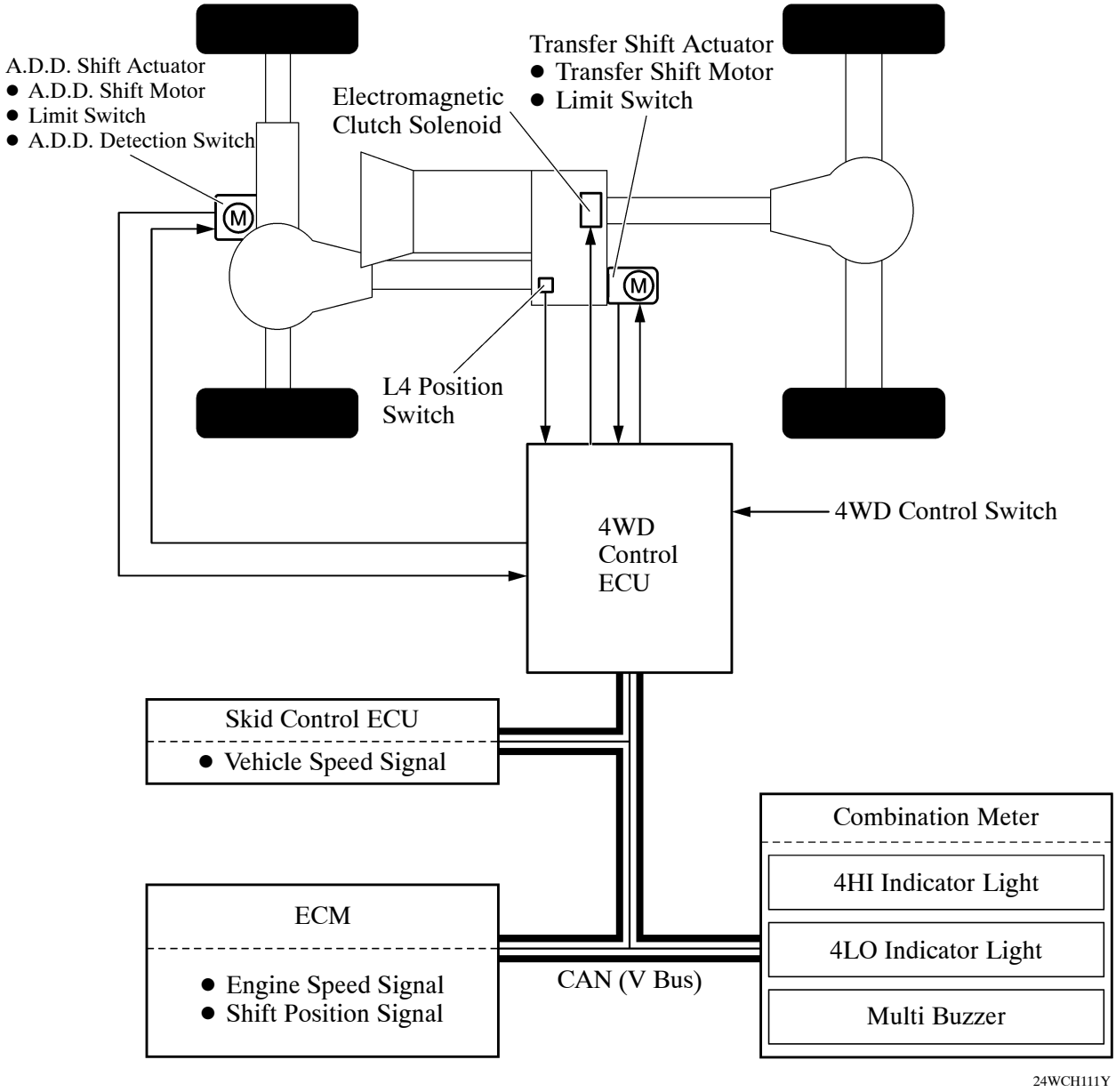
■4WD CONTROL SYSTEM

1. General

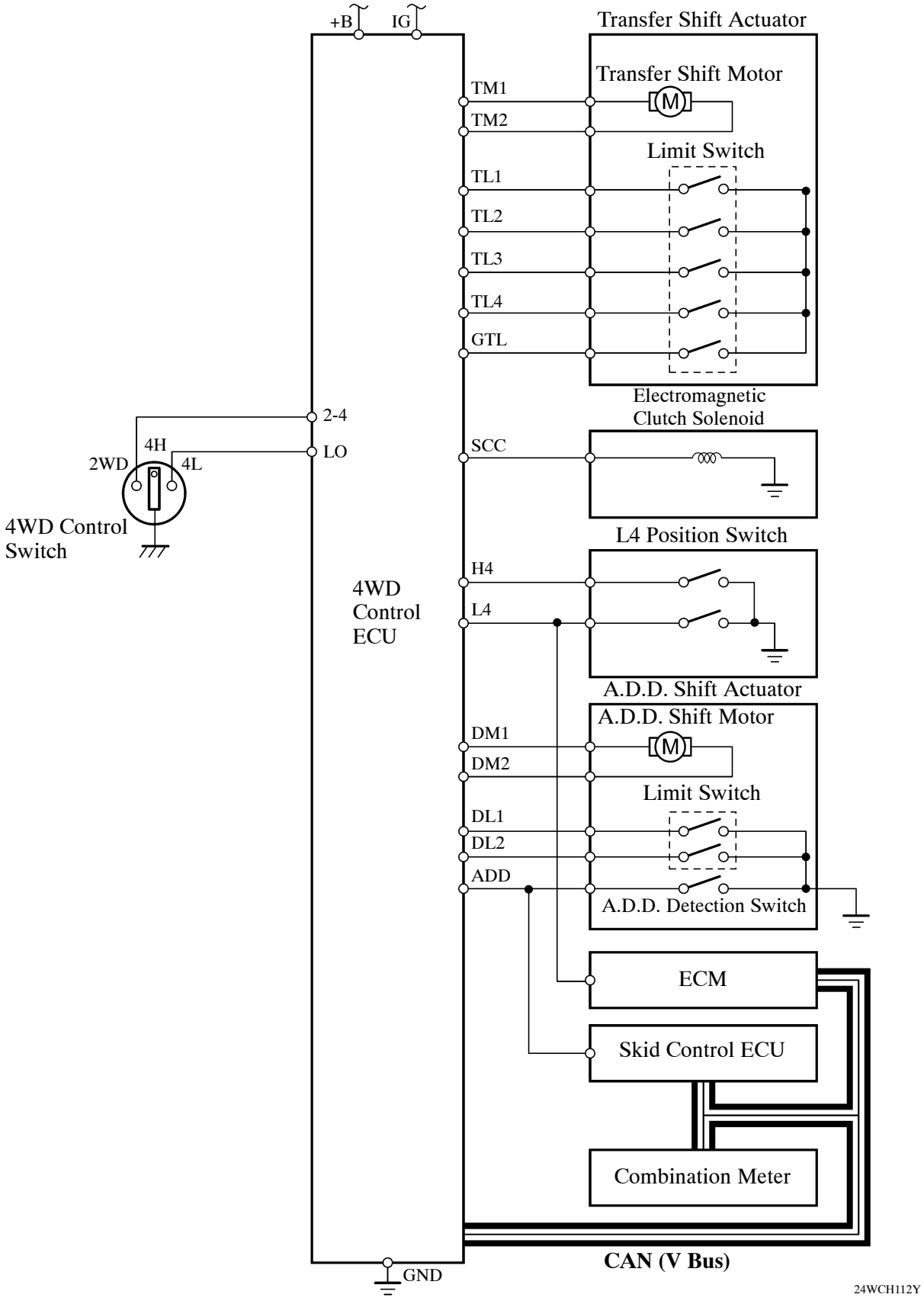
- The 4WD system used allows the driver to select the appropriate mode from among the 3 drive modes by utilizing the 4WD control switch. In addition, the Automatic Disconnecting Differential (A.D.D.) operates after the 4WD control ECU detects that the transfer shift actuator is in the 4H position by receiving a signal from the limit switch of the transfer shift actuator.
- Through the 4WD control switch signal, the 4WD control ECU actuates the electromagnetic clutch solenoid, the shift motor in the transfer shift actuator and the shift motor in the A.D.D. shift actuator.

