Diagnosis – Function Test, Recalling Actual Values with HHT

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

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.

Preparation for Function Test, Recalling Actual Values:

- 1. Review 12, 20, 21, 31,
- 2. Fuses ok,
- 3. Battery voltage ok,
- 4. Connect the Hand-Held Tester (HHT) to X11/4, according to diagram, see section 0,
- 5. Voltage supply for control module and CAN-data wiring ok, refer to DM Body and Accessories, Volume 2, section 7.1, 23,
- 6. All CAN-data wiring contacted,
- 7. Ignition ON, or open relevant left door,
- Additional test for seatback activation: vehicle speed < 5mph (Model 208 only).

i

Function sequence:

The voltage-coded signals from the power seat switches (S91/1, S92/2) are read into the associated door control modules (N69/1, N69/2). The door control modules (N69/1, N69/2) send a CAN message to the associated ESA control module (N32/1, N32/2) which actuates the seat adjustment motors.

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.

i

Actual values and activations from one system may be stored in several control modules, therefore the actual values and activations of control modules which are relevant to the system should be retreived. When retreiving actual values, all available actual values from the respective control module appear.

Abbreviations:

ESA L	Electric seat adjustment, left
esa r	Electric seat adjustment, right
EIS	Electronic ignition switch/lock control module (N73)
PSE	Pneumatic system equipment (A37)
DCM I	Front driver door control module (N69/1)
DCW 5	Front driver door control module (N69/2)

The abbreviations listed above are found in the second column of the following test table test steps and they indicate in which control module(s) the actual values or activations are stored.

Diagnosis – Function Test, Recalling Actual Values with HHT

Special Tools



Test equipment; See MBUSA Standard Service Equipment Program

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

Electrical Test Program – Function Test, Recalling Actual values with HHT

\Rightarrow		Test scope	Test connection	Activation	Nominal value	Possible cause/Remedy 1)
1.0	EIS (DAS)	Circuit 15		Ignition switch position 2: ON OFF	ON OFF	23 ⇒ 4.0
2.0	PSE	Door switch		< 10.0 V > 10.0 V	YES NO	DM, Body and Accessories, Vol. 1, section 3.4, 23 PSE
3.0	PSE	Door switch		> 15.5 V < 15.5 V	YES NO	DM, Body and Accessories, Vol. 1, section 3.4, 23 PSE
4.0	ESA L	Left front ESA motor group (with memory) fore/aft motor (M27m1) (Hall sensor)		Left front ESA switch group (with memory) fore/aft switch (S91/2s1) Press switch forward:	Value increases, seat moves forward.	Wiring, 23 \Rightarrow 2.0
				Press switch aft:	Value decreases, seat moves backward.	

Electrical Test Program – Function Test, Recalling Actual Values with HHT

⇒		Test scope	Test connection	Activate	Nominal value	Possible cause/Remedy 1)
5.0	ESA L	Left front ESA motor group (with memory) rear raise/lower motor (M27m2) (Hall sensor)		Left front ESA switch group (with memory) raise/lower switch (S91/2s2) Press switch up:	Value increases, seat rises at rear.	Wiring, 23 \Rightarrow 8.0
				Press switch down:	Value decreases, seat lowers at rear.	
6.0	ESA L	Left front ESA motor group (with memory) front raise/lower motor (M27m3) (Hall sensor)		Left front ESA switch group (with memory) fore/aft switch (S91/2s1) Press switch up:	Value	Wiring, $23 \Rightarrow 5.0$
					increases, seat rises at front.	
				Press switch down:	Value decreases, seat lowers at front.	

