■ DETAILS

1. System Control

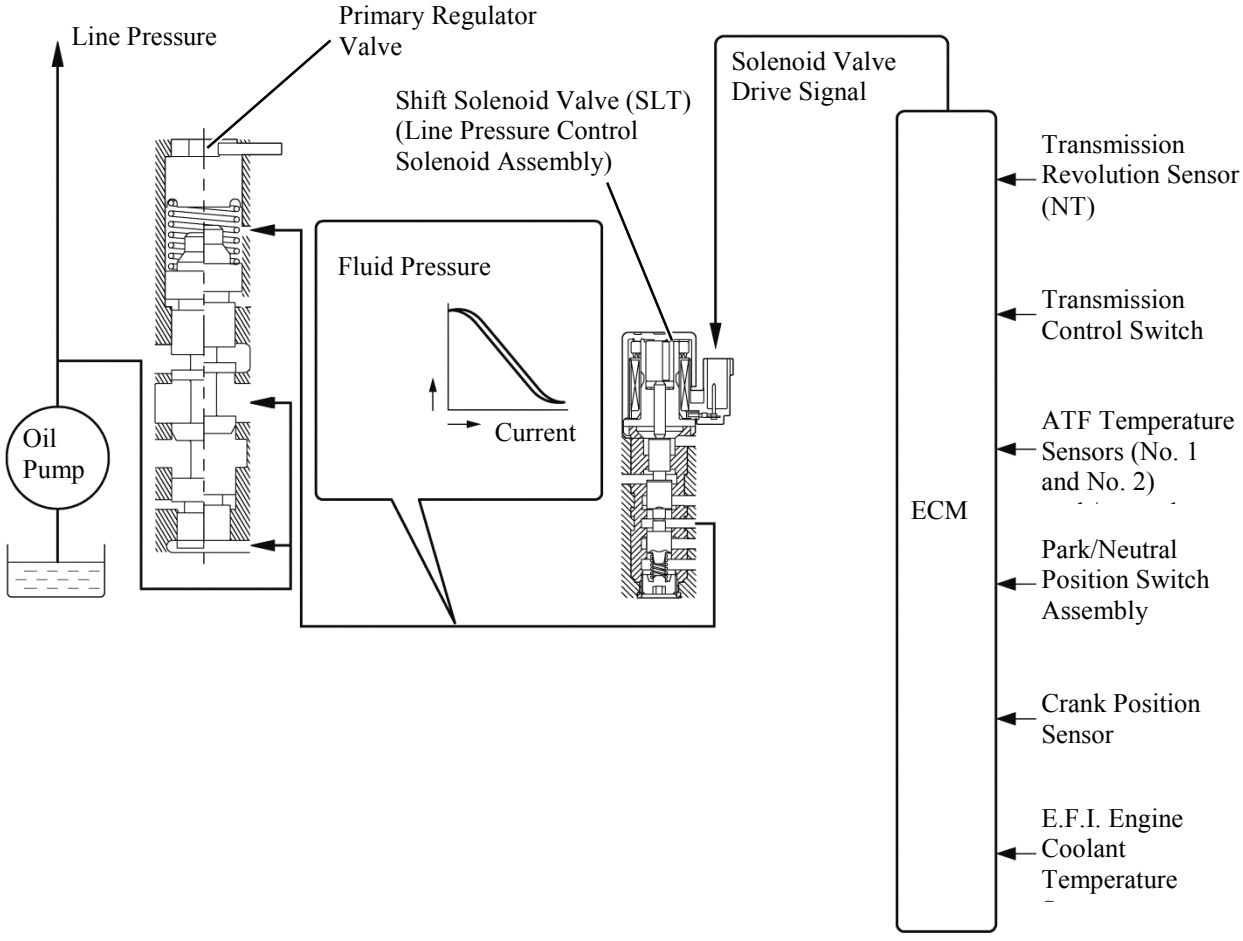
►**Electronic Control of Automatic Transmission**◄
(Models with 1GD-FTV Engine)

