

## ■ ELECTRONIC CONTROL SYSTEM

### 1. General

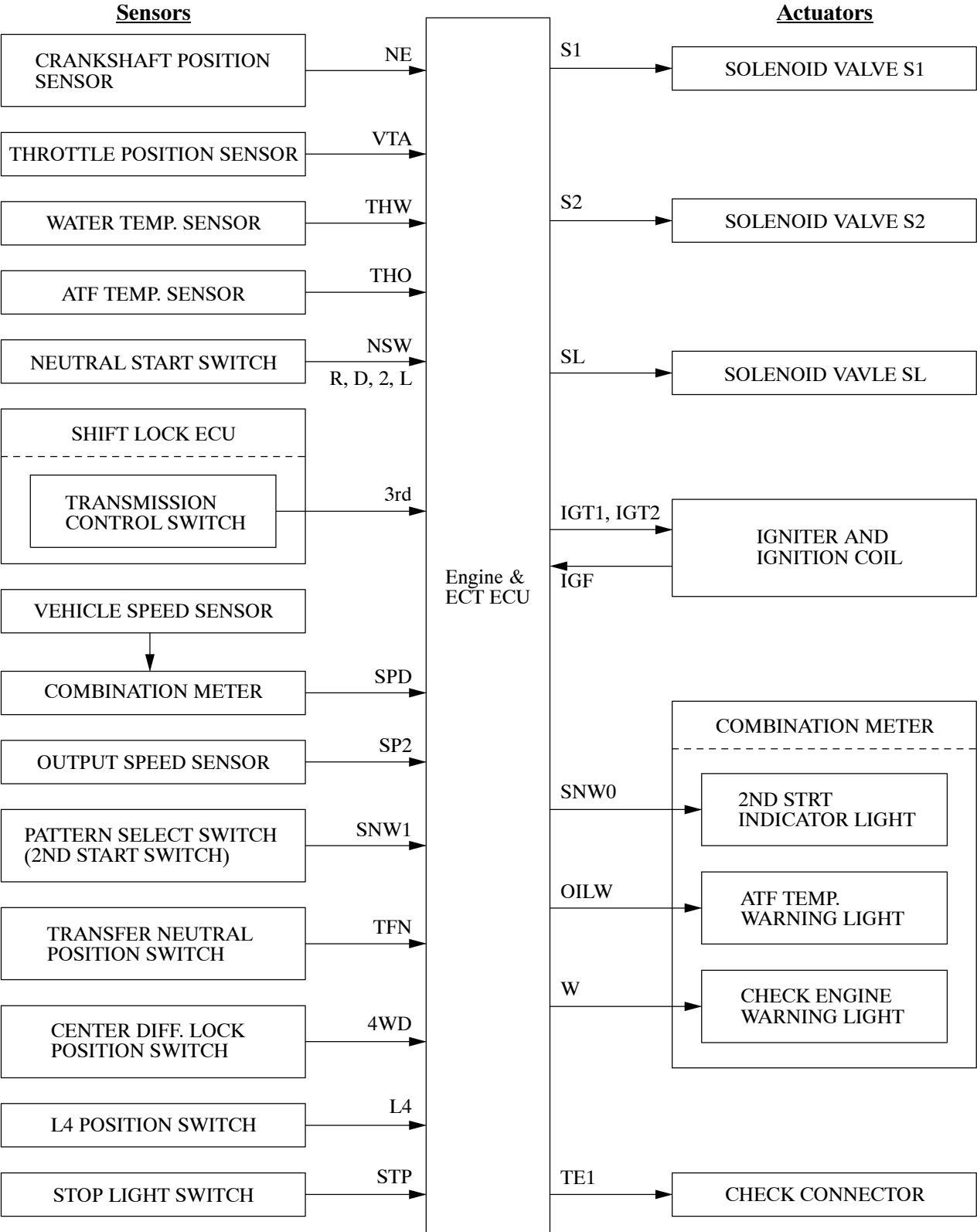
The electronic control system of the A343F automatic transmission consists of the control listed below:

System	Function	Engine	
		3RZ	1KZ/ 1KD
Shift Timing Control	The engine & ECT ECU sends current to the solenoid valve S1 and/or S2 based on signals from each sensor and shifts the gear.	○	○
Lock-Up Timing Control	This engine & ECT ECU sends current to the solenoid valve SL based on signals from each sensor and engages or disengages the lock-up clutch.	○	○
Line Pressure Control	Actuates the solenoid valve SLT to control the line pressure in accordance with information from engine & ECT ECU and the operating conditions of the transmission.	—	○
Engine Torque Control	Retards the ignition timing temporarily to increase shift feeling during up or down shifting.	○	—
	Reduces the fuel injection volume temporarily to increase shift feeling during up or down shifting.	—	○
“N” or “D” Squat Control	When the shift lever is shifted from “N” to “D” position, the gear is temporarily shifted to OD and than 1st to reduce vehicle squat.	○	○
2nd Start System	Enabling the vehicle to take off in the 2nd gear and thus make it easy to take off snowy, sandy or muddy terrain.	○	○
Self-Diagnosis	When the engine & ECT ECU detects a malfunction, the engine & ECT ECU makes a diagnosis and memorizes the failed section.	○	○
Fail-Safe	Controls other normally operating components, permitting continued driving when malfunctions occur in the electrical circuit.	○	○

# 2. Construction

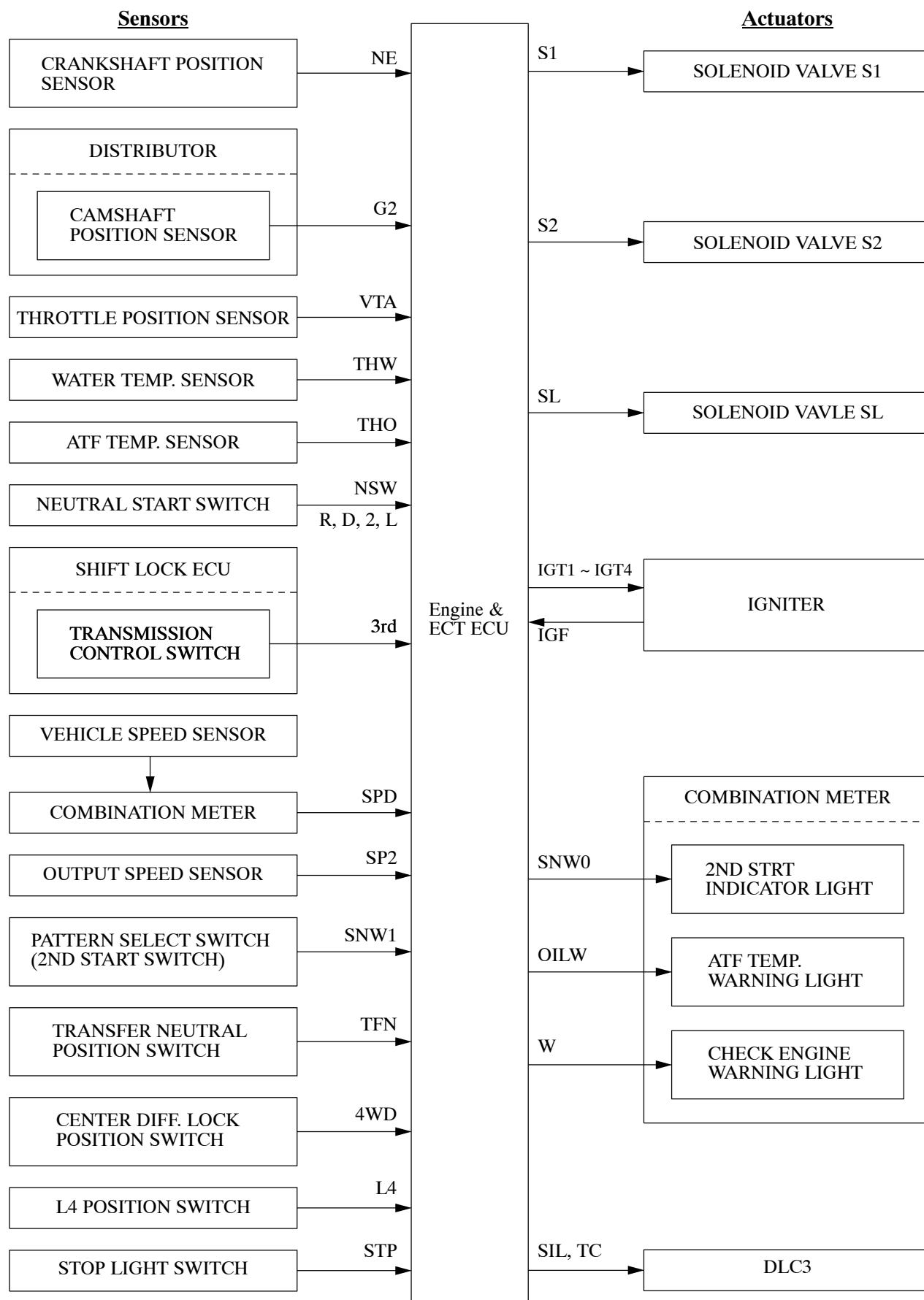
The configuration of the electronic control system in the A343F automatic transmission is as shown in the following chart.

