6. Electronic Control System

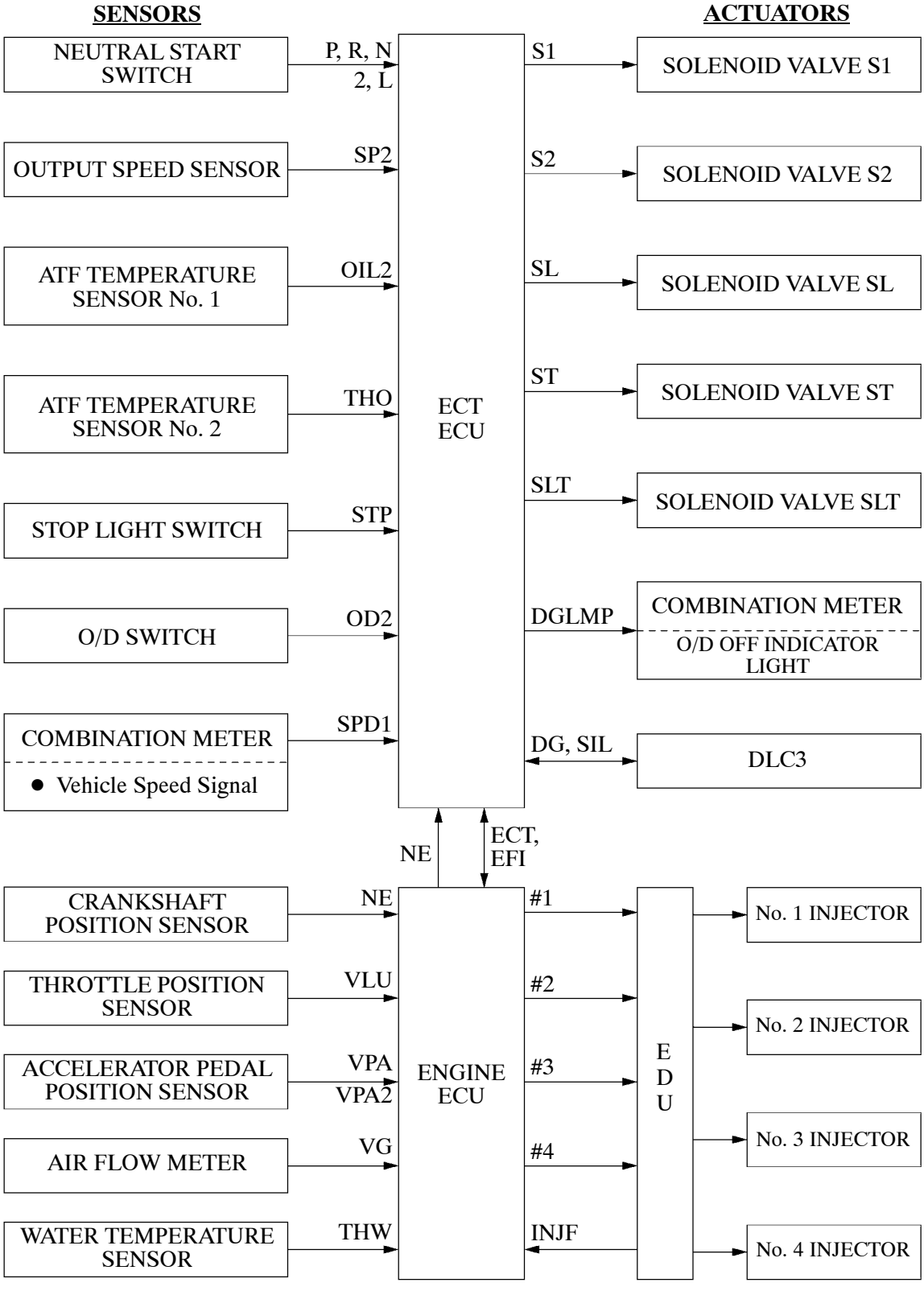
General

The electronic control system of the A444E automatic transmission consists of the control functions listed below.

