■ELECTRONIC CONTROL SYSTEM

1. General

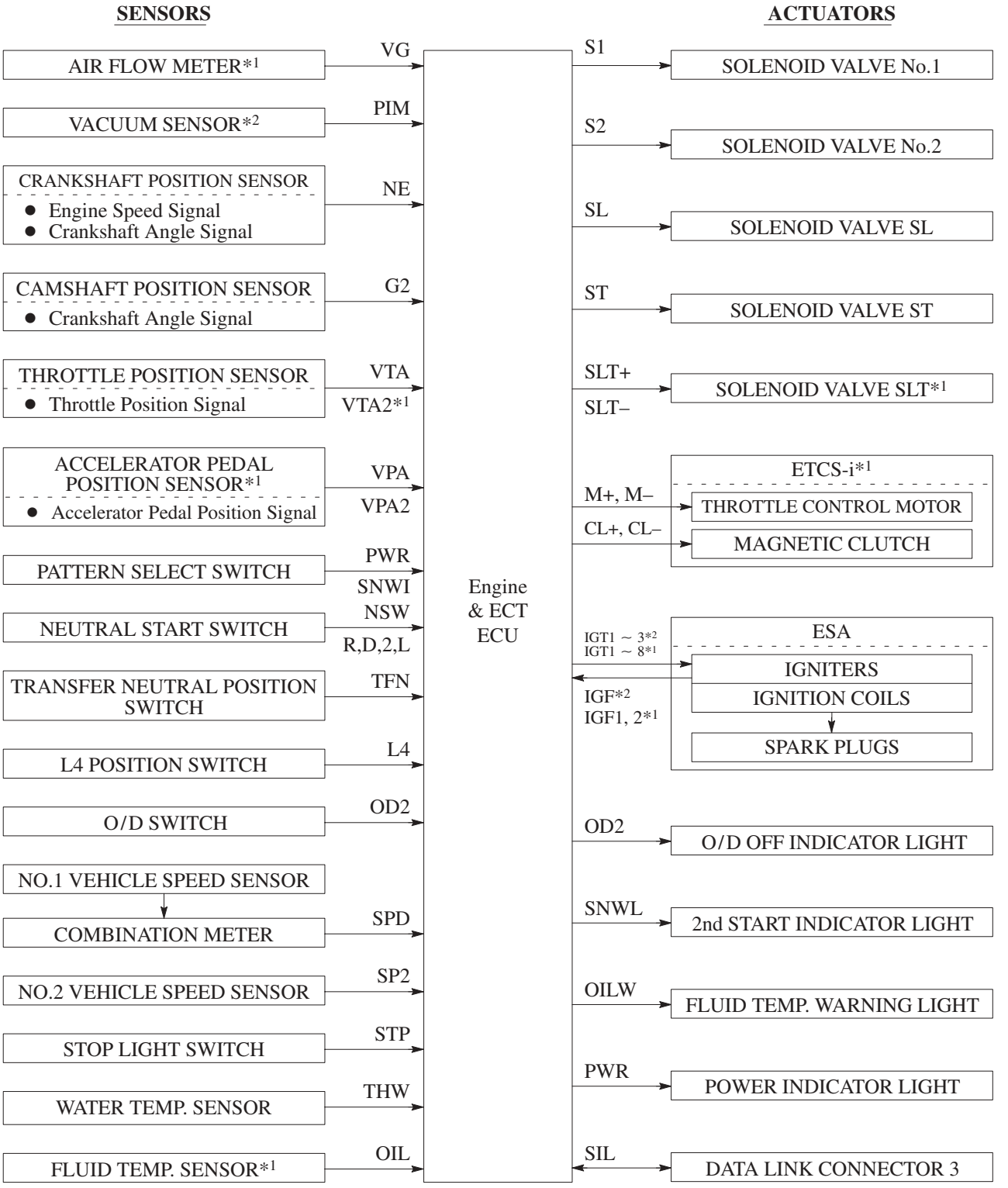
The electronic control system of the A442F automatic transmission consists of the controls listed below.