## ► 3RZ-FE Engine (Leaded Gasoline) Model ◀

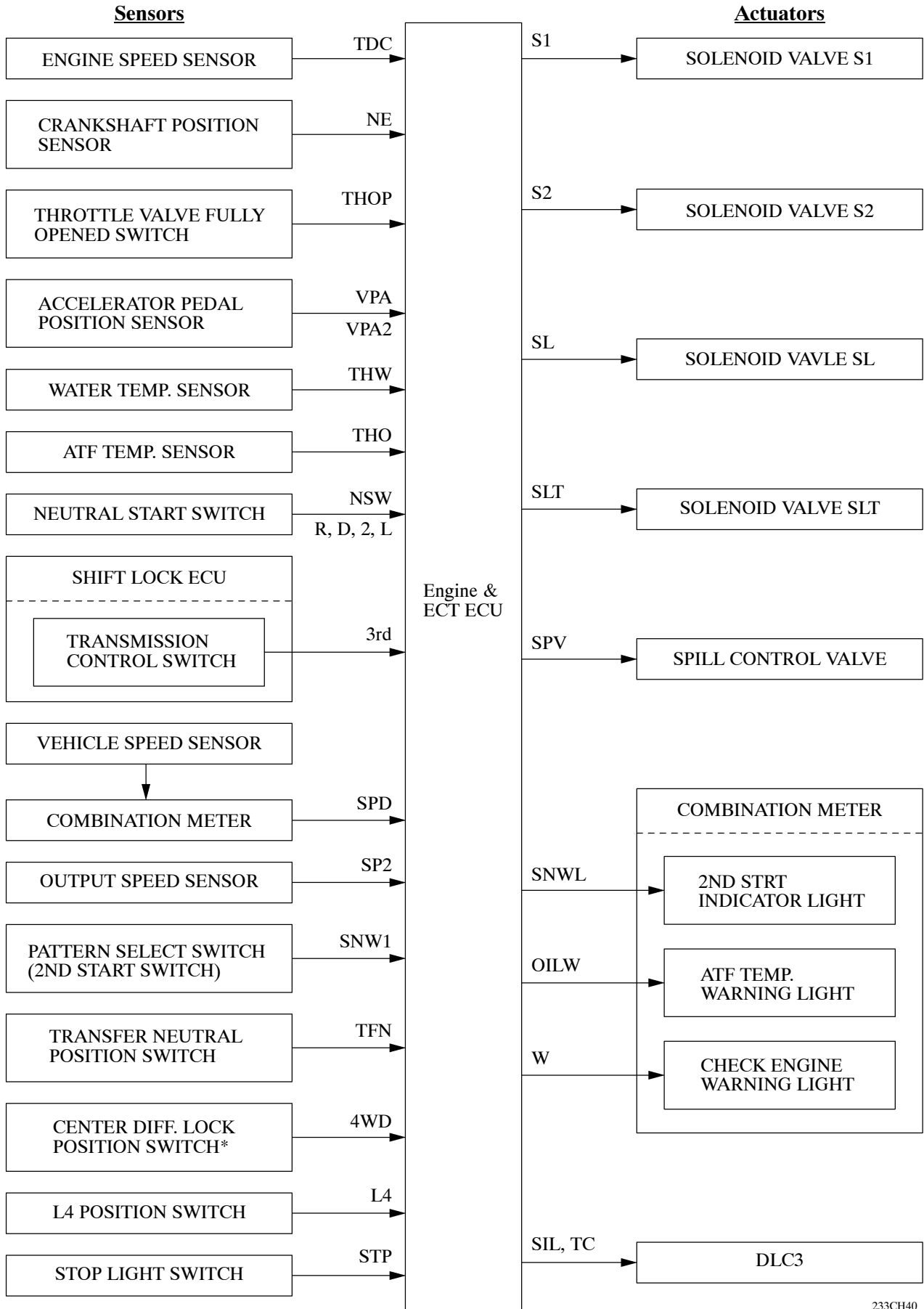


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► 3RZ-FE Engine (Unleaded Gasoline) Model ◀

