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ABS Diagnosis

INTRODUCTION

The first ABS System was introduced in 1988 on the K100 model motorcycles. An improved system, ABS II was introduced on 1994 models on the K1100 and R1100 models. The two systems operate primarily the same but the fault codes differ. This section covers the first ABS System. Refer to the next section for ABS II diagnosis.

CHECK THE BASICS

Before any electrical diagnosis takes place always **consider** the basics. The following list will assist you in **considering** other areas of the motorcycle's operating systems that may prevent operation or effect performance.

Determine if any of the listed items below might be a contributing factor to the malfunction of the motorcycle. Check them.

1. **Battery Fully charged:** >12.6VDC
2. **Check brake fluid level:** If necessary, top off brake fluid reservoir.
3. **Check brake system for leaks:** If necessary, correct any leakage.
4. **Check brake system for operation:** Air in the lines, spongy brake that pumps up.

ABS Test Steps

The ABS System is diagnosed using the BMW Multi-Tester in conjunction with ABS / Motronic Diagnosis KTE-201 to access the fault codes and the BMW Multi-Tester in conjunction with the Volt / Ohm Leads and Adapters for various test steps.

All of the equipment connections are made with the special harness adapters as outlined in the test equipment section of this manual.

Prior to doing any testing or disconnecting of components, access the fault codes. Record the code on a Repair Order. Erase the fault code and then perform the Test Drive (see page ABS Diagnosis - 7). Again access the fault code and perform the test procedures for the fault code stored.

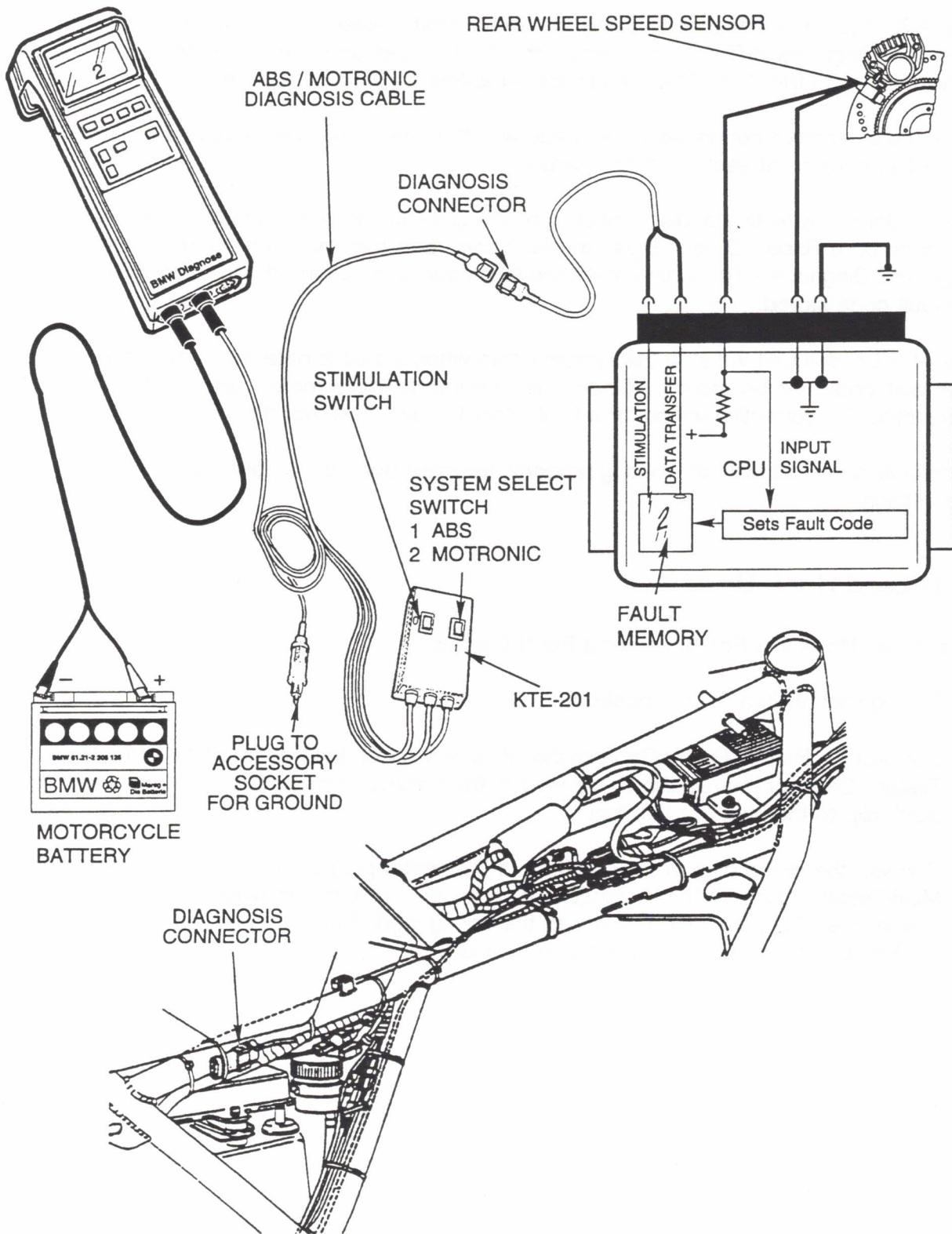
The ABS Control Unit will shut the system down when a fault is detected. Therefore, only one fault code will be stored. Since it is possible to have more than one fault, after completing the corrective action for a fault, clear the fault and test drive the motorcycle.

If the fault indicators are not working properly, troubleshoot them as directed in Test 10 of this section.

Test Lead Hook Up

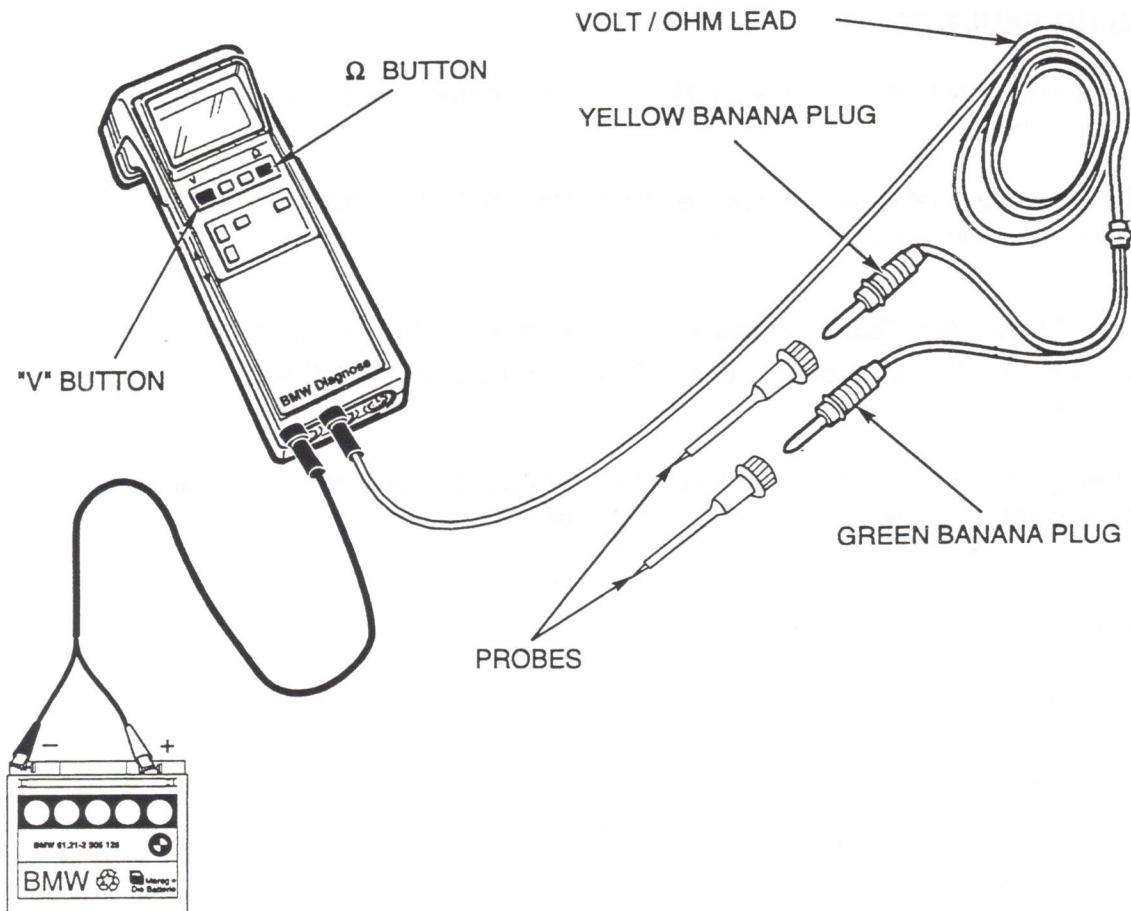
Test Lead Hook Up For Accessing Fault Codes

1. Turn ignition switch to OFF position.
2. Connect the Battery Power Cable to the left connector on the bottom of the BMW Multi-Tester. Connect the red clip to the lead to the positive terminal of the battery and the black clip to the negative terminal.
3. Connect the round plug of the KTE-201 to the center plug on the bottom of the BMW Multi-Tester. Connect the rectangular plug on the cable to the diagnosis plug on the motorcycle. Plug the round plug with the spring loaded contact into the motorcycle's auxiliary power socket for a ground connection.



Test Lead Hook Up for Volt / Ohm Reading

1. Set ignition switch to OFF position.
2. Connect the round 4 pin plug on the Volt / Ohm lead to the center plug on the bottom of the BMW Multi-Tester.
3. Place the probe on the yellow banana plug for positive (+) connection and the probe on the green banana plug for negative (-) connection.
4. Connect the Battery Power Cable to the left connector on the bottom of the BMW Multi-Tester. Connect the red clip to the lead to the positive terminal of the battery and the black clip to the negative terminal.
5. Never test a control unit for ohms.
6. When testing for resistance, continuity or open circuit, zero the BMW Multi-Tester as directed in BMW Motorcycle Test Equipment Section, page Test Equipment - 8.



DIAGNOSIS FAULT CODES

GENERAL

The ABS system has the capability of monitoring its operation. When a malfunction occurs, the control unit detects it and stores the information about the malfunction in a portion of the control unit known as the fault memory. The information in the fault memory is in the form of a numeric code. The system will shut down when a fault is detected. Therefore, only one fault will be stored. The code corresponds to an actual circuit or component that is found to be defective on the system.

The existence of a fault is indicated by the ABS indicator in the instrument cluster and the bulb monitor in the center of the dashboard. These indicators operate during the self-test function up to a speed of 2.5 mph. If the indicators continue to flash above this speed or if they flash during operation of the ABS System, a fault in the system has been detected.

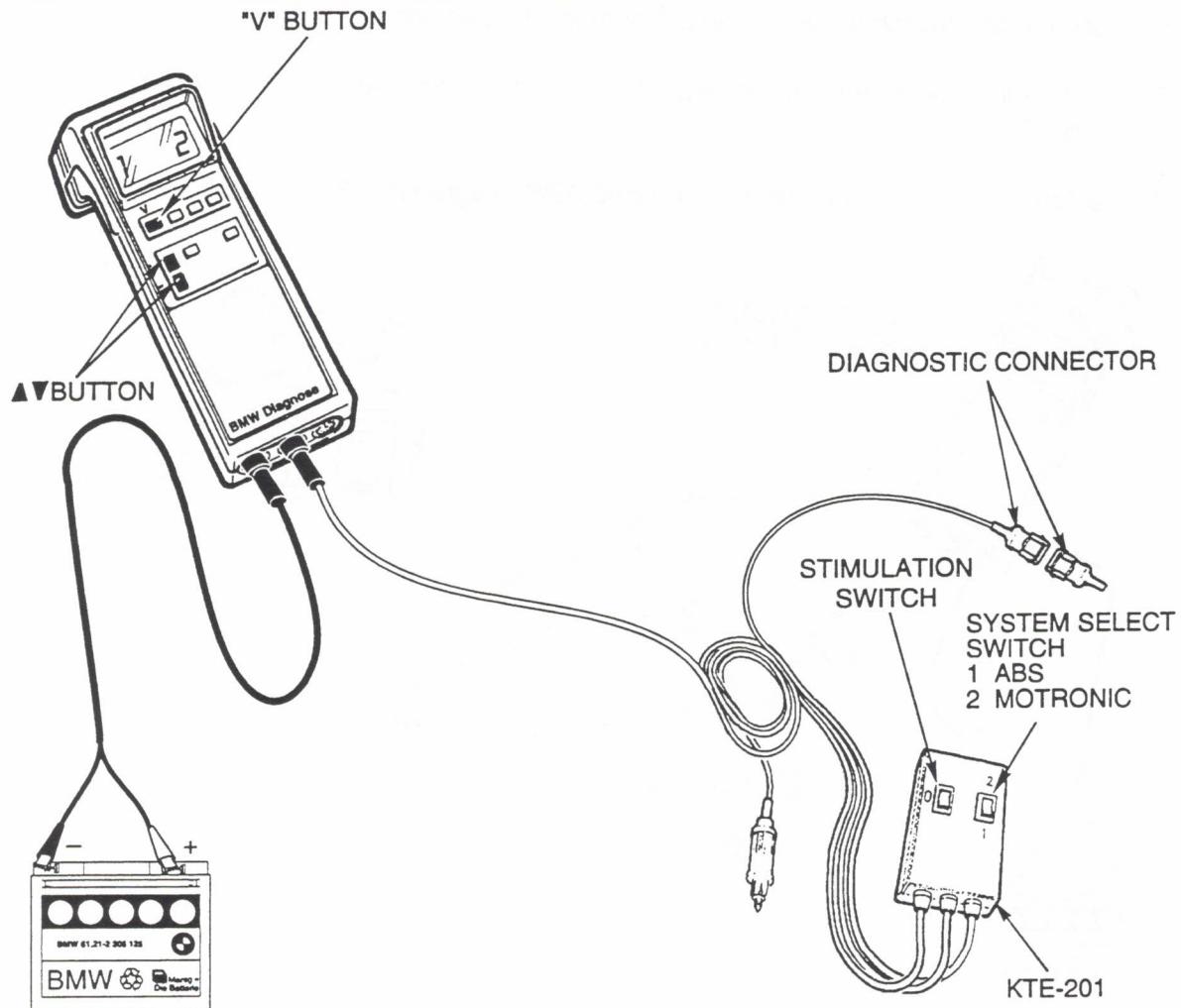
Located on the motorcycle is a connector known as the diagnosis lead. Using the BMW Multi-Tester and KTE-201 connected to the diagnosis lead, the codes are accessed and displayed. Refer to the Fault Code chart (next page) for an explanation of what the fault is.