Control	Function
Shift Timing Control	The ECM sends current to shift solenoid valve SL1 (SL1, SL2, SL3 and SL4) and/or shift solenoid valve DSL (SL) based on signals from various sensors in order to shift the gears.
Line Pressure Control	Actuates the shift solenoid valve (SLT) (line pressure control solenoid assembly) to control the line pressure in accordance with information from the ECM and the operating conditions of the transmission.
Clutch Pressure Optimal Control	The shift solenoid valve SL1 (SL1) and shift solenoid valve (SLT) (line pressure control solenoid assembly) minutely control the clutch pressure in accordance with the engine output and driving conditions of the transmission.
Clutch to Clutch Pressure Control	By utilizing pressure outputted from shift solenoid valve SL1 (SL1, SL2, SL3, and SL4) to be controlled based on drive signals sent from the ECM, it has been realized that each of clutch and brake hydraulic pressures are controlled directly and independently.
Vehicle Lift Control	To restrain the upward movement of the vehicle when the shift lever is moved from D to N, the clutch release speed has been optimized.
Shift Down Control	In order to ensure a smooth shift feel during downshifting to accelerate the vehicle, the hydraulic passages and control have been optimized.
Engine Torque Control	Fuel injection volume temporarily to improve shift feeling while upshifts or downshifts occur.
Coast Downshift Control	To prevent engine speed from decreasing and thereby maintain fuel cut, the ECM performs downshifts before fuel cut ends.
Lock-up Timing Control	The ECM sends current to the shift solenoid valve (SLU) (line pressure control solenoid assembly) based on signals from various sensors and engages or disengages the lock-up clutch.
Flex Lock-up Clutch Control	Controls the shift solenoid valve (SLU) (line pressure control solenoid assembly), provides an intermediate mode for when the lock-up clutch is between on and off, and increases the operating range of the lock-up clutch to improve fuel economy.
Artificial Intelligence-shift Control (AI-shift Control)	Based on the signals from various sensors, the ECM determines the road conditions and the intention of the driver. Thus, an appropriate shift pattern is automatically determined, thus improving drivability.
Multi-mode Automatic Transmission	The ECM appropriately controls the automatic transmission in accordance with the shift range position selected while the shift lever is in S.

- Line Pressure Control

1) In order to obtain a predetermined line pressure characteristic in accordance with each sensor signal, the ECM activates the shift solenoid valve (SLT) (line pressure control solenoid assembly) to regulate the throttle pressure.
2) This makes it possible for the primary regulator valve to precisely and minutely control the line pressure in accordance with the engine output, thus providing smoother shift characteristics.