2. System Diagram

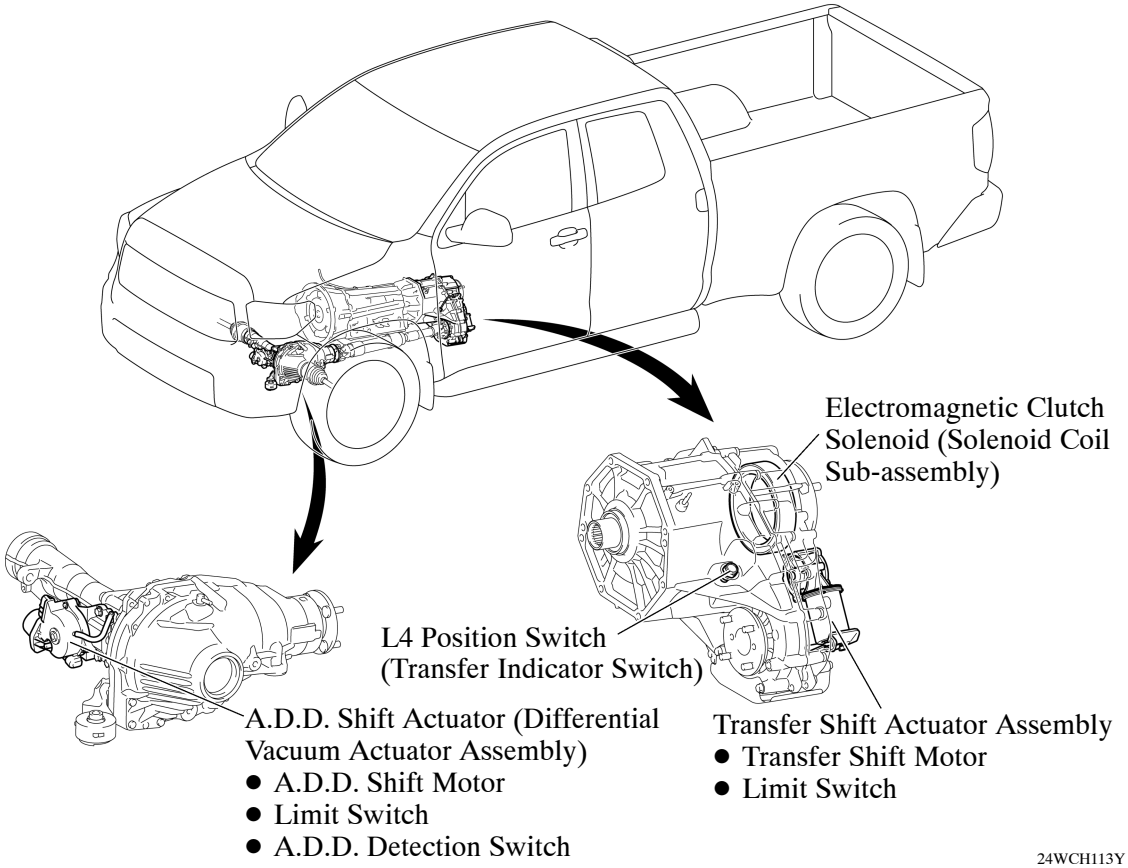


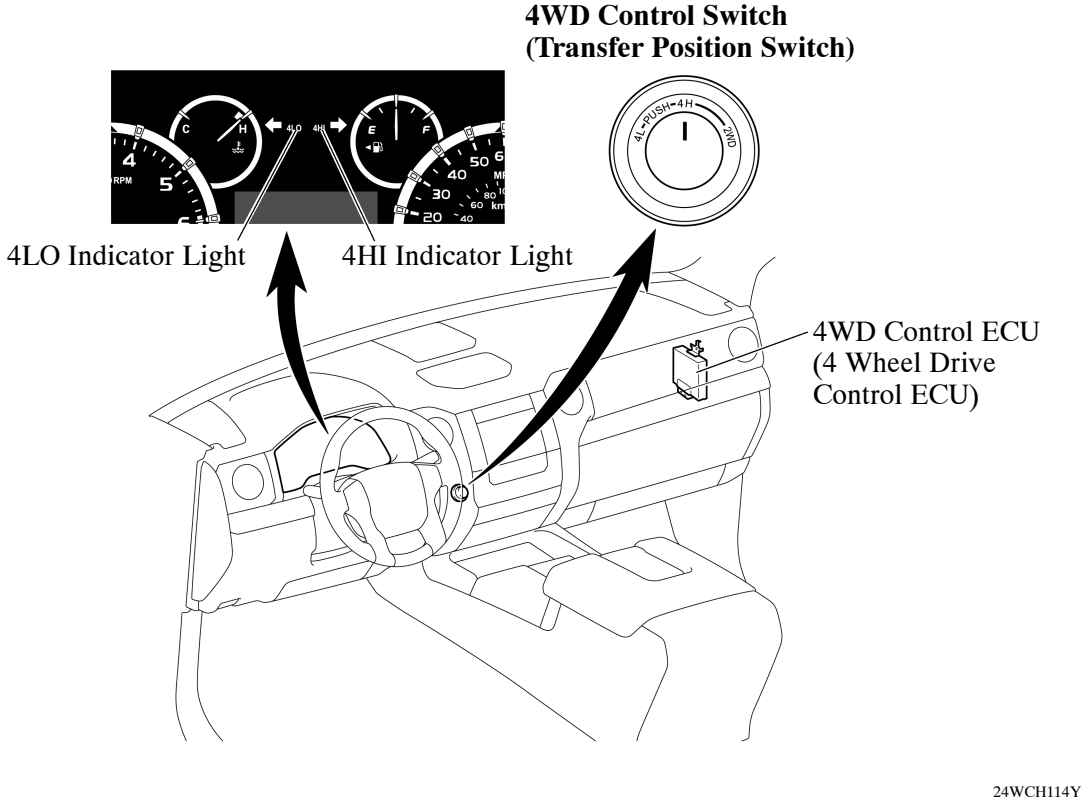
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3. Wiring Diagram



