

2460-4 ELECTRONIC TRANSMISSION CONTROL

TROUBLESHOOTING HINTS

- Try the following check before doing the System Check.
Check Fuse 6 if all the Transmission Range Display bulbs do not operate.
- Go to System Check for a guide to Normal Operation.
- Go to System Diagnosis for diagnostic tests.

SYSTEM CHECK

- Use the System Check Table as a guide to normal operation.
- Refer to System Diagnosis for a list of symptoms and diagnostic steps.

SYSTEM CHECK TABLE

ACTION	NORMAL OPERATION
Turn the Ignition Switch to RUN	The Transmission Fault Indicator flashes twice, then stays on
Set the Program Selector Switch to "321"	The "321" Indicator lights
Crank the engine	The Program Selector Switch returns to E
Start the engine	The Transmission Fault Indicator goes out with the engine running
Drive the car with the Program Selector Switch in "321"	The car operates in selected gear only (first, second, or third gear)

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COMPONENT LOCATION

Auto. Trans. Range Switch.	On left side of shift lever	
Ignition Switch.	In upper part of steering column.	7000-4-4
Main Relay	On power distribution box.	7000-0-1
Motronic Control Unit	Under RH side of dash, above glove box.	7000-4-5
On-Board Computer Module.	In center console, right of radio face.	7000-5-3
Power Distribution Box	Top front of left front wheel well.	7000-1-1
Program Selector Switch	On center console, to right of shift lever.	7000-5-4
Start Relay	Under LH side of dash, on body electrical bracket.	7000-4-1
Throttle Position Sensor.	Top center of engine, behind rubber boot.	7000-2-3
Throttle Switch.	Top LH side of engine, below throttle body.	7000-2-3
Transmission Control Unit.	Under LH side of dash, above speaker.	7000-4-3
Transmission Kickdown Switch.	Passenger compartment, under accelerator pedal	
C103 (4 pin)	Under RH side of dash, above glove box.	7000-4-5
C132 (4 pin)	Under RH side of dash, above glove box.	7000-4-5
C133 (13 pin)	Under right side of dash, above glove box	
C152 (8 pin)	Under center of car, near transmission	
C200 (10 pin)	Under LH side of dash, on LH side of steering column.	7000-3-2
C209 (7 pin)	Under LH side of dash, near body electrical bracket.	7000-4-2
C214 (2 pin)	Under LH side of dash, near steering column	
C301 (2 pin)	In center console, ahead of lever	
G103 (Engine Ground)	To rear of engine.	7000-1-6
G104 (Main Body Ground)	Inner side of LH fender, near battery.	7000-1-2
G200 (Front Interior Ground).	On dash frame, left of steering column	

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Drive the car with the Program Selector Switch in S	First, second, and third gears are kept selected up to full engine speed. Fourth gear (overdrive) is not selected
Drive the car with the Program Selector Switch in E	Transmission shifts at lower engine speeds and a fourth gear (overdrive) is available

- Refer to System Diagnosis when a result is not normal.

SYSTEM DIAGNOSIS

- Do the tests listed for your symptom in the Symptom Table below.
- Tests follow the Symptom Table.

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- Perform all tests in order listed in the Symptom Table.

SYMPTOM TABLE

SYMPTOM	DO TEST
Transmission Fault Indicator does not flash when the Ignition Switch is turned to RUN and lights when the engine is running	A: Transmission Control Unit 5 Volt Power and Ground Test
Transmission Fault Indicator flashes when the Ignition Switch is turned to RUN and lights with the engine running	C: Engine Speed and Fuel Rate Input Test D: Hydraulic Pressure Regulator and Solenoid Test
Transmission Fault Indicator does not light with the Ignition Switch in RUN and the engine not running	B: Transmission Control Unit Ignition Power Test G: Transmission Fault Indicator Test
Program Selector Switch does not return to E when the engine is cranked	F: Program Selector Switch Return Test
"321" Indicator does not light when the Program Selector Switch is set to "321", but Transmission operates in the 321 mode	H: "321" Indicator Test

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Transmission does not operate in selected program and the Transmission Fault Indicator is off with the engine running	I: Program Selector Switch Continuity Test
Kickdown function is inoperative	K: Kickdown Switch Test
Shift Points are inaccurate or rough and the Transmission Fault Indicator is off with the engine running	L: Gear Input Test M: Throttle Position Sensor and Wide Open Throttle Output Test J: Transmission Speed Sensor Test

- If your symptom does not appear in the Symptom Table, perform all of the following tests.

