

1MZ-FE ENGINE

■ DESCRIPTION

The 1MZ-FE engine, which is a V6, 3.0-liter, 24-valve DOHC engine, based on the 1MZ-FE engine on the '01 Camry.

This engine has following features that have been newly adopted in order to realize the further improvement of the engine performance, fuel economy and to reduce exhaust emissions.

- The PS (Planetary reduction Segment conductor motor) starter has been adopted.
- Meets the ULEV (Ultra Low Emission Vehicle) regulation requirements
- Meets the SFTP (Supplementary Federal Test Procedure) regulation requirements
- ETCS-i (Electronic Throttle Control System-intelligent) has been adopted.
- Air intake control system has been adopted.

► Engine Specification ◀

Model			'02 Camry	'01 Camry
No. of Cyls. & Arrangement			6-Cylinder, V Type	←
Valve Mechanism			24-Valve DOHC, Belt & Gear Drive	←
Combustion Chamber			Pentroof Type	←
Manifolds			Cross-Flow	←
Fuel System			SFI	←
Displacement	cm ³ (cu. in.)		2995 (182.8)	←
Bore × Stroke	mm (in.)		87.5 × 83.0 (3.44 × 3.27)	←
Compression Ratio			10.5 : 1	←
Max. Output	(SAE-NET)		143 kw @ 5300 rpm (192 HP @ 5300 rpm)	143 kw @ 5200 rpm (192 HP @ 5200 rpm)
Max. Torque	(SAE-NET)		283 N·m @ 4400 rpm (209 lb·ft @ 4400 rpm)	281 N·m @ 4400 rpm (207 lb·ft @ 4400 rpm)
Valve Timing	Intake	Open	4°BTDC	←
		Close	44°ABDC	←
	Exhaust	Open	46°BBDC	←
		Close	2°ATDC	←
Firing Order			1-2-3-4-5-6	←
Research Octane Number			91 or higher	←
Octane Rating			87 or higher	←
Dry Weight	kg (lb)		158 (348)	155 (342)
Oil Grade			API SJ, SL, EC or ILSAC	API SH, SJ , EC or ILSAC

■ FEATURES OF 1MZ-FE ENGINE

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

- (1) High performance and fuel economy
- (2) Low noise and vibration
- (3) Lightweight and compact design
- (4) Good serviceability
- (5) Clean emission

Item	(1)	(2)	(3)	(4)	(5)	'02 Camry	'01 Camry
The ETCS-i has been adopted.	○					○	—
A cylinder block made of aluminum alloy has been adopted.			○			○	←
Independent type DIS (Direct Ignition System) has been adopted.	○			○	○	○	—
The fuel returnless system has been adopted.			○	○	○	○	←
Quick connectors are used to connect the fuel hose with the fuel pipes.				○		○	←
12-hole type fuel injectors with high atomizing performance have been adopted.	○				○	○	—
Iridium-tipped spark plugs have been adopted.	○			○		○	—
ACIS (Acoustic Control Induction System) is used.	○					○	←
Air intake control system has been adopted.	○	○				○	—
EGR system is used.					○	○	←
A 2-way exhaust control system has been adopted.	○	○				○	←
The use of an air fuel ratio sensor allows precise control.					○	○	←*
The PS (Planetary reduction-Segment conductor motor) starter has been adopted.			○			○	—

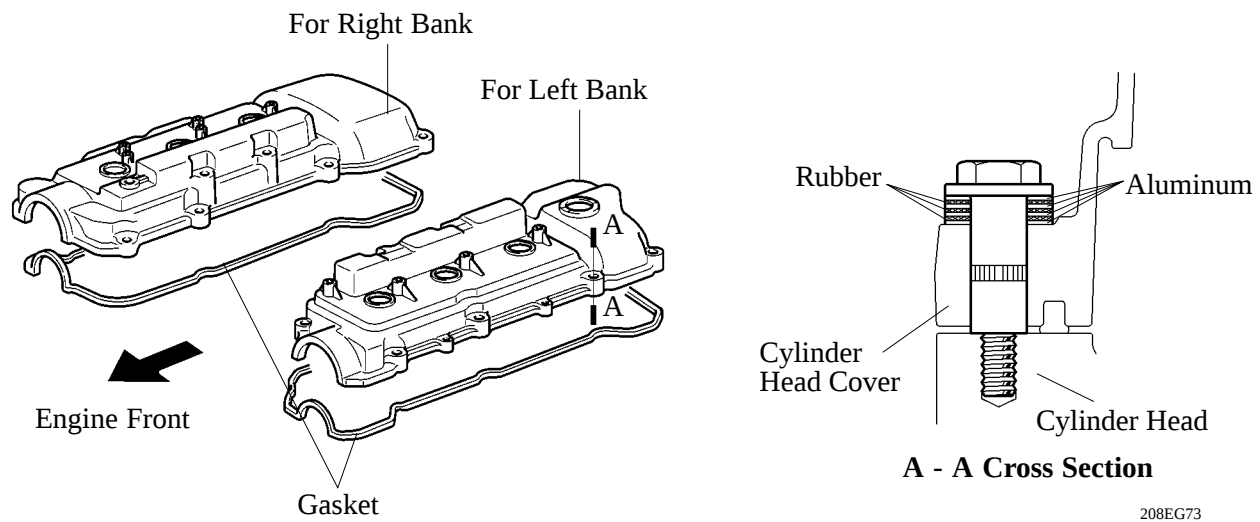
*: California Specification Model

Other parts and construction are the same as in the '01 Camry.

ENGINE PROPER

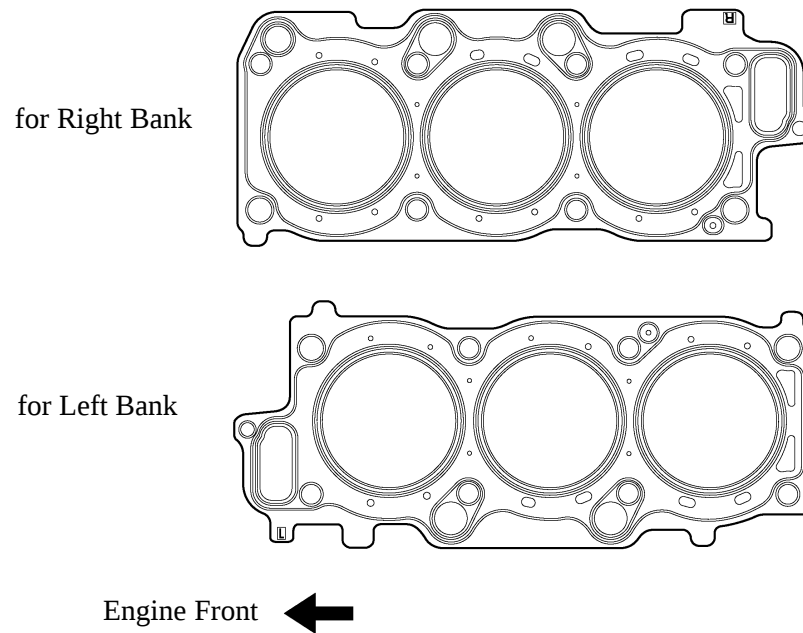
1. Cylinder Head Cover

- Lightweight yet high-strength aluminum diecast cylinder head covers are used.
- An aluminum washer made of vibration-damping laminated aluminum sheet is used on the evenly spaced shoulder bolts which fasten the cylinder head covers.



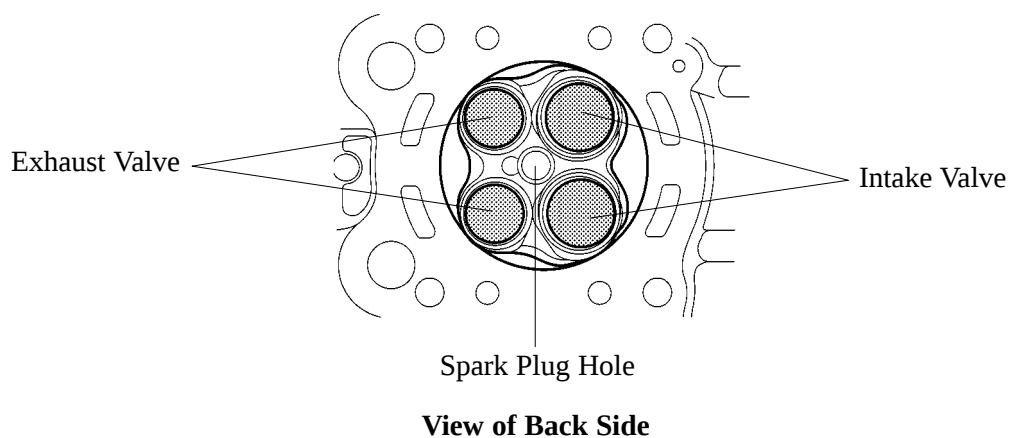
2. Cylinder Head Gasket

- A metal type cylinder head gasket which offers superior pressure resistance and sealing performance has been adopted.



3. Cylinder Head

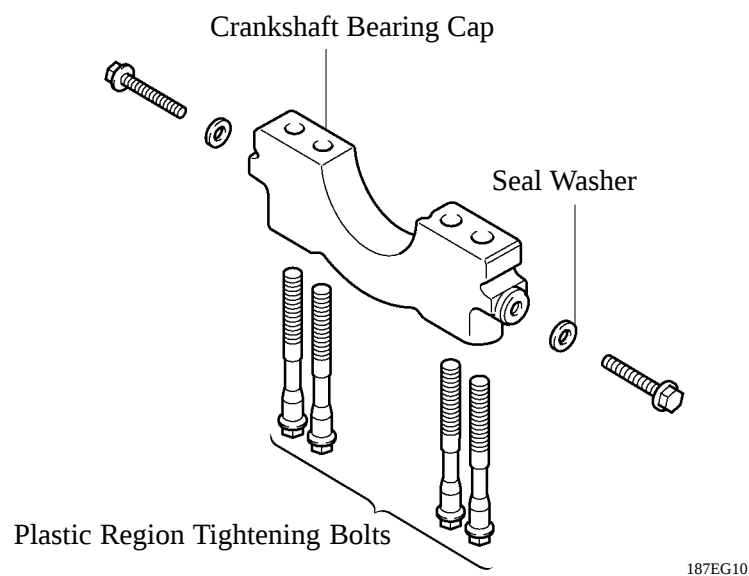
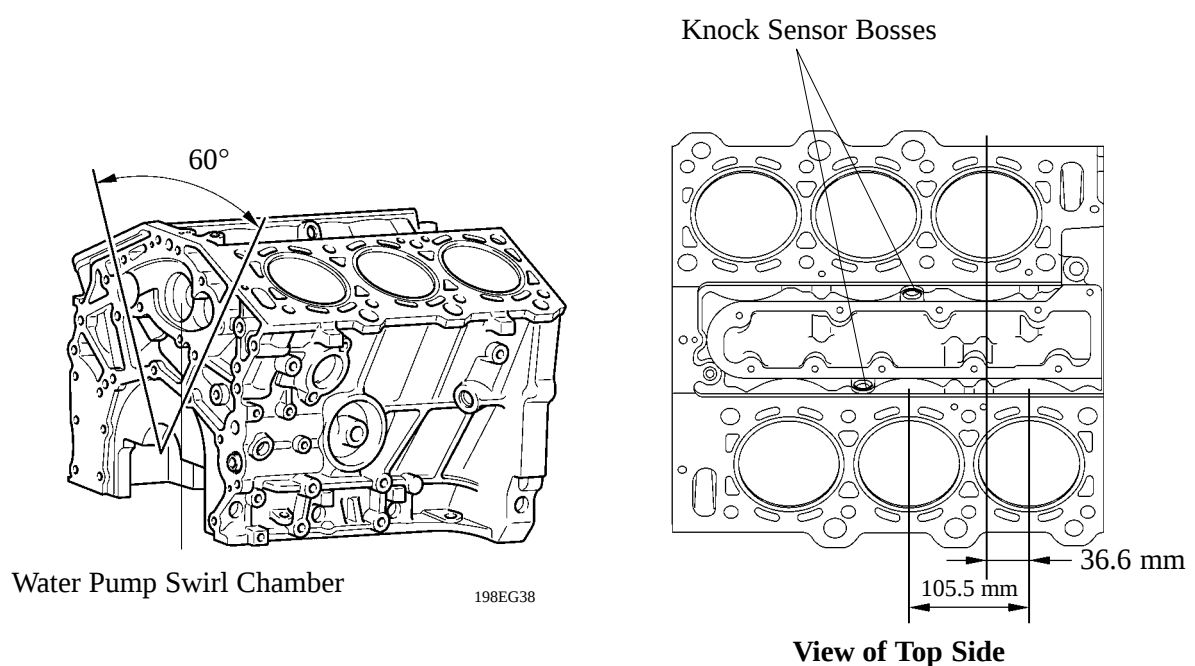
- The cylinder head, which is made of aluminum, has adopted a pentroof-type combustion chamber. The spark plug has been located in the center of the combustion chamber.
- The angle of the intake and exhaust valves is narrowed and set at 22.5° to permit a compact cylinder head.
- Upright, small-diameter intake ports are adopted.
- The cross section of the protrusion of the valve guide into the intake port has been reduced by decreasing the valve stem diameter and the valve guide outer diameter.
- Plastic region tightening bolt is used for the cylinder head bolts for good axial tension.



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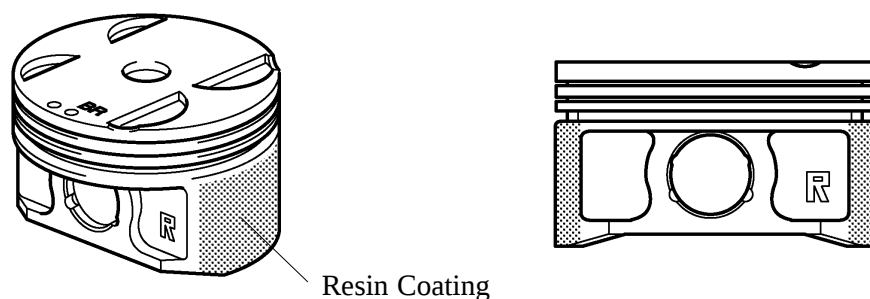
4. Cylinder Block

- The cylinder block has a bank angle of 60°, a bank offset of 36.6 mm (1.44 in.) and a bore pitch of 105.5 mm (4.15 in.), resulting in a compact block.
- Lightweight aluminum alloy is used for the cylinder block.
- A thin cast-iron liner is press- fit inside the cylinder to ensure an added reliability. This liner is thin, so that boring is not possible.
- A water pump swirl chamber and an inlet passage to the pump are provided in the V-bank to help make the engine compact.
- Knock sensor bosses are provided at 2 locations in V-bank.
- The crankshaft bearing caps are tightened using 4 plastic- region bolts for each journal. In addition, each cap is tightened laterally to improve its reliability.



5. Piston

- The piston is made of aluminum alloy and skirt area is made compact and lightweight.
- The piston skirt has been coated with resin to reduce the friction loss.
- Full floating type piston pins are used.
- Each of the pistons is made specifically for the right or left bank.

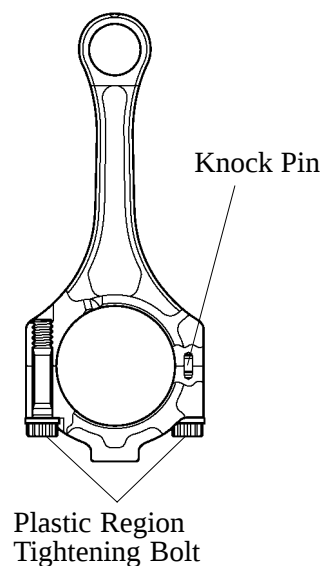


for Right Bank

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6. Connecting Rod

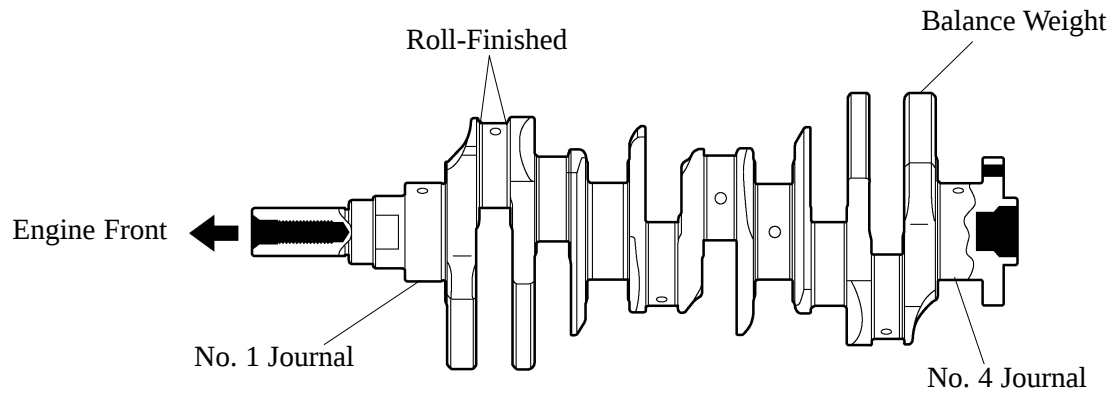
- Connecting rods that have been forged for high strength are used for weight reduction.
- An aluminum bearing with overlay is used for the connecting rod bearings.
- Plastic region tightening bolts are used.
- Knock pins are used at the mating surfaces of the bearing caps of the connecting rod to minimize the shifting of the bearing caps during assembly.



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7. Crankshaft

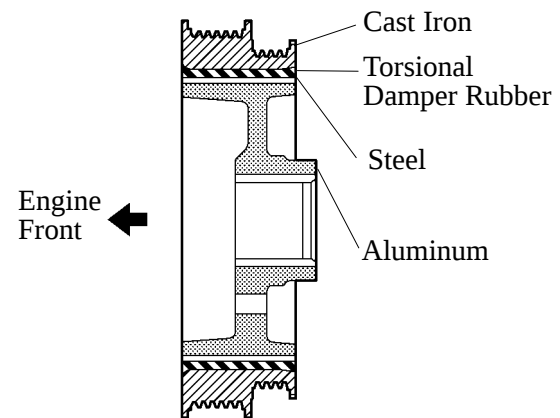
- The crankshaft is made of forged steel and has 4 journals and 9 balance weights.
- All pin and journal fillets are roll-finished to maintain adequate strength.
- The crankshaft bearings for the No.1 and No.4 journals are made wider to decrease noise and vibration, and those for the No.2 and No.3 journals are made narrower friction.



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8. Crankshaft Pulley

- The crankshaft pulley hub is made of aluminum to reduce weight and vibration.
- The rigidity of the torsional damper rubber has been optimized to reduce noise.

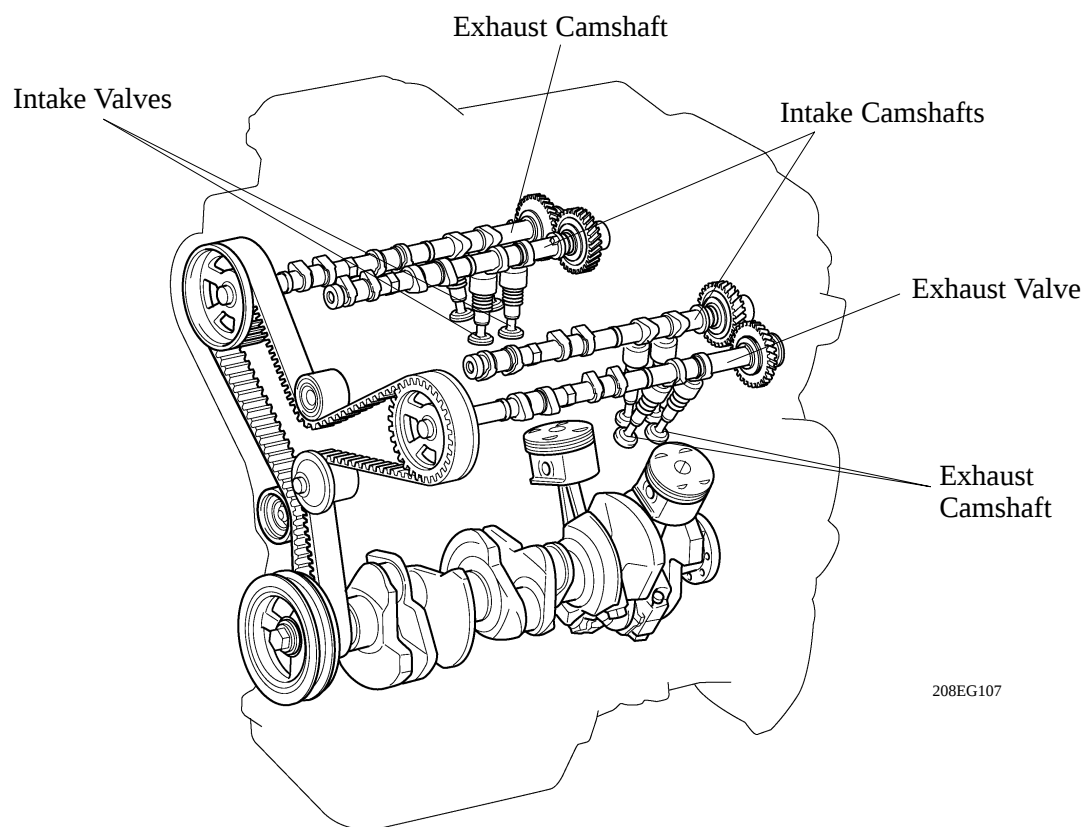


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■ VALVE MECHANISM

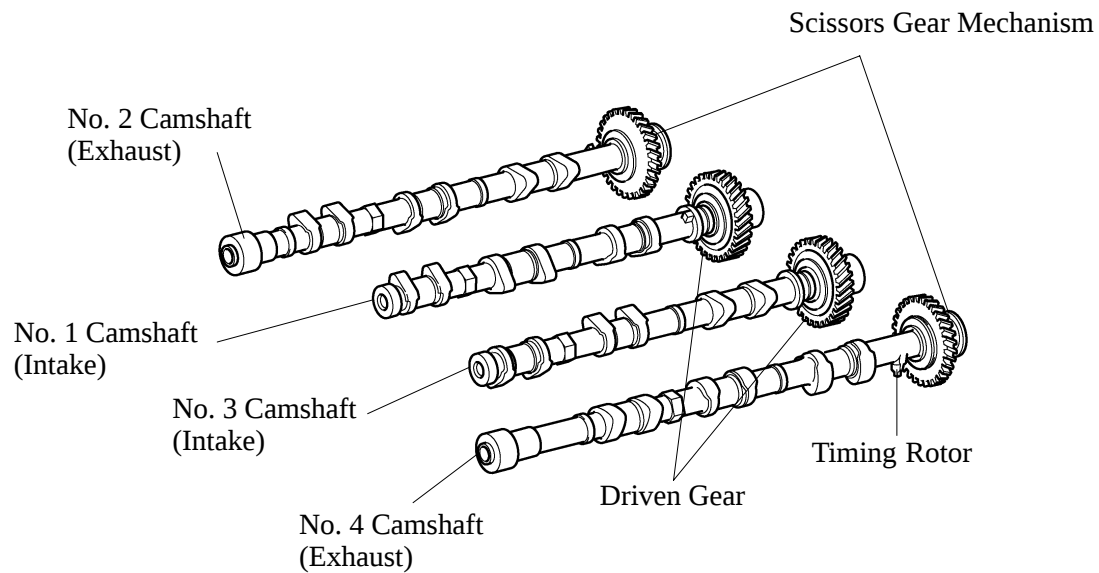
1. General

- The valves are directly opened and closed by 4 camshafts.
- The exhaust camshafts are driven by a timing belt, while the intake camshafts are driven through gears on the exhaust camshafts.



2. Camshafts

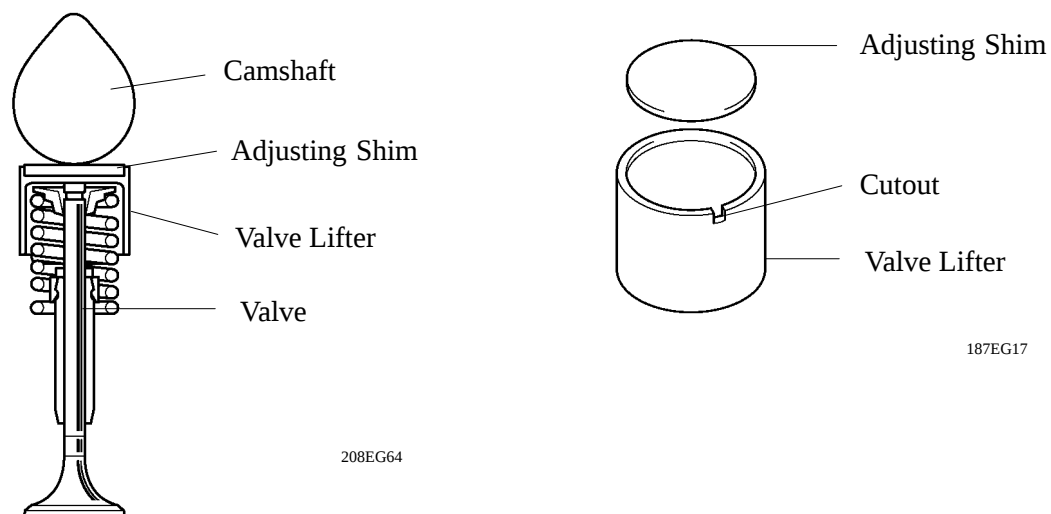
- The camshafts are made of cast iron alloy.
- In conjunction with the use of the DIS (Direct Ignition System), the No.4 camshaft is provided with timing rotor to trigger the camshaft position sensor.
- The intake camshafts are driven by gears on the exhaust camshafts. The scissors gear mechanism is used on drive gear of the exhaust camshaft to control backlash and suppress gear noise.



208EG108

3. Intake and Exhaust Valve and Valve Lifter

- Narrower valve stems have been adopted to reduce the intake and exhaust resistance and for weight reduction.
- The adjusting shim has been located directly above the valve lifter. This construction allows the adjusting shim to be replaced without removing the camshaft, which improves the serviceability during valve clearance adjustment.
- A cutout is provided in the valve lifter to improve the serviceability of replacing the adjusting shims.



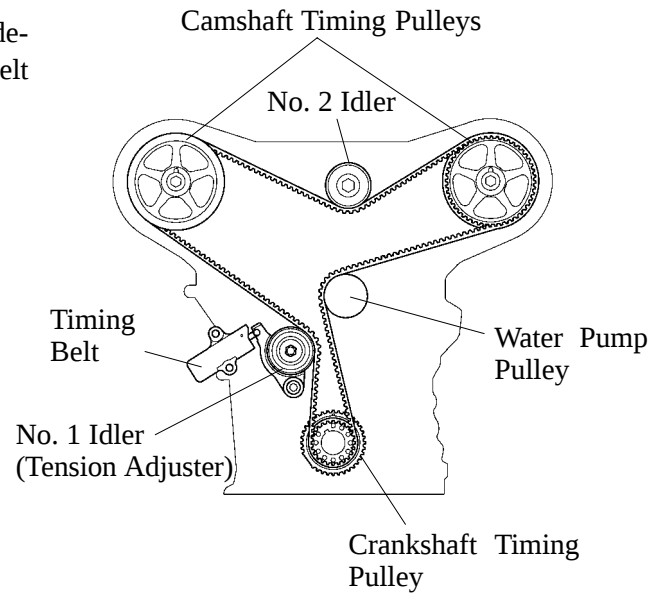
Service Tip

The adjusting shims are available in 17 sizes in increments of 0.050 mm (0.0020 in.), from 2.500 (0.0984 in.) to 3.300 (0.1299 in.).

For details, refer to see the 2002 Camry Repair Manual (Pub. No. RM881U).

4. Timing Belt

The timing belt tooth configuration has been designed to help to reduce noise and to enable the belt to transmit power under high load factors.

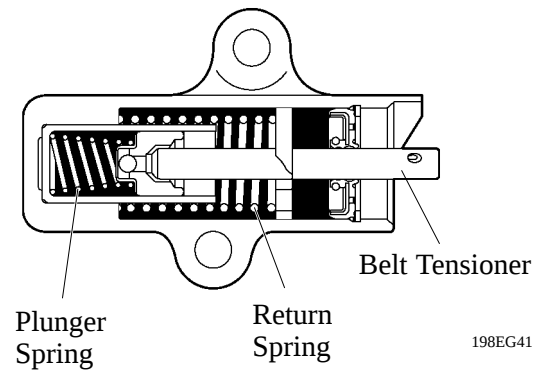


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5. Timing Belt Tensioner

The timing belt tensioner uses a spring and silicon oil damper, and maintains proper timing belt tension at all times.

The timing belt tensioner suppresses noise generated by the timing belt.

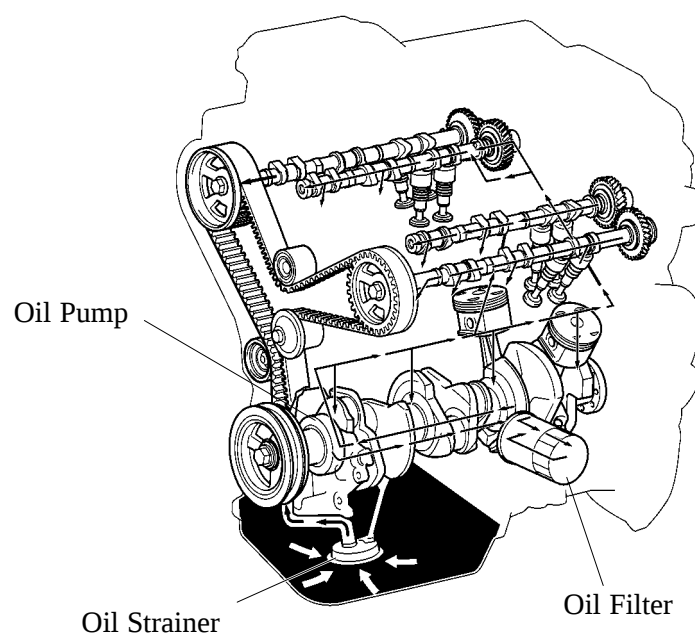


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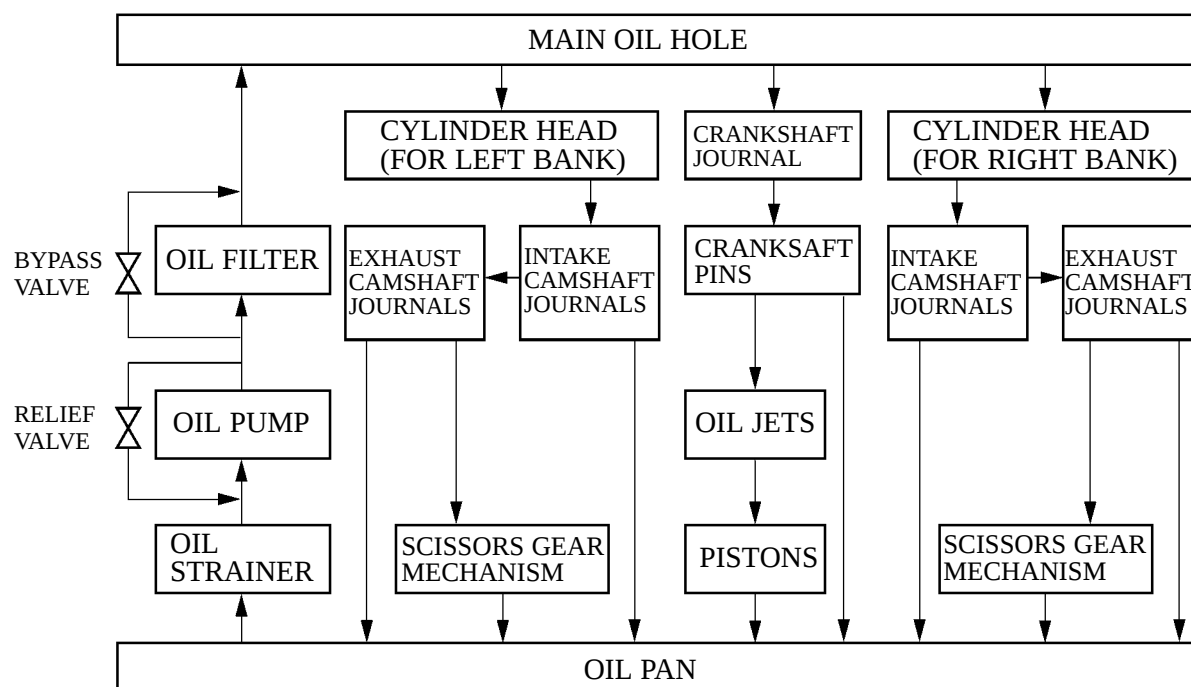
■ LUBRICATION SYSTEM

1. General

- The lubrication is fully pressurized and all oil passes through an oil filter.
- A trochoid gear type oil pump is directly driven by the crankshaft.



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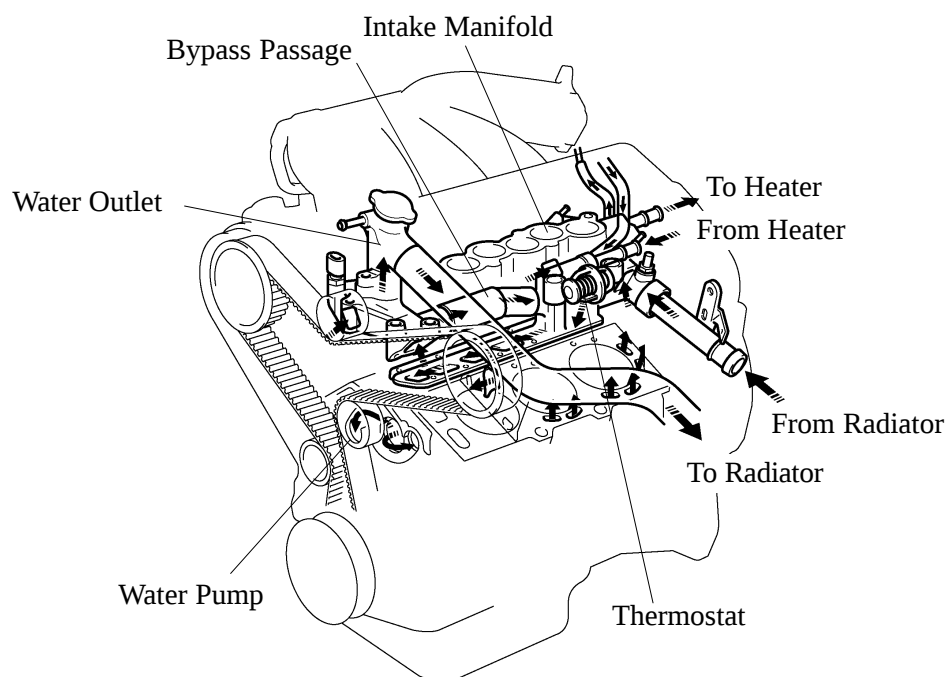
208EG110

► Specifications ◀

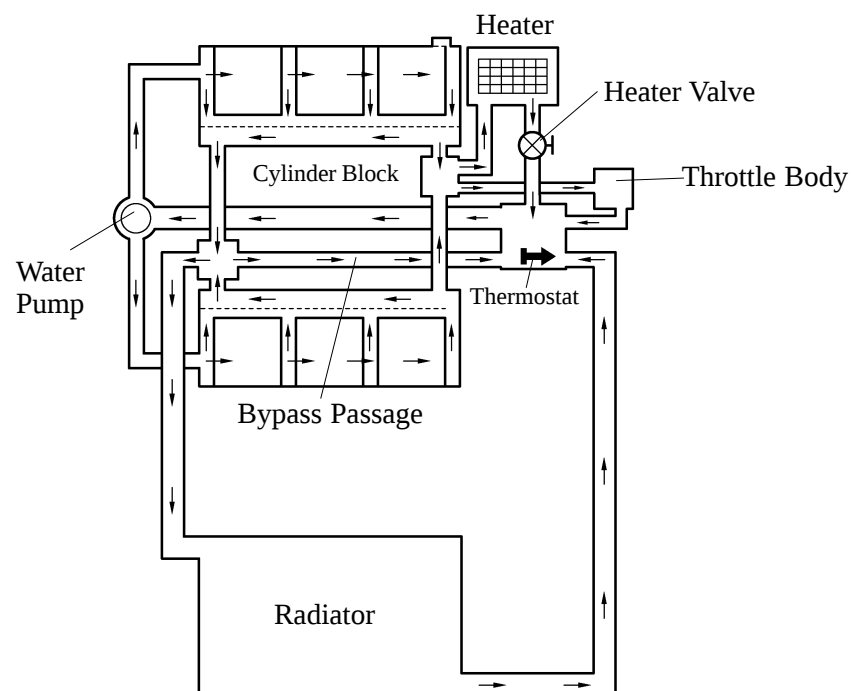
Oil Capacity Liters (US qts, Imp. qts)	Dry	5.5 (5.8, 4.8)
	with Oil Filter	4.7 (5.0, 4.1)
	without Oil Filter	4.5 (4.8, 4.0)

■ COOLING SYSTEM

- The cooling system is a pressurized, forced-circulation type.
- A thermostat having a bypass valve is located on the water pump inlet side of the cooling circuit.



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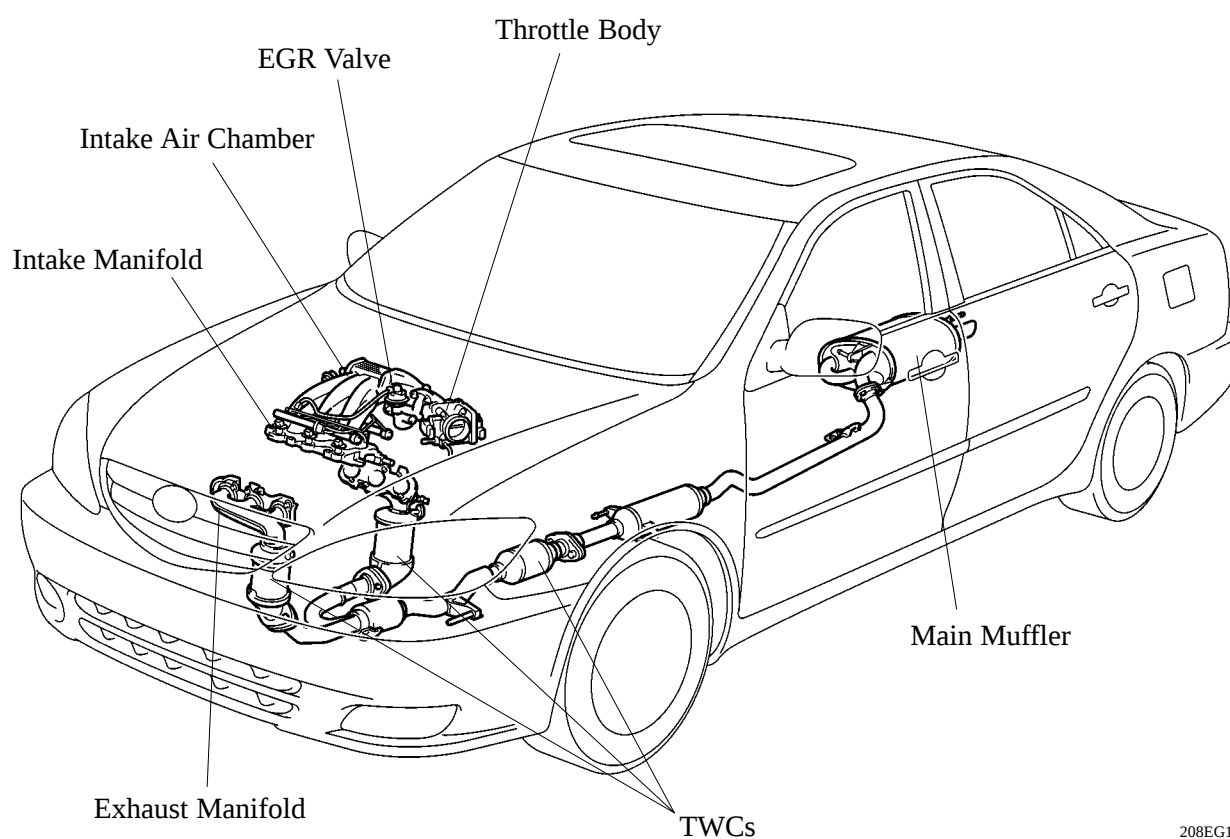
► Specifications ◀

Engine Coolant	Capacity	liters (US qts, Imp. qts)	9.2 (9.7, 8.1)
	Type		TOYOTA Long Life Coolant or Equivalent
Thermostat	Opening Temperature	°C (°F)	80 - 84 (176 - 183)

■ INTAKE AND EXHAUST SYSTEM

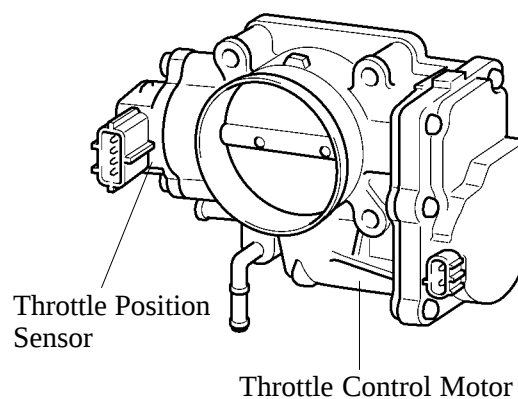
1. General

- The adoption of the ETCS-i (Electronic Throttle Control System-intelligent) has realized excellent throttle control.
- The adoption of the ACIS (Acoustic Control Induction System) has improved the engine performance.
- The adoption of the air intake control system has improved engine noise reduction and performance. For details, see page EG-86.
- 2-way exhaust control system is provided to reduce noise and vibration in the main muffler.
- The EGR (Exhaust Gas Recirculation) system is used to reduce and control NO_x formation.



2. Throttle Body

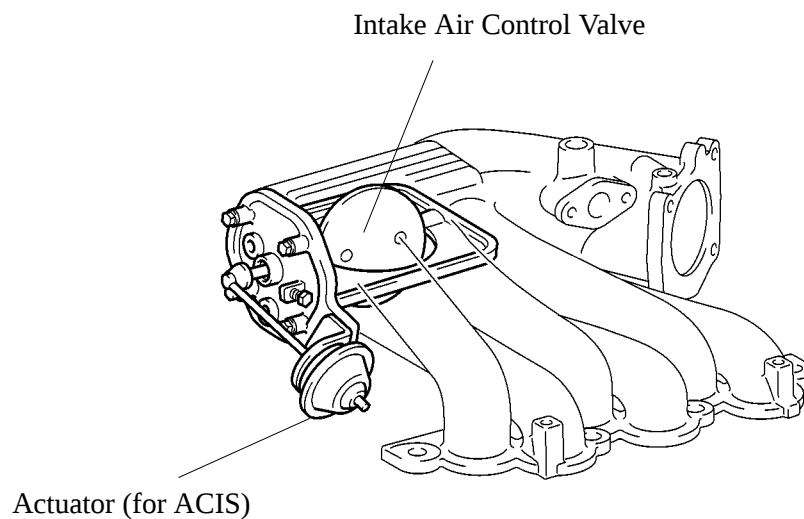
- The link-less type ETCS-i has adopted and it realizes excellent throttle control.
For details of ETCS-i control, refer to see page EG-81.
- A DC motor with excellent response and minimal power consumption is used for the throttle control motor. The ECM performs the duty ratio control of the direction and the amperage of the current that flows to the throttle control motor in order to regulate the opening angle of the throttle valve.



208EG112

3. Intake Air Chamber

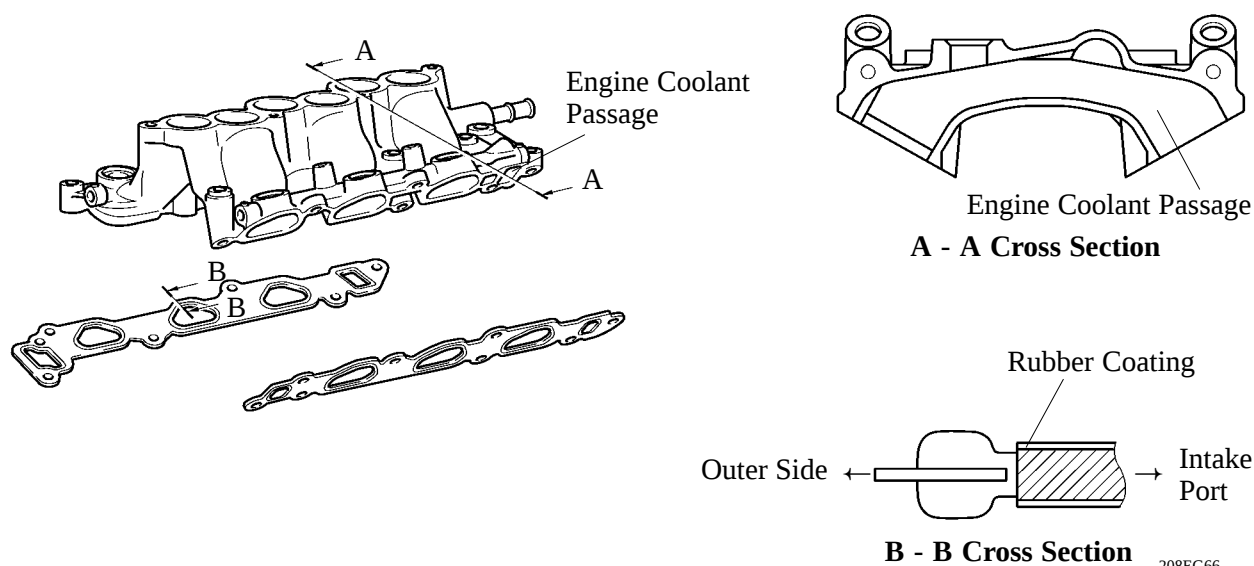
The intake air chamber consists of upper and lower sections and contains an intake air control valve. This valve is activated by ACIS (Acoustic Control Induction System) and is used to alter the intake pipe length to improve the engine performance in all speed ranges. For details of ACIS control, refer to see page EG-83.



208EG46

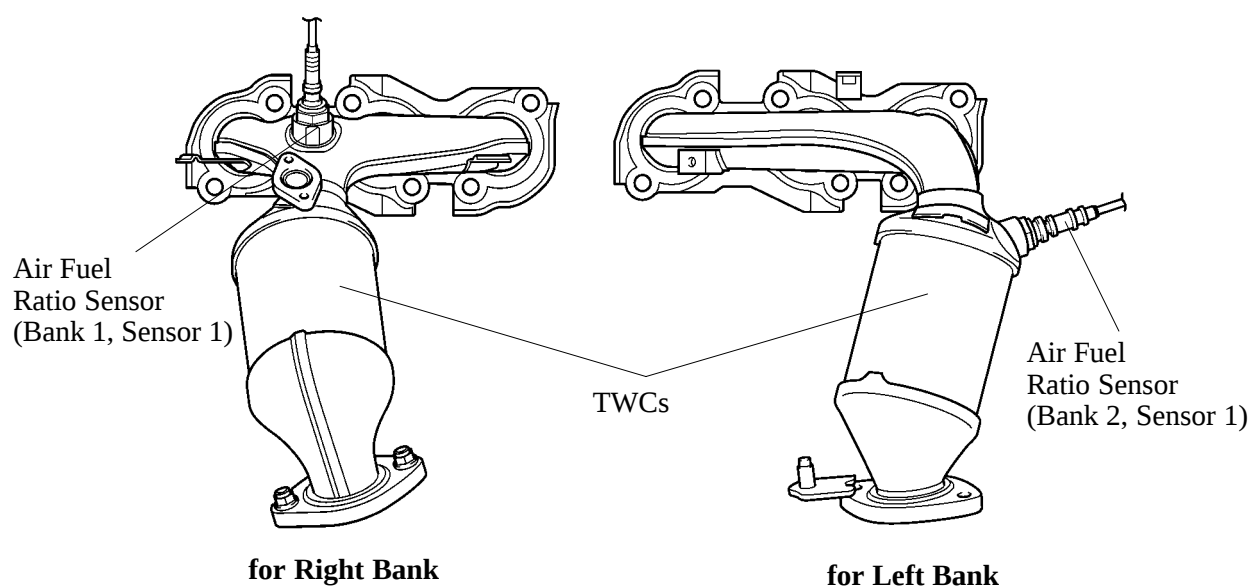
4. Intake Manifold

- The port diameter of the intake manifold has been increased and the port length has been optimized to improve engine performance.
- An engine coolant passage connects the left and right banks at the rear end of the intake manifold.
- The intake manifold gaskets has rubber coating applied onto surface, and provide superior durability.



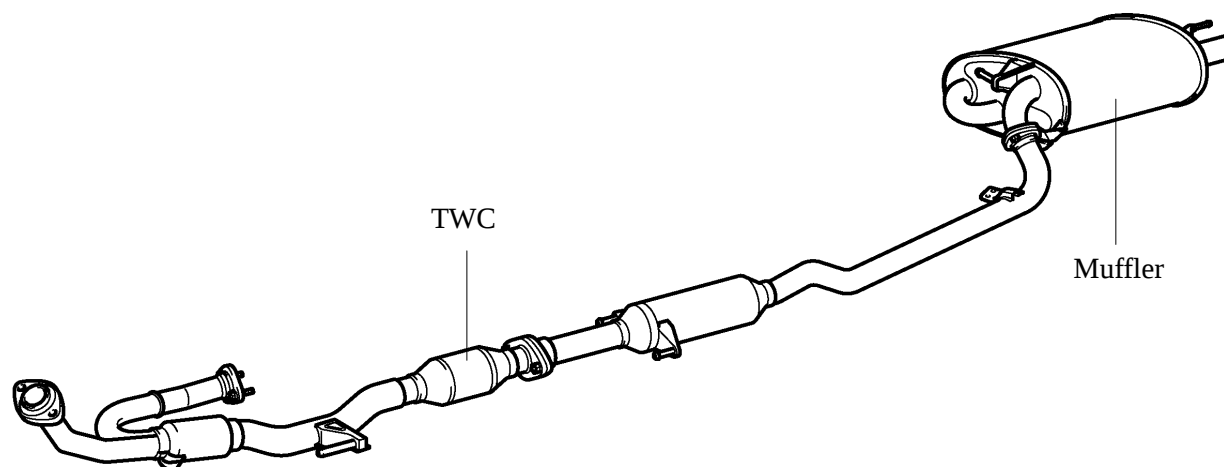
5. Exhaust Manifold

- A stainless steel exhaust manifold is used for improving the warm-up of three-way catalytic converter and for weight reduction.
- The air fuel ratio sensor has been adopted to the exhaust manifold.
- An ultra thin-wall, high-cell metal type TWC (Three-Way Catalytic Converter) has been adopted. This TWC enables to improve exhaust emissions by optimizing the cells density.



6. Exhaust Pipe

- An ultra thin-wall, high-cell ceramic type TWC has been adopted. This TWC enables to improve exhaust emissions by optimizing the cells density.
- 2- way exhaust control system is provided to reduce noise and vibration in the main muffler. For details, see page EG-23 in 2AZ-FE engine section.

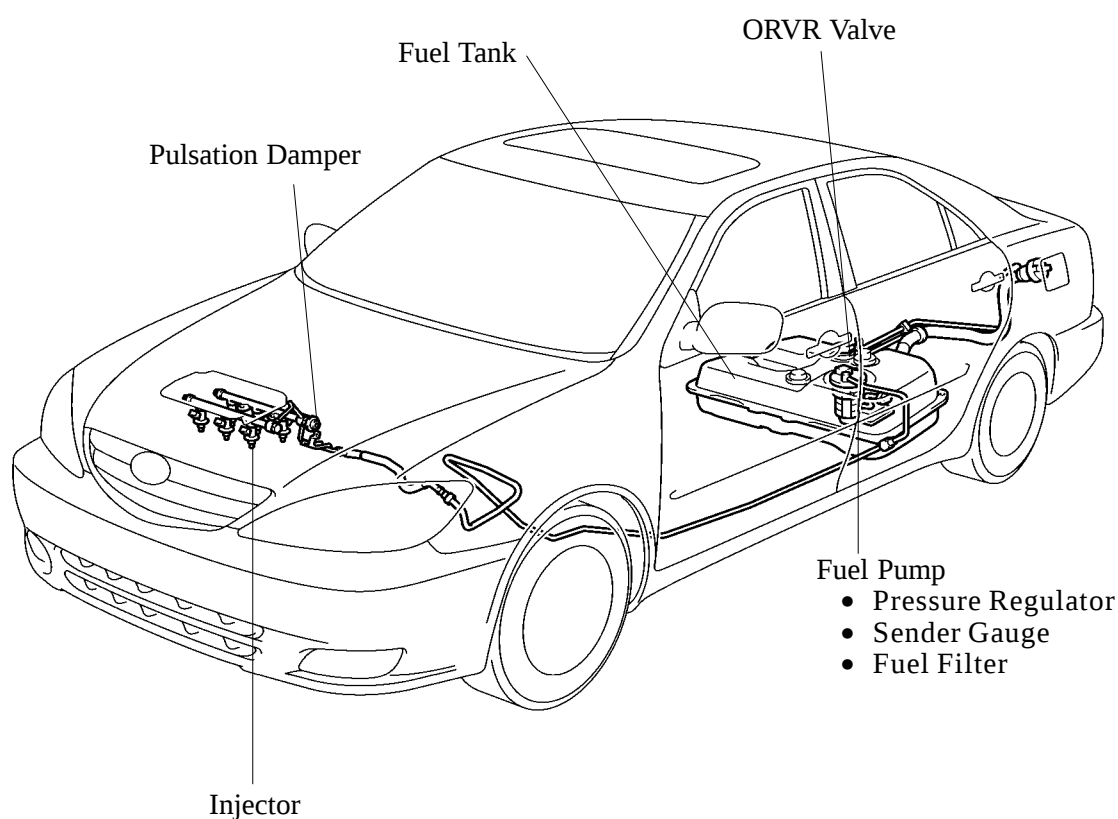


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■ FUEL SYSTEM

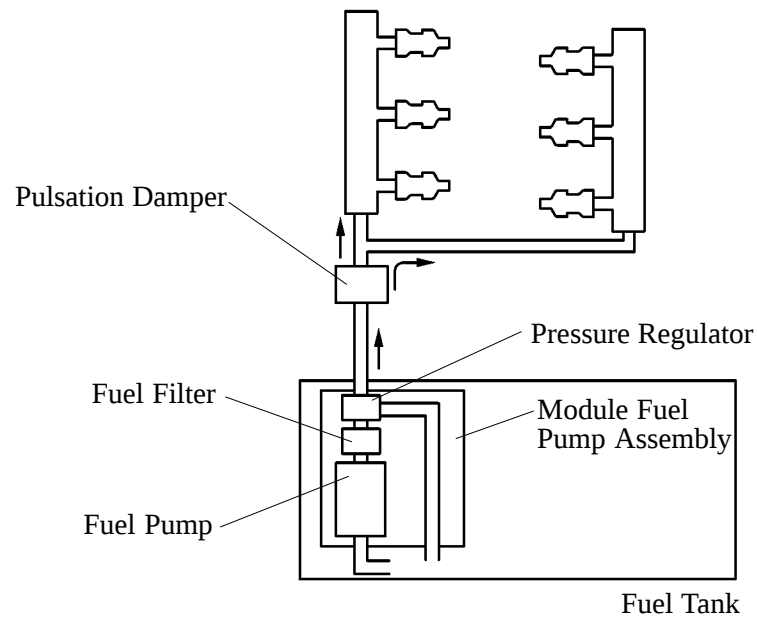
1. General

- A fuel returnless system has been used to reduce evaporative emissions.
- A compact fuel pump in which a fuel filter and pressure regulator are integrated in the module fuel pump assembly has been adopted. For details, see page EG-26 in 2AZ-FE engine section.
- A quick connector has been adopted to connect the fuel pipe with the fuel hose to improve serviceability.
- A compact 12-hole type injector with high atomizing performance has been adopted to improve the atomization of fuel. As the result, the air assist system used on '01 Camry has been discontinued.
- A tether has been provided on the fuel filter cap to prevent the cap from being lost, which results in preventing the leakage of fuel or the evaporative gas.
- The quick-turn type fuel tank cap has been newly adopted to improve usability.
- The ORVR (On-board Refueling Vapor Recovery) system has been adopted. For details, see page EG-45.



2. Fuel Returnless System

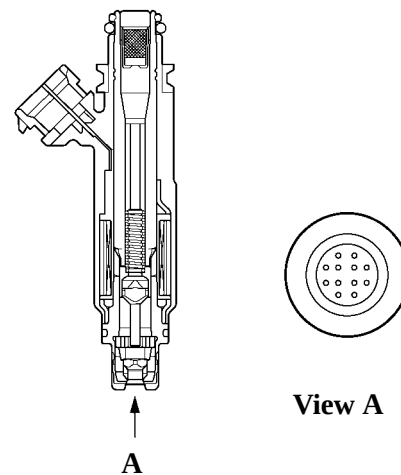
This system has been adopted to reduce the evaporative emission. As shown below, integrating the fuel filter, pressure regulator, and fuel sender gauge with fuel pump assembly, it is possible to discontinue the return of fuel from the engine area and prevent temperature rise inside the fuel tank.



208EG117

3. Fuel Injector

The 12-hole type injector has been adopted to improve the atomization of fuel.

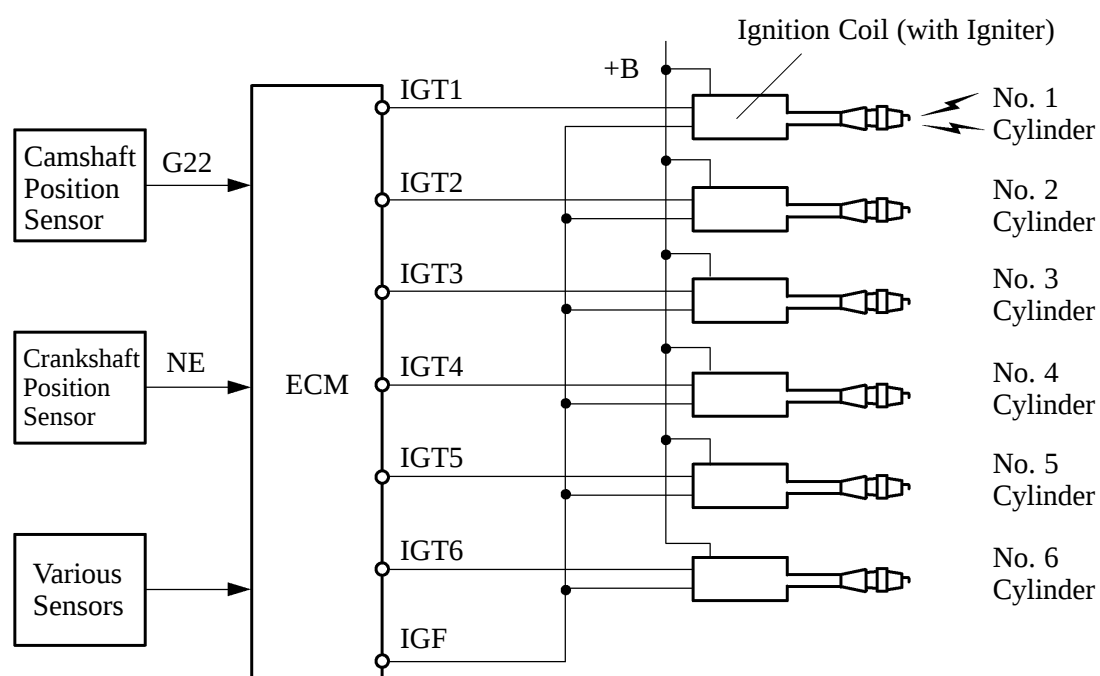


208EG118

■ IGNITION SYSTEM

1. General

- A DIS (Direct Ignition System) has been adopted. The DIS improves the ignition timing accuracy, reduces high-voltage loss, and enhances the overall reliability of the ignition system by eliminating the distributor. The DIS in this engine is an independent ignition system which has one ignition coil (with igniter) for each cylinder.
- Iridium-tipped spark plugs have been adopted to realize a 120,000 mile (192,000 km) maintenance-free operation. For details, see page EG-27 in 2AZ-FE engine section.



161EG43

2. Ignition Coil

The DIS provides 6 ignition coils, one for each cylinder. The spark plug caps, which provide contact to the spark plugs, are integrated with an ignition coil. Also, an igniter is enclosed to simplify the system.

■ STARTING SYSTEM

A compact and lightweight PS (Planetary reduction-Segment conductor motor) starter has been adopted on all models. For details, see page EG-28 in 2AZ-FE engine.

ENGINE CONTROL SYSTEM

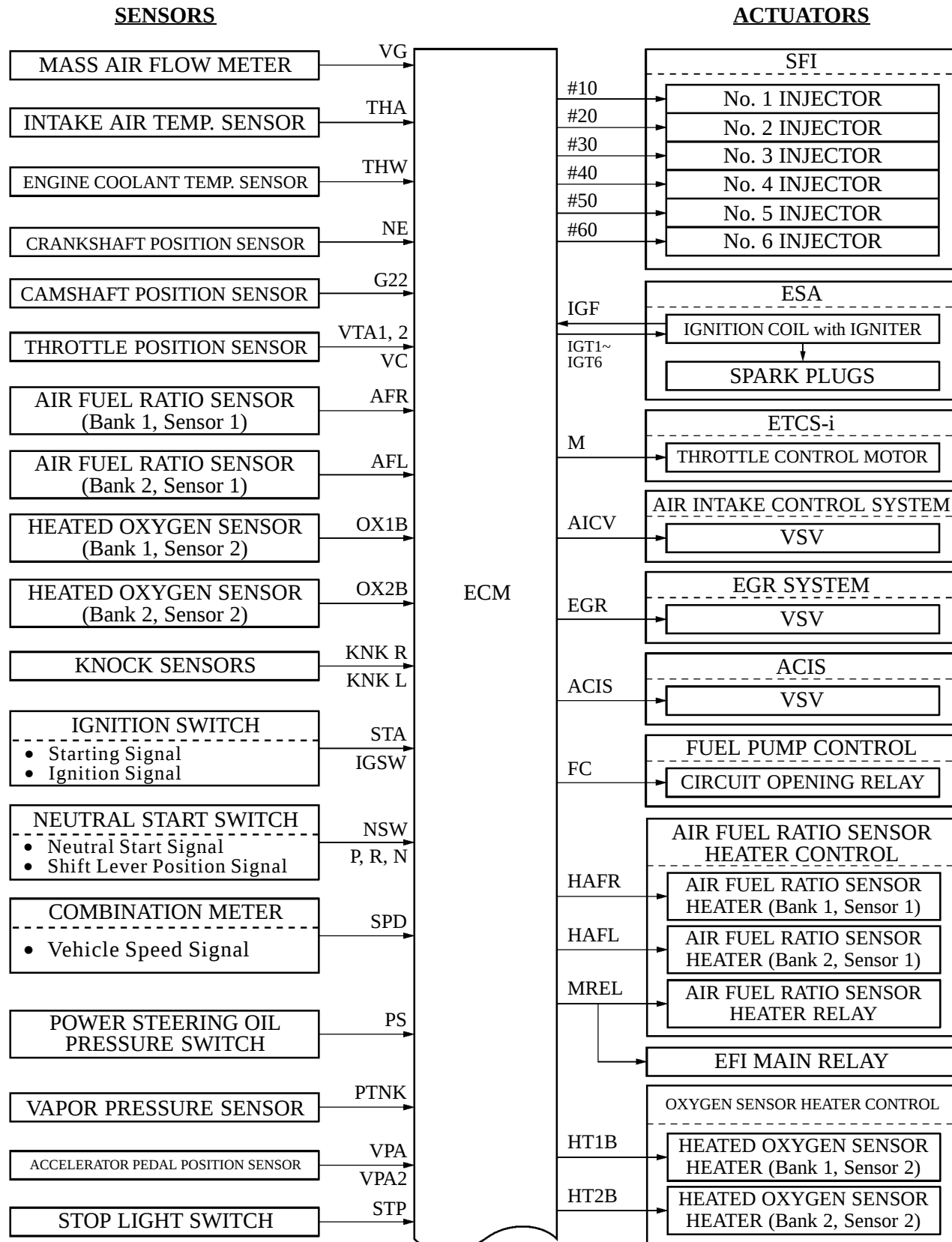
1. General

The engine control system of the 1MZ-FE engine has following system.

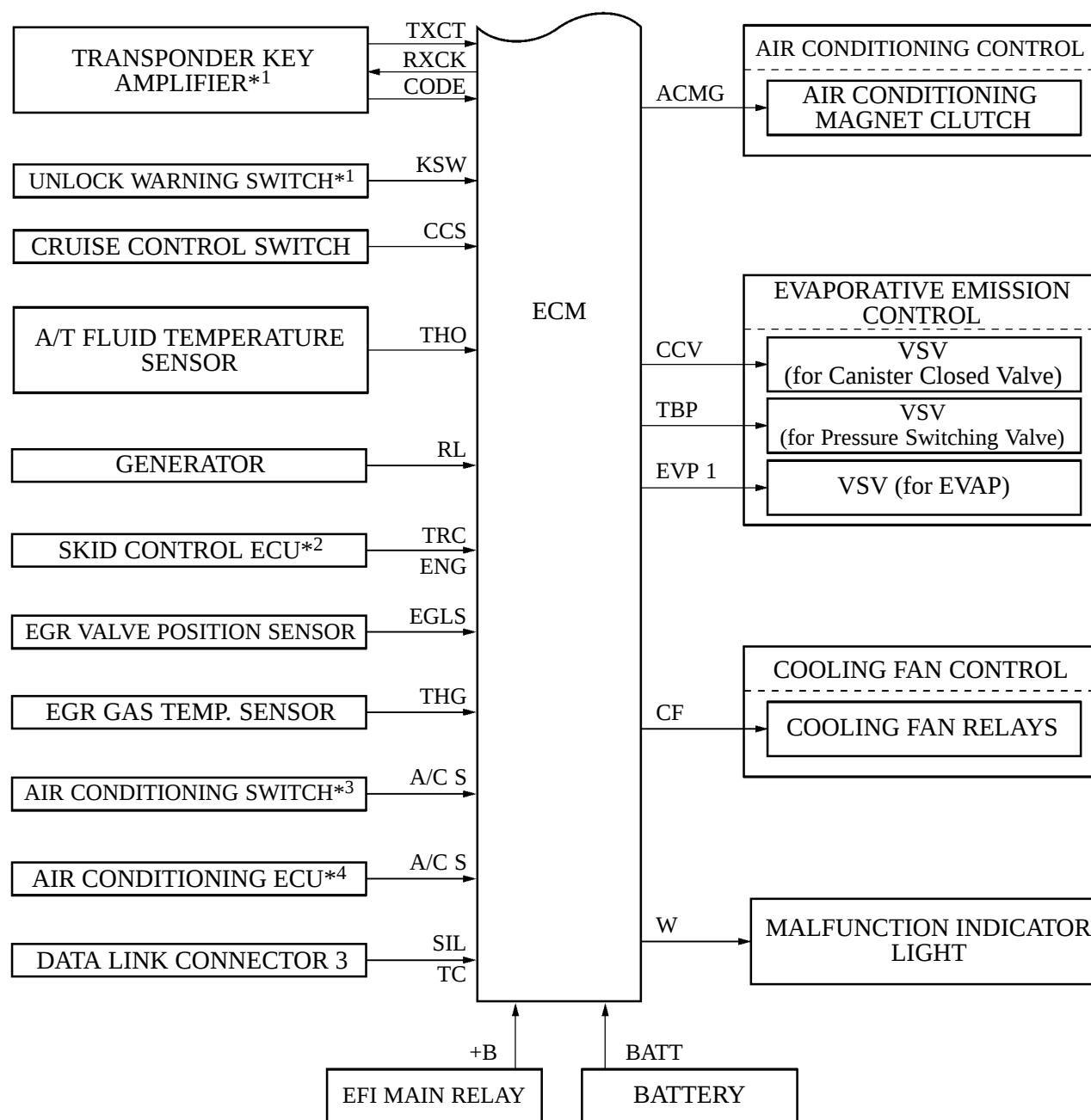
System	Outline	'02 Camry	'01 Camry
SFI (Sequential Multiport Fuel Injection) (For details, see page EG-80)	An L-type SFI system directly detects the intake air mass with a hot wire type mass air flow meter.	○	←
ESA (Electronic Spark Advance) (For details, see page EG-80)	Ignition timing is determined by the ECM based on signals from various sensors. The ECM corrects ignition timing in response to engine knocking.	○	←
ETCS-i (Electronic Throttle Control System-intelligent) (For details, see page EG-81)	Optimally controls the throttle valve opening in accordance with the amount of accelerator pedal effort and the condition of the engine and the vehicle.	○	—
ACIS (Acoustic Control Induction System) (For details, see page EG-83)	The intake air passages are switched according to the engine speed and throttle valve opening angle to provide high performance in all speed ranges.	○	←
Air Intake Control System (For details, see page EG-86)	The intake air duct is divided into two areas, and the ECM controls the air intake control valve and the actuator that are provided in one of the areas to reduce the amount of engine noise.	○	—
Fuel Pump Control	Fuel pump operation is controlled by signal from the ECM.	○	←
Air Fuel Ratio Sensor, Oxygen Sensor Heater Control	Maintains the temperature of the air fuel ratio sensor or oxygen sensor at an appropriate level to increase accuracy of detection of the oxygen concentration in the exhaust gas.	○	←
EGR (Exhaust Gas Recirculation) System	- This system recirculates a portion of the exhaust gases through the intake in order to reduce the amount of NOx in the exhaust gases. - Cuts off EGR according to the engine condition to maintain drivability of the vehicle and durability of the EGR components.	○	←
Evaporative Emission Control (For details, see page EG-44)	- The ECM controls the purge flow of evaporative emission (HC) in the charcoal canister in accordance with engine conditions. - Using 3VSVs and a vapor pressure sensor, the ECM detects any evaoprative emission leakage occurring between the fuel tank and the charcoal canister through the changes in the tank pressure.	○	←
Air Conditioning Cut-off Control	By turning the air conditioner compressor ON or OFF in accordance with the engine condition, drivability is maintained.	○	←
Engine Immobiliser	Prohibits fuel delivery and ignition if an attempt is made to start the engine with an invalid ignition key.	○	←
Diagnosis (For details, see page EG-87)	When the ECM detects a malfunction, the ECM diagnoses and memorizes the failed section.	○	←
	To increase the speed for processing the signals, the 32-bit CPU of the ECM has been adopted	○	—
Fail-Safe (For details, see page EG-88)	When the ECM detects a malfunction, the ECM stops or controls the engine according to the data already stored in the memory.	○	←

2. Construction

The configuration of the engine control system in the 1MZ-FE engine in the '02 Camry is as shown in the following chart.



(Continued)



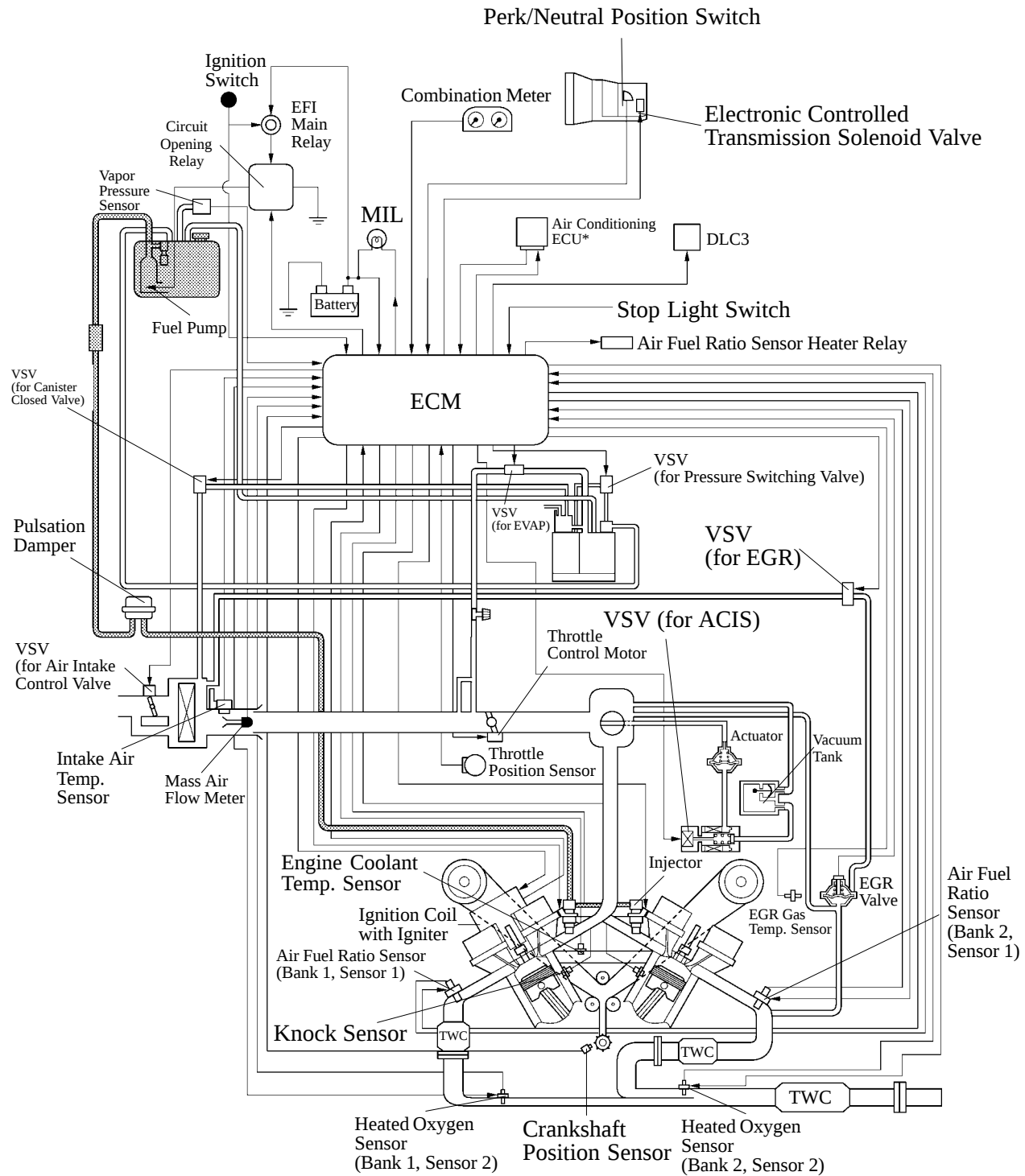
*1: with Engine Immobiliser System

*2: with VSC System

*3: with Manual Air Conditioning System

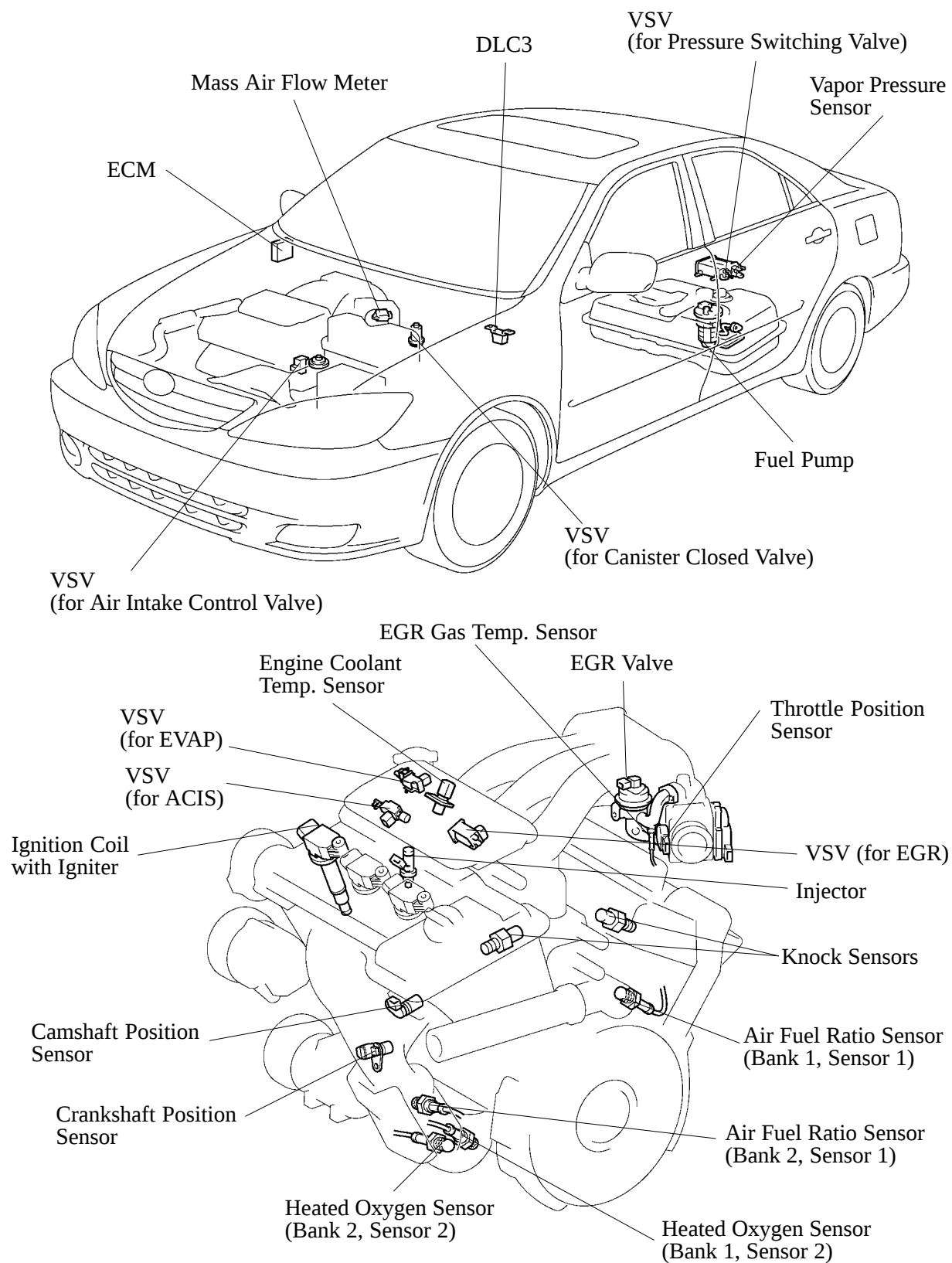
*4: with Automatic Air Conditioning System

3. Engine Control System Diagram



*: with Automatic Air Conditioning System

4. Layout of Main Component



5. Main Components of Engine Control System

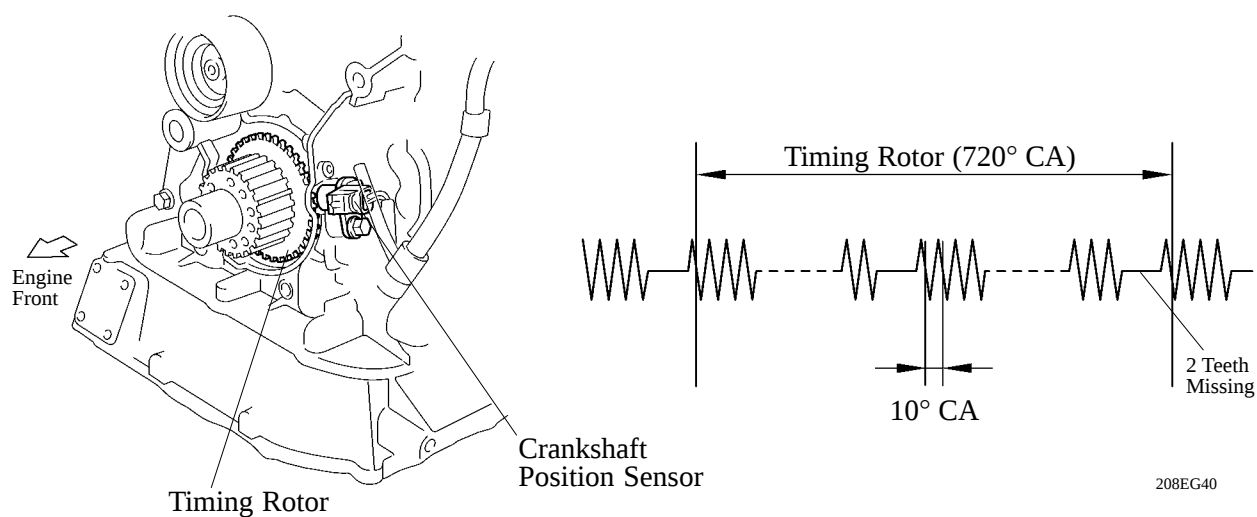
General

The following table compares the main components.

Components	New		Previous	
	Outline	Quantity	Outline	Quantity
ECM	32-bit CPU	1	16-bit CPU	1
Mass Air Flow Meter (For details, see page EG-36)	Hot-wire Type	1	←	
Crankshaft Position Sensor (Rotor Teeth)	Pick-up Coil Type (36-2)	1	←	
Camshaft Position Sensor (Rotor Teeth)	Pick-up Coil Type (3)	1	←	
Throttle Position Sensor	Linear Type	1	←	
Accelerator Pedal Position Sensor (For details, see page EG-38)	Linear Type	1	—	
Knock Sensor	Built-in Piezoelectric Type	1	←	
Air Fuel Ratio Sensor (Bank 1, Sensor 1) (Bank 2, Sensor 1)	with Heater Type	2	← (A/T Model)	
Oxygen Sensor (Bank 1, Sensor 2) (Bank 2, Sensor 2)	with Heater Type	2	with Heater Type	3 (M/T Model)
				1 (A/T Model)
Injector	12-hole Type	6	4-hole Type	6

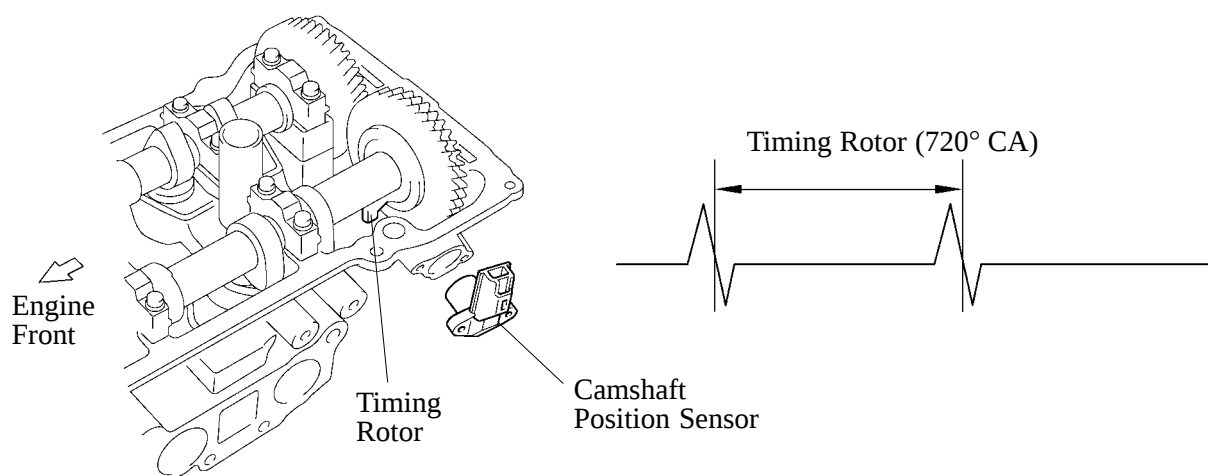
Crankshaft Position Sensor

The timing rotor of the crankshaft consists of 34 teeth, with 2 teeth missing. The crankshaft position sensor outputs the crankshaft rotation signals every 10°, and the missing teeth are used to determine the top-dead-center.



Camshaft Position Sensor

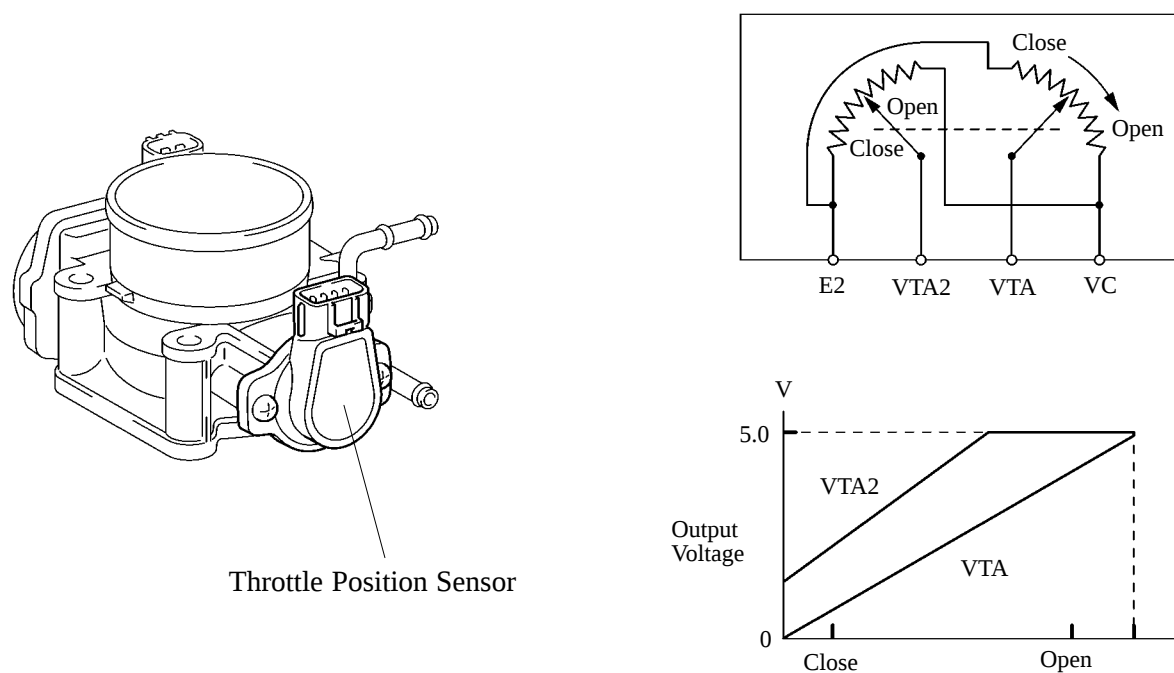
The camshaft position sensor is mounted on the left side cylinder head. To detect the camshaft position, a timing rotor that is provided on the camshaft is used to generate 1 pulse for every 2 revolutions of the crankshaft.



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Throttle Position Sensor

This sensor converts the throttle valve opening angles into electronic signals with two differing characteristics and outputs them to the ECM. One is the VTA signal that linearly outputs the voltage along the entire range of the throttle valve opening angle. The other is the VTA 2 signal that outputs an offset voltage.

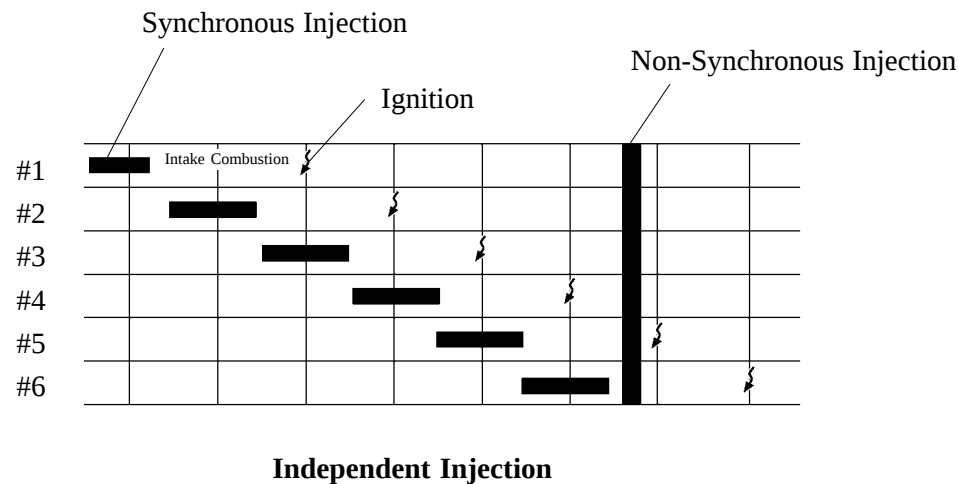


208EG42

6. SFI (Sequential Multiport electronic Fuel Injection) System

- An L-type SFI system directly detects the intake air mass with a hot wire type mass air flow meter.
- An independent injection system (in which fuel is injected once into each cylinder for each two revolution of the crankshaft) has been adopted.
- There are two types of fuel injection:
 - a) One is synchronous injection in which corrections based on the signals from the sensors are added to the basic injection time so that injection occurs always at the same timing.
 - b) The other is non-synchronous injection in which injection is effected by detecting the requests from the signals of the sensors regardless of the crankshaft angle.

Furthermore, to protect the engine and improve fuel economy, the system effects fuel cutoff in which the injection of fuel is stopped temporarily in accordance with the driving conditions.



208EG43

7. ESA (Electronic Spark Advance)

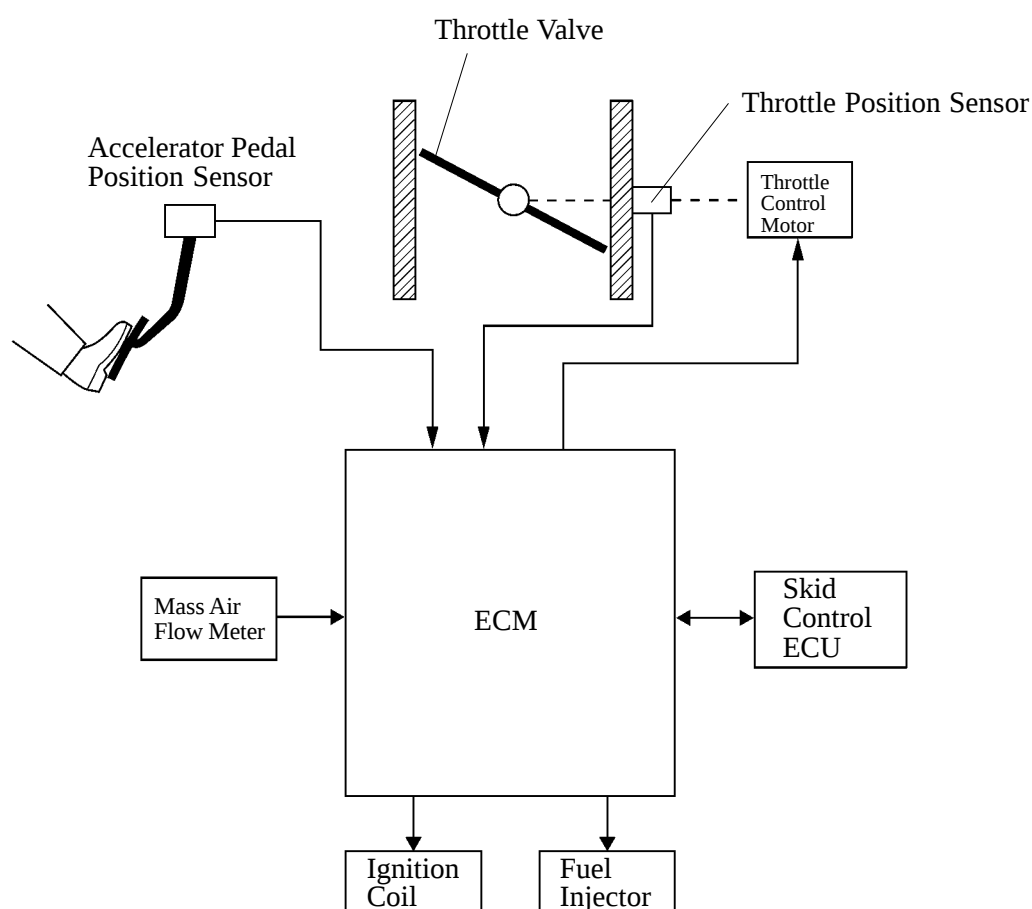
This system selects the optimal ignition timing in accordance with the signals received from the sensors and sends the (IGT) ignition signal to the igniter. The default ignition timing is set to 5° BTDC.

8. ETCS-i (Electronic Throttle Control System-intelligent)

General

- In the conventional throttle body, the throttle valve opening is determined invariably by the amount of the accelerator pedal effort. In contrast, the ETCS-i uses the ECM to calculate the optimal throttle valve opening that is appropriate for the respective driving condition and uses a throttle control motor to control the opening.
- The accelerator cable and link have been discontinued, and an accelerator position sensor has been provided on the accelerator pedal.

► System Diagram ◀



Operation

1) General

The ECM drives the throttle control motor by determining the target throttle valve opening in accordance with the respective vehicle operating condition.

- Idle Speed Control
- Shift Shock Reduction Control
- Cruise Control

2) Idle Speed Control

Controls the ECM and the throttle valve in order to constantly effect ideal idle speed control.

3) Shift Shock Reduction Control

The throttle control is synchronized to the ECT (Electronically Controlled Transmission) control during the shifting of the transmission in order to reduce the shift shock.

4) TRAC Throttle Control

As part of the TRAC system, the throttle valve is closed by a demand signal from the skid control ECU if an excessive amount of slippage is created at a driving wheel, thus facilitating the vehicle in ensuring stability and driving force.

5) VSC Coordination Control

In order to bring the effectiveness of the VSC system control into full play, the throttle valve opening angle is controlled by effecting a coordination control with the skid control ECU.

6) Cruise Control

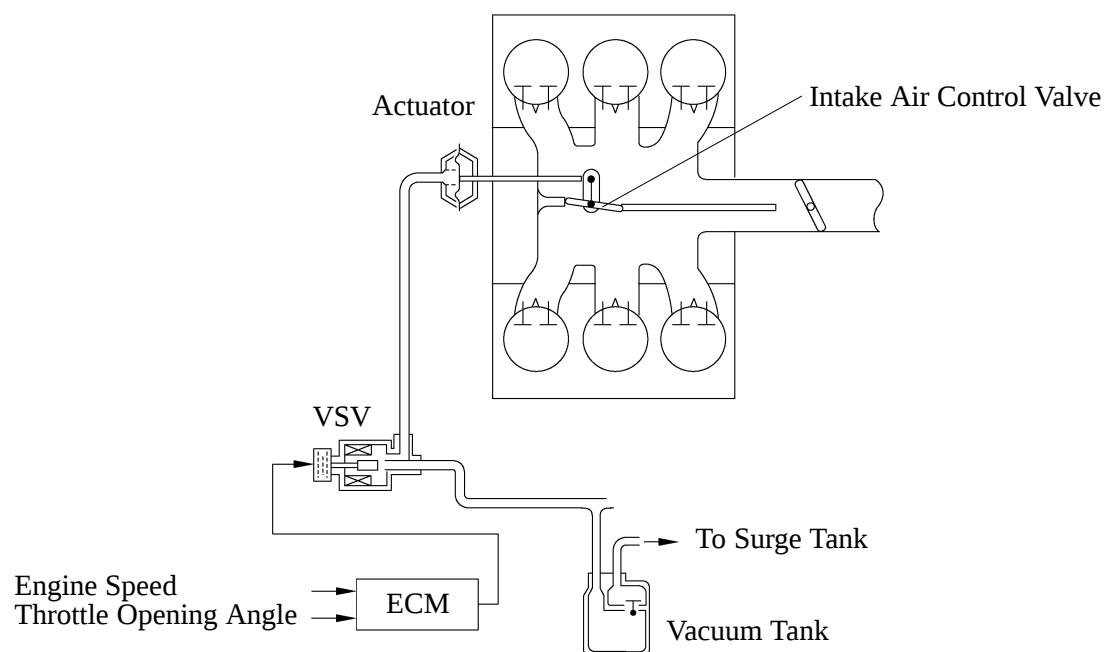
An ECM with an integrated cruise control ECU directly actuates the throttle valve to effect the operation of the cruise control.

9. ACIS (Acoustic Control Induction System)

General

The ACIS is realized by using a bulkhead to divide the intake manifold into 2 stages, with an intake air control valve in the bulkhead being opened and closed to vary the effective length of the intake manifold in accordance with the engine speed and throttle valve opening angle. This increases the power output in all ranges from low to high speed.

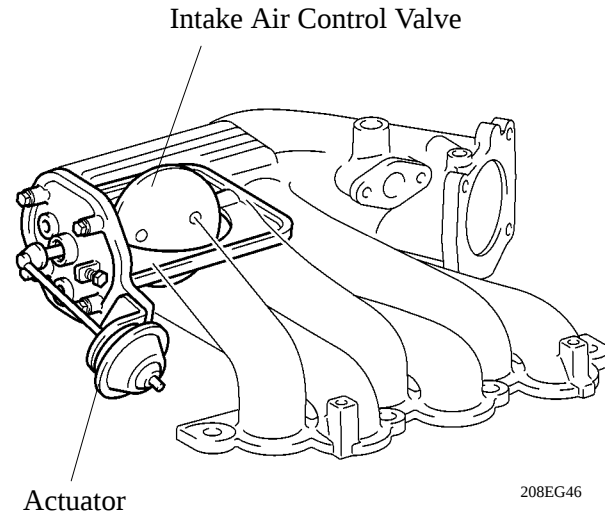
► System Diagram ◀



General

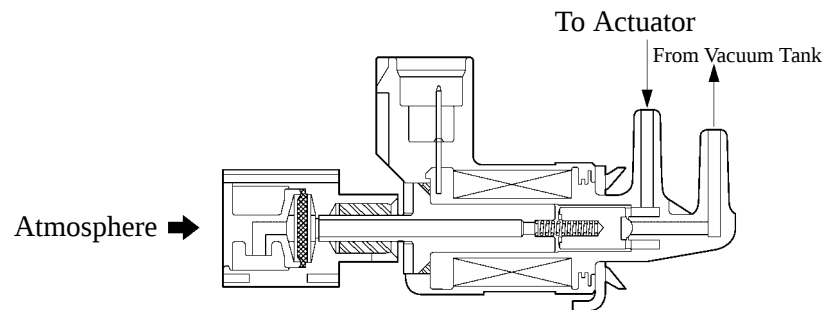
1) Intake Air Control Valve

The intake air control valves, which are provided in the intake air chamber, open and close to change the effective length of the intake manifold in two stages.



