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Model Year Start: 2023			Model: Prius Prim	<b>Prod Date Range:</b> [12/2022 -		
Title: BRA	KE CONTROL	/ DYNAMIC	CONTROL SYSTEM	S: ELECT	RONICALLY CONTROLLED BRAKE SYSTEM:	
C12D112,	,C12DC14;	Left Rear WI	heel ABS Hold Sole	noid Con	trol Circuit Short to Battery; 2023 - 2024 MY Prius	
Prius Prime	[12/2022 -	]				
DTC	C12D112	Left Rear V	Wheel ABS Hold S	Solenoid	Control Circuit Short to Battery	
DTC	C12D114	Left Rear V	Wheel ABS Hold S	Solenoid	Control Circuit Short to Ground or Open	
	'.					
DTC	C12D118	Left Rear V	Wheel ABS Hold S	Solenoid	Control Circuit Current Below Threshold	
DTC	C12D119	Left Rear V	Wheel ABS Hold S	olenoid	Control Circuit Current Above Threshold	
DTC	C12D11D	Left Rear V	Wheel ABS Hold S	Solenoid	Control Circuit Current Out of Range	

C12DC12 Left Rear Wheel ABS Release Solenoid Control Circuit Short to Battery

C12DC14 Left Rear Wheel ABS Release Solenoid Control Circuit Short to Ground or Open

# **DESCRIPTION**

**DTC** 

**DTC** 

The solenoid relay and solenoid valves are built into the brake actuator assembly.

The rear solenoid valve LH controls the brake fluid pressure of the rear wheel cylinder LH of the vehicle.

When these DTCs are stored, the fail-safe function operates and the solenoid relay is turned off to prevent the solenoid valves from operating.

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	DTC OUTPUT FROM	PRIORITY	NOTE
C12D112	Hold		No. 2 skid control ECU (brake actuator assembly)	Comes	Brake/EPB	A	<ul> <li>SAE Code: C12D4 (Case 2 and 3)</li> <li>Output ECU: No. 2 skid control ECU (brake)</li> </ul>

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	DTC OUTPUT FROM	PRIORITY	NOTE
							actuator assembly)
C12D114	Left Rear Wheel ABS Hold Solenoid Control Circuit Short to Ground or Open	Insufficient current is detected in the solenoid for 0.05 seconds or more.	No. 2 skid control ECU (brake actuator assembly)	Comes	Brake/EPB	А	<ul> <li>SAE Code:     C12D3     (Case 1     and 2)</li> <li>Output     ECU: No. 2     skid     control     ECU (brake     actuator     assembly)</li> </ul>
C12D118	Left Rear Wheel ABS Hold Solenoid Control Circuit Current Below Threshold	An open is detected in the solenoid for 0.05 seconds or more.	No. 2 skid control ECU (brake actuator assembly)	Comes	Brake/EPB	А	<ul> <li>SAE Code:     C12D3     (Case 3)</li> <li>Output     ECU: No. 2     skid     control     ECU (brake     actuator     assembly)</li> </ul>
C12D119	Left Rear Wheel ABS Hold Solenoid Control Circuit Current Above Threshold	Overcurrent is detected in the solenoid for 0.05 seconds or more.	No. 2 skid control ECU (brake actuator assembly)	Comes	Brake/EPB	A	• SAE Code: C12D4 (Case 4) • Output ECU: No. 2 skid control ECU (brake actuator assembly)
C12D11D	Left Rear Wheel ABS Hold Solenoid Control Circuit Current Out of Range	Current leakage is detected in the solenoid for 0.05 seconds or more.	No. 2 skid control ECU (brake actuator assembly)	Comes	Brake/EPB	А	SAE Code: C12D4 (Case 1) Output ECU: No. 2 skid control ECU (brake actuator assembly)

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	DTC OUTPUT FROM	PRIORITY	NOTE
C12DC12	Left Rear Wheel ABS Release Solenoid Control Circuit Short to Battery	Any of the following is detected:  • Overcurrent is detected in the solenoid for 0.05 seconds or more.  • Overheat in the solenoid is detected for 0.05 seconds or more.  • When the solenoid is OFF, a current leak in the solenoid circuit is detected for 0.05 seconds or more.	No. 2 skid control ECU (brake actuator assembly)	Comes	Brake/EPB	A	SAE Code: C12DF Output ECU: No. 2 skid control ECU (brake actuator assembly)
C12DC14	Wheel ABS Release Solenoid Control Circuit Short to Ground or Open	Any of the following is detected:  • When the solenoid is not being operated, an open in the solenoid circuit or short to ground is detected for 0.05 seconds or more.  • When the solenoid is being operated, an open in the solenoid circuit is detected for 0.05 seconds or more.	No. 2 skid control ECU (brake actuator assembly)	on	Brake/EPB	A	SAE Code: C12DE Output ECU: No. 2 skid control ECU (brake actuator assembly)

DTC NO.	DETECTION ITEM	DTC DETECTION CONDITION	TROUBLE AREA	MIL	DTC OUTPUT FROM	PRIORITY	NOTE
		An open in the solenoid ground circuit is detected for 0.05 seconds or more.					

## **MONITOR DESCRIPTION**

The No. 2 skid control ECU (brake actuator assembly) monitors the drive voltage and current of the ABS holding solenoid and ABS reduction solenoid. Based on the monitored information, if any of the following abnormal conditions are detected, the MIL is illuminated and a DTC is stored.

- Excessively high current in a solenoid circuit is detected
- Excessively low current in a solenoid circuit is detected
- An open in a solenoid circuit is detected
- Overcurrent in a solenoid circuit is detected
- · A current leak in a solenoid circuit is detected
- Excessively high temperature in a solenoid is detected
- · An abnormal solenoid circuit is detected

# **MONITOR STRATEGY**

Related DTCs	C12D3 (Case 1 and 2): ABS hold solenoid (RL) circuit open C12D3 (Case 3): ABS hold solenoid (RL) circuit low C12D4 (Case 1): ABS hold solenoid (RL) circuit high (solenoid Off current) C12D4 (Case 2 and 3): ABS hold solenoid (RL) circuit high (IC data) C12D4 (Case 4): ABS hold solenoid (RL) circuit high (solenoid On current)
	C12DE: ABS release solenoid (RL) circuit low C12DF: ABS release solenoid (RL) circuit high
Required Sensors/Components(Main)	No. 2 skid control ECU (brake actuator assembly)
Required Sensors/Components(Related)	No. 2 skid control ECU (brake actuator assembly)
Frequency of Operation	Continuous
Duration	0.054 seconds: C12D3, C12D4 (Case 1 to 3), C12DE and C12DF -: C12D4 (Case 4)
MIL Operation	Immediately
Sequence of Operation	None

# **TYPICAL ENABLING CONDITIONS**

C12D3 (Case 1)

Monitor runs whenever the following DTCs are not stored

C0597: ABS hold solenoid performance

C12A7 (Case 1 and 2): ABS hold solenoid (FL) circuit open

C12A7 (Case 3): ABS hold solenoid (FL) circuit low

C12A8 (Case 1): ABS hold solenoid (FL) circuit high (solenoid Off current)

C12A8 (Case 2 and 3): ABS hold solenoid (FL) circuit high (IC data)

C12A8 (Case 4): ABS hold solenoid (FL) circuit high (solenoid On current)

C12B2: ABS release solenoid (FL) circuit low

C12B3: ABS release solenoid (FL) circuit high

C12BD (Case 1 and 2): ABS hold solenoid (FR) circuit open

C12BD (Case 3): ABS hold solenoid (FR) circuit low

C12BE (Case 1): ABS hold solenoid (FR) circuit high (solenoid Off current)

C12BE (Case 2 and 3): ABS hold solenoid (FR) circuit high (IC data)

C12BE (Case 4): ABS hold solenoid (FR) circuit high (solenoid On current)

C12C8: ABS release solenoid (FR) circuit low

C12C9: ABS release solenoid (FR) circuit high

C12D4 (Case 1): ABS hold solenoid (RL) circuit high (solenoid Off current)

C12D4 (Case 2 and 3): ABS hold solenoid (RL) circuit high (IC data)

C12D4 (Case 4): ABS hold solenoid (RL) circuit high (solenoid On current)

C12DE: ABS release solenoid (RL) circuit low

C12DF: ABS release solenoid (RL) circuit high

C12E9 (Case 1 and 2): ABS hold solenoid (RR) circuit open

C12E9 (Case 3): ABS hold solenoid (RR) circuit low

C12EA (Case 1): ABS hold solenoid (RR) circuit high (solenoid Off current)

C12EA (Case 2 and 3): ABS hold solenoid (RR) circuit high (IC data)

C12EA (Case 4): ABS hold solenoid (RR) circuit high (solenoid On current)

C12F4: ABS release solenoid (RR) circuit low

C12F5: ABS release solenoid (RR) circuit high

C12F6: ABS hold solenoid other functional

C12F7: ABS hold solenoid other functional

C13BF: SM solenoid other functional

C13C2 (Case 1 and 2): SM1 solenoid circuit open

C13C2 (Case 3): SM1 solenoid circuit low

C13C3 (Case 1): SM1 solenoid circuit high (solenoid Off current)

C13C3 (Case 2 and 3): SM1 solenoid circuit high (IC data)

C13C3 (Case 4): SM1 solenoid circuit high (solenoid On current)

C13CB (Case 1 and 2): SM2 solenoid circuit open

C13CB (Case 3): SM2 solenoid circuit low

C13CC (Case 1): SM2 solenoid circuit high (solenoid Off current)

C13CC (Case 2 and 3): SM2 solenoid circuit high (IC data)

	C13CC (Case 4): SM2 solenoid circuit high (solenoid On current) C137D: Brake system voltage circuit high C143B: Brake system voltage power supply relay circuit high C143C: Brake system voltage power supply relay circuit open
All of the following conditions are met	A, B, C, D, E and F
A. Command to solenoid relay	On
B. Following condition is met	More than 0.012 seconds
AST voltage	6 V or higher
C. Following condition is met	More than 0.22 seconds
+BS voltage	17.4 V or less
D. +BS voltage	9.5 V or higher
E. IGR voltage	Higher than 10 V
F. IGP voltage	Higher than 10 V

