

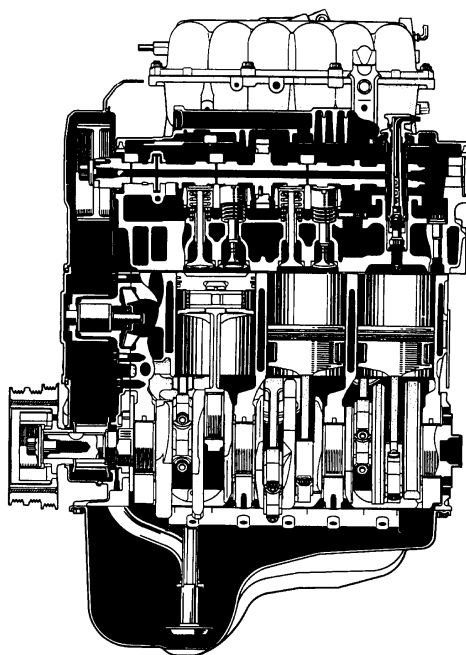
ENGINE

5VZ-FE ENGINE

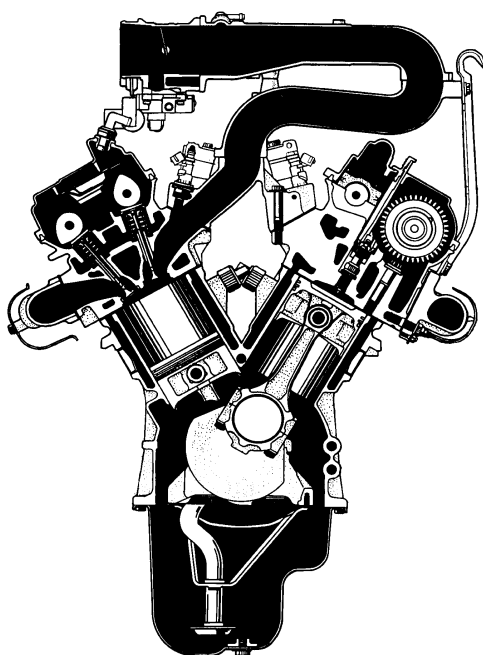
■ DESCRIPTION

The 5VZ-FE engine is a V6, 3.4-liter, 24-valve DOHC engine, and its application to the Toyota Tundra has been continued from the '98 Toyota T100.

This engine is acclaimed for its high performance, fuel economy, and quiet operation, Partial improvements have been made in conjunction with its application on the Toyota Tundra.



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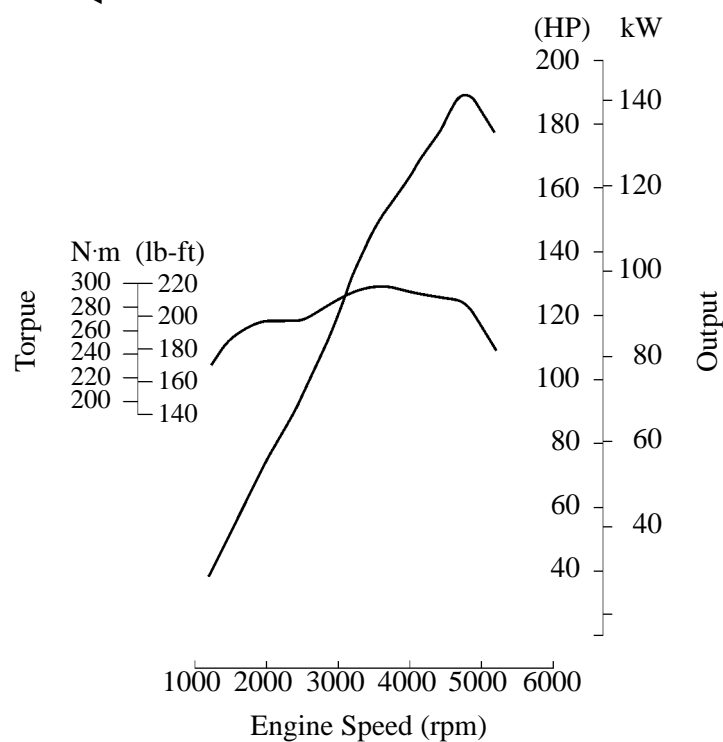


164EG02

► Specifications ◀

Engine			New 5VZ-FE (Toyota Tundra)	Previous 5VZ-FE (’98 Toyota T100)
Item				
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.)			3378 (206.1)	←
Bore x Stroke mm (in.)			93.5 x 82 (3.68 x 3.23)	←
Compression Ratio			9.6 : 1	←
Max. Output [SAE-NET]			142 KW@4800 rpm (190 HP@4800 rpm)	←
Max. Torque [SAE-NET]			298 N·m @3600 rpm (220-lb-ft @3600 rpm)	←
Valve Timing	Intake	Open	4° BTDC	←
		Close	42° ABDC	←
	Exhaust	Open	46° BBDC	←
		Close	4° ATDC	←
Fuel Octane Number (RON)			91	←
Oil Grade			API SJ, EC or ILSAC	API SH EC-II, SJEC or ILSAC

► Performance Curve ◀



■ FEATURES OF 5VZ-FE ENGINE

The features of the 5VZ-FE engine and a comparison between the 5VZ-FE engine in the Toyota Tundra and '98 Toyota T100 are listed below.

System	Features	New (Toyota Tundra)	Previous ('98 Toyota T100)
Engine Proper	<ul style="list-style-type: none"> ● A pentroof type combustion chamber plus high compression ratio. ● A cast iron crankshaft with 5 balance weights. 	○	○
	The shape of the oil pan has been changed due to the change in the installation position of the front differential.	○	—
Valve Mechanism	Direct-drive DOHC with a 4-valve crossflow layout for high intake/exhaust efficiency.	○	○
Lubrication System	The water-cooler type engine oil cooler has been made compact.	○	—
Cooling System	<ul style="list-style-type: none"> ● To improve the cooling performance, a larger radiator is used. ● The method for installing the radiator reservoir tank has been simplified and its overflow pipe has been integrated with the radiator reservoir tank. 	○	—
Intake and Exhaust System	<ul style="list-style-type: none"> ● The shape of the air cleaner has been optimized to improve performance and serviceability. ● On the California specification model, the exhaust manifold and the crossover pipe have been adopted a double-wall construction made of stainless steel. The basic construction is the same as in the '99 4Runner. For details, see the 1999 Model New Car Features (Pub. No. NCF160U). 	○	—
Fuel System	An air-assisted fuel system is used to promote atomizing of the fuel for improved fuel economy.	○	○
	<ul style="list-style-type: none"> ● A compact 4-hole type injector has been newly adopted. ● A compact fuel filter has been adopted for weight reduction. ● Tubing made of nylon has been adopted for the main fuel hose for weight reduction. ● The fuel tank capacity has been changed from 91.0L (24.0 gal.) to 100L (26.4 gal.). 	○	—
Ignition System	The DIS (Direct Ignition System) contributes to the powerful high output by providing a powerful spark to the engine.	○	○

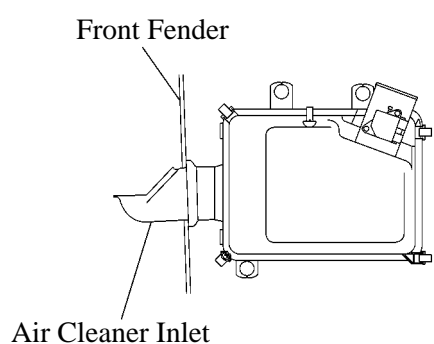
(Continued)

