13. Diagnostics Chart with Diagnosis Connector S005522

A: ABS WARNING LIGHT, VDC WARNING LIGHT, VDC OPERATING INDICATOR LIGHT OR VDC OFF INDICATOR LIGHT DOES NOT COME ON.

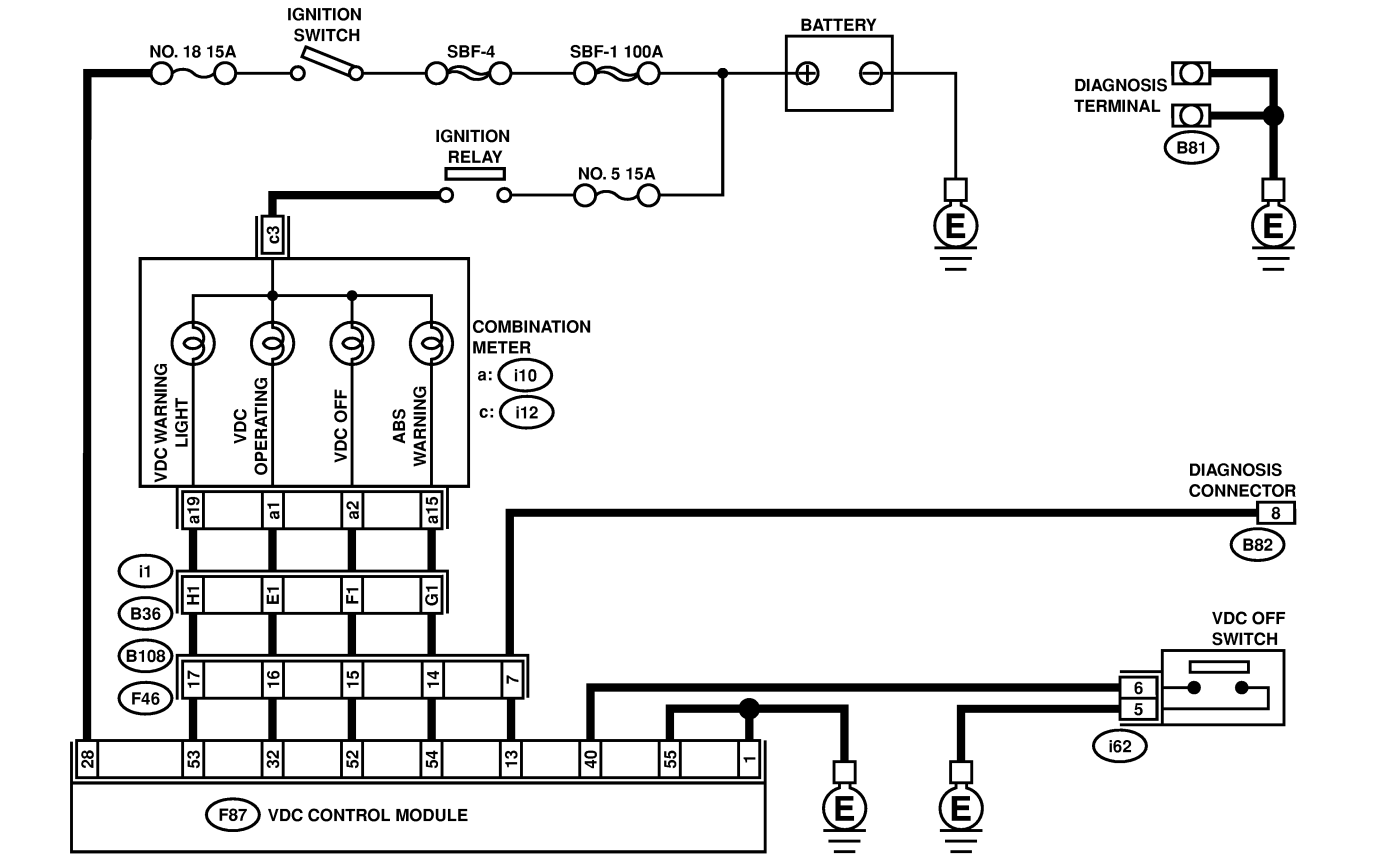
S005522E26

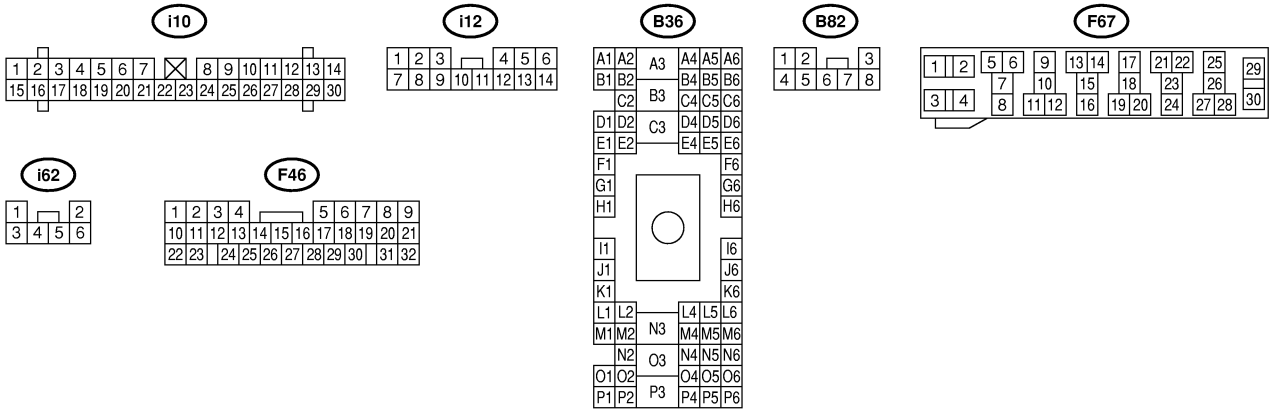
DIAGNOSIS:
- ABS warning light circuit is open or shorted.
- VDC warning light circuit is open or shorted.
- VDC operating indicator light circuit is open or shorted.
- VDC OFF indicator light circuit is open or shorted.

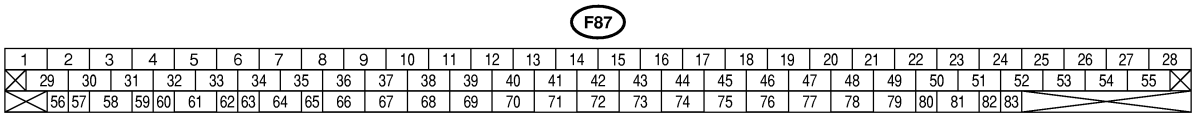
TROUBLE SYMPTOM:
- When ignition switch is turned ON (engine OFF), ABS warning light, VDC warning light, VDC operating indicator light or VDC OFF indicator light does not come on.

NOTE:
When pushing the VDC OFF switch for 10 seconds or more while revving the engine, the VDC OFF indicator light goes off and operations cannot be continued. Turn ignition switch from OFF to ON again to recover the previous condition.

WIRING DIAGRAM:







B4M2546

DIAGNOSTICS CHART WITH DIAGNOSIS CONNECTOR

No.	Step	Check	Yes	No
1	**CHECK IF OTHER WARNING LIGHTS TURN ON.** Turn ignition switch to ON (engine OFF).	Do other warning lights turn on?	Go to step **2**.	Repair combination meter. <Ref. to IDI-11, Combination Meter Assembly.>
2	**CHECK LIGHT BULB.** 1) Turn ignition switch to OFF. 2) Remove combination meter. 3) Remove ABS warning light bulb, VDC warning light bulb, VDC operating indicator light bulb or VDC OFF indicator light bulb from combination meter.	Is light bulb OK?	Go to step **3**.	Replace faulty light bulb. <Ref. to IDI-11, DISASSEMBLY, Combination Meter Assembly.>
3	**CHECK BATTERY SHORT OF LIGHT HARNESS.** 1) Disconnect VDCCM connector from VDCCM. 2) Place a sheet of thick paper [thickness 1.5 mm (0.059 in)] in switch area of VDCCM connector. 3) Turn ignition switch to ON. 4) Measure voltage between VDC connector and chassis ground. ***Connector & terminal*** ***ABS warning light*** ***(F87) No. 54 (+) — Chassis ground (–):*** ***VDC warning light*** ***(F87) No. 53 (+) — Chassis ground (–):*** ***VDC operating indicator light*** ***(F87) No. 32 (+) — Chassis ground (–):*** ***VDC OFF indicator light*** ***(F87) No. 52 (+) — Chassis ground (–):***	Is voltage less than 3 V?	Go to step **4**.	Repair light harness.
4	**CHECK WIRING HARNESS.** 1) Turn ignition switch to OFF. 2) Install ABS warning light bulb from combination meter. 3) Install combination meter. 4) Place a sheet of thick paper [thickness 1.5 mm (0.059 in)] in switch area of VDCCM connector. 5) Turn ignition switch to ON. 6) Measure voltage between VDCCM connector and chassis ground. ***Connector & terminal*** ***ABS warning light*** ***(F87) No. 54 (+) — Chassis ground (–):*** ***VDC warning light*** ***(F87) No. 53 (+) — Chassis ground (–):*** ***VDC operating indicator light*** ***(F87) No. 32 (+) — Chassis ground (–):*** ***VDC OFF indicator light*** ***(F87) No. 52 (+) — Chassis ground (–):***	Is voltage between 10 and 15 V?	Go to step **5**.	Repair wiring harness.
5	**CHECK POOR CONTACT IN CONNECTORS.** Turn ignition switch to OFF.	Is there poor contact in connectors between combination meter and VDCCM?	Repair connector.	Go to step **6**.
6	**CHECK WARNING AND INDICATOR LIGHTS.** 1) Connect connector to VDCCM. 2) Turn ignition switch to ON.	Do ABS warning light, VDC warning light, VDC operating indicator light and VDC OFF indicator light turn on?	A temporary poor contact.	Replace VDCCM. <Ref. to VDC-9, VDC Control Module (VDCCM).>

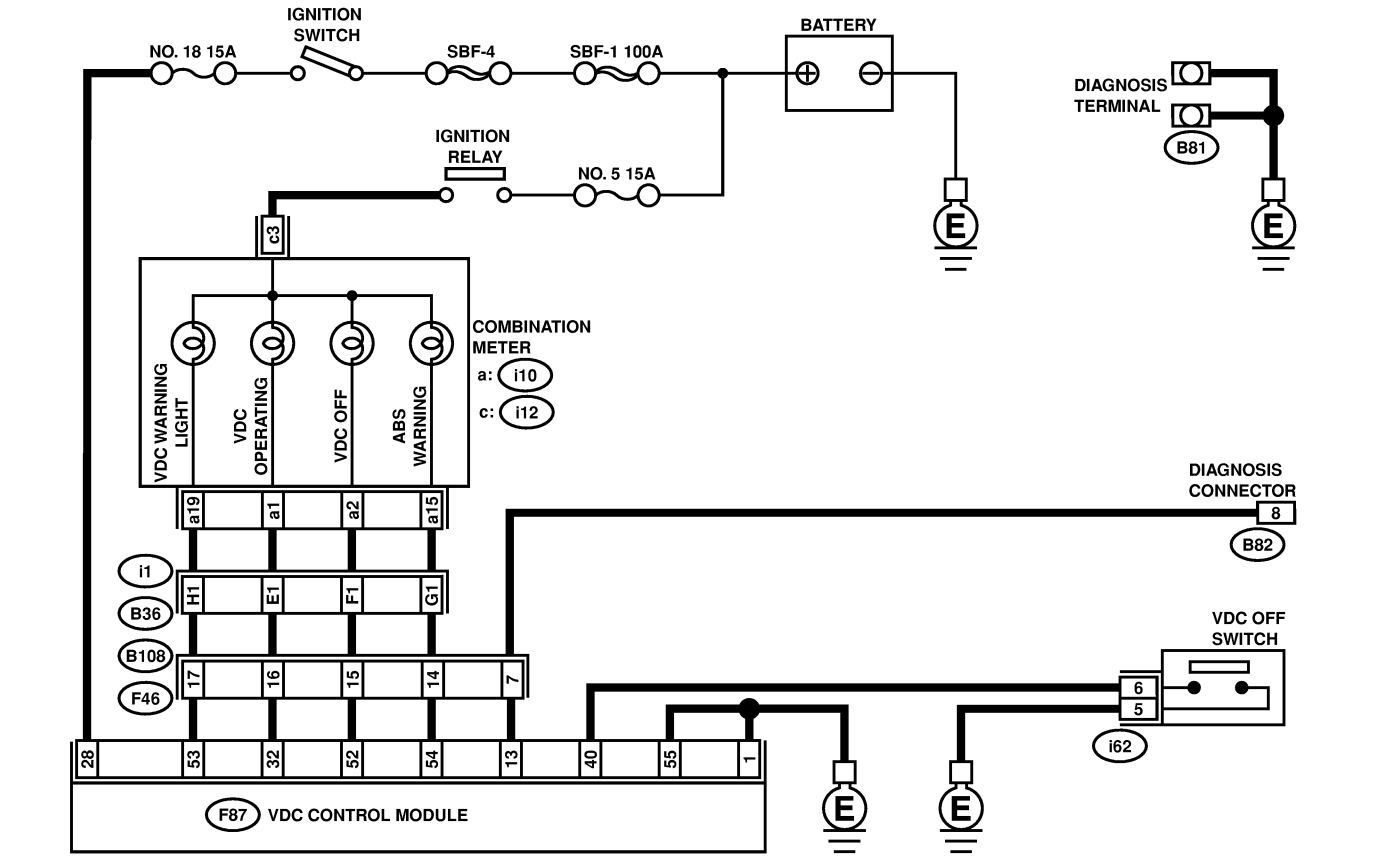
MEMO:

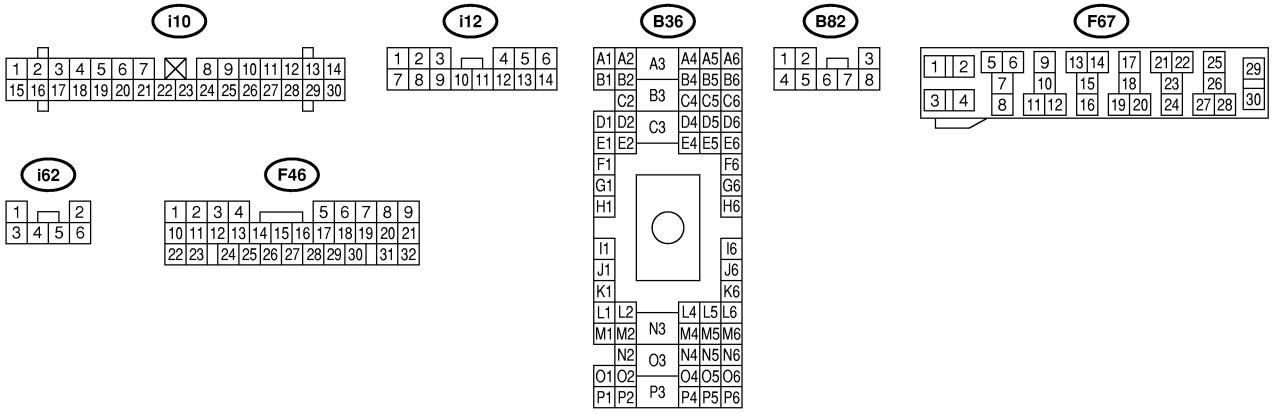
B: ABS AND VDC WARNING LIGHTS DO NOT GO OFF. S005522F13

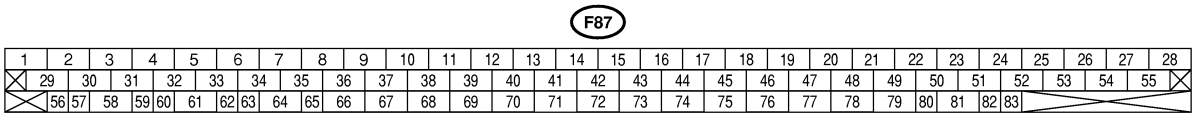
DIAGNOSIS:
- ABS warning light circuit is open or shorted.
- VDC warning light circuit is open or shorted.
- Diagnosis circuit is open.

TROUBLE SYMPTOM:
- When starting the engine and while ABS and/or VDC warning light is kept ON.

WIRING DIAGRAM:







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DIAGNOSTICS CHART WITH DIAGNOSIS CONNECTOR

No.	Step	Check	Yes	No
1	**CHECK INSTALLATION OF VDCCM CONNECTOR.** Turn ignition switch to OFF.	Is VDCCM connector inserted into VDCCM until the clamp locks onto it?	Go to step **2**.	Insert VDCCM connector into VDCCM until the clamp locks onto it.
2	**CHECK DIAGNOSIS TERMINAL.** Measure resistance between diagnosis terminals (B81) and chassis ground. ***Terminals*** ***Diagnosis terminal (A) — Chassis ground:*** ***Diagnosis terminal (B) — Chassis ground:***	Is the resistance less than 0.5 Ω?	Go to step **3**.	Repair diagnosis terminal harness.
3	**CHECK DIAGNOSIS LINE.** 1) Turn ignition switch to OFF. 2) Connect diagnosis terminal (B81) to diagnosis connector (B82) No. 8. 3) Disconnect connector from VDCCM. 4) Measure resistance between VDCCM connector and chassis ground. ***Connector & terminal*** ***(F87) No. 13 — Chassis ground:***	Is the resistance less than 0.5 Ω?	Go to step **4**.	Repair harness connector between VDCCM and diagnosis connector.
4	**CHECK WIRING HARNESS.** 1) Place a sheet of thick paper [thickness 1.5 mm (0.059 in)] in switch area of VDCCM connector. 2) Turn ignition switch to ON.	Do the ABS warning light and VDC warning light remain off?	Go to step **5**.	Repair front wiring harness.
5	**CHECK PROJECTION AT VDCCM.** 1) Turn ignition switch to OFF. 2) Check for broken projection at the VDCCM terminal.	Are the projection broken?	Go to step **6**.	Replace VDCCM. <Ref. to VDC-9, VDC Control Module (VDCCM).>
6	**CHECK POWER SUPPLY OF VDCCM.** 1) Disconnect connector from VDCCM. 2) Start engine. 3) Idle the engine. 4) Measure voltage between VDCCM connector and chassis ground. ***Connector & terminal*** ***(F87) No. 28 (+) — Chassis ground (–):***	Is the voltage between 10 and 15 V?	Go to step **7**.	Repair VDCCM power supply circuit.
7	**CHECK POOR CONTACT IN VDCCM CONNECTOR.**	Is there poor contact in VDCCM connector?	Repair connector.	Replace VDCCM. <Ref. to VDC-9, VDC Control Module (VDCCM).>

MEMO:

C: VDC OPERATING INDICATOR LIGHT DOES NOT GO OFF. S005522E53

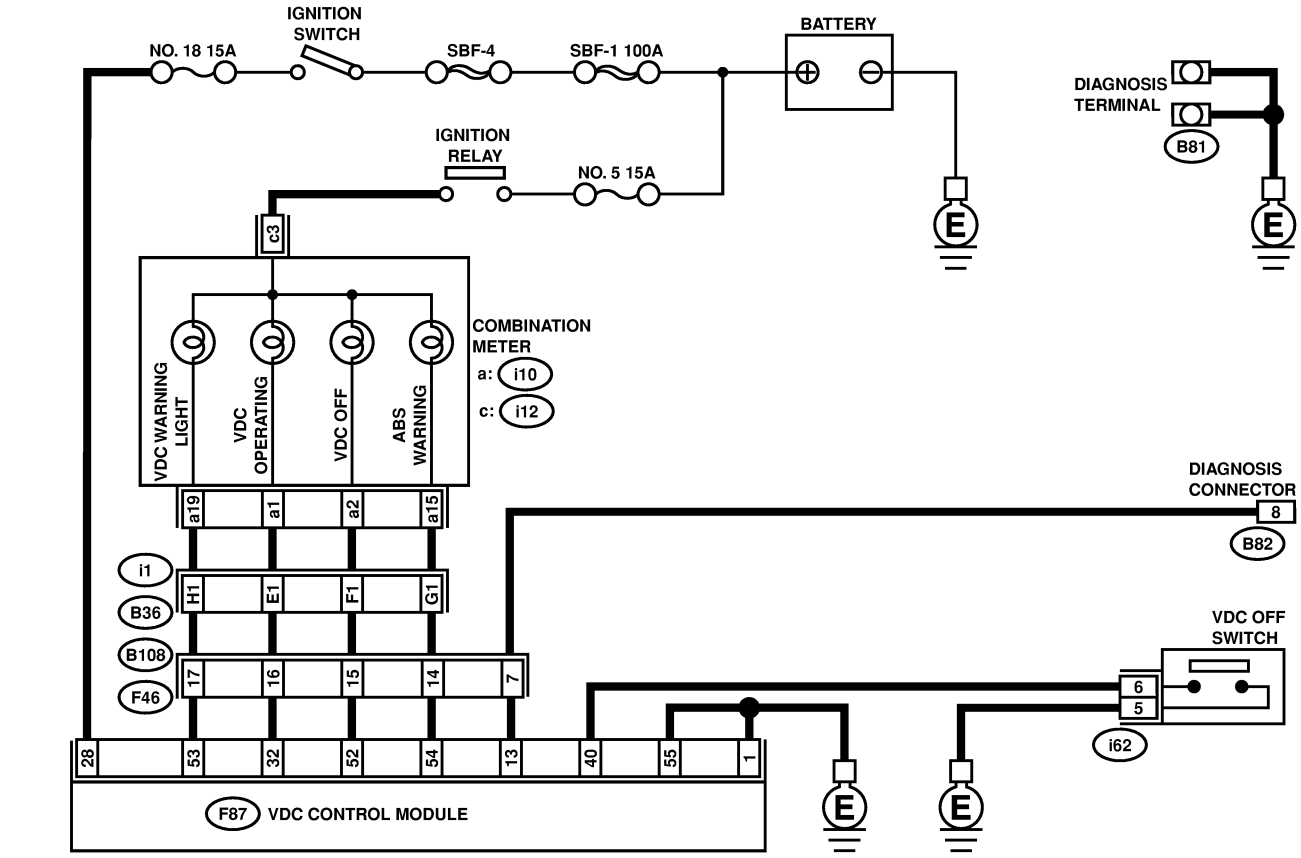
DIAGNOSIS:

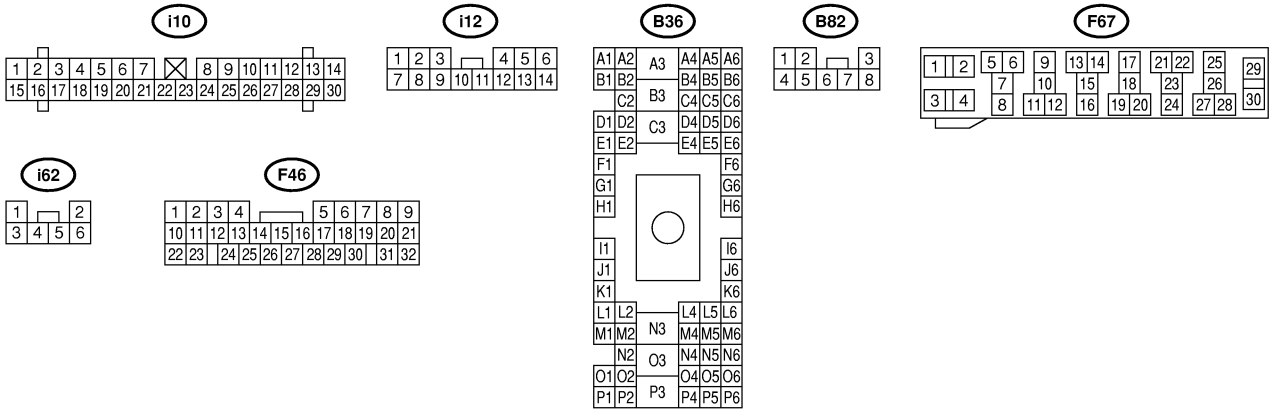
- VDC operating indicator light circuit is open or shorted.

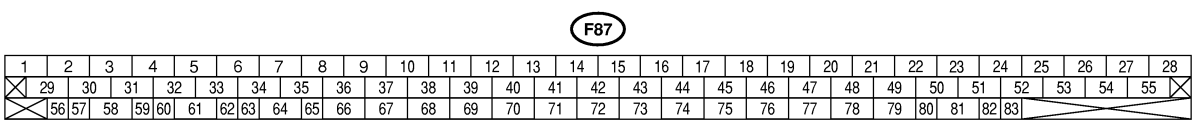
TROUBLE SYMPTOM:

- When starting the engine and while VDC operating indicator light is kept ON.

WIRING DIAGRAM:







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No.	Step	Check	Yes	No
1	**CHECK WIRING HARNESS.** 1) Turn ignition switch to OFF. 2) Disconnect VDCCM connector from VDCCM. 3) Turn ignition switch to ON.	Does the VDC operating indicator light remain off?	Replace VDCCM. <Ref. to VDC-9, VDC Control Module (VDCCM).>	Repair wiring harness.