### C12D3 (Case 2)

Monitor runs whenever the following DTCs are	C0597: ABS hold solenoid performance
not stored	C12A7 (Case 1 and 2): ABS hold solenoid (FL) circuit open
	C12A7 (Case 3): ABS hold solenoid (FL) circuit low
	C12A8 (Case 1): ABS hold solenoid (FL) circuit high (solenoid Off current)
	C12A8 (Case 2 and 3): ABS hold solenoid (FL) circuit high (IC data)
	C12A8 (Case 4): ABS hold solenoid (FL) circuit high (solenoid On current)
	C12B2: ABS release solenoid (FL) circuit low
	C12B3: ABS release solenoid (FL) circuit high
	C12BD (Case 1 and 2): ABS hold solenoid (FR) circuit open
	C12BD (Case 3): ABS hold solenoid (FR) circuit low
	C12BE (Case 1): ABS hold solenoid (FR) circuit high (solenoid Off current)
	C12BE (Case 2 and 3): ABS hold solenoid (FR) circuit high (IC data)
	C12BE (Case 4): ABS hold solenoid (FR) circuit high (solenoid On current)
	C12C8: ABS release solenoid (FR) circuit low
	C12C9: ABS release solenoid (FR) circuit high
	C12D4 (Case 1): ABS hold solenoid (RL) circuit high (solenoid Off current)
	C12D4 (Case 2 and 3): ABS hold solenoid (RL) circuit high (IC data)
	C12D4 (Case 4): ABS hold solenoid (RL) circuit high (solenoid On current)
	C12DE: ABS release solenoid (RL) circuit low
	C12DF: ABS release solenoid (RL) circuit high
	C12E9 (Case 1 and 2): ABS hold solenoid (RR) circuit open
	C12E9 (Case 3): ABS hold solenoid (RR) circuit low

	C12EA (Case 1): ABS hold solenoid (RR) circuit high (solenoid Off current) C12EA (Case 2 and 3): ABS hold solenoid (RR) circuit high (IC data) C12EA (Case 4): ABS hold solenoid (RR) circuit high (solenoid On current) C12F4: ABS release solenoid (RR) circuit low C12F5: ABS release solenoid (RR) circuit high C12F6: ABS hold solenoid other functional C12F7: ABS hold solenoid other functional C13BF: SM solenoid other functional C13C2 (Case 1 and 2): SM1 solenoid circuit open C13C2 (Case 3): SM1 solenoid circuit low
	C13C3 (Case 1): SM1 solenoid circuit high (solenoid Off current) C13C3 (Case 2 and 3): SM1 solenoid circuit high (IC data) C13C3 (Case 4): SM1 solenoid circuit high (solenoid On current) C13CB (Case 1 and 2): SM2 solenoid circuit open C13CB (Case 3): SM2 solenoid circuit low C13CC (Case 1): SM2 solenoid circuit high (solenoid Off current) C13CC (Case 2 and 3): SM2 solenoid circuit high (IC data) C13CC (Case 4): SM2 solenoid circuit high (solenoid On current) C137D: Brake system voltage circuit high C143B: Brake system voltage power supply relay circuit high C143C: Brake system voltage power supply relay circuit open
All of the following conditions are met	A, B, C, D, E, F and G
A. Command to solenoid relay	On
B. Following condition is met	More than 0.012 seconds
AST voltage	6 V or higher
C. Following condition is met	More than 0.22 seconds
+BS voltage	17.4 V or less
D. Following condition is met	More than 0.054 seconds
Solenoid target current value	0 A
E. +BS voltage	9.5 V or higher
F. IGR voltage	Higher than 10 V
G. IGP voltage	Higher than 10 V

## C12D3 (Case 3)

Monitor runs whenever the following DTCs are not	C0597: ABS hold solenoid performance
stored	C12A7 (Case 1 and 2): ABS hold solenoid (FL) circuit open
	C12A7 (Case 3): ABS hold solenoid (FL) circuit low
	C12A8 (Case 1): ABS hold solenoid (FL) circuit high
	(solenoid Off current)
	C12A8 (Case 2 and 3): ABS hold solenoid (FL) circuit high
	(IC data)
	C12A8 (Case 4): ABS hold solenoid (FL) circuit high
	(solenoid On current)

- C12B2: ABS release solenoid (FL) circuit low
- C12B3: ABS release solenoid (FL) circuit high
- C12BD (Case 1 and 2): ABS hold solenoid (FR) circuit open
- C12BD (Case 3): ABS hold solenoid (FR) circuit low
- C12BE (Case 1): ABS hold solenoid (FR) circuit high (solenoid Off current)
- C12BE (Case 2 and 3): ABS hold solenoid (FR) circuit high (IC data)
- C12BE (Case 4): ABS hold solenoid (FR) circuit high (solenoid On current)
- C12C8: ABS release solenoid (FR) circuit low
- C12C9: ABS release solenoid (FR) circuit high
- C12D4 (Case 1): ABS hold solenoid (RL) circuit high (solenoid Off current)
- C12D4 (Case 2 and 3): ABS hold solenoid (RL) circuit high (IC data)
- C12D4 (Case 4): ABS hold solenoid (RL) circuit high (solenoid On current)
- C12DE: ABS release solenoid (RL) circuit low
- C12DF: ABS release solenoid (RL) circuit high
- C12E9 (Case 1 and 2): ABS hold solenoid (RR) circuit open
- C12E9 (Case 3): ABS hold solenoid (RR) circuit low
- C12EA (Case 1): ABS hold solenoid (RR) circuit high (solenoid Off current)
- C12EA (Case 2 and 3): ABS hold solenoid (RR) circuit high (IC data)
- C12EA (Case 4): ABS hold solenoid (RR) circuit high (solenoid On current)
- C12F4: ABS release solenoid (RR) circuit low
- C12F5: ABS release solenoid (RR) circuit high
- C12F6: ABS hold solenoid other functional
- C12F7: ABS hold solenoid other functional
- C13BF: SM solenoid other functional
- C13C2 (Case 1 and 2): SM1 solenoid circuit open
- C13C2 (Case 3): SM1 solenoid circuit low
- C13C3 (Case 1): SM1 solenoid circuit high (solenoid Off current)
- C13C3 (Case 2 and 3): SM1 solenoid circuit high (IC data)
- C13C3 (Case 4): SM1 solenoid circuit high (solenoid On current)
- C13CB (Case 1 and 2): SM2 solenoid circuit open
- C13CB (Case 3): SM2 solenoid circuit low
- C13CC (Case 1): SM2 solenoid circuit high (solenoid Off current)
- C13CC (Case 2 and 3): SM2 solenoid circuit high (IC data)
- C13CC (Case 4): SM2 solenoid circuit high (solenoid On current)
- C137D: Brake system voltage circuit high
- C143B: Brake system voltage power supply relay circuit high

	C143C: Brake system voltage power supply relay circuit open
All of the following conditions are met	A, B, C, D, E, F, G, H, I, J and K
A. Command to solenoid relay	On
B. Following condition is met	More than 0.012 seconds
AST voltage	9.5 V or higher
C. Following condition is met	More than 0.22 seconds
+BS voltage	17.4 V or less
D. Following condition is met	More than 0.048 seconds
Solenoid target current value	0.25 A or higher
E. Solenoid overcurrent signal (IC Data)	Off
F. Solenoid driver overtemperature signal (IC Data)	Off
G. Solenoid return current terminal disconnection signal (IC Data)	Off
H. Solenoid GND terminal disconnection signal (IC Data)	Off
I. +BS voltage	9.5 V or higher
J. IGR voltage	Higher than 10 V
K. IGP voltage	Higher than 10 V

## C12D4 (Case 1)

Monitor runs whenever the following DTCs are not	C0597: ABS hold solenoid performance
stored	C12A7 (Case 1 and 2): ABS hold solenoid (FL) circuit open
	C12A7 (Case 3): ABS hold solenoid (FL) circuit low
	C12A8 (Case 1): ABS hold solenoid (FL) circuit high
	(solenoid Off current)
	C12A8 (Case 2 and 3): ABS hold solenoid (FL) circuit high
	(IC data)
	C12A8 (Case 4): ABS hold solenoid (FL) circuit high
	(solenoid On current)
	C12B2: ABS release solenoid (FL) circuit low
	C12B3: ABS release solenoid (FL) circuit high
	C12BD (Case 1 and 2): ABS hold solenoid (FR) circuit open
	C12BD (Case 3): ABS hold solenoid (FR) circuit low
	C12BE (Case 1): ABS hold solenoid (FR) circuit high
	(solenoid Off current)
	C12BE (Case 2 and 3): ABS hold solenoid (FR) circuit high
	(IC data)
	C12BE (Case 4): ABS hold solenoid (FR) circuit high
	(solenoid On current)
	C12C8: ABS release solenoid (FR) circuit low
	C12C9: ABS release solenoid (FR) circuit high
	C12D3 (Case 1 and 2): ABS hold solenoid (RL) circuit open
	C12D3 (Case 3): ABS hold solenoid (RL) circuit low

	C12DE: ABS release solenoid (RL) circuit low C12DF: ABS release solenoid (RL) circuit high				
	C12E9 (Case 1 and 2): ABS hold solenoid (RR) circuit open				
	C12E9 (Case 3): ABS hold solenoid (RR) circuit low				
	C12EA (Case 1): ABS hold solenoid (RR) circuit high				
	(solenoid Off current)				
	C12EA (Case 2 and 3): ABS hold solenoid (RR) circuit high (IC data)				
	C12EA (Case 4): ABS hold solenoid (RR) circuit high				
	(solenoid On current)				
	C12F4: ABS release solenoid (RR) circuit low				
	C12F5: ABS release solenoid (RR) circuit high				
	C12F6: ABS hold solenoid other functional				
	C12F7: ABS hold solenoid other functional				
	C13BF: SM solenoid other functional				
	C13C2 (Case 1 and 2): SM1 solenoid circuit open				
	C13C2 (Case 3): SM1 solenoid circuit low				
	C13C3 (Case 1): SM1 solenoid circuit high (solenoid Off current)				
	C13C3 (Case 2 and 3): SM1 solenoid circuit high (IC data)				
	C13C3 (Case 4): SM1 solenoid circuit high (solenoid On current)				
	C13CB (Case 1 and 2): SM2 solenoid circuit open				
	C13CB (Case 3): SM2 solenoid circuit low				
	C13CC (Case 1): SM2 solenoid circuit high (solenoid Off				
	current)				
	C13CC (Case 2 and 3): SM2 solenoid circuit high (IC data) C13CC (Case 4): SM2 solenoid circuit high (solenoid On				
	current)				
	C137D: Brake system voltage circuit high				
	C143B: Brake system voltage power supply relay circuit				
	high				
	C143C: Brake system voltage power supply relay circuit				
	open				
All of the following conditions are met	A, B, C, D, E, F, G, H, I, J, K, L and M				
A. Command to solenoid relay	On				
B. Following condition is met	More than 0.012 seconds				
AST voltage	6 V or higher				
C. Following condition is met	More than 0.054 seconds				
Solenoid target current value	0 A				
D. Following condition is met	More than 0.22 seconds				
+BS voltage	17.4 V or less				
E. Solenoid overcurrent signal (IC Data)	Off				
F. Solenoid driver overtemperature signal (IC Data)	Off				
G. Solenoid load open/short to ground signal (IC Data)	Off				