System	Features	New (Toyota Tundra)	Previous (^{'98} Toyota T100)
Engine Mounting	<ul style="list-style-type: none"> ● The installation angle of the front engine mount has been optimized and its constituent parts have been optimized to realize low noise and vibration. ● A center bolt type stopper with guide has been adopted for the rear engine mount. 	○	—
Emission Control System	An EGR (Exhaust Gas Recirculation) system that recirculates a portion of the exhaust gases into the intake side is used.	—	○
	<ul style="list-style-type: none"> ● The charcoal capacity of the canister has been increased to optimize the absorption rate of the evaporative HC. ● A service port has been provided for inspecting the evaporative emission control system. 	○	—

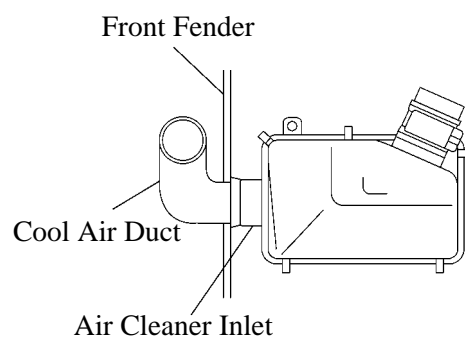
■ INTAKE AND EXHAUST SYSTEM

1. Air Cleaner

- The filtering area of the air cleaner element has been increased and the shape of the air cleaner has been optimized to reduce intake noise and intake pressure loss. Also, the air cleaner inlet has been changed to a shape that provides the function of a cool air duct, and the cool air duct has been discontinued. As a result, the number of parts has been reduced.
- The air cleaner element and the air cleaner case are common to both the 5VZ-FE and 2UZ-FE engines.

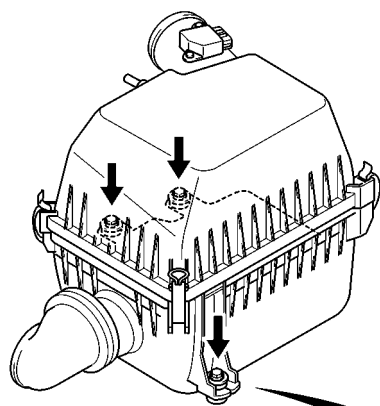
**New**

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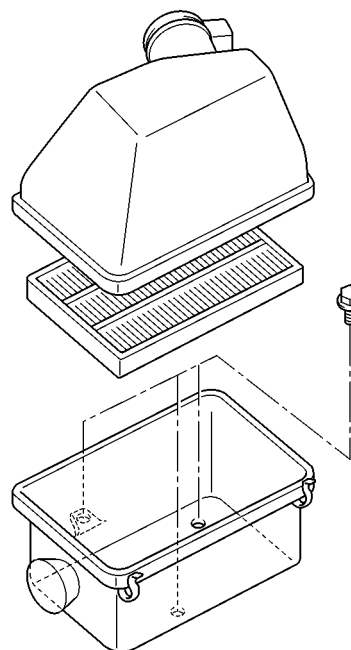
**Previous**

164EG05

- As for the method of air cleaner installation, the exterior of the air cleaner case is bolted at 3 points. To prevent the bolts from falling during service, the bolts are integrated with collar, thus offering improved serviceability.

**New****Bolt integrated with collar**

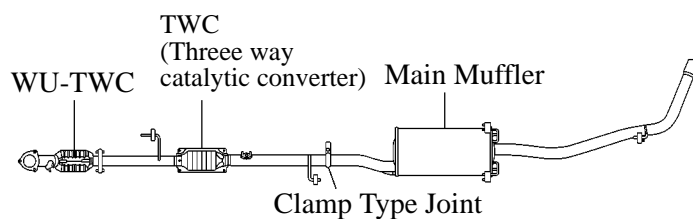
164EG06

**Previous**

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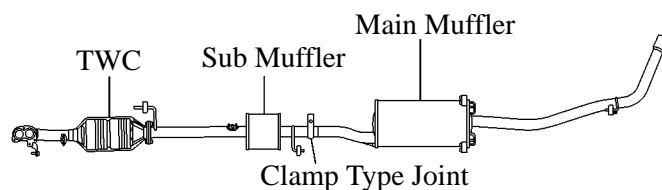
2. Exhaust Pipe

- The exhaust pipe is made of stainless steel for improved rust resistance.
- A WU-TWC (Warm Up Three-Way Catalytic Converter) for improving exhaust emissions has been adopted on the California specification model.
- Except for the California specification model, a sub-muffler has been adopted in the center pipe.
- A clamp type joint is used to join the center pipe and tail pipe to realize weight reduction.



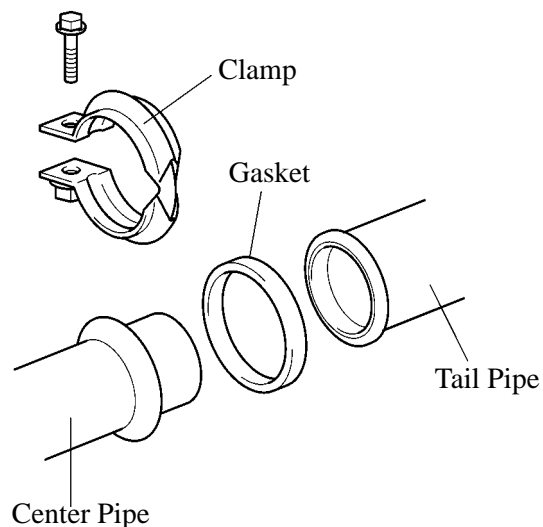
California Specification Model

164EG08



Except California Specification Model

164EG09



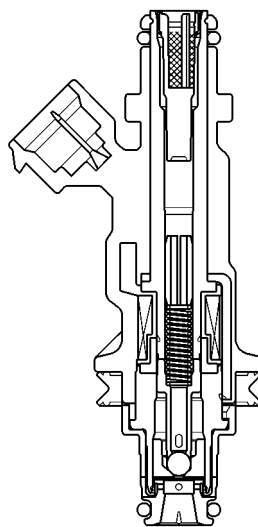
Connecting Exhaust Pipe

164EG22

■ FUEL SYSTEM

Injector

A compact 4-hole type injector has been adopted to improve the atomization of fuel.



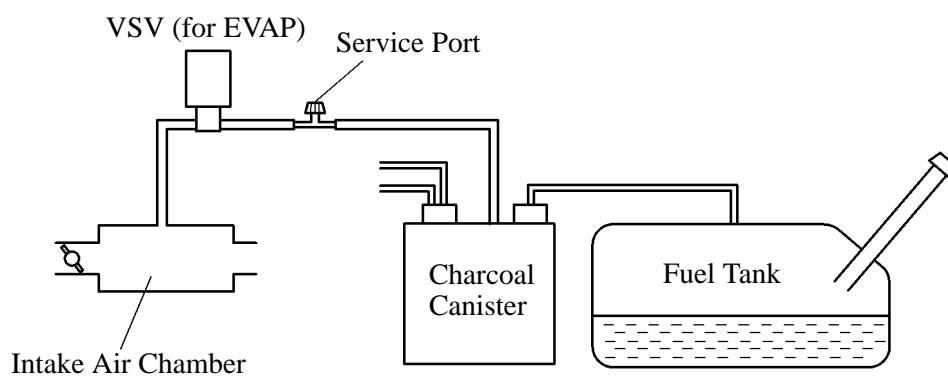
164EG21

■ EMISSION CONTROL SYSTEM

A service port for inspecting the evaporative emission control system has been provided between the charcoal canister and the VSV for EVAP.