A: TRANSMISSION CONTROL UNIT 5 VOLT POWER AND GROUND TEST

Measure: VOLTAGE At: TRANSMISSION CONTROL UNIT CONNECTOR (Connected) Condition: • Ignition Switch: RUN		
Measure Between	Correct Voltage	For Diagnosis
24 (BR/GN) & Ground	Approximately 5 Volts	See 1
24 (BR/GN) & 19 (BR)	Approximately 5 Volts	See 2
24 (BR/GN) & 5 (BR)	Approximately 5 Volts	See 2
• If all the results are correct, replace the Transmission Control Unit. 1. Go to Test E: Motronic Control Unit Test. 2. Check/repair the BR wire for an open (see schematic).		

B: TRANSMISSION CONTROL UNIT IGNITION POWER TEST

Measure: VOLTAGE At: TRANSMISSION CONTROL UNIT CONNECTOR (Connected) Condition: • Ignition Switch: RUN		
Measure Between	Correct Voltage	For Diagnosis
35 (RD/BU) & Ground	Battery	See 1
• If the result is correct, go to the Symptom Table. 1. Check/repair the RD/BU wire to the Main Relay for an open (see schematic).		

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C: ENGINE SPEED AND FUEL RATE INPUT TEST

Measure: VOLTAGE At: TRANSMISSION CONTROL UNIT CONNECTOR (Connected) Condition: • Ignition Switch: RUN		
Measure Between	Correct Voltage	For Diagnosis
11 (WT) & Ground	Greater than 10 Volts	See 1
21 (BK/BU) & Ground	Greater than 10 Volts	See 2
<ul style="list-style-type: none"> If all the results are correct, go to the Symptom Table. <ol style="list-style-type: none"> <ul style="list-style-type: none"> Go to Test E: Motronic Control Unit Test, if the Fuel Rate Gauge does not operate. Check/repair the WT wire, if the Fuel Rate Gauge operates. <ul style="list-style-type: none"> Go to Test E: Motronic Control Unit Test, if the Tachometer does not operate. Check/repair the BK/BU wire if the Tachometer operates. 		

D: HYDRAULIC PRESSURE REGULATOR AND SOLENOID TEST

Measure: RESISTANCE At: TRANSMISSION CONTROL UNIT CONNECTOR (Disconnected)		
Measure Between	Correct Resistance	For Diagnosis
1 (VI) & Ground	Greater than 500 K Ohms	See 1
1 (VI) & 25 (BU)	25 to 46 Ohms	See 2
1 (VI) & 20 (GY)	25 to 46 Ohms	See 2
1 (VI) & 17 (GN)	25 to 46 Ohms	See 2
1 (VI) & 16 (OR)	25 to 46 Ohms	See 2
1 (VI) & 22 (RD)	1.8 to 4.6 Ohms	See 3
<ul style="list-style-type: none"> If all the results are correct, replace the Transmission Control Unit. <ol style="list-style-type: none"> Check the wiring from terminals 1, 16, 17, 20, 22, and 25 for shorts to ground (see schematic). Check the Pressure Regulator and Solenoids for a short to ground if wiring is OK. Repair/replace as necessary. Check/repair wire (see schematic) and connector terminal. Replace the Solenoid Valve (see schematic), if wire and connector terminal are OK. Check/repair wire (see schematic) and connector terminal. Replace the Hydraulic Pressure Regulator Solenoid, if wire and connector terminal are OK. 		

E: MOTRONIC CONTROL UNIT TEST

Measure: VOLTAGE At: MOTRONIC CONTROL UNIT CONNECTOR (Connected) Condition: • Ignition Switch: RUN		
Measure Between	Correct Voltage	For Diagnosis
10 (BR/GN) & Ground	Approximately 5 Volts	See 1
11 (WT) & Ground	Greater than 10 Volts	See 1
21 (BK/BU) & Ground	Greater than 10 Volts	See 1
3 (BR/BK) & Ground	Approximately 5 Volts	See 1
<ul style="list-style-type: none"> If all the results are correct, check/repair the wire(s) to the Transmission Control Unit for an open(s). <ol style="list-style-type: none"> Check the wire to the Transmission Control Unit for a short to ground (see schematic). Check/replace the Motronic Control Unit if wire is OK. 		