Electrical Test Program – Function Test, Recalling Actual Values with HHT

\Rightarrow		Test scope	Test connection	Activation	Nominal value	Possible cause/Remedy 1)
7.0	ESA L	Left front ESA motor group (with memory), head restraint raise/lower motor (M27m4) (Hall sensor)		Left front ESA switch group (with memory), head restraint raise/lower switch (S91/2s4) Press switch up:	Value	Wiring, 23 \Rightarrow 14.0
					increases, head restraint rises.	
				Press switch down	Value decreases, head restraint lowers.	
8.0	ESR L	Left front ESA motor group (with memory), backrest fore/aft motor (M27m5) (Hall sensor)		Left front ESA switch group (with memory), backrest fore/aft switch (S91/2s5)		Wiring, 23 \Rightarrow 11.0
				Press switch forward:	Value increases, backrest moves forward.	
				Press switch aft:	Value decreases, backrest moves backward.	

Electrical Test Program – Function Test, Recalling Actual Values with HHT

\Rightarrow		Test scope	Test connection	Activation	Nominal value	Possible cause/Remedy 1)
9.0	ESA L	Left front seat back release microswitch (S91/3) (Model 208 up to 6/98)		Seat back: Unlocked: Locked:	on OFF	$23 \Rightarrow 19.0$ Left front ESA control module (N32/1).
		Left front seatback release microswitch (S91/3) or left front hibernation microswitch (S91/1s2) (Model 208 as of 06/98 only)		Seat back: Unlocked and tilted only 20 degrees forward: Tilted completely forward and locked:	ON OFF	$23 \Rightarrow 20.0$ Left front ESA control module (N32/1).
10.0	ESA L	Left front seatback inclination microswitch (S91/1) (model 208)		Seat back tilted: Forward: Backward:	ON OFF	$23 \Rightarrow 21.0$ Left front ESA control module (N32/1).
11.0	ו חכם	Left front door ESA switch group (with memory), fore/aft switch (S91/2s1)		S91/2s1 pressed forward: S91/2s1 pressed backward:	fore Aft	23 ⇒ 1.0

Electrical Test Program – Function Test, Recalling Actual Values with HHT

\Rightarrow		Test scope	Test connection	Activation	Nominal value	Possible cause/Remedy 1)
12.0	ו חוכם	Left front door ESA switch group (with memory), front raise lower switch (S91/2s3)		S91/2s3 pressed up: S91/2s1 pressed down:	raise Lower	23 ⇒ 4.0
13.0	ו חוכם	Left front door ESA switch group (with memory), rear raise lower switch (S91/2s2)		S91/2s2 pressed up: S91/2s2 pressed down:	raise Lower	23 ⇒ 7.0
14.0	ו חוכם	Left front door ESA switch group (with memory), backrest fore/aft switch (S91/2s5)		S91/2s5 pressed forward: S91/2s5 pressed aft:	fore Aft	23 ⇒ 10.0
15.0	ו חוכם	Left front door ESA switch group (with memory), head restraint raise/lower (S91/2s4)		S91/2s4 pressed up: S91/2s4 pressed down:	rrise Lower	23 ⇒ 13.0
16.0	ו חוכם	Left front door ESA switch group (with memory), memory button 1 switch (S91/2s6)		Button 1: Rest position: Press button:	not Activated Activated	23 ⇒ 17.0

1) Observe Preparation for test, see 22.

Electrical Test Program – Function Test, Recalling Actual Values with HHT

\Rightarrow		Test scope	Test connection	Activation	Nominal value	Possible cause/Remedy 1)
17.0	ו חכם	Left front door ESA switch group (with memory), memory button 2 switch (S91/2s7)		Button 2: Rest position: Press button:	not Activated Activated	23 ⇒ 17.0
18.0	DCM I	Left front door ESA switch group (with memory), memory button 3 switch (S91/2s8)		Button 3: Rest position Press button:	not Activated Activated	23 ⇒ 17.0
19.0	DCM I	Left front door ESA switch group (with memory), memory store button (S91/2s9)		Green button: Rest position: Press button:	not Rctivrted Rctivrted	23 ⇒ 17.0
20.0	EIS (DRS)	Circuit 15		Ignition switch: Position 2 ON OFF	ON OFF	DM, Body and Accessories, Vol. 2, section 7.1, 23 NS
21.0	PSE	Door switch		< 10.0 V > 10.0 V	YES NO	DM, Body and Accessories, Vol. 1, section 3.4, 23 PSE
22.0	PSE	Door switch		>15.5 V < 15.5 V	YES NO	DM, Body and Accessories, Vol. 1, section 3.4, 23 PSE