The evaporative emission control system can be inspected by connecting a pressure gauge to the service port and performing a vacuum or a pressure test.

See the 2000 Toyota Tundra Repair Manual (Pub. No. RM682U) for check method.



159EG07

■ ENGINE CONTROL SYSTEM

1. General

The engine control system of the new 5VZ-FE engine is basically the same in construction and operation as that of the previous 5VZ-FE engine, except for some changes.

The engine control system of the new 5VZ-FE engine in the Toyota Tundra and previous 5VZ-FE engine in the '98 Toyota T100 are compared below.

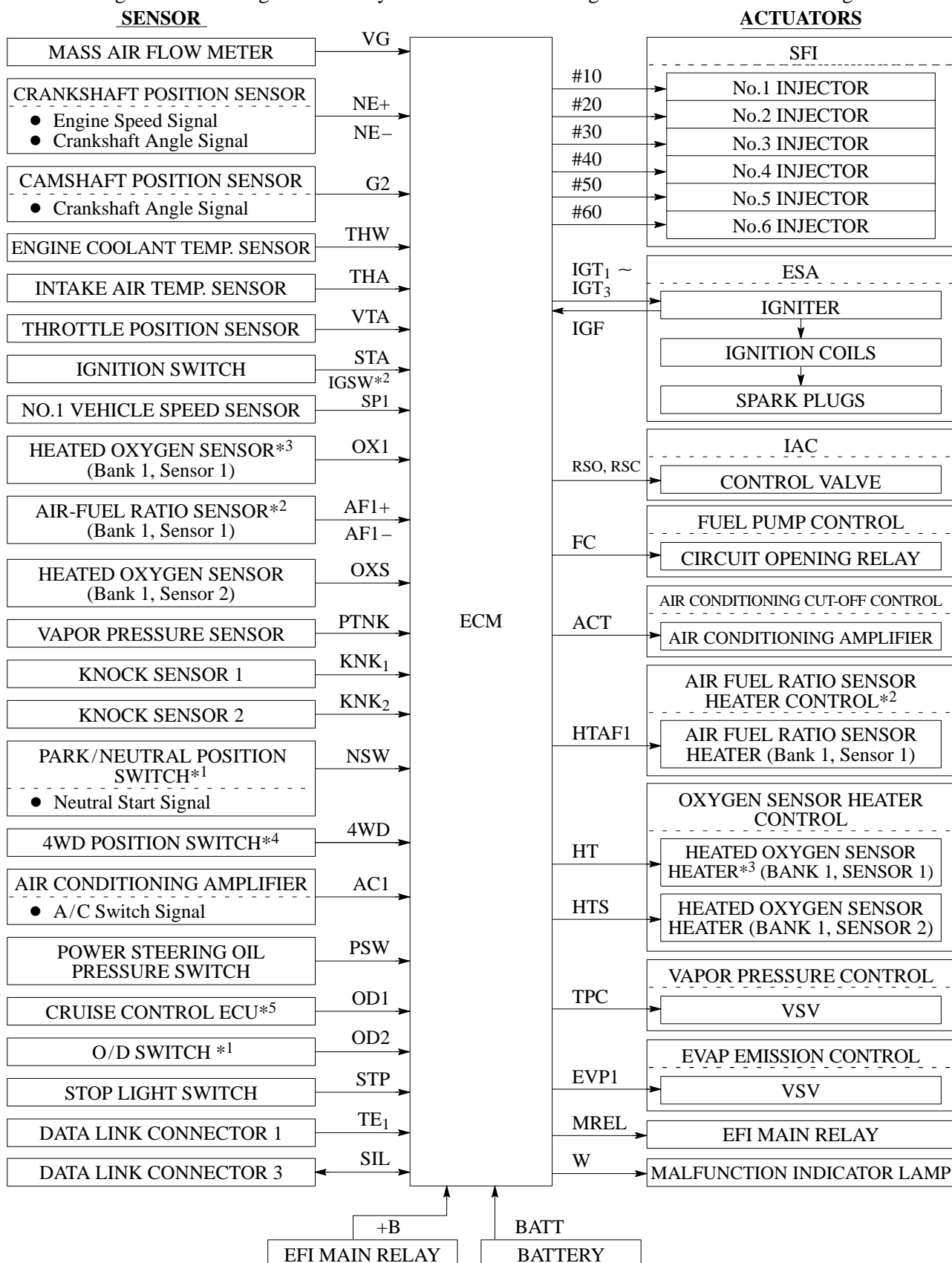
System	Outline	New (Toyota Tundra)	Previous '98 (Toyota T100)
SFI (Sequential Multiport Fuel Injection)	An L-type SFI system directly detects the intake air mass with a hot wire type mass air flow meter.	○	○
	A plug-in type hot-wire airflow meter that is even more compact and lightweight, has been adopted.	○	—
	The fuel injection system is a sequential multiport fuel injection system.	○	○
ESA (Electronic Spark Advance)	Ignition timing is determined by the ECM based on signals from various sensors. The ECM corrects ignition timing in response to engine knocking.	○	○
	2 knock sensors are used to improve knock detection.	○	○
	Torque control correction during gear shifting has been used to minimize the shift shock.*1	○	○
IAC (Idle Air Control)	A rotary solenoid type IAC valve controls the fast idle and idle speeds.	○	○
Fuel Pump Control	Fuel pump operation is controlled by signals from the ECM based on the engine speed signal (Ne).	○	○
Oxygen Sensor (Air Fuel Ratio Sensor*2) Heater Control	Maintains the temperature of the oxygen sensor at an appropriate level to increase accuracy of detection of the oxygen concentration in the exhaust gas.	○	○
	An air-fuel ratio sensor (Bank 1, Sensor 1) (with heater control) has been adopted on the California specification model.	○	—
Air Conditioning Control	By turning the air conditioning compressor ON or OFF in accordance with the engine condition, driveability is maintained.	○	○
Evaporative Emission Control	The ECM controls the purge flow of evaporative emissions (HC) in the charcoal canister in accordance with engine conditions.	○	○
Diagnosis	When the ECM detects a malfunction, the ECM diagnoses and memorizes the failed section.	○	○
	The diagnosis system includes a function that detects a malfunction in the evaporative emission control system.	○	○
Fail-Safe	When the ECM detects a malfunction, the ECM stops or controls the engine according to the data already stored in memory.	○	○

*1: Only for the Automatic Transmission Model.

*2: Only for the California Specification Model.

2. Construction

The configuration of the engine control system in the 5VZ-FE engine is shown in the following chart.



*1: Only for the Automatic Transmission Model.