2) VSV (Vacuum Switching Valve)

Controls the vacuum that is applied to the actuator by way of the signal (ACIS) that is output by the ECM.



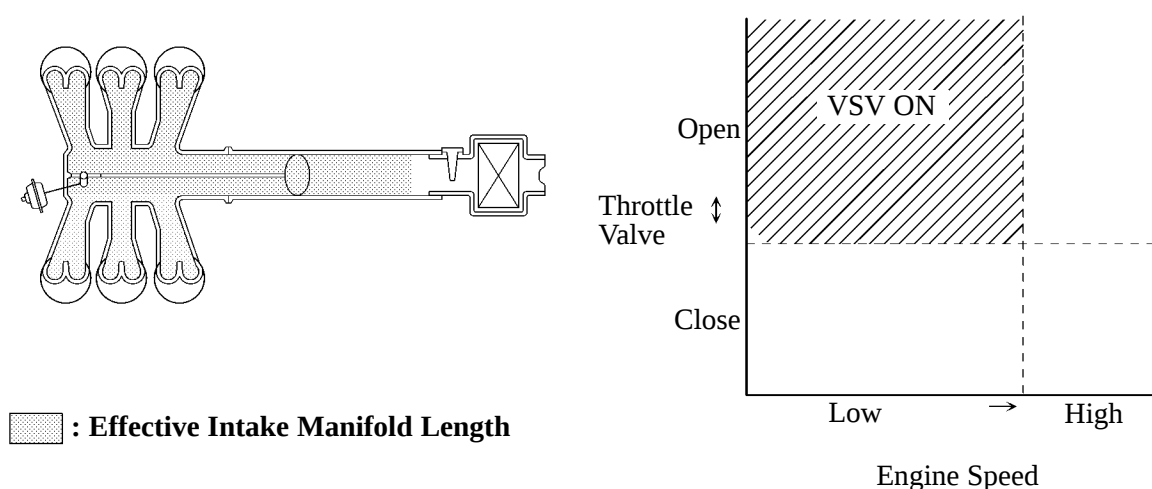
3) Vacuum Tank

Equipped with an internal check valve, the vacuum tank stores the vacuum that is applied to the actuator in order to maintain the intake air control valve fully closed even during low-vacuum conditions.

Operation

1) When the Intake Control Valve Closes (VSV ON)

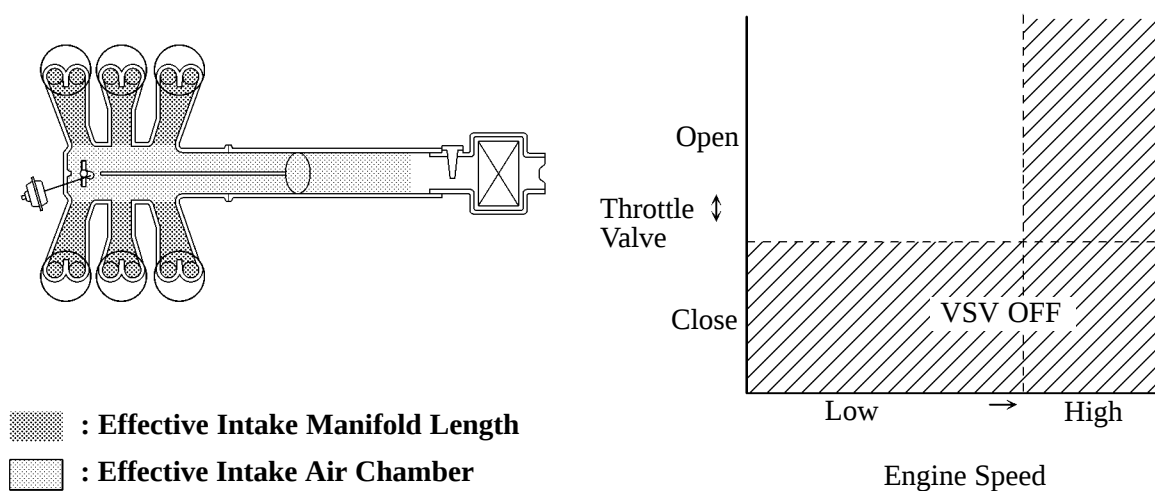
The ECM activates the VSV to match the longer pulsation cycle so that the negative pressure acts on the diaphragm chamber of the actuator. This closes the control valve. As a result, the effective length of the intake manifold is lengthened and the intake efficiency in the low-to-medium speed range is improved due to the dynamic effect of the intake air, thereby increasing the power output.



208EG48

2) When the Intake Control Valve Open (VSV OFF)

The ECM deactivates the VSV to match the shorter pulsation cycle so that atmospheric air is led into the diaphragm chamber of the actuator and opens the control valve. When the control valve is open, the effective length of the intake air chamber is shortened and peak intake efficiency is shifted to the high engine speed range, thus providing greater output at high engine speeds.



208EG49

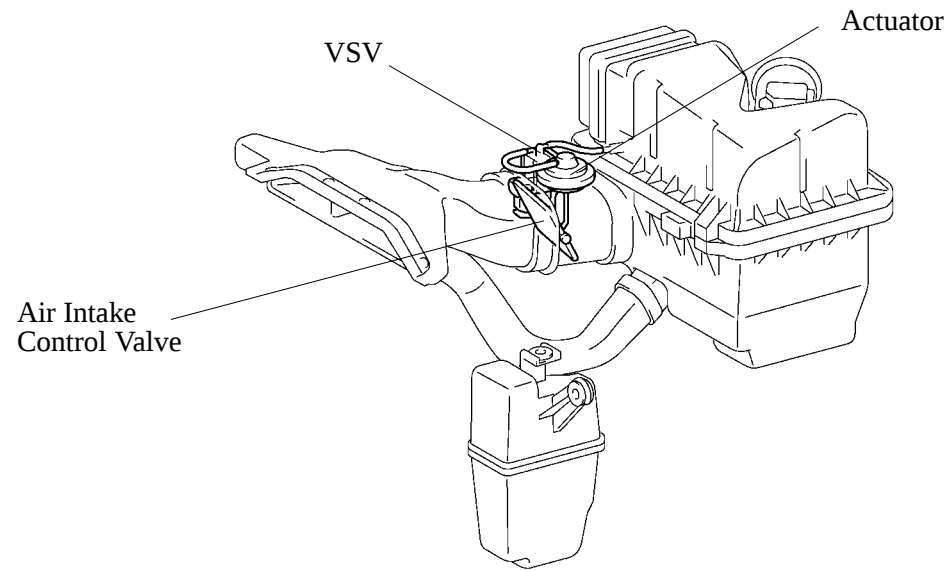
10. Air Intake Control System

General

The air cleaner inlet is divided into two areas, and a air intake control valve and an actuator have been provided in one of the areas.

As a result, a reduction in intake noise in the low-speed range and an increase in the power output in the high-speed range have been realized.

► Layout of Components ◀

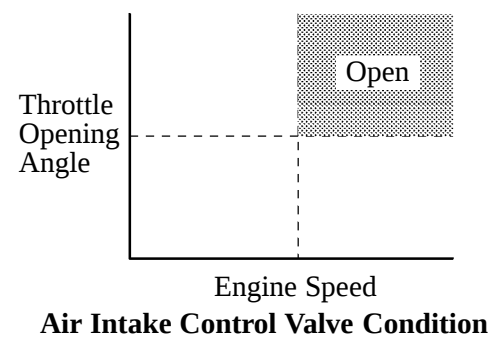
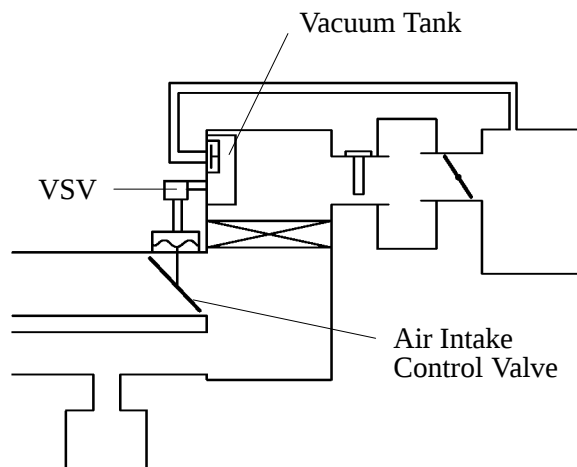


208EG50

Operation

When the engine is operating in the low-to mid-speed range, this control operates the air intake control valve to close one side of the air cleaner inlet.

When the engine is operating in the high-speed range, this control operates the air intake control valve to open both side of the air cleaner inlet to effect the intake of air.



208EG51

11. Diagnosis

When the ECM detects a malfunction, the ECM makes a diagnosis and memorizes the failed section. Furthermore, the MIL (Malfunction Indicator Light) in the combination meter illuminates or blinks to inform the driver.

The ECM will also store the DTCs of the malfunctions.

The DTCs can be accessed the use of the hand-held tester.

Service Tip

The length of time to clear the DTC via the battery terminal has been changed from the previous 10 seconds to 1 minute.

— Changes (from '01 Camry) —

The DTCs (Diagnostic Trouble Codes) listed below have been added or discontinued.

► Added DTCs ◀

DTC No.	Detection Item
P0156	O ₂ Sensor Circuit Malfunction (Bank 2, Sensor 2)
P0161	O ₂ Sensor Heater Circuit Malfunction (Bank 2, Sensor 2)
P0430	Catalyst System Efficiency Below Threshold (Bank 2)
P0605	Internal Control Module Read Only Memory (ROM) Error
P1120	Accelerator Pedal Position Sensor Circuit Malfunction
P1121	Accelerator Pedal Position Sensor Range/Performance Problem
P1125	Throttle Control Motor Circuit Malfunction
P1127	ETCS Actuator Power Source Circuit Malfunction
P1128	Throttle Control Motor Lock Malfunction
P1129	Electric Throttle Control System Malfunction
P1633	ECM Malfunction (ETCS Circuit)

► Discontinued DTCs ◀

DTC No.	Detection Item
P0130	O ₂ Sensor Circuit Malfunction (Bank 1, Sensor 1)
P0133	O ₂ Sensor Circuit Slow Response (Bank 1, Sensor 1)
P0135	O ₂ Sensor Heater Circuit Malfunction (Bank 1, Sensor 1)
P0150	O ₂ Sensor Circuit Malfunction (Bank 2, Sensor 1)
P0153	O ₂ Sensor Circuit Slow Response (Bank 2, Sensor 1)
P0155	O ₂ Sensor Heater Circuit Malfunction (Bank 2, Sensor 1)

12. Fail-Safe

General

When the ECM detects a malfunction, the ECM stops or controls the engine according to the data already stored in the memory.

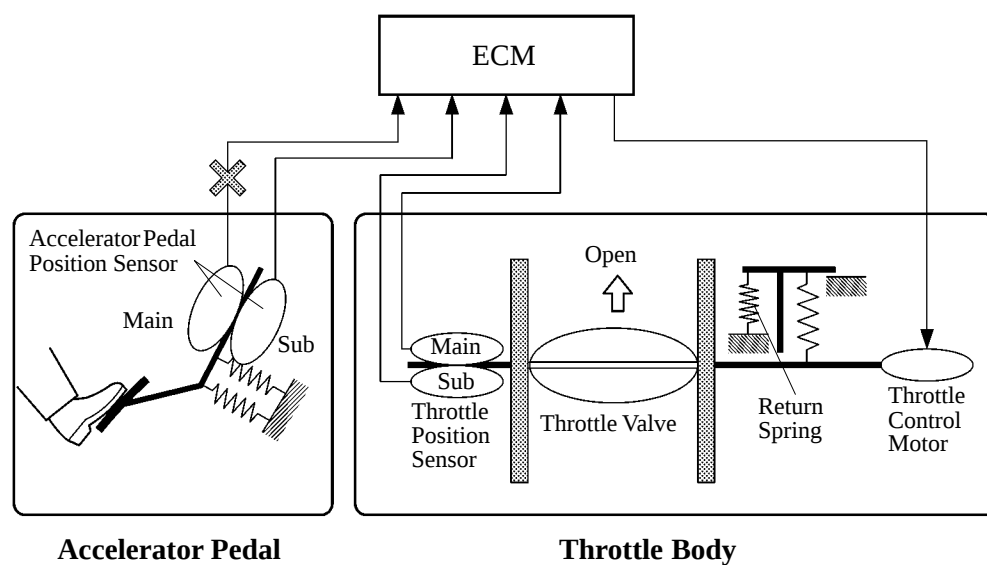
► Fail-Safe Control List ◀

☐ : New

Location on Malfunction	Description Control
Mass Air Flow Meter	In case of a signal malfunction, the engine could operate poorly or the catalyst could overheat if the engine continues to be controlled with the signals from the sensors. Therefore, the ECM effects control by using the values in the ECM or stops the engine.
Accelerator Pedal Position Sensor (For details, see page EG-89)	In case of a signal malfunction, the ECM calculates the accelerator pedal opening angle that is limited by the dual system sensor value and continues effecting throttle valve control. If both system malfunction, the ECM considers that the accelerator pedal is fully closed.
Throttle Position Sensor (For details, see page EG-90)	In case of a signal malfunction, the ECM cuts off the current to the throttle control motor. The throttle valve returns to the prescribed opening by the force of the return spring. The ECM then adjusts the engine output by controlling the fuel injection and ignition timing in accordance with the accelerator pedal opening angle to enable the vehicle to continue driving.
Engine Coolant Temp. Sensor and Intake Air Temp. Sensor	In case of a signal malfunction, the use of the values from the sensors will make the air-fuel ratio become too rich or too lean, which could causes the engine to stall or to run poorly during cold operation. Therefore, the ECM fixes the air-fuel ratio to the stoichiometric ratio and uses the constant values of 80°C engine coolant temperature and 20°C intake air temperature to perform the calculation.
Knock Sensor	In case of a malfunction in the knock sensor or in the knocking signal system (open or short circuit), the engine could become damaged if the timing is advanced despite the presence of knocking. Therefore, if a malfunction is detected in the knock sensor system, the ECM turns the timing retard correction of the knock sensor into the maximum retard value.
Ignition Coil (with Igniter)	In case of a malfunction in the ignition system, such as an open circuit in the ignition coil, the catalyst could be become overheated due to engine misfire. Therefore, if the (IGF) ignition signal is not input twice or more in a row, the ECM determines that a malfunction occurred in the ignition system and stops only the injection of fuel into the cylinder with the malfunction.

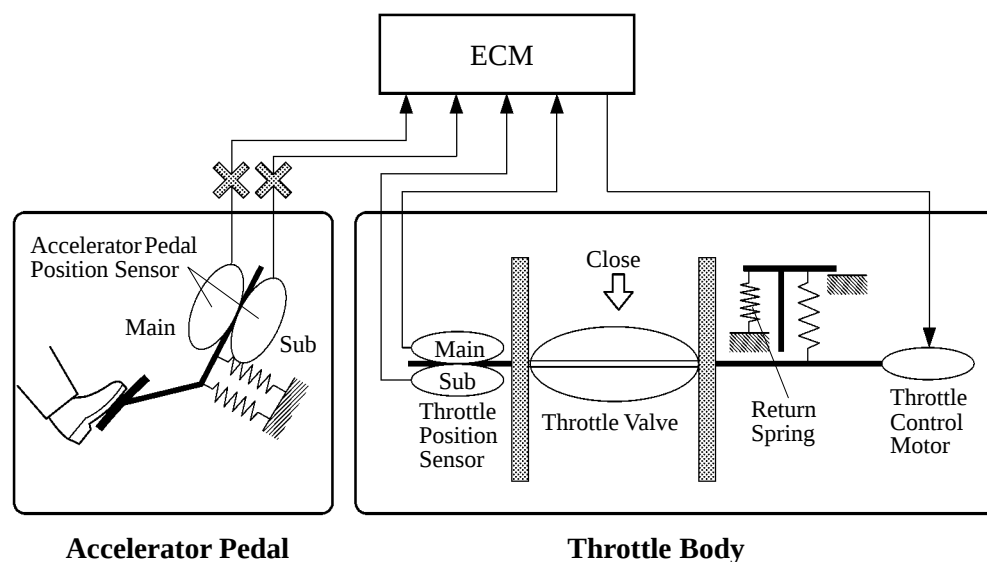
Fail-Safe of Accelerator Pedal Position Sensor

- The accelerator pedal position sensor comprises two (main, sub) sensor circuits. If a malfunction occurs in either one of the sensor circuits, the ECM detects the abnormal signal voltage difference between these two sensor circuit and switches to the limp mode. In the limp mode, the remaining circuit is used to calculate the accelerator pedal opening, in order to operate the vehicle under limp mode control.



199EG45

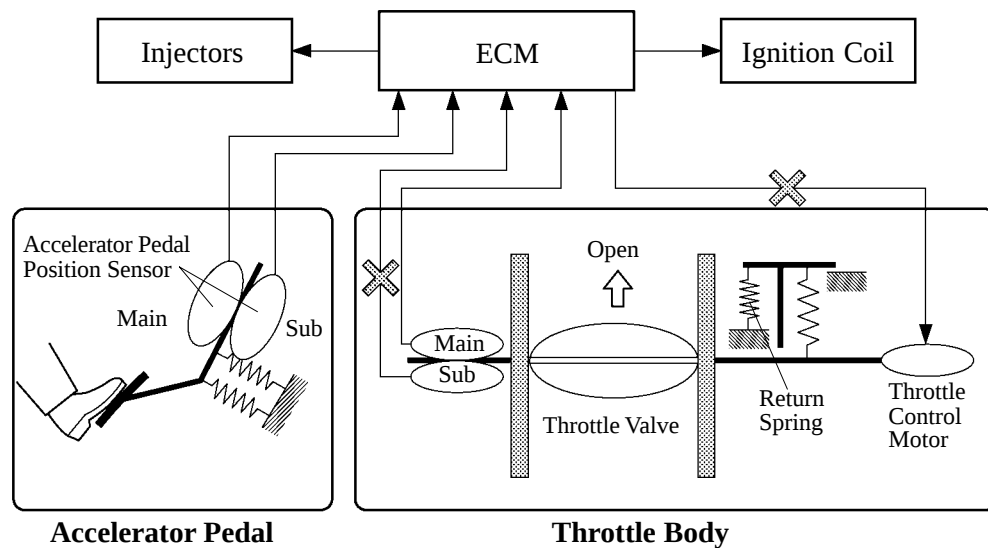
- If both systems malfunction, the ECM detects the abnormal signal voltage between these two sensor circuits and regards that the opening angle of the accelerator pedal is fully opened and then continues the throttle control. At this time, the vehicle can be driven within its idling range.



199EG46

Fail-Safe of Throttle Position Sensor

- The throttle position sensor comprises two (main, sub) sensor circuits. If a malfunction occurs in either one of the sensor circuits, the ECM detects the abnormal signal voltage difference between these two sensor circuits, cuts off the current to the throttle control motor, and switches to the limp mode. Then, the force of the return spring causes the throttle valve to return and stay at the prescribed opening. At this time, the vehicle can be driven in the limp mode while the engine output is regulated through the control of the fuel injection and ignition timing in accordance with the accelerator opening.
- The same control as above is effected if the ECM detects a malfunction in the throttle control motor system.



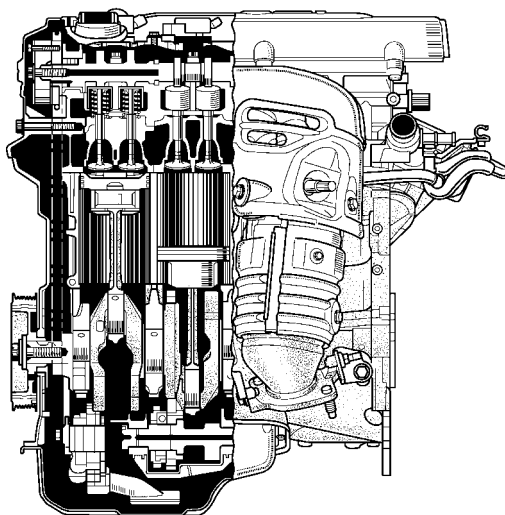
199EG47

ENGINE

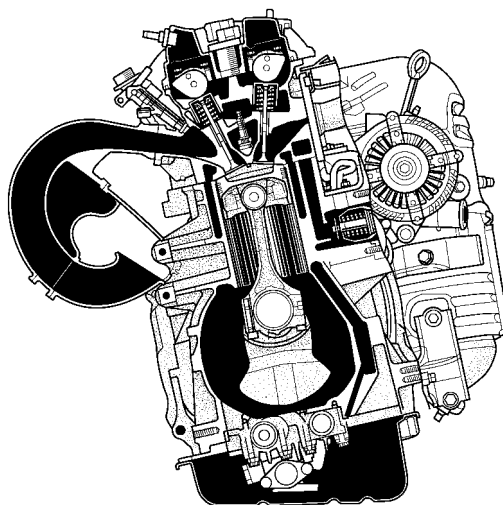
2AZ-FE ENGINE

■ DESCRIPTION

- The 2AZ-FE engine, which is an in-line, 4-cylinder, 2.4-liter, 16-valve DOHC engine, based on the 2AZ-FE engine on the '01 Highlander.
- This engine has following features that have been optimized in order to realize the further improvement of the engine performance, fuel economy and to reduce exhaust emissions.
 - The PS (Planetary reduction Segment conductor motor) starter has been adopted.
 - Meets the ULEV (Ultra Low Emission Vehicle) regulation requirements.
 - ETCS-i (Electronic Throttle Control System-intelligent) has been adopted.
 - VVT-i (Variable Valve Timing-intelligent) system is used.
 - A big bore / long port intake manifold is used.
 - A balance shaft is used.



208EG01

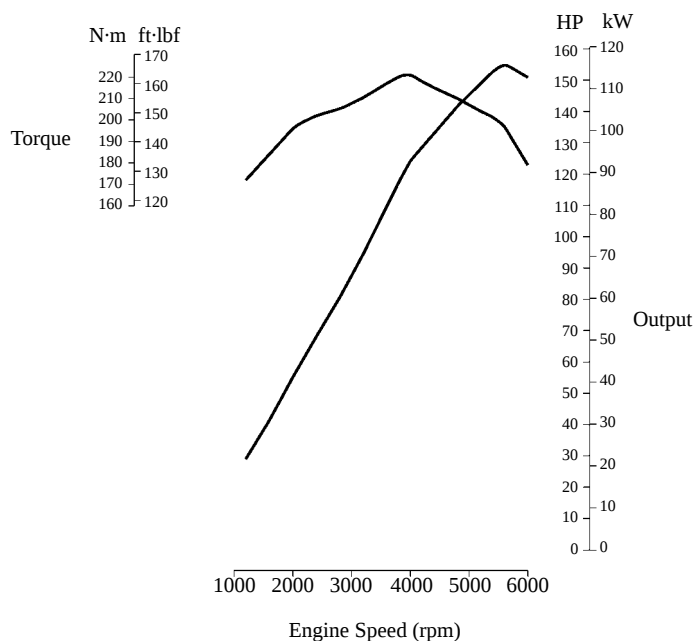


208EG02

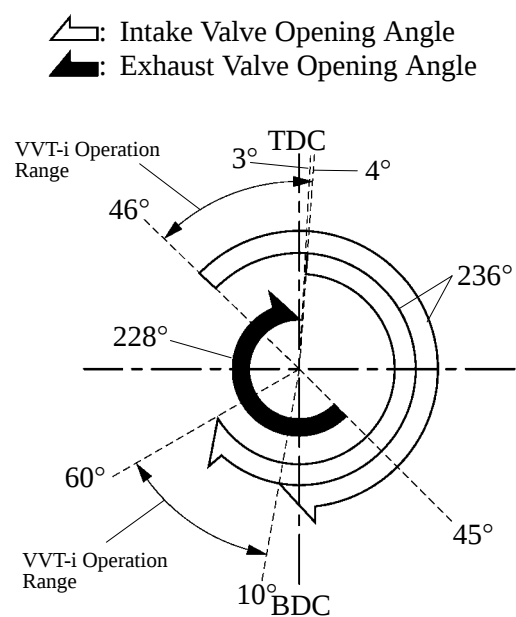
► Engine Specification ◀

Model		Camry	'01 Highlander	
Engine Type		2AZ-FE	←	
No. of Cyls. & Arrangement		4-cylinder, In-line	←	
Valve Mechanism		16-Valve, DOHC, Chain Drive	←	
Combustion Chamber		Pentroof Type	←	
Manifolds		Cross-Flow	←	
Fuel System		SFI	←	
Displacement	cm ³ (cu. in.)	2362 (144.2)	←	
Bore × Stroke	mm (in.)	88.5 × 96.0 (3.48 × 3.78)	←	
Compression Ratio		9.6 : 1	←	
Max. Output	(SAE-NET)	117 kW @ 5600 rpm (157 HP @ 5600 rpm)	115 kW @ 5600 rpm (155 HP @ 5600 rpm)	
Max. Torque	(SAE-NET)	220 N·m @ 4000 rpm (162 ft·lbf @ 4000 rpm)	221 N·m @ 4000 rpm (163 ft·lbf @ 4000 rpm)	
Firing Order		1-3-4-2	←	
Research Octane Number		91 or more	←	
Octane Rating		87 or more	←	
Dry Weight	kg (lb)	M/T	127 (280)	—
		A/T	121 (267)	←
Oil Grade		API SJ, SL, EC or ILSAC	API SH, SJ , EC or ILSAC	

► Performance Curve ◀



► Valve Timing ◀



■ FEATURES OF 2AZ-FE ENGINE

The 2AZ-FE engine has been able to achieve the following performance through of the adoption of the item listed below.

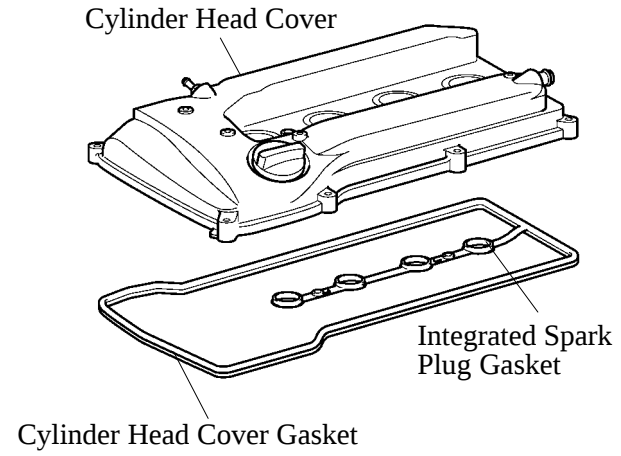
- (1) High performance and fuel economy
- (2) Low noise and vibration
- (3) Lightweight and compact design
- (4) Good serviceability
- (5) Clean emission

Item	(1)	(2)	(3)	(4)	(5)	Camry	Highlander
The VVT-i system is used.	○				○	○	←
The ETCS-i has been newly adopted.	○					○	—
A cylinder block made of aluminum alloy along with a magnesium head cover has been adopted.			○			○	←
The taper squish shape has been adopted for the piston head.	○				○	○	←
The DIS (Direct Ignition System) makes ignition timing adjustment unnecessary.	○			○	○	○	←
A serpentine belt drive system has been adopted, and the brackets and the engine have been integrated.			○	○		○	←
Timing chain has been used.			○	○		○	←
The fuel returnless system has been adopted.			○	○	○	○	←
Quick connectors are used to connect the fuel hose with the fuel pipes.				○		○	←
12-hole type fuel injectors with high atomizing performance have been adopted.	○				○	○	←
Iridium-tipped spark plugs have been adopted.	○			○		○	←
Intake manifold made of plastic has been adopted.			○			○	←
A 2-way exhaust control system has been adopted.	○	○				○	←
The use of an air fuel ratio sensor allows precise control.					○	○	←
A resin gear balance shaft has been adopted.		○	○			○	←
The PS (Planetary reduction-Segment conductor motor) starter has been adopted.			○			○	—

Other parts construction are the same as in the '01 Highlander.

ENGINE PROPER**1. Cylinder Head Cover**

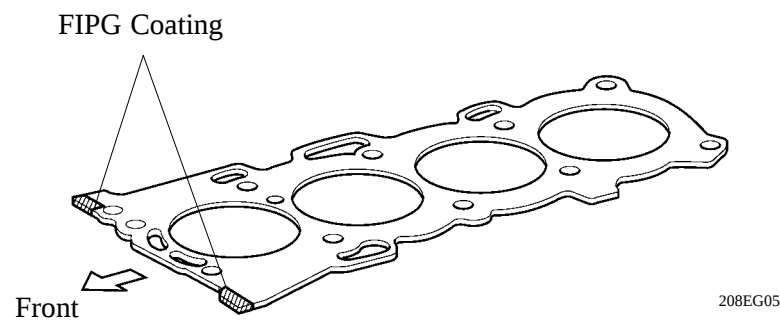
- A lightweight magnesium alloy diecast cylinder head cover is used.
- The cylinder head cover gasket and the spark plug gasket have been integrated to reduce the number of parts.



185EG35

2. Cylinder Head Gasket

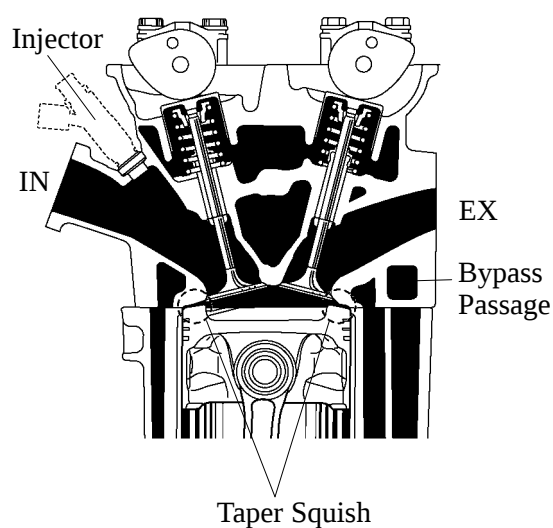
A steel-laminate type cylinder head gasket has been adopted.



208EG05

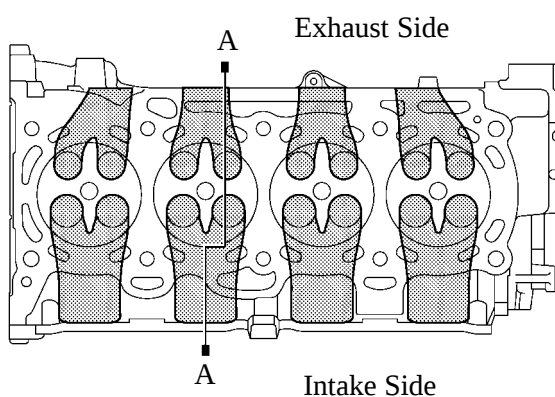
3. Cylinder Head

- The taper squish combustion chamber has been used to realize the highly engine's knocking resistance and fuel efficiency.
- An upright intake port has been used to realize the highly intake efficiency.
- Installing the injectors in the cylinder head enables the injectors inject fuel as close as possible to the combustion chamber. This prevents the fuel from adhering to the intake port walls, which reduces HC exhaust emissions.
- The routing of the water bypass jacket in the cylinder head has been optimized to realize the highly cooling performance. In addition, a water bypass passage has been provided below the exhaust ports to reduce the number of parts and to achieve weight reduction.



A - A Cross Section

208EG67

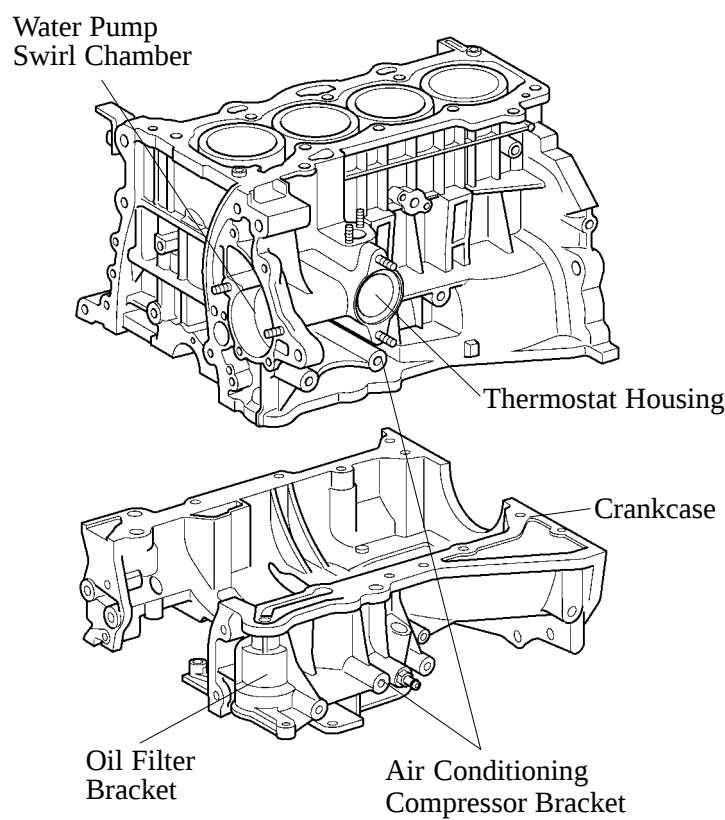


View from the Back Side

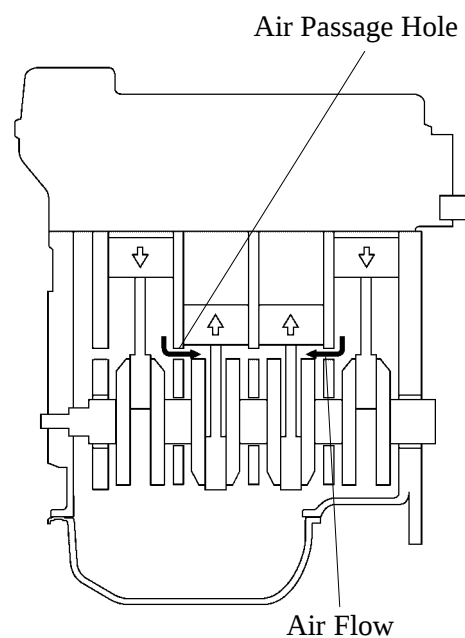
198EG29

4. Cylinder Block

- Lightweight aluminum alloy is used for the cylinder block.
- By producing the thin cast-iron liners and aluminum alloy cylinder block as a unit to realize the compact design. The liner is thin, so that boring is not possible.
- Passage holes are provided in the bulkhead of the cylinder block. As a result, the air at the bottom of the cylinder flows smoother, and pumping loss (back pressure at the bottom of the piston generated by the piston's reciprocal movement) is reduced.
- The oil filter and the air conditioning compressor bracket are integrated the crankcase, also the water pump swirl chamber, the thermostat housing and the rear oil seal retainer integrated the cylinder block.



► Air Flow During Engine Revolution ◀

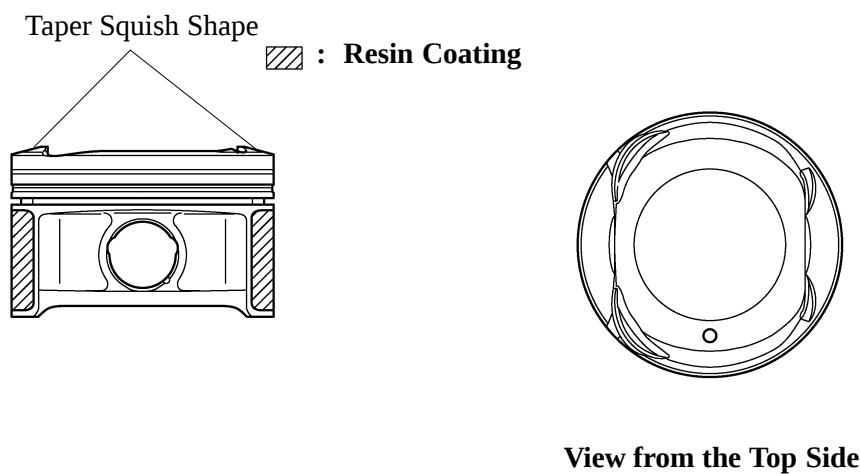


179EG04

185EG42

5. Piston

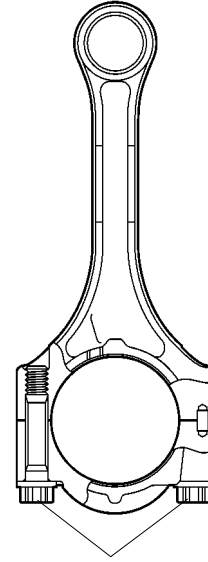
- The piston is made of aluminum alloy and skirt area is made compact and lightweight.
- The piston head portion has adopted a taper squish shape.
- The piston skirt has been coated with resin.
- Full floating type piston pins are used.
- By increasing the machining precision of the cylinder bore diameter, the outer diameter of the piston has been made into one type.



208EG06

6. Connecting Rod

- The connecting rods and caps are made of high strength steel for weight reduction.
- Nutless-type plastic region tightening bolts of the connecting rod are adopted for a lighter design.

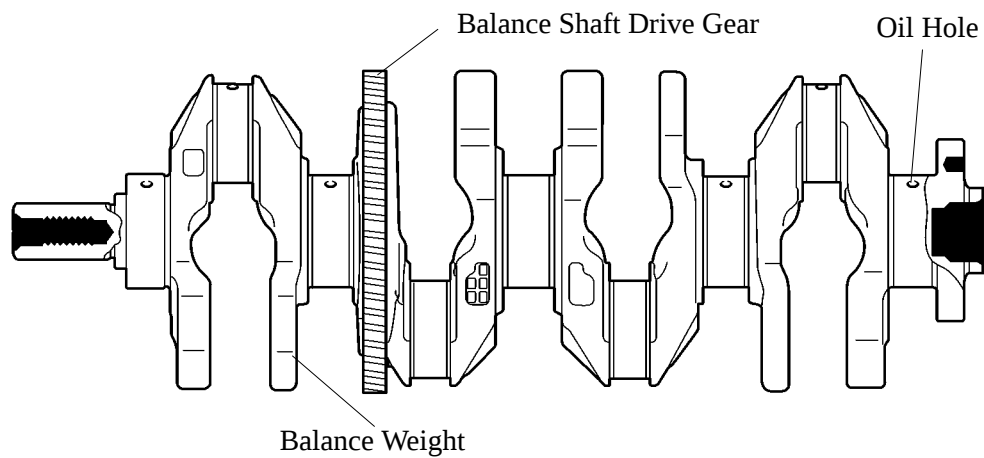


208EG61

Plastic Region Tightening Bolts

7. Crankshaft

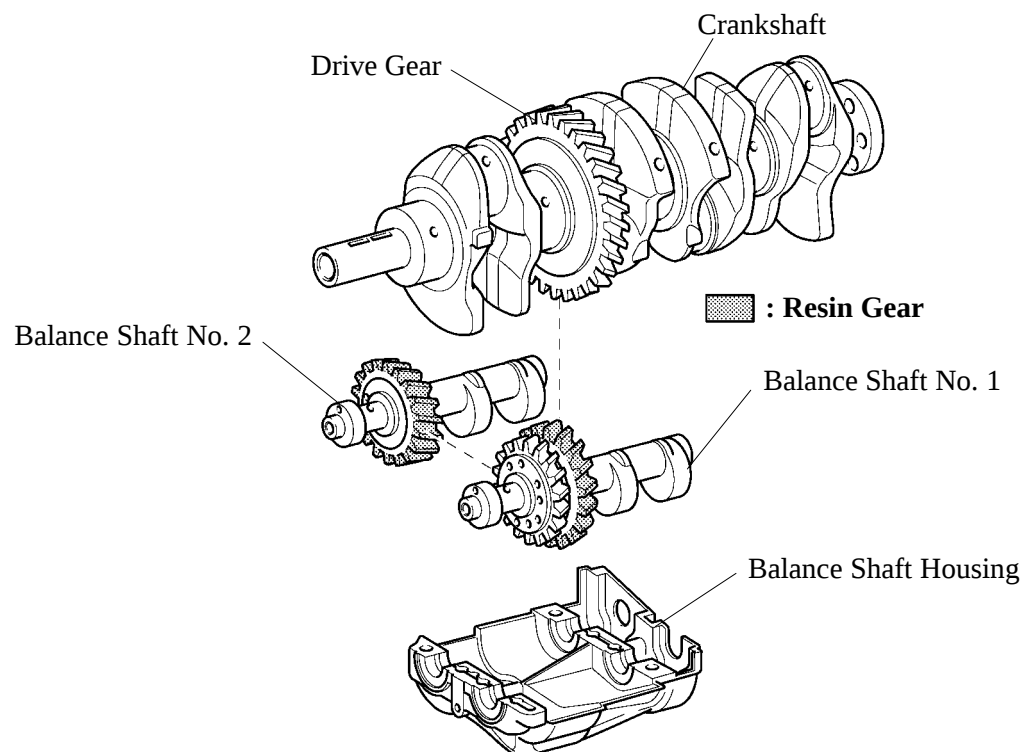
- The crankshaft has 5 journals and 8 balance weights.
- The precision and surface roughness of the pins and journals have been realized to reduce friction.
- The balance shaft drive gear has been installed onto the crankshaft.
- The crankshaft is made of forged steel.



208EG68

8. Balance Shaft

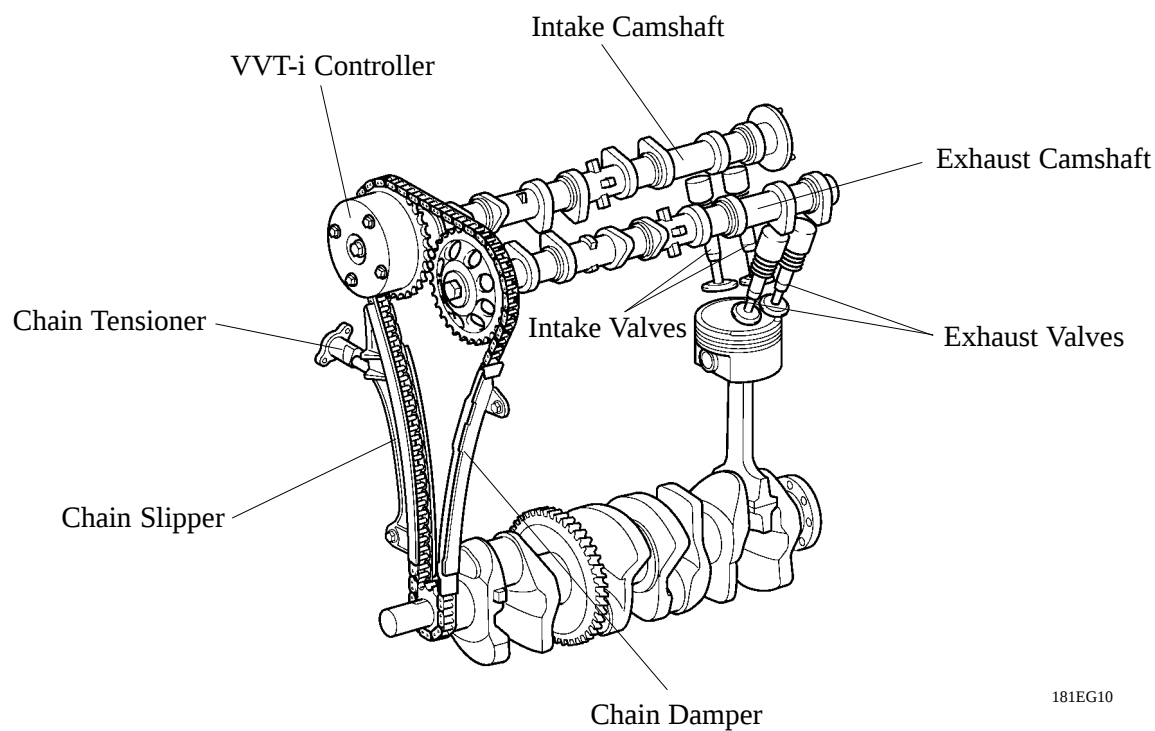
- A balance shaft has been adopted to reduce vibrations.
- A direct-drive system has been adopted which makes use of a gear that is installed onto the counterweight of crankshaft.
- In addition, a resin gear has been adopted on the driven side to suppress noise and offer lightweight design.



■ VALVE MECHANISM

1. General

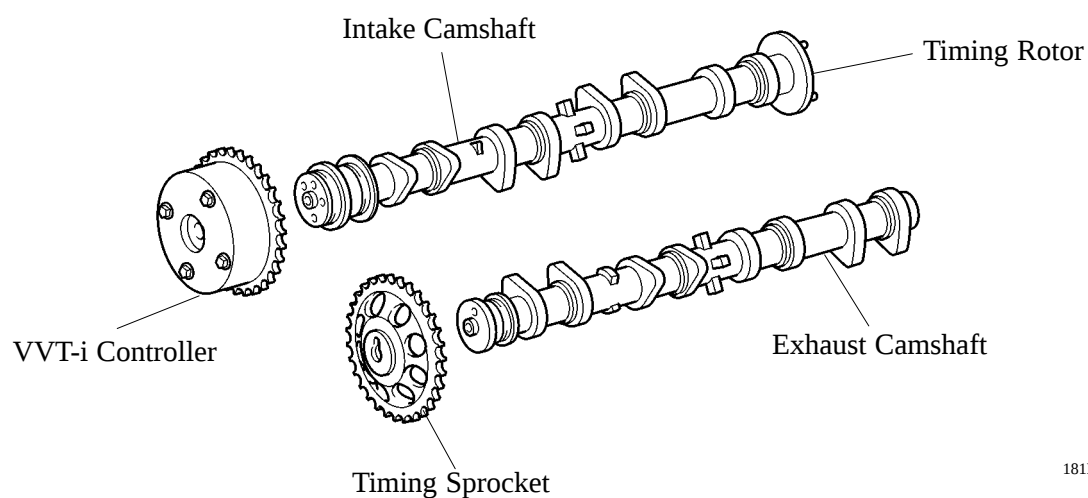
- Each cylinder is equipped with 2 intake valves and 2 exhaust valves. Intake and exhaust efficiency has been increased due to the larger total port areas.
- The valves are directly opened and closed by 2 camshafts.
- The intake and exhaust camshafts are driven by a chain. The VVT-i system used for the intake camshaft is used to realize highly fuel economy, engine performance and reduce exhaust emissions. For details, see page EG-42 in the VVT-i system section.
- The shimless type valve lifter is used.



181EG10

2. Camshaft

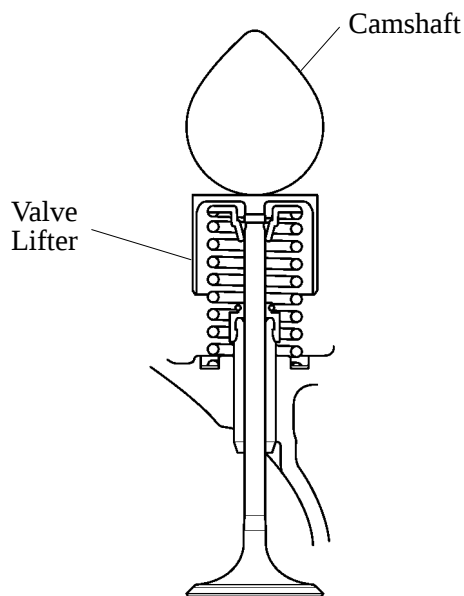
- The intake camshaft is provided with timing rotor to trigger the camshaft position sensor.
- In conjunction with the adoption of the VVT-i system, an oil passage is provided in the intake camshaft in order to supply engine oil pressure to the VVT-i system.
- A VVT-i controller has been installed on the front of the intake camshaft to vary the timing of the intake valves.



181EG11

3. Intake and Exhaust Valves

- Intake and exhaust valves with large-diameter valve face have been adopted to improve the intake air and exhaust gas flow.
- Narrow valve stems have been adopted to reduce the intake and exhaust resistance and for weight reduction.



208EG69

- Along with the increased amount of valve lift, shimless valve lifters that provide a large cam contact surface have been adopted. The adjustment of the valve clearance is accomplished by selecting and replacing the appropriate valve lifters.

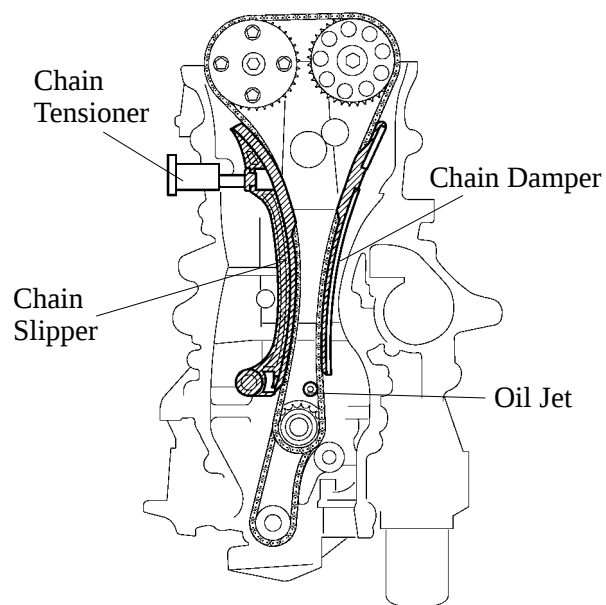
Service Tip

The valve lifters are available in 35 size in increment of 0.020 mm (0.008 in.), from 5.060 (0.199 in.) to 5.740 (0.226 in.).

For details, refer to see the 2002 Camry Repair Mnnual (Pub. No. RM881U).

4. Timing Chain

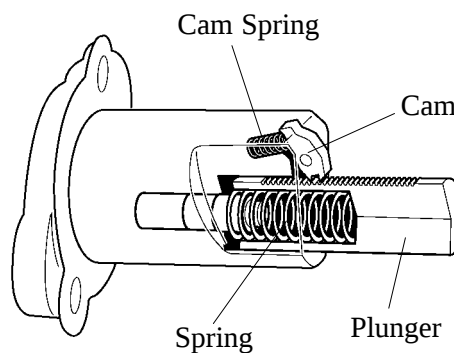
- A roller chain with an 8 mm pitch has been adopted.
- The timing chain is lubricated by an oil jet.



181EG13

5. Chain Tensioner

- The chain tensioner uses a spring and oil pressure to maintain proper chain tension at all times. The chain tensioner suppresses noise generated by the chain. A ratchet type non-return mechanism is also used.
- To improve serviceability, the chain tensioner is constructed so that it can be removed and installed from the outside of the timing chain cover.

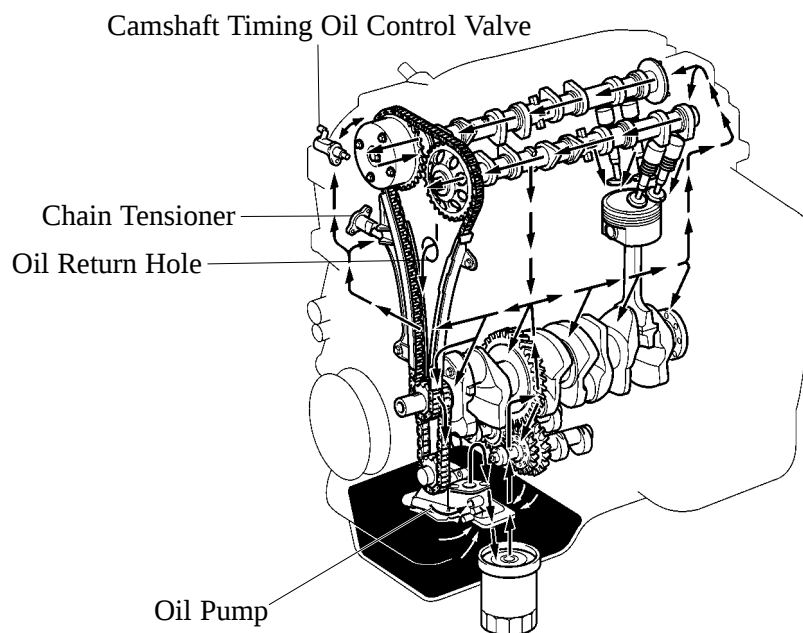


181EG14

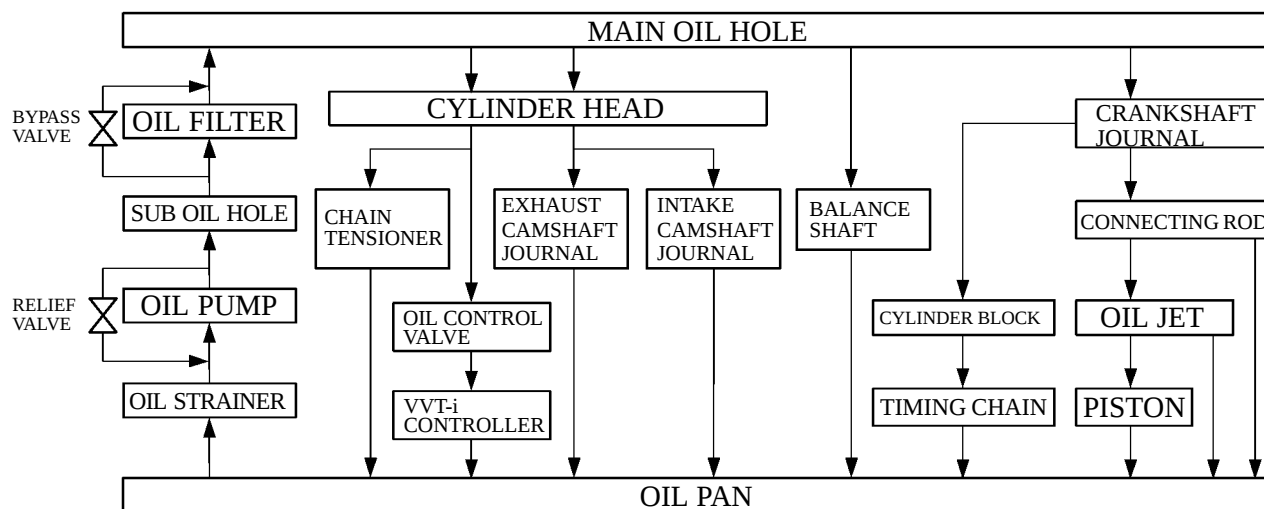
■ LUBRICATION SYSTEM

1. General

- The lubrication circuit is fully pressurized and oil passes through an oil filter.
- The trochoidal type oil pump is chain-driven by the crankshaft.
- The oil filter is attached downward from the crankcase to improve serviceability.
- Along with the adoption of the VVT-i system, the cylinder head is provided with a VVT-i controller and a camshaft timing oil control valve. This system is operated by the engine oil.



208EG07



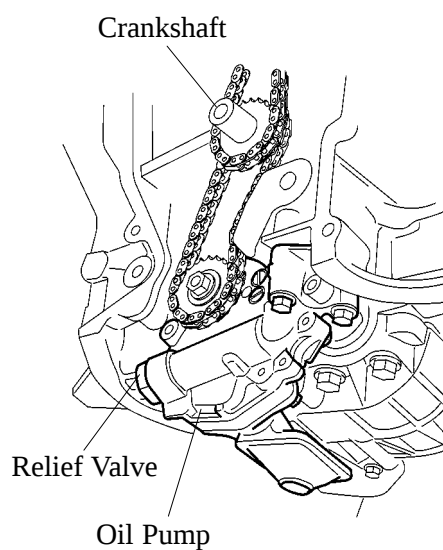
208EG08

► Specifications ◀

Oil Capacity	Dry	4.5 liters (4.8 US qts, 4.0 Imp. qts)
	with Oil Filter	3.8 liters (4.0 US qts, 3.3 Imp. qts)
	without Oil Filter	3.6 liters (3.8 US qts, 3.2 Imp. qts)

2. Oil Pump

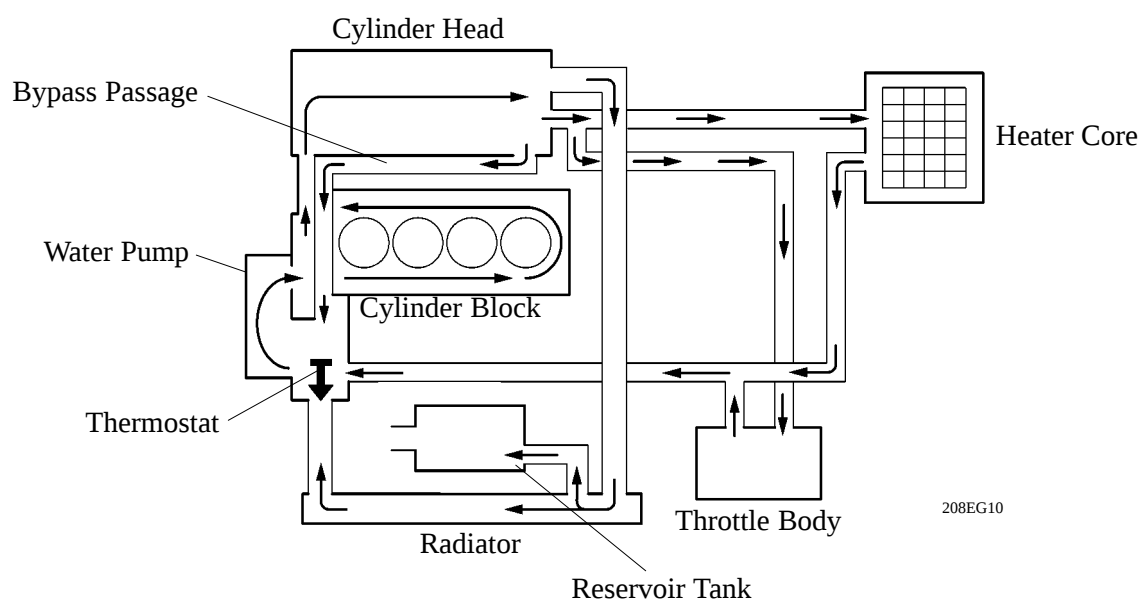
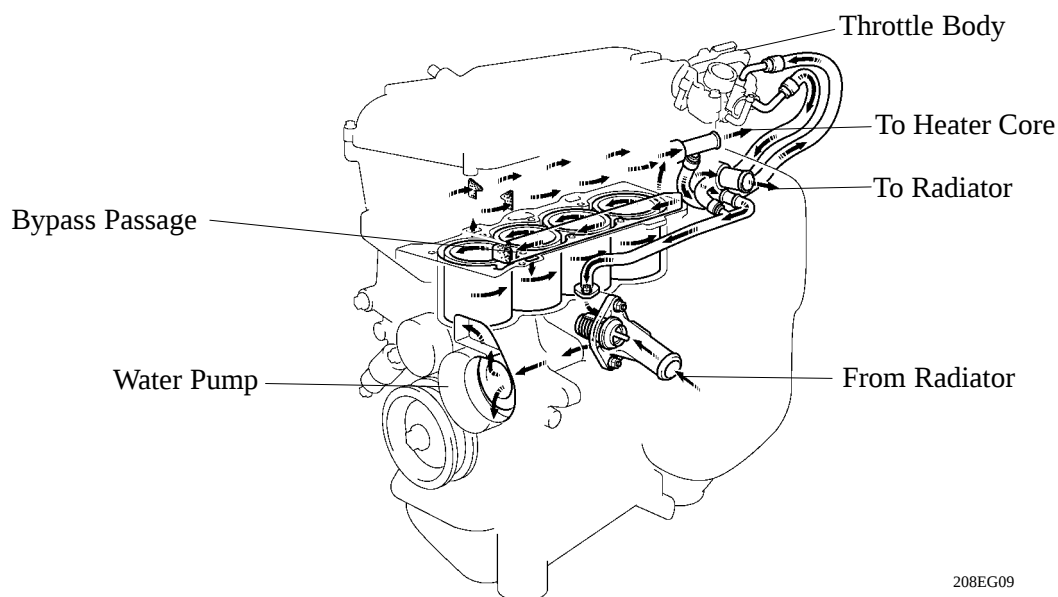
- The trochoidal type oil pump is chain-driven by the crankshaft, and fits compactly inside the timing chain cover.
- Friction has been reduced by means of 2 relief holes in the internal relief system.



181EG43

■ COOLING SYSTEM

- The cooling system is a pressurized, forced-circulation type.
- A thermostat with a bypass valve is located on the water inlet housing to maintain suitable temperature distribution in the cooling system.
This prevents sudden jumps in temperature while the engine is warming up.
- The flow of the engine coolant makes a U-turn in the cylinder block to ensure a smooth flow of the engine coolant. In addition, a bypass passage is enclosed in the cylinder head and the cylinder block.
- Warm water from the engine is sent to the throttle body to prevent freeze-up.



► Specifications ◀

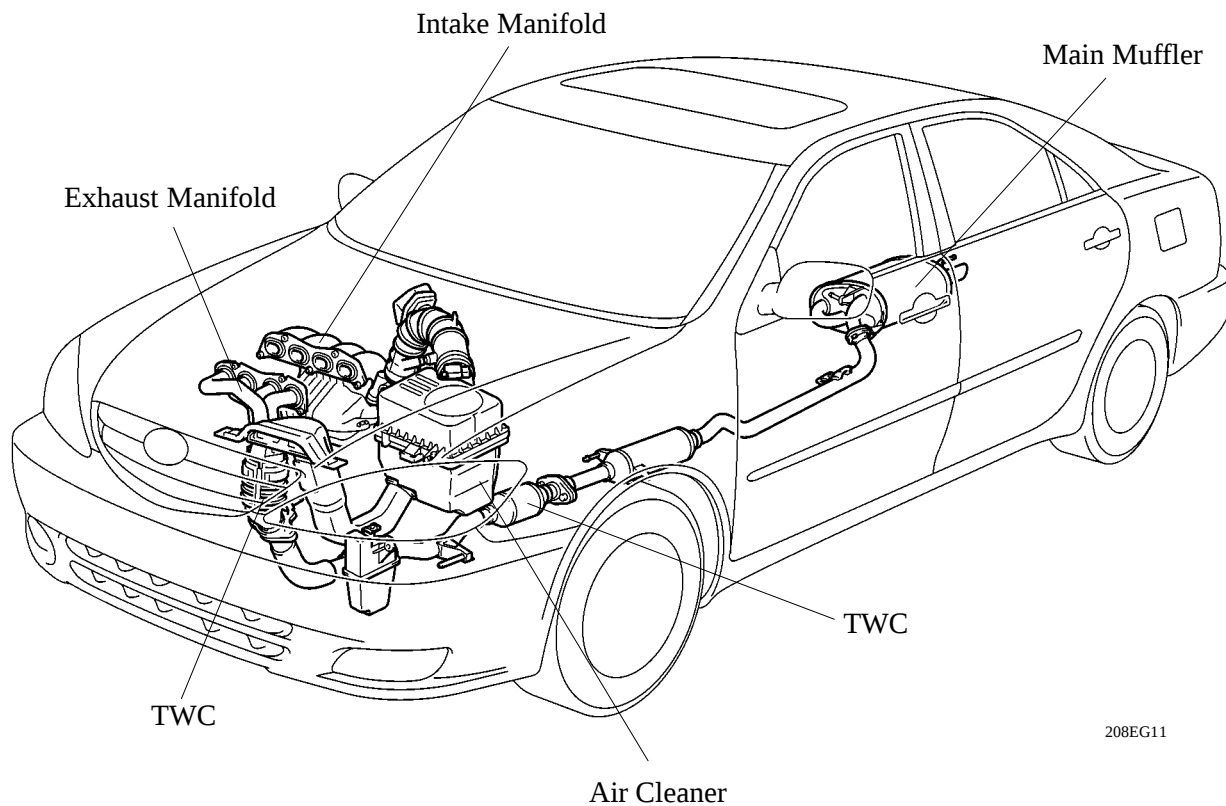
Engine Coolant	Capacity	liters (US qts, Imp. qts)	6.2 (6.6, 5.5)
	Type		TOYOTA Long Life Coolant or Equivalent
Thermostat	Opening Temperature	°C (°F)	80 - 84 (176 - 183)

■ INTAKE AND EXHAUST SYSTEM

1. General

- The two resonators, the side branch and PET* (Polyethylene Terephthalate) material have been newly adopted to air cleaner inlet and air cleaner hose.
- The adoption of ETCS-i (Electronic Throttle Control System-intelligent) has realized excellent throttle control.
- The intake manifold has been made of plastic to reduce the weight and the amount of heat transferred from the cylinder head.
- 2-way exhaust control system is provided to reduce noise and vibration in the main muffler.

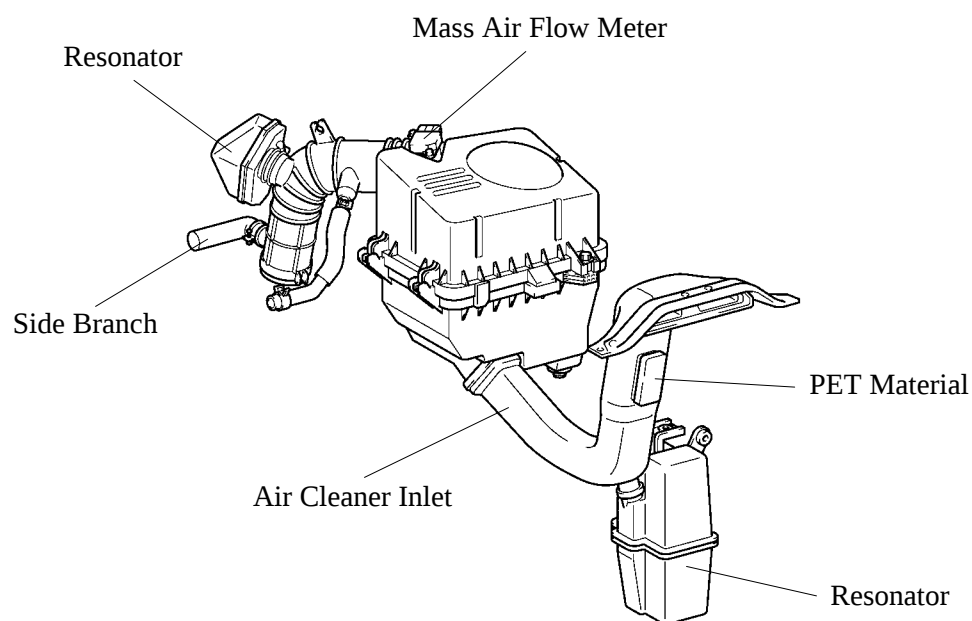
*: Using porous material that permits it to breath, air intake pulsating pressure will be let out to the outside of air cleaner inlet.



208EG11

2. Air Cleaner

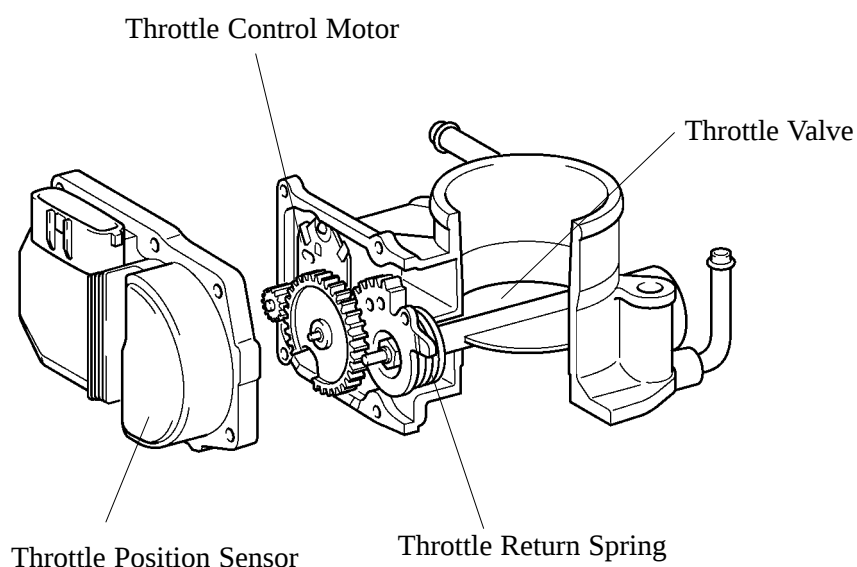
- A flameless, full-fabric air filter has been adopted to reduce weight and to simplify its disposal.
- The two resonators, the side branch and PET material have been newly adopted to air cleaner inlet and air cleaner hose to reduce the intake air noise.



208EG12

3. Throttle Body

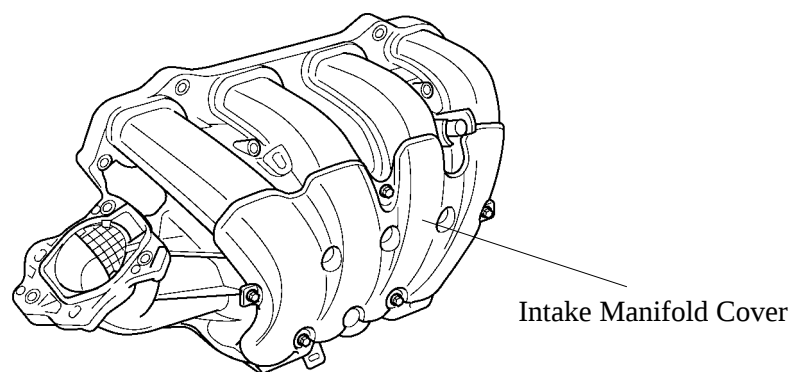
- The adoption of the link-less type ETCS-i has realized excellent throttle control. For details of ETCS-i control, refer to see page EG-40.
- A DC motor with excellent response and minimal power consumption is used for the throttle control motor. The ECM performs the duty ratio control of the direction and the amperage of the current that flows to the throttle control motor in order to regulate the opening angle of the throttle valve.



208EG13

4. Intake Manifold

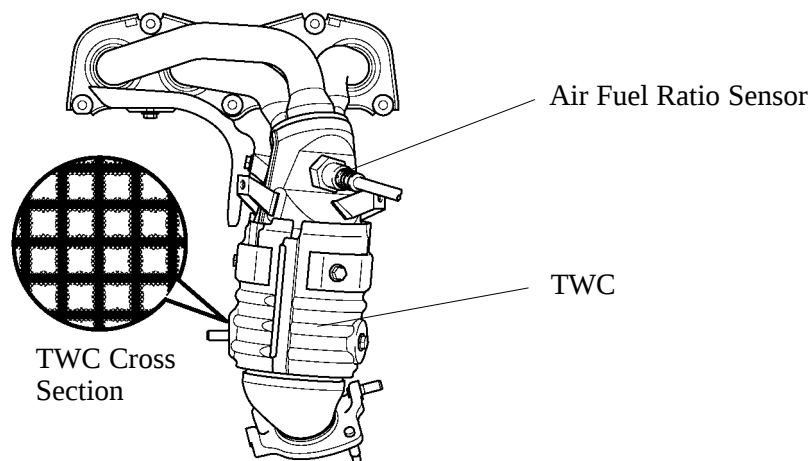
- The intake manifold has been made of plastic to reduce the weight and the amount of heat transferred from the cylinder head. As a result, it has become possible to reduce the intake air temperature and improve the intake volumetric efficiency.
- A resonator is installed inside the air intake chamber which makes use of the intake pulse to improve torque in the mid-speed range.
- The intake manifold cover is used on the intake manifold to reduce intake air noise.



198EG34

5. Exhaust Manifold

- A stainless steel exhaust manifold is used for weight reduction.
- An ultra thin-wall, high-cell ceramic type TWC (Three-Way Catalytic Converter) has been adopted. This TWC enables to improve exhaust emissions by optimizing the cells density.

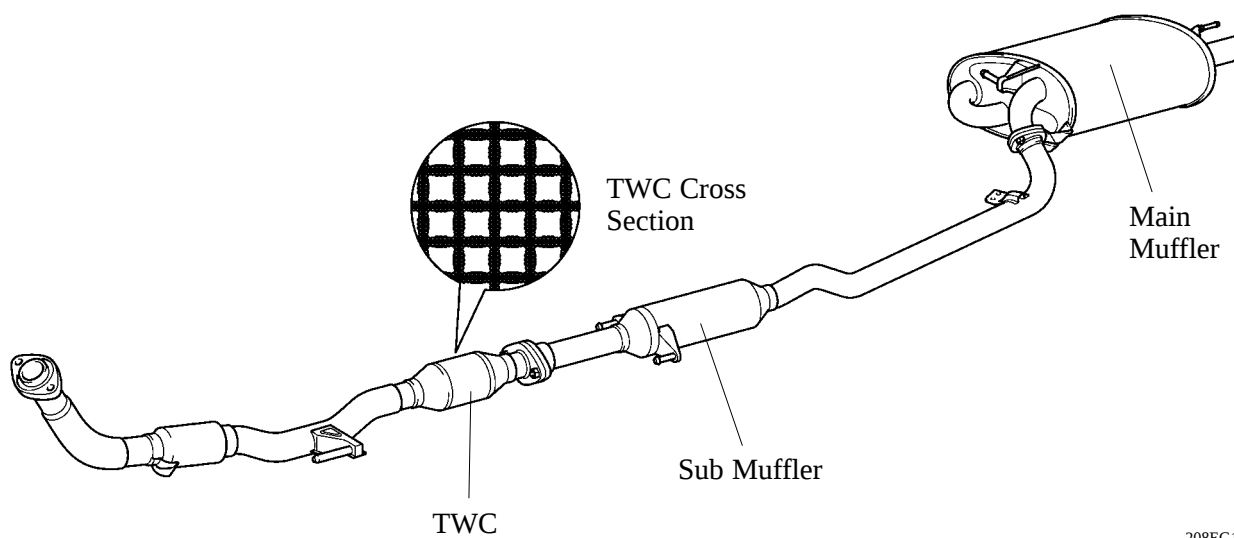


208EG14

6. Exhaust Pipe

General

- An ultra thin-wall, high-cell ceramic type TWC (Three-Way Catalytic Converter) has been adopted. This TWC enables to improve exhaust emissions by optimizing the cells density.
- 2-way exhaust control system is provided to reduce noise and vibration in the main muffler.



2-Way Exhaust Control System

- A 2-way exhaust control system is used. This system reduces the back pressure by opening and closing a variable valve that is enclosed in the main muffler, thus varying the exhaust gas pressure.
- The valve opens steplessly in accordance with the operating condition of the engine, thus enabling a quieter operation at lower engine speeds, and reducing back pressure at higher engine speeds.

1) Construction

The control valve is enclosed in the main-muffler. When the exhaust gas pressure overcomes the spring pressure, the control valve opens steplessly in accordance with the exhaust gas pressure.

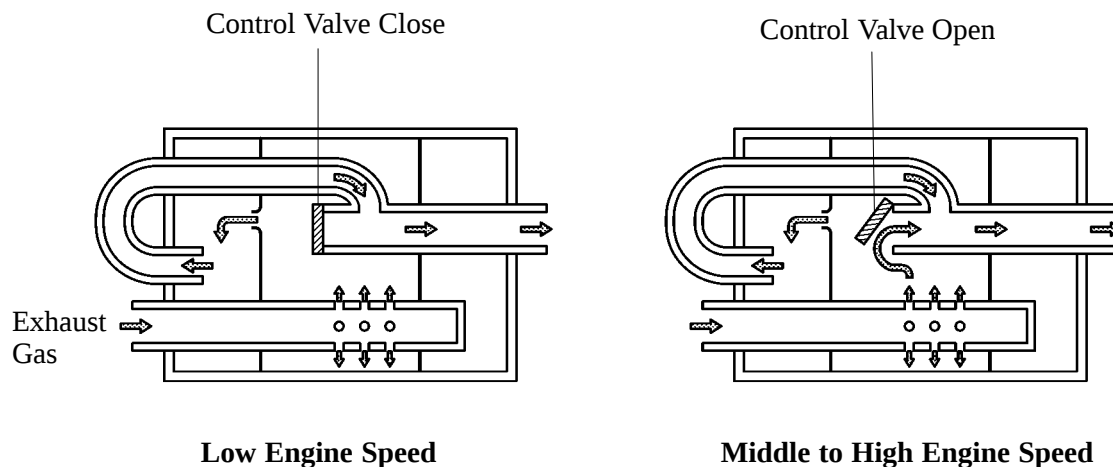
2) Operation

a. When Control Valve is Closed (low engine speed)

Since the pressure in the main muffler is low, the control valve is closed. Hence exhaust gas does not pass the bypass passage, and exhaust noise decreased by the main muffler.

b. When Control Valve is Open (middle to high engine speed)

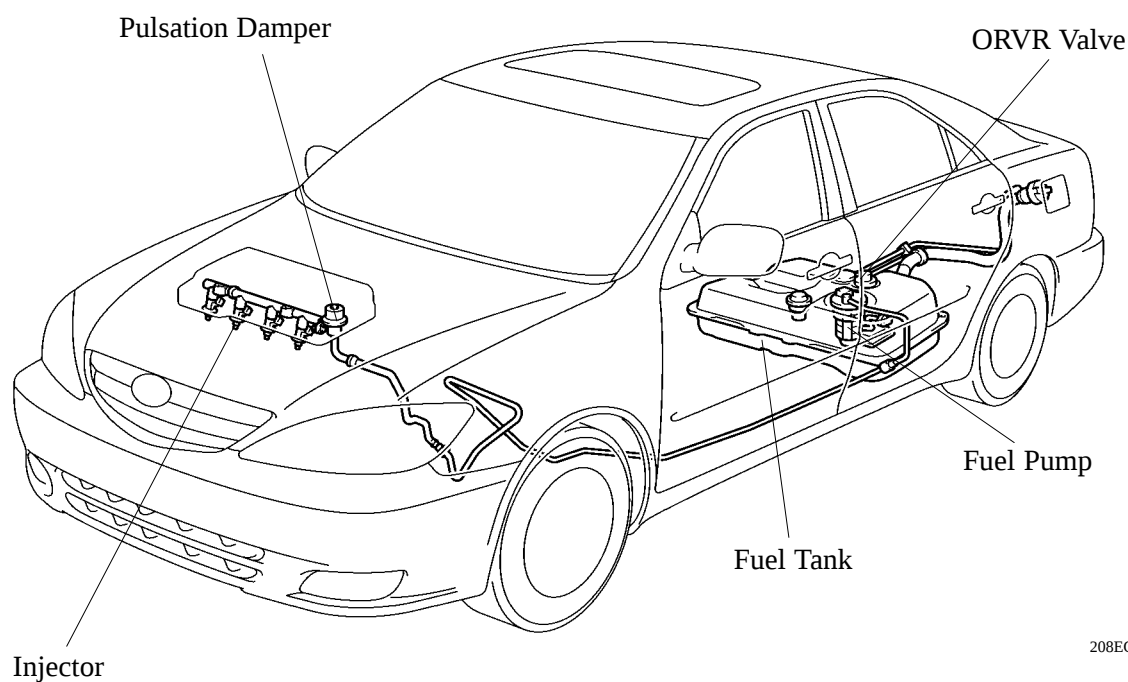
The valve opens more as the engine speed and the back pressure in the muffler increase. This allows a large volume of exhaust gas to pass the bypass passage, thereby substantially decreasing the back pressure.



■ FUEL SYSTEM

1. General

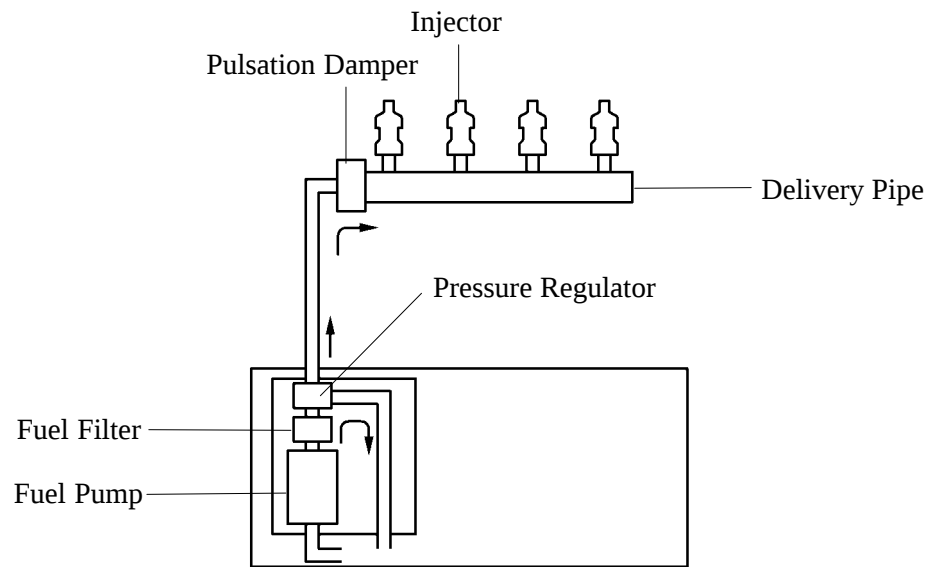
- A fuel returnless system has been used to reduce evaporative emissions.
- A compact fuel pump in which a fuel filter and pressure regulator are integrated in the module fuel pump assembly has been adopted.
- A quick connector has been adopted to connect the fuel pipe with the fuel hose to improve serviceability.
- The aluminum die-cast delivery pipe has been integrated with the pulsation damper.
- A 12-hole type injector has been adopted.
- A tether has been provided on the fuel filler cap to prevent the cap from being lost, which results in preventing the leakage of fuel or the evaporative gas.
- The quick-turn type fuel tank cap has been adopted to improve usability.
- The ORVR (On-board Refueling Vapor Recovery) system has been used.



208EG17

2. Fuel Returnless System

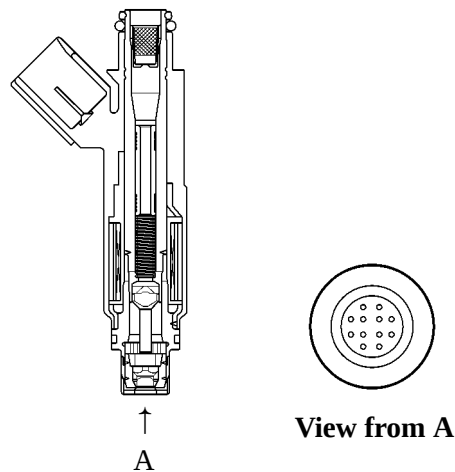
This system has been adopted to reduce the evaporative emission. As shown below, integrating the fuel filter, pressure regulator, and fuel sender gauge with fuel pump assembly it possible to discontinue the return of fuel from the engine area and prevent temperature rise inside the fuel tank.



208EG18

3. Fuel Injector

The compact 12-hole type injector with high atomizing performance has been adopted.



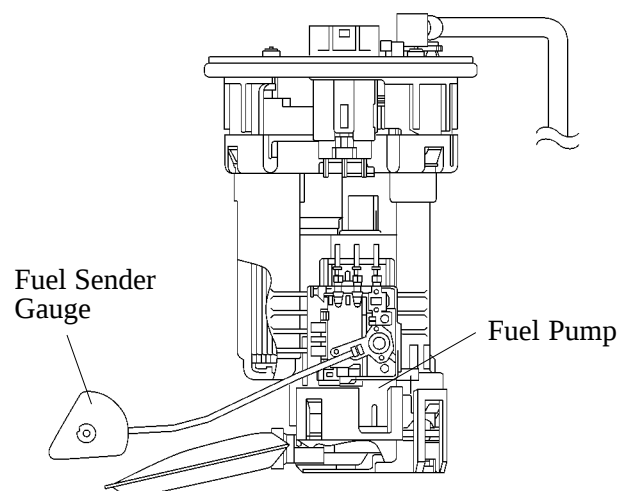
181EG41

4. Fuel Pump

A compact fuel pump in which a fuel filter, pressure regulator, and fuel sender gauge are integrated in the fuel pump assembly has been adopted.

► Specification of Pressure Regulator ◀

Adjusting Pressure kPa (kgf/cm ²)	324 ± 3.0 (3.3 ± 0.03)
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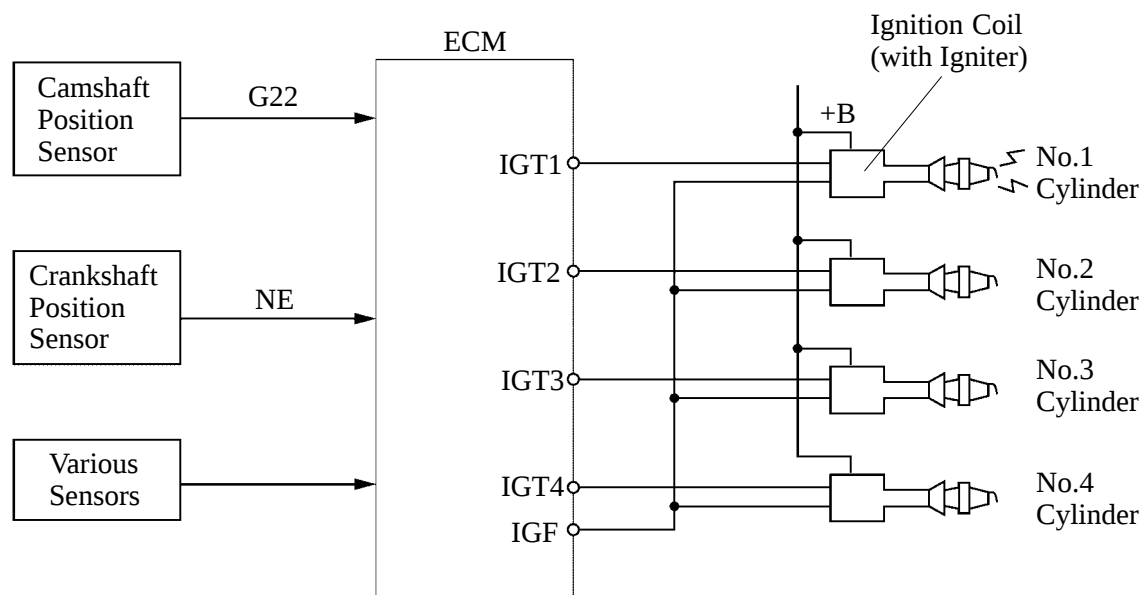


208EG19

■ IGNITION SYSTEM

1. General

- A DIS (Direct Ignition System) has been adopted. The DIS improves the ignition timing accuracy, reduces high-voltage loss, and enhances the overall reliability of the ignition system by eliminating the distributor. The DIS in this engine is an independent ignition system which has one ignition coil (with igniter) for each cylinder.
- Iridium-tipped spark plugs have been adopted.



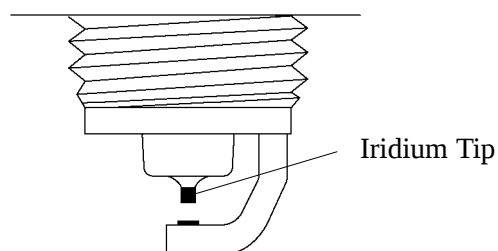
165EG25

2. Ignition Coil

The DIS provides 4 ignition coils, one for each cylinder. The spark plug caps, which provide contact to the spark plugs, are integrated with an ignition coil. Also, an igniter is enclosed to simplify the system.

3. Spark Plug

Iridium-tipped spark plugs have been adopted to realize a 120,000 mile (192,000 km) maintenance-free operation. By making the center electrode of iridium, the same ignition performance as of the platinum-tipped spark plug and further improvement of durability have been realized.



208EG70

► Specifications ◀

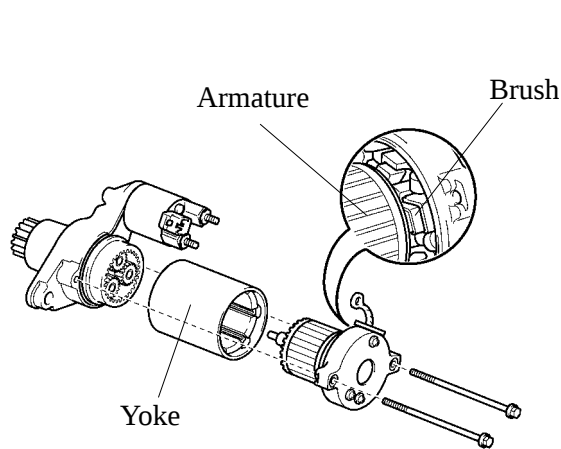
DENSO	SK20R11
NGK	IFR6A11
Plug Gap	1.0 - 1.1 mm (0.0394 - 0.043 in.)

■ STARTING SYSTEM

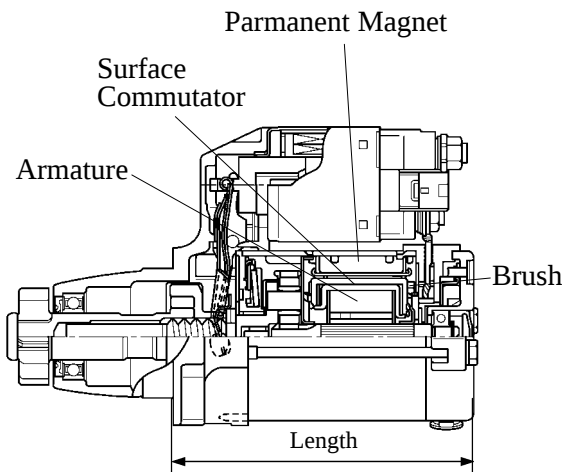
Starter

1) General

- A compact and lightweight PS (Planetary reduction-Segment conductor motor) starter has been adopted on all models.
- Because the PS starter contains an armature that uses square-shaped conductors, and its surface functions as a commutator, it has resulted in both improving its output torque and reducing its overall length.
- In place of the field coil used in the conventional starter, the PS starter uses two types of permanent magnets: main magnets and interpolar magnets. The main magnets and interpolar magnets have been efficiently arranged to increase the magnetic flux and to shorten the length of the yoke.



206EG18



206EG19

► Specifications ◀

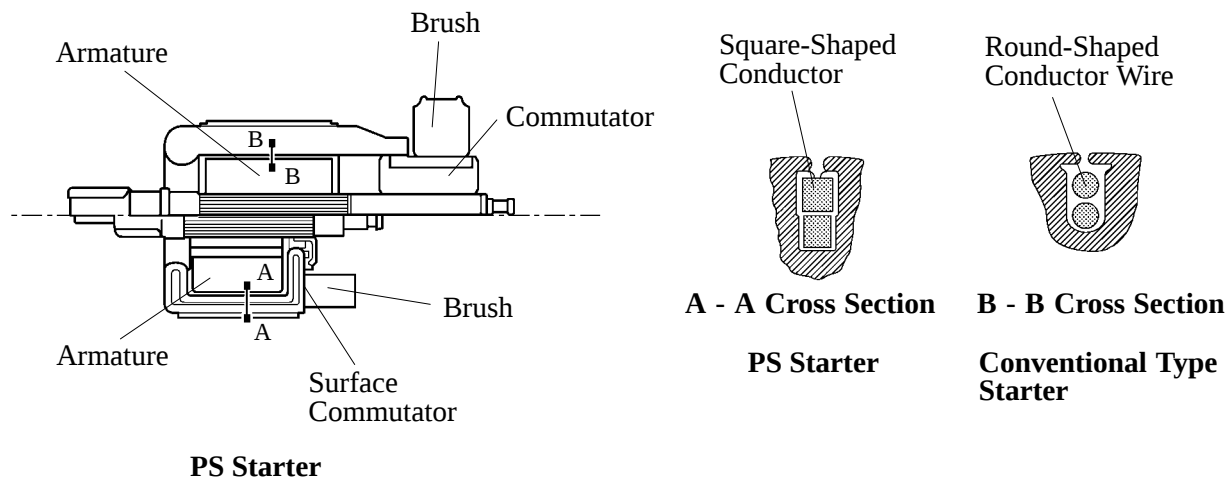
Model	PS Starter	Conventional Type Starter
Length	128 mm (5.04 in.)	145 mm (5.71 in.)
Weight	2950 g	3800 g
Rating Voltage	12 V	12 V
Rating Output	1.6 kW	1.4 kW
Rotating of Direction	Counterclockwise*	←

*: Viewed from Pinion Side

2) Construction

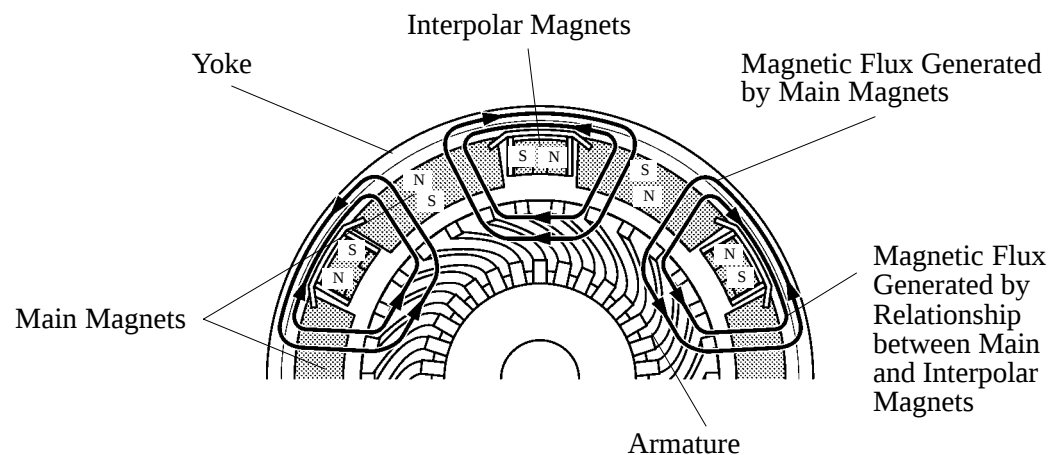
- Instead of the construction of the armature coil of the conventional starter that uses round-shaped conductor wires, the PS starter uses square conductors. With this type of construction, the same conditions that are realized by winding numerous round-shaped conductor wires can be achieved without increasing the mass. As a result, the output torque has been increased, and the armature coil has been made more compact.
- Because the surface of the square-shaped conductors that are used in the armature coil functions as a commutator, the overall length of the PS starter has been shortened.

Conventional Type Starter



206EG20

- Instead of the field coils used in the conventional starter, the PS starter has adopted two types of permanent magnets: the main magnets and the interpolar magnets. The main and interpolar magnets are arranged alternately inside the yoke, allowing the magnetic flux that is generated between the main and interpolar magnets to be added to the magnetic flux that is generated by the main magnets. In addition to increasing the amount of magnetic flux, this construction shortens the overall length of the yoke.



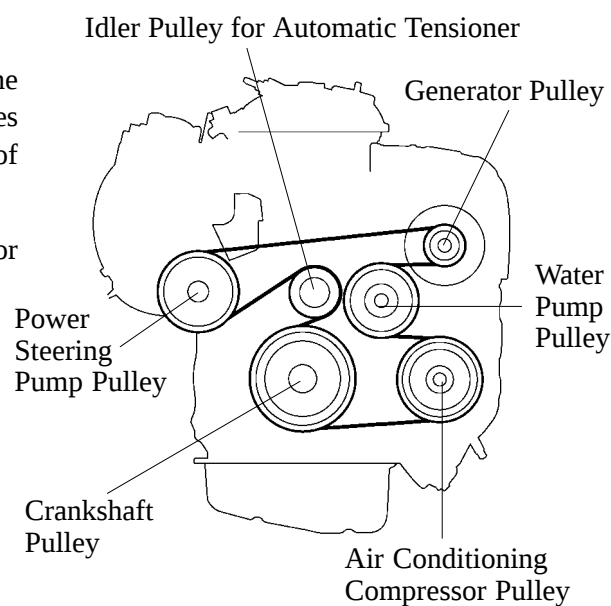
Cross Section of Yoke Portion

206EG21

■ SERPENTINE BELT DRIVE SYSTEM

1. General

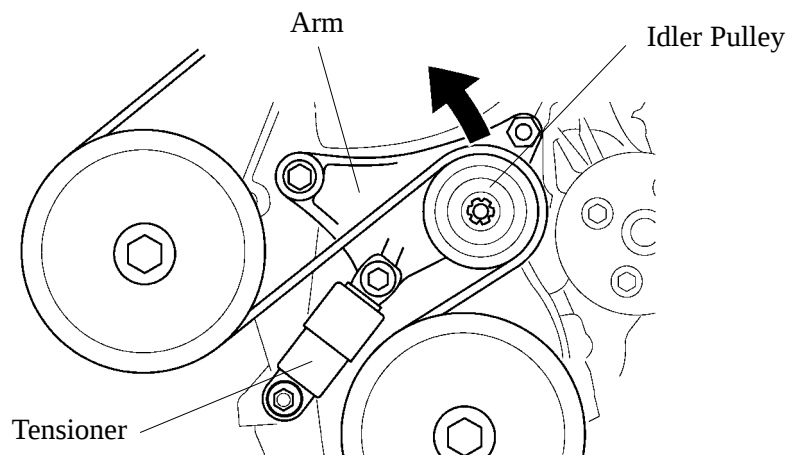
- Accessory components are driven by a serpentine belt consisting of a single V-ribbed belt. It reduces the overall engine length, weight and number of engine parts.
- An automatic tensioner eliminates the need for tension adjustment.