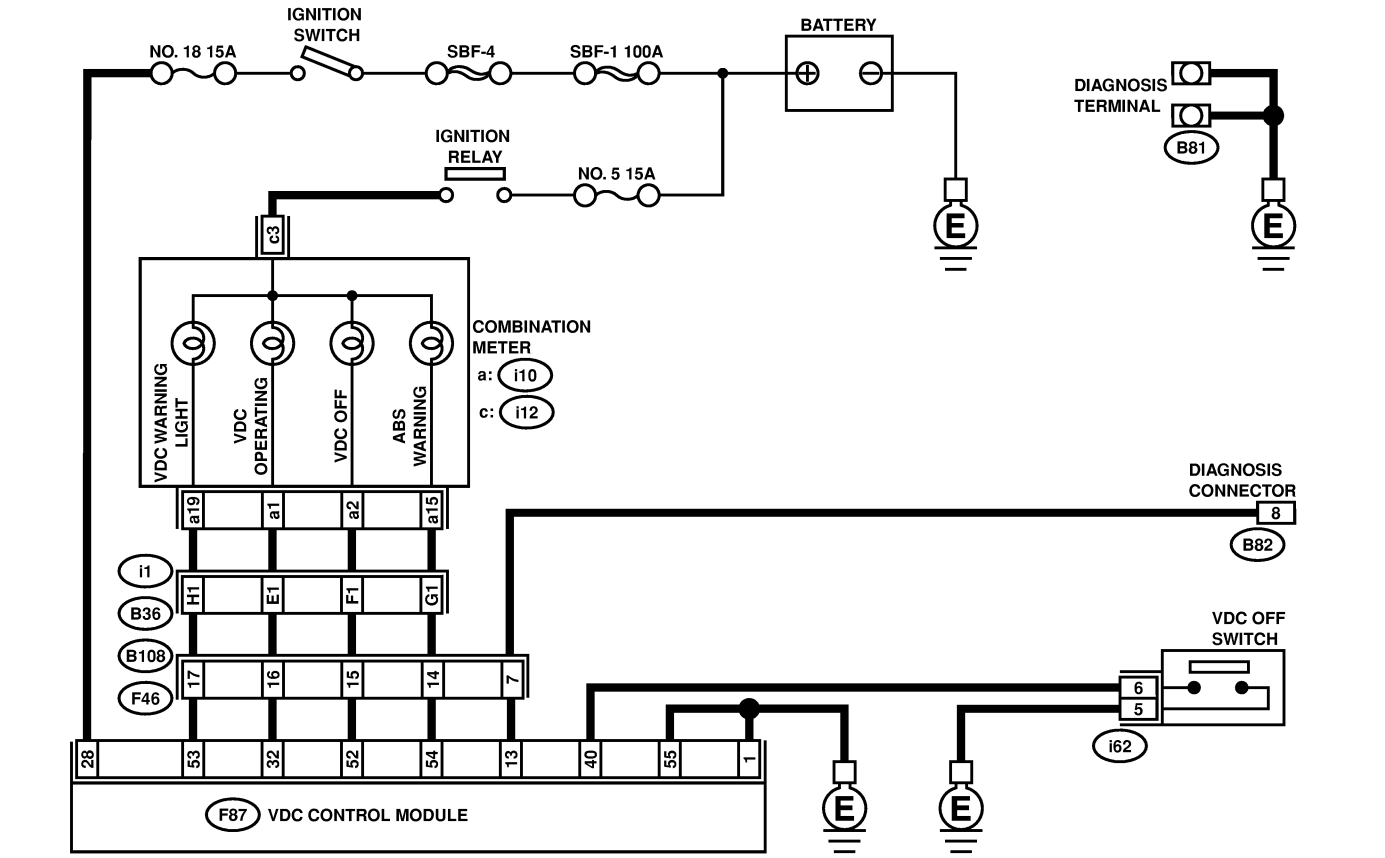
D: VDC OFF INDICATOR LIGHT DOES NOT GO OFF. S005522E52

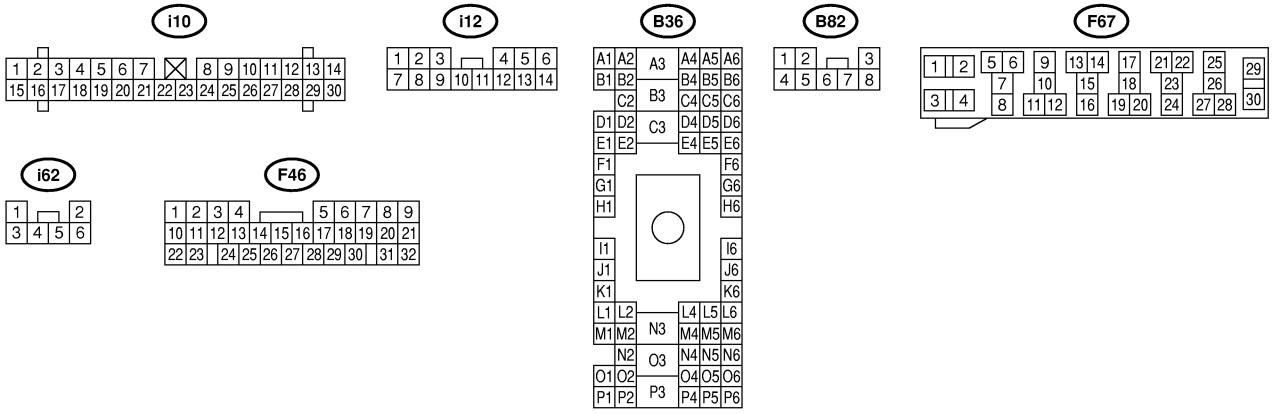
DIAGNOSIS:
- VDC OFF indicator light circuit is open or shorted.
- VDC OFF switch is shorted.

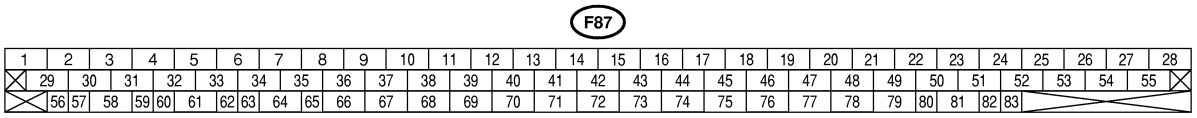
TROUBLE SYMPTOM:
- When starting the engine and while VDC OFF indicator light is kept ON.

NOTE:
When pushing the VDC OFF switch for 10 seconds or more while revving the engine, the VDC OFF indicator light goes off and operations cannot be continued. Turn ignition switch from OFF to ON again to recover the previous condition.

WIRING DIAGRAM:







B4M2546

DIAGNOSTICS CHART WITH DIAGNOSIS CONNECTOR

No.	Step	Check	Yes	No
1	**OPERATE VDC OFF SWITCH.** 1) Operate VDC OFF switch once. 2) Turn ignition switch OFF, then turn ignition switch ON.	Is VDC OFF indicator light off?	The VDC is normal.	Go to step **2**.
2	**CHECK ENGINE COOLANT TEMPERATURE.**	Does VDC OFF indicator light come on when engine coolant temperature is too low? Does it go out after engine has warmed up?	The VDC is normal.	Go to step **3**.
3	**CHECK VDC OFF SWITCH.** Remove and check VDC OFF switch. <Ref. to VDC-32, VDC OFF Switch.>	Is VDC OFF switch OK?	Go to step **4**.	Replace VDC OFF switch.
4	**CHECK WIRING HARNESS.** 1) Turn ignition switch to OFF. 2) Disconnect VDCCM connector from VDCCM. 3) Turn ignition switch to ON.	Does the VDC OFF indicator light remain off?	Go to step **5**.	Repair wiring harness.
5	**CHECK VDC OFF SWITCH LINE.** 1) Disconnect fuse from VDC OFF switch. 2) Measure resistance between VDCCM connector and chassis ground. ***Connector & terminal*** ***(F87) No. 40 — Chassis ground:***	Is the resistance more than 1 MΩ?	Replace VDCCM. <Ref. to VDC-9, VDC Control Module (VDCCM).>	Repair VDC OFF switch circuit.

MEMO:

E: DIAGNOSTIC TROUBLE CODE (DTC) DOES NOT APPEAR. S005522I28

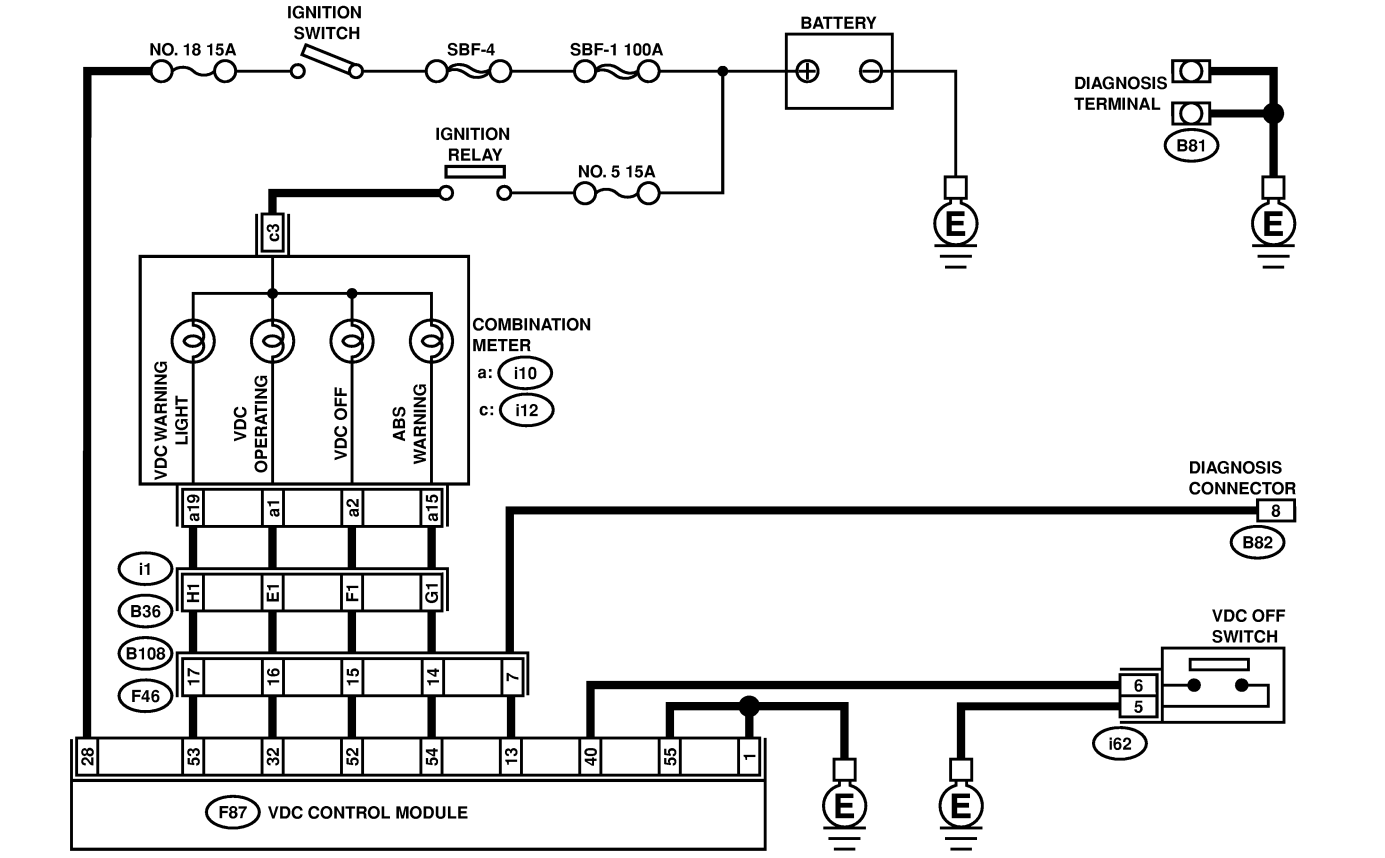
DIAGNOSIS:

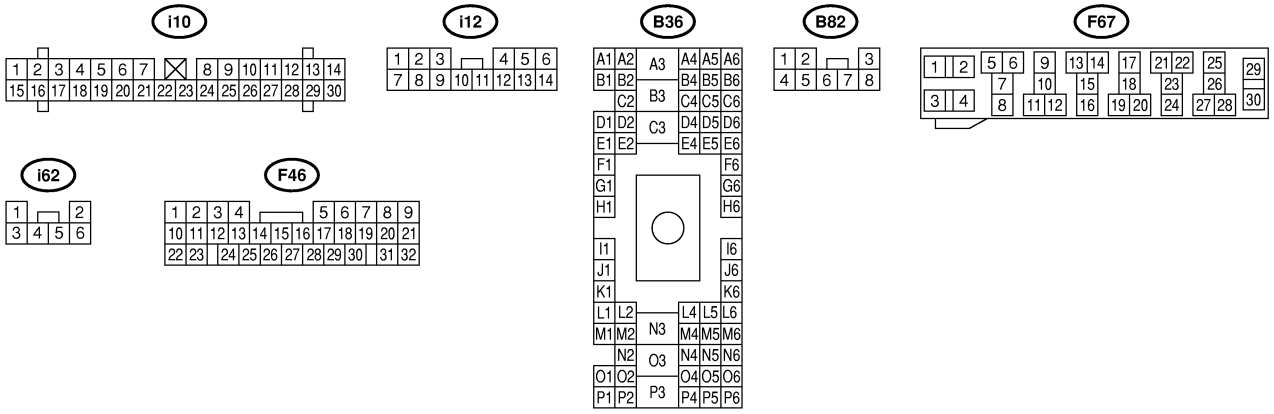
- Diagnosis circuit is open.

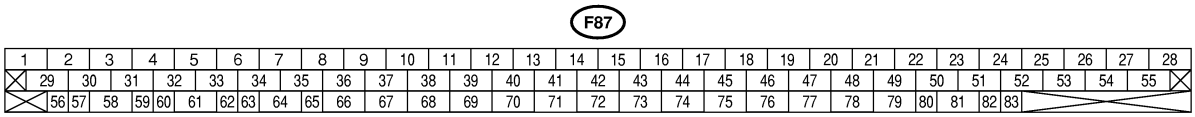
TROUBLE SYMPTOM:

- The ABS warning light turns on or off normally but the start code cannot be read out in the diagnostic mode.

WIRING DIAGRAM:







B4M2546

No.	Step	Check	Yes	No
1	**CHECK DIAGNOSIS TERMINAL.** Measure resistance between diagnosis terminals (B81) and chassis ground. ***Terminals*** ***Diagnosis terminal (A) — Chassis ground:*** ***Diagnosis terminal (B) — Chassis ground:***	Is the resistance less than 0.5 Ω?	Go to step **2**.	Repair diagnosis terminal harness.
2	**CHECK DIAGNOSIS LINE.** 1) Turn ignition switch to OFF. 2) Connect diagnosis terminal (B81) to diagnosis connector (B82) No. 8. 3) Disconnect connector from VDCCM. 4) Measure resistance between VDCCM connector and chassis ground. ***Connector & terminal*** ***(F87) No. 13 — Chassis ground:***	Is the resistance less than 0.5 Ω?	Go to step **3**.	Repair harness connector between VDCCM and diagnosis connector.
3	**CHECK POOR CONTACT IN VDCCM CONNECTOR.**	Is there poor contact in VDCCM connector?	Repair connector.	Replace VDCCM. <Ref. to VDC-9, VDC Control Module (VDCCM).>

F: DTC 21 ABNORMAL ABS SENSOR (OPEN CIRCUIT OR INPUT VOLTAGE TOO HIGH) (FRONT RH) S005522I29

NOTE:
For diagnostic procedure, refer to DTC 27. <Ref. to VDC-50, DTC 27 ABNORMAL ABS SENSOR (OPEN CIRCUIT OR INPUT VOLTAGE TOO HIGH) (REAR LH), Diagnostics Chart with Diagnosis Connector.>

G: DTC 23 ABNORMAL ABS SENSOR (OPEN CIRCUIT OR INPUT VOLTAGE TOO HIGH) (FRONT LH) S005522I30

NOTE:
For diagnostic procedure, refer to DTC 27. <Ref. to VDC-50, DTC 27 ABNORMAL ABS SENSOR (OPEN CIRCUIT OR INPUT VOLTAGE TOO HIGH) (REAR LH), Diagnostics Chart with Diagnosis Connector.>

H: DTC 25 ABNORMAL ABS SENSOR (OPEN CIRCUIT OR INPUT VOLTAGE TOO HIGH) (REAR RH) S005522I31

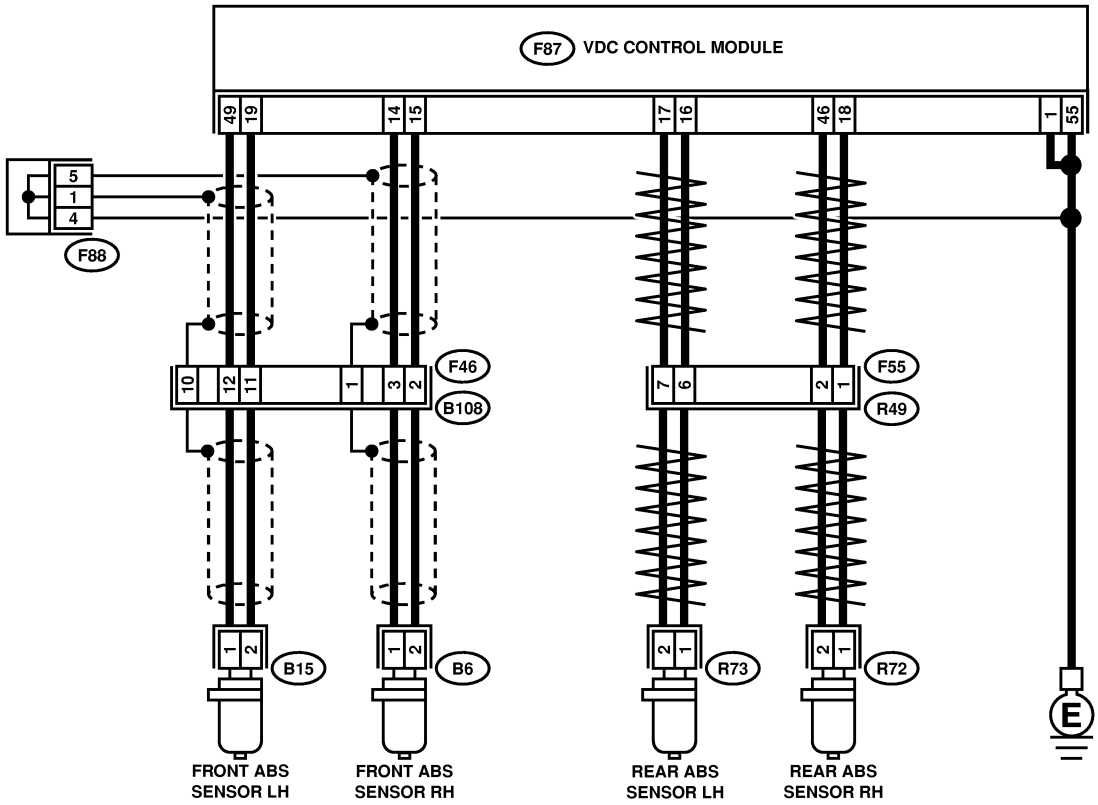
NOTE:
For diagnostic procedure, refer to DTC 27. <Ref. to VDC-50, DTC 27 ABNORMAL ABS SENSOR (OPEN CIRCUIT OR INPUT VOLTAGE TOO HIGH) (REAR LH), Diagnostics Chart with Diagnosis Connector.>

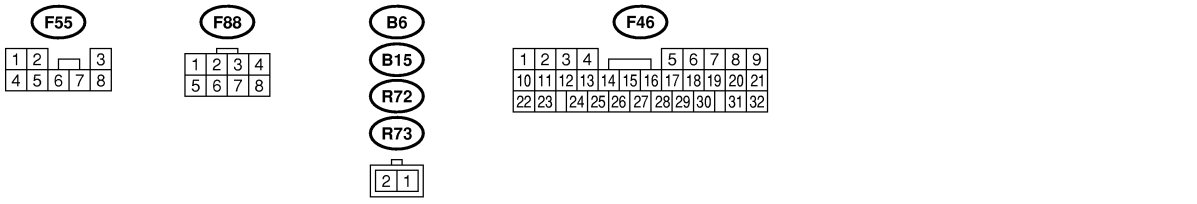
I: DTC 27 ABNORMAL ABS SENSOR (OPEN CIRCUIT OR INPUT VOLTAGE TOO HIGH) (REAR LH) S005522I32

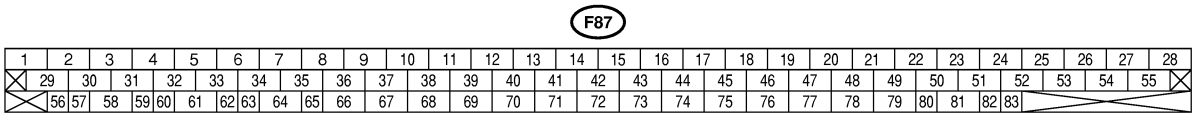
DIAGNOSIS:
- Faulty ABS sensor (Broken wire, input voltage too high)
- Faulty harness connector

TROUBLE SYMPTOM:
- ABS does not operate.
- VDC does not operate.

WIRING DIAGRAM:







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No.	Step	Check	Yes	No
1	**CHECK ABS SENSOR.** 1) Turn ignition switch to OFF. 2) Disconnect connector from ABS sensor. 3) Measure resistance of ABS sensor connector terminals. ***Terminal*** ***Front RH No. 1 — No. 2:*** ***Front LH No. 1 — No. 2:*** ***Rear RH No. 1 — No. 2:*** ***Rear LH No. 1 — No. 2:***	Is the resistance between 1.0 and 1.5 kΩ?	Go to step **2**.	Replace ABS sensor. Front <Ref. to VDC-28, Front ABS Sensor.> Rear <Ref. to VDC-29, Rear ABS Sensor.>
2	**CHECK BATTERY SHORT OF ABS SENSOR.** 1) Disconnect connector from VDCCM. 2) Measure voltage between ABS sensor and chassis ground. ***Terminal*** ***Front RH No. 1 (+) — Chassis ground (–):*** ***Front LH No. 1 (+) — Chassis ground (–):*** ***Rear RH No. 1 (+) — Chassis ground (–):*** ***Rear LH No. 1 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **3**.	Replace ABS sensor. Front <Ref. to VDC-28, Front ABS Sensor.> Rear <Ref. to VDC-29, Rear ABS Sensor.>
3	**CHECK BATTERY SHORT OF ABS SENSOR.** 1) Turn ignition switch to ON. 2) Measure voltage between ABS sensor and chassis ground. ***Terminal*** ***Front RH No. 1 (+) — Chassis ground (–):*** ***Front LH No. 1 (+) — Chassis ground (–):*** ***Rear RH No. 1 (+) — Chassis ground (–):*** ***Rear LH No. 1 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **4**.	Replace ABS sensor. Front <Ref. to VDC-28, Front ABS Sensor.> Rear <Ref. to VDC-29, Rear ABS Sensor.>
4	**CHECK HARNESS/CONNECTOR BETWEEN VDCCM AND ABS SENSOR.** 1) Turn ignition switch to OFF. 2) Connect connector to ABS sensor. 3) Measure resistance between VDCCM connector terminals. ***Connector & terminal*** ***DTC 21 / (F87) No. 14 — No. 15:*** ***DTC 23 / (F87) No. 49 — No. 19:*** ***DTC 25 / (F87) No. 18 — No. 46:*** ***DTC 27 / (F87) No. 16 — No. 17:***	Is the resistance between 1.0 and 1.5 kΩ?	Go to step **5**.	Repair harness/ connector between VDCCM and ABS sensor.

No.	Step	Check	Yes	No
5	**CHECK BATTERY SHORT OF HARNESS.** Measure voltage between VDCCM connector and chassis ground. ***Connector & terminal*** ***DTC 21 / (F87) No. 14 (+) — Chassis ground (–):*** ***DTC 23 / (F87) No. 49 (+) — Chassis ground (–):*** ***DTC 25 / (F87) No. 18 (+) — Chassis ground (–):*** ***DTC 27 / (F87) No. 16 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **6**.	Repair harness between VDCCM and ABS sensor.
6	**CHECK BATTERY SHORT OF HARNESS.** 1) Turn ignition switch to ON. 2) Measure voltage between VDCCM connector and chassis ground. ***Connector & terminal*** ***DTC 21 / (F87) No. 14 (+) — Chassis ground (–):*** ***DTC 23 / (F87) No. 49 (+) — Chassis ground (–):*** ***DTC 25 / (F87) No. 18 (+) — Chassis ground (–):*** ***DTC 27 / (F87) No. 16 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **7**.	Repair harness between VDCCM and ABS sensor.
7	**CHECK INSTALLATION OF ABS SENSOR.** ***Tightening torque:*** ***32±10 N·m (3.3±1.0 kgf-m, 24±7 ft-lb)***	Are the ABS sensor installation bolts tightened securely?	Go to step **8**.	Tighten ABS sensor installation bolts securely.
8	**CHECK ABS SENSOR GAP.** Measure tone wheel-to-pole piece gap over entire perimeter of the wheel. ***Specifications*** ***Front wheel*** ***0.3 — 0.8 mm (0.012 — 0.031 in)*** ***Rear wheel*** ***0.44 — 0.94 mm (0.0173 — 0.0370 in)***	Is the gap within the specifications?	Go to step **9**.	Adjust the gap. NOTE: Adjust the gap using spacers (Part No. 26755AA000). If spacers cannot correct the gap, replace worn sensor or worn tone wheel.
9	**CHECK HUB AND TONE WHEEL RUNOUT.** Measure hub and tone wheel runout.	Is the runout less than 0.05 mm (0.0020 in)?	Go to step **10**.	Repair hub and tone wheel. Front <Ref. to VDC-30, Front Tone Wheel.> Rear <Ref. to VDC-31, Rear Tone Wheel.>
10	**CHECK POOR CONTACT IN CONNECTORS.**	Is there poor contact in connectors between VDCCM and ABS sensor?	Repair connector.	Go to step **11**.
11	**CHECK VDCCM.** 1) Connect all connectors. 2) Erase the memory. 3) Perform inspection mode. 4) Read out the diagnostic trouble code.	Is the same diagnostic trouble code as in the current diagnosis still being output?	Replace VDCCM. <Ref. to VDC-9, VDC Control Module (VDCCM).>	Go to step **12**.

No.	Step	Check	Yes	No
12	**CHECK ANY OTHER DIAGNOSTIC TROUBLE CODES APPEARANCE.**	Are other diagnostic trouble codes being output?	Proceed with the diagnosis corresponding to the diagnostic trouble code.	A temporary poor contact. NOTE: Check harness and connectors between VDCCM and ABS sensor.

MEMO:

J: DTC 22 ABNORMAL ABS SENSOR (ABNORMAL ABS SENSOR SIGNAL) (FRONT RH) S005522J09

NOTE:
For diagnostic procedure, refer to DTC 28. <Ref. to VDC-56, DTC 28 ABNORMAL ABS SENSOR (ABNORMAL ABS SENSOR SIGNAL) (REAR LH), Diagnostics Chart with Diagnosis Connector.>

K: DTC 24 ABNORMAL ABS SENSOR (ABNORMAL ABS SENSOR SIGNAL) (FRONT LH) S005522J10

NOTE:
For diagnostic procedure, refer to DTC 28. <Ref. to VDC-56, DTC 28 ABNORMAL ABS SENSOR (ABNORMAL ABS SENSOR SIGNAL) (REAR LH), Diagnostics Chart with Diagnosis Connector.>

L: DTC 26 ABNORMAL ABS SENSOR (ABNORMAL ABS SENSOR SIGNAL) (REAR RH) S005522J11

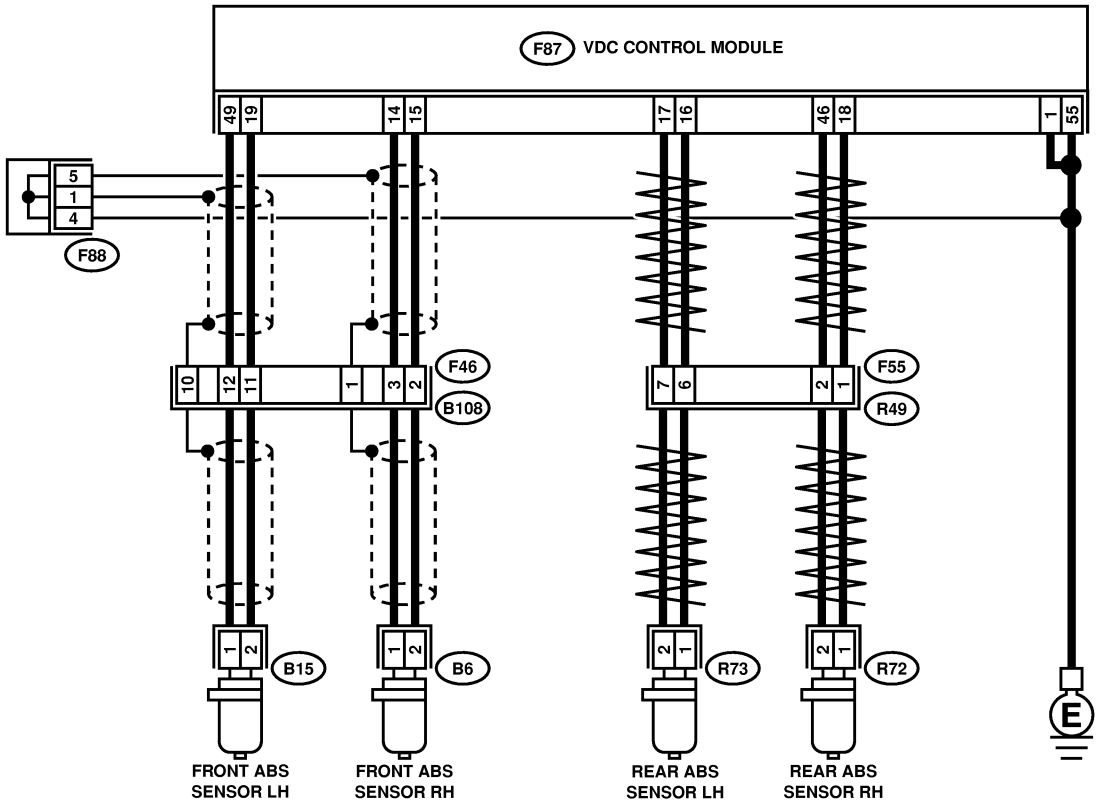
NOTE:
For diagnostic procedure, refer to DTC 28. <Ref. to VDC-56, DTC 28 ABNORMAL ABS SENSOR (ABNORMAL ABS SENSOR SIGNAL) (REAR LH), Diagnostics Chart with Diagnosis Connector.>

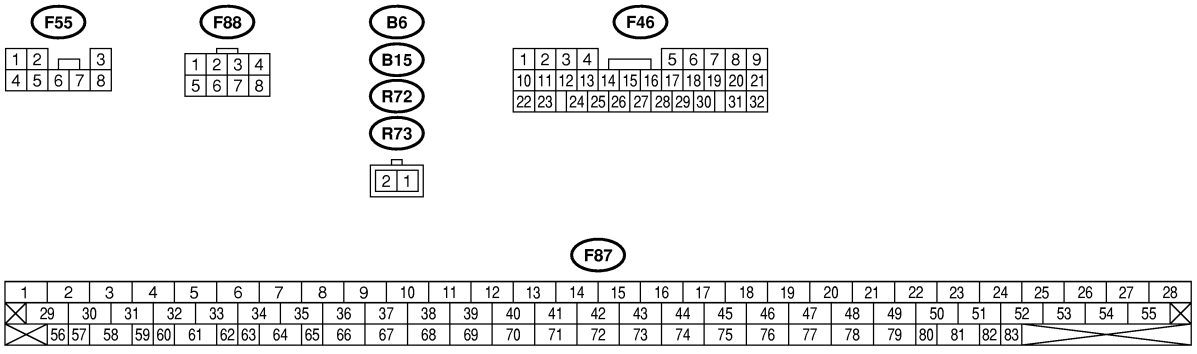
M: DTC 28 ABNORMAL ABS SENSOR (ABNORMAL ABS SENSOR SIGNAL) (REAR LH) S005522J12

DIAGNOSIS:
- Faulty ABS sensor signal (noise, irregular signal, etc.)
- Faulty harness/connector

TROUBLE SYMPTOM:
- ABS does not operate.
- VDC does not operate.