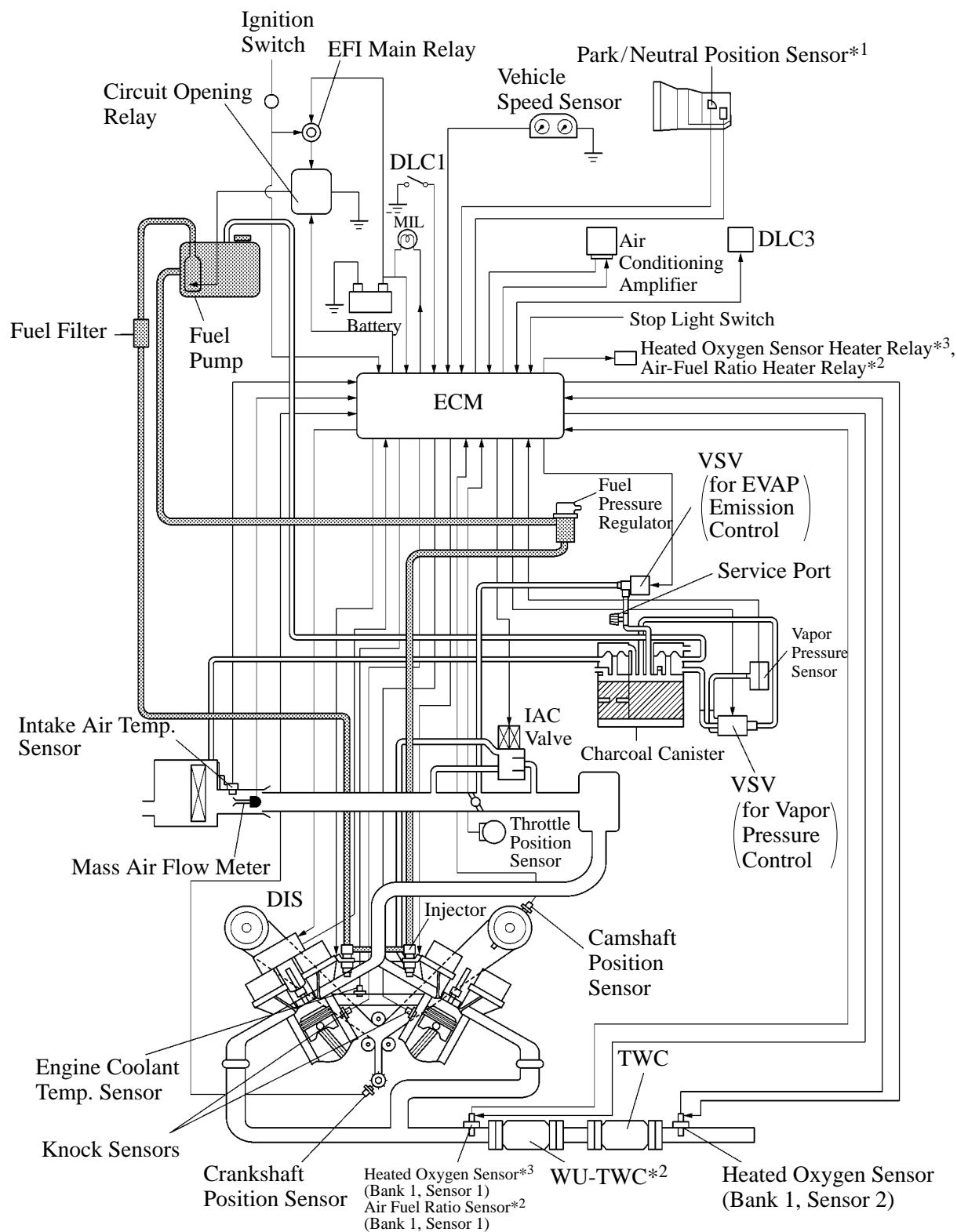
*2: Only for the California Specification Model.

*3: Except for the California Specification Model.

*4: Only for the 4WD Model.

*5: With Cruise Control.