198EG11

2. Automatic Tensioner

- The automatic tensioner consists of an idler pulley, an arm, and a tensioner. The idler pulley maintains belt tension by the force of the spring that is located in the tensioner.
- Due to the different suppliers used, the tensioner comes in two types, although their basic operation remain the same and they are interchangeable.



181EG18

■ ENGINE CONTROL SYSTEM

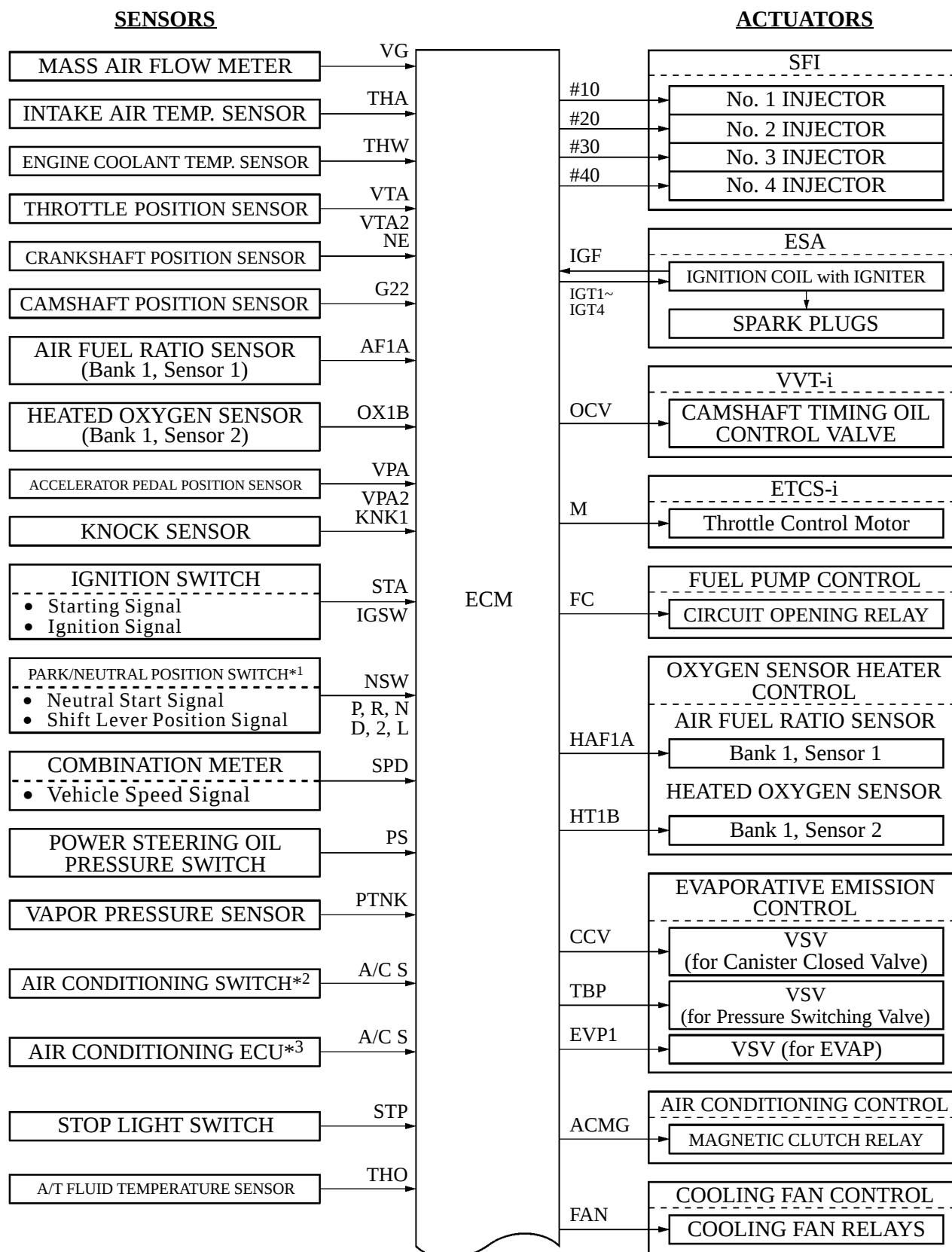
1. General

The engine control system of the 2AZ-FE engine has following system.

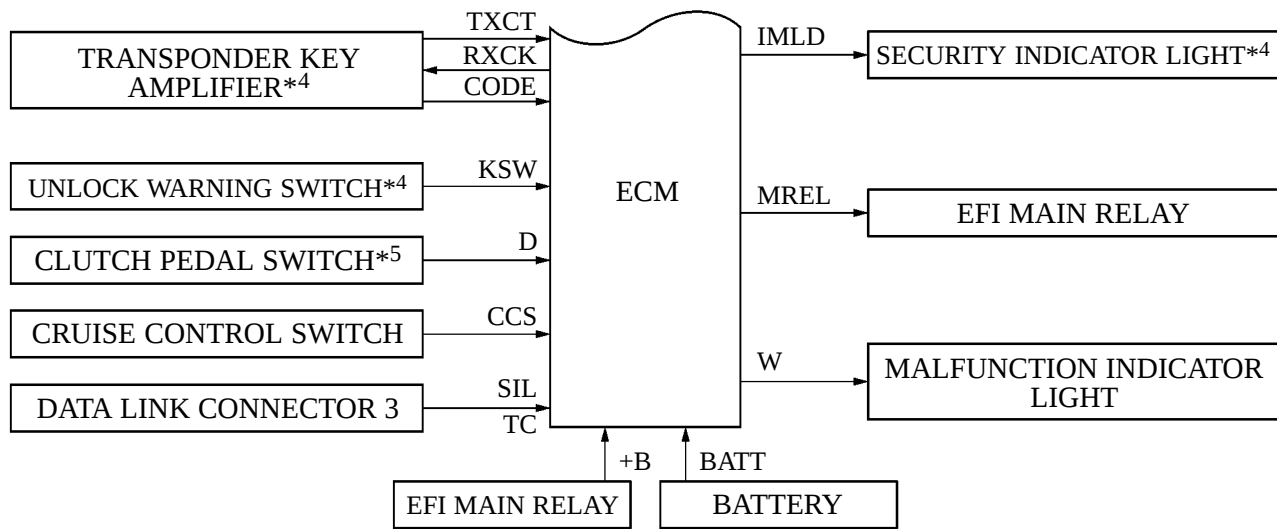
System	Outline
SFI (Sequential Multiport Fuel Injection) (For details, see page EG-39)	An L-type SFI system directly detects the intake air mass with a hot wire type mass air flow meter.
ESA (Electronic Spark Advance) (For details, see page EG-39)	Ignition timing is determined by the ECM based on signals from various sensors. The ECM corrects ignition timing in response to engine knocking.
ETCS-i (Electronic Throttle Control System-intelligent) (For details, see page EG-40)	Optimally controls the throttle valve opening in accordance with the amount of accelerator pedal effort and the condition of the engine and the vehicle.
VVT-i (Variable Valve Timing-intelligent) (For details, see page EG-42)	Controls the intake camshaft to an optimal valve timing in accordance with the engine condition.
Fuel Pump Control	Fuel pump operation is controlled by signal from the ECM.
Air Fuel Ratio Sensor, Oxygen Sensor Heater Control	Maintains the temperature of the air fuel ratio sensor or oxygen sensor at an appropriate level to increase accuracy of detection of the oxygen concentration in the exhaust gas.
Evaporative Emission Control (For details, see page EG-44)	• The ECM controls the purge flow of evaporative emission (HC) in the charcoal canister in accordance with engine conditions. • Using 3 VSVs and a vapor pressure sensor, the ECM detects any evaoprative emission leakage occurring between the fuel tank and the charcoal canister through the changes in the tank pressure.
Air Conditioning Cut-off Control	By turning the air conditioning compressor ON or OFF in accordance with the engine condition, drivability is maintained.
Cooling Fan Control (For details, see page EG-43)	Radiator cooling fan operation is controlled by engine coolant temperature sensor signal (THW) and the condition of the air conditioning operation.
Engine Immobiliser	Prohibits fuel delivery and ignition if an attempt is made to start the engine with an invalid ignition key.
Diagnosis (For details, see page EG-49)	• When the ECM detects a malfunction, the ECM diagnoses and memorizes the failed section. • To increase the speed for processing the signals, the 32-bit CPU of the ECM has been adopted.
Fail-Safe (For details, see page EG-50)	When the ECM detects a malfunction, the ECM stops or controls the engine according to the data already stored in the memory.

2. Construction

The configuration of the engine control system in the 2AZ-FE engine in the '02 Camry is as shown in the following chart.

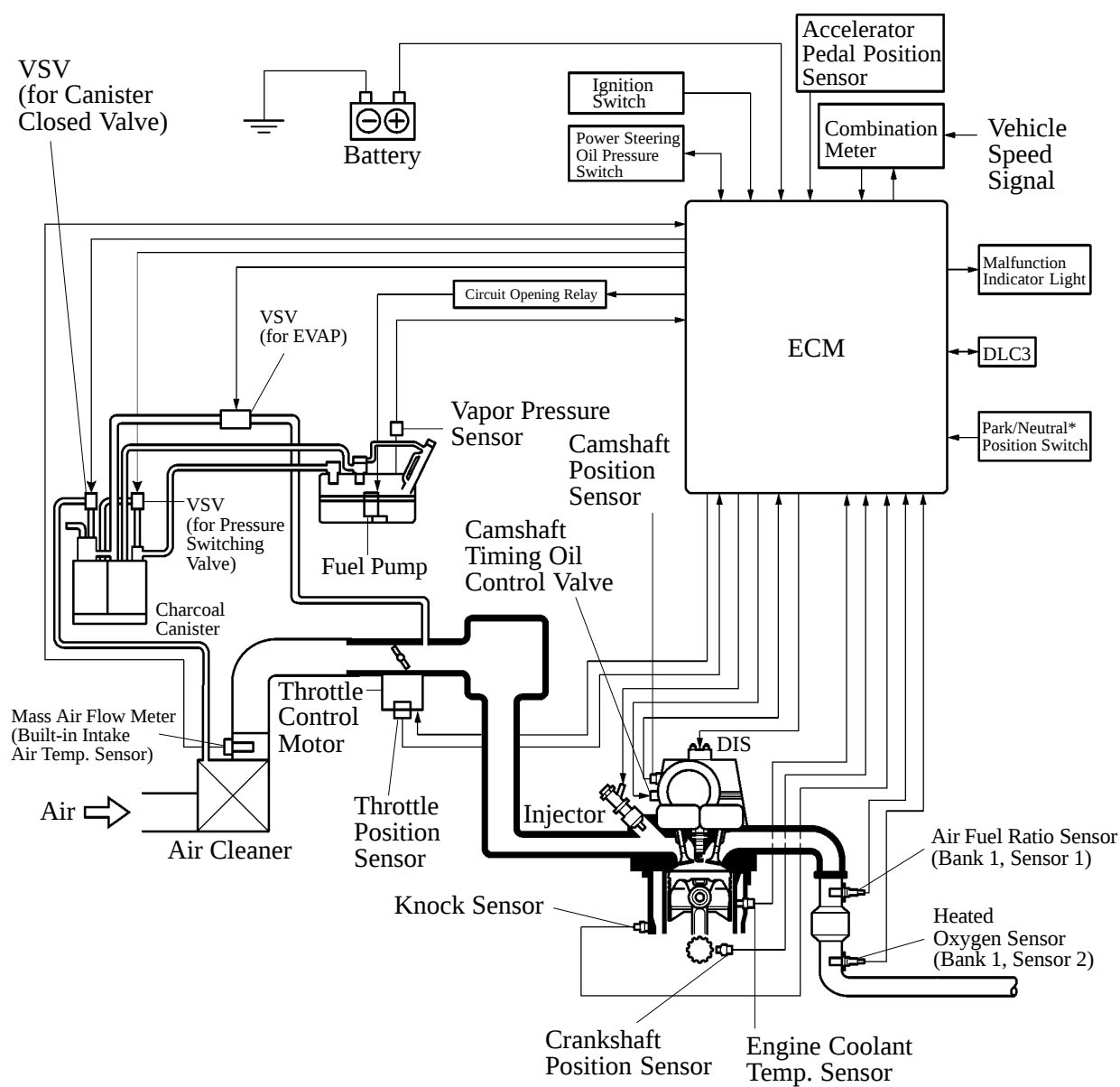


(Continued)



- *1: Automatic Transaxle Model Only
- *2: with Manual Air Conditioning System
- *3: with Automatic Air Conditioning System
- *4: with Engine Immobiliser System
- *5: Manual Transaxle Model Only

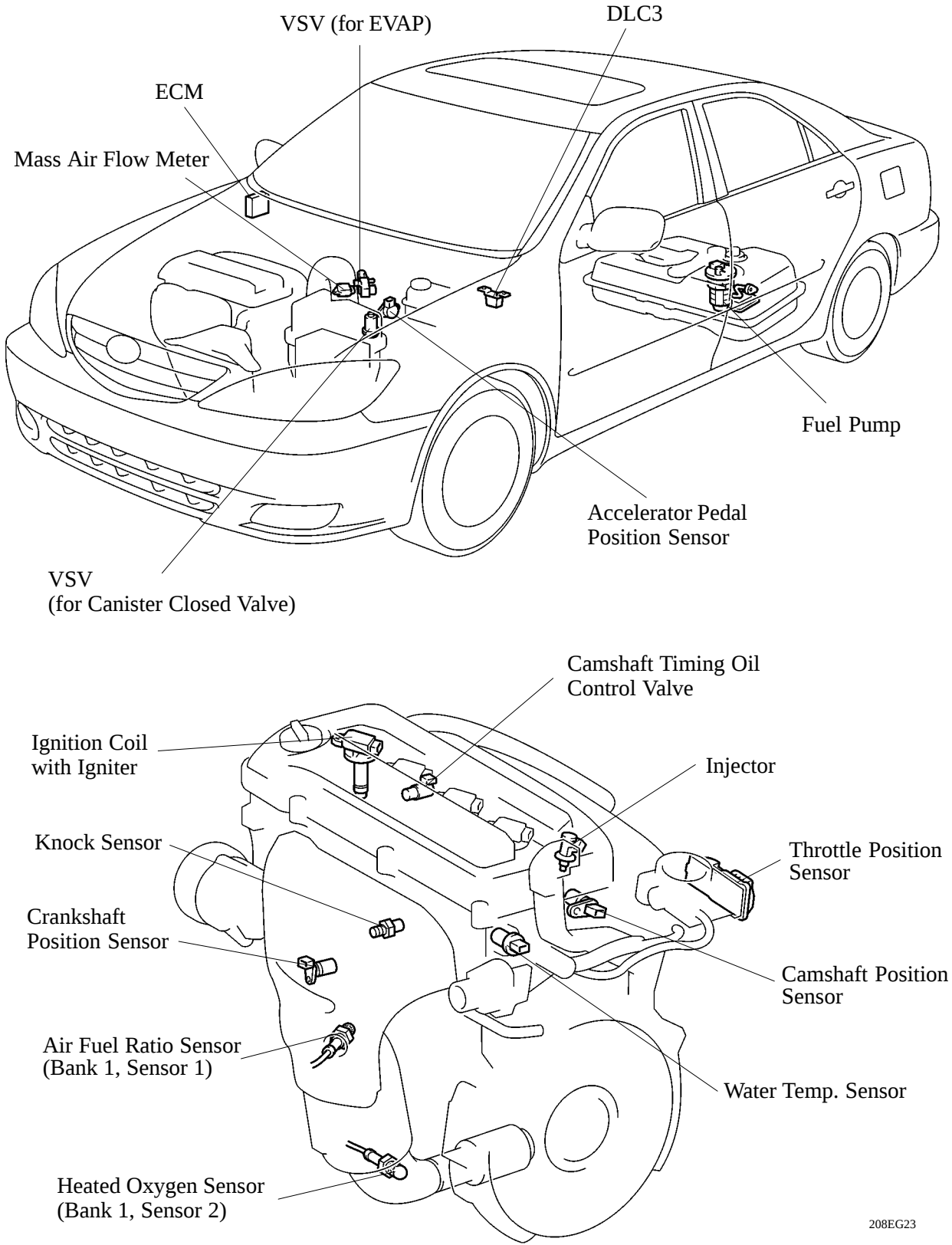
3. Engine Control System Diagram



*: Automatic Transaxle Model Only

208EG22

4. Layout of Main Components



5. Main Components of Engine Control System

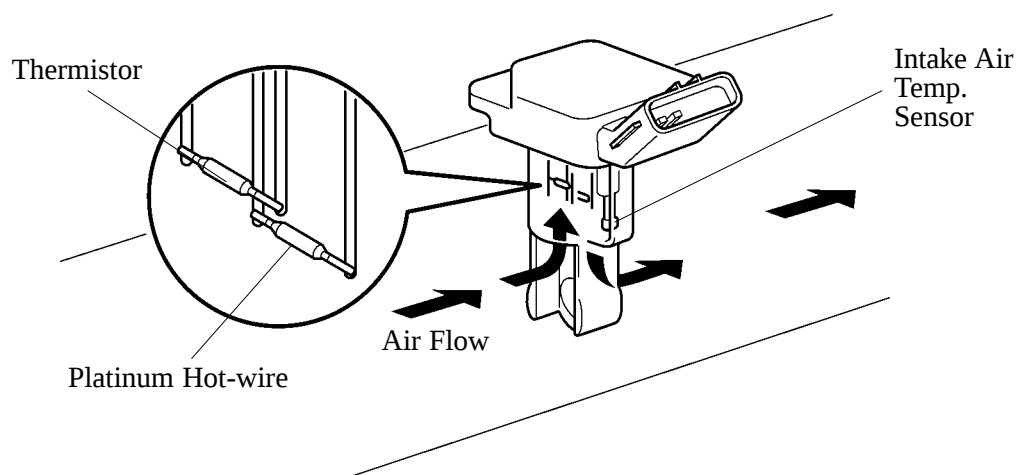
General

The following table compares the main components.

Components	Outline	Quantity
ECM	32-bit ECU	1
Mass Air Flow Meter	Hot-wire Type	1
Crankshaft Position Sensor (Rotor Teeth)	Pick-up Coil Type (36-2)	1
Camshaft Position Sensor (Rotor Teeth)	Pick-up Coil Type (3)	1
Throttle Position Sensor	Linear Type	1
Accelerator Pedal Position Sensor	Linear Type	1
Knock Sensor	Built-in Piezoelectric Type	1
Air Fuel Ratio Sensor	with Heater Type	1
Oxygen Sensor	with Heater Type	1
Injector	12-hole Type	4

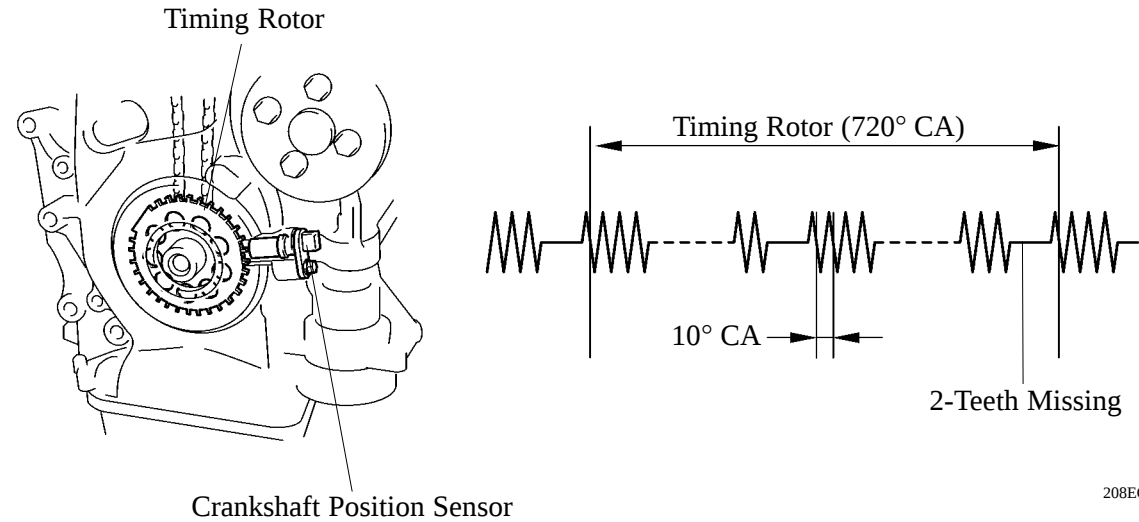
Mass Air Flow Meter

- This mass air flow meter, which is a plug-in type, allows a portion of the intake air to flow through the detection area. By directly measuring the mass and the flow rate of the intake air, the detection precision has been improved and the intake air resistance has been reduced.
- This mass air flow meter has a built-in intake air temperature sensor.



Crankshaft Position Sensor

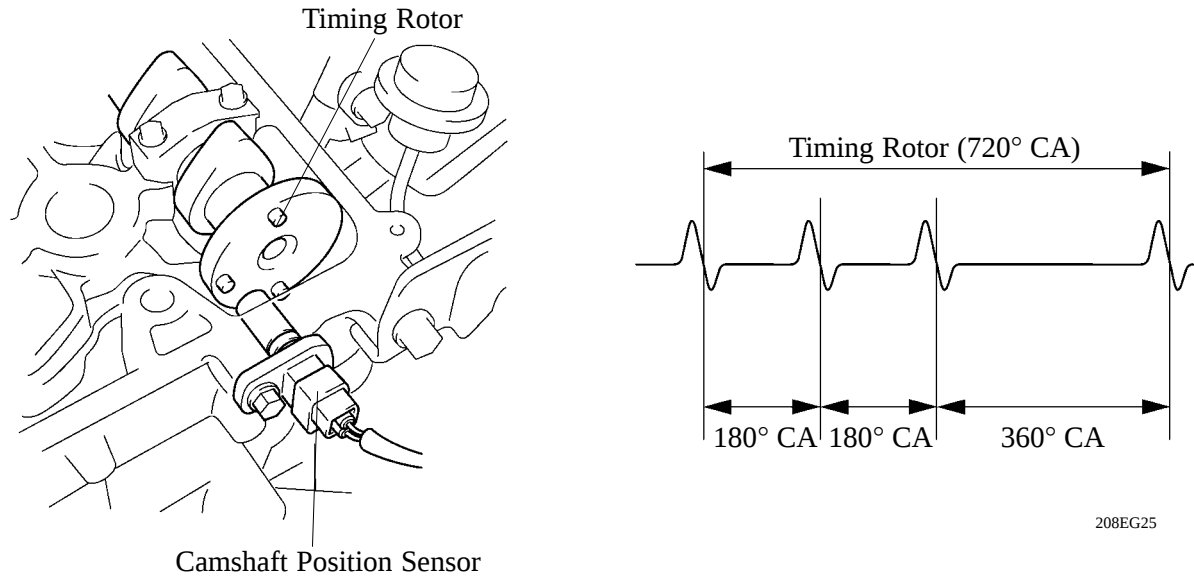
The timing rotor of the crankshaft consists of 34 teeth, with 2 teeth missing. The crankshaft position sensor outputs the crankshaft rotation signals every 10°, and the missing teeth are used to determine the top-dead-center.



208EG24

Camshaft Position Sensor

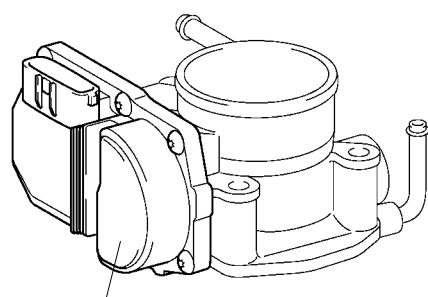
The camshaft position sensor is mounted on the left bank of cylinder head. To detect the camshaft position, a protrusion that is provided on the timing pulley is used to generate 1 pulse for every 2 revolution of the crankshaft.



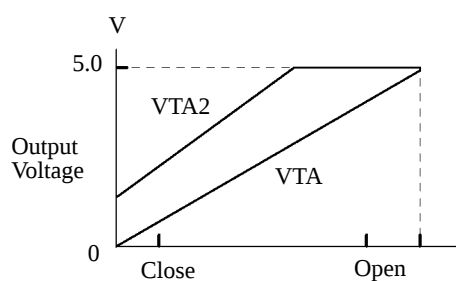
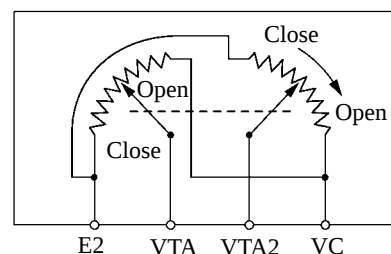
208EG25

Throttle Position Sensor

This sensor converts the throttle valve opening angles into electronic signals with two differing characteristics and outputs them to the ECM. One is the VTA signal that linearly outputs the voltage along the entire range of the throttle valve opening angle. The other is the VTA2 signal that outputs an offset voltage.



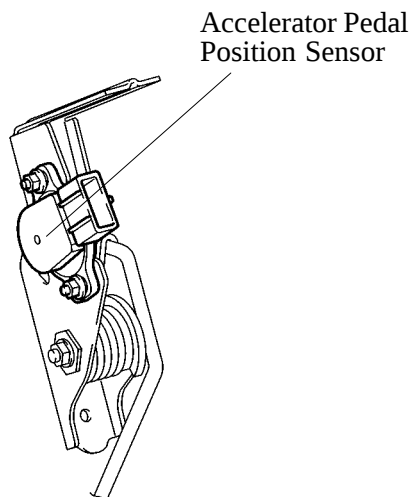
Throttle Position Sensor



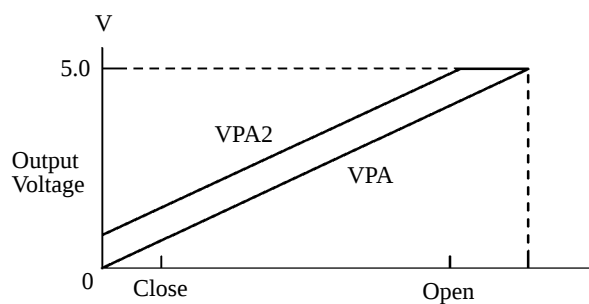
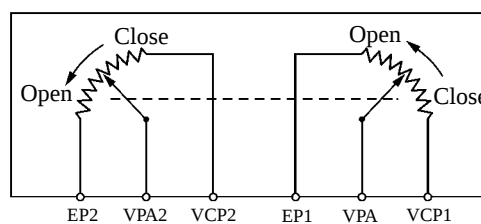
208EG26

Accelerator Pedal Position Sensor

This sensor converts the accelerator pedal depressed angles into electric signals with two differing characteristics and outputs them to the ECM. One is the VPA signal that linearly outputs the voltage along the entire range of the accelerator pedal depressed angle. The other is the VPA2 signal that outputs an offset voltage.



Accelerator Pedal Position Sensor

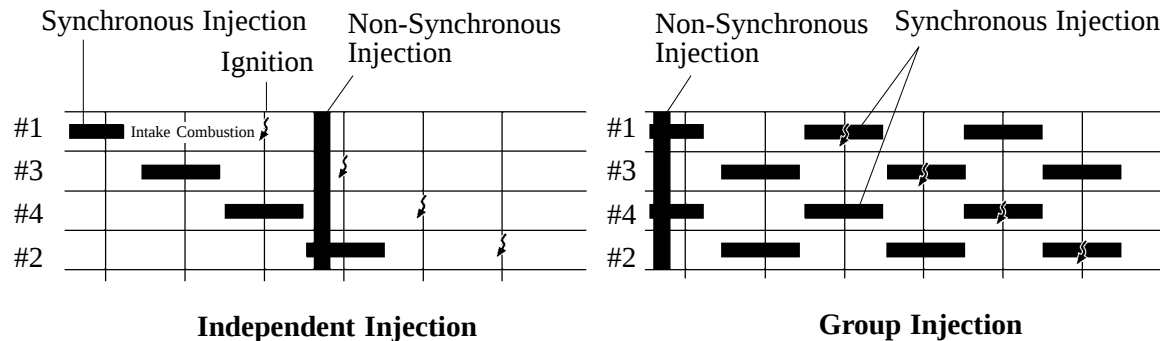


208EG27

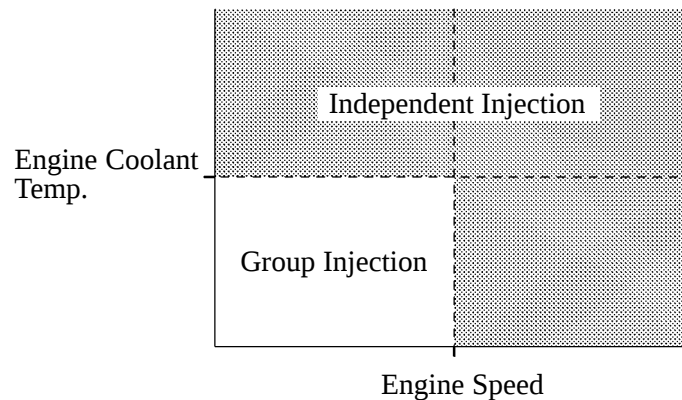
6. SFI (Sequential multiport electronic Fuel Injection) System

- An L-type SFI system directly detects the intake air mass with a hot wire type mass air flow meter.
- An independent injection system (in which fuel is injected once into each cylinder for each two revolution of the crankshaft) has been adopted.
Also, when the engine is starting, a group injection system (in which fuel is injected once into two cylinders for each one revolution of the crankshaft) has been adopted.
- There are two types of fuel injection:
 - a) One is synchronous injection in which corrections based on the signals from the sensors are added to the basic injection time so that injection occurs always at the same timing.
 - b) The other is non-synchronous injection in which injection is effected by detecting the requests from the signals of the sensors regardless of the crankshaft angle.

Furthermore, to protect the engine and improve fuel economy, the system effects fuel cutoff in which the injection of fuel is stopped temporarily in accordance with the driving conditions.



208EG28



208EG29

7. ESA (Electronic Spark Advance)

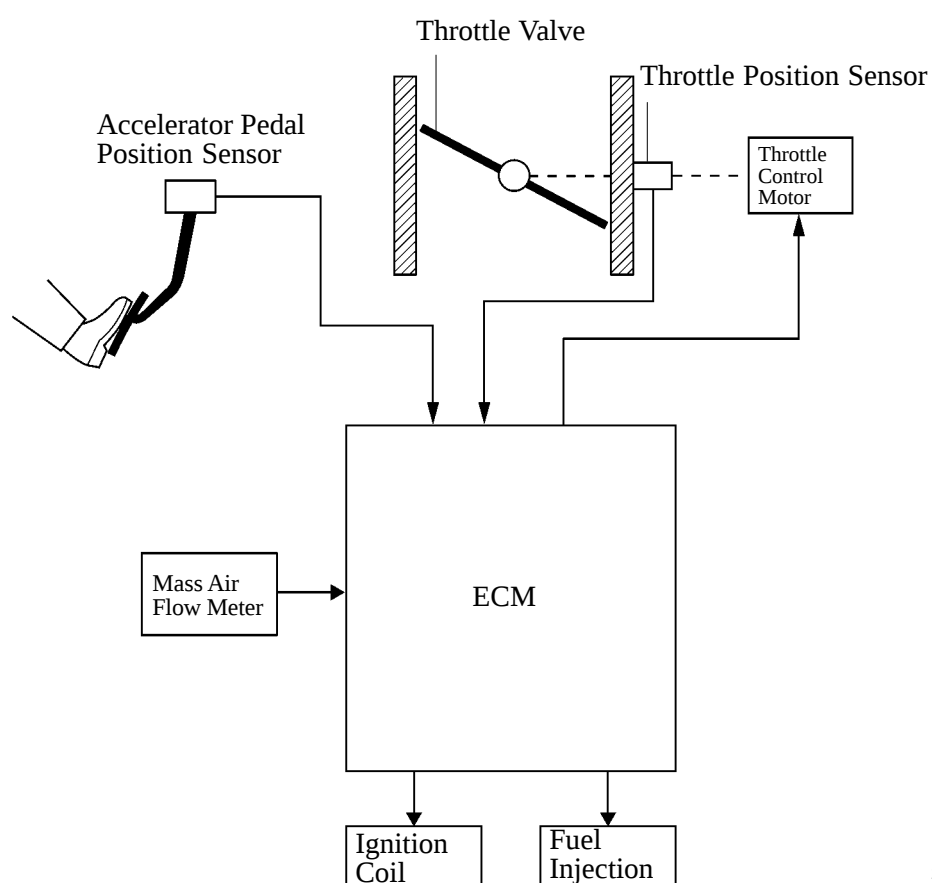
This system selects the optimal ignition timing in accordance with the signals received from the sensors and sends the (IGT) ignition signal to the igniter. The default ignition timing is set to 5° BTDC.

8. ETCS-i (Electronic Throttle Control System-intelligent)

General

- In the conventional throttle body, the throttle valve opening is determined invariably by the amount of the accelerator pedal effort. In contrast, the ETCS-i uses the ECM to calculate the optimal throttle valve opening that is appropriate for the respective driving condition and uses a throttle control motor to control the opening.
- The accelerator cable and link have been discontinued, and an accelerator position sensor has been provided on the accelerator pedal.

► System Diagram ◀



208EG30

Operation

1) General

The ECM drives the throttle control motor by determining the target throttle valve opening in accordance with the respective vehicle operating condition.

- Idle Speed Control
- Shift Shock Reduction Control
- Cruise Control

2) Idle Speed Control

Controls the throttle valve in order to constantly effect ideal idle speed control.

3) Shift Shock Reduction Control

The throttle control is synchronized to the ECT (Electronically Controlled Transmission) control during the shifting of the transmission in order to reduce the shift shock.

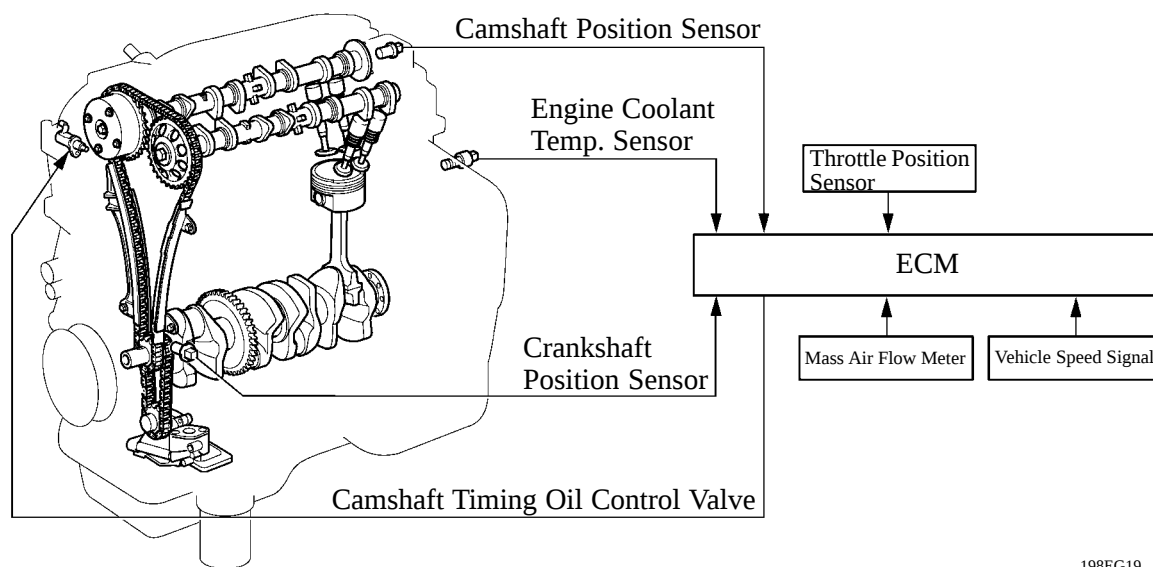
4) Cruise Control

An ECM with an integrated cruise control ECU directly actuates the throttle valve to effect the operation of the cruise control.

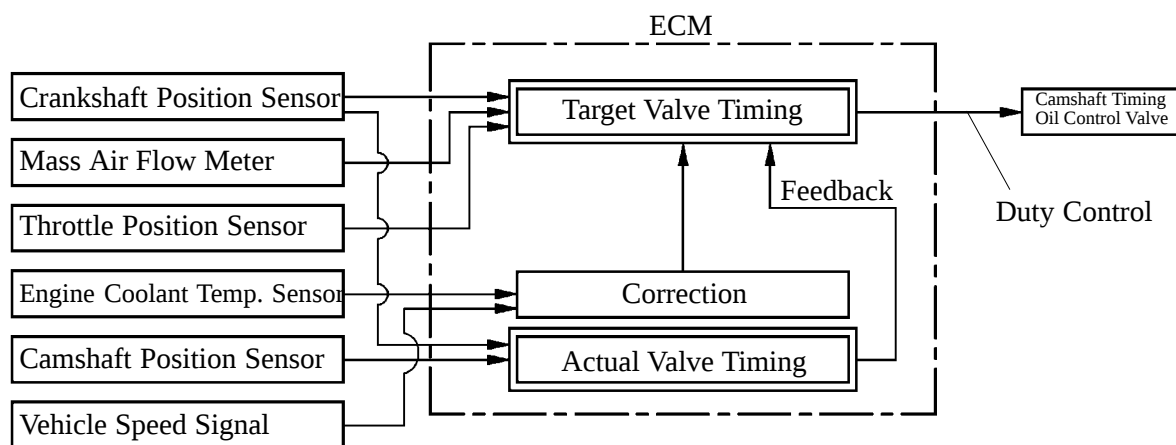
9. VVT-i (Variable Valve Timing-intelligent) System

General

The VVT-i system is designed to control the intake camshaft within a wide range of 50° (of crankshaft angle) to provide a valve timing that is optimally suited to the engine condition, thus realizing improved torque in all the speed ranges and fuel economy, and reduce exhaust emissions. The actual intake valve timing is feedback by means of the camshaft position sensor for constant control to the target valve timing.



198EG19



172CR07

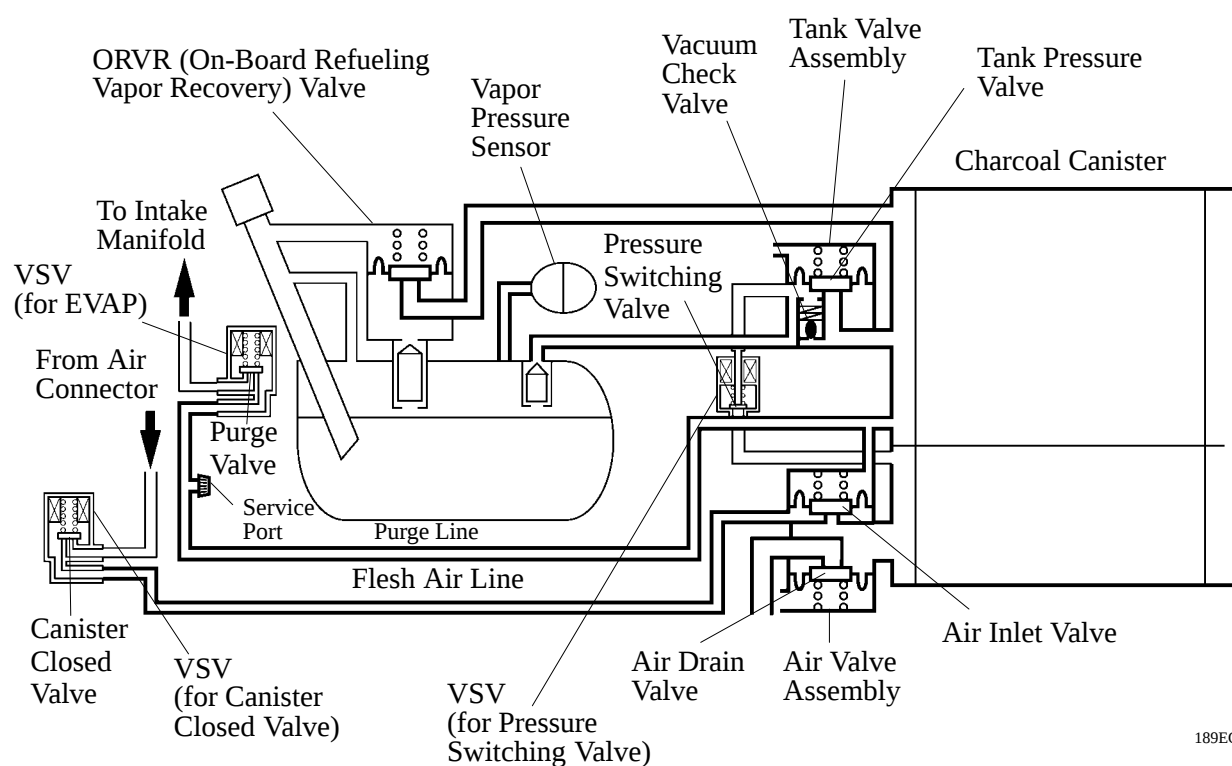
Air Conditioning Condition		Engine Coolant Temperature	
Compressor	Refrigerant Pressure	About 94°C (201°F) or Lower	About 95.5°C (204°F) or Higher
OFF	1.2 MPa (12.5 kgf/cm ² , 177.8 psi) or Lower	OFF	High
ON	1.2 MPa (12.5 kgf/cm ² , 177.8 psi) or Lower	Low	High
	1.5 MPa (15.5 kgf/cm ² , 220.5 psi) or Higher	High	High

11. Evaporative Emission Control System

General

The vacuum type has been adopted on the '02 Camry to detect leaks in the evaporative emission control system. This vacuum type detects leaks by forcefully introducing the purge vacuum into the entire system and monitoring the changes in the pressure. It consists of the following main components:

- A VSV (for canister closed valve) that closes the fresh air line from the air cleaner to the charcoal canister has been adopted.
- A VSV (for pressure switching valve) that opens the evaporator line between the fuel tank and the charcoal canister has been adopted.
- Function to close the purge line from the air intake chamber to the charcoal canister for this system is added to the original functions of VSV (for EVAP).
- A vapor pressure sensor that measures the pressure in the fuel tank while checking for evaporative emission leaks and sends signals to the ECM has been adopted.



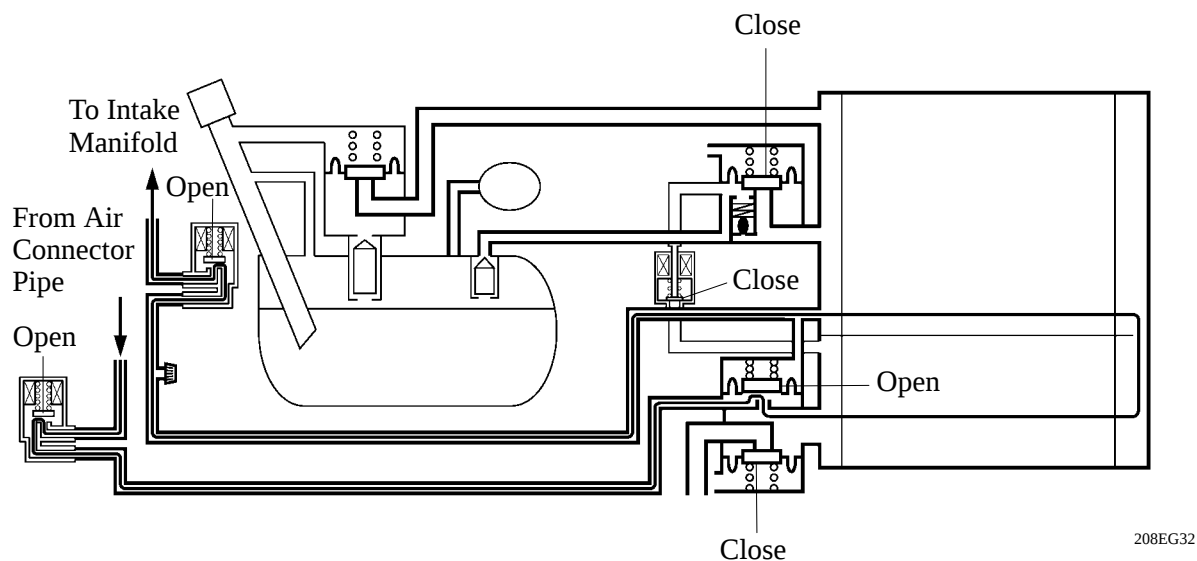
189EG31

Operation

1) Purge Flow

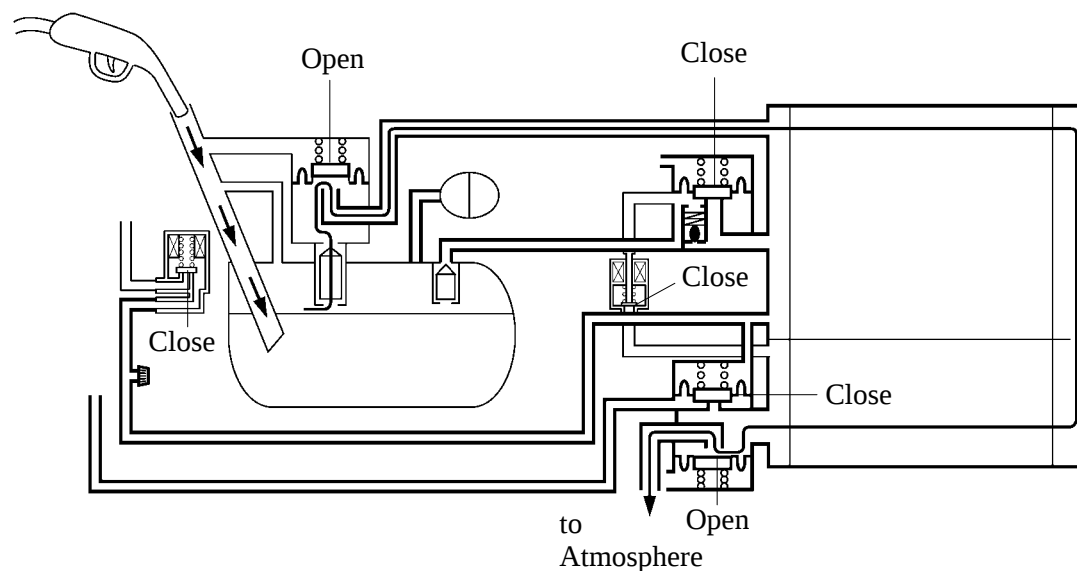
When the engine has reached predetermined parameters (closed loop, engine coolant temp. above 74°C (165°F), etc.), stored fuel vapors are purged from the charcoal canister whenever the purge valve is opened by the ECM. At the appropriate time, the ECM will turn on the VSV (for EVAP).

The ECM will change the duty ratio cycle of the VSV (for EVAP) thus controlling purge flow volume. Purge flow volume is determined by manifold pressure and the duty ratio cycle of the VSV (for EVAP). Atmospheric pressure is allowed into the canister to ensure that purge flow is constantly maintained whenever purge vacuum is applied to the canister.



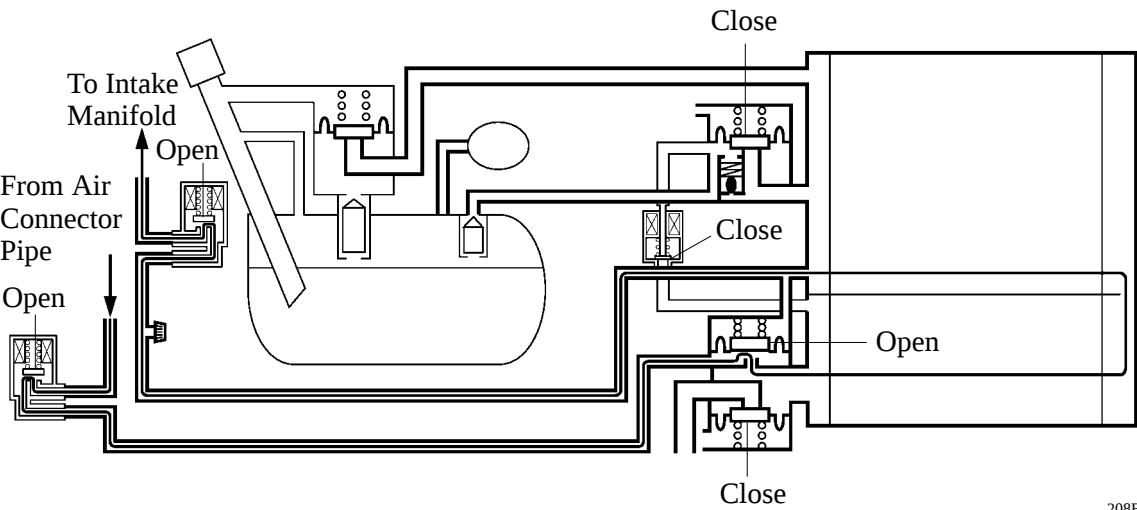
2) ORVR (On-Board Refueling Vapor Recovery)

During refueling, low pressure above the diaphragm in the onboard recovery valve lifts allowing fuel vapors into the charcoal canister. At the same time, the air drain valve opens and the charcoal absorbs the fuel vapors.

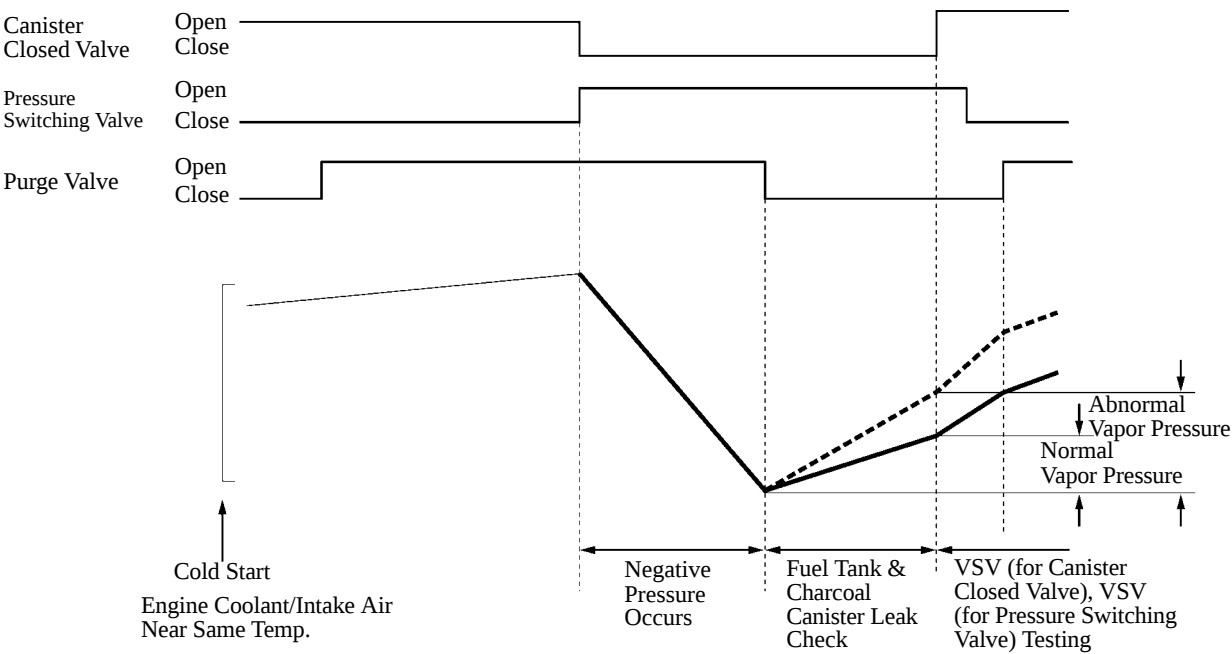


3) Monitor

The monitor sequence begins with a cold engine start. The intake air temp. and engine coolant temp. sensors must have approximately the same temperature reading. The ECM is constantly monitoring fuel tank pressure. As the temperature of the fuel increases, pressure slowly rises. The ECM will purge the charcoal canister at the appropriate time. With VSV (for pressure switching valve) closed, pressure will continue to rise in fuel tank.



208EG34



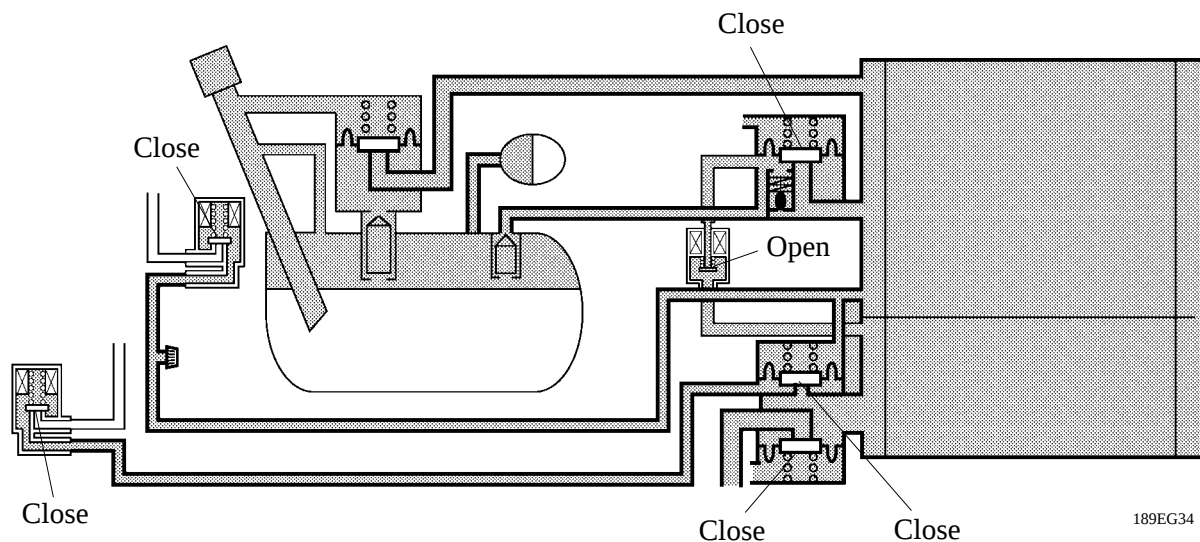
189EG33

4) DTC P0440 (Evaporative Emission Control System Malfunction)

Initially, when the canister closed valve is closed, and the pressure switching valve and the purge valve are opened, a vacuum is applied to the purge line from the air intake to the charcoal canister and to the evaporator line from the charcoal canister to the fuel tank. Next, the purge valve is closed in order to maintain a vacuum from the VSV (for EVAP) to the inside of the fuel tank. Then, any subsequent changes in the pressure are monitored by the vapor pressure sensor in order to check for evaporative emission leaks.

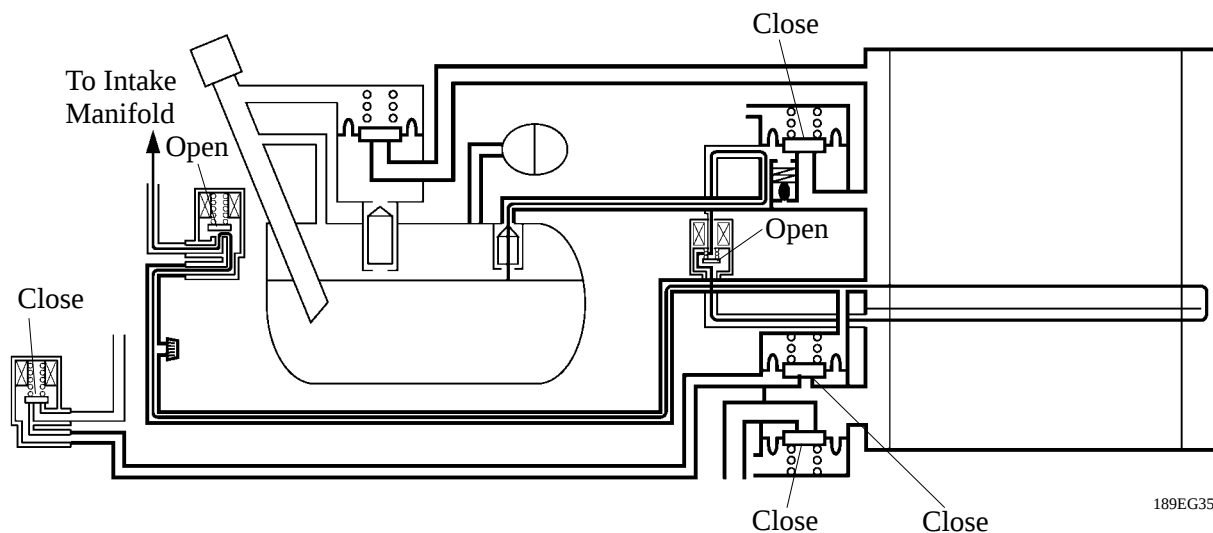
If a leak is detected, the MIL (Malfunction Indicator Lamp) illuminates to inform the driver. Also, the DTC (Diagnostic Trouble Code) can be accessed through the use of a hand-held tester.

For details on the DTCs, refer to the 2002 Camry Repair Manual (Pub. No. RM881U).

**5) DTC P0441 (Evaporative Emission Control System Incorrect Purge Flow)**

At a predetermined point, the ECM closed the canister closed valve and opens the pressure switching valve causing a pressure drop in the entire EVAP system. The ECM continues to operate the VSV (for EVAP) until the pressure is lowered to a specified point at which time the ECM closed the purge valve. If the pressure did not drop, or if the drop in pressure increase beyond the specified limit, the ECM judges the VSV (for EVAP) and related components to be faulty and the MIL illuminates to inform the driver. Also, the DTC can be accessed through the use of a hand-held tester.

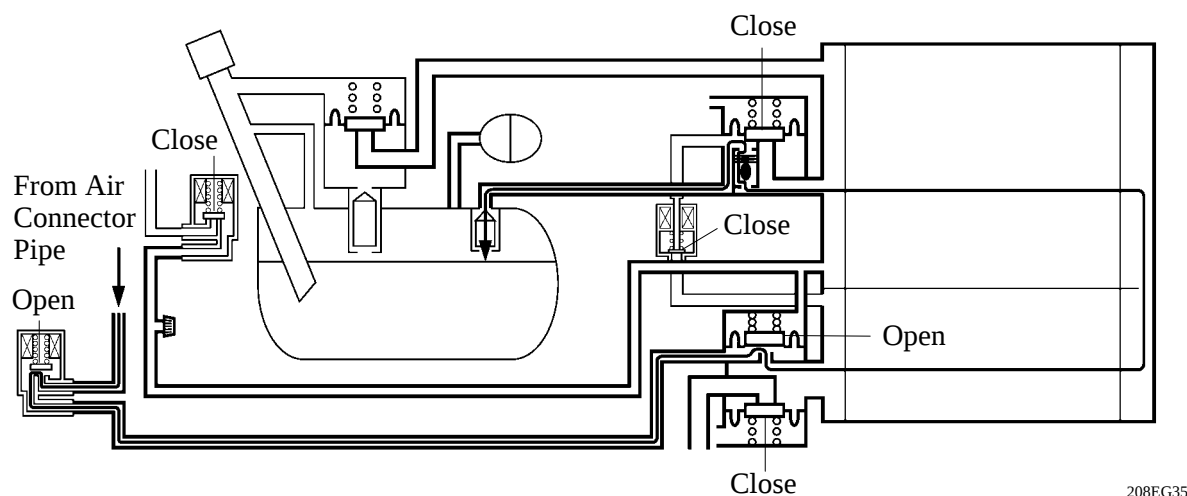
For details on the DTCs, refer to the 2002 Camry Repair Manual (Pub. No. RM881U).



6) DTC P0446 (Evaporative Emission Control System Vent Control Malfunction)

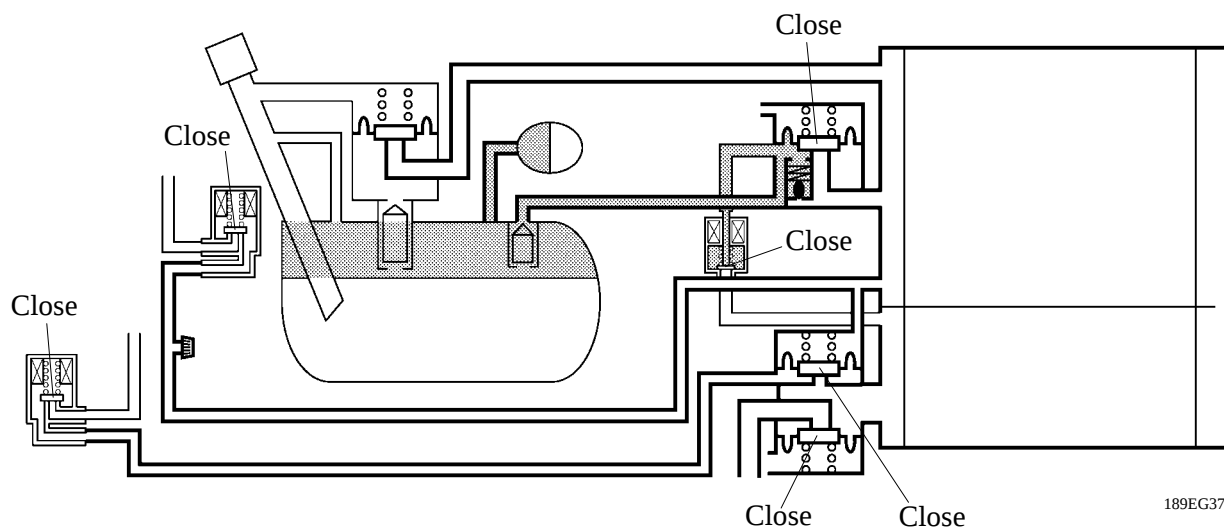
a. Canister Closed Valve

This stage checks the VSV (for canister closed valve) and vent (air inlet side) operation. When the vapor pressure rises to a specified point, the ECM opens the canister closed valve. Pressure will increase rapidly because of the air allowed into the system. No increase or an increase below specified rate of pressure increase indicates a restriction on the air inlet side. If a malfunction is detected, the MIL illuminates to inform the driver. Also, the DTC can be accessed through the use of a hand-held tester. For details on the DTCs, refer to the 2002 Camry Repair Manual (Pub. No. RM881U).



b. Pressure Switching Valve

The ECM closes the pressure switching valve. This action blocks air entire the tank side of the system. The pressure rise is no longer as great. If there was no change in pressure, the ECM will conclude the pressure switching valve did not close. If a malfunction is detected, the MIL illuminates to inform the driver. Also, the DTC can be accessed through the use of a hand-held tester. For details on the DTCs, refer to the 2002 Camry Repair Manual (Pub. No. RM881U).



12. Diagnosis

When the ECM detects a malfunction, the ECM makes a diagnosis and memorizes the failed section. Furthermore, the MIL (Malfunction Indicator Lamp) in the combination meter illuminates or blinks to inform the driver.

The ECM will also store the DTCs of the malfunctions.

The DTCs can be accessed the use of the hand-held tester.

Service Tip

The length of time to clear the DTC via the battery terminal has been changed from the previous 10 seconds to 1 minute.

13. Fail-Safe

General

When the ECM detects a malfunction, the ECM stops or controls the engine according to the data already stored in the memory.

► Fail-Safe Control List ◀

Location on Malfunction	Description Control
Mass Air Flow Meter	In case of a signal malfunction, the engine could operate poorly or the catalyst could overheat if the engine continues to be controlled with the signals from the sensors. Therefore, the ECM effects control by using the values in the ECM or stops the engine.
Accelerator Pedal Position Sensor (For details, see page EG-89)	In case of a signal malfunction, the ECM calculates the accelerator pedal opening angle that is limited by the dual system sensor value and continues effecting throttle valve control. If both system malfunction, the ECM considers that the accelerator pedal is fully closed.
Throttle Position Sensor (For details, see page EG-90)	In case of a signal malfunction, the ECM cuts off the current to the throttle control motor. The throttle valve returns to the prescribed opening by the force of the return spring. The ECM then adjusts the engine output by controlling the fuel injection and ignition timing in accordance with the accelerator pedal opening angle to enable the vehicle to continue driving.
Engine Coolant Temp. Sensor and Intake Air Temp. Sensor	In case of a signal malfunction, the use of the values from the sensors will make the air-fuel ratio become too rich or too lean, which could causes the engine to stall or to run poorly during cold operation. Therefore, the ECM fixes the air-fuel ratio to the stoichiometric ratio and uses the constant values of 80°C engine coolant temperature and 20°C intake air temperature to perform the calculation.
Knock Sensor	In case of a malfunction in the knock sensor or in the knocking signal system (open or short circuit), the engine could become damaged if the timing is advanced despite the presence of knocking. Therefore, if a malfunction is detected in the knock sensor system, the ECM turns the timing retard correction of the knock sensor into the maximum retard value.
Ignition Coil (with Igniter)	In case of a malfunction in the ignition system, such as an open circuit in the ignition coil, the catalyst could be become overheated due to engine misfire. Therefore, if the (IGf) ignition signal is not input twice or more in a row, the ECM determines that a malfunction occurred in the ignition system and stops only the injection of fuel into the cylinder with the malfunction.
Camshaft Position Sensor	In case of a signal malfunction (open or short circuit) or a mechanical malfunction, the ECM stops the VVT-i control.

FOREWORD

To assist you in your sales and service activities, this manual explains the main characteristics of the 2002 model year vehicles, in particular providing a technical explanation of the construction and operation of new mechanisms and new technology used.

CAUTION, **NOTICE**, ***REFERENCE*** and **NOTE** are used in the following ways:

CAUTION	A potentially hazardous situation which could result in injury to people may occur if instructions on what to do or not do are ignored.
NOTICE	Damage to the vehicle or components may occur if instructions on what to do or not do are ignored.
<i>REFERENCE</i>	Explains the theory behind mechanisms and techniques.
NOTE	Notes or comments not included under the above 3 titles.

All information contained herein is the most up-to-date at the time of publication. We reserve the right to make changes without prior notice.

TOYOTA MOTOR CORPORATION

FOREWORD

To assist you in your sales and service activities, this manual explains the main characteristics of the new CAMRY, in particular providing a technical explanation of the construction and operation of new mechanisms and new technology used.

Applicable models: ACV30, MCV30 series

This manual is divided into 3 sections.

- 1. New Model Outline** — Explanation of the product to give a general understanding of its features.
- 2. Technical Description** — Technical explanation of the construction and operation of each new system and component.
- 3. Appendix** — Major technical specifications of the vehicle.

CAUTION, **NOTICE**, **REFERENCE** and **NOTE** are used in the following ways:

CAUTION	A potentially hazardous situation which could result in injury to people may occur if instructions on what to do or not do are ignored.
NOTICE	Damage to the vehicle or components may occur if instructions on what to do or not do are ignored.
REFERENCE	Explains the theory behind mechanisms and techniques.
NOTE	Notes or comments not included under the above 3 titles.

For detailed service specifications and repair procedures, refer to the following Repair Manuals:

Manual Name		Pub. No.
● 2002 CAMRY Repair Manual	Vol. 1	RM881U1
	Vol. 2	RM881U2
● U140E Automatic Transaxle Repair Manual		RM836U
● U241E Automatic Transaxle Repair Manual		RM840U
● 2002 CAMRY Electrical Wiring Diagram		EWD461U

All information contained herein is the most up-to-date at the time of publication. We reserve the right to make changes without prior notice.

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First Printing: Jun. 5, 2001 01-010605-00

CONCEPT

New Century Camry

A sedan package evolved through an attractive design



208MO03

EXTERIOR

- Attractive design (Dynamic total form)
- High-quality and sporty image

INTERIOR

Intelligent space created by the wide interior and high-quality workmanship

MAIN MECHANISM

- High-performance engine with plenty of power to spare
- Excellent driving stability and riding comfort

EQUIPMENT

A variety of features for excellent utility and comfort

BODY

- Lightweight and highly rigid body
- Low-vibration and low-noise body
- Excellent aerodynamics

SAFETY

- Energy-absorbing body
- Comprehensive passive safety equipment

ENVIRONMENT

Earth-friendly automobile manufacturing to protect the environment

DIMENSION

A fusion of ample interior and elegant style

EXTERIOR APPEARANCE

FRONT VIEW



REAR VIEW



EXTERIOR

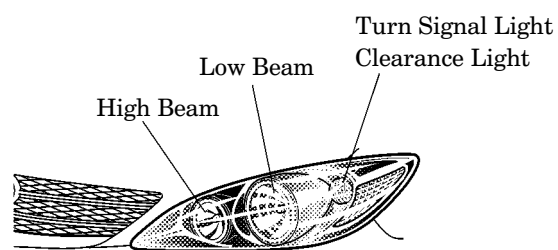
- Attractive design
- High-quality and sporty form

FRONT DESIGN

- Angular front styling with unique lights and grille.
- Integrated hood, fenders, and bumper with a 3D feel.



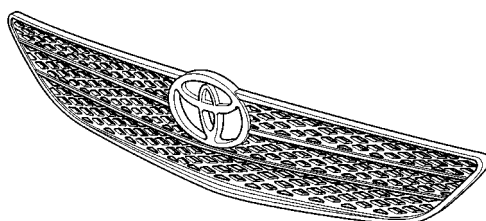
208MO04



208MO07

■ Headlight

Angular front styling expression with a slanted outline.



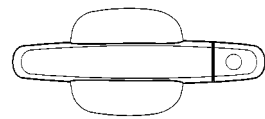
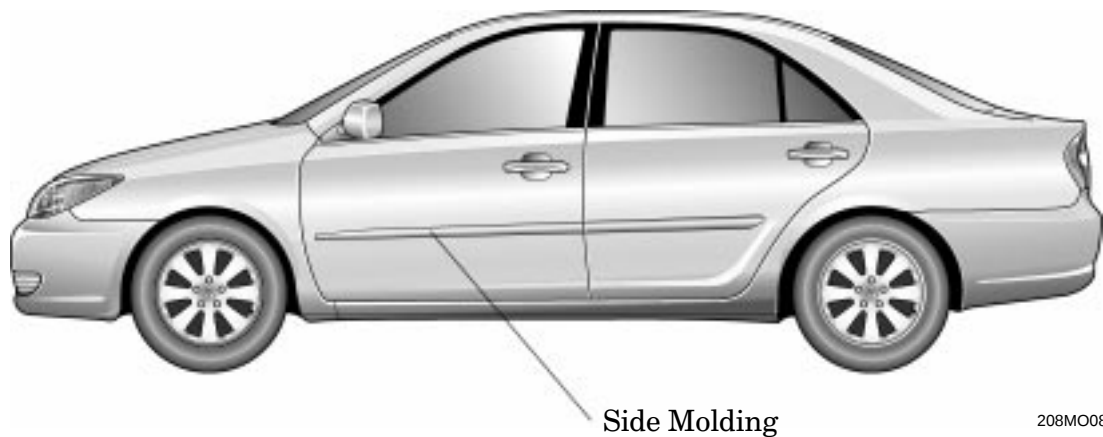
208MO06

■ Radiator Grille

Sporty and classy image.

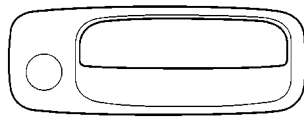
SIDE DESIGN

- A cabin form that flows flexibly
- Chrome side molding is standard on the XLE and LE grades to achieve a high-quality appearance.



New Model

208MO10

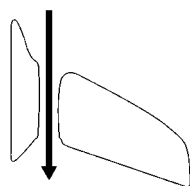


Previous Model

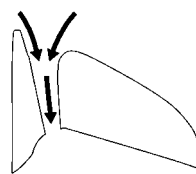
208MO53

■ Outside Door Handle

A grip-type handle is used to enhance utility.



New Model



Previous Model

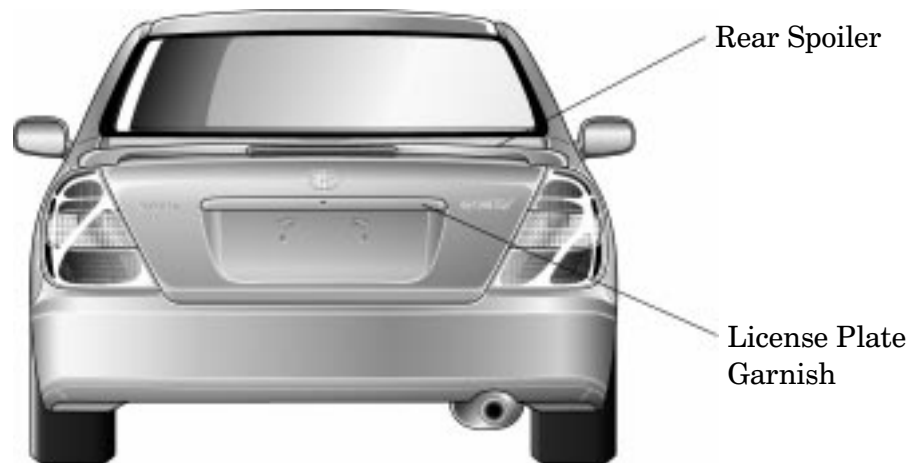
208MO09

■ Outside Rear View Mirror

The shape of the outside rear view mirror has been changed to reduce wind noise.

REAR DESIGN

- Wide and sporty design
- Chrome license plate garnish is standard on the XLE and LE grades to achieve a high-quality appearance.
- A rear spoiler has been provided on the SE grade as standard equipment to improve aerodynamics and appearance.
- The luggage compartment opening has been widened to improve ease of luggage loading and unloading.



208MO96



208MO12

■ Rear Combination Light

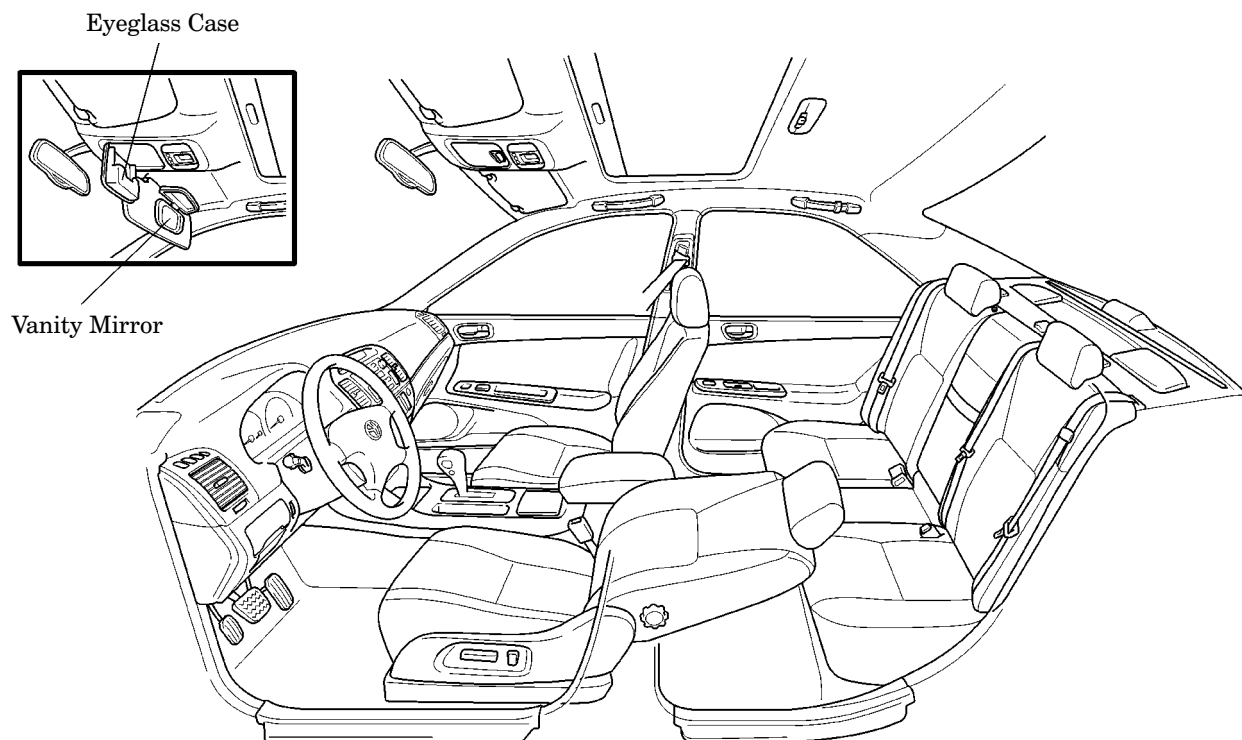
Various types of lights have been organized in the rear combination light to give the luggage compartment area a streamlined look.

INTERIOR

Luxurious space created by the wide interior and high-quality workmanship

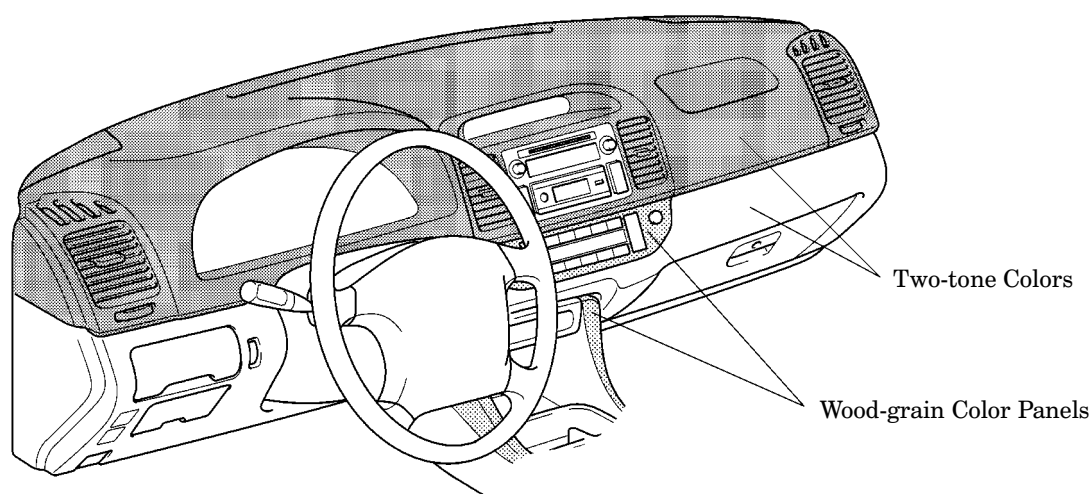
INTERIOR DESIGN

- An integrated and continuous look has been achieved from the instrument panel to the door trim.
- Simulated wood-grain color panels are used in various areas (air conditioning control panel, center console, etc.) of the instrument panel of the XLE grade to achieve a high-quality appearance.
- On the SE grade, gun-metallic paint is used in various areas (air conditioning control panel, center console, etc.) of the instrument panel to express sportiness.
- Functional features have been provided in every corner of the interior to enhance comfort and utility.
- An eyeglass case is provided in the overhead console of all models as standard equipment to enhance storage capability.
- A vanity mirror and indirect illumination are provided on the back of the sun visor of all models as standard equipment to enhance utility.



INSTRUMENT PANEL

- The amount of height offset has been minimized at the center cluster, register, instrument panel pads, etc., to achieve high quality and a feeling of openness.
- Two-tone colors have been adopted on the instrument panel to achieve high quality and a feeling of openness.
- The height offset at the mating surfaces between parts has been minimized to enhance the high-quality appearance.



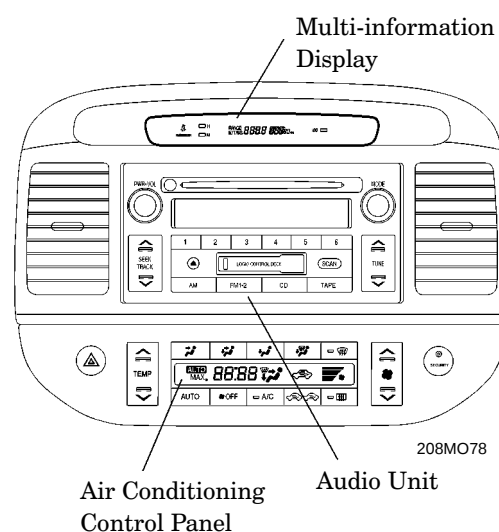
208MO15

CENTER CLUSTER

- The width of the center cluster has been increased (+150 mm from previous) to enhance the high-quality appearance and improve utility.
- The clock, audio unit, and the air Conditioning control panel have been optimally allocated to enhance utility and visibility.
- On the XLE grade, the clock provides an additional multi-information function that provides the driver with vehicle information.

Multi-information display items

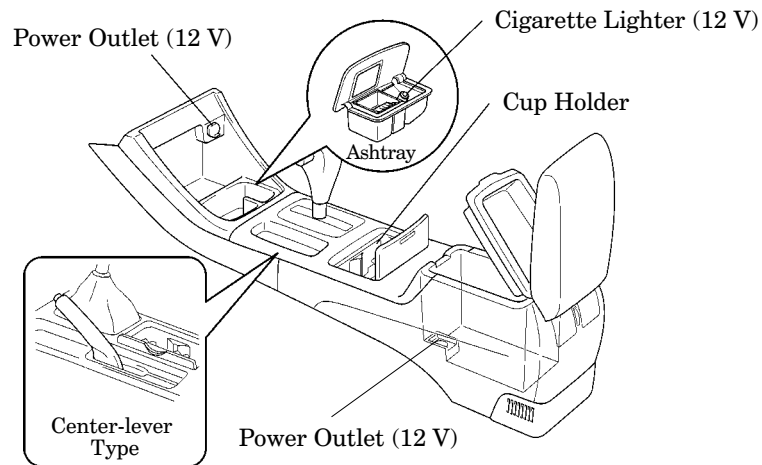
Clock
Outside Air Temperature
Instant Fuel Consumption Rate
Average Fuel Consumption Rate
Average Vehicle Speed
Driving Distance
Elapsed Time



208MO78

CENTER CONSOLE

- Large, functional storage spaces have been provided to promote greater ease of use.
- Two power outlets (one in front of the center console and the other inside the console box) have been provided for enhanced utility.
- Cup holders for three cups have been provided for enhanced storage capability (the cup holders hold two cups if the vehicle is equipped with an optional ashtray in front).
- A large-capacity ashtray (approximately 1.5 times larger) is available as optional equipment for enhanced utility.

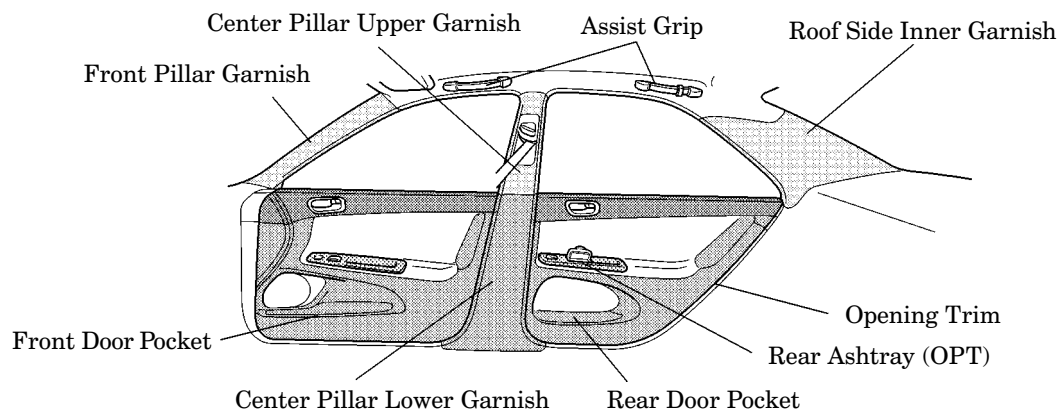


208MO60

Center Console For Foot-pedal Type Parking Brake

TRIM & GARNISHES

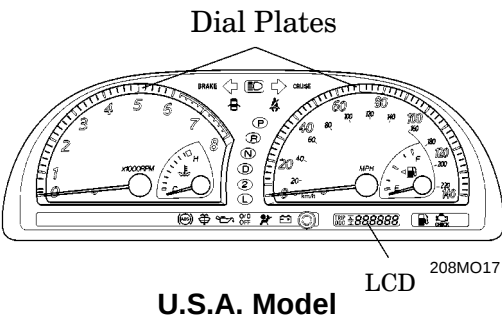
- Simulated marble and cross patterns are provided on the inner garnishes of the front and center pillars and the roof side to improve their appearance.
- The top of the door trim uses the same color as the instrument panel to achieve an integrated look.
- A door pocket has been added to the rear door trim to improve the storage capability.



208MO16

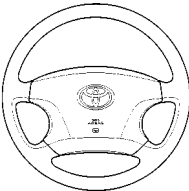
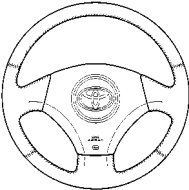
COMBINATION METER

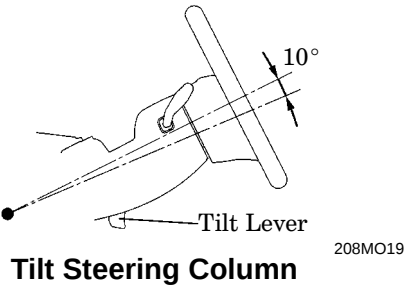
- Large, dual analog meters are standard equipment on all models to enhance their high-quality appearance.
- Deep-dished, well-defined, three-dimensional dial plates are used.
- An odometer and trip meter that use LCD (Liquid Crystal Display) have been adopted.
- Silver dial plates and amber illumination are used on the SE grade to improve its sporty appearance.



STEERING WHEEL & STEERING COLUMN

- The steering wheel comes as a 3-spoke or 4-spoke type.
- A leather type steering wheel is also available to enhance the high-quality appearance.
- A steering column with a manual tilt function is standard equipment on all models.

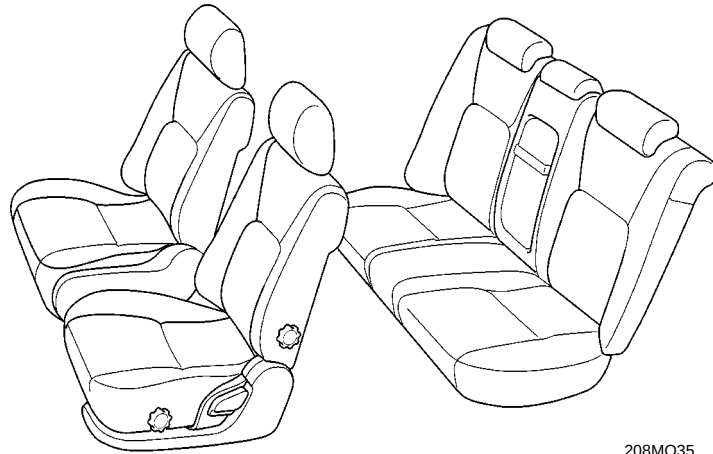
Steering Wheel		Grade		
		LE	XLE	SE
 20IM056	Urethane 4-spoke type	STD	STD	—
 20IM018	Leather-wrapped 3-spoke type	—	—	STD
 20IM091	Leather-wrapped 4-spoke type	—	OPT	—



SEAT

Seats with a superior fit and solid support suited to sporty tastes and reflective of new century camry

Item	Grade		
	LE	XLE	SE
Fabric	STD	STD	STD
Leather	—	OPT	OPT



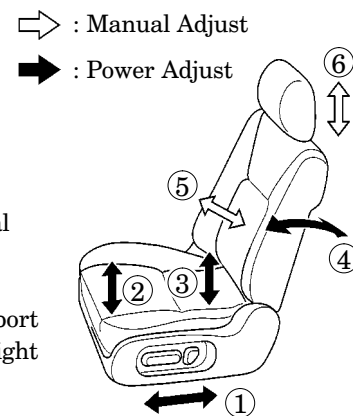
208MO35

■ Front Seats

- Power adjustable seats are provided for the driver and front passenger seats to enhance utility.
- An 8-way power adjuster, which is based on the previous 6-way power adjuster with an added front vertical mechanism, is used.

Power Adjustable Seat	Grade		
	LE	XLE	SE
Driver Seat Only	OPT	STD	OPT
Driver and Front Passenger Seats	OPT	OPT	OPT

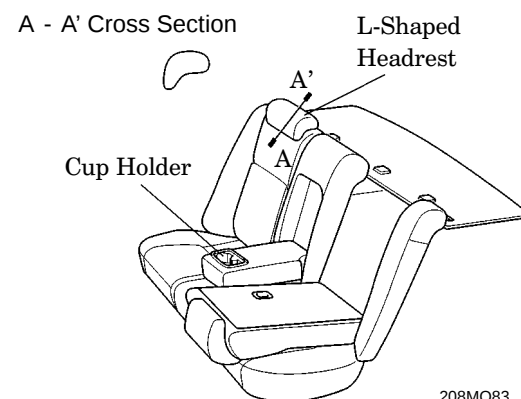
- ① Slide
- ② Front Vertical
- ③ Rear Vertical
- ④ Reclining
- ⑤ Lumbar Support
- ⑥ Headrest Height



208MO82

■ Rear Seats

- An L-shaped headrest is used to achieve excellent rearward visibility. The headrest level of comfort was also increased by locating it closer to the occupant's head.
- The width of the rear center armrest has been increased to 194 mm (+14 mm from the previous model) for enhanced utility.
- A 40/60 split fold-down seats have been adopted for enhanced utility.
- When the seat is folded, through access to the trunk is gained in order to accommodate a large piece of cargo or skis.
- A cup holder have been provided at the rear center arm rest for enhanced utility.



208MO83

40/60 Split Fold-down Seats

MAIN MECHANISM

- High-performance engine with plenty of power to spare
- Excellent driving stability and riding comfort

ENGINE

■ 2AZ-FE ENGINE

- The new Camry newly adopted the 2AZ-FE engine. This engine meets the ULEV (Ultra Low Emission Vehicle) requirements and offers better fuel economy and lower emissions.
- This engine has adopted the VVT-i (Variable Valve Timing-intelligent) system and a big bore/long port intake manifold. It has been developed to realize high performance, quietness, fuel economy and clean emissions.
- This engine uses the ETCS-i (Electronic Throttle Control System-intelligent) system to achieve high levels of functionality and reliability.

Specifications

Engine Type	2AZ-FE	
No. of Cyls. & Arrangement	4-Cylinder, In-Line	
Valve Mechanism	16-Valve DOHC, Chain Drive	
Displacement	cm ³ (cu.in.)	2,362 (144.1)
Bore x Stroke	mm (in.)	88.5 x 96.0 (3.48 x 3.78)
Compression Ratio	9.6 : 1	
Max. Output	[SAE-NET]	115 kW@5,600 rpm (155 HP@5,600 rpm)
Max. Torque	[SAE-NET]	221 N·m@4,000 rpm (163 ft-lbf@4,000 rpm)

■ 1MZ-FE ENGINE

- The new Camry continues to use the 1MZ-FE engine of the previous model. This engine meets the ULEV and SFTP (Supplementary Federal Test Procedure) requirements and offers better fuel economy.
- This engine uses the ETCS-i (Electronic Throttle Control System-intelligent) and ACIS (Acoustic Control Induction System) to achieve high levels of functionality and reliability.

Specifications

Engine Type	1MZ-FE	
No. of Cyls. & Arrangement	6-Cylinder, V-Type	
Valve Mechanism	24-Valve DOHC, Belt & Gear Drive	
Displacement	cm ³ (cu.in.)	2,994 (182.7)
Bore x Stroke	mm (in.)	87.5 x 83.0 (3.84 x 3.27)
Compression Ratio	10.5 : 1	
Max. Output	[SAE-NET]	143 kW@5,300 rpm (192 HP@5,300 rpm)
Max. Torque	[SAE-NET]	283 N·m@4,400 rpm (209 ft-lbf@4,400 rpm)

TRANSAXLE

■ MANUAL TRANSAXLE

- The E351 manual transaxle is used to improve torque and to achieve a compact and lightweight package.

Engine Type		2AZ-FE
Transaxle Type		E351
Gear Ratio	1st	3.538
	2nd	2.045
	3rd	1.333
	4th	0.972
	5th	0.731
	Reverse	3.583

■ AUTOMATIC TRANSAXLE

- The U241E and U140E automatic transaxles are used.

Engine Type		2AZ-FE	1MZ-FE
Transaxle Type		U241E	U140E
Gear Ratio	1st	3.943	3.938
	2nd	2.197	2.194
	3rd	1.413	1.411
	4th	1.020	1.019
	Reverse	3.145	3.141

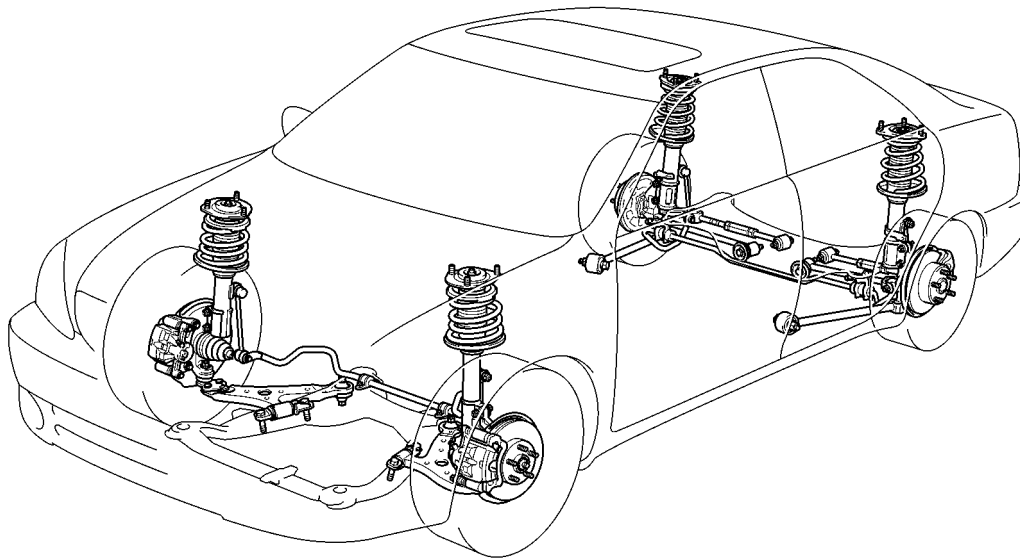
SUSPENSION & BRAKE

■ **SUSPENSION**

- The front and rear suspension uses the same MacPherson struts that are used on the previous model.
- On both the front and rear suspensions, the suspension geometry has been optimized and the components have been newly developed to improve the dynamics, driving stability, and riding comfort of the vehicle.

■ **BRAKE**

- The front brakes use ventilated disc brakes to achieve excellent braking performance and improved braking feel.
- The rear brakes of the LE grade use drum brakes, and the XLE and SE grades use solid disc brakes to achieve excellent braking performance and improved braking feel.
- A pedal type parking brake is standard equipment on the XLE grade and a lever type parking brake is standard equipment on the LE and SE grades.

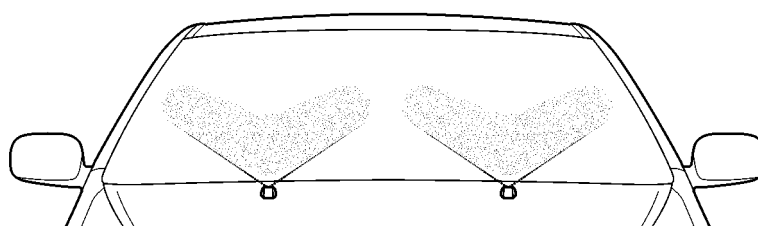


EQUIPMENT

A variety of features for excellent utility and comfort

WASHER SYSTEM

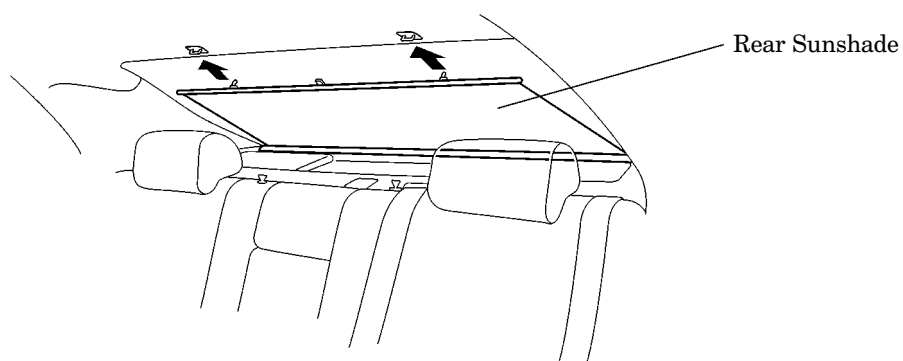
- Spray type washer nozzles are provided as standard equipment on all models. Because these nozzles can spray washer fluid over a wide range, they provide excellent wiping performance.



208MO61

SUNSHADE

- A rear sunshade that reduces the amount of direct sunlight entering through the rear window is option equipment for all the vehicles, in order to improve comfort for rear passenger.