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F: PROGRAM SELECTOR SWITCH RETURN TEST

Measure: VOLTAGE At: PROGRAM SELECTOR SWITCH CONNECTOR C1 (Connected) Condition: • Ignition Switch: START		
Measure Between	Correct Voltage	For Diagnosis
1 (BK) & Ground	Greater than 8 Volts	See 1
1 (BK) & 2 (BR)	Greater than 8 Volts	See 2
• If all the results are correct, replace the Program Selector Switch. 1. Check/repair the BK wire for an open (see schematic). 2. Check/repair the BR wire for an open (see schematic).		

G: TRANSMISSION FAULT INDICATOR TEST (TABLE 2)

Measure: VOLTAGE At: TRANSMISSION RANGE DISPLAY CONNECTOR (Disconnected) Condition: • Ignition Switch: RUN		
Measure Between	Correct Voltage	For Diagnosis
1 (RD/WT) & Ground	Greater than 10 Volts	See 1
1 (RD/WT) & 2 (BR)	Greater than 10 Volts	See 2
• If all the voltages are correct, check the bulb and printed circuit board. Replace as necessary. 1. Check/repair the RD/WT wire for an open (see schematic). 2. Check/repair the BR wire for an open (see schematic).		

H: 321 INDICATOR TEST

Measure: VOLTAGE At: TRANSMISSION RANGE DISPLAY CONNECTOR (Disconnected) Conditions: • Ignition Switch: RUN • Program Selector Switch: 321		
Measure Between	Correct Voltage	For Diagnosis
3 (BR/WT) & Ground	0 Volts	See 1
12 (GN/BK) & Ground	Greater than 10 Volts	See 2
• If all the results are correct, check the GY wire bulb, printed circuit board, and connector terminals. Repair/replace as necessary. 1. Check/repair the BR/WT wire and the connector terminal (see schematic). 2. Check/repair the GN/BK wire for an open (see schematic).		

G: TRANSMISSION FAULT INDICATOR TEST (TABLE 1)

Measure: VOLTAGE At: TRANSMISSION CONTROL UNIT CONNECTOR (Connected) Condition: • Ignition Switch: RUN		
Measure Between	Correct Voltage	For Diagnosis
33 (RD/WT) & Ground	Greater than 10 Volts	See 1
• If the voltage is correct, go to Table 2. 1. Replace the Transmission Control Unit.		

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I: PROGRAM SELECTOR SWITCH CONTINUITY TEST

Measure: RESISTANCE At: TRANSMISSION CONTROL UNIT CONNECTOR (Disconnected) Conditions: <ul style="list-style-type: none"> • Transmission Range Display Connector: Disconnected • Program Selector Switch: E 		
Measure Between	Correct Resistance	For Diagnosis
14 (BR/RD) & 6 (BR)	Approximately 0 Ohms	See 1
• Set Program Selector Switch to 321.		
15 (BR/WT) & 6 (BR)	Approximately 0 Ohms	See 1
• Set Program Selector Switch to S.		
14 (BR/RD) & 6 (BR)	Infinite Ohms	See 2
15 (BR/WT) & 6 (BR)	Infinite Ohms	See 2
• If all the results are correct, replace the Transmission Control Unit. 1. Check the wires and connector terminals (see schematic). Replace the Program Selector Switch if wires and connector terminals are OK. 2. Replace the Program Selector Switch.		

J: TRANSMISSION SPEED SENSOR TEST (TABLE 1)

Measure: RESISTANCE At: TRANSMISSION CONTROL UNIT CONNECTOR (Disconnected)		
Measure Between	Correct Resistance	For Diagnosis
8 (BR) & Ground	Greater than 500 K Ohms	See 1
8 (BR) & 27 (WT)	800 Ohms to 1.6 K Ohms	See 2
• If all the results are correct, go to Table 2. 1. Check/repair the wires from terminals 8 and 27 for shorts to ground (see schematic). Replace the Transmission Speed Sensor if wires are OK. 2. Check/repair the wires from terminals 8 and 27 for opens (see schematic). Replace the Transmission Speed Sensor if wires are OK.		