WIRING DIAGRAM:





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No.	Step	Check	Yes	No
1	**CHECK INSTALLATION OF ABS SENSOR.** ***Tightening torque:*** ***32±10 N·m (3.3±1.0 kgf-m, 24±7 ft-lb)***	Are the ABS sensor installation bolts tightened securely?	Go to step **2**.	Tighten ABS sensor installation bolts securely.
2	**CHECK ABS SENSOR GAP.** Measure tone wheel to pole piece gap over entire perimeter of the wheel. ***Specifications*** ***Front wheel*** ***0.3 — 0.8 mm (0.012 — 0.031 in)*** ***Rear wheel*** ***0.44 — 0.94 mm (0.0173 — 0.0370 in)***	Is the gap within the specifications?	Go to step **3**.	Adjust the gap. NOTE: Adjust the gap using spacer (Part No. 26755AA000). If spacers cannot correct the gap, replace worn sensor or worn tone wheel.
3	**CHECK OSCILLOSCOPE.**	Is an oscilloscope available?	Go to step **4**.	Go to step **5**.
4	**CHECK ABS SENSOR SIGNAL.** 1) Raise all four wheels of ground. 2) Turn ignition switch OFF. 3) Remove VDCCM connector cover. <Ref. to VDC-17, VDCCM Connector Cover.> 4) Connect the oscilloscope to the connector. 5) Turn ignition switch ON. 6) Rotate wheels and measure voltage at specified frequency. NOTE: When this inspection is completed, the VDCCM sometimes stores the trouble code 29. ***Connector & terminal*** ***DTC 22 / (F87) No. 14 (+) — No. 15 (–):*** ***DTC 24 / (F87) No. 49 (+) — No. 19 (–):*** ***DTC 26 / (F87) No. 18 (+) — No. 46 (–):*** ***DTC 28 / (F87) No. 16 (+) — No. 17 (–):***	Is oscilloscope pattern smooth, as shown in figure?	Go to step **8**.	Go to step **5**.
5	**CHECK CONTAMINATION OF ABS SENSOR OR TONE WHEEL.** Remove disc rotor or drum from hub in accordance with diagnostic trouble code.	Is the ABS sensor pole piece or the tone wheel contaminated by dirt or other foreign matter?	Thoroughly remove dirt or other foreign matter.	Go to step **6**.
6	**CHECK DAMAGE OF ABS SENSOR OR TONE WHEEL.**	Are there broken or damaged in the ABS sensor pole piece or the tone wheel?	Replace ABS sensor or tone wheel. Front <Ref. to VDC-28, Front ABS Sensor.> and <Ref. to VDC-30, Front Tone Wheel.> Rear <Ref. to VDC-29, Rear ABS Sensor.> and <Ref. to VDC-31, Rear Tone Wheel.>	Go to step **7**.
7	**CHECK TONE WHEEL RUNOUT.** Measure tone wheel runout.	Is the runout less than 0.05 mm (0.0020 in)?	Go to step **8**.	Repair tone wheel. Front <Ref. to VDC-30, Front Tone Wheel.> Rear <Ref. to VDC-31, Rear Tone Wheel.>

No.	Step	Check	Yes	No
8	**CHECK RESISTANCE OF ABS SENSOR.** 1) Turn ignition switch OFF. 2) Disconnect connector from ABS sensor. 3) Measure resistance between ABS sensor connector terminals. ***Terminal*** ***Front RH No. 1 — No. 2:*** ***Front LH No. 1 — No. 2:*** ***Rear RH No. 1 — No. 2:*** ***Rear LH No. 1 — No. 2:***	Is the resistance between 1.0 and 1.5 kΩ?	Go to step **9**.	Replace ABS sensor. Front <Ref. to VDC-28, Front ABS Sensor.> Rear <Ref. to VDC-29, Rear ABS Sensor.>
9	**CHECK GROUND SHORT OF ABS SENSOR.** Measure resistance between ABS sensor and chassis ground. ***Terminal*** ***Front RH No. 1 — Chassis ground:*** ***Front LH No. 1 — Chassis ground:*** ***Rear RH No. 1 — Chassis ground:*** ***Rear LH No. 1 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **10**.	Replace ABS sensor. Front <Ref. to VDC-28, Front ABS Sensor.> Rear <Ref. to VDC-29, Rear ABS Sensor.>
10	**CHECK HARNESS/CONNECTOR BETWEEN VDCCM AND ABS SENSOR.** 1) Connect connector to ABS sensor. 2) Disconnect connector from VDCCM. 3) Measure resistance at VDCCM connector terminals. ***Connector & terminal*** ***DTC 22 / (F87) No. 14 — No. 15:*** ***DTC 24 / (F87) No. 49 — No. 19:*** ***DTC 26 / (F87) No. 18 — No. 46:*** ***DTC 28 / (F87) No. 16 — No. 17:***	Is the resistance between 1.0 and 1.5 kΩ?	Go to step **11**.	Repair harness/ connector between VDCCM and ABS sensor.
11	**CHECK GROUND SHORT OF HARNESS.** Measure resistance between VDCCM connector and chassis ground. ***Connector & terminal*** ***DTC 22 / (F87) No. 14 — Chassis ground:*** ***DTC 24 / (F87) No. 49 — Chassis ground:*** ***DTC 26 / (F87) No. 18 — Chassis ground:*** ***DTC 28 / (F87) No. 16 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **12**.	Repair harness/ connector between VDCCM and ABS sensor.
12	**CHECK GROUND CIRCUIT OF VDCCM.** Measure resistance between VDCCM and chassis ground. ***Connector & terminal*** ***(F87) No. 1 — Chassis ground:*** ***(F87) No. 55 — Chassis ground:***	Is the resistance less than 0.5 Ω?	Go to step **13**.	Repair VDCCM ground harness.
13	**CHECK POOR CONTACT IN CONNECTORS.**	Is there poor contact in connectors between VDCCM and ABS sensor?	Repair connector.	Go to step **14**.
14	**CHECK SOURCES OF SIGNAL NOISE.**	Is the car telephone or the wireless transmitter properly installed?	Go to step **15**.	Properly install the car telephone or the wireless transmitter.
15	**CHECK SOURCES OF SIGNAL NOISE.**	Are noise sources (such as an antenna) installed near the sensor harness?	Install the noise sources apart from the sensor harness.	Go to step **16**.

No.	Step	Check	Yes	No
16	**CHECK SHIELD CIRCUIT.** 1) Connect all connectors. 2) Measure resistance between shield connector and chassis ground. ***Connector & terminal*** ***DTC 22 / (B62) No. A5 — Chassis ground:*** ***DTC 24 / (B62) No. A6 — Chassis ground:*** NOTE: For the DTC 26 and 28, Go to step **17**.	Is the resistance less than 0.5 Ω?	Go to step **17**.	Repair shield harness.
17	**CHECK VDCCM.** 1) Connect all connectors. 2) Erase the memory. 3) Perform inspection mode. 4) Read out the diagnostic trouble code.	Is the same diagnostic trouble code as in the current diagnosis still being output?	Replace VDCCM. <Ref. to VDC-9, VDC Control Module (VDCCM).>	Go to step **18**.
18	**CHECK ANY OTHER DIAGNOSTIC TROUBLE CODES APPEARANCE.**	Are other diagnostic trouble codes being output?	Proceed with the diagnosis corresponding to the diagnostic trouble code.	A temporary noise interference.

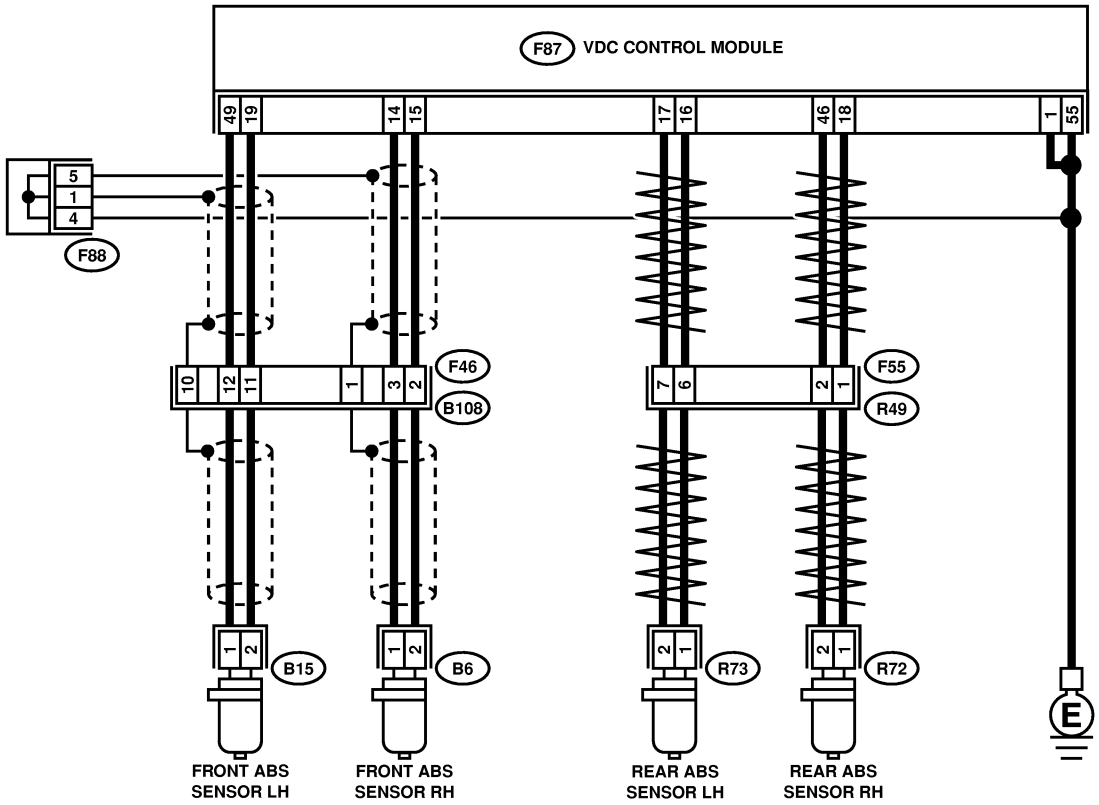
MEMO:

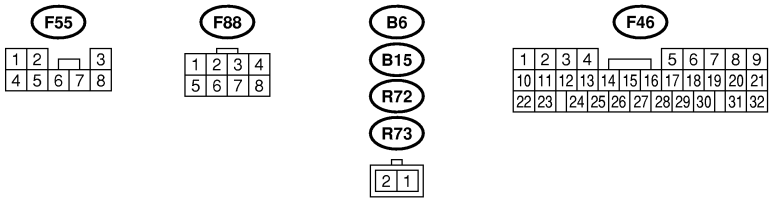
N: DTC 29 ABNORMAL ABS SENSOR SIGNAL (ANY ONE OF FOUR) S005522I37

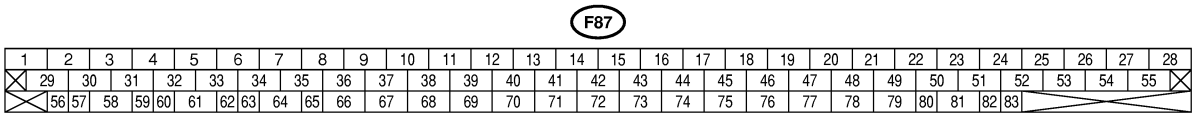
DIAGNOSIS:
- Faulty ABS sensor signal (noise, irregular signal, etc.)
- Faulty tone wheel
- Wheels turning freely for a long time

TROUBLE SYMPTOM:
- ABS does not operate.
- VDC does not operate.

WIRING DIAGRAM:







B4M2547

No.	Step	Check	Yes	No
1	**CHECK IF THE WHEELS HAVE TURNED FREELY FOR A LONG TIME.**	Check if the wheels have been turned freely for more than one minute, such as when the vehicle is jacked-up, under full-lock cornering or when tire is not in contact with road surface.	The VDC is normal. Erase the diagnostic trouble code. NOTE: When the wheels turn freely for a long time, such as when the vehicle is towed or jacked-up, or when steering wheel is continuously turned all the way, this trouble code may sometimes occur.	Go to step **2**.
2	**CHECK TIRE SPECIFICATIONS.**	Are the tire specifications correct?	Go to step **3**.	Replace tire.
3	**CHECK WEAR OF TIRE.**	Is the tire worn excessively?	Replace tire.	Go to step **4**.
4	**CHECK TIRE PRESSURE.**	Is the tire pressure correct?	Go to step **5**.	Adjust tire pressure.
5	**CHECK INSTALLATION OF ABS SENSOR.** ***Tightening torque:*** ***32±10 N·m (3.3±1.0 kgf-m, 24±7 ft-lb)***	Are the ABS sensor installation bolts tightened securely?	Go to step **6**.	Tighten ABS sensor installation bolts securely.
6	**CHECK ABS SENSOR GAP.** Measure tone wheel to pole piece gap over entire perimeter of the wheel. ***Specifications*** ***Front wheel*** ***0.3 — 0.8 mm (0.012 — 0.031 in)*** ***Rear wheel*** ***0.44 — 0.94 mm (0.0173 — 0.0370 in)***	Is the gap within the specifications?	Go to step **7**.	Adjust the gap. NOTE: Adjust the gap using spacer (Part No. 26755AA000). If spacers cannot correct the gap, replace worn sensor or worn tone wheel.
7	**CHECK OSCILLOSCOPE.**	Is an oscilloscope available?	Go to step **8**.	Go to step **9**.
8	**CHECK ABS SENSOR SIGNAL.** 1) Raise all four wheels of ground. 2) Turn ignition switch OFF. 3) Remove VDCCM connector cover. <Ref. to VDC-17, VDCCM Connector Cover.> 4) Connect the oscilloscope to the connector. 5) Turn ignition switch ON. 6) Rotate wheels and measure voltage at specified frequency. NOTE: When this inspection is completed, the VDCCM sometimes stores the DTC 29. ***Connector & terminal*** ***(F87) No. 14 (+) — No. 15 (–) (Front RH):*** ***(F87) No. 49 (+) — No. 19 (–) (Front LH):*** ***(F87) No. 18 (+) — No. 46 (–) (Rear RH):*** ***(F87) No. 16 (+) — No. 17 (–) (Rear LH):***	Is oscilloscope pattern smooth, as shown in figure?	Go to step **12**.	Go to step **9**.

No.	Step	Check	Yes	No
9	**CHECK CONTAMINATION OF ABS SENSOR OR TONE WHEEL.** Remove disc rotor from hub.	Is the ABS sensor pole piece or the tone wheel contaminated by dirt or other foreign matter?	Thoroughly remove dirt or other foreign matter.	Go to step **10**.
10	**CHECK DAMAGE OF ABS SENSOR OR TONE WHEEL.**	Are there broken or damaged teeth in the ABS sensor pole piece or the tone wheel?	Replace ABS sensor or tone wheel. Front <Ref. to VDC-28, Front ABS Sensor.> and <Ref. to VDC-30, Front Tone Wheel.> Rear <Ref. to VDC-29, Rear ABS Sensor.> and <Ref. to VDC-31, Rear Tone Wheel.>	Go to step **11**.
11	**CHECK TONE WHEEL RUNOUT.** Measure tone wheel runout.	Is the runout less than 0.05 mm (0.0020 in)?	Go to step **12**.	Repair tone wheel. Front <Ref. to VDC-30, Front Tone Wheel.> Rear <Ref. to VDC-31, Rear Tone Wheel.>
12	**CHECK VDCCM.** 1) Turn ignition switch to OFF. 2) Connect all connectors. 3) Erase the memory. 4) Perform inspection mode. 5) Read out the diagnostic trouble code.	Is the same diagnostic trouble code as in the current diagnosis still being output?	Replace VDCCM. <Ref. to VDC-9, VDC Control Module (VDCCM).>	Go to step **13**.
13	**CHECK ANY OTHER DIAGNOSTIC TROUBLE CODES APPEARANCE.**	Are other diagnostic trouble codes being output?	Proceed with the diagnosis corresponding to the diagnostic trouble code.	A temporary poor contact.

O: DTC 31 ABNORMAL INLET AND CUT SOLENOID VALVE CIRCUIT(S) (FRONT RH INLET) S005522J13

NOTE:
For diagnostic procedure, refer to DTC 62. <Ref. to VDC-66, DTC 62 ABNORMAL INLET AND CUT SOLENOID VALVE CIRCUIT(S) (SECONDARY CUT), Diagnostics Chart with Diagnosis Connector.>

P: DTC 33 ABNORMAL INLET AND CUT SOLENOID VALVE CIRCUIT(S) (FRONT LH INLET) S005522J14

NOTE:
For diagnostic procedure, refer to DTC 62. <Ref. to VDC-66, DTC 62 ABNORMAL INLET AND CUT SOLENOID VALVE CIRCUIT(S) (SECONDARY CUT), Diagnostics Chart with Diagnosis Connector.>

Q: DTC 35 ABNORMAL INLET AND CUT SOLENOID VALVE CIRCUIT(S) (REAR RH INLET) S005522J15

NOTE:
For diagnostic procedure, refer to DTC 62. <Ref. to VDC-66, DTC 62 ABNORMAL INLET AND CUT SOLENOID VALVE CIRCUIT(S) (SECONDARY CUT), Diagnostics Chart with Diagnosis Connector.>

R: DTC 37 ABNORMAL INLET AND CUT SOLENOID VALVE CIRCUIT(S) (REAR LH INLET) S005522J16

NOTE:
For diagnostic procedure, refer to DTC 62. <Ref. to VDC-66, DTC 62 ABNORMAL INLET AND CUT SOLENOID VALVE CIRCUIT(S) (SECONDARY CUT), Diagnostics Chart with Diagnosis Connector.>

S: DTC 61 ABNORMAL INLET AND CUT SOLENOID VALVE CIRCUIT(S) (PRIMARY CUT) S005522J17

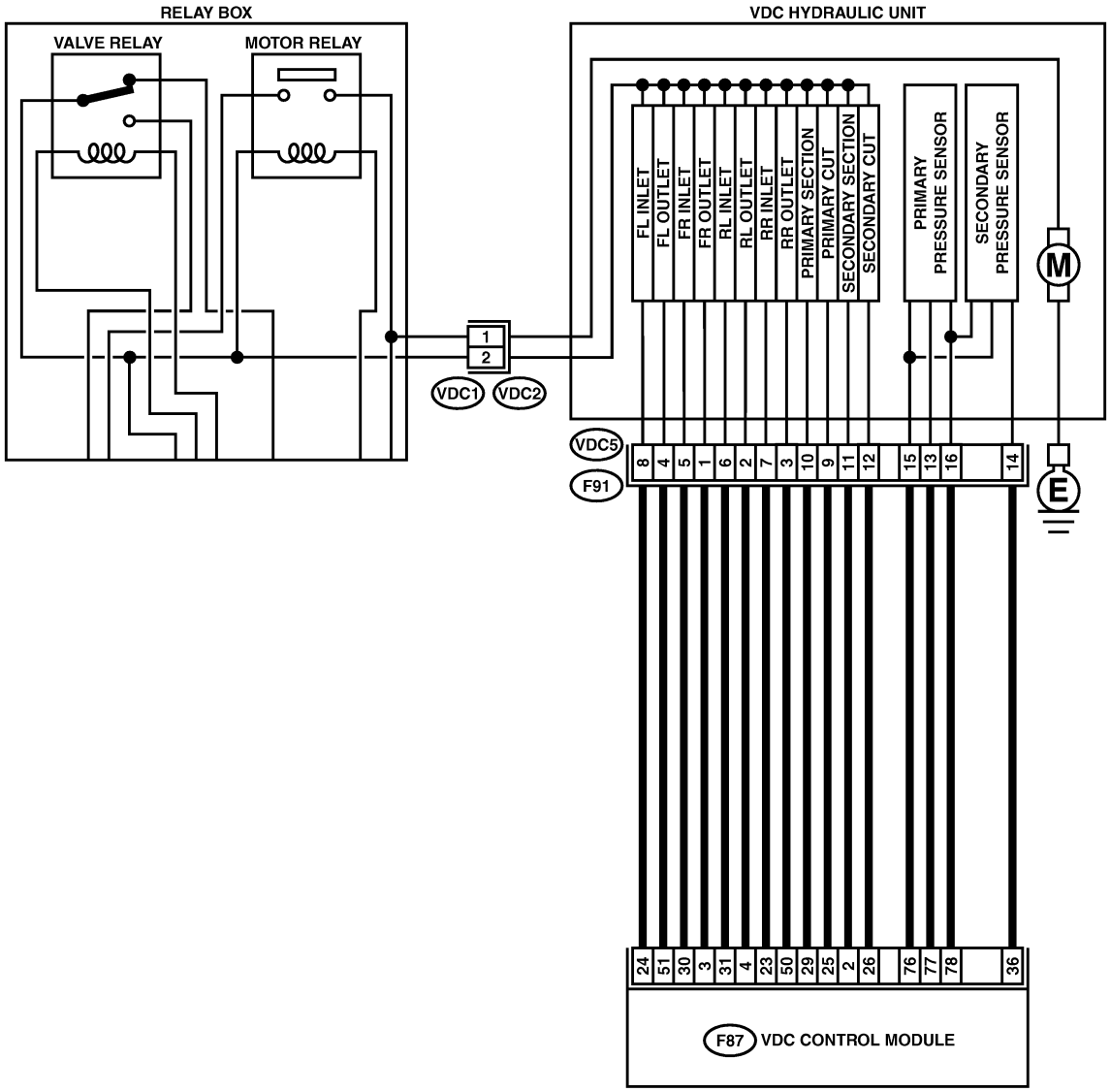
NOTE:
For diagnostic procedure, refer to DTC 62. <Ref. to VDC-66, DTC 62 ABNORMAL INLET AND CUT SOLENOID VALVE CIRCUIT(S) (SECONDARY CUT), Diagnostics Chart with Diagnosis Connector.>

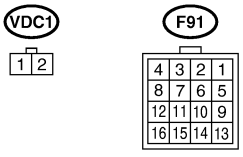
T: DTC 62 ABNORMAL INLET AND CUT SOLENOID VALVE CIRCUIT(S) (SECONDARY CUT) S005522J18

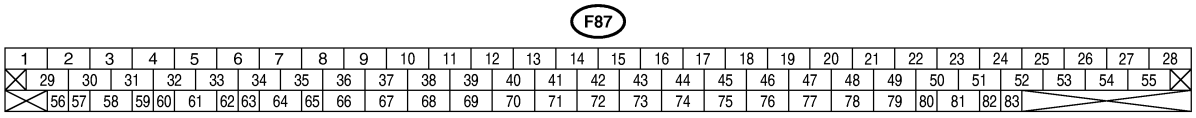
DIAGNOSIS:
- Faulty harness/connector
- Faulty solenoid valve in VDCH/U

TROUBLE SYMPTOM:
- ABS does not operate.
- VDC does not operate.

WIRING DIAGRAM:







B4M2320

DIAGNOSTICS CHART WITH DIAGNOSIS CONNECTOR

No.	Step	Check	Yes	No
1	**CHECK RESISTANCE OF SOLENOID VALVE.** 1) Turn ignition switch to OFF. 2) Disconnect two connectors (VDC1, F91) from VDCH/U. 3) Measure resistance between VDCH/U connector terminals. ***Connector & terminal*** ***DTC 31/(VDC5) No. 5 — (VDC2) No. 2:*** ***DTC 33/(VDC5) No. 8 — (VDC2) No. 2:*** ***DTC 35/(VDC5) No. 7 — (VDC2) No. 2:*** ***DTC 37/(VDC5) No. 6 — (VDC2) No. 2:*** ***DTC 61/(VDC5) No. 9 — (VDC2) No. 2:*** ***DTC 62/(VDC5) No. 12 — (VDC2) No. 2:***	Is the resistance between 8.04 and 9.04 Ω?	Go to step **2**.	Replace VDCH/U. <Ref. to VDC-11, Hydraulic Control Unit (H/U).>
2	**CHECK GROUND SHORT OF SOLENOID VALVE.** Measure resistance between VDCH/U connector and chassis ground. ***Connector & terminal*** ***DTC 31/(VDC5) No. 5 — Chassis ground:*** ***DTC 33/(VDC5) No. 8 — Chassis ground:*** ***DTC 35/(VDC5) No. 7 — Chassis ground:*** ***DTC 37/(VDC5) No. 6 — Chassis ground:*** ***DTC 61/(VDC5) No. 9 — Chassis ground:*** ***DTC 62/(VDC5) No. 12 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **3**.	Replace VDCH/U. <Ref. to VDC-11, Hydraulic Control Unit (H/U).>
3	**CHECK BATTERY SHORT OF SOLENOID VALVE.** 1) Disconnect connector from VDCCM. 2) Measure voltage between VDCH/U connector and chassis ground. ***Connector & terminal*** ***DTC 31/(VDC5) No. 5 (+) — Chassis ground (–):*** ***DTC 33/(VDC5) No. 8 (+) — Chassis ground (–):*** ***DTC 35/(VDC5) No. 7 (+) — Chassis ground (–):*** ***DTC 37/(VDC5) No. 6 (+) — Chassis ground (–):*** ***DTC 61/(VDC5) No. 9 (+) — Chassis ground (–):*** ***DTC 62/(VDC5) No. 12 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **4**.	Replace VDCH/U. <Ref. to VDC-11, Hydraulic Control Unit (H/U).>

No.	Step	Check	Yes	No
4	**CHECK BATTERY SHORT OF SOLENOID VALVE.** 1) Turn ignition switch to ON. 2) Measure voltage between VDCH/U connector and chassis ground. ***Connector & terminal*** ***DTC 31/(VDC5) No. 5 (+) — Chassis ground (–):*** ***DTC 33/(VDC5) No. 8 (+) — Chassis ground (–):*** ***DTC 35/(VDC5) No. 7 (+) — Chassis ground (–):*** ***DTC 37/(VDC5) No. 6 (+) — Chassis ground (–):*** ***DTC 61/(VDC5) No. 9 (+) — Chassis ground (–):*** ***DTC 62/(VDC5) No. 12 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **5**.	Replace VDCH/U. <Ref. to VDC-11, Hydraulic Control Unit (H/U).>
5	**CHECK BATTERY SHORT OF HARNESS.** 1) Turn ignition switch to OFF. 2) Measure voltage between VDCCM connector and chassis ground. ***Connector & terminal*** ***DTC 31/(F87) No. 30 (+) — Chassis ground (–):*** ***DTC 33/(F87) No. 24 (+) — Chassis ground (–):*** ***DTC 35/(F87) No. 23 (+) — Chassis ground (–):*** ***DTC 37/(F87) No. 31 (+) — Chassis ground (–):*** ***DTC 61/(F87) No. 25 (+) — Chassis ground (–):*** ***DTC 62/(F87) No. 26 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **6**.	Repair harness between VDCCM and VDCH/U.
6	**CHECK BATTERY SHORT OF HARNESS.** 1) Turn ignition switch to ON. 2) Measure voltage between VDCCM connector and chassis ground. ***Connector & terminal*** ***DTC 31/(F87) No. 30 (+) — Chassis ground (–):*** ***DTC 33/(F87) No. 24 (+) — Chassis ground (–):*** ***DTC 35/(F87) No. 23 (+) — Chassis ground (–):*** ***DTC 37/(F87) No. 31 (+) — Chassis ground (–):*** ***DTC 61/(F87) No. 25 (+) — Chassis ground (–):*** ***DTC 62/(F87) No. 26 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **7**.	Repair harness between VDCCM and VDCH/U.

