

## 5.13 Loudspeaker Systems (LS)

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### Diagnosis – Function Test

#### Function Test Explanation

For the Function Test, adjust the radio as follows:

- Tune-in a strong radio station (music), or play a cassette or CD.
- Set fader, bass, treble and balance to position 0 (reading in display window).
- Listen to each individual loudspeaker at the various locations.

### Diagnosis – Complaint Related Diagnostic Chart - model 208

Complaint/Problem	Possible cause	Test step/Remedy <sup>1)</sup>
Loudspeaker system not functioning	Left/right audio power amplifier (N40/3) Radio (A2)	23 ⇒ 1.0
Left door speaker (H4/5) not functioning	H4/5 Left/right audio power amplifier (N40/3) Radio (A2)	23 ⇒ 3.0 23 ⇒ 1.0
Left front door speaker group (H4/1) not functioning	H4/1 Left/right audio power amplifier (N40/3) Radio (A2)	23 ⇒ 4.0 23 ⇒ 1.0
Left rear speaker (H4/7) not functioning Model 208.3	H4/7 Left/right audio power amplifier (N40/3) Radio (A2)	23 ⇒ 5.0 23 ⇒ 1.0
Right rear door speaker (H4/6) not functioning	H4/6 Left/right audio power amplifier (N40/3) Radio (A2)	23 ⇒ 6.0 23 ⇒ 1.0
Right front door speaker group (H4/2) not functioning	H4/2 Left/right audio power amplifier (N40/3) Radio (A2)	23 ⇒ 7.0 23 ⇒ 1.0
Right rear speaker (H4/8) not functioning Model 208.3	H4/8 Left/right audio power amplifier (N40/3) Radio (A2)	23 ⇒ 8.0 23 ⇒ 1.0
Subwoofer speaker (H4/29) not functioning Model 208.4 (cabrio)	H4/29 Left/right audio power amplifier (N40/3) Radio (A2)	23 ⇒ 9.0 23 ⇒ 1.0

<sup>1)</sup> Observe Preparation for Test, see 22.

## 5.13 Loudspeaker System (LS)

## Models 163, 208 with Sound System

### Diagnosis – Complaint Related Diagnostic Chart - model 163 (with Premium Radio)

Complaint/Problem	Possible cause	Test step/Remedy <sup>1)</sup>
Loudspeaker system not functioning	Radio/speakers audio power amplifier control module (N40/6) Radio (A2)	24 ⇒ 1.0
Left rear door speaker (H4/3) not functioning	H4/3 Radio/speakers audio power amplifier control module (N40/6) Radio (A2)	24 ⇒ 3.0 24 ⇒ 1.0
Right rear door speaker (H4/4) not functioning	H4/4 Radio/speakers audio power amplifier control module (N40/6) Radio (A2)	24 ⇒ 4.0 24 ⇒ 1.0
Left front door speaker (H4/5) not functioning	H4/5 Radio/speakers audio power amplifier control module (N40/6) Radio (A2)	24 ⇒ 5.0 24 ⇒ 1.0
Right front door speaker (H4/6) not functioning	H4/6 Radio/speakers audio power amplifier control module (N40/6) Radio (A2)	24 ⇒ 6.0 24 ⇒ 1.0
Acoustimass® bass module (H4/17)	H4/17 Radio/speakers audio power amplifier control module (N40/6) Radio (A2)	24 ⇒ 7.0 24 ⇒ 1.0

<sup>1)</sup> Observe Preparation for Test, see 22.

## 5.13 Loudspeaker System (LS)

Models 163, 208 with Sound System

### Electrical Test Program – Component Locations

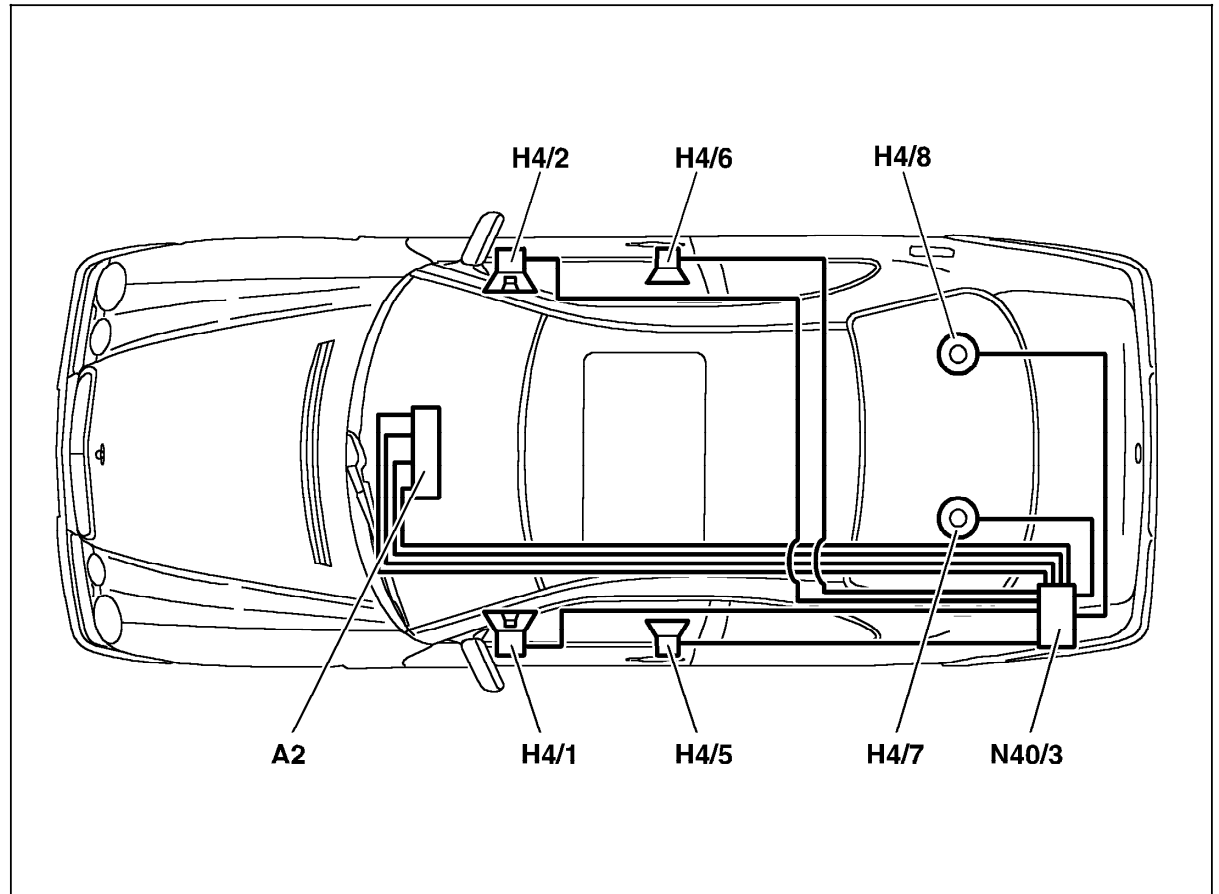


Figure 1

Model 208 (except cabrio)

- A2 Radio
- H4/1 Left front door speaker group
- H4/2 Right front door speaker group
- H4/5 Left door speaker
- H4/6 Right door speaker
- H4/7 Left rear speaker
- H4/8 Right rear speaker
- N40/3 Left/right audio power amplifier

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## 5.13 Loudspeaker System (LS)

Models 163, 208 with Sound System

### Electrical Test Program – Component Locations

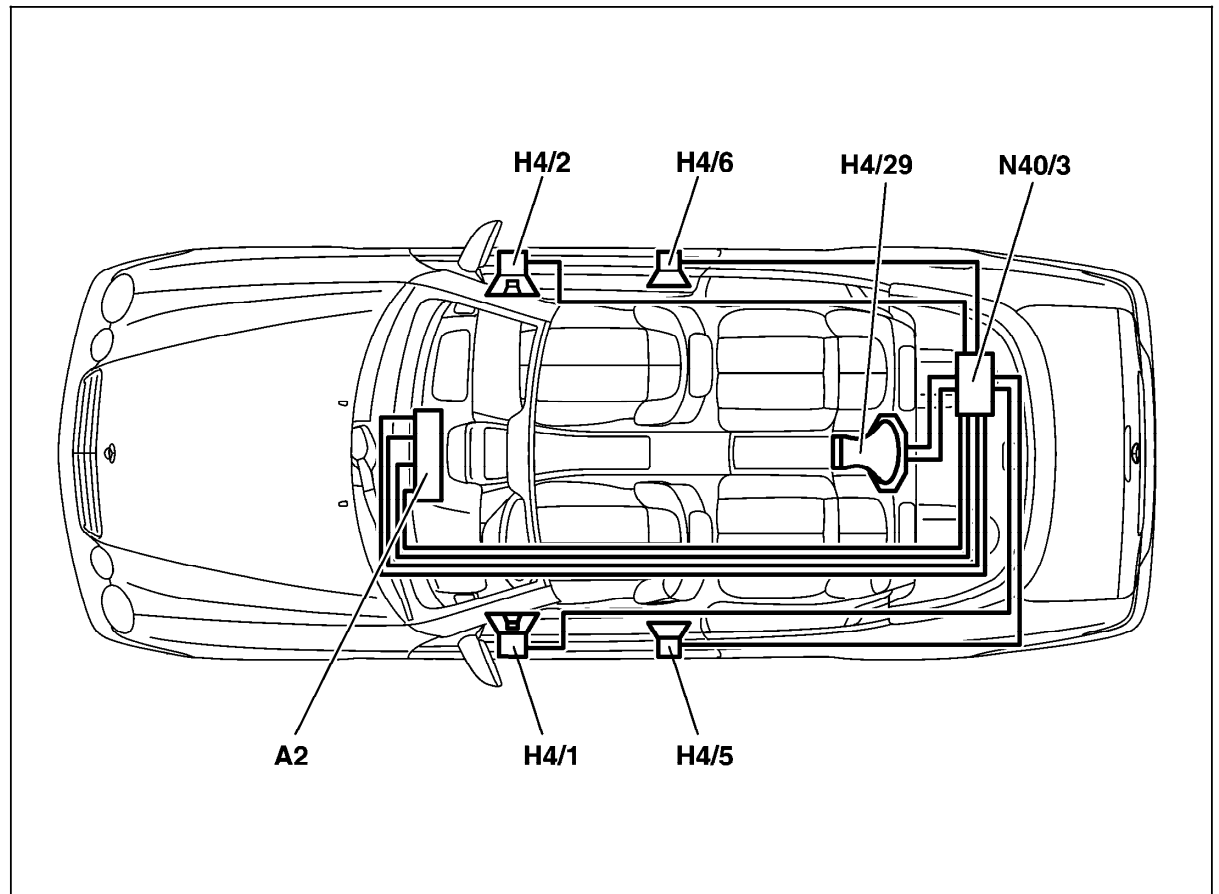


Figure 2  
Model 208.4 (cabrio)  
A2 Radio  
H4/1 Left front door speaker group  
H4/2 Right front door speaker group  
H4/5 Left door speaker  
H4/6 Right door speaker  
H4/29 Subwoofer speaker  
N40/3 Left/right audio power amplifier

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## 5.13 Loudspeaker System (LS)

Models 163, 208 with Sound System

### Electrical Test Program – Component Locations

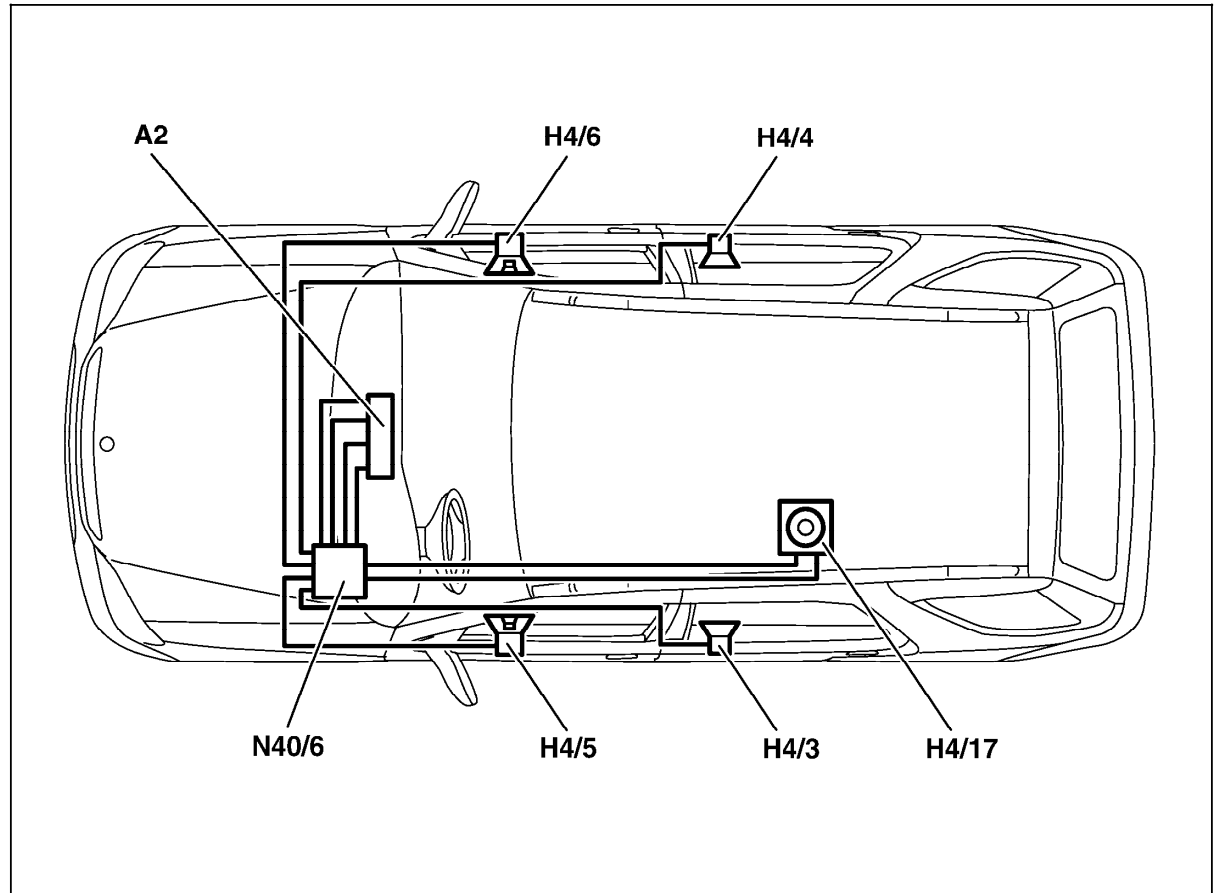


Figure 3  
Model 163  
A2 Radio  
H4/3 Left rear door speaker  
H4/4 Right rear door speaker  
H4/5 Left front door speaker  
H4/6 Right front door speaker  
H4/17 Acoustimass® bass module  
N40/6 Radio/speakers audio power amplifier control module

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### Electrical Test Program – Preparation for Test

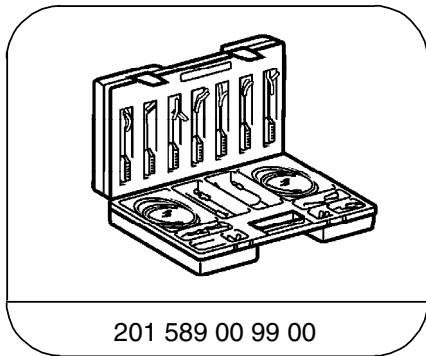
1. Battery voltage 11–14 V.
2. Check fuses.
3. Radio OK.

Electrical wiring diagrams :  
 Electrical Troubleshooting Manual, Model 202/208  
 Wiring diagrams model 163 in WIS

**Note:**

To prevent damage to the radio, the connectors must only be removed or installed with the ignition and radio **OFF**.

### Special Tools



201 589 00 99 00  
 Electrical connecting set

### Conventional tools, test equipment

Description	Brand, model, etc.
Multimeter <sup>1)</sup>	Fluke Models 23, 77 III, 83, 85, 87, 88
Signal generator <sup>1)</sup>	SUN DTR-8416










<sup>1)</sup> Available through the MBUSA Standard Equipment Program.



## 5.13 Loudspeaker System (LS)

## Model 208 with Sound System


















### Electrical Test Program – Test

⇒	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
1.0	<b>Left/right audio power amplifier (N40/3)</b> Voltage supply	9 —  N40/3 — 26	Disconnect connector from N40/3. Radio (A2): <b>OFF</b>	11 – 14 V	Fuse 12 in fuse and relay box (F1), Fuse in N40/3, Ground (W6, W7), Wiring, Values OK: ⇒ 1.1
1.1	Control voltage from radio (A2)	9 —  N40/3 — 8	Disconnect connector from N40/3. Radio (A2): <b>ON</b>	11 – 14 V	Wiring, Loudspeaker signal from radio (A2) Values OK: ⇒ 2
2.0	<b>Left/right audio power amplifier (N40/3)</b> Loudspeaker signal from radio (A2)	<p>Left front: 10 —  N40/3 — 18</p> <p>Right front: 1 —  N40/3 — 2</p> <p>Left rear: 3 —  N40/3 — 5</p> <p>Right rear: 4 —  N40/3 — 6</p>	Disconnect connector from N40/3. Radio (A2): <b>ON</b> Turn volume control to maximum.	> 0.2 V Short voltage surges permitted	Wiring, Radio (A2), see 3.1 23, AD82.60 in WIS
3.0	<b>Left door speaker (H4/5)</b>	<p>15 —  H4/5 — 23</p> <p>9 —  H4/5 — 15</p> <p>9 —  H4/5 — 23</p>	Disconnect connector from N40/3. Radio (A2): <b>OFF</b>	1.5 – 2.5 Ω  ∞ Ω ∞ Ω	Wiring, Connectors, H4/5 Values OK: N40/3

## 5.13 Loudspeaker System (LS)

## Model 208 with Sound System

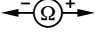

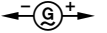

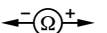
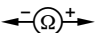
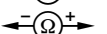
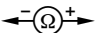
### Electrical Test Program – Test

⇒	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
4.0	<b>Left front door speaker group (H4/1)</b>	<p>H4/1</p> <p>9 —  —  — 13</p> <p>9 —  —  — 21</p> <p>21 —  —  — 13</p>	<p>Disconnect connector from N40/3.</p> <p>Connect function generator and set a frequency of 100 to 10,000 Hz with a voltage amplitude of 2 V.</p> <p>Radio (A2): <b>OFF</b></p> <p></p> <p>Voltage amplitude changes result in volume changes; Frequency changes result in tone changes.</p>	<p><math>\infty \Omega</math></p> <p><math>\infty \Omega</math></p> <p>The set frequency can be heard via the speakers.</p>	<p>H4/1</p> <p>Wiring,</p> <p>Connectors,</p> <p>Values OK:</p> <p>N40/3</p>
5.0	<b>Left rear speaker (H4/7)</b> Model 208.3	<p>H4/7</p> <p>12 —  —  — 20</p> <p>9 —  —  — 12</p> <p>9 —  —  — 20</p>	<p>Disconnect connector from N40/3.</p> <p>Radio (A2): <b>OFF</b></p>	<p>1.5 – 2.5 <math>\Omega</math></p> <p><math>\infty \Omega</math></p> <p><math>\infty \Omega</math></p>	<p>H4/7</p> <p>Wiring,</p> <p>Values OK:</p> <p>N40/3</p>
6.0	<b>Right door speaker (H4/6)</b>	<p>H4/6</p> <p>17 —  —  — 25</p> <p>9 —  — 17</p> <p>9 —  — 25</p>	<p>Disconnect connector from N40/3.</p> <p>Radio (A2): <b>OFF</b></p>	<p>1.5 – 2.5 <math>\Omega</math></p> <p><math>\infty \Omega</math></p> <p><math>\infty \Omega</math></p>	<p>Wiring,</p> <p>Connectors,</p> <p>H4/6</p> <p>Values OK:</p> <p>N40/3</p>

## 5.13 Loudspeaker System (LS)

## Model 208 with Sound System

### Electrical Test Program – Test

⇒	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
7.0	<b>Right front door speaker group (H4/1)</b>	<p>H4/2</p> <p>9 —  — 14</p> <p>9 —  — 22</p> <p>14 —  — 22</p>	<p>Disconnect connector from N40/3.</p> <p>Connect function generator and set a frequency of 100 to 10,000 Hz with a voltage amplitude of 2 V.</p> <p>Radio (A2): <b>OFF</b></p> <p></p> <p>Voltage amplitude changes result in volume changes; Frequency changes result in tone changes.</p>	<p><math>\infty \Omega</math></p> <p><math>\infty \Omega</math></p> <p>The set frequency can be heard via the speakers.</p>	<p>H4/2</p> <p>Wiring,</p> <p>Connectors,</p> <p>Values OK:</p> <p>N40/3</p>
8.0	<b>Right rear speaker (H4/8)</b> Model 208.3	<p>H4/8</p> <p>11 —  — 19</p> <p>9 —  — 11</p> <p>9 —  — 19</p>	<p>Disconnect connector from N40/3.</p> <p>Radio (A2): <b>OFF</b></p>	<p>1.5 – 2.5 <math>\Omega</math></p> <p><math>\infty \Omega</math></p> <p><math>\infty \Omega</math></p>	<p>H4/8.</p> <p>Wiring,</p> <p>Values OK:</p> <p>N40/3</p>
9.0	<b>Subwoofer speaker (H4/29)</b> Model 208.4	<p>H4/29</p> <p>—  —</p>	<p>Radio (A2): <b>OFF</b></p> <p>Remove speaker and disconnect speaker connector (H4/29x1).</p> <p>Measure directly on speaker.</p>	<p>around 4 <math>\Omega</math></p>	<p>H4/29.</p> <p>Values OK:</p> <p>Wiring,</p> <p>Connectors,</p> <p>N40/3</p>

### Electrical Test Program – Component Locations

#### Connections on back of Radio

Figure 1

#### A

- 1 Speed-sensitive volume control
- 2 Diagnostic connection (as of MY 1998)
- 3 Muting for telephone system
- 4 Battery voltage (circuit 30)
- 5 Automatic antenna control output, FM/AM amplifier voltage supply and control signal for sound system control module
- 6 Illumination (circuit 58)
- 7 Switched battery power (circuit 15)
- 8 Ground (circuit 31)

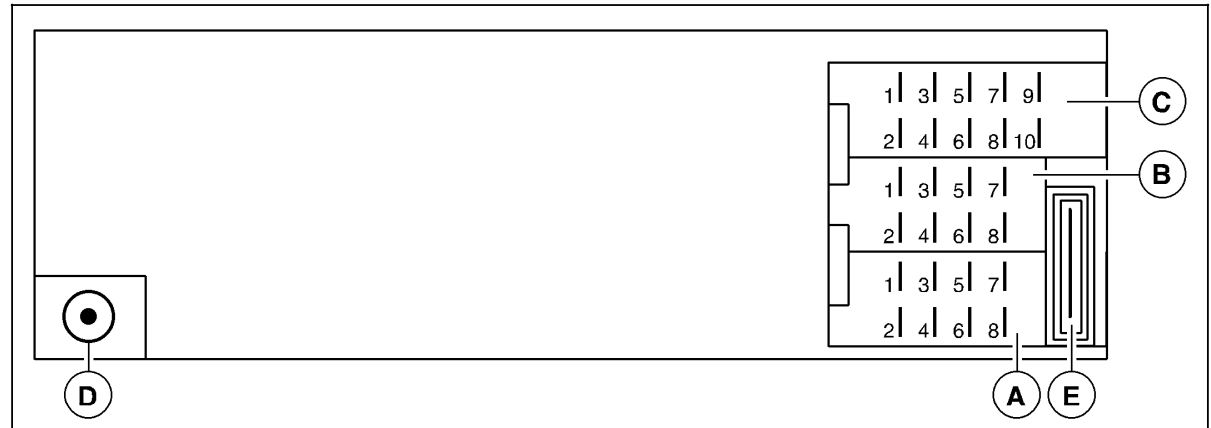
#### B

- 1 Right rear loudspeaker +
- 2 Right rear loudspeaker –
- 3 Right front loudspeaker +
- 4 Right front loudspeaker –
- 5 Left front loudspeaker +
- 6 Left front loudspeaker –
- 7 Left rear loudspeaker +
- 8 Left rear loudspeaker –

- C** Connector for CD changer, coding (via wiring harness)

- D** Antenna jack

- E** Fuse



P82.60-0238-04

## 5.13 Loudspeaker System (LS)

## Model 163 with Sound System

### Electrical Test Program – Test

⇒	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
1.0	<b>Radio/speakers audio power amplifier control module (N40/6)</b> Voltage supply	A —(C) ←(V) <sup>+</sup> → H	Disconnect connector 1 from N40/6. Radio (A2): <b>OFF</b>	11 – 14 V	Fuse 21 in fuse and relay box (F1), Ground (W29/2), Wiring, Values OK: ⇒ 1.1
1.1	Control voltage from radio (A2)	A —(C) ←(V) <sup>+</sup> → A1	Disconnect connector 1 and 2 from N40/6. Radio (A2): <b>ON</b>	11 – 14 V	Wiring, AD82.60 in WIS Loudspeaker signal from radio (A2) ⇒ 2
2.0	<b>Radio/speakers audio power amplifier control module (N40/6)</b> Loudspeaker signal from radio (A2)	<p>Left front: B12 —(C) ←(V)<sup>+</sup> → B5</p> <p>Right front: B9 —(C) ←(V)<sup>+</sup> → B6</p> <p>Left rear: B11 —(C) ←(V)<sup>+</sup> → B7</p> <p>Right rear: B10 —(C) ←(V)<sup>+</sup> → B8</p>	Disconnect connector 2 from N40/6. Radio (A2): <b>ON</b> Turn volume control to maximum.	> 0.2 V Short voltage surges permitted	Wiring, AD82.60 in WIS
3.0	<b>Left rear door speaker (H4/3)</b>	<p>B —(C) ←(Ω)<sup>+</sup> → G</p> <p>A —(C) ←(Ω)<sup>+</sup> → B</p> <p>A —(C) ←(Ω)<sup>+</sup> → G</p>	Disconnect connector 1 from N40/6. Radio (A2): <b>OFF</b>	1.5 – 2.5 Ω  ∞ Ω ∞ Ω	Wiring, Connectors, H4/3 Values OK: N40/6

## 5.13 Loudspeaker System (LS)

## Model 163 with Sound System

### Electrical Test Program – Test

⇒	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
4.0	<b>Right rear door speaker (H4/4)</b>	<p>H4/4</p> <p>A10—( ←⊖⊕→ )—A9</p> <p>A—( ←⊖⊕→ )—A10</p> <p>A—( ←⊖⊕→ )—A9</p>	<p>Disconnect connector 1 and 2 from N40/6.</p> <p>Radio (A2): <b>OFF</b></p>	<p>1.5 – 2.5 Ω</p> <p>∞ Ω</p> <p>∞ Ω</p>	<p>Wiring, Connectors, H4/4</p> <p>Values OK: N40/6</p>
5.0	<b>Left front door speaker (H4/5)</b>	<p>H4/5</p> <p>A—( ←⊖⊕→ )—A11</p> <p>A—( ←⊖⊕→ )—A12</p> <p>A11—( ←⊖⊕→ )—A12</p>	<p>Disconnect connector 1 and 2 from N40/6.</p> <p>Connect function generator and set a frequency of 100 to 10,000 Hz with a voltage amplitude of 2 V.</p> <p>Radio (A2): <b>OFF</b></p> <p><b>i</b></p> <p>Voltage amplitude changes result in volume changes; Frequency changes result in tone changes.</p>	<p>∞ Ω</p> <p>∞ Ω</p> <p>The set frequency can be heard via the speakers.</p>	<p>H4/5</p> <p>Wiring, Connectors, Values OK: N40/6</p>

## 5.13 Loudspeaker System (LS)

## Model 163 with Sound System

### Electrical Test Program – Test

⇒	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
6.0	<b>Right front door speaker (H4/6)</b>	<p>H4/6</p> <p>A —( —) ← ⊖ ⊕ → —) A71</p> <p>A —( —) ← ⊖ ⊕ → —) A82</p> <p>A7 —( —) ← ⊖ ⊕ → —) A8</p>	<p>Disconnect connector 1 and 2 from N40/6.</p> <p>Connect function generator and set a frequency of 100 to 10,000 Hz with a voltage amplitude of 2 V.</p> <p>Radio (A2): <b>OFF</b></p> <p><b>i</b></p> <p>Voltage amplitude changes result in volume changes; Frequency changes result in tone changes.</p>	<p><math>\infty \Omega</math></p> <p><math>\infty \Omega</math></p> <p>The set frequency can be heard via the speakers.</p>	<p>H4/6</p> <p>Wiring,</p> <p>Connectors,</p> <p>Values OK:</p> <p>N40/6</p>
7.0	<b>Acoustimass® bass module (H4/17)</b> Bass module speaker 1  Bass module speaker 1	<p>H4/17</p> <p>F —( —) ← ⊖ ⊕ → —) C</p> <p>A —( —) ← ⊖ ⊕ → —) C</p> <p>A —( —) ← ⊖ ⊕ → —) F</p> <p>E —( —) ← ⊖ ⊕ → —) D</p> <p>A —( —) ← ⊖ ⊕ → —) D</p> <p>A —( —) ← ⊖ ⊕ → —) E</p>	<p>Disconnect connector 1 from N40/6.</p> <p>Radio (A2): <b>OFF</b></p>	<p>1.5 – 2.5 <math>\Omega</math></p> <p><math>\infty \Omega</math></p> <p><math>\infty \Omega</math></p> <p>1.5 – 2.5 <math>\Omega</math></p> <p><math>\infty \Omega</math></p> <p><math>\infty \Omega</math></p>	<p>Wiring,</p> <p>H4/17,</p> <p>Values OK:</p> <p>N40/6</p>