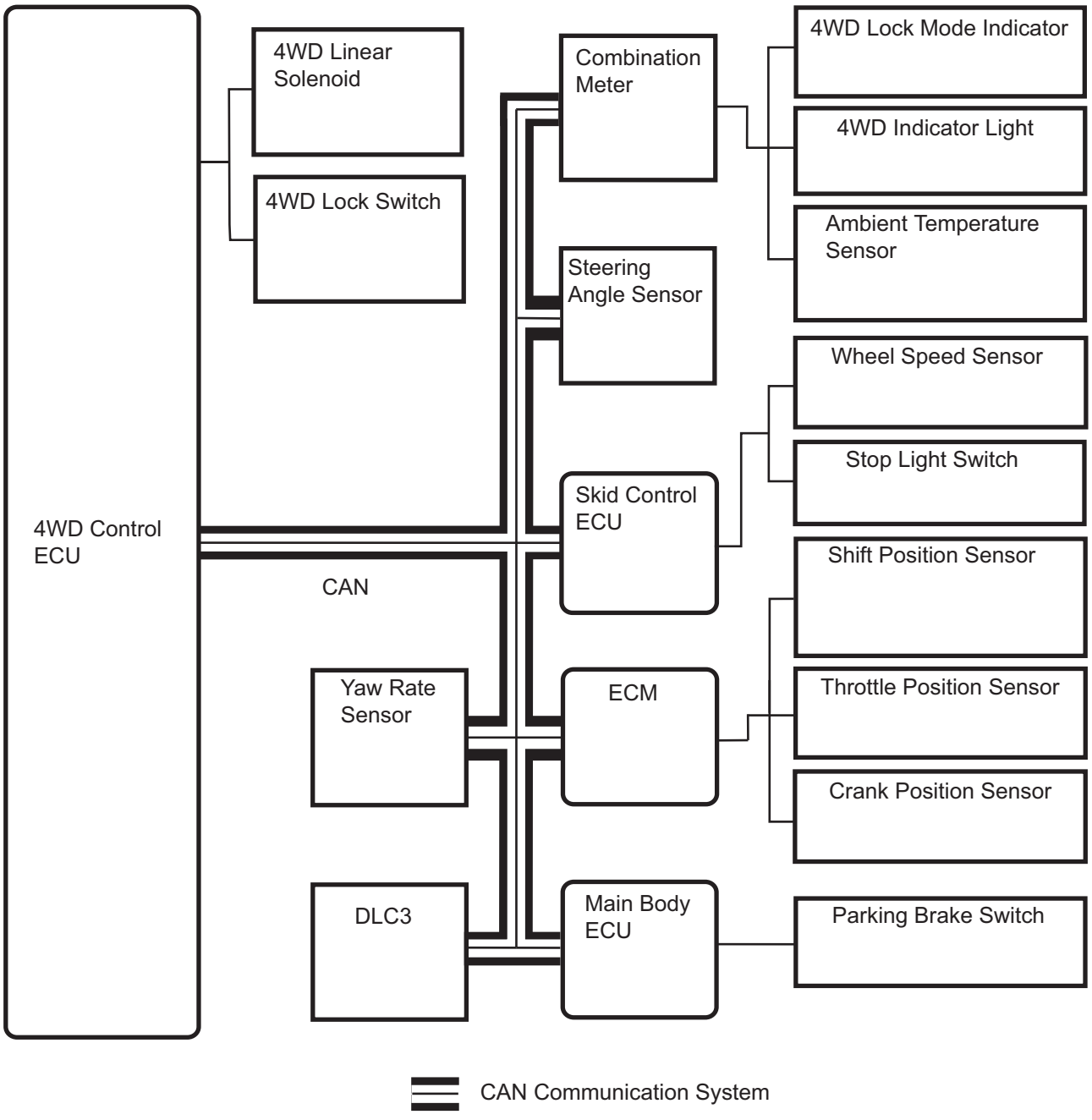
SYSTEM DIAGRAM



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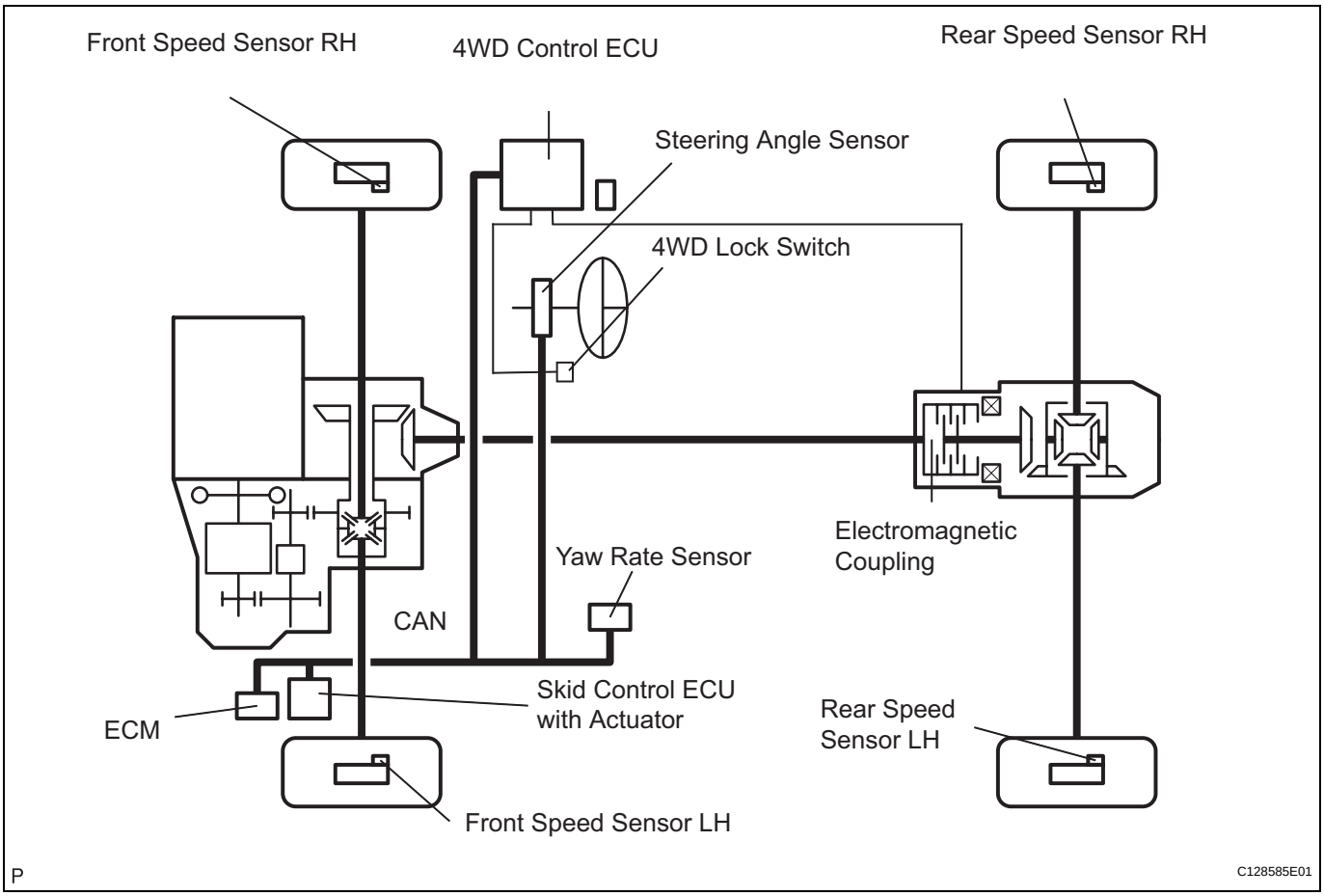
SYSTEM DESCRIPTION

1. GENERAL DESCRIPTION

(a) The active torque control 4WD system detects the driving conditions based on signals from each ECU, each switch, the steering angle sensor, the wheel speed sensor, and the yaw rate sensor. The system controls the electronic current passing through the linear solenoid of the electromagnetic coupling, and performs electronic control to distribute the optimum torque to the rear wheels.



