

■ ELECTRONIC CONTROL SYSTEM

1. General

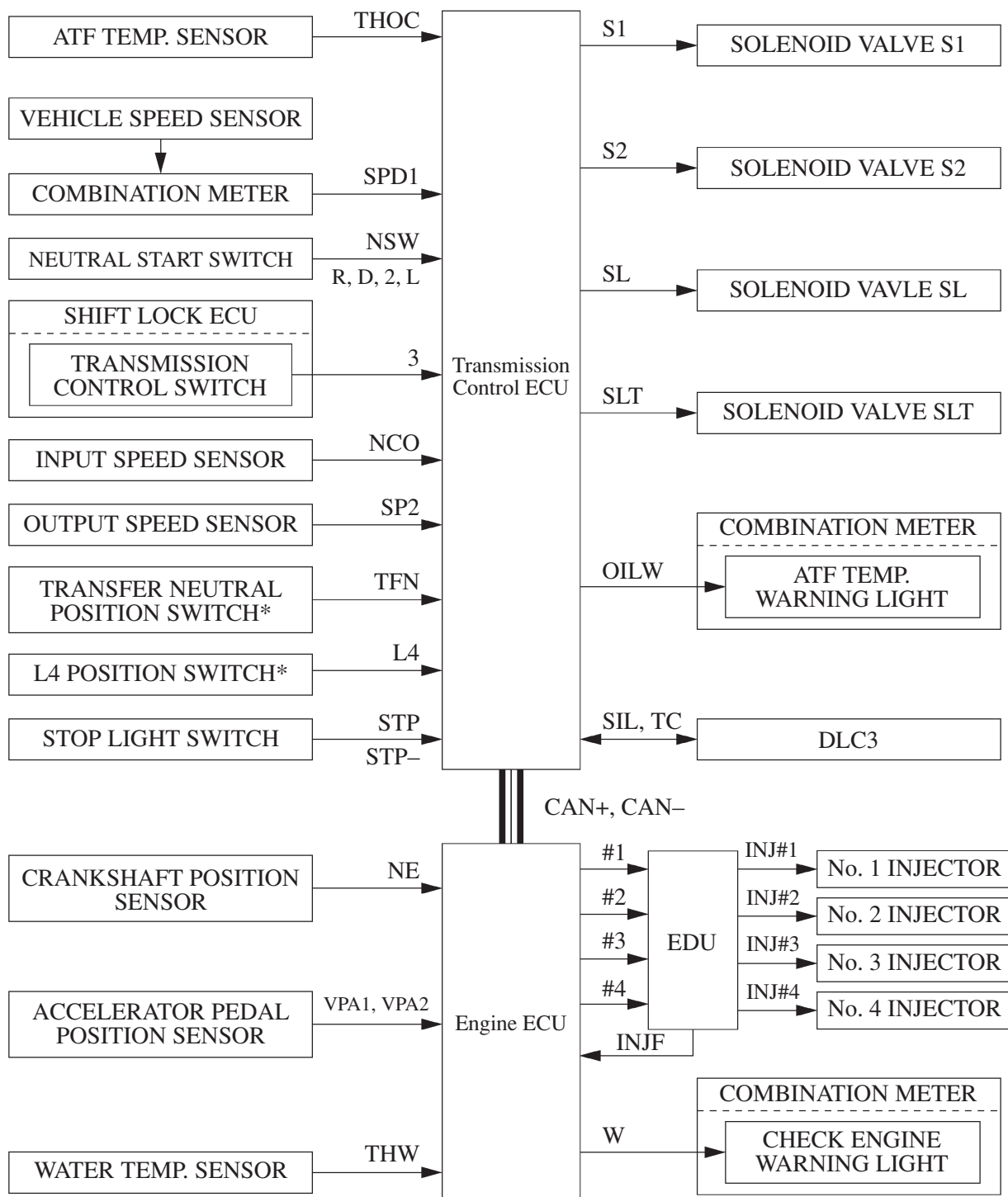
The electronic control system of the A340E, A340F, A343E and A343F automatic transmissions consists of the control listed below:

