

Diagnosis – Function Test

Test step/Test scope	Test condition	Nominal value	Possible cause/Remedy ¹⁾
⇒ 1.0 Function test	<p>Low beam: ON</p> <p>Verify the light-dark border with the help of a headlamp adjustment tester</p> <p>Load or unload right front or right rear of vehicle as necessary.</p>	<p>With a time delay, the light-dark border must shift to the previously set parameter.</p> <p>Model 202</p> <p>Model 208</p> <p>Model 210</p>	<p>Test with HHT, Readout DTC's.</p> <p>23 Test</p> <p>24 Test</p> <p>24 Test</p>

1) Observe Preparation for Test, see 22.

Function description:

Headlamp range adjustment with Xenon headlamps:
 Headlamp range adjustment operates dynamically. The front and rear axle sensors (A51 and A52) report any changes in the vehicle ride height directly to the headlamp range adjustment control module (N71). In turn, the headlamp range adjustment control module compares both the vehicle ride height and the headlamp adjustment values and as necessary the headlamps are adjusted via the headlamp range adjustment motors (E1m1 and E2m1). This adjustment only takes place, if over a period of time, the front and rear axle sensors (A51 and A52) relay a change in the vehicle ride height.

Headlamp range adjustment control module (N71)

The headlamp range adjustment control module processes the received signals from the front and rear axle sensors and the position of the headlamp range adjustment motors. After evaluation of the signals, a necessary command is sent to the headlamp range adjustment motors.

Front and rear axle sensors (A51 and A52)

A sensor is mounted on the stabilizer bar of both the front and rear axles. These sensors relay a vehicle ride height signal to the headlamp range adjustment control module (N71).


Headlamp range adjustment motors (E1m1 and E2m1)

Via a potentiometer in the headlamp range adjustment motor, the position of the headlamp reflectors is relayed to the headlamp range adjustment control module (N71). For a correction, the headlamp range adjustment motors receive a command from the headlamp range adjustment control module (N71).

Diagnostics:


Diagnostics are performed using both the HHT and the Diagnostic Manual.

Diagnosis – Function Test

	Actual Value	Nominal value	Possible cause/Remedy ¹⁾
01	Spring compression front/rear	Display: Front x.x mm Rear x.x mm The value increases as the springs compress. The readout displayed is relative to the spring height when communication is established with the HHT.	Front axle sensor ⇒ 1.1 Rear axle sensor ⇒ 1.1
02	Ride height sensor signal front/rear	Display: Front x.x mm Rear x.x mm The sensor has an operating voltage between 0 and 5 volts. The zero position programming is only possible in the range between 1.64 and 3.20 volts.	Front axle sensor ⇒ 1.1 Rear axle sensor ⇒ 1.1

1) Observe Preparation for Test, see 22.

Diagnosis – Function Test

	Actual Value	Nomi	Possible cause/Remedy ¹⁾
03	Voltage terminal 15	Display x.xx V Nominal value: 11 - 14 V	Model 208: ⇒ 1.1 Model 210: ⇒ 1.1
04	Vehicle speed (ABS)	Display x.x mph Model 208: LF X47 Model 210: LF X62/21	Wiring
05	Light signal	Display ON/OFF Signal from illumination control module (N7-1).	⇒ 1.1

¹⁾ Observe Preparation for Test, see 22.

1.4 Headlamp Range Adjustment (HRA)

Models 202, 208, 210

Diagnosis – Complaint Related Diagnostic Chart

Complaint/Problem	Possible cause	Test step/Remedy ¹⁾
Headlamp range adjustment does not function.	Wiring, Rear axle sensor (A51) (headlamp range adjustment), Front axle sensor (A52) (headlamp range adjustment), Headlamp range adjustment motor (E1m1), Headlamp range adjustment motor (E2m1), Headlamp range adjustment control module (N71),	Test with HHT
Headlamp range adjustment can not be tested using the HHT: – No communication between HHT and headlamp range adjustment control module (N71).	Wiring, Voltage supply Model 202 Model 208 Model 210	 23 ⇒ 1.0 24 ⇒ 1.0 24 ⇒ 1.0

¹⁾ Observe Preparation for Test, see 22

Electrical Test Program – Component Locations

Headlamp Range Adjustment Model 202

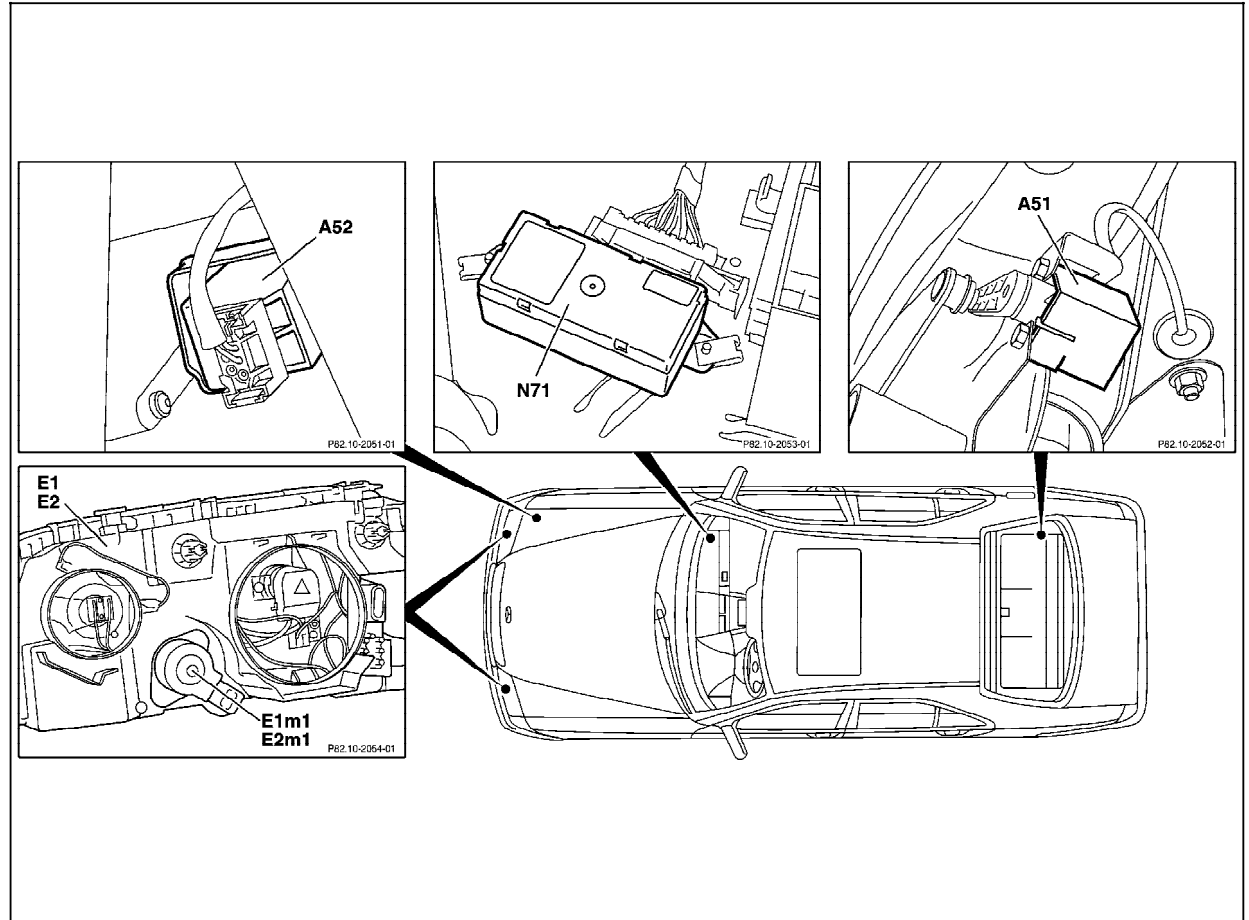


Figure 1

- A51 Rear axle sensor (headlamp range adjustment)
- A52 Front axle sensor (headlamp range adjustment)
- E1 Left headlamp unit
- E1m1 Headlamp range adjustment motor
- E2 Right headlamp unit
- E2m1 Headlamp range adjustment motor
- N71 Headlamp range adjustment control module

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Electrical Test Program – Component Locations

Headlamp Range Adjustment Model 208

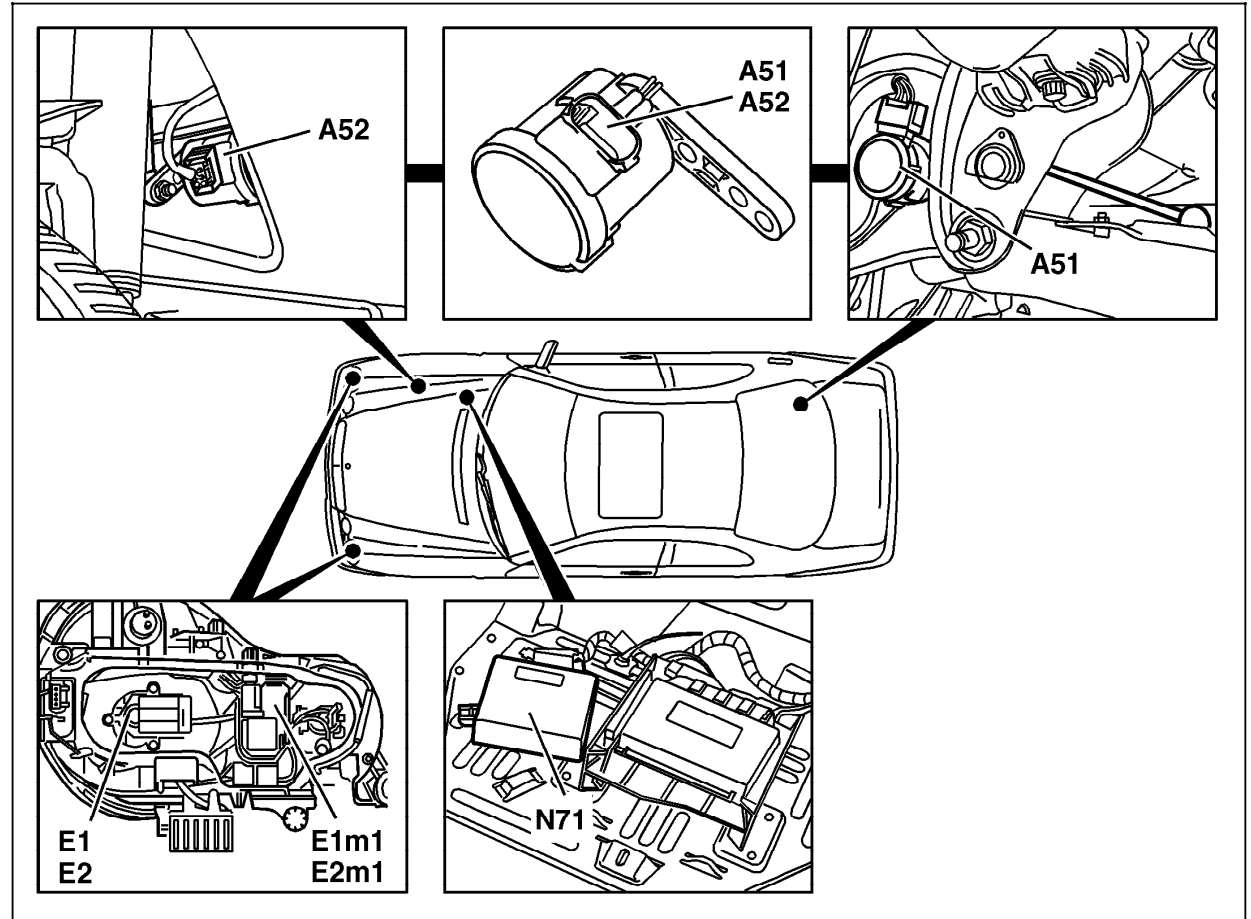


Figure 2

- A51 Rear axle sensor (headlamp range adjustment)
- A52 Front axle sensor (headlamp range adjustment)
- E1 Left headlamp unit
- E1m1 Headlamp range adjustment motor
- E2 Right headlamp unit
- E2m1 Headlamp range adjustment motor
- N71 Headlamp range adjustment control module

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Electrical Test Program – Component Locations