ACCESSING FAULT CODES

- Connect the BMW Multi-Tester and KTE-201 to the motorcycle as directed in "Test Lead Hook Up" above.
- On the Diagnosis Cable switch box, set the System Select Switch to "1" (ABS). Set the Fault Memory Stimulation Switch to "0".
- On the BMW Multi-Tester, press the "V" button. Press the \blacktriangle & \blacktriangledown buttons simultaneously. In the display, a large "0" will light up on the left with a small "0" on either side.
- Turn the ignition on. If a fault is stored in the ABS Control Unit, the fault code will show up in the display on the right with a "1" to the left. If only a "0" shows up to the left, no faults have been stored.
- Record fault code on a Repair Order.

ABS SYSTEM FAULT CODES

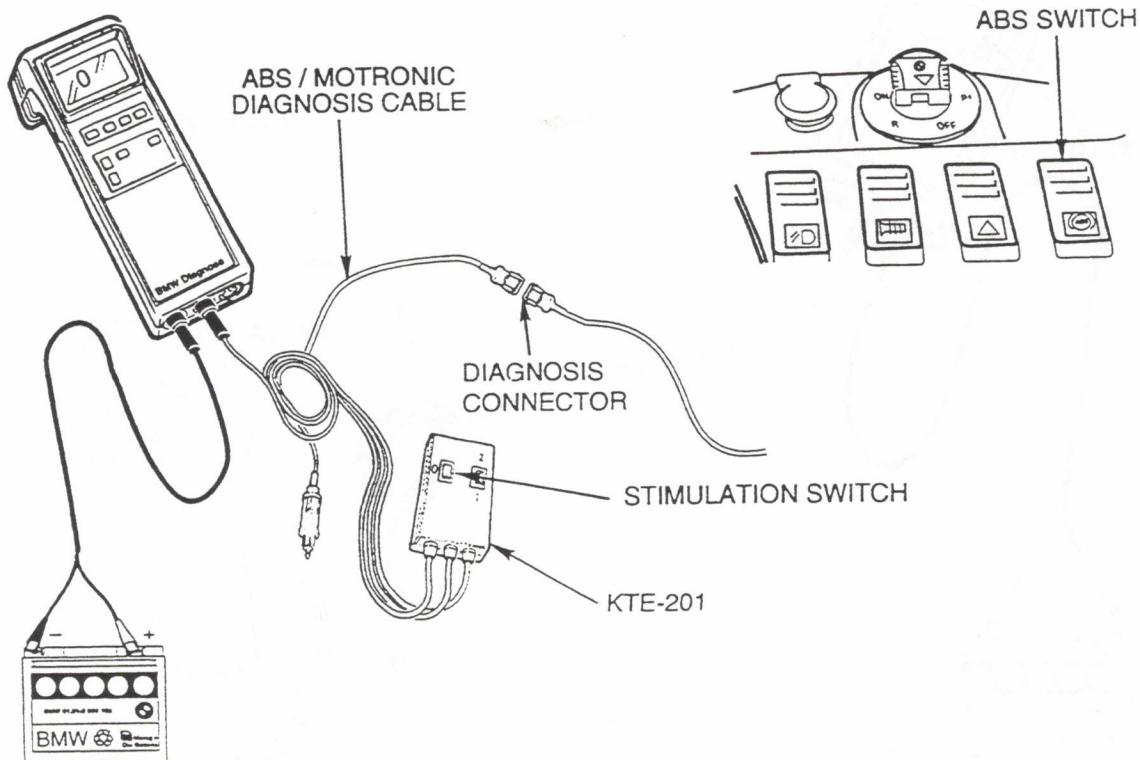
CODE	FAULT DESCRIPTION
1	Front pressure modulator
2	Rear pressure modulator
3	Front wheel speed sensor
4	Rear wheel speed sensor
5	Battery voltage too low
6	ABS relay
7	ABS Control Unit
8	Fault - Outside Influence (possible low battery voltage)



ERASING FAULT CODE

Prior to erasing the fault, record the code on the Repair Order. Erase the fault code as follows:

1. Hook up test equipment as directed in "Test Lead Hook Up - Accessing Fault Codes", page ABS Diagnosis - 2.
2. Turn ignition switch to ON position and read out fault code.
3. Press and hold Stimulation Switch on the KTE-201 box. Press and hold ABS Switch on motorcycle. Hold both switches depressed for at least 10 seconds.
4. Release the ABS Switch first and then the Stimulation Switch on the KTE-201 box. The one and the code should become a "0".
5. Turn ignition switch to OFF position for at least 5 seconds. Fault storage is now erased.
6. If the fault code is not erased, repeat steps 1 through 5 and increase the time in steps 3 and 5.
7. Perform Road Test as directed on page ABS Diagnosis - 31 to see if fault reoccurs.



ABS SYSTEM TEST

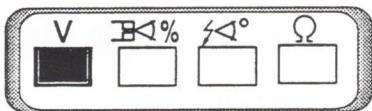
1. ABS System Control Unit Power Supply And Ground

Test Equipment: BMW Multi-Tester and Volt / Ohm Leads and Adapters

Tested Pins: Pin 15 (K2 valve engine) or 16 (K4 valve engine) = 12VDC Power, Pin 14 = Ground

Test Condition:

1. ABS CU plug disconnected.
2. BMW Multi-Tester V button pressed.



3. Volt/Ohm leads from BMW Multi-Tester connected yellow to pin 15 (K2 valve engine) or 16 (K4 valve engine) and green to pin 14 of ABS CU plug.
4. Turn ignition switch to ON position.

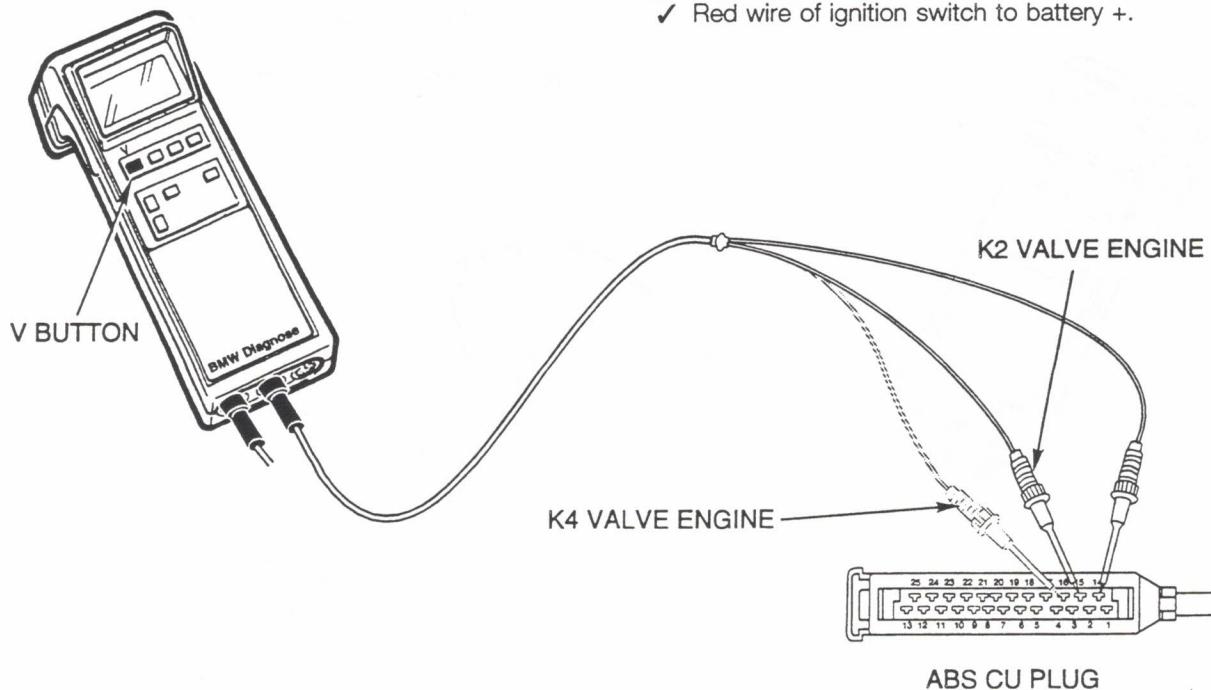
→ **BMW Multi-Tester Display:**

Voltage reading
should be same
as battery voltage.



If display voltage differs from direct battery measurement, check the following:

- ✓ Battery charge and condition (load test).
- ✓ Pin 14 of ABS CU plug to frame ground.
- ✓ Ground connection at battery, frame, engine.
- ✓ Pin 15 or 16 of ABS CU plug to terminal 15 of ignition switch.
- ✓ Red wire of ignition switch to battery +.



ABS SYSTEM TEST

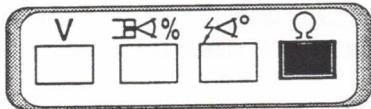
2. Fault Code 1 - Front Pressure Modulator (Continued on next page)

Test Equipment: BMW Multi-Tester and Volt / Ohm Leads and Adapters

Tested Pins: Pins 6, 9 and 10, resistance between pins.

Test Condition:

1. Ignition switch to OFF position.
2. ABS CU plug disconnected.
3. BMW Multi-Tester Ω button pressed.
4. Perform zero calibration procedure on the tester.
5. Volt/Ohm leads from BMW Multi-Tester connected between pins 6 and 9; 6 and 10; 9 and 10 of ABS CU plug.



BMW Multi-Tester Display:

Resistance

6 - 9 = \approx 4.48K Ω

6 - 10 = \approx 16.7K Ω

9 - 10 = \approx 19.5K Ω

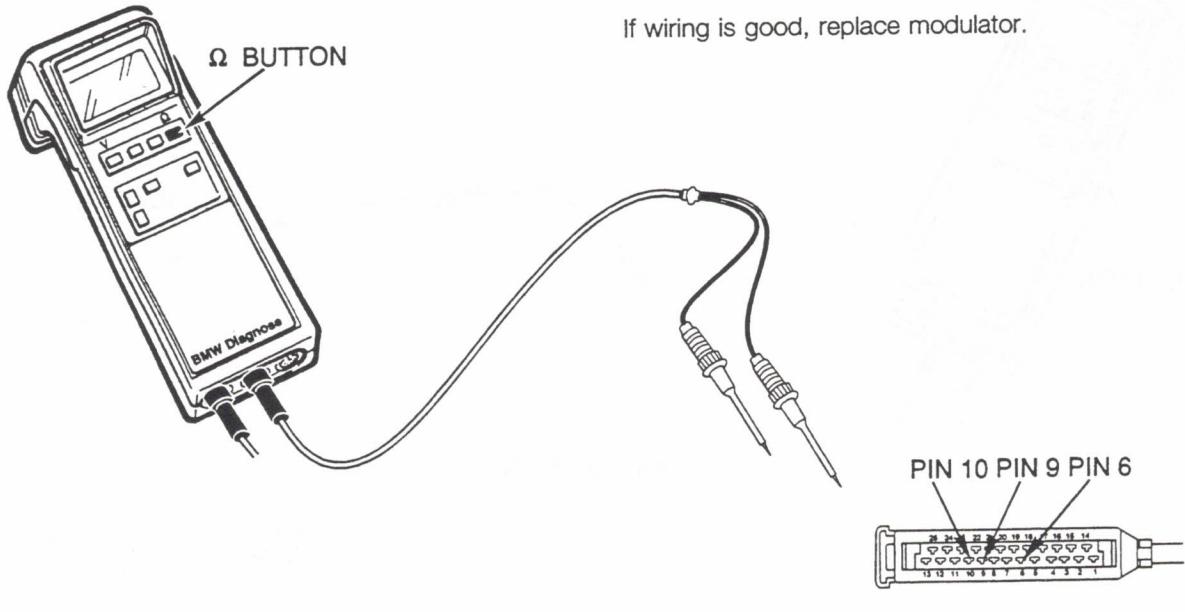


If resistance readings are correct, go to page 10.
If resistance readings are incorrect, replace modulator.