System	Function	Type	
		A340E, F	A343E, F
Shift Timing Control	The engine & ECT ECU (Transmission Control 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 (Transmission Control 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 (See Page CH-24)	Actuates the solenoid valve SLT to control the line pressure in accordance with information from engine & ECT ECU (Transmission Control ECU) and the operating conditions of the transmission.	○	○
Engine Torque Control (See Page CH-25)	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.	○	○
Self-Diagnosis	When the engine & ECT ECU (Transmission Control ECU) detects a malfunction, the ECU makes a diagnosis and memorizes the failed section.	○	○
	All the DTCs (Diagnostic Trouble Codes) have been made to correspond to the SAE controlled codes.	○	○
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 A340E, A340F, A343E and A343F automatic transmissions are as shown in the following chart.

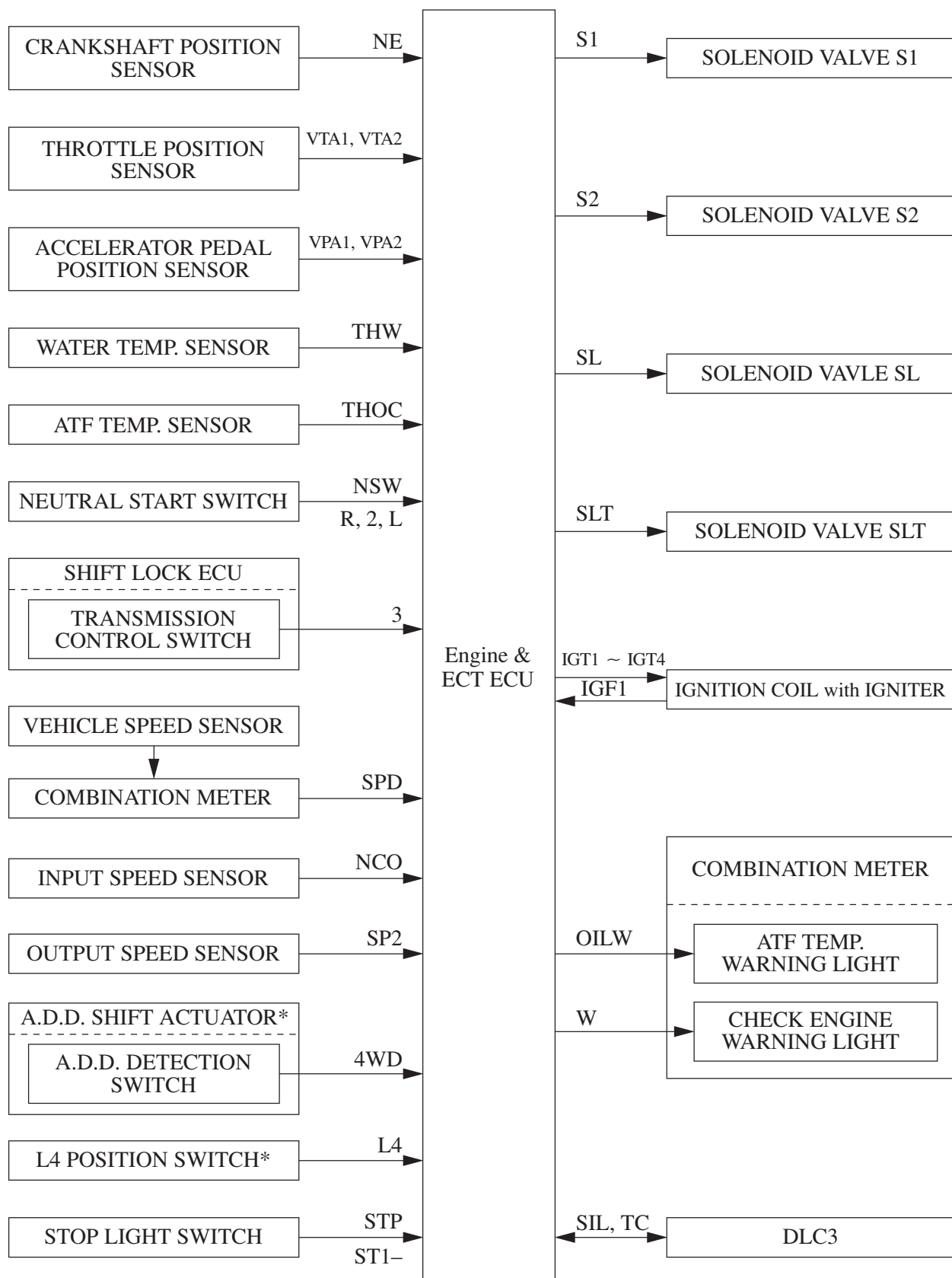
► A340E and A340F ◀



≡ : CAN (Controller Area Network)