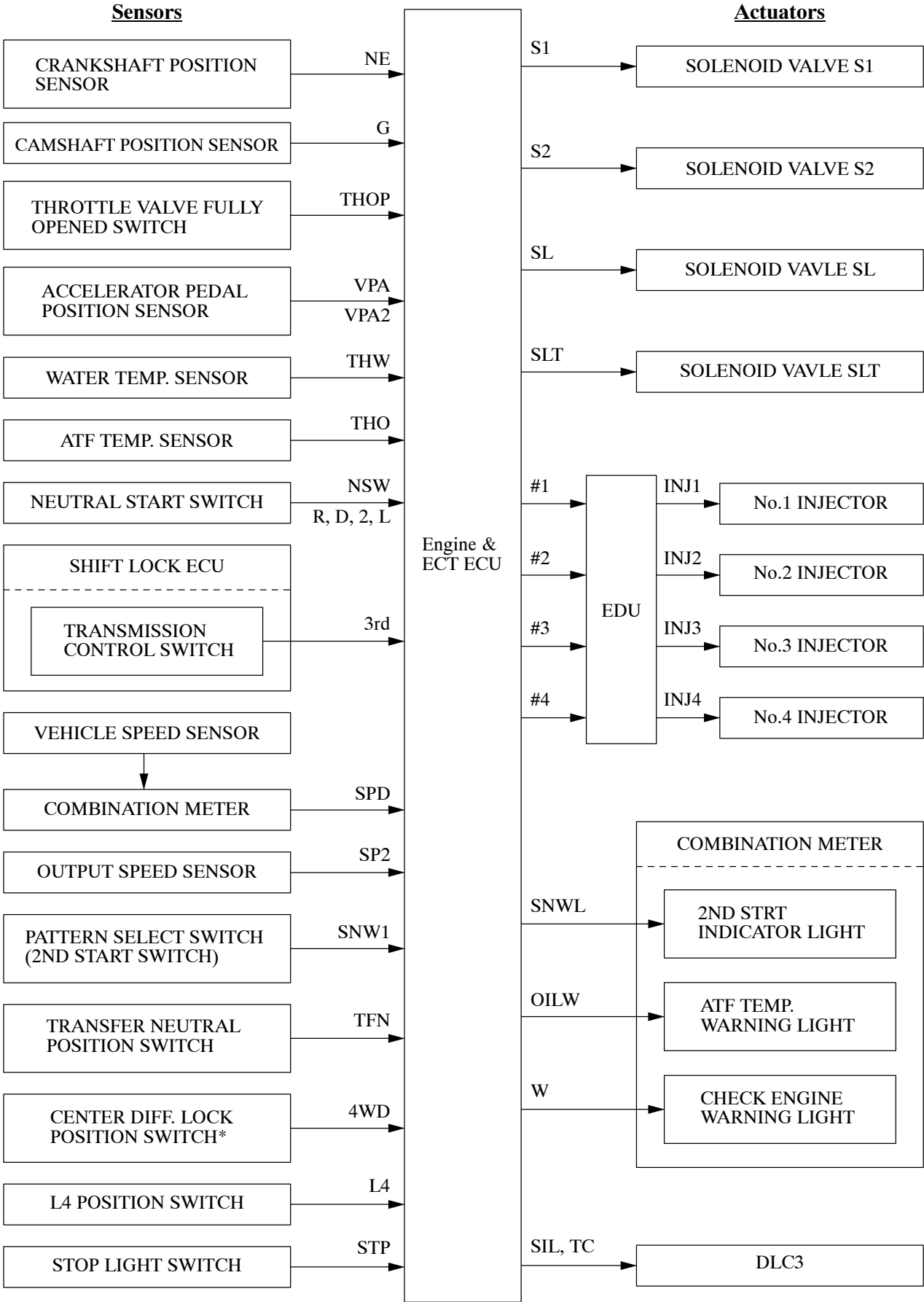


► 1KZ-TE Engine Model ◀

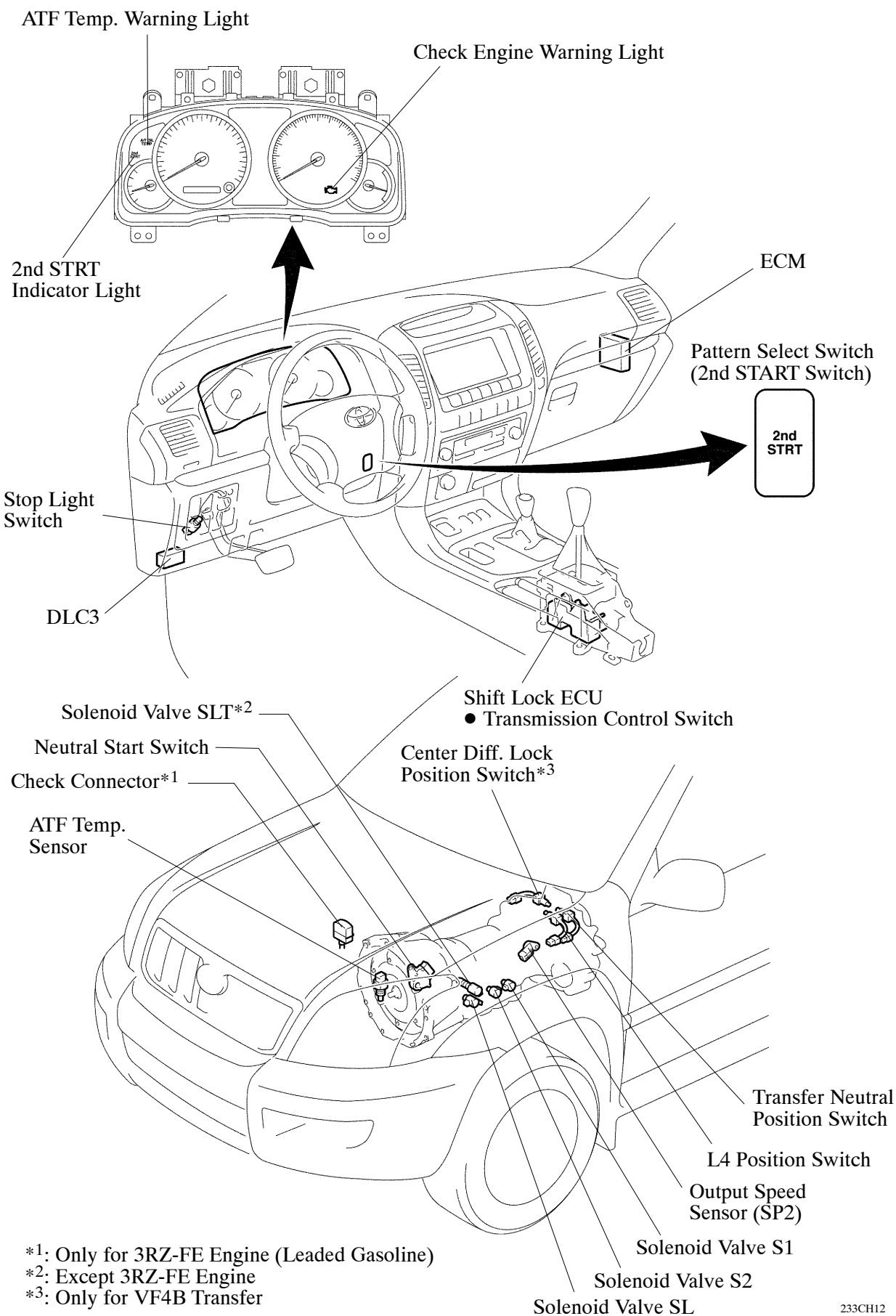


\*: Only for VF4B Transfer Model