If an open circuit is indicated, check the following:

- ✓ Pin 6 of ABS CU plug to front modulator plug.
- ✓ Pin 9 of ABS CU plug to front modulator plug.
- ✓ Pin 10 of ABS CU plug to front modulator plug.

If wiring is good, replace modulator.



ABS CU PLUG

ABS SYSTEM TEST

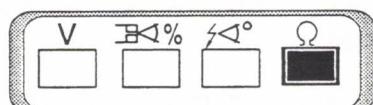
2. Fault Code 1 - Front Pressure Modulator (Continued from previous page)

Test Equipment: BMW Multi-Tester and Volt / Ohm Leads and Adapters

Tested Pins: Pin 87 of ABS relay socket to ground = resistance through modulator to ground.

Test Condition:

1. Ignition switch to OFF position.
2. ABS CU plug disconnected.
3. ABS relay removed.
4. BMW Multi-Tester Ω button pressed.



5. Perform zero calibration procedure on the tester.
6. Volt/Ohm leads from BMW Multi-Tester connected yellow to pin 87 of ABS relay socket and green to frame ground.

→ **BMW Multi-Tester Display:**

Resistance = $\approx 17.4\text{K}\Omega$

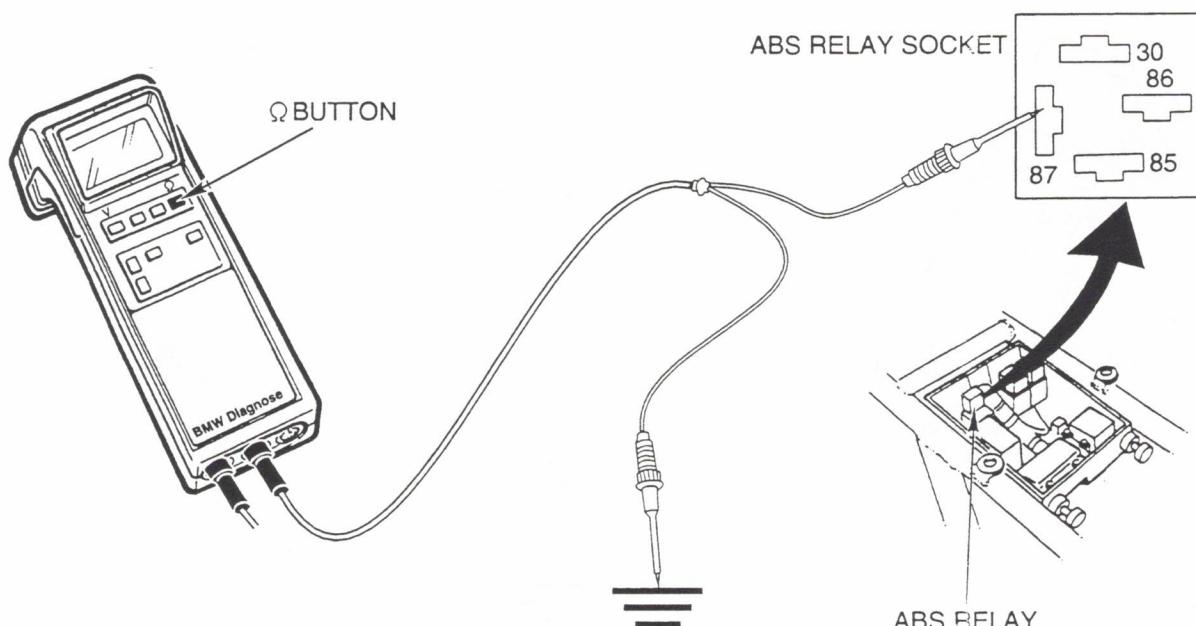


If resistance reading is correct, go to page 11. If open circuit is indicated, check the following:

- ✓ Pin 87 of ABS relay socket to front modulator plug.
- ✓ Terminal 31 of front modulator to ground terminal.

If wiring is good, replace modulator.

If resistance reading is not correct, replace modulator.



ABS SYSTEM TEST

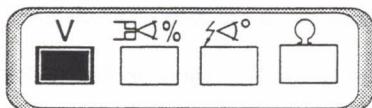
2. Fault Code 1 - Front Pressure Modulator (Continued from previous page)

Test Equipment: BMW Multi-Tester and Volt / Ohm Leads and Adapters

Tested Pins: Pin 30 of ABS relay, battery voltage

Test Condition:

1. Ignition switch to OFF position.
2. ABS CU plug disconnected.
3. ABS relay removed.
4. BMW Multi-Tester V button pressed.

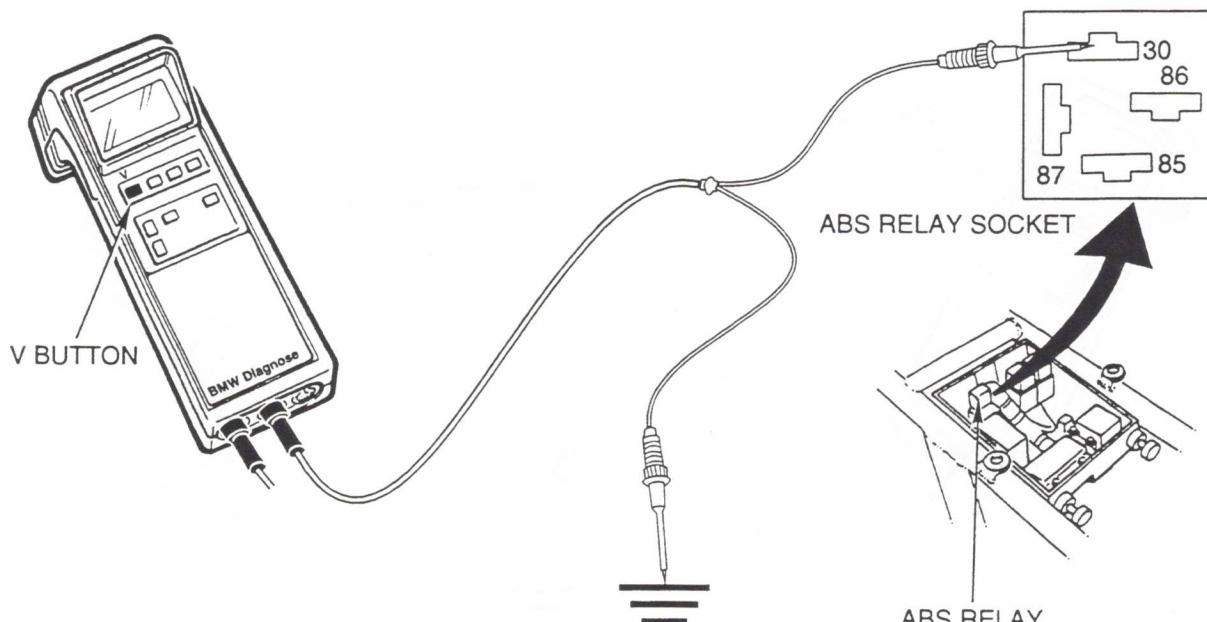


BMW Multi-Tester Display:

5. Volt/Ohm leads from BMW Multi-Tester connected yellow to terminal 30 of ABS relay and green to frame ground.
6. Reinstall ABS relay after completing test.

If battery voltage is indicated, replace ABS CU. If battery voltage is not indicated, check the following:

- ✓ Terminal 30 of ABS relay secure in socket.
- ✓ Red wire from terminal 30 of ABS relay to battery +.



ABS SYSTEM TEST

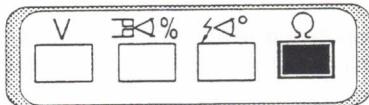
3. Fault Code 2 Rear Pressure Modulator (Continued on next Page)

Test Equipment: BMW Multi-Tester and Volt / Ohm Lead Adapters

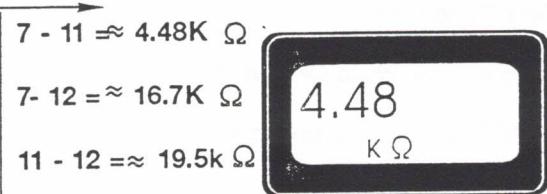
Tested Pins: Pins 7, 11, and 12, resistance between pins.

Test Condition:

1. Ignition switch to OFF position.
2. ABS CU plug disconnected.
3. BMW Multi-Tester Ohm button pressed.



4. Perform zero calibration procedure on the tester.
5. Volt/Ohm leads from BMW Multi-Tester connected between pins 7 & 11, 7 & 12, 11 & 12 of ABS CU Plug.



If resistance readings are correct, go to page 13. If resistance readings are incorrect, replace modulator.

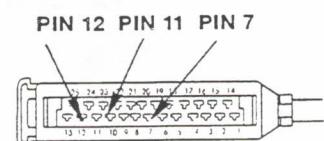
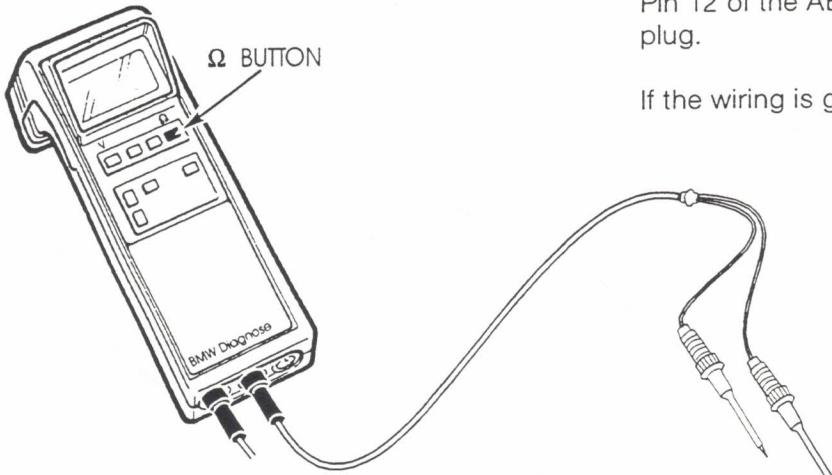
If an open circuit is indicated, check the following:

Pin 7 of the ABS CU plug to rear modulator plug.

Pin 11 of the ABS CU plug to rear modulator plug.

Pin 12 of the ABS CU plug to rear modulator plug.

If the wiring is good, replace the modulator.



ABS CU PLUG

ABS SYSTEM TEST

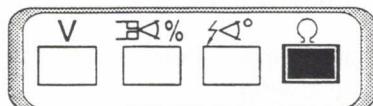
3. Fault Code 2 - Rear Pressure Modulator (Continued from previous page)

Test Equipment: BMW Multi-Tester and Volt / Ohm Leads and Adapters

Tested Pins: Pin 87 of ABS relay socket to ground = resistance through modulator to ground.

Test Condition:

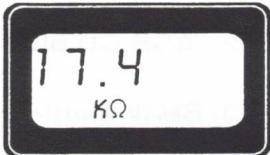
1. Ignition switch to OFF position.
2. ABS CU plug disconnected.
3. ABS relay removed.
4. BMW Multi-Tester Ω button pressed.



5. Perform zero calibration procedure on the tester.
6. Volt/Ohm leads from BMW Multi-Tester connected yellow to pin 87 of ABS relay socket and green to frame ground.