4. Layout of Main Components



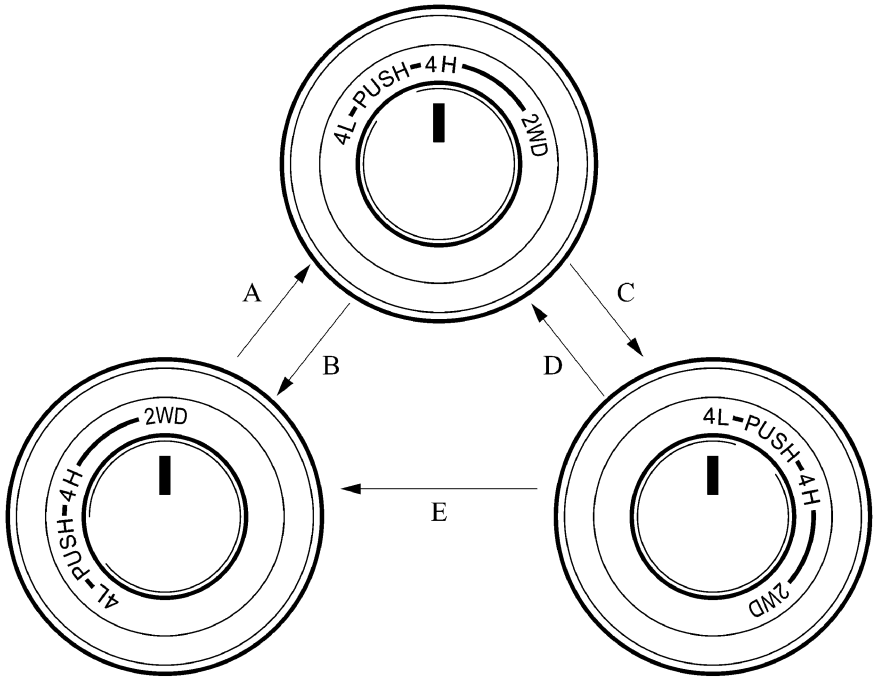


5. System Operation

General

- The drive mode switching pattern of this system is as shown in the illustration below. The system operation of each switching pattern is explained starting from the next page.
- 2WD-4WD switching (switching patterns A and B) is available while driving.
- High-low switching of the transfer gear ratio (switching patterns C, D and E) is available only when the vehicle is stationary, the brake pedal is held down, and the shift lever is in N.
- When the 4WD control ECU detects that the 4WD control switch has been operated while a mode switching restriction condition is satisfied, it prohibits shifting and informs the driver by blinking the 4HI indicator light or 4LO indicator light and sounding the multi buzzer in the combination meter.

