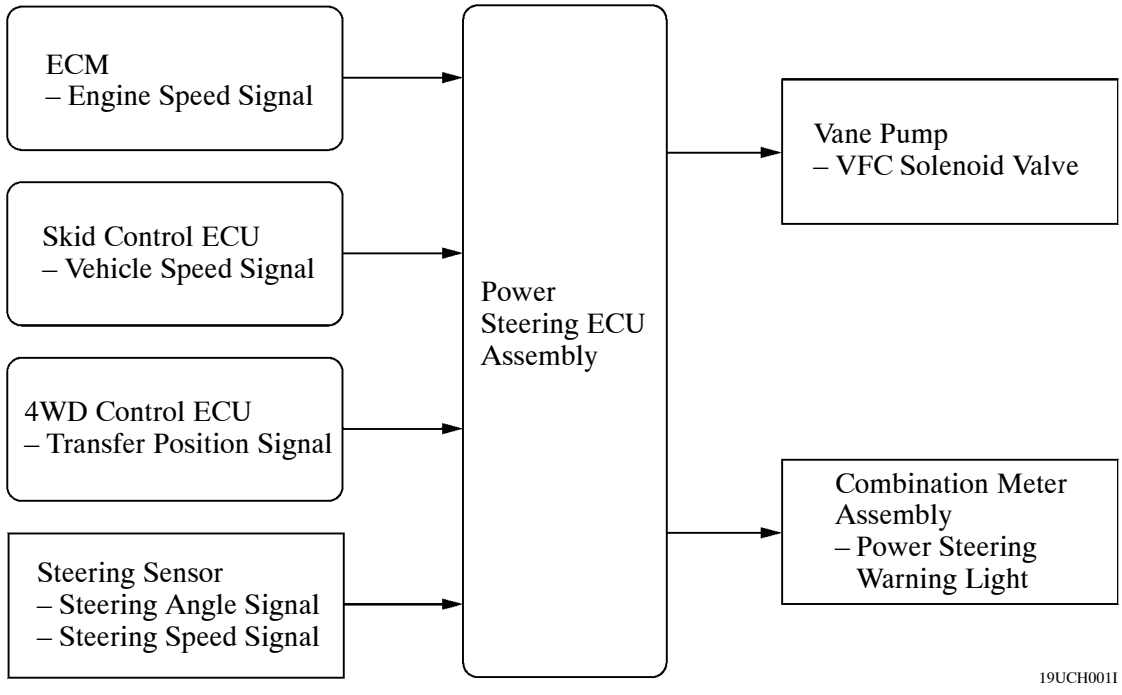
STEERING

■VARIABLE FLOW CONTROL (VFC) POWER STEERING

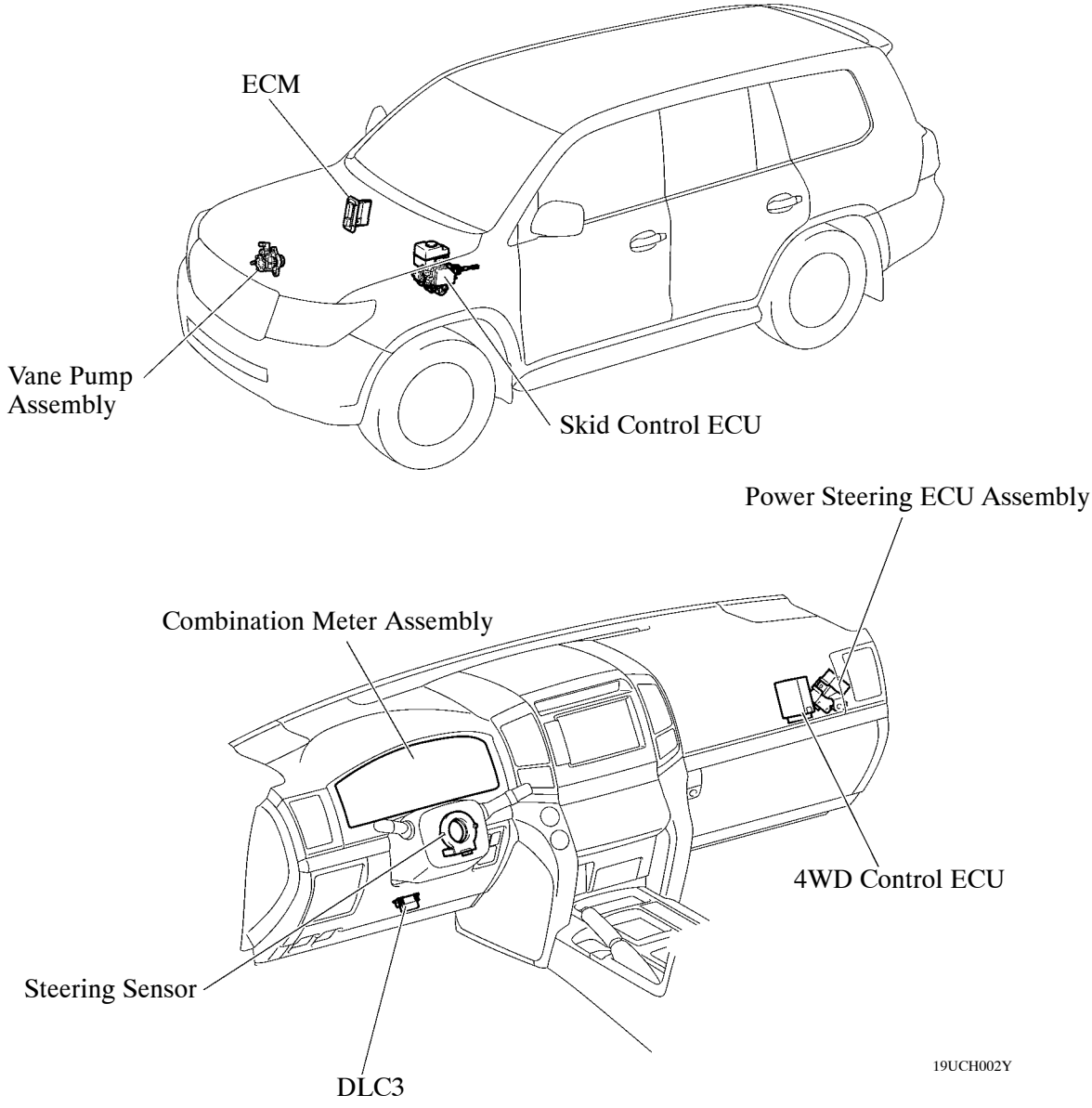
1. General

The VFC power steering is provided with a solenoid valve in the vane pump, which is controlled by the power steering ECU. The solenoid valve controls the discharge flow rate of the power steering fluid in accordance with the operating conditions of the steering wheel, vehicle speed, and engine speed. Thus, it reduces the load on the engine applied by the actuation of the vane pump, and improves fuel economy.

