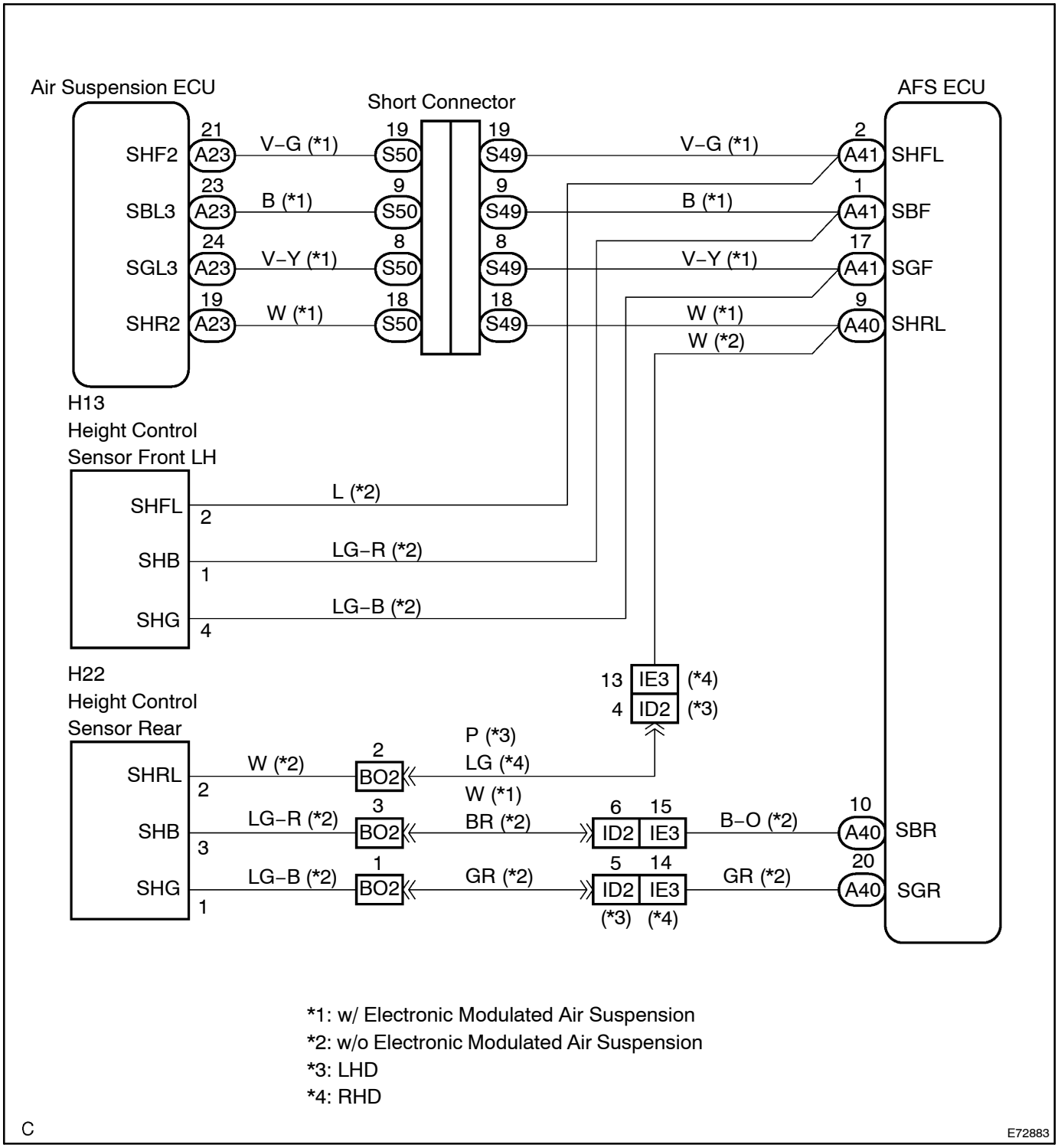
DTC B2416 HEIGHT CONTROL SENSOR MALFUNCTION

CIRCUIT DESCRIPTION

The AFS ECU receives signals regarding the height of the front/rear of the vehicle from the suspension control ECU. If the vehicle doesn't have a suspension control ECU, the AFS ECU also has height control sensors.