No.	Step	Check	Yes	No
7	**CHECK GROUND SHORT OF HARNESS.** 1) Turn ignition switch to OFF. 2) Measure resistance between VDCCM connector and chassis ground. ***Connector & terminal*** ***DTC 31/(F87) No. 30 — Chassis ground:*** ***DTC 33/(F87) No. 24 — Chassis ground:*** ***DTC 35/(F87) No. 23 — Chassis ground:*** ***DTC 37/(F87) No. 31 — Chassis ground:*** ***DTC 61/(F87) No. 25 — Chassis ground:*** ***DTC 62/(F87) No. 26 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **8**.	Repair harness between VDCCM and VDCH/U.
8	**CHECK HARNESS/CONNECTOR BETWEEN VDCCM AND VDCH/U.** 1) Connect connector (F91) to VDCH/U. 2) Measure resistance between VDCCM connector and VDCH/U connector. ***Connector & terminal*** ***DTC 31/(F87) No. 30 — (VDC2) No. 2:*** ***DTC 33/(F87) No. 24 — (VDC2) No. 2:*** ***DTC 35/(F87) No. 23 — (VDC2) No. 2:*** ***DTC 37/(F87) No. 31— (VDC2) No. 2:*** ***DTC 61/(F87) No. 25 — (VDC2) No. 2:*** ***DTC 62/(F87) No. 26 — (VDC2) No. 2:***	Is the resistance between 7 and 10 Ω?	Go to step **9**.	Repair harness/ connector between VDCCM and VDCH/U.
9	**CHECK POOR CONTACT IN CONNECTORS.**	Is there poor contact in connectors between VDCCM and VDCH/U?	Repair connector.	Go to step **10**.
10	**CHECK VDCCM.** 1) Connect all connectors. 2) Erase the memory. 3) Perform inspection mode. 4) Read out the diagnostic trouble code.	Is the same diagnostic trouble code as in the current diagnosis still being output?	Repair VDCCM. <Ref. to VDC-9, VDC Control Module (VDCCM).>	Go to step **11**.
11	**CHECK ANY OTHER DIAGNOSTIC TROUBLE CODES APPEARANCE.**	Are other diagnostic trouble codes being output?	Proceed with the diagnosis corresponding to the diagnostic trouble code.	A temporary poor contact.

MEMO:

U: DTC 32 ABNORMAL OUTLET AND SUCTION SOLENOID VALVE CIRCUIT(S) (FRONT RH OUTLET) S005522J19

NOTE:
For diagnostic procedure, refer to DTC 64. <Ref. to VDC-72, DTC 64 ABNORMAL OUTLET AND SUCTION SOLENOID VALVE CIRCUIT(S) (SECONDARY SUCTION), Diagnostics Chart with Diagnosis Connector.>

V: DTC 34 ABNORMAL OUTLET AND SUCTION SOLENOID VALVE CIRCUIT(S) (FRONT LH OUTLET) S005522J20

NOTE:
For diagnostic procedure, refer to DTC 64. <Ref. to VDC-72, DTC 64 ABNORMAL OUTLET AND SUCTION SOLENOID VALVE CIRCUIT(S) (SECONDARY SUCTION), Diagnostics Chart with Diagnosis Connector.>

W: DTC 36 ABNORMAL OUTLET AND SUCTION SOLENOID VALVE CIRCUIT(S) (REAR RH OUTLET) S005522J21

NOTE:
For diagnostic procedure, refer to DTC 64. <Ref. to VDC-72, DTC 64 ABNORMAL OUTLET AND SUCTION SOLENOID VALVE CIRCUIT(S) (SECONDARY SUCTION), Diagnostics Chart with Diagnosis Connector.>

X: DTC 38 ABNORMAL OUTLET AND SUCTION SOLENOID VALVE CIRCUIT(S) (REAR LH OUTLET) S005522J22

NOTE:
For diagnostic procedure, refer to DTC 64. <Ref. to VDC-72, DTC 64 ABNORMAL OUTLET AND SUCTION SOLENOID VALVE CIRCUIT(S) (SECONDARY SUCTION), Diagnostics Chart with Diagnosis Connector.>

Y: DTC 63 ABNORMAL OUTLET AND SUCTION SOLENOID VALVE CIRCUIT(S) (PRIMARY SUCTION) S005522J23

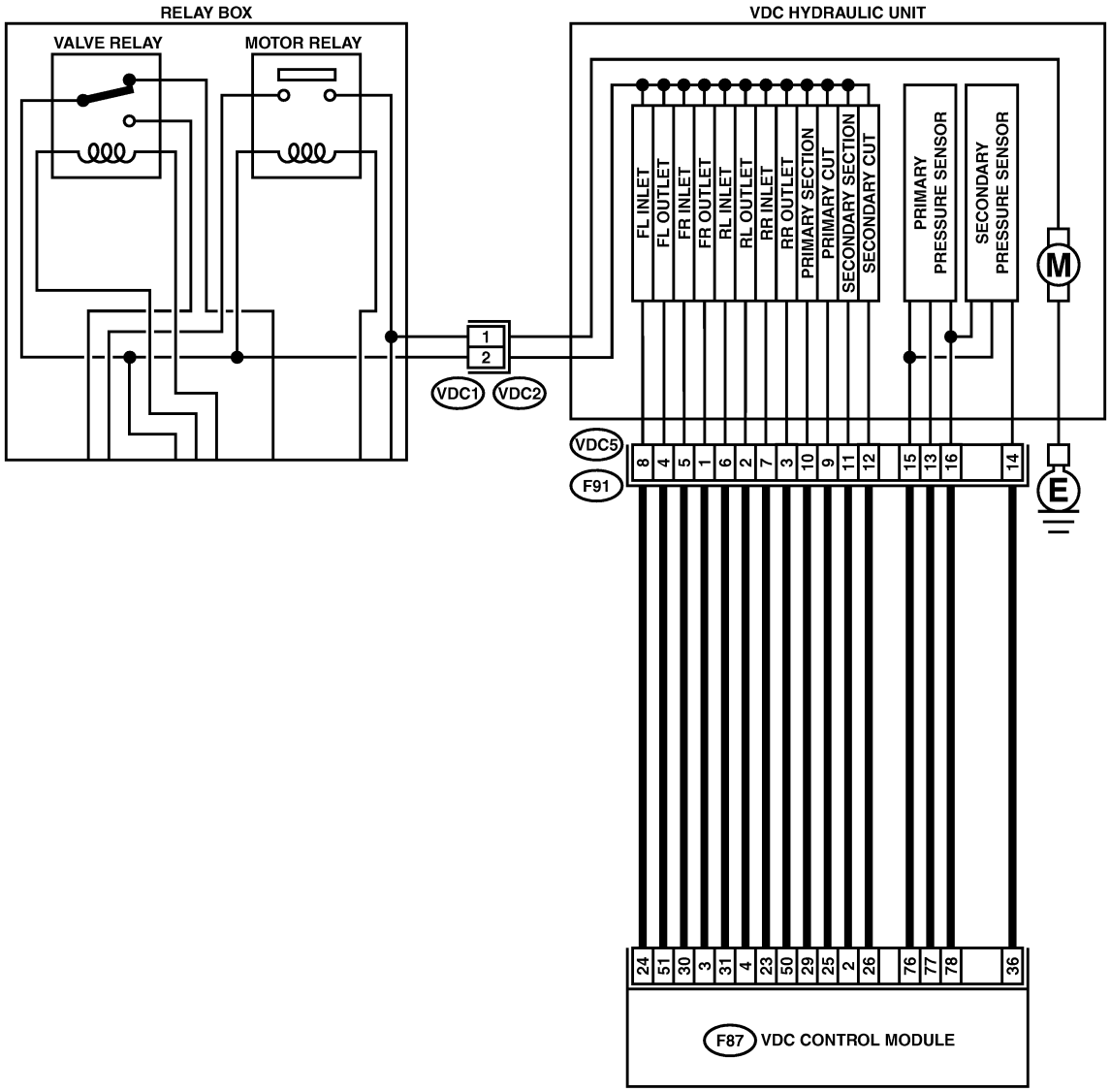
NOTE:
For diagnostic procedure, refer to DTC 64. <Ref. to VDC-72, DTC 64 ABNORMAL OUTLET AND SUCTION SOLENOID VALVE CIRCUIT(S) (SECONDARY SUCTION), Diagnostics Chart with Diagnosis Connector.>

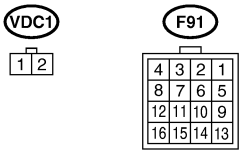
Z: DTC 64 ABNORMAL OUTLET AND SUCTION SOLENOID VALVE CIRCUIT(S) (SECONDARY SUCTION) S005522J24

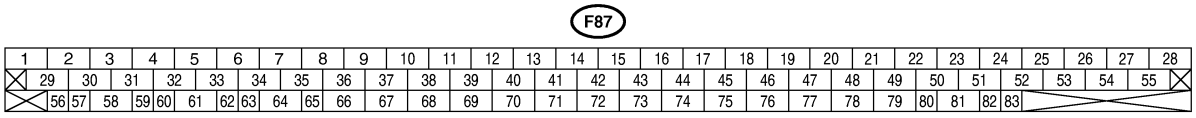
DIAGNOSIS:
- Faulty harness/connector
- Faulty solenoid valve in VDCH/U

TROUBLE SYMPTOM:
- ABS does not operate.
- VDC does not operate.

WIRING DIAGRAM:







B4M2320

No.	Step	Check	Yes	No
1	**CHECK RESISTANCE OF SOLENOID VALVE.** 1) Turn ignition switch to OFF. 2) Disconnect two connectors (VDC1, F91) from VDCH/U. 3) Measure resistance between VDCH/U connector terminals. ***Connector & terminal*** ***DTC 32/(VDC5) No. 1 — (VDC2) No. 2:*** ***DTC 34/(VDC5) No. 4 — (VDC2) No. 2:*** ***DTC 36/(VDC5) No. 3 — (VDC2) No. 2:*** ***DTC 38/(VDC5) No. 2 — (VDC2) No. 2:*** ***DTC 63/(VDC5) No. 10 — (VDC2) No. 2:*** ***DTC 64/(VDC5) No. 11 — (VDC2) No. 2:***	Is the resistance between 3.8 and 4.8 Ω?	Go to step **2**.	Replace VDCH/U. <Ref. to VDC-11, Hydraulic Control Unit (H/U).>
2	**CHECK GROUND SHORT OF SOLENOID VALVE.** Measure resistance between VDCH/U connector and chassis ground. ***Connector & terminal*** ***DTC 32/(VDC5) No. 1 — Chassis ground:*** ***DTC 34/(VDC5) No. 4 — Chassis ground:*** ***DTC 36/(VDC5) No. 3 — Chassis ground:*** ***DTC 38/(VDC5) No. 2 — Chassis ground:*** ***DTC 63/(VDC5) No. 10 — Chassis ground:*** ***DTC 64/(VDC5) No. 11 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **3**.	Replace VDCH/U. <Ref. to VDC-11, Hydraulic Control Unit (H/U).>
3	**CHECK BATTERY SHORT OF SOLENOID VALVE.** 1) Disconnect connector from VDCCM. 2) Measure voltage between VDCH/U connector and chassis ground. ***Connector & terminal*** ***DTC 32/(VDC5) No. 1 (+) — Chassis ground (–):*** ***DTC 34/(VDC5) No. 4 (+) — Chassis ground (–):*** ***DTC 36/(VDC5) No. 3 (+) — Chassis ground (–):*** ***DTC 38/(VDC5) No. 2 (+) — Chassis ground (–):*** ***DTC 63/(VDC5) No. 10 (+) — Chassis ground (–):*** ***DTC 64/(VDC5) No. 11 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **4**.	Replace VDCH/U. <Ref. to VDC-11, Hydraulic Control Unit (H/U).>

No.	Step	Check	Yes	No
4	**CHECK BATTERY SHORT OF SOLENOID VALVE.** 1) Turn ignition switch to ON. 2) Measure voltage between VDCH/U connector and chassis ground. ***Connector & terminal*** ***DTC 32/(VDC5) No. 1 (+) — Chassis ground (–):*** ***DTC 34/(VDC5) No. 4 (+) — Chassis ground (–):*** ***DTC 36/(VDC5) No. 3 (+) — Chassis ground (–):*** ***DTC 38/(VDC5) No. 2 (+) — Chassis ground (–):*** ***DTC 63/(VDC5) No. 10 (+) — Chassis ground (–):*** ***DTC 64/(VDC5) No. 11 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **5**.	Replace VDCH/U. <Ref. to VDC-11, Hydraulic Control Unit (H/U).>
5	**CHECK BATTERY SHORT OF HARNESS.** 1) Turn ignition switch to OFF. 2) Measure voltage between VDCCM connector and chassis ground. ***Connector & terminal*** ***DTC 32/(F87) No. 3 (+) — Chassis ground (–):*** ***DTC 34/(F87) No. 51 (+) — Chassis ground (–):*** ***DTC 36/(F87) No. 50 (+) — Chassis ground (–):*** ***DTC 38/(F87) No. 4 (+) — Chassis ground (–):*** ***DTC 63/(F87) No. 29 (+) — Chassis ground (–):*** ***DTC 64/(F87) No. 2 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **6**.	Repair harness between VDCCM and VDCH/U.
6	**CHECK BATTERY SHORT OF HARNESS.** 1) Turn ignition switch to ON. 2) Measure voltage between VDCCM connector and chassis ground. ***Connector & terminal*** ***DTC 32/(F87) No. 3 (+) — Chassis ground (–):*** ***DTC 34/(F87) No. 51 (+) — Chassis ground (–):*** ***DTC 36/(F87) No. 50 (+) — Chassis ground (–):*** ***DTC 38/(F87) No. 4 (+) — Chassis ground (–):*** ***DTC 63/(F87) No. 29 (+) — Chassis ground (–):*** ***DTC 64/(F87) No. 2 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **7**.	Repair harness between VDCCM and VDCH/U.

No.	Step	Check	Yes	No
7	**CHECK GROUND SHORT OF HARNESS.** 1) Turn ignition switch to OFF. 2) Measure resistance between VDCCM connector and chassis ground. ***Connector & terminal*** ***DTC 32/(F87) No. 3 — Chassis ground:*** ***DTC 34/(F87) No. 51 — Chassis ground:*** ***DTC 36/(F87) No. 50 — Chassis ground:*** ***DTC 38/(F87) No. 4 — Chassis ground:*** ***DTC 63/(F87) No. 29 — Chassis ground:*** ***DTC 64/(F87) No. 2 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **8**.	Repair harness between VDCCM and VDCH/U.
8	**CHECK HARNESS/CONNECTOR BETWEEN VDCCM AND VDCH/U.** 1) Connect connector (F91) to VDCH/U. 2) Measure resistance between VDCCM connector and VDCH/U connector. ***Connector & terminal*** ***DTC 32/(F87) No. 3 — (VDC2) No. 1:*** ***DTC 34/(F87) No. 51 — (VDC2) No. 1:*** ***DTC 36/(F87) No. 50 — (VDC2) No. 1:*** ***DTC 38/(F87) No. 4 — (VDC2) No. 1:*** ***DTC 63/(F87) No. 29 — (VDC2) No. 1:*** ***DTC 64/(F87) No. 2 — (VDC2) No. 1:***	Is the resistance between 3 and 6 Ω?	Go to step **9**.	Repair harness/ connector between VDCCM and VDCH/U.
9	**CHECK POOR CONTACT IN CONNECTORS.**	Is there poor contact in connectors between VDCCM and VDCH/U?	Repair connector.	Go to step **10**.
10	**CHECK VDCCM.** 1) Connect all connectors. 2) Erase the memory. 3) Perform inspection mode. 4) Read out the diagnostic trouble code.	Is the same diagnostic trouble code as in the current diagnosis still being output?	Replace VDCCM. <Ref. to VDC-9, VDC Control Module (VDCCM).>	Go to step **11**.
11	**CHECK ANY OTHER DIAGNOSTIC TROUBLE CODES APPEARANCE.**	Are other diagnostic trouble codes being output?	Proceed with the diagnosis corresponding to the diagnostic trouble code.	A temporary poor contact.

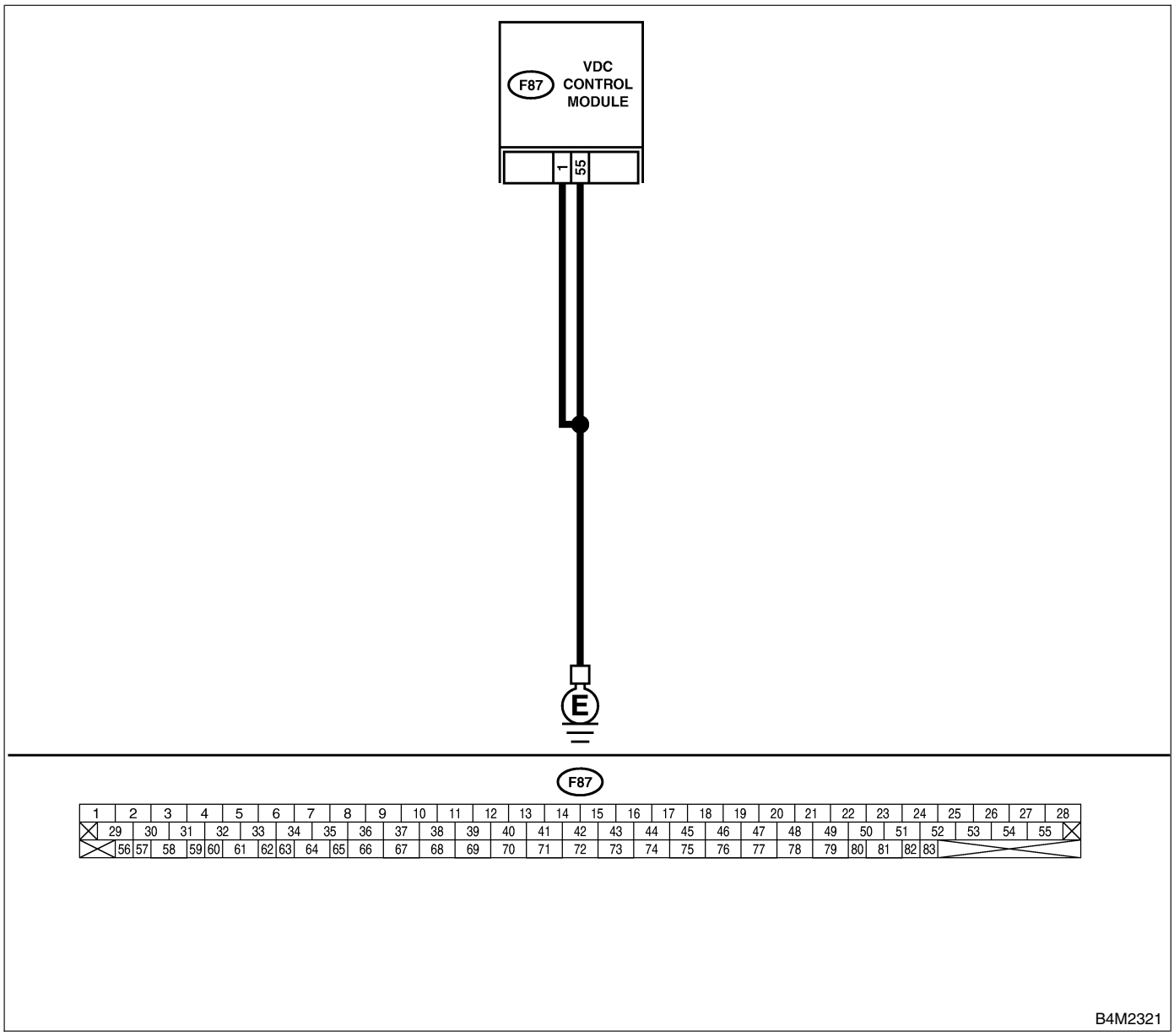
MEMO:

AA: DTC 41 ABNORMAL VDC CONTROL MODULE S005522J25

DIAGNOSIS:
- Faulty VDCCM

TROUBLE SYMPTOM:
- ABS does not operate.
- VDC does not operate.

WIRING DIAGRAM:



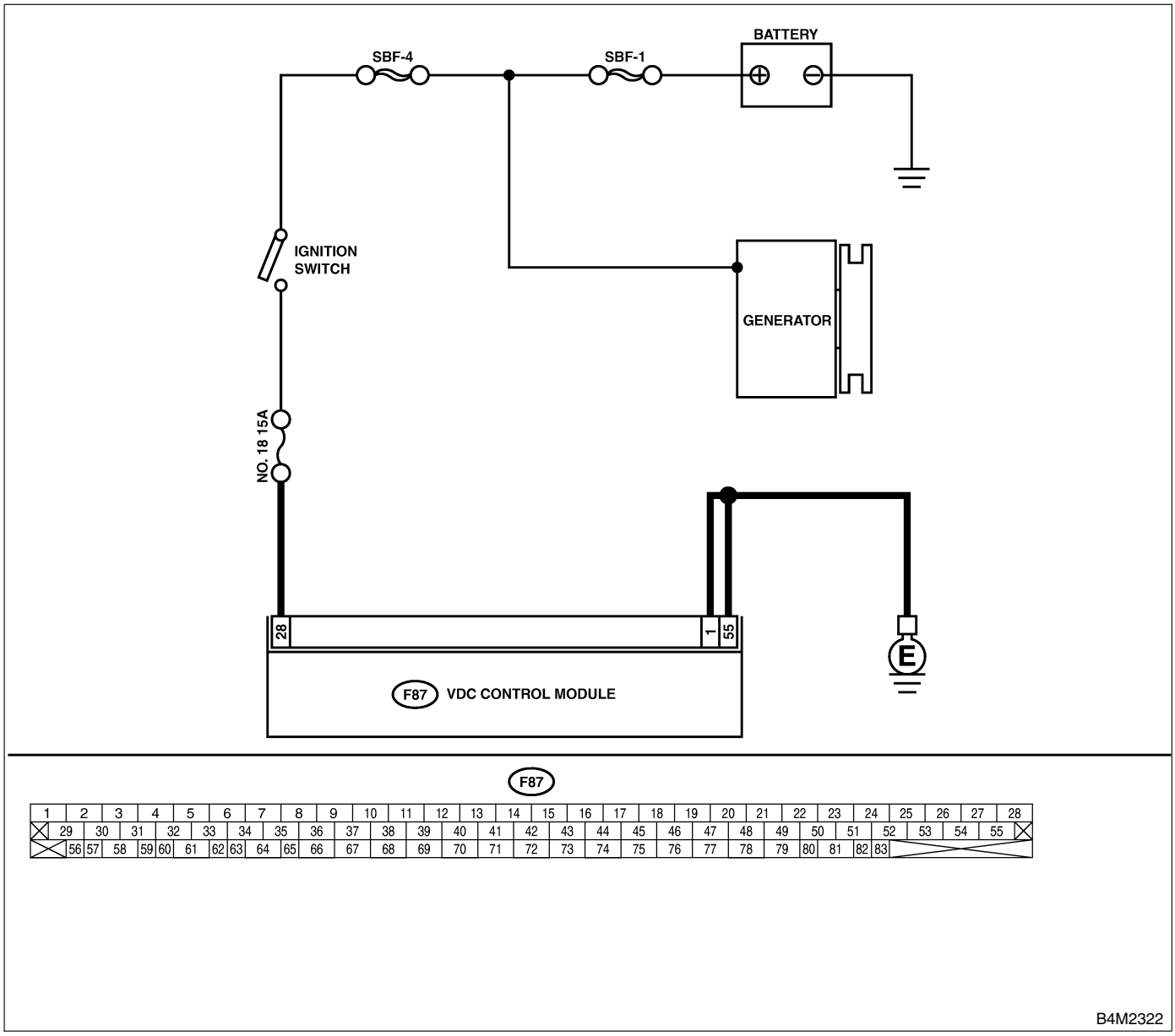
No.	Step	Check	Yes	No
1	**CHECK GROUND CIRCUIT OF VDCCM.** 1) Turn ignition switch to OFF. 2) Disconnect connector from VDCCM. 3) Measure resistance between VDCCM and chassis ground. ***Connector & terminal*** ***(F87) No. 1 — Chassis ground:*** ***(F87) No. 55 — Chassis ground:***	Is the resistance less than 0.5 Ω?	Go to step **2**.	Repair VDCCM ground harness.
2	**CHECK POOR CONTACT IN CONNECTORS.**	Is there poor contact in connectors between battery, ignition switch and VDCCM?	Repair connector.	Go to step **3**.
3	**CHECK SOURCES OF SIGNAL NOISE.**	Is the car telephone or the wireless transmitter properly installed?	Go to step **4**.	Properly install the car telephone or the wireless transmitter.
4	**CHECK SOURCES OF SIGNAL NOISE.**	Are noise sources (such as an antenna) installed near the sensor harness?	Install the noise sources apart from the sensor harness.	Go to step **5**.
5	**CHECK VDCCM.** 1) Connect all connectors. 2) Erase the memory. 3) Perform inspection mode. 4) Read out the diagnostic trouble code.	Is the same diagnostic trouble code as in the current diagnosis still being output?	Replace VDCCM. <Ref. to VDC-9, VDC Control Module (VDCCM).>	Go to step **6**.
6	**CHECK ANY OTHER DIAGNOSTIC TROUBLE CODES APPEARANCE.**	Are other diagnostic trouble codes being output?	Proceed with the diagnosis corresponding to the diagnostic trouble code.	A temporary poor contact.

AB: DTC 42 SOURCE VOLTAGE IS ABNORMAL. S005522I47

DIAGNOSIS:
- Power source voltage of the VDCCM is low.