(b) Main components and their functions.

Component	Function
4WD Indicator Light	Displays warning to driver when system malfunctions
Stop Light Switch	Detects brake operation
Throttle Position Sensor	Detects opening angle of throttle
Park/Neutral Position Switch	Detects "P" position
Steering Angle Sensor	Detects turning of steering wheel
4WD Linear Solenoid	Detects electronic control limiting clutch operation using signals from 4WD control ECU
Skid Control ECU with Actuator	Detects signals from each sensor and outputs them to 4WD control ECU
4WD Control ECU	Detects signals from each sensor via skid control ECU to operate linear solenoid and control system
Crankshaft Position Sensor	Detects engine rpm and inputs it into ECM
Yaw Rate Sensor	Detects forward and rearward acceleration of vehicle, and inputs it into skid control ECU

Component	Function
Ambient Temperature	Detects external ambient temperature and inputs it into body ECU
Electromagnetic Coupling	Based on amount of current sent from 4WD control ECU, torque is distributed to rear wheels
4WD Lock Switch	Change of side auto mode for lock mode
4WD Lock Mode Indicator Light	Lock mode control status is communicated to driver through indicator light illumination When lock mode is turned ON, indicator light blinks twice and then remains illuminated. When lock mode is turned OFF, indicator light turns OFF.