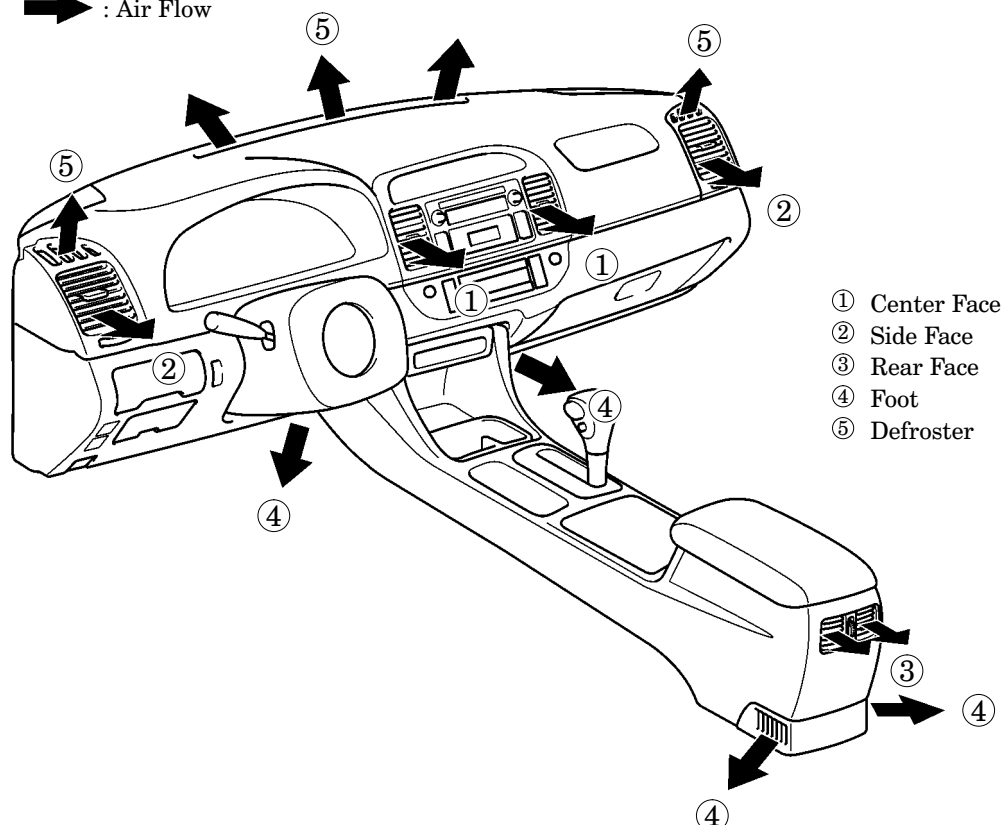


208MO79

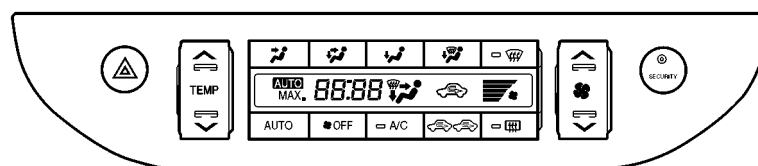
AIR CONDITIONING SYSTEM

- The system has been designed to save space and reduce weight while maintaining the air Conditioning performance of the previous Camry.
- Manual air Conditioning is standard equipment on the LE and SE grades.
- Automatic air Conditioning is standard equipment on the XLE grade.
- A clean air filter is standard equipment on all models for improved comfort.

➔ : Air Flow

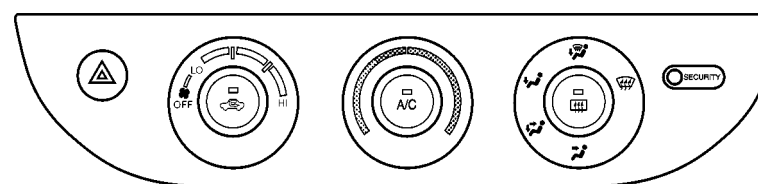


208MO37



208MO46

Automatic Air Conditioning Panel



208MO49

Manual Air Conditioning Panel

NAVIGATION SYSTEM

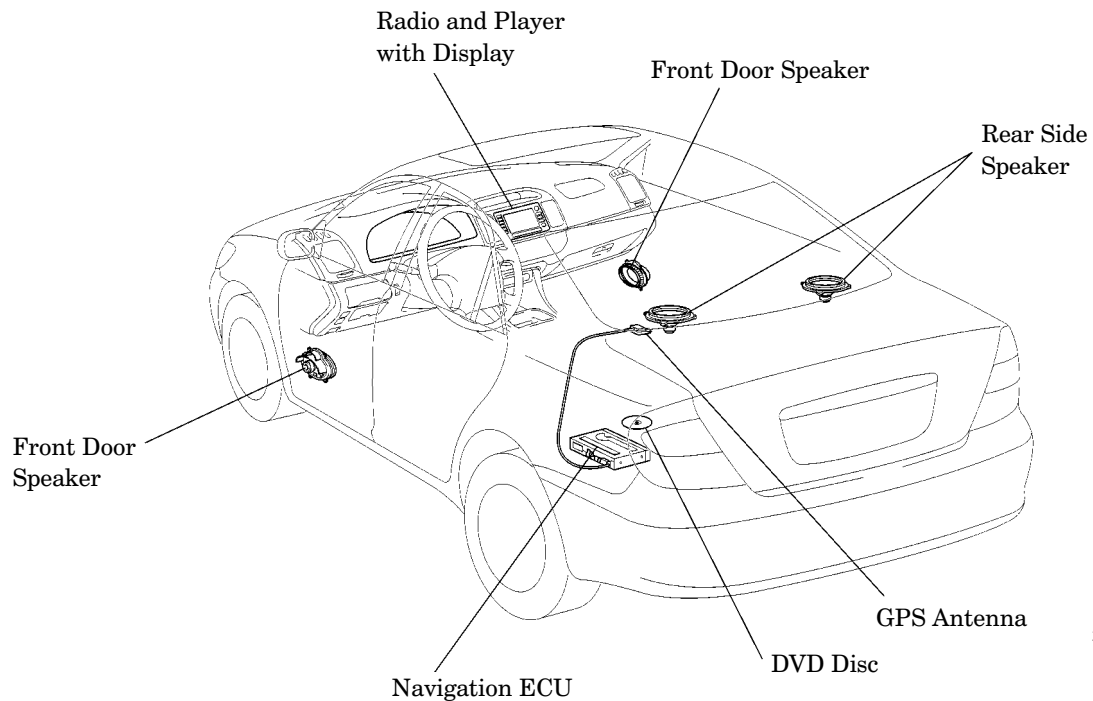
- A navigation system with AV (Audio Visual) system is available as an option on the XLE, SE grade to improve product appeal.

	Function
Audio	AVX-integrated type (AM/FM/Cassette/CD)
Display	6.5-inch pressure-sensitive touch panel
Navigation	Voice operation support Multiple destination setting On-route scroll



208MO57

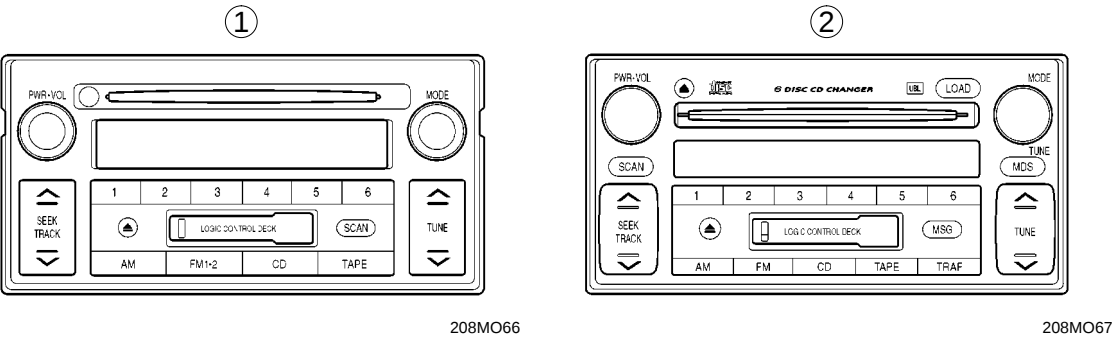
■ Navigation System Layout



208MO39

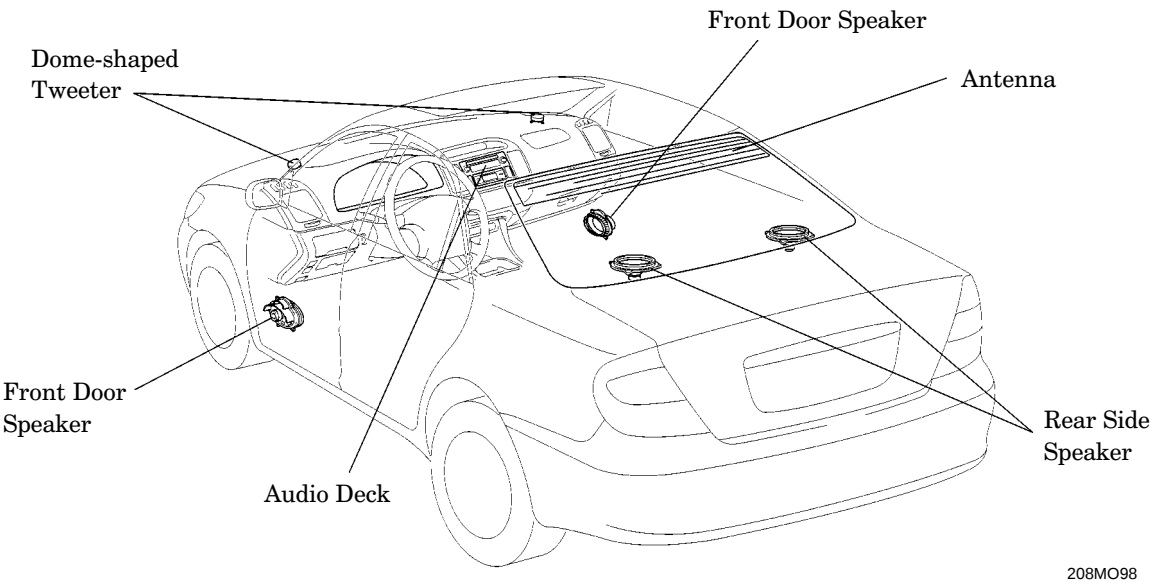
AUDIO SYSTEM

- An anomalous audio unit that excels in the ease of use has been provided in the center cluster.



No.	Audio Unit	Manufacturer	Speaker Output			Grade		
			Dome-shaped Tweeter 6.5 cm	Front Door Speaker 6" x 9"	Rear Side Speaker 6" x 9"	LE	XLE	SE
①	AM/FM/Cassette/ CD/6-Speaker	Fujitsu TEN	9 W	17.5 W	12 W	STD	—	STD
		PIONEER	17.5 W	17.5 W	17.5 W			
②	AM/FM/Cassette/ CD/6-Speaker	JBL (1.4 cm tweeter enclosed in the rear side speaker)	15 W	20 W	25 W	OPT	STD	OPT
	AM/FM/Cassette/ In-dash 6-CD changer/6-Speaker		15 W	20 W	25 W	OPT	OPT	OPT

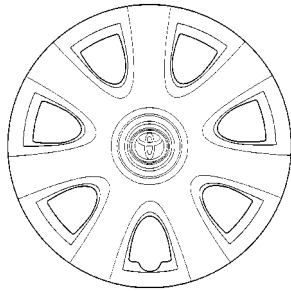
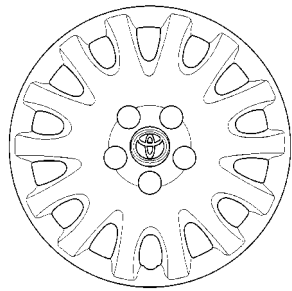
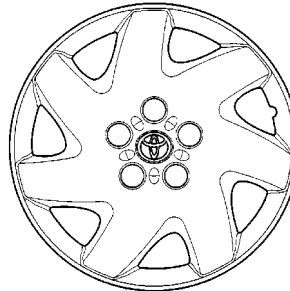
Speaker Layout



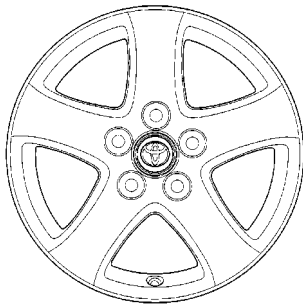
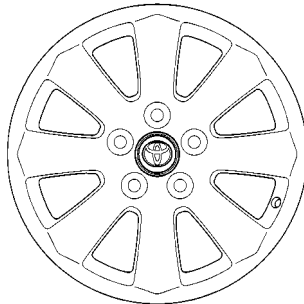
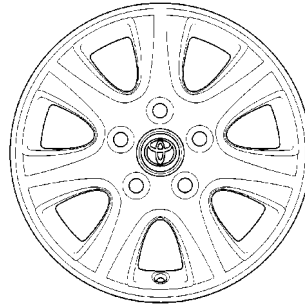
TIRE & DISC WHEEL

- Three types of wheel caps are provided for the steel wheels.
- Three types of 15- and 16-inch aluminum wheels are provided.

Wheel Caps

No.	Tire Size	Offset	P.C.D	Grade		
				LE	XLE	SE
①	P205/65R15	50 mm	ø114.3 mm	STD	—	—
②	P215/60R16			—	STD	—
③	P215/60R16			—	—	STD
①		②		③		
						
208MO31		208MO72		208MO30		

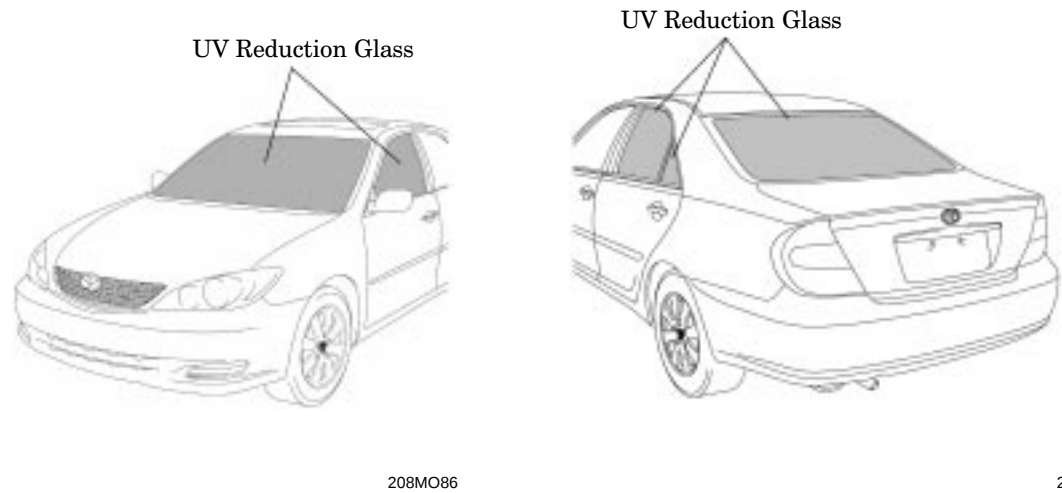
Aluminum Wheels

No.	Tire Size	Offset	P.C.D	Grade		
				LE	XLE	SE
④	P215/60R16	50 mm	ø114.3 mm	—	—	OPT
⑤	P215/60R16			—	OPT	—
⑥	P205/65R15			OPT*1	—	—
④		⑤		⑥		
						
208MO32		208MO33		208MO73		

*1: Produced TMMK

UV (Ultraviolet) REDUCTION GLASS

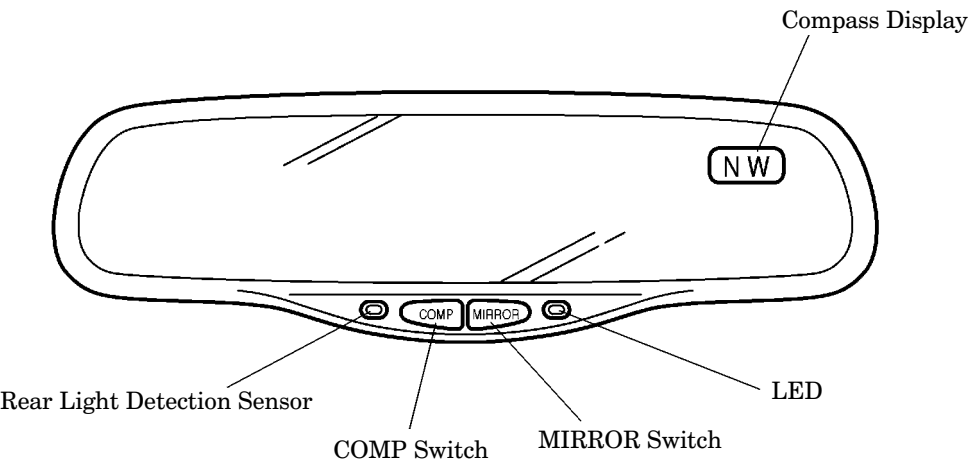
- UV Reduction Glass which block the ultraviolet and infrared rays in the sunlight has been adopted to ensure comfort.



Glass Portion	Windshield	Door	Quarter	Rear
UV Reduction rate	100%	90%	90%	90%

INSIDE REAR VIEW MIRROR

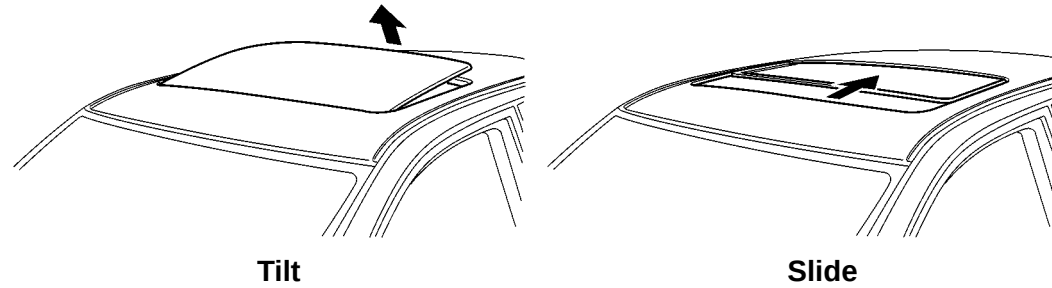
- An EC (electro chromic), glare-resistant mirror is provided as standard equipment on the XLE grade, and optional equipment on the LE and SE grades.
- A compass display is provided at the top right area of the mirror to indicate the vehicle's direction of travel.



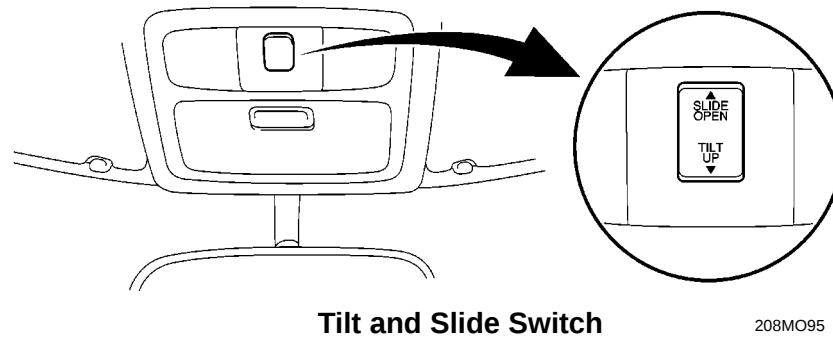
208MO54

MOON ROOF

- A tilt-and-slide type moon roof is available as an option on all models.
- One touch open-and-close function is provided for opening and closing the sliding roof.
- A jam protection function is provided as standard equipment to help prevent injuries while performing automatic close or tilt-down operations.



208MO94



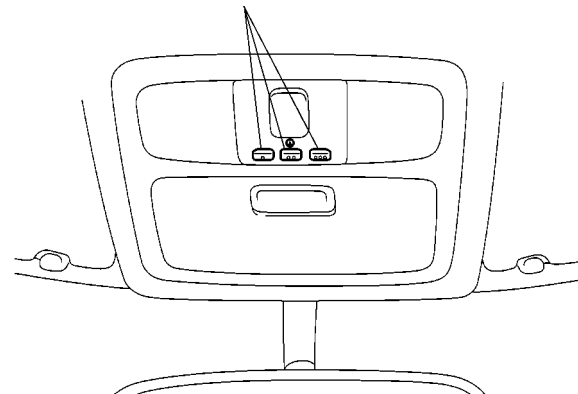
208MO95

GARAGE DOOR OPENER

- A garage door opener switch has been set in the overhead console.

Item	Grade		
	LE	XLE	SE
Garage Door Opener Switch	OPT	STD	OPT

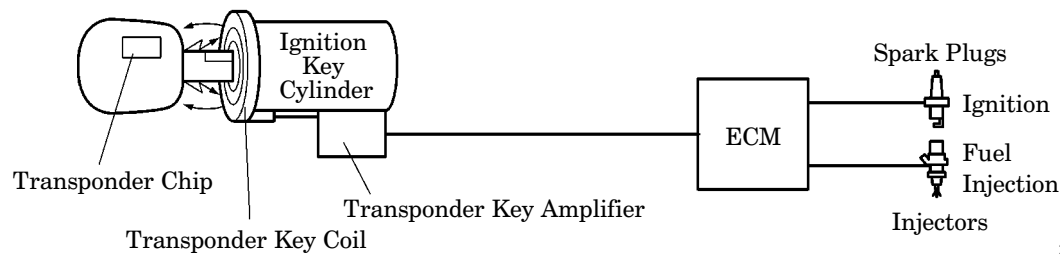
Garage Door Opener Switch



208MO85

ENGINE IMMOBILISER SYSTEM

- The engine immobiliser system is standard equipment on the XLE grade, and optional equipment on the LE and SE grades.
- The engine immobiliser system prevents vehicle theft by comparing the ID code that is stored in the ECM against the ID code that is stored in the ignition key and permits ignition and the injection of fuel if the codes match.



208MO84

THEFT DETERRENT SYSTEM

- The theft deterrent system is standard equipment on the XLE grade.
- The theft deterrent system utilizes the components of the door lock control system and the wireless door lock remote control system. The theft deterrent system activates when an attempt is made to forcibly enter the vehicle, open the engine hood, or disconnect and reconnect the battery terminals.

DOOR LOCK CONTROL SYSTEM

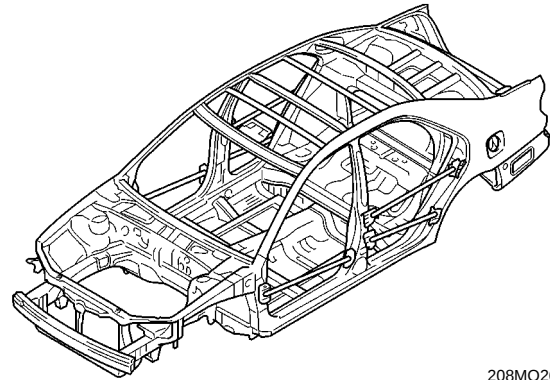
- The door lock control system has been adopted on the all model as standard equipment.
- When the shift lever in the P position is changed to any other position, all the doors automatically locked once.
- If there is a collision which would trigger deployment of the airbags, the locked doors are released to aid rescue of the occupants.

BODY

- Lightweight and highly rigid body
- Low-vibration and low-noise body
- Excellent aerodynamics

HIGHLY RIGID & LIGHTWEIGHT BODY

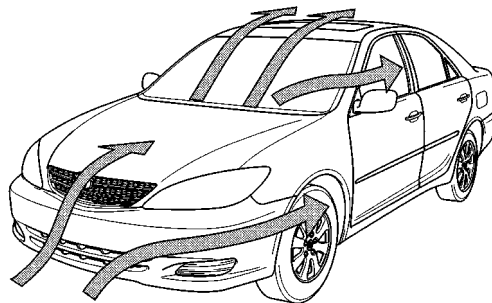
- A strong cabin has been achieved by optimizing the body reinforcements and reducing their weight.
- The vibration resistance of the body has been improved by increasing the rigidity of various areas.



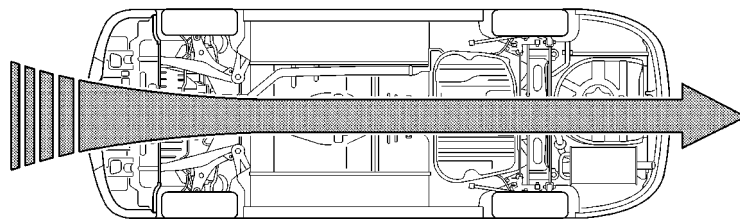
208MO26

AERODYNAMICS

- The shape of the body exterior has been optimized to improve its aerodynamics.
- The height offset of the glass, pillars, and the roof has been minimized to reduce wind noise and improve aerodynamics.
- A flat under floor layout with an optimized shape has been adopted to ensure smooth airflow and excellent aerodynamics.



208MO27



208MO25

SAFETY

- Energy-absorbing body
- Comprehensive passive safety equipment

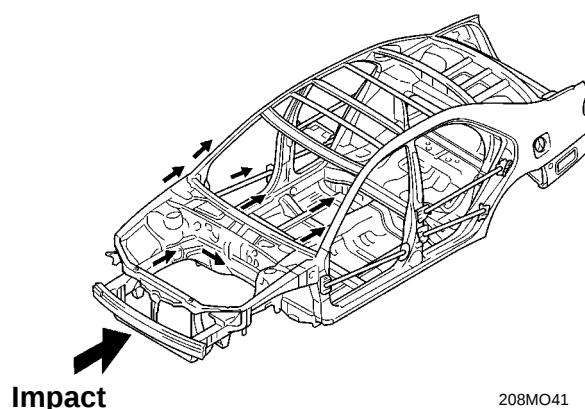
PASSIVE SAFETY EQUIPMENT

■ IMPACT-ABSORBING BODY

- High-level passive safety performance has been achieved through an excellent body construction that preserves the cabin space.

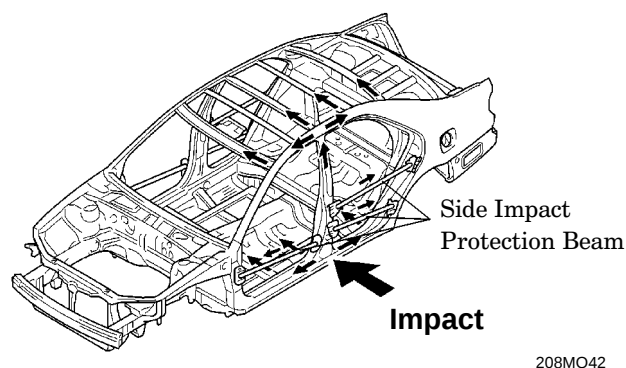
Front Impact-absorbing Body

- Through the use of a crash-safety body design, the impact of a collision can be effectively absorbed and dissipated to achieve excellent safety of the occupants.
- The front side members have been designed to collapse, starting from their front ends, to effectively absorb and dissipate the impact of a collision.



Side Impact-absorbing Body

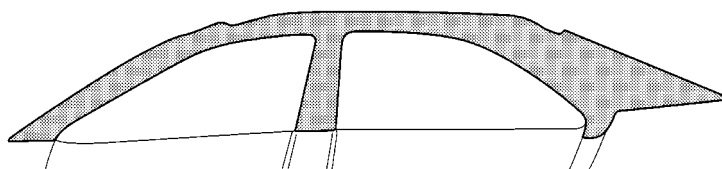
- Side impact beams have been optimally located to ensure safety during a collision.
- Side cross members have been optimally located to achieve excellent safety during a side collision.



■ HEAD IMPACT PROTECTION STRUCTURE

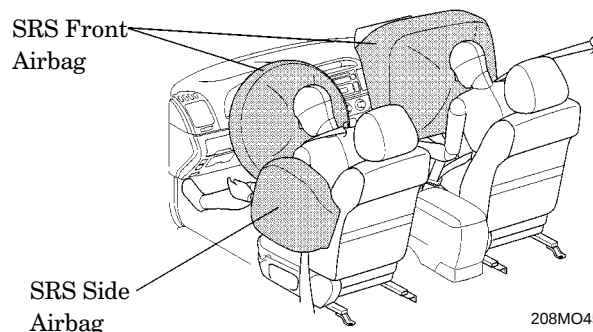
- An energy-absorbing construction has been provided in the interior garnishes to help minimize injury to the heads of the occupants in case secondary impact of the occupants against the cabin interior occurs during a collision.

 : Head Impact Protection Structure

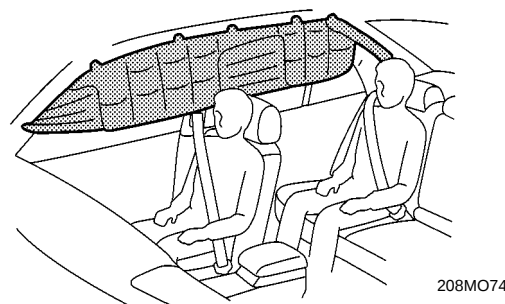


■ SRS AIRBAG

- SRS Airbags for the driver's and front passenger seats are provided as standard equipment on all models.
- The driver and front passenger airbags are provided with a function to control the deployment pressure of the airbags in two steps, depending on the extent of the frontal impact collision. Furthermore, the deployment pressure of the driver airbag is controlled in two steps, depending on the position of the driver seat.
- SRS curtain-shield airbags for the front and rear seats and SRS side airbags are available as an option. In the event of a side collision, the curtain-shield airbags function to support the seat belts in help reduce the impact to the head of the driver and passengers.



SRS Front Airbag and Side Airbag

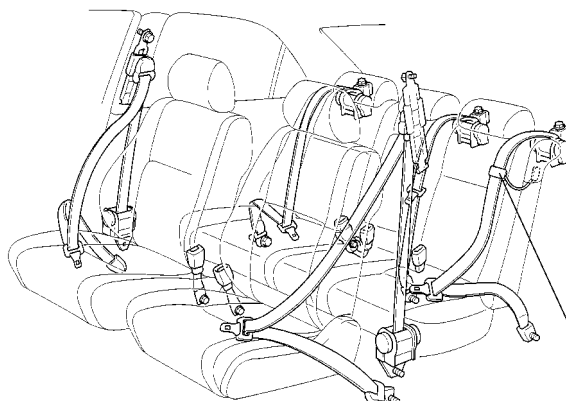


SRS Curtain-Shield Airbag

■ SEAT BELT

- For the front seats, seat belts with a pretensioner mechanism and a force limiter mechanism are provided as standard equipment. These mechanisms enhance the occupant restraining performance of the seat belts and dampen the impact that is applied to the occupants' chest areas.
- Adjustable shoulder-belt anchors, which can be vertically adjusted in 5 steps, are used for the front seats. They ensure comfort when the seat belts are fastened.
- Seat belt comfort guides are used for the outer rear seats to ensure comfort when occupants with a small stature are fastening the seat belts.
- A system in which the inner buckles for the rear seat belts are buried flush with the seat surface is used to soften the feel to the occupants' hips.

Items	Driver's Seat	Front Passenger's Seat	Outer Rear Seats	Center Rear Seat
Pretensioner + Force Limiter	STD	STD	—	—
ELR (Emergency Locking Retractor)	STD	STD	STD	STD
ALR (Automatic Locking Retractor)	—	STD	STD	STD
Adjustable Shoulder Belt Anchor	STD	STD	—	—
Seat Belt Comfort Guide	—	—	STD	—



Seat Belt Comfort Guide

209MO38

ACTIVE SAFETY EQUIPMENT

Comprehensive passive safety equipment has been provided to help ensure safety. The systems listed below are provided, depending on the grade.

Engine Type Grade System	2AZ-FE			1MZ-FE		
	LE	XLE	SE	LE	XLE	SE
ABS with EBD	OPT	STD	OPT	STD		
ABS with EBD & Brake Assist & TRAC & VSC	—			OPT		

■ ABS with EBD

- The ABS (Anti-lock Brake System), which prevents the wheels from locking during emergency braking, and thus helps to maintain the vehicle posture and steering performance, is used on the Camry. In addition, the EBD (Electronic Brake force Distribution), which uses the ABS hydraulic control unit to properly distribute the braking force between the front and rear wheels in accordance with driving conditions, is provided as a set with the ABS. The EBD also controls the braking forces of the right and left wheels, thus helping to maintain the vehicle posture during braking while cornering. These functions ensure excellent braking performance.

■ TRAC SYSTEM

- The TRAC (Traction Control) system is provided to help ensure the proper drive force and to help achieve excellent straightline and cornering performance on slippery roads.

■ VSC SYSTEM

- If the vehicle's equilibrium is disrupted due to a hazard avoidance maneuver taken by the driver, the VSC (Vehicle Skid Control) system controls the yaw moment by effecting engine output control and brake control, which helps the vehicle to maintain its proper posture.

■ BRAKE ASSIST

- When the driver suddenly applies the brakes, the Brake Assist system determines this action to be an emergency stop and provides a more powerful braking force to assist drivers who cannot depress the brake pedal firmly. Apart from sudden braking, there are other situations in which the Brake Assist system becomes useful. For example, if the vehicle is fully loaded, it may require a stronger braking force to stop, in which case the Brake Assist system can provide a more powerful brake force.

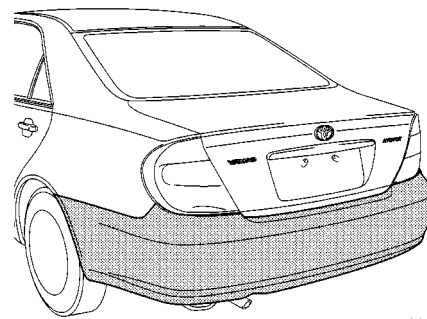
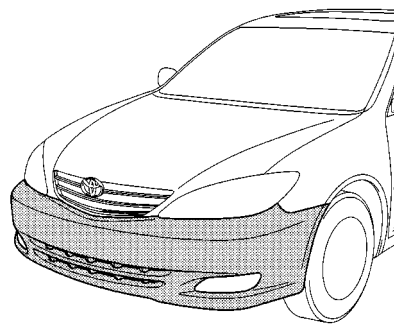
ENVIRONMENT

Earth-friendly automobile manufacturing to protect the environment

RECYCLABLE PARTS

- TSOP (Toyota Super Olefin Polymer) is used in the front and rear bumpers and pillar garnishes to improve their recyclability.
- Recycled bumper material is used in the side trims of the luggage compartment.
- The luggage compartment mat uses 40% recycled PP (polypropylene) to promote the recycling of materials.

 : Parts adopted TSOP

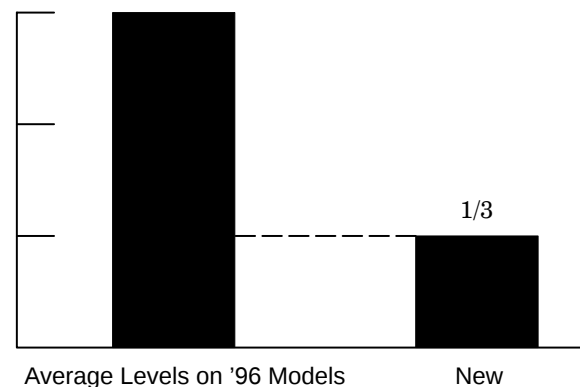


208MO05

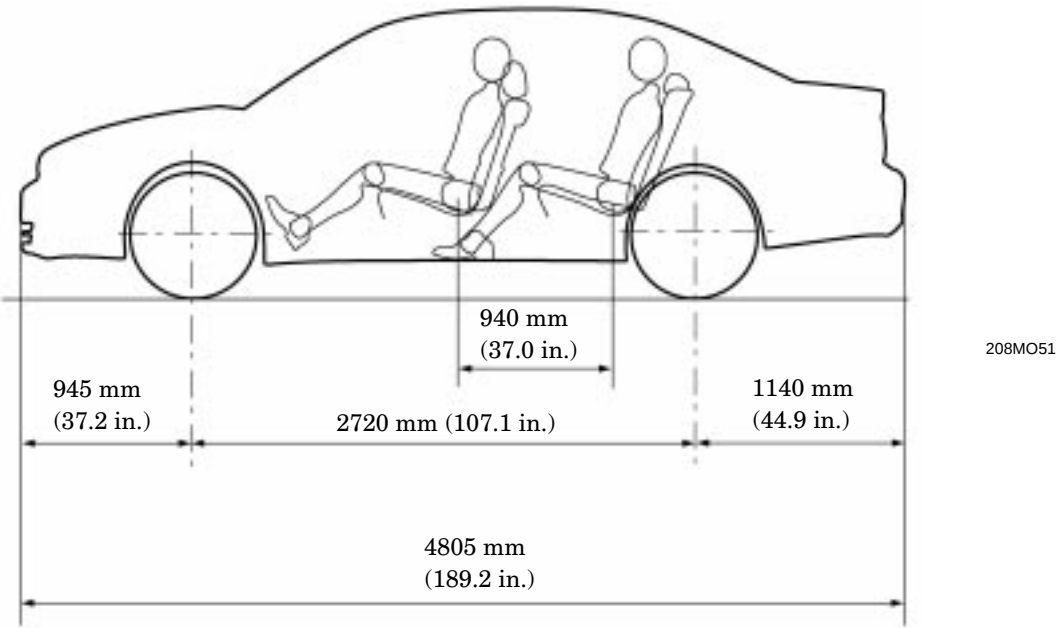
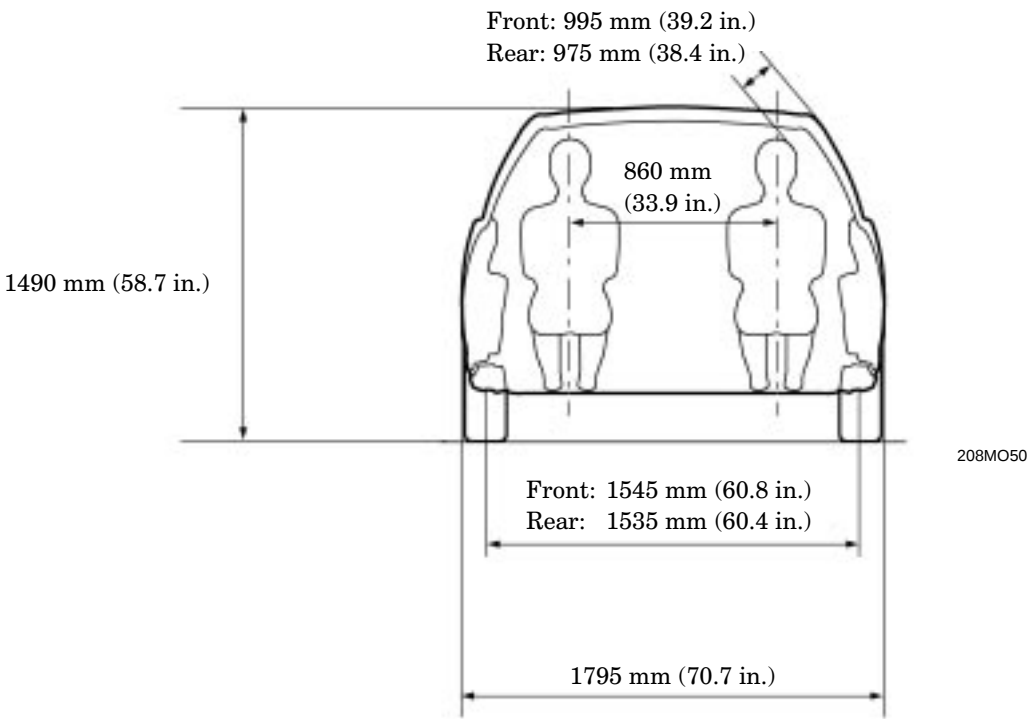
LEAD REDUCTION

To address environmental concerns, Toyota has reduced the amount of lead used in its vehicles and promotes the development of lead-free parts. On the '02 Camry, the parts listed below are either lead-free or their use of lead has been significantly reduced. Thus, the amount of lead that is used has been reduced to approximately 1/3 of the 1996 average.

- Lead-Free Electrode position Paint
- Reduced Lead in Power Steering Pipes
- Front Axle Hub
- Balance Weights for Disc Wheel (TMC production only)



DIMENSION



EQUIPMENT LIST

GRADE			LE		XLE		SE	
ENGINE TYPE			2AZ-FE	1MZ-FE	2AZ-FE	1MZ-FE	2AZ-FE	1MZ-FE
EXTERIOR	Headlight	4-Beam Halogen	STD		STD		STD	
		Automatic Light Control System	STD		STD		STD	
	Daytime Running Light		STD		STD		STD	
	Windshield Glass	Green w/ Dark Shade	STD		—		STD	
		Green w/ Dark Shade + for EC mirror	OPT		STD		OPT	
	Rear Spoiler		—		—		STD	
	Moon Roof		OPT		OPT		OPT	
INTERIOR	Multi-Information Display		—		STD		—	
	Steering Wheel	4-Spoke Urethane	STD		STD		—	
		4-Spoke Leather-Wrapped	—		OPT		—	
		3-Spoke Leather-Wrapped	—		—		STD	
	Manual Tilt Steering Column		STD		STD		STD	
	SRS Airbag	Driver Seat, Front Passenger Seat	STD		STD		STD	
		Side, Curtain Shield	OPT		OPT		OPT	
	Parking Brake	Center Lever Type	STD		—		STD	
		Foot Pedal Type	—		STD		—	
	Console Box	Front	STD		STD		STD	
		Rear (two-layer)	STD		STD		STD	
	Power Front Seat	Driver Seat Only	OPT		STD		OPT	
		Driver Seat, Front Passenger Seat	—		OPT		—	
	Rear Foldable 40/60 Split Seats		STD		STD		STD	

GRADE			LE		XLE		SE		
ENGINE TYPE			2AZ- FE	1MZ- FE	2AZ- FE	1MZ- FE	2AZ- FE	1MZ- FE	
INTERIOR	Seat Cover		Fabric	STD		STD		OPT	
			Leather	—		OPT		—	
	Seat Heater		Driver Seat, Front Passenger Seat	—		OPT		OPT	
	Seat Belt	Front	Pretensioner + Force Limiter Driver Seat: ELR Front Passenger Seat: ELR/ALR	STD		STD		STD	
		Rear	ELR/ALR	STD		STD		STD	
	Audio System	AM/FM/Cassette/CD/6-Speaker		STD		—		STD	
		AM/FM/Cassette/CD/6-Speaker (1.4 cm Tweeter Enclosed in Rear Side Speaker)		OPT		STD		OPT	
		AM/FM/Cassette/In-dash 6-CD changer/ 6-Speaker (1.4 cm Tweeter Enclosed in Rear Side Speaker)		OPT		OPT		OPT	
	EMV & Navigation System			—		OPT		OPT	
	Inside Rear view Mirror		EC (electrochromic), glare-resistant mirror with Compass	OPT		STD		OPT	
			Manual glare-resistant mirror	STD		—		STD	
	Garage Door Opener			OPT		STD		OPT	
	Ashtray			OPT		OPT		OPT	
CHASSIS	ABS with EBD		OPT	STD	STD	STD	OPT	STD	
	VSC & TRAC & Brake Assist		—	OPT	—	OPT	—	OPT	
	Tire & Disc Wheel	P205/65R15 AS 6.5JJ Steel		STD		—		—	
		P205/65R15 SM 6.5JJ Steel		OPT		—		—	
		P215/60R16 AS 6.5JJ Steel		—		STD		OPT	
		P215/60R16 SM 6.5JJ Steel		—		OPT		STD	
		P205/65R15 AS 6.5JJ Aluminum		OPT* ¹		—		—	
		P205/65R15 SM 6.5JJ Aluminum		OPT* ¹		—		—	
		P215/60R16 AS 6.5JJ Aluminum		—		OPT		OPT	
		P215/60R16 SM 6.5JJ Aluminum		—		OPT		OPT	

*¹: Produced TMMK

GRADE		LE		XLE		SE	
ENGINE TYPE		2AZ- FE	1MZ- FE	2AZ- FE	1MZ- FE	2AZ- FE	1MZ- FE
BODY ELECTRICAL	Power Window System		STD	STD	STD	STD	STD
	Power Door Lock Control System		STD	STD	STD	STD	STD
	Wireless Door Lock Control System		OPT	STD	STD	OPT	OPT
	Cruise Control System	With	STD	STD	STD	STD	STD
		Without	OPT	—	—	—	—
	Air Conditioning	Manual	STD	—	—	STD	STD
		Auto	—	STD	—	—	—
		Clean Air Filter	STD	STD	STD	STD	STD
	Engine Immobiliser System		OPT	STD	STD	OPT	OPT
	Theft Deterrent System		—	STD	STD	—	—

MODEL CODE

ACV30 **L** - **A** **E** **M** **N** **K** **A**
 1 2 3 4 5 6 7 8

1	BASIC MODEL CODE
	ACV30 : With 2AZ-FE Engine MCV30 : With 1MZ-FE Engine

2	STEERING WHEEL POSITION
	L : Left-Hand Drive

3	MODEL NAME
	A : Camry (Produced TMC ^{*1}) C : Camry (Produced TMMK ^{*2})

4	BODY TYPE
	E : 4-Door Sedan

5	GEAR SHIFT TYPE
	M: 5-Speed Manual P : 4-Speed Automatic

6	GRADE
	N : LE G : XLE S : SE

7	ENGINE SPECIFICATION
	K : DOHC and SFI

8	DESTINATION
	A : U.S.A. and Canada

^{*1} TMC: Toyota Motor Corporation

^{*2} TMMK: Toyota Motor Manufacturing, Kentucky, Inc.

This Camry New Car Features Explains the features of Camrys manufactured by TMC. Specifications of Camrys manufactured TMMK are basically the same as those of TMC.

MODEL LINE-UP

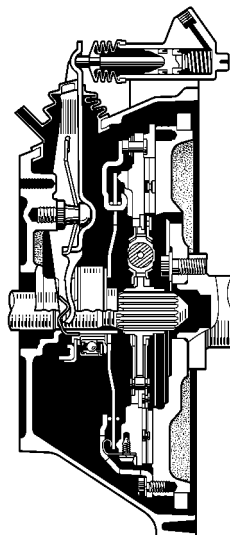
Destination	Engine	Body Type	Grade	Transaxle		
				5-Speed Manual	4-Speed Automatic	
				E351	U241E	U140E
U.S.A. and Canada	2AZ-FE	4-Door Sedan	LE	ACV30L-AEMNKA	ACV30L-AEPNKA ACV30L-CEPNKA	—
			XLE	—	ACV30L-AEPGKA ACV30L-CEPGKA	—
			SE	ACV30L-AEMSKA	ACV30L-AEPSKA ACV30L-CEPSKA	—
	1MZ-FE		LE	—	—	MCV30L-AEPNKA MCV30L-CEPNKA
			XLE	—	—	MCV30L-AEPGKA MCV30L-CEPGKA
			SE	—	—	MCV30L-AEPSKA MCV30L-CEPSKA

CHASSIS

CLUTCH

DESCRIPTION

- A dry type single plate clutch which is operated by hydraulic pressure is used.
- Turnover mechanism, which reduces clutch pedal effort, is used.



181CH01

► Specification ◀

Model		'02 Camry	'01 Camry	
Engine Type		2AZ-FE	5S-FE	1MZ-FE
Clutch	Type	Dry Type Single Plate Clutch Diaphragm Spring	←	←
	Operation	Hydraulic	←	←
Clutch Cover	Type	DST* ¹	←	←
	Size mm (in.)	236 (9.29)	224 (8.82)	236 (9.29)
Clutch Disc	Facing Size* ² mm (in.)	236 × 150 × 3.5 (9.29 × 5.91 × 0.14)	224 × 150 × 3.5 (8.82 × 5.91 × 0.14)	236 × 150 × 3.5 (9.29 × 5.91 × 0.14)
	Facing Area cm ² (in. ²)	260 (40.4)	217 (33.7)	260 (40.4)
Master Cylinder	Type	Conventional	←	←
	Cylinder Dia. mm (in.)	15.87 (0.62)	←	←
Release Cylinder	Type	Non-Adjustable	←	←
	Cylinder Dia. mm (in.)	20.64 (0.81)	←	22.2 (0.87)
Clutch Start System		STD	←	←
Clutch Pedal		Turnover	←	←

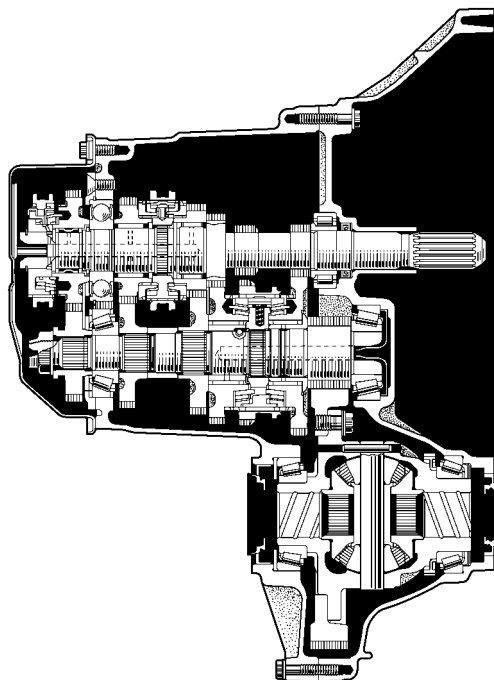
*1: DST (Diaphragm Spring Turnover)

*2: Outer Diameter × Inner Diameter × Thickness

E351 MANUAL TRANSAXLE

DESCRIPTION

- The 2AZ-FE engine model has newly adopted the E351 manual transaxle.
- The basic construction and operation of the E153 manual transaxle are the same as those of the 1MZ-FE engine model for '01 Camry.
However, the gear ratio has been changed to accommodate the characteristics of the engine.



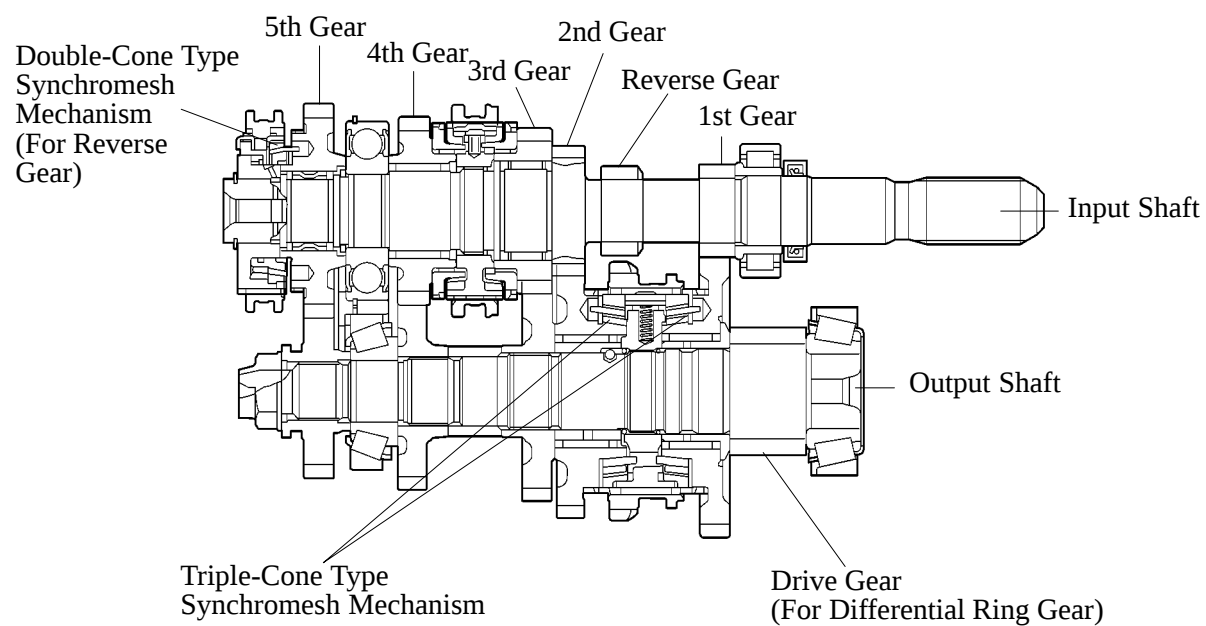
181CH04

► Specification ◀

Model		'02 Camry	'01 Camry	
Transaxle Type		E351	S51	E153
Engine Type		2AZ-FE	5S-FE	1MZ-FE
Gear Ratio	1st	3.538	←	3.230
	2nd	2.045	1.960	1.913
	3rd	1.333	1.250	1.258
	4th	0.972	0.945	0.918
	5th	0.731	←	←
	Reverse	3.583	3.153	3.545
Differential Gear Ratio		3.944	←	3.933
Oil Capacity Liters (US qts, Imp. qts)		2.5 (2.6, 2.2)	2.6 (2.7, 2.3)	4.2 (4.4, 3.7)
Oil Viscosity		SAE 75W-90	←	←
Oil Grade		API, GL-4 or GL-5	←	←
Dry Weight	kg (lb)	Approx. 44 (97)	Approx. 41 (90.4)	Approx. 50.5 (121)

■ TRANSMISSION GEAR

- A triple-cone type synchronmesh mechanism is used in the 1st gear and 2nd gear to increase the synchronizer capacity. This helps to reduce the shifting effort and provides smoother shifting.
- A double-cone type synchronmesh mechanism is used in the reverse gear to suppress gear engagement.

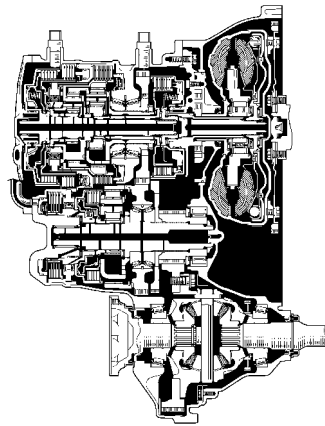


181CH05

U140E AND U241E AUTOMATIC TRANSAXLE

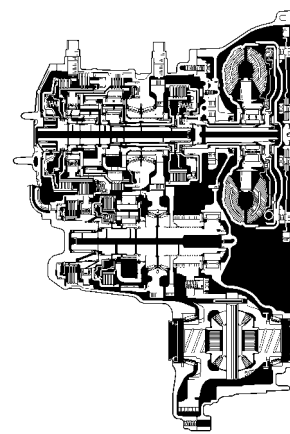
DESCRIPTION

- The '02 Camry line-up uses the following types of automatic transaxles:
2AZ-FE × U241E
1MZ-FE × U140E
- These automatic transaxles are compact and high-capacity 4-speed Super ECT (Electronically Controlled Transaxle).
- The basic construction and operation of these automatic transaxles are the same.
However, the gear ratio, disc, and spring number have been changed to accommodate the characteristic of the engine.



U140E

161ES20



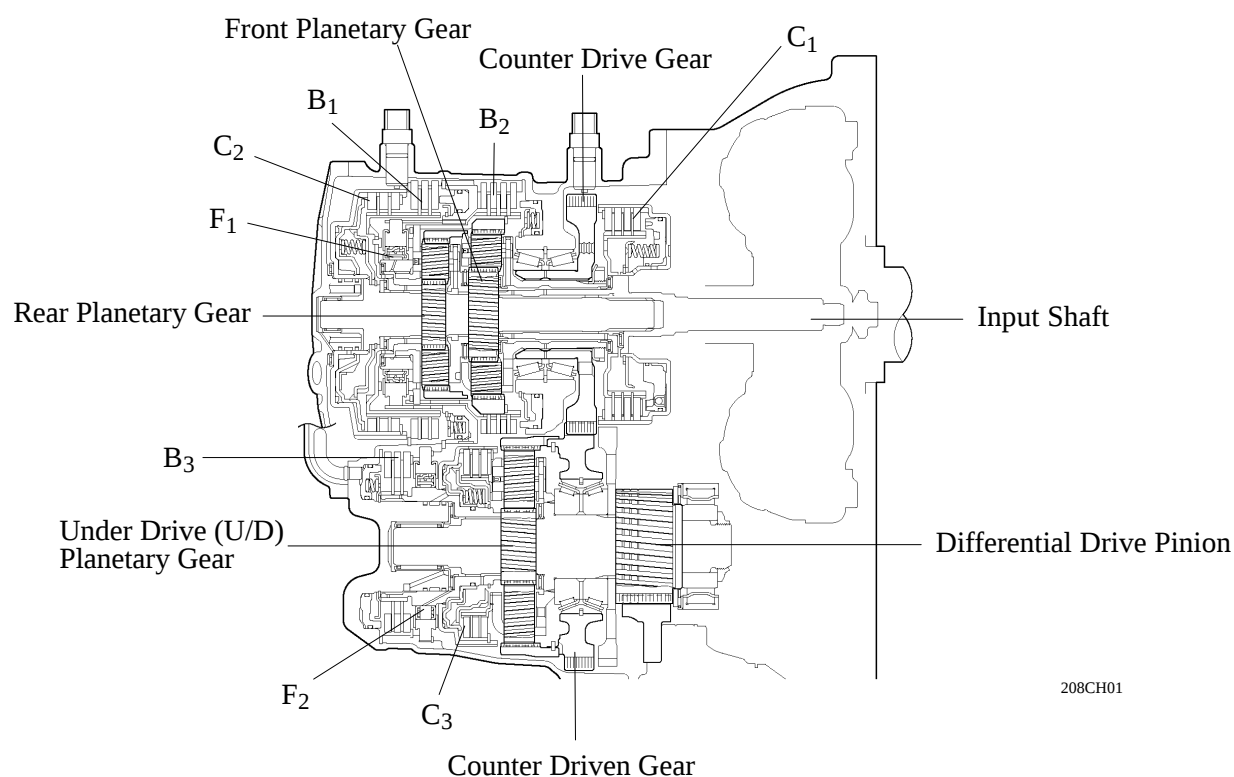
U241E

181CH09

Specification

Model		'02 Camry		'01 Camry	
Transaxle Type		U140E	U241E	A140E	A541E
Engine Type		1MZ-FE	2AZ-FE	5S-FE	1MZ-FE
Gear Ratio	1st	3.938* ¹	3.943* ¹	2.810	←
	2nd	2.194* ¹	2.197* ¹	1.549	←
	3rd	1.411* ¹	1.413* ¹	1.000	←
	4th	1.019* ¹	1.020* ¹	0.706	0.735
	Reverse	3.141* ¹	3.145* ¹	2.296	←
Counter Gear Ratio		1.019	1.020	0.945	←
Differential Gear Ratio		2.814	2.740	3.944	3.933
Fluid Capacity Liters (US qts, Imp. qts)		8.6 (9.1, 7.7)* ²	←	5.6 (5.9, 4.9)* ³ 1.6 (1.7, 1.4)* ⁴	6.8 (7.2, 5.9)* ³ 0.9 (0.9, 0.8)* ⁴
Fluid Type		ATF Type T-IV	←	ATF D-II or DEXRON®III (DEXRON®II)	←
Dry Weight kg (lb)		91 (200.6)	82 (180.8)	73 (160.9)	83.3 (183.6)

*¹: Counter Gear Ratio Included*²: Differential Included*³: Only for Transmission*⁴: Only for Differential



► Specification ◀

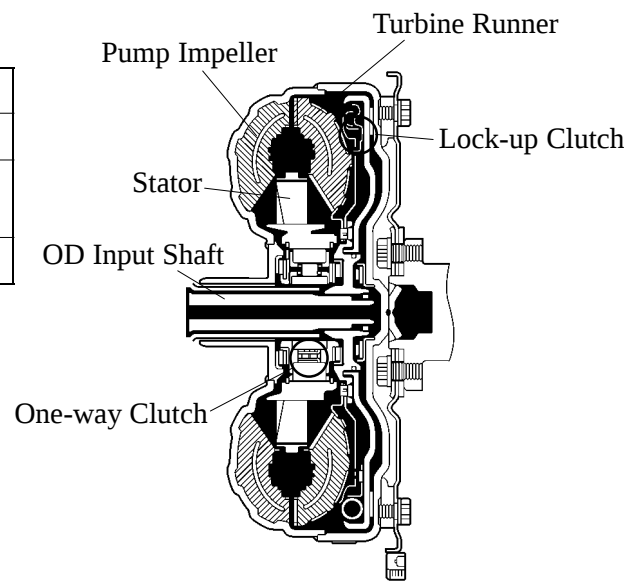
Transaxle Type			U140E	U241E
C ₁	Forward Clutch	The No. of Discs	6	5
C ₂	Direct Clutch		4	3
C ₃	U/D Direct Clutch		4	3
B ₁	2nd Brake		4	3
B ₂	1st & Reverse Brake		7	5
B ₃	U/D Brake		4	3
F ₁	No. 1 One-Way Clutch	The No. of Sprags	28	←
F ₂	U/D One-Way Clutch		24	15
Front Planetary Gear	The No. of Sun Gear Teeth		43	←
	The No. of Pinion Gear Teeth		17	←
	The No. of Ring Gear Teeth		77	←
Rear Planetary Gear	The No. of Sun Gear Teeth		31	←
	The No. of Pinion Gear Teeth		19	←
	The No. of Ring Gear Teeth		69	←
U/D Planetary Gear	The No. of Sun Gear Teeth		35	32
	The No. of Pinion Gear Teeth		28	26
	The No. of Ring Gear Teeth		91	83
Counter Gear	The No. of Drive Gear Teeth		52	50
	The No. of Driven Gear Teeth		53	51

■ TORQUE CONVERTER

- These torque converters have optimally designed fluid passages and impeller configuration resulting in substantially enhanced transmission efficiency to ensure better starting, acceleration and fuel economy.
- Furthermore, a hydraulically operated lock-up mechanism which cuts power transmission losses due to slippage at medium and high speeds is used.
- The basic construction and operation are the same as for the A541E for the previous models.

► Specification ◀

Engine Type	1MZ-FE	2AZ-FE
Transaxle Type	U140E	U241E
Torque Converter Type	3-Element, 1-Step, 2-Phase (with Lock-up Mechanism)	
Stall Torque Ratio	1.8	2.0



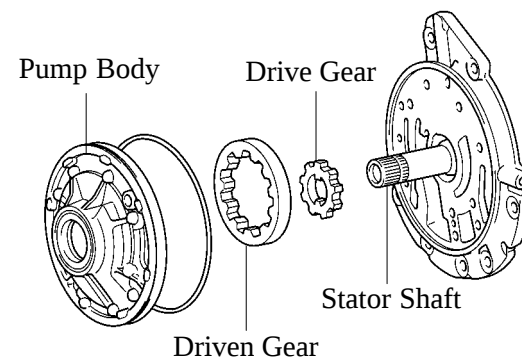
208CH02

■ OIL PUMP

The oil pump is combined with torque converter, lubricates the planetary gear units and supplies operating pressure to the hydraulic control.

► Specification ◀

Gear	Gear Teeth
Drive Gear	9
Driven Gear	10

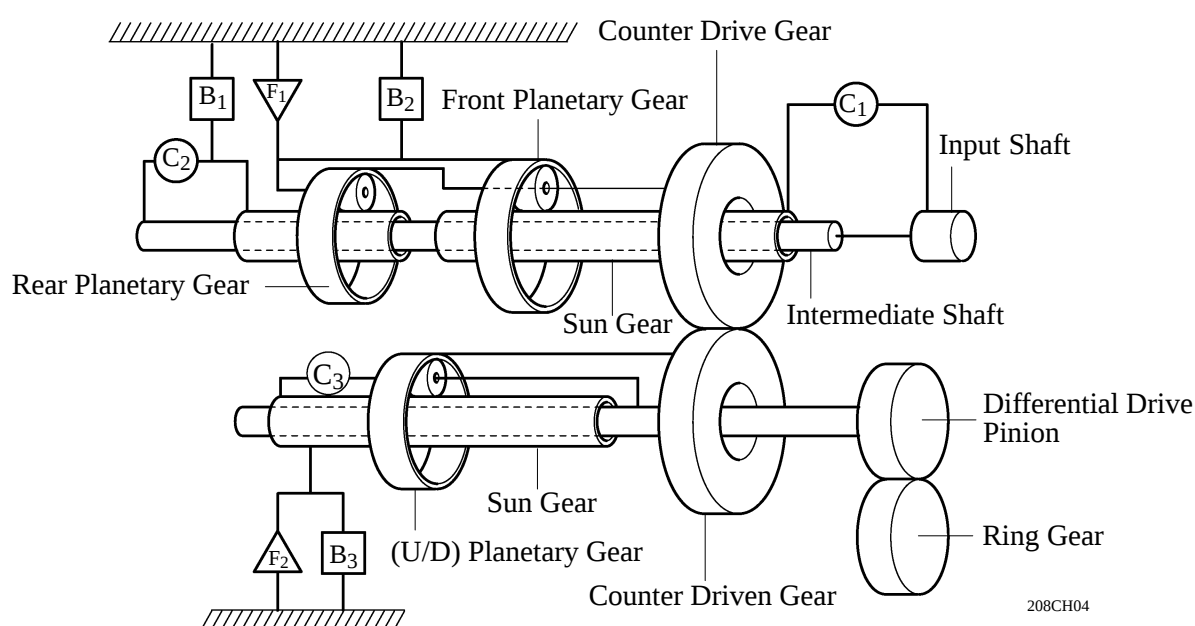


208CH03

■ PLANETARY GEAR UNIT

1. Construction

- The counter drive and driven gears are placed in front of the front planetary gear and the under drive (U/D) planetary gear unit is placed above the counter shaft. Furthermore, the force transmission method has been changed by eliminating the brake and the one-way clutch. As a result, a torque capacity that accommodates the high output engine has been attained, while realizing a compact gear unit.
- A centrifugal fluid pressure canceling mechanism has been adopted in the C₂ and C₃ clutches that are applied when shifting from 2nd to 3rd and from 3rd to 4th.



208CH04

2. Function of Component

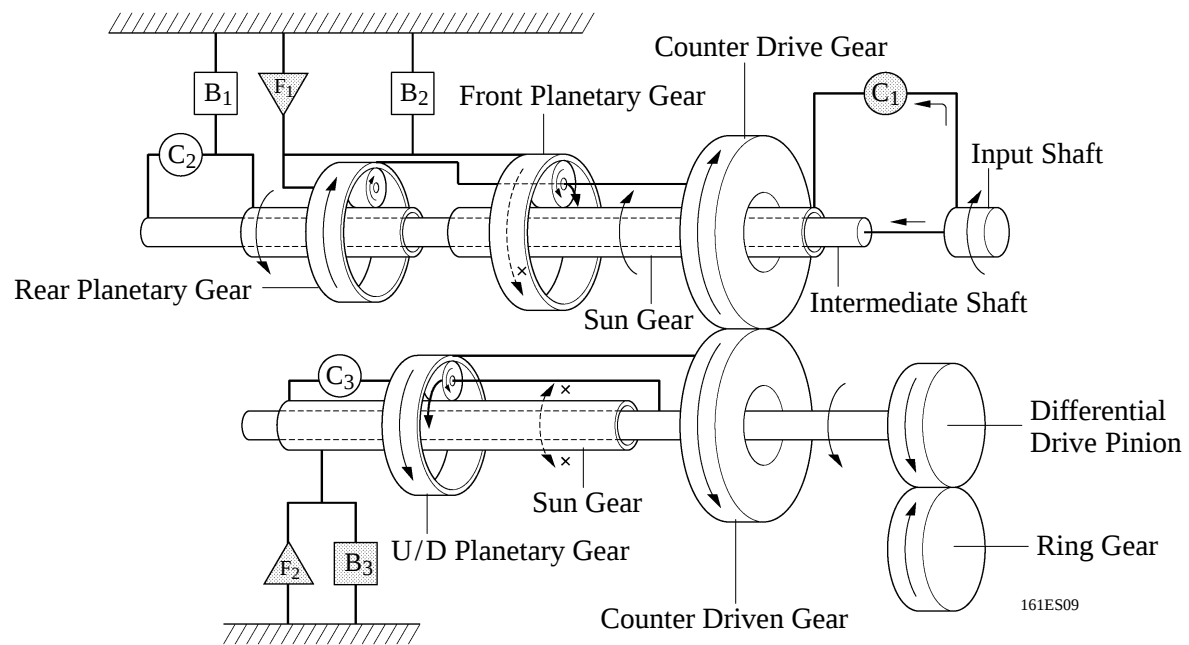
Component		Function
C ₁	Forward Clutch	Connects input shaft and front planetary sun gear.
C ₂	Direct Clutch	Connects input shaft and rear planetary sun gear.
C ₃	U/D Direct Brake	Connects U/D sun gear and U/D planetary carrier.
B ₁	2nd Brake	Prevents rear planetary carrier from turning either clockwise or counterclockwise.
B ₂	1st & Reverse Brake	Prevents rear planetary carrier and front planetary ring gear from turning either clockwise or counterclockwise.
B ₃	U/D Brake	Prevents U/D sun gear from turning either clockwise or counterclockwise.
F ₁	No. 1 One-Way Clutch	Prevents rear planetary carrier from turning counterclockwise.
F ₂	U/D One-Way Clutch	Prevents U/D planetary sun gear from turning clockwise.
Planetary Gears		These gears change the route through which driving force is transmitted, in accordance with the operation of each clutch and brake, in order to increase or reduce the input and output speed.

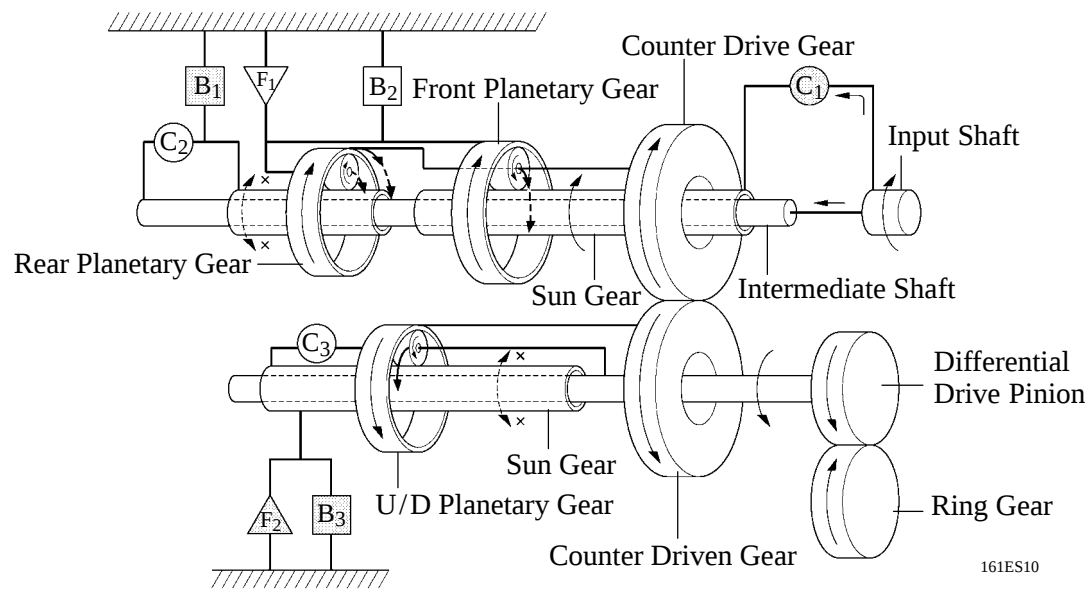
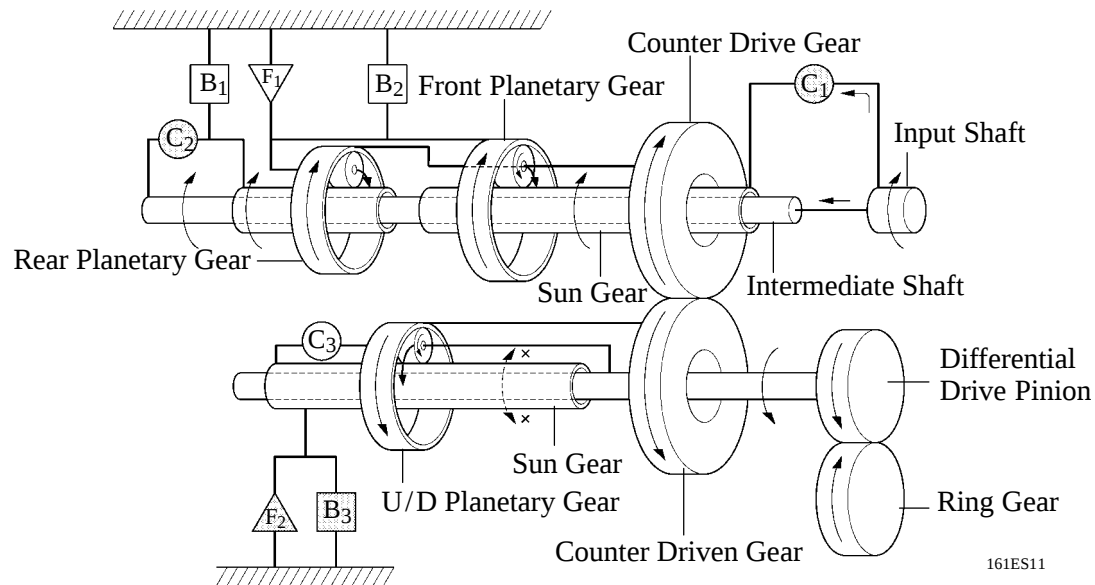
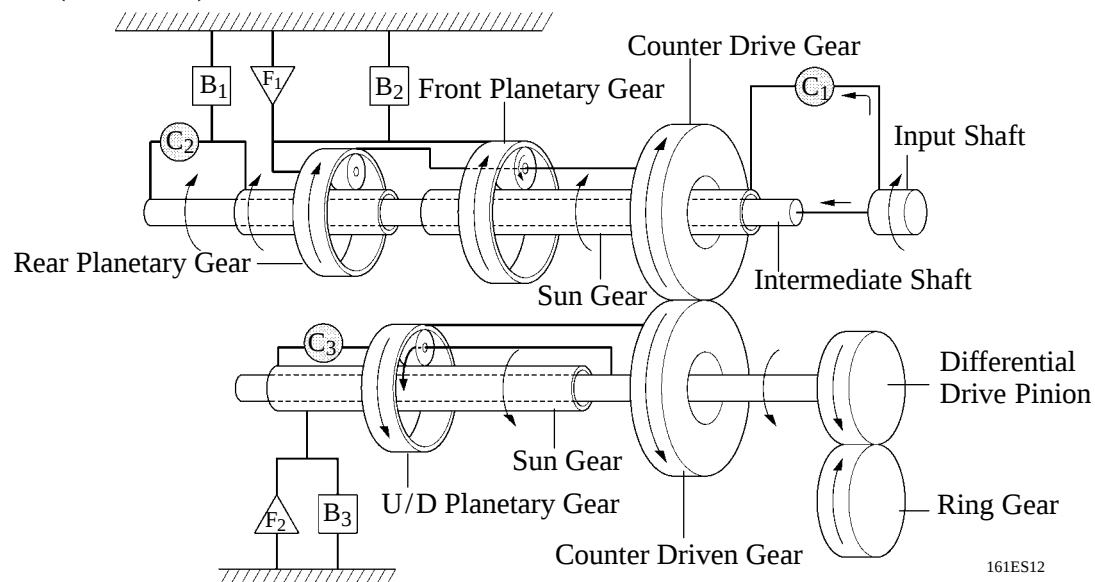
3. Motive Power Transaxle

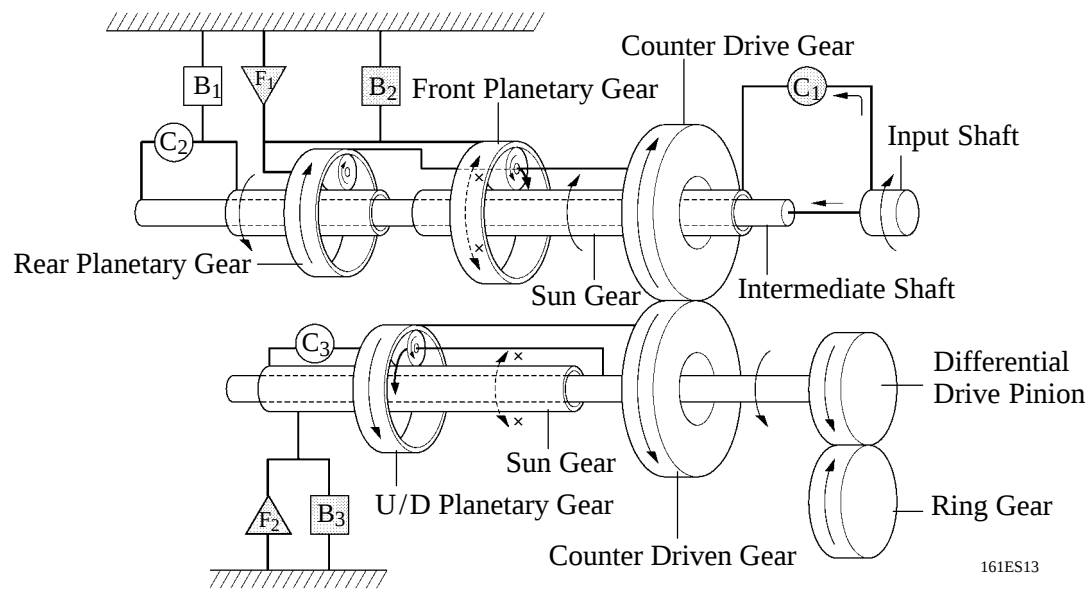
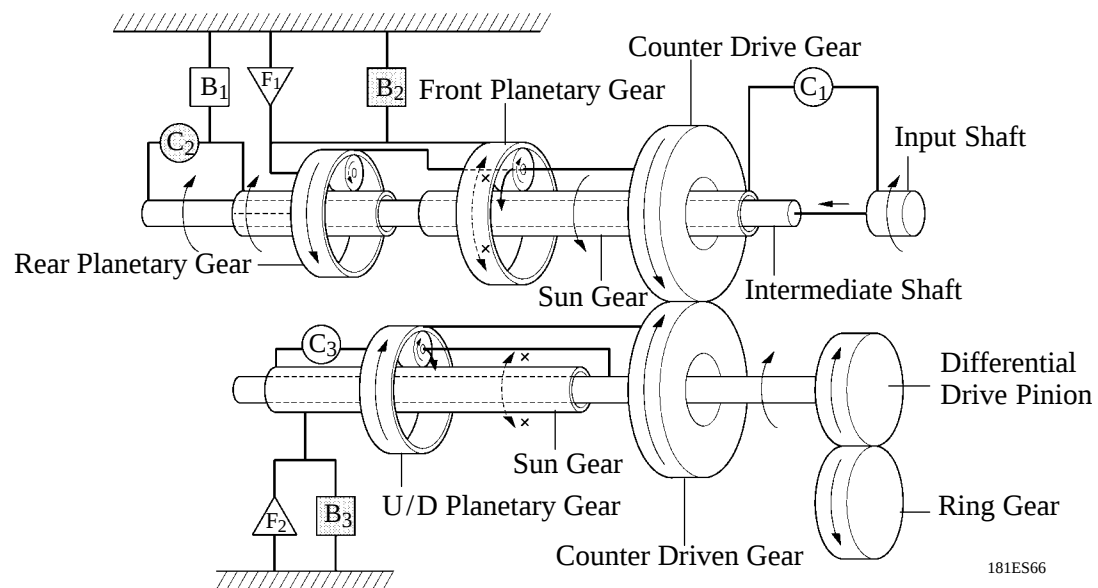
Shift Lever Position	Gear	Solenoid Valve				C ₁	C ₂	C ₃	B ₁	B ₂	B ₃	F ₁	F ₂
		SL1	SL2	S4	DSL								
P	Park	ON	ON	OFF	OFF						○		
R	Reverse	ON	OFF	OFF	OFF		○			○	○		
N	Neutral	ON	ON	OFF	OFF						○		
D	1st	ON	ON	OFF	OFF	○					○	○	○
	2nd	OFF	ON	OFF	OFF	○			○		○		○
	3rd	OFF	OFF	OFF	OFF/ON*	○	○				○		○
	4th	OFF	OFF	ON	OFF/ON*	○	○	○					
2	1st	ON	ON	OFF	OFF	○					○	○	○
	2nd	OFF	ON	OFF	OFF	○			○		○		○
L	1st	ON	ON	OFF	ON	○				○	○	○	○

*: Lock-up ON

1st Gear (D or 2 Position)



2nd Gear (D or 2 Position)**3rd Gear (D Position)****4th Gear (D Position)**

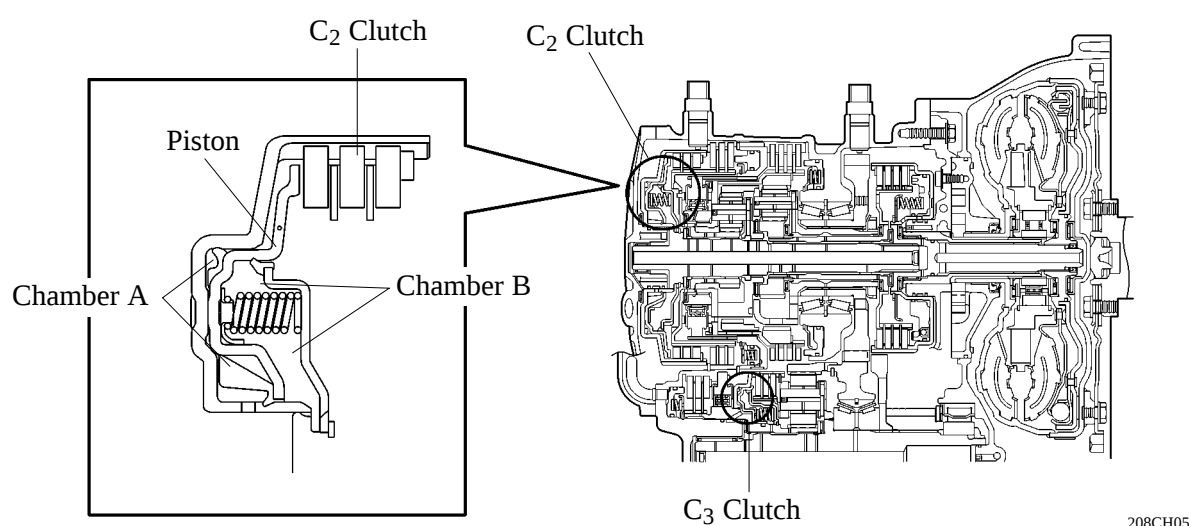
1st Gear (L Position)**Reverse Gear (R Position)**

4. Centrifugal Fluid Pressure Canceling Mechanism

There are two reasons for improving the conventional clutch mechanism:

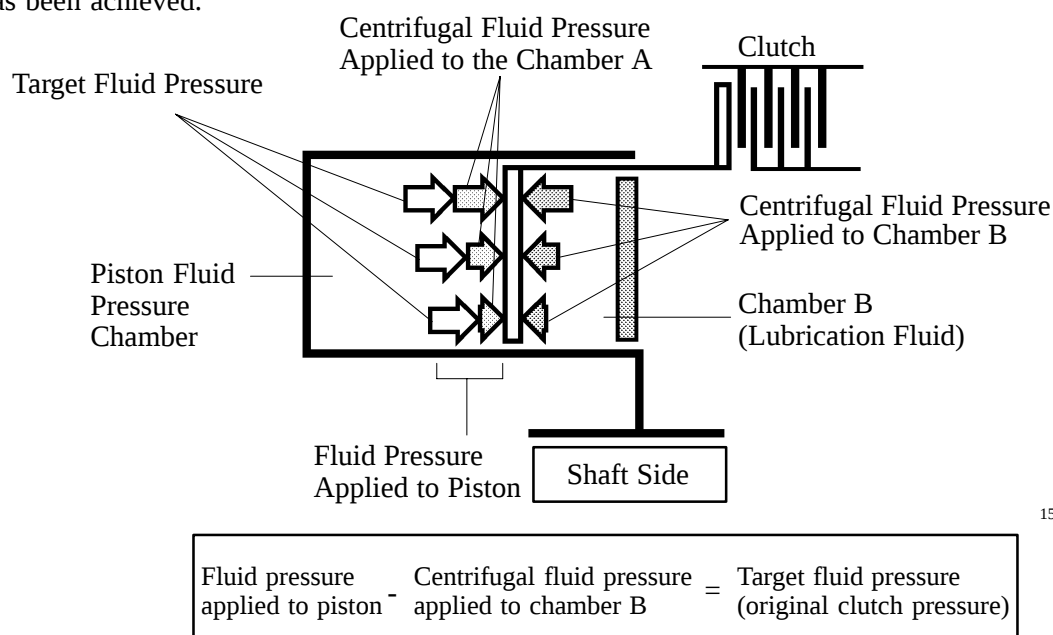
- To prevent the generation of pressure by the centrifugal force that applied to the fluid in piston fluid pressure chamber (hereafter referred to as “chamber A”) when the clutch is released, a check ball is provided to discharge the fluid. Therefore, before the clutch can be subsequently applied, it took time for the fluid to fill the chamber A.
- During shifting, in addition to the original clutch pressure that is controlled by the valve body, the pressure that acts on the fluid in the chamber A also exerts influence, which is dependent upon revolution fluctuations.

To address these two needs for improvement, a canceling fluid pressure chamber (hereafter referred to as “chamber B”) has been provided opposite chamber A.



208CH05

By utilizing the lubrication fluid such as that of the shaft, the same amount of centrifugal force is applied, thus canceling the centrifugal force that is applied to the piston itself. Accordingly, it is not necessary to discharge the fluid through the use of a check ball, and a highly responsive and smooth shifting characteristic has been achieved.



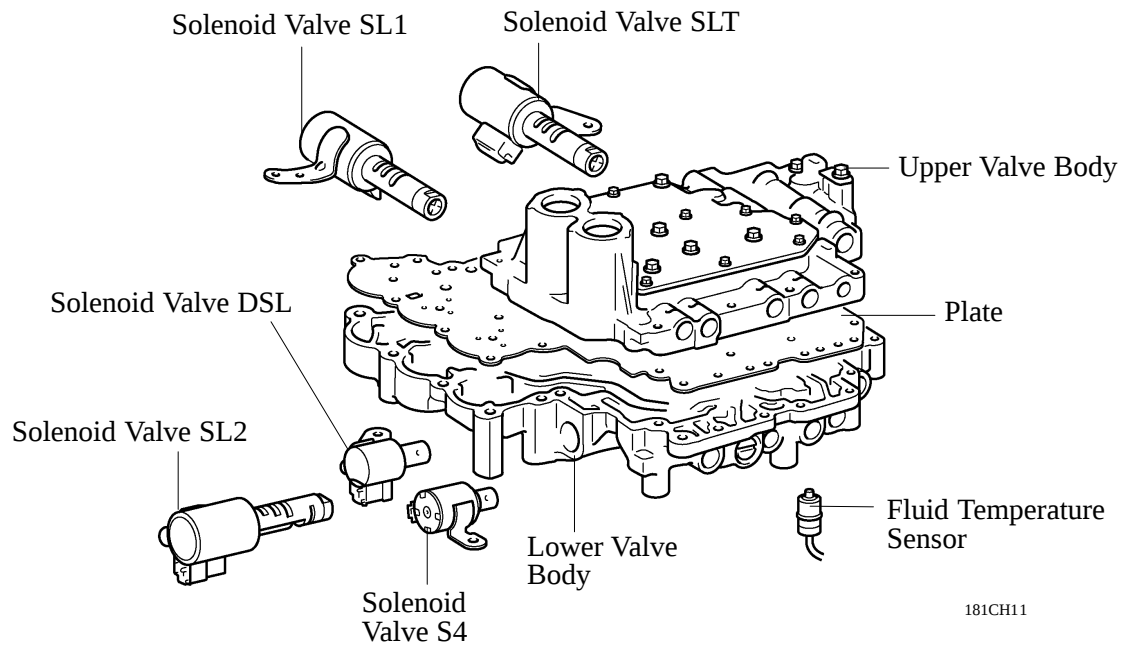
157CH17

■ VALVE BODY UNIT

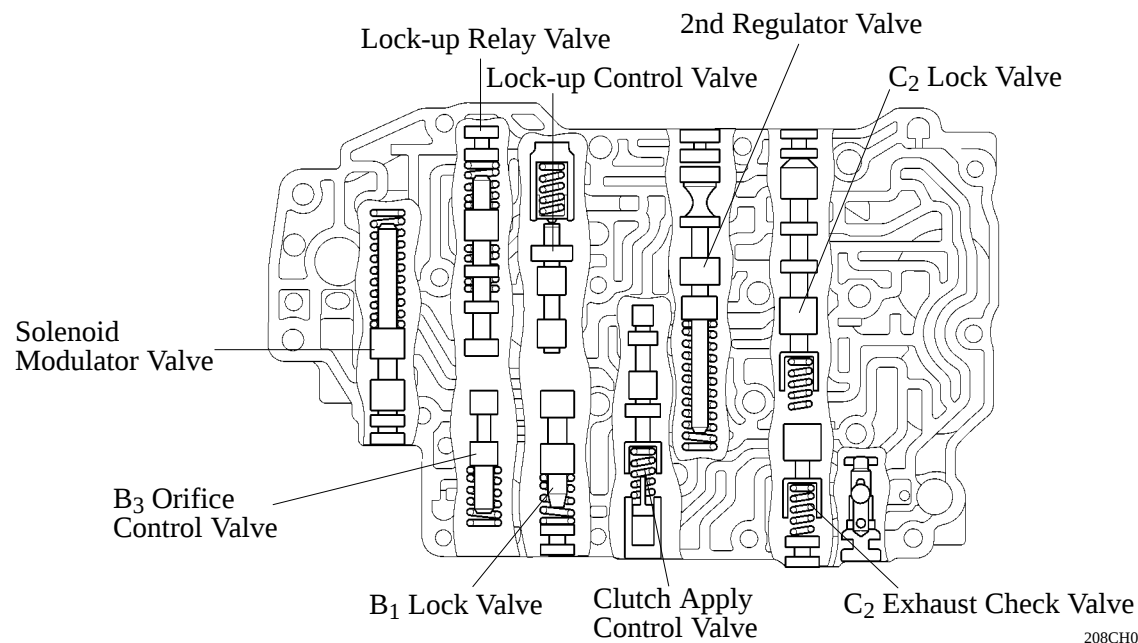
1. General

The valve body consists of the upper and lower valve bodies and 5 solenoid valves.

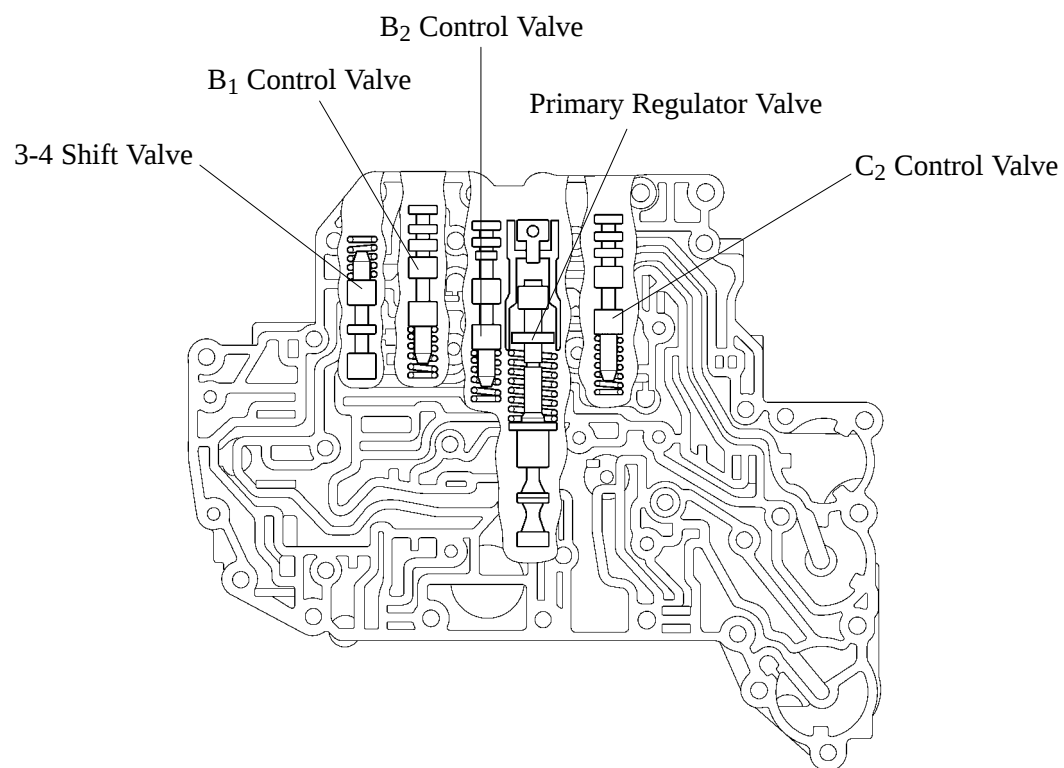
Apply orifice control, which controls the flow volume to the B₃ brake, has been adopted in this unit.



► Upper Valve Body ◀



► Lower Valve Body ◀



208CH07

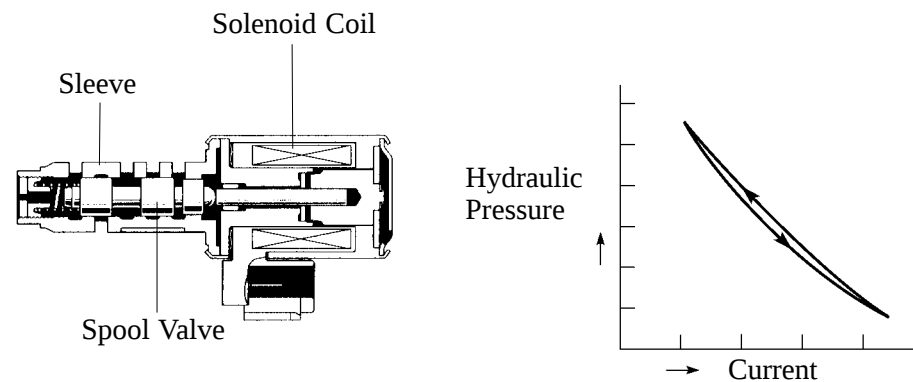
2. Solenoid Valve

Solenoid Valves SL1, SL2, and SLT

1) General

In order to provide a hydraulic pressure that is proportion to current that flows to the solenoid coil, the solenoid valve SL1, SL2, and SLT linearly controls the line pressure and clutch and brake engagement pressure based on the signals it receives from the ECM.

The solenoid valves SL1, SL2, and SLT have the same basic structure.



198CH31

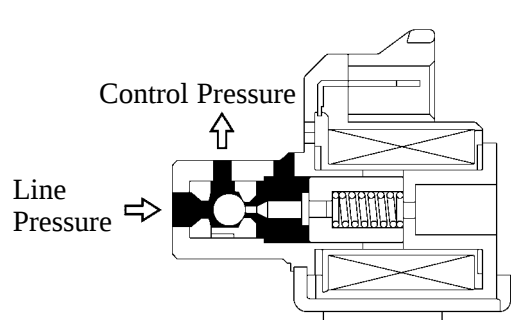
2) Function of Solenoid Valve SL1, SL2, and SLT

Solenoid Valve	Action	Function
SL1	For clutch and brake engagement pressure control	• B ₁ brake pressure control
SL2		• Lock-up clutch pressure control
		C ₂ clutch pressure control
SLT	For line pressure control	• Line pressure control
		• Secondary pressure control

Solenoid Valves S4 and DSL

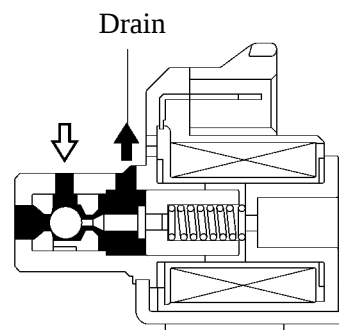
1) General

The solenoid valves S4 and DSL use a three-way solenoid valve.



Solenoid Valve ON

161ES65

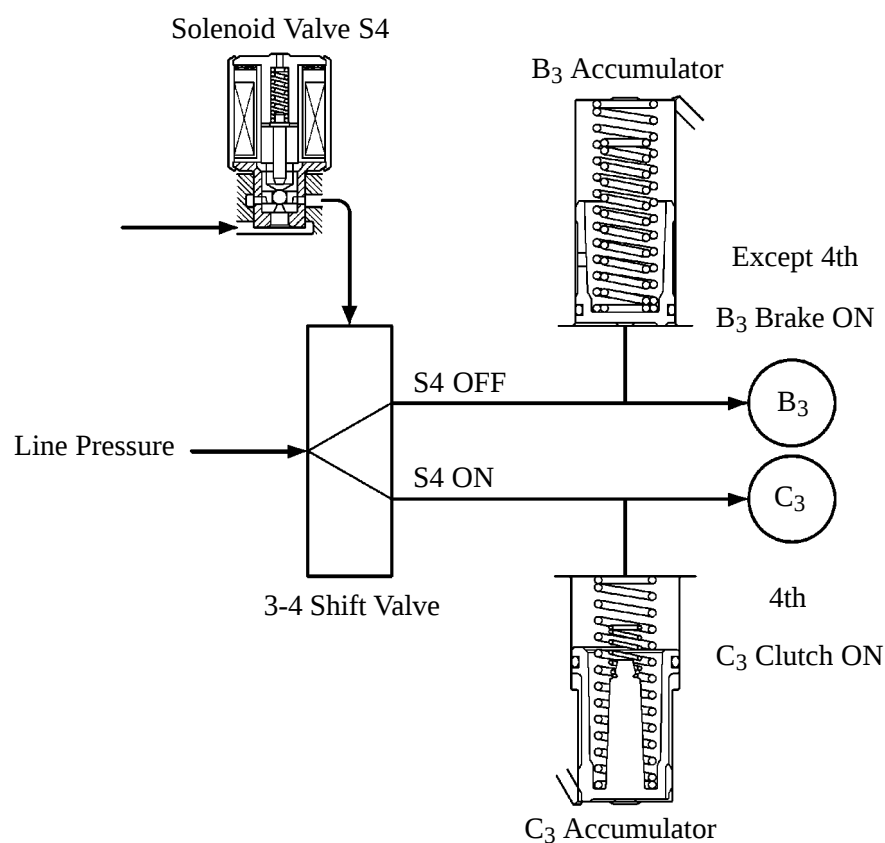


Solenoid Valve OFF

181CH12

2) Function of Solenoid Valve S4

The solenoid valves S4 when set to ON controls the 3-4 shift valve to establish the 4th by changing over the fluid pressure applied to B₃ brake and C₃ clutch.

