888	0
886	888	890	0
888	889	890	0
889	888	888	0
888	888	888	0
887	888	887	0

ANALYZE THE TEST RESULT.

ANAL

7.2 IDLE SPEED COMPARISON

CYLINDER ENGINE SPEED(RPM)

#1	#2	#3	#4
888	891	890	0
884	889	888	0
886	888	890	0
888	889	890	0
889	888	888	0
888	888	888	0
887	888	887	0

ANALYZE THE TEST RESULT.

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AUG

HELP

CYLINDER ENGINE SPEED(RPM)

SPEED(RPM)	650	750	850	950	AUG.
#1 CYL.					888
#2 CYL.					890
#3 CYL.					889
#4 CYL.					0

PREV

HELP

7.2 IDLE SPEED COMPARISON

*The lower engine speed:

->The injector injects less quantity than other injectors.

*The higher engine speed:

->The injector injects more quantity than other injectors.

PREV

Engine Test Function – Injection quantity comparison

1.7. COMPRESSION TEST

- 01. COMPRESSION TEST
- 02. IDLE SPEED COMPARISON
- 03. INJECT. QUANTITY COMPARISON**

7.3 INJECT. QUANTITY COMPARISON

This test is used for detecting cylinder specific quantity with individual energizing of injector. (Cylinder balancing function is activated.)

*Test condition

- Compression test : Normal
- Shift level : P or N
- Engine : Idle
- Electrical Load : OFF

IF you ready, Press[ENTER].

7.3 INJECT. QUANTITY COMPARISON

ENG. SPEED(RPM)				INJECTION QUANTITY(MM3)			
#1	#2	#3	#4	#1	#2	#3	#4
879	880	880	0	0.1	-0.1	-0.0	-0.0
880	880	881	0	0.1	-0.1	-0.0	-0.0
880	879	881	0	0.1	-0.1	-0.0	-0.0
879	880	880	0	0.1	-0.1	-0.0	-0.0
879	880	879	0	0.1	-0.1	-0.0	-0.0
879	879	880	0	0.1	-0.1	-0.0	-0.0
880	880	881	0	0.1	-0.1	-0.0	-0.0

ANALYZE THE TEST RESULT.

ANAL

7.3 INJECT. QUANTITY COMPARISON

ENG. SPEED(RPM)				INJECTION QUANTITY(MM3)			
#1	#2	#3	#4	#1	#2	#3	#4
879	880	880	0	0.1	-0.1	-0.0	-0.0
880	880	881	0	0.1	-0.1	-0.0	-0.0
880	879	881	0	0.1	-0.1	-0.0	-0.0
879	880	880	0	0.1	-0.1	-0.0	-0.0
879	880	879	0	0.1	-0.1	-0.0	-0.0
879	879	880	0	0.1	-0.1	-0.0	-0.0
880	880	881	0	0.1	-0.1	-0.0	-0.0

ANALYZE THE TEST RESULT.

<<

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AUG

HELP

CYLINDER ENGINE SPEED(RPM)

SPEED(RPM)	650	750	850	950	AUG.
#1 CYL.					878
#2 CYL.					878
#3 CYL.					879
#4 CYL.					0
QUANT.(MM3)	-4	-2	0	2	AUG.
#1 CYL.					0.08
#2 CYL.					-0.05
#3 CYL.					-0.03
#4 CYL.					-0.00

PREV

HELP

7.3 INJECT. QUANTITY COMPARISON

*The positive correction value:
->The fuel injection of the cylinder is less than that of other cylinder.
*The negative correction value:
->The fuel injection of the cylinder is more than that of other cylinder.
*Extreme correction value identifies a problematic injector.
After replacing a injector with new one, retest & confirm the engine condition

PREV