15.8 Electric Seat Adjustment (ESA)

Contents

15.8 Electric Seat Adjustment (ESA) Model 170 (as of M.Y. 2001)

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15.8 ESA

Diagnosis – Function Test



Injury hazard from pinching and crushing, in extreme cases extremities can even be severed when caught in the mechanism.

⚠ CAUTION!

When working on components activated via hand, electrically via motors, hydraulically, pneumatically via linkages, it is possible that severe injury can result in the severing, pinching, or crushing of body parts.

Do not allow any body parts to be in the general area of the moving components.

Protective measures:

- Supervise work.
- Do not reach into the moving mechanism at any time during any tests.
- Keep away from the moving mechanism of components which are being activated via the HHT and or directly via circuit 30.
- Ensure that all test cables are of sufficient length.

Preparation for Test:

- 1. Fuses ok.
- 2. Battery voltage 11 to 14 V
- 3. Convenience Feature is functional.



Should there be numerous faults within ESA, then select the appropriate test steps in this section, after reviewing 14 to narrow down the faults.

Electrical wiring diagrams:

Electrical Troubleshooting Manual, Model 170, Vol. 2, Section 91, (future edition).

Test step/Test scope	Test condition	Nominal value	Possible cause/Remedy 1)
· · · · · · · · · · · · · · · · · · ·		Driver/passenger seat moves forward/backward.	Driver's seat: 23 ⇒2.0, 23 ⇒3.0
			Passenger seat: 23 ⇒10.0, 23 ⇒11.0

¹⁾ Observe Preparation for Test, see 22.

Diagnosis – Function Test

Test st	ep/Test scope	Test condition	Nominal value	Possible cause/Remedy 1)
⇒ 2.0	Driver/passenger power seat Raise/lower front seat height	Ignition: ON Press seat height, rear of switch (S22s2/S23s2) upward/downward:	Front of seat raises/lowers.	Driver's seat: 23 ⇒4.0, 23 ⇒5.0
				Passenger seat: 23 ⇒12.0 23 ⇒13.0
⇒ 3.0	, , ,	Ignition: ON Press seat height, front switch (S22s4/S23s4) upward/downward:	Rear of seat raises/lowers.	Driver's seat: $23 \Rightarrow 6.0$, $23 \Rightarrow 7.0$ Passenger seat: $23 \Rightarrow 14.0$ $23 \Rightarrow 15.0$
⇒ 4.0	Driver/passenger power seat Backrest tilt forward/backward	Ignition: ON Press backrest switch (S22s5/S23s5): tilt forward/backward:	Backrest tilts forward/backward.	Driver's seat: $23 \Rightarrow 8.0$, $23 \Rightarrow 9.0$ Passenger seat: $23 \Rightarrow 16.0$ $23 \Rightarrow 17.0$

¹⁾ Observe Preparation for Test, see 22.

Diagnosis – Complaint Related Diagnostic Chart



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Complaint/Problem	Possible cause	Test step/Remedy 1)
Driver/passenger power seat adjustment does not function at all.	Wiring to CF relay module (K24), CF relay module (K24)	23 ⇒ 18.0
CF function via circuit 15R does not function.	Wiring from X4/18 to K24, CF relay module (K24)	23 ⇒ 18.0
CF function via doors does not function.	Left/right door switch (S17/3, S17/4), Wiring from S17/3, S17/4 to K24, CF relay module (K24)	23 ⇒ 19.0, 23 ⇒ 18.0

¹⁾ Observe Preparation for Test, see 22.

Diagnosis – Complaint Related Diagnostic Chart

Complaint/Problem	Possible cause	Test step/Remedy 1)
Driver power seat entire adjustment does not function at all.	Fuse, Seat adjustment switch voltage supply, Wiring from CF relay module (K24) to seat, Left front ESA switch (S22)	23 ⇒ 1.0
Passenger power seat entire adjustment does not function at all.	Fuse, Seat adjustment switch voltage supply, Wiring from CF relay module (K24) to seat, Right front ESA switch (S23)	23 ⇒ 1.0
Driver power seat forward/backward adjustment does not function.	Voltage supply to fore/aft motor (M25m1), Left front ESA switch (S22), Fore/aft motor (M25m1)	$23 \Rightarrow 2.0,$ $23 \Rightarrow 3.0,$
Passenger power seat forward/backward adjustment does not function.	Voltage supply to fore/aft motor (M26m1), Left front ESA switch (S23), Fore/aft motor (M26m1)	23 ⇒ 10.0, 23 ⇒ 11.0,
Driver power seat raise/lower adjustment does not function.	Voltage supply to front raise/lower motor (M25m3), Left front ESA switch (S22), Front raise/lower motor (M25m3)	$23 \Rightarrow 4.0,$ $23 \Rightarrow 5.0,$
Passenger power seat raise/lower adjustment does not function.	Voltage supply to front raise/lower motor (M26m3), Left front ESA switch (S23), Front raise/lower motor (M26m3)	$23 \Rightarrow 12.0,$ $23 \Rightarrow 13.0,$

¹⁾ Observe Preparation for Test, see 22.

Diagnosis – Complaint Related Diagnostic Chart

Complaint/Problem	Possible cause	Test step/Remedy 1)
Driver power seat raise/lower adjustment does not function.	Voltage supply to rear raise/lower motor (M25m2), Left front ESA switch (S22), Rear raise/lower motor (M25m2)	$23 \Rightarrow 6.0,$ $23 \Rightarrow 7.0,$
Passenger power seat raise/lower adjustment does not function.	Voltage supply to rear raise/lower motor (M26m2), Left front ESA switch (S23), Rear raise/lower motor (M26m2)	23 ⇒ 14.0, 23 ⇒ 15.0,
Driver power seat backrest fore/aft adjustment does not function.	Voltage supply to backrest fore/aft motor (M25m2), Left front ESA switch (S22), Backrest fore/aft motor (M25m5)	$23 \Rightarrow 8.0,$ $23 \Rightarrow 9.0,$
Passenger power seat backrest fore/aft adjustment does not function.	Voltage supply to backrest fore/aft motor (M26m2), Left front ESA switch (S23), Seatback fore/aft motor (M26m5)	23 ⇒ 16.0, 23 ⇒ 17.0,

¹⁾ Observe Preparation for Test, see 22.

Component Locations

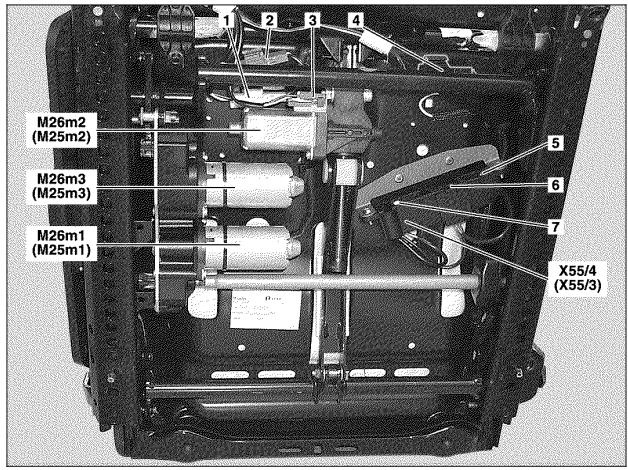
(Shown on right seat)

Figure 1

6 7

M25	Left front ESA motor group
M25m1	Fore/aft motor
M25m2	Rear raise/lower motor
M25m3	Front raise/lower motor
M26	Right front ESA motor group
M26m1	Fore/aft motor
M26m2	Rear raise/lower motor
M26m3	Front raise/lower motor
X55/3	Driver seat connector block
X55/4	Passenger seat connector block
1	Connector (white) (M26m3)
2	Connector (blue) (M26m1)
3	Connector (M26m2)
4	Connector (black) (M26m5)
5	Connector:
	Seat adjustment (voltage supply)
6	Connector: Seat heating

Connector: Front seat occupied



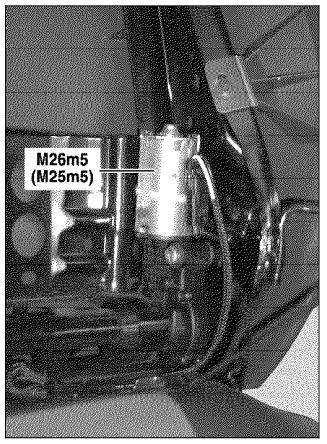
P91.29-2118-06

Component Locations

(Shown on right seat)

Figure 2

M25 Left front ESA motor group
M25m5 Backrest fore/aft motor
M26 Right front ESA motor group
M26m5 Seatback for/aft motor



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Component Locations

(Shown on right seat)

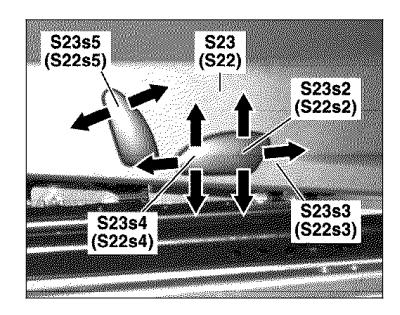
Figure 3

S22	Left front ESA switch
S22s2	Seat height, front
S22s3	Seat fore/aft
S22s4	Seat height, rear
S22s5	Backrest

S23 Right front ESA switch S23s2 Seat height, front S23s3 Seat fore/aft S23s4 Seat height, rear S23s5 **Backrest**



The left/right front ESA switches (S22/S23) are located on the corresponding lower seat frame, facing the door.



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Location of CF relay module (K24)

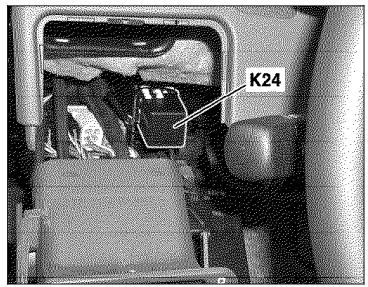
(Shown on lefthand steering [LHS])

Figure 4

K24 CF relay module (K24)



The CF relay module (K24) is located between the steering column and the A-pillar.



P91.29-2121-01

Electrical Test Program – Preparation for Test

⚠ CAUTION!

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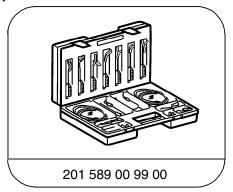
Electrical wiring diagrams:

Electrical Troubleshooting Manual, Model 170, Vol. 2, section 91, (future edition).

15.8 ESA

Electrical Test Program – Preparation for Test

Special Tools



Electrical connecting set

Test equipment; See MBUSA Standard Service Equipment Program

Description	Brand, model, etc.
Digital multimeter	Fluke models 23, 77 III, 83, 85, 87

Preparation for Test:

1. **CAUTION!** Review 22/1

2. Review 20

3. Fuses: F1f21 and F1f22 are OK.

4. Battery voltage 11 - 14 V

\Rightarrow	Test scope	Test conn	ection		Test condition	Nominal value	Possible cause/Remedy
1.0	Left/right front ESA switch (S22/S23) Voltage supply i Test X55/3 for left seat, test X55/4 for right seat	3 — c	X55/3 X55/4 - - (V) ⁺ -) — 4	Disconnect connector 5 at X55/3 (left seat) or connector 5 at X55/4 (right seat). Circuit 15R: ON i See 20	11 – 14 V	Wiring, Fuses: F1f21, F1f22, CF Relay Module (K24)
2.0	Left front power seat fore/aft motor (M25m1) Voltage supply	3 — (M25m1 - <u>(</u> <u>V</u>) [±] <u>-</u>		Voltage supply to S22 OK, Disconnect blue connector at M25m1, Circuit 15R: ON Press seat fore/aft switch: Forward Backward	– 11 to – 14 V 11 to 14 V	S22

\Rightarrow	Test scope	Test con	nection		Test condition	Nominal value	Possible cause/Remedy
3.0	Fore/aft motor (M25m1) Resistance	1	M25m1 - - <u>-</u>	2	Disconnect connector (blue) at M25m1 (motor).	0.5 – 5 Ω	M25m1
4.0	Front raise/lower motor (M25m3) Voltage supply	1 — (M25m3 ~ ¯(Y) ⁺ ►) — 2	Voltage supply to S22 OK, Disconnect white connector at M25m3, Circuit 15R: ON Press front raise/lower switch: Up Down	– 11 to – 14 V 11 to 14 V	S22
5.0	Front raise/lower motor (M25m3) Resistance	1	M25m3 →¯① [±] →	2	Disconnect connector (white) at M25m3 (motor).	0.5 – 5 Ω	M25m3
6.0	Rear raise/lower motor (M25m2) Voltage supply	1 — (M25m2 - - (Y) ⁺ ►) — 2	Voltage supply to S22 OK, Disconnect connector at M25m2, Circuit 15R: ON Press Rear raise/lower switch: Up Down	– 11 to – 14 V 11 to 14 V	S22

\Rightarrow	Test scope	Test conr	nection		Test condition	Nominal value	Possible cause/Remedy
7.0	Rear raise/lower motor (M25m2) Resistance	11	M25m2 - □Ω ⁺ →	_ _ 12	Disconnect connector at M25m2 (motor).	0.5 – 5 Ω	M25m2
8.0	Backrest fore/aft motor (M25m5) Voltage supply	1 — (M25m5	> ─2	Voltage supply to S22 OK, Disconnect (black) connector at M25m2, Circuit 15R: ON Press backrest fore/aft switch: Forward Backward	11 – 14 V – 11 to – 14 V	S22
9.0	Backrest fore/aft motor (M25m5) Resistance	1 _=	M25m5 - □Ω ⁺ →	2	Disconnect black connector at M25m5 (motor).	0.5 – 5 Ω	M25m5

\Rightarrow	Test scope	Test con	nection		Test condition	Nominal value	Possible cause/Remedy
10.0	Fore/aft motor (M26m1) Voltage supply	1—(M26m1 - -(Y) [±] →) — 2	Voltage supply to S23 OK, Disconnect (blue) connector at M26m1, Circuit 15R: ON Press seat fore/aft switch (S23s3): Forward Backward	11 to 14 V - 11 to - 14 V	S23
11.0	Front raise/lower motor (M26m5) Resistance	1	M26m5 - Q) ⁺ →	_ _2	Disconnect black connector at M26m5 (motor).	0.5 – 5 Ω	M26m5
12.0	Front raise/lower motor (M26m3) Voltage supply	1—(M26m3 (Ŷ) ⁺ →) — 2	Voltage supply to S23 OK, Disconnect (white) connector at M26m3, Circuit 15R: ON Press seat height, front switch (S23s2): Up Down	11 to 14 V - 11 to - 14 V	S23

\Rightarrow	Test scope	Test conr	nection		Test condition	Nominal value	Possible cause/Remedy
13.0	Front raise/lower motor (M26m3) Resistance	1	M26m3 -	2	Disconnect white connector at M26m3 (motor).	0.5 – 5 Ω	M26m3
14.0	Rear raise/lower motor (M26m2) Voltage supply	1—(M26m2 <u>-</u> <u>(</u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u> <u></u>		Voltage supply to S23 OK, Disconnect (white) connector at M26m2, Circuit 15R: ON Press seat height, rear switch (S23s4): Up Down	– 11 to – 14 V 11 to 14	S23
15.0	Rear raise/lower motor (M26m2) Resistance	1	M26m2 → ⁻ (Ω) ⁺ →	<u> </u>	Disconnect connector at M26m2 (motor).	0.5 – 5 Ω	M26m2

\Rightarrow	Test scope	Test connection	on	Test condition	Nominal value	Possible cause/Remedy
16.0	Seatback fore/aft motor (M26m5) Voltage supply	M26 1 — ∢ ——————————————————————————————————	~ .	Voltage supply to S23 OK, Disconnect (black) connector at M26m5, Circuit 15R: ON Press backrest switch (S23s5): Foreward Backward	11 – 14 V – 11 to – 14 V	S23
17.0	Seatback fore/aft motor (M26m5) Resistance	M26 1 _ _ - □	2 − 2	Disconnect black connector at M26m5 (motor).	0.5 – 5 Ω	M26m5

\Rightarrow	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
18.0	CF relay module (K24) Voltage supply (Circuit 30)	$6 \longrightarrow \begin{array}{c} K24 \\ 6 \longrightarrow \end{array} \longrightarrow 8$ $6 \longrightarrow \begin{array}{c} -(\mathbb{V})^{\pm} \longrightarrow 3 \end{array}$	Ignition: OFF K24 removed (disconnected)	11 – 14 V	Wiring to X4 and W29 or W29/2 If values are OK: ⇒ 18.1
18.1	Voltage supply Circuit 15R	K24 6 — (Circuit 15R: ON K24 removed (disconnected)	11 – 14 V	Wiring to X4/18 and W29 or W29/2 If values are OK: If there continues to be no voltage at left/right front ESA switches, check: Fuses: F1f21, F1f22, Wiring to the seats, K24

\Rightarrow	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
19.0	Left door switch (S17/3)	6 -(√ (∀) →) − 1	Ignition: OFF K24 removed (disconnected) Left door: Open Left door: Closed	< 1 V > 5 V	Wiring, S17/3 If values are OK: If CF function via S17/3 is still faulty: K24 If CF function via S17/4 is still faulty: ⇒ 19.1
19.1	Right door switch (S17/4)	6 -(Ignition: OFF K24 removed (disconnected) Right door: Open Right door: Closed	< 1 V > 5 V	Wiring, S17/4 If values are OK: If CF function via S17/4 is still faulty: K24