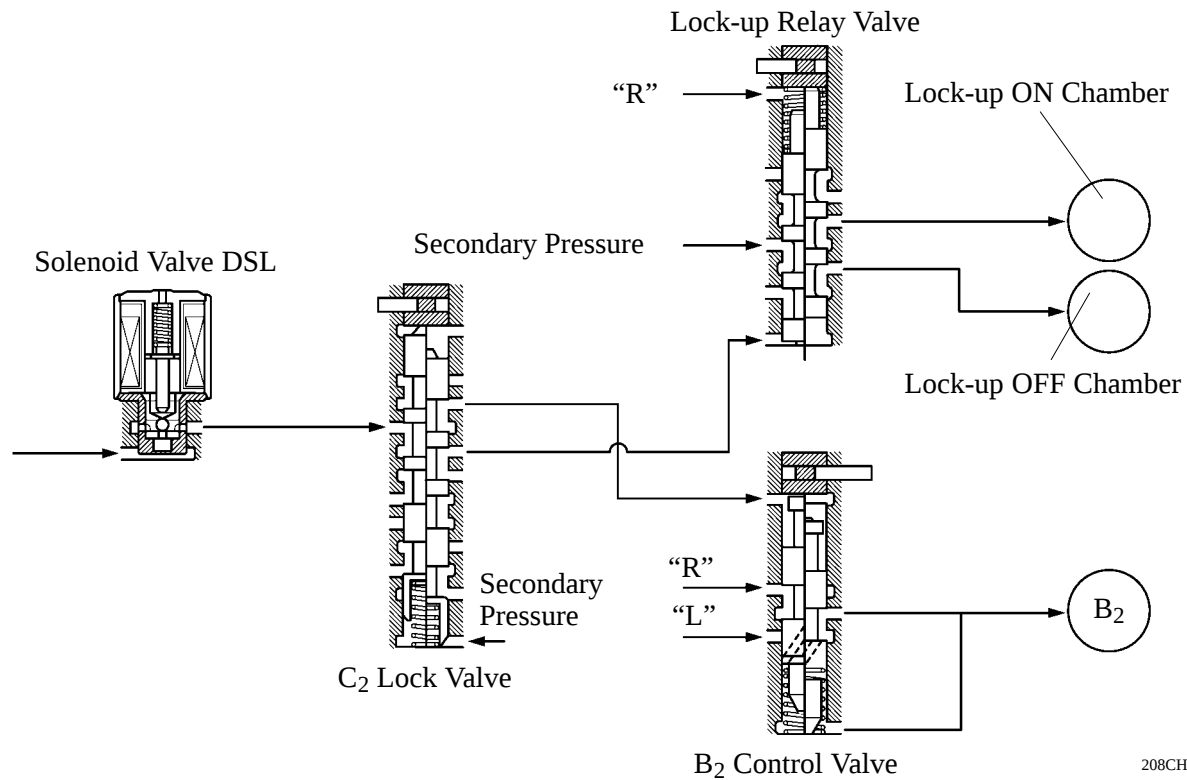


161ES23

3) Function of Solenoid Valve DSL

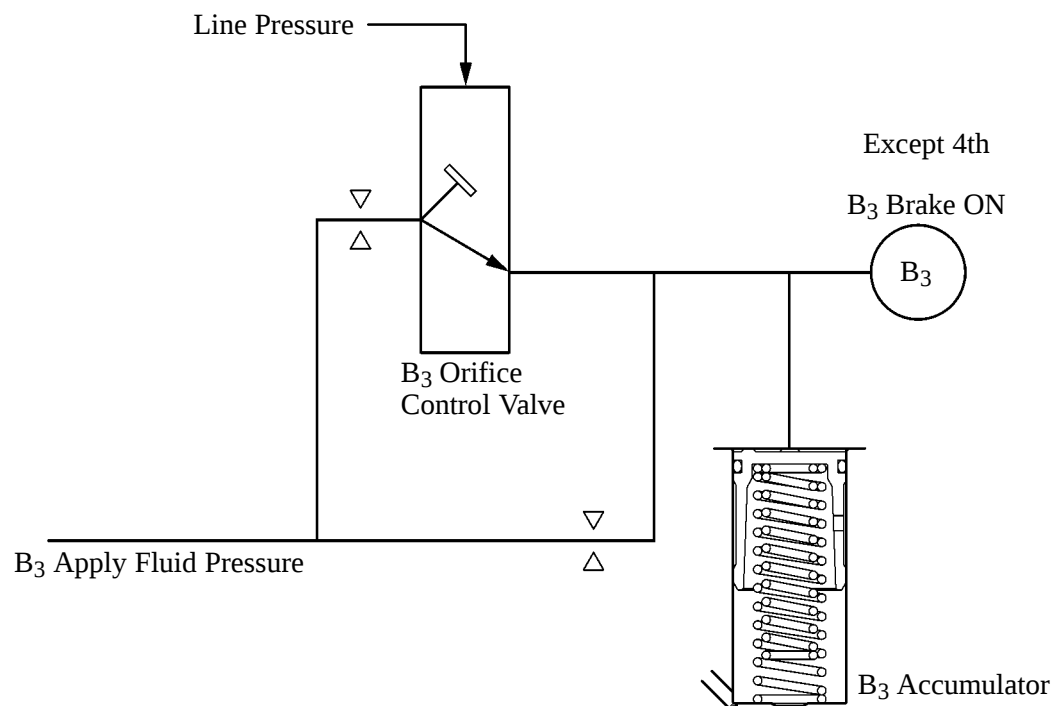
The solenoid valve DSL controls the B₂ control valve via the C₂ lock valve when the transaxle is shifted in the R or L position.

During lock-up, the lock-up relay valve is controlled via the C_2 lock valve.



3. Apply Orifice Control

This control is effected by the B₃ orifice control valve. The B₃ orifice control valve has been provided for the B₃ brake, which is applied when shifting from 4th to 3rd. The B₃ orifice control valve is controlled by the amount of the line pressure in accordance with shifting conditions, and the flow volume of the fluid that is supplied to the B₃ brake is controlled by varying the size of the control valve's apply orifice.



■ ELECTRONIC CONTROL SYSTEM

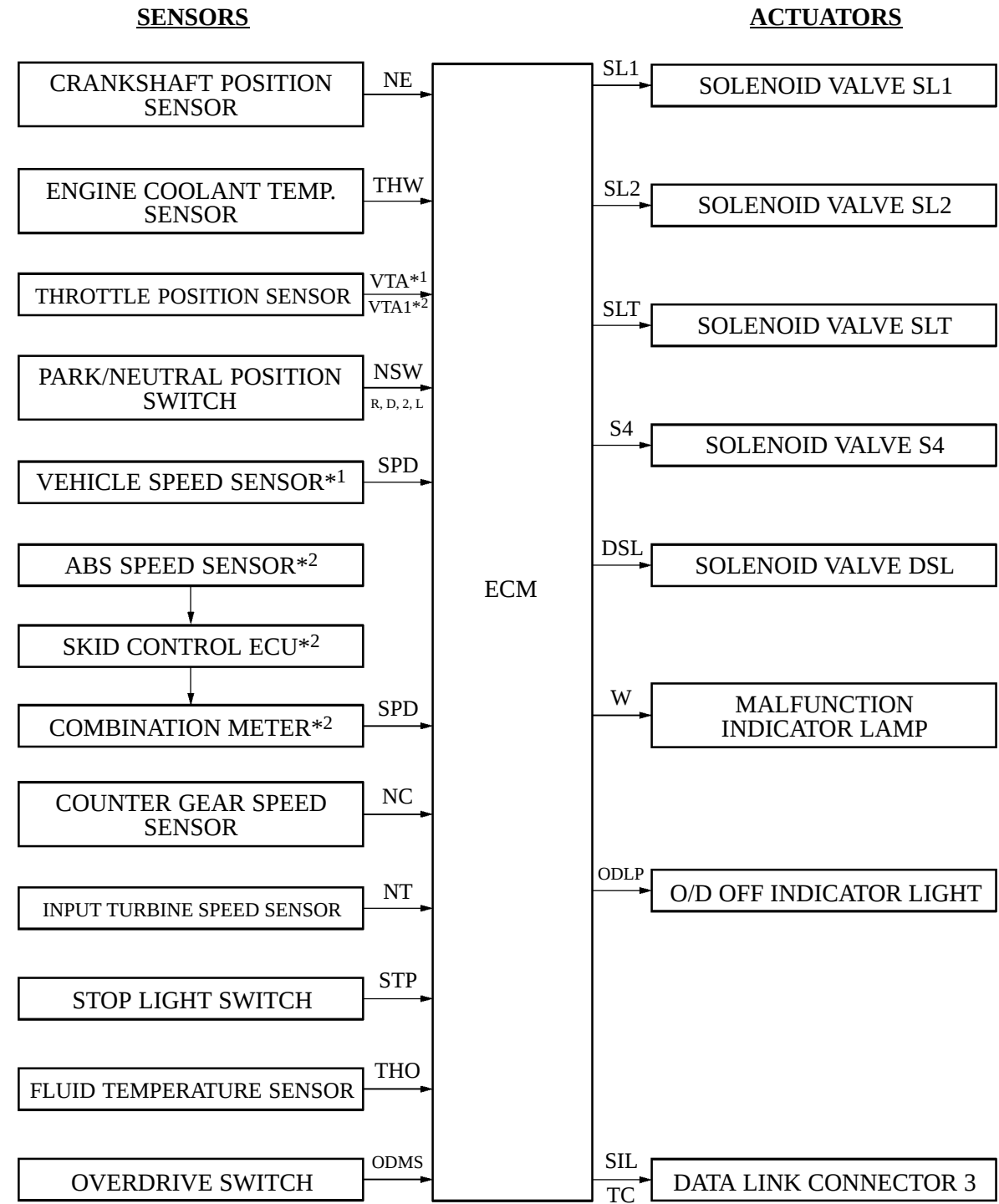
1. General

The electronic control system of the U140E and U241E automatic transaxles consists of the control listed below.

System	Function	U140E, U241E	A541E
Clutch Pressure Control	- Controls the pressure that is applied directly to B₁ brake and C₂ clutch by actuating the shift solenoid valve (SL1, SL2) in accordance with ECM signals. - The solenoid valves SL1 and SL2 minutely controls the clutch pressure in accordance with the engine output and driving conditions.	○	—
Line Pressure Optimal Control	Actuates the solenoid valve SLT to control the line pressure in accordance with information from the ECM and the operating conditions of the transaxle.	○	—
Engine Torque Control	Retards the engine ignition timing temporarily to improve shift feeling during up or down shifting.	○	○
Shift Control in Uphill/Downhill Traveling	Controls to restrict the 4th upshift or to provide appropriate engine braking by using the ECM to determine whether the vehicle is traveling uphill or downhill.	○	—
Shift Timing Control	The ECM sends current to the solenoid valve SL1 and/or SL2 based on signals from each sensor and shifts the gear.	○	○
Lock-up Timing Control	The ECM sends current to the shift solenoid valve (DSL) based on signals from each sensor and engages or disengages the lock-up clutch.	○	○
Accumulator Back Pressure Control	The ECM sends signals to solenoid valve SLN when gear shift occurs to temporarily lower the accumulator back pressure so that the gear shift is completed smoothly.	—	○
“N” to “D” Squat Control	When the shift lever is shifted from “N” to “D” position, the gear is temporarily shifted to 2nd or O/D and then to 1st to reduce vehicle squat.	—	○
	When the shift lever is shifted from “N” to “D” position, the gear is temporarily shifted to 3rd and then to 1st to reduce vehicle squat.	○	—
Diagnosis	When the ECM detects a malfunction, the ECM makes a diagnosis and memorizes the failed section.	○	○
	To increase the speed for processing the signals, the 32-bit CPU of the ECM has been adopted.	○	—
Fail-safe	Even if a malfunction is detected in the sensors or solenoids, the ECM effects fail-safe control to prevent the vehicle's drivability from being affected significantly.	○	○

2. Construction

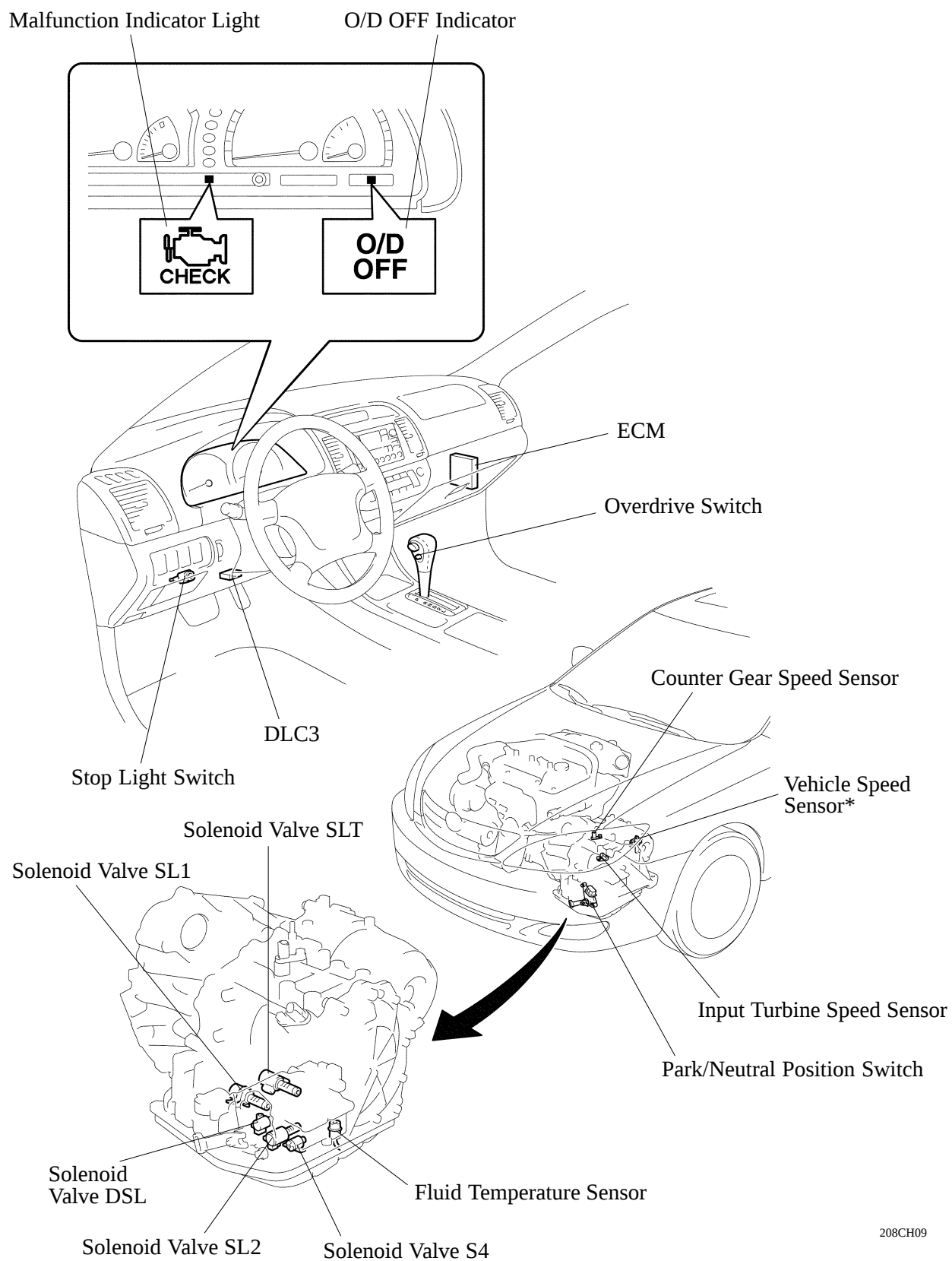
The configuration of the electronic control system in the U140E and U241E automatic transaxles are as shown in the following chart.



*1: 2AZ-FE Engine Model

*2: 1MZ-FE Engine Model

3. Layout of Components

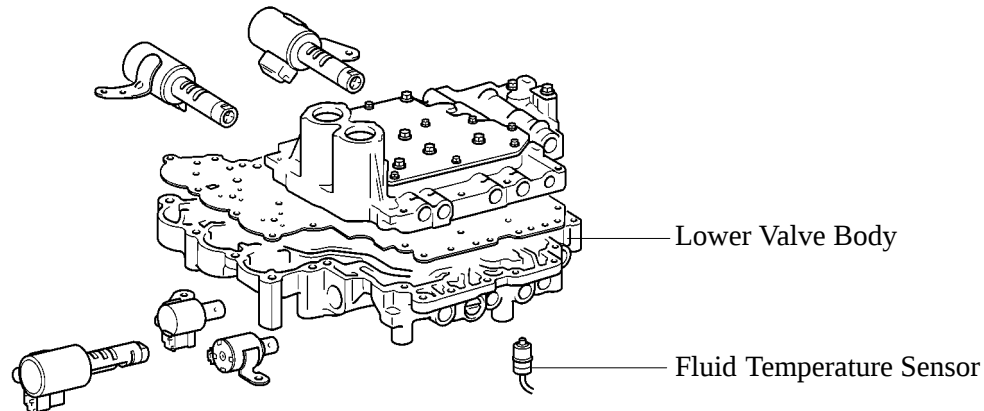


*: 2AZ-FE Engine Model

4. Construction and Operation of Main Component

Fluid Temperature Sensor

A fluid temperature sensor is installed in the valve body for direct detection of the fluid temperature. Fluid temperature sensor is used for revision of clutches and brakes pressure to keep smooth shift quality every time.

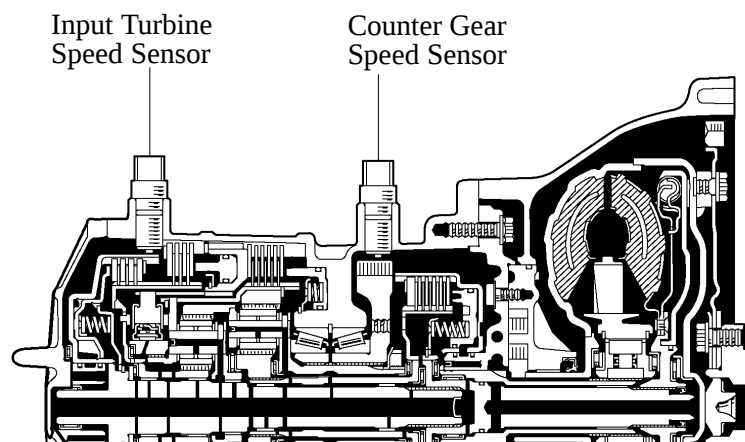


181CH11

Speed Sensors

The U140E and U241E automatic transaxles have adopted an input turbine speed sensor (for the NT signal) and a counter gear speed sensor (for the NC signal). Thus, the ECM can detect the timing of the shifting of the gears and appropriately control the engine torque and hydraulic pressure in response to the various conditions.

- The input turbine speed sensor detects the input speed of the transaxle. The direct clutch (C₂) drum is used as the timing rotor for this sensor.
- The counter gear speed sensor detects the speed of the counter gear. The counter drive gear is used as the timing rotor for this sensor.



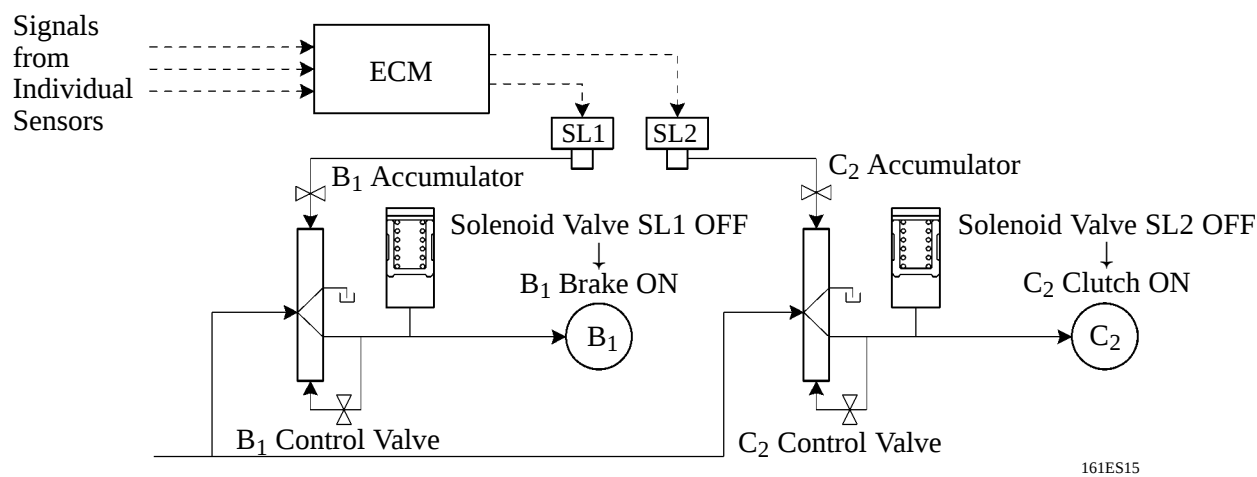
181CH14

5. Clutch Pressure Control

Clutch to Clutch Pressure Control

This control has been adopted for shifting from the 1st to 2nd gear, and from the 2nd to 3rd gear. Actuates solenoid valves SL1 and SL2 in accordance with the signals from the ECM, and guides this output pressure directly to the control valves B_1 and C_2 in order to regulate the line pressure that acts on the B_1 brake and C_2 clutch.

As a result, compact B_1 and C_2 accumulators without a back pressure chamber have been realized.

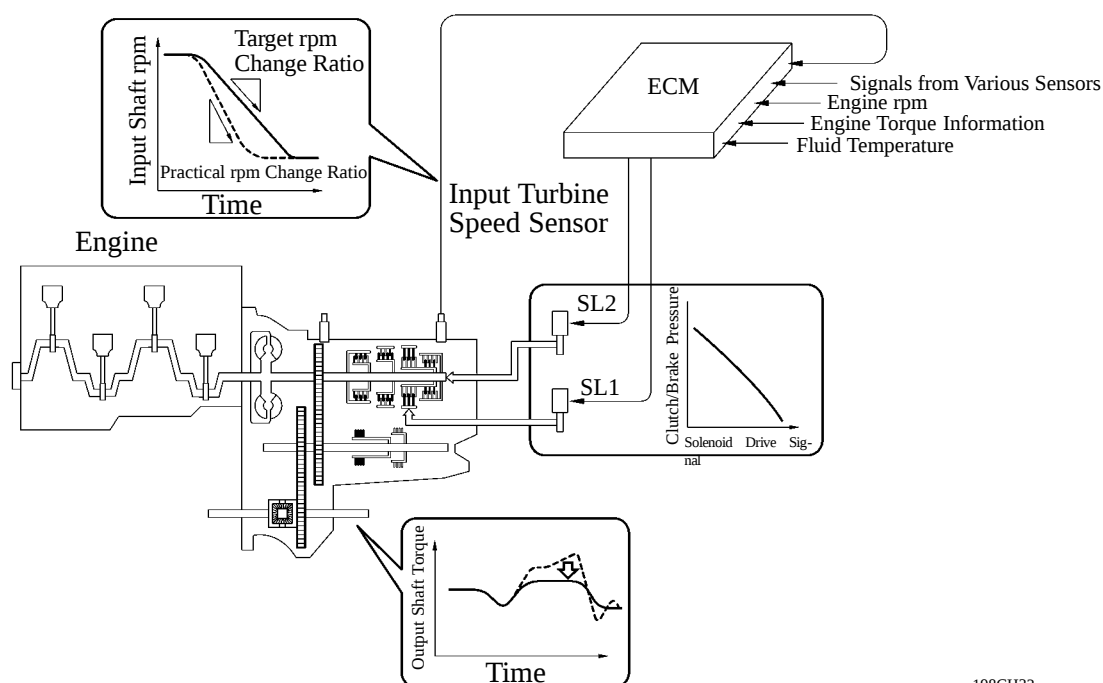


161ES15

Clutch Pressure Optimal Control

The ECM monitors the signals from various types of sensor such as the input turbine speed sensor, allowing shift solenoid valves SL1 and SL2 to minutely control the clutch pressure in accordance with engine output and driving conditions.

As a result, smooth shift characteristics have been realized.



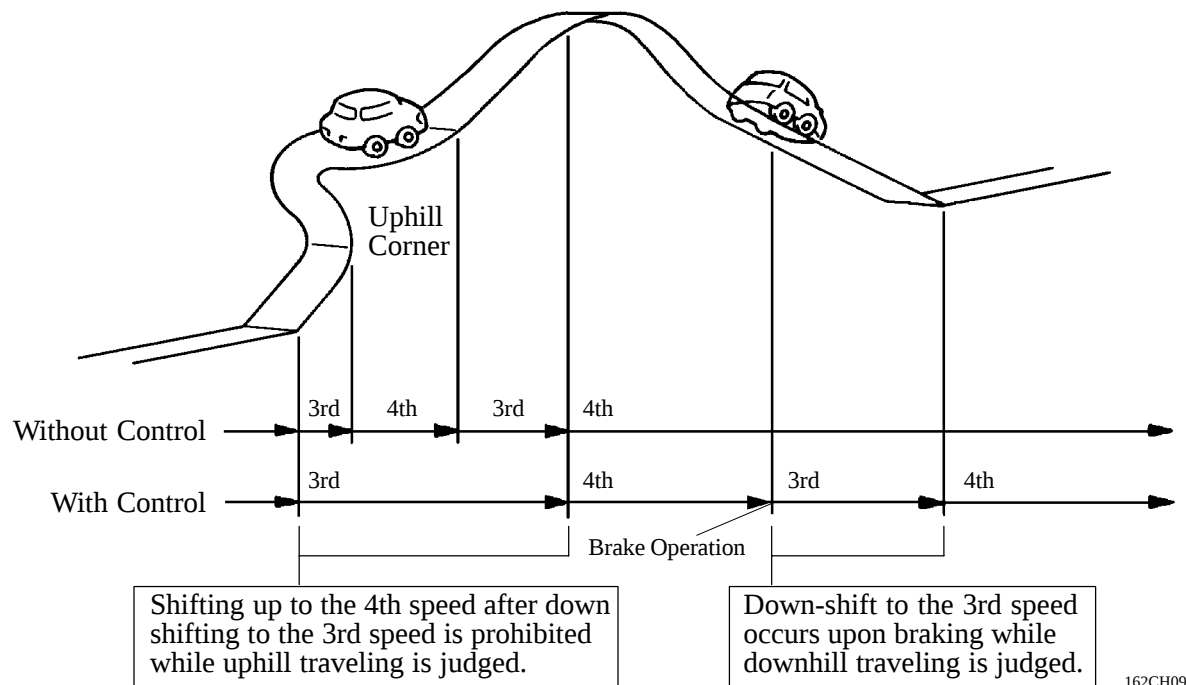
198CH32

6. Shifting Control in Uphill/Downhill Traveling

General

With shifting control in uphill/downhill traveling, the ECM calculates the throttle opening angle and the acceleration rate to determine whether the vehicle is in the uphill or downhill state. While driving uphill on a winding road with ups and downs, the 4th upshift is restricted to ensure a smooth drive. Also, if a brake application is detected while the ECM judges a downhill travel in 4th, the transmission automatically downshifts to 3rd in order to provide an appropriate engine brake.

In addition, while the ECM judges a downhill travel, it restricts the travel in 3rd without keeping the brake application.



Uphill/Downhill Judgment

The actual acceleration calculated from the speed sensor signal is compared with the reference acceleration stored in the ECM to judge uphill or downhill traveling.

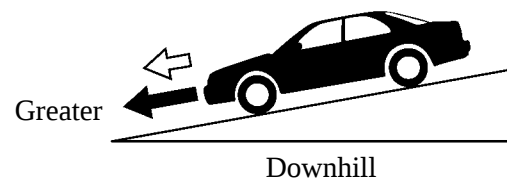
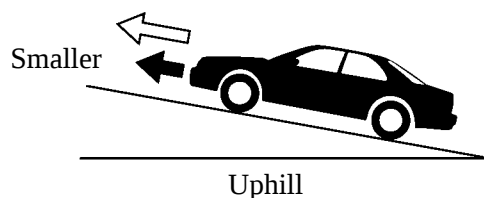
The ECM judges an uphill travel if the actual acceleration is smaller than the reference acceleration, and restricts the 3rd to 4th upshift after a 4th to 3rd downshift has occurred. Also, the ECM judges a downhill travel if the actual acceleration is greater than the reference acceleration, and restricts the 4th upshift while traveling in 3rd. If a brake application is detected while traveling in 4th, it downshifts to 3rd.

Actual Acceleration < Reference Acceleration

Actual Acceleration > Reference Acceleration

◀ Reference acceleration

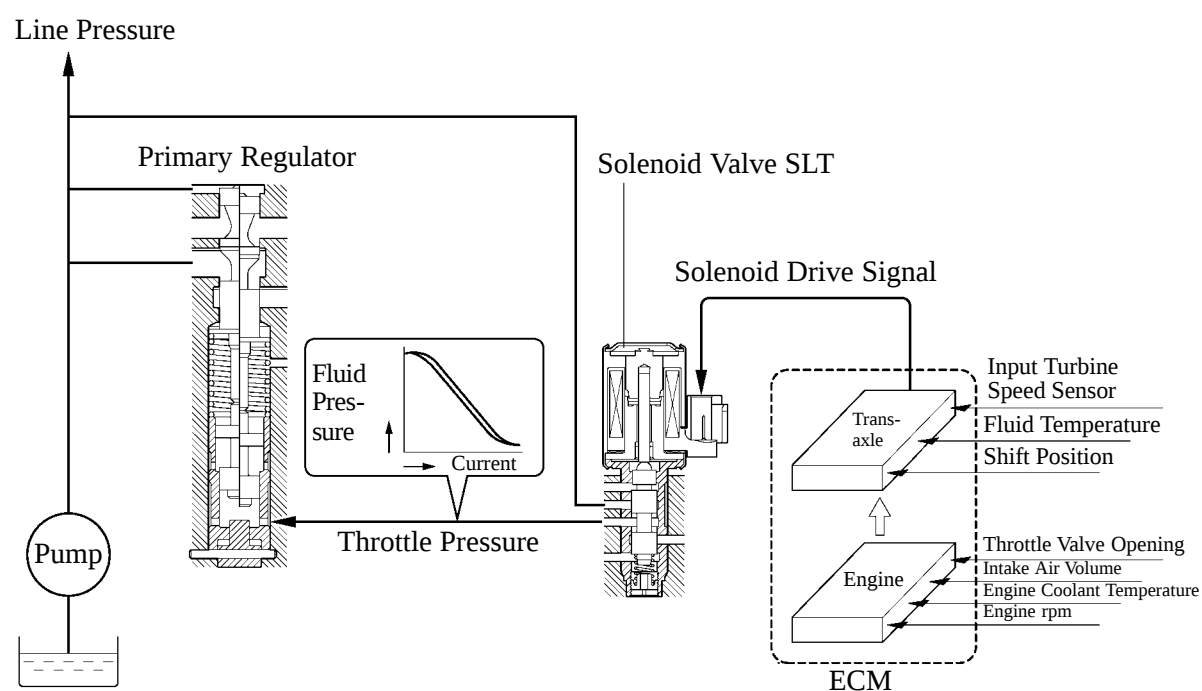
◀ Actual acceleration



7. Line Pressure Optimal Control

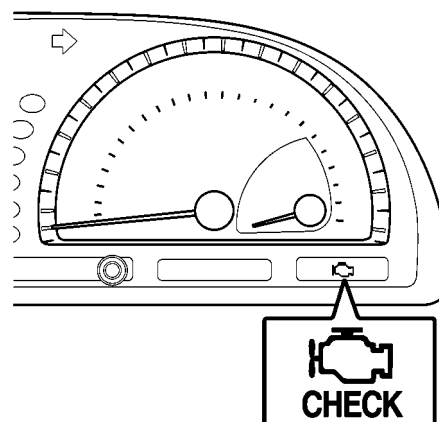
Through the use of the solenoid valve SLT, the line pressure is optimally controlled in accordance with the engine torque information, as well as with the internal operating conditions of the torque converter and the transaxle.

Accordingly, the line pressure can be controlled minutely in accordance with the engine output, traveling condition, and the ATF temperature, thus realizing smooth shift characteristics and optimizing the workload in the oil pump.



8. Diagnosis

- When the ECM detected a malfunction, the ECM makes a diagnosis and memorizes the failed section. Furthermore, the MIL (Malfunction Indicator Lamp) in the combination meter illuminates or blinks to inform the driver.
- At the same time, the DTCs (Diagnosis Trouble Codes) are stored in memory. The DTCs can be read by connecting a hand-held tester.



208CH36

— Changes (from A541E) —

The DTCs (Diagnosis Trouble Codes) listed below have been added or discontinued.

DTC No.		Detection Item
Added DTC	P0710	Transmission Fluid Temp. Sensor Malfunction (Fluid Temp. Sensor)
	P0711	Transmission Fluid Temp. Sensor Range/Performance Problem (Fluid Temp. Sensor)
	P0765	Shift Solenoid D Malfunction (Solenoid Valve S4)
	P0768	Shift Solenoid D Electrical Malfunction (Solenoid Valve S4)
	P1725	NT Revolution Sensor Circuit Malfunction (Input Turbine Speed Sensor)
	P1730	NC Revolution Sensor Circuit Malfunction (Counter Gear Speed Sensor)
Discontinued DTC	P1760	Linear Solenoid for Line Pressure Control Circuit Malfunction (Solenoid Valve SLT)
	P1705	NC2 Revolution Sensor Circuit Malfunction (Direct Clutch Speed Sensor)
	P1765	Linear Solenoid for Accumulator Pressure Control Circuit Malfunction (Solenoid Valve SLN)

Service Tip

The length of time to clear the DTC by the battery terminal disconnection has been changed from the previous 10 seconds to 1 minute.

9. Fail Safe

General

This function minimizes the loss of operability when any abnormality occurs in each sensor or solenoid.

► Fail-Safe Control List ◀

Malfunction Part	Function
Speed Sensor	During a speed sensor malfunction, the vehicle speed is detected through the signals from the counter gear speed sensor to effect normal control.
Fluid Temp. Sensor	During a fluid temp. sensor malfunction, 4th upshift is prohibited.
Counter Gear Speed Sensor	During a counter gear speed sensor malfunction, 4th upshift is prohibited.
Solenoid Valve SL1, SL2, and S4	The current to the failed solenoid valve is cut off and control is effected by operating the other solenoid valves with normal operation. Shift control is effected as described in the table below, depending on the failed solenoid.

When all solenoids are normal				When shift solenoid SL1 is abnormal								When SL2 is abnormal			
				Traveling 3rd or 4th				Traveling 1st or 2nd							
Solenoid			Gear	Solenoid			Gear	Solenoid			Gear	Solenoid			Gear
SL1	SL2	S4		SL1	SL2	S4		SL1	SL2	S4		SL1	SL2	S4	
ON	ON	OFF	1st	×	ON ↓ OFF	OFF	3rd	×	ON	OFF	2nd	ON ↓ OFF	×	OFF	3rd
OFF	ON	OFF	2nd	×	ON ↓ OFF	OFF	3rd	×	ON	OFF	2nd	OFF	×	OFF	3rd
OFF	OFF	OFF	3rd	×	OFF	OFF	3rd	×	OFF ↓ ON	OFF ↓ ON	3rd	OFF	×	OFF ↓ ON	3rd
OFF	OFF	ON	4th	×	OFF	ON	4th	×	OFF ↓ ON	ON	3rd	OFF	×	ON	4th

*: B₁ is constantly operating.

When S4 is abnormal				When SL1 and SL2 are abnormal				When SL1 and S4 are abnormal							
								Traveling 3rd or 4th				Traveling 1st or 2nd			
Solenoid			Gear	Solenoid			Gear	Solenoid			Gear	Solenoid			Gear
SL1	SL2	S4		SL1	SL2	S4		SL1	SL2	S4		SL1	SL2	S4	
ON	ON	×	1st	×	×	OFF	3rd	×	ON ↓ OFF	×	3rd	×	ON	×	2nd
OFF	ON	×	2nd	×	×	OFF	3rd	×	ON ↓ OFF	×	3rd	×	ON	×	2nd
OFF	OFF	×	3rd	×	×	OFF	3rd	×	OFF ↓ ON	×	3rd	×	OFF ↓ ON	×	2nd
OFF	OFF	×	4th	×	×	ON	4th	×	OFF ↓ ON	×	3rd	×	OFF ↓ ON	×	2nd

(Continued)

When SL2 and S4 are abnormal				When SL1, SL2 and S4 are abnormal			
Solenoid			Gear	Solenoid			Gear
SL1	SL2	S4		SL1	SL2	S4	
ON ↓ OFF	×	×	3rd	×	×	×	3rd
OFF	×	×	3rd	×	×	×	3rd
OFF	×	×	3rd	×	×	×	3rd
OFF	×	×	3rd	×	×	×	3rd

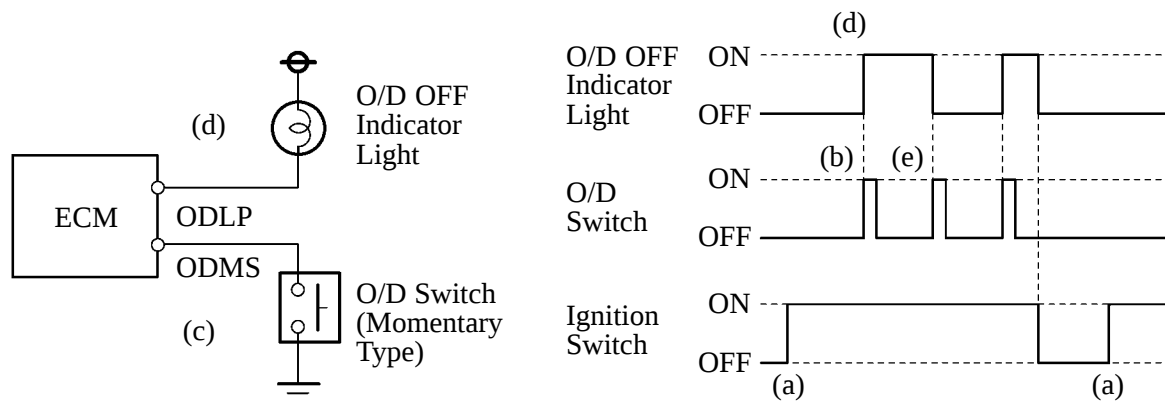
■ SHIFT CONTROL MECHANISM

1. General

- As in the past, the shift control mechanism of the '02 Camry consists of a straight shift lever that uses a shift control cable.
- The O/D (overdrive) switch has been adopted on the momentary type.
- A shift lock system consists of the key interlock device and shift lock mechanism, has been adopted.

2. Overdrive Switch

- Turn the ignition switch from OFF to ON turns the overdrive ON.
- Pressing the O/D switch close (turn ON) the contact points, and releasing the switch opens (turn OFF) the contact points.
- Accordingly, pressing the switch cause the signal to be input into the ECM.
- The ECM turns OFF the overdrive (O/D OFF indicator light turn ON).
- Pressing the O/D switch again turns the overdrive back ON (O/D OFF indicator light turns OFF).

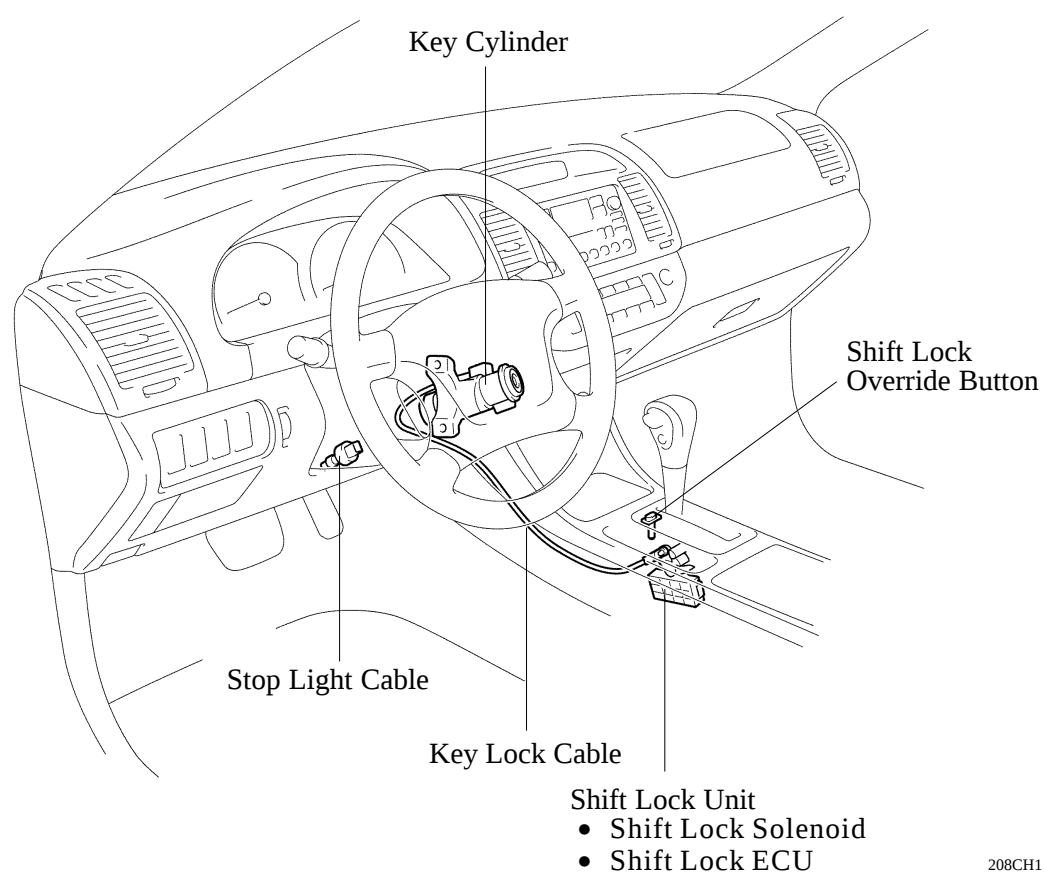


3. Shift Lock System

General

- A shift lock system consists of the key interlock device and shift lock mechanism, that prevents the unintended operation of the shift lever has been provided.
- A mechanical key interlock device that uses the key lock cable has been adopted.
- An electrical shift lock mechanism, in which a shift lock solenoid and a shift lock ECU are integrated, has been adopted.

Layout of Component



208CH11

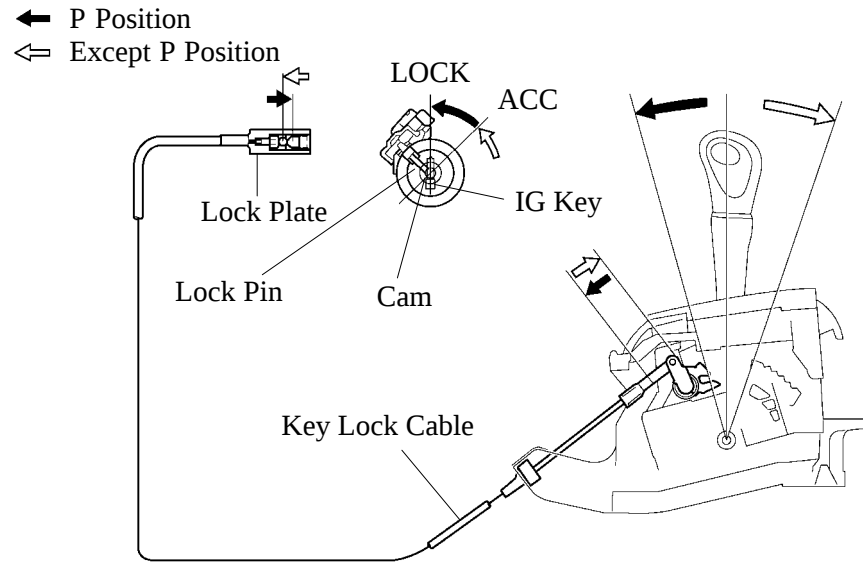
Key Interlock Device

1) General

- This device will not allow the ignition key to be turned to the LOCK position or to pull out the ignition key unless the shift lever is moved to the P position.
- This device, in which the shift lever and the key cylinder are connected via the key lock cable, mechanically limits the movement of the ignition key through the movement of the shift lever.

2) Construction and Operation

- The key cylinder contains a cam and a lock pin that move in unison with the ignition key. In addition, a key lock cable and a lock plate are placed above the lock pin.
- When the driver moves the shift lever, the lock plate slides to restrict the movement of the lock pin, which in turn, restricts the movement of the ignition key.

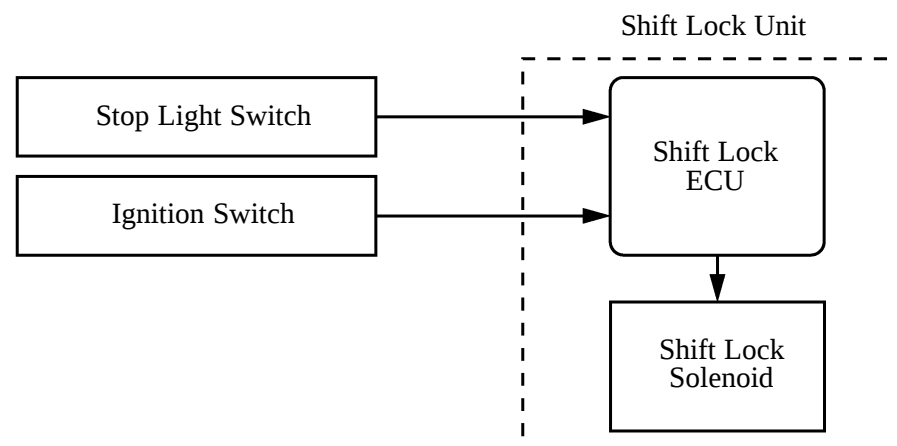


208CH12

Shift Lock Mechanism

- The shift lock mechanism prevents the shift lever from being shifted out of the "P" position to any other position unless the ignition switch is turned ON and the brake pedal is pressed.
- A shift lock override button, which manually overrides the shift lock mechanism, is provided.

► System Diagram ◀



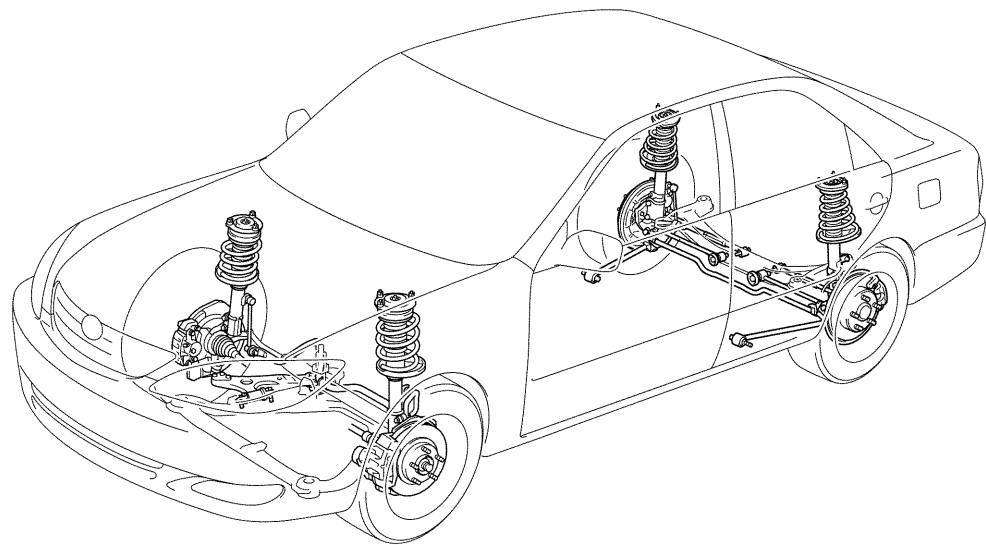
208CH13

SUSPENSION AND AXLE

SUSPENSION

1. General

- A MacPherson strut type independent suspension has been adopted for the front.
- A dual link MacPherson strut type independent suspension has been adopted for the rear.



208CH14

► Specification ◀

Front Wheel Alignment	Tread	mm (in.)	1547 (60.9)
	Caster*	degrees	2° 44'
	Camber*	degrees	-0 °40'
	Toe-in*	mm (in.)	0
	King Pin Inclination*	degrees	11°20'
Rear Wheel Alignment	Tread	mm (in.)	1533 (60.3)
	Camber*	degrees	-1 °16'
	Toe-in*	mm (in.)	4 (0.16)

*: Unload Vehicle Condition

2. Front Suspension

General

Through the optimal allocation of components, and the adoption of the nachlauf geometry, the front suspension realizes excellent riding comfort and controllability.

Upper Support

- Optimized characteristics

Coil Spring

- Optimized spring constant

Lower Arm

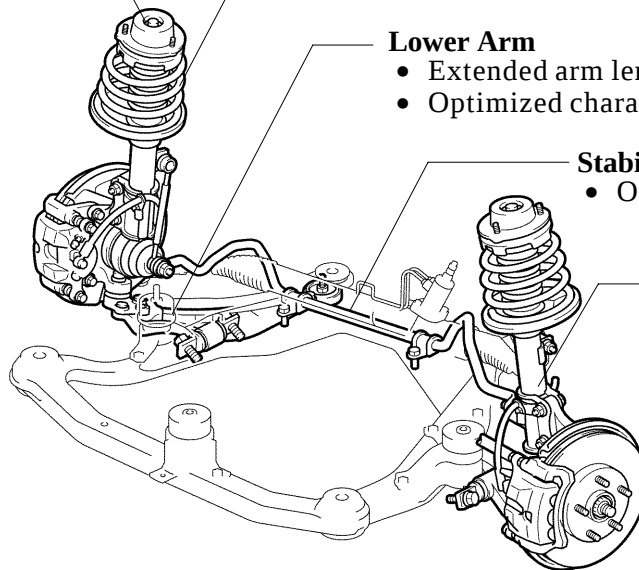
- Extended arm length
- Optimized characteristics

Stabilizer Bar

- Optimized spring constant

Shock Absorber

- Increase stroke
- Linear control valve used



208CH15

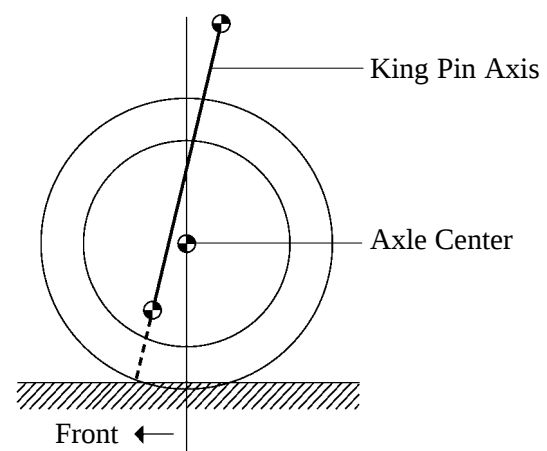
Service Tip

To prevent hazardous conditions, make sure to empty the gas from the shock absorber before discarding a low-pressure (N_2) gas sealed shock absorber. For details, refer to the 2002 Camry Repair Manual (Pub. No. RM881U).

Nachlauf Geometry

The front suspension adopts the nachlauf geometry in which the king pin axis is located ahead of the axle carrier.

As a result, excellent straightline stability has been realized and the steering feeling has been improved.

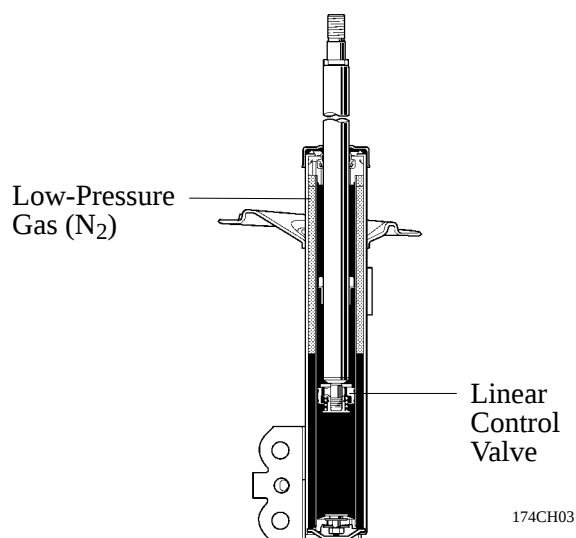


181CH22

Shock Absorber

1) General

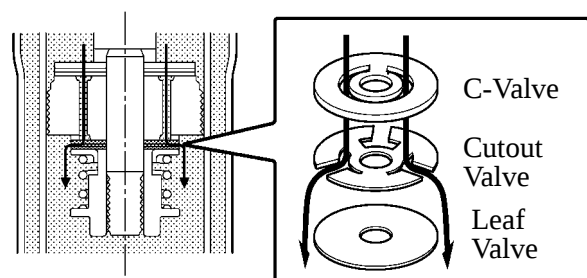
Low-pressure (N_2) gas sealed front shock absorbers with a linear control valve have been adopted to realize both driving stability and riding comfort.



2) Construction of Linear Control Valve

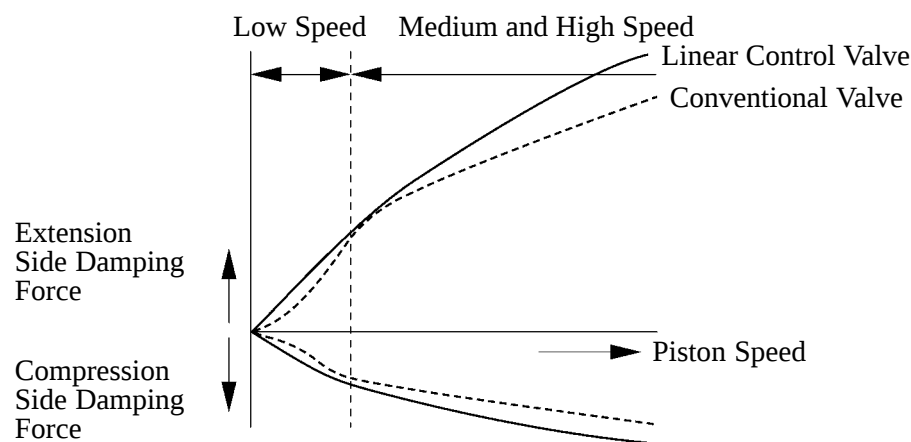
The linear control valve consists of a C-valve, a cutout valve and a leaf valve. These valves adopt a laminate construction and form orifices. At low piston speeds, the oil flows through the cutouts of the valves to achieve a linear damping force.

Through the adoption of the linear control valve, the changes in the damping force are made constant at low piston speeds, thus making the vehicle behave more smoothly in relation to the steering operation.



Low Speeds

206CH29



Damping Force Characteristics

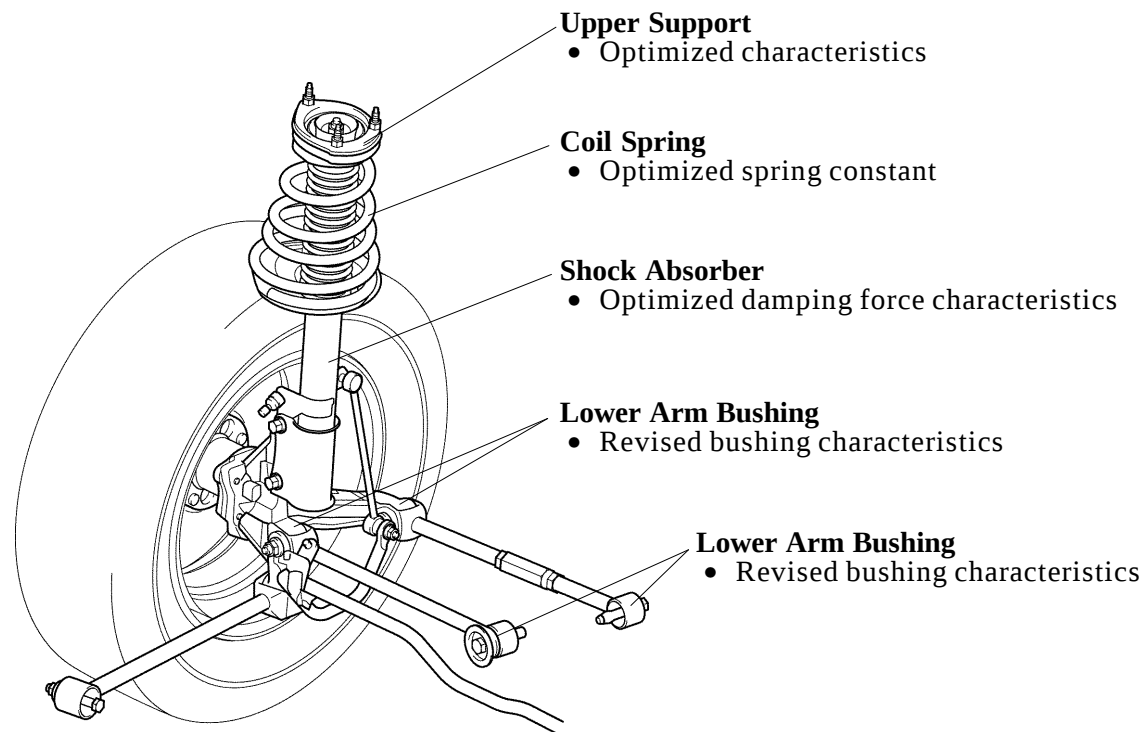
199CH110

3. Rear Suspension

General

Rear suspension realizes excellent stability and controllability by optimizing the suspension geometry and the allocation of components.

The wheel stroke has been increased to ensure stability and ride comfort on rough roads.



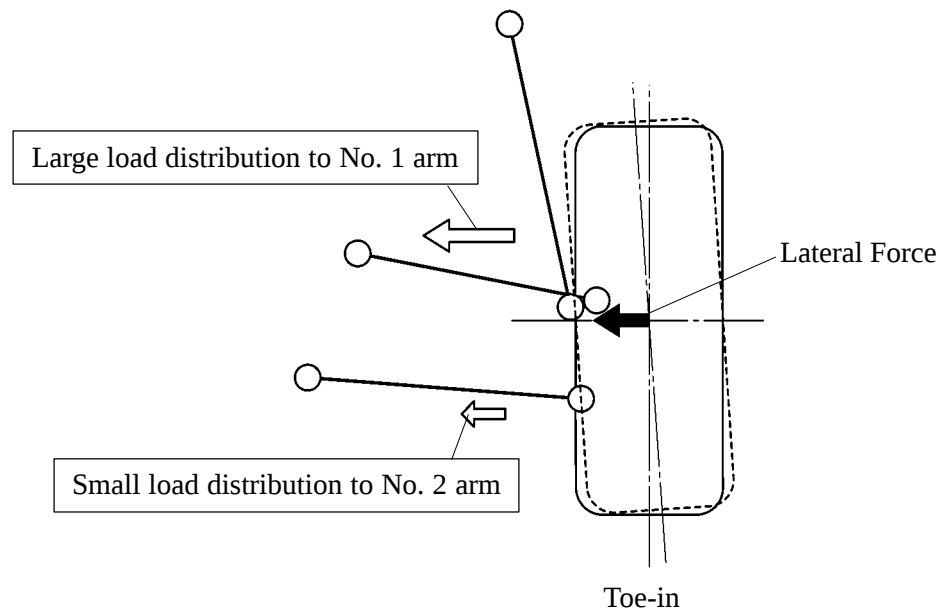
208CH16

Service Tip

To prevent hazardous conditions, make sure to empty the gas from the shock absorber before discarding a low-pressure (N₂) gas sealed shock absorber. For details, refer to the 2002 Camry Repair Manual (Pub. No. RM881U).

Cornering Geometry

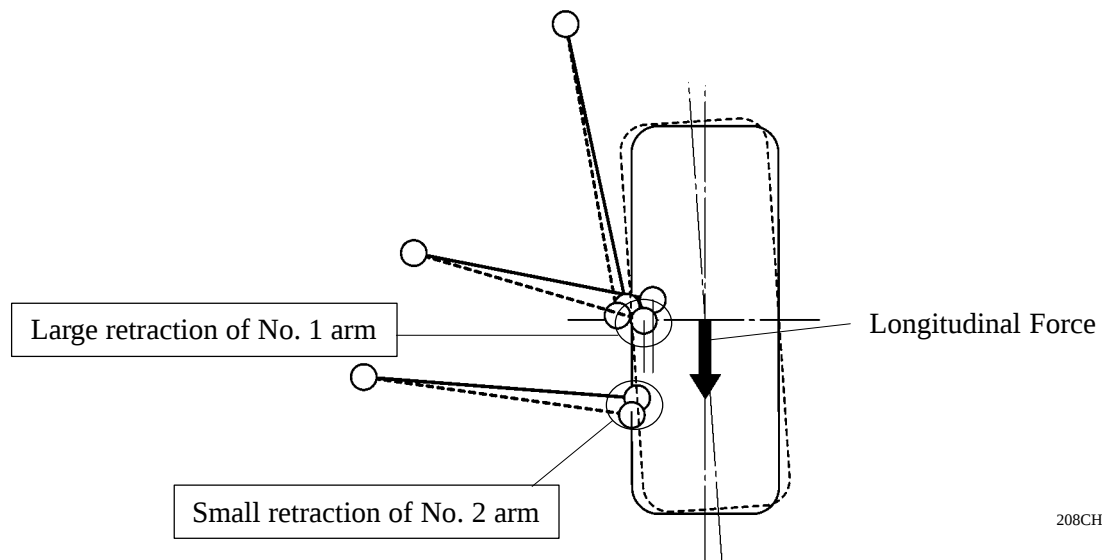
When a lateral force is generated, the load becomes distributed to the No. 1 and No. 2 suspension arms as shown below. This causes the wheels to toe-in, in order to ensure the proper stability of the rear suspension.



208CH18

Braking Geometry

When the longitudinal force is generated, the displacement locus of the No. 1 and No. 2 suspension arms will toe-in as shown below, in order to ensure the stability of the vehicle.

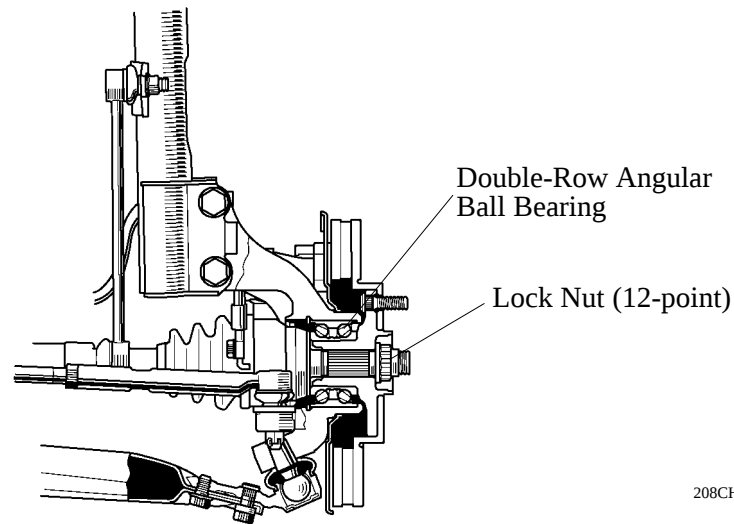


208CH17

■ AXLE

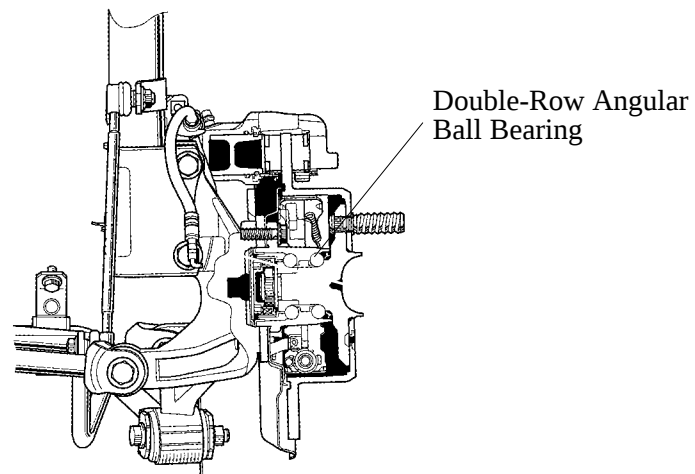
1. Front Axle

- The front axle use a double-row angular ball bearing which offers low rolling resistance.
- A lock nut (12-point) has been adopted and staked for tightening the axle hub in order to ensure the tightening performance.
This nut cannot reused.
- A lead-free material is used in the front axle hub to address environmental concerns.



2. Rear Axle

- The rear axle use a double-row angular ball bearing which offers low rolling resistance.
- Part of the inner race is integrated with the shaft, thus optimizes the high rigidity.

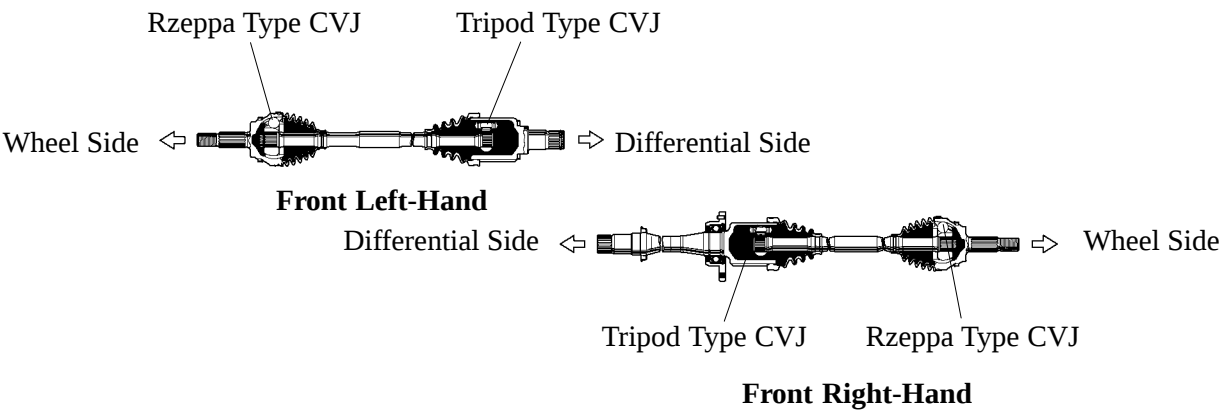


DRIVE SHAFT

DESCRIPTION

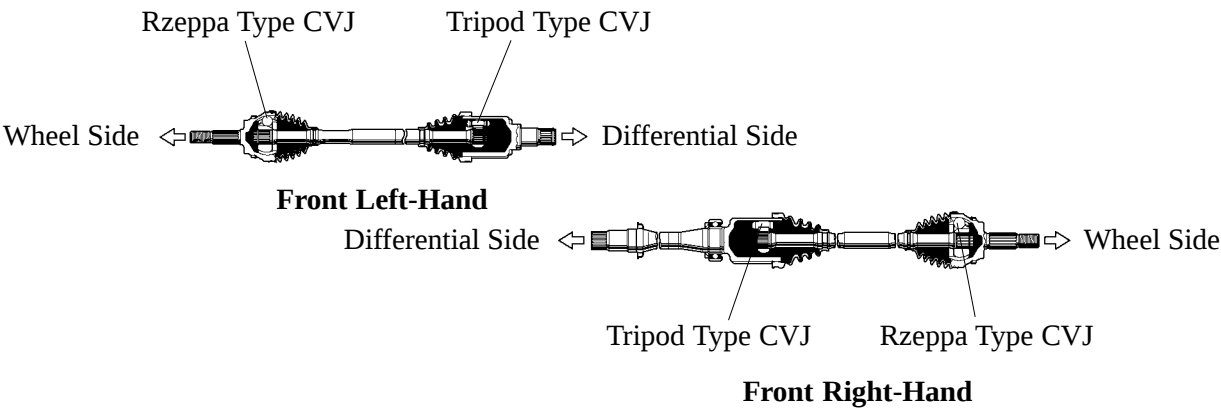
The drive shaft use the low-vibration tripod type CVJ (Constant-Velocity Joint) on the differential side, and Rzeppa type CVJ on the wheel side.

2AZ-FE Engine Model



208CH46

1MZ-FE Engine Model



208CH35

BRAKE

■ DESCRIPTION

The '02 Camry has a brake system with the following specifications:

Engine		2AZ-FE			1MZ-FE		
Grade		LE	SE	XLE	LE	SE	XLE
Front Brake	Type	Ventilated Disc	←	←	←	←	←
	Rotor Size	for 15 in. wheel	←	←	←	for 16 in. wheel	←
Rear Brake	Type	Leading-Trailing Drum	Solid Disc	←	←	←	←
	Drum Inner Dia. mm (in.)	228.6 (9.00)	—	—	—	—	—
	Rotor Size	—	for 14 in. wheel	←	←	←	←
Brake Pedal		Double-Link	←	←	←	Normal	←
ABS with EBD		OPT	←	STD	←	←	←
ABS with EBD & Brake Assist & TRAC & VSC		—	—	—	OPT	←	←
Brake Control Valve		P Valve* ¹ , EBD* ²	←	EBD	←	←	←
Parking Brake Lever Type		Lever	←	Pedal	Lever	←	Pedal

*1: without ABS with EBD

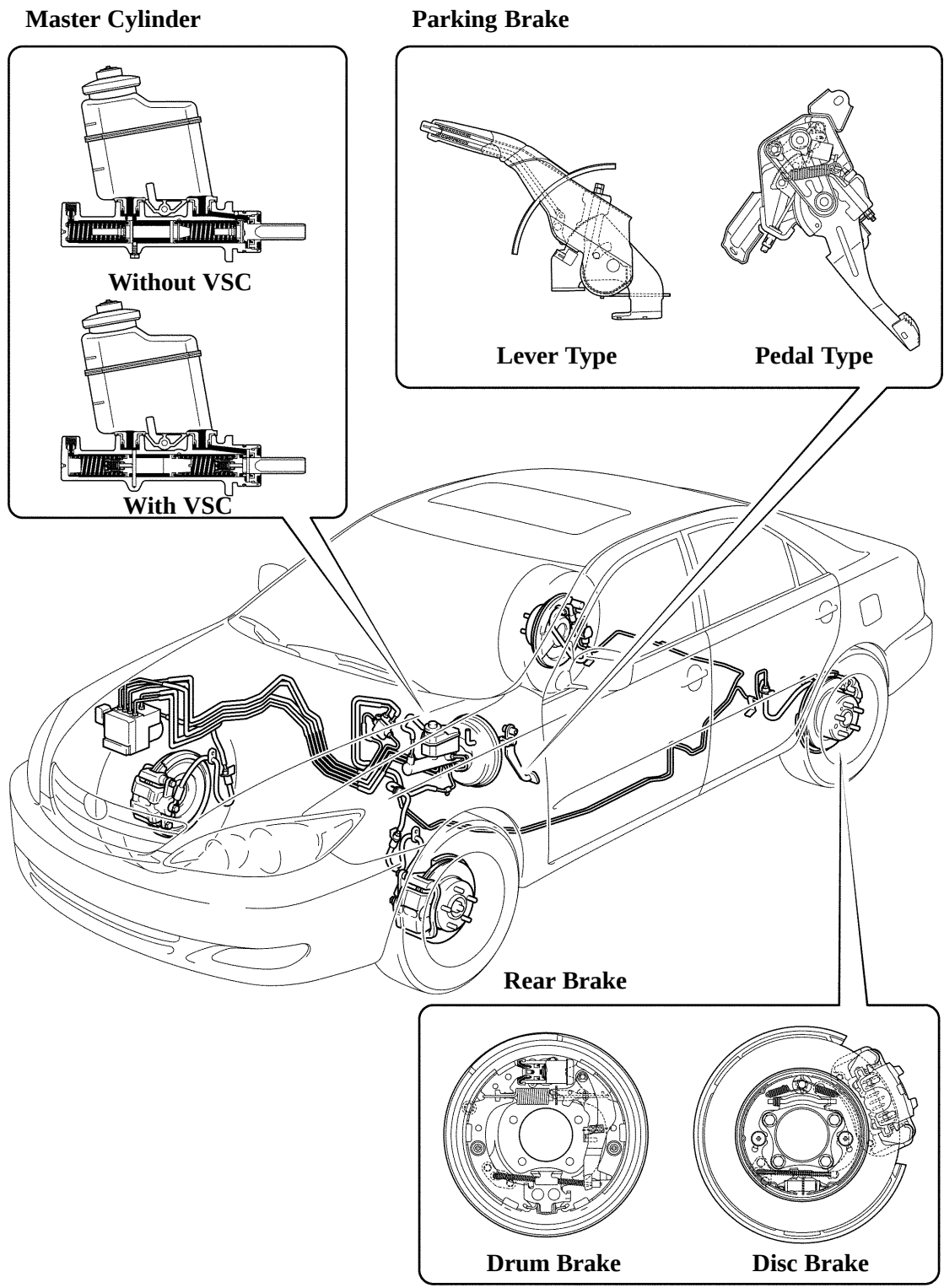
*2: with ABS model

► Specification ◀

Model		'02 Camry	'01 Camry
Master Cylinder	Type	Tandem	←
	Diameter mm (in.)	22.22 (0.87)	23.81 (0.94)
Brake Booster	Type	Single	Tandem
	Size in.	10.5	8.5 + 8.5, 8 + 9* ⁶
Front Disc Brake	Pad Area cm ² (in. ²)	47.6 (7.38)	44 (6.82)
	Wheel Cylinder Dia. mm (in.)	63.5 (2.50)	60.33 (2.38)
	Rotor Size (D × T)* ¹ mm (in.)	275 × 28 (10.83 × 1.10)* ² 296 × 28 (11.65 × 1.10)* ³	275 × 28 (10.83 × 1.10)
	Pad Material	PA533Z* ² /PA556H* ³	PA533Z
Rear Drum Brake	Lining Area cm ² (in. ²)	77 (11.94) × 2	←
	Wheel Cylinder Dia. mm (in.)	22.22 (0.87)	20.64 (0.81)
	Drum Inner Dia. mm (in.)	228.6 (9.00)	←
	Lining Material	LA509A	←
Rear Disc Brake	Pad Area cm ² (in. ²)	21.5 (3.33)	20.2 (3.13)
	Wheel Cylinder Dia. mm (in.)	38.1 (1.50)	34.9 (1.38)
	Rotor Size (D × T)* ¹ mm (in.)	269 × 12 (10.6 × 0.47)	269 × 10 (10.6 × 0.39)
	Pad Material	PA544	←
P Valve	Type	Dual* ⁷	Dual
Parking Brake	Type	Drum	←
	Drum Inner Dia. mm (in.)	228.6 (9.00)* ⁴ 170.0 (6.69)* ⁵	←

*1: D: Outer Diameter, T: Thickness *2: for 15 in. wheel *3: for 16 in. wheel *4: Rear Drum Brake

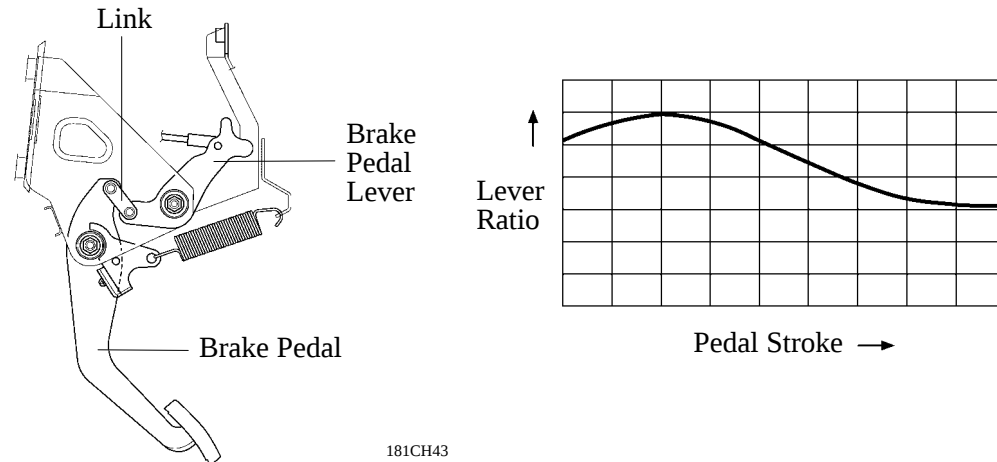
*5: Rear Disc Brake *6: TMMK Produced *7: without ABS with EBD



■ DOUBLE-LINK TYPE BRAKE PEDAL

This brake pedal has adopted a construction in which the brake pedal and brake pedal lever are jointed by a link to vary the lever ratio.

- When the pedal stroke is small or medium, the lever ratio is increased in order to reduce the pedal effort.
- When the pedal stroke is large, the lever ratio is decreased to provide ample pedal response.

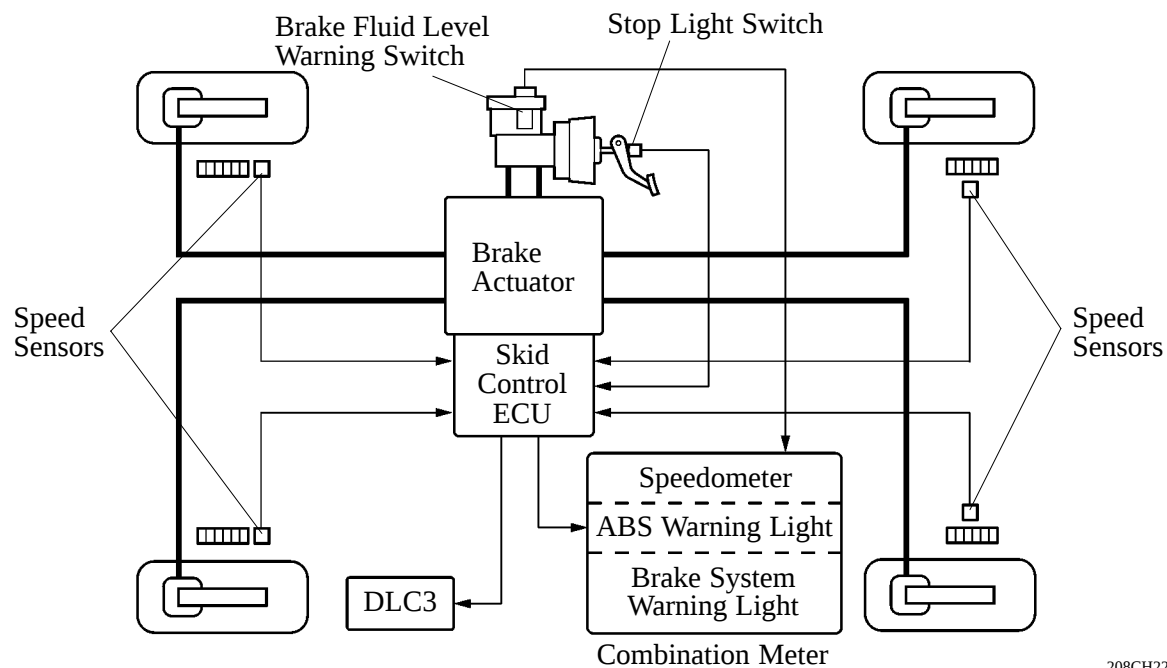


■ ABS with EBD SYSTEM

1. General

- The primary purpose of the ABS has been to help the vehicle's behavior during braking.
- The EBD control utilizes ABS, realizing the proper brake force distribution between front and rear wheels in accordance with the driving conditions.
In addition, during cornering braking, it also controls the brake forces of right and left wheels, helping to maintain the vehicle behavior.

2. System Diagram



3. Outline of EBD Control

General

The distribution of the brake force, which was performed mechanically in the past, is now performed under electrical control of the skid control ECU, which precisely controls the braking force in accordance with the vehicle's driving conditions.

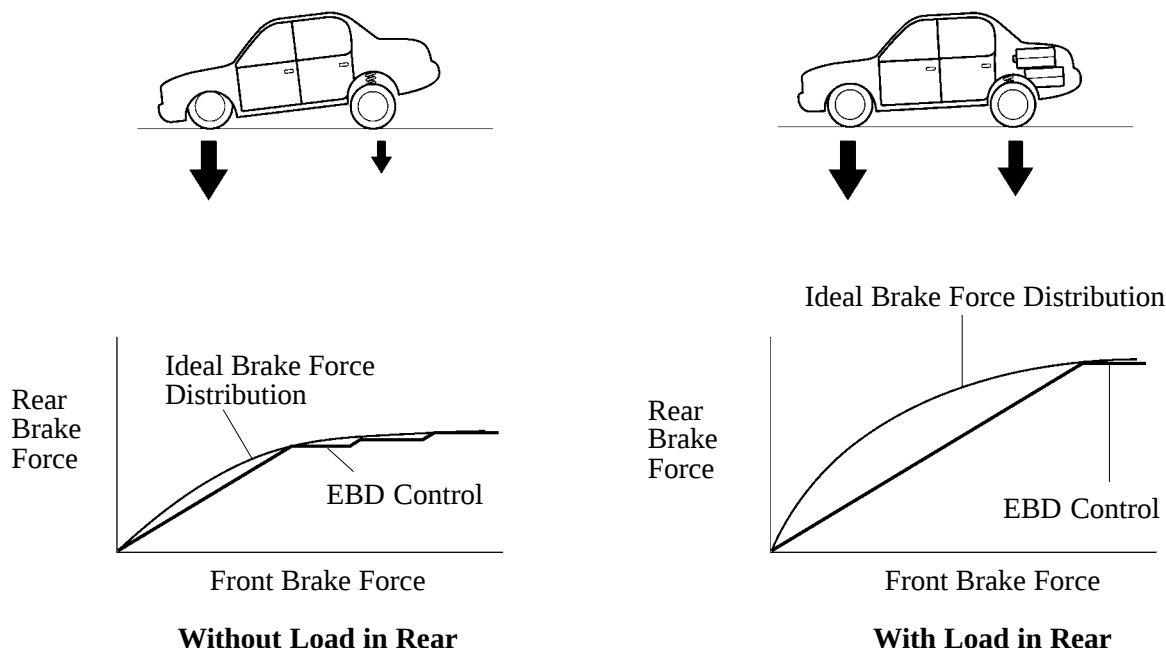
Front/Rear Wheels Brake Force Distribution

If the brakes are applied while the vehicle is moving straight forward, the transfer of the road reduces the load that is applied to the rear wheels. The skid control ECU determines this condition by way of the signals from the speed sensor, and the brake actuator regulates the distribution of the brake force of the rear wheels to optimally control.

For example, the amount of the brake force that is applied to the rear wheels during braking varies whether or not the vehicle is carrying a load. The amount of the brake force that is applied to the rear wheels also varies in accordance with the extent of the deceleration.

Thus, the distribution of the brake force to the rear is optimally controlled in order to effectively utilize the braking force of the rear wheels under these conditions.

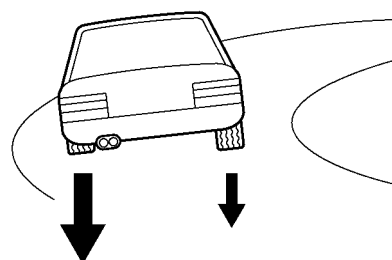
► EBD Control Concept ◀



Right/Left Wheels Brake Force Distribution (During Cornering Braking)

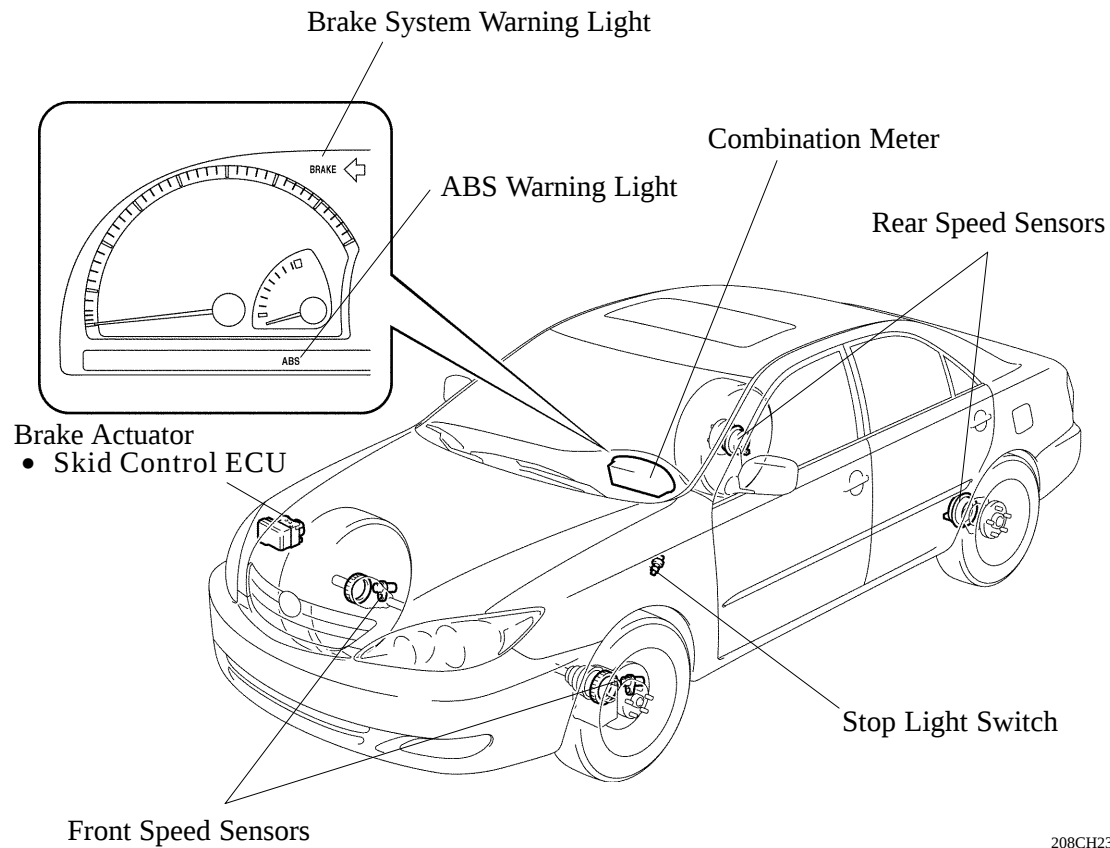
When the brakes are applied while the vehicle is cornering, the load that applied to the inner wheel decreases to the outer wheel increases.

The skid control ECU determines this condition by way of the signals from the speed sensor, and the brake actuator regulates the brake force in order to optimally control the distribution of the brake force to the inner wheel and outer wheel.



181CH56

4. Layout of Component



208CH23

5. Function of Component

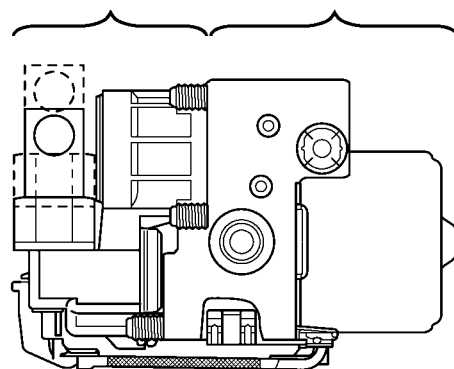
Component		Function
Combination Meter	ABS Warning Light	Lights up to alert the driver when the skid control ECU detects the malfunction in the ABS.
	Brake System Warning Light	Lights up together with the ABS warning light to alert the driver when the skid control ECU detects the malfunction in the EBD control.
Brake Fluid Level Warning Switch		Detects the brake fluid level.
Stop Light Switch		Detect the brake pedal depressing signal.
Speed Sensors		Detect the wheel speed of each four wheels.
Brake Actuator	Actuator Portion	Charges the fluid path based on the signals from the skid control ECU during the operation of the ABS with EBD system, in order to control the fluid pressure that is applied to the wheel cylinders.
	Skid Control ECU	Judges the vehicle driving condition based on signals from each sensor, and sends brake control signal to the brake actuator.

6. Brake Actuator

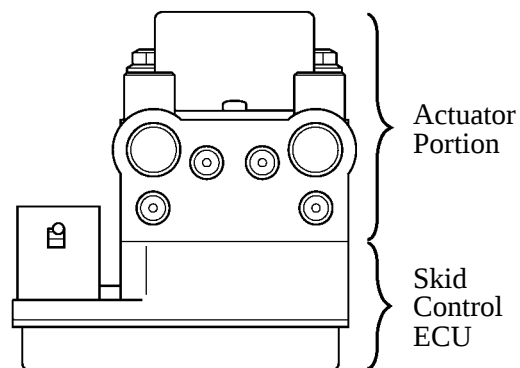
General

The brake actuator consists of actuator portion and skid control ECU.

Skid Control ECU Actuator Portion



TMMK Made



TMC Made

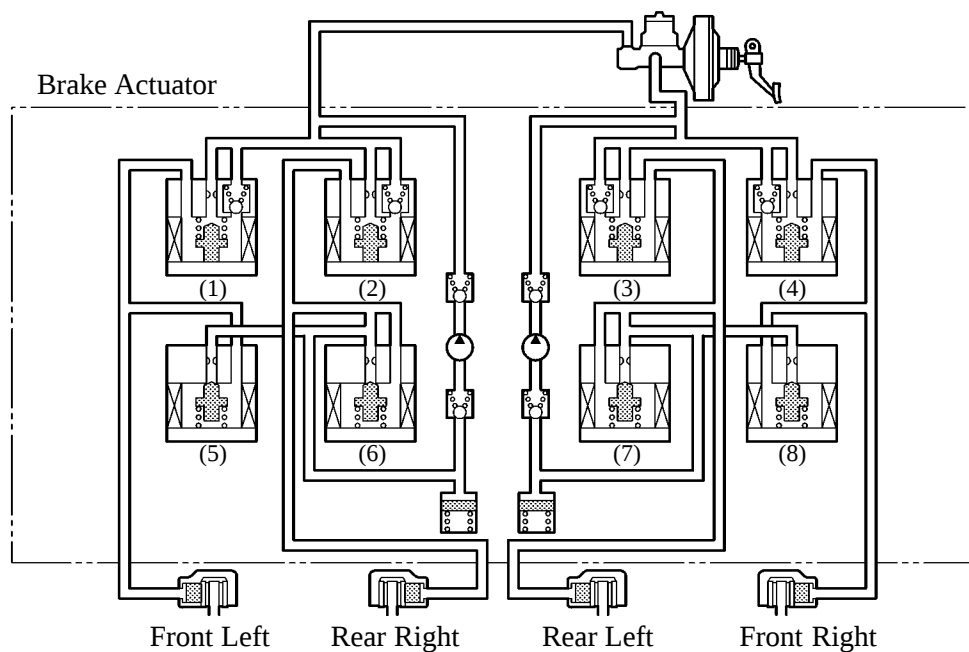
208CH24

Actuator Portion

1) Construction

The brake actuator consists of 8 two-position solenoid valves, 1 motor, 2 pumps and 2 reservoirs. The 8 two-position solenoid valves consists of 4 pressure holding valves [(1), (2), (3), (4)], and 4 pressure reduction valves [(5), (6), (7), (8)].

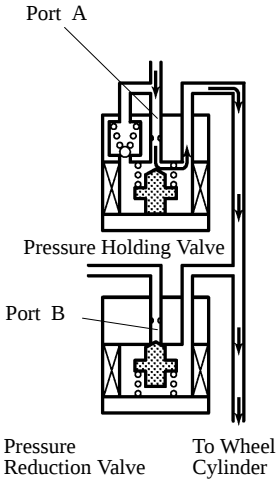
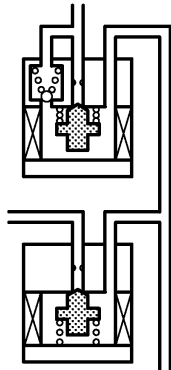
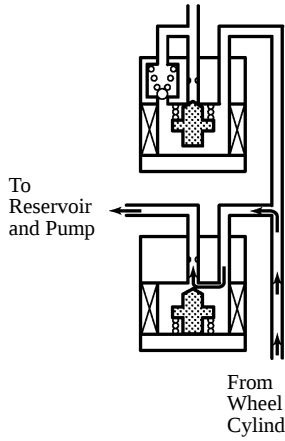
► Hydraulic Circuit ◀



208CH25

2) ABS with EBD Operation

Based on the signals received from the 4 wheel speed sensors, the skid control ECU calculates each wheel speed and deceleration, and checks wheel slipping condition. And according to the slipping condition, the ECU controls the pressure holding valve and pressure reduction valve in order to adjust the fluid pressure of each wheel cylinder in the following 3 modes: pressure reduction, pressure holding, and pressure increase modes.

Not Activated	Normal Braking	—	—
Activated	Increase Mode	Holding Mode	Reduction Mode
Hydraulic Circuit	 Port A Pressure Holding Valve Port B Pressure Reduction Valve To Wheel Cylinder 169CH54	 169CH55	 To Reservoir and Pump From Wheel Cylinder 169CH56
Pressure Holding Valve (Port A)	OFF (Open)	ON (Close)	ON (Close)
Pressure Reduction Valve (Port B)	OFF (Close)	OFF (Close)	ON (Open)
Wheel Cylinder Pressure	Increase	Hold	Reduction

3) Skid Control ECU

Initial Check

After the ignition is turned ON, and the vehicle attains an approximate speed of 6 km/h (4 mph) or more only at first time, the skid control ECU performs the initial check.

The functions of each solenoid valve and pump motor in the brake actuator are checked in order.

Self-Diagnosis

- If the skid control ECU detects a malfunction in the ABS with EBD system, the ABS and brake system warning lights that corresponds to the function in which the malfunction has been detected indicates or lights up, indicated in the table below, to alert the driver of the malfunction.

○: Light ON —: Light OFF

Item	ABS	EBD	Skid Control ECU
ABS Warning Light	○	○	○
Brake System Warning Light	—	○	○

- At the same time, the DTCs (Diagnosis Trouble Codes) are stored in memory. The DTCs can be read by connecting the SST (09843-18040) between the Tc and CG terminals of DLC3 and observing the blinking of the ABS warning light, or by connecting ahand-heldtester.
- This system has a sensor signal check function. The DTCs can be read by connecting theSST (09843-18040) between the Ts and CG terminals of DLC3 and observing the blinkingof the ABS warning light (only for TMC made brake actuator) or by connecting a hand-held tester.
- The DTCs listed below have been added (only for TMC made brake actuator).

DTC No.	Detection Item
C1235/35	Foreign matter is attached on the tip of the right front sensor
C1236/36	Foreign matter is attached on the tip of the left front sensor
C1238/38	Foreign matter is attached on the tip of the right rear sensor
C1239/39	Foreign matter is attached on the tip of the left rear sensor

For details on the DTCs that are stored in skid control ECU memory and the DTCs that are output through the sensor check function, see the 2002 Camry Repair Manual (Pub. No. RM881U).

4) Fail-Safe

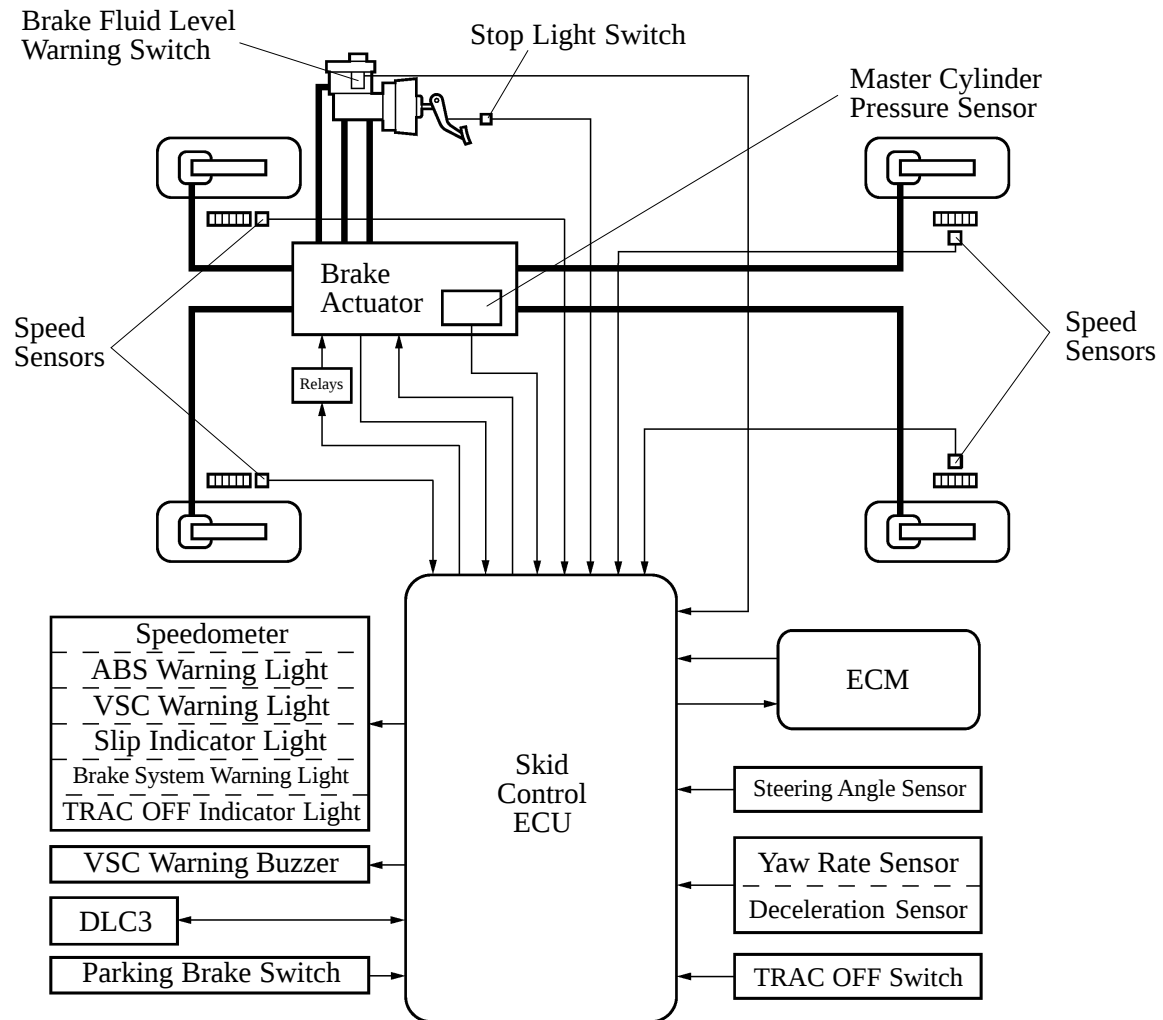
- In the event of a malfunction in the ABS, the skid control ECU prohibits the ABS control.
- In the event of a malfunction in EBD control, skid control ECU prohibits the EBD control.
Thus, the brake will be operated in the same condition as in the condition without the ABS control.