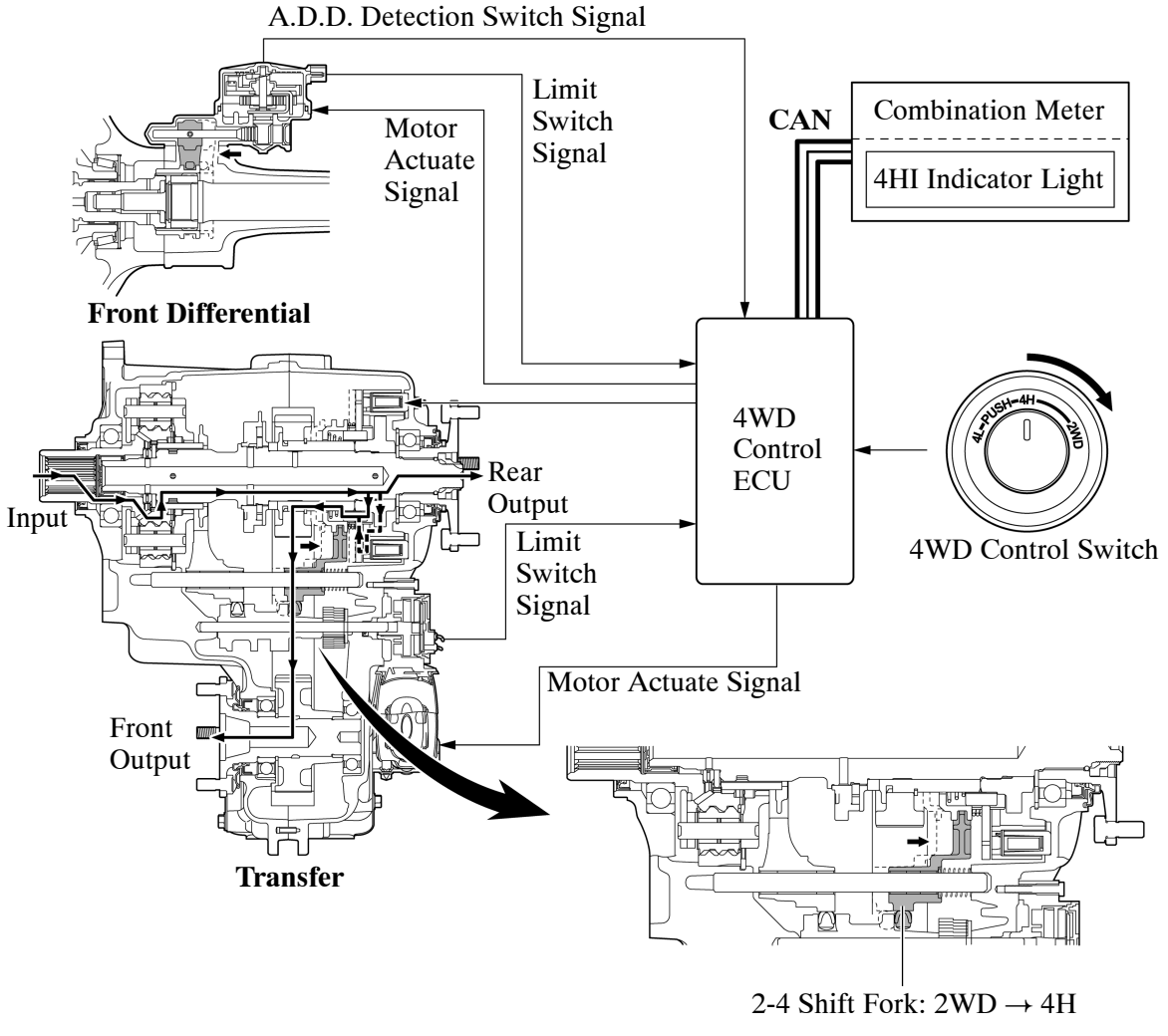
▶ Drive Mode Switching Pattern ◀



Switching Pattern A (2WD → 4H)

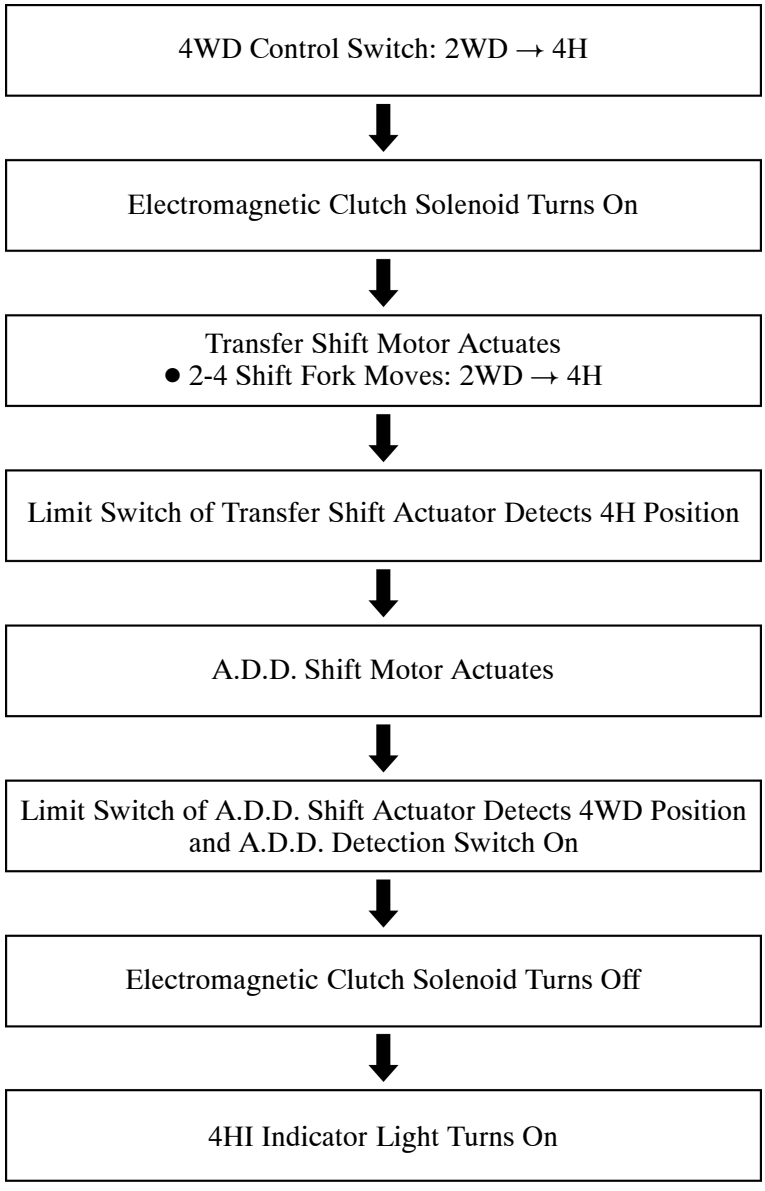
When the 4WD control switch is turned from the 2WD to 4H position, a signal is received by the 4WD control ECU, which actuates the electromagnetic clutch solenoid, transfer shift motor and A.D.D. shift motor.

- Electricity is supplied to the electromagnetic clutch solenoid, thereby synchronizing the front driveline and rear driveline.
- The transfer shift motor rotates the transfer shifter to the 4H position. At this time, the transfer shifter moves the 2-4 shift fork rearward together with the 4-wheel drive lock-up hub. As a result, the operation of the 4-wheel drive lock-up hub connects the front driveline and rear driveline, changing the mode to 4H.
- The A.D.D. shift motor then operates to activate 4WD mode. When the shift actuator is engaged, the electromagnetic clutch solenoid stops operation.
- The 4WD control ECU detects the state of the transfer shift actuator and the A.D.D. shift actuator through the limit switch and the A.D.D. detection switch. The 4HI indicator light turns on after switching from 2WD to 4H mode has been completed.