3. Engine Control System Diagram



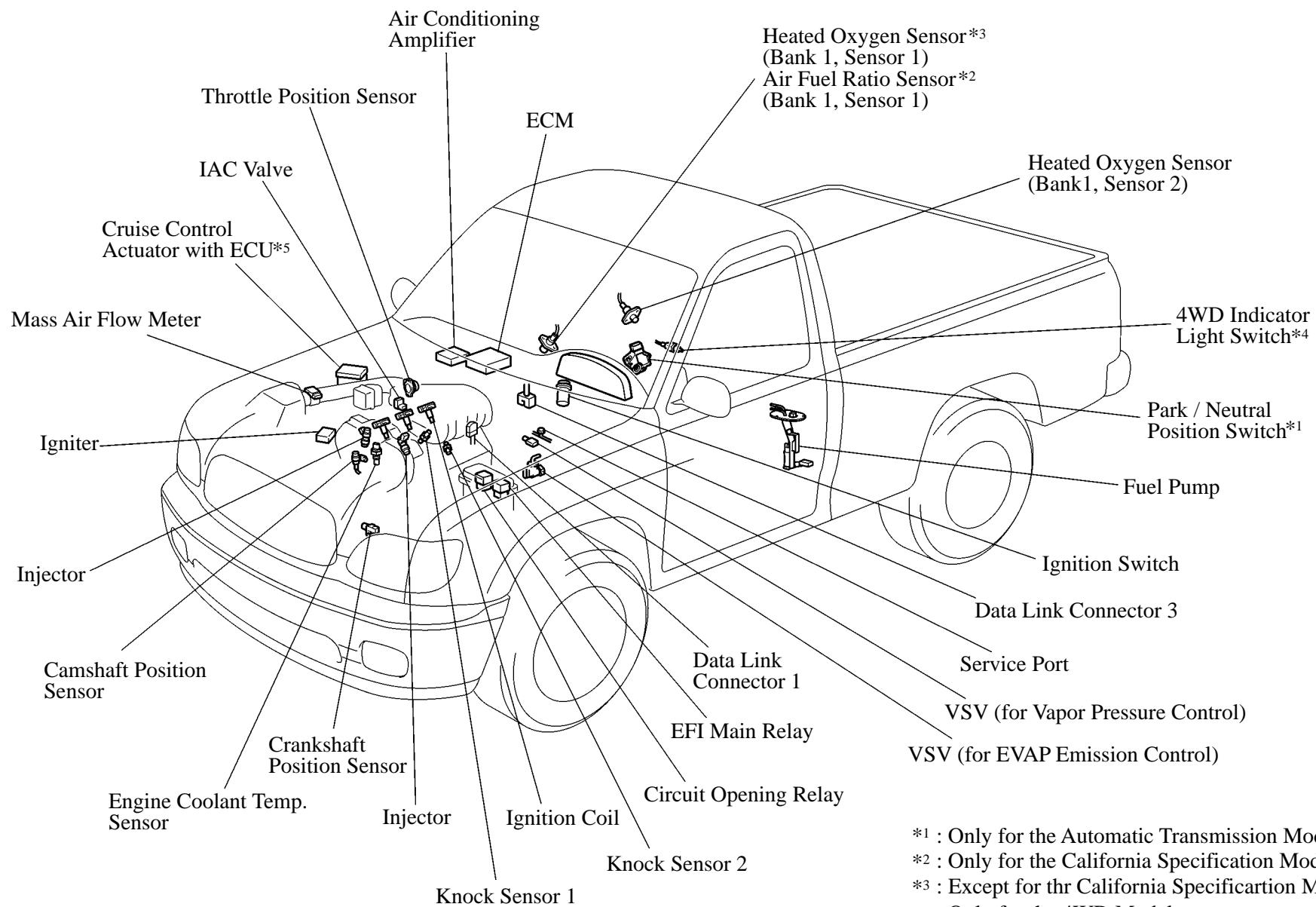
164EG11

*¹: Only for the Automatic Transmission Model

*²: Only for the California Specification Model

*³: Except for the California Specification Model

4. Layout of Components

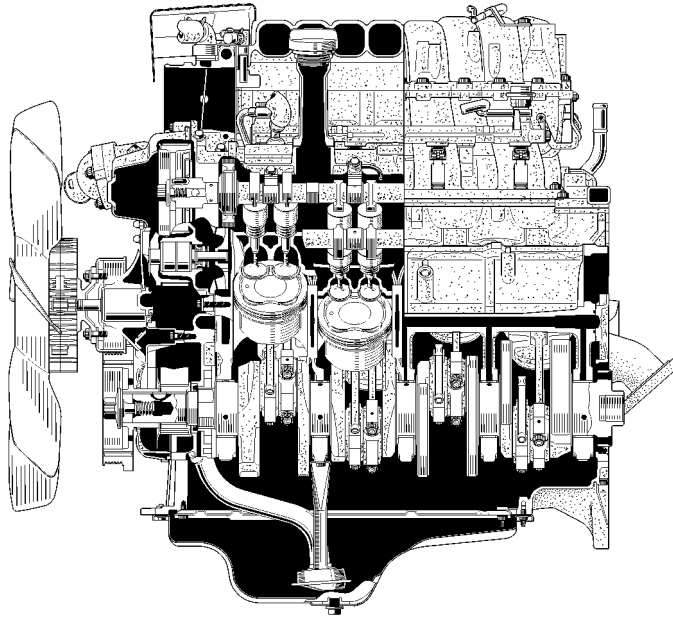


- *1 : Only for the Automatic Transmission Model
 *2 : Only for the California Specification Model
 *3 : Except for the California Specification Model
 *4 : Only for the 4WD Model
 *5 : With Cruise Control

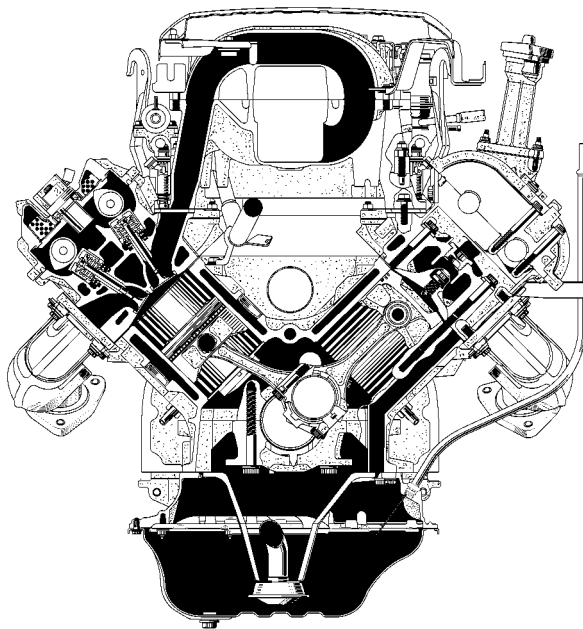
2UZ-FE ENGINE

■ DESCRIPTION

The 2UZ-FE engine that is newly adopted in the Toyota Tundra is a V8, 4.7-liter, 32-valve DOHC engine used in the '99 Land Cruiser. This engine has been developed to realize high performance, quiet operation, and fuel economy. In addition, it has adopted the ETCS-i (Electronic Throttle Control System-intelligent) to ensure excellent controllability of the vehicle and to improve its comfort.



164EG13



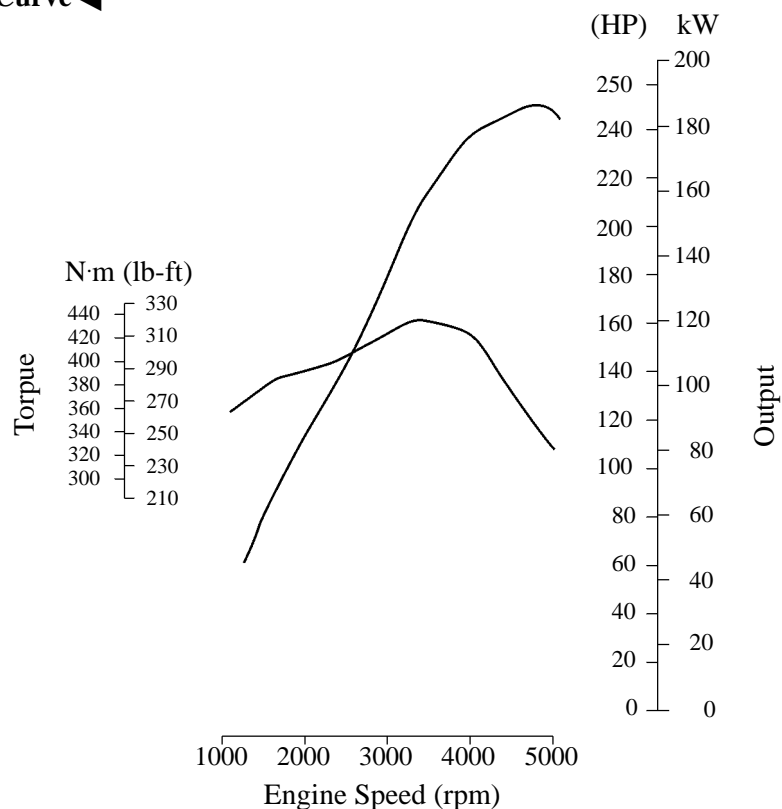
164EG14

► Specifications ◀

Engine			2UZ-FE (Toyota Tundra)	2UZ-FE (’99 Land Cruiser)
Item				
No. of Cyls. & Arrangement			8-Cylinder, V Type	←
Valve Mechanism			32-Valve, DOHC, Belt & Gear Drive	←
Combustion Chamber			Pentroof Type	←
Manifolds			Cross-Flow	←
Fuel System			SFI	←
Displacement cm ³ (cu. in.)			4664 (284.5)	←
Bore x Stroke mm (in.)			94.0 x 84.0 (3.70 x 3.31)	←
Compression Ratio			9.6 : 1	←
Max. Output [SAE-NET]			183 kW@4800 rpm (245 HP@4800 rpm) 179 kW@4800rpm* (240 HP@4800 rpm)*	172 kW@4800 rpm (230 HP@4800 rpm)
Max. Torque [SAE-NET]			427 N·m@3400 rpm (315 lb-ft@3400 rpm)	434 N·m@3400 rpm (320 lb-ft@3400 rpm)
Valve Timing	Intake	Open	3° BTDC	←
		Close	36° ABDC	←
	Exhaust	Open	46° BBDC	←
		Close	3° ATDC	←
Fuel Octane Number (RON)			91	96
Oil Grade			API SJ, EC or ILSAC	API SH EC-II, SJEC or ILSAC

*Only for the California Specification Model

► Performance Curve ◀



Except for the California Specification Model

164EG15

■ FEATURES OF 2UZ-FE ENGINE

The features of the 2UZ-FE engine and a comparison between the 2UZ-FE engine in the Toyota Tundra and '99 Land Cruiser are listed below.