System	Function	1FZ-FE	2UZ-FE	1HZ, 1HD-T	1HD-FTE
Shift Timing Control	The optimum shift pattern is selected from 2 shift patterns in the engine & ECT ECU or ECT ECU* by the pattern select switch. The engine & ECT ECU or ECT ECU* sends current to the solenoid valve No.1 and/or No.2 based on signals from each sensor and shifts the gear.	○	○	○	○
Lock-Up Timing Control	The optimum lock-up pattern is selected from 2 lock-up patterns in the engine & ECT ECU or ECT ECU* by the pattern select switch. The engine & ECT ECU or 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	Based on the throttle opening angle, the engine & ECT ECU or ECT ECU* sends a signal to solenoid valve SLT to generate line pressure according to the engine output, to effect a smooth gear shift change.	–	○	–	○
"N" ro "D" Squat Control	When the shift lever is shifted from "N" to "D" range, the gear is temporarily shifted to 3rd and then to 1st to reduce vehicle squat.	○	○	○	○
Engine Torque Control	Retards the engine ignition timing temporarily to improve shift feeling during up or down shifting.	○	○	–	–
	Effects engine torque control in accordance with the fuel injection volume to reduce the shift shock.	–	–	–	○
2nd Start System	Enablilng the vehicle to take off in the 2nd gear and thus make it easy to take off on snowy, sandy or muddy terrain.	○	○	○	○
Self-Diagnosis	When the engine & ECT ECU or ECT ECU* detects the electrical circuit malfunctions, it flashes the O/D OFF indicator light to alert the driver. In addition, the engine & ECT ECU or ECT ECU* stores the codes of the malfunctions. Diagnosis code can be confirmed with flashing of O/D OFF indicator light.	○	○	○	○
	As the M-OBD system is supported, a hand-held tester can be connected to DLC3 to check the diagnostic codes.	○	○	–	–
Fail-Safe	Controls other normally operating components, permitting continued driving when malfunctions occur in the electrical circuit.	○	○	○	○

*: For Diesel Engine Model

2. Construction

The configuration of the electronic control system in the gasoline engine model's A442F is as shown in the following chart.



*1: Only 2UZ-FE Engine Model
*2: Only 1FZ-FE Engine Model

The configuration of the electronic control system in the diesel engine model's A442F is as shown in the following chart.

*1: Except 1HD-FTE Engine Model

*2: For 1HD-FTE Engine Model

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3. Construction and Operation of Main Components

Solenoid Valve SLT

The solenoid valve SLT is used to control the line pressure for the 2UZ-FE and the 1HD-FTE engine models. The basic construction and operation are the same as in the A343F's solenoid valve SLT. For details, see page 161.