H. Solenoid load leakage signal (IC Data)	Off
I. Solenoid return current terminal disconnection signal (IC Data)	Off
J. Solenoid GND terminal disconnection signal (IC Data)	Off
K. +BS voltage	9.5 V or higher
L. IGR voltage	Higher than 10 V
M. IGP voltage	Higher than 10 V

### C12D4 (Case 2)

Monitor runs whenever the following DTCs are	C0597: ABS hold solenoid performance		
not stored	C12A7 (Case 1 and 2): ABS hold solenoid (FL) circuit open		
	C12A7 (Case 3): ABS hold solenoid (FL) circuit low		
	C12A8 (Case 1): ABS hold solenoid (FL) circuit high (solenoid		
	Off current)		
	C12A8 (Case 2 and 3): ABS hold solenoid (FL) circuit high (IC data)		
	C12A8 (Case 4): ABS hold solenoid (FL) circuit high (solenoid On current)		
	C12B2: ABS release solenoid (FL) circuit low		
	C12B3: ABS release solenoid (FL) circuit high		
	C12BD (Case 1 and 2): ABS hold solenoid (FR) circuit open		
	C12BD (Case 3): ABS hold solenoid (FR) circuit low		
	C12BE (Case 1): ABS hold solenoid (FR) circuit high (solenoid Off current)		
	C12BE (Case 2 and 3): ABS hold solenoid (FR) circuit high (IC data)		
	C12BE (Case 4): ABS hold solenoid (FR) circuit high (solenoid On current)		
	C12C8: ABS release solenoid (FR) circuit low		
	C12C9: ABS release solenoid (FR) circuit high		
	C12D3 (Case 1 and 2): ABS hold solenoid (RL) circuit open		
	C12D3 (Case 3): ABS hold solenoid (RL) circuit low		
	C12DE: ABS release solenoid (RL) circuit low		
	C12DF: ABS release solenoid (RL) circuit high		
	C12E9 (Case 1 and 2): ABS hold solenoid (RR) circuit open		
	C12E9 (Case 3): ABS hold solenoid (RR) circuit low		
	C12EA (Case 1): ABS hold solenoid (RR) circuit high (solenoid Off current)		
	C12EA (Case 2 and 3): ABS hold solenoid (RR) circuit high (IC data)		
	C12EA (Case 4): ABS hold solenoid (RR) circuit high (solenoid On current)		
	C12F4: ABS release solenoid (RR) circuit low		
	C12F5: ABS release solenoid (RR) circuit high		
	C12F6: ABS hold solenoid other functional		
	C12F7: ABS hold solenoid other functional		
	C13BF: SM solenoid other functional		

	C13C2 (Case 1 and 2): SM1 solenoid circuit open
	C13C2 (Case 3): SM1 solenoid circuit low
	C13C3 (Case 1): SM1 solenoid circuit high (solenoid Off current)
	C13C3 (Case 2 and 3): SM1 solenoid circuit high (IC data)
	C13C3 (Case 4): SM1 solenoid circuit high (solenoid On current)
	C13CB (Case 1 and 2): SM2 solenoid circuit open
	C13CB (Case 3): SM2 solenoid circuit low
	C13CC (Case 1): SM2 solenoid circuit high (solenoid Off current)
	C13CC (Case 2 and 3): SM2 solenoid circuit high (IC data)
	C13CC (Case 4): SM2 solenoid circuit high (solenoid On current)
	C137D: Brake system voltage circuit high
	C143B: Brake system voltage power supply relay circuit high
	C143C: Brake system voltage power supply relay circuit open
All of the following conditions are met	A, B, C, D, E and F
A. Command to solenoid relay	On
B. Following condition is met	More than 0.012 seconds
AST voltage	6 V or higher
C. Following condition is met	More than 0.22 seconds
+BS voltage	17.4 V or less
D. +BS voltage	9.5 V or higher
E. IGR voltage	Higher than 10 V
F. IGP voltage	Higher than 10 V

### C12D4 (Case 3)

Monitor runs whenever the following DTCs are	C0597: ABS hold solenoid performance
not stored	C12A7 (Case 1 and 2): ABS hold solenoid (FL) circuit open
	C12A7 (Case 3): ABS hold solenoid (FL) circuit low
	C12A8 (Case 1): ABS hold solenoid (FL) circuit high (solenoid
	Off current)
	C12A8 (Case 2 and 3): ABS hold solenoid (FL) circuit high (IC
	data)
	C12A8 (Case 4): ABS hold solenoid (FL) circuit high (solenoid
	On current)
	C12B2: ABS release solenoid (FL) circuit low
	C12B3: ABS release solenoid (FL) circuit high
	C12BD (Case 1 and 2): ABS hold solenoid (FR) circuit open
	C12BD (Case 3): ABS hold solenoid (FR) circuit low
	C12BE (Case 1): ABS hold solenoid (FR) circuit high (solenoid
	Off current)
	C12BE (Case 2 and 3): ABS hold solenoid (FR) circuit high (IC
	data)
	C12BE (Case 4): ABS hold solenoid (FR) circuit high (solenoid
	On current)
	C12C8: ABS release solenoid (FR) circuit low
	C12C9: ABS release solenoid (FR) circuit high
	C12D3 (Case 1 and 2): ABS hold solenoid (RL) circuit open