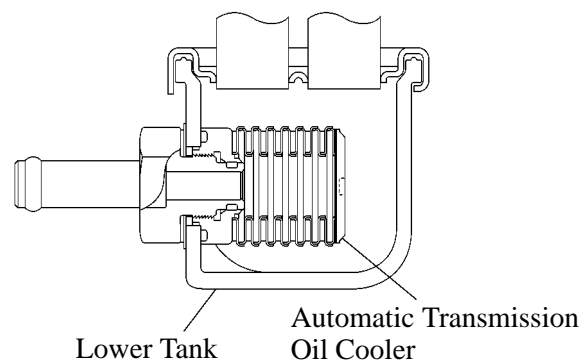
System	Features	Toyota Tundra	'99 Land Cruiser
Engine Proper	<ul style="list-style-type: none"> ● An upright intake port has been adopted to improve the intake efficiency. ● A taper squish configuration has been adopted to improve the combustion efficiency. ● A steel laminate type cylinder head gasket has been adopted to improve its reliability. ● An aluminum oil pan that is integrated with stiffeners has been adopted to reduce noise and vibration. ● The skirt portion of the piston has been applied with tin plating to reduce friction. 	○	○
	Changing the shape of the constituent parts of the oil pan reduced friction, and increasing the oil volume improved the life of oil.	○	○
Valve Mechanism	<ul style="list-style-type: none"> ● Inner shim type valve lifters have been adopted. ● Large-diameter intake and exhaust valves have been adopted to reduce the intake and exhaust resistance. 	○	○
Cooling System	<ul style="list-style-type: none"> ● The automatic transmission oil cooler has been changed to the multi-plate aluminum type. ● The method for installing the radiator reservoir tank has been simplified and its overflow pipe has been integrated with the radiator reservoir tank. 	○	—
Intake and Exhaust System	A long port intake manifold is used to improve the engine's torque in the low-to mid speed range.	○	○
	<ul style="list-style-type: none"> ● Performance and serviceability have been improved by optimizing the shape of the air cleaner. For details, see page 28 in the 5VZ-FE Engine Section, Intake and Exhaust System. ● The exhaust pipe has adopted a stainless steel. 	○	—
Fuel System	4-hole type fuel injectors have been adopted to improve the atomization of fuel.	○	○
	<ul style="list-style-type: none"> ● A fuel pump inertia switch, which stops the fuel pump if an extremely strong impact such as that of a collision is detected, has been adopted to realize excellent safety performance. ● The fuel pump ECU controls the fuel pump speed. 	—	○
	<ul style="list-style-type: none"> ● A compact fuel filter has been adopted for weight reduction. ● Tubing made of nylon has been adopted for the main fuel hose for weight reduction. ● The fuel pump speed is controlled by the fuel pump relay and the fuel pump resistor. 	○	—

System	Features	Toyota Tundra	'99 Land Cruiser
Ignition System	● The DIS (Direct Ignition System) is used to enhance the reliability of the ignition system.	○	○
	● Iridium-tipped spark plugs is used.	–	○
Emission Control System	A service port has been provided for inspecting the evaporative emission control system. For details, see page 30 in the 5VZ-FE Engine section, Emission control system.	○	○
Engine Control System	ETCS-i has been adopted to realize excellent controllability and comfort of the vehicle.	○	○

■ COOLING SYSTEM

Radiator

The automatic transmission oil cooler has been changed to the multi-plate aluminum type.

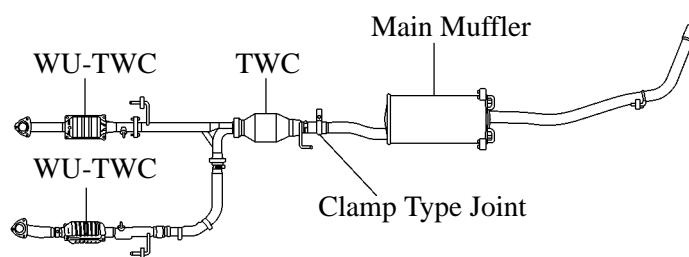


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■ INTAKE AND EXHAUST SYSTEM

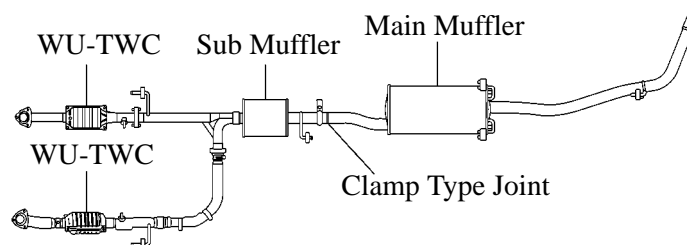
Exhaust Pipe

- The exhaust pipe is made of stainless steel for improved rust resistance.
- A clamp type joint is used to join the center pipe and tail pipe to realize weight reduction. For details, see page 28 in the 5VZ-FE Engine section, Intake and Exhaust system.
- A WU-TWC (Warm Up Three-Way Catalytic Converter) for improving exhaust emissions has been adopted.
- A TWC (Three-way Catalytic Converter) has been adopted in the center pipe on the California specification model. A sub-muffler has been adopted in the center pipe except on the California specification model.



California Specification Model

164EG17



Except California Specification Model

164EG18

■ ENGINE CONTROL SYSTEM

1. General

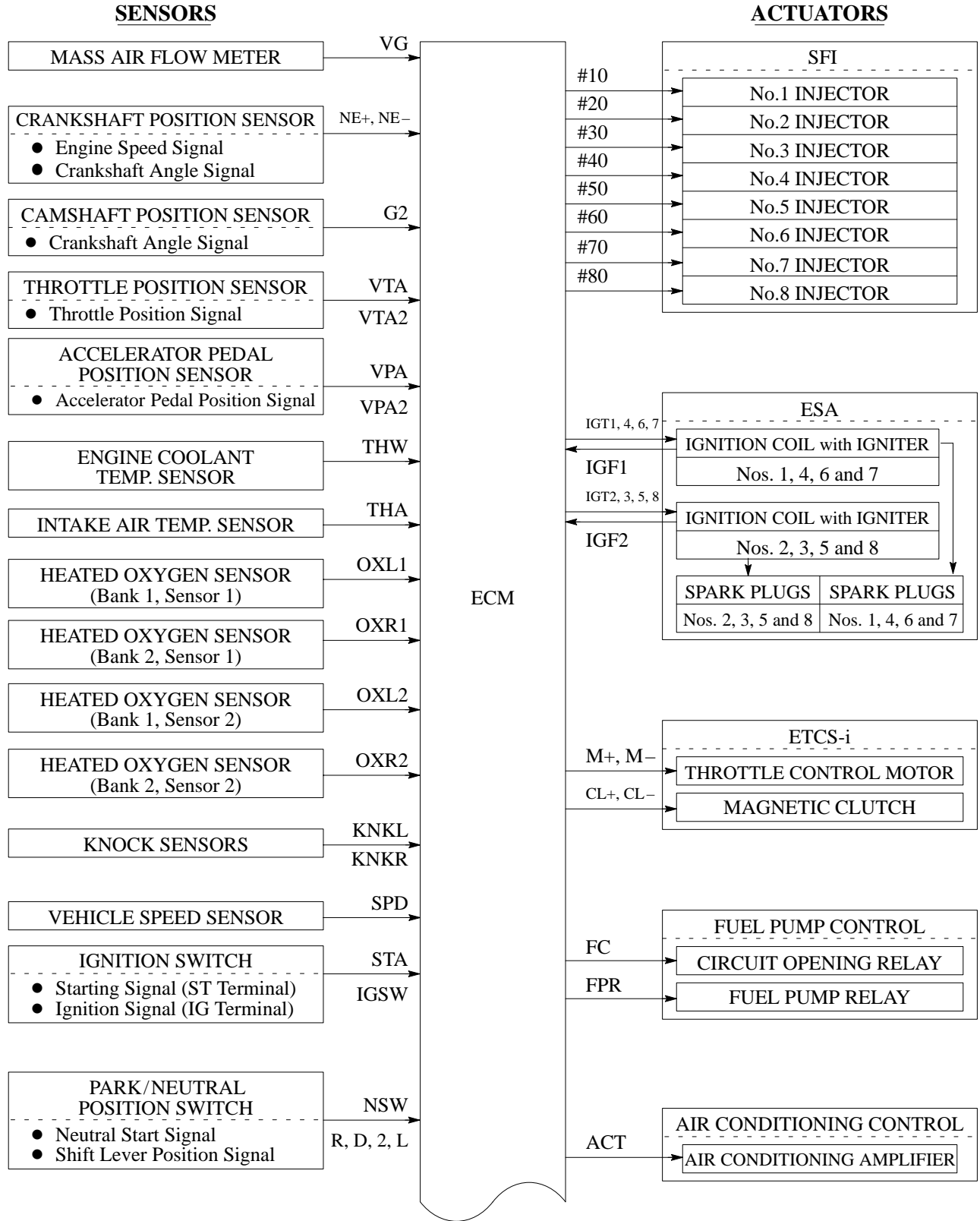
The engine control system of the Toyota Tundra's 2UZ-FE engine is basically the same in construction and operation as that of the '99 Land Cruiser's 2UZ-FE engine.