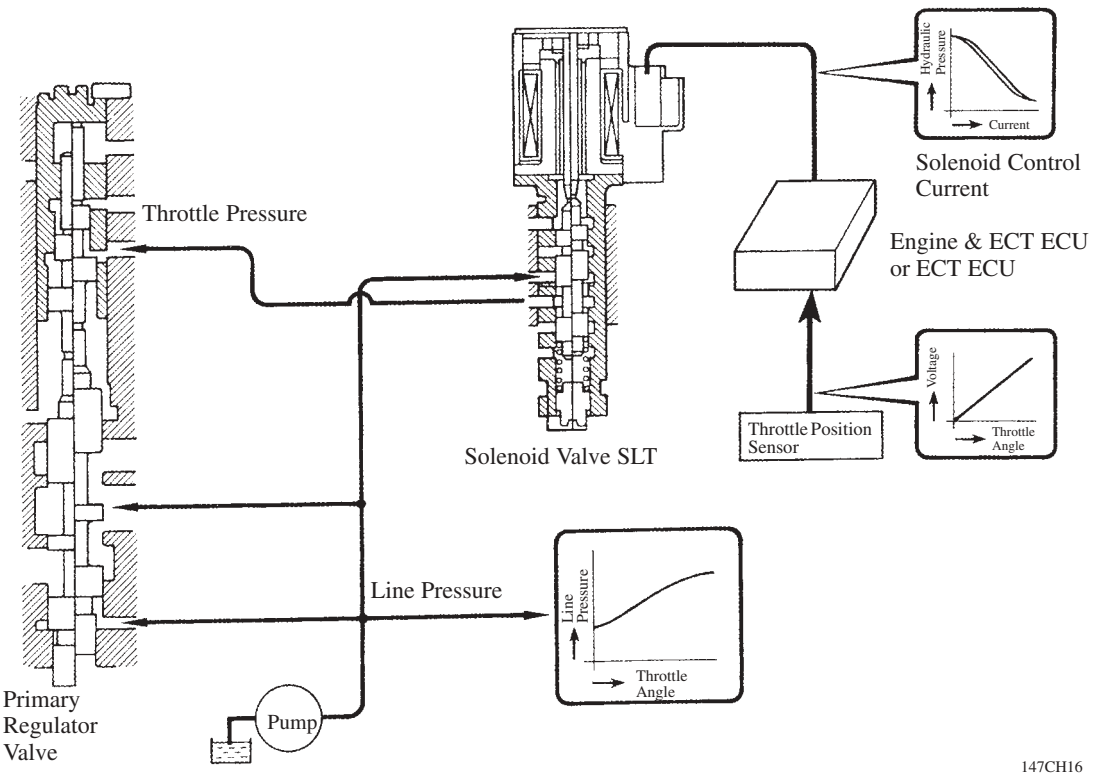
Fluid Temperature Sensor

A fluid temperature sensor is fixed onto in the valve body to detect the temperature of the fluid in the transmission of the 2UZ-FE and 1HD-FTE engine models. Finely tuned shift control has been realized by monitoring the fluid temperature.

4. Function of Engine & ECT ECU or ECT ECU

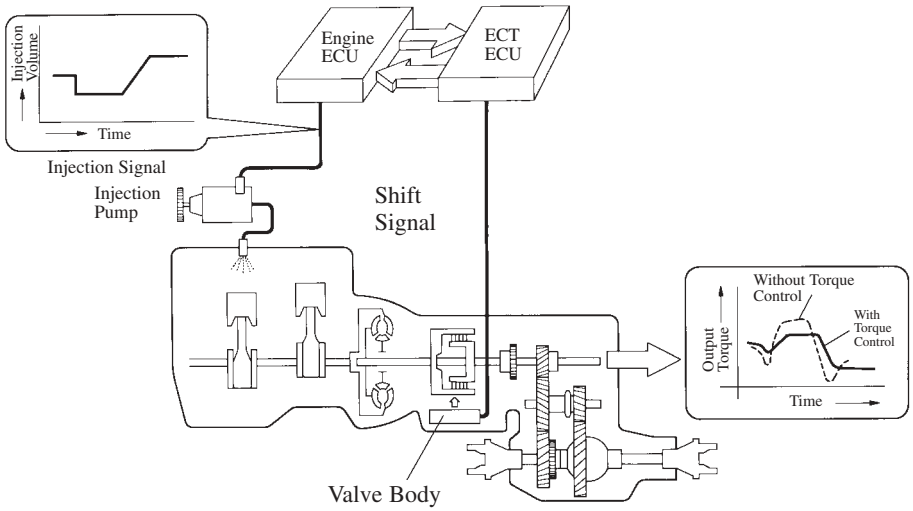
Line Pressure Control

The previous mechanical control, which consisted of a throttle cable, cam, and throttle valve, has been changed to an electronic control system that uses a solenoid valve SLT.
In order to obtain a predetermined line pressure characteristic according to the throttle position sensor (VTA) signal the engine & ECT ECU or 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.



Engine Torque Control (For 1HD-FTE Engine Model)

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 ECT ECU judges a gear shift timing according to signals from various sensors, it activates the shift control solenoid valves to perform gear shifting. When the gear shifting starts, the engine 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 shift change is performed smoothly.



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