CL2DE: ABS release solenoid (RL) circuit low CL2DF: ABS release solenoid (RL) circuit high CL2E9 (Case 1 and 2): ABS hold solenoid (RR) circuit open CL2E9 (Case 1): ABS hold solenoid (RR) circuit open CL2E9 (Case 1): ABS hold solenoid (RR) circuit high (Solenoid Off current) CL2EA (Case 1): ABS hold solenoid (RR) circuit high (solenoid Off current) CL2EA (Case 4): ABS hold solenoid (RR) circuit high (IC data) CL2EA (Case 4): ABS hold solenoid (RR) circuit high (Solenoid On current) CL2EA: ABS release solenoid (RR) circuit high (CL2EA: ABS hold solenoid other functional CL2EA: ABS hold solenoid other functional CL2EA: ABS hold solenoid other functional CL3EA: ABS hold solenoid circuit high (Solenoid Off current) CL3CA: Case 1 and 2): SM1 solenoid circuit high (Cdata) CL3CA: Case 1 and 2): SM2 solenoid circuit high (Cdata) CL3CA: Case 2 and 3): SM1 solenoid circuit high (Cdata) CL3CA: Case 2 and 3): SM1 solenoid circuit high (Cdata) CL3CA: Case 2 and 3): SM2 solenoid circuit high (Cdata) CL3CA: Case 2 and 3): SM2 solenoid circuit high (Cdata) CL3CA: Case 2 and 3): SM2 solenoid circuit high (Cdata) CL3CA: Case 2 and 3): SM2 solenoid circuit high (Cdata) CL3CA: Case 2 and 3): SM2 solenoid circuit high (Cdata) CL3CA: Case 2 and 3): SM2 solenoid circuit high (Cdata) CL3CA: Case 2 and 3): SM2 solenoid circuit high (Cdata) CL3CA: Case 2 and 3): SM2 solenoid circuit high (Cdata) CL3CA: Case 2 and 3): SM2 solenoid circuit high (Cdata) CL3CA: Case 2 and 3): SM2 solenoid circuit high (Cdata) CL3CA: Case 2 and 3): SM2 solenoid circuit high (Cdata) CL3CA: Case 2 and 3): SM2 solenoid circuit high (Cdata) CL3CA: Case 2 and 3): SM2 solenoid circuit high (Cdata) CL3CA: Case 2 and 3): SM2 solenoid circuit high (Cdata) CL3CA: Case 2 and 3): SM2 solenoid circuit high (Cdata) CL3CA: Case 2 and 3): SM2 solenoid circuit high (Cdata) CL3CA: Case 2 and 3): SM2 solenoid circuit high (Cdata) CL3CA: Case 2 and 3): S		C12D3 (Case 3): ABS hold solenoid (RL) circuit low
C12E9 (Case 1 and 2): ABS hold solenoid (RR) circuit open C12E9 (Case 3): ABS hold solenoid (RR) circuit low C12EA (Case 1): ABS hold solenoid (RR) circuit high (solenoid Off current) C12EA (Case 2 and 3): ABS hold solenoid (RR) circuit high (IC data) C12EA (Case 2 and 3): ABS hold solenoid (RR) circuit high (IC data) C12EA (Case 4): ABS hold solenoid (RR) circuit high (Solenoid On current) C12E4: ABS release solenoid (RR) circuit high (Solenoid On current) C12E7: ABS release solenoid (RR) circuit high (C12E7: ABS hold solenoid other functional C12E7: ABS hold solenoid other functional C13E7: ABS hold solenoid other functional C13E7: ABS hold solenoid other functional C13C2 (Case 1 and 2): SM1 solenoid circuit ippen C13C2 (Case 1): SM1 solenoid circuit high (Solenoid Off current) C13C2 (Case 3): SM1 solenoid circuit high (Solenoid Off current) C13C3 (Case 4): SM1 solenoid circuit high (C1 data) C13C3 (Case 4): SM1 solenoid circuit high (Solenoid Off current) C13C3 (Case 4): SM2 solenoid circuit high (Solenoid Off current) C13C3 (Case 4): SM2 solenoid circuit high (Solenoid Off current) C13C3 (Case 4): SM2 solenoid circuit high (Solenoid Off current) C13C3 (Case 4): SM2 solenoid circuit high (Solenoid Off current) C13C3 (Case 4): SM2 solenoid circuit high (Solenoid Off current) C13C3 (Case 4): SM2 solenoid circuit high (Solenoid Off current) C13C3 (Case 4): SM2 solenoid circuit high (Solenoid Off current) C13C3 (Case 4): SM2 solenoid circuit high (Solenoid Off current) C13C3 (Case 4): SM2 solenoid circuit high (Solenoid Off current) C13C3 (Case 4): SM2 solenoid circuit high (Solenoid Off current) C13C4 (Case 4): SM2 solenoid circuit high (Solenoid Off current) C13C5 (Case 4): SM2 solenoid circuit high (Solenoid Off current) C13C5 (Case 4): SM2 solenoid circuit high (Solenoid Off current) C13C5 (Case 4): SM2 solenoid circuit high (Solenoid Off current) C13C5 (Case 4): SM2 solenoid circuit high (Solenoid Off current) C13C5 (Case 4): SM2 solenoid circuit high (Solenoid Off current) C13C5 (Case 4): SM3 solenoid circ		C12DE: ABS release solenoid (RL) circuit low
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On current) C12F4: ABS release solenoid (RR) circuit low C12F5: ABS release solenoid (RR) circuit high C12F6: ABS nelease solenoid other functional C12F7: ABS hold solenoid other functional C13F7: ABS hold solenoid other functional C13C2 (Case 1 and 2): SM1 solenoid circuit pen C13C2 (Case 3): SM1 solenoid circuit high (solenoid Off current) C13C3 (Case 2): SM1 solenoid circuit high (IC data) C13C3 (Case 2): SM1 solenoid circuit high (solenoid On current) C13C8 (Case 1): SM2 solenoid circuit high (solenoid On current) C13C8 (Case 3): SM2 solenoid circuit high (solenoid Off current) C13C8 (Case 3): SM2 solenoid circuit high (solenoid Off current) C13C6 (Case 4): SM2 solenoid circuit high (solenoid Off current) C13C7 (Case 4): SM2 solenoid circuit high (solenoid On current) C13C8 (Case 4): SM2 solenoid circuit high (solenoid On current) C13C8 (Case 4): SM2 solenoid circuit high (solenoid On current) C13C9 (Case 4): SM2 solenoid circuit high (solenoid On current) C13C9 (Case 4): SM2 solenoid circuit high (solenoid On current) C13C9 (Case 4): SM2 solenoid circuit high (solenoid On current) C13C9 (Case 4): SM2 solenoid circuit high (solenoid On current) C13C9 (Case 4): SM2 solenoid circuit high (solenoid On current) C13C9 (Case 4): SM2 solenoid circuit high (solenoid On current) C13C9 (Case 4): SM2 solenoid circuit high (solenoid On current) C13C9 (Case 4): SM2 solenoid circuit high (solenoid On current) C13C9 (Case 4): SM2 solenoid circuit high (solenoid On current) C13C9 (Case 4): SM2 solenoid circuit high (solenoid On current) C13C9 (Case 4): SM2 solenoid circuit high (solenoid On current) C13C9 (Case 4): SM2 solenoid circuit high (solenoid On current) C13C9 (Case 4): SM2 solenoid circuit high (solenoid On current) C13C9 (Case 4): SM2 solenoid circuit high (solenoid On current) C13C9 (Case 4): SM2 solenoid circuit high (solenoid On current) C13C9 (Case 4): SM2 solenoid circuit high (soleno		
C12F5: ABS release solenoid (RR) circuit high C12F6: ABS hold solenoid other functional C12F7: ABS hold solenoid other functional C13BF: SM solenoid other functional C13BF: SM solenoid other functional C13BF: SM solenoid other functional C13C2 (Case 1 and 2): SM1 solenoid circuit open C13C2 (Case 3): SM1 solenoid circuit low C13C3 (Case 1): SM1 solenoid circuit high (IC data) C13C3 (Case 2): SM1 solenoid circuit high (IC data) C13C3 (Case 4): SM1 solenoid circuit high (IC data) C13C3 (Case 4): SM2 solenoid circuit high (solenoid On current) C13CB (Case 3): SM2 solenoid circuit high (solenoid Off current) C13CC (Case 3): SM2 solenoid circuit high (solenoid Off current) C13CC (Case 3): SM2 solenoid circuit high (solenoid Off current) C13CC (Case 4): SM2 solenoid circuit high (solenoid Off current) C13C2 (Case 4): SM2 solenoid circuit high (solenoid On current) C13C2 (Case 4): SM2 solenoid circuit high (solenoid On current) C13C3 (Case 4): SM2 solenoid circuit high (solenoid On current) C13C2 (Case 4): SM2 solenoid circuit high (solenoid On current) C13C2 (Case 4): SM2 solenoid circuit high (solenoid On current) C13C2 (Case 4): SM2 solenoid circuit high (solenoid On current) C13C2 (Case 4): SM2 solenoid circuit high (solenoid On current) C13C2 (Case 4): SM2 solenoid circuit high (solenoid On current) C13C2 (Case 4): SM2 solenoid circuit high (solenoid On current) C13C2 (Case 4): SM2 solenoid circuit high (solenoid On current) C13C2 (Case 4): SM2 solenoid circuit high (solenoid On current) C13C2 (Case 4): SM2 solenoid circuit high (solenoid On current) C13C2 (Case 4): SM2 solenoid circuit high (solenoid On current) C13C2 (Case 4): SM2 solenoid circuit high (solenoid On current) C13C2 (Case 4): SM2 solenoid circuit high (solenoid On current) C13C2 (Case 4): SM2 solenoid circuit high (solenoid On current) C13C2 (Case 4): SM2 solenoid circuit high (solenoid On current) C13C2 (Case 4): SM2 solenoid circuit high (solenoid On current) C13C2 (Case 4): SM2 solenoid circuit high (solenoid On current) C13C2 (Case 4): SM2 sol		
C12F6: ABS hold solenoid other functional C12F7: ABS hold solenoid other functional C13BF: SM solenoid other functional C13BF: SM solenoid other functional C13C2 (Case 1 and 2): SM1 solenoid circuit open C13C2 (Case 3): SM1 solenoid circuit low C13C3 (Case 3): SM1 solenoid circuit high (solenoid Off current) C13C3 (Case 2): SM1 solenoid circuit high (IC data) C13C3 (Case 2): SM2 solenoid circuit high (IC data) C13C3 (Case 4): SM1 solenoid circuit high (solenoid On current) C13C6 (Case 1): SM2 solenoid circuit high (solenoid Off current) C13C6 (Case 3): SM2 solenoid circuit high (solenoid Off current) C13C6 (Case 3): SM2 solenoid circuit high (solenoid Off current) C13C7 (Case 4): SM2 solenoid circuit high (solenoid Off current) C13C8 (Case 4): SM2 solenoid circuit high (solenoid Off current) C13C8 (Case 4): SM2 solenoid circuit high (solenoid Off current) C13C9: Brake system voltage power supply relay circuit high C143B: Brake system voltage power supply relay circuit high C143B: Brake system voltage power supply relay circuit open All of the following conditions are met A, B, C, D, E, F and G  A. Command to solenoid relay On B. Following condition is met More than 0.012 seconds  AST voltage  G V or higher  C. Following condition is met More than 0.22 seconds  +BS voltage D. Following condition is met More than 0.054 seconds  Solenoid target current value  F. HGR voltage Higher than 10 V		C12F4: ABS release solenoid (RR) circuit low
C12F7: ABS hold solenoid other functional C13BF: SM solenoid other functional C13C2 (Case 1 and 2): SM1 solenoid circuit open C13C2 (Case 3): SM1 solenoid circuit low C13C3 (Case 2): SM1 solenoid circuit high (solenoid Off current) C13C3 (Case 2): SM1 solenoid circuit high (IC data) C13C3 (Case 2): SM1 solenoid circuit high (IC data) C13C3 (Case 4): SM1 solenoid circuit high (IC data) C13C3 (Case 4): SM1 solenoid circuit high (solenoid On current) C13C6 (Case 1 and 2): SM2 solenoid circuit open C13C6 (Case 3): SM2 solenoid circuit high (solenoid Off current) C13CC (Case 4): SM2 solenoid circuit high (solenoid Off current) C13CC (Case 4): SM2 solenoid circuit high (IC data) C13CC (Case 4): SM2 solenoid circuit high (solenoid On current) C137D: Brake system voltage circuit high (c143B: Brake system voltage power supply relay circuit high C143B: Brake system voltage power supply relay circuit high C143C: Brake system voltage power supply relay circuit open All of the following conditions are met A, B, C, D, E, F and G  A. Command to solenoid relay On B. Following condition is met More than 0.012 seconds  AST voltage 6 V or higher C. Following condition is met More than 0.22 seconds  +BS voltage 17.4 V or less  D. Following condition is met More than 0.054 seconds  Solenoid target current value  F. HGR voltage Higher than 10 V		C12F5: ABS release solenoid (RR) circuit high
C13BF: SM solenoid other functional C13C2 (Case 1 and 2): SM1 solenoid circuit open C13C2 (Case 1): SM1 solenoid circuit low C13C3 (Case 1): SM1 solenoid circuit high (solenoid Off current) C13C3 (Case 1): SM1 solenoid circuit high (IC data) C13C3 (Case 2): SM1 solenoid circuit high (IC data) C13C3 (Case 2): SM2 solenoid circuit high (IC data) C13C8 (Case 1 and 2): SM2 solenoid circuit high (solenoid On current) C13C8 (Case 1): SM2 solenoid circuit high (solenoid Off current) C13C8 (Case 1): SM2 solenoid circuit high (solenoid Off current) C13CC (Case 1): SM2 solenoid circuit high (IC data) C13CC (Case 2): SM2 solenoid circuit high (IC data) C13CC (Case 4): SM2 solenoid circuit high (solenoid On current) C13CB: Gase 3): SM2 solenoid circuit high (IC data) C13CC (Case 4): SM2 solenoid circuit high (solenoid On current) C13CB: Gase 3): SM2 solenoid circuit high (IC data) C13CC (Case 4): SM2 solenoid circuit high (IC data) C13CC (Case 4): SM2 solenoid circuit high (solenoid On current) C13CB: Gase 3): SM2 solenoid circuit high (IC data) C13CC (Case 4): SM2 solenoid circuit high (IC data) C13CC (Case 4): SM2 solenoid circuit high (IC data) C13CC (Case 4): SM2 solenoid circuit high (IC data) C13CC (Case 4): SM2 solenoid circuit high (IC data) C13CC (Case 4): SM2 solenoid circuit high (IC data) C13CC (Case 4): SM2 solenoid circuit high (IC data) C13CC (Case 4): SM2 solenoid circuit high (IC data) C13CC (Case 4): SM2 solenoid circuit high (IC data) C13CC (Case 4): SM2 solenoid circuit high (IC data) C13CC (Case 4): SM2 solenoid circuit high (IC data) C13CC (Case 4): SM2 solenoid circuit high (IC data) C13CC (Case 4): SM2 solenoid circuit high (IC data) C13CC (Case 4): SM2 solenoid circuit high (IC data) C13CC (Case 4): SM2 solenoid circuit high (IC data) C13CC (Case 4): SM2 solenoid circuit high (IC data) C13CC (Case 4): SM2 solenoid circuit high (IC data) C13CC (Case 4): SM2 solenoid circuit high (IC data) C13CC (Case 4): SM2 solenoid circuit high (IC data) C13CC (Case 2): SM2 solenoid circuit high (IC data) C13CC (C		C12F6: ABS hold solenoid other functional