The engine control system of the Toyota Tundra's 2UZ-FE engine and '99 Land Cruiser's 2UZ-FE engine are compared below.

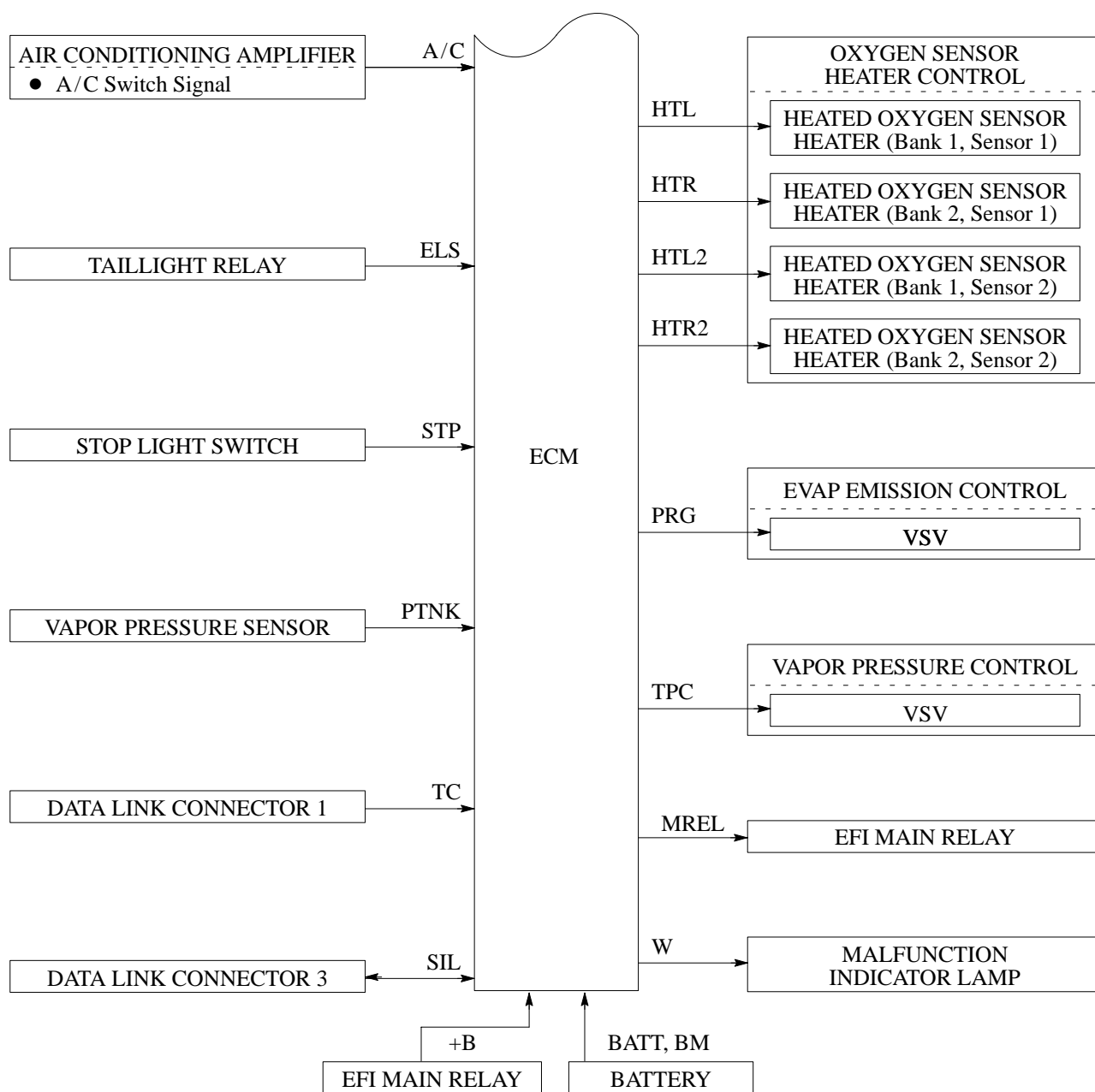
System	Outline	Toyota Tundra	'99 Land Cruiser
SFI (Sequential Multiport Fuel Injection)	<ul style="list-style-type: none"> An L-type SFI system directly detects the intake air volume with a hot-wire type mass air flow meter. The fuel injection system is a sequential multiport fuel injection system. 	○	○
ESA (Electronic Spark Advance)	<ul style="list-style-type: none"> Ignition timing is determined by the ECM based on signals from various sensors. Corrects ignition timing in response to engine knocking. The torque control correction during gear shifting has been used to minimize the shift shock. 2 knock sensors are used to further improve knock detection. 	○	○
ETCS-i (Electronic Throttle Control System-intelligent)	Optimally controls the throttle valve opening in accordance with the amount of the accelerator pedal effort, and the conditions of the engine and the vehicle, and comprehensively controls the ISC, and cruise control.	○	○
Fuel Pump Control	The fuel pump ECU controls the fuel pump speed.	—	○
	The fuel pump speed is controlled by the fuel pump relay and the fuel pump resistor.	○	—
Oxygen Sensor Heater Control	Maintains the temperature of the oxygen sensor at an appropriate level to increase accuracy of detection of the oxygen concentration in the exhaust gas.	○	○
Air Conditioning Cut-Off Control	By controlling the air conditioning compressor ON or OFF in accordance with the engine condition, drivability is maintained.	○	○
Evaporative Emission Control	The ECM controls the purge flow of evaporative emissions (HC) in the charcoal canister in accordance with engine conditions.	○	○
Engine Immobiliser	Prohibits fuel delivery and ignition if an attempt is made to start the engine with an invalid ignition key.	—	○
Diagnosis	<ul style="list-style-type: none"> When the ECM detects a malfunction, the ECM diagnoses and memorizes the failed section. The diagnosis system includes a function that detects a malfunction in the evaporative emission control system. 	○	○
Fail-Safe	When the ECM detects a malfunction, the ECM stops or controls the engine according to the data already stored in the memory.	○	○