DTC No.	DTC Detecting Condition	Trouble Area
B2416	• Malfunction in height control ECU • Open or short in vehicle height sensor circuit	• Suspension control ECU (w/ Air suspension) • Height control sensor (w/o Air suspension) • Wire harness or connector • AFS ECU

WIRING DIAGRAM



*1: w/ Electronic Modulated Air Suspension
*2: w/o Electronic Modulated Air Suspension
*3: LHD
*4: RHD

C

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INSPECTION PROCEDURE

HINT:

For vehicles without an electronic modulated air suspension: If there is a malfunction in the power source circuit inside the AFS ECU, DTC B2412/B2413 are also output. In this case, troubleshoot B2416 and then the B2412 before replacing the AFS ECU.

1	READ VALUE OF INTELLIGENT TESTER II

(a) Connect the intelligent tester II to the DLC3.

(b) Turn the ignition switch to the ON position and turn the intelligent tester II main switch on.

(c) Select the items below in the DATA LIST, and read the displays on the intelligent tester II.

AFS (AFS ECU):

Item	Measurement Item/ Display (Range)	Normal condition	Diagnostic Note
Fr Height Sens Signal Val	Front height sensor signal value/ 0 to 5 V	Approx. 2.5 V	–
Rr Height Sens Signal Val	Rear height sensor signal value/ 0 to 5 V	Approx. 2.5 V	–

OK: Condition sign can be displayed.

Result:

OK (When checking from the PROBLEM SYMPTOMS TABLE)	A
OK (When checking from the DIAGNOSTICS TROUBLE CODE CHART)	B
NG	C

B → **REPLACE AFS ECU (SEE PAGE 65–28 OR 65–29)**

C → **Go to step 2**

A

PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (SEE PAGE 05–1369)

2	CHECK VEHICLE CONDITION

(a) Check the vehicle condition.

Standard:

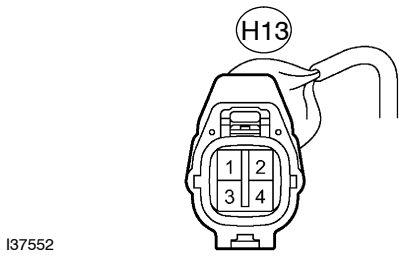
w/o Air Suspension System	A
w/ Air Suspension System	B

B → **Go to step 11**

A

3 CHECK HARNESS AND CONNECTOR(FRONT HEIGHT SENSOR CIRCUIT)

Height Control Sensor Front Wire Harness View:



(a) Disconnect the H13 connector from the height control sensor front LH.

(b) Measure the voltage according to the value(s) in the table below.

Standard:

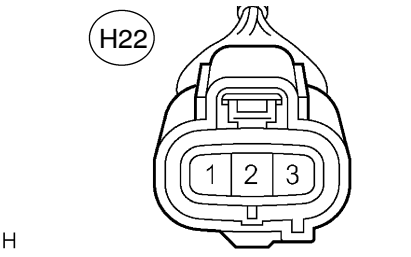
Tester Connection	Condition	Specified Condition
H13–1 – H13–4	Ignition switch ON	4.5 to 5.5 V

NG → **Go to step 9**

OK

4 CHECK HARNESS AND CONNECTOR(REAR HEIGHT SENSOR CIRCUIT)

Height Control Sensor Front Wire Harness View:



(a) Disconnect the H22 connector from the height control sensor rear LH.

(b) Measure the voltage according to the value(s) in the table below.

Standard:

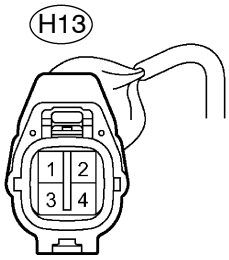
Tester Connection	Condition	Specified Condition
H22–1 – H22–3	Ignition switch ON	4.5 to 5.5 V

NG → **Go to step 10**

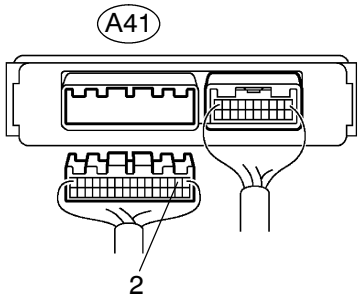
OK

5	CHECK HARNESS AND CONNECTOR(AFS ECU – HEIGHT CONTROL SENSOR FRONT)

Height Control Sensor Front Wire Harness View:



AFS ECU Connector Front View:



(a) Disconnect the A41 connector from the AFS ECU.
(b) Measure the resistance according to the value(s) in the table below.