C13C2 (Case 1 and 2): SM1 solenoid circuit open C13C2 (Case 3): SM1 solenoid circuit low C13C3 (Case 3): SM1 solenoid circuit low C13C3 (Case 1): SM1 solenoid circuit high (solenoid Off current) C13C3 (Case 4): SM1 solenoid circuit high (IC data) C13C3 (Case 4): SM1 solenoid circuit high (solenoid On current) C13CB (Case 1 and 2): SM2 solenoid circuit open C13CB (Case 3): SM2 solenoid circuit open C13CB (Case 3): SM2 solenoid circuit high (solenoid Off current) C13CC (Case 1): SM2 solenoid circuit high (IC data) C13CC (Case 2 and 3): SM2 solenoid circuit high (IC data) C13CC (Case 4): SM2 solenoid circuit high (solenoid On current) C13CD (Case 4): SM2 solenoid circuit high (solenoid On current		
C13C2 (Case 3): SM1 solenoid circuit low C13C3 (Case 1): SM1 solenoid circuit high (solenoid Off current) C13C3 (Case 1): SM1 solenoid circuit high (IC data) C13C3 (Case 4): SM1 solenoid circuit high (IC data) C13C3 (Case 4): SM1 solenoid circuit high (Solenoid On current) C13CB (Case 1): SM2 solenoid circuit open C13CB (Case 3): SM2 solenoid circuit inpen (C13CB (Case 1): SM2 solenoid circuit high (Solenoid Off current) C13CC (Case 1): SM2 solenoid circuit high (IC data) C13CC (Case 2): SM2 solenoid circuit high (IC data) C13CC (Case 4): SM2 solenoid circuit high (IC data) C13C2 (Case 4): SM2 solenoid circuit high (Solenoid On current) C137D: Brake system voltage circuit high C143B: Brake system voltage circuit high C143C: Brake system voltage power supply relay circuit open All of the following conditions are met A, B, C, D, E, F and G  A. Command to solenoid relay On B. Following condition is met More than 0.012 seconds AST voltage G. Following condition is met More than 0.22 seconds  +BS voltage 17.4 V or less  D. Following condition is met More than 0.054 seconds  Solenoid target current value  G. Following condition is met More than 0.054 seconds  F. Higher than 10 V		
C13C3 (Case 1): SM1 solenoid circuit high (solenoid Off current) C13C3 (Case 2 and 3): SM1 solenoid circuit high (IC data) C13C3 (Case 4): SM1 solenoid circuit high (Solenoid On current) C13CB (Case 1 and 2): SM2 solenoid circuit open C13CB (Case 3): SM2 solenoid circuit high (solenoid On current) C13CB (Case 3): SM2 solenoid circuit high (solenoid Off current) C13CC (Case 1): SM2 solenoid circuit high (Solenoid Off current) C13CC (Case 2 and 3): SM2 solenoid circuit high (IC data) C13CC (Case 2): SM2 solenoid circuit high (solenoid On current) C13CB (Case 3): SM2 solenoid circuit high (solenoid On current) C13CB (Case 4): SM2 solenoid circuit high (solenoid On current) C13CD: Brake system voltage circuit high C143B: Brake system voltage power supply relay circuit open All of the following conditions are met A, B, C, D, E, F and G  A. Command to solenoid relay On  B. Following condition is met More than 0.012 seconds  AST voltage 6 V or higher C. Following condition is met More than 0.22 seconds  +BS voltage 17.4 V or less  D. Following condition is met More than 0.054 seconds  Solenoid target current value  9.5 V or higher F. IGR voltage Higher than 10 V		
C13C3 (Case 2 and 3): SM1 solenoid circuit high (IC data) C13C3 (Case 4): SM1 solenoid circuit high (solenoid On current) C13CB (Case 1 and 2): SM2 solenoid circuit open C13CB (Case 3): SM2 solenoid circuit low C13CC (Case 1): SM2 solenoid circuit high (solenoid Off current) C13CC (Case 1): SM2 solenoid circuit high (IC data) C13CC (Case 2 and 3): SM2 solenoid circuit high (IC data) C13CC (Case 2 and 3): SM2 solenoid circuit high (solenoid Off current) C13CC (Case 4): SM2 solenoid circuit high (solenoid On current) C137D: Brake system voltage circuit high C143B: Brake system voltage power supply relay circuit high C143C: Brake system voltage power supply relay circuit open All of the following conditions are met A, B, C, D, E, F and G  A. Command to solenoid relay On B. Following condition is met More than 0.012 seconds  AST voltage 6 V or higher  C. Following condition is met More than 0.22 seconds  +BS voltage 17.4 V or less  D. Following condition is met More than 0.054 seconds  Solenoid target current value 0 A  E. +BS voltage Higher than 10 V		
C13C3 (Case 4): SM1 solenoid circuit high (solenoid On current) C13CB (Case 1 and 2): SM2 solenoid circuit open C13CB (Case 3): SM2 solenoid circuit low C13CC (Case 1): SM2 solenoid circuit high (solenoid Off current) C13CC (Case 2 and 3): SM2 solenoid circuit high (IC data) C13CC (Case 4): SM2 solenoid circuit high (IC data) C13CC (Case 4): SM2 solenoid circuit high (solenoid On current) C137D: Brake system voltage circuit high C143B: Brake system voltage power supply relay circuit high C143C: Brake system voltage power supply relay circuit open All of the following conditions are met A, B, C, D, E, F and G  A. Command to solenoid relay On B. Following condition is met More than 0.012 seconds  AST voltage 6 V or higher  C. Following condition is met More than 0.22 seconds  +BS voltage 17.4 V or less  D. Following condition is met More than 0.054 seconds  Solenoid target current value 0 A  E. +BS voltage Higher than 10 V		
C13CB (Case 1 and 2): SM2 solenoid circuit open C13CB (Case 3): SM2 solenoid circuit low C13CC (Case 1): SM2 solenoid circuit high (solenoid Off current) C13CC (Case 2 and 3): SM2 solenoid circuit high (IC data) C13CC (Case 4): SM2 solenoid circuit high (IC data) C13CC (Case 4): SM2 solenoid circuit high (solenoid On current) C137D: Brake system voltage circuit high C143B: Brake system voltage power supply relay circuit high C143C: Brake system voltage power supply relay circuit open All of the following conditions are met A, B, C, D, E, F and G  A. Command to solenoid relay On B. Following condition is met More than 0.012 seconds  AST voltage 6 V or higher C. Following condition is met More than 0.22 seconds  +BS voltage 17.4 V or less D. Following condition is met More than 0.054 seconds  Solenoid target current value 0 A  E. +BS voltage Higher than 10 V		
C13CB (Case 3): SM2 solenoid circuit low C13CC (Case 1): SM2 solenoid circuit high (solenoid Off current) C13CC (Case 2 and 3): SM2 solenoid circuit high (IC data) C13CC (Case 4): SM2 solenoid circuit high (IC data) C13CC (Case 4): SM2 solenoid circuit high (solenoid On current) C137D: Brake system voltage circuit high C143B: Brake system voltage power supply relay circuit high C143C: Brake system voltage power supply relay circuit open All of the following conditions are met A, B, C, D, E, F and G  A. Command to solenoid relay On B. Following condition is met More than 0.012 seconds  AST voltage 6 V or higher C. Following condition is met More than 0.22 seconds  +BS voltage 17.4 V or less D. Following condition is met More than 0.054 seconds  Solenoid target current value 0 A  E. +BS voltage Higher than 10 V		
C13CC (Case 1): SM2 solenoid circuit high (solenoid Off current) C13CC (Case 2 and 3): SM2 solenoid circuit high (IC data) C13CC (Case 4): SM2 solenoid circuit high (IC data) C13CC (Case 4): SM2 solenoid circuit high (solenoid On current) C137D: Brake system voltage circuit high C143B: Brake system voltage power supply relay circuit high C143C: Brake system voltage power supply relay circuit open  All of the following conditions are met  A, B, C, D, E, F and G  A. Command to solenoid relay  On  B. Following condition is met  More than 0.012 seconds  AST voltage  C. Following condition is met  More than 0.22 seconds  +BS voltage  D. Following condition is met  More than 0.054 seconds  Solenoid target current value  O A  E. +BS voltage  Higher than 10 V		
C13CC (Case 4): SM2 solenoid circuit high (solenoid On current) C137D: Brake system voltage circuit high C143B: Brake system voltage power supply relay circuit high C143C: Brake system voltage power supply relay circuit open  All of the following conditions are met A, B, C, D, E, F and G  A. Command to solenoid relay On B. Following condition is met More than 0.012 seconds  AST voltage G V or higher  C. Following condition is met More than 0.22 seconds  +BS voltage 17.4 V or less  D. Following condition is met More than 0.054 seconds  Solenoid target current value G A  E. +BS voltage Higher than 10 V  Higher than 10 V		C13CC (Case 1): SM2 solenoid circuit high (solenoid Off current)
C137D: Brake system voltage circuit high C143B: Brake system voltage power supply relay circuit high C143C: Brake system voltage power supply relay circuit open  All of the following conditions are met A, B, C, D, E, F and G  A. Command to solenoid relay On B. Following condition is met More than 0.012 seconds  AST voltage 6 V or higher  C. Following condition is met More than 0.22 seconds  +BS voltage 17.4 V or less  D. Following condition is met More than 0.054 seconds  Solenoid target current value 0 A  E. +BS voltage 9.5 V or higher  F. IGR voltage Higher than 10 V		C13CC (Case 2 and 3): SM2 solenoid circuit high (IC data)
C143B: Brake system voltage power supply relay circuit high C143C: Brake system voltage power supply relay circuit open  All of the following conditions are met A, B, C, D, E, F and G  A. Command to solenoid relay On B. Following condition is met More than 0.012 seconds  AST voltage 6 V or higher  C. Following condition is met More than 0.22 seconds  +BS voltage 17.4 V or less  D. Following condition is met More than 0.054 seconds  Solenoid target current value 0 A  E. +BS voltage 9.5 V or higher  F. IGR voltage Higher than 10 V		C13CC (Case 4): SM2 solenoid circuit high (solenoid On current)
C143C: Brake system voltage power supply relay circuit open  All of the following conditions are met  A, B, C, D, E, F and G  A. Command to solenoid relay  Dn  B. Following condition is met  More than 0.012 seconds  AST voltage  C. Following condition is met  More than 0.22 seconds  +BS voltage  17.4 V or less  D. Following condition is met  More than 0.054 seconds  Solenoid target current value  D A  E. +BS voltage  9.5 V or higher  Higher than 10 V		C137D: Brake system voltage circuit high
All of the following conditions are met  A, B, C, D, E, F and G  A. Command to solenoid relay  B. Following condition is met  More than 0.012 seconds  AST voltage  C. Following condition is met  More than 0.22 seconds  +BS voltage  17.4 V or less  D. Following condition is met  More than 0.054 seconds  Solenoid target current value  E. +BS voltage  9.5 V or higher  F. IGR voltage  Higher than 10 V		
A. Command to solenoid relay  B. Following condition is met  More than 0.012 seconds  AST voltage  6 V or higher  C. Following condition is met  More than 0.22 seconds  +BS voltage  17.4 V or less  D. Following condition is met  More than 0.054 seconds  Solenoid target current value  0 A  E. +BS voltage  9.5 V or higher  F. IGR voltage  Higher than 10 V		C143C: Brake system voltage power supply relay circuit open
B. Following condition is met  AST voltage  6 V or higher  C. Following condition is met  More than 0.22 seconds  +BS voltage  17.4 V or less  D. Following condition is met  More than 0.054 seconds  Solenoid target current value  E. +BS voltage  9.5 V or higher  F. IGR voltage  Higher than 10 V	All of the following conditions are met	A, B, C, D, E, F and G
AST voltage 6 V or higher  C. Following condition is met More than 0.22 seconds  +BS voltage 17.4 V or less  D. Following condition is met More than 0.054 seconds  Solenoid target current value 0 A  E. +BS voltage 9.5 V or higher  F. IGR voltage Higher than 10 V	A. Command to solenoid relay	On
C. Following condition is met  HBS voltage  D. Following condition is met  More than 0.22 seconds  More than 0.054 seconds  O A  E. +BS voltage  9.5 V or higher  F. IGR voltage  Higher than 10 V	B. Following condition is met	More than 0.012 seconds
+BS voltage 17.4 V or less  D. Following condition is met More than 0.054 seconds  Solenoid target current value 0 A  E. +BS voltage 9.5 V or higher  F. IGR voltage Higher than 10 V	AST voltage	6 V or higher
D. Following condition is met  More than 0.054 seconds  Solenoid target current value  0 A  E. +BS voltage  9.5 V or higher  F. IGR voltage  Higher than 10 V	C. Following condition is met	More than 0.22 seconds
Solenoid target current value 0 A  E. +BS voltage 9.5 V or higher  F. IGR voltage Higher than 10 V	+BS voltage	17.4 V or less
E. +BS voltage 9.5 V or higher  F. IGR voltage Higher than 10 V	D. Following condition is met	More than 0.054 seconds
F. IGR voltage Higher than 10 V	Solenoid target current value	0 A
	E. +BS voltage	9.5 V or higher
G. IGP voltage Higher than 10 V	F. IGR voltage	Higher than 10 V
	G. IGP voltage	Higher than 10 V

### C12D4 (Case 4)

Monitor runs whenever the following DTCs are not	C0597: ABS hold solenoid performance
stored	C12A7 (Case 1 and 2): ABS hold solenoid (FL) circuit open
	C12A7 (Case 3): ABS hold solenoid (FL) circuit low

- C12A8 (Case 1): ABS hold solenoid (FL) circuit high (solenoid Off current)
- C12A8 (Case 2 and 3): ABS hold solenoid (FL) circuit high (IC data)
- C12A8 (Case 4): ABS hold solenoid (FL) circuit high (solenoid On current)
- C12B2: ABS release solenoid (FL) circuit low
- C12B3: ABS release solenoid (FL) circuit high
- C12BD (Case 1 and 2): ABS hold solenoid (FR) circuit open
- C12BD (Case 3): ABS hold solenoid (FR) circuit low
- C12BE (Case 1): ABS hold solenoid (FR) circuit high (solenoid Off current)
- C12BE (Case 2 and 3): ABS hold solenoid (FR) circuit high (IC data)
- C12BE (Case 4): ABS hold solenoid (FR) circuit high (solenoid On current)
- C12C8: ABS release solenoid (FR) circuit low
- C12C9: ABS release solenoid (FR) circuit high
- C12D3 (Case 1 and 2): ABS hold solenoid (RL) circuit open
- C12D3 (Case 3): ABS hold solenoid (RL) circuit low
- C12DE: ABS release solenoid (RL) circuit low
- C12DF: ABS release solenoid (RL) circuit high
- C12E9 (Case 1 and 2): ABS hold solenoid (RR) circuit open
- C12E9 (Case 3): ABS hold solenoid (RR) circuit low
- C12EA (Case 1): ABS hold solenoid (RR) circuit high
- (solenoid Off current)
- C12EA (Case 2 and 3): ABS hold solenoid (RR) circuit high (IC data)
- C12EA (Case 4): ABS hold solenoid (RR) circuit high (solenoid On current)
- C12F4: ABS release solenoid (RR) circuit low
- C12F5: ABS release solenoid (RR) circuit high
- C12F6: ABS hold solenoid other functional
- C12F7: ABS hold solenoid other functional
- C13BF: SM solenoid other functional
- C13C2 (Case 1 and 2): SM1 solenoid circuit open
- C13C2 (Case 3): SM1 solenoid circuit low
- C13C3 (Case 1): SM1 solenoid circuit high (solenoid Off current)
- C13C3 (Case 2 and 3): SM1 solenoid circuit high (IC data)
- C13C3 (Case 4): SM1 solenoid circuit high (solenoid On current)
- C13CB (Case 1 and 2): SM2 solenoid circuit open
- C13CB (Case 3): SM2 solenoid circuit low
- C13CC (Case 1): SM2 solenoid circuit high (solenoid Off current)
- C13CC (Case 2 and 3): SM2 solenoid circuit high (IC data)
- C13CC (Case 4): SM2 solenoid circuit high (solenoid On current)
- C137D: Brake system voltage circuit high

	C143B: Brake system voltage power supply relay circuit high C143C: Brake system voltage power supply relay circuit open
All of the following conditions are met	A, B, C, D, E, F, G, H, I, J and K
A. Command to solenoid relay	On
B. Following condition is met	More than 0.012 seconds
AST voltage	9.5 V or higher
C. Following condition is met	More than 0.22 seconds
+BS voltage	17.4 V or less
D. Following condition is met	More than 0.048 seconds
Solenoid target current value	Higher than 0 A
E. Solenoid overcurrent signal (IC Data)	Off
F. Solenoid driver overtemperature signal (IC Data)	Off
G. Solenoid return current terminal disconnection signal (IC Data)	Off
H. Solenoid GND terminal disconnection signal (IC Data)	Off
I. +BS voltage	9.5 V or higher
J. IGR voltage	Higher than 10 V
K. IGP voltage	Higher than 10 V

## C12DE (Case 1)

Monitor runs whenever the following DTCs are	C0597: ABS hold solenoid performance
not stored	C12A7 (Case 1 and 2): ABS hold solenoid (FL) circuit open
	C12A7 (Case 3): ABS hold solenoid (FL) circuit low
	C12A8 (Case 1): ABS hold solenoid (FL) circuit high (solenoid Off current)
	C12A8 (Case 2 and 3): ABS hold solenoid (FL) circuit high (IC data)
	C12A8 (Case 4): ABS hold solenoid (FL) circuit high (solenoid On current)
	C12B3: ABS release solenoid (FL) circuit high
	C12BD (Case 1 and 2): ABS hold solenoid (FR) circuit open
	C12BD (Case 3): ABS hold solenoid (FR) circuit low
	C12BE (Case 1): ABS hold solenoid (FR) circuit high (solenoid Off current)
	C12BE (Case 2 and 3): ABS hold solenoid (FR) circuit high (IC data)
	C12BE (Case 4): ABS hold solenoid (FR) circuit high (solenoid On current)
	C12C9: ABS release solenoid (FR) circuit high
	C12D3 (Case 1 and 2): ABS hold solenoid (RL) circuit open
	C12D3 (Case 3): ABS hold solenoid (RL) circuit low

	C12D4 (Case 1): ABS hold solenoid (RL) circuit high (solenoid Off current) C12D4 (Case 2 and 3): ABS hold solenoid (RL) circuit high (IC data) C12D4 (Case 4): ABS hold solenoid (RL) circuit high (solenoid On current) C12DF: ABS release solenoid (RL) circuit high C12E9 (Case 1 and 2): ABS hold solenoid (RR) circuit open C12E9 (Case 3): ABS hold solenoid (RR) circuit low C12EA (Case 1): ABS hold solenoid (RR) circuit high (solenoid Off current) C12EA (Case 2 and 3): ABS hold solenoid (RR) circuit high (IC data) C12EA (Case 4): ABS hold solenoid (RR) circuit high (solenoid On current) C12F5: ABS release solenoid (RR) circuit high C12F6: ABS hold solenoid other functional C12F7: ABS hold solenoid other functional C13BF: SM solenoid other functional C13C2 (Case 1 and 2): SM1 solenoid circuit open C13C3 (Case 1): SM1 solenoid circuit high (solenoid Off current) C13C3 (Case 2 and 3): SM1 solenoid circuit high (solenoid On current) C13CB (Case 1 and 2): SM2 solenoid circuit high (solenoid On current) C13CB (Case 1): SM2 solenoid circuit high (solenoid Off current) C13CB (Case 3): SM2 solenoid circuit high (solenoid Off current) C13CC (Case 2): SM2 solenoid circuit high (solenoid Off current) C13CC (Case 2): SM2 solenoid circuit high (solenoid Off current) C13CC (Case 4): SM2 solenoid circuit high (solenoid Off current) C13CC (Case 4): SM2 solenoid circuit high (solenoid Off current)
	C137D: Brake system voltage circuit high C143B: Brake system voltage power supply relay circuit high C143C: Brake system voltage power supply relay circuit open
All of the following conditions are met	A, B, C, D, E, F, G and H
A. Command to solenoid relay	On Mare than 0.012 accords
B. Following condition is met	More than 0.012 seconds
AST voltage	6 V or higher
C. Following condition is met	More than 0.22 seconds
+BS voltage	17.4 V or less
D. Following condition is met	More than 0.015 seconds
Command to ABS release solenoid	Off
E. Following condition is met	More than 0.015 seconds
Command to reference solenoid	Off
F. +BS voltage	9.5 V or higher
G. IGR voltage	Higher than 10 V
H. IGP voltage	Higher than 10 V

### C12DE (Case 2)

Monitor	runs	whenever	the	following	DTCs	are
not store	he					

C0597: ABS hold solenoid performance

C12A7 (Case 1 and 2): ABS hold solenoid (FL) circuit open

C12A7 (Case 3): ABS hold solenoid (FL) circuit low

C12A8 (Case 1): ABS hold solenoid (FL) circuit high (solenoid Off current)

C12A8 (Case 2 and 3): ABS hold solenoid (FL) circuit high (IC data)

C12A8 (Case 4): ABS hold solenoid (FL) circuit high (solenoid On current)

C12B3: ABS release solenoid (FL) circuit high

C12BD (Case 1 and 2): ABS hold solenoid (FR) circuit open

C12BD (Case 3): ABS hold solenoid (FR) circuit low

C12BE (Case 1): ABS hold solenoid (FR) circuit high (solenoid Off current)

C12BE (Case 2 and 3): ABS hold solenoid (FR) circuit high (IC data)

C12BE (Case 4): ABS hold solenoid (FR) circuit high (solenoid On current)

C12C9: ABS release solenoid (FR) circuit high

C12D3 (Case 1 and 2): ABS hold solenoid (RL) circuit open

C12D3 (Case 3): ABS hold solenoid (RL) circuit low

C12D4 (Case 1): ABS hold solenoid (RL) circuit high (solenoid Off current)

C12D4 (Case 2 and 3): ABS hold solenoid (RL) circuit high (IC data)

C12D4 (Case 4): ABS hold solenoid (RL) circuit high (solenoid On current)

C12DF: ABS release solenoid (RL) circuit high

C12E9 (Case 1 and 2): ABS hold solenoid (RR) circuit open

C12E9 (Case 3): ABS hold solenoid (RR) circuit low

C12EA (Case 1): ABS hold solenoid (RR) circuit high (solenoid Off current)

C12EA (Case 2 and 3): ABS hold solenoid (RR) circuit high (IC data)

C12EA (Case 4): ABS hold solenoid (RR) circuit high (solenoid On current)

C12F5: ABS release solenoid (RR) circuit high

C12F6: ABS hold solenoid other functional

C12F7: ABS hold solenoid other functional

C13BF: SM solenoid other functional

C13C2 (Case 1 and 2): SM1 solenoid circuit open

C13C2 (Case 3): SM1 solenoid circuit low

C13C3 (Case 1): SM1 solenoid circuit high (solenoid Off current)

C13C3 (Case 2 and 3): SM1 solenoid circuit high (IC data)

C13C3 (Case 4): SM1 solenoid circuit high (solenoid On current)

C13CB (Case 1 and 2): SM2 solenoid circuit open

C13CB (Case 3): SM2 solenoid circuit low

C13CC (Case 1): SM2 solenoid circuit high (solenoid Off current)

C13CC (Case 2 and 3): SM2 solenoid circuit high (IC data)

	C13CC (Case 4): SM2 solenoid circuit high (solenoid On current) C137D: Brake system voltage circuit high C143B: Brake system voltage power supply relay circuit high C143C: Brake system voltage power supply relay circuit open		
All of the following conditions are met	A, B, C, D, E, F, G and H		
A. Command to solenoid relay	On		
B. Following condition is met	More than 0.012 seconds		
AST voltage	6 V or higher		
C. Following condition is met	More than 0.22 seconds		
+BS voltage	17.4 V or less		
D. Either of the following conditions is met	a or b		
a. Following condition is met	More than 0.006 seconds		
Command to ABS release solenoid	On		
b. Following condition is met	More than 0.015 seconds		
Command to ABS release solenoid	Off		
E. Either of the following conditions is met	a or b		
a. Following condition is met	More than 0.006 seconds		
Command to reference solenoid	On		
b. Following condition is met	More than 0.015 seconds		
Command to reference solenoid	Off		
F. +BS voltage	9.5 V or higher		
G. IGR voltage	Higher than 10 V		
H. IGP voltage	Higher than 10 V		

## C12DF (Case 1) and C12F5 (Case 2)

Monitor runs whenever the following DTCs are	C0597: ABS hold solenoid performance
not stored	C12A7 (Case 1 and 2): ABS hold solenoid (FL) circuit open
	C12A7 (Case 3): ABS hold solenoid (FL) circuit low
	C12A8 (Case 1): ABS hold solenoid (FL) circuit high (solenoid
	Off current)
	C12A8 (Case 2 and 3): ABS hold solenoid (FL) circuit high (IC
	data)
	C12A8 (Case 4): ABS hold solenoid (FL) circuit high (solenoid
	On current)
	C12B2: ABS release solenoid (FL) circuit low
	C12BD (Case 1 and 2): ABS hold solenoid (FR) circuit open
	C12BD (Case 3): ABS hold solenoid (FR) circuit low
	C12BE (Case 1): ABS hold solenoid (FR) circuit high (solenoid
	Off current)
	C12BE (Case 2 and 3): ABS hold solenoid (FR) circuit high (IC
	data)
	C12BE (Case 4): ABS hold solenoid (FR) circuit high (solenoid
	On current)

	C12C8: ABS release solenoid (FR) circuit low C12D3 (Case 1 and 2): ABS hold solenoid (RL) circuit open C12D3 (Case 3): ABS hold solenoid (RL) circuit low C12D4 (Case 1): ABS hold solenoid (RL) circuit high (solenoid Off current) C12D4 (Case 2 and 3): ABS hold solenoid (RL) circuit high (IC data) C12D4 (Case 4): ABS hold solenoid (RL) circuit high (solenoid On current) C12DE: ABS release solenoid (RL) circuit low C12E9 (Case 1 and 2): ABS hold solenoid (RR) circuit open C12E9 (Case 3): ABS hold solenoid (RR) circuit low C12EA (Case 1): ABS hold solenoid (RR) circuit high (solenoid Off current) C12EA (Case 2 and 3): ABS hold solenoid (RR) circuit high (IC data) C12EA (Case 4): ABS hold solenoid (RR) circuit high (solenoid On current) C12EA (Case 4): ABS hold solenoid (RR) circuit high (solenoid On current) C12F4: ABS release solenoid (RR) circuit low C12F6: ABS hold solenoid other functional C12F7: ABS hold solenoid other functional C13BF: SM solenoid other functional C13C2 (Case 1 and 2): SM1 solenoid circuit open C13C3 (Case 1): SM1 solenoid circuit high (solenoid Off current) C13C3 (Case 2 and 3): SM1 solenoid circuit high (IC data) C13C6 (Case 1): SM2 solenoid circuit high (solenoid On current) C13C7 (Case 1): SM2 solenoid circuit high (solenoid Off current) C13C8 (Case 1): SM2 solenoid circuit high (solenoid Off current) C13C8 (Case 2 and 3): SM2 solenoid circuit high (solenoid Off current) C13C6 (Case 2): SM2 solenoid circuit high (solenoid Off current) C13C7 (Case 2 and 3): SM2 solenoid circuit high (solenoid Off current) C13C8 (Case 2 and 3): SM2 solenoid circuit high (solenoid On current) C13C8 (Case 4): SM2 solenoid circuit high (solenoid On current) C13C9 (Case 4): SM2 solenoid circuit high (solenoid On current) C13C9 (Case 4): SM2 solenoid circuit high (solenoid On current) C13C9 (Case 4): SM2 solenoid circuit high (solenoid On current) C13C9 (Case 4): SM2 solenoid circuit high (solenoid On current)
	C137D: Brake system voltage circuit high C143B: Brake system voltage power supply relay circuit high
	C143C: Brake system voltage power supply relay circuit open
All of the following conditions are met	A, B, C, D, E, F, G and H
A. Command to solenoid relay	On
B. Following condition is met	More than 0.012 seconds
AST voltage	6 V or higher
C. Following condition is met	More than 0.22 seconds
+BS voltage	17.4 V or less
D. Either of the following conditions is met	a or b
a. Following condition is met	More than 0.006 seconds
Command to ABS release solenoid	On
b. Following condition is met	More than 0.015 seconds
Command to ABS release solenoid	Off

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E. Either of the following conditions is met	a or b
a. Following condition is met	More than 0.006 seconds
Command to reference solenoid	On
b. Following condition is met	More than 0.015 seconds
Command to reference solenoid	Off
F. +BS voltage	9.5 V or higher
G. IGR voltage	Higher than 10 V
H. IGP voltage	Higher than 10 V

# **TYPICAL MALFUNCTION THRESHOLDS**

### C12D3 (Case 1)

Either of the following conditions is met	-
Solenoid return current terminal disconnection signal (IC Data)	On
Solenoid GND terminal disconnection signal (IC Data)	On

### C12D3 (Case 2) and C12DE (Case 1)

Solenoid load open/short to ground signal (IC Data)	On	
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### C12D3 (Case 3)

Solenoid current monitor value / Solenoid target current value	Below 0.25

### C12D4 (Case 1)

Solenoid current monitor value	Higher than 0.1 A

### C12D4 (Case 2) and C12DF (Case 1)

Either of the following conditions is met	-
Solenoid overcurrent signal (IC Data)	On
Solenoid driver overtemperature signal (IC Data)	On

### C12D4 (Case 3)

Solenoid load leakage signal (IC Data)	On	
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### C12D4 (Case 4)

Either of the following conditions is met	A or B
A. Both of the following conditions are met	More than 0.054 seconds
Solenoid target current value	0.25 A or higher
Solenoid current monitor value / Solenoid target current value	Higher than 2

B. Both of the following conditions are met	More than 0.054 seconds
Solenoid target current value	Below 0.25 A
Solenoid current monitor value	0.5 A or higher

### C12DE (Case 2)

Either of the following conditions is met	-
Solenoid load open at ON signal (IC Data)	On
Solenoid GND terminal disconnection signal (IC Data)	On

### C12DF (Case 2)

Both of the following conditions are met	-
Solenoid load leakage signal (IC Data)	On
Solenoid load open/short to ground signal (IC Data)	Off

# **COMPONENT OPERATING RANGE**

### C12D3 (Case 1)

All of the following conditions are met	-
ABS hold solenoid fail (C12A7, C12A8, C12BD, C12BE, C12D4, C12E9, C12EA, C12F6, C12F7)	Not detected
ABS release solenoid fail (C12B2, C12B3, C12C8, C12C9, C12DE, C12DF, C12F4, C12F5)	Not detected
SM solenoid fail (C13BF, C13C2, C13C3, C13CB, C13CC)	Not detected
Brake system voltage fail (C143B, C143C)	Not detected
Initial check	Finished
Solenoid return current terminal disconnection signal (IC Data)	Off
Solenoid GND terminal disconnection signal (IC Data)	Off

### C12D3 (Case 2)

All of the following conditions are met	-
ABS hold solenoid fail (C12A7, C12A8, C12BD, C12BE, C12D4, C12E9, C12EA, C12F6, C12F7)	Not detected
ABS release solenoid fail (C12B2, C12B3, C12C8, C12C9, C12DE, C12DF, C12F4, C12F5)	Not detected
SM solenoid fail (C13BF, C13C2, C13C3, C13CB, C13CC)	Not detected
Brake system voltage fail (C143B, C143C)	Not detected
Initial check	Finished
Solenoid load open/short to ground signal (IC Data)	Off

### C12D3 (Case 3)

All of the following conditions are met	-
ABS hold solenoid fail (C12A7, C12A8, C12BD, C12BE, C12D4, C12E9, C12EA, C12F6, C12F7)	Not detected

ABS release solenoid fail (C12B2, C12B3, C12C8, C12C9, C12DE, C12DF, C12F4, C12F5)	Not detected
SM solenoid fail (C13BF, C13C2, C13C3, C13CB, C13CC)	Not detected
Brake system voltage fail (C143B, C143C)	Not detected
Initial check	Finished
Solenoid current monitor value / Solenoid target current value	0.25 or higher

### C12D4 (Case 1)

All of the following conditions are met	-
ABS hold solenoid fail (C12A7, C12A8, C12BD, C12BE, C12D3, C12E9, C12EA, C12F6, C12F7)	Not detected
ABS release solenoid fail (C12B2, C12B3, C12C8, C12C9, C12DE, C12DF, C12F4, C12F5)	Not detected
SM solenoid fail (C13BF, C13C2, C13C3, C13CB, C13CC)	Not detected
Brake system voltage fail (C143B, C143C)	Not detected
Initial check	Finished
Solenoid current monitor value	0.1 A or less

### C12D4 (Case 2)

All of the following conditions are met	-
ABS hold solenoid fail (C12A7, C12A8, C12BD, C12BE, C12D3, C12E9, C12EA, C12F6, C12F7)	Not detected
ABS release solenoid fail (C12B2, C12B3, C12C8, C12C9, C12DE, C12DF, C12F4, C12F5)	Not detected
SM solenoid fail (C13BF, C13C2, C13C3, C13CB, C13CC)	Not detected
Brake system voltage fail (C143B, C143C)	Not detected
Initial check	Finished
Solenoid overcurrent signal (IC Data)	Off
Solenoid driver overtemperature signal (IC Data)	Off

### C12D4 (Case 3)

All of the following conditions are met	-
ABS hold solenoid fail (C12A7, C12A8, C12BD, C12BE, C12D3, C12E9, C12EA, C12F6, C12F7)	Not detected
ABS release solenoid fail (C12B2, C12B3, C12C8, C12C9, C12DE, C12DF, C12F4, C12F5)	Not detected
SM solenoid fail (C13BF, C13C2, C13C3, C13CB, C13CC)	Not detected
Brake system voltage fail (C143B, C143C)	Not detected
Initial check	Finished
Solenoid load leakage signal (IC Data)	Off

### C12D4 (Case 4)

All of the following conditions are met	-
ABS hold solenoid fail (C12A7, C12A8, C12BD, C12BE, C12D3, C12E9, C12EA, C12F6, C12F7)	Not detected

ABS release solenoid fail (C12B2, C12B3, C12C8, C12C9, C12DE, C12DF, C12F4, C12F5)	Not detected
SM solenoid fail (C13BF, C13C2, C13C3, C13CB, C13CC)	Not detected
Brake system voltage fail (C143B, C143C)	Not detected
Initial check	Finished
Solenoid target current value	0.25 A or higher
Solenoid current monitor value / Solenoid target current value	2 or less
Solenoid target current value	Below 0.25 A
Solenoid current monitor value	0.5 A or less

## C12DE (Case 1)

All of the following conditions are met	-
ABS hold solenoid fail (C12A7, C12A8, C12BD, C12BE, C12D3, C12D4, C12E9, C12EA, C12F6, C12F7)	Not detected
ABS release solenoid fail (C12B3, C12C9, C12DF, C12F5)	Not detected
SM solenoid fail (C13BF, C13C2, C13C3, C13CB, C13CC)	Not detected
Brake system voltage fail (C143B, C143C)	Not detected
Initial check	Finished
Solenoid load open/short to ground signal (IC Data)	Off

## C12DE (Case 2)

All of the following conditions are met	-
ABS hold solenoid fail (C12A7, C12A8, C12BD, C12BE, C12D3, C12D4, C12E9, C12EA, C12F6, C12F7)	Not detected
ABS release solenoid fail (C12B3, C12C9, C12DF, C12F5)	Not detected
SM solenoid fail (C13BF, C13C2, C13C3, C13CB, C13CC)	Not detected
Brake system voltage fail (C143B, C143C)	Not detected
Initial check	Finished
Solenoid load open at ON signal (IC Data)	Off
Solenoid GND terminal disconnection signal (IC Data)	Off

## C12DF (Case 1)

All of the following conditions are met	-
	Not detected

ABS release solenoid fail (C12B2, C12C8, C12DE, C12F4)	Not detected
SM solenoid fail (C13BF, C13C2, C13C3, C13CB, C13CC)	Not detected
Brake system voltage fail (C143B, C143C)	Not detected
Initial check	Finished
Solenoid overcurrent signal (IC Data)	Off
Solenoid driver overtemperature signal (IC Data)	Off

### C12DF (Case 2)

All of the following conditions are met	-
ABS hold solenoid fail (C12A7, C12A8, C12BD, C12BE, C12D3, C12D4, C12E9, C12EA, C12F6, C12F7)	Not detected
ABS release solenoid fail (C12B2, C12C8, C12DE, C12F4)	Not detected
SM solenoid fail (C13BF, C13C2, C13C3, C13CB, C13CC)	Not detected
Brake system voltage fail (C143B, C143C)	Not detected
Initial check	Finished
Solenoid load leakage signal (IC Data)	Off
Solenoid load open/short to ground signal (IC Data)	Off

# **CONFIRMATION DRIVING PATTERN**

#### **NOTICE:**

When performing the normal judgment procedure, make sure that the driver door is closed and is not opened at any time during the procedure.

#### HINT:

- After repair has been completed, clear the DTC and then check that the vehicle has returned to normal by performing the following All Readiness check procedure.
- When clearing the permanent DTCs, refer to the "CLEAR PERMANENT DTC" procedure.
  - 1. Connect the GTS to the DLC3.
  - 2. Turn the ignition switch to ON and turn the GTS on.
  - 3. Clear the DTCs (even if no DTCs are stored, perform the clear DTC procedure).
  - 4. Turn the ignition switch off.
  - 5. Turn the ignition switch to ON (READY) and turn the GTS on.
  - 6. Drive the vehicle at a speed of 20 km/h (12 mph) for 1 minute. [\*1]
  - 7. Operate the ABS using a drum tester or equivalent. [\*2]

#### HINT:

[\*1] to [\*2]: Normal judgment procedure.

The normal judgment procedure is used to complete DTC judgment and also used when clearing permanent DTCs.

8. Enter the following menus: Chassis / Brake/EPB\* / Utility / All Readiness.

- \*: Electric Parking Brake System
- 9. Check the DTC judgment result.

### **HINT:**

- If the judgment result shows NORMAL, the system is normal.
- If the judgment result shows ABNORMAL, the system has a malfunction.
- If the judgment result shows INCOMPLETE, perform driving pattern again.

## **PROCEDURE**

1. REPLACE BRAKE ACTUATOR ASSEMBLY

### HINT:

Click here NFO