2. Construction

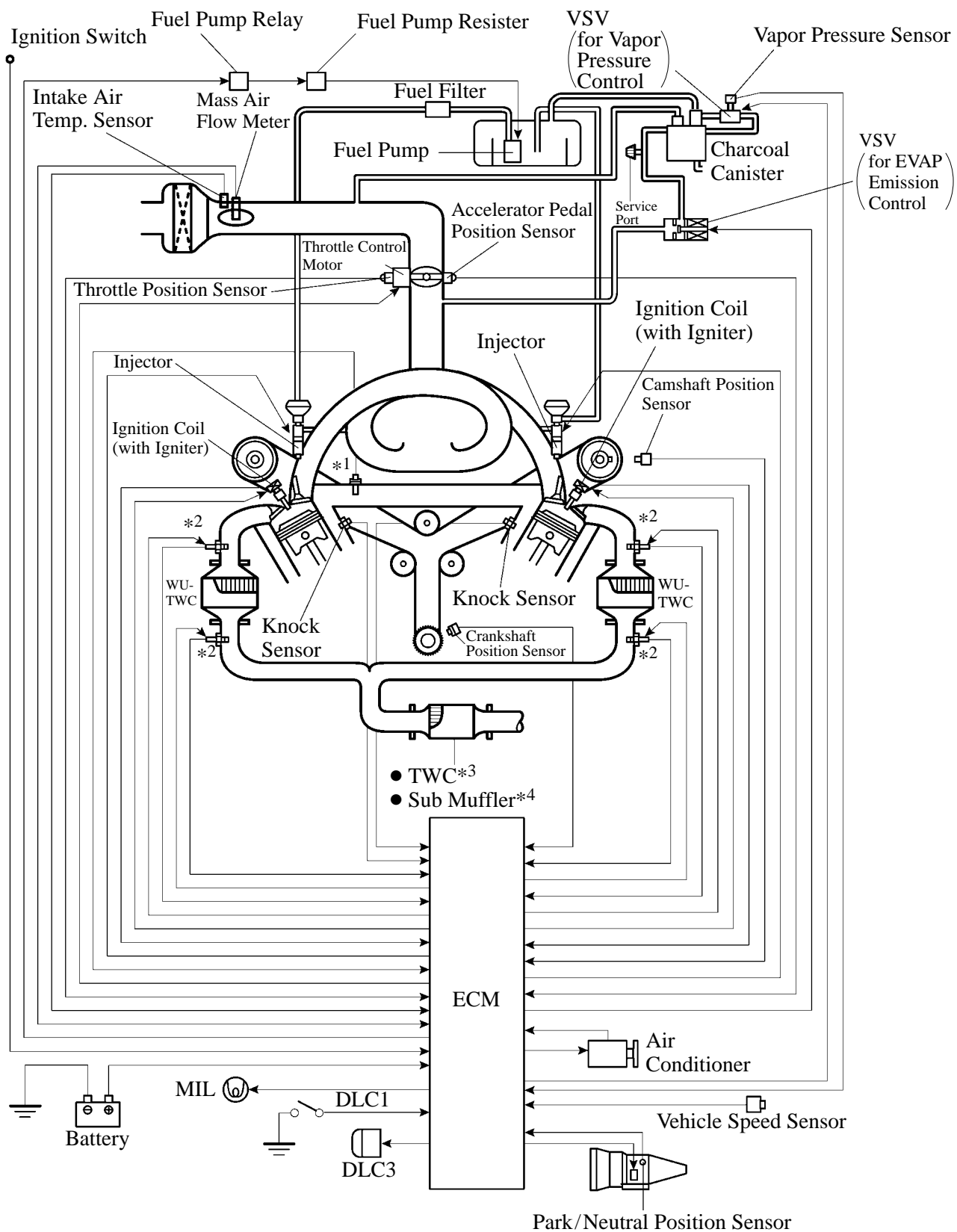
The configuration of the engine control system in the 2UZ-FE engine is shown in the following chart.



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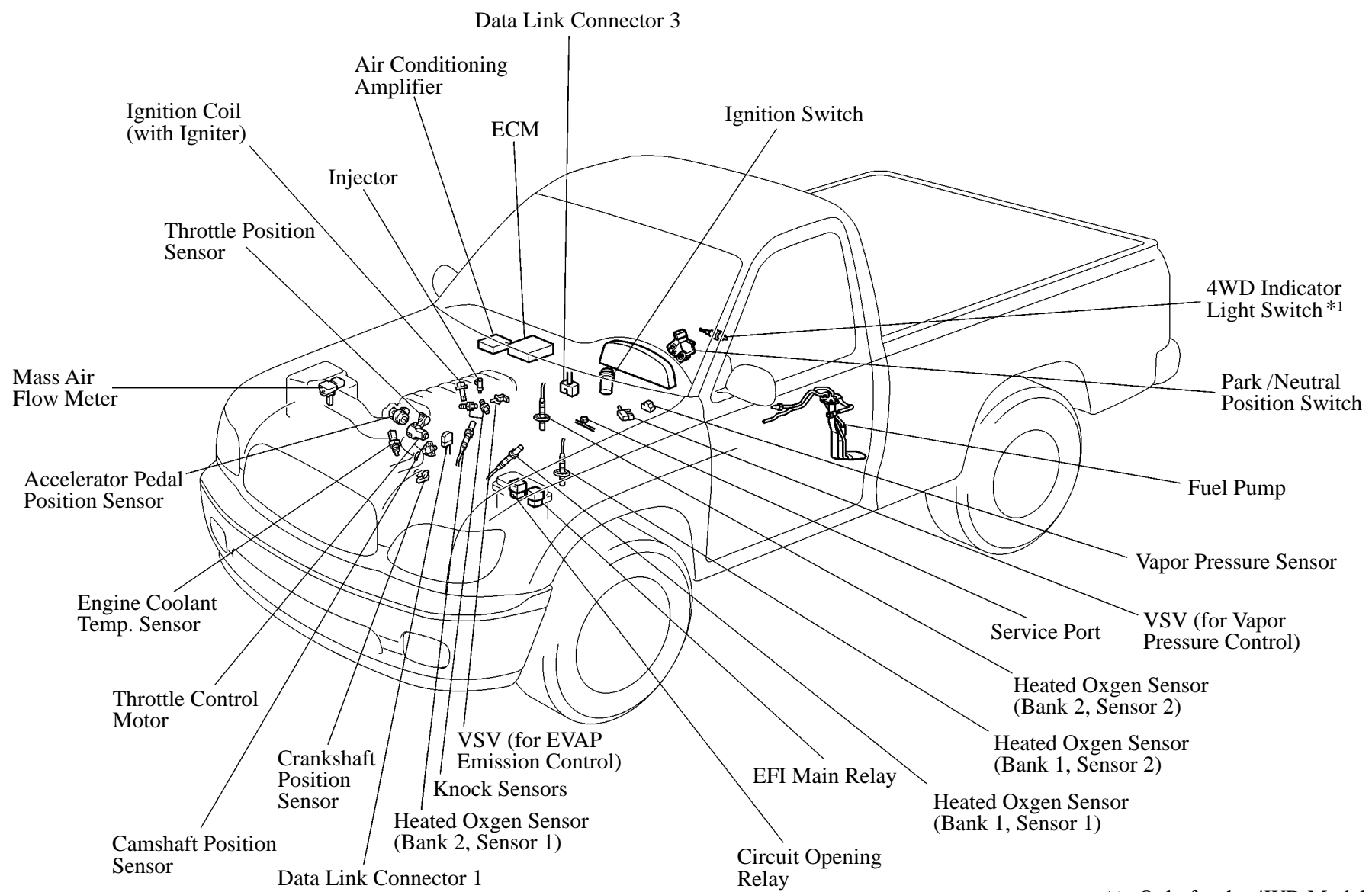


3. Engine Control System Diagram



164EG19

4. Layout of Components



*1 : Only for the 4WD Model