J: TRANSMISSION SPEED SENSOR TEST (TABLE 2)

Measure: AC VOLTAGE At: TRANSMISSION CONTROL UNIT CONNECTOR (Disconnected) Conditions: <ul style="list-style-type: none"> • Lift Car (rear wheels must turn freely) • Engine running • Gear Selector: D • Speedometer: 30 km/h (20 mph) 		
Measure Between	Correct Voltage	For Diagnosis
8 (BR) & 27 (WT)	Greater than 3.5 Volts AC	See 1
• If the result is correct, replace the Transmission Control Unit. 1. Replace the Transmission Output Speed Sensor.		

K: KICKDOWN SWITCH TEST

Measure: VOLTAGE At: TRANSMISSION CONTROL UNIT CONNECTOR (Connected) Condition: <ul style="list-style-type: none"> • Ignition Switch: RUN 		
Measure Between	Correct Voltage	For Diagnosis
2 (GY/YL) & Ground	Approximately 5 Volts	See 1
• Depress accelerator pedal to Kickdown.		
2 (GY/YL) & Ground	0 Volts	See 2
• If all the results are correct, check the BMW Troubleshooting Manual to verify the problem is not in the Transmission. Replace the Transmission Control Unit, if the problem is not in the Transmission. 1. Check the GY/YL wire and Kickdown Switch for a short to ground (see schematic). Replace the Transmission Control Unit if GY/YL wire and Kickdown Switch are OK. 2. Check the GY/YL wire for an open (see schematic). Replace the Kickdown Switch if GY/YL wire is OK.		

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L: GEAR INPUT TEST

Measure: VOLTAGE		
At: TRANSMISSION CONTROL UNIT CONNECTOR (Connected)		
Conditions:		
<ul style="list-style-type: none"> • Ignition Switch: RUN • Gear Selector: N (Neutral) 		
Measure Between	Correct Voltage	For Diagnosis
1 (BU/BR) & Ground	Battery	See 1
• Put the Gear Selector in all positions except N (Neutral).		
4 (BU/BR) & Ground	Less than 1 Volt	See 2
• Put the Gear Selector in D (Drive).		
30 (BU/GN) & Ground	Battery	See 1
• Put the Gear Selector in all positions except D (Drive).		
30 (BU/GN) & Ground	Less than 1 Volt	See 2
• Put the Gear Selector in 3 (third gear).		
29 (BU/GY) & Ground	Battery	See 1
• Put the Gear Selector in all positions except 3 (third gear).		
29 (BU/GY) & Ground	Less than 1 Volt	See 2
• Put the Gear Selector in 2 (second gear).		
28 (BU/BK) & Ground	Battery	See 1
• Put the Gear Selector in all positions except 2 (second gear).		
28 (BU/BK) & Ground	Less than 1 Volt	See 2

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• Put the Gear Selector in 1 (first gear).		
18 (BU/RD) & Ground	Battery	See 1
• Put the Gear Selector in all positions except 1 (first gear).		
18 (BU/RD) & Ground	Less than 1 Volt	See 2
• If all the results are correct, go to the Symptom Table.		
1. • If the associated bulb in the Transmission Range Display lights, check/repair the wire to the Automatic Transmission Range Switch for an open (see schematic).		
• If the associated bulb in the Transmission Range Display does not light, check/repair wire from the Automatic Transmission Range Switch, and the Automatic Transmission Range Switch (see schematic).		
2. Check/repair the wire for a short to voltage and the Automatic Transmission Range Switch (see schematic).		

M: THROTTLE POSITION SENSOR AND WIDE OPEN THROTTLE OUTPUT TEST

Measure: VOLTAGE		
At: TRANSMISSION CONTROL UNIT CONNECTOR (Connected)		
Condition:		
• Ignition Switch: RUN		
Measure Between	Correct Voltage	For Diagnosis
31 (BR/BK) & Ground	Approximately 5 Volts	See 1
9 (OR/BK) & Ground	Approximately 5 Volts	See 2
9 (OR/BK) & 10 (BR)	Approximately 5 Volts	See 3
• Operate Throttle through its full range.		
7 (YL) & 10 (BR)	.7 Volts (Throttle closed) increasing evenly to 4.77 Volts (Throttle fully opened)	See 4
• Depress throttle pedal to the floor.		
31 (BR/BK) & Ground	Approximately .3 Volts	See 2

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