System	Function
Shift Timing Control	The ECT ECU sends current to the solenoid valve S1 and/or S2 based on the signals from each sensor and shifts the gear.
Lock-up Timing Control	The 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 (See Page 83)	Actuates the solenoid valve SLT to control the line pressure in accordance with information from the ECT ECU and the operating conditions of the transmission.
“N” or “D” Squat Control	When the shift lever is shifted from the “N” to “D” position, the gear is temporarily shifted to the 2nd and then to the 1st to reduce vehicle squat.
Engine Torque Control	Temporarily reduces the fuel injection volume to restrict the output torque, thus ensuring the shift feel during upshifting or downshifting.
2nd Start System	Enabling the vehicle to take off in the 2nd gear and thus make it easy to take off on snowy, sandy or muddy terrain.
Diagnosis (See Page 84)	When the ECT ECU detects a malfunction, the ECT ECU makes a diagnosis and memorizes the failed section.
Fail-safe (See Page 84)	Even if a malfunction is detected in the sensors or solenoids, the ECT ECU effects fail-safe control to prevent the vehicle’s drivability from being affected significantly.

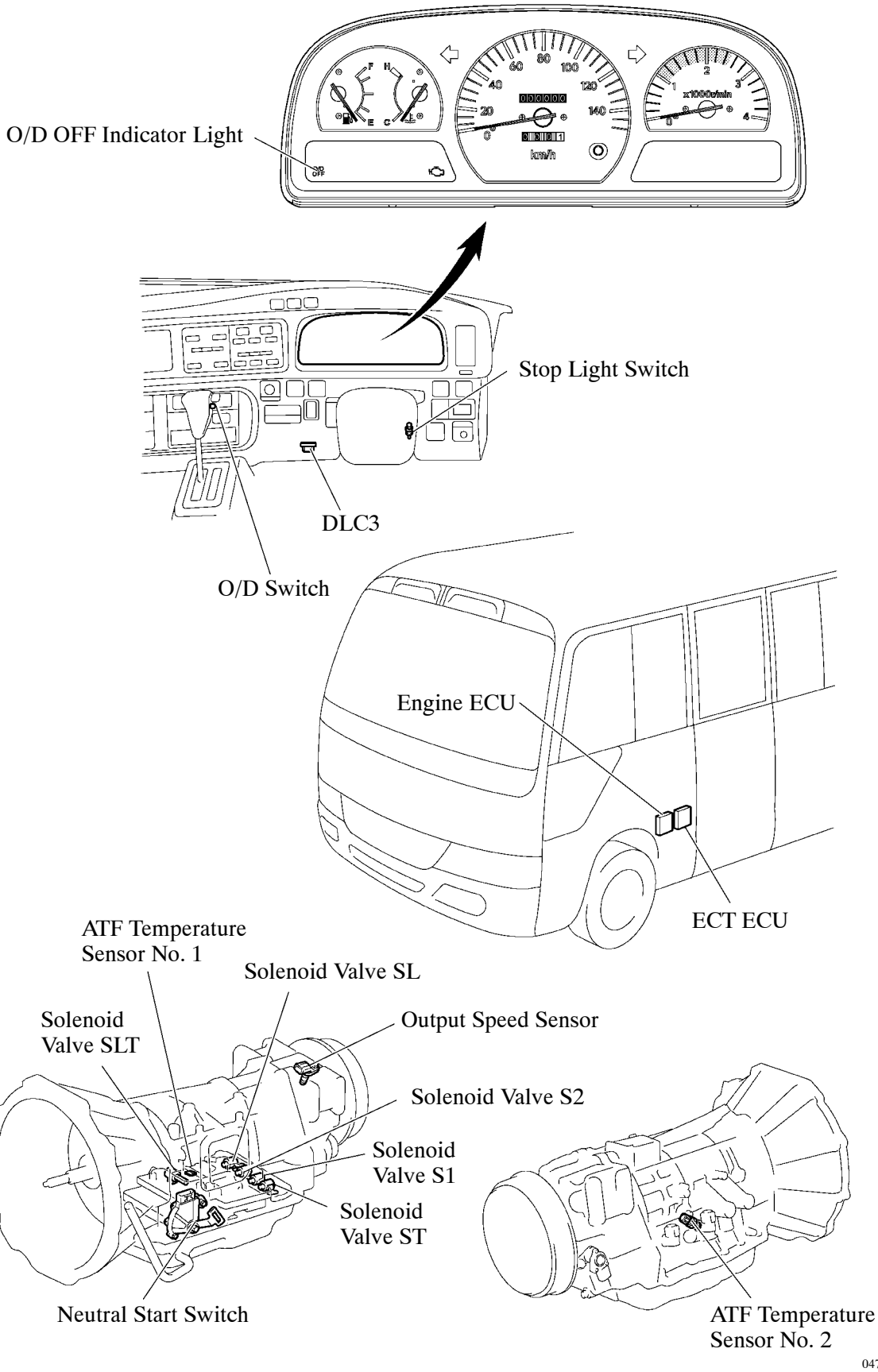
Construction

The configuration of the electronic control system in the A444E automatic transmission is as shown in the following chart.