► 1KD-FTV Engine Model ◀



### 3. Layout of Component



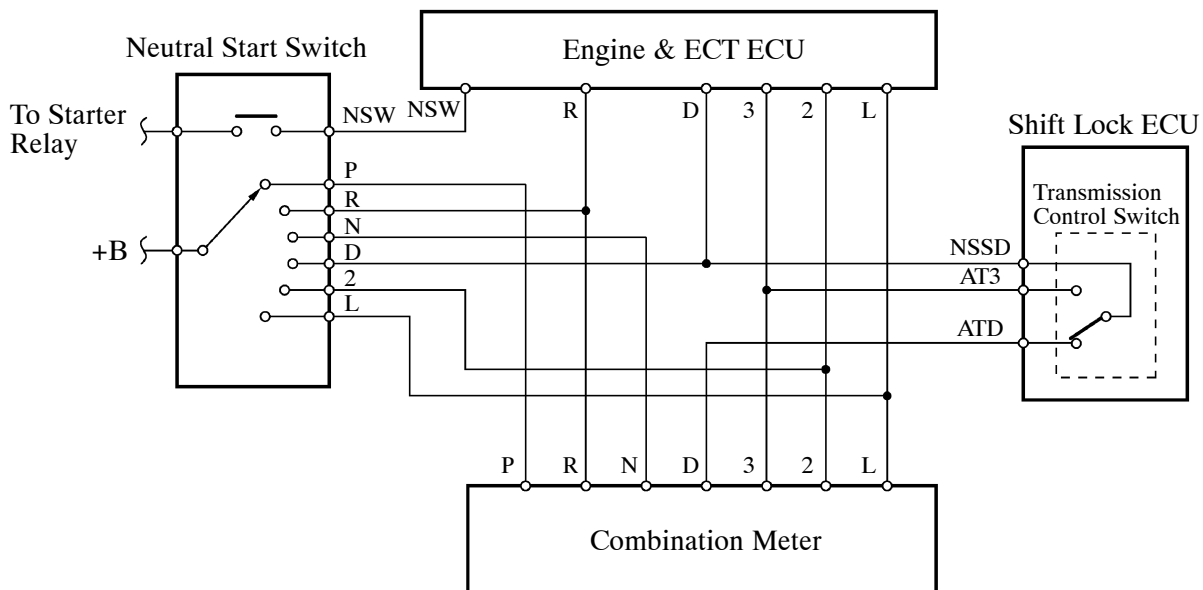
## 4. Construction and Operation of Main Component