TROUBLE SYMPTOM:
- ABS does not operate.
- VDC does not operate.

WIRING DIAGRAM:



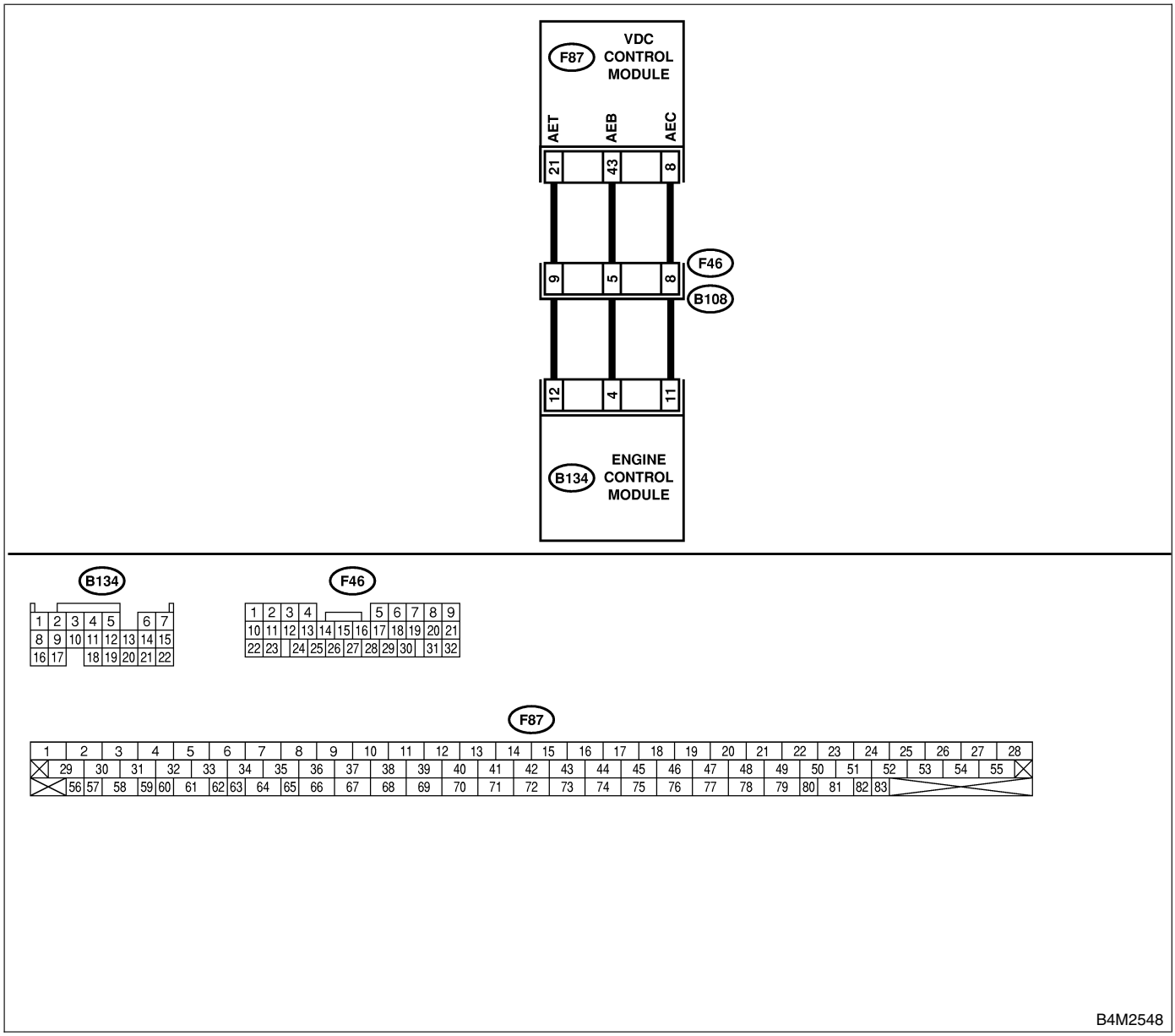
No.	Step	Check	Yes	No
1	**CHECK GENERATOR.** 1) Start engine. 2) Idling after warm-up. 3) Measure voltage between generator B terminal and chassis ground. ***Terminal*** ***Generator B terminal — Chassis ground:***	Is the voltage between 10 and 15 V?	Go to step **2**.	Repair generator.
2	**CHECK BATTERY TERMINAL.** Turn ignition switch to OFF.	Are the positive and negative battery terminals tightly clamped?	Go to step **3**.	Tighten the clamp of terminal.
3	**CHECK INPUT VOLTAGE OF VDCCM.** 1) Disconnect connector from VDCCM. 2) Run the engine at idle. 3) Measure voltage between VDCCM connector and chassis ground. ***Connector & terminal*** ***(F87) No. 28 (+) — Chassis ground (–):***	Is the voltage between 10 and 15 V?	Go to step **4**.	Repair harness connector between battery, ignition switch and VDCCM.
4	**CHECK GROUND CIRCUIT OF VDCCM.** 1) Turn ignition switch to OFF. 2) Measure resistance between VDCCM connector and chassis ground. ***Connector & terminal*** ***(F87) No. 1 — Chassis ground:*** ***(F87) No. 55 — Chassis ground:***	Is the resistance less than 0.5 Ω?	Go to step **5**.	Repair VDCCM ground harness.
5	**CHECK POOR CONTACT IN CONNECTORS.**	Is there poor contact in connectors between generator, battery and VDCCM?	Repair connector.	Go to step **6**.
6	**CHECK VDCCM.** 1) Connect all connectors. 2) Erase the memory. 3) Perform inspection mode. 4) Read out the diagnostic trouble code.	Is the same diagnostic trouble code as in the current diagnosis still being output?	Replace VDCCM. <Ref. to VDC-9, VDC Control Module (VDCCM).>	Go to step **7**.
7	**CHECK ANY OTHER DIAGNOSTIC TROUBLE CODES APPEARANCE.**	Are other diagnostic trouble codes being output?	Proceed with the diagnosis corresponding to the diagnostic trouble code.	A temporary poor contact.

AC: DTC 43 FAULTY VDCCM — ECM COMMUNICATION LINE S005522J26

DIAGNOSIS:
- AET communication line is broken or short circuited.
- AEB communication line is broken or short circuited.
- AEC communication line is broken or short circuited.

TROUBLE SYMPTOM:
- VDC does not operate.

WIRING DIAGRAM:



No.	Step	Check	Yes	No
1	**CHECK HARNESS/CONNECTOR BETWEEN VDCCM AND ECM.** 1) Turn ignition switch to OFF. 2) Disconnect connector from VDCCM. 3) Disconnect connector from ECM. 4) Measure resistance between VDCCM connector and ECM. ***Terminal*** ***(F87) No. 21 — (B134) No. 12:*** ***(F87) No. 43 — (B134) No. 4:*** ***(F87) No. 8 — (B134) No. 11:***	Is the resistance less than 0.5 Ω?	Go to step **2**.	Repair harness/ connector between VDCCM and ECM.
2	**CHECK GROUND SHORT OF HARNESS.** Measure resistance between VDCCM connector and chassis ground. ***Terminal*** ***(F87) No. 21 — Chassis ground:*** ***(F87) No. 43 — Chassis ground:*** ***(F87) No. 8 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **3**.	Repair harness/ connector between VDCCM and ECM.
3	**CHECK BATTERY SHORT OF HARNESS.** Measure voltage between VDCCM connector and chassis ground. ***Terminal*** ***(F87) No. 21 (+) — Chassis ground (–):*** ***(F87) No. 43 (+) — Chassis ground (–):*** ***(F87) No. 8 (+) — Chassis ground (–):***	Is the voltage less than 0.5 V?	Go to step **4**.	Repair harness/ connector between VDCCM and ECM.
4	**CHECK BATTERY SHORT OF HARNESS.** 1) Turn ignition switch to ON. 2) Measure voltage between VDCCM connector and chassis ground. ***Terminal*** ***(F87) No. 21 (+) — Chassis ground (–):*** ***(F87) No. 43 (+) — Chassis ground (–):*** ***(F87) No. 8 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **5**.	Repair harness/ connector between VDCCM and ECM.
5	**CHECK HARNESS/CONNECTOR BETWEEN VDCCM AND ECM.** 1) Turn ignition switch to OFF. 2) Connect connector to ECM. 3) Turn ignition switch to ON. 4) Measure voltage between VDCCM connector and chassis ground. ***Connector & terminal*** ***(F87) No. 21 (+) — Chassis ground (–):*** ***(F87) No. 43 (+) — Chassis ground (–):*** ***(F87) No. 8 (+) — Chassis ground (–):***	Is the voltage between 10 and 15 V?	Go to step **6**.	Go to step **9**.
6	**CHECK POOR CONTACT IN CONNECTORS.**	Is there poor contact in connectors between ECM and VDCCM?	Repair connector.	Go to step **7**.
7	**CHECK VDCCM.** 1) Turn ignition switch to OFF. 2) Connect all connectors. 3) Erase the memory. 4) Perform inspection mode. 5) Read out the diagnostic trouble code.	Is the same diagnostic trouble code as in the current diagnosis still being output?	Replace VDCCM. <Ref. to VDC-9, VDC Control Module (VDCCM).>	Go to step **8**.
8	**CHECK ANY OTHER DIAGNOSTIC TROUBLE CODES APPEARANCE.**	Are other diagnostic trouble codes being output?	Proceed with the diagnosis corresponding to the diagnostic trouble code.	A temporary poor contact.

No.	Step	Check	Yes	No
9	**CHECK ECM.** 1) Turn ignition switch to ON. 2) Measure voltage between ECM connector terminal and chassis ground. ***Connector & terminal*** ***(B134) No. 12 (+) — Chassis ground (–):*** ***(B134) No. 4 (+) — Chassis ground (–):*** ***(B134) No. 11 (+) — Chassis ground (–):***	Is the voltage between 10 V and 15 V?	Repair harness/ connector between ECM and VDCCM.	Go to step **10**.
10	**CHECK POOR CONTACT IN CONNECTORS.**	Is there poor contact in connector ECM?	Repair connector.	Go to step **11**.
11	**CHECK ENGINE.**	Is the engine functioning normally?	Replace ECM.	Repair engine.

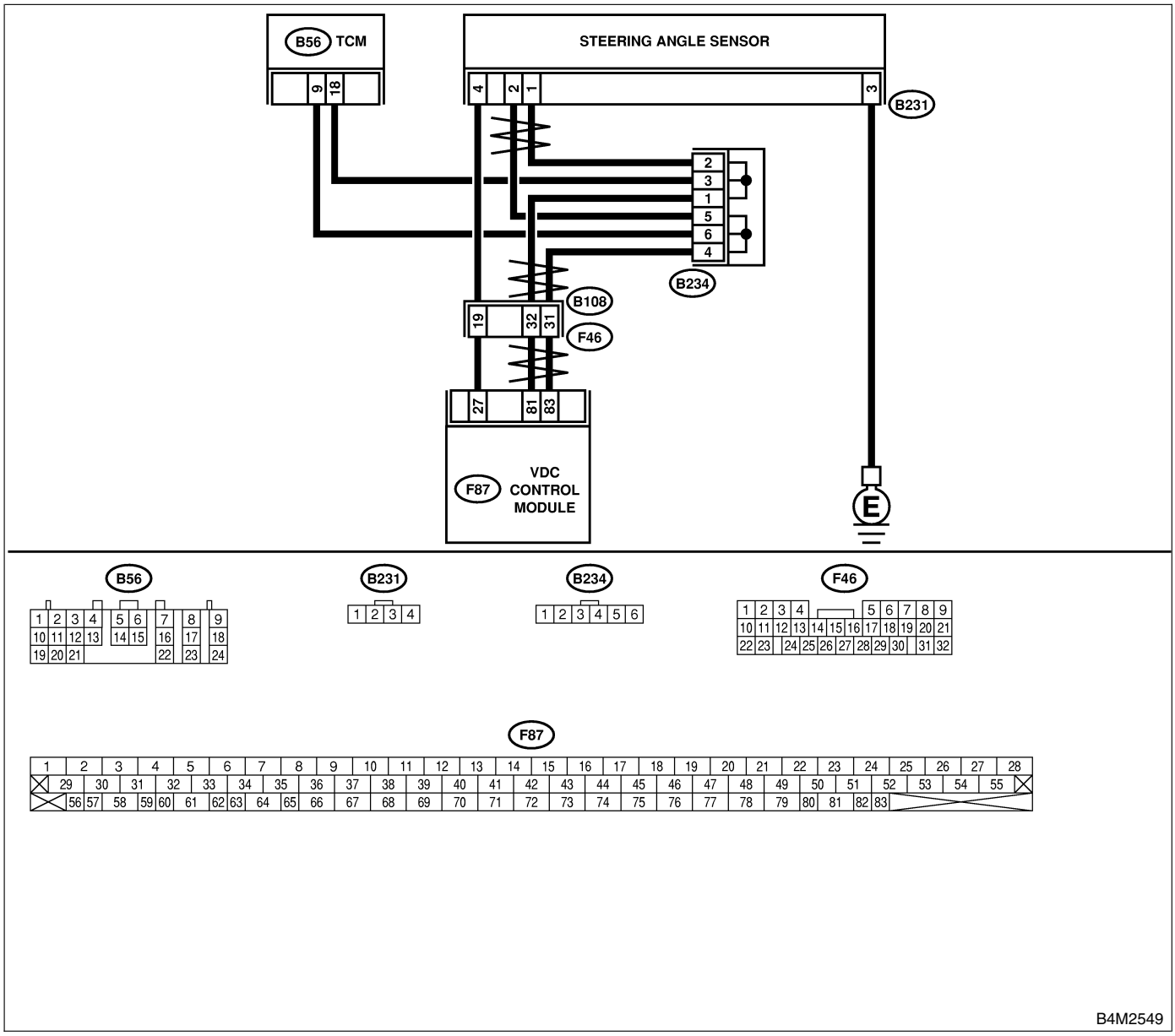
MEMO:

AD: DTC 44 A COMMUNICATION WITH AT CONTROL ABNORMAL S005522J27

DIAGNOSIS:
- Communication with AT control faults

TROUBLE SYMPTOM:
- VDC does not operate.

WIRING DIAGRAM:



No.	Step	Check	Yes	No
1	**CHECK RESISTANCE OF HARNESS.** 1) Turn ignition switch to OFF. 2) Disconnect two connectors from TCM. 3) Measure resistance between TCM connector terminals. ***Connector & terminal*** ***(B56) No. 9 — No. 18:***	Is the resistance 60±3 Ω?	Go to step **2**.	Repair harness between TCM and VDCCM.
2	**CHECK POOR CONTACT IN CONNECTORS.**	Is there poor contact in TCM connectors?	Repair connector.	Go to step **3**.
3	**CHECK TCM.** 1) Turn ignition switch to OFF. 2) Connect all connectors. 3) Erase the memory. 4) Perform inspection mode. 5) Read out the diagnostic trouble code.	Is the same diagnostic trouble code as in the current diagnosis still being output?	Replace TCM. <Ref. to AT-49, Transmission Control Module (TCM).>	Go to step **4**.
4	**CHECK ANY OTHER DIAGNOSTIC TROUBLE CODES APPEARANCE.**	Are other diagnostic trouble codes being output?	Proceed with the diagnosis corresponding to the diagnostic trouble code.	A temporary poor contact.

AE: DTC 45 CONTROL MODULE OUT OF SPECIFICATION S005522J28

DIAGNOSIS:
- Control module out of specification

TROUBLE SYMPTOM:
- ABS does not operate.
- VDC does not operate.

No.	Step	Check	Yes	No
1	**CHECK TCM.**	Is the same diagnostic trouble code as in the current diagnosis still being output?	Go to step **2**.	Proceed with the diagnosis corresponding to the diagnostic trouble code.
2	**CHECK VDCCM SPECIFICATIONS.** Check the VDCCM identification mark. ***VDCCM identification mark*** ***P***	Does the VDCCM identification mark agree with the vehicle specifications?	Go to step **3**.	Replace VDCCM. <Ref. to VDC-9, VDC Control Module (VDCCM).>
3	**CHECK TCM SPECIFICATIONS.** Check the TCM identification mark. ***TCM identification mark*** ***ZV***	Does the TCM identification mark agree with the vehicle specifications?	Go to step **4**.	Replace TCM. <Ref. to AT-49, Transmission Control Module (TCM).>
4	**CHECK TCM.** 1) Replace TCM. <Ref. to AT-49, Transmission Control Module (TCM).> 2) Erase the memory. 3) Perform inspection mode. 4) Read out the diagnostic trouble code.	Is the same diagnostic trouble code as in the current diagnosis still being output?	Go to step **5**.	The original TCM has been faulty.
5	**CHECK VDCCM.** 1) Install original TCM. 2) Replace VDCCM. <Ref. to VDC-9, VDC Control Module (VDCCM).> 3) Erase the memory. 4) Perform inspection mode. 5) Read out the diagnostic trouble code.	Is the same diagnostic trouble code as in the current diagnosis still being output?	Go to step **6**.	The original VDCCM has been faulty.
6	**CHECK VDCCM.**	Is the same diagnostic trouble code as in the current diagnosis still being output?	Replace TCM. <Ref. to AT-49, Transmission Control Module (TCM).>	Proceed with the diagnosis corresponding to the diagnostic trouble code.

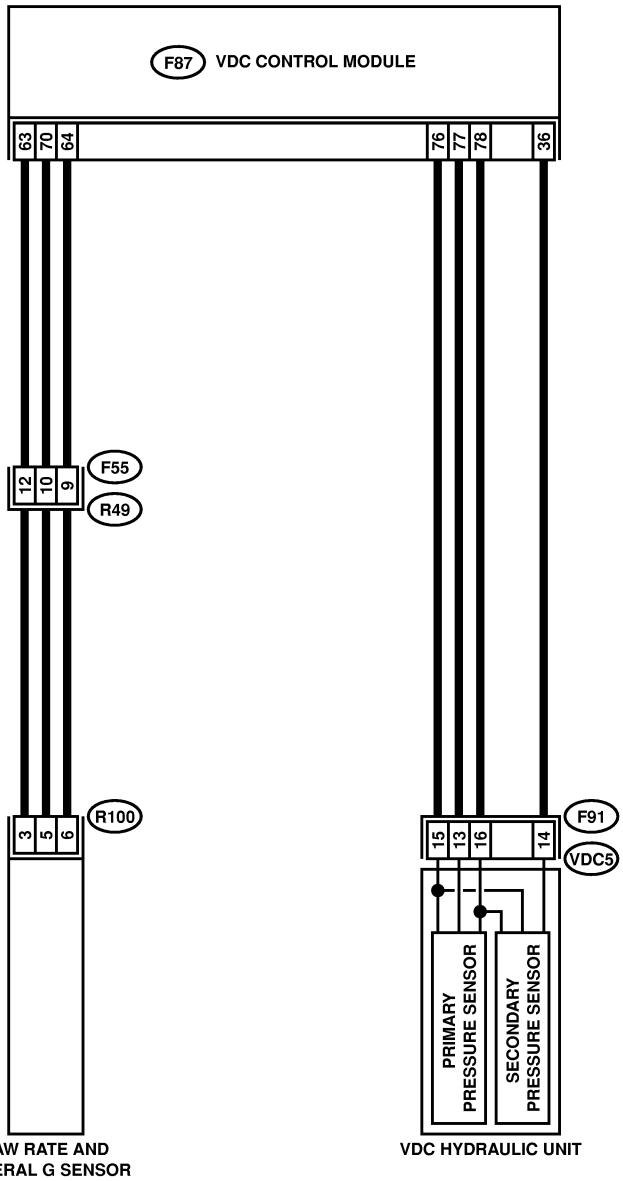
MEMO:

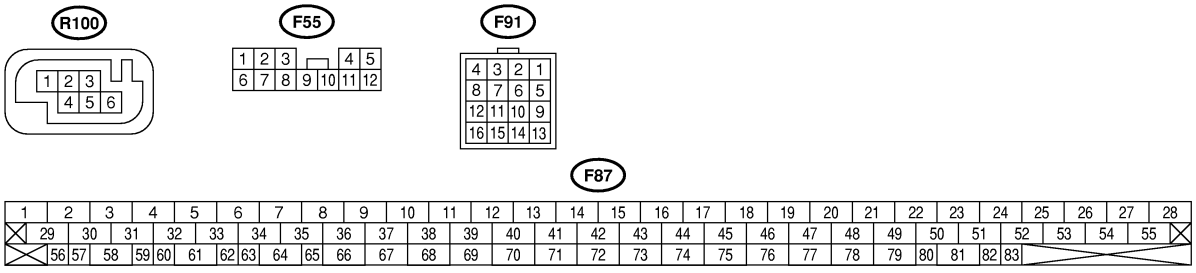
AF: DTC 46 ABNORMAL VOLTAGE OF 5 V POWER SUPPLY S005522J29

DIAGNOSIS:
- 5 volt power supply is abnormal.

TROUBLE SYMPTOM:
- ABS does not operate.
- VDC does not operate.

WIRING DIAGRAM:





B4M2555

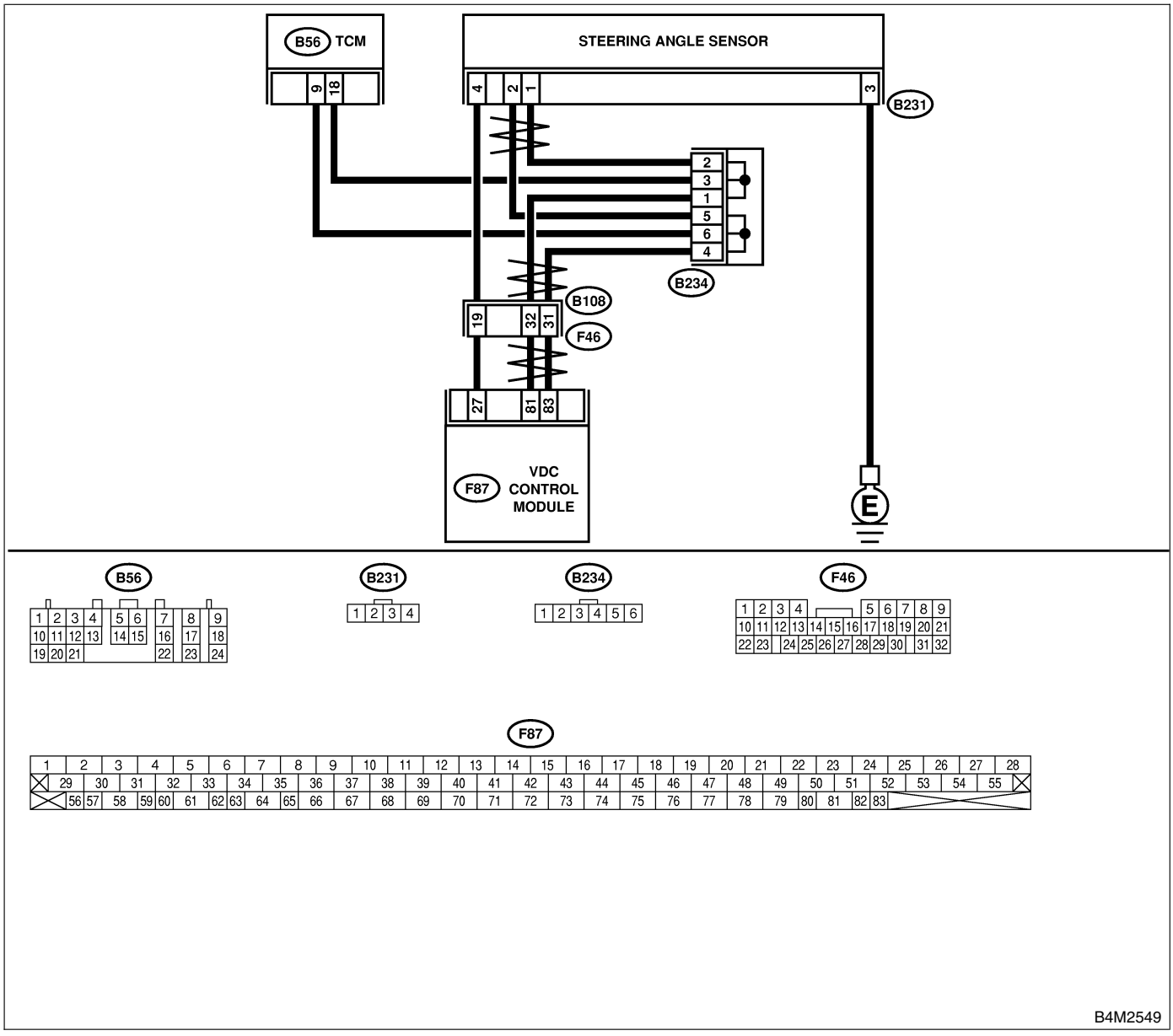
No.	Step	Check	Yes	No
1	**CHECK GROUND SHORT OF SENSOR AND HARNESS.** 1) Turn ignition switch OFF. 2) Disconnect connector from VDCCM. 3) Measure resistance between VDCCM connector and chassis ground. ***Connector & terminal*** ***(F87) No. 63 — Chassis ground (Lateral G sensor):*** ***(F87) No. 78 — Chassis ground (Pressure sensor):***	Is the resistance more than 1 MΩ?	Go to step **3**.	Go to step **2**.
2	**CHECK GROUND SHORT OF HARNESS.** 1) Disconnect connector from faulty sensors. 2) Measure resistance between VDCCM and chassis ground. ***Connector & terminal*** ***(F87) No. 63 — Chassis ground (Lateral G sensor):*** ***(F87) No. 78 — Chassis ground (Pressure sensor):***	Is the resistance more than 1 MΩ?	Replace faulty sensors.	Repair or replace harness connector between VDCCM and faulty sensor.
3	**CHECK BATTERY SHORT OF SENSOR AND HARNESS.** Measure voltage between VDCCM and chassis ground. ***Connector & terminal*** ***(F87) No. 63 (+) — Chassis ground (–) (Lateral G sensor):*** ***(F87) No. 78 (+) — Chassis ground (–) (Pressure sensor):***	Is the voltage less than 0.5 V?	Go to step **4**.	Go to step **5**.
4	**CHECK BATTERY SHORT OF SENSOR AND HARNESS.** 1) Turn ignition switch to ON. 2) Measure voltage between VDCCM connector and chassis ground. ***Connector & terminal*** ***(F87) No. 63 (+) — Chassis ground (–) (Lateral G sensor):*** ***(F87) No. 78 (+) — Chassis ground (–) (Pressure sensor):***	Is the voltage less than 0.5 V?	Replace VDCCM.	Go to step **5**.
5	**CHECK BATTERY SHORT OF HARNESS.** 1) Turn ignition switch to OFF. 2) Disconnect connector from faulty sensors. 3) Measure voltage between VDCCM and chassis ground. ***Connector & terminal*** ***(F87) No. 63 (+) — Chassis ground (–) (Lateral G sensor):*** ***(F87) No. 78 (+) — Chassis ground (–) (Pressure sensor):***	Is the voltage less than 0.5 V?	Go to step **6**.	Repair or replace harness connector between VDCCM and faulty sensor.
6	**CHECK BATTERY SHORT OF HARNESS.** 1) Turn ignition switch to ON. 2) Measure voltage between VDCCM and chassis ground. ***Connector & terminal*** ***(F87) No. 63 (+) — Chassis ground (–) (Lateral G sensor):*** ***(F87) No. 78 (+) — Chassis ground (–) (Pressure sensor):***	Is the voltage less than 0.5 V?	Replace faulty sensor.	Repair or replace harness connector between VDCCM and faulty sensor.