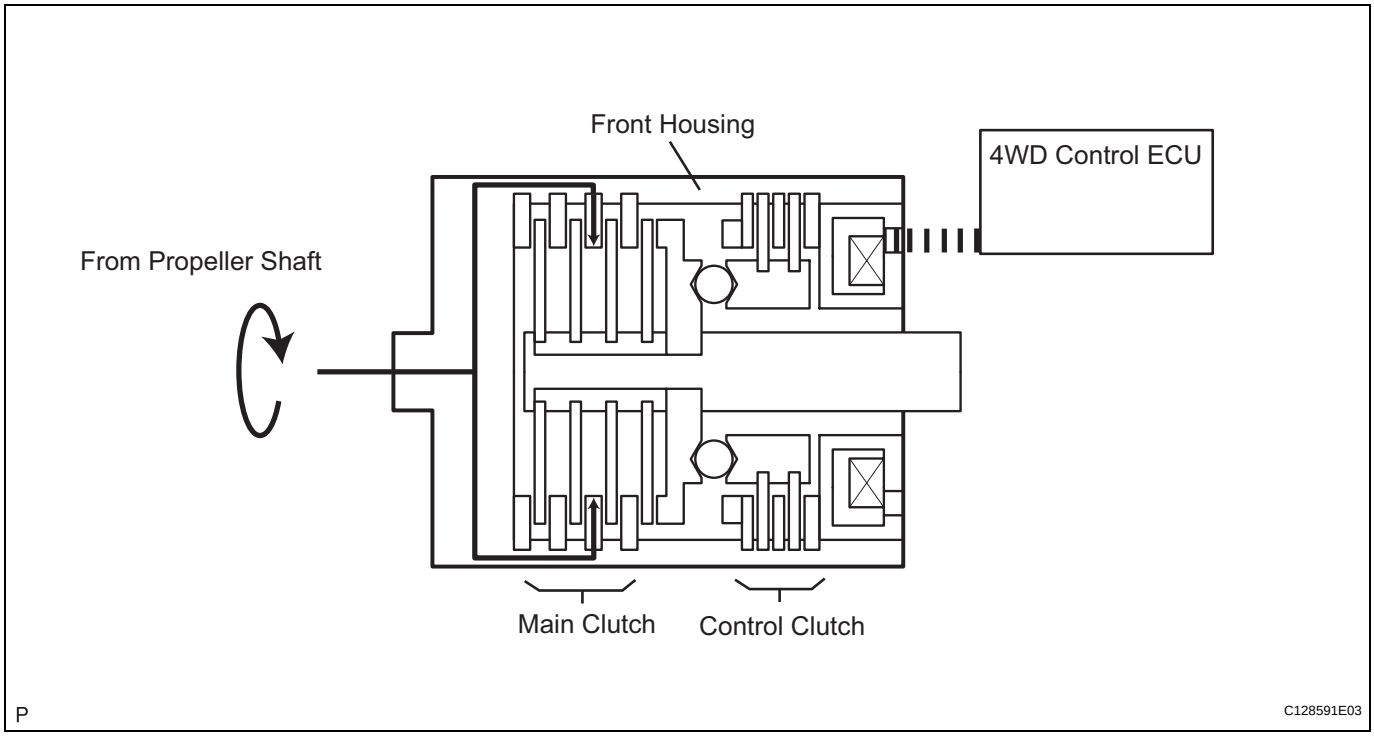
2. DRIVING FUNCTION

Vehicle Condition	Status
Control at Vehicle Startup	This controls the amount of sideway sliding that occurs at rear of vehicles when accelerating from stop to improve acceleration and hill climbing capacity
Slip Control at Vehicle Startup	This helps prevent vehicle from sliding sideways. When accelerating a stopped vehicle with the steering wheel turned, it ensures steering stability
Slip Control	This ensures high turning performance and that stability is not affected by road surface conditions during mid and high speed running
Control During Acceleration	This controls straight-line running when accelerating during mid and high speeds to ensure straight-line stability of the vehicle