→ **BMW Multi-Tester Display:**

Resistance = $\approx 17.4 \text{ k}\Omega$

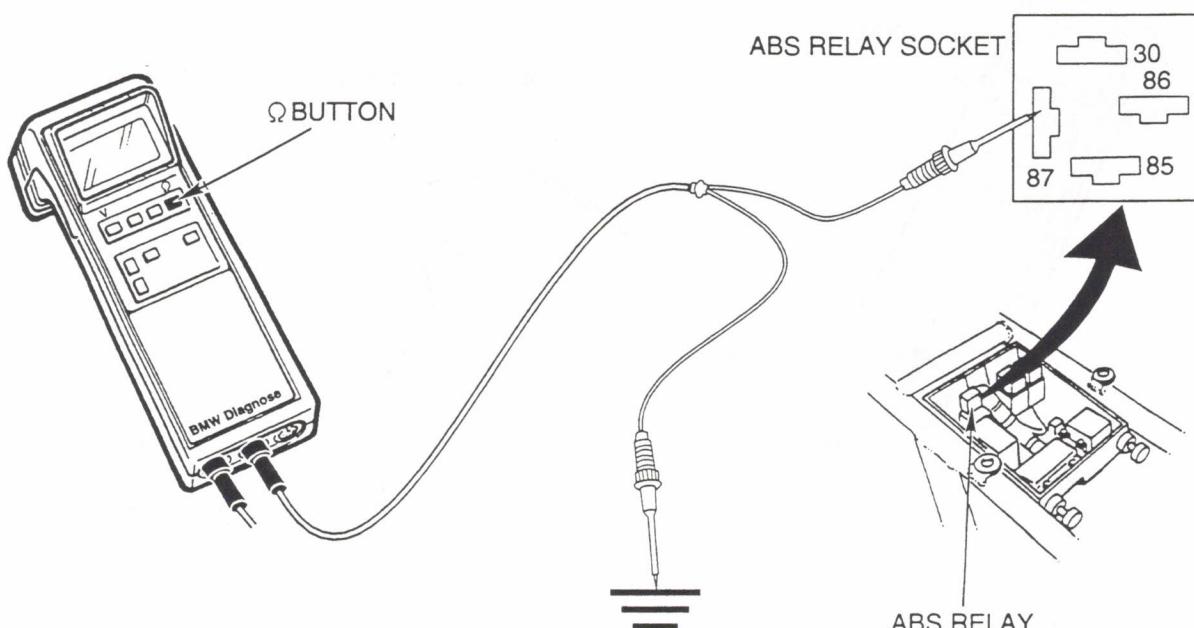


If resistance reading is correct, go to page 14. If open circuit is indicated, check the following:

- ✓ Pin 87 of ABS relay socket to rear modulator plug.
- ✓ Terminal 31 of rear modulator to ground terminal.

If wiring is good, replace modulator.

If resistance reading is not correct, replace modulator.



ABS SYSTEM TEST

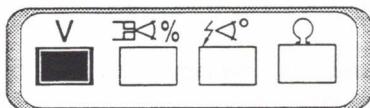
3. Fault Code 2 - Rear Pressure Modulator (Continued from previous page)

Test Equipment: BMW Multi-Tester and Volt / Ohm Leads and Adapters

Tested Pins: Pin 30 of ABS relay socket, battery voltage

Test Condition:

1. Ignition switch to OFF position.
2. ABS CU plug disconnected.
3. ABS relay removed.
4. BMW Multi-Tester V button pressed.



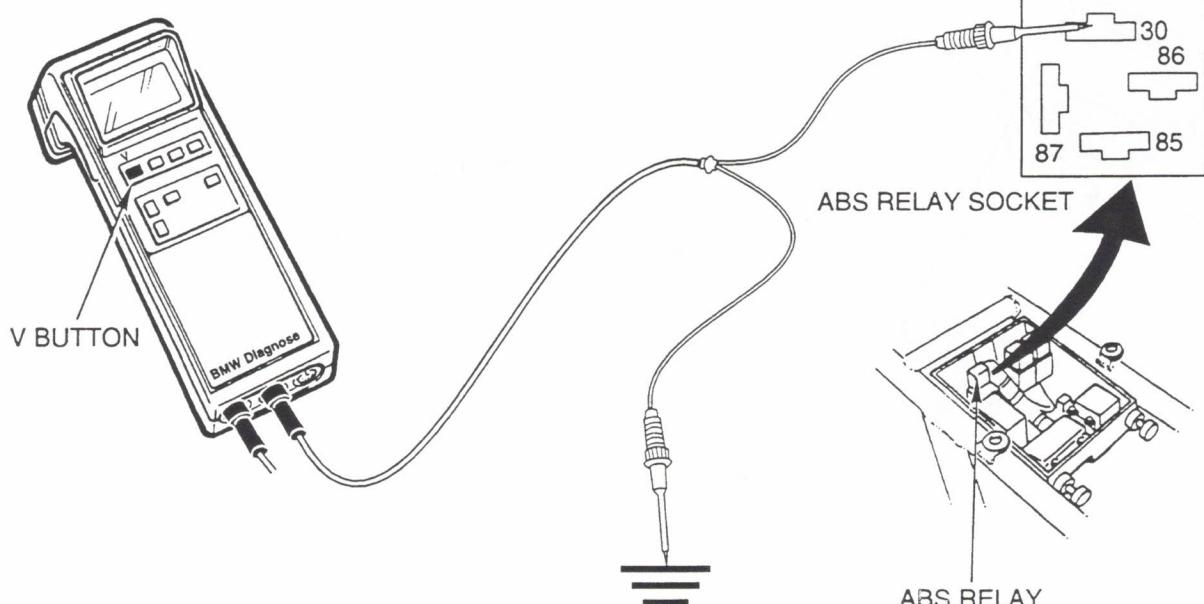
5. Volt/Ohm leads from BMW Multi-Tester connected yellow to terminal 30 of ABS relay socket and green to frame ground.
6. Reinstall relay after test is complete.

→ **BMW Multi-Tester Display:**



If battery voltage is indicated, replace ABS CU. If battery voltage is not indicated, check the following:

- ✓ Terminal 30 of ABS relay secure in socket.
- ✓ Red wire from terminal 30 of ABS relay socket to battery +.



ABS SYSTEM TEST

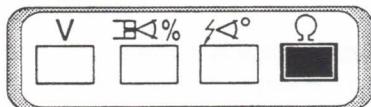
4. Fault Code 3 - Front Wheel Speed Sensor (Continued on next page)

Test Equipment: BMW Multi-Tester and Volt / Ohm Leads and Adapters

Tested Pins: Pins 1 and 2, resistance between pins.

Test Condition:

1. Ignition switch to OFF position.
2. ABS CU plug disconnected.
3. BMW Multi-Tester Ω button pressed.



4. Perform zero calibration procedure on the tester.
5. Volt/Ohm leads from BMW Multi-Tester connected between pins 1 and 2 of ABS CU plug.

→ **BMW Multi-Tester Display:**

Resistance =

$135 \pm 20\Omega$



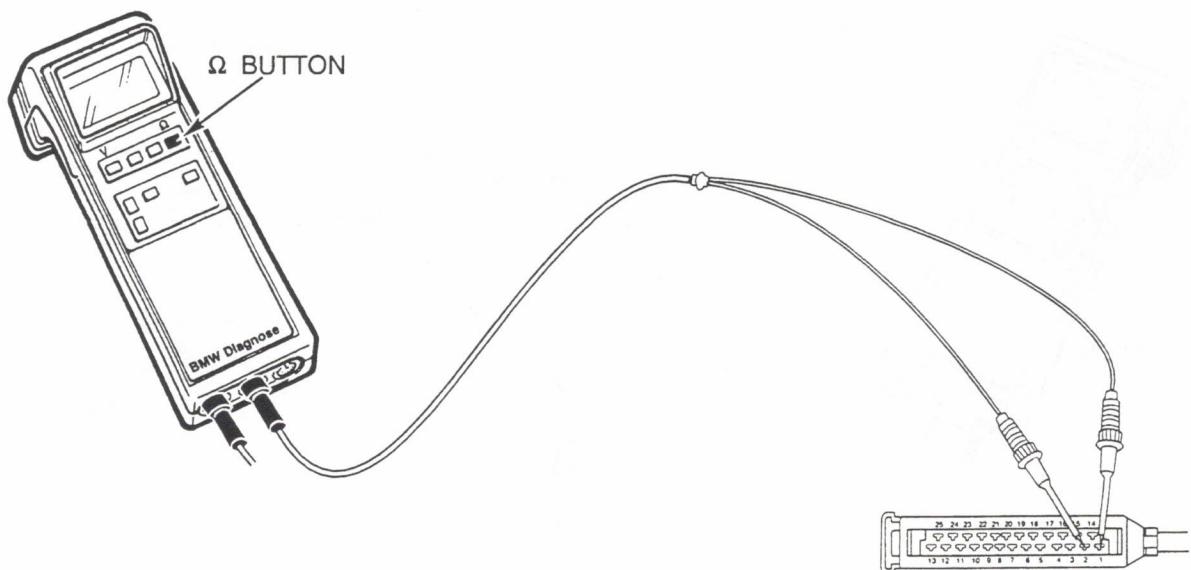
If an open circuit is indicated, go to page 16.

If resistance reading is not correct, check the following:

- ✓ Wires from pins 1 and 2 of ABS CU plug to wheel speed sensor.
- ✓ Plug connection at wheel speed sensor.

If wiring is good, replace front wheel speed sensor.

If resistance reading is correct, replace ABS CU.



ABS SYSTEM TEST

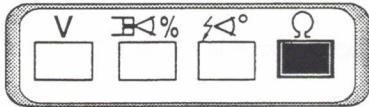
4. Fault Code 3 - Front Wheel Speed Sensor (Continued from previous page)

Test Equipment: BMW Multi-Tester and Volt / Ohm Leads and Adapters

Tested Pins: Pins 1 and 2, open circuit to ground.

Test Condition:

1. Ignition switch to OFF position.
2. ABS CU plug disconnected.
3. BMW Multi-Tester Ω button pressed.



4. Perform zero calibration procedure on the tester.
5. Volt/Ohm leads from BMW Multi-Tester connected between pin 1 of ABS CU plug and frame ground and between pin 2 and frame ground.

→ **BMW Multi-Tester Display:**

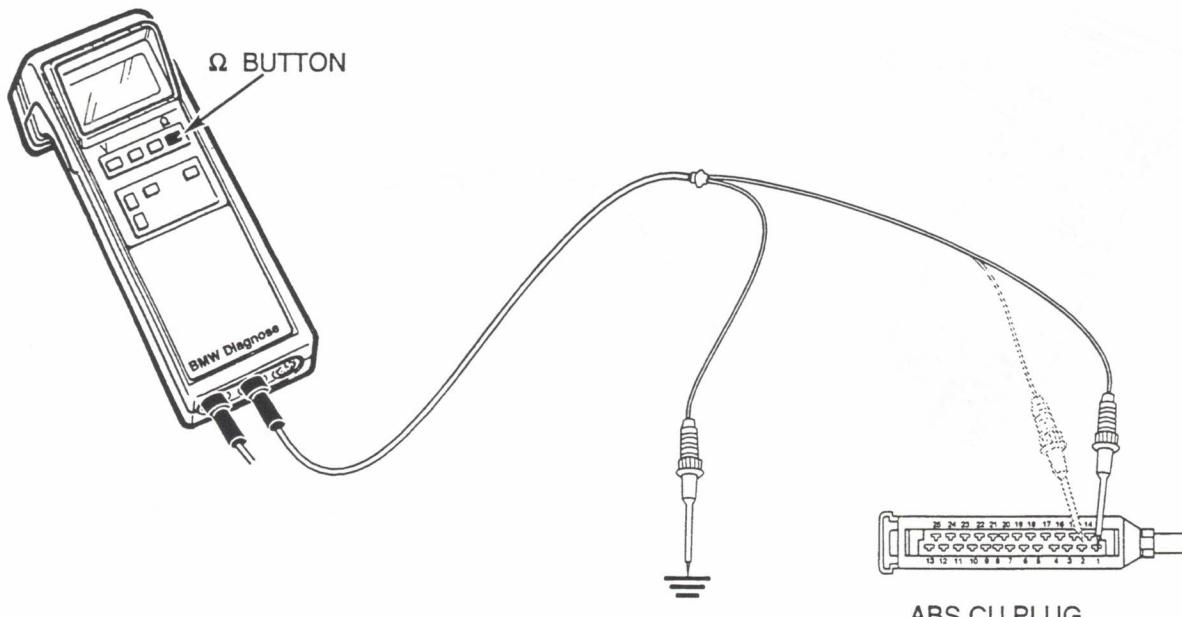


An open circuit should be indicated.

If a circuit to ground is indicated, check the following for short to ground.

- ✓ Pin 1 of ABS CU plug to front wheel speed sensor plug.
- ✓ Pin 2 of ABS CU plug to front wheel speed sensor plug.

If wiring is good, replace front wheel speed sensor.