■ ABS with EBD & BRAKE ASSIST & TRAC & VSC SYSTEM

1. General

- The primary purpose of the ABS and TRAC system has been to help the vehicle's behavior during braking and acceleration.
In contrast, the purpose of the VSC system is to help maintain the vehicle's behavior during cornering.
- The TRAC system controls driving wheels, therefore, it controls the front wheels.
However, depending on the unexpected situations or external elements such as the ground surface conditions, vehicle speed, and emergency avoidance maneuvers, the vehicle may exhibit strong understeer or oversteer tendencies. In such situations, the VSC system dampens the strong understeer or oversteer to help maintain vehicle behavior.
- The primary purpose of the Brake Assist system is to provide an auxiliary brake force assist to the driver who cannot generate a large brake force during emergency braking.
- The EBD control utilizes ABS, realizing the proper brake force distribution between front and rear wheels in accordance with the driving conditions.
In addition, during cornering braking, it also controls the brake forces of right and left wheels, helping to maintain the vehicle behavior.

2. System Diagram



3. Outline of Brake Assist System

Brake Assist system interprets a quick push of the brake pedal as emergency braking and supplements the braking power applied if the driver has not stepped hard enough on the brake pedal.

In emergencies, drivers, especially inexperienced ones, often panic and do not apply sufficient pressure on the brake pedal.

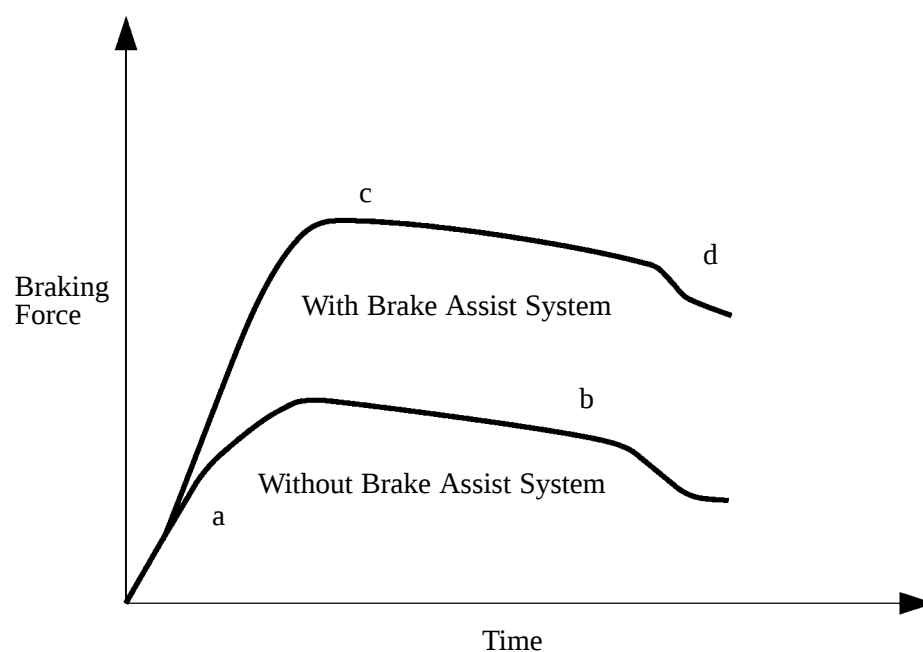
Brake Assist system measures the speed and force with which the brake pedal is pushed to determine whether the driver is attempting to brake rapidly, and applies additional pressure to increase braking performance. A key feature of Brake Assist system is that the timing and the degree of braking assistance are designed to ensure that the driver does not discern anything unusual about the braking operation.

When the driver intentionally eases up on the brake pedal, the system reduce the amount of assistance it provides.

— REFERENCE —

Effectiveness of the Brake Assist Operation:

- During emergency braking, an inexperienced driver, or a driver in a state of panic might not be able to firmly depress the brake pedal, although driver can depress it quickly. As a result, only a small amount of brake force is generated.
- The pedal effort of this type of driver might weaken as time passes, causing a reduction in the braking force.
- Based on how quickly the brake pedal is depressed, the Brake Assist operation assesses the intention of the driver to apply emergency braking and increases the brake force.
- After the Brake Assist operation, if the driver intentionally releases the brake pedal, the assist operation reduces the amount of Brake Assist in order to reduce the feeling of uneasiness.



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Service Tip

When this system is activated, the brake pedal could shudder, which is a normal occurrence of the system in operation and should not be considered a malfunction.

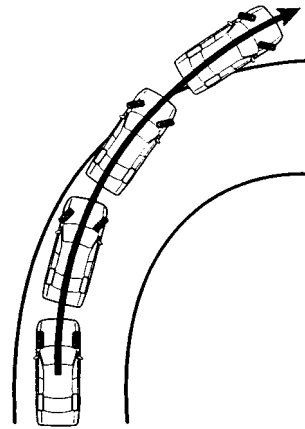
4. Outline of VSC System

General

The followings are two examples that can be considered as circumstances in which the tires over their lateral grip limit.

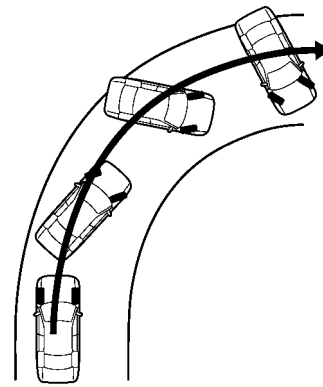
VSC system is to help control the vehicle behavior by applying the engine output control and each wheels brake control when the vehicle is under the condition indicated below.

- When the front wheels lose grip in relation to the rear wheels (strong understeer tendency).
- When the rear wheels lose grip in relation to the front wheels (strong oversteer tendency).



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Strong Understeer Tendency



189CH100

Strong Oversteer Tendency

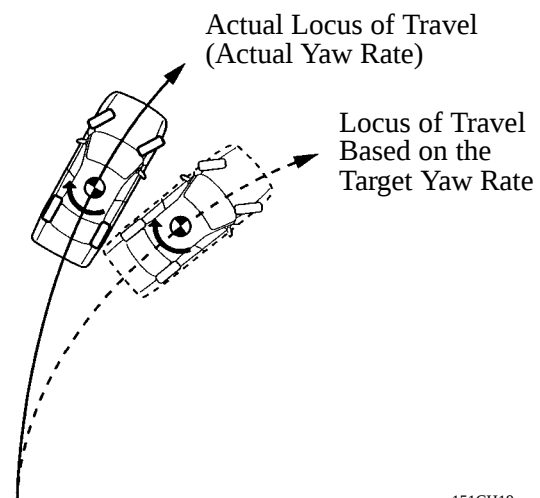
Method for Determining the Vehicle Condition

To determine the condition of the vehicle, sensors detect the steering angle, vehicle speed, vehicle's yaw rate, and the vehicle's lateral acceleration, which are then calculated by the skid control ECU.

1) Determining Understeer

Whether or not the vehicle is in the state of understeer is determined by the difference between the target yaw rate and the vehicle's actual yaw rate. When the vehicle's actual yaw rate is smaller than the yaw rate (a target yaw rate that is determined by the vehicle speed and steering angle) that should be rightfully generated when the driver operates the steering wheel, it means the vehicle is making a turn at a greater angle than the loss of travel.

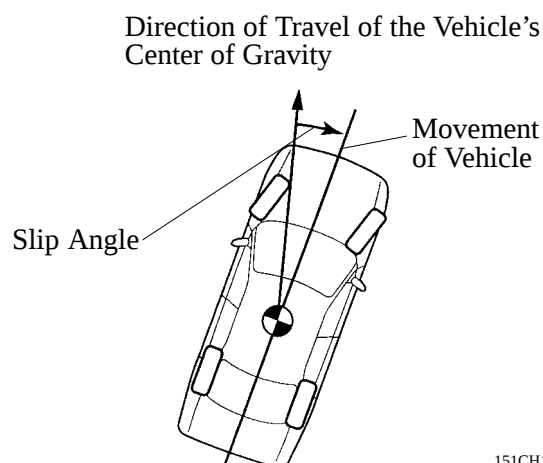
Thus, the ECU determines that there is a large tendency to understeer.



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2) Determining Oversteer

Whether or not the vehicle is in the state of oversteer is determined by the values of the vehicle's slip angle and the vehicle's slip angular velocity (time-dependent changes in the vehicle's slip angle). When the vehicle's slip angle is large, and the slip angular velocity is also large, the ECU determines that the vehicle has a large oversteer tendency.



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Method of VSC Operation

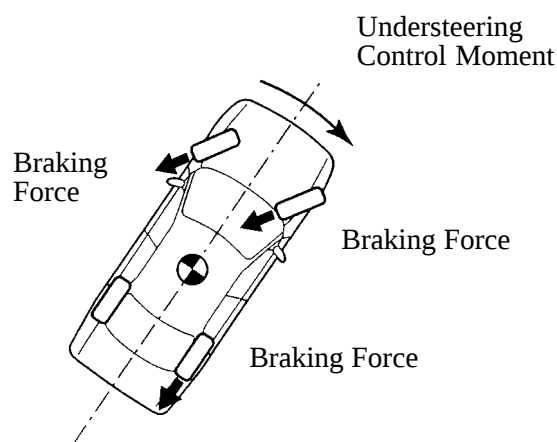
When the skid control ECU determines that the vehicle exhibits a tendency to understeer or oversteer, it decreases the engine output and applies the brake of a front or rear wheel to control the vehicle's yaw moment.

The basic operation of the VSC is described below. However, the control method differs depending on the vehicle's characteristics and driving conditions.

1) Dampening a Strong Understeer

When the skid control ECU determines that the vehicle exhibits a strong tendency to understeer, depending on the extent of that tendency, it decreases the engine output and applies the brakes of the front wheels and inside rear wheel, thus providing the vehicle with an understeer control moment, which helps dampen its tendency to understeer.

Also, depending on whether the brakes are ON or OFF and the condition of the vehicle, there are circumstances in which the brakes might not be applied to the wheels even if those wheels are targeted for braking.

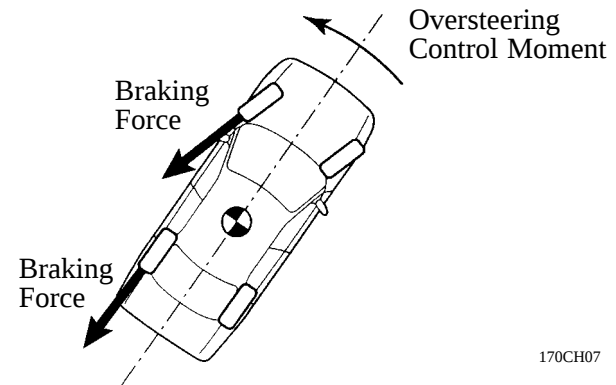


Making a Right Turn

161ES30

2) Dampening a Strong Oversteer

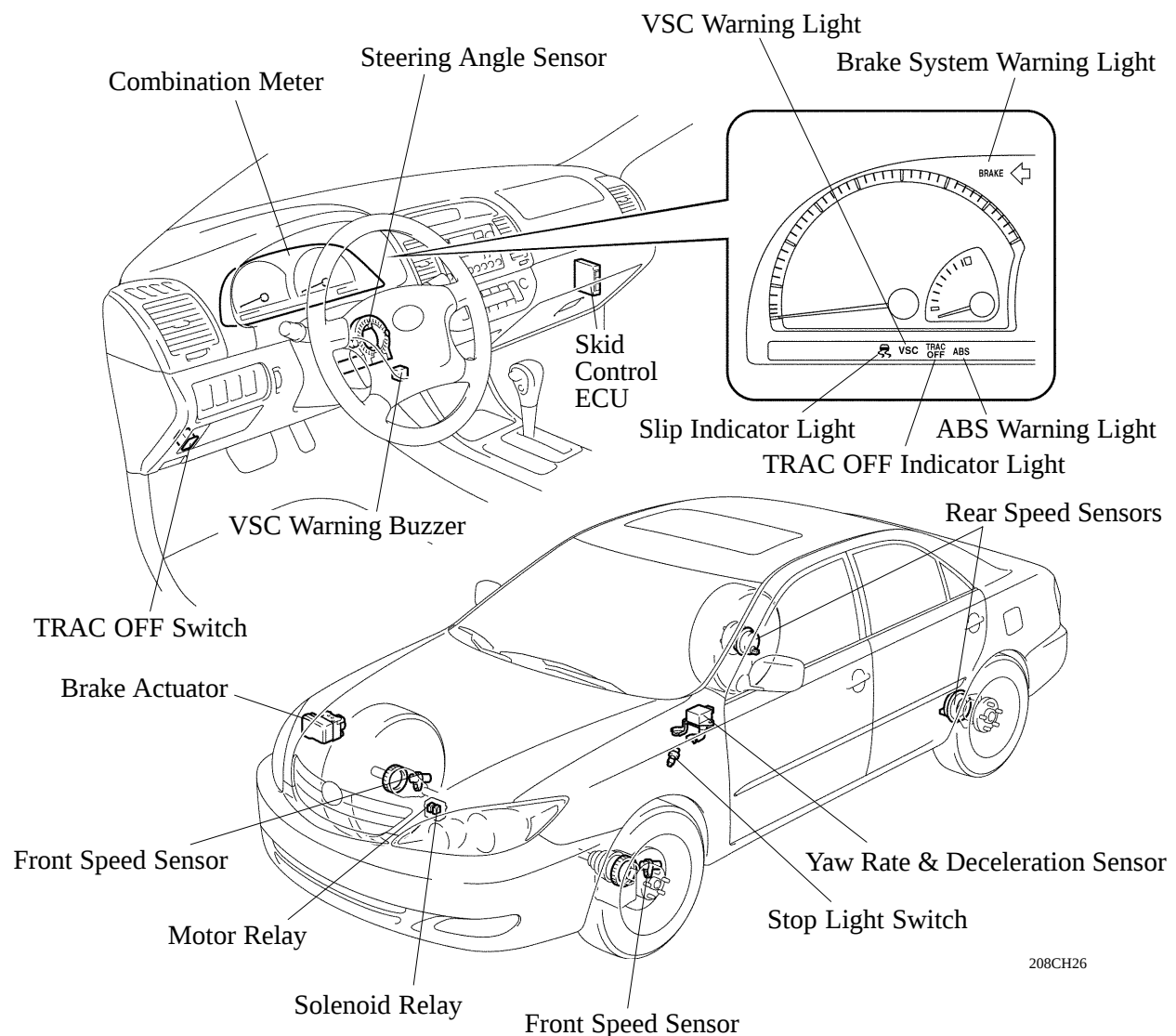
When the skid control ECU determines that the vehicle exhibits a strong tendency to oversteer, depending on the extent of that tendency, it controls the engine output and applies the brakes of the front and rear wheels of the outside of the turn, thus generating an inertial moment in the vehicle's outward direction, which helps dampen its tendency to oversteer.



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Making a Right Turn

5. Layout of Components



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6. Function of Component

Component		Function
Combination Meter	ABS Warning Light	Lights up to alert the driver when the skid control ECU detects the malfunction in the ABS or Brake Assist system.
	VSC Warning Light	Lights up to alert the driver when the skid control ECU detects the malfunction in the VSC system.
	Slip Indicator Light	Blinks to inform the driver when the TRAC system or the VSC system is operated.
	TRAC OFF Indicator Light	Lights up to inform the driver when the TRAC system is turned OFF by the TRAC OFF switch.
	Brake System Warning Light	Lights up together with the ABS warning light to alert the driver when the skid control ECU detects the malfunction in the EBD control.
ECM		- Sends the throttle valve opening angle signal, crankshaft position sensor, intake air temp. sensor, etc., to the skid control ECU. - Receive the signal of throttle valve opening request from the skid control ECU.
Speed Sensors		Detects the wheel speed of each four wheels.
Brake Actuator		Charges the fluid path based on the signals from the skid control ECU during the operation of the ABS with EBD & Brake Assist & TRAC & VSC system, in order to control the fluid pressure that is applied to the wheel cylinders.
	Master Cylinder Pressure Sensor	Assembled in the brake actuator and detects the master cylinder pressure.
Skid Control ECU		Judges the vehicle driving condition based on signals from each sensor, and sends brake control signal to the brake actuator.
Brake Fluid Level Warning Switch		Detects the brake fluid level.
Stop Light Switch		Detects the brake pedal depressing signal.
TRAC OFF Switch		Turns the TRAC system inoperative.
VSC Warning Buzzer		Emits an intermittent sound to inform the driver that the skid control ECU detects the strong understeer tendency or strong oversteer tendency.
Yaw Rate & Deceleration Sensor		- Detects the vehicle's yaw rate. - Detects the vehicle's acceleration in the forward, rearward, lateral and all directions.
Steering Angle Sensor		Detects the steering direction and angle of the steering wheel.
Motor Relay		Supply power to the pump motor in the brake actuator.
Solenoid Relay		Supply power to the solenoid valves in the brake actuator.

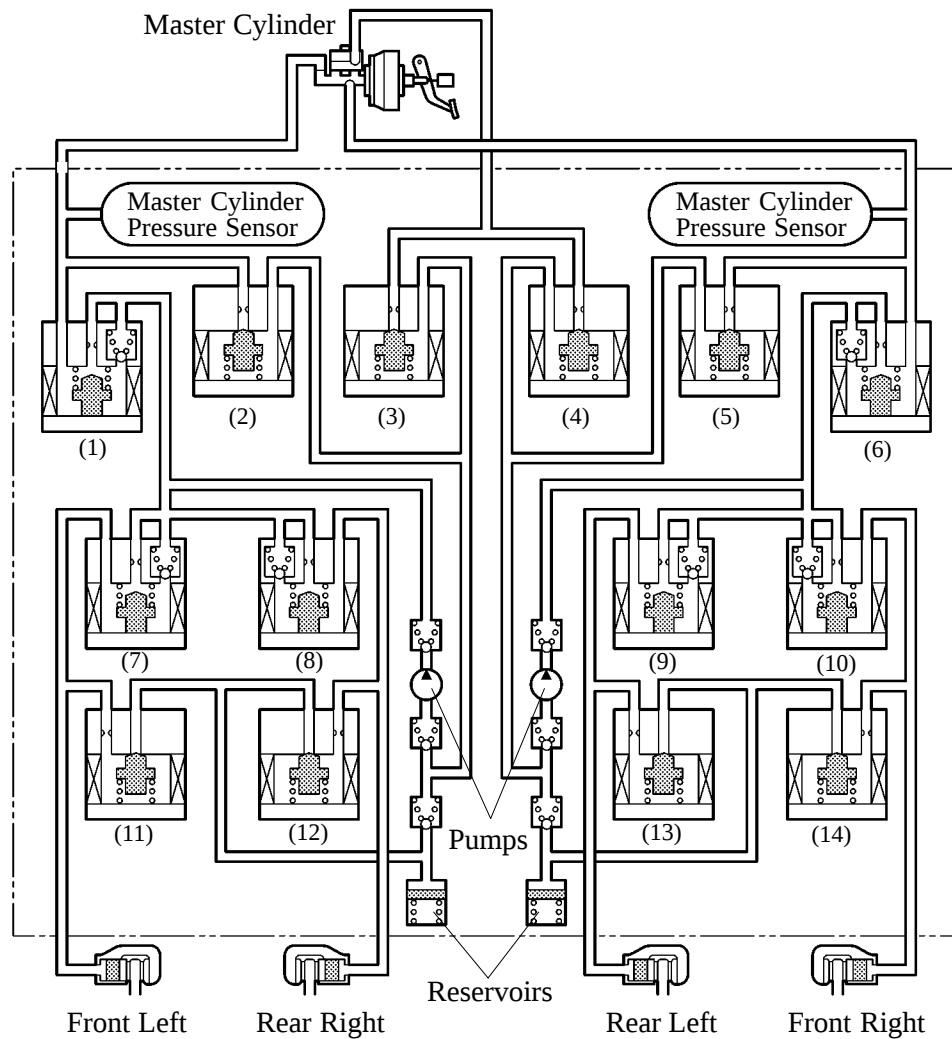
7. Brake Actuator

Construction

The brake actuator consists of 14 two-position valves, 1 motor, 2 pumps, and 2 reservoirs, and 2 master cylinder pressure sensor.

The 14 two-position solenoid valves consists of 2 master cylinder cut solenoid valve [(1), (6)], 2 suction solenoid valves [(2), (5)], 2 reservoir cut solenoid valves [(3), (4)], 4 pressure holding valves [(7), (8), (9), (10)], and 4 pressure reduction valves [(11), (12), (13), (14)].

► Hydraulic Circuit ◀



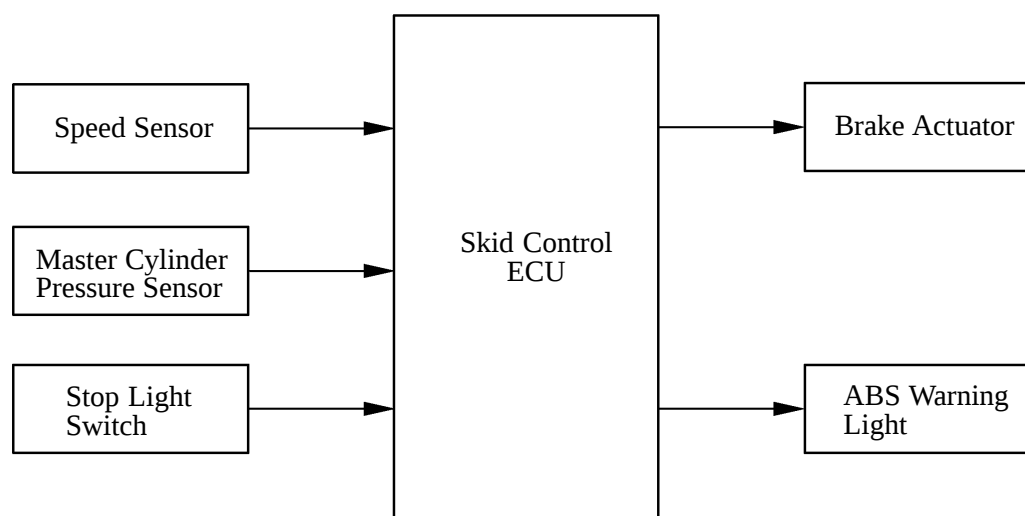
ABS with EBD Operation

The ABS with EBD operation is the same as the operation of the ABS with EBD system. Refer to that system for details.

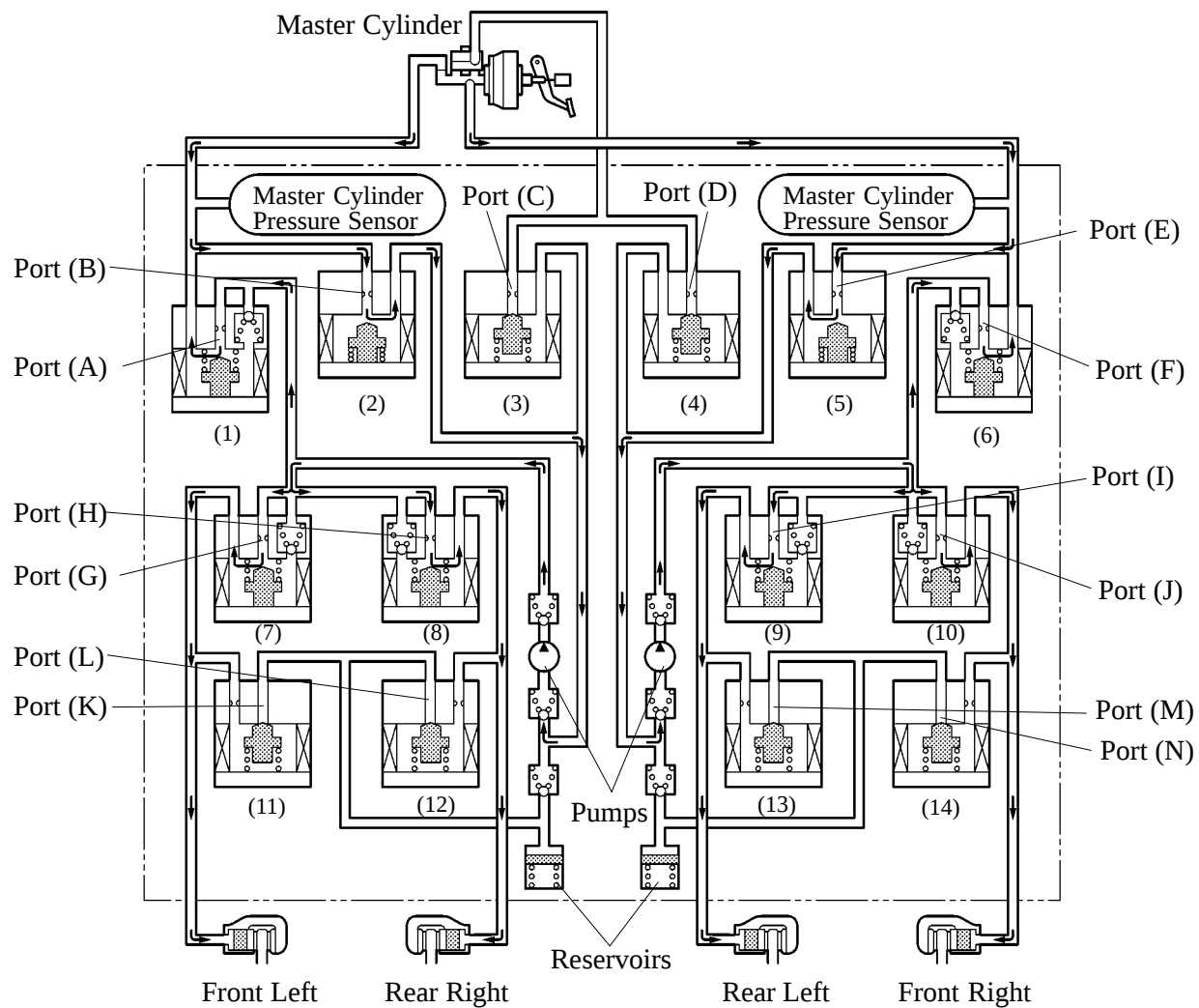
Brake Assist Operation

The fluid pressure that has been generated by the pump in the brake actuator is directed to the wheel cylinders. By applying a greater fluid pressure than the master cylinder, a greater braking force is achieved.

► System Diagram ◀



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Item		Brake Assist Not Activated	Brake Assist Activated
(1), (6)	Master Cylinder Cut Solenoid Valve	OFF (Open)	ON*
	Port: (A), (F)		
(3), (4)	Reservoir Cut Solenoid Valve	OFF (Close)	OFF (Close)
	Port: (C), (D)		
(2), (5)	Suction Solenoid Valve	OFF (Close)	ON (Open)
	Port: (B), (E)		
(7), (8), (9), (10)	Pressure Holding Valve	OFF (Open)	OFF (Open)
	Port: (G), (H), (I), (J)		
(11), (12), (13), (14)	Pressure Reduction Valve	OFF (Close)	OFF (Close)
	Port: (K), (L), (M), (N)		

*: The solenoid valve controls the hydraulic pressure between “open” through “close” according to the operating condition by adjusting continually.

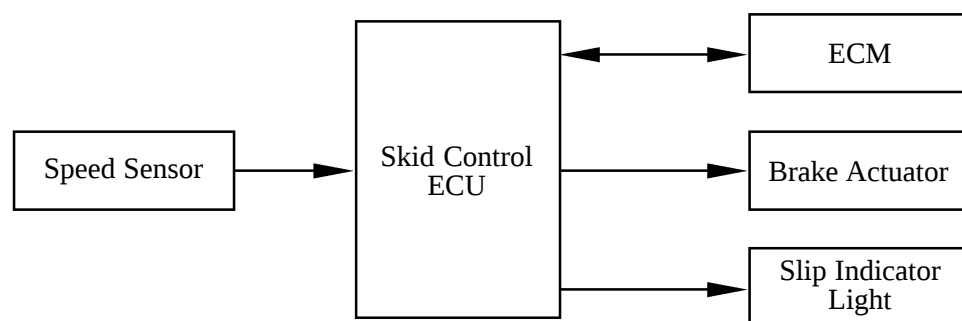
TRAC Operation

The fluid pressure that is generated by the pump is regulated by the master cylinder cut solenoid valve to the required pressure. Thus, the wheel cylinder of the drive wheels are controlled in the following 3 modes: pressure reduction, pressure holding, and pressure increase modes, to restrain the slippage of the drive wheels.

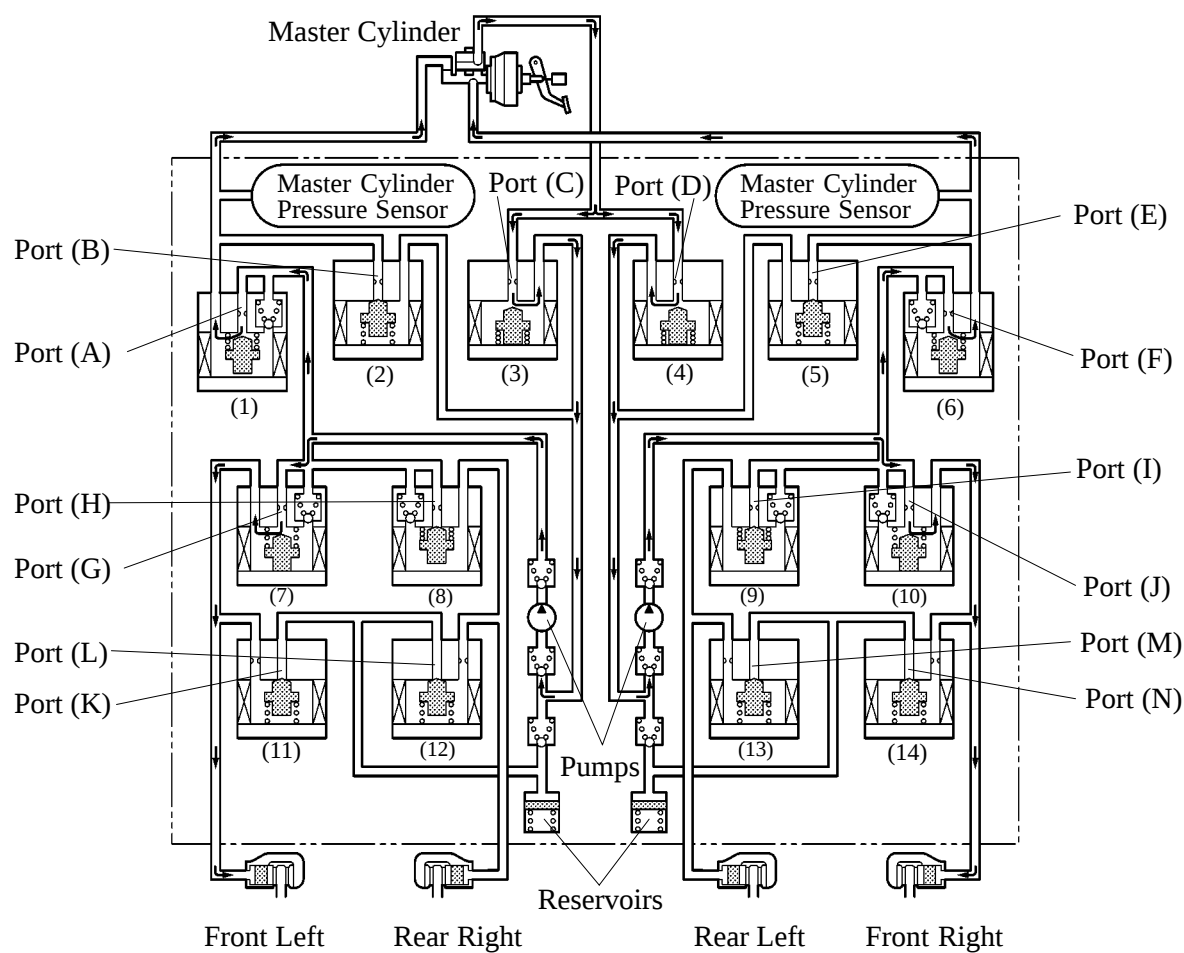
The diagram below shows the hydraulic circuit in the pressure increase mode when the TRAC system is activated.

In other, the pressure holding valve and the pressure reduction valve are turned ON/OFF according to the ABS operation pattern described on the previous page.

► System Diagram ◀



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Item			TRAC not Activated	TRAC Activated		
				Increase Mode	Holding Mode	Reduction Mode
(1), (6)		Master Cylinder Cut Solenoid Valve	OFF (Open)	ON*	ON*	ON*
		Port: (A), (F)				
(3), (4)		Reservoir Cut Solenoid Valve	OFF (Close)	ON (Open)	ON (Open)	ON (Open)
		Port: (C), (D)				
(2), (5)		Suction Solenoid Valve	OFF (Close)	OFF (Close)	OFF (Close)	OFF (Close)
		Port: (B), (E)				
Front Brake	(7), (10)	Pressure Holding Valve	OFF (Open)	OFF (Open)	ON (Close)	ON (Close)
		Port: (G), (J)				
	(11), (14)	Pressure Reduction Valve	OFF (Close)	OFF (Close)	OFF (Close)	ON (Open)
		Port: (K), (N)				
	Wheel Cylinder Pressure		—	Increase	Hold	Reduction
Rear Brake	(8), (9)	Pressure Holding Valve	OFF (Open)	ON (Close)	ON (Close)	ON (Close)
		Port: (H), (J)				
	(12), (13)	Pressure Reduction Valve	OFF (Close)	OFF (Close)	OFF (Close)	OFF (Close)
		Port: (L), (M)				
	Wheel Cylinder Pressure		—	—	—	—

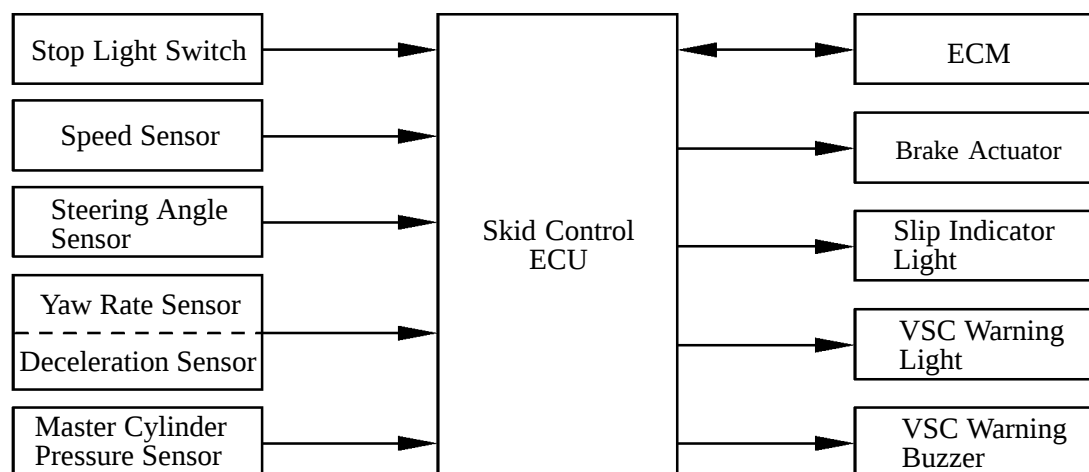
*: The solenoid valve controls the hydraulic pressure between “open” through “close” according to the operating condition by adjusting continually.

VSC Operation

1) General

The VSC system, by way of solenoid valves, controls the fluid pressure that is generated by the pump and applies it to the brake wheel cylinder of each wheel in the following 3 modes: pressure reduction, pressure holding, and pressure increase modes. As a result, the tendency to understeer or oversteer is restrained.

► System Diagram ◀

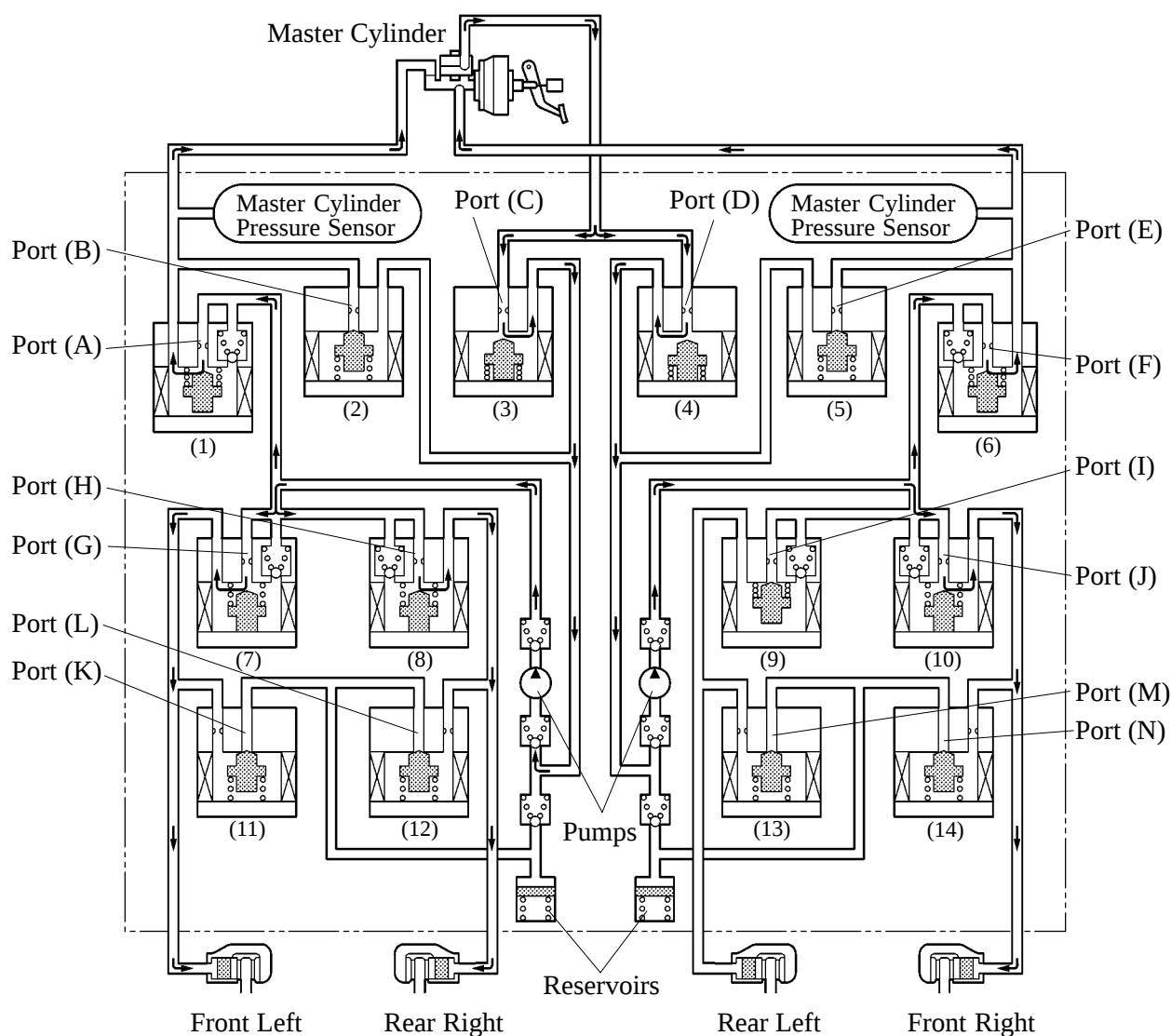


2) Understeer Restraining Control (Turning to the Right)

In understeer restraining control, the brake of the front wheels and rear wheel of the inner side of the turn is applied.

Also, depending on whether the brake is ON or OFF and the condition of the vehicle, there are circumstances in which the brake might not be applied to the wheels even if those wheels are targeted for braking. The diagram below shows the hydraulic circuit in the pressure increase mode, as it restrains an understeer condition while the vehicle makes a right turn.

In other, the pressure holding valve and the pressure reduction valve are turned ON/OFF according to the ABS operation pattern.



Increase Mode

208CH33

Item			VSC not Activated	VSC Activated			
				Increase Mode	Holding Mode	Reduction Mode	
(1), (6)	Master Cylinder Cut Solenoid Valve		OFF (Open)	ON*	ON*	ON*	
	Port: (A), (F)						
(3), (4)	Reservoir Cut Solenoid Valve		OFF (Close)	ON (Open)	ON (Open)	ON (Open)	
	Port: (C), (D)						
(2), (5)	Suction Solenoid Valve		OFF (Close)	OFF (Close)	OFF (Close)	OFF (Close)	
	Port: (B), (E)						
Front Brake	(7), (10)	Pressure Holding Valve	OFF (Open)	OFF (Open)	ON (Close)	ON (Close)	
		Port: (G), (J)					
	(11), (14)	Pressure Reduction Valve	OFF (Close)	OFF (Close)	OFF (Close)	ON (Open)	
		Port: (K), (N)					
	Wheel Cylinder Pressure		—	Increase	Hold	Reduction	
Rear Brake	(8)	Pressure Holding Valve (Rear Right)	OFF (Open)	OFF (Open)	ON (Close)	ON (Close)	
		Port: (H)					
	(9)	Pressure Holding Valve (Rear Left)	OFF (Open)	ON (Close)	ON (Close)	ON (Close)	
		Port: (I)					
	(12)	Pressure Reduction Valve (Rear Right)	OFF (Close)	OFF (Close)	OFF (Close)	ON (Open)	
		Port: (L)					
	(13)	Pressure Reduction Valve (Rear Left)	OFF (Close)	OFF (Close)	OFF (Close)	OFF (Close)	
		Port: (M)					
	Wheel Cylinder Pressure		Right	—	Increase	Hold	Reduction
			Left	—	—	—	—

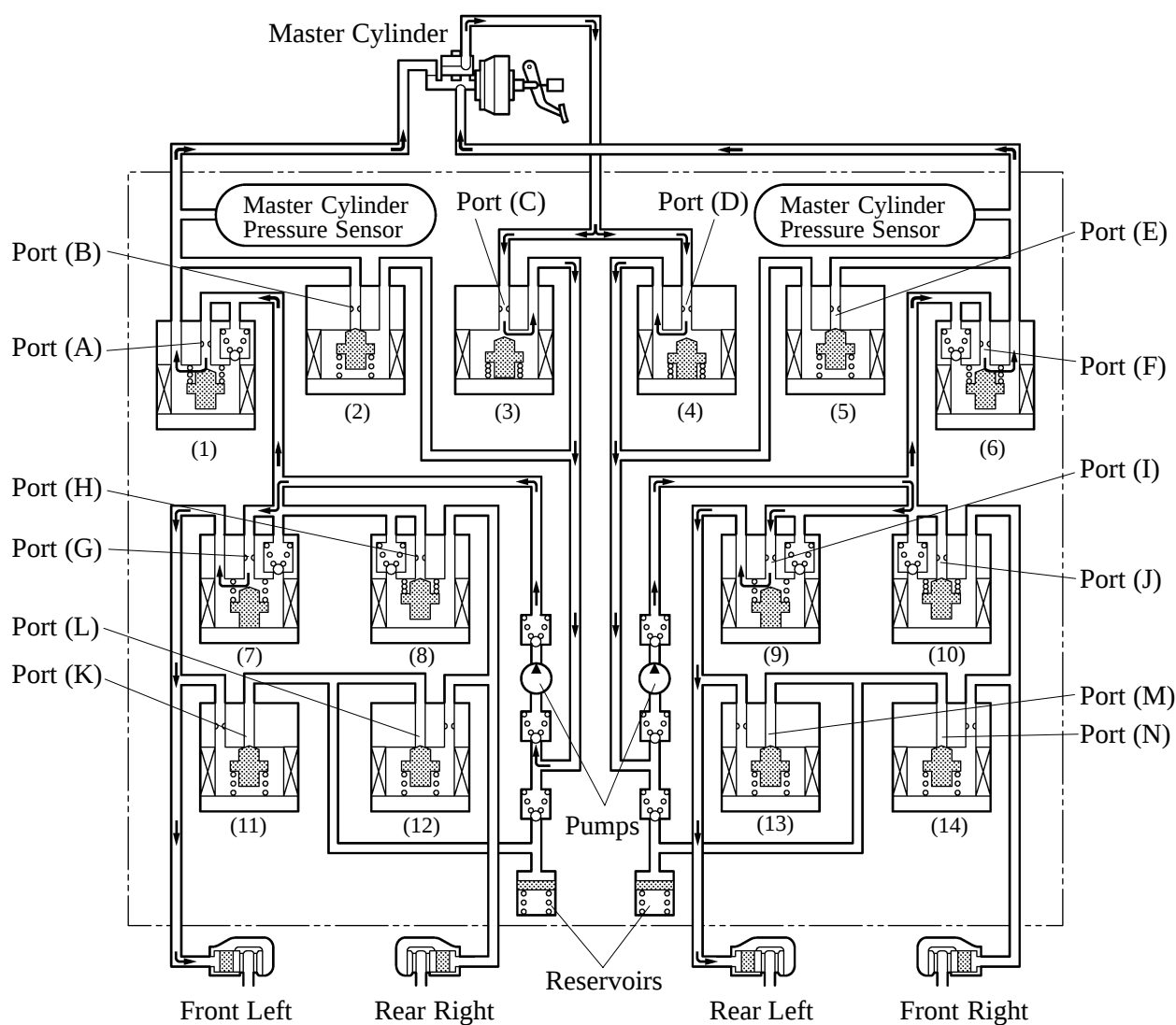
*: The solenoid valve controls the hydraulic pressure between “open” through “close” according to the operating condition by adjusting continually.

3) Oversteer Restraining Control (Turning to the Right)

In oversteer restraining control, the brake of the front and rear wheels of the outer side of the turn is applied. As an example, the diagram below shows the hydraulic circuit in the pressure increase mode, as it restrains an oversteer condition while the vehicle make a right turn.

As in understeer restraining control, in other, the pressure holding valve and the pressure reduction valve are turned ON/OFF according to the ABS operating pattern.

However, in oversteer control, the pressure holding valve is turned ON and blocks the hydraulic passage to the front inner wheel in order to prevent applying the brake to the front inner wheel.



Increase Mode

Item			VSC not Activated	VSC Activated			
				Increase Mode	Holding Mode	Reduction Mode	
(1), (6)		Master Cylinder Cut Solenoid Valve	OFF (Open)	ON*	ON*	ON*	
		Port: (A), (F)					
(3), (4)		Reservoir Cut Solenoid Valve	OFF (Close)	ON (Open)	ON (Open)	ON (Open)	
		Port: (C), (D)					
(2), (5)		Suction Solenoid Valve	OFF (Close)	OFF (Close)	OFF (Close)	OFF (Close)	
		Port: (B), (E)					
Front Brake	(10)	Pressure Holding Valve (Front Right)	OFF (Open)	ON (Close)	ON (Close)	ON (Close)	
		Port: (J)					
	(7)	Pressure Holding Valve (Front Left)	OFF (Open)	OFF (Open)	ON (Close)	ON (Close)	
		Port: (G)					
	(14)	Pressure Reduction Valve (Front Right)	OFF (Close)	OFF (Close)	OFF (Close)	OFF (Close)	
		Port: (N)					
	(11)	Pressure Reduction Valve (Front Left)	OFF (Close)	OFF (Close)	OFF (Close)	ON (Open)	
		Port: (K)					
	Wheel Cylinder Pressure		Right	—	—	—	—
			Left	—	Increase	Hold	Reduction
Rear Brake	(8)	Pressure Holding Valve (Rear Right)	OFF (Open)	ON (Close)	ON (Close)	ON (Close)	
		Port: (H)					
	(9)	Pressure Holding Valve (Rear Left)	OFF (Open)	OFF (Open)	ON (Close)	ON (Close)	
		Port: (I)					
	(12)	Pressure Reduction Valve (Rear Right)	OFF (Close)	OFF (Close)	OFF (Close)	OFF (Close)	
		Port: (L)					
	(13)	Pressure Reduction Valve (Rear Left)	OFF (Close)	OFF (Close)	OFF (Close)	ON (Open)	
		Port: (M)					
	Wheel Cylinder Pressure		Right	—	—	—	—
			Left	—	Increase	Hold	Reduction

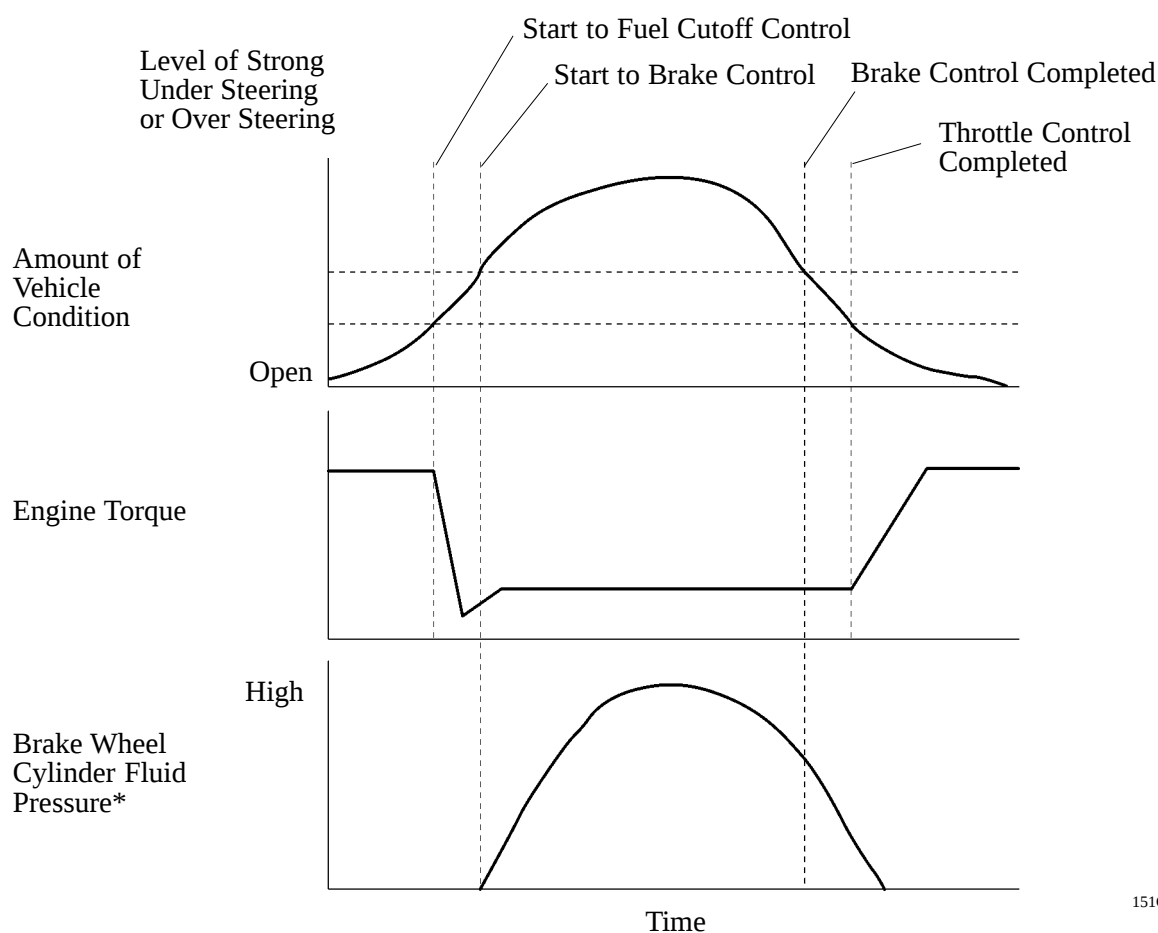
*: The solenoid valve controls the hydraulic pressure between “open” through “close” according to the operating condition by adjusting continually.

8. Skid Control ECU

VSC

Based on the 4 type of sensor signals received from the speed sensors, yaw rate sensor, deceleration sensor and steering sensor, the skid control ECU calculates the amount of vehicle condition.

If a strong understeer or oversteer tendency is created during an emergency avoidance maneuver or cornering, and the skid control ECU determines that the amount of vehicle condition exceeds a prescribed value, it controls the engine torque through throttle and the brake fluid pressure according to the amount of the vehicle condition.



151CH31

*: The wheel cylinder that activates varies depending on the condition of the vehicle.

Initial Check

After the ignition is turned ON, and the vehicle attains an approximate speed of 6 km/h (4 mph) or more only at first time, the skid control ECU performs the initial check.

The functions of each solenoid valve and pump motor in the brake actuator are checked in order.

Self-Diagnosis

If the skid control ECU detects a malfunction in the ABS with EBD, Brake Assist, TRAC, and VSC systems, the ABS, brake system, VSC warning lights and TRAC OFF indicator light that corresponds to the function in which the malfunction has been detected indicates or lights up, as indicated in the table below, to alert the driver of the malfunction.

○: Light ON —: Light OFF

Item	ABS	EBD	Brake Assist	TRAC	VSC	Skid Control ECU
ABS Warning Light	○	○	○	—	—	○
Brake System Warning Light	—	○	—	—	—	○
TRAC OFF Indicator Light	○	○	○	○	○	○
VSC Warning Light	○	○	○	○	○	○

- At the same time, the DTCs (Diagnosis Trouble Codes) are stored in memory. The DTCs can be read by connecting the SST (09843-18040) between the Tc and CG terminals DLC3 and observing the blinking of the ABS warning light and VSC warning light, or by connecting a hand-held tester.
- This system has a sensor signal check function. The DTCs can be read by connecting the SST (09843-18040) between the Ts and CG terminals of DLC3 and observing the blinking of the ABS warning light and VSC warning light, or by connecting a hand-held tester.
- The DLC1 has been discontinued.
- The following DTCs have been added to the TRAC system of the previous model:

► Output by blinking ABS warning light ◀

DTC No.	Detection Item	DTC No.	Detection Item
C1235/35	Foreign matter is attached on the tip of the right front sensor	C1243/43	Malfunction in deceleration sensor (abnormal constant output)
C1236/36	Foreign matter is attached on the tip of the left front sensor	C1244/44	Open or short circuit of deceleration sensor circuit
C1238/38	Foreign matter is attached on the tip of the right rear sensor	C1245/45	Malfunction in deceleration sensor circuit
C1239/39	Foreign matter is attached on the tip of the left rear sensor	C1246/46	Malfunction in master cylinder pressure sensor

► Output by blinking VSC warning light ◀

DTC No.	Detection Item	DTC No.	Detection Item
C1231/31	Malfunction in steering angle sensor	C1223/43	Malfunction in ABS control system
C1232/32	Malfunction in deceleration sensor	C1224/44	Open or short circuit in NE signal circuit
C1233/33	Open or short circuit of yaw rate sensor circuit	C1201/51	ECM system malfunction
C1234/34	Malfunction in yaw rate sensor	C1202/52	• Brake fluid level low • Open circuit of brake fluid level warning switch circuit
C1335/35	Malfunction in steering angle sensor communication circuit	C1203/53	ECM communication circuit malfunction
C1210/36	Zero point calibration of yaw rate sensor undone	C1261/61	Malfunction in master cylinder pressure sensor
C1336/39	Zero point calibration of deceleration sensor undone	—	—

- The C1228/28 (Open or short circuit in SRC2 circuit) DTC have been discontinued to the TRAC system of the previous model.

For details on the DTCs that are stored in skid control ECU memory and the DTCs that are output through the sensor check function, see the 2002 Camry Repair Manual (Pub. No. RM881U).

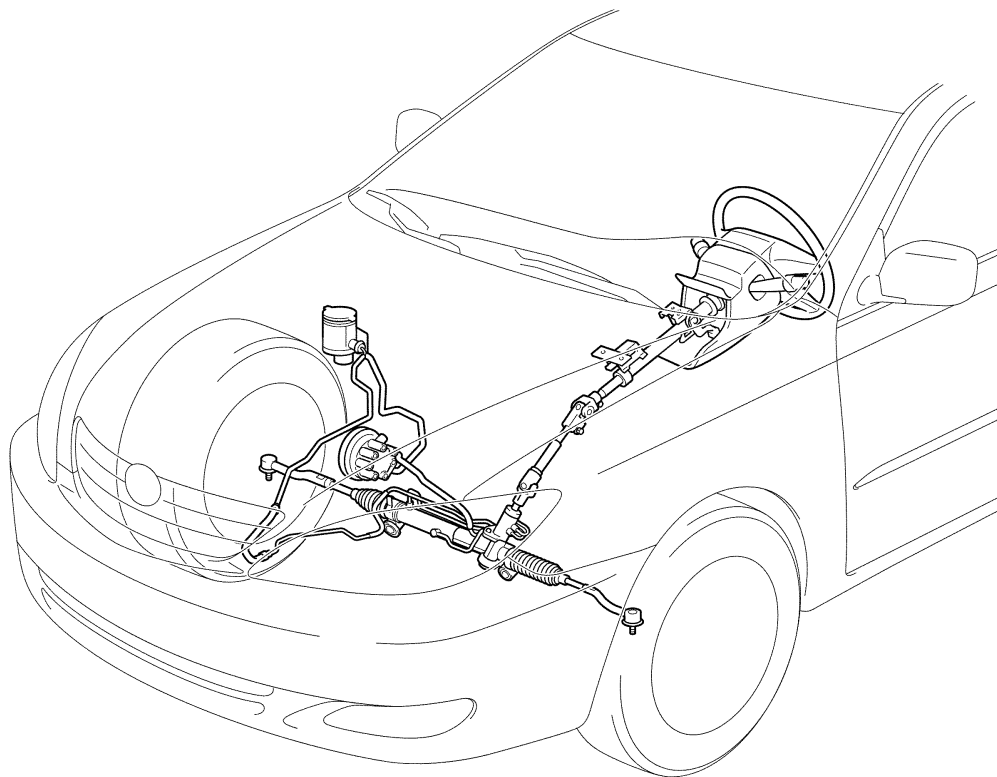
Fail-Safe

- In the event of a malfunction in the TRAC and/or VSC, the skid control ECU prohibits the TRAC and VSC control.
- In the event of a malfunction in the ABS and/or Brake Assist, the skid control ECU prohibits the ABS, TRAC, and VSC control and Brake Assist.
- In the event of a malfunction in the EBD control, skid control ECU prohibits the EBD control. Thus, brake and throttle valve opening angle control will be opened in the same condition as in the condition without the ABS, TRAC, VSC, control and Brake Assist.

STEERING

DESCRIPTION

- As in the previous models, a rack and pinion type steering gear and an engine revolution sensing type power steering are used on all model.
- The power steering vane pump on '02 Camry (except SE grade of 1MZ-FE engine model) has newly adopted a flow volume return pump which makes the discharge pressure flow volume return at middle and high speed, thus secured the fine steering feeling.
- The stepless tilt steering is used on all models.
- The steering column has adopted an energy absorbing mechanism that uses energy absorbing plate.



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► Specification ◀

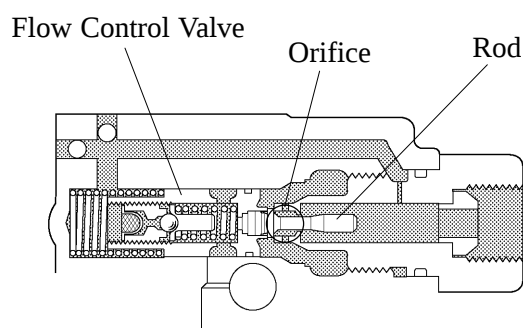
Model	'02 ES300		'01 ES300	
Engine Type	2AZ-FE	1MZ-FE	5S-FE	1MZ-FE
Gear Ratio (Overall)	16.1	16.0	17.4	←
No. to Turns Lock to Lock	2.98	←	3.1	3.0
Rack Stroke mm (in.)	145.0 (5.71)	←	149.0 (5.87)	145.0 (5.71)
Fluid Type	ATF Type DEXRON® II or III	←	←	←

■ POWER STEERING VANE PUMP

1. Construction

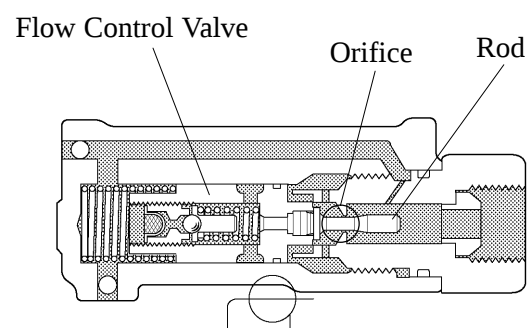
In this pump, the control spool to control the pump flow volume in the middle and high range of the pump speed has been discontinued and a rod for the flow control valve which decides the flow volume opening area has been established instead.

Other basic structure and operation are the same as '01 Camry.



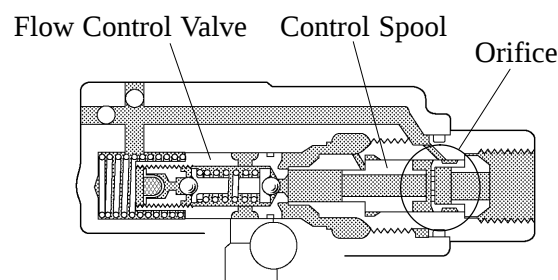
'02 Camry
(1MZ-FE Engine)

208CH39



'02 Camry
(2AZ-FE Engine)

208CH40

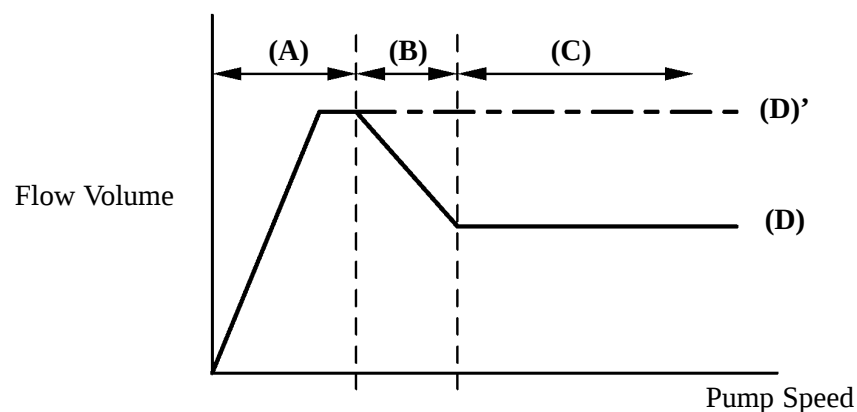


'01 Camry
(1MZ-FE Engine)

208CH38

2. Operation

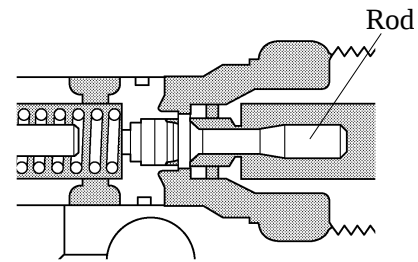
► Flow Volume Characteristics ◀



208CH45

Low Speed Range (A)

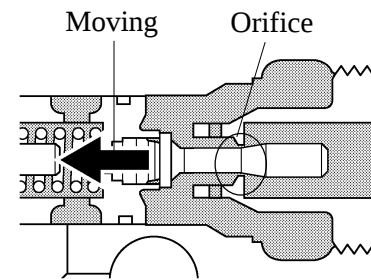
Flow volume increases in accordance with the increase of pump speed.



208CH41

Middle Speed Range without Steering (B)

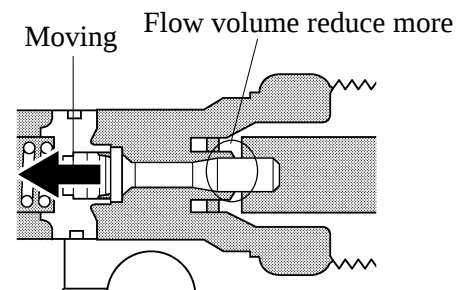
The flow control valve moves to the left and reduces the flow volume by drawing the orifice according to the change of the shaft diameter of the rod.



208CH42

High Speed Range without Steering (C)

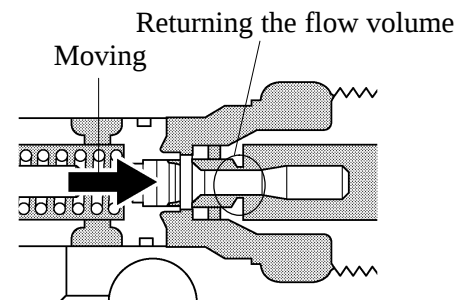
The flow control valves moves further left and with the maximum shaft diameter of the rod, the flow volume reduces more.



208CH43

During Pressure Loading (D → D')

If operating the steering in the middle and high speed range, the flow control valve moves to the right according to the pressure increase of the vane pump resulting in opening the orifice and returning the flow volume.



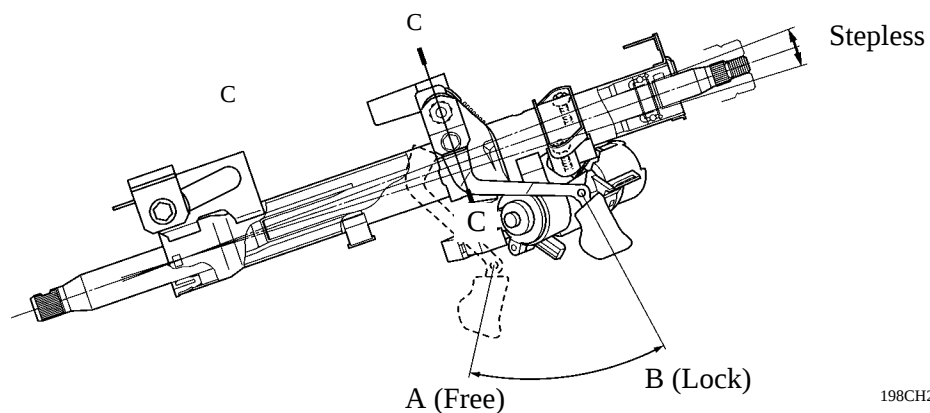
208CH44

■ TILT STEERING

The tilt mechanism mainly consists of a tilt lever, steering column tube attachment, breakaway bracket, tilt lever lock bolt and tilt steering stoppers.

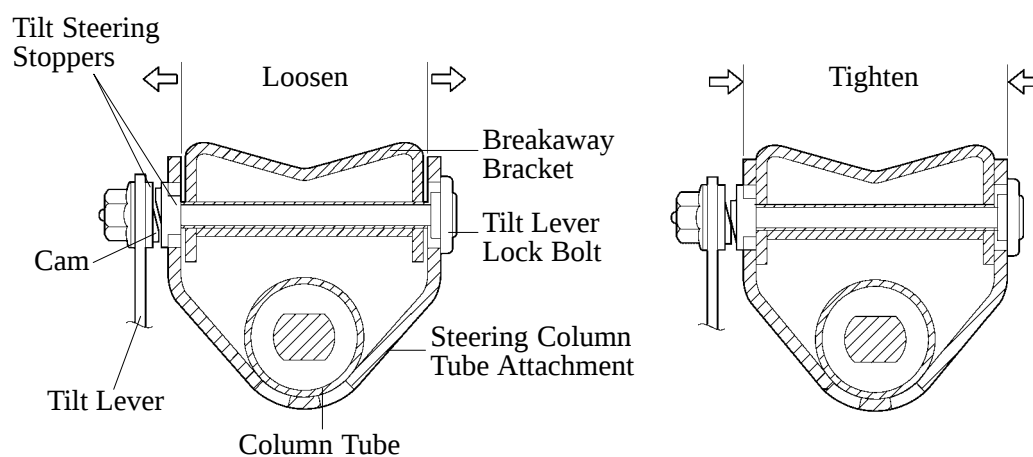
When the tilt mechanism is in its locked state, the tilt lever at B position causes the cam of the tilt steering stoppers to tighten the steering column tube attachment.

When the tilt mechanism is in its free state, the tilt lever at A position causes the cam of the tilt steering stoppers to loosen the steering column tube attachment.



198CH28

► C - C Cross Section ◀



Free

211CH48

Lock

211CH49

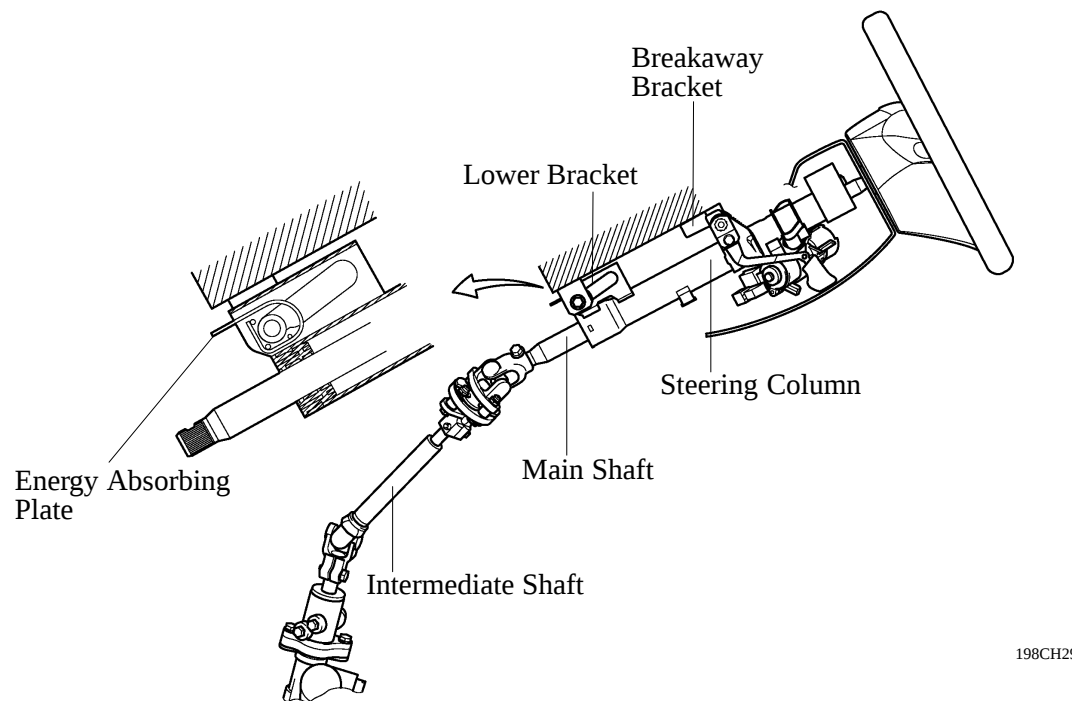
■ ENERGY ABSORBING MECHANISM

The energy absorbing mechanism mainly consists of a lower bracket, energy absorbing plate, breakaway bracket, contractile main shaft and contractile intermediate shaft.

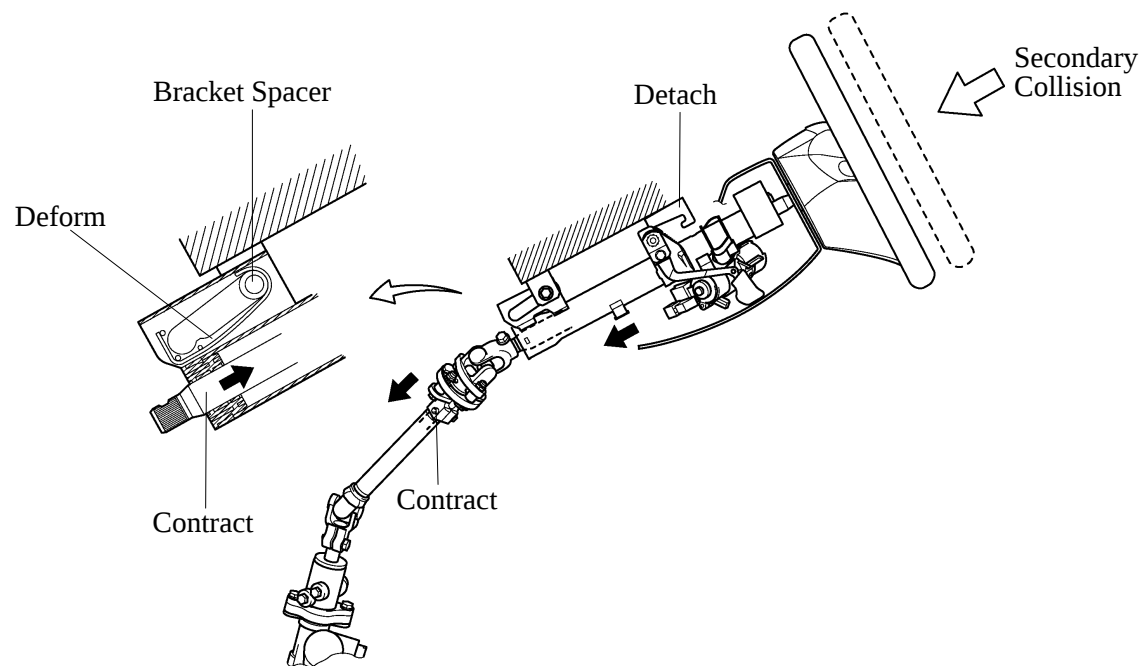
When an impact is transmitted to the steering wheel in a frontal collision (secondary collision), the lower bracket and the bracket spacer, as well as the breakaway bracket and the tilt lever lock bolt separate, causing the entire steering column to move forward.

At the same time, the energy absorbing plate in the lower bracket is deformed by the bracket spacer to and helps absorb the impact of the secondary collision.

Furthermore, the amount of forward movement of the entire steering column is absorbed by the contraction of the main shaft and the intermediate shaft.



Before Collision



After Collision

BODY

BODY STRUCTURE

■ LIGHTWEIGHT AND HIGH RIGID BODY

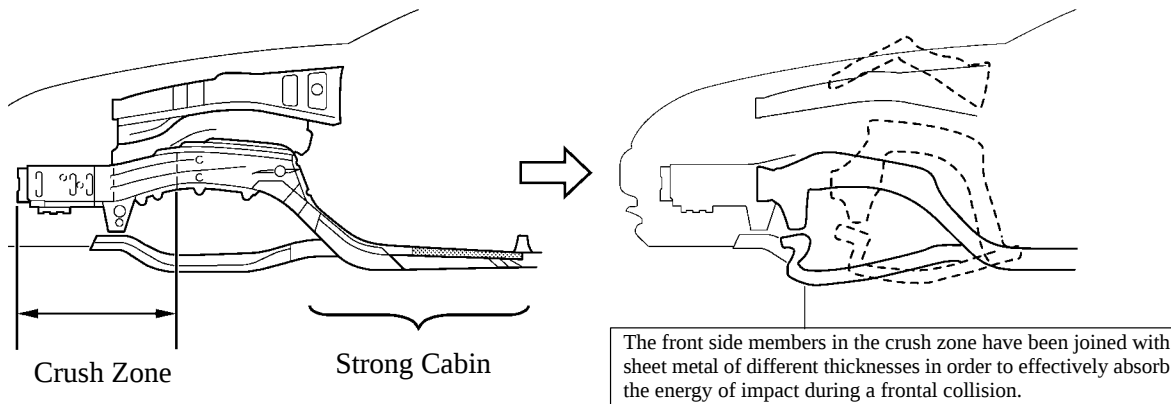
High strength sheet steel has been used in order to ensure body rigidity and realize a lightweight body.

■ SAFETY FEATURE

1. Impact Absorbing Structure

General

The impact absorbing body structure of the '02 Camry can effectively help absorb the energy of impact in the event of a frontal or side collision. This structure also realizes high-performance occupant protection through the use of reinforcements and members that help to minimize cabin deformation.

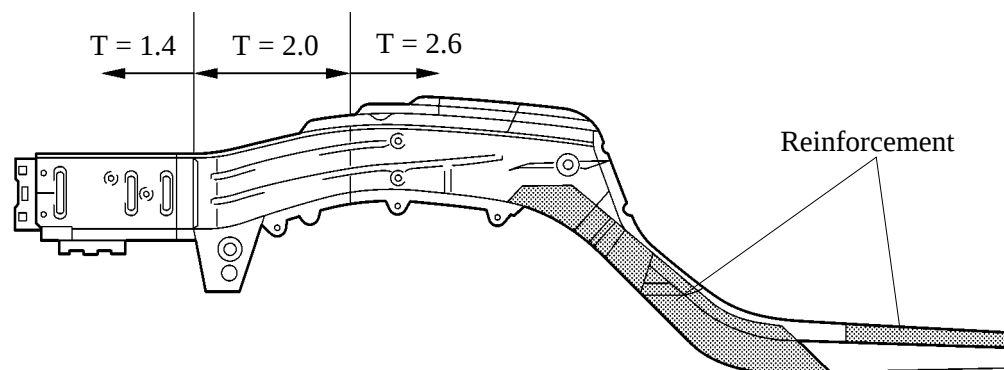


208BO01

Construction

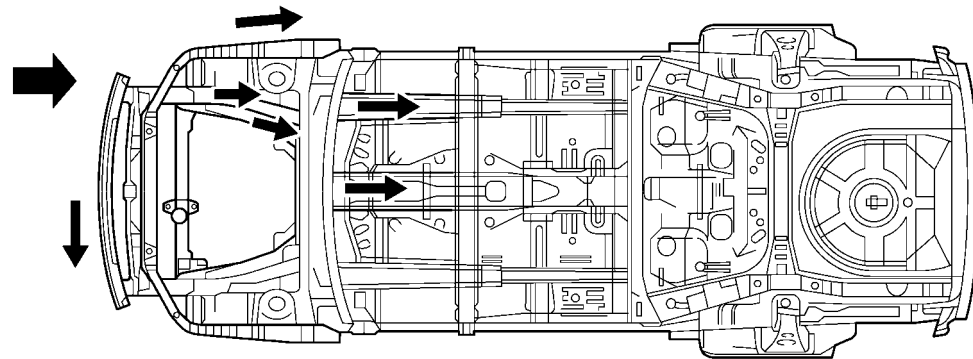
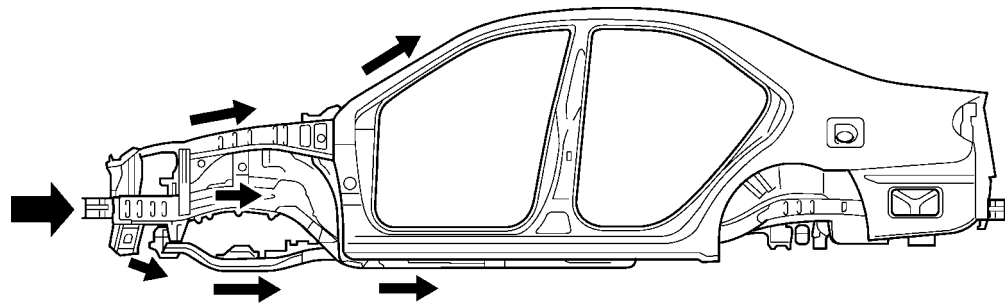
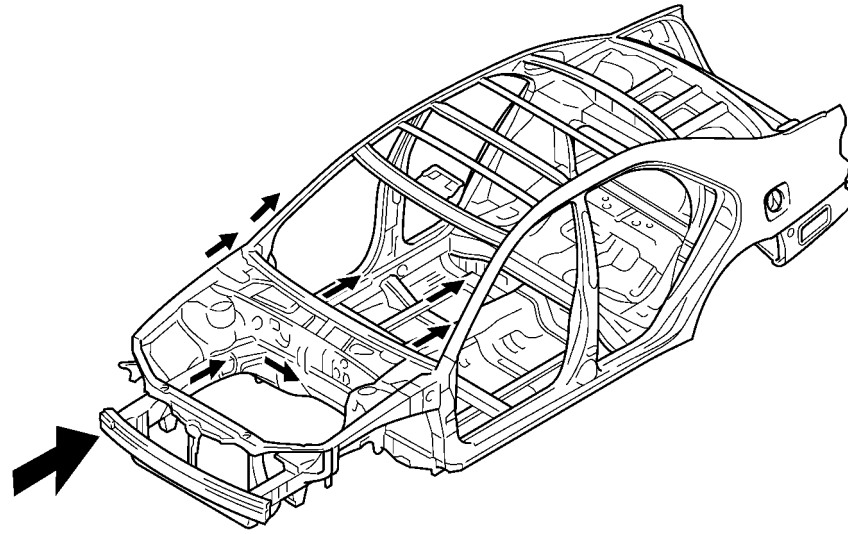
1) Impact Absorbing Structure for Frontal Collision

- The front side members in the crush zone have been joined with sheet metal of different thicknesses in order to effectively absorb the energy of impact during a frontal collision.
- The front side members in the cabin have been provided with reinforcements in order to restrain the deformation of the cabin.



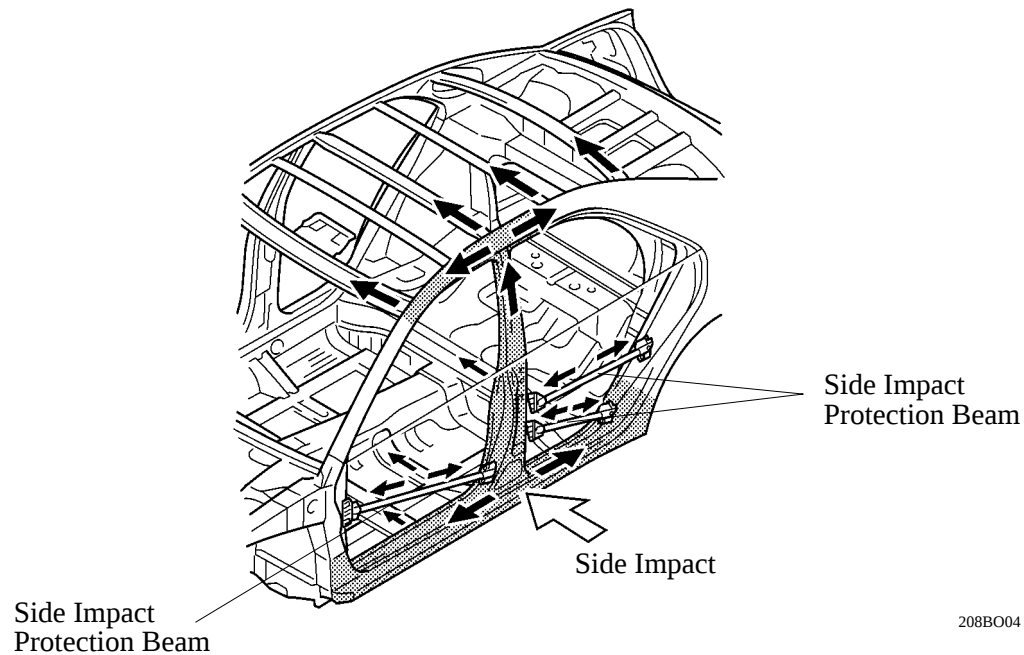
208BO02

► Frontal Collision Load Distribution Diagram ◀

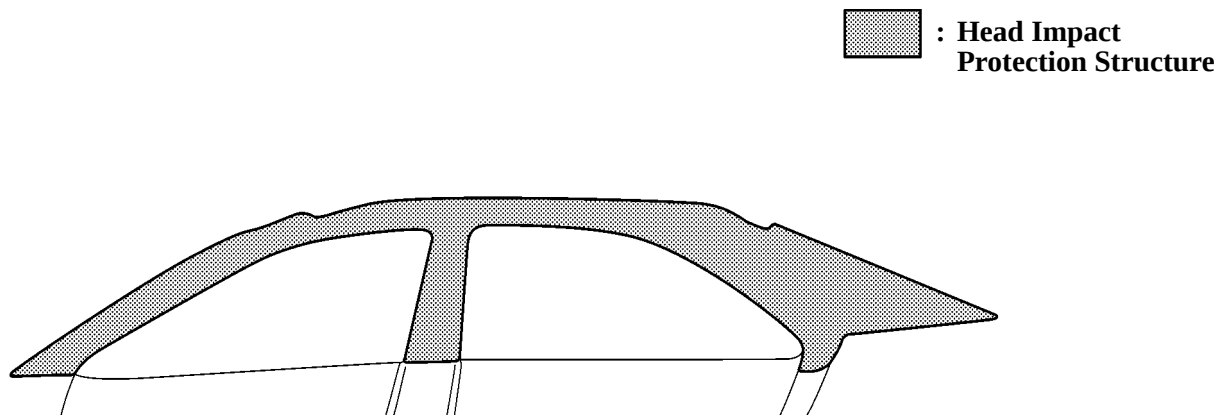


2) Impact Absorbing Structure for Side Collision

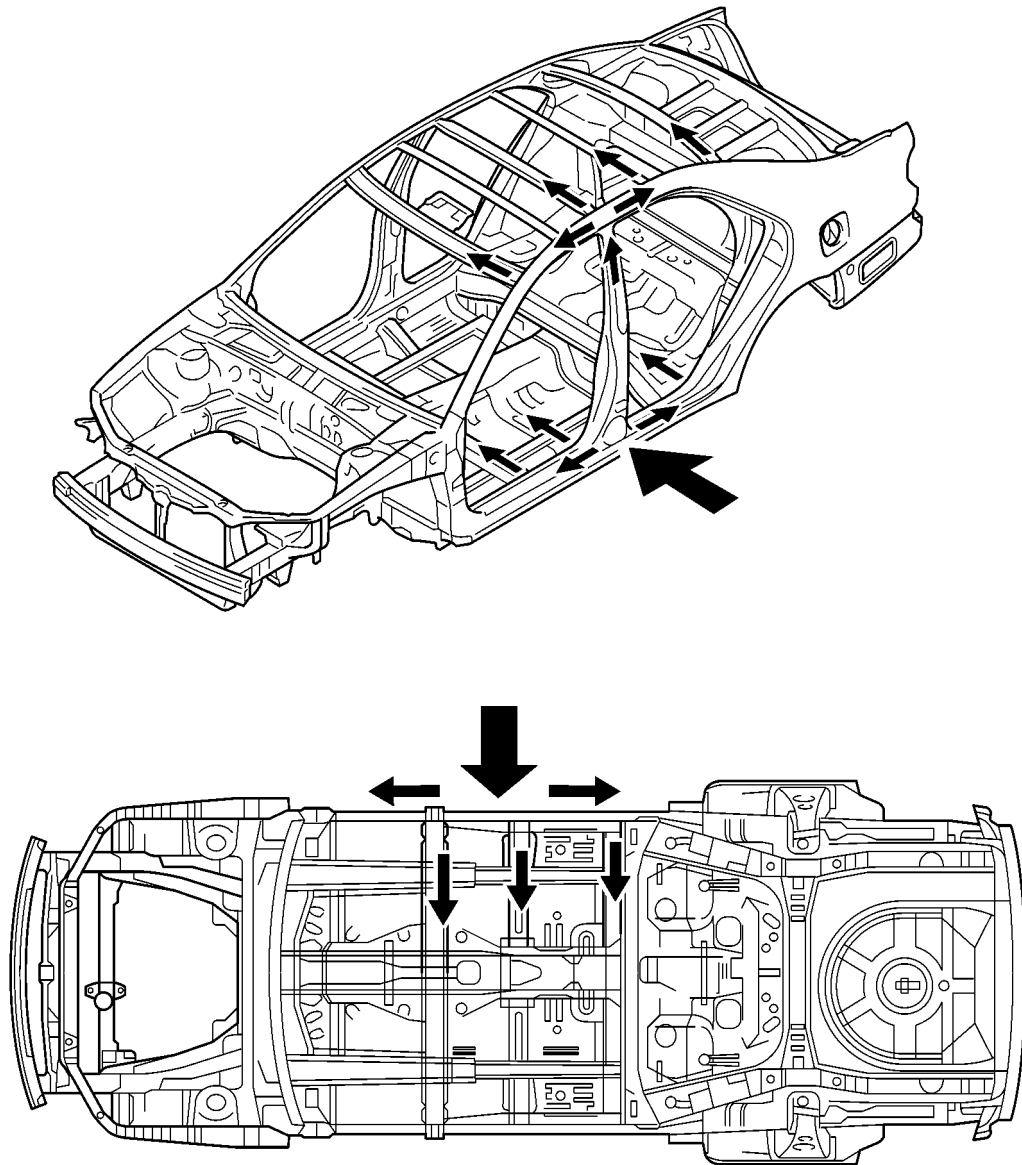
- Impact energy of a side collision directed to the cabin area is dispersed throughout the body via pillar reinforcements, side impact protection beams, floor cross members, thus helping minimize the impact energy finally directed to the cabin.



- A Head Impact Protection Structure has been adopted. With this type of construction, if the occupant's head hits against the roof side rail and pillar in reaction to a collision, the inner panel of the roof side rail and pillar collapses to help reduce the impact.



► Side Collision Load Distribution Diagram ◀



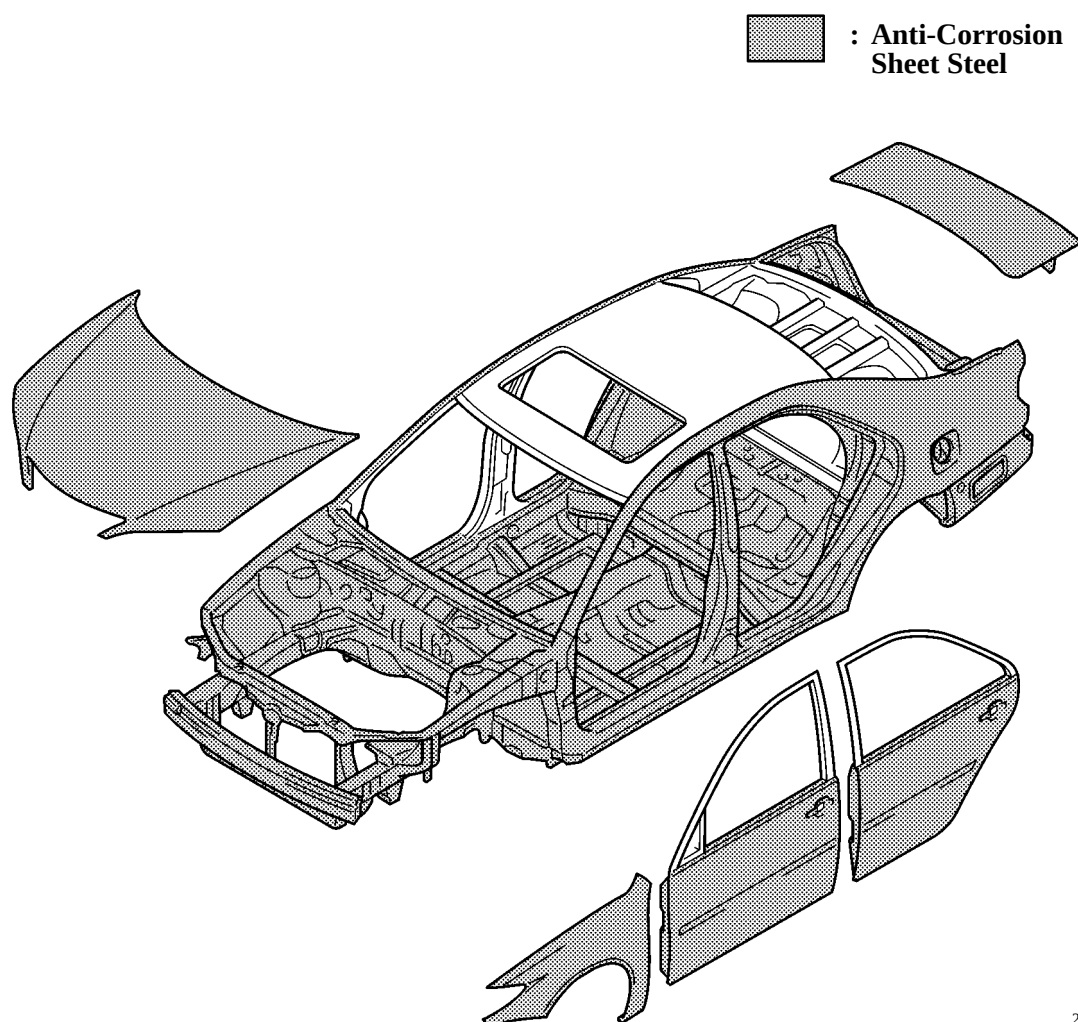
■ RUST-RESISTANT BODY

1. General

Rust-resistant performance is enhanced by extensive use of anti-corrosion sheet steel, as well as by an anti-corrosion treatment which includes the application of wax, sealer and anti-chipping paint to easily corroded parts such as the hood, doors and rocker panels.

2. Anti-Corrosion Sheet Steel

Anti-corrosion sheet steel is used in all areas other than the roof and interior parts.



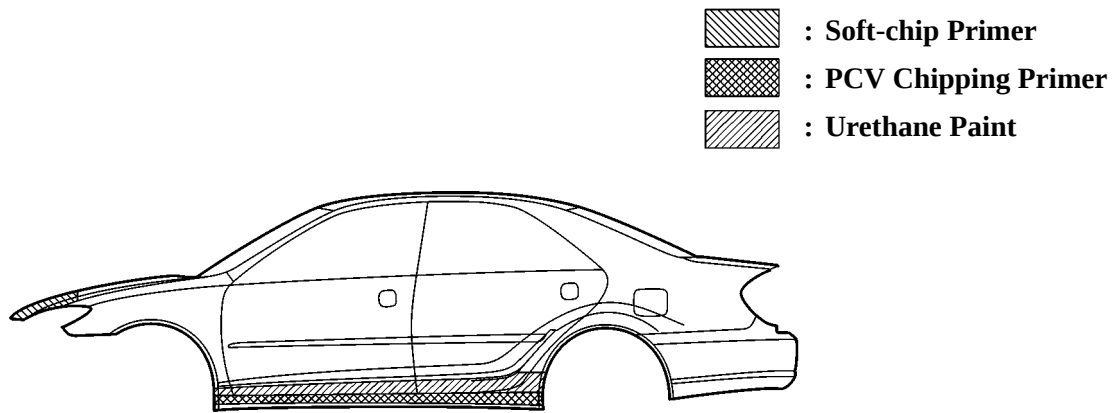
208BO06

3. Wax and Sealer

Wax and sealer are applied to the hemmed portions of the hood, door panels and luggage compartment door to improve rust-resistant performance.

4. Anti-Chipping Application

PVC chipping primer is applied to the rocker panel area to protect them from stone chipping. In addition, soft-chip primer is applied to the hood.



208BO07

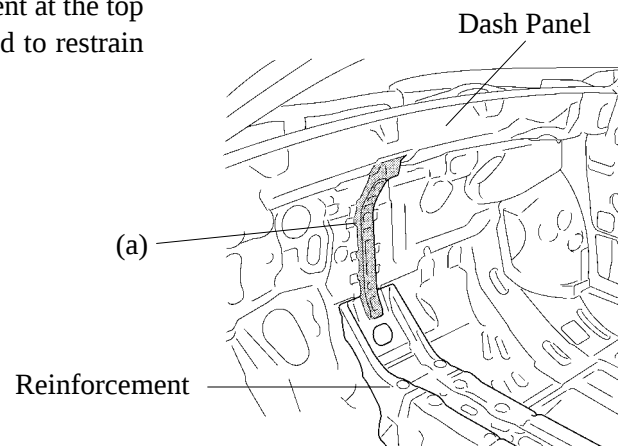
■ LOW VIBRATION AND LOW NOISE BODY

1. General

Effective application of vibration damping and noise suppressant materials reduce engine and road noise.

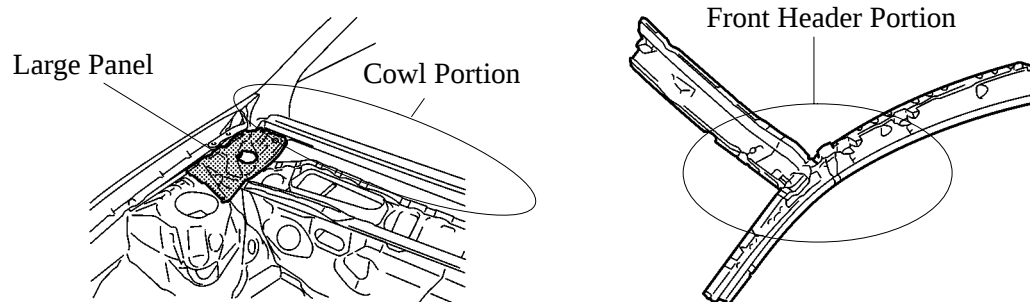
2. Body Shell Construction

- (a) The dash panel and the reinforcement at the top of the floor tunnel have been joined to restrain vibration.