### Transmission Control Switch and Neutral Start Switch

The engine & ECT ECU uses these switches to detect the shift position.

- The neutral start switch sends the R, D, 2, L and NSW position signals to the engine & ECT ECU. It also sends signals for the shift indicator light (P, R, N, and 2, L) in the combination meter.
- The transmission control switch is located in the shift lock ECU. This switch sends the 3rd signal to the engine & ECT ECU. It also sends signals for the shift position indicator light (D and 3rd) in the combination meter.

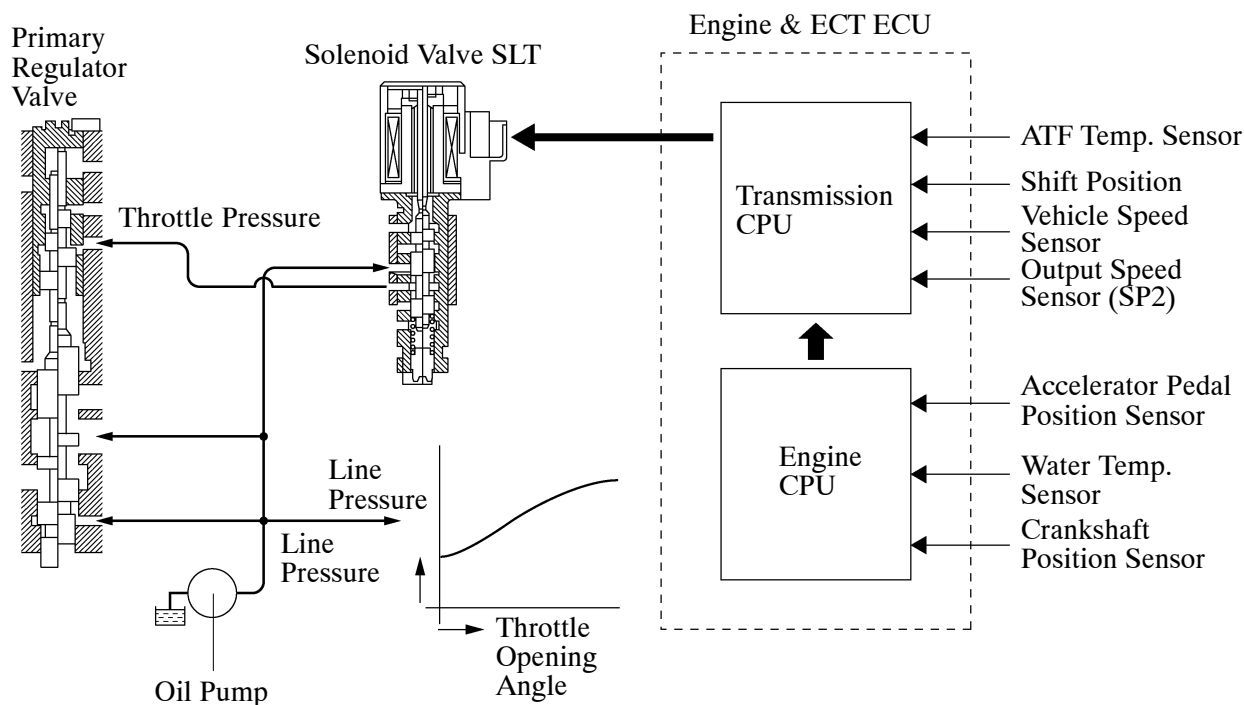
### ► Wiring Diagram ◀



## 5. Line Pressure Control

In order to obtain a predetermined line pressure characteristic according to the each sensor signal the engine & ECT ECU activates the solenoid valve SLT to regulate the throttle pressure.

This makes it possible for the primary regulator valve to precisely and minutely control the line pressure in accordance with the engine output, and thus realize smoother shift characteristics.

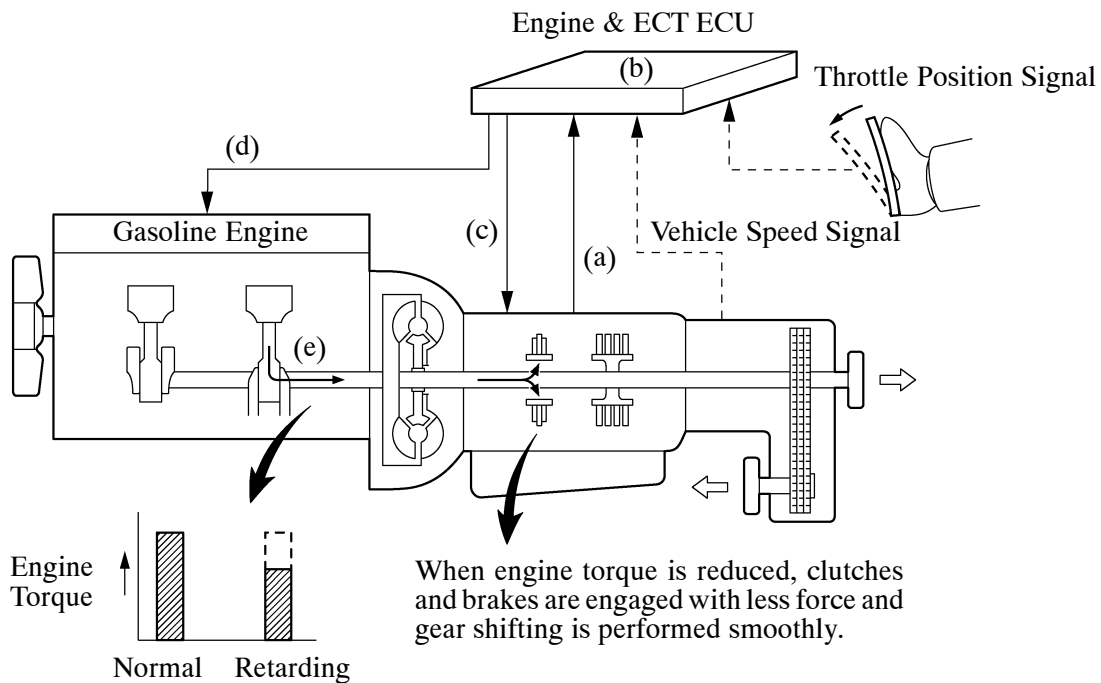


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## 6. Engine Torque Control (for 3RZ-FE Engine)

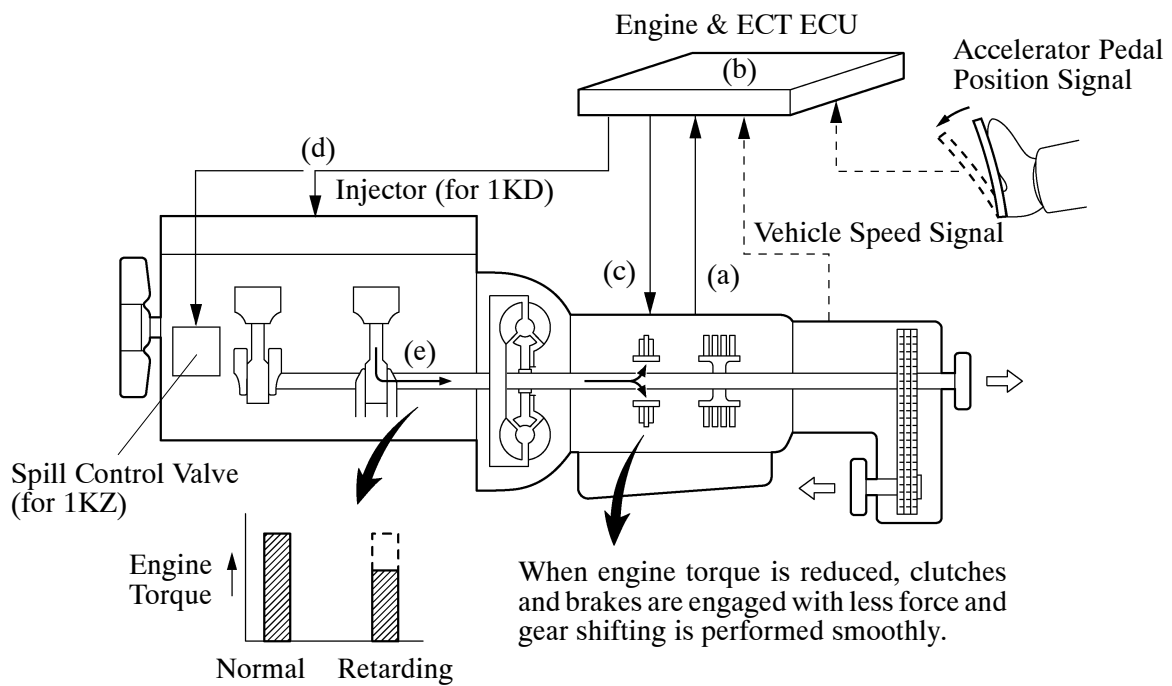
Engagement of the clutches and brakes of the planetary gear unit in the transmission is controlled smoothly by momentarily retarding the engine ignition timing when gears are shifted up or down in the transmission. When the engine & ECT ECU judges a gear shift timing according to signals, it activates the shift control solenoid valves to perform gear shifting. When the gear shifting starts, the engine & ECT ECU retards the engine ignition timing to reduce the engine torque. As a result, engagement force of the clutches and brakes of the planetary gear units is weakened and the gear change is performed smoothly.