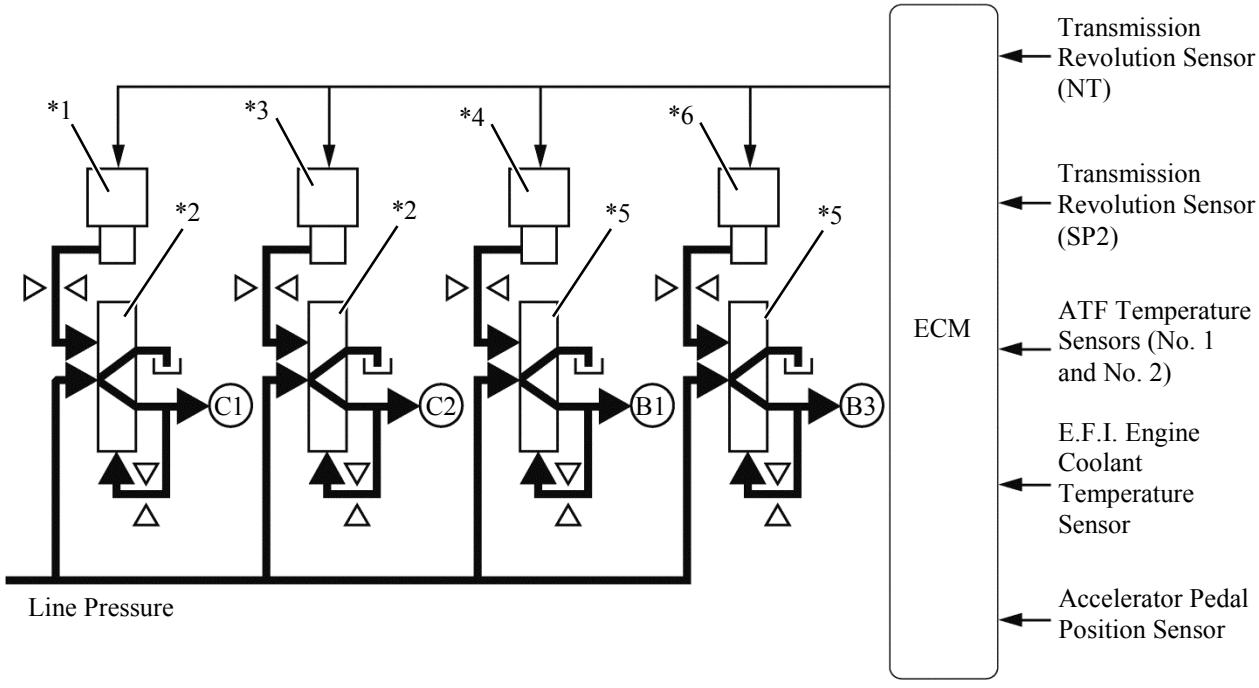
►Models with 1GD-FTV Engine◄



- Clutch to Clutch Pressure Control

1) By adopting a clutch-to-clutch shift control without using 1-way clutches in the 2nd or higher gears, a light, compact 6-speed automatic transmission has been provided.
2) By utilizing pressure outputted from shift solenoid valve SL1 (SL1, SL2, SL3, and SL4) to be controlled based on drive signals sent from the ECM, it has been realized that each of clutch and brake hydraulic pressures are controlled directly and independently.

►Models with 1GD-FTV Engine◄



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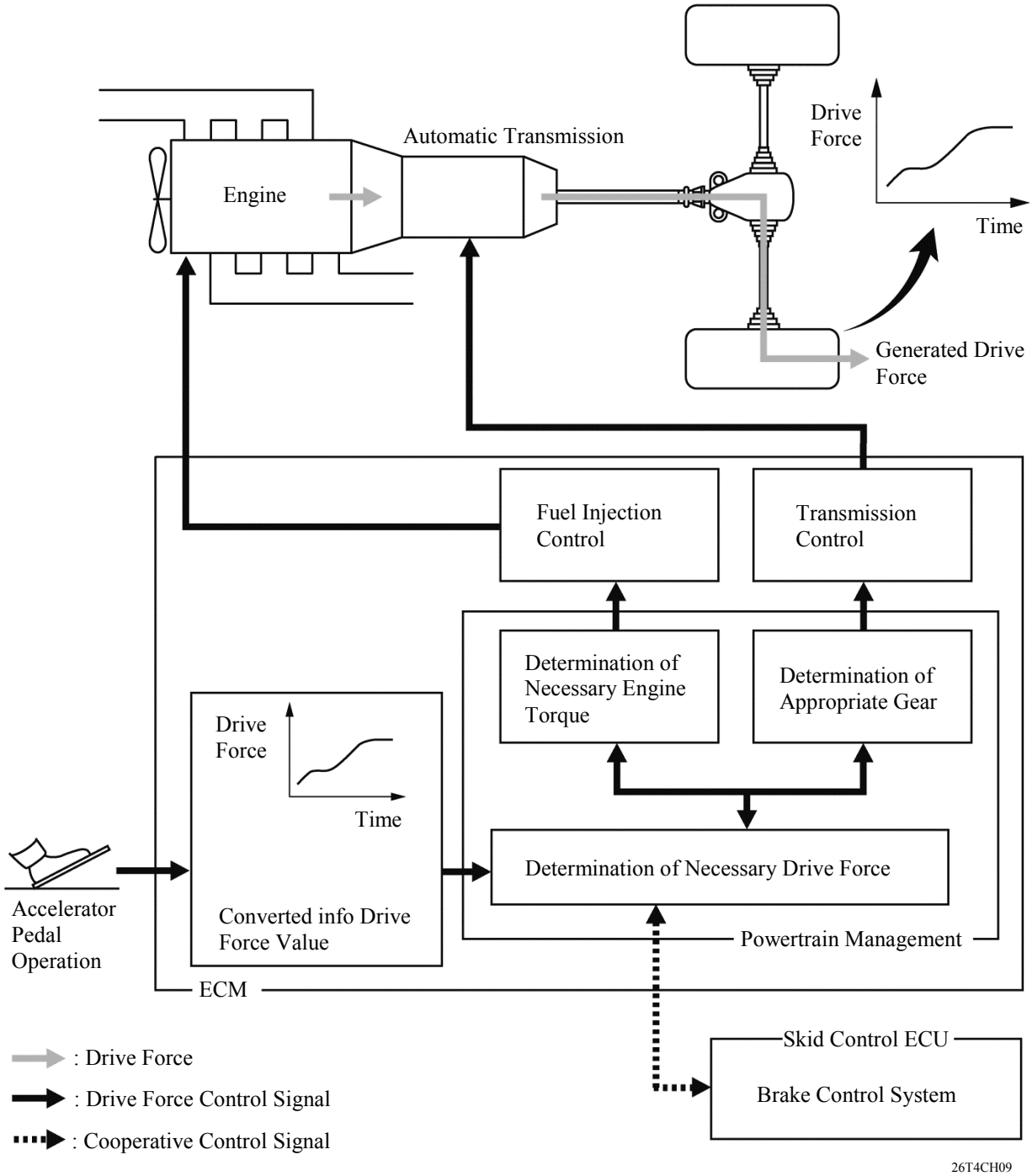
Text in Illustration

*1	Shift Solenoid Valve SL1 (SL1)	*2	Clutch Control Valve
*3	Shift Solenoid Valve SL1 (SL2)	*4	Shift Solenoid Valve SL1 (SL3)
*5	Brake Control Valve	*6	Shift Solenoid Valve SL1 (SL4)

• Powertrain Cooperative Control

1) Driving Response and Acceleration Management System (DRAMS) is used for this vehicle. This system integrally controls the engine, transmission and other driving related controls in order to enhance vehicle maneuverability and driving comfort, as well as provides optimal drive feeling as a whole including the behavior of the vehicle while taking into account drivers' needs and environment.
2) By integrally controlling the engine and automatic transmission using this system where acceleration maneuvers will be replaced with driving force that the driver demands, quick response and a high quality driving feel in accordance with the driver's intentions are achieved, such as when accelerating or decelerating or during gear shifts to provide demanded driving force even for smoother shift transient and when starting or decelerating.

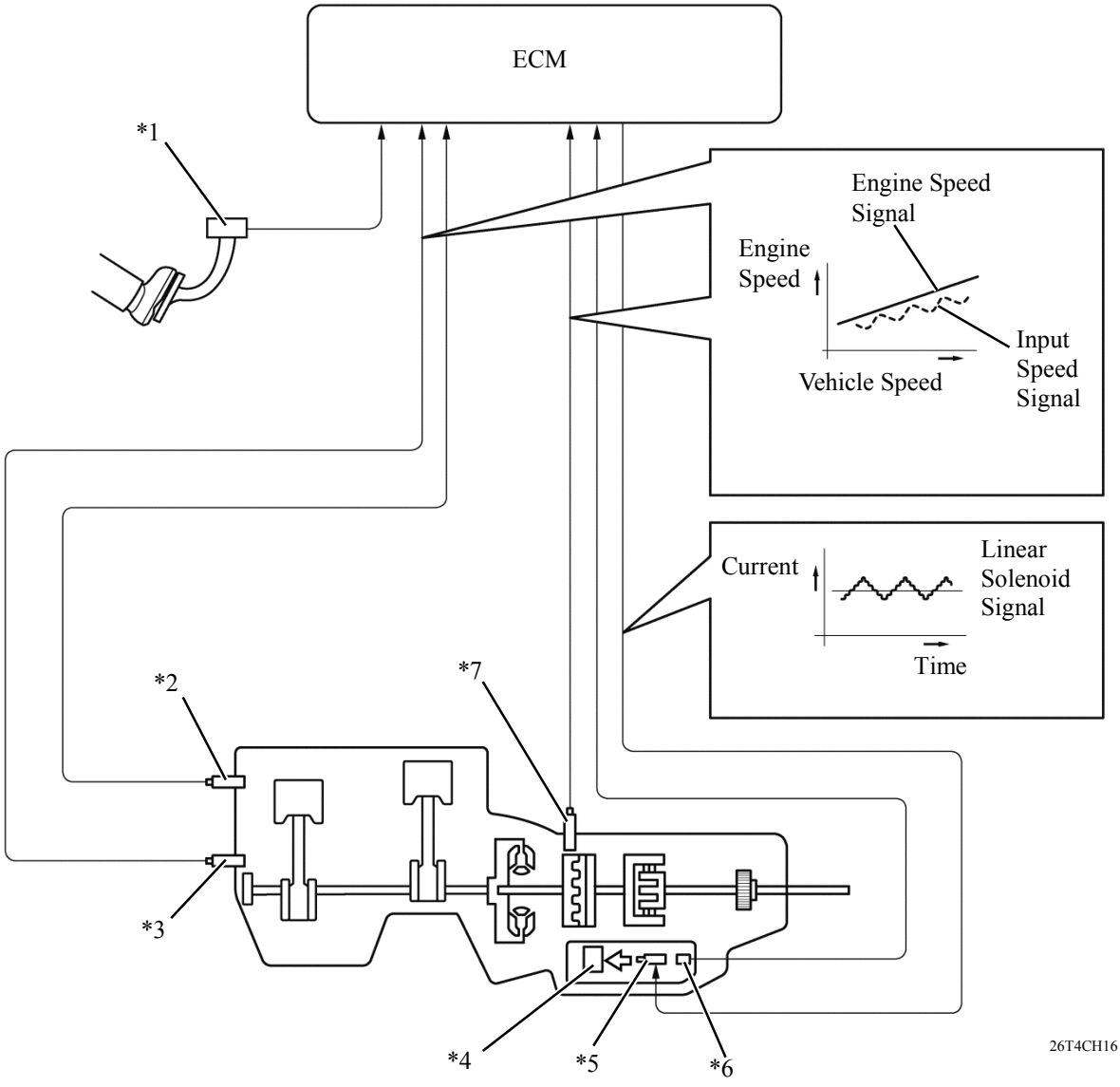
►Models with 1GD-FTV Engine◄



• Flex Lock-up Clutch Control

1) During acceleration, partial control of the power transmission between the lock-up clutch and torque converter greatly boosts transmission efficiency in accordance with the driving conditions, improving fuel economy.
2) Even when the vehicle is decelerating (the accelerator pedal is released), flex lock-up clutch control operates. As a result, the fuel cut area is expanded and fuel economy is improved.
3) By allowing flex lock-up clutch control to continue operating during gearshifts, smooth torque transmission is obtained. As a result, fuel economy and drivability are improved.
4) For flex lock-up clutch control, H infinity (H∞) control theory is used to achieve a high level of system stability and response to various characteristic changes.

►Models with 1GD-FTV Engine◄



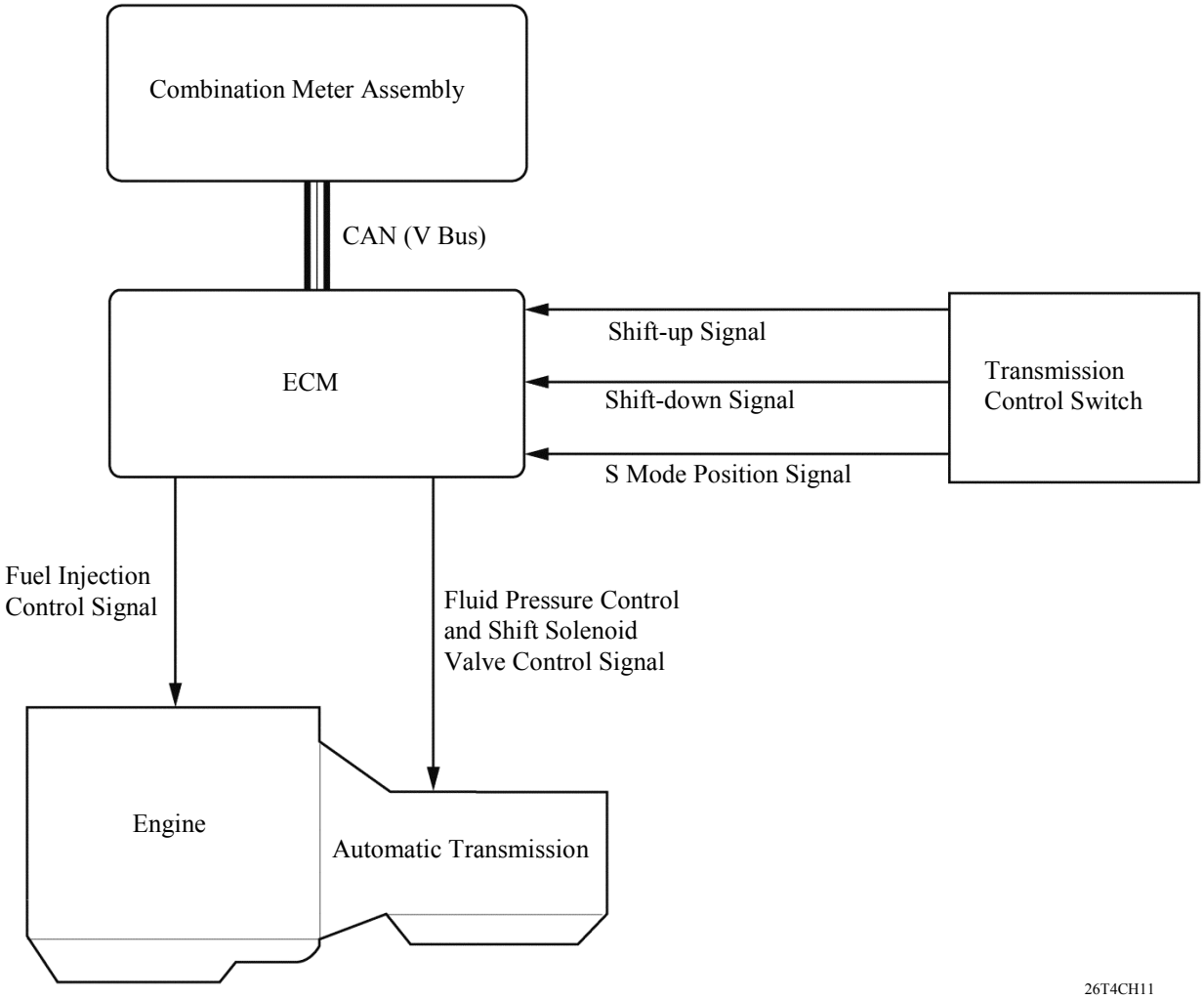
Text in Illustration

*1	Accelerator Pedal Position Sensor	*2	E.F.I. Engine Coolant Temperature Sensor
*3	Crank Position Sensor	*4	Lock-up Control Valve
*5	Shift Solenoid Valve (SLU) (Lock Up Control Solenoid Assembly)	*6	ATF Temperature Sensors (No.1 and No.2)
*7	Transmission Revolution Sensor (NT)	-	-

- Multi-mode Automatic Transmission

1) The driver can select the desired gear step by moving the shift lever "+" (forward) or to "-" (backward) while the shift lever is in S (6-speed sequential shiftmatic mode). Thus, the driver is able to change gear steps with a manual-like feel.
2) 6-speed sequential shiftmatic mode can be selected from normal driving mode by moving the shift lever to S. The driver can change the gear step by selecting it using the shift lever.

►Models with 1GD-FTV Engine◄

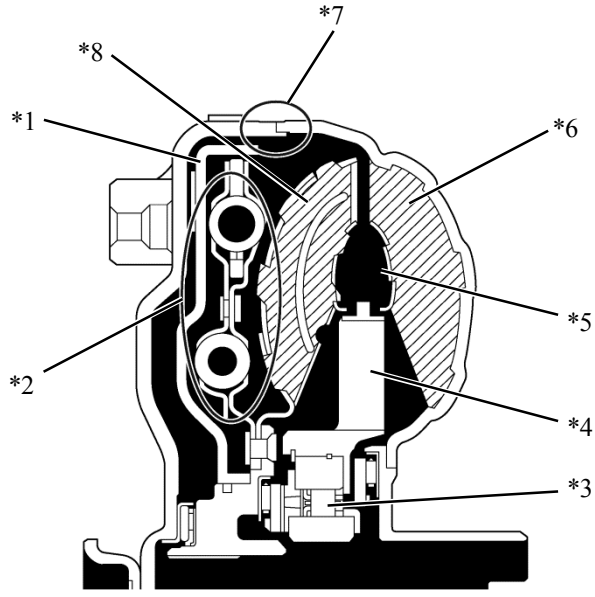


2. Construction

- Torque Converter Assembly

A high-capacity torque converter has been employed for vehicles equipped with the 1GD-FTV engine. Diesel engines have been accommodated by optimizing the fluid coupling section and damper section.

►Models with 1GD-FTV Engine◄



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▸ Text in Illustration ◂

*1	Lock-up Clutch	*2	Lock-up Damper
*3	1-way Clutch	*4	Stator
*5	Fluid Coupler	*6	Pump Impeller
*7	Laser Welded Portion	*8	Turbine Runner