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Layout of Main Components

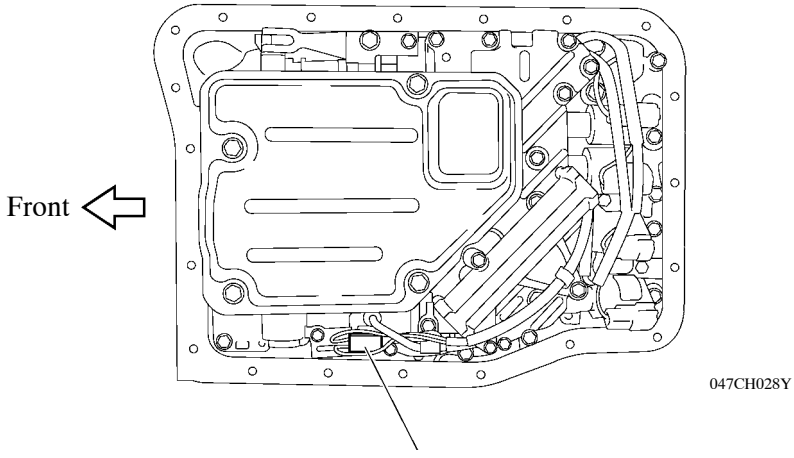


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Construction and Operation of Main Components

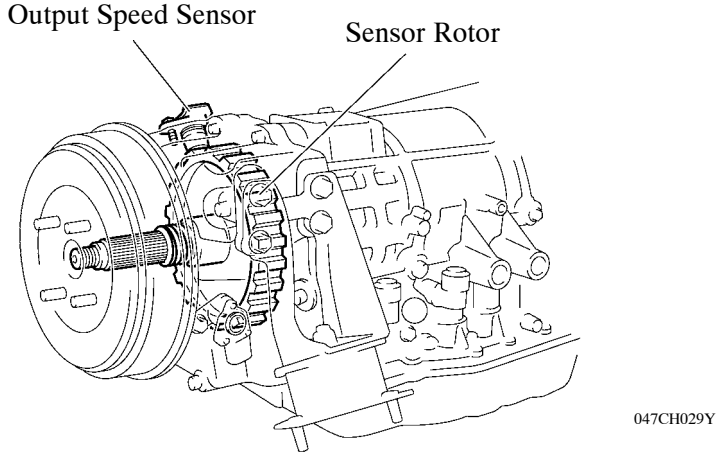
1) ATF Temperature Sensors No. 1 and No. 2

- An ATF temperature sensor No. 1, which is located in the lower part of the valve body, detects the ATF temperature. This sensor is used for revision of the pressure that is used to apply clutches and brakes in the transmission. This helps to ensure smooth shift quality.
- An ATF temperature sensor No. 2 is used as a basis for modifying the ECT shift timing control when the AFT temperature is high.