Standard:

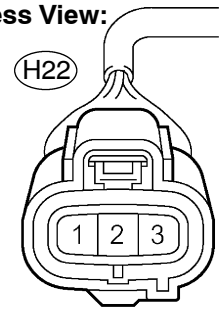
Tester Connection	Condition	Specified Condition
A41–2 (SHFL) – H13–2 (SHFL)	Always	Below 1 Ω
A41–2 (SHFL) – Body ground	Always	10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

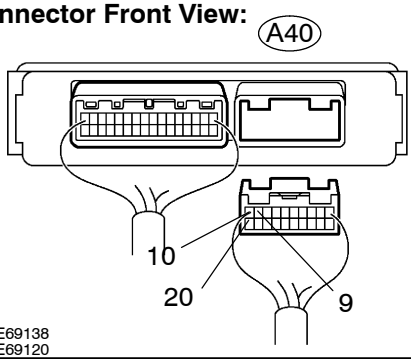
OK

6	CHECK HARNESS AND CONNECTOR(AFS ECU – HEIGHT CONTROL SENSOR REAR)

Height Control Sensor Rear
Wire Harness View:



AFS ECU
Connector Front View:



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(a) Disconnect the A40 connector from AFS ECU.
(b) Measure the resistance according to the value(s) in the table below.

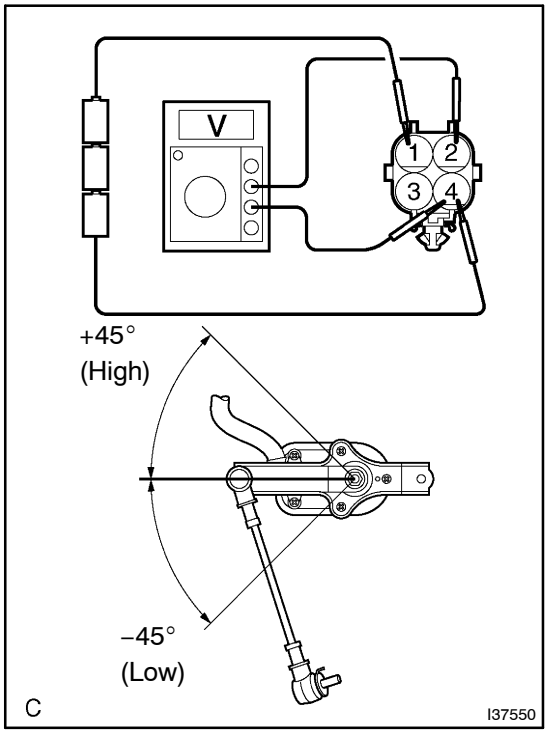
Standard:

Tester Connection	Condition	Specified Condition
A40–9 (SHRL) – H22–2 (SHRL)	Always	Below 1 Ω
A40–9 (SHRL) – Body ground	Always	10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

7	INSPECT HEIGHT CONTROL SENSOR SUB–ASSY FRONT LH



(a) Connect the 3 dry cell batteries (1.5 V) in series.
(b) Remove the height control sensor sub–assy front.
(c) Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead from the battery to terminal 4.
(d) Measure the voltage between terminals 2 and 4 while slowly moving the link up and down.