AG: DTC 47 FAULTY CAN COMMUNICATION LINE S005522J30

DIAGNOSIS:
- CAN communication line is broken or short circuited.

TROUBLE SYMPTOM:
- ABS does not operate.
- VDC does not operate.

WIRING DIAGRAM:



No.	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN VDCCM, STEERING ANGLE SENSOR AND TCM.** 1) Turn ignition switch OFF. 2) Disconnect connector from VDCCM, TCM and steering angle sensor. 3) Measure resistance between VDCCM, TCM and steering angle sensor. ***Connector & terminal*** ***(F87) No. 83 — (B56) No. 9:*** ***(F87) No. 81 — (B56) No. 18:*** ***(F87) No. 83 — (B231) No. 2:*** ***(F87) No. 81 — (B231) No. 1:***	Is the resistance less than 0.5 Ω?	Go to step **3**.	Go to step **2**.
2	**CHECK HARNESS BETWEEN STEERING ANGLE SENSOR AND TCM.** Measure resistance between TCM and steering angle sensor. ***Connector & terminal*** ***(B56) No. 9 — (B231) No. 2:*** ***(B56) No. 18 — (B231) No. 1:***	Is the resistance less than 0.5 Ω?	Repair or replace harness connector between VDCCM and steering angle sensor.	Repair or replace harness connector between TCM and steering angle sensor.
3	**CHECK GROUND SHORT OF HARNESS.** Measure resistance between VDCCM and chassis ground. ***Connector & terminal*** ***(F87) No. 83 — Chassis ground:*** ***(F87) No. 81 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **4**.	Repair or replace harness connector between VDCCM, TCM and steering angle sensor.
4	**CHECK BATTERY SHORT OF SENSOR.** Measure voltage between VDCCM and chassis ground. ***Connector & terminal*** ***(F87) No. 83 — Chassis ground:*** ***(F87) No. 81 — Chassis ground:***	Is the voltage less than 0.5 V?	Go to step **5**.	Repair or replace harness connector between VDCCM, TCM and steering angle sensor.
5	**CHECK BATTERY SHORT OF SENSOR.** 1) Turn ignition switch to ON. 2) Measure voltage between VDCCM and chassis ground. ***Connector & terminal*** ***(F87) No. 83 — Chassis ground:*** ***(F87) No. 81 — Chassis ground:***	Is the voltage less than 0.5 V?	Go to step **6**.	Repair or replace harness connector between VDCCM, TCM and steering angle sensor.
6	**CHECK STEERING ANGLE SENSOR.** 1) Turn ignition switch to OFF. 2) Connect connector to steering angle sensor. 3) Measure resistance between VDCCM connector terminals. ***Connector & terminal*** ***(F87) No. 83 — No. 81:***	Is the resistance 120±6 Ω?	Go to step **8**.	Go to step **7**.
7	**CHECK POOR CONTACT IN CONNECTORS.**	Is there poor contact in steering angle sensor?	Replace steering angle sensor.	Repair or replace steering angle sensor connector.
8	**CHECK VDCCM.** 1) Connect connector to VDCCM. 2) Disconnect connector from steering angle sensor. 3) Measure resistance between steering angle sensor connector terminals. ***Connector & terminal*** ***(B231) No. 1 — No. 2:***	Is the resistance 120±6 Ω?	Go to step **10**.	Go to step **9**.

No.	Step	Check	Yes	No
9	**CHECK POOR CONTACT IN CONNECTORS.**	Is there poor contact in steering angle sensor?	Replace VDCCM.	Repair or replace VDCCM connector.
10	**CHECK TCM.** 1) Connect connector to TCM. 2) Disconnect connector from VDCCM. 3) Measure resistance between steering angle sensor terminals. ***Connector & terminal*** ***(B231) No. 1 — No. 2:***	Is the resistance more than 1 MΩ?	Go to step **12**.	Go to step **11**.
11	**CHECK POOR CONTACT IN CONNECTORS.**	Is there poor contact in steering angle sensor?	Replace TCM.	Repair or replace TCM connector.
12	**CHECK VDCCM.** 1) Connect all connectors. 2) Erase the memory. 3) Perform inspection mode. 4) Read out the diagnostic trouble code.	Are other diagnostic trouble codes being output?	Go to step **13**.	A temporary poor contact.
13	**CHECK DIAGNOSTIC TROUBLE CODE.**	Is the same diagnostic trouble code as in the current diagnosis still being output?	Go to step **14**.	Proceed with the diagnosis corresponding to the diagnostic trouble code.
14	**CHECK AT SYSTEM DIAGNOSTIC TROUBLE CODE.**	Is the AT system diagnostic trouble code No. 86?	Replace steering angle sensor.	Replace VDCCM.

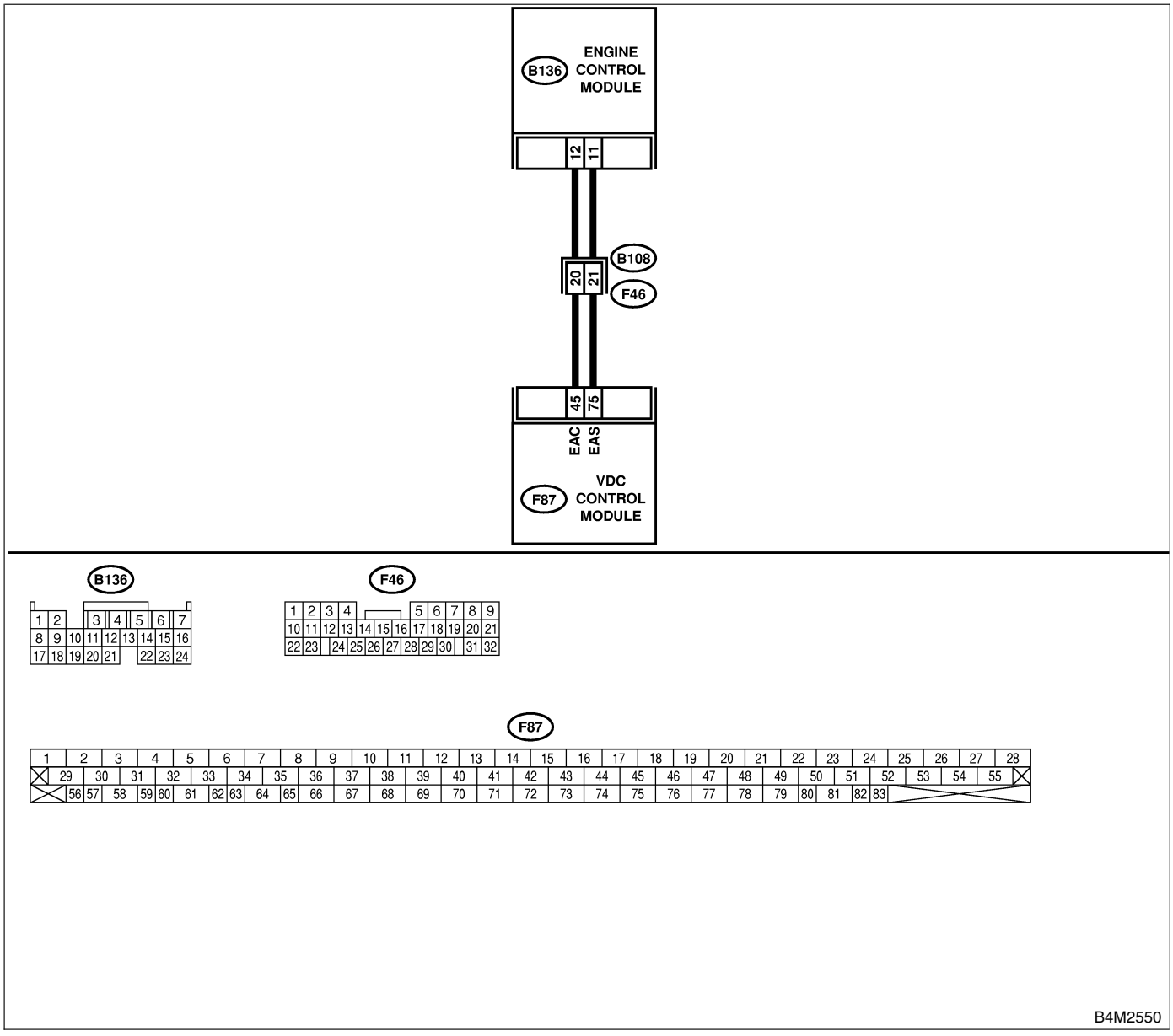
MEMO:

AH: DTC 48 FAULTY ECM — VDCCM COMMUNICATION LINE S005522J31

DIAGNOSIS:
- EAS communication line is broken or short circuited.
- EAC communication line is broken or short circuited.

TROUBLE SYMPTOM:
- ABS does not operate.
- VDC does not operate.

WIRING DIAGRAM:



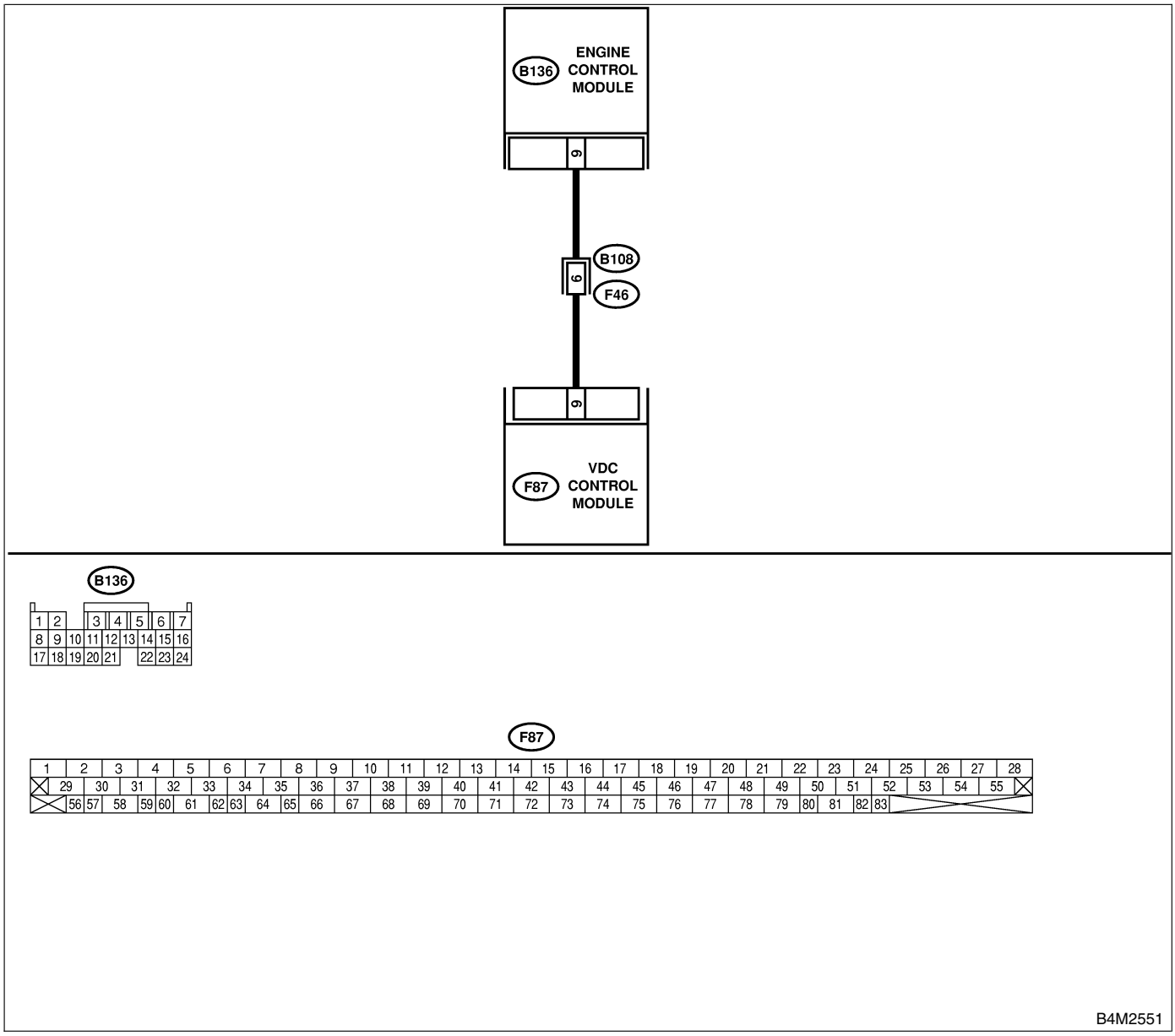
No.	Step	Check	Yes	No
1	**CHECK HARNESS BETWEEN ECM AND VDCCM.** 1) Turn ignition switch to OFF. 2) Disconnect connectors from VDCCM and ECM. 3) Measure resistance between VDCCM and ECM. ***Connector & terminal*** ***(F87) No. 75 — (B136) No. 11:*** ***(F87) No. 45 — (B136) No. 12:***	Is the resistance less than 0.5 Ω?	Go to step **2**.	Repair or replace open circuit between VDCCM and ECM.
2	**CHECK GROUND SHORT OF HARNESS.** Measure resistance between VDCCM and ECM. ***Connector & terminal*** ***(F87) No. 75 — Chassis ground:*** ***(F87) No. 45 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **3**.	Repair or replace ground short circuit between VDCCM and ECM.
3	**CHECK BATTERY SHORT OF HARNESS.** 1) Turn ignition switch to ON. 2) Measure voltage between VDCCM and chassis ground. ***Connector & terminal*** ***(F87) No. 75 — Chassis ground:*** ***(F87) No. 45 — Chassis ground:***	Is the voltage less than 0.5 V?	Go to step **4**.	Repair or replace battery short circuit between VDCCM and ECM.
4	**CHECK INPUT VOLTAGE TO ECM.** 1) Turn ignition switch to OFF. 2) Connect connector to VDCCM. 3) Turn ignition switch to ON. 4) Measure voltage between ECM connector and chassis ground. ***Connector & terminal*** ***(B136) No. 11 (+) — Chassis ground (–):*** ***(B136) No. 12 (+) — Chassis ground (–):***	Is the voltage between 10 and 15 V?	Go to step **6**.	Go to step **5**.
5	**CHECK POOR CONTACT IN ECM CONNECTORS.**	Is there poor contact in ECM connector?	Replace ECM.	Repair or replace ECM connector.
6	**ERASE MEMORY.** 1) Connect all connectors. 2) Erase the memory.	Can the memory be erased?	Go to step **7**.	Replace VDCCM.
7	**CHECK DIAGNOSTIC TROUBLE CODE.** 1) Perform inspection mode. 2) Read out the diagnostic trouble code.	Is the same diagnostic trouble code as in the current diagnosis still being output?	Replace ECM.	A temporary poor contact.

AI: DTC 49 ABNORMAL ENGINE SPEED SIGNAL S005522J32

DIAGNOSIS:
- Engine speed signal line is broken or short circuited.

TROUBLE SYMPTOM:
- VDC does not operate.

WIRING DIAGRAM:



No.	Step	Check	Yes	No
1	**CHECK TACHOMETER OPERATION IN COMBINATION METER.**	Does tachometer operate normally?	Go to step **2**.	Repair tachometer.
2	**CHECK HARNESS BETWEEN VDCCM AND ECM.** 1) Turn ignition switch to OFF. 2) Disconnect connector from VDCCM and ECM. 3) Measure resistance between VDCCM connector and ECM. ***Connector & terminal*** ***(F87) No. 9 — (B136) No. 9:***	Is the resistance less than 0.5 Ω?	Go to step **3**.	Repair harness connector between VDCCM and ECM.
3	**CHECK POOR CONTACT IN CONNECTORS.**	Is there poor contact in connectors between VDCCM and ECM?	Repair connector.	Go to step **4**.
4	**CHECK VDCCM.** 1) Connect all connectors. 2) Erase the memory. 3) Perform inspection mode. 4) Read out the diagnostic trouble code.	Is the same diagnostic trouble code as in the current diagnosis still being output?	Replace VDCCM. <Ref. to VDC-9, VDC Control Module (VDCCM).>	Go to step **5**.
5	**CHECK ANY OTHER DIAGNOSTIC TROUBLE CODES APPEARANCE.**	Are other diagnostic trouble codes being output?	Proceed with the diagnosis corresponding to the diagnostic trouble code.	A temporary poor contact.

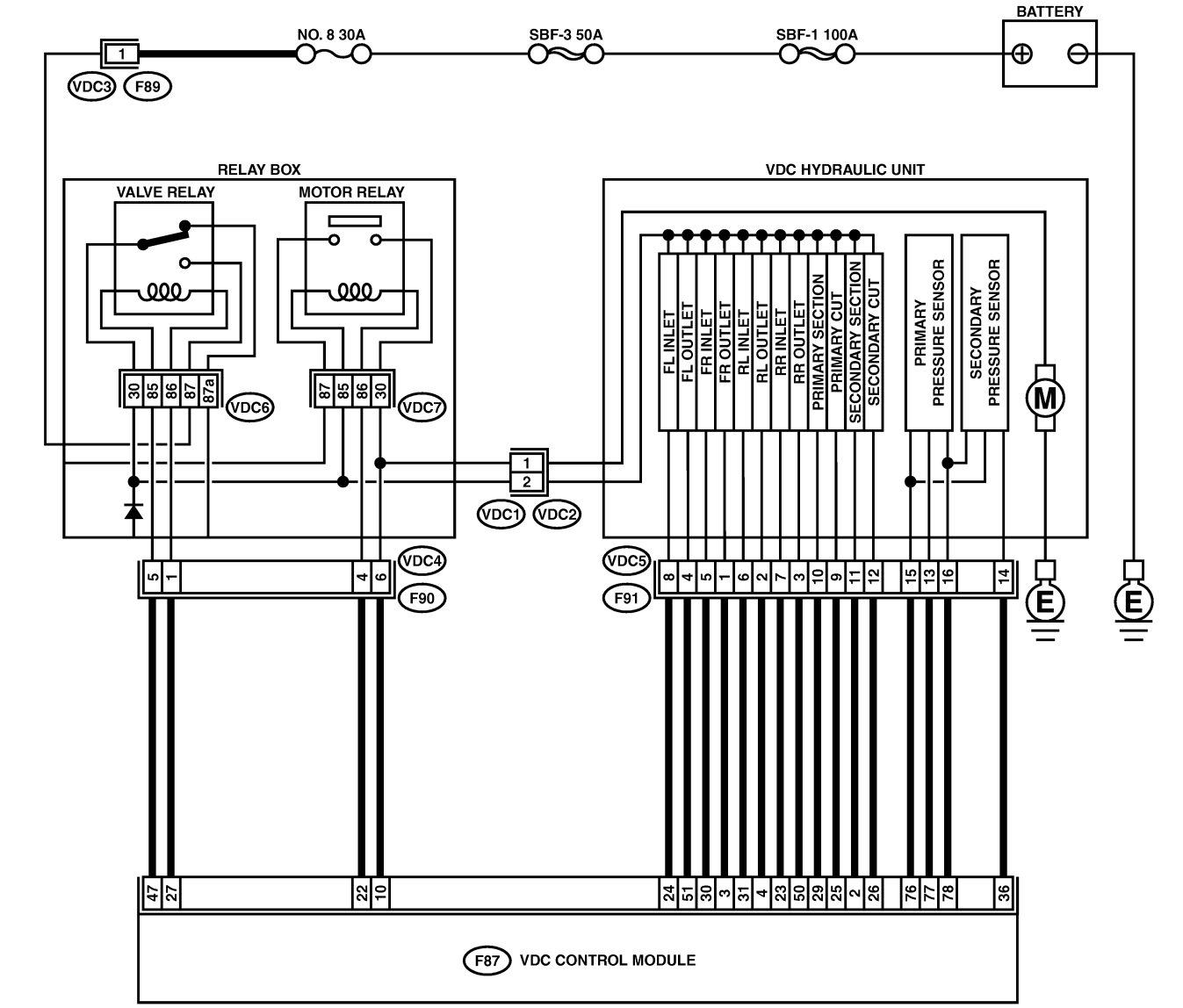
AJ: DTC 51 ABNORMAL VALVE RELAY S005522I49

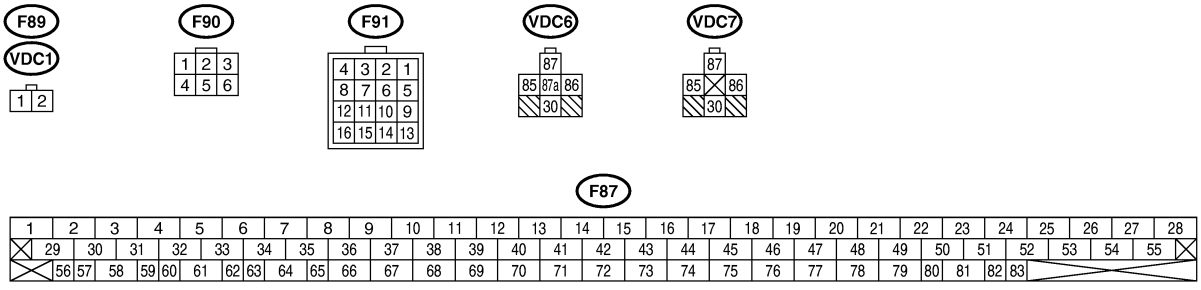
DIAGNOSIS:
- Faulty valve relay

NOTE:
When DTC 74 ABNORMAL PRESSURE SENSOR procedure 4 is carried out, DTC 51 is memorized.

TROUBLE SYMPTOM:
- ABS does not operate.
- VDC does not operate.

WIRING DIAGRAM:





B4M2328

No.	Step	Check	Yes	No
1	**CHECK RESISTANCE OF VALVE RELAY.** 1) Turn ignition switch to OFF. 2) Remove valve relay from relay box. 3) Measure resistance between valve relay terminals. ***Terminals*** ***No. 85 — No. 86:***	Is the resistance between 93 and 113 Ω?	Go to step **2**.	Replace valve relay.
2	**CHECK CONTACT POINT OF VALVE RELAY.** 1) Connect battery to valve relay terminals No. 85 and No. 86. 2) Measure resistance between valve relay terminals. ***Terminals*** ***No. 30 — No. 87:***	Is the resistance less than 0.5 Ω?	Go to step **3**.	Replace valve relay.
3	**CHECK CONTACT POINT OF VALVE RELAY.** Measure resistance between valve relay terminals. ***Terminals*** ***No. 30 — No. 87a:***	Is the resistance more than 1 MΩ?	Go to step **4**.	Replace valve relay.
4	**CHECK CONTACT POINT OF VALVE RELAY.** 1) Disconnect battery from valve relay terminals. 2) Measure resistance between valve relay terminals. ***Terminals*** ***No. 30 — No. 87:***	Is the resistance more than 1 MΩ?	Go to step **5**.	Replace valve relay.
5	**CHECK CONTACT POINT OF VALVE RELAY.** Measure resistance between valve relay terminals. ***Terminals*** ***No. 30 — No. 87a:***	Is the resistance less than 0.5 Ω?	Go to step **6**.	Replace valve relay.
6	**CHECK SHORT OF VALVE RELAY.** Measure resistance between valve relay terminals. ***Terminals*** ***No. 86 — No. 87:*** ***No. 86 — No. 87a:***	Is the resistance more than 1 MΩ?	Go to step **7**.	Replace valve relay.
7	**CHECK POWER SUPPLY FOR VALVE RELAY.** 1) Disconnect connector (F89) from relay box. 2) Measure voltage between relay box connector and chassis ground. ***Connector & terminal*** ***(F89) No. 1 (+) — Chassis ground (–):***	Is the voltage between 10 and 15 V?	Go to step **8**.	Repair harness between battery and relay box connector. Check fuse No. 8.
8	**CHECK OPEN CIRCUIT AND GROUND SHORT IN POWER SUPPLY CIRCUIT OF RELAY BOX.** 1) Disconnect connector (VDC1) from VDCH/U. 2) Connect connector (F89) to relay box. 3) Measure voltage of relay box. ***Connector & terminal*** ***(VDC6) No. 87 (+) — Chassis ground (–):***	Is the voltage between 10 and 15 V?	Go to step **9**.	Replace relay box and check fuse No. 8.

No.	Step	Check	Yes	No
9	**CHECK OPEN CIRCUIT IN CONTROL CIRCUIT OF RELAY BOX.** 1) Turn ignition switch to OFF. 2) Disconnect connector (F90) from relay box. 3) Measure resistance between relay box connector and valve relay installing point. ***Connector & terminal*** ***(VDC4) No. 5 — (VDC6) No. 85:*** ***(VDC4) No. 1 — (VDC6) No. 86:***	Is the resistance less than 0.5 Ω?	Go to step **10**.	Replace relay box.
10	**CHECK GROUND SHORT IN CONTACT POINT CIRCUIT OF RELAY BOX.** Measure resistance between relay box connector and chassis ground. ***Connector & terminal*** ***(VDC4) No. 5 — Chassis ground:*** ***(VDC4) No. 1 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **11**.	Replace relay box and check fuse No. 8.
11	**CHECK BATTERY SHORT IN CONTACT POINT CIRCUIT OF RELAY BOX.** Measure voltage between relay box connector and chassis ground. ***Connector & terminal*** ***(VDC4) No. 5 (+) — Chassis ground (–):*** ***(VDC4) No. 1 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **12**.	Replace relay box. Check fuse No. 8.
12	**CHECK BATTERY SHORT IN CONTACT POINT CIRCUIT OF RELAY BOX.** 1) Turn ignition switch to ON. 2) Measure voltage between relay box connector and chassis ground. ***Connector & terminal*** ***(VDC4) No. 5 (+) — Chassis ground (–):*** ***(VDC4) No. 1 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **13**.	Replace relay box. Check fuse No. 8.
13	**CHECK OPEN CIRCUIT IN CONTROL SYSTEM HARNESS OF VALVE RELAY.** 1) Turn ignition switch to OFF. 2) Disconnect connector from VDCCM. 3) Measure resistance between VDCCM connector and relay box connector. ***Connector & terminal*** ***(F87) No. 47 — (F90) No. 5:*** ***(F87) No. 27 — (F90) No. 1:***	Is the resistance less than 0.5 Ω?	Go to step **14**.	Repair harness between VDCCM and relay box.
14	**CHECK GROUND SHORT IN CONTROL SYSTEM HARNESS OF VALVE RELAY.** Measure resistance between VDCCM connector and chassis ground. ***Connector & terminal*** ***(F87) No. 47 — Chassis ground:*** ***(F87) No. 27 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **15**.	Repair harness between VDCCM and relay box and check all fuses.
15	**CHECK BATTERY SHORT IN CONTROL SYSTEM HARNESS OF VALVE RELAY.** Measure voltage between VDCCM connector and chassis ground. ***Connector & terminal*** ***(F87) No. 27 (+) — Chassis ground (–):*** ***(F87) No. 47 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **16**.	Repair harness between VDCCM and relay box.