ABS CU PLUG

ABS SYSTEM TEST

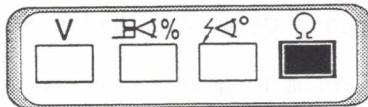
5. Fault Code 4 - Rear Wheel Speed Sensor (Continued on next page)

Test Equipment: BMW Multi-Tester and Volt / Ohm Leads and Adapters

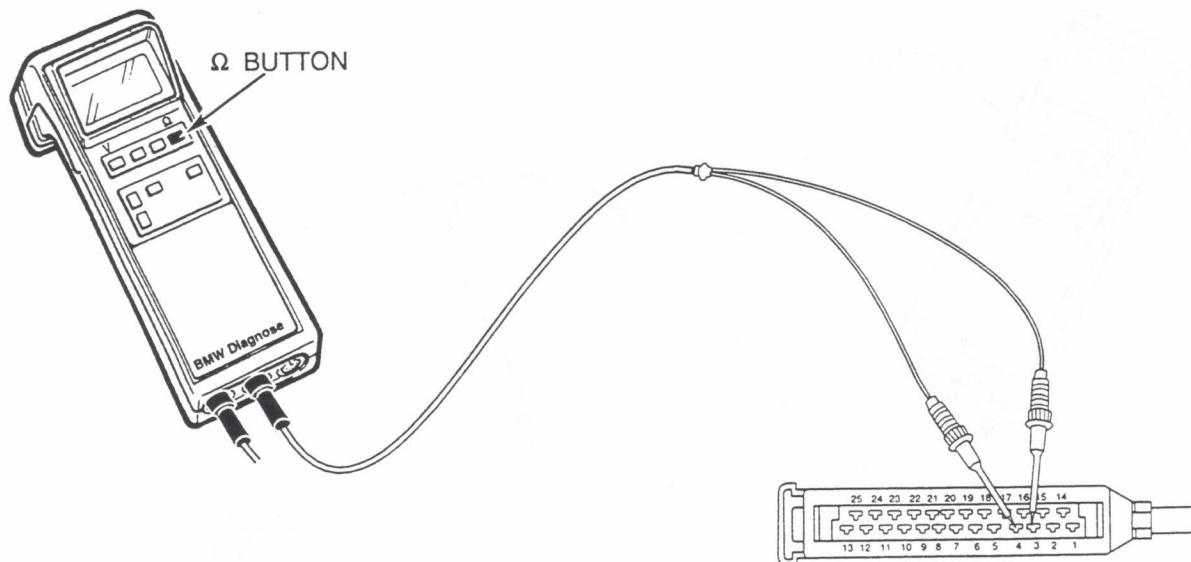
Tested Pins: Pins 3 and 4, resistance between pins.

Test Condition:

1. Ignition switch to OFF position.
2. ABS CU plug disconnected.
3. BMW Multi-Tester Ω button pressed.



4. Perform zero calibration procedure on the tester.
5. Perform zero calibration procedure on the tester.
5. Volt/Ohm leads from BMW Multi-Tester connected between pins 3 and 4 of ABS CU plug.



BMW Multi-Tester Display:

Resistance =
 $135 \pm 20\Omega$



If an open circuit is indicated, go to page 18.

If resistance reading is not correct, check the following:

- ✓ Wires from pins 3 and 4 of ABS CU to wheel speed sensor.
- ✓ Plug connection at wheel speed sensor.

If wiring is good, replace rear wheel speed sensor.

If resistance reading is correct, replace ABS CU.

ABS SYSTEM TEST

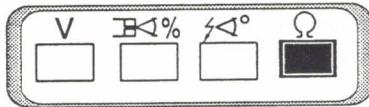
5. Fault Code 4 - Rear Speed Sensor (Continued from previous page)

Test Equipment: BMW Multi-Tester and Volt / Ohm Leads and Adapters

Tested Pins: Pins 3 and 4, open circuit to ground.

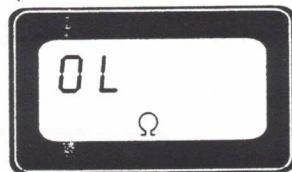
Test Condition:

1. Ignition switch to OFF position.
2. ABS CU plug disconnected.
3. BMW Multi-Tester Ω button pressed.



4. Perform zero calibration procedure on the tester.
5. Volt/Ohm leads from BMW Multi-Tester connected between pin 3 of ABS CU plug and frame ground and between pin 4 and frame ground.

BMW Multi-Tester Display:

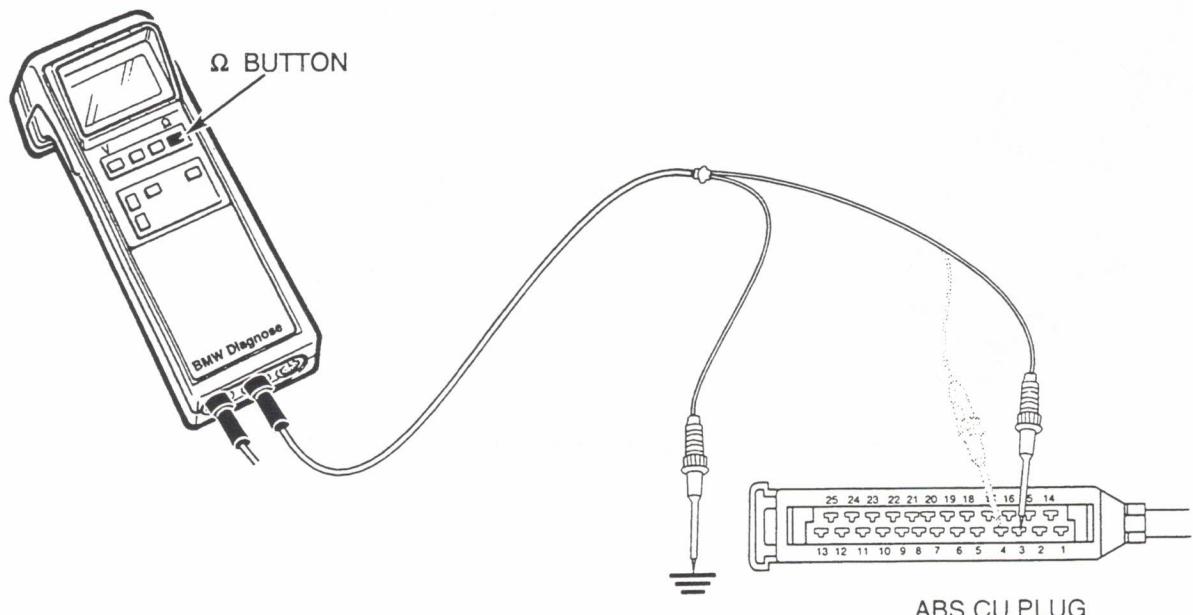


An open circuit should be indicated.

If a circuit to ground is indicated, check the following for short to ground.

- ✓ Pin 3 of ABS CU plug to rear wheel speed sensor plug.
- ✓ Pin 4 of ABS CU plug to rear wheel speed sensor plug.

If wiring is good, replace rear wheel speed sensor.



ABS SYSTEM TEST

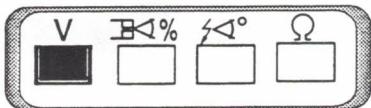
6. Fault Code 5 - Battery Voltage Too Low

Test Equipment: BMW Multi-Tester and Volt / Ohm Leads and Adapters

Tested Pins: Pin 15 (K 2 valve engine) or 16 (K 4 valve engine) = 12VDC Power, Pin 14 = Ground

Test Condition:

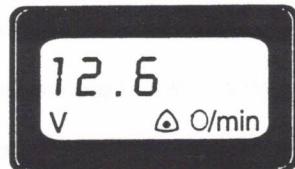
1. ABS CU plug disconnected.
2. BMW Multi-Tester V button pressed.



3. Volt/Ohm leads from BMW Multi-Tester connected yellow to pin 15 (K 2 valve engine) or 16 (K 4 valve engine) and green to pin 14 of ABS CU plug.
4. Turn ignition switch to ON position.

→ **BMW Multi-Tester Display:**

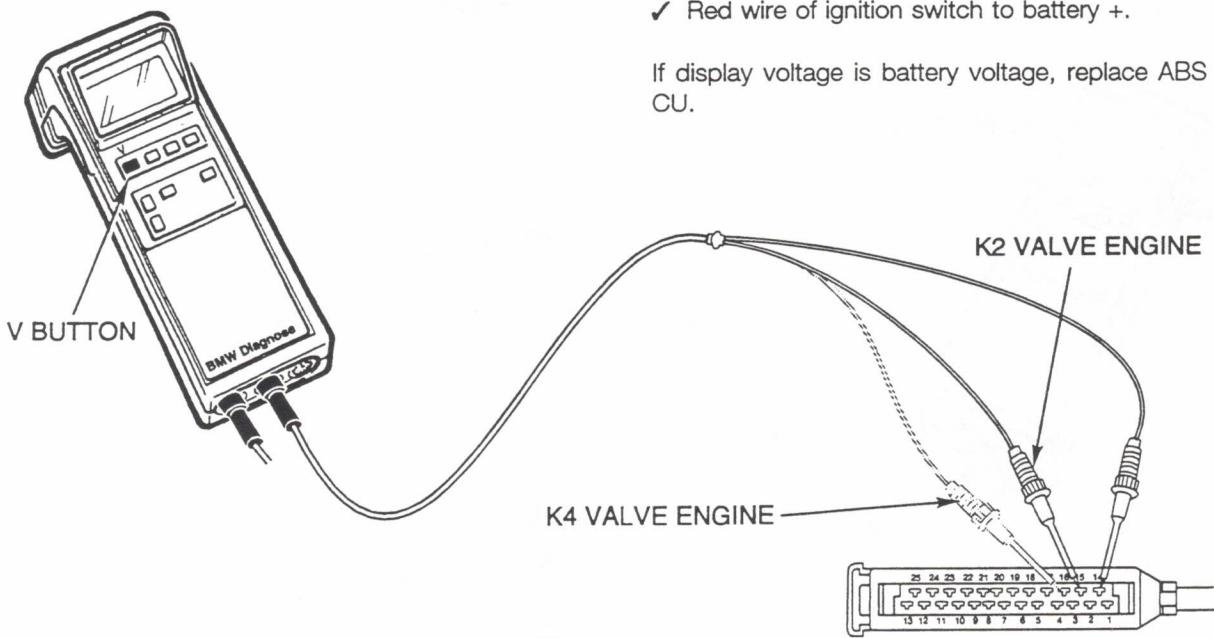
Voltage reading
should be same
as battery voltage.



If display voltage differs from direct battery measurement, check the following:

- ✓ Battery charge and condition (load test).
- ✓ Pin 14 of ABS CU plug to frame ground.
- ✓ Ground connection at battery, frame, engine.
- ✓ Pin 15 or 16 of ABS CU plug to terminal 15 of ignition switch.
- ✓ Red wire of ignition switch to battery +.

If display voltage is battery voltage, replace ABS CU.



ABS CU PLUG

ABS SYSTEM TEST

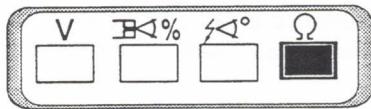
7. Fault Code 6 - ABS Relay (Continued on next page)

Test Equipment: BMW Multi-Tester and Volt / Ohm Leads and Adapters

Tested Pins: Pin 17 to pin 19 = resistance

Test Conditions:

1. ABS CU plug disconnected
2. Ignition switch to OFF position.
3. BMW Multi-Tester Ω button pressed.



4. Perform zero calibration procedure on the tester.
5. Volt/Ohm leads from BMW Multi-Tester connected between pins 17 and 19 of ABS CU plug.

→ **BMW Multi-Tester Display:**

Resistance =

< 92Ω



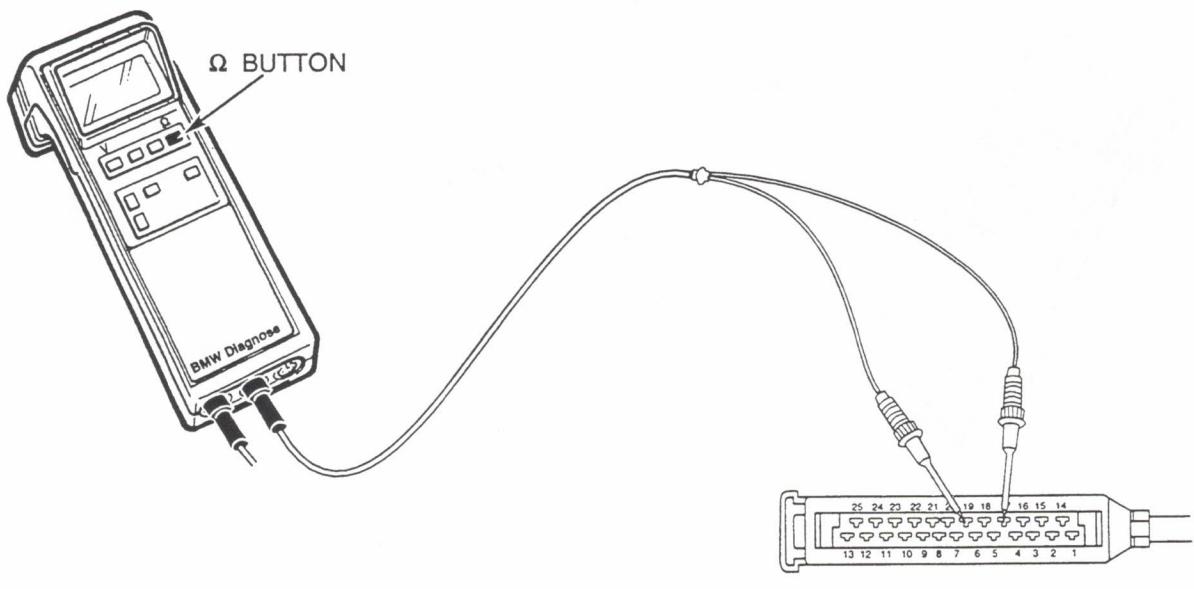
If resistance reading is correct, replace ABS CU.