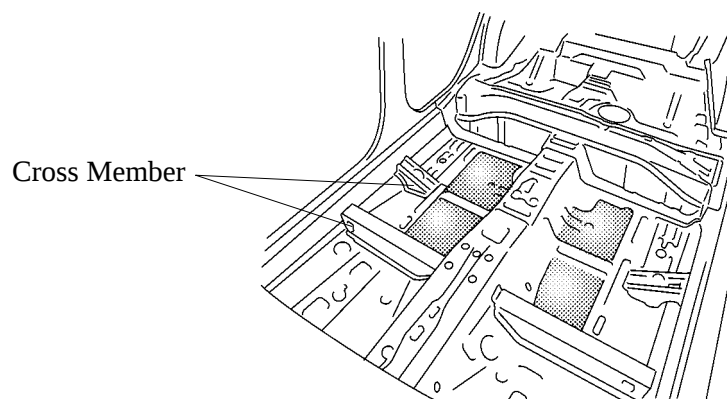
208BO08

- (b) To restrain the vibration of the front windshield glass, the cowl and front header portion that support the glass have been reinforced.
In addition, a large panel that connects the spring support to the cowl has been provided to ensure the rigidity of the spring support.



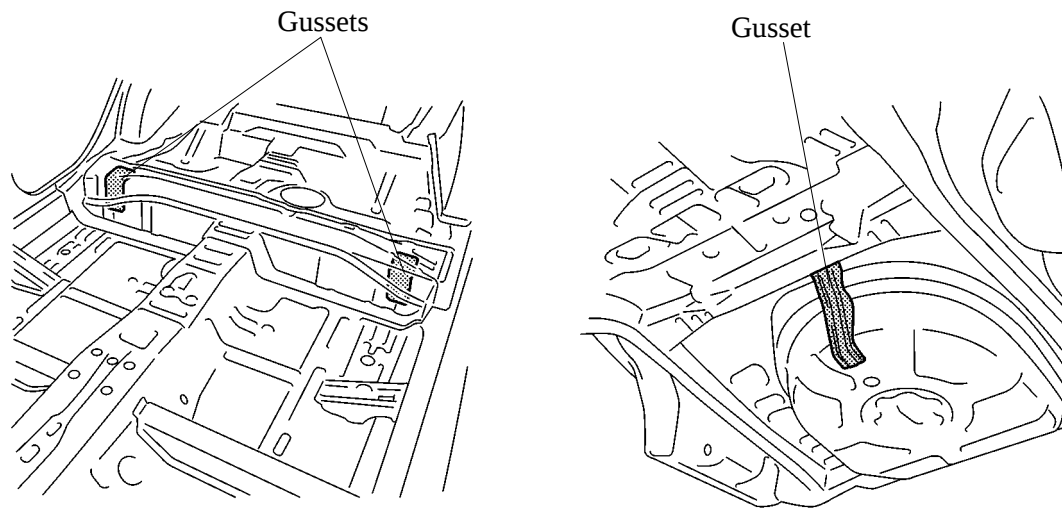
208BO09

- (c) The floor panel has been provided with a curvature to increase the rigidity of the panel, and the panel has been separated by a cross member to restrain the vibration of the panel.



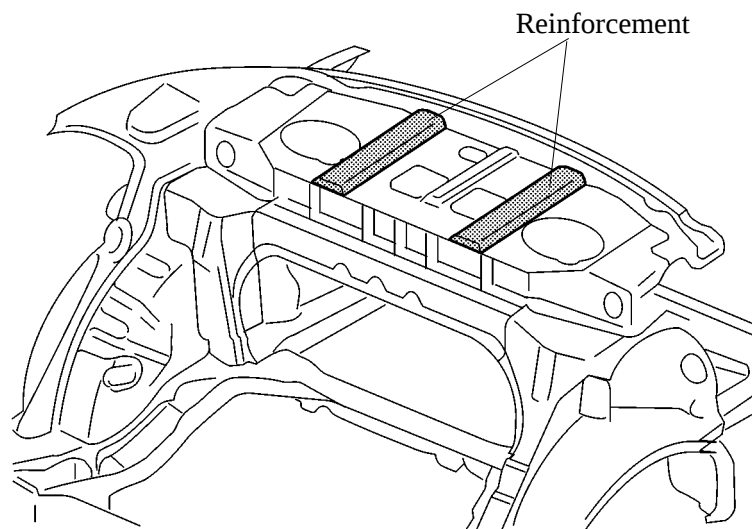
208BO10

- (d) Gussets have been added to the floor under reinforcement in order to restrain the vibration that is created by the difference in angles between the front floor and the center floor.
- (e) Gusset has been added to the front portion of the spare tire housing to restrain vibration.



208BO12

- (f) Two reinforcements that separate the upper back panel surface have been provided to restrain the vibration of the upper back panel.

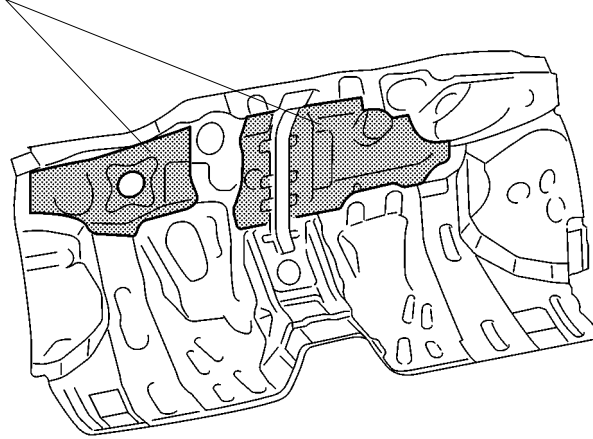


208BO11

3. Dash Panel Construction

Sandwich panels are used in the dash panel, which consists of a dash outer silencer, inner silencer, and floor tunnel silencer. This reduces engine and road noise and ensures a quieter vehicle operation.

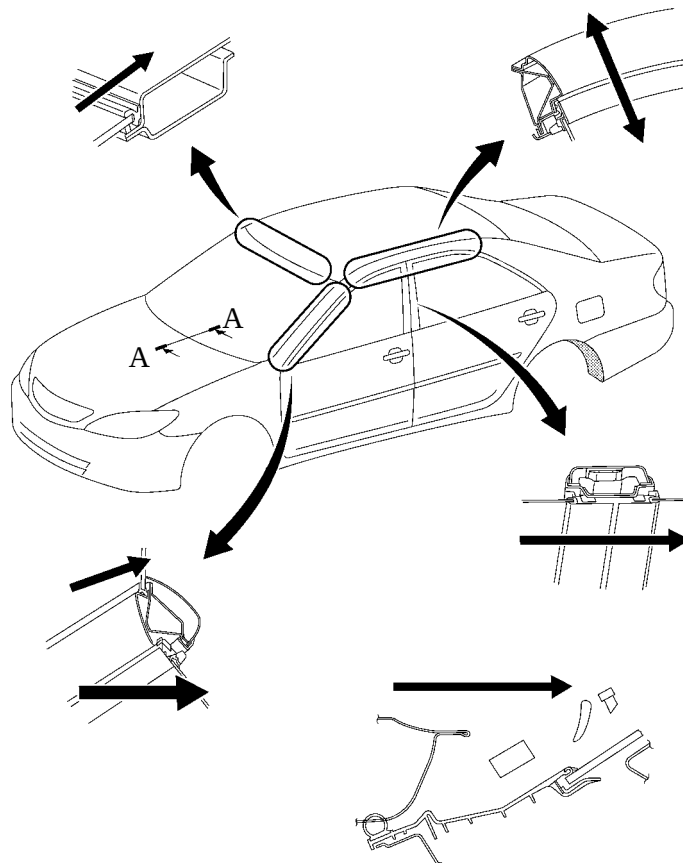
Sandwich Panels



208BO13

4. Roof Construction

The height offset has been eliminated from the glass, pillars, and the roof. The engine hood and the wipers have been made flush to reduce wind noise.



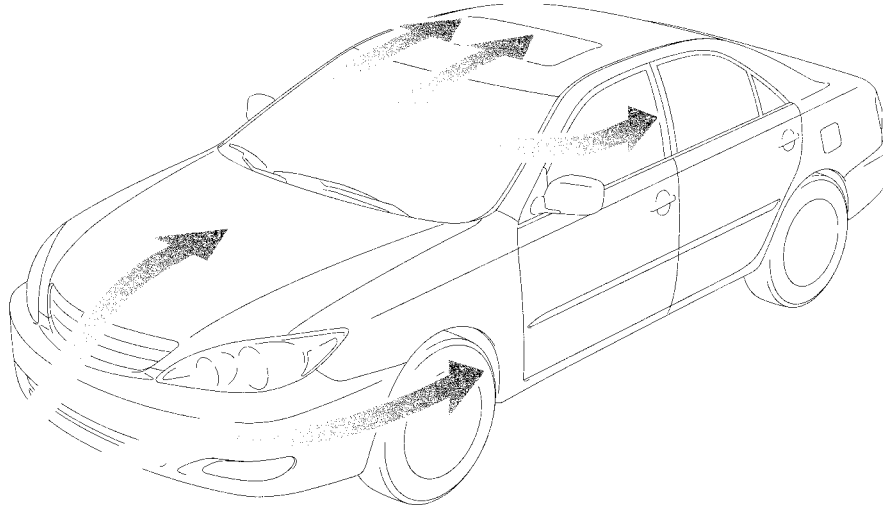
208BO14

A - A Cross Section

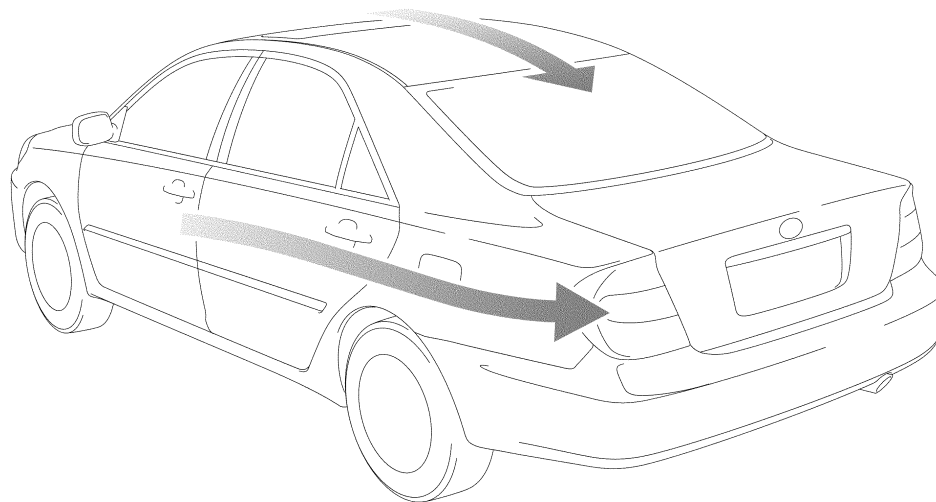
■ AERODYNAMICS

To improve aerodynamics performance, the following measure have been taken.

- The shape of the front bumper has been optimized to collect the flow of air from under the floor and the sides of the body.
- The flattened under body smoothly guides the under-the-car air flow towards the rear.
- The shape of the rear bumper has been optimized so as not to obstruct the flow of air under the floor.



208BO15



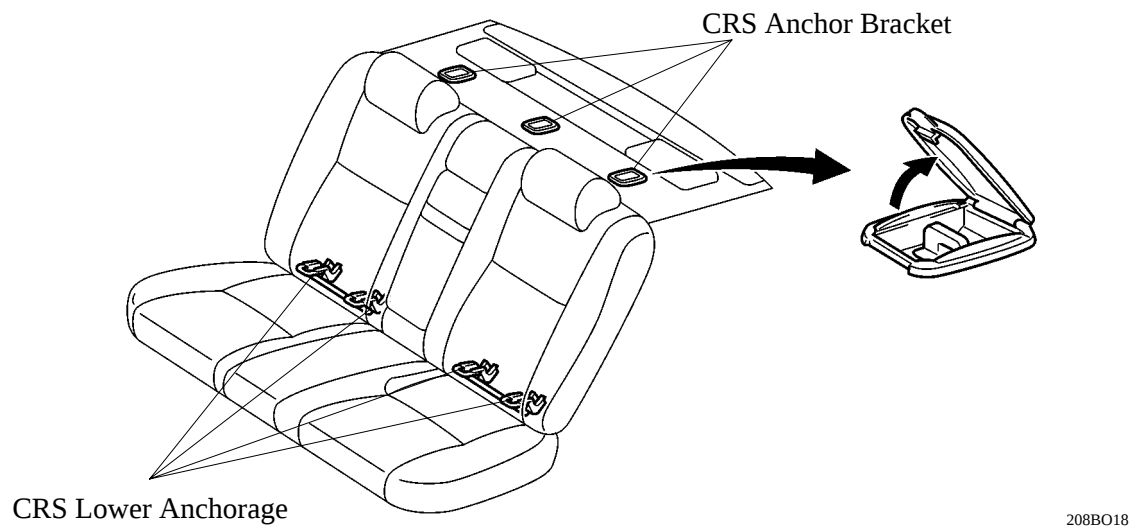
208BO16

ENHANCEMENT OF PRODUCT APPEAL

■ REAR SEAT

CRS (Child Restrain System) lower anchorage for securing child seats has been provided behind the seat cushion of the rear seat.

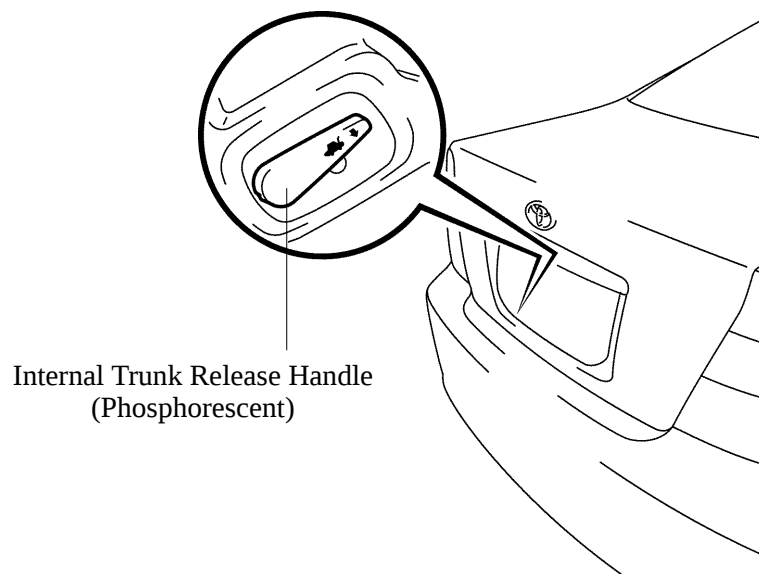
Three CRS anchor brackets for securing a child seat have been provided above the package tray trim.



■ INTERNAL TRUNK RELEASE HANDLE

In case a person inadvertently locks oneself within the trunk and needs to free oneself, an internal trunk release handle is included inside the luggage room.

The handle is made of phosphorescent, so that it is visible in the luggage room for a while even after the luggage room has been closed.



■ SEAT BELT

1. General

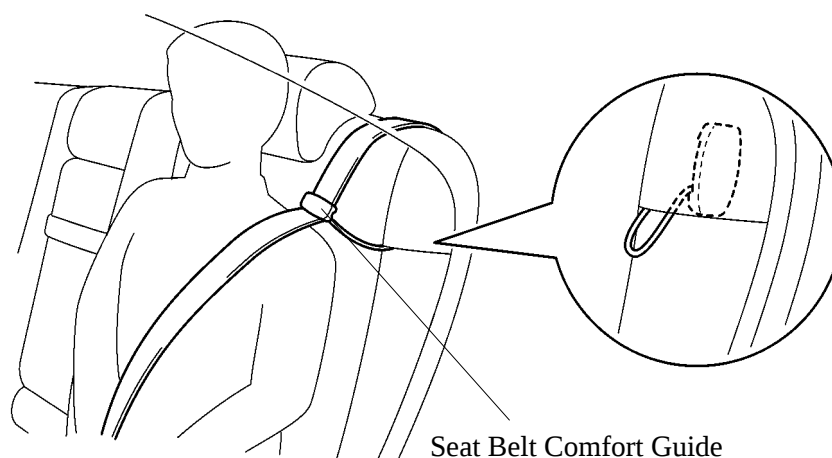
- The following types of seat belts are provided:

Seat	Seat Belt Type	Remarks
Driver	3-point ELR (Emergency Locking Retractor)	Electrical sensing type Pretensioner & Force Limiter
Front Passenger	3-point ELR & ALR (Automatic Locking Retractor)	Electrical sensing type Pretensioner & Force Limiter
Rear Passenger (LH, RH, and Center)		—

- The function of the airbag sensor assembly to memorize the driver and front passenger's seat belt wearing condition while inflating the airbag is added.
- Seat belt comfort guide for children or small children are provided on the both sides of rear seats.

2. Seat Belt Comfort Guide

This comfort guide can be stored in the pocket on both sides of the rear seats.



Seat Belt Comfort Guide

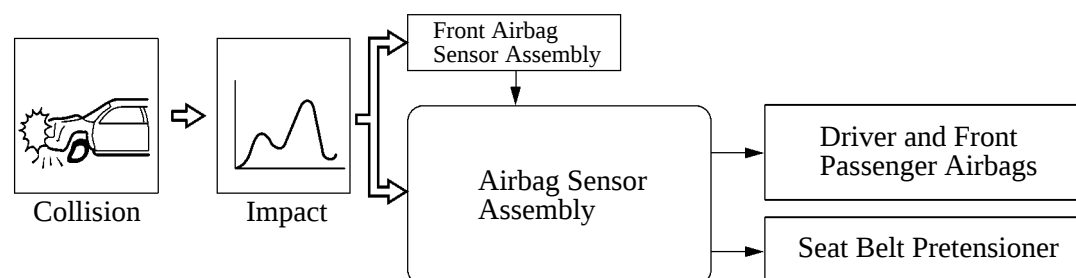
208BO19

3. Pretensioner and Force Limiter

In accordance with the ignition signal from the airbag sensor assembly, the seat belt pretensioner activates simultaneously with the deployment of SRS airbag for the driver and front passenger.

In the beginning of the collision, the seat belt pretensioner instantly pulls up the seat belt thus providing the excellent belt's effectiveness in restraining the occupant.

When the impact of a collision causes the tension of the seat belt applied to the occupant to reach a predetermined level, the force limiter activates to control the force.

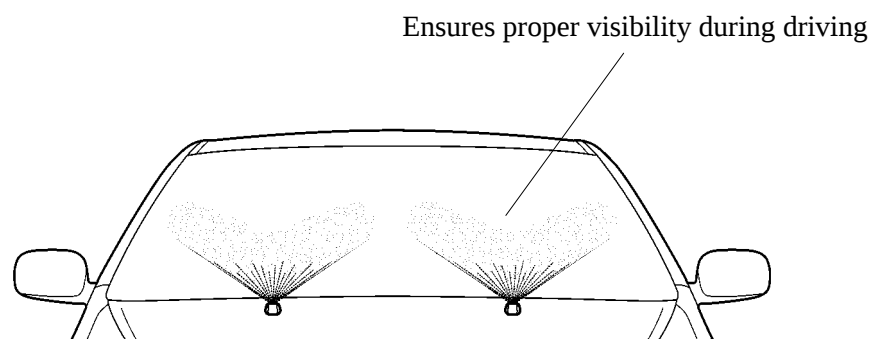


196BO21

■ WINDSHIELD WASHER NOZZLE

Spray type windshield washer nozzles have been adopted. Because these nozzles can spray windshield washer fluid in a wide range, excellent wiping performance has been achieved.

The spray pattern has been designed so that it will not obstruct the driver's view.



Spray pattern during driving

208BO20

Service Tip

With the adoption of the spray-type windshield washer nozzles, it is no longer necessary to adjust the nozzles.

BODY ELECTRICAL

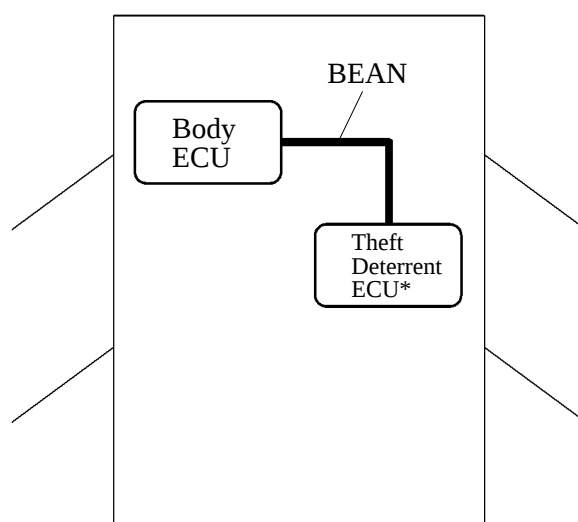
BODY ELECTRICAL SYSTEM CONTROL

■ MULTIPLEX COMMUNICATION SYSTEM

1. General

- On the '02 Camry, the LE and SE grade standard specification model with the 2AZ-FE engine has adopted an integration relay, and other models have adopted a body ECU to control the body electrical system.
- Models with a theft deterrent system have adopted a BEAN (Body Electronics Area Network) system to maintain communication between the theft deterrent ECU and the body ECU.

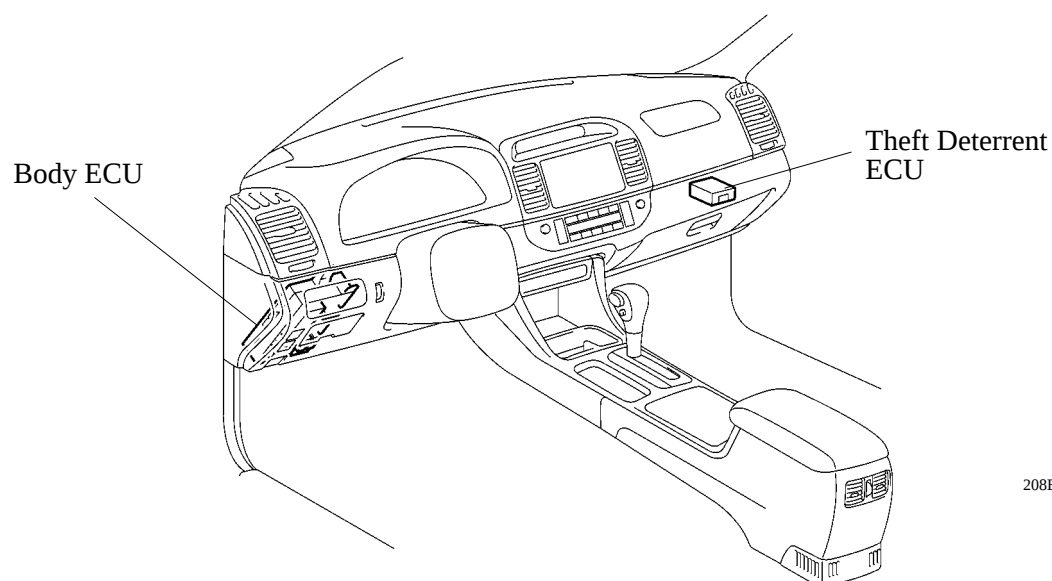
► System Diagram ◀



208BE01

*: With Theft Deterrent System Model

► Layout of Main Component ◀

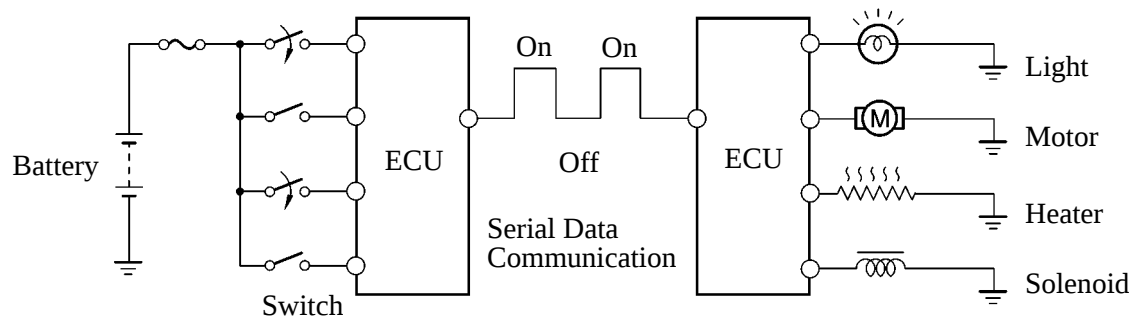


208BE02

2. System Outline

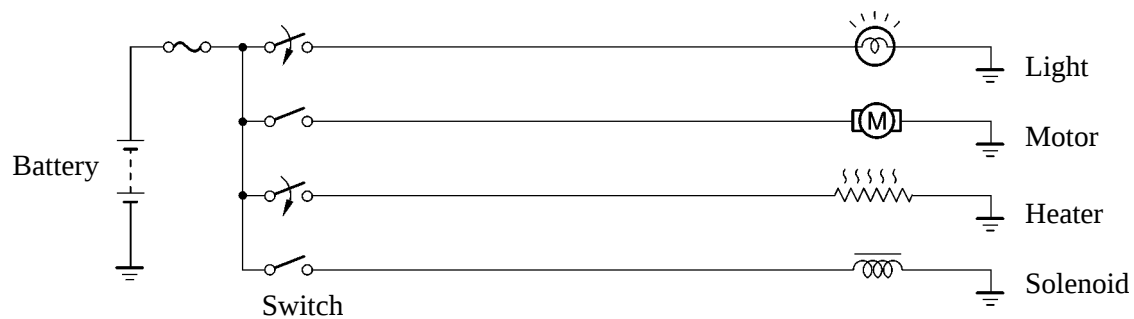
In the conventional system, electrical loads such as motors and lights were directly connected by wire harness to their switches which controlled their operation. However, in the multiplex communication system, the wire harness is replaced by serial data communication by the ECU, to provide functions similar to the conventional system, through a single serial communication bus. With this system, even when multiple tasks demand additional switches and electrical loads, communication among ECUs can be implemented through the serial communication bus only, resulting in the only reduction in wire harnesses.

► Conceptual Drawing of Multiplex Communication System ◀



Multiplex Communication System

208BE03



Conventional System

208BE51

■ SYSTEM OPERATION

The ECUs that pertain to the body electrical system perform the functions and system controls described in the following chart.

Function		Body ECU*1		Integration Relay*2
		U.S.A.	Canada	
Interior Light	Illuminated entry system control	○	○	○
Exterior Light	Light Auto turn-off system control (with Delay control)	○	○	○
	Daytime running light system control	○	○	○
	Automatic light control system	—	○	—
Warning Control	Key reminder warning	○	○	○
	Door ajar warning	○	○	○
Door Lock Control	Door lock control switch manual operation	○	○	○
	Key-linked lock and unlock function	○	○	○
	Manual unlock prohibition function	○	○	○
	2-step unlock function	○	○	○
	Key confine prevention function	○	○	○
	Shift-linked automatic door lock*3	○	○	○
Wireless Door Lock Remote Control System	Door lock and unlock operation	○	○	—
	Answer back operation	○	○	—
	Panic alarm operation	○	○	—
	Luggage door open operation	○	○	—
Theft Deterrent System	Door lock operation	○	○	—
	Warning operation (Interior light, Hazard light, Headlight, Tail-light, Vehicle Horn, Security Horn)	○	○	—
Diagnosis	Self diagnosis	○	○	○

*1: Except for The 2AZ-FE Engine LE and SE Grade Standard Specification Model

*2: Only for The 2AZ-FE Engine LE and SE Grade Standard Specification Model

*3: Only for The Automatic Transaxle Model

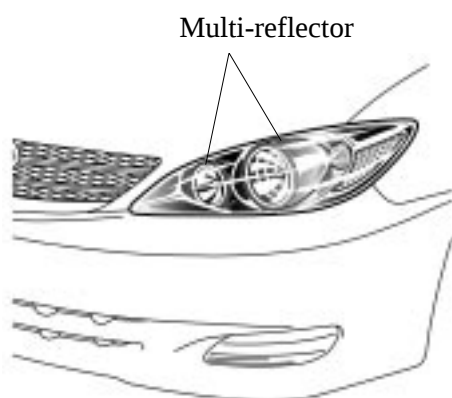
LIGHTING

■ HEADLIGHT AND TAILLIGHT

The Camry has been adopted the multi-reflector headlights and taillights.

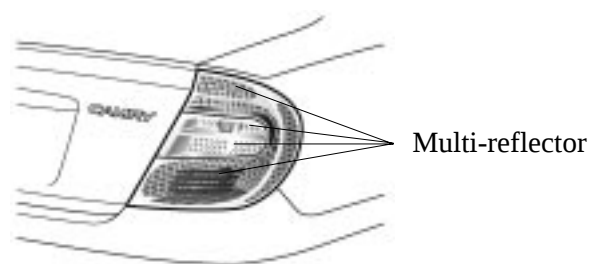
With the multi-reflector type headlights and taillights, the light from the bulbs is dispersed and distributed through multiple parabolic shaped reflectors. As a result, the lens cut pattern is no longer provided in the center of the lens, thus realizing a clear look.

► Headlight ◀



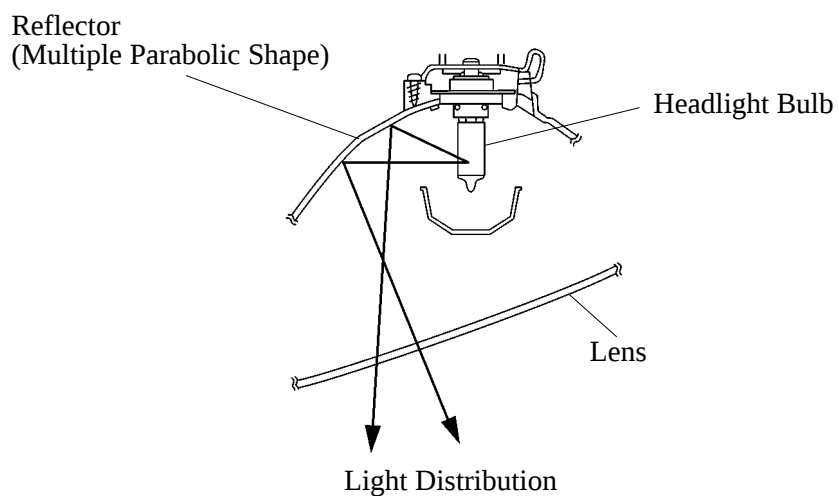
208BE04

► Taillight ◀



208BE05

► Light Distribution Imaginary Diagram ◀



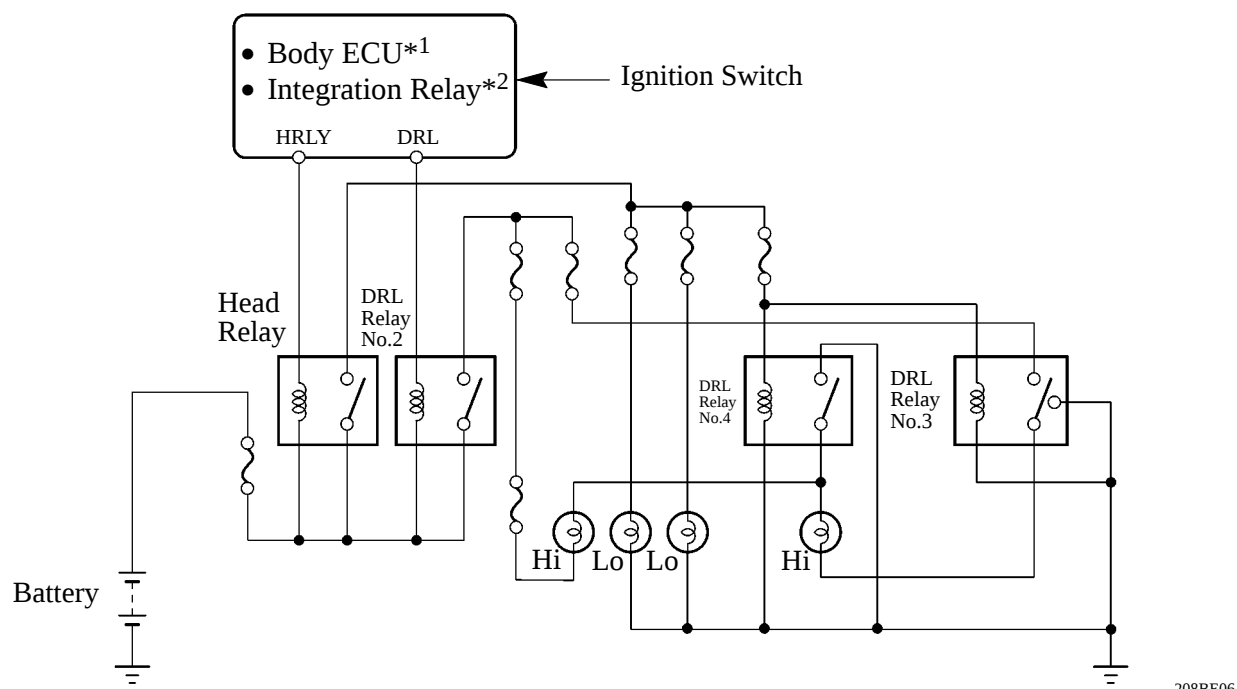
151LBE67

■ DAYTIME RUNNING LIGHT SYSTEM

This system, which is directly connected to the high-beam headlights, is designed to automatically activate them the daytime in order to keep the vehicle highly visible to other vehicles.

This system is controlled by the Body ECU or Integration Relay.

► Wiring Diagram ◀



*1: Except for The 2AZ-FE Engine LE and SE Grade Standard Specification Model

*2: Only for The 2AZ-FE Engine LE and SE Grade Standard Specification Model

208BE06

■ AUTOMATIC LIGHT CONTROL SYSTEM

- When the light control switch at the AUTO position, the automatic light control sensor detects the ambient light and automatically turns the headlights and taillights ON or OFF accordingly.
- This system is controlled by the Body ECU.

■ LIGHT AUTO TURN-OFF SYSTEM

- When the headlights and taillights are illuminated through the operation of the light control switch or the activation of the automatic light control system, if the ignition switch is turned OFF and all the door are closed, this system continues to illuminate the headlights and taillights for approximately 30 seconds, and then turns OFF the headlights.

However, with all the doors locked, when “LOCK” button on the wireless remote control is pushed, the headlights and taillights are turned OFF immediately.

- This system is controlled by the Body ECU or Integration Relay.

■ ILLUMINATED ENTRY SYSTEM

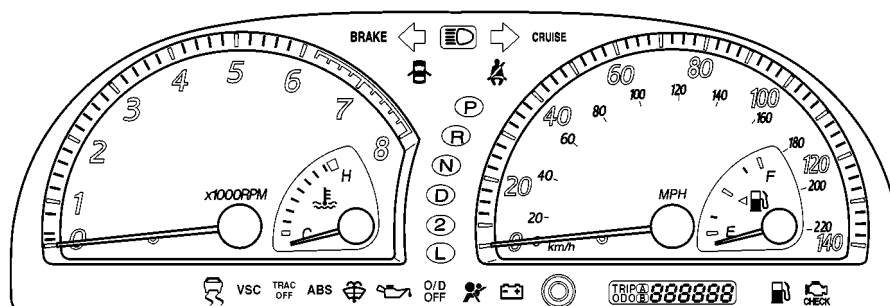
- When a door is unlocked through a key operation or transmitter operation, or if a door is opened or closed, the illuminated entry system turns ON the interior light and the ignition key illumination.
- If the ignition switch is turned to the ACC or ON position or if all doors are locked during the 15 seconds in which these lights are ON, they will immediately turn OFF.
- This system is controlled by the Body ECU or Integration Relay.

METER

■ COMBINATION METER

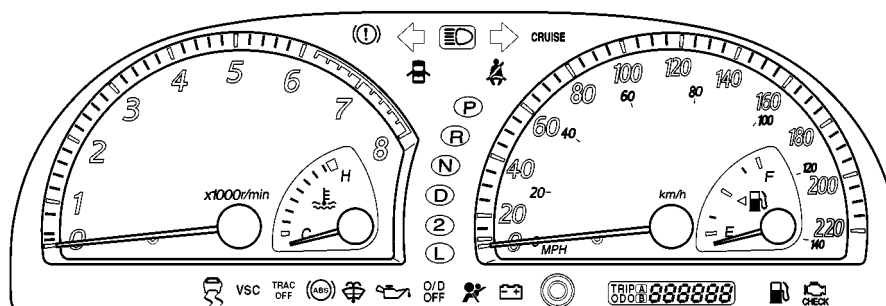
1. General

- The combination meter of the '02 Camry has been adopted the analog type.
- An odometer and trip meter that use an LCD(Liquid Crystal Display) have been adopted.
- The odometer/trip meter and the fuel gauge continue to display their readings so that they can be seen up to 10 minutes after the ignition switch has been turned OFF.
- The combination meter has a built-in meter ECU and buzzer (for Key remainder, Seat belt warning).
- This meter ECU receives the engine coolant temperature signal and the engine speed signal by establishing communication with the ECM via a serial data link.
On the XLE grade model, communication is established between the meter ECU and the multi-information display via a local protocol to transmit the remaining fuel information to the multi-information display.
Furthermore, the meter ECU receives various pieces of information that are necessary for its operation from the sensors and switches.
- This meter ECU flashes its warning lights even if an open circuit occurs in the wiring harnesses, which are connected to the ECUs for the purpose of flashing the ABS warning light, brake system warning light, and the SRS airbag warning light.



208BE07

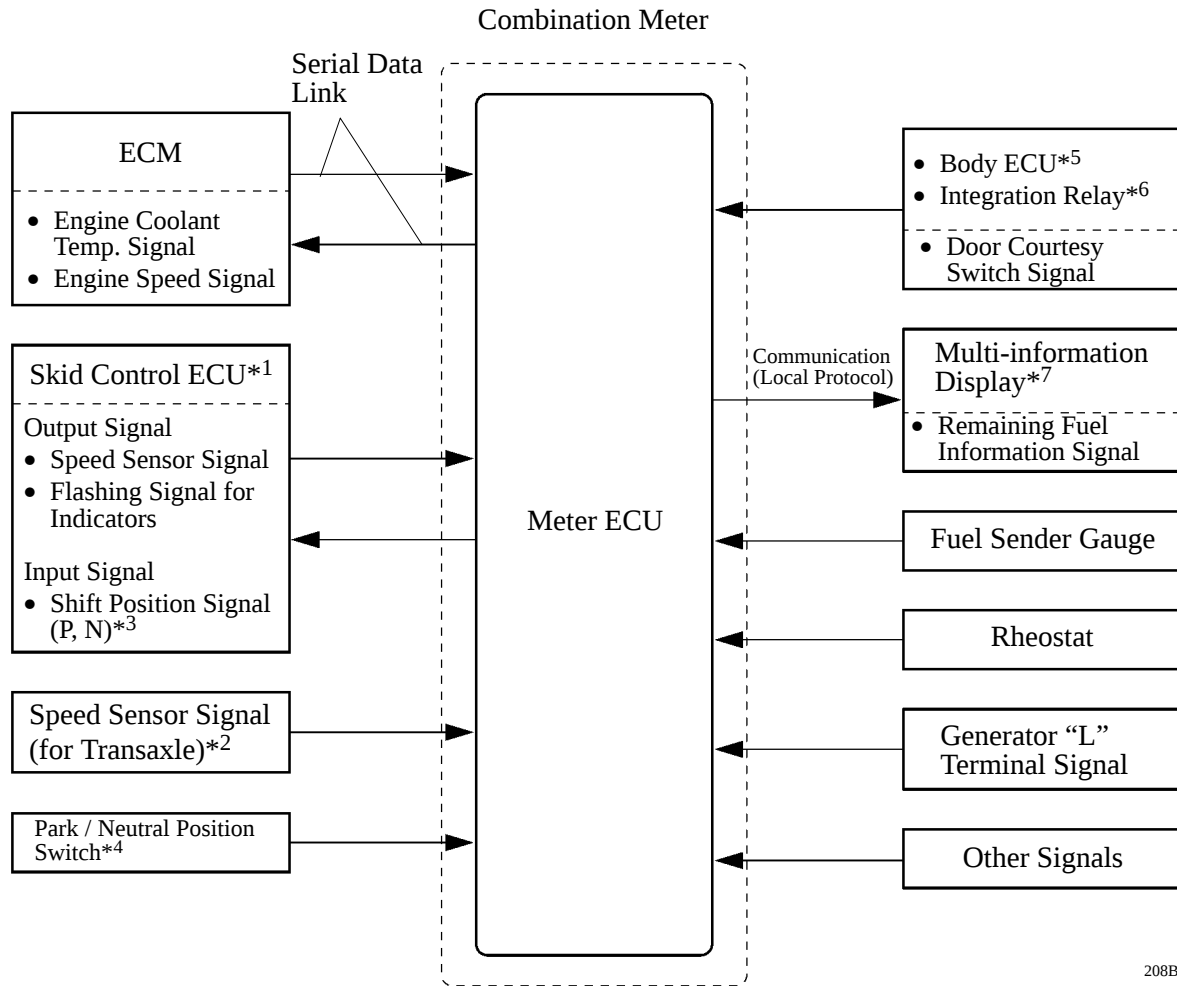
U.S.A. Model with Automatic Transaxle



208BE08

Canada Model with Automatic Transaxle

2. System Diagram



208BE09

*1: Only for The 1MZ-FE Engine Model

*2: Only for The 2AZ-FE Engine Model

*3: Only for The 1MZ-FE Engine Model and without VSC System

*4: Only for The Automatic Transaxle Model

*5: Except for The 2AZ-FE Engine LE and SE Grade Standard Specification Model

*6: Only for The 2AZ-FE Engine LE and SE Grade Standard Specification Model

*7: Only for The XLE Grade Model

AIR CONDITIONING

DESCRIPTION

1. General

The air conditioning system in the '02 Camry has the following features:

- A automatic control air conditioning system is standard equipment on the XLE grade model and a manual control air conditioning system is standard equipment on the other grade model.
- A semi-center location air conditioning unit, in which the evaporator and heater core are placed in the vehicle's longitudinal direction, has been adopted.
- A compact, lightweight, and highly efficient straight flow (full-path flow) aluminum heater core has been adopted.
- A multi-tank, super-slim structure evaporator has been adopted.
- A compact, lightweight, and low-noise swash plate type compressor has been adopted.
- The heater exchange efficiency has been improved through the adoption of the sub-cool condenser.
- A clean air filter that excels in removing dust has been adopted.
- The air conditioning ECU is equipped with a self-diagnosis function. If there is a malfunction in the system, it stores the DTCs (Diagnostic Trouble Codes) in its memory and blinks the air conditioning switch indicator.

► Performance ◀

Model		'02 Camry		'01 Camry	
		TMMK Made	TMC Made	TMMK Made	TMC Made
Heater	Heat Output W (Kcal/h)	5750 (4950)	←	5580 (4800)	5400 (4650)* ¹ 5220 (4490)* ²
	Air Flow Volume m ³ /h	360	←	380	365
	Power Consumption W	210	←	220* ³	←
Air Conditioning	Cooling Capacity W (Kcal/h)	5500 (4730)	←	5300 (4560)	5230 (4500)
	Air Flow Volume m ³ /h	530	←	520	505
	Power Consumption W	260	←	←	←

*1: Only for The Cold Area Specification Model

*2: Except for The Cold Area Specification Model

*3: With Side Vent Closed

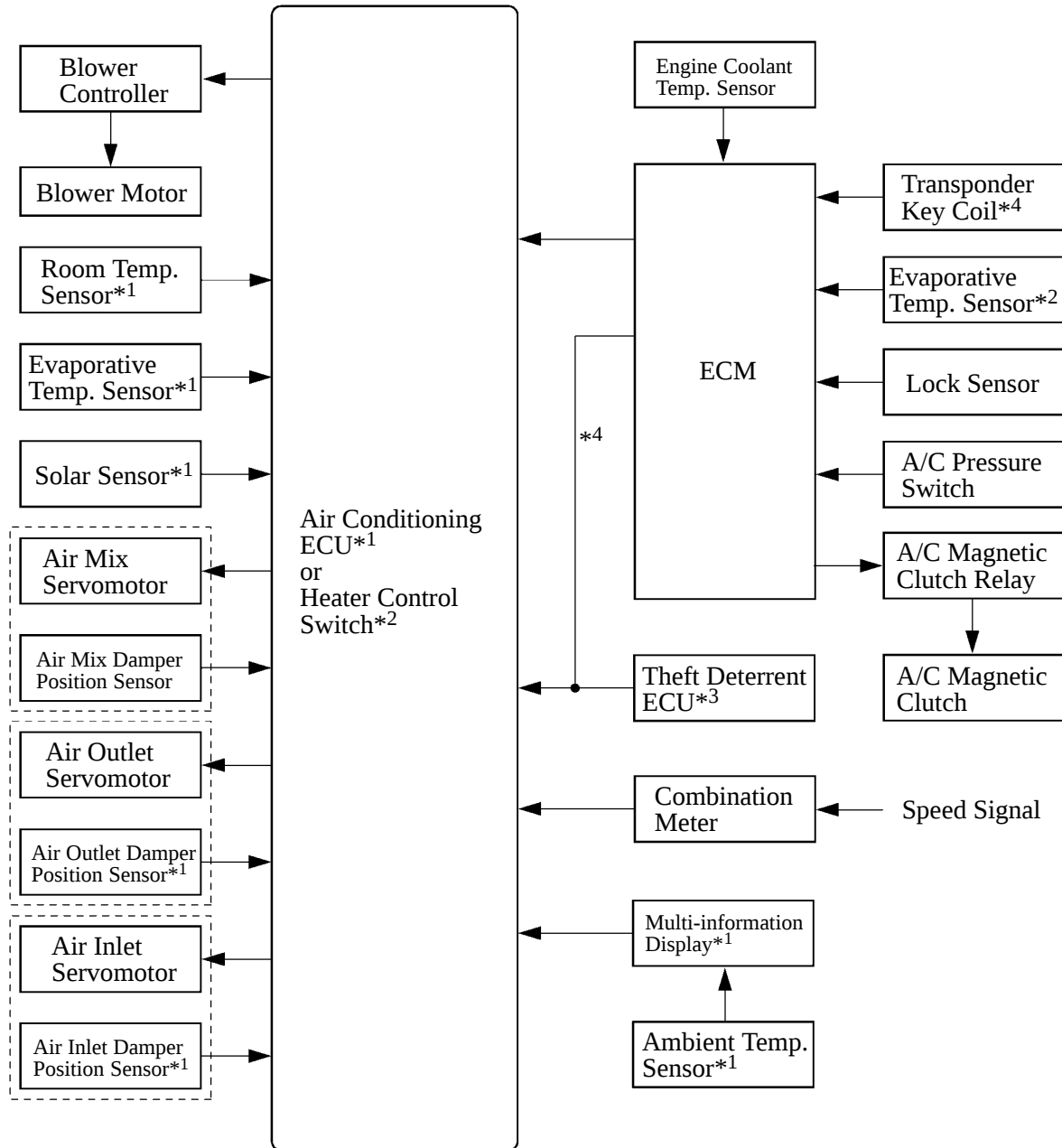
► Specification ◀

Model			'02 Camry		'01 Camry	
			TMMK Made	TMC Made	TMMK Made	TMC Made
Ventilation and Heater Core	Heater Core	Type	Straight Flow (Full-path Flow)	←	U-turn Flow	←
		Size W × H × L mm (in.)	228.7 × 140 × 27 (9.0 × 5.5 × 1.1)	←	220.4 × 155.7 × 27 (8.7 × 6.1 × 1.1)	←
		Fin Pitch mm (in.)	1.8 (0.07)	←	2.0 (0.08)	2.0 (0.08)* ¹ 2.5 (0.10)* ²
	Blower	Motor Type	A80Fs-12.5T	←	A80Fs-13T	S80Fs-12T
		Fan Size Dia. × H mm (in.)	150 × 75 (5.9 × 3.0)	←	←	←
Air Conditioning	Condenser	Type	Multi-flow (Sub-cool)	←	3-Passage Flow Type	←
		Size W × H × L mm (in.)	670 × 387.8 × 16 (26.4 × 15.3 × 0.6)	←	726 × 415.6 × 22 (28.6 × 16.4 × 0.9)	←
		Fin Pitch mm (in.)	3.6 (0.14)	←	4.5 (0.18)	←
	Evaporator	Type	Multi-tank, Super-slim Structure	←	Drawn Cup	←
		Size W × H × L mm (in.)	266.2 × 255 × 58 (10.5 × 10.0 × 2.3)	←	250.5 × 260 × 90 (9.9 × 10.2 × 3.5)	←
		Fin Pitch mm (in.)	3.5 (0.14)	←	4.0 (0.16)	←
	Compressor	Type	10S17	←	10PA17	←

*1: Only for The Cold Area Specification Model

*2: Except for The Cold Area Specification Model

2. System Diagram



*1: Only for The Automatic Control Air Conditioning System Model

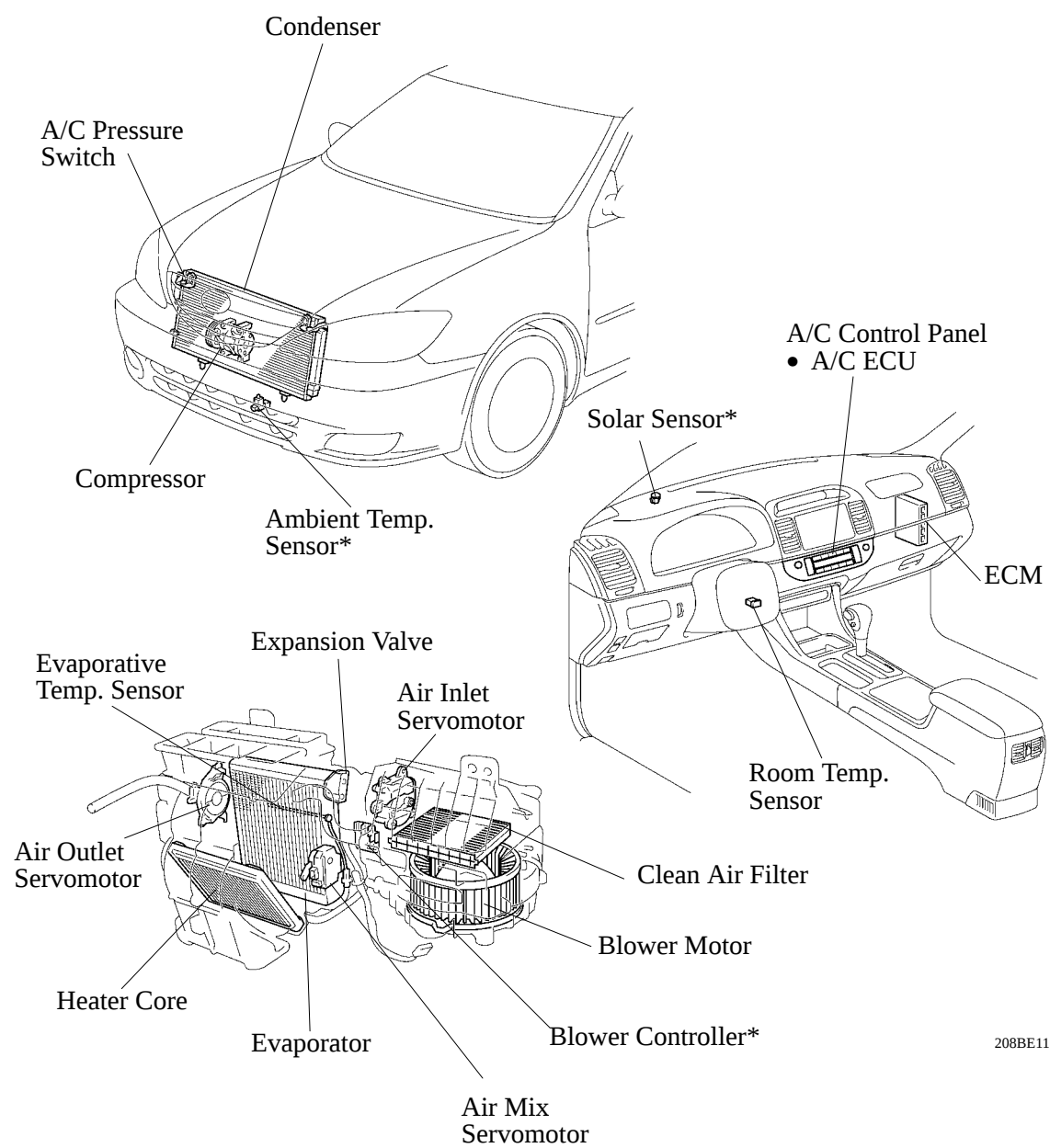
*2: Only for The Manual Control Air Conditioning System Model

*3: with Theft Deterrent System Model

*4: with Engine Immobiliser System Model

208BE10

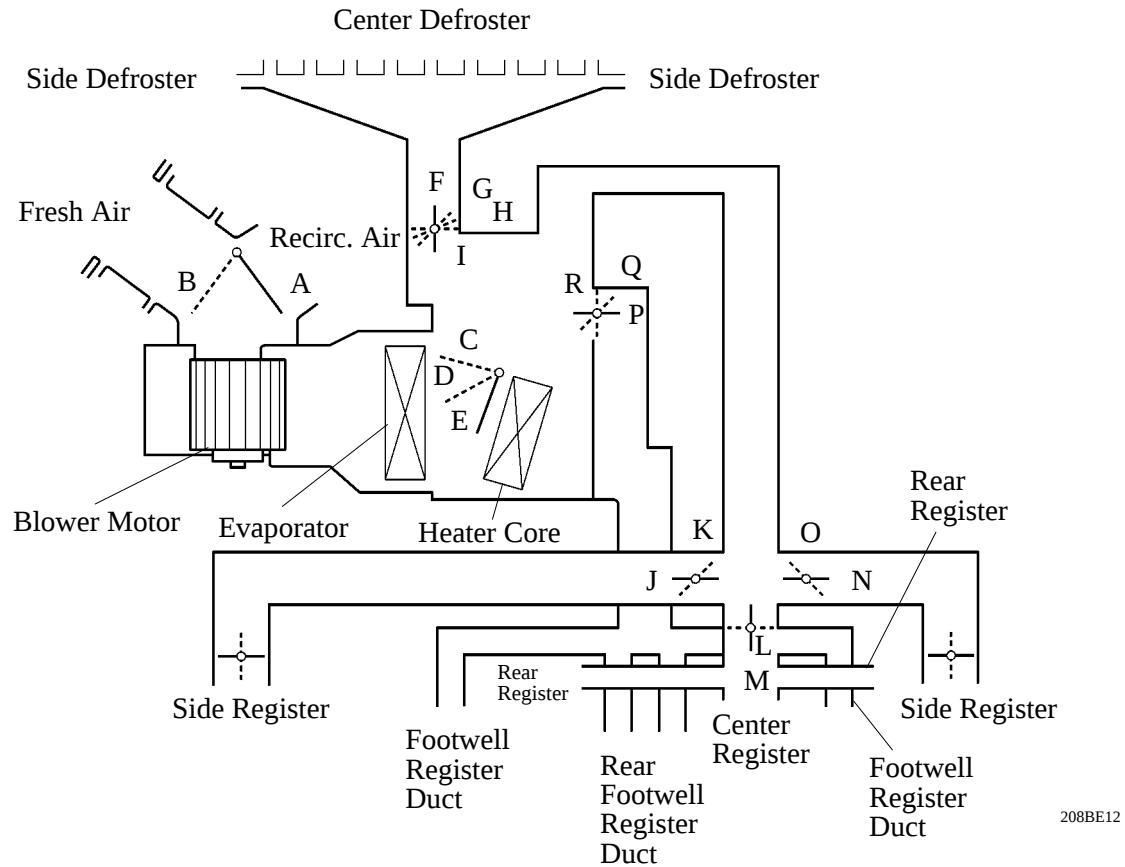
3. Layout of Main Component



208BE11

*: Only for The Automatic Control Air Conditioning System Model

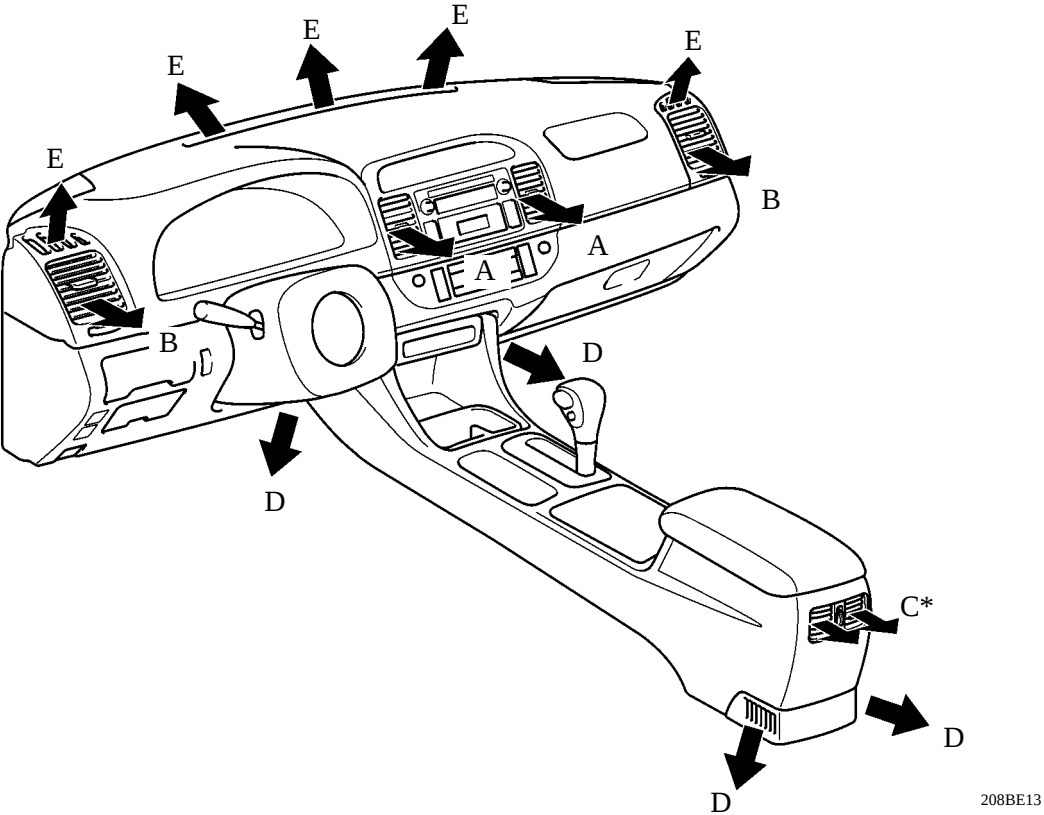
4. Mode Position and Damper Operation



► Function of Main Damper ◀

Control Damper	Control Position	Damper Position	Operation
Air Inlet Control Damper	FRESH 187BE23	A	Brings in fresh air.
	RECIRC 187BE41	B	Recirculates internal air.
Air Mix Control Damper	MAX COLD - MAX HOT TEMP. SETTING {18°C (65°F) - 32°C (85°F)}	C ~ D ~ E	Varies the mixture ratio of the fresh air and the recirculation air in order to regulate the temperature continuously from HOT to COLD.
Mode Control Damper	DEF 187BE28	F, K, L, O, R	Defrosts the windshield through the center defroster, side defroster, and side register.
	FOOT/DEF 187BE27	G, K, L, O, Q	Defrosts the windshield through the center defroster, side defroster, and side register, while air is also blown out from the front and rear foot well register ducts.
	FOOT 187BE26	H, K, L, O, P	Air blows out of the front and rear foot well register ducts, and side register. In addition, air blows out slightly from the center defroster and side defroster.
	BI-LEVEL 187BE25	I, J, M, N, P	Air blows out of the center registers, side registers, and foot well register ducts.
	FACE 187BE24	I, J, M, N, R	Air blows out of the center registers, and side register.

5. Air Outlets and Air Volume Ratios



Air Outlet Mode		A	B	C*	D	E
		Center Face	Side Face	Rear Face	Foot	Defroster
FACE	 187BE24	○	○	○	—	—
BI-LEVEL	 187BE25	○	○	○	○	—
FOOT	 187BE26	—	○	—	○	○
FOOT/DEF	 187BE27	—	○	—	○	○
DEF	 187BE28	—	○	—	—	○

The size of the circle ○ indicates the proportion of airflow volume.

*: Only for The Automatic Control Air Conditioning System Model.

■ CONSTRUCTION AND OPERATION

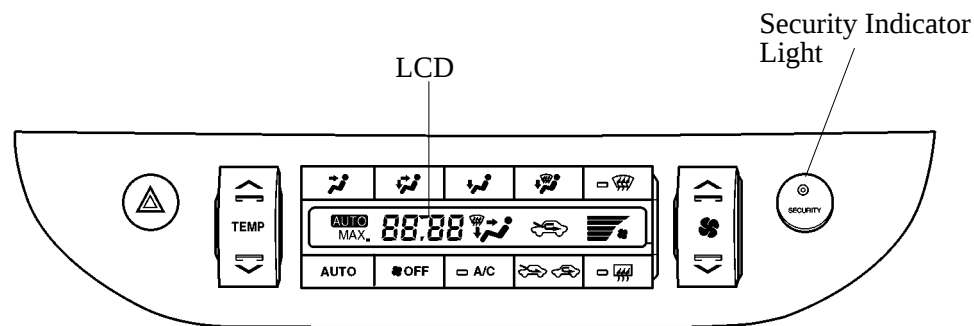
1. Air Conditioning Control Panel

- 2 type of air conditioning control panel are used; the push button type for the automatic control type air conditioning, and rotary switch type for the manual control type air conditioning.
- The air conditioning control panel for the automatic control air conditioning system uses an LCD (Liquid Crystal Display) to display the set temperature, air outlet mode, and blower speed to ensure excellent visibility.

This automatic control air conditioning system maintains unidirectional communication between the multi-information display in the center cluster and the air conditioning ECU via a local protocol. The ambient air temperature information that is received is then used by the air conditioning ECU to effect control.

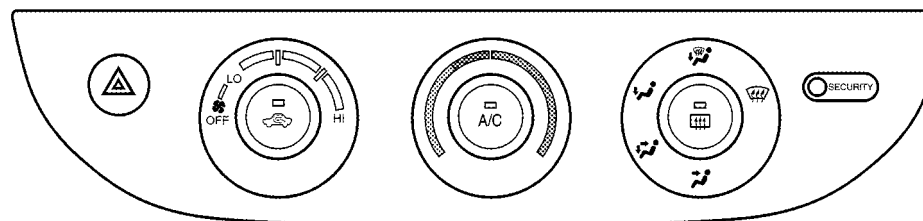
NOTE: At times, it takes 2 to 3 seconds from the time the ignition switch is turned ON, the air conditioning ECU receives ambient air temperature information from the multi-information display, control is started, and the information appears on the LCD (Liquid Crystal Display) of the air conditioning control panel.

- This air conditioning control panel is integrated with the air conditioning ECU.



**Automatic Control Type
Air Conditioning Control Panel**

208BE14



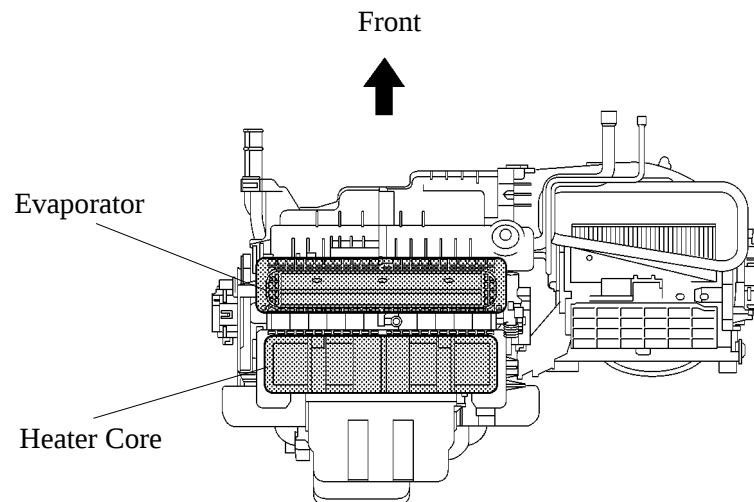
**Manual Control Type
Air Conditioning Control Panel**

208BE15

2. Air Conditioning Unit

General

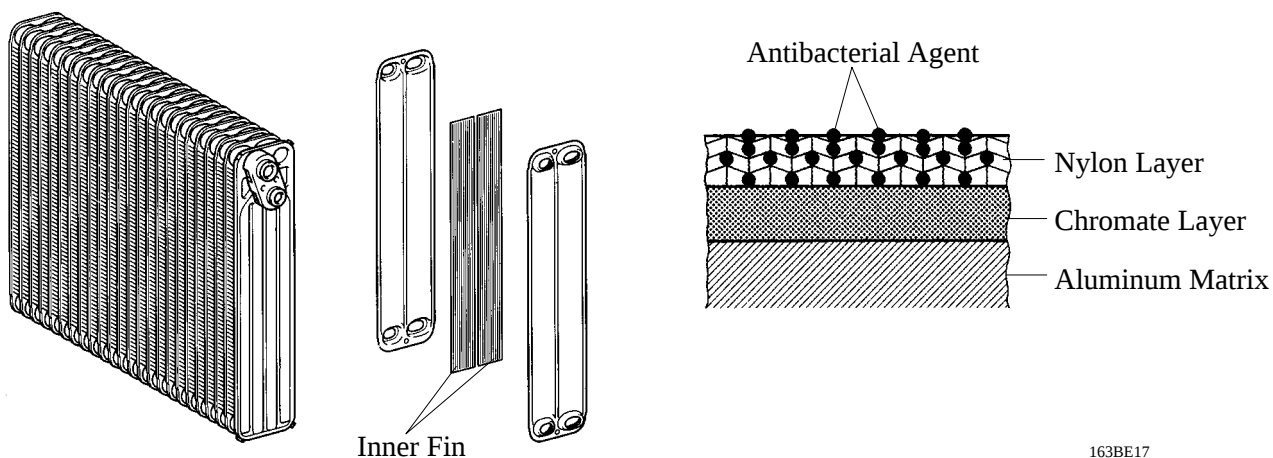
A semi-center location air conditioning unit, in which the evaporator and heater core are placed in the vehicle's longitudinal direction. As a result, the air conditioning unit has been made compact and light weight.



208BE16

Evaporator

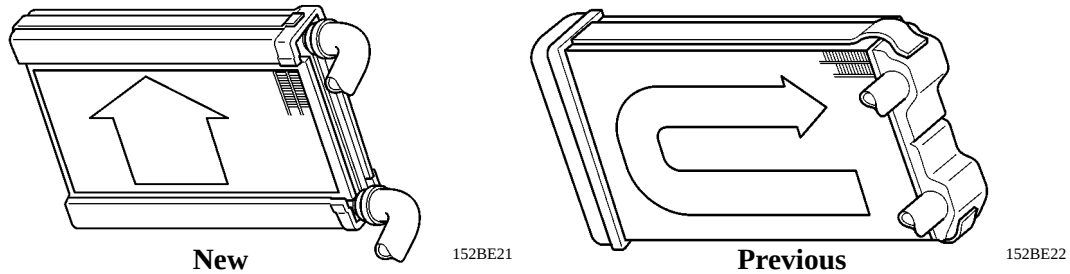
- By placing the tanks at the top and the bottom of the evaporator unit and by adopting an inner fin construction, the following effects have been realized:
 - a) The heat exchanging efficiency has been improved.
 - b) The temperature distribution has been made more uniform.
 - c) The evaporator has been made thinner.
- The evaporator body has been coated with a type of resin that contains an antibacterial agent in order to minimize the source of foul odor and the propagation of bacteria.



163BE17

Heater Core

A compact, lightweight, and highly efficient straight flow (full-path flow) aluminum heater core has been adopted.



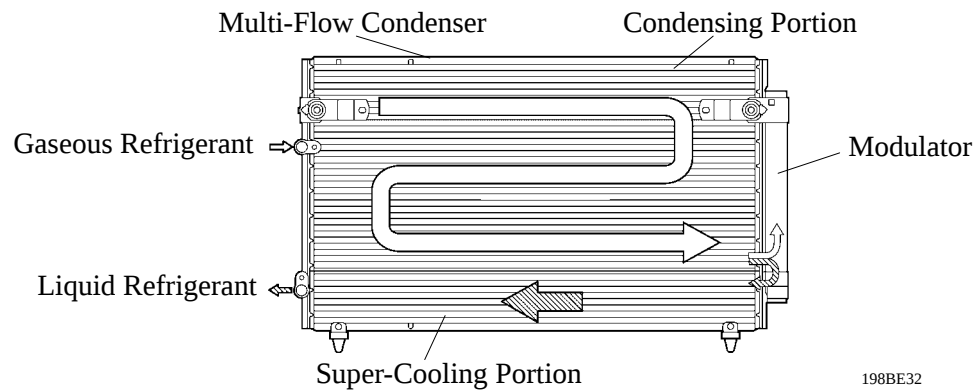
3. Condenser

General

The '02 Camry has adopted sub-cool condenser in which a multi-flow condenser (consisting of two cooling portions: a condensing portion and a super-cooling portion) and a gas-liquid separator (modulator) have been integrated. This condenser has adopted the sub-cool cycle for its cooling cycle system to improve the heat exchanging efficiency.

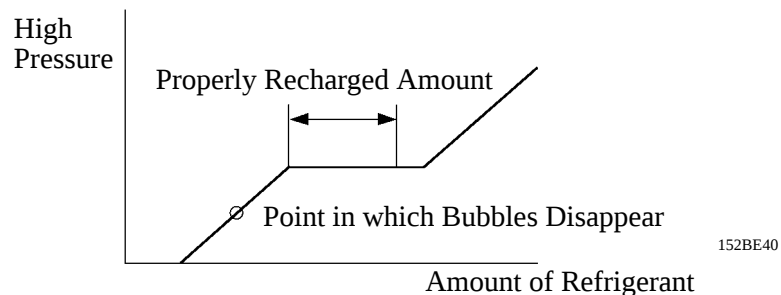
Sub-Cool Cycle

In the sub-cool cycle of the sub-cool condenser that has been adopted, after the refrigerant passes through the condensing portion of the condenser. Both the liquid refrigerant and the gaseous refrigerant that could not be liquefied are cooled again in the super-cooling portion. Thus, the refrigerant is sent the evaporator in an almost completely liquefied state.



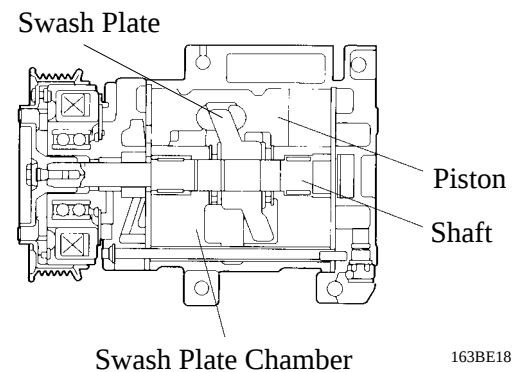
NOTE: The point at which the air bubbles disappear in the refrigerant of the sub-cool cycle is lower than the proper amount of refrigerant with which the system must be filled. Therefore, if the system is recharged with refrigerant based on the point at which the air bubbles disappear, the amount of refrigerant would be insufficient. As a result, the cooling performance of the system will be affected.

For the proper method of verifying the amount of the refrigerant and to recharge the system with refrigerant, see the 2002 Camry Repair Manual (Pub. No. RM881U).



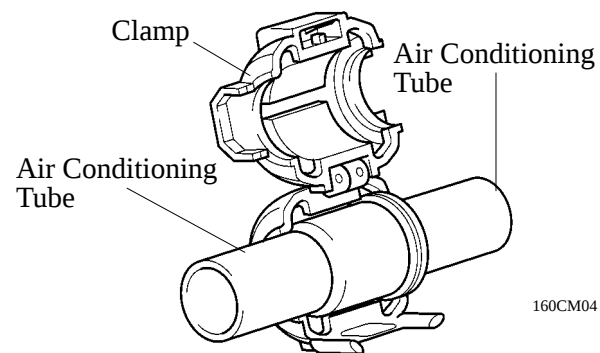
4. Compressor

A compact, lightweight, and low-noise swash plate type compressor has been adopted on the Camry.



5. Quick Joint

The joint of the air conditioning tube, which passes through the dash panel, has been changed from the nut-and-union type that is used on the previous model to the clamp type quick joint. As a result, the ease of operation and service has been improved.

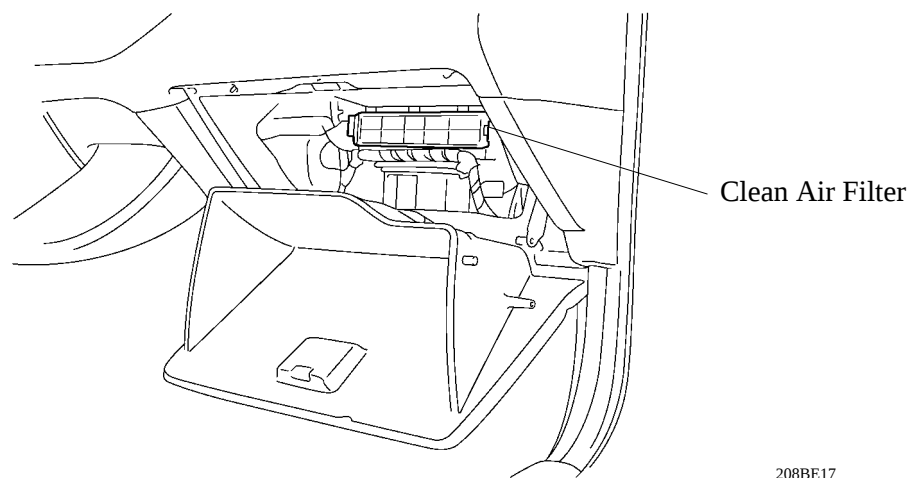


6. Clean Air Filter

A clean air filter that excels in removing dust is standard equipment.

This filter, which cleans the air in the cabin, is made of polyester. Thus, it can be disposed of easily as a combustible material, a feature that is provided in consideration of the environment.

To facilitate the replacement of the filter, a one-touch clip is used in the filter cover which is unified with filter case. Thus, a construction that excels in serviceability has been realized.



Service Tip

The clean air filter on U.S.A. model should be changed at 15,000 miles. On Canada model, it should be changed at 16,000km. However, it varies with the use conditions (or environment).

7. Air Conditioning ECU

General

The air conditioning ECU has following control.

Control	Outline	Auto- matic	Manual
Outlet Air Temp. Control	In response to the temperature control switch setting, the required outlet air temperature, evaporator temperature sensor, and engine coolant temperature sensor compensations are used by the air mix control damper control to calculate a tentative damper opening angle, through an arithmetic circuit in the air mix damper, to arrive at a target damper opening angle.	○	—
Blower Control	This function controls the operation of the blower motor in accordance with the signals from the engine coolant temperature sensor, evaporator temperature sensor, and the solar sensor. In addition, it protects the blower motor controller from the sudden drive current that occurs when the blower motor is activated.	○	—
Air Outlet Control	When the AUTO switch has been turned ON, automatic control causes the servomotor (for air mix control) to rotate to a desired position in accordance with the target damper opening, which is based on the calculation of the required outlet air temperature. Furthermore, under automatic control, the potentiometer in the servomotor (for air mix control) is used to detect the actual damper opening, as opposed to the calculated target damper opening, so that control can be effected to match the actual damper opening to the calculated target damper opening.	○	—
	In accordance with the engine coolant temperature, outside air temperature, amount of sunlight, required blower outlet temperature, and vehicle speed conditions, this control automatically switches the blower outlet to the FOOT/DEF mode to prevent the window from becoming fogged when the outside air temperature is low.	○	—
Air Inlet Control	Drives the servomotor (for air inlet) according to the operation of the air inlet control switch and fixes the dampers in the FRESH or RECIRC position.	○	○
	When the compressor is turned OFF through the manual operation of the switch or through automatic control, the air conditioning ECU switches the air inlet mode to the FRESH mode. When the outside air temperature is low, the air conditioning ECU automatically switches the air inlet mode to the FRESH mode in order to ensure the demisting performance of the window.	○	—
Compressor Control	This control turns OFF the magnetic clutch of the compressor when the blower motor is turned OFF at the time the engine coolant temperature is below a predetermined value, an abnormal refrigerant pressure has been input, or the discharge temperature of the evaporator is below a predetermined value.	○	○
	When the DEF mode switch is turned on, the magnetic clutch relay is activated automatically to engage the compressor. Also, when the blower is turned off, and the front defroster switch is turned on, the blower will turn on in the automatic control condition.	○	—
Rear Window Defogger Control	When switching the rear window defogger ON, the rear window defogger and outside rear view mirror heaters* will operate. Then, after 15 minutes have passed, the switch will automatically turn OFF.	○	○
Self-Diagnosis	Checks the sensor in accordance with operation of the air conditioning switches, then heater control panel display portion a DTC (Diagnosis Trouble Code) to indicate if there is a malfunction or not (sensor check function).	○	—
	Drives the actuators through a predetermined sequence in accordance with the operation of the air conditioning switches (actuator check function).	○	—

Bold frame: Controls added since the '01 Camry

*: Outside Rear View Mirror with Heater Model

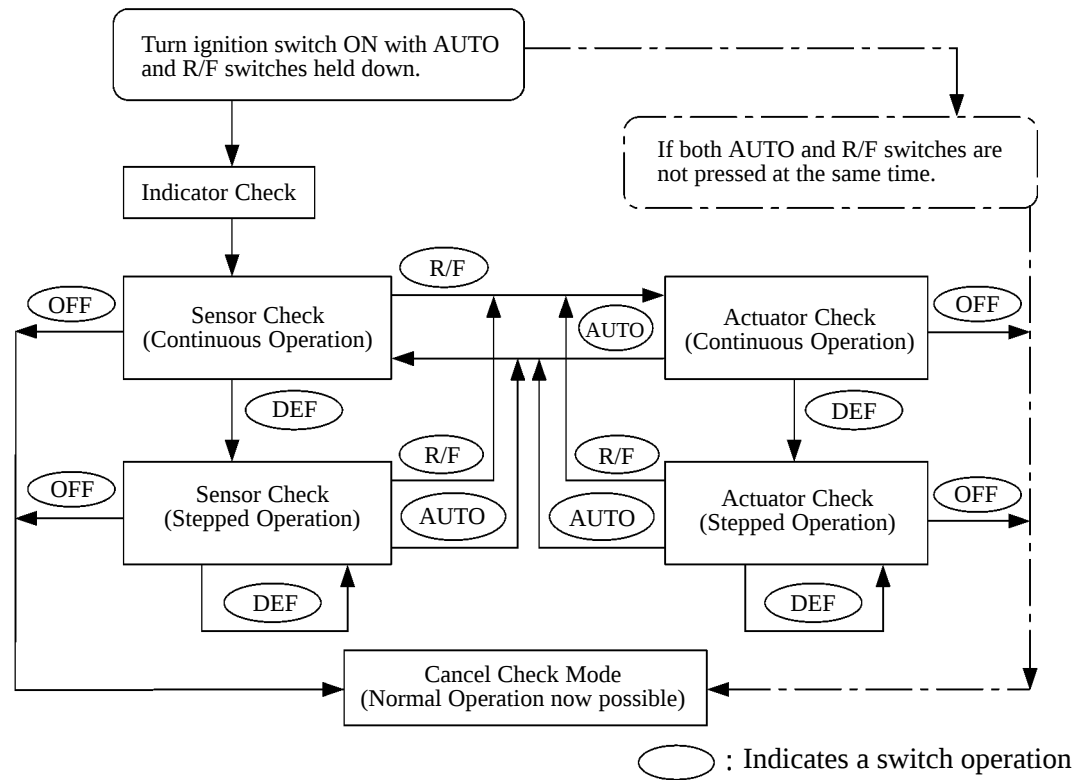
Self-Diagnosis

- The air conditioning ECU has a self-diagnosis function. It stores any operation failures in the air conditioning system memory in the form of a malfunction code. By operating switches on the air conditioning control switches, the stored malfunction code will be indicated. Since diagnostic results are stored directly by electric power from the battery, they are not cleared even when the ignition switch is turned off.

► Functions ◀

Function	Outline
Indicator Check	Checks indicator lights and temperature setting display.
Sensor Check	Checks the past and present malfunctions of the sensors, and clearing the past malfunction data.
Actuator Check	Checks against actuator check pattern if blower motor, servomotors and magnetic clutch are operating correctly according to signals from ECU.

- The check function can be started by the following procedure shown below.



187BE33

For details on the indicator check, sensor check, actuator check function, and clearing DTCs of this system, refer to the 2002 Camry Repair Manual (Pub. No. RM881U).

ACCESSORIES

NAVIGATION SYSTEM

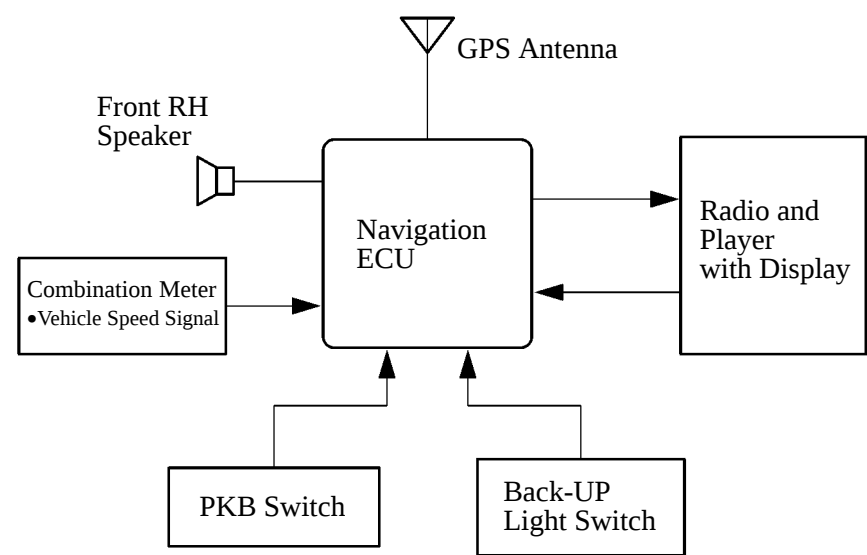
1. General

- The navigation system with AV(Audio Visual) system has been adopted on XLE grade model and SE grade model as optional equipment.
- Through the use of the GPS (Global Positioning System) and map data in a DVD (Digital Versatile Disc), this navigation system analyzes the position of the vehicle and indicates that position on the map that is displayed on the screen.
Additionally, it provided voice instructions to guide the driver through the route to reach the destination that has been selected.

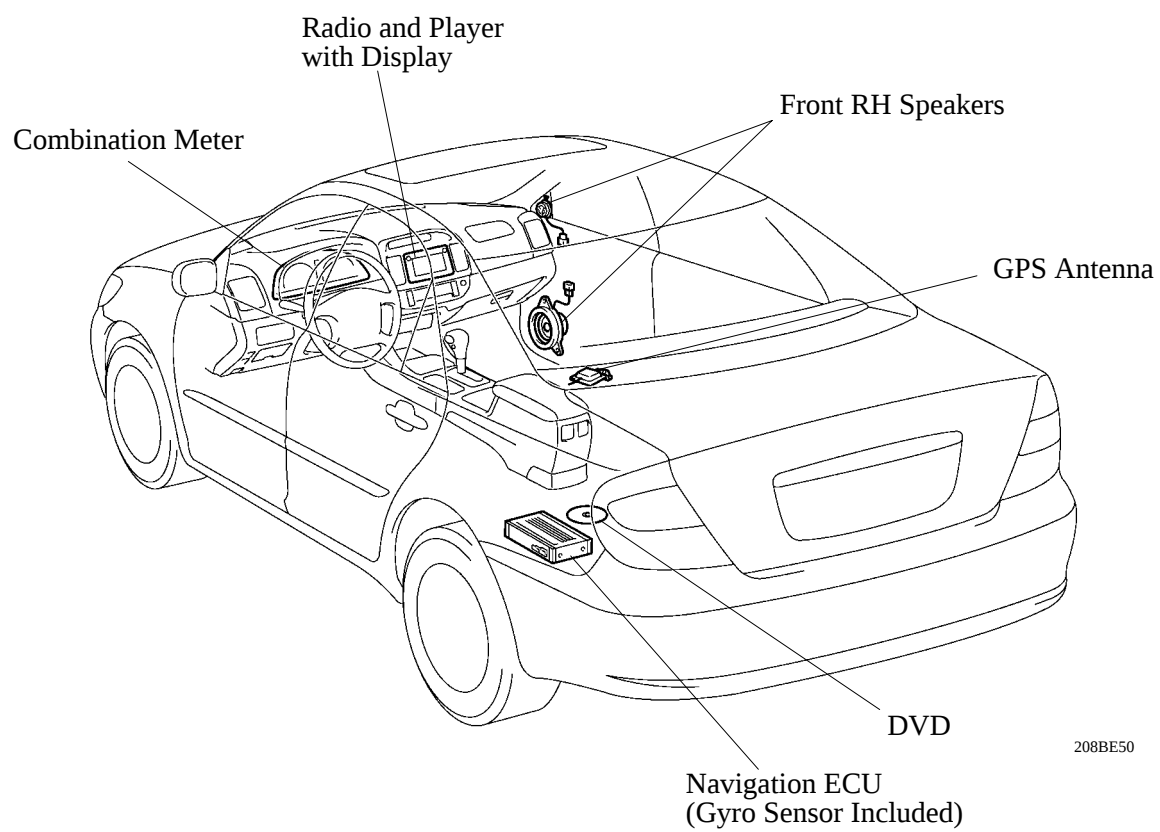
Specifications

Display	• 6.5-Inch Wide LCD (Liquid Crystal Display) • Pressure Sensitive Touch Panel • Dual Screen Display
Map Data Media	DVD (Digital Versatile Disc)
Navigation System	GPS (Global Positioning System)

2. System Diagram



3. Layout of Main Component



4. Construction and Operation

General

Listed below are the main functions of navigation display.

Function	Outline
Adjustment Screen Display	Image quality adjustment screen indication.
Navigation Screen Display	● Enlargement / reduction, rotation and movement of map. ● Indication of current position and direction of travel. ● Correction of current position. ● Setting change and indication of route. ● Voice guidance. There are many additional functions.
Diagnosis Screen Display	● Service Check Menu. ● Display Check. ● Navigation Check.

Navigation Screen Display

- Based on the map data on the DVD, signal from the GPS satellites, signals from the built-in gyro sensor, and signals from the vehicle's speed sensor, the vehicle's present position, direction of travel, and driven distance are calculated and displayed on the navigation display.
- The '02 Camry has the GPS voice navigation system functions listed below:

	Item	Function
Map Display	Linear Touch Scroll	Enables smooth scrolling by connecting the touch points on the screen
	On-route Scroll	Scrolls the center of the cursor forward and reverse constantly along the route.
	Heading Up	Displays the map so that the direction of the route progression head up during route guidance.
	Map Color Change	Automatically changes the map display color by season.
	Front Wide	Displays a map in the direction of travel of the vehicle in an enlarged form. (Heading up only)
	Step-less Scale Display	Changes the scale of the map from the basic 13 steps to an even finer display.
	Direct Scale Change	Directly selects and displays the map scale.
	Multi-step Scale Display	Changes and displays the map scale in 13 stages.
	Split-view Display	Displays different modes on a screen that is split into two views.
	Points-of-Interest Display	Displays selected types of marks on the map.
	Taillight-interlocked Map Color Change	Changes the displayed color on the map screen when the taillights are turned ON.
	Road Number Sign Board Display	Displays the road number on the map.
Destination Search	Last Destination Memory	Stores 20 locations of coordinates, names and times that have been set as destinations in the past.
	Hybrid Points-of-interest Search	Narrows the search by names of the points-of-interest, category, and areas.
	Points-of-interest Pinpoint Display	Pinpoints and displays the position of the point-of-interest.
	House Number Search	Searches for a house number.
	Special Memory Point	Sets a pre-registered point as a destination point while driving.
	Nearest Point-of-interest Search List Display	Searches nearest points-of-interest and displays a list.

(Continued)

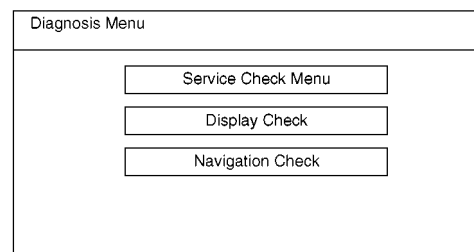
Item		Function
Destination Search	Intersection Search	By specifying two streets, the point at which they intersection is set as the destination point.
	Emergency Search	Performs a specific search for hospitals, police stations and dealers.
	Freeway Entrance / Exit Search	Searches for the destination bay the name of the street that connects to a freeway entrance / exit.
Route Search	Multiple Destination Setting	Sets multiple destinations. It can also rearrange the sequence of the destinations.
	Route Search	Searches for multiple routes.
	Search Condition Designation	Searches for the recommended, shortest, and other routes.
	Regulated Road Consideration	Performs search while considering regulated roads.
	Avoidance Area	Avoids a designated area and searches a route.
Guidance	Destination Direction Arrow Display	Uses arrows along the road to display the direction of the destination during route guidance.
	Off-Route Arrow Display	Uses arrows along the road to display the direction of the destination during off-route.
	Rotary Guidance	Guidance that renders the entry and exit into a rotary as a single branching point.
	Right or Left Turn Guidance	Voice guidance to instruct the direction of travel to be taken.
	Freeway Direction of Travel Guidance	Voice guidance to instruct the direction of travel to take on the freeway.
	Distance Display Destination	Displays the distance from the present location to the destination.
	Freeway Branch Type Specimen Guidance	Type specimen for guidance to a freeway branch.
	Intersection Zoom-in Display	Zoom-in display when approaching an intersection.
	Turn List Display	Displays a turn list on the right side of the two-screen display when approaching an intersection.

Diagnosis Screen Display

The navigation display is equipped with a self-diagnosis system and can display the diagnosis menus shown on the right.

The diagnosis menu contains the following three items

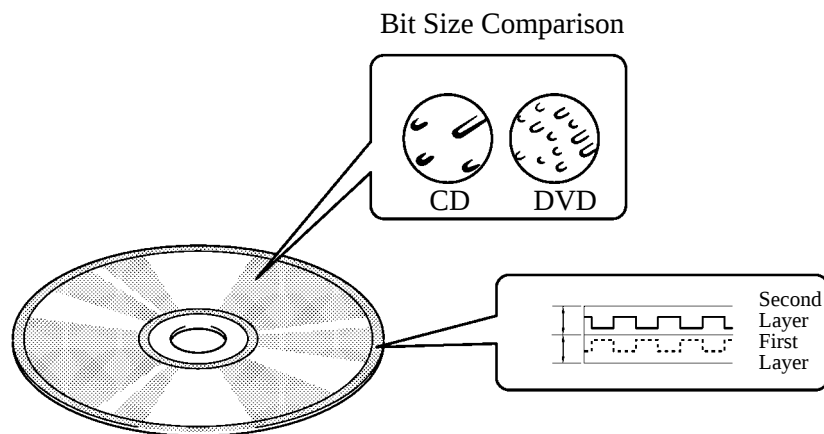
- Service Check Menu
- Display Check
- Navigation Check



For details, refer to the 2002 Camry Repair Manual (Pub. No. RM881U).

DVD (Digital Versatile Disc)

The DVD, which uses a smaller laser beam diameter than the CD (Compact Disc), is able to record and play back a greater amount of data because it can handle pits, or signal grooves, at a higher density. The volume of data that a 12 cm (0.47 in.) diameter DVD can store is equivalent to approximately 7.5 times that of a CD-ROM, totaling 4.7 gigabytes. The navigation system has adopted a dual-layer DVD, which has two layers per side to store a large capacity of signal data, totaling 8.5 gigabytes.



187BE38

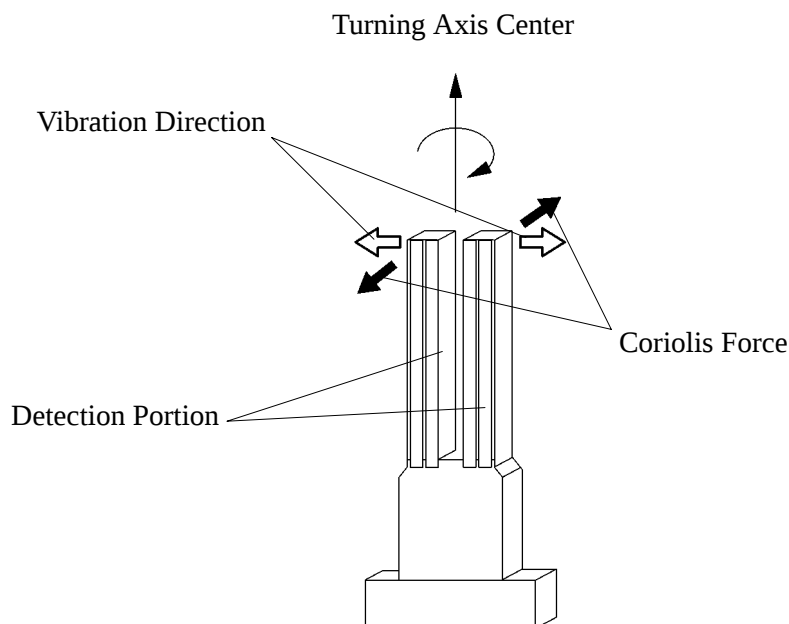
Gyro sensor

The gyro sensor is designed to detect the yaw rate of vertical axis turn of the vehicle and installed in the Navigation ECU.

The gyro sensor has a piezoelectric ceramic piece inside. This piezoelectric ceramic piece deforms by charging voltage and generates voltage by deforming with force.

The piezoelectric ceramic piece inside the gyro sensor is vibrated by the driving circuit and when the vehicle turns (when the detection portion turns to the axis direction), coriolis force is added to the detection portion. With this force, the detection portion is twisted. The voltage generated by this twisting is signal-processed inside the gyro sensor and outputted.

Navigation ECU receives this signal and judges the yaw rate of the vehicle.



182BE49

Detection the Vehicle Position

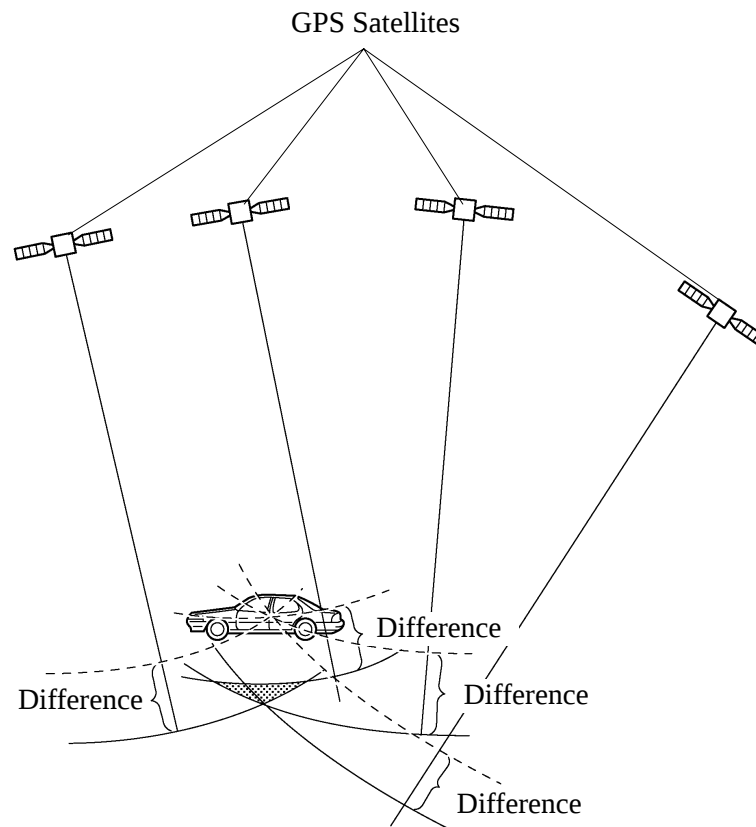
The navigation ECU calculates the position based on the principle of a 3-point measurement.

The GPS satellites are equipped with high-precision clocks. Thus, the satellites are able to transmit continuous orbit signals and radio wave transmission time signals.

The navigation ECU also contains a clock, which can understand the radio wave time signals that are received from the satellites.

As a result, the length of time that is taken by the radio waves to arrive from the satellites to the antenna can be determined. Thus, the lengths of time that elapse for the radio waves of the 4 satellites to reach the antenna are measured. Each of these lengths of time are multiplied by the luminous flux (the rate of transmission of luminous energy: approximately 300,000 km / second), the results of which are the distances from the satellites to the antenna. Because the positions of the GPS satellites are known by their signals, the receiving point (vehicle position) can be rendered as the point in which the 4 spheres (of which the centers are the respective satellites) converge.

However, due to the differences that exist between the clocks of the satellite and the ECU, the 4 spheres do not converge at a single point. Therefore, the ECU uses another satellite to calculate the point at which the 4 spheres converge at a signal point and corrects its internal clock. As a result, the ECU determines the vehicle position and adjusts its internal clock to the clocks of the satellites.