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▶ Operation Flow ◀

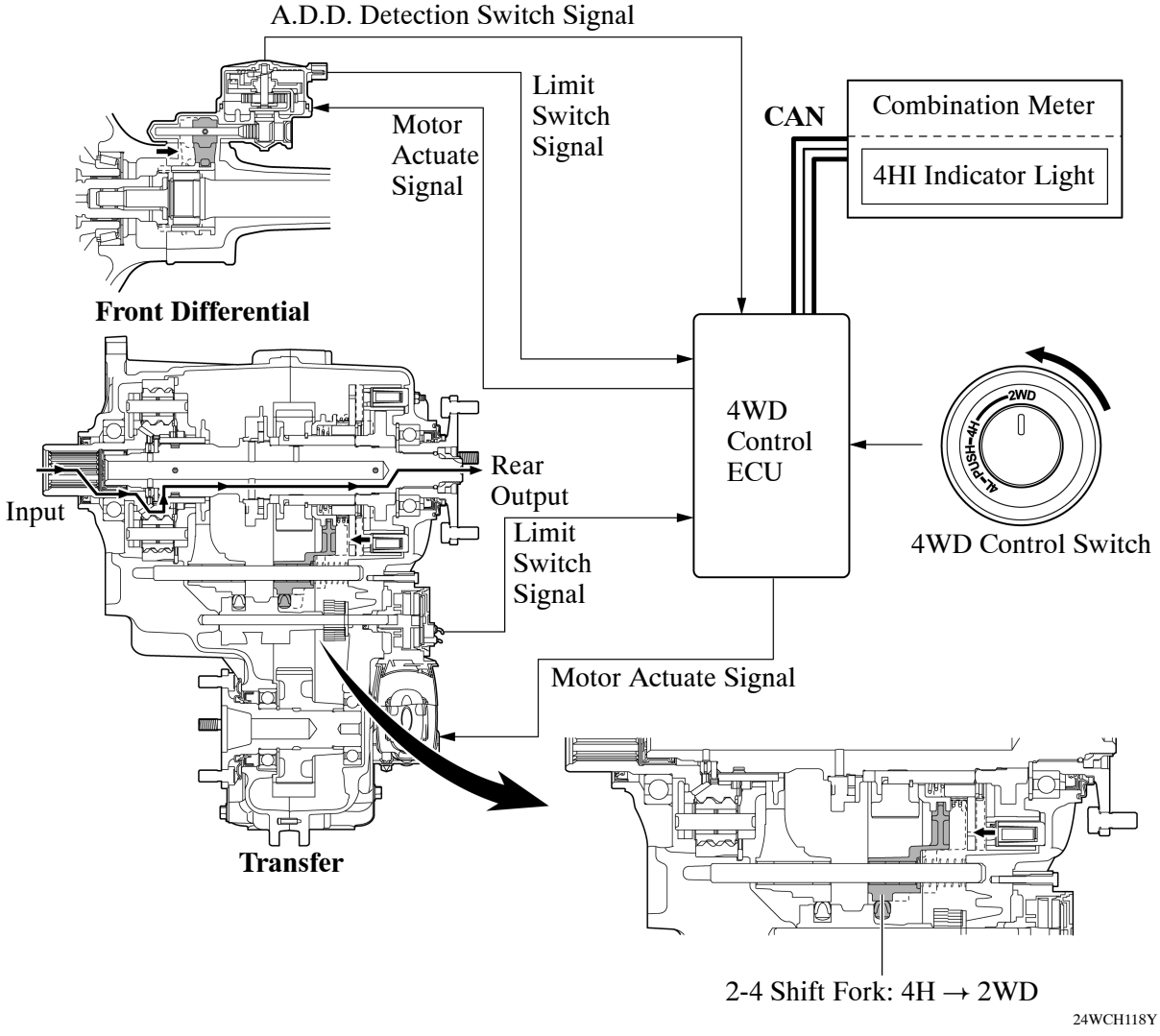


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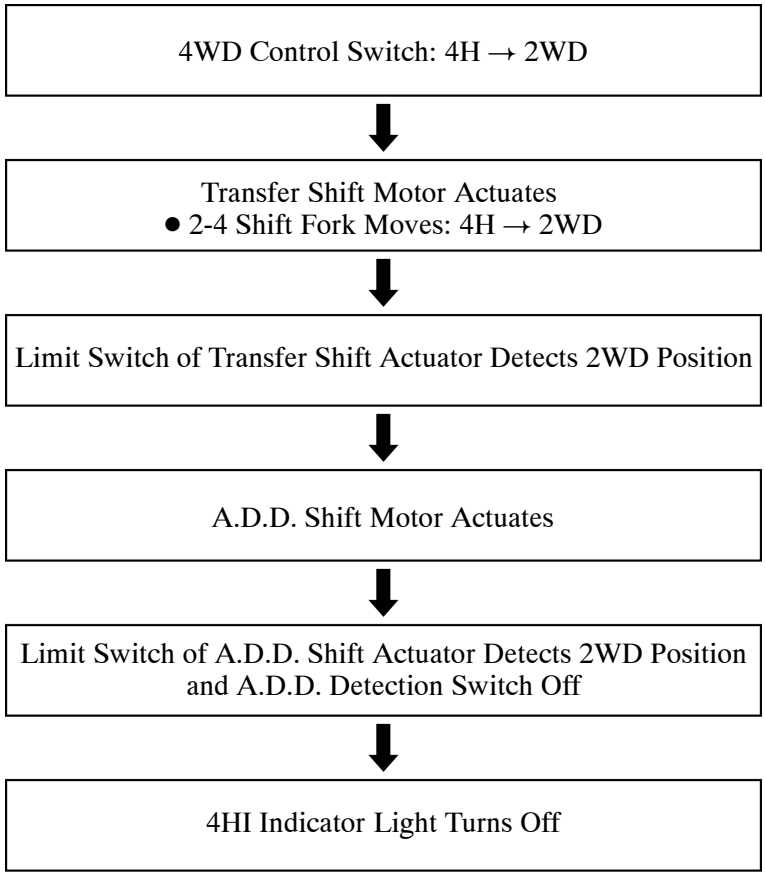
Switching Pattern B (4H → 2WD)

When the 4WD control switch is turned from the 4H to 2WD position, a signal is received by the 4WD control ECU, which actuates the transfer shift motor and A.D.D. shift motor.

- The transfer shift motor rotates the transfer shifter to the 2WD position. At this time, the transfer shifter moves the 2-4 shift fork frontward together with the 4-wheel drive lock-up hub. As a result, the operation of the 4-wheel drive lock-up hub disconnects the front driveline and rear driveline, changing the mode to 2WD.
- The A.D.D. shift motor then operates to activate 2WD mode.
- The 4WD control ECU detects the state of the transfer shift actuator and the A.D.D. shift actuator through the limit switch and the A.D.D. detection switch. The 4HI indicator light turns off after switching from 4H to 2WD mode has been completed.