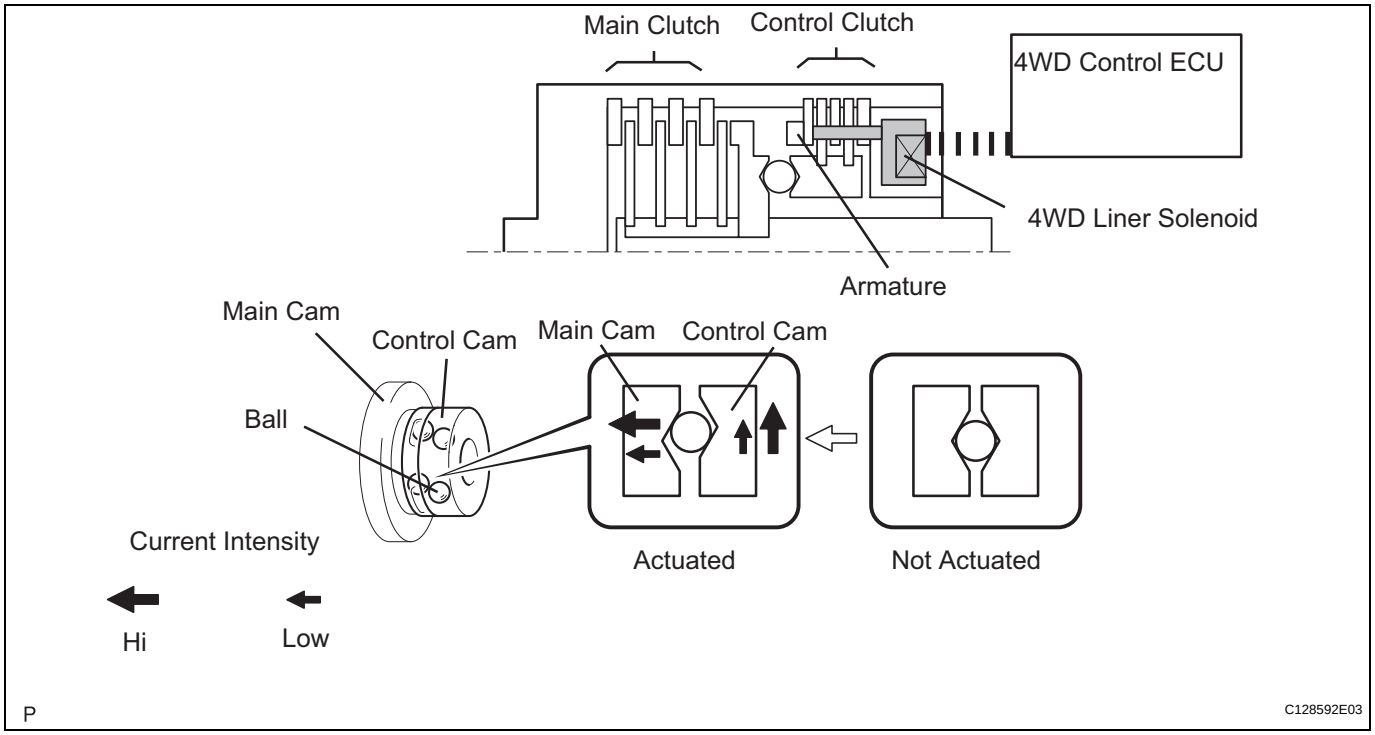
3. REFERENCE MECHANISM

(a) Electromagnetic coupling

(1) The outer part of the main clutch is attached together with the front housing. The inner part of the main clutch is attached together with the shaft. The control clutch is attached together with the control cam. The activation energy from the transfer is transferred from the propeller shaft to the front housing. However, when the linear solenoid is not operating, the main clutch and control clutch are in a free state, and the activation energy from the transfer is not transferred to the rear wheels.



(2) If current is applied to the linear solenoid, the solenoid magnetizes, and the electromagnet pull force causes the armature to attach to the control clutch side. Or, if there is a difference between the rotation speed of the front and rear wheels and the control clutch attaches, a difference occurs in the rotation of the main cam attached to the shaft and the control cam attached to the front housing. As a result, each ball pushes its cam, and the main clutch attaches. The activation energy from the front housing passes through main clutch to the shaft, and then to the rear differential. Then the activation energy is transferred to the rear wheels.



(3) Depending on the rotation difference between the front and rear wheels, the system controls the current flowing to the linear solenoid. Then the activation energy applied to the rear wheels is smoothly controlled. Depending on the amount of current, the restraint energy of the outer and inner side of the main clutch changes, and the activation energy from the propeller shaft is smoothly controlled from a limited condition to condition that is nearly a direct-link 4WD condition.

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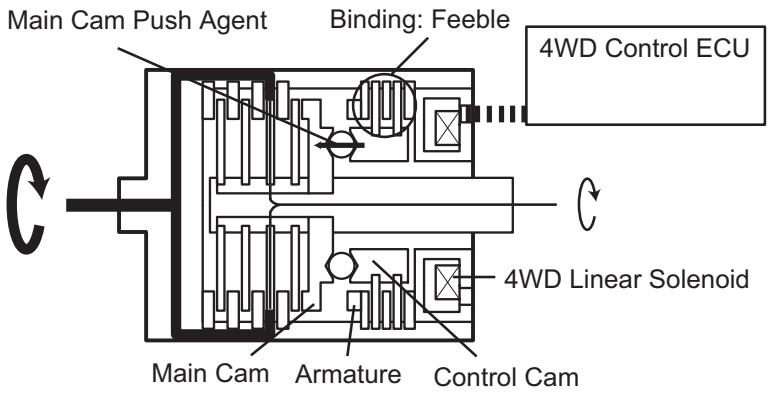

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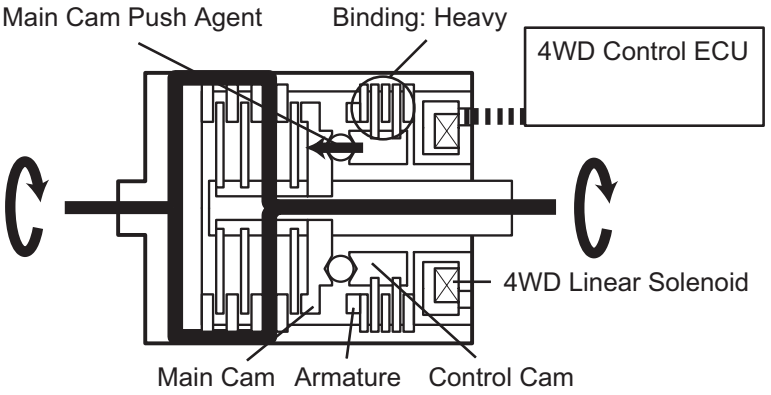

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