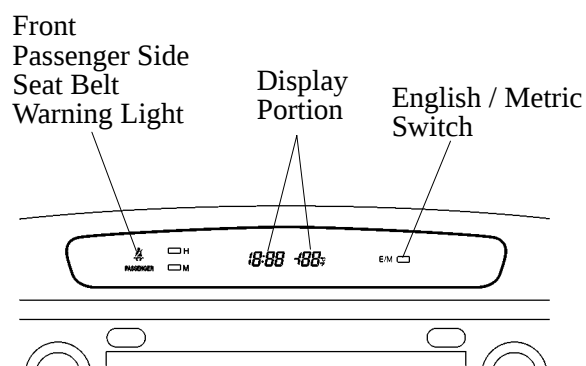


■ MULTI-INFORMATION DISPLAY

1. General

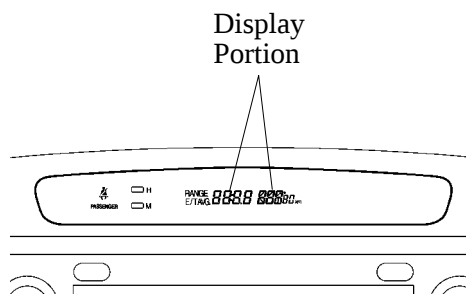
- The multi-information display has been adopted as standard equipment.
- On the XLE grade model, the following pieces of information appear on the multi-information display: clock, ambient temperature, average vehicle speed, average fuel consumption, instant fuel consumption, elapsed time, and drivable distance. On the SE and LE grades, the following appears on the display: clock and ambient temperature.
The built-in ECU calculates the contents to be displayed in accordance with the information received from the sensors and other ECUs.
- On the XLE grade model, the display functions can be switched by operating the steering wheel pad switch.
- On the SE and LE grade models, the indication (°C or °F) of the ambient temperature on the multi-information display can be switched by pressing the English/Metric switch.
- A front passenger seat belt warning light is provided above the multi-information display.

► SE and LE Grade Model ◀



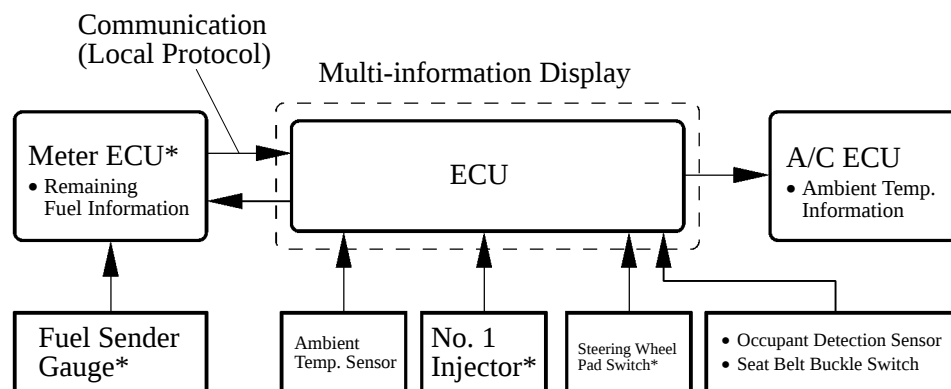
208BE18

► XLE Grade Model ◀



208BE19

► System Diagram ◀



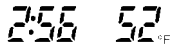
*: Only for The XLE Grade Model

208BE20

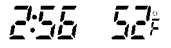
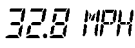
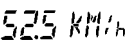
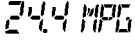
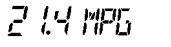
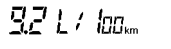
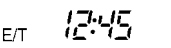
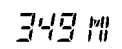
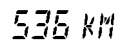
2. Function of Main Components

Display Portion

► SE and LE Grade Model ◀

Item	Display Contents	Outline
Clock and Ambient Temperature Display	 208BE21	• Clock display • Displays ambient temperature (°C or °F)* in accordance with the ambient temperature sensor signal. *: Switched through the English/Metric switch.

► XLE Grade Model ◀

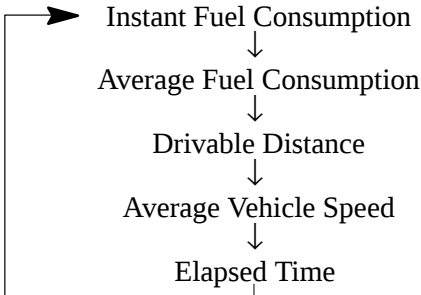
Item		Display Contents		Outline
Clock and Ambient Temperature Display		U.S.A.	 208BE22	• Clock display • Displays ambient temperature in accordance with the ambient temperature sensor signal.
		Canada	 208BE52	
Multi-information	Average Vehicle speed	U.S.A.	AVG.  208BE23	Displays the average vehicle speed, which is calculated by the ECU based on the length of time and the driven distance after connecting the battery terminal or prolonged pressing (0.6 seconds or longer) of MODE/RESET switch of the steering wheel pad switch.
		Canada	AVG.  208BE53	
	Average Fuel Consumption	U.S.A.	AVG.  208BE24	The calculation of the average fuel consumption rate for this display is updated every 10 seconds by the ECU, based on the following pieces of information: the driven distance (from the time the battery terminals have been connected, or the MODE/RESET switch on the steering wheel pad switch has been pressed for a long time {0.6 seconds or longer}) and the fuel consumption volume (fuel injection signal from No. 1 injector).
		Canada	AVG.  208BE54	
	Instant Fuel Consumption	U.S.A.	 208BE25	In contrast to the calculations performed every 10 seconds for the average fuel consumption, the ECU calculates and displays the instant fuel consumption every 2 seconds.
		Canada	 208BE55	
	Elapsed Time	 208BE26		Displays the length of time that has elapsed from the time the ignition switch has been turned ON after the battery terminals have been connected, or the MODE/RESET switch on the steering wheel pad switch has been pressed for a long time (0.6 seconds or longer).
	Drivable Distance	U.S.A.	RANGE  208BE27	Displays the approximate drivable distance that has been calculated based on the following pieces of information: the remaining fuel information from the meter ECU, vehicle speed signal, No. 1 injector's fuel injection signal, and the fuel consumption that the ECU has learned.
Canada		RANGE  208BE56		

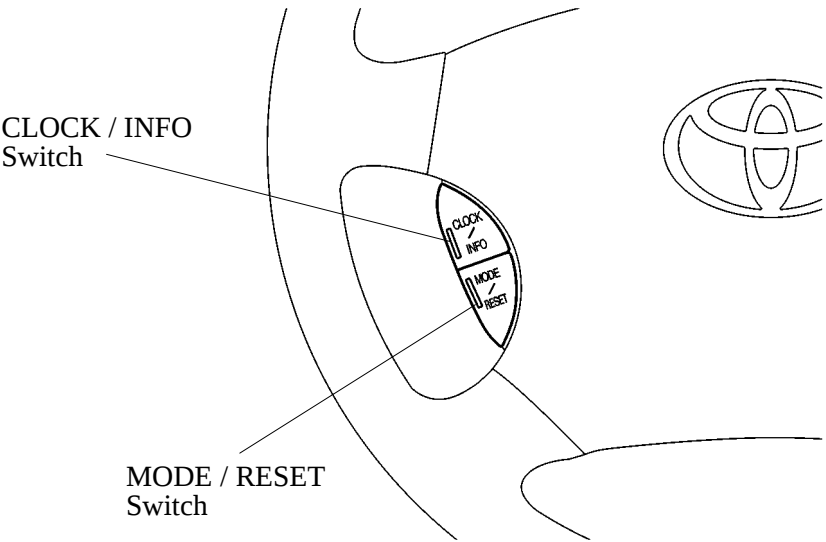
Switch

► SE and LE Grade Model ◀

Switch	Function
English / Metric Switch	Pressing this switch changes the unit of the ambient temperature display between “°F” and “°C”. The “°F” unit is for the U.S.A., and the “°C” for Canada.

► XLE Grade Model ◀

Switch	Function
CLOCK / INFO Switch	Pressing this switch changes from the clock and ambient temperature display to the multi-information display.
MODE / RESET Switch	- Pressing this switch changes the contents of the multi-information display in the following sequence: <pre>graph TD; A[Instant Fuel Consumption] --> B[Average Fuel Consumption]; B --> C[Drivable Distance]; C --> D[Average Vehicle Speed]; D --> E[Elapsed Time]; E --> A;</pre> - Pressing this switch for a long time (0.6 seconds or longer) resets the display contents of each mode.



■ POWER WINDOW SYSTEM

1. General

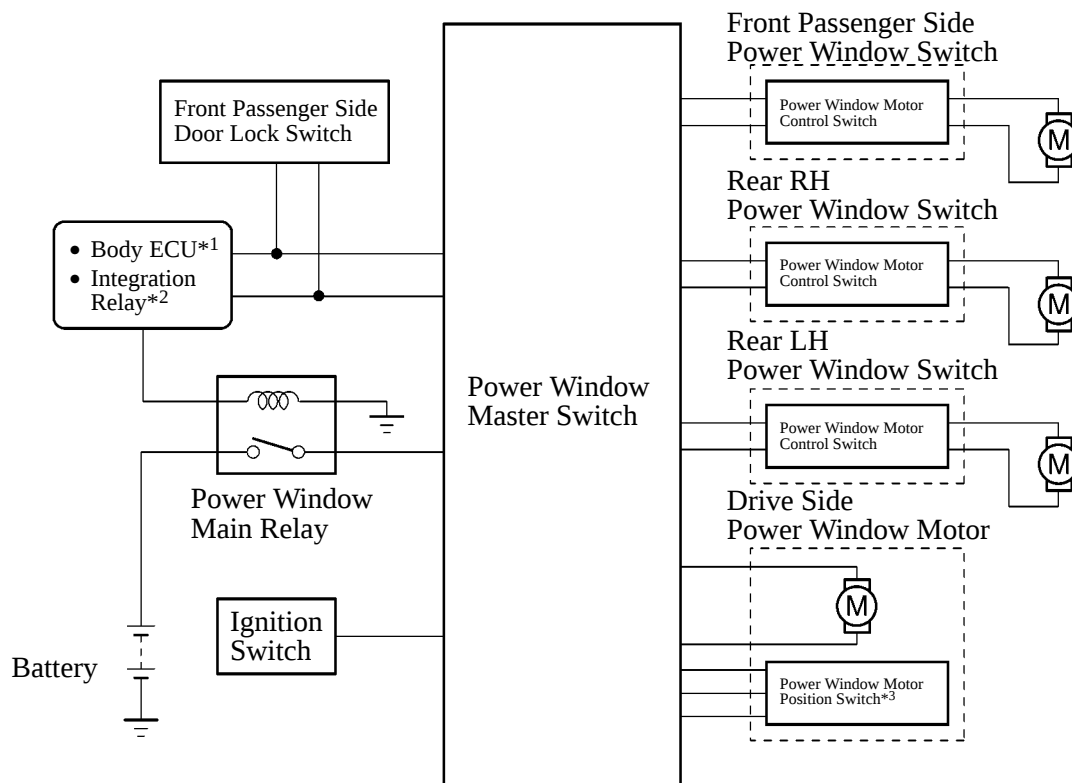
The power window system has the following functions:

Function	Outline
Manual up-and-down	This function causes the window to open or close while the power window switch is being pulled halfway up or pushed halfway down. The window stops as soon as the switch is released.
Driver's door one-touch auto up-and-down function* ¹	The driver's door one-touch auto up-and-down function enables the window of driver's door to be fully opened or closed at a touch of the power window switch.
Driver's door one-touch auto down function* ²	The driver's door one-touch auto down function enables the window of driver's door to be fully closed at a touch of the power window switch.
Jam protection function* ¹	A jam protection function automatically stops the power window and moves it downward if a foreign object gets jammed in the window during one-touch auto-up operation.
Remote control function	The up-and-down operations of the front passenger door window and the rear door windows can be controlled by operating the power window master switch.
Key-off operation function	The driver's door key-off operation function makes it possible to operate the power window for approximately 43 seconds after the ignition switch is turned to the ACC or LOCK position, if the front doors are not opened.

*¹: Only for The XLE Grade Model

*²: Except for The XLE Grade Model

► System Diagram ◀

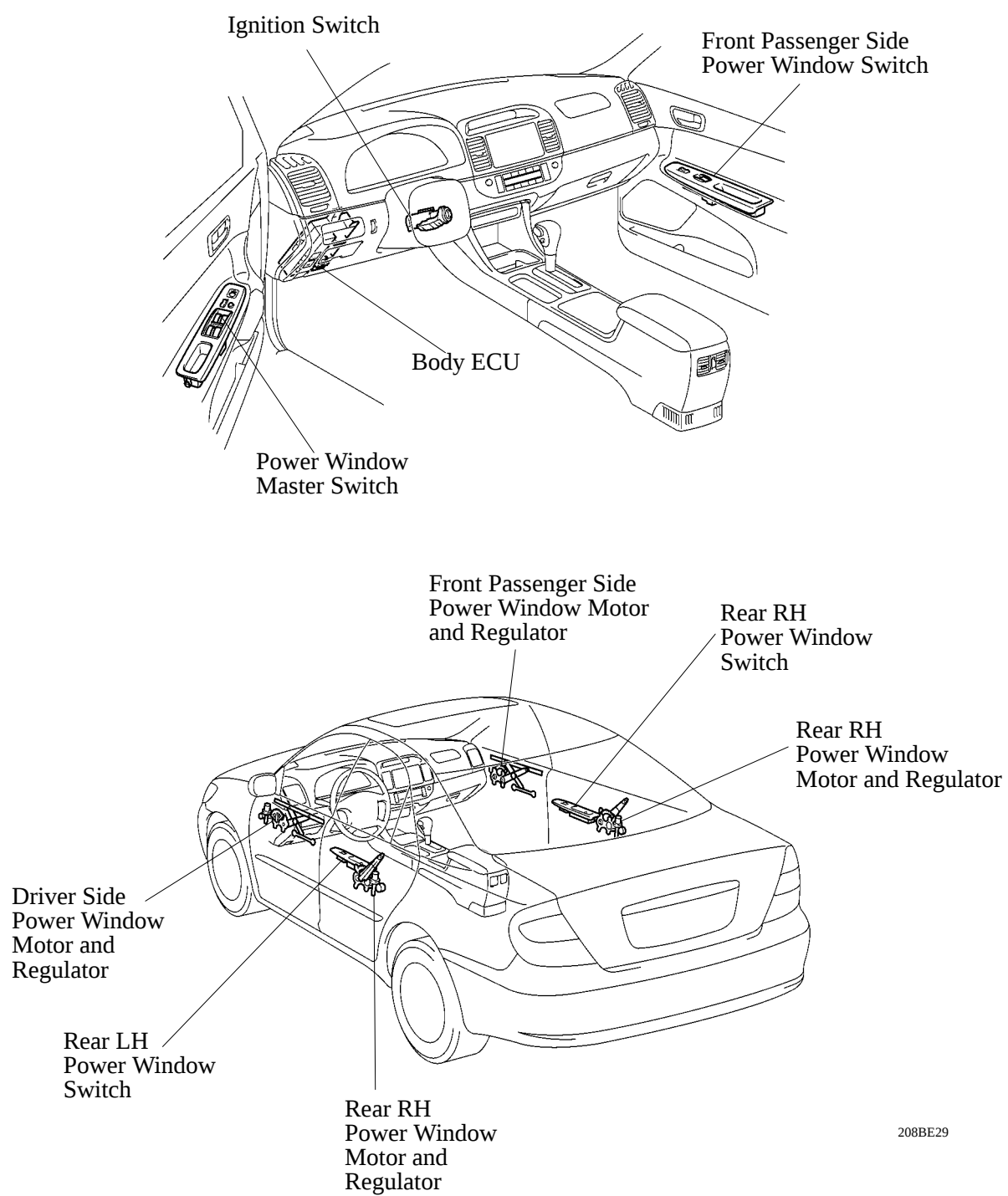


*¹: Except for The 2AZ-FE Engine LE and SE Grade Standard Specification Model

*²: Only for The 2AZ-FE Engine LE and SE Grade Standard Specification Model

*³: Only for The XLE Grade Model

2. Layout of Main Component



■ DOOR LOCK CONTROL SYSTEM

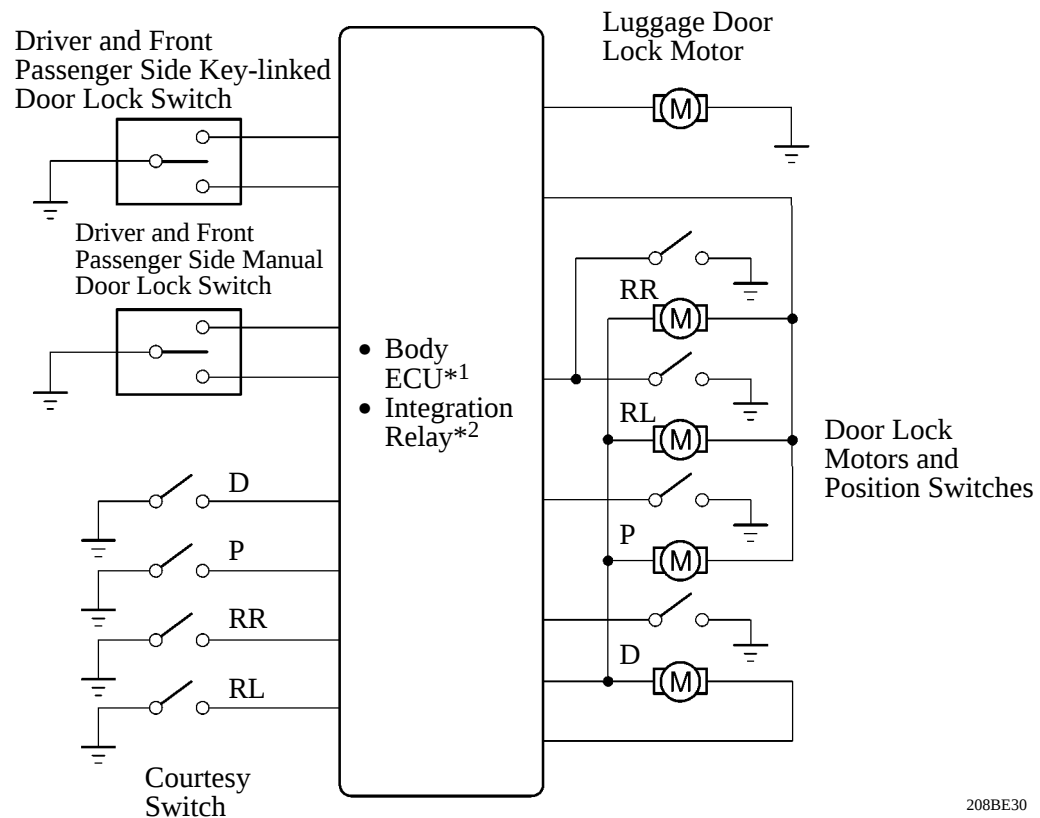
1. General

The door lock control system has the following functions:

Function	Outline
Key-linked lock and unlock function	This function, which is linked with the key cylinder, can lock or unlock all the doors when a lock or unlock operation is effected.
Key confine prevention function	Provided that the key is inserted in the ignition key cylinder and the driver's door is open, an attempt to lock the door will cause all the doors to unlock.
Manual unlock prohibition function	When a lock operation is effected through wireless door lock remote control, this function prohibits the driver's and front passenger door lock switches from becoming unlocked.
2-step unlock function	This function is provided to unlock the driver's door by turning the key cylinder first and to unlock passenger's door by turning it the second time.
Shift-linked automatic door lock*	When the conditions listed below are met consecutively, this function causes all the doors to be automatically locked. • The ignition switch is turned from the "OFF" or "ACC" position to the "ON" position. • All doors are closed. • The shift lever is moved out of P position. • Either one of the doors is unlocked.

*: Only for The Automatic Transaxle Model

► System Diagram ◀

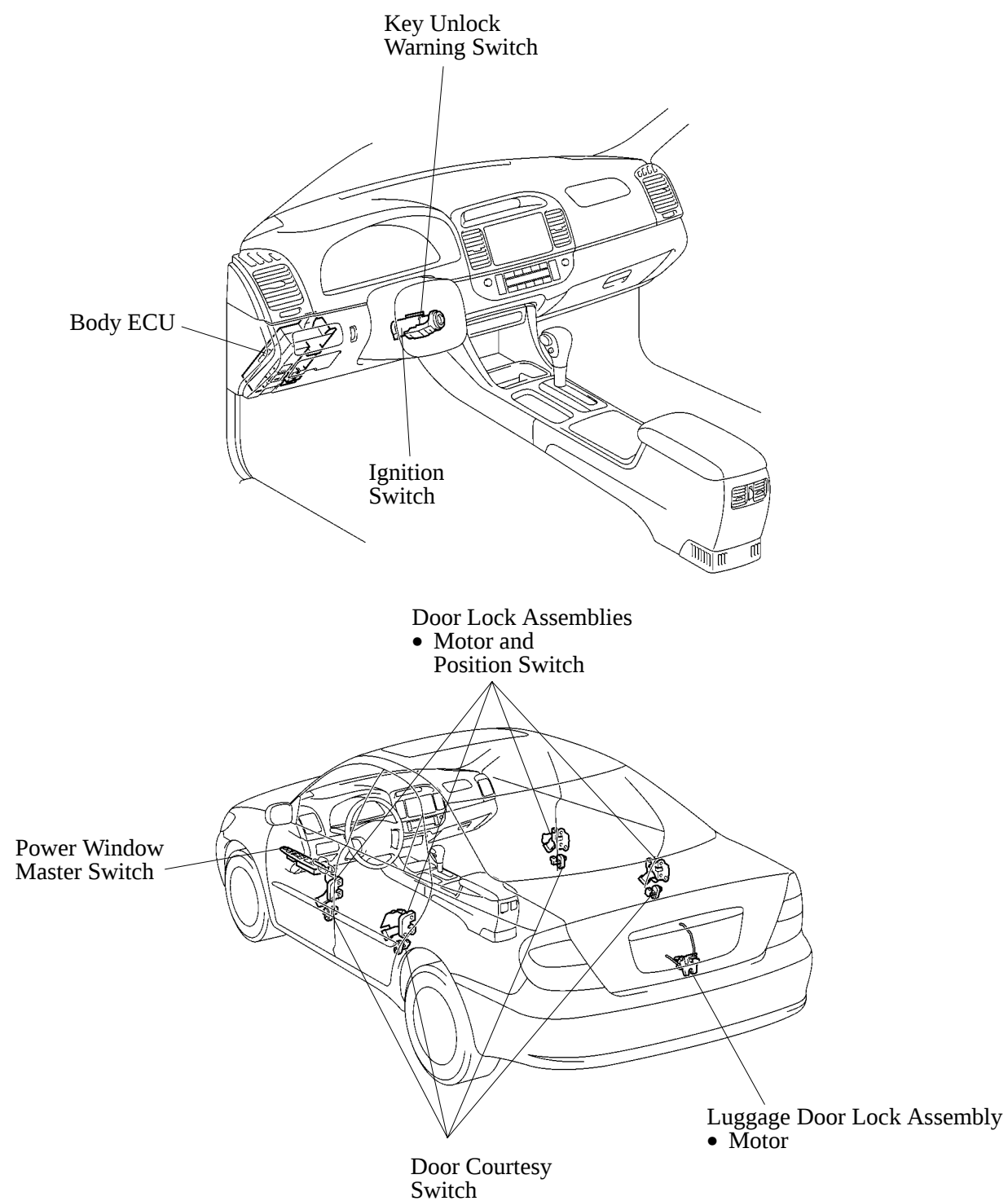


208BE30

*1: Except for The 2AZ-FE Engine LE and SE Grade Standard Specification Model

*2: Only for The 2AZ-FE Engine LE and SE Grade Standard Specification Model

2. Layout of Main Component



■ WIRELESS DOOR LOCK REMOTE CONTROL SYSTEM

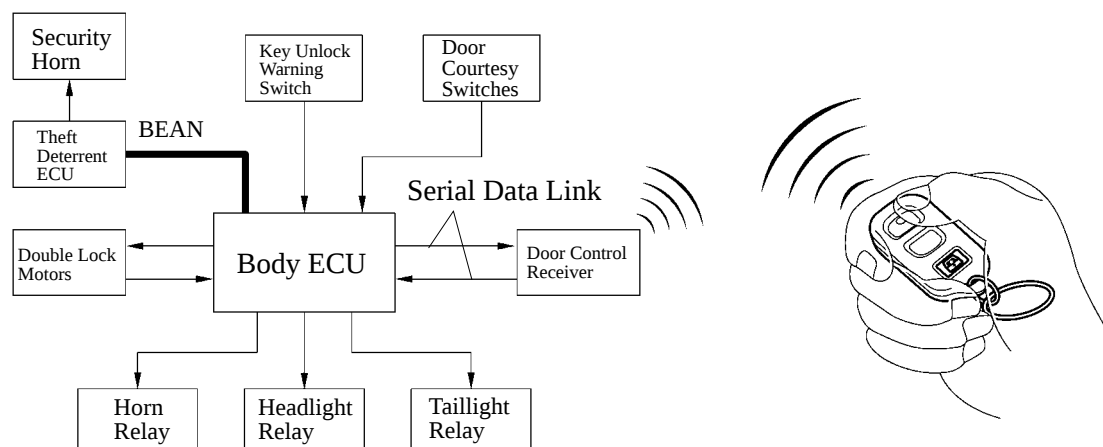
1. General

The wireless door lock remote control system has been adopted on the XLE grade model as standard equipment and SE and LE grade model as optional equipment.

This system is a convenient system for locking and unlocking all the doors, at a distance. This system in the Camry has the following features:

- In this system, the wireless door control receiver performs the code identification process and the body ECU effects the door lock control. Serial data link is provided for communication between the wireless door control receiver and the body ECU.
- A key-holder type transmitter has been adopted, and it contains the following four switches: the door lock switch, door unlock switch, luggage door open switch and panic switch.
- A rolling code system, in which the signal configuration changes each time when a signal is transmitted by the transmitter, has been adopted.

► System Diagram ◀

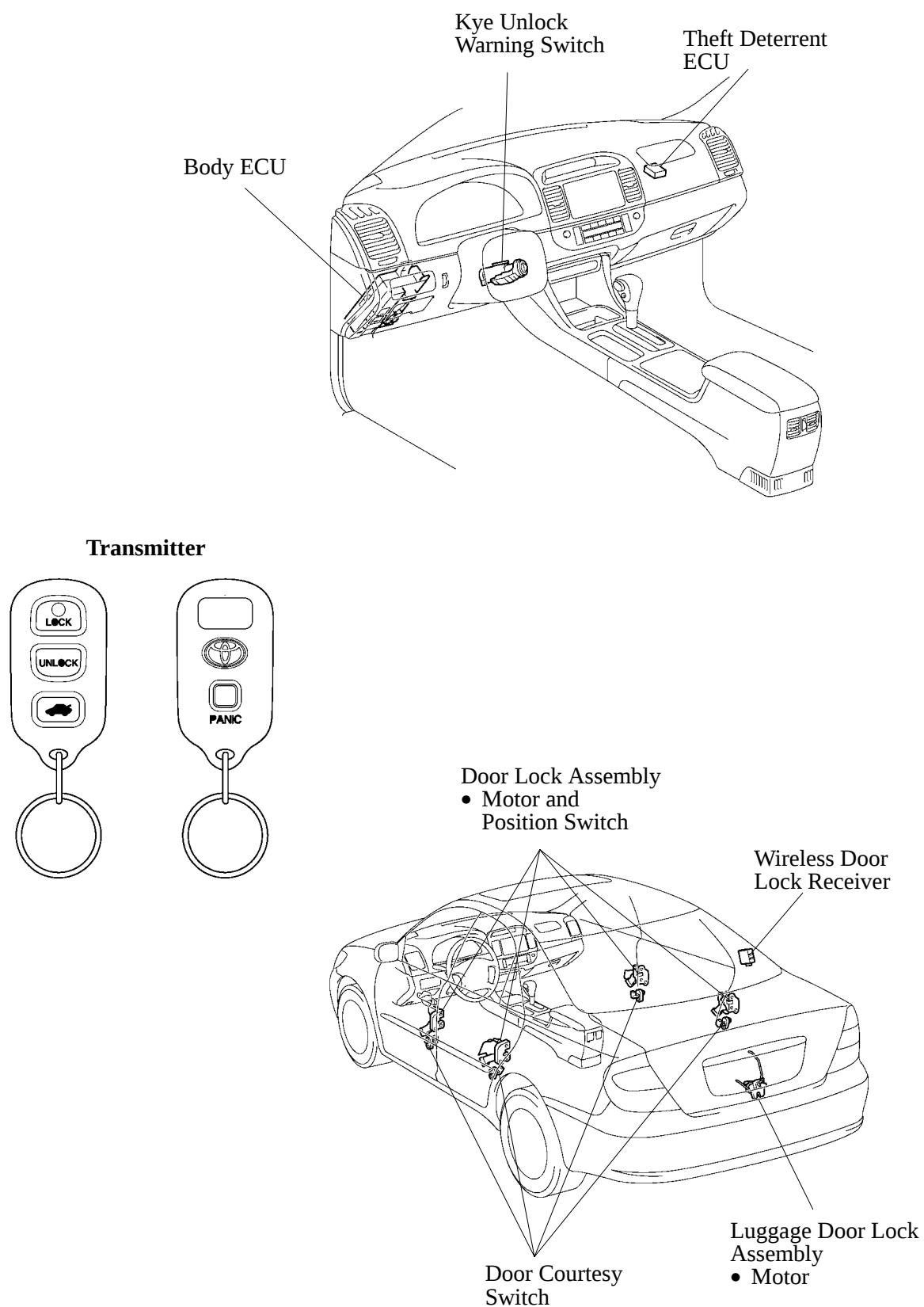


208BE32

Service Tip

In case of making new ignition key due to the loss of it, it is necessary to register recognition code. Refer to see the 2002 Camry Repair Manual (Pub. No. RM881U).

2. Layout of Component



3. Function

General

The wireless door lock remote control system in the Camry has the following functions.

Function	Outline
All Doors Lock Operation	Pressing the door lock switch of the transmitter locks all doors.
All Doors Unlock (2-step Unlock) Operation	Pressing the door unlock switch twice within 3 seconds opens all doors after opening the driver's door.
Luggage Door Open Operation	Keeping the luggage door opener switch of the transmitter pressed longer than about 1 second opens the luggage door.
Answer Back Operation	When the transmitter is used for locking or unlocking the doors, this function flashes the parking lights and taillights and momentarily sounds the buzzer to inform the user that the operation has been completed.
Panic Alarm Operation	Pressing the PANIC switch of the transmitter activates the alarm (to sound the vehicle horn, flash the headlights, taillights, and hazard lights). In addition, a model with the theft deterrent system sounds the security horn and illuminates the interior light and the ignition switch light.
Automatic Lock Function	If none of the doors are opened within 30 seconds after they are unlocked by the wireless door lock remote control, all the doors are locked again automatically.
Transmitter Switch Miss-operation Prevention Function	When an ignition key is in the ignition key cylinder or any of the door is not closed completely, the wireless door lock remote control is temporarily cancelled to prevent miss-operation.
Repeat Function	If a door is not locked in response to the locking operation of the transmitter, the Body ECU will output a lock signal after the 1 second.
Illuminated Entry Function	When all the doors are locked, pressing the door unlock switch causes the interior lights to illuminate simultaneously with the unlock operation.
Security Function	Sends an operation signal as a rolling code.
Transmitter Recognition Code Registration Function	Enables the registering (writing and storing) of 4 types of transmitter recognition codes in the EEPROM that is contained in the Body ECU.
Self-Diagnosis	If there is a malfunction in the system, the Body ECU stores the DTCs (Diagnostic Trouble Codes) in its memory.

Transmitter Recognition Code Registration Function

The table below shows the 4 special coded ID registration function modes through which up to 4 different codes can be registered. The codes are electronically registered (written to and stored) in the EEPROM. For details of the recognition code registration procedure, refer to the 2002 Camry Repair Manual (Pub. No. RM881U) to register the codes correctly.

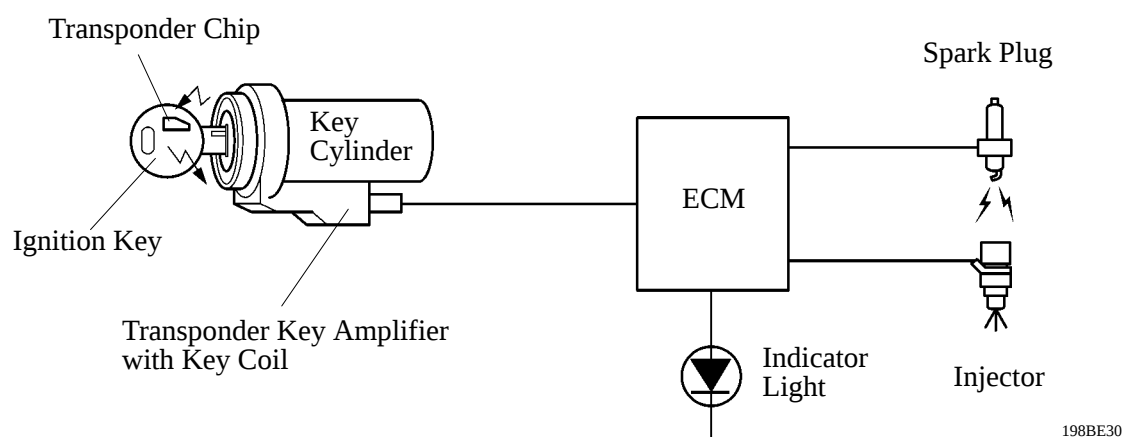
Mode	Function
Rewrite Mode	Erases all previously registered codes and registers only the newly received codes. This mode is used whenever a transmitter or the Body ECU is replaced.
Add Mode	Adds a newly received code while preserving any previously registered codes. This mode is used when adding a new transmitter. If the number of codes exceeds 4, the oldest registered code is erased first.
Confirm Mode	Confirms how many codes are currently registered. When adding a new code, this mode is used to check how many codes already exist.
Prohibit Mode	To delete all the registered codes and to prohibit the wireless door lock function. This mode is used when the transmitter is lost.

■ ENGINE IMMOBILISER SYSTEM

1. General

- This system has been provided on the XLE grade model and 1MZ-FE engine model as standard equipment and the other model as optional equipment.
- The engine immobiliser system is theft deterrent system which disables the engine from starting using the ignition key with an ID code that matched is the pre-registered code in the vehicle. This system consists of the transponder chip, coil, amplifier, and immobiliser ECU. The immobiliser ECU is enclosed in the ECM. This system adopts a transponder system which uses a transponder chip embedded in the grip of the ignition key. When the coil located around the ignition key cylinder receives the ID code signal transmitted by the transponder chip, the ECM determines whether or not the ID code matches the code stored.

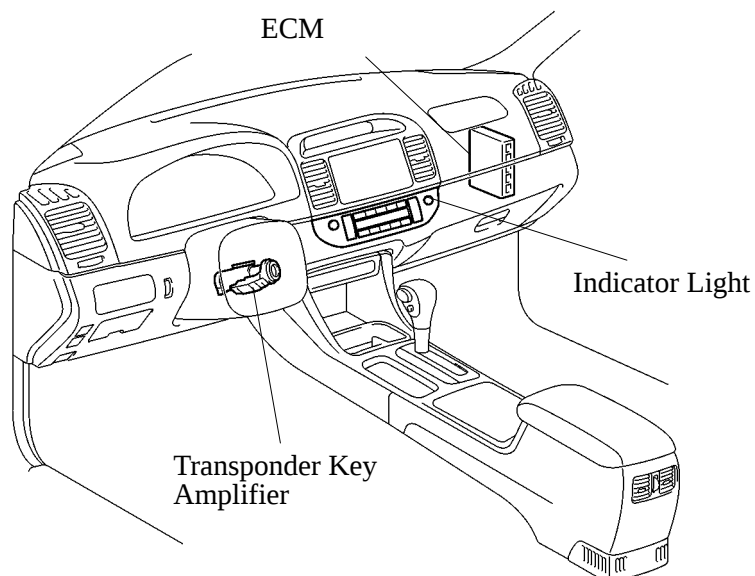
► System Diagram ◀



Service Tip

In case of making new ignition key due to the loss of it, it is necessary to register ID code. Refer to see the 2002 Camry Repair Manual (Pub. No. RM881U).

2. Layout of Main Component



THEFT DETERRENT SYSTEM

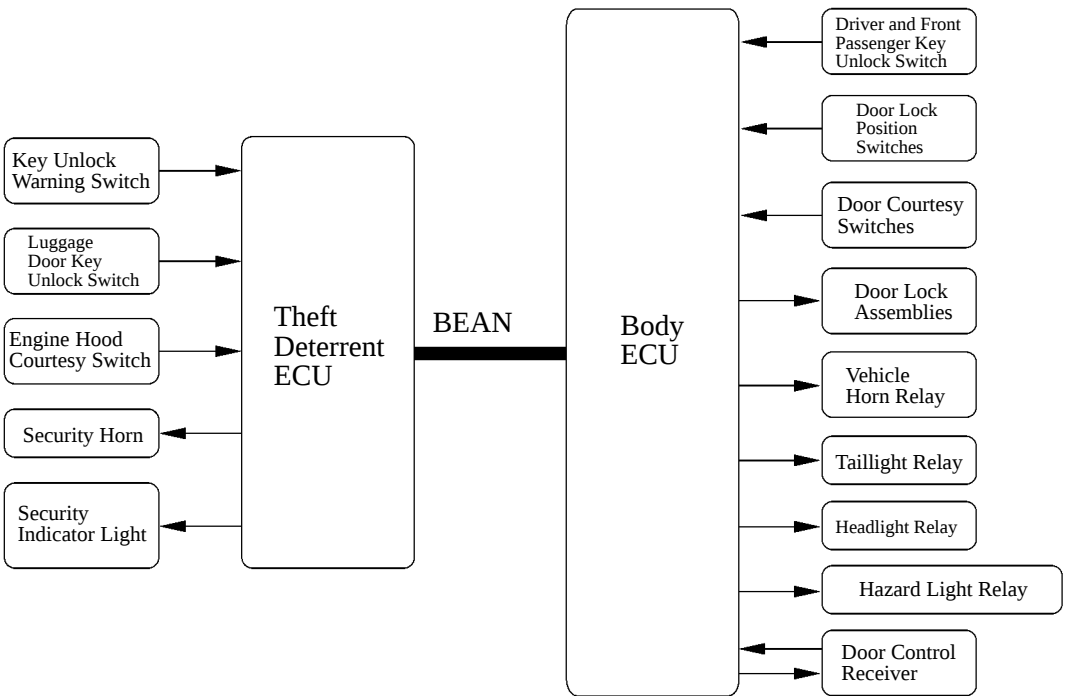
1. General

- This system has been provided on the XLE grade model as standard equipment.
- The theft deterrent system use the door lock control system and wireless door lock remote control system parts. The theft deterrent system will operate when somebody attempts to forcibly enter the vehicle, open the engine hood, or when the battery terminals are removed and reconnected.
- The control of this system is effected by the theft deterrent ECU, which maintains communication via the body ECU and BEAN (Body Electronics Area Network).
- The warning specifications of this system are listed below.

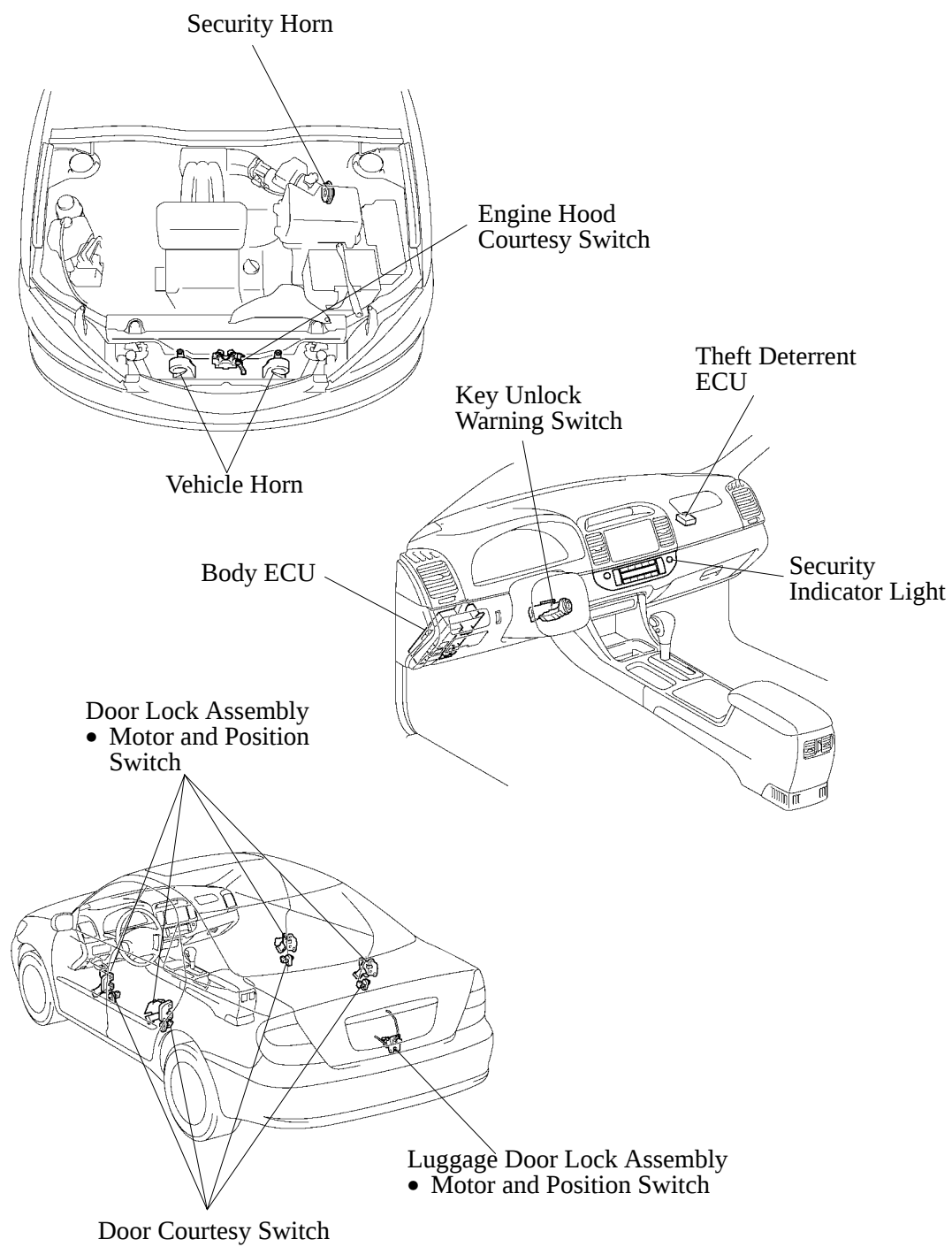
Warning Specifications ◀

Warning Method	Interior Light	Illuminates
	Hazard Light	Flashing
	Headlights and Taillights	Flashing
	Vehicle Horn	Sounds a warning at approx. 0.4 second cycles
	Security Horn	Sounds a warning at approx. 0.4 second cycles
	Door Lock Motor	Locking
Warning Time		60 sec.

System Diagram ◀



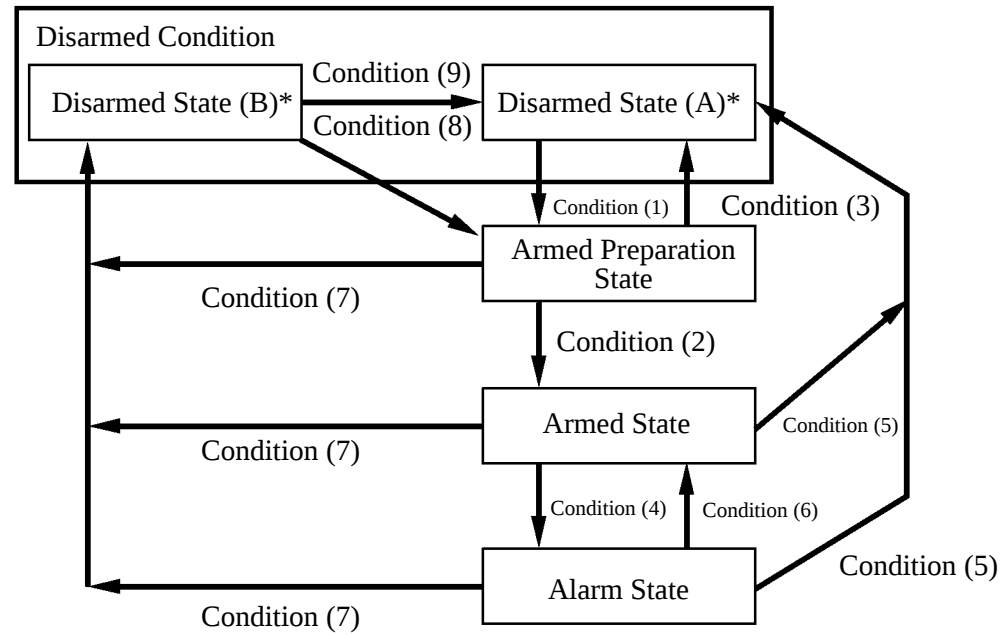
2. Layout of Main Component



3. System Operation

Basic Operation

This system activates as described in the diagram below when one of items place in the respective state.



189BE188

*: The only difference between disarmed State (A) and (B) is the difference in the conditions.

Condition	Item
Condition (1)	● There is no ignition key in the ignition key cylinder. ● When the doors, engine food, and luggage door are all closed, the transmitter is used to lock all doors. ● When the doors, engine food, and luggage door are all closed, the key is use to lock all doors.
Condition (2)	When the doors, engine hood, and luggage door are all closed and locked, and 30 seconds have elapsed.
Condition (3)	● When one of the doors or engine hood is changed from “close” to “open”. ● When the luggage door is changed from “close” to “open”. ● When one of the doors is change from “lock” to “unlock”. ● When the ignition key is inserted in the ignition key cylinder. ● When the ignition switch is change from “OFF” to “ON”. ● When a terminal is disconnected from the battery and reconnected.
Condition (4)	● All the doors are closed, and one of the doors is subsequently opened. ● Any door is unlocked with something other than the ignition key or transmitter. ● The luggage door is opened with something other than the ignition key or transmitter. ● The engine hood is opened. ● A terminal is disconnected from the battery and reconnected. ● The wiring harness is directly connected as if the turn the ignition switch ON.
Condition (5)	● The transmitter is used to unlock the doors. ● The key is inserted in the ignition key cylinder and the ignition switch is turned ON. ● When the key is available, and the engine immobiliser is canceled by turning the ignition switch ON.
Condition (6)	When the warning time has elapsed.
Condition (7)	● A luggage door open signal is input by the transmitter. ● A luggage door key unlock switch signal is input. ● The luggage door is opened.
Condition (8)	The luggage door is opened.
Condition (9)	● Any door is unlocked. ● Any door or engine hood is opened. ● The key is inserted in the ignition key cylinder. ● A terminal is disconnected from the battery and reconnected. ● When the ignition switch is change from “OFF” to “ON”.

Forced Door Lock Operation

When the system starts the alarm state, and one of the doors is subsequently unlocked, the forced door lock operation forcefully outputs a door lock signal to prevent intrusion into the vehicle. This operation becomes activated when all the starting conditions listed below have been met, and stops when one of the stopping conditions occurs.

Condition	Item
Starting Condition	The theft deterrent system is in the alarm state.
	There is no key inserted in the ignition key cylinder.
	If one of the doors is unlocked.
Stopping Condition	All doors are locked.
	The warning ends.
	The key is inserted in the ignition key cylinder.

Alarm Memory Operation

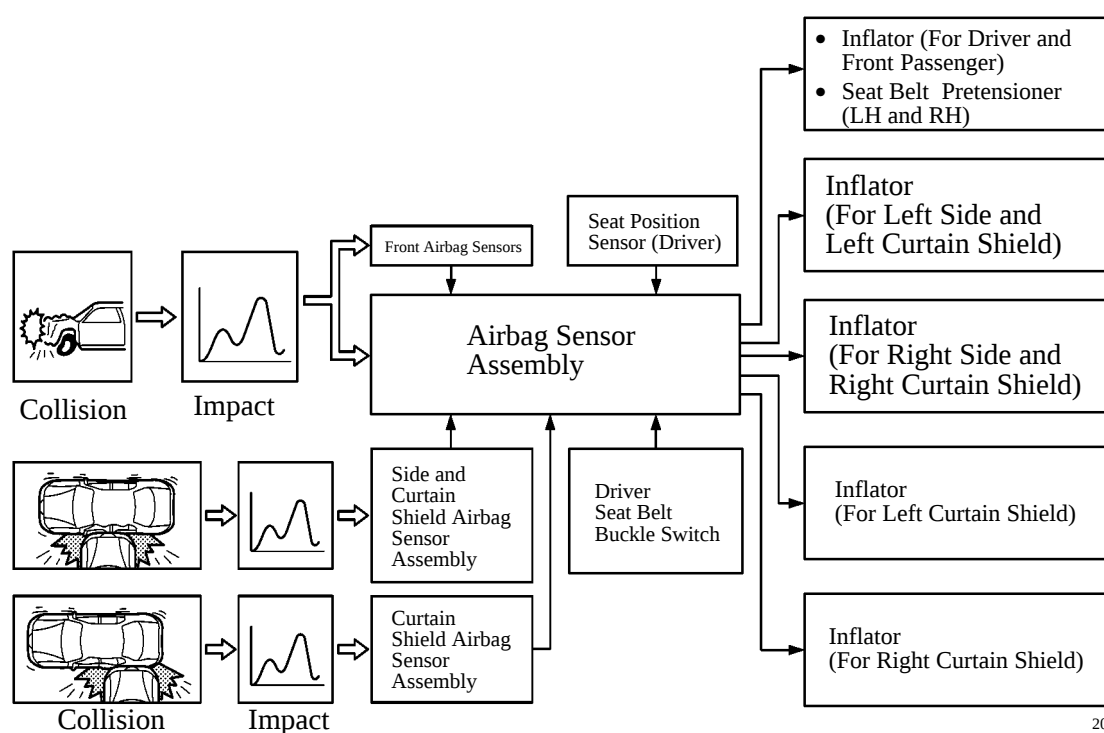
When the driver returns to the vehicle and cancels the theft deterrent system, this function illuminates the taillights for 2 seconds to inform the driver that the theft deterrent system had been tripped and was in the alarm state.

■ SRS AIRBAG SYSTEM

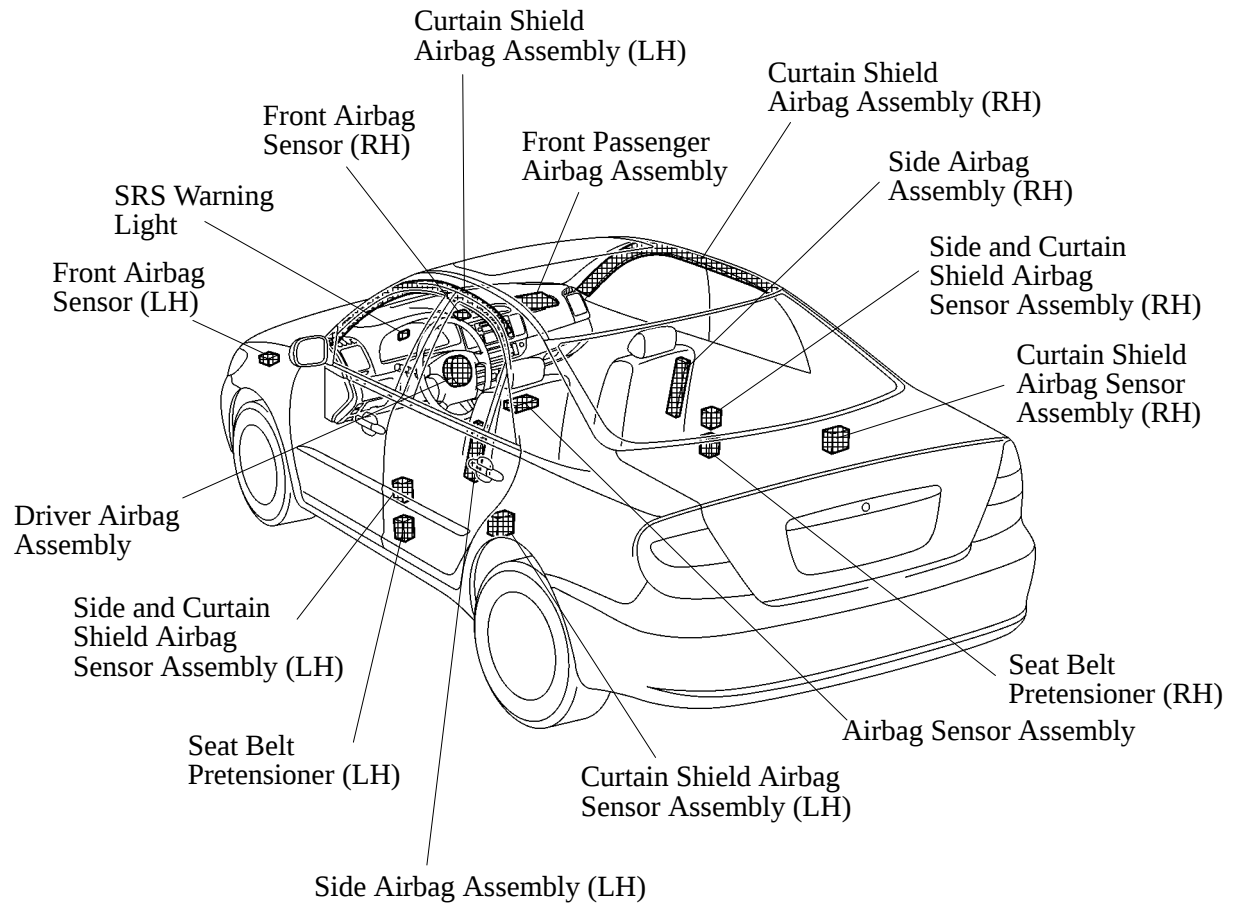
1. General

- The SRS (Supplemental Restraint System) airbag are provided for the driver and front passenger. The SRS airbags have been designed to help reducing the shocks to the heads and chests of the driver and front passenger in the event of a frontal impact collision as supplements to the seat belts. This system is a 3-sensor type airbag system to detect the impact during a front collision using the airbag sensor assembly and front airbag sensors, and to make the airbag system and seat belt pretensioner operate as well.
- On the '02 Camry, the previous mechanical type front airbag sensor assembly (consisting of movable and stationary contact points) has been changed to an electrical (deceleration sensor) type front airbag sensor assembly.
- Dual-stage SRS airbags system, that controls the airbag inflating output optimum by judging the extent of impact, seat position and whether or not the seat belt is fasten, has been adopted for the driver and front passenger airbags.
- In accordance with the adoption of the dual-stage SRS airbags system, a seat position sensor has been established for the driver seat.
- On the '02 Camry, a curtain shield airbag system that helps reduce the impact applied to the front and rear seat occupants with a single curtain shield airbag has been adopted. In conjunction with this system, a side and curtain shield airbag sensor assembly has been provided at the bottom of the center pillar and a curtain shield airbag sensor assembly at the bottom of the rear pillar.
- In this system, a front side collision is detected by the side and curtain shield airbag sensor assembly in order to simultaneously deploy the side and curtain shield airbags. A rear side collision is detected by the curtain shield airbag sensor assembly and the airbag sensor assembly in order to deploy only the curtain shield airbag.
- The function of the airbag sensor assembly to memorize the driver and front passenger's seat belt wearing condition while inflating the airbag is added.

► System Diagram ◀



2. Layout of Main Components



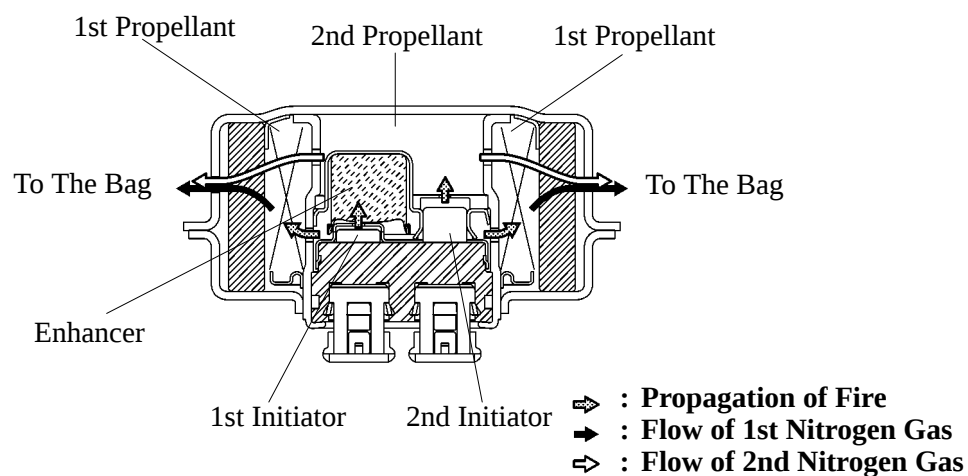
3. Dual-stage SRS Airbags System

General

- In this system, when the front airbag sensors and airbag sensor assembly detect the front collision, it controls the airbag inflating output optimum by judging the extent of impact, seat position and whether or not the seat belt is fasten.

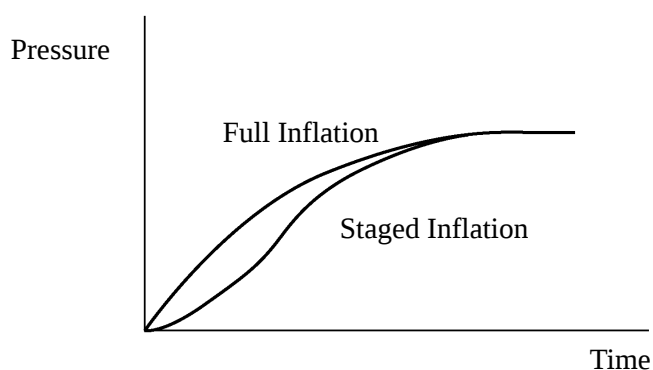
For example, at the driver side airbag, when the front airbag sensors and airbag sensor assembly judge that the extent of impact is smaller than the specified value, the airbag inflating output is controlled by delaying the ignition timing of the 2nd initiator than that of the 1st initiator inside the inflator.

► Driver Side Inflator ◀



208BE38

► Pressure Curve Imaginary Diagram ◀



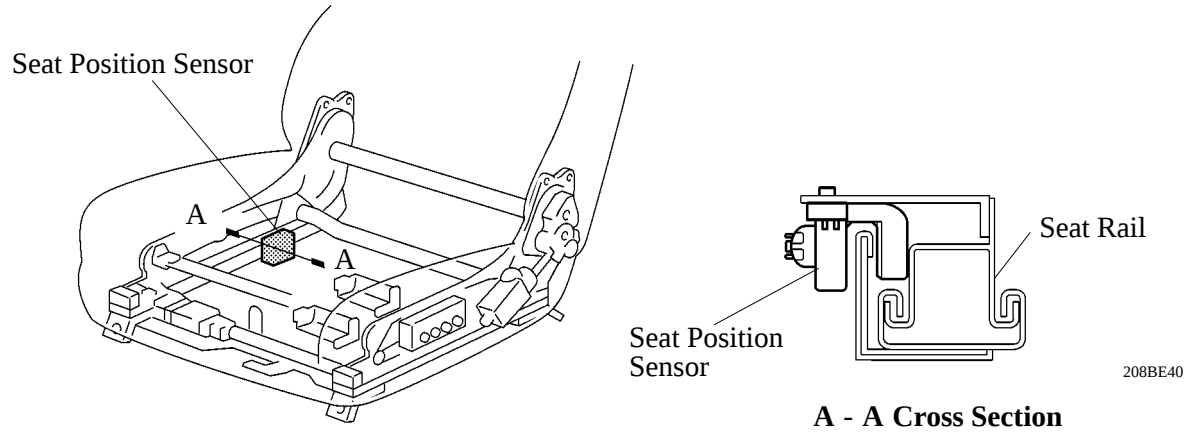
186BE136

Service Tip

In accordance with the structure change of the driver and front passenger inflators on '02 Camry, a SST (09082-00800) used for scrapping driver and front passenger airbag assemblies of the vehicle has been newly established.

Seat Position Sensor

The seat position sensor, which is attached to the seat rail of the driver seat, detects the sliding position of the seat.



4. Self-Diagnosis Function

- If the airbag sensor assembly detects a malfunction in the SRS airbag system, the airbag sensor assembly stores the malfunction data in memory, in addition to illuminating the SRS warning light. Then, the DTCs (Diagnostic Trouble Codes) can be accessed by connecting a hand-held tester to the DLC3 terminal or the SST (09843-18040) to the Tc and CG terminals of the DLC3 and reading the blinking of the SRS warning light. For further details, see the 2002 Camry Repair Manual (Pub. No. RM881U).
- The following DTC is newly added.

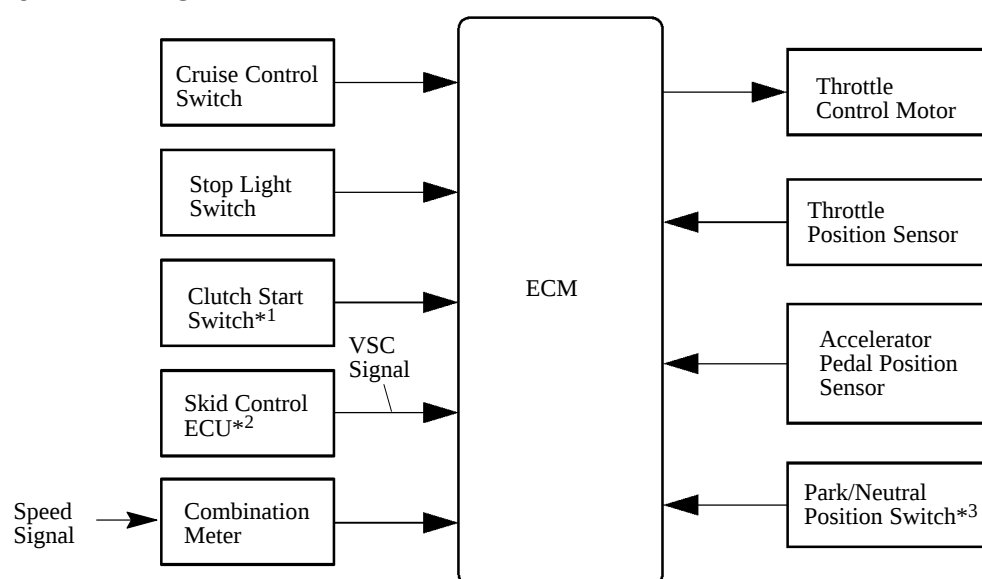
DTC No.	Detection Item	DTC No.	Detection Item
B1180 / 17	Short in D squib (2nd step) circuit	B1149 / 37	Front airbag sensor (LH) malfunction
B1181 / 18	Open in D squib (2nd step) circuit	B1154 / 38	Curtain shield airbag sensor assembly (RH) malfunction
B1182 / 19	Short in D squib (2nd step) circuit (to ground)	B1155 / 39	Curtain shield airbag sensor assembly (LH) malfunction
B1183 / 22	Short in D squib (2nd step) circuit (to B+)	B1187 / 55	Short in P squib (2nd step) circuit (to ground)
B1153 / 25	Seat position sensor assembly malfunction	B1188 / 56	Short in P squib (2nd step) circuit (to B+)
B0126 / 27	Seat belt buckle switch (LH) malfunction	B1185 / 57	Short in P squib (2nd step) circuit
B0127 / 27	Seat belt buckle switch (LH) malfunction	B1186 / 58	Open in P squib (2nd step) circuit
B1148 / 36	Front airbag sensor (RH) malfunction	—	

■ CRUISE CONTROL SYSTEM

1. General

- Once the system is set to a desired vehicle speed, the engine throttle position is adjusted automatically to maintain the vehicle speed at that speed without depressing the accelerator pedal. This system is standard equipment.
- The cruise control ECU is integrated with the ECM.
- With this system, the ECM directly controls the throttle valve to operate the vehicle at a fixed speed because it has adopted the ETCS-i (Electronic Throttle Control System-intelligent).

2. System Diagram



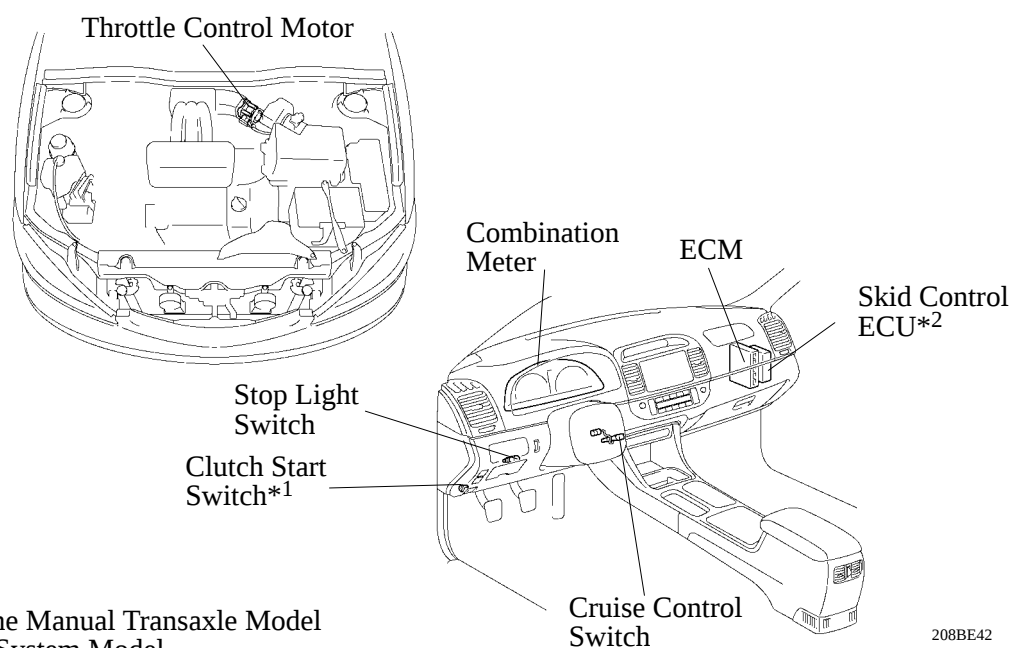
*1: Only for The Manual Transaxle Model

*2: with VSC System Model

*3: Only for The Automatic Transaxle Model

208BE41

3. Layout of Main Components



*1: Only for The Manual Transaxle Model

*2: With VSC System Model

208BE42

4. Function

The cruise control has the following functions.

1	Constant Speed Control	6	Low Speed Limit Control	11	Tap-Down Control
2	Set	7	High Speed Limit Control	12	Tap-Up Control
3	Coast	8	Automatic Transmission Control	13	Diagnosis
4	Accel	9	Manual Cancel	14	Fail Safe
5	Resume	10	Auto Cancel	—	

5. Self-Diagnosis Function

If the cruise control ECU detects a malfunction in the cruise control system, the ECU stores the malfunction data in memory, in addition to illuminating the cruise indicator light. Then, the DTCs (Diagnostic Trouble Codes) can be accessed by connecting a hand-held tester to the DLC3 terminal or the SST (09843-18040) to the Tc and CG terminals of the DLC3 and reading the blinking of the cruise indicator light. For further details, see the 2002 Camry Repair Manual (Pub. No. RM881U).

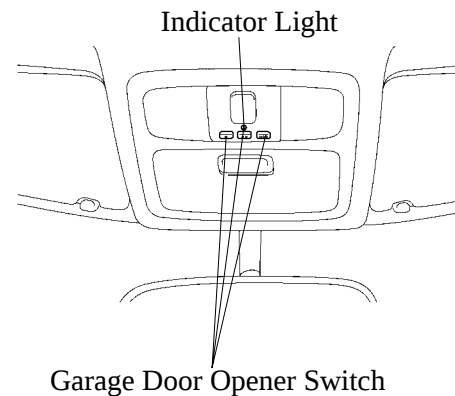
■ GARAGE DOOR OPENER

1. General

The garage door opener system has been adopted on the XLE grade model as standard equipment and on the other grade model as optional equipment.

This system enables the garage door to be opened or closed from inside the vehicle by operating the switch that is provided in the overhead console. This system provides the features listed below.

- Up to three types of transmitter codes can be registered in the garage door opener.
- The garage door opener switch is provided in the overhead console where it is easily accessible.
- An indicator light is provided to enable the operator to verify the operation mode of the garage door opener.
- A rolling code function has been adopted, which changes the transmitter code each time the garage door opener switch is pressed.



208BE43

2. Function

The following table shows the garage door opener function and the indicator light operation in each of the modes.

Function	Outline	Indicator Light
Transmission Mode	While the switch is being pressed, the garage door opener transmits the code that was previously registered. Even if the button is pressed continuously, the transmission stops after 20 seconds.	Flash → On (Rolling Code) ON (Except Rolling Code)
Learning Mode	When the button is pressed continuously for 20 seconds, the mode transfers to the learning mode in which a transmitter code can be registered. In this mode, a new transmitter code can be registered or an existing code can be overwritten. If no codes are registered within 90 seconds after transferring to the learning mode, the mode transfers to the low power mode.	Slow flashing (during learning mode) Quick flashing (registration completed)
All Delete Mode	When the 2 outside buttons are pressed simultaneously for 20 seconds, all the transmitter codes that are registered in the button are cleared. By releasing the buttons within 10 seconds after clearing the codes, the mode transfers to the learning mode. By keeping the buttons pressed longer than 10 seconds after clearing the codes, all the buttons will be registered with a code for operation verification.	Quick flashing (code clearing completed)
Low Power Mode	If the button remains pressed longer than 100 seconds, such as in the case in which the pressed button does not release it self, the mode transfers to the low power mode to reduce power consumption.	OFF

3. Transmitter Code Registration Procedure

The garage door opener contains an EEPROM in which the maximum of 3 types of transmitter recognition codes can be registered. A transmitter code is registered into the EEPROM of the garage door opener according to the following steps.

- A: Press the button for registering transmitter codes continuously until the indicator light flashes slowly.
- B: While keeping the garage door opener's button pressed, place the transmitter for which you wish to register the code within about 25 mm (1 in.) of the garage door opener and press the transmitter's button.
- C: After the flashing of the indicator light changes from slow to quick flashing, the registration of the transmitter code has been completed. Then, release your fingers from the buttons of the garage door opener and the transmitter.
- D: To register the code of another transmitter, repeat the operation starting with step "A". To register a new code to the button that already has a code registered to it, select the button to which you wish to register the new code and start the operation starting with step "A".

CAUTION

The garage door or the gate could operate unintentionally while registering a transmitter code. Therefore, make sure that there are no people near the garage door or the gate before carrying out this operation.

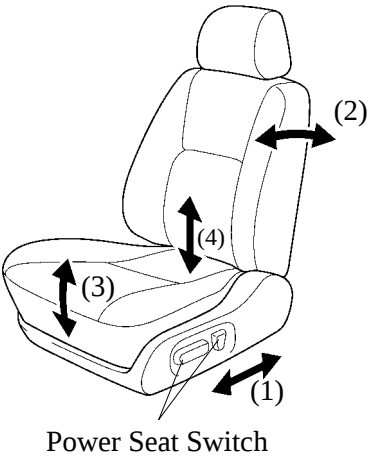
- NOTE:**
- Before performing a transmitter code registration, stop the engine and pull the key from the ignition key cylinder.
 - The transmitter code of a garage door opener manufactured before 1982 cannot be registered in this system.

For details of procedures of transmitter code registration, refer to the 2002 Camry Repair Manual (Pub. No. RM881U) to register the codes correctly.

■POWER SEAT

- The power seat has been adopted for driver seat on XLE grade model as standard equipment and the other grade model as optional equipment.
The power seat has been adopted for front passenger seat on XLE grade model as standard equipment.
- The following features are all for power functions.

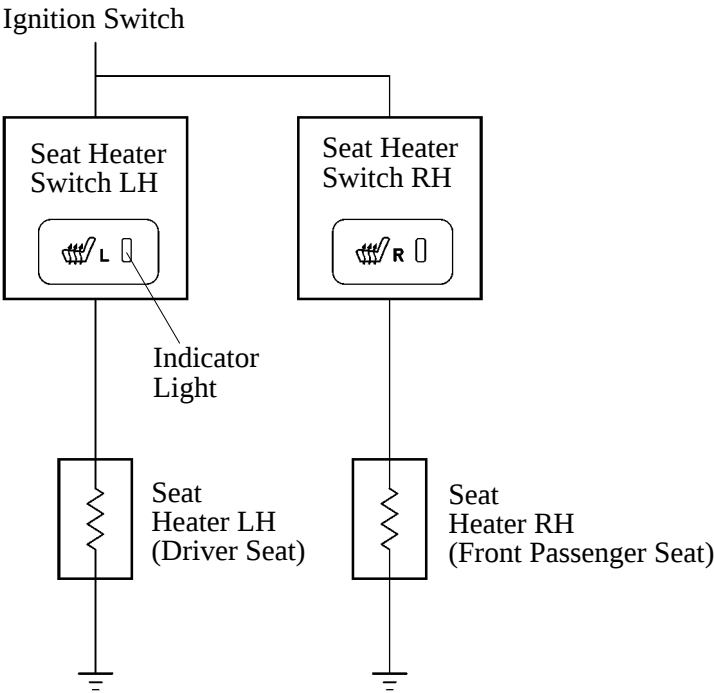
Power Adjustment Function			Stroke
(1)	Fore-and-After Slide	mm (in.)	240 (9.45)
(2)	Reclining	degrees	48
(3)	Front Vertical	mm (in.)	24 (0.94)
(4)	Rear Vertical	mm (in.)	45 (1.77)



208BE44

■SEAT HEATER

- The seat heater for front seats are provided on XLE and SE grade model as optional equipment.
- A seat heater switch with a built-in indicator light for checking the heater operation is provided.
- The output temperature of the seat heater is controlled by thermostat that are enclosed in the cushion.



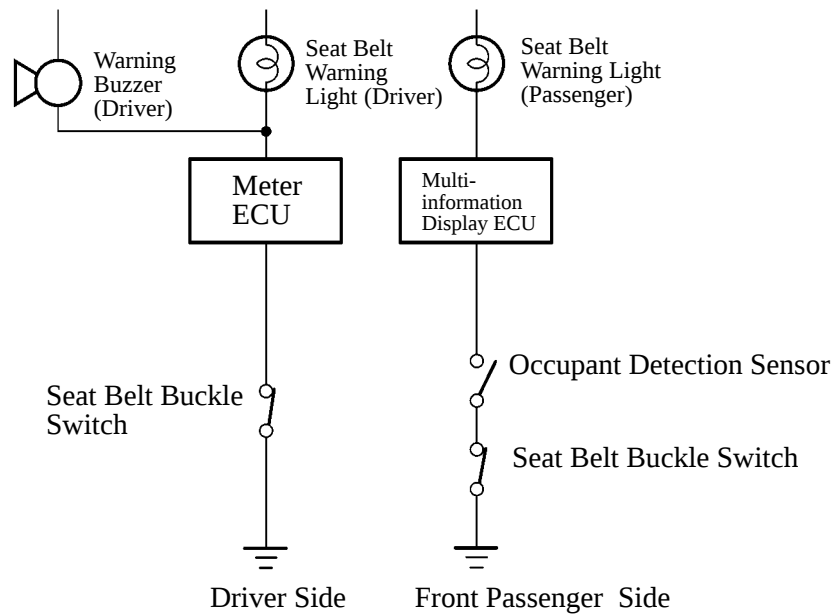
208BE45

SEAT BELT WARNING SYSTEM

1. General

A seat belt warning system has been adopted. If the seat belt is not buckled, the warning light flashes and the buzzer sounds. When the ignition switch is turned ON, this system determines whether or not the seat belt is buckled by the ON or OFF condition of the switch that is provided in the seat belt buckle. The occupant detection sensor provided in the seat cushion of the front passenger seat determines whether or not an occupant is seated in the front passenger seat.

► System Diagram ◀

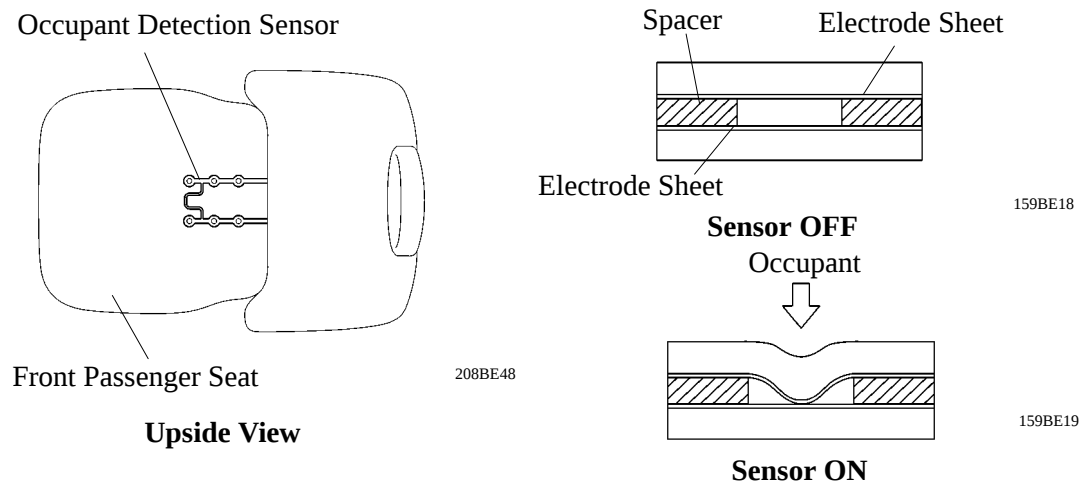


2. Occupant Detection Sensor

The occupant detection sensor, which is enclosed in the seat cushion of the front passenger seat, is used to detect whether or not the front passenger seat is occupied.

This sensor, which is shaped as illustrated below, consists of a construction in which two sheets of electrodes sandwich a spacer. When the occupant is seated, the electrode sheets come in contact with each other through the hole that is provided in the spacer portion, thus enabling the current to flow.

Thus, the sensor detects whether or not an occupant is seated in the front passenger seat.



INSIDE REAR VIEW MIRROR

1. General

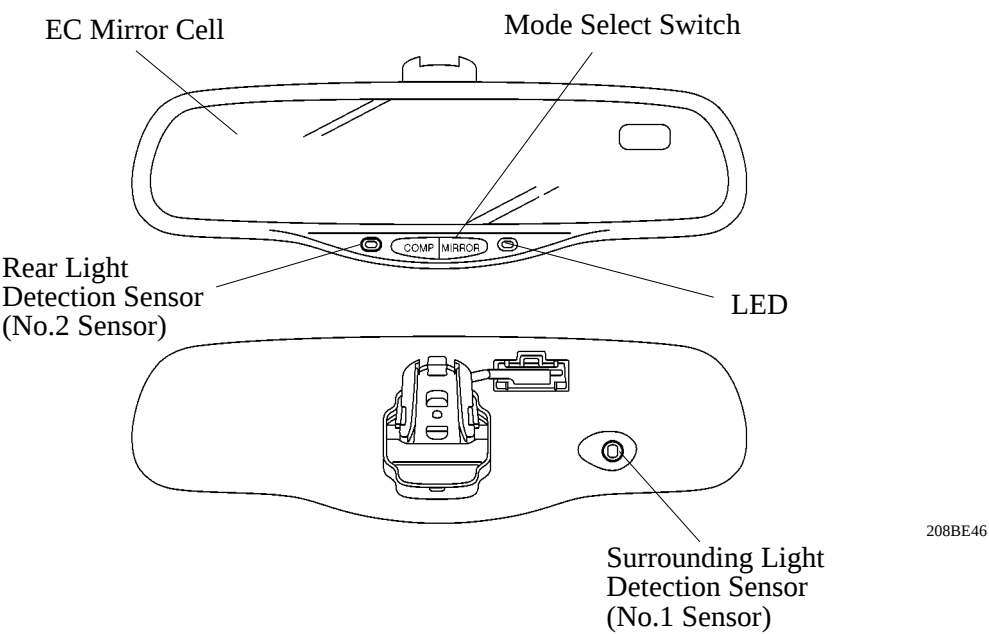
An automatic glare-resistant EC (electrochromic) mirror and compass display have been adopted for the inside rearview mirror as standard equipment on the XLE grade model and as an option on other models.

2. Automatic Glare-Resistant EC Mirror

General

- This system uses 2 sensors that are attached onto the inside rear view mirror to detect the difference between the intensity of light entering the inside rear view mirror from the rear of the vehicle, and of the light surrounding the vehicle
- During nighttime driving, if a large difference in intensity exists between the surrounding light and the light entering the inside rear view mirror from the headlights of the vehicle driving behind, this system automatically reduce the reflection rate of the inside rear view mirror and thus dampens the glare on the mirror.

Function of Components

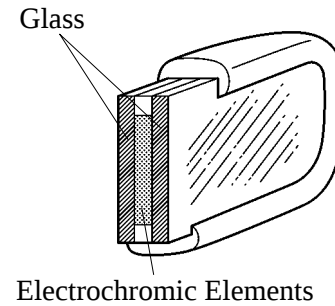


Components	Function
Surrounding Light Detection Sensor (No.1 Sensor)	Detects the intensity of the light surrounding the vehicle.
Rear Light Detection Sensor (No.2 Sensor)	Detects the intensity of the light entering the inside rear view mirror from behind the vehicle.
LED	Turns on to inform the driver that the mirror control mode is operating in the AUTO mode.
Mode Select Switch	Selects the inside rear view mirror control to AUTO mode or DAY mode.
EC Mirror Cell	Varies the reflection rate of the mirror through the function of EC elements.

EC Mirror Cell

An EC mirror cell consists of 2 layers of glass which sandwich the EC elements in the middle.

The EC elements control coloring and discoloring characteristics through their electro-chemical oxidation reduce reaction. These characteristics are utilized to electronically vary the mirror's reflection rate.



189BE55

Operation

1) General

The EC mirror system provides 2 types of control modes, the AUTO and DAY modes, which can be selected using the mode select switch.

In the AUTO mode, the system switches (Fig. 1) the inside rear view mirror's glare resistant and non-glare resistant functions in accordance with the difference in intensity between the surrounding and rear lights and automatically varies the reflection rate of the inside and outside rear view mirrors.

When the mode select switch is fixed to the DAY mode, the reflection rate of the inside and outside rear view mirrors are fixed to maximum reflection (DAY mode) regardless of the intensity of the surrounding or rear light. This system, when selected to the AUTO mode, is activated only when the ignition switch is ON.

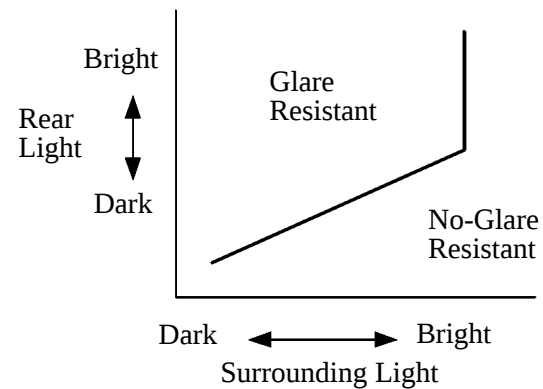


Fig. 1

189BE56

2) Auto Mode

During daytime driving, the inside and outside rear view mirrors remain in the DAY mode. The automatic glare-resistant circuit detects the surrounding light through its No. 1 sensor, the rear light through its No. 2 sensor, and determines whether it is day or night through the intensity of the surrounding light. At the same time, the intensity of the glare from the rear is determined through the difference in intensity between the surrounding and rear light.

When the automatic glare-resistant circuit determines that the rear light is too bright, the EC drive circuit applies voltage to the inside and outside rear view mirror cells to vary their reflection rate. In accordance with the intensity of the rear light, the inside and outside rear view mirror's reflection rate varies steplessly (Fig. 2).

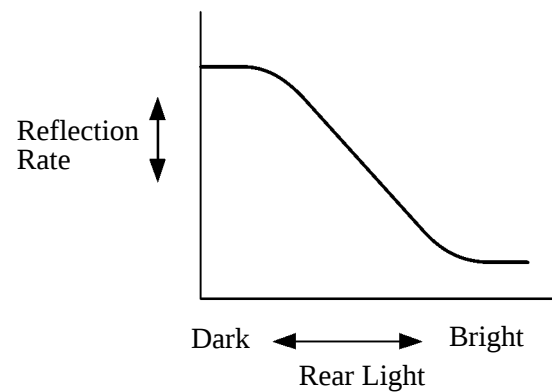
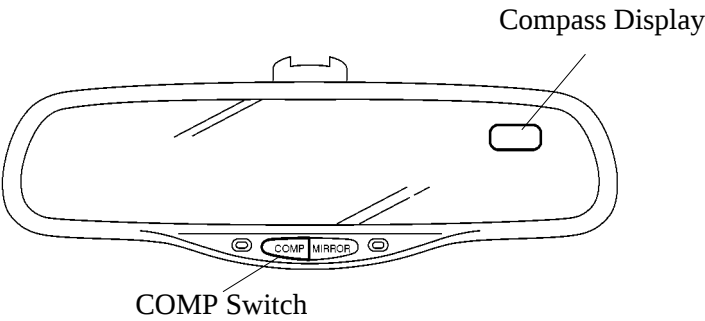


Fig. 2

189BE57

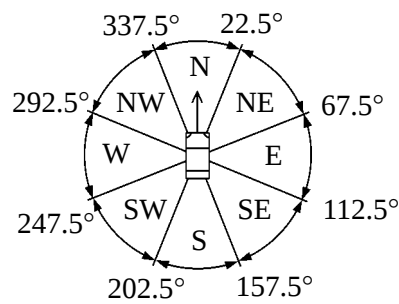
3. Compass Display

- Earth magnetism sensor has been built-in inside the mirror which has less influence on the magnetization of the vehicle. Thus, the accuracy has been improved.
- The compass indicates the North as 0° and the forward direction of the vehicle by 8 azimuths.
- By operating the “COMP” switch, whether or not to indicate the compass, establishment of the compass zone and calibration can be performed.



208BE47

► Compass Display ◀



186BE05

		Display				
Calibration						
Azimuths		Display		Azimuths		
N	337.5° ~ 22.5°			S	157.5° ~ 202.5°	
NE	22.5° ~ 67.5°			SW	202.5° ~ 247.5°	
E	67.5° ~ 112.5°			W	247.5° ~ 292.5°	
SE	112.5° ~ 157.5°			NW	292.5° ~ 337.5°	

186BE06

Service Tip

As the compass system memorize the vehicle’s marked magnetic field, it is necessary to do calibration for each vehicle. Once calibration has done, it is not necessary to do the calibration unless having a sudden magnetic field change. In case of occurrence of a sudden magnetic field change, “C” will be display in the compass display and it is necessary to do the calibration again. For details, refer to 2002 Camry Repair Manual (Pub. No. RM881U).

■ OUTSIDE REAR VIEW MIRROR

- Electrical remote control type mirrors have been adopted as standard equipment. Furthermore, internal heaters have been available as an standard equipment on the XLE grade model and as optional equipment on the other grade model.
- The outside rear view mirror has following functions:

Function	Outline
Electrical Remote Control type Mirror	When the mirror control switch is operated, this function moves the mirror surface vertically or laterally to enable the driver to attain an optimal mirror angle. Setting the mirror master switch to the “R” position operates the right mirror, and to the “L” position operates the left mirror.
Rear Window Defogger-linked Mirror Heater	This function also automatically turns ON the mirror heater when the rear window defogger switch is turned ON. After 15 minutes have elapsed from the time this function has been activated, the rear window defogger turns OFF automatically, and the mirror heater also turns OFF.

■ MOON ROOF

- This system is optional equipment. The moon roof system has the following functions.

Function	Outline
One touch tilt up-and-down function	The “tilt one-touch auto up-and-down” function enables the moon roof to be tilt up or down a touch of the tilt up switch or slide close switch.
One touch open-and-close function	The “one-touch auto open-and-close” function enables the moon roof to be open or close a touch of the slide open switch or slide close switch.
Jam protection function	The “jam protection” function detects if a foreign object gets caught while the moon roof is closing (in the slide-close or tilt-down mode).

- On the '01 Camry, the moon roof position was detected by a limit switch. However, the '02 Camry discontinued the limit switch and has adopted a new mechanism to detect the position by using a pulse sensor (Hall IC), in which the position is detected by counting the pulses output during the moon roof has traveled from specified initial position.
However, this mechanism is only adopted on TMC made models.

Service Tip

The moon roof ECU memorizes the initial position of the moon roof, therefore, the data will be lost when the battery terminal is removed, so that only manual operation is available. After connecting the battery terminal, move the moon roof once to the tilt-up full open state with a manual operation. With this, the moon roof ECU will memorize the initial position again.
For details, refer to the 2002 Camry Repair Manual (Pub. No. RM881U).

APPENDIX

MAJOR TECHNICAL SPECIFICATIONS

Item			Area		U.S.A. and Canada						
Body Type					4-Door Sedan						
Vehicle Grade					LE		XLE		SE		
Model Code					ACV30L-AEMNKA		ACV30L-A (C) EPNKA		ACV30L-A (C) EPGKA	ACV30L-AEMSKA	
Major Dimensions & Vehicle Weights	Overall	Length	mm (in.)	4805 (189.2)		←		←		←	
		Width	mm (in.)	1795 (70.7)		←		←		←	
		Height	mm (in.)	1490 (58.7)		←		←		←	
	Wheel Base		mm (in.)	2720 (107.1)		←		←		←	
	Tread	Front	mm (in.)	1545 (60.8)		←		←		←	
		Rear	mm (in.)	1535 (60.4)		←		←		←	
	Effective Head Room	Front	mm (in.)	995 (39.2)		←		←		←	
		Rear	mm (in.)	975 (38.4)		←		←		←	
	Effective Leg Room	Front	mm (in.)	1055 (41.5)		←		←		←	
		Rear	mm (in.)	960 (37.8)		←		←		←	
	Shoulder Room	Front	mm (in.)	1460 (57.5)		←		←		←	
		Rear	mm (in.)	1440 (56.7)		←		←		←	
	Overhang	Front	mm (in.)	945 (37.2)		←		←		←	
		Rear	mm (in.)	1140 (44.9)		←		←		←	
	Min. Running Ground Clearance			mm (in.)	150 (5.9)		←		←		←
	Angle of Approach			degrees	15.2°		←		←		←
	Angle of Departure			degrees	16.6°		←		←		←
	Curb Weight	Front	kg (lb)	835 (1841)* ⁴ , 845 (1863)* ⁵		865 (1907)* ⁴ , 870 (1918)* ⁵		875 (1929)* ⁴ , 885 (1951)* ⁵		845 (1863)	
		Rear	kg (lb)	580 (1279)* ⁴ , 590 (1301)* ⁵		575 (1268)* ⁴ , 585 (1290)* ⁵		590 (1301)* ⁴ , 605 (1334)* ⁵		590 (1301)	
		Total	kg (lb)	1415 (3120)* ⁴ , 1435 (3164)* ⁵		1440 (3175)* ⁴ , 1455 (3208)* ⁵		1465 (3230)* ⁴ , 1490 (3285)* ⁵		1435 (3164)	
	Gross Vehicle Weight	Front	kg (lb)	955 (2105)* ⁴ , 960 (2116)* ⁵		980 (2161)* ⁴ , 985 (2172)* ⁵		990 (2183)* ⁴ , 1000 (2205)* ⁵		960 (2116)	
		Rear	kg (lb)	900 (1984)* ⁴ , 910 (2006)* ⁵		895 (1973)* ⁴ , 905 (1995)* ⁵		910 (2006)* ⁴ , 925 (2039)* ⁵		910 (2006)	
		Total	kg (lb)	1855 (4090)* ⁴ , 1870 (4123)* ⁵		1875 (4134)* ⁴ , 1890 (4167)* ⁵		1900 (4189)* ⁴ , 1925 (4244)* ⁵		1870 (4123)	
	Fuel Tank Capacity			ℓ (US.gal, Imp.gal)	70 (18.5, 15.4)		←		←		←
	Luggage Compartment Capacity			m³ (cu.ft.)	14.1 (497.9)		←		←		←
Performance	Max. Speed			km / h (mph)	190 (118)		←		←		
	Max. Cruising Speed			km / h (mph)	—		—		—		
	Acceleration	0 to 60 mph	sec.	9.1		9.9		←		9.1	
		0 to 400 m	sec.	—		—		—		—	
	Max. Permissible Speed	1st Gear	km / h (mph)	52 (32)		64 (40)		65 (41)		53 (33)	
		2nd Gear	km / h (mph)	89 (55)		115 (71)		118 (73)		92 (57)	
		3rd Gear	km / h (mph)	137 (85)		—		—		141 (88)	
		4th Gear	km / h (mph)	189 (117)		—		—		194 (120)	
	Turning Diameter (Outside Front)	Wall to Wall	m (ft.)	11.4 (37.4)		←		12.0 (39.4)		←	
Curb to Curb		m (ft.)	10.6 (34.8)		←		11.2 (36.7)		←		
Engine	Engine Type			2AZ-FE		←		←		←	
	Valve Mechanism			16-Valve, DOHC		←		←		←	
	Bore x Stroke			mm (in.)	88.5 x 96.0 (3.48 x 3.78)		←		←		
	Displacement			cm³ (cu.in.)	2362 (144.2)		←		←		
	Compression Ratio			9.6 : 1		←		←		←	
	Carburetor Type			SFI		←		←		←	
	Research Octane No.			RON	96		←		←		
	Max. Output (SAE-NET)			kW / rpm (HP@rpm)	115 / 5600 (155@5600)		←		←		
	Max. Torque (SAE-NET)			N·m / rpm (lb-ft@rpm)	221 / 4000 (163@4000)		←		←		
Engine Electrical	Battery Capacity (5HR)			Voltage & Amp. hr.	12-48* ¹ , 12-55* ²		←		←		
	Alternator Output			Watts	960		←		←		
Chassis	Starter Output			kW	1.6		←		←		
	Clutch Type			Dry, Single		—		—		Dry, Single	
	Transaxle Type			E351		U241E		←		E351	
	Transmission Gear Ratio	In First	3.538		3.943		←		3.538		
		In Second	2.045		2.197		←		2.045		
		In Third	1.333		1.413		←		1.333		
		In Fourth	0.972		1.020		←		0.972		
		In Fifth	0.731		—		—		0.731		
		In Reverse	3.583		3.145		←		3.583		
	Counter Gear Ratio			—		—		—		—	
	Differential Gear Ratio (Final)			3.944		2.740		←		3.944	
	Brake Type	Front	Ventilated Disc		←		←		←		
		Rear	Drum		←		Solid Disc		←		
	Parking Brake Type			Duo-Servo		←		←		←	
	Brake Booster Type and Size			in.	Tandem 10.5"		←		←		←
	Proportioning Valve Type			Dual-P Valve* ³		←		—		Dual-P Valve* ³	
	Suspension Type	Front	MacPherson Strut		←		←		←		
		Rear	MacPherson Strut		←		←		←		
	Stabilizer Bar	Front	STD		←		←		←		
		Rear	STD		←		←		←		
	Steering Gear Type			Rack & Pinion		←		←		←	
	Steering Gear Ratio (Overall)			17.4 : 1		←		←		←	
	Power Steering Type			Integral Type		←		←		←	

U.S.A. and Canada				
4-Door Sedan				
	SE	LE	XLE	SE
	ACV30L-A (C) EPSKA	MCV30L-A (C) EPNKA	MCV30L-A (C) EPGKA	MCV30L-A (C) EPSKA
5	←	←	←	←
	←	←	←	←
	←	←	←	←
	←	←	←	←
	←	←	←	←
10	←	←	←	←
	←	←	←	←
	←	←	←	←
	←	←	←	←
	←	←	←	←
15	←	←	←	←
	←	←	←	←
	←	←	←	←
	←	←	←	←
	←	←	←	←
20	←	←	←	←
	←	←	←	←
	870 (1918)	930 (2050)* ⁴ , 935 (2061)* ⁵	950 (2094)	945 (2083)
	590 (1301)	575 (1268)* ⁴ , 585 (1290)* ⁵	605 (1334)	600 (1323)
	1460 (3219)	1505 (3318)* ⁴ , 1520 (3351)* ⁵	1555 (3428)	1545 (3406)
25	990 (2183)	1045 (2304)* ⁴ , 1050 (2315)* ⁵	1065 (2348)	←
	910 (2006)	895 (1973)* ⁴ , 905 (1995)* ⁵	925 (2039)	←
	1900 (4189)	1940 (4277)* ⁴ , 1955 (4310)* ⁵	1990 (4387)	←
	←	←	←	←
	←	←	←	←
30	—	—	—	—
	—	—	—	—
	9.9	8.3	←	←
	—	—	—	—
	65 (41)	64 (40)	66 (41)	←
35	118 (73)	116 (72)	119 (74)	←
	—	—	—	—
	—	—	—	—
	←	11.4 (37.4)	12.0 (39.4)	←
	←	10.6 (34.8)	11.2 (36.7)	←
40	←	1MZ-FE	←	←
	←	24-Valve, DOHC	←	←
	←	87.5 x 83.0 (3.44 x 3.27)	←	←
	←	2995 (182.8)	←	←
	←	10.5 : 1	←	←
45	←	←	←	←
	←	96	←	←
	←	143 / 5300 (192@5300)	←	←
	←	283 / 4400 (209@4400)	←	←
	←	←	←	←
50	←	1200	←	←
	←	←	←	←
	—	—	—	—
	U241E	U140E	←	←
	3.943	3.938	←	←
55	2.197	2.194	←	←
	1.413	1.411	←	←
	1.020	1.019	←	←
	—	—	—	—
	3.145	3.141	←	←
60	—	—	—	—
	2.740	2.814	←	←
	←	←	←	←
	←	←	←	←
	←	←	←	←
65	←	←	←	←
	←	←	—	Dual-P Valve* ³
	←	←	←	←
	←	←	←	←
	←	←	←	←
70	←	←	←	←
	←	←	←	←
	←	←	←	←
	←	←	←	←
	←	←	←	←