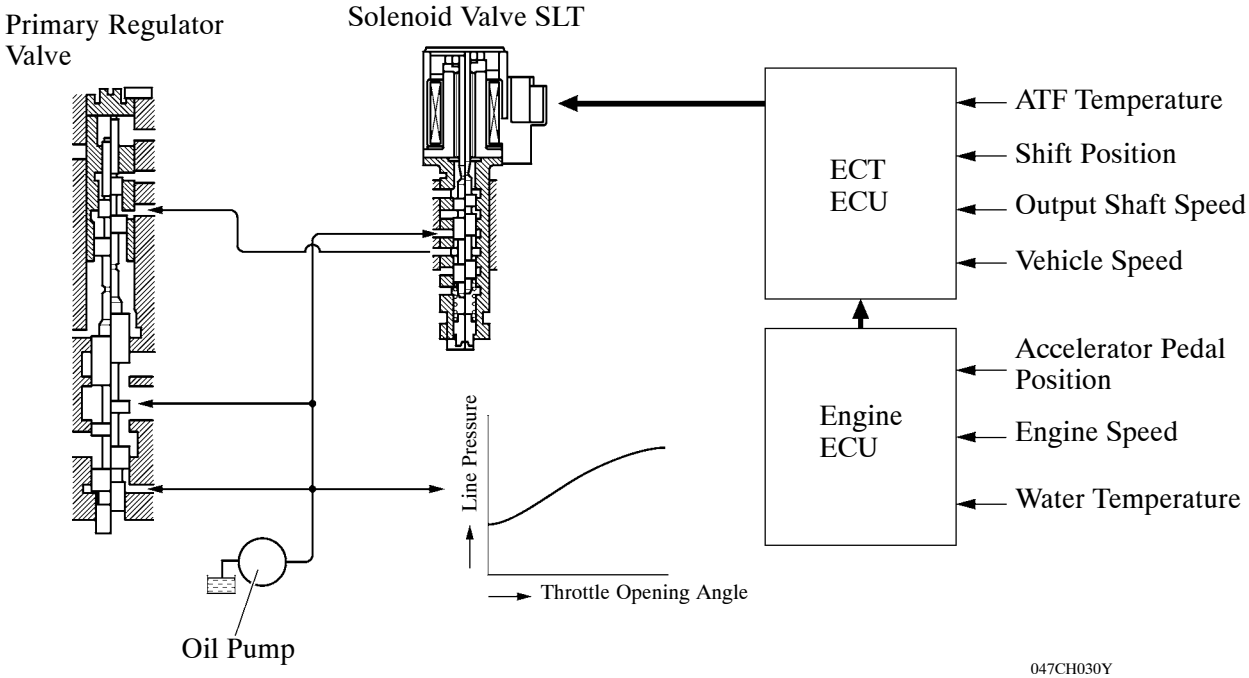
2) Output Speed Sensor

The output speed sensor mounted on the transmission extension housing detects the speed of the transmission output shaft rotation.



Line Pressure Control

In order to obtain a predetermined line pressure characteristic according to the each sensor signal, the 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, thus realizing smoother shift characteristics.



Diagnosis

- When the ECT ECU detects a malfunction, the ECT ECU makes a diagnosis and memorizes the failed section. Furthermore, the OD OFF indicator light in the combination meter illuminates or blinks to inform the driver.
- At the same time, the DTCs (Diagnosis Trouble Codes) are stored in memory.

For details, see the Coaster Repair Manual Supplement (Pub. No. RM0471E).

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
ATF Temperature Sensors No. 1 and No. 2	During a malfunction of the ATF temperature sensors No. 1 and No. 2, the system effects shift control by fixing the ATF temperature at 100°C (196°F).
Output Speed Sensor	During an output speed sensor malfunction, shift control is effected through the speedometer signal (SPD1) or engine speed signal (NE).
Solenoid Valves S1, S2 and ST	The current to the failed solenoid valve is cut off and control is effected by operating the other solenoid valves. Shift control is effected depending on the failed solenoid as described in the table below.
Solenoid Valve SL	During a solenoid valve SL malfunction, the current to the solenoid is stopped. Because this stops lock-up control, then 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.

Shift Lever Position	Normal			Solenoid Valve S1 Malfunction			Solenoid Valve S2 Malfunction			Solenoid Valves S1 and S2 Malfunction		
	Solenoid Valve		Gear	Solenoid Valve		Gear	Solenoid Valve		Gear	Solenoid Valve		Gear
	S1	S2		S1	S2		S1	S2		S1	S2	
D	ON	OFF	1st	×	OFF ↓ ON	3rd	ON	×	1st	×	×	4th
	ON	ON	2nd	×	ON		ON ↓ OFF	×	4th	×	×	
	OFF	ON	3rd	×	ON		OFF	×		×	×	
	OFF	OFF	4th	×	OFF	4th	OFF	×		×	×	
2	ON	OFF	1st	×	OFF ↓ ON	3rd	ON	×	1st	×	×	3rd
	ON	ON	2nd	×	ON		ON	×	3rd	×	×	
	OFF	ON	3rd	×	ON		OFF	×		×	×	
L	ON	OFF	1st	×	OFF	1st	ON	×	1st	×	×	1st
	ON	ON	2nd	×	ON	2nd	ON	×		×	×	