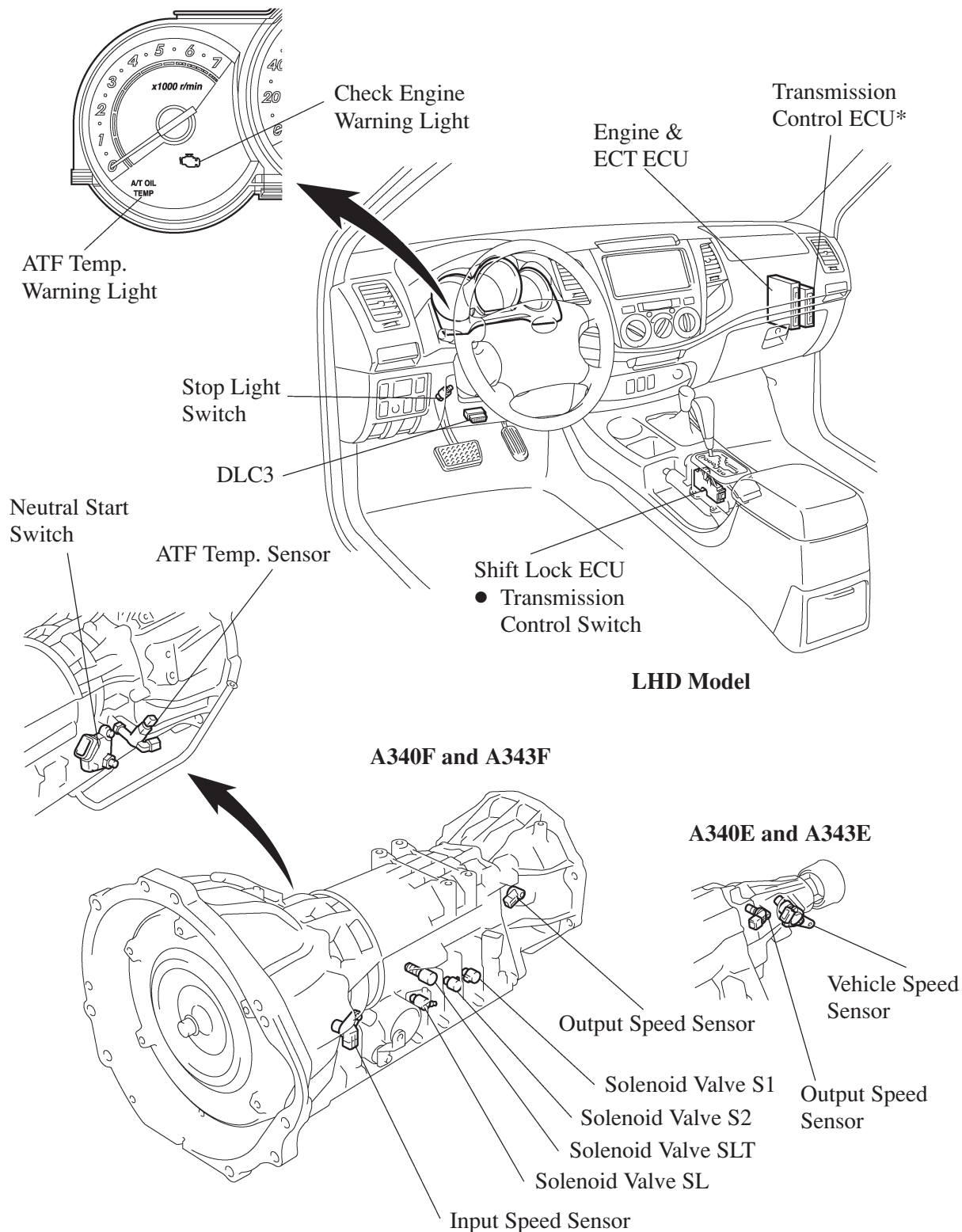
* : A340F AT Models

► A343E and A343F ◀



*: A343F AT Models

3. Layout of Main Components



*: Only for The A340E and A340F AT models

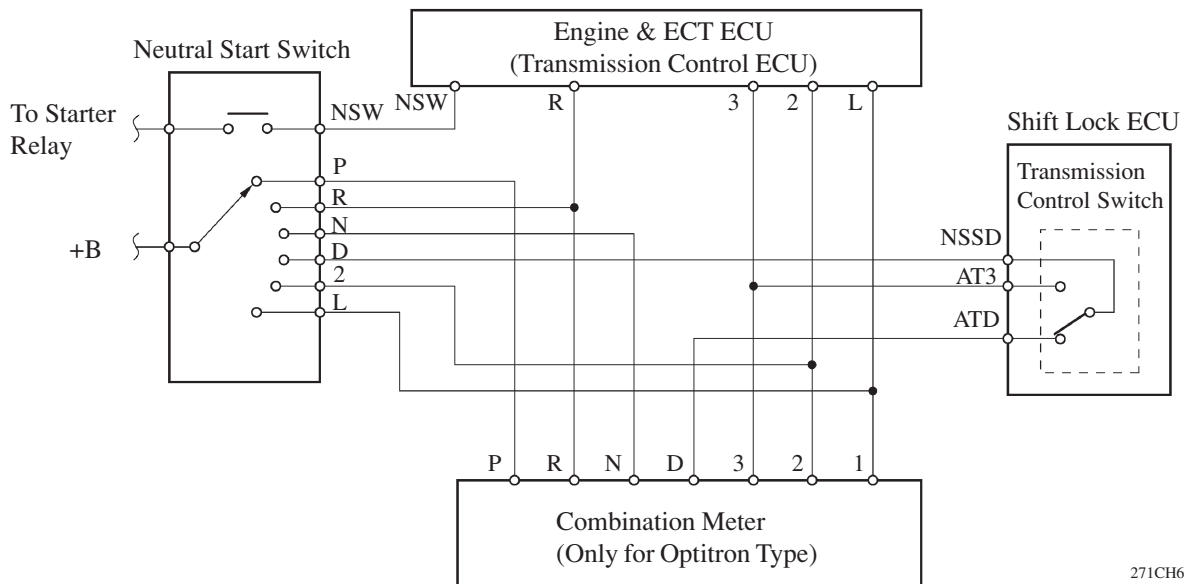
4. Construction and Operation

Transmission Control Switch and Neutral Start Switch

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

► Wiring Diagram ◀

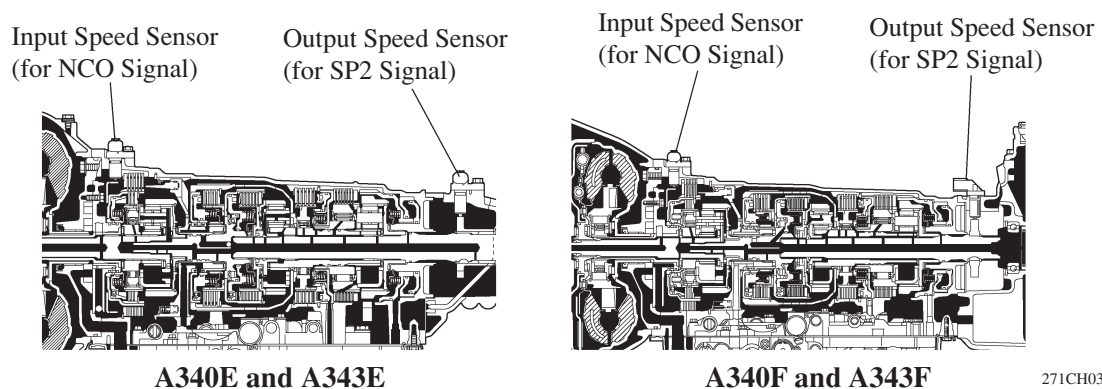


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Input Speed Sensor and Output Speed Sensor

These automatic transmissions use an input speed sensor (for NCO signal) and output speed sensor (for SP2 signal). Thus, the engine & ECT ECU (Transmission Control ECU) 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. These speed sensors are the pick-up coil type.

- The input speed sensor detects the input speed of the transmission. The O/D direct clutch drum is used as the timing rotor for this sensor.
- The output speed sensor detects the speed of the output shaft.