Electrical Test Program – Function Test, Recalling Actual Values with HHT

\Rightarrow		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy 1)
23.0	ESA R	Right front ESA motor group (with memory) fore/aft motor (M28m1) (Hall sensor)		Right front ESA switch group (with memory) fore/aft switch (S92/2s1) Press switch forward:	Value increases, seat moves forward.	23 ⇒ 2.0
				Tress switch all.	decreases, seat moves backward.	
24.0	esr r	Right front ESA motor group (with memory) rear raise/lower motor (M28m2) (Hall sensor)		Right front ESA switch group (with memory) raise lower/switch (S92/2s2)		23 ⇒ 8.0
				Press switch up:	Value increases, seat rises at front.	
				Press switch down:	Value decreases, seat lowers at front.	

Electrical Test Program – Function Test, Recalling Actual Values with HHT

\Rightarrow		Test scope	Test connection	Activation	Nominal value	Possible cause/Remedy 1)
25.0	ESR R	Right front ESA motor group (with memory), front raise/lower motor (M28m3) (Hall sensor)		Right front door ESA switch group (with memory), fore/aft switch (S92/2s1) Press switch up:	Value increases, seat	23 ⇒ 5.0
				Press switch down:	Value decreases, seat lowers at front.	
26.0	ESA R	Right front ESA motor group (with memory), head restraint raise/lower motor (M28m4) (Hall sensor)		Left front door ESA switch group (with memory), raise/lower switch (S92/2s4)		Wiring, 23 \Rightarrow 14.0
				Press switch up:	Value increases, head restraint rises.	
				Press switch down:	Value decreases, head restraint lowers.	

Electrical Test Program – Function Test, Recalling Actual Values with HHT

⇒		Test scope	Test connection	Activation	Nominal value	Possible cause/Remedy 1)
27.0	ESA R	Right front ESA motor group (with memory), backrest fore/aft motor (M28m5) (Hall sensor)		Right front door ESA switch group (with memory), backrest fore/aft switch (S92/2s5) Press switch forward: Press switch aft:	Value increases backrest moves forward. Value decreases backrest moves backward.	Wiring, 23 ⇒ 11.0
28.0	1 MJQ 1000 2	Illuminate ESA switch group (S91/2, S92/2) (Activation)		Ignition: ON Adjust instrument lamps to full intensity. HHT button: Press F2	Switch group illumination: 0N	Wiring, S91/2, S92/2, Front driver-side door control module (N69/1), Front passenger-side door control module (N69/2).

Electrical Test Program – Function Test, Recalling Actual Values with HHT

\Rightarrow		Test scope	Test connection	Activation	Nominal value	Possible cause/Remedy 1)
29.0	ESR R	Right front seatback release microswitch (S92/3) (Model 208 up to 6/98 only)		Seatback: Unlocked: Locked:	ON OFF	$23 \Rightarrow 19.0$ Right front ESA control module (N32/2).
		Left front seatback release microswitch (S91/3) or left front hibernation microswitch (S91/1s2) (Model 208 as of 06/98 only)		Seatback: Unlocked and tilted only 20 degrees forward: Tilted completely forward and locked:	ON OFF	$23 \Rightarrow 20.0$ Right front ESA control module (N32/2).
30.0	ESA R	Right front seat backrest inclination microswitch (S92/1) (Model 208)		Seatback moved: Forward: Backward:	ON OFF	$23 \Rightarrow 21.0$ Right front ESA control module (N32/2).
31.0	ocm 2	Right front door ESA switch group (with memory), fore/aft switch (S92/2s1)		S92/2s1 pressed forward: S92/2s1 pressed backward:