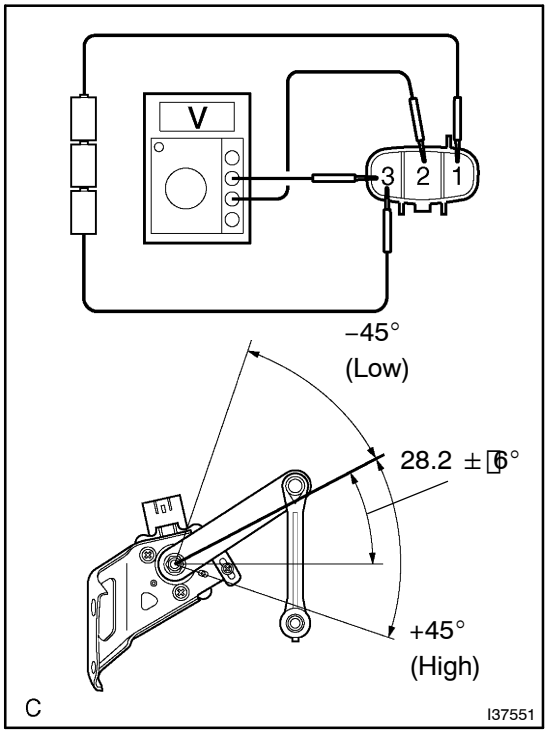
Standard:

Tester Connection	Link Angle	Specified Condition
H13–2 (SHFL) – H13–4 (SGF)	+45° (High)	Approx. 4.5 V
H13–2 (SHFL) – H13–4 (SGF)	0° (Normal)	Approx. 2.5 V
H13–2 (SHFL) – H13–4 (SGF)	–45° (Low)	Approx. 0.5 V

NG → **REPLACE HEIGHT CONTROL SENSOR SUB–ASSY FRONT LH (SEE PAGE 65–26)**

OK

8	INSPECT HEIGHT CONTROL SENSOR SUB–ASSY REAR LH



(a) Connect the 3 dry cell batteries (1.5 V) in series.
(b) Remove the height control sensor sub–assy rear.
(c) Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead from the battery to terminal 3.
(d) Measure the voltage between terminal 2 and 3 while slowly moving the link up and down.

Standard:

Tester Connection	Link Angle	Specified Condition
H22–2 (SHRL) – H22–3 (SHG)	+45° (High)	Approx. 4.5 V
H22–2 (SHRL) – H22–3 (SHG)	0° (Normal)	Approx. 2.5 V
H22–2 (SHRL) – H22–3 (SHG)	–45° (Low)	Approx. 0.5 V

Result:

OK (When checking from the DIAGNOSTIC TROUBLE CODE CHART)	A
OK (When checking from the PROBLEM SYMPTOMS TABLE)	B
NG	C

B → **PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (SEE PAGE 05–1369)**

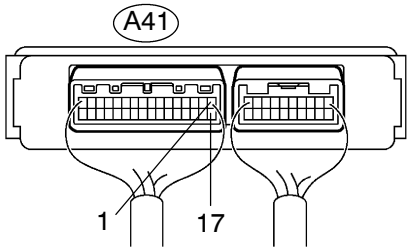
C → **REPLACE HEIGHT CONTROL SENSOR SUB–ASSY REAR LH (SEE PAGE 65–27)**

A

REPLACE AFS ECU (SEE PAGE 65–28 OR 65–29)

9	INSPECT AFS ECU

AFS ECU
Connector Front View:



(a) Measure the voltage according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified Voltage
A41–1 (SBF) – A41–17 (SGF)	Ignition switch ON	4.5 to 5.5 V

Result:

OK	A
NG (When checking from the DIAGNOSTIC TROUBLE CODE CHART)	B
NG (When checking from the PROBLEM SYMPTOMS TABLE)	C

B → **REPLACE AFS ECU (SEE PAGE 65–28 OR 65–29)**

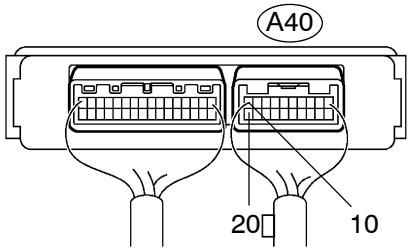
C → **PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (SEE PAGE 05–1369)**

A

REPAIR OR REPLACE HARNESS OR CONNECTOR (AFS ECU – HEIGHT CONTROL SENSOR FRONT)

10	INSPECT AFS ECU

AFS ECU
Connector Front View:



(a) Measure the voltage according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified Voltage
A41–10 (SBR) – A41–20 (SGR)	Ignition switch ON	4.5 to 5.5 V

Result:

OK	A
NG (When checking from the DIAGNOSTIC TROUBLE CODE CHART)	B
NG (When checking from the PROBLEM SYMPTOMS TABLE)	C

B → **REPLACE AFS ECU (SEE PAGE 65–28 OR 65–29)**

C → **PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (SEE PAGE 05–1369)**

A

REPAIR OR REPLACE HARNESS OR CONNECTOR (AFS ECU – HEIGHT CONTROL SENSOR REAR)

11	CHECK DTC(AIR SUSPENSION SYSTEM)

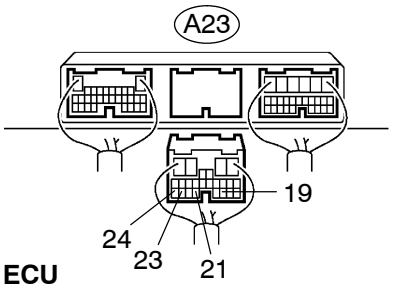
(a) Check for DTCs in the air suspension system (see page 05–248).
OK: Normal system code is output.

NG → **GO TO FLOW CHART (SEE PAGE 05–254)**

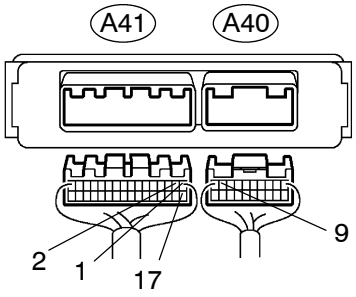
OK

12 CHECK HARNESS AND CONNECTOR(SUSPENSION CONTROL ECU – AFS ECU)

Air Suspension ECU
Connector Front View:



AFS ECU
Connector Front View:



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(a) Disconnect the suspension control ECU connector and AFS ECU connectors.
(b) Measure the resistance according to the value(s) in the table below.

Standard:

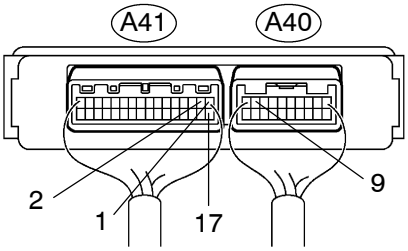
Tester connection	Condition	Specified condition
A41–1 (SBF) – A23–23 (SBL3)	Always	Below 1 Ω
A41–2 (SHFL) – A23–21 (SHF2)	Always	Below 1 Ω
A41–17 (SGF) – A23–24 (SGL3)	Always	Below 1 Ω
A40–9 (SHRL) – A23–19 (SHR2)	Always	Below 1 Ω
A41–1 (SBF) – Body ground	Always	10 kΩ or higher
A41–2 (SHFL) – Body ground	Always	10 kΩ or higher
A41–17 (SGF) – Body ground	Always	10 kΩ or higher
A40–9 (SHRL) – Body ground	Always	10 kΩ or higher

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

13	INSPECT AFS ECU

AFS ECU
Connector Front View:



(a) Reconnect the suspension control ECU and AFS ECU.
(b) Measure the voltage according to the value(s) in the table below.

Standard:

Tester connection	Condition	Specified Voltage
A41–1 (SBF) – A41–17 (SGF)	Ignition switch ON	4.5 to 5.5 V
A41–2 (SHFL) – A41–17 (SGF)	Ignition switch ON	0.5 to 4.5 V
A40–9 (SHRL) – A41–17 (SGF)	Ignition switch ON	0.5 to 4.5 V

Result:

OK (When checking from the DIAGNOSTIC TROUBLE CODE CHART)	A
OK (When checking from the PROBLEM SYMPTOMS TABLE)	B
NG	C

B → **PROCEED TO NEXT CIRCUIT INSPECTION SHOWN IN PROBLEM SYMPTOMS TABLE (SEE PAGE 05–1369)**

C → **REPLACE SUSPENSION CONTROL ECU (SEE PAGE 25–20)**

A

REPLACE AFS ECU (SEE PAGE 65–28 OR 65–29)