No.	Step	Check	Yes	No
16	**CHECK BATTERY SHORT IN CONTROL SYSTEM HARNESS OF VALVE RELAY.** 1) Turn ignition switch to ON. 2) Measure voltage between VDCCM connector and chassis ground. ***Connector & terminal*** ***(F87) No. 27 (+) — Chassis ground (–):*** ***(F87) No. 47 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **17**.	Repair harness between VDCCM and relay box.
17	**CHECK OPEN CIRCUIT IN CONTACT POINT CIRCUIT OF RELAY BOX.** Measure resistance between VDCH/U connector and valve relay installing point. ***Connector & terminal*** ***(VDC1) No. 2 — (VDC6) No. 30:***	Is the resistance less than 0.5 Ω?	Go to step **18**.	Replace relay box.
18	**CHECK GROUND SHORT IN CONTACT POINT CIRCUIT OF RELAY BOX.** Measure resistance between VDCH/U connector and chassis ground. ***Connector & terminal*** ***(VDC1) No. 2 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **19**.	Replace relay box and check fuse No. 8.
19	**CHECK BATTERY SHORT IN CONTACT POINT CIRCUIT OF RELAY BOX.** Measure voltage between VDCH/U connector and chassis ground. ***Connector & terminal*** ***(VDC1) No. 2 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **20**.	Replace relay box. Check fuse No. 8.
20	**CHECK BATTERY SHORT IN CONTACT POINT CIRCUIT OF RELAY BOX.** 1) Turn ignition switch to ON. 2) Measure voltage between VDCH/U connector and chassis ground. ***Connector & terminal*** ***(VDC1) No. 2 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **21**.	Replace relay box. Check fuse No. 8.
21	**CHECK RESISTANCE OF INLET AND CUT SOLENOID VALVES.** 1) Disconnect connector from VDCH/U. 2) Measure resistance between VDCH/U connector terminals. ***Connector & terminal*** ***(VDC5) No. 8 — (VDC2) No. 2:*** ***(VDC5) No. 5 — (VDC2) No. 2:*** ***(VDC5) No. 6 — (VDC2) No. 2:*** ***(VDC5) No. 7 — (VDC2) No. 2:*** ***(VDC5) No. 9 — (VDC2) No. 2:*** ***(VDC5) No. 12 — (VDC2) No. 2:***	Is the resistance between 8.04 and 9.04 Ω?	Go to step **22**.	Replace VDCH/U.
22	**CHECK RESISTANCE OF OUTLET SOLENOID VALVE.** Measure resistance between VDCH/U connector terminals. ***Connector & terminal*** ***(VDC5) No. 4 — (VDC2) No. 2:*** ***(VDC5) No. 1 — (VDC2) No. 2:*** ***(VDC5) No. 2 — (VDC2) No. 2:*** ***(VDC5) No. 3 — (VDC2) No. 2:*** ***(VDC5) No. 10 — (VDC2) No. 2:*** ***(VDC5) No. 11 — (VDC2) No. 2:***	Is the resistance between 3.8 and 4.8 Ω?	Go to step **23**.	Replace VDCH/U.

No.	Step	Check	Yes	No
23	**CHECK GROUND SHORT OF SOLENOID VALVE.** Measure resistance between VDCH/U connector and chassis ground. ***Connector & terminal*** ***(VDC2) No. 2 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **24**.	Replace VDCH/U and check all fuses.
24	**CHECK BATTERY SHORT OF SOLENOID VALVE.** Measure voltage between VDCH/U connector and chassis ground. ***Connector & terminal*** ***(VDC2) No. 2 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **25**.	Replace VDCH/U and check all fuses.
25	**CHECK BATTERY SHORT OF SOLENOID VALVE.** 1) Turn ignition switch to ON. 2) Measure voltage between VDCH/U connector and chassis ground. ***Connector & terminal*** ***(VDC2) No. 2 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **26**.	Replace VDCH/U and check all fuses.
26	**CHECK BATTERY SHORT OF HARNESS.** 1) Turn ignition switch to OFF. 2) Disconnect connector from VDCCM. 3) Measure voltage between VDCCM connector and chassis ground. ***Connector & terminal*** ***(F87) No. 30 (+) — Chassis ground (–):*** ***(F87) No. 24 (+) — Chassis ground (–):*** ***(F87) No. 23 (+) — Chassis ground (–):*** ***(F87) No. 31 (+) — Chassis ground (–):*** ***(F87) No. 26 (+) — Chassis ground (–):*** ***(F87) No. 25 (+) — Chassis ground (–):*** ***(F87) No. 3 (+) — Chassis ground (–):*** ***(F87) No. 51 (+) — Chassis ground (–):*** ***(F87) No. 50 (+) — Chassis ground (–):*** ***(F87) No. 4 (+) — Chassis ground (–):*** ***(F87) No. 2 (+) — Chassis ground (–):*** ***(F87) No. 29 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **27**.	Repair harness between VDCH/U and VDCCM and check all fuses.
27	**CHECK BATTERY SHORT OF HARNESS.** 1) Turn ignition switch to ON. 2) Measure voltage between VDCCM connector and chassis ground. ***Connector & terminal*** ***(F87) No. 30 (+) — Chassis ground (–):*** ***(F87) No. 24 (+) — Chassis ground (–):*** ***(F87) No. 23 (+) — Chassis ground (–):*** ***(F87) No. 31 (+) — Chassis ground (–):*** ***(F87) No. 26 (+) — Chassis ground (–):*** ***(F87) No. 25 (+) — Chassis ground (–):*** ***(F87) No. 3 (+) — Chassis ground (–):*** ***(F87) No. 51 (+) — Chassis ground (–):*** ***(F87) No. 50 (+) — Chassis ground (–):*** ***(F87) No. 4 (+) — Chassis ground (–):*** ***(F87) No. 2 (+) — Chassis ground (–):*** ***(F87) No. 29 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **28**.	Repair harness between VDCH/U and VDCCM and check all fuses.

No.	Step	Check	Yes	No
28	**CHECK GROUND SHORT OF HARNESS.** 1) Turn ignition switch to OFF. 2) Measure resistance between VDCCM connector and chassis ground. ***Connector & terminal*** ***(F87) No. 30 — Chassis ground:*** ***(F87) No. 24 — Chassis ground:*** ***(F87) No. 23 — Chassis ground:*** ***(F87) No. 31 — Chassis ground:*** ***(F87) No. 26 — Chassis ground:*** ***(F87) No. 25 — Chassis ground:*** ***(F87) No. 3 — Chassis ground:*** ***(F87) No. 51 — Chassis ground:*** ***(F87) No. 50 — Chassis ground:*** ***(F87) No. 4 — Chassis ground:*** ***(F87) No. 2 — Chassis ground:*** ***(F87) No. 29 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **29**.	Repair harness between VDCH/U and VDCCM.
29	**CHECK HARNESS/CONNECTOR BETWEEN VDCCM AND VDCH/U.** 1) Connect connector (F91) to VDCH/U. 2) Measure resistance between VDCCM connector and VDCH/U connector. ***Connector & terminal*** ***(F87) No. 30 — (VDC2) No. 2:*** ***(F87) No. 24 — (VDC2) No. 2:*** ***(F87) No. 23 — (VDC2) No. 2:*** ***(F87) No. 31 — (VDC2) No. 2:*** ***(F87) No. 26 — (VDC2) No. 2:*** ***(F87) No. 25 — (VDC2) No. 2:***	Is the resistance between 8.0 and 10.0 Ω?	Go to step **30**.	Repair harness/ connector between VDCH/U and VDCCM.
30	**CHECK HARNESS/CONNECTOR BETWEEN VDCCM AND VDCH/U.** Measure resistance between VDCCM connector and VDCH/U connector. ***Connector & terminal*** ***(F87) No. 3 — (VDC2) No. 2:*** ***(F87) No. 51 — (VDC2) No. 2:*** ***(F87) No. 50 — (VDC2) No. 2:*** ***(F87) No. 4 — (VDC2) No. 2:*** ***(F87) No. 2 — (VDC2) No. 2:*** ***(F87) No. 29 — (VDC2) No. 2:***	Is the resistance between 4.3 and 5.3 Ω?	Go to step **31**.	Repair harness/ connector between VDCH/U and VDCCM.
31	**CHECK POOR CONTACT IN CONNECTORS.**	Is there poor contact in connector between VDCCM and VDCH/U?	Repair connector.	Go to step **32**.
32	**CHECK VDCCM.** 1) Connect all connectors. 2) Erase the memory. 3) Perform inspection mode. 4) Read out the diagnostic trouble code.	Is the same diagnostic trouble code as in the current diagnosis still being output?	Replace VDCCM.	Go to step **33**.
33	**CHECK ANY OTHER DIAGNOSTIC TROUBLE CODES APPEARANCE.**	Are other diagnostic trouble codes being output?	Proceed with the diagnosis corresponding to the diagnostic trouble code.	A temporary poor contact.

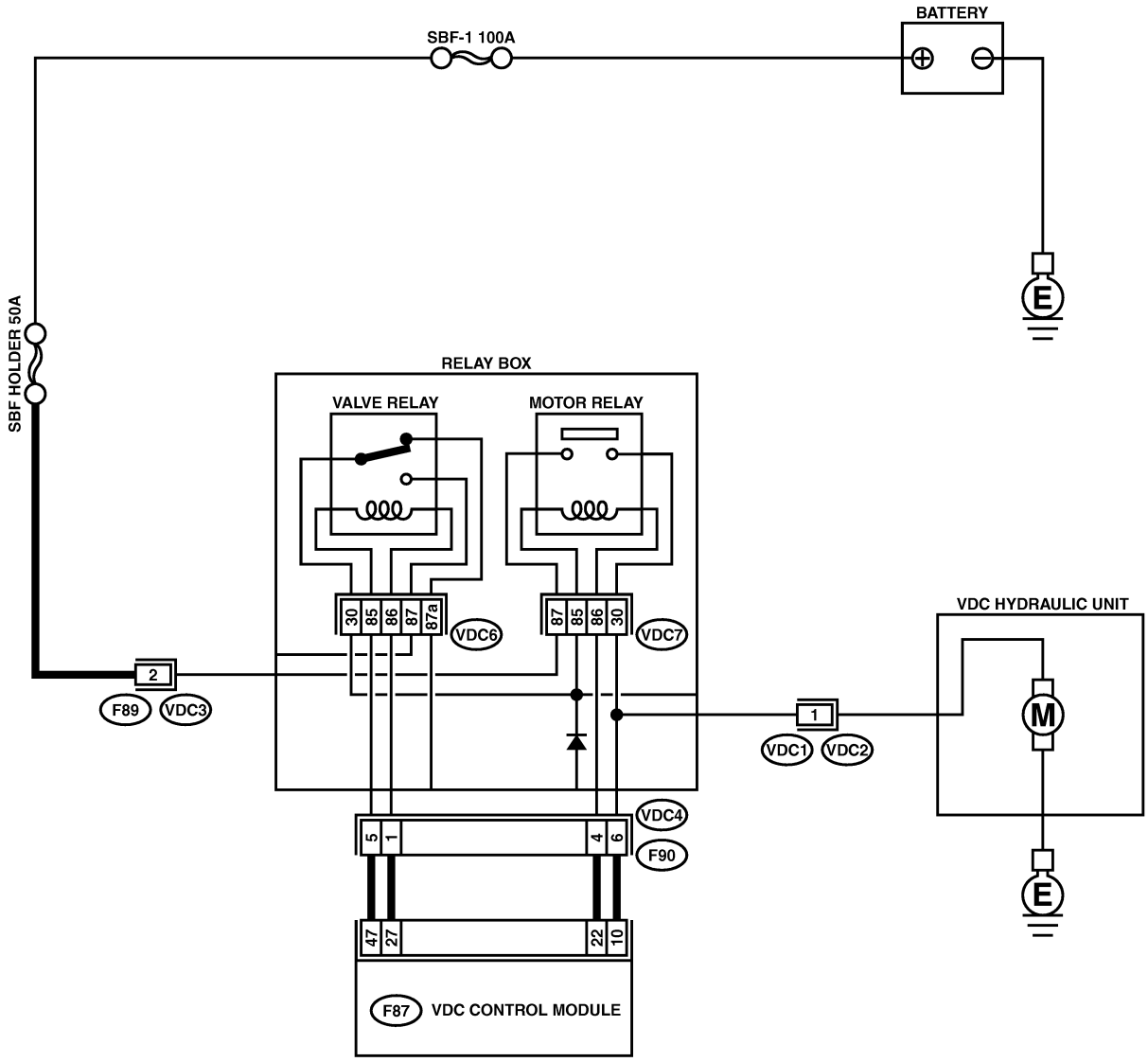
MEMO:

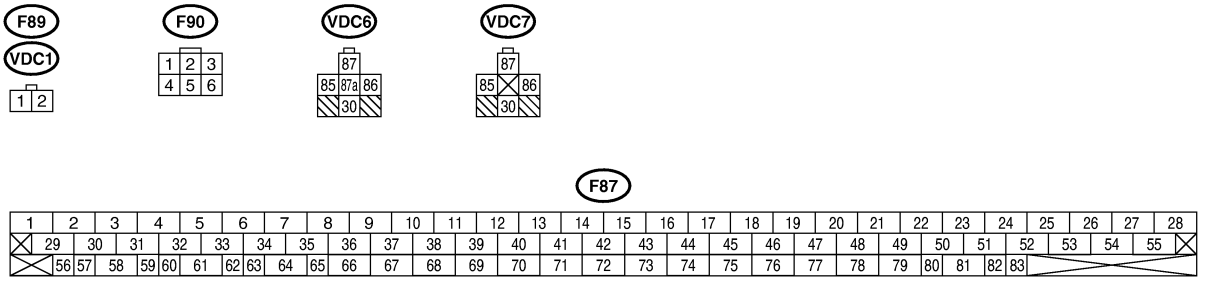
AK: DTC 52 ABNORMAL MOTOR AND/OR MOTOR RELAY S005522I50

DIAGNOSIS:
- Faulty motor
- Faulty motor relay
- Faulty harness connector

TROUBLE SYMPTOM:
- ABS does not operate.
- VDC does not operate.

WIRING DIAGRAM:





B4M2329

No.	Step	Check	Yes	No
1	**CHECK RESISTANCE OF MOTOR RELAY.** 1) Turn ignition switch to OFF. 2) Remove motor relay from relay box. 3) Measure resistance between motor relay terminals. ***Terminals*** ***No. 85 — No. 86:***	Is the resistance between 70 and 90 Ω?	Go to step **2**.	Replace motor relay.
2	**CHECK CONTACT POINT OF MOTOR RELAY.** 1) Connect battery to motor relay terminals No. 85 and No. 86. 2) Measure resistance between motor relay terminals. ***Terminals*** ***No. 30 — No. 87:***	Is the resistance less than 0.5 Ω?	Go to step **3**.	Replace motor relay.
3	**CHECK CONTACT POINT OF MOTOR RELAY.** 1) Disconnect battery from motor relay terminals. 2) Measure resistance between motor relay terminals. ***Terminals*** ***No. 30 — No. 87:***	Is the resistance more than 1 MΩ?	Go to step **4**.	Replace motor relay.
4	**CHECK SHORT OF MOTOR RELAY.** Measure resistance between motor relay terminals. ***Terminals*** ***No. 85 — No. 30:*** ***No. 85 — No. 87:***	Is the resistance more than 1 MΩ?	Go to step **5**.	Replace motor relay.
5	**CHECK INPUT VOLTAGE OF RELAY BOX.** 1) Disconnect connector (F89) from relay box. 2) Disconnect connector from VDCCM. 3) Measure voltage between relay box connector and chassis ground. ***Connector & terminal*** ***(F89) No. 2 (+) — Chassis ground (–):***	Is the voltage between 10 and 15 V?	Go to step **6**.	Repair harness/ connector between battery and relay box, and check fuse SBF holder.
6	**CHECK INPUT VOLTAGE OF MOTOR RELAY.** 1) Connect connector (F89) to relay box. 2) Measure voltage between relay box and chassis ground. ***Connector & terminal*** ***(VDC7) No. 87 (+) — Chassis ground (–):***	Is the voltage between 10 and 15 V?	Go to step **7**.	Replace relay box.
7	**CHECK OPEN CIRCUIT IN CONTACT POINT CIRCUIT OF RELAY BOX.** 1) Turn ignition switch to OFF. 2) Disconnect connectors (VDC2, F90) from relay box. 3) Measure resistance between relay box connector unit and motor relay installing portion. ***Connector & terminal*** ***(VDC1) No. 1 — (VDC7) No. 30:***	Is the resistance less than 0.5 Ω?	Go to step **8**.	Replace relay box.
8	**CHECK OPEN CIRCUIT IN MONITOR SYSTEM CIRCUIT OF RELAY BOX.** Measure resistance between relay box connector and motor relay installing point. ***Connector & terminal*** ***(VDC4) No. 6 — (VDC7) No. 30:***	Is the resistance less than 0.5 Ω?	Go to step **9**.	Replace relay box.

No.	Step	Check	Yes	No
9	**CHECK OPEN CIRCUIT IN CONTROL CIRCUIT OF RELAY BOX.** Measure resistance between motor relay installing point and relay box connector. ***Connector & terminal*** ***(VDC4) No. 4 — (VDC7) No. 85:***	Is the resistance less than 0.5 Ω?	Go to step **10**.	Replace relay box.
10	**CHECK OPEN CIRCUIT IN CONTROL CIRCUIT OF RELAY BOX.** 1) Remove valve relay from relay box. 2) Measure resistance between motor relay installing point and valve relay installing point. ***Connector & terminal*** ***(VDC7) No. 86 — (VDC6) No. 30:***	Is the resistance less than 0.5 Ω?	Go to step **11**.	Replace relay box.
11	**CHECK GROUND SHORT IN CIRCUIT OF RELAY BOX.** Measure resistance between relay box connector unit and chassis ground. ***Connector & terminal*** ***(VDC4) No. 4 — Chassis ground:*** ***(VDC4) No. 6 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **12**.	Replace relay box.
12	**CHECK BATTERY SHORT IN CIRCUIT OF RELAY BOX.** Measure voltage between relay box connector and chassis ground. ***Connector & terminal*** ***(VDC4) No. 4 (+) — Chassis ground (–):*** ***(VDC4) No. 6 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **13**.	Replace relay box.
13	**CHECK BATTERY SHORT IN CIRCUIT OF RELAY BOX.** 1) Turn ignition switch to ON. 2) Measure voltage between relay box connector and chassis ground. ***Connector & terminal*** ***(VDC4) No. 4 (+) — Chassis ground (–):*** ***(VDC4) No. 6 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **14**.	Replace relay box.
14	**CHECK OPEN CIRCUIT IN RELAY CONTROL SYSTEM HARNESS.** 1) Turn ignition switch to OFF. 2) Measure resistance between VDCCM connector and relay box connector. ***Connector & terminal*** ***(F87) No. 22 — (F90) No. 4:*** ***(F87) No. 10 — (F90) No. 6:***	Is the resistance less than 0.5 Ω?	Go to step **15**.	Repair harness connector between VDCCM and relay box.
15	**CHECK GROUND SHORT IN HARNESS BETWEEN RELAY BOX AND VDCCM.** Measure resistance between VDCCM connector and chassis ground. ***Connector & terminal*** ***(F87) No. 22 — Chassis ground:*** ***(F87) No. 10 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **16**.	Repair harness between VDCCM and relay box. Check fuse SBF holder.

No.	Step	Check	Yes	No
16	**CHECK BATTERY SHORT IN HARNESS BETWEEN RELAY BOX AND VDCCM.** Measure voltage between VDCCM connector and chassis ground. ***Connector & terminal*** ***(F87) No. 22 (+) — Chassis ground (–):*** ***(F87) No. 10 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **17**.	Repair harness between VDCCM and relay box. Check fuse SBF holder.
17	**CHECK BATTERY SHORT IN HARNESS BETWEEN RELAY BOX AND VDCCM.** 1) Turn ignition switch to ON. 2) Measure voltage between VDCCM connector and chassis ground. ***Connector & terminal*** ***(F87) No. 22 (+) — Chassis ground (–):*** ***(F87) No. 10 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **18**.	Repair harness between VDCCM and relay box. Check fuse SBF holder.
18	**CHECK CONDITION OF MOTOR GROUND.** ***Tightening torque:*** ***32±10 N·m (3.3±1.0 kgf-m, 24±7 ft-lb)***	Is the motor ground terminal tightly clamped?	Go to step **19**.	Tighten the clamp of motor ground terminal.
19	**CHECK VDCCM MOTOR DRIVE TERMINAL.** 1) Turn ignition switch OFF. 2) Remove VDC connector cover. <Ref. to VDC-17, VDCCM Connector Cover.> 3) Connect all connectors. 4) Install motor relay and valve relay to relay box. 5) Operate the ABS check sequence. <Ref. to VDC-16, ABS Sequence Control.> 6) Measure voltage between VDCCM connector terminals. ***Connector & terminal*** ***(F87) No. 22 (+) — No. 1 (–):***	Does the voltage drop from between 10 V and 13 V to less than 1.5 V, and rise to between 10 V and 13 V again when carrying out the check sequence?	Go to step **20**.	Replace VDCCM.
20	**CHECK MOTOR OPERATION.** Operate the check sequence. <Ref. to VDC-19, VDC Sequence Control.>	Can motor revolution noise (buzz) be heard when carrying out the check sequence?	Go to step **21**.	Replace VDCH/U.
21	**CHECK POOR CONTACT IN CONNECTORS.** Turn ignition switch to OFF.	Is there poor contact in connector between VDCH/U, relay box and VDCCM?	Repair connector.	Go to step **22**.
22	**CHECK VDCCM.** 1) Connect all connectors. 2) Erase the memory. 3) Perform inspection mode. 4) Read out the diagnostic trouble code.	Is the same diagnostic trouble code as in the current diagnosis still being output?	Replace VDCCM.	Go to step **23**.
23	**CHECK ANY OTHER DIAGNOSTIC TROUBLE CODES APPEARANCE.**	Are other diagnostic trouble codes being output?	Proceed with the diagnosis corresponding to the diagnostic trouble code.	A temporary poor contact.

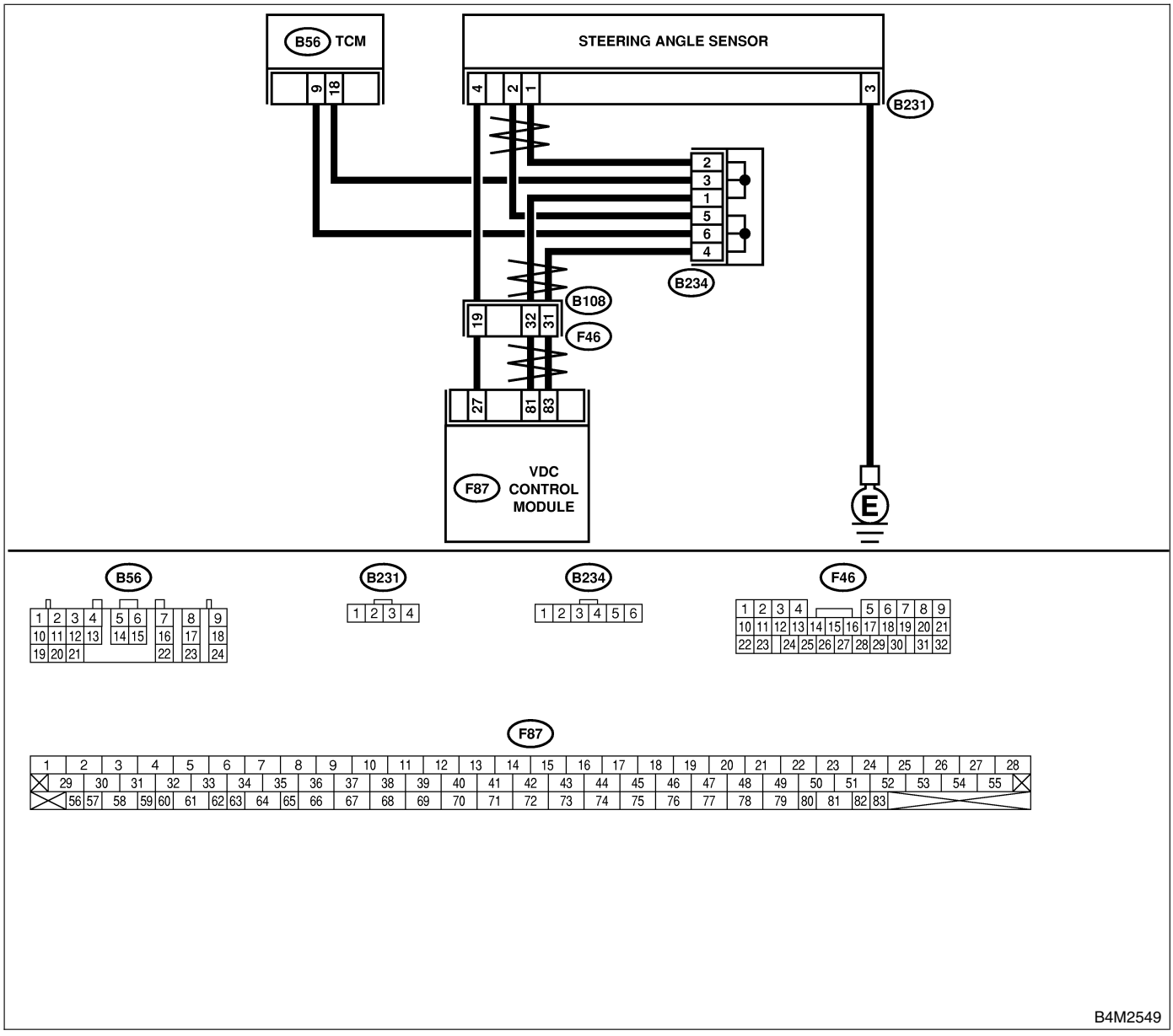
MEMO:

AL: DTC 71 ABNORMAL STEERING ANGLE SENSOR S005522J33

DIAGNOSIS:
- Faulty steering angle sensor

TROUBLE SYMPTOM:
- ABS does not operate.
- VDC does not operate.

WIRING DIAGRAM:



No.	Step	Check	Yes	No
1	**CHECK THE STEERING WHEEL.** 1) Drive the vehicle on a flat road. 2) Stop the vehicle in a straight line. 3) Check the angle of steering wheel.	Is the angle of steering wheel within 5°?	Go to step **2**.	Perform centering alignment of steering.
2	**CHECK RUNNING FIELD.** Check if the vehicle was driven on banked road surfaces or sandy surfaces (not dirt road surfaces).	Was the vehicle driven on banked road surfaces or sandy surfaces (not dirt road surfaces)?	Driving on banked road surfaces or sandy surfaces (not dirt road surfaces) sometimes results in a VDCCM memory trouble code.	Go to step **3**.
3	**CHECK POWER SUPPLY OF STEERING ANGLE SENSOR.** 1) Turn ignition switch to OFF. 2) Disconnect connector from steering angle sensor. 3) Turn ignition switch to ON. 4) Measure voltage between steering angle sensor and chassis ground. ***Connector & terminal*** ***(B231) No. 4 — Chassis ground:***	Is the voltage between 10 and 15 V?	Go to step **6**.	Go to step **4**.
4	**CHECK OUTPUT VOLTAGE OF VDCCM.** 1) Turn ignition switch to OFF. 2) Disconnect connector from VDCCM. 3) Remove cover for VDCCM connector. <Ref. to VDC-17, VDCCM Connector Cover.> 4) Connect connector to VDCCM. 5) Turn ignition switch to ON. 6) Measure voltage between VDCCM and chassis ground. ***Connector & terminal*** ***(F87) No. 27 — Chassis ground:***	Is the voltage between 10 and 15 V?	Repair harness between yaw rate sensor and VDCCM.	Go to step **5**.
5	**CHECK POOR CONTACT IN CONNECTORS.**	Is there poor contact in yaw rate sensor connector?	Repair or replace VDCCM connector.	Replace VDCCM.
6	**CHECK GROUND CIRCUIT OF STEERING ANGLE SENSOR.** Measure resistance between steering sensor and chassis ground. ***Connector & terminal*** ***(B231) No. 3 — Chassis ground:***	Is the resistance less than 0.5 Ω?	Go to step **7**.	Repair steering angle sensor ground harness.
7	**CHECK HARNESS OF STEERING ANGLE SENSOR.** 1) Connect connector to steering angle sensor. 2) Disconnect connector from VDCCM. 3) Measure resistance between VDCCM connector terminals. ***Connector & terminal*** ***(F87) No. 81 — No. 83:***	Is the resistance 120±6 Ω?	Repair harness between steering angle sensor and VDCCM.	Go to step **8**.
8	**CHECK STEERING ANGLE SENSOR.** 1) Turn ignition switch to OFF. 2) Connect all connectors. 3) Erase the memory. 4) Perform inspection mode. 5) Read out the diagnostic trouble code.	Is the same diagnostic trouble code as in the current diagnosis still being output?	Go to step **10**.	Go to step **9**.