If an open circuit is indicated, check the following:

- ✓ Pin 17 of ABS CU plug to ABS relay socket.
- ✓ Pin 19 of ABS CU plug to ABS relay socket.

If wiring is good, replace ABS relay.

If resistance reading is not correct, go to page 21.



ABS SYSTEM TEST

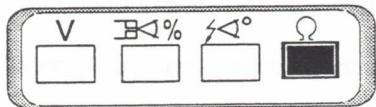
7. Fault Code 6 - ABS Relay (Continued from last page)

Test Equipment: BMW Multi-Tester and Volt / Ohm Leads and Adapters

Tested Pins: Terminal 86 of ABS relay to terminal 85 = resistance

Test Conditions:

1. Ignition switch to OFF position.
2. ABS relay removed from socket.
3. BMW Multi-Tester Ω button pressed.
4. Perform zero calibration procedure on the tester.
5. Volt/Ohm leads from BMW Multi-Tester connected between terminals 86 and 85 of ABS relay.



→ BMW Multi-Tester Display:

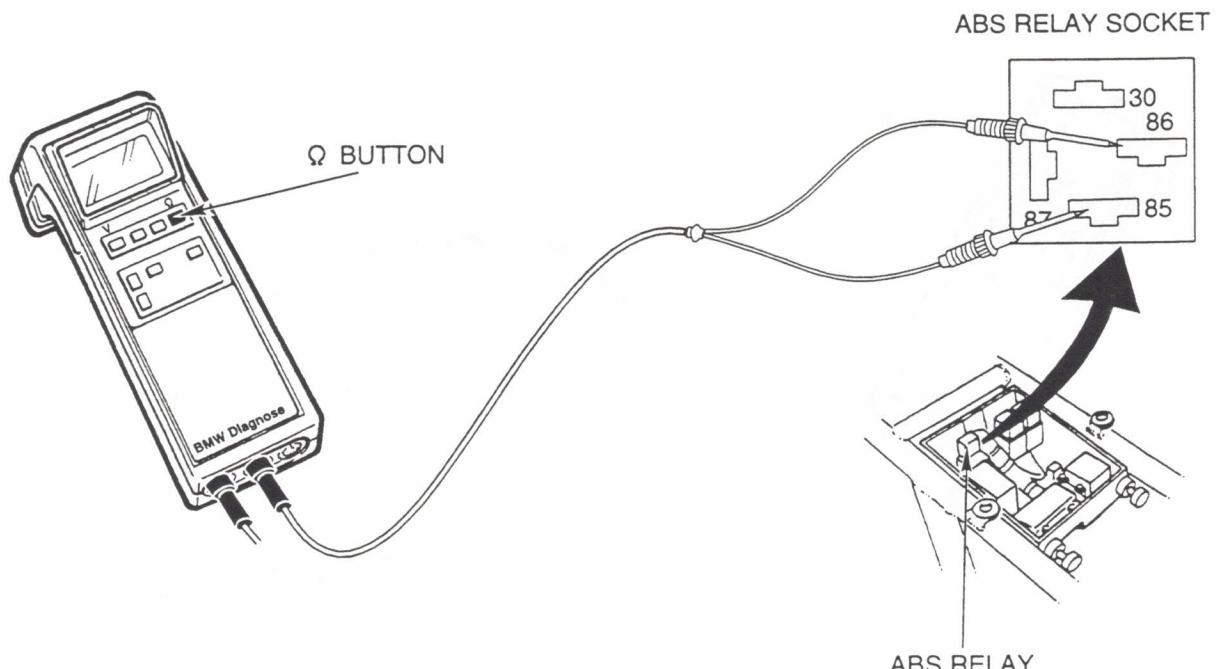
Resistance =

< 92 Ω



If resistance is not correct, replace ABS relay. If resistance is correct, check the following:

- ✓ Relay socket terminals.
- ✓ Terminal 86 of ABS relay socket to pin 17 of ABS CU plug.
- ✓ Terminal 85 of ABS relay socket to pin 19 of ABS CU plug.



ABS SYSTEM TEST

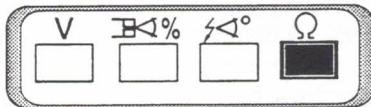
8. Fault Code 7 - ABS Control Unit

Test Equipment: BMW Multi-Tester and Volt / Ohm Leads and Adapters

Tested Pins: Pins 1, 3, and 17 of ABS CU plug to ground = open circuit to ground

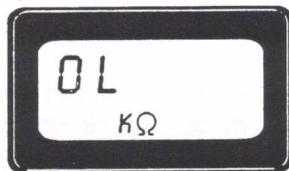
Test Conditions:

1. Ignition switch to OFF position.
2. ABS CU plug disconnected.
3. BMW Multi-Tester Ω button pressed.



4. Perform zero calibration procedure on the tester.
5. Volt/Ohms leads of BMW Multi-Tester connected between pins 1, 3 and 17 of ABS CU plug and frame ground.

→ **BMW Multi-Tester Display:**

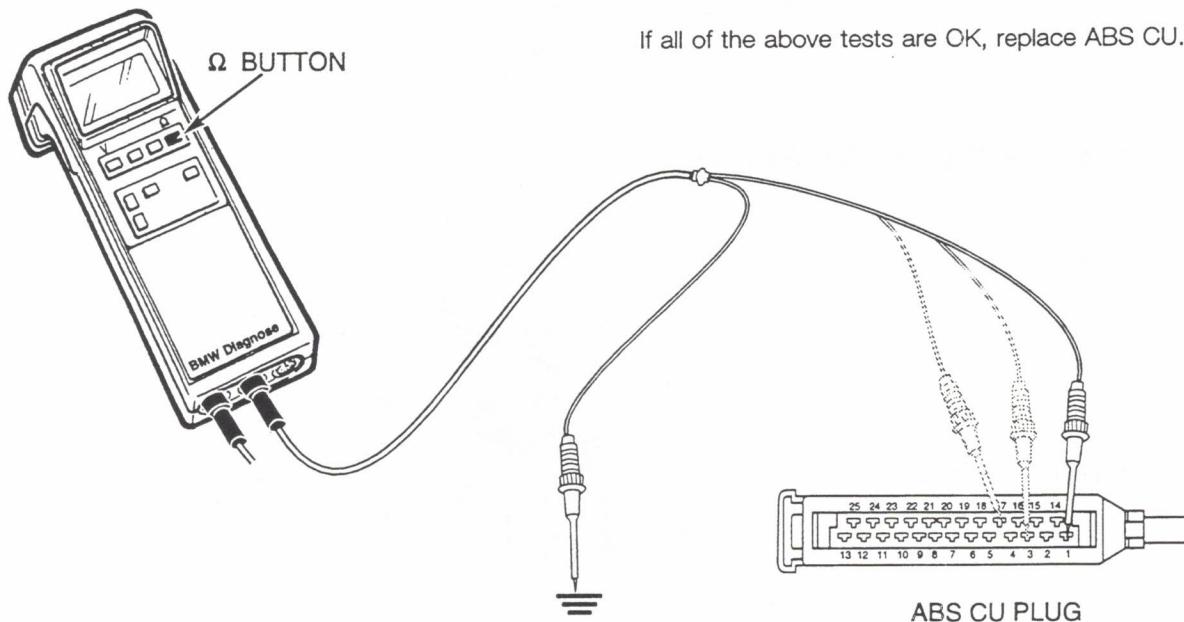


Open circuit is indicated from all three pins.

If a circuit to ground is indicated on any pin, check the following for that pin:

- ✓ Pin 1 of ABS CU plug to front wheel speed sensor - open circuit.
- ✓ Pin 3 of ABS CU plug to rear wheel speed sensor - open circuit.
- ✓ Pin 17 of ABS CU plug to ABS relay socket terminal 86 - closed circuit.

If all of the above tests are OK, replace ABS CU.



ABS SYSTEM TEST

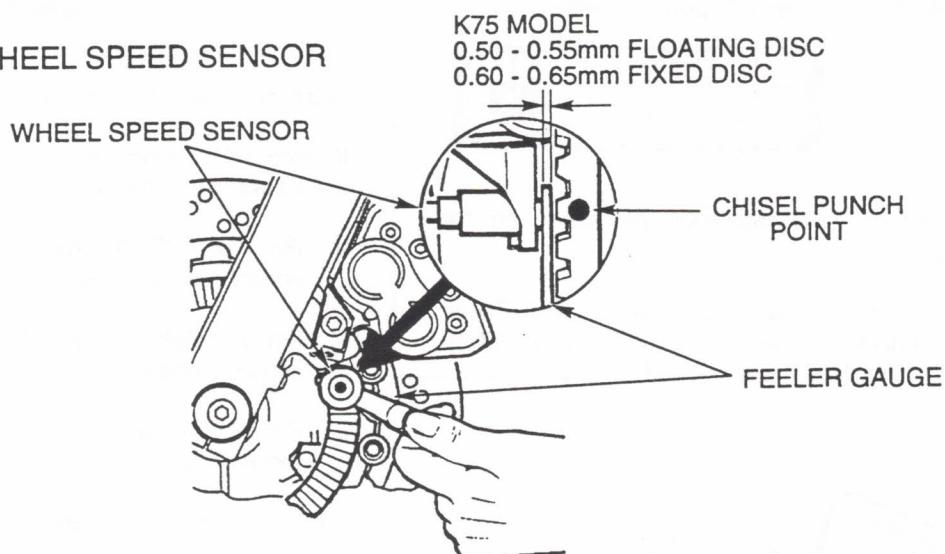
9. Fault Code 8 - Outside Influence

Test Equipment: Feeler gauge = wheel speed sensor gap

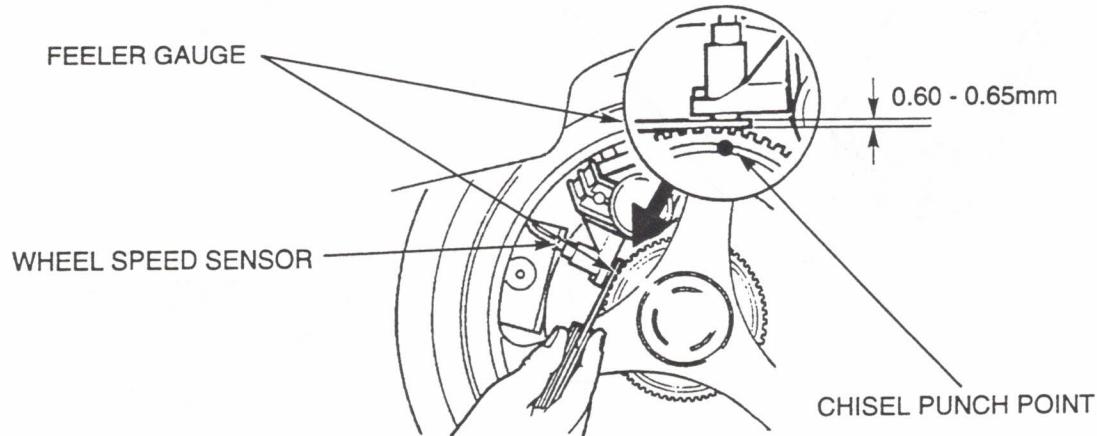
NOTE: This fault can be caused by low battery voltage, loose wheel speed sensor or incorrect sensor gap.

1. Check power supply and ground for ABS CU, perform Test 1.
2. Check that both front and rear wheel speed sensors are secure.
3. Check both front and rear wheel speed sensor gap as shown below. Wheel speed sensor gap will vary by model. Check Riders Manual for proper gap for the model.