▶ Operation Flow ◀

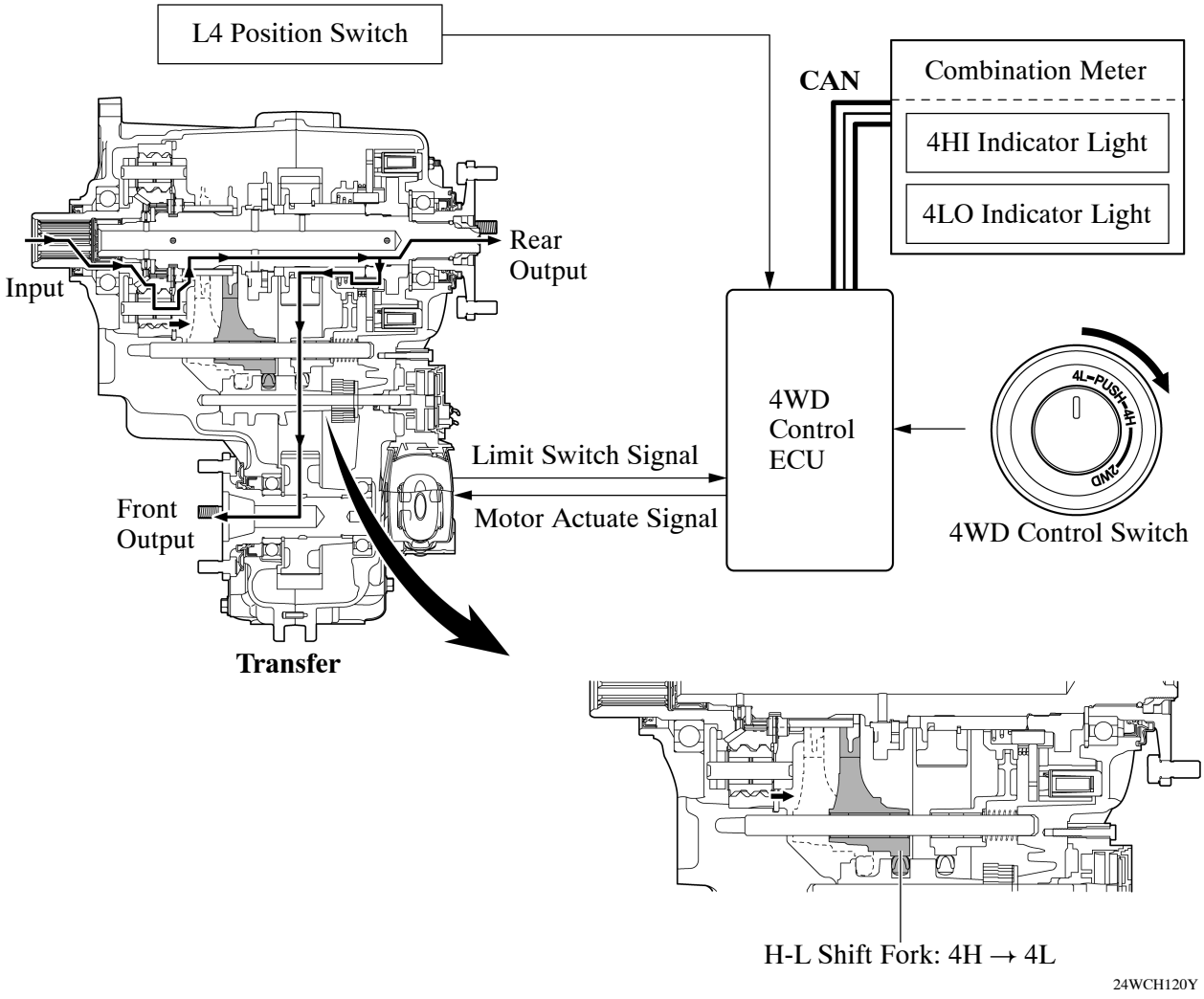


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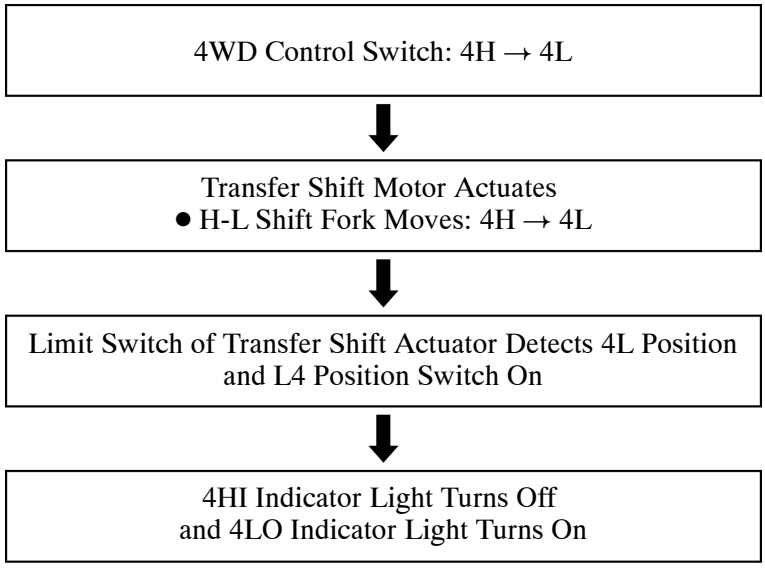
Switching Pattern C (4H → 4L)

When the 4WD control switch is turned from the 4H to 4L position, a signal is received by the 4WD control ECU, which actuates the transfer shift motor.

- The transfer shift motor rotates the transfer shifter to the 4L position. At this time, the transfer shifter moves the H-L shift fork rearward together with the reduction hub. As a result, the reduction hub engages the planetary carrier, changing the mode to 4L.
- The 4WD control ECU detects the state of the transfer shift actuator through the limit switch and the L4 position switch. The 4HI indicator light turns off and the 4LO indicator light turns on after switching from 4H to 4L mode has been completed.



▶ Operation Flow ◀

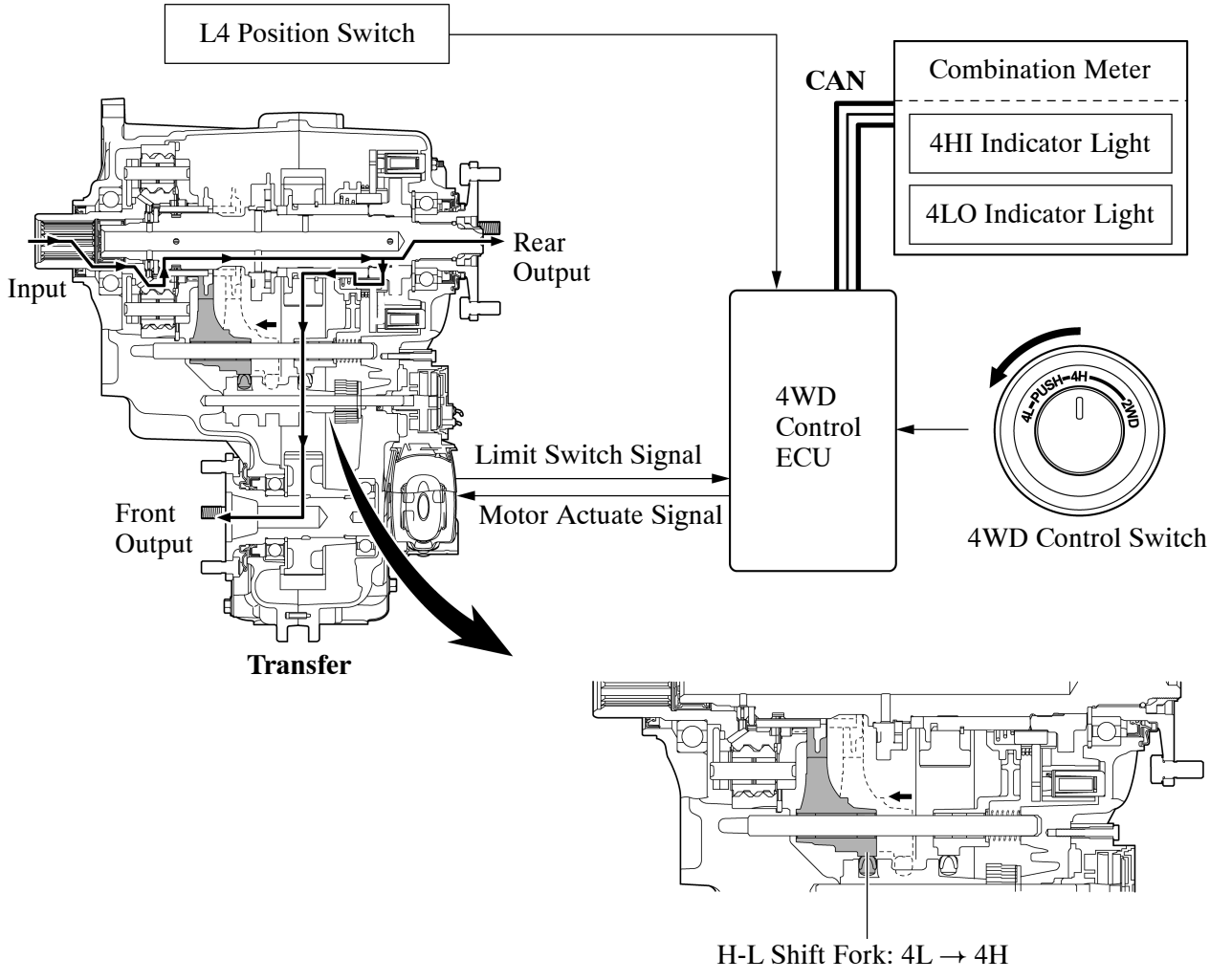


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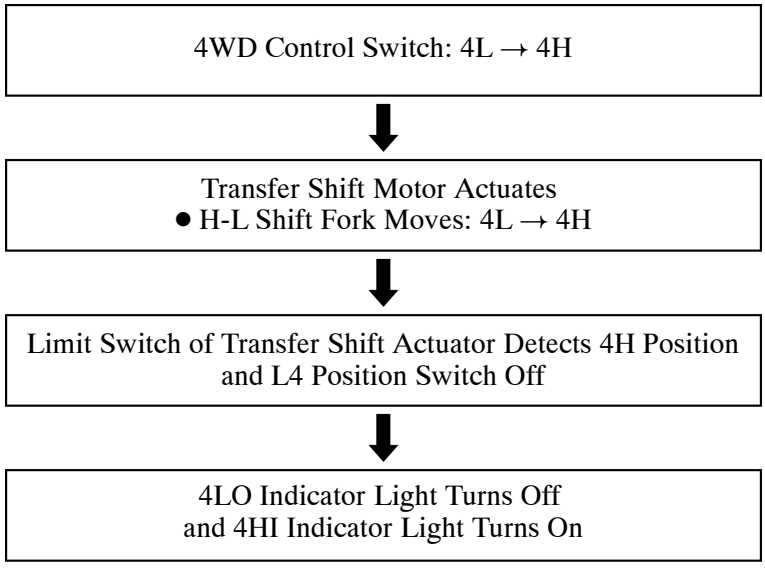
Switching Pattern D (4L → 4H)

When the 4WD control switch is turned from the 4L to 4H position, a signal is received by the 4WD control ECU, which actuates the transfer shift motor.

- The transfer shift motor rotates the transfer shifter to the 4H position. At this time, the transfer shifter moves the H-L shift fork frontward together with the reduction hub. As a result, the reduction hub engages the input shaft, changing the mode to 4H.
- The 4WD control ECU detects the state of the transfer shift actuator through the limit switch and the L4 position switch. The 4LO indicator light turns off and the 4HI indicator light turns on after switching from 4L to 4H mode has been completed.



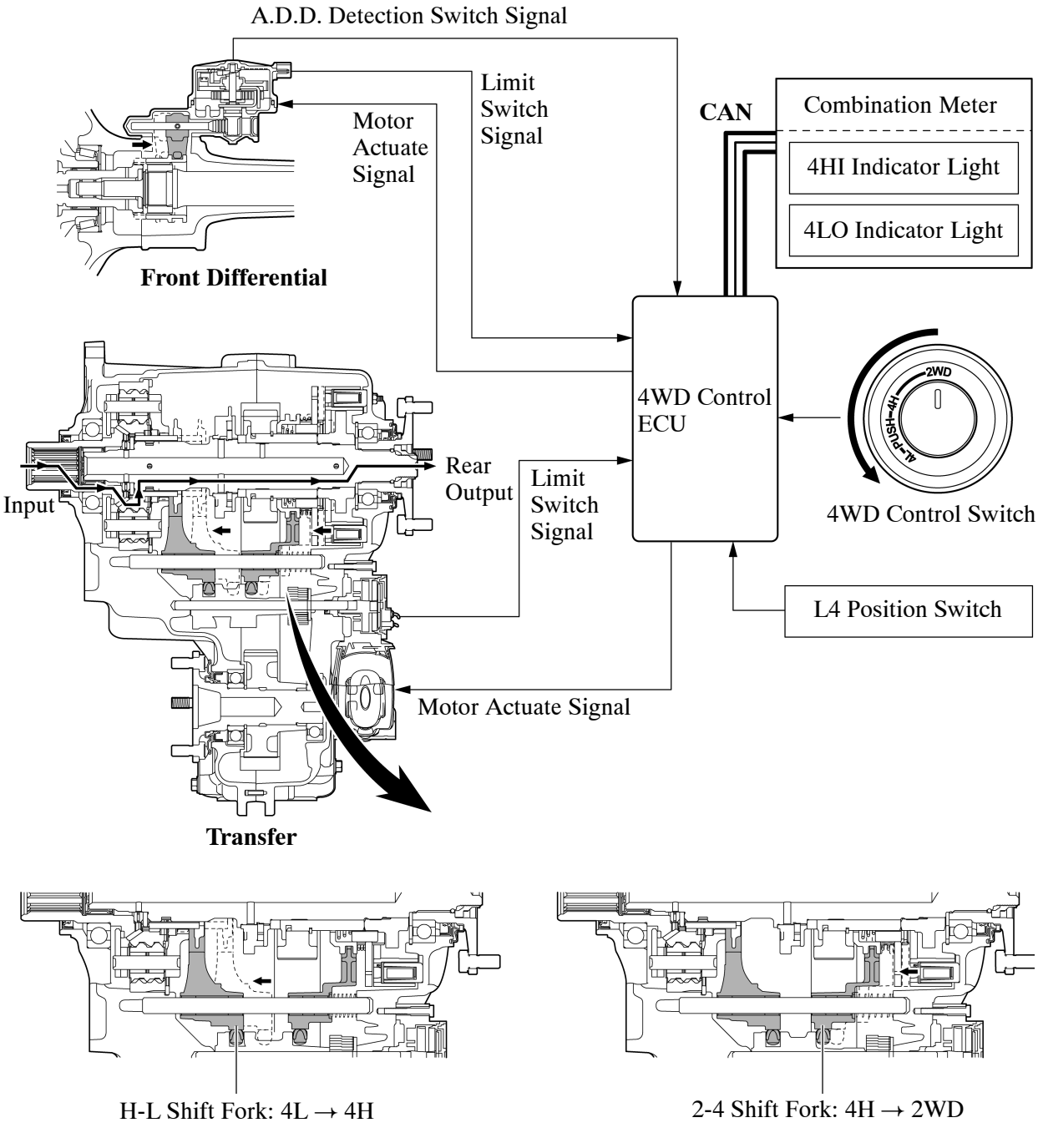
▶ Operation Flow ◀



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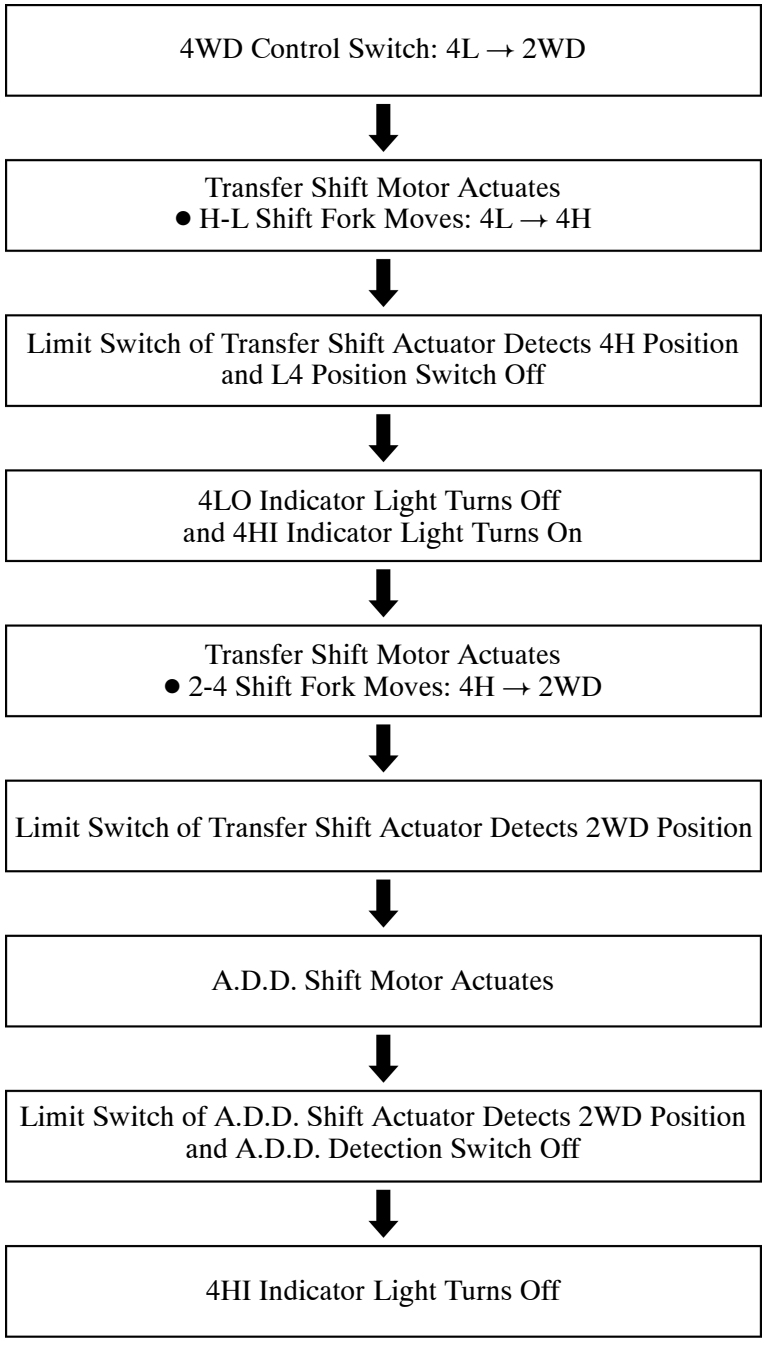
Switching Pattern E (4L → 2WD)

When the 4WD control switch is turned from the 4L to 2WD position, a signal is received by the 4WD control ECU. Then, the 4WD control ECU actuates the transfer shift motor and A.D.D. shift motor. The switching operation changes in the following sequence: 4L → 4H → 2WD (switching pattern D → B).



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▶ Operation Flow ◀



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6. Diagnosis

- If the 4WD control ECU detects a malfunction in the 4WD control system, it will make the 4HI indicator light and 4LO indicator light blink to warn the driver. The 4WD control ECU will also store the Diagnostic Trouble Codes (DTCs) in memory.
- 5-digit DTCs can be read by connecting a Global TechStream (GTS) to the DLC3. For details, refer to the Repair Manual.

7. Fail-safe

If a malfunction occurs in the signal system of the 4WD control system, the 4WD control ECU disables the 4WD control.