2. System Diagram

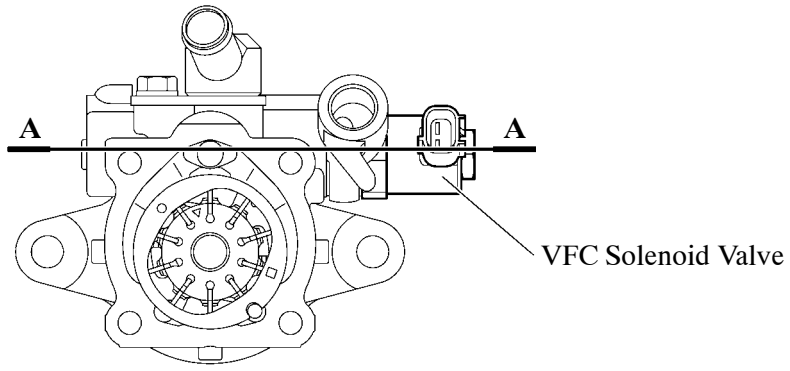


3. Layout of Main Components

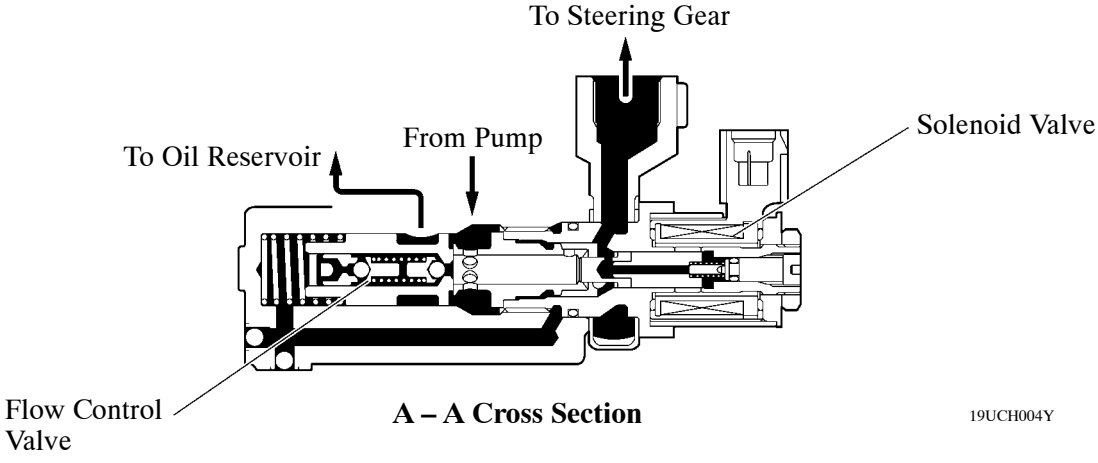


4. Vane Pump

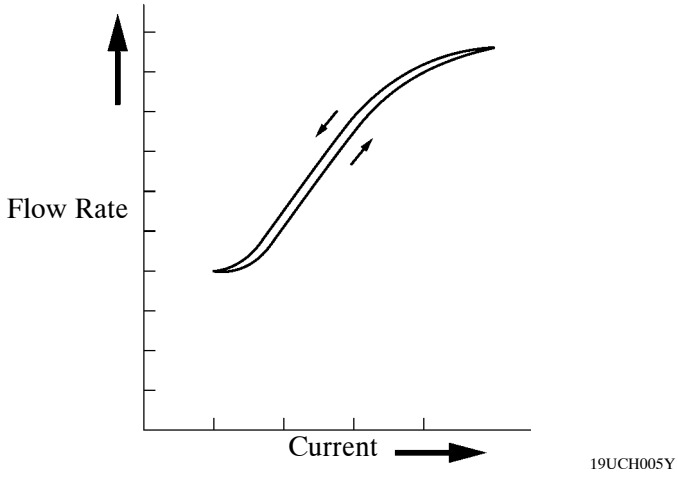
- A compact and lightweight vane pump is used.
- A VFC solenoid valve is provided to control the discharge flow rate.



Vane Pump Assembly 19UCH003Y



A – A Cross Section 19UCH004Y



19UCH005Y

Flow Rate Characteristic of Solenoid Valve

NF

5. System Operation

The power steering ECU assembly effects the following controls:

Control		Function
Flow Rate Control		It effects control in accordance with the vehicle speed, steering angle, and steering speed conditions. It effects assist control when the steering wheel is being operated and standby control when the steering wheel is not being operated. Thus, it prevents the vane pump from discharging excessive flow, which lightens the load on the engine and improves fuel economy. Control characteristics have been achieved, which prevent the discharge flow rate from changing as much as possible in accordance with changes of the steering speed and vehicle speed when the transfer position L4 is selected. Also, the following corrections are made to determine an optimal discharge flow rate.
	Steering Angle Correction	Determines the discharge flow rate in accordance with driving conditions such as steering at standstill, cornering, or straightline driving.
	Engine Speed Correction	Determines the discharge flow rate in accordance with the engine speed.
Fail-safe		If the steering control ECU detects a malfunction in the VFC power steering system, it makes the steering feel heavier than normal, in order to inform the driver of a system failure.