Headlamp Range Adjustment Model 210

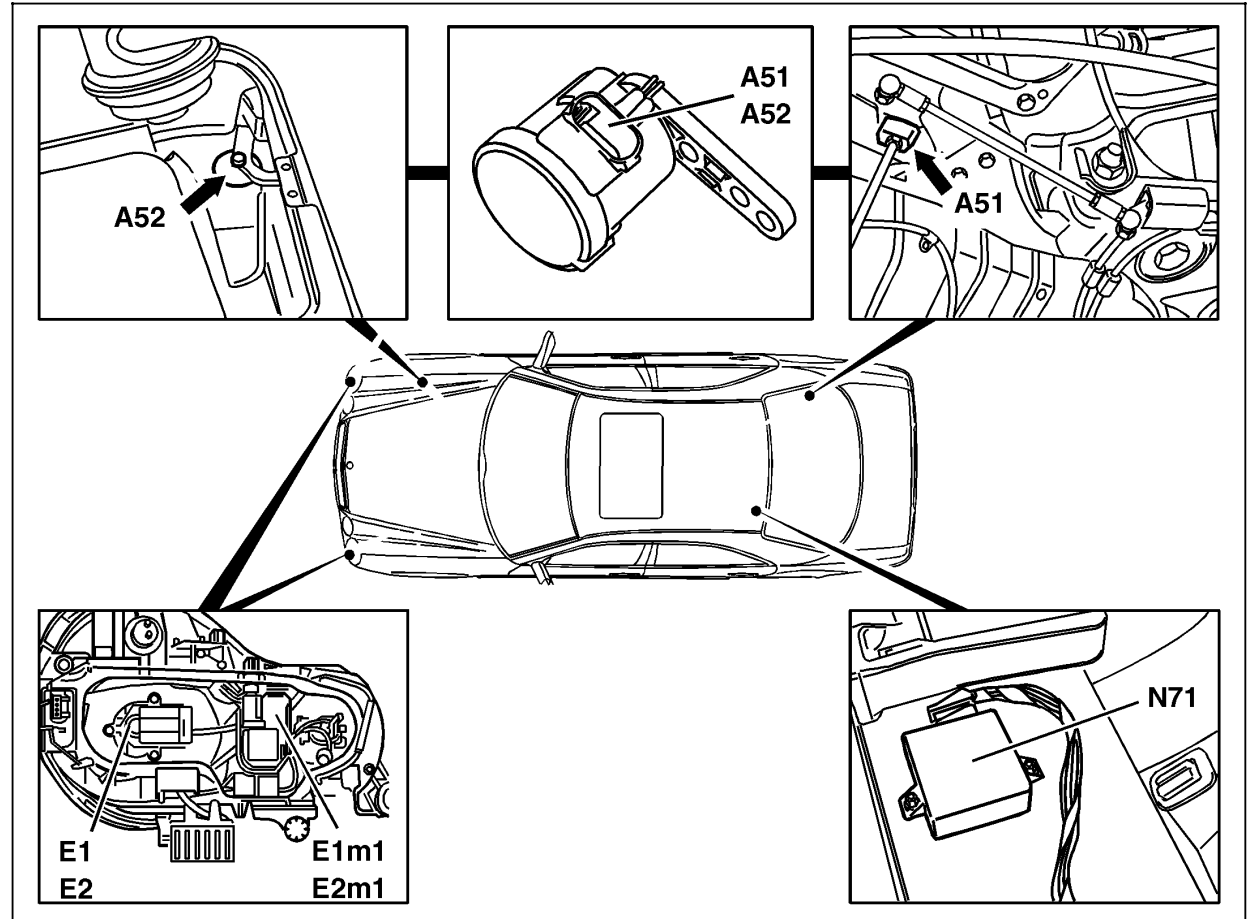


Figure 3

- A51 Rear axle sensor (headlamp range adjustment)
- A52 Front axle sensor (headlamp range adjustment)
- E1 Left headlamp unit
- E1m1 Headlamp range adjustment motor
- E2 Right headlamp unit
- E2m1 Headlamp range adjustment motor
- N71 Headlamp range adjustment control module

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1.4 Headlamp Range Adjustment (HRA)

Models 202, 208, 210

Electrical Test Program – Preparation for Test

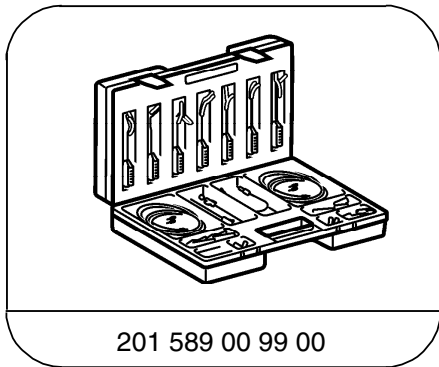
Preparation for Test:

1. Vehicle battery must be sufficiently charged (electrolyte specific gravity: 1:3.6)
2. Check fuses OK.
3. Rear/front axle sensor (A51, A52) are mechanically OK.

Electrical wiring diagrams (location of grounds and connectors):

Electrical Troubleshooting Manual, Model 202, group 82,
Model 208, group 82
Model 210, group 82

Special Tools



201 589 00 99 00

Electrical connecting set

Conventional tools, test equipment


Description	Brand, model, etc.
Multimeter ¹⁾	Fluke models 23, 83, 85, 87
Headlight adjustment tester ¹⁾	Hella Hopkins Mfg./SPX Corp.

¹⁾ Available through the MBUSA Standard Equipment Program.

1.4 Headlamp Range Adjustment (HRA)

Models 202, 208, 210


Electrical Test Program – Test for Model 202

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
1.0		Headlamp range adjustment control module (N71) Voltage supply	18 —(—($\overset{\ominus}{\text{V}} \overset{+}{\text{}}$)— 16 N71	Disconnect connector from N71. Ignition: ON	11 – 14 V	Fuse 13 in fuse and relay box (F1). ⇒ 1.1
1.1		Activation voltage from illumination control module (N7-1)	18 —(—($\overset{\ominus}{\text{V}} \overset{+}{\text{}}$)— 10 N71	Disconnect connector from N71. Low beam: ON	11 – 14 V	Fuse (F1f24), Wiring, ⇒ 1.2
1.2		Check diagnostic line for interruption, open circuit or high resistance.	N71 9 —(—($\overset{\ominus}{\Omega} \overset{+}{\text{}}$)— 35 X11/4	Disconnect connector from N71.	< 5 Ω	Wiring.

1.4 Headlamp Range Adjustment (HRA)

Models 202, 208, 210


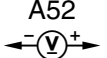
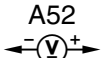
Electrical Test Program – Test for Models 208, 210

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
1.0		Headlamp range adjustment control module (N71) Voltage supply	3 —(—($\overset{N71}{\leftarrow \text{V} \rightarrow}$) —() — 14	Disconnect connector from N71. Ignition: ON	11 – 14 V	Model 208: Fuse 13 in fuse and relay box (F1). Model 210: Fuse 13 in fuse and relay box (F1).
2.0		Activation voltage from illumination control module (N7-1)	3 —(—($\overset{N71}{\leftarrow \text{V} \rightarrow}$) —() — 7	Disconnect connector from N71. Parking lamps: ON	5.6 – 9.8 V	Wiring, Illumination control module (N7-1),
3.0		Rear axle headlamp range adjustment sensor (A51) voltage supply	1 —(—($\overset{A51}{\leftarrow \text{V} \rightarrow}$) —() — 5 $\leftarrow \text{Ω} \rightarrow$	Disconnect connector from rear axle headlamp range adjustment sensor.(A51). Ignition: ON	4.9 - 5.1 V < 5 Ω	Wiring. Illumination control module (N7-1), ⇒ 3.1

1.4 Headlamp Range Adjustment (HRA)

Models 202, 208, 210






Electrical Test Program – Test for Models 208, 210

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
4.0		Front axle headlamp range adjustment sensor (A52) voltage supply	1 —()— 5	Disconnect connector from rear axle headlamp range adjustment sensor.(A52). Ignition: ON	4.9 - 5.1 V	Wiring. Illumination control module (N7-1), ⇒ 4.1
4.1		Signal voltage	1 —()— 4	Front axle headlamp range adjustment sensor.(A52) connected . Ignition: ON	0.2 - 4.9 V	Front axle headlamp range adjustment sensor.(A52)

1.4 Headlamp Range Adjustment (HRA)

Models 202, 208, 210



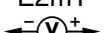


Electrical Test Program – Test for Models 208, 210

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
5.0		Headlamp range adjustment motor (E1m1). Voltage supply	1 —()— 3	Disconnect connector from headlamp range adjustment motor (E1m1). Ignition: ON	4.9 – 5.1 V	Wiring, Illumination control module (N7-1), ⇒ 5.1
5.1		Signal voltage sensor	1 —( )— 2	Headlamp range adjustment motor (E1m1) connected . Ignition: ON	0.2 - 4.9 V < 5 Ω	.Headlamp range adjustment motor (E1m1) ⇒ 5.2
5.2		Voltage supply motor.	4 —()— 5	Disconnect connector from headlamp range adjustment motor (E1m1). Activate headlamp range adjustment motor (E1m1). Ignition: ON	6 - 14 V	Wiring, Illumination control module (N7-1),

1.4 Headlamp Range Adjustment (HRA)

Models 202, 208, 210

Electrical Test Program – Test for Models 208, 210

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
6.0		Headlamp range adjustment motor (E2m1). Voltage supply	1 —()— 3 E2m1	Disconnect connector from headlamp range adjustment motor (E2m1). Ignition: ON	4.9 – 5.1 V	Wiring, Illumination control module (N7-1), ⇒ 6.1
6.1		Signal voltage sensor	1 —( )— 2 E2m1	Headlamp range adjustment motor (E2m1) connected . Ignition: ON	0.2 - 4.9 V < 5 Ω	.Headlamp range adjustment motor (E1m1) ⇒ 6.2
6.2		Voltage supply motor.	4 —()— 5 E2m1	Disconnect connector from headlamp range adjustment motor (E2m1). Activate headlamp range adjustment motor (E2m1). Ignition: ON	6 - 14 V	Wiring, Illumination control module (N7-1),