FRONT WHEEL SPEED SENSOR



REAR WHEEL SPEED SENSOR



ABS SYSTEM TEST

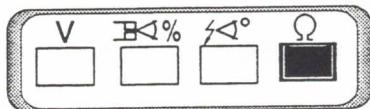
10. ABS Warning Indicator Continuously On (Continued on next page)

Test Equipment: BMW Multi-Tester and Volt / Ohm Leads and Adapters

Tested Pins: Pins 18 and 19 of ABS CU plug = resistance between pins

Test Conditions:

1. ABS CU plug disconnected.
2. Ignition switch to OFF position.
3. BMW Multi-Tester Ω button pressed.



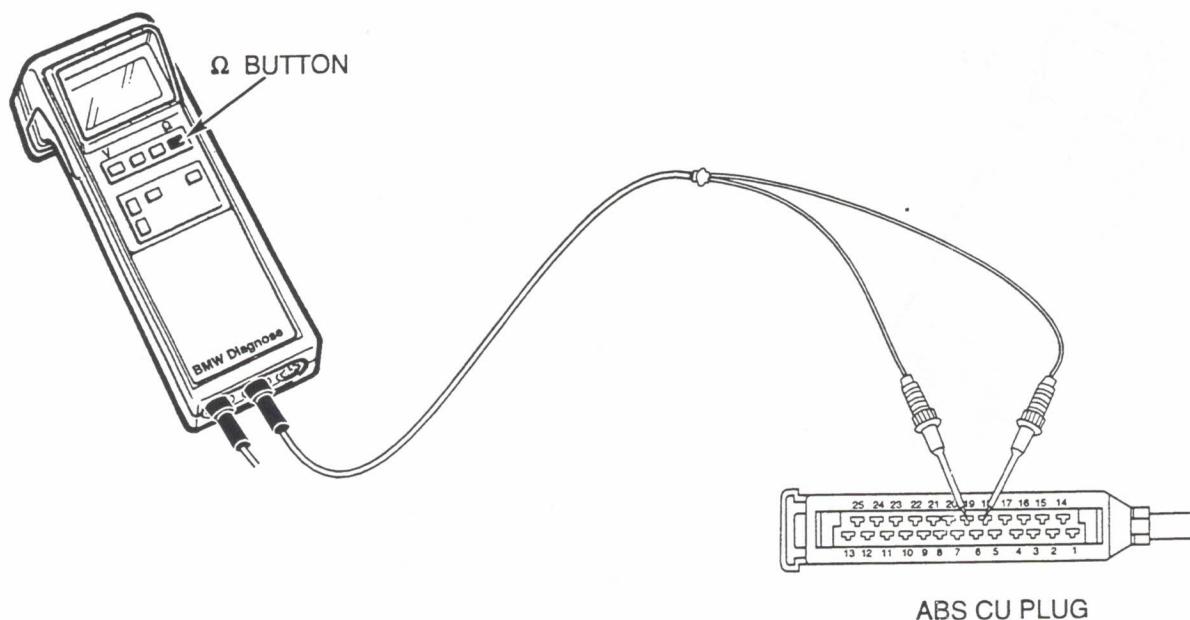
4. Perform zero calibration procedure on the tester.
5. Volt/Ohm leads from BMW Multi-Tester connected between pins 18 and 19 of ABS CU plug.



If resistance reading is correct, go to page 25.

If resistance reading is not correct, check the following:

- ✓ Pin 18 of ABS CU plug to ABS Warning Relay, pin 86.
- ✓ Pin 19 of ABS CU plug to ABS Warning Relay, pin 85



ABS SYSTEM TEST

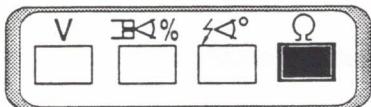
10. ABS Warning Indicator Continuously On (Continued from previous page)

Test Equipment: BMW Multi-Tester and Volt / Ohm Leads and Adapters

Tested Pin: Pin 5 of ABS CU plug to ground = open circuit to ground

Test Conditions:

1. ABS CU plug disconnected.
2. Ignition switch to OFF position.
3. BMW Multi-Tester Ω button pressed.



4. Perform zero calibration procedure on the tester.
5. Volt/Ohm leads from BMW Multi-Tester connected yellow to pin 5 of ABS CU plug and green to frame ground.

→ **BMW Multi-Tester Display:**

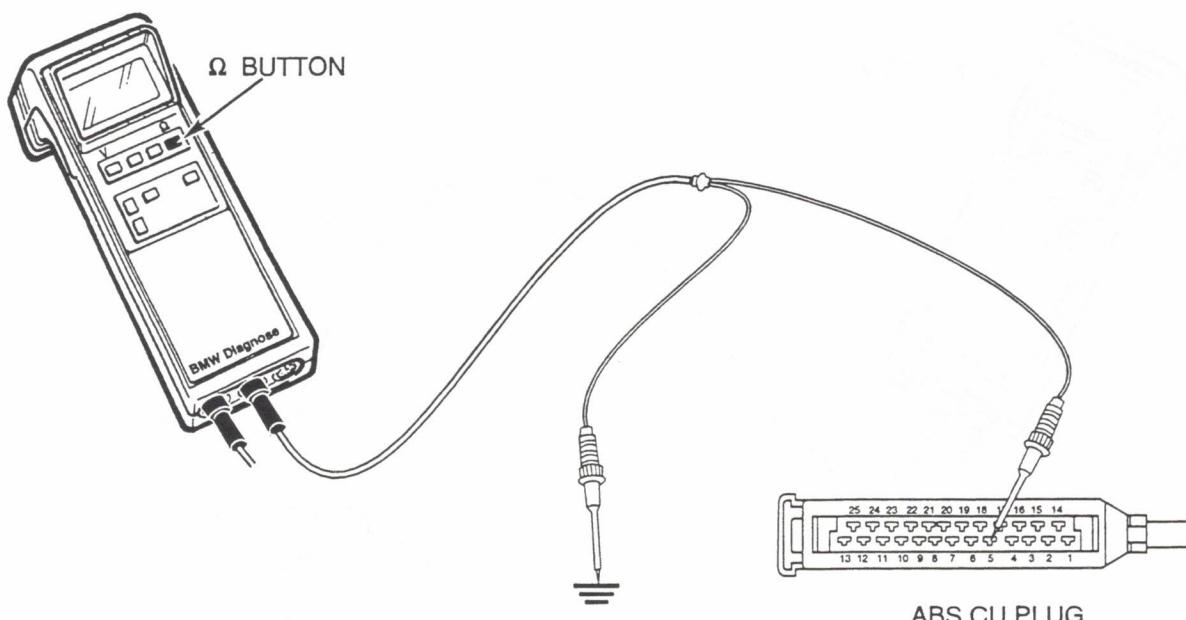


If open circuit is indicated, replace ABS CU.

If an open circuit is not indicated, check the following:

- ✓ Pin 5 of ABS CU plug to ABS Switch.

If wiring is good, replace ABS Switch.



ABS CU PLUG

ABS SYSTEM TEST

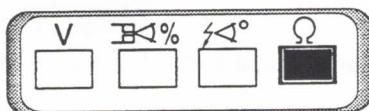
11. ABS Warning Indicator Does Not come On When Starting Motorcycle (Continued on next page)

Test Equipment: BMW Multi-Tester and Volt / Ohm Leads and Adapters

Tested Pins: Pins 18 and 19 of ABS CU plug = resistance between pins

Test Conditions:

1. ABS CU plug disconnected.
2. Ignition switch to OFF position.
3. BMW Multi-Tester Ω button pressed.
4. Perform zero calibration procedure on the tester.
5. Volt/Ohm leads from BMW Multi-Tester connected between pins 18 and 19 of ABS CU plug.



BMW Multi-Tester Display:

Resistance =

$110 \pm 20\Omega$

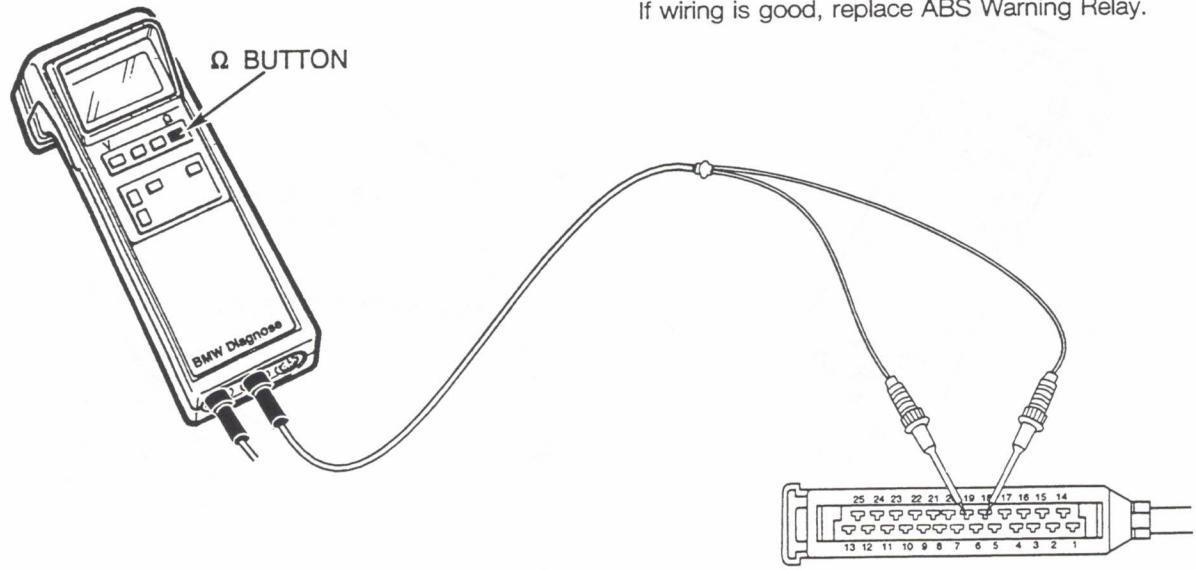


If resistance reading is correct, go to page 27.

If resistance reading is not correct, check the following:

- ✓ Pin 18 of ABS CU to terminal 86 of ABS Warning Relay socket.
- ✓ Pin 19 of ABS CU plug to terminal 85 of ABS Relay and then to terminal 85 of ABS Warning Relay.

If wiring is good, replace ABS Warning Relay.



ABS CU PLUG

ABS SYSTEM TEST

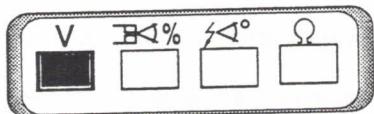
11. ABS Warning Indicator Does Not come On When Starting Motorcycle (Continued from previous page)

Test Equipment: BMW Multi-Tester and Volt / Ohm Leads and Adapters

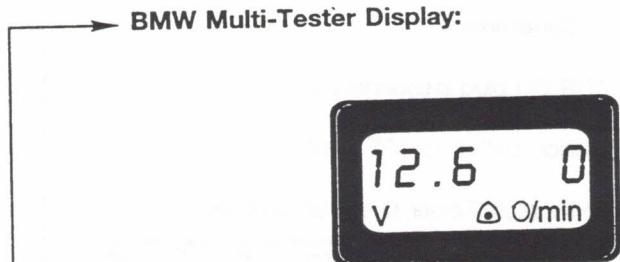
Tested Pins: Terminal 30 of ABS Warning Relay = battery voltage

Test Conditions:

1. ABS Warning Relay removed.
2. Ignition switch to ON position.
3. BMW Multi-Tester V button pressed.



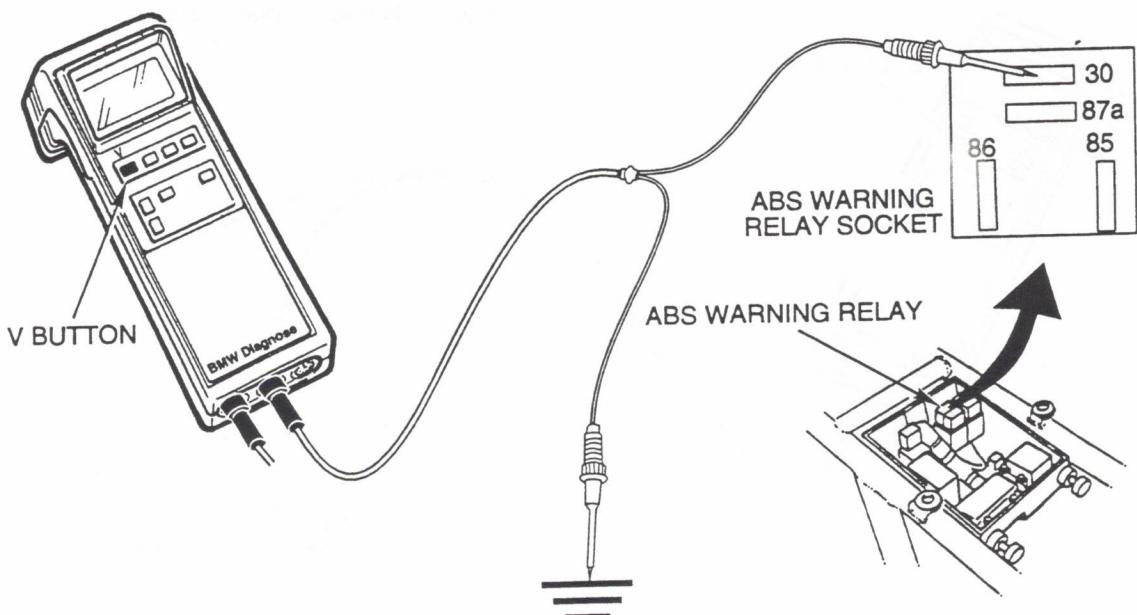
4. Volt/Ohm leads from BMW Multi-Tester connected yellow to terminal 30 of ABS Warning Relay and green to frame ground.
5. Reinstall ABS Warning Relay after completing test.