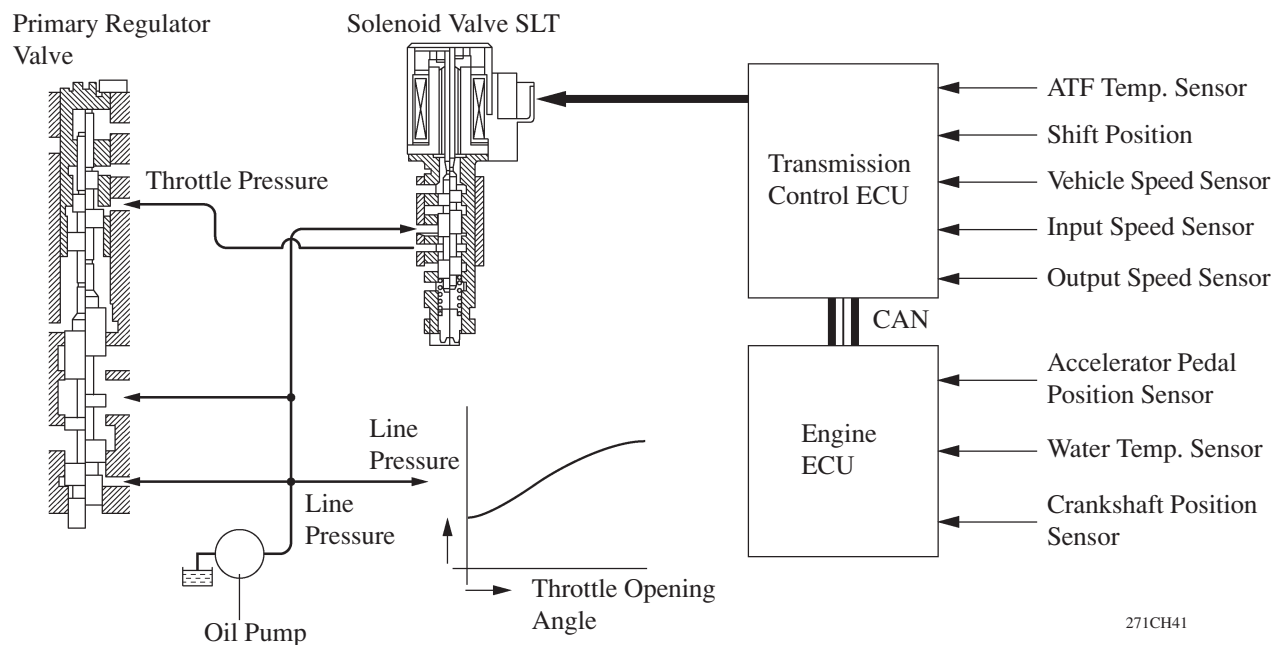


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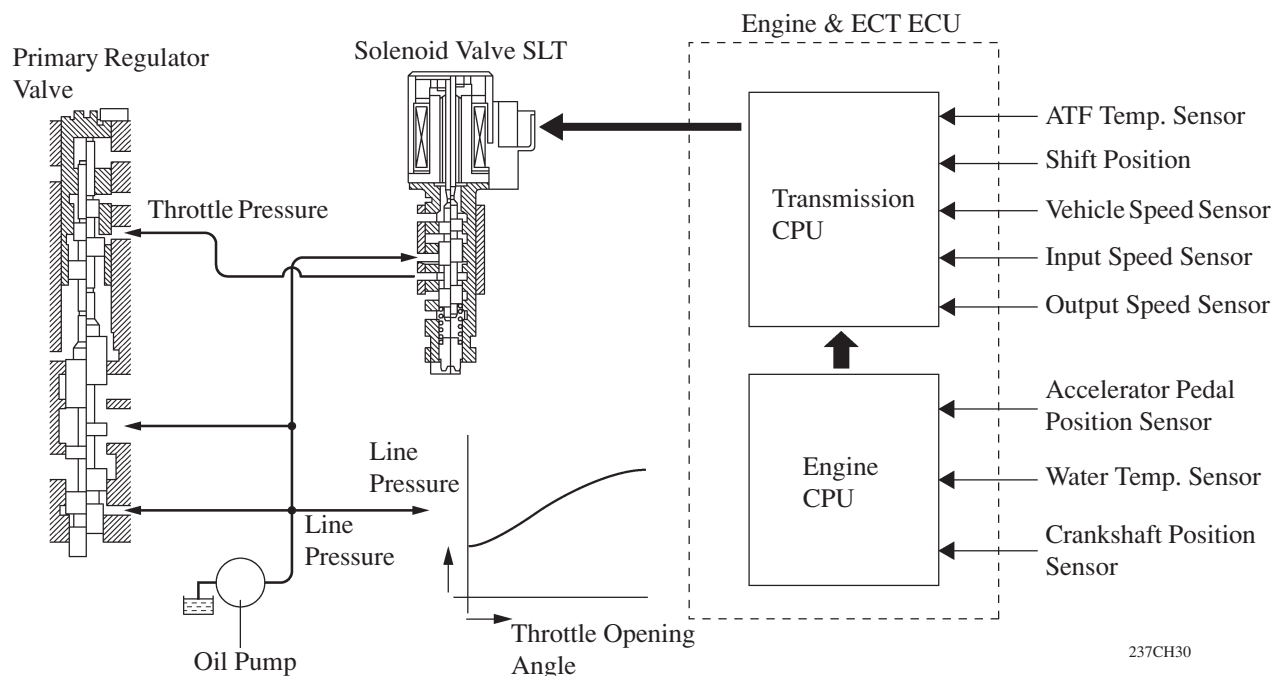
5. Line Pressure Control

In order to obtain a predetermined line pressure characteristic according to the each sensor signal, the engine & ECT ECU (Transmission Control 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.

► A340E and A340F ◀

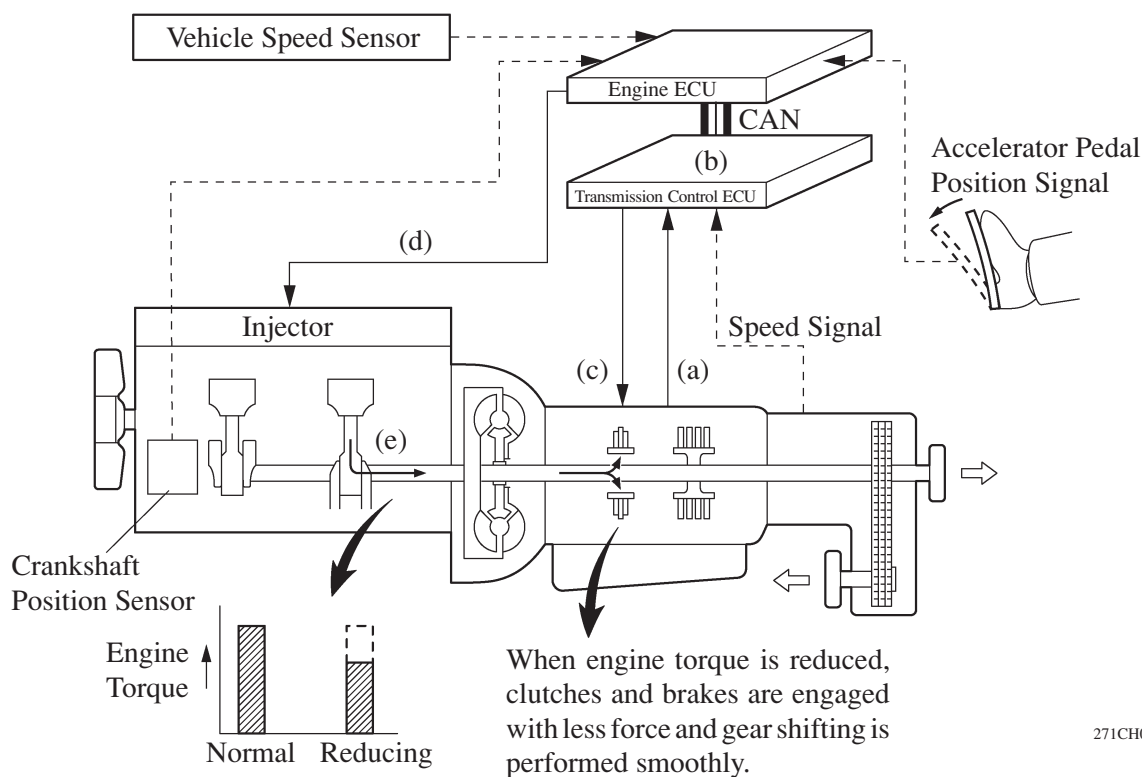


► A343E and A343F ◀



6. Engine Torque Control (for A340E and A340F)

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 transmission control 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 transmission control 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. Diagnosis

- When the engine & ECT ECU (Transmission Control ECU) detects a malfunction, the engine & ECT ECU (Transmission Control ECU) makes a diagnosis and memorizes the failed section.
Furthermore, the check engine warning light in the combination meter illuminates to inform the driver.
- At the same time, the DTCs (Diagnostic Trouble Codes) are stored in memory.
- The DTCs can be read by connecting a intelligent tester II 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. This function is only available on models for Philippines and Malaysia.

For details, see the Hilux Repair Manual.

9. Fail Safe

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

► Fail-Safe Control List ◀

Malfunction Part	Function
Output Speed Sensor (SP2)	During an output speed sensor malfunction, shift control is effected through the input speed sensor signal (NC0) or engine speed signal (NE).
ATF Temp. Sensor No. 1	During a malfunction of ATF temp. sensor No. 1, the system effects control by fixing the ATF temp. at 80°C (176°F).
Solenoid Valve No. 1 and No. 2	The current to the failed solenoid valve is cut off and control is effected by operating the other solenoid valves with normal operation.
Solenoid Valve SL	During a solenoid valve SL malfunction, the current to the solenoid valve is stopped. Because this stops lock-up control, and fuel economy decreases.
Solenoid Valve SLT	During a solenoid valve SLT malfunction, the current to the solenoid valve is stopped. Because this stops line pressure control, the shift shock increases. However, shifting is effected through normal clutch pressure control.