- (a): Judgment of Gear Shifting
- (b): Determination of Ignition Timing Retard Angle
- (c): Gear Shifting
- (d): Retarding Ignition Timing
- (e): Torque Reduction

## 7. Engine Torque Control (for 1KZ-TE and 1KD-FTV Engine)

Engagement of the clutches and brakes of the planetary gear unit in the transmission is controlled smoothly by momentarily reducing the fuel injection volume when gears are shifted up or down in the transmission. When the engine & ECT ECU judges a gear shift timing according to signals, it activates the shift control solenoid valves to perform gear shifting. When the gear shifting starts, the engine & ECT ECU reduces the fuel injection volume to reduce the engine torque. As a result, engagement force of the clutches and brakes of the planetary gear units is weakened and the gear change is performed smoothly.



- (a): Judgment of Gear Shifting
- (b): Determination of Fuel Injection Reduce Volume
- (c): Gear Shifting
- (d): Reducing Fuel Injection Volume
- (e): Torque Reduction

## 8. 2nd Start Control

- This control enables the driver to use a 2nd start (momentary type) switch to select the 2nd start mode which allows the vehicle to start in 2nd gear, thus is used to make it easy for the vehicle to start on sandy or muddy terrain.
- When the 2nd start mode is selected while the shift lever is in the “D”, “3”, or “2” position, the vehicle can start in the 2nd gear. After a start, if the shift lever is in the “D” or “3” position, transmission will shift up automatically into 3rd and overdrive gears, as usual. If the shift lever is in the “2” position, the transmission will continue to operate in the 2nd gear.

### ► Shift Program ◀

→: Up Shift   ←: Down Shift

Mode		Normal	2nd Start
Shift Lever Position	D, 3	1st ↔ 2nd ↔ 3rd ↔ O/D	2nd ↔ 3rd ↔ O/D
	2	1st ↔ 2nd ← 3rd	2nd ← 3rd
	L	1st ← 2nd	←

## 9. Diagnosis

### 3RZ-FE Engine (Leaded Gasoline)

- When the engine & ECT ECU detects a malfunction, the engine & ECT ECU makes a diagnosis and memorizes the failed section.  
Furthermore, the check engine warning light in the combination meter illuminates or blinks to inform the driver.
- At the same time, the DTCs (Diagnostic Trouble Codes) are stored in memory.
- The DTCs can be read from number of the blinking of the check engine warning light by connecting the SST (09843-18020) to the TE1 and E1 terminals of the check connector.
- For details, see the Land Cruiser/ Land Cruiser Prado Repair Manual (Pub. No. RM990E).

### 3RZ-FE (Unleaded Gasoline), 1KZ-TE, and 1KD-FTV Engines

- When the engine & ECT ECU detects a malfunction, the engine & ECT ECU makes a diagnosis and memorizes the failed section.  
Furthermore, the check engine warning light in the combination meter illuminates or blinks to inform the driver.
- At the same time, the DTCs are stored in memory.
- The DTCs can be read by connecting a hand-held tester to DLC3.
- The DTCs can be read from number of the blinking of the check engine warning light by connecting the SST (09843-18040) to the Tc and CG terminals of the DLC3.
- For details, see the Land Cruiser/ Land Cruiser Prado Repair Manual (Pub. No. RM990E).