If battery voltage is indicated, go to page 28.

If battery voltage is not indicated, check the following:

- ✓ Terminal 30 of ABS Warning Relay.
- ✓ Green wire from terminal 30 of ABS Warning Relay to battery +.



ABS SYSTEM TEST

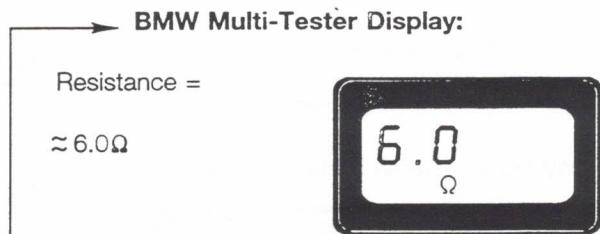
11. ABS Warning Indicator Does Not come On When Starting Motorcycle (Continued from previous page)

Test Equipment: BMW Multi-Tester and Volt / Ohm Leads and Adapters

Tested Pins: Terminal 87a of ABS Warning Relay = resistance

Test Conditions:

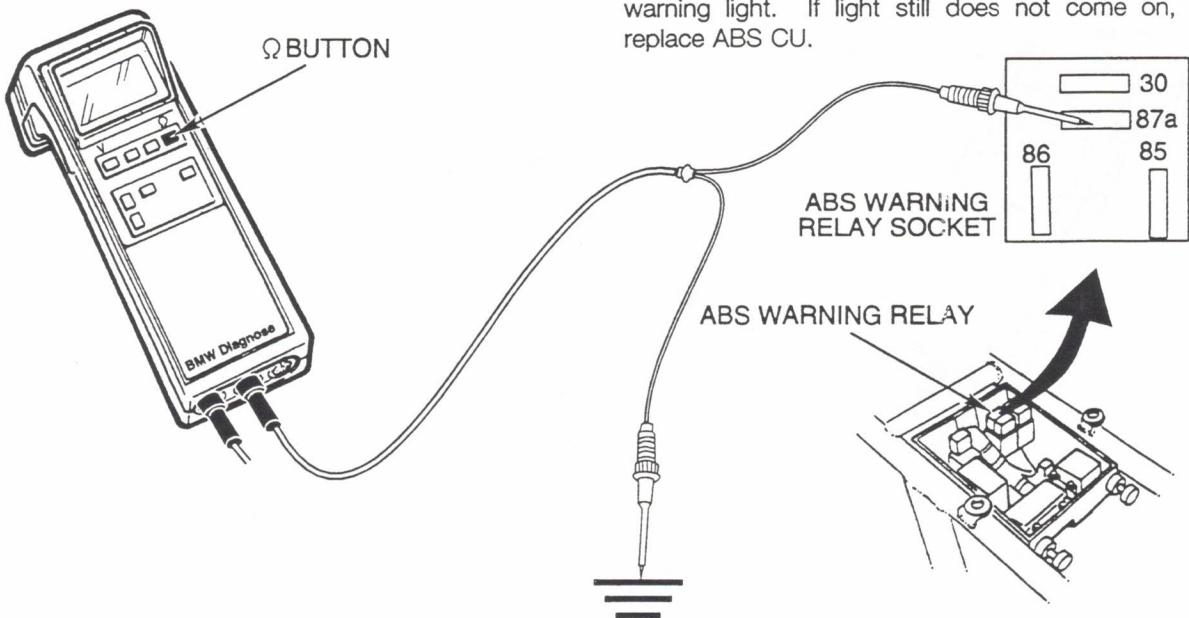
1. ABS Warning Relay removed.
2. Ignition switch to OFF position.
3. BMW Multi-Tester Ω button pressed.
4. Perform zero calibration procedure on the tester.
5. Volt/Ohm leads from BMW Multi-Tester connected between terminal 87a of ABS Warning Relay and frame ground.
6. Reinstall ABS Warning Relay after completing test.



If resistance reading is not correct, check the following:

- ✓ Terminal 87a of ABS Warning Relay.
- ✓ Green/Yellow wire from terminal 87a of ABS Warning Relay to Instrument Cluster.
- ✓ ABS Warning Indicator bulb.

If resistance reading is correct, replace ABS Warning Relay. Start motorcycle and check warning light. If light still does not come on, replace ABS CU.



ABS SYSTEM TEST

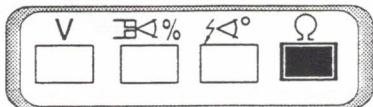
12. Check Control Indicator Does Not Flash With ABS Warning Indicator

Test Equipment: BMW Multi-Tester and Volt / Ohm Leads and Adapters

Tested Pins: Pins 8 of ABS CU plug to ground

Test Conditions:

1. ABS CU plug disconnected.
2. Ignition switch to OFF position.
3. BMW Multi-Tester Ω button pressed.
4. Perform zero calibration procedure on the tester.
5. Volt/Ohm leads from BMW Multi-Tester connected between pin 8 of ABS CU plug and frame ground.



→ **BMW Multi-Tester Display:**

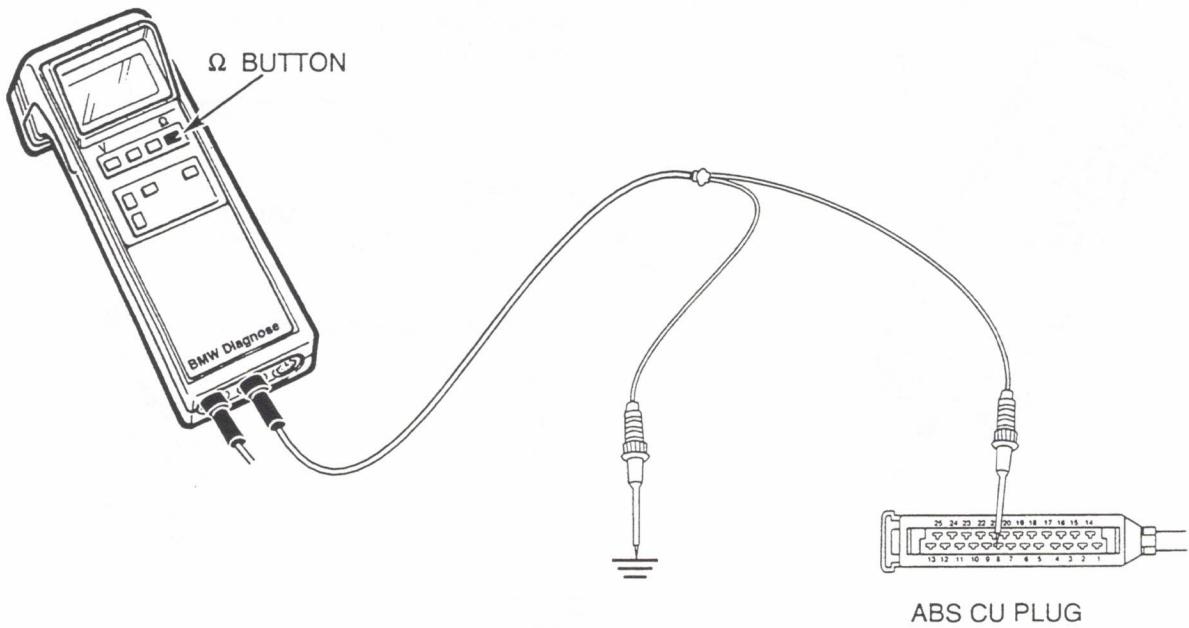
Resistance =
 $\approx 9.0 \Omega$



If circuit is indicated, replace ABS CU.

If a circuit is not indicated, check the following:

- ✓ Pin 8 of ABS CU plug to pin K (blue / white wire) of Bulb Monitoring Unit
- ✓ Check wire from Bulb Monitoring Unit to Instrument Cluster and Check Control bulb.



ABS CU PLUG

ABS SYSTEM TEST

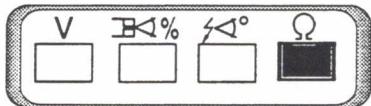
13. ABS Switch Does Not Turn ABS Warning Indicator On Constant

Test Equipment: BMW Multi-Tester and Volt / Ohm Leads and Adapters

Tested Pins: Pin 5 of ABS CU plug to ground

Test Conditions:

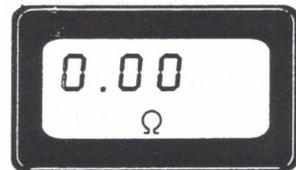
1. ABS CU plug disconnected.
2. Ignition switch to OFF position.
3. BMW Multi-Tester Ω button pressed.



4. Perform zero calibration procedure on the tester.
5. Volt/Ohm leads from BMW Multi-Tester connected between pin 5 of ABS CU plug and frame ground.
6. Operate ABS Switch on dash panel.

→ **BMW Multi-Tester Display:**

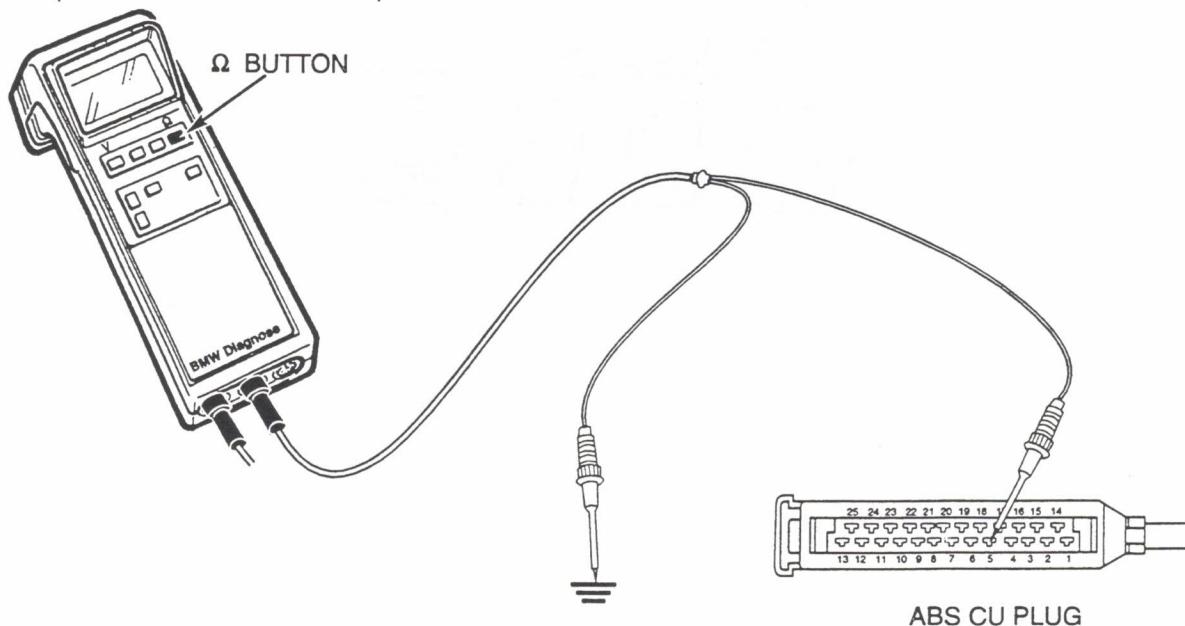
Resistance =
 $\approx 0.3\Omega$



If circuit is indicated when ABS Switch is operated, replace ABS CU.

If a circuit is not indicated, check the following:

- ✓ Pin 5 of ABS CU plug to pin 2 of ABS Cancel Switch.
- ✓ Pin 1 of ABS Switch to ground.
- ✓ ABS Switch operation.



ABS SYSTEM

TEST DRIVE

1. Turn ignition switch OFF and then ON. Check ABS Warning Indicator. Indicator should be flashing. If indicator is not flashing, troubleshoot system.
2. Drive motorcycle above 2.5 MPH. Check that Warning Indicators go off. If indicators do not go off, access fault code, correct fault and erase code. Repeat Test Drive.
3. Apply both front and rear brakes and check ABS Warning Indicator and Bulb Monitor. If Indicators come on, access fault code, correct fault and erase code. Repeat Test Drive.

