

FAIL-SAFE CHART

If a problem occurs in the electric power steering system, the P/S warning light will come on in the combination meter and steering power assist will be stopped, fixed at a particular point, or decreased simultaneously to protect the system.

Electronic power steering system

DTC No.	Detection Condition	Fail-safe
C1511/11	Torque sensor malfunction	Power assist stops
C1512/11		
C1513/11		
C1514/11		
C1521/25	Motor malfunction	
C1524/24		
C1528/12	Motor rotation angle sensor malfunction	
C1531/25	ECU malfunction	
C1532/25		
C1534/25		
C1551/25	IG power source voltage error	
C1552/22	PIG power source voltage error	
C1554/23	Power source relay malfunction	
C1555/25	Motor relay malfunction	
C1533/25	ECU malfunction	Assist force restricted
U0073/49	CAN bus malfunction	Amount of power assist is locked at 140 km/h (87.5 mph) level of power assist
U0121/42	Skid control ECU communication error	
U0105/41	ECM communication error	Power assist stops

HINT:

The amount of power assist may be decreased to prevent the motor and ECUs from overheating if the steering wheel is continuously turned when the vehicle is either stopped or driven at a low speed, or if the steering wheel is kept at either full lock position for a long time. In such cases, the amount of power assist returns to normal if the steering wheel is not turned for approximately 10 minutes with the engine idling.

DATA LIST / ACTIVE TEST

1. READ DATA LIST

HINT:

Using the intelligent tester's DATA LIST allows switch, sensor, actuator and other item values to be read without removing any parts. Reading the DATA LIST early in troubleshooting is one way to save time.

- Connect the intelligent tester (with CAN VIM) to the DLC3.
- Turn the ignition switch ON and press the intelligent tester main switch ON.
- Read the DATA LIST by following the directions on the tester screen.

Tester Display	Measurement Item/Range	Normal Condition	Reference Value
BATTERY VOLTAGE	Battery voltage: Min.: 0 V Max.: 25.5 V	-	10 to 14 V
SPD	Vehicle speed from meter: Min.: 0 km/h (0 mph) Max.: 300 km/h (187.5 mph)	Vehicle stopped	0 km/h (0 mph)
		Vehicle driven at constant speed	No significant fluctuation
SPD SIG INVALID	Record of vehicle speed signal invalid: REC or UNREC	-	UNREC
ENGINE REV	Show the engine revolution: Min.: 0 rpm Max.: 12800 rpm	Engine is running at a constant speed	No significant fluctuation
ENG REV INTER	Record of engine revolution signal interruption REC or UNREC	-	UNREC
MOTOR ACTUAL	Amount of current to motor: Min.: -327.68 A Max.: 327.67 A	Power steering is in operation	Value changes in proportion to steering effort
COMMAND VALUE	Demanded amount of current to motor: Min.: -327.68 A Max.: 327.68 A	Power steering is in operation	Value changes in proportion to steering effort
STR ANGL VEL	Steering angle speed: Min.: -32768°/sec. Max.: 32767°/sec.	Steering wheel is turned	Value changes in proportion to steering effort
STEERING TORQUE	Steering wheel torque: Min.: -7 Nm Max.: 7 Nm	-	-
THERMISTOR TEMP	ECU substrate temperature: Min.: -40°C Max.: 150°C	Ignition switch ON	-
PIG SUPPLY	Power source voltage to activate motor: Min.: 0 V Max.: 20.1531 V	Power steering in operation	10 to 14 V
IG SUPPLY	ECU power source voltage: Min.: 0 V Max.: 20.1531 V	Ignition switch ON	10 to 14 V
MTR OVERHEAT	Continuous overheat prevention control record: REC or UNREC	-	UNREC
MTR LOW POWER	PIG power source voltage drop record: REC or UNREC	-	UNREC

Tester Display	Measurement Item/Range	Normal Condition	Reference Value
MOTOR ROTATE	Motor rotation angle: Min.: 0° Max.: 360°	Power steering in operation	During steering operation, motor rotation angle value changes from 0 to 360°
MOTOR VOLTAGE	Motor power supply voltage: 0 V Max.: 45.955 V	Power steering in operation	-
MTR TERMINAL(U)	Motor terminal voltage (U phase): Min.: 0 V Max.: 46.667 V	Steering wheel is turned	While turning the steering wheel, a value within the range of 1 V to approximately 0.7 V less than the battery voltage is displayed. (The value changes according to the steering load.)
MTR TERMINAL(V)	Motor terminal voltage (V phase): Min.: 0 V Max.: 46.667 V	Steering wheel is turned	While turning the steering wheel, a value within the range of 1 V to approximately 0.7 V less than the battery voltage is displayed. (The value changes according to the steering load.)
MTR TERMINAL(W)	Motor Terminal voltage (W phase): Min.: 0 V Max.: 46.667 V	Steering wheel is turned	While turning the steering wheel, a value within the range of 1 V to approximately 0.7 V less than the battery voltage is displayed. (The value changes according to the steering load.)
IG ON/OFF TIMES	Ignition switch ON/OFF number of times after fail detection: Min.: 0 times Max.: 65535 times	-	-
# CODES	Number of detected DTCs when freeze frame data stored: Min.: 0 Max.: 255	-	-
PS ASSIST SIG	Power steering assist signal: ON or OFF	-	-

2. PERFORM ACTIVE TEST

HINT:

Performing the intelligent tester's ACTIVE TEST allows relays, the VSV, actuators and other items to be operated without removing any parts. Performing the ACTIVE TEST early in troubleshooting is one way to save time. The DATA LIST can be displayed in the ACTIVE TEST.

- Connect the intelligent tester (with CAN VIM) to the DLC3.
- Turn the ignition switch ON and turn the intelligent tester ON.
- Perform the ACTIVE TEST by following the prompts on the tester.

Combination meter

Tester Display	Test Part	Control Range
EPS INDIC	P/S indicator ON/OFF	Confirm that vehicle is stopped, engine idling