No.	Step	Check	Yes	No
9	**CHECK ANY OTHER DIAGNOSTIC TROUBLE CODES APPEARANCE.**	Are other diagnostic trouble codes being output?	Proceed with the diagnosis corresponding to the diagnostic trouble code.	A temporary poor contact.
10	**CHECK VDCCM.** 1) Turn ignition switch to OFF. 2) Replace steering angle sensor. 3) Erase the memory. 4) Perform inspection mode. 5) Read out the diagnostic trouble code.	Is the same diagnostic trouble code as in the current diagnosis still being output?	Replace VDCCM. <Ref. to VDC-9, VDC Control Module (VDCCM).>	Go to step **11**.
11	**CHECK ANY OTHER DIAGNOSTIC TROUBLE CODES APPEARANCE.**	Are other diagnostic trouble codes being output?	Proceed with the diagnosis corresponding to the diagnostic trouble code.	The original steering angle sensor has been faulty.

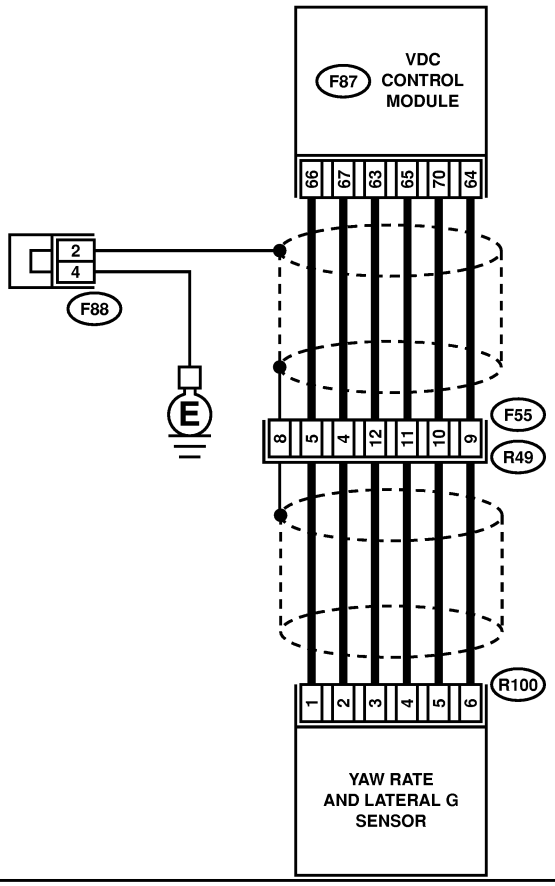
MEMO:

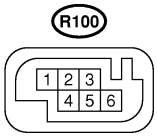
AM: DTC 72 ABNORMAL YAW RATE SENSOR S005522J34

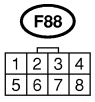
DIAGNOSIS:
- Faulty yaw rate sensor

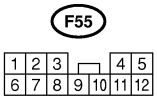
TROUBLE SYMPTOM:
- ABS does not operate.
- VDC does not operate.

WIRING DIAGRAM:









F87

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	
29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55		
56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	

B4M2552

No.	Step	Check	Yes	No
1	**CHECK THE STEERING WHEEL.** 1) Drive the vehicle on a flat road. 2) Stop the vehicle in a straight line. 3) Check the angle of steering wheel.	Is the angle of steering wheel within 5°?	Go to step **2**.	Perform centering alignment of steering.
2	**CHECK RUNNING FIELD.**	Was the vehicle driven on banked road surfaces or sandy surfaces (not dirt road surfaces) or surfaces with holes or bumps at high speeds?	Driving on banked road surfaces or sandy surfaces (not dirt road surfaces) or surfaces with holes or bumps at high speeds, sometimes results in a VDCCM memory trouble code.	Go to step **3**.
3	**CHECK INSTALLATION OF YAW RATE AND LATERAL G SENSOR.** Check installation of yaw rate and lateral G sensor.	Is the yaw rate and lateral G sensor fixed securely?	Go to step **4**.	Install yaw rate and lateral G sensor securely.
4	**CHECK POWER SUPPLY OF YAW RATE AND LATERAL G SENSOR.** 1) Turn ignition switch OFF. 2) Disconnect connector from yaw rate and lateral G sensor. 3) Turn ignition switch to ON. 4) Measure voltage between yaw rate and lateral G sensor and chassis ground. ***Connector & terminal*** ***(R100) No. 3 — Chassis ground:***	Is the voltage between 10 and 15 V?	Go to step **7**.	Go to step **5**.
5	**CHECK OUTPUT VOLTAGE OF VDCCM.** 1) Turn ignition switch to OFF. 2) Disconnect connector from VDCCM. 3) Remove cover for VDCCM connector. <Ref. to VDC-17, VDCCM Connector Cover.> 4) Connect connector to VDCCM. 5) Turn ignition switch to ON. 6) Measure voltage between VDCCM connector and chassis ground. ***Connector & terminal*** ***(F87) No. 63 — Chassis ground:***	Is the voltage between 10 and 15 V?	Repair harness between yaw rate and lateral G sensor and VDCCM.	Go to step **6**.
6	**CHECK POOR CONTACT IN CONNECTORS.**	Is there poor contact in yaw rate and lateral G sensor connector?	Repair or replace VDCCM connector.	Replace VDCCM.
7	**CHECK GROUND CIRCUIT OF YAW RATE AND LATERAL G SENSOR.** Measure resistance between yaw rate and lateral G sensor and chassis ground. ***Connector & terminal*** ***(R100) No. 6 — Chassis ground:***	Is the resistance less than 0.5 Ω?	Go to step **10**.	Go to step **8**.
8	**CHECK GROUND CIRCUIT OF VDCCM.** 1) Disconnect connector from VDCCM. 2) Remove cover from VDCCM connector. <Ref. to VDC-17, VDCCM Connector Cover.> 3) Connect connector to VDCCM. 4) Measure resistance between VDCCM connector and chassis ground. ***Connector & terminal*** ***(F87) No. 64 — Chassis ground:***	Is the resistance less than 0.5 Ω?	Repair harness between yaw rate and lateral G sensor and VDCCM.	Go to step **9**.

No.	Step	Check	Yes	No
9	**CHECK POOR CONTACT IN CONNECTORS.**	Is there poor contact in VDCCM connector?	Repair or replace VDCCM connector.	Replace VDCCM.
10	**CHECK HARNESS OF YAW RATE AND LATERAL G SENSOR.** 1) Disconnect connector from VDCCM. 2) Measure resistance between VDCCM and yaw rate and lateral G sensor. ***Connector & terminal*** ***(F87) No. 65 — (R100) No. 4:*** ***(F87) No. 66 — (R100) No. 1:*** ***(F87) No. 67 — (R100) No. 2:***	Is the resistance less than 0.5 Ω?	Go to step **11**.	Repair harness between yaw rate and lateral G sensor and VDCCM.
11	**CHECK GROUND SHORT OF HARNESS.** Measure resistance between VDCCM connector and chassis ground. ***Connector & terminal*** ***(F87) No. 65 — Chassis ground:*** ***(F87) No. 66 — Chassis ground:*** ***(F87) No. 67 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **12**.	Repair harness between yaw rate and lateral G sensor and VDCCM.
12	**CHECK BATTERY SHORT OF HARNESS.** Measure voltage between VDCCM connector and chassis ground. ***Connector & terminal*** ***(F87) No. 65 (+) — Chassis ground (–):*** ***(F87) No. 66 (+) — Chassis ground (–):*** ***(F87) No. 67 (+) — Chassis ground (–):***	Is the voltage less than 0.5 V?	Go to step **13**.	Repair harness between yaw rate and lateral G sensor and VDCCM.
13	**CHECK BATTERY SHORT OF HARNESS.** 1) Turn ignition switch to ON. 2) Measure voltage between VDCCM and chassis ground. ***Connector & terminal*** ***(F87) No. 65 (+) — Chassis ground (–):*** ***(F87) No. 66 (+) — Chassis ground (–):*** ***(F87) No. 67 (+) — Chassis ground (–):***	Is the voltage less than 0.5 V?	Go to step **14**.	Repair harness between yaw rate and lateral G sensor and VDCCM.
14	**CHECK YAW RATE AND LATERAL G SENSOR.** 1) Turn ignition switch to OFF. 2) Install yaw rate and lateral G sensor to body. 3) Connect all connectors. 4) Turn ignition switch to ON. 5) Measure voltage between VDCCM connector terminals. ***Connector & terminal*** ***(F87) No. 66 (+) — No. 64 (–):***	Is the voltage between 2.1 and 2.9 V?	Go to step **15**.	Replace yaw rate and lateral G sensor.
15	**CHECK YAW RATE AND LATERAL G SENSOR.** 1) Turn ignition switch to ON. 2) Check oscilloscope signal pattern between VDCCM connector terminals. <Ref. to VDC-15, WAVE FORM, MEASUREMENT, Control Module I/O Signal.> ***Connector & terminal*** ***(F87) No. 67 (+) — No. 64 (–):***	Is the oscilloscope pattern the same as shown in the figure?	Go to step **16**.	Replace VDCCM.

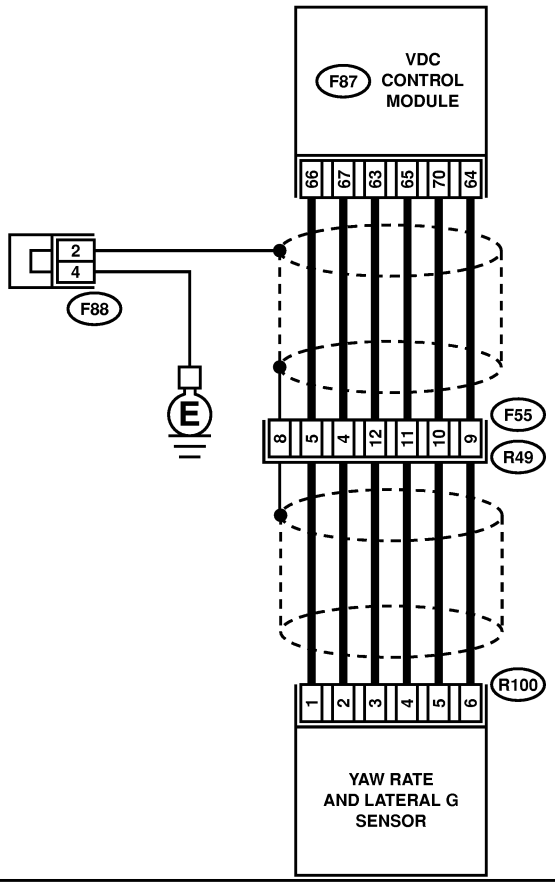
No.	Step	Check	Yes	No
16	**CHECK YAW RATE SENSOR.** Check oscilloscope pattern between yaw rate and lateral G sensor terminals. <Ref. to VDC-15, WAVE FORM, MEASUREMENT, Control Module I/O Signal.> ***Connector & terminal*** ***(F87) No. 65 (+) — No. 64 (–):***	Is the oscilloscope pattern the same as shown in the figure?	Replace VDCCM.	Replace yaw rate and lateral G sensor.

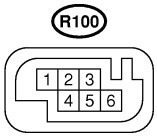
AN: DTC 73 ABNORMAL LATERAL G SENSOR S005522J35

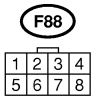
DIAGNOSIS:
- Faulty lateral G sensor

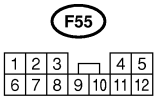
TROUBLE SYMPTOM:
- ABS does not operate.
- VDC does not operate.

WIRING DIAGRAM:









F87

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	
29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55		
56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	

B4M2552

No.	Step	Check	Yes	No
1	**CHECK INSTALLATION OF LATERAL G SENSOR.** Check installation of lateral G sensor.	Is the yaw rate and lateral G sensor fixed securely?	Go to step **2**.	Install yaw rate and lateral G sensor securely.
2	**CHECK INPUT VOLTAGE OF G SENSOR.** 1) Turn ignition switch to OFF. 2) Remove console box. 3) Disconnect connector from yaw rate and lateral G sensor. 4) Turn ignition switch to ON. 5) Measure voltage between yaw rate and lateral G sensor connector terminals. ***Connector & terminal*** ***(R100) No. 3 (+) — No. 6 (–):***	Is the voltage between 10 and 15 V?	Go to step **3**.	Repair harness/ connector between yaw rate and lateral G sensor and VDCCM.
3	**CHECK YAW RATE AND LATERAL G SENSOR.** 1) Turn ignition switch to OFF. 2) Measure resistance between yaw rate and lateral G sensor terminals. ***Terminals*** ***No. 3 — No. 5:***	Is the resistance between 4.3 and 4.9 kΩ?	Go to step **4**.	Replace yaw rate and lateral G sensor.
4	**CHECK OPEN CIRCUIT IN YAW RATE AND LATERAL G SENSOR OUTPUT HARNESS AND GROUND HARNESS.** 1) Connect connector to yaw rate and lateral G sensor. 2) Disconnect connector from VDCCM. 3) Measure resistance between VDCCM connector terminals. ***Connector & terminal*** ***(F87) No. 63 — No. 70:***	Is the resistance between 4.3 and 4.9 kΩ?	Go to step **5**.	Repair harness/ connector between yaw rate and lateral G sensor and VDCCM.
5	**CHECK GROUND SHORT IN YAW RATE AND LATERAL G SENSOR HARNESS.** 1) Disconnect connector from yaw rate and lateral G sensor. 2) Measure resistance between VDCCM connector and chassis ground. ***Connector & terminal*** ***(F87) No. 63 — Chassis ground:*** ***(F87) No. 70 — Chassis ground:*** ***(F87) No. 64 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **6**.	Repair harness between yaw rate and lateral G sensor and VDCCM.
6	**CHECK BATTERY SHORT OF HARNESS.** Measure voltage between VDCCM connector and chassis ground. ***Connector & terminal*** ***(F87) No. 63 (+) — Chassis ground (–):*** ***(F87) No. 70 (+) — Chassis ground (–):*** ***(F87) No. 64 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **7**.	Repair harness between yaw rate and lateral G sensor and VDCCM.
7	**CHECK BATTERY SHORT OF HARNESS.** 1) Turn ignition switch to ON. 2) Measure voltage between VDCCM connector and chassis ground. ***Connector & terminal*** ***(F87) No. 63 (+) — Chassis ground (–):*** ***(F87) No. 70 (+) — Chassis ground (–):*** ***(F87) No. 64 (+) — Chassis ground (–):***	Is the voltage less than 1 V?	Go to step **8**.	Repair harness between yaw rate and lateral G sensor and VDCCM.

No.	Step	Check	Yes	No
8	**CHECK LATERAL G SENSOR.** 1) Turn ignition switch to OFF. 2) Remove yaw rate and lateral G sensor from vehicle. 3) Connect connector to yaw rate and lateral G sensor. 4) Connect connector to VDCCM. 5) Turn ignition switch to ON. 6) Measure voltage between yaw rate and lateral G sensor connector terminals. ***Connector & terminal*** ***(R100) No. 5 (+) — No. 6 (–):***	Is the voltage between 2.3 and 2.7 V when yaw rate and lateral G sensor is horizontal?	Go to step **9**.	Replace yaw rate and lateral G sensor. <Ref. to VDC-22, Yaw Rate and Lateral G Sensor.>
9	**CHECK YAW RATE AND LATERAL G SENSOR.** Measure voltage between yaw rate and lateral G sensor connector terminals. ***Connector & terminal*** ***(R100) No. 5 (+) — No. 6 (–):***	Is the voltage between 3.3 and 3.7 V when yaw rate and lateral G sensor is horizontal, and is inclined 90° to the left in front of the sensor?	Go to step **10**.	Replace yaw rate and lateral G sensor. <Ref. to VDC-22, Yaw Rate and Lateral G Sensor.>
10	**CHECK YAW RATE AND LATERAL G SENSOR.** Measure voltage between yaw rate and lateral G sensor connector terminals. ***Connector & terminal*** ***(R100) No. 5 (+) — No. 6 (–):***	Is the voltage between 1.3 and 1.7 V when yaw rate and lateral G sensor is horizontal, and is inclined 90° to the right in front of the sensor?	Go to step **11**.	Replace yaw rate and lateral G sensor. <Ref. to VDC-22, Yaw Rate and Lateral G Sensor.>
11	**CHECK POOR CONTACT IN CONNECTORS.**	Is there poor contact in connector between VDCCM and yaw rate and lateral G sensor?	Repair connector.	Go to step **12**.
12	**CHECK VDCCM.** 1) Connect all connectors. 2) Erase the memory. 3) Perform inspection mode. 4) Read out the diagnostic trouble code.	Is the same diagnostic trouble code as in the current diagnosis still being output?	Replace VDCCM. <Ref. to VDC-9, VDC Control Module (VDCCM).>	Go to step **13**.
13	**CHECK ANY OTHER DIAGNOSTIC TROUBLE CODES APPEARANCE.**	Are other diagnostic trouble codes being output?	Proceed with the diagnosis corresponding to the diagnostic trouble code.	A temporary poor contact.

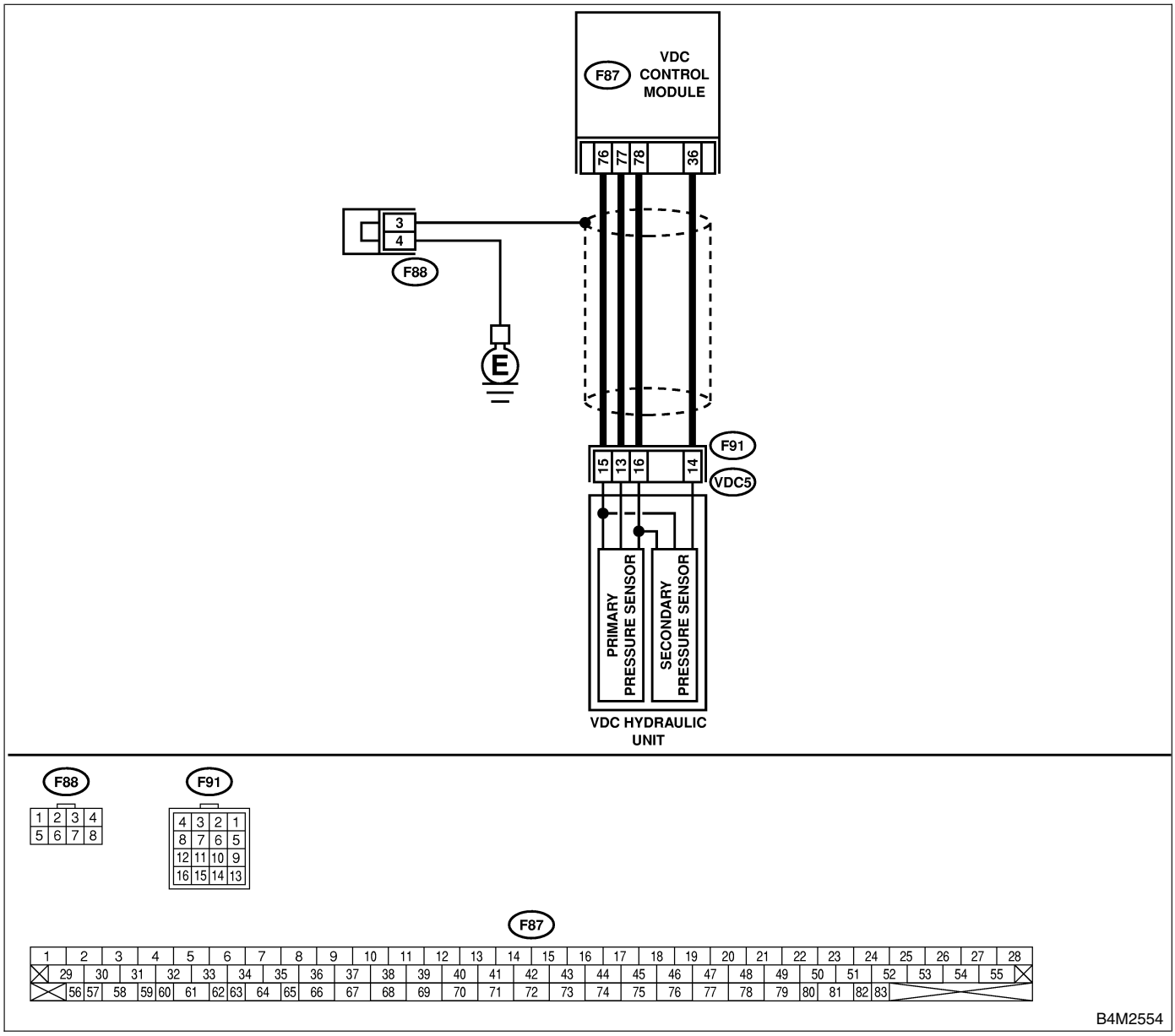
MEMO:

AO: DTC 74 ABNORMAL PRESSURE SENSOR S005522J36

DIAGNOSIS:
- Faulty pressure sensor

TROUBLE SYMPTOM:
- ABS does not operate.
- VDC does not operate.

WIRING DIAGRAM:



No.	Step	Check	Yes	No
1	**CHECK GROUND CIRCUIT OF PRESSURE SENSOR.** 1) Turn ignition switch to OFF. 2) Disconnect connector (F91) from VDCH/U. 3) Measure resistance between VDCH/U connector and chassis ground. ***Connector & terminal*** ***(F91) No. 15 — Chassis ground:***	Is the resistance less than 0.5 Ω?	Go to step **4**.	Go to step **2**.
2	**CHECK GROUND CIRCUIT OF VDCCM.** 1) Disconnect connector from VDCCM. 2) Remove cover from VDCCM. <Ref. to VDC-17, VDCCM Connector Cover.> 3) Connect connector to VDCCM. 4) Measure resistance between VDCCM and chassis ground. ***Connector & terminal*** ***(F87) No. 76 — Chassis ground:***	Is the resistance less than 0.5 Ω?	Replace harness between VDCH/U and VDCCM.	Go to step **3**.
3	**CHECK POOR CONTACT IN CONNECTORS.**	Is there poor contact in VDCCM connector?	Repair or replace VDCCM connector.	Replace VDCCM.
4	**CHECK POWER SUPPLY OF PRESSURE SENSOR.** NOTE: When this inspection is carried out, DTC 51 ABNORMAL VALVE RELAY is memorized, but this does not indicate valve relay malfunction. 1) Turn ignition switch to ON. 2) Measure voltage between VDCH/U connector terminals. ***Connector & terminal*** ***(F91) No. 16 (+) — No. 15 (–):***	Is the voltage between 4.75 and 5.25 V?	Go to step **7**.	Go to step **5**.
5	**CHECK POWER SUPPLY OF VDCCM.** 1) Turn ignition switch to OFF. 2) Disconnect connector from VDCCM. 3) Remove cover from VDCCM. <Ref. to VDC-17, VDCCM Connector Cover.> 4) Connect connector to VDCCM. 5) Turn ignition switch to ON. 6) Measure voltage between VDCCM connector terminals. ***Connector & terminal*** ***(F87) No. 78 (+) — No. 76 (–):***	Is the voltage between 4.75 and 5.25 V?	Repair harness between VDCH/U and VDCCM.	Go to step **6**.
6	**CHECK POOR CONTACT IN CONNECTORS.**	Is there poor contact in VDCCM connector?	Repair or replace VDCCM connector.	Replace VDCCM.
7	**CHECK GROUND SHORT OF HARNESS.** 1) Turn ignition switch to OFF. 2) Disconnect connector from VDCCM. 3) Measure resistance between VDCH/U connector and chassis ground. ***Connector & terminal*** ***(F91) No. 13 — Chassis ground:*** ***(F91) No. 14 — Chassis ground:***	Is the resistance more than 1 MΩ?	Go to step **8**.	Repair harness between VDCH/U and VDCCM.
8	**CHECK BATTERY SHORT OF HARNESS.** Measure voltage between VDCH/U connector and chassis ground. ***Connector & terminal*** ***(F91) No. 13 (+) — Chassis ground (–):*** ***(F91) No. 14 (+) — Chassis ground (–):***	Is the voltage less than 0.5 V?	Go to step **9**.	Repair harness between VDCH/U and VDCCM.

No.	Step	Check	Yes	No
9	**CHECK BATTERY SHORT OF HARNESS.** 1) Turn ignition switch to ON. 2) Measure voltage between VDCH/U connector and chassis ground. ***Connector & terminal*** ***(F91) No. 13 (+) — Chassis ground (–):*** ***(F91) No. 14 (+) — Chassis ground (–):***	Is the voltage less than 0.5 V?	Go to step **10**.	Repair harness between VDCH/U and VDCCM.
10	**CHECK OUTPUT VOLTAGE OF PRESSURE SENSOR.** 1) Turn ignition switch to OFF. 2) Disconnect connector from VDCCM. 3) Remove cover from VDCCM. <Ref. to VDC-17, VDCCM Connector Cover.> 4) Connect connector to VDCCM. 5) Connect all connectors. 6) Turn ignition switch to ON. 7) Do not depress brake pedal. 8) Measure voltage between VDCCM connector terminals. ***Connector & terminal*** ***(F87) No. 77 (+) — No. 76 (–):*** ***(F87) No. 36 (+) — No. 76 (–):***	Is the voltage between 0.48 and 0.72 V?	Go to step **11**.	Replace VDCH/U. <Ref. to VDC-11, Hydraulic Control Unit (H/U).>
11	**CHECK BRAKE FLUID LEAKAGE.** Inspect fluid leakage between brake master cylinder and VDC H/U.	Does brake fluid leak?	Retighten or replace.	Go to step **12**.
12	**CHECK BRAKE MASTER CYLINDER.** Inspect brake master cylinder hydraulic pressure. <Ref. to BR-31, OPERATION CHECK (WITH GAUGES), INSPECTION, Brake Booster.>	Is hydraulic pressure normal?	Go to step **13**.	Replace master cylinder.
13	**CHECK BRAKE PEDAL STROKE.** Measure the stroke between non-forced pedal position and forced pedal position with 50 kg (110 lb).	Is the stroke less than 95 mm (3.74 in)?	Go to step **14**.	Perform bleeding.
14	**CHECK INPUT VOLTAGE OF PRESSURE SENSOR.** 1) Depress the brake pedal with 50 kg (110 lb). 2) Measure voltage between VDCCM connector terminals. ***Connector & terminal*** ***A (F87) No. 77 (+) — No. 76 (–):*** ***B (F87) No. 36 (+) — No. 76 (–):***	Is the voltage between A and B more than 0.2 V?	Go to step **15**.	Replace VDCH/U.
15	**CHECK POOR CONTACT IN CONNECTORS.**	Is there poor contact in connector between VDCCM and pressure sensor?	Repair connector.	Go to step **16**.
16	**CHECK VDCCM.** 1) Connect all connectors. 2) Erase the memory. 3) Perform inspection mode. 4) Read out the diagnostic trouble code.	Is the same diagnostic trouble code as in the current diagnosis still being output?	Replace VDCCM. <Ref. to VDC-9, VDC Control Module (VDCCM).>	Go to step **17**.
17	**CHECK ANY OTHER DIAGNOSTIC TROUBLE CODES APPEARANCE.**	Are other diagnostic trouble codes being output?	Proceed with the diagnosis corresponding to the diagnostic trouble code.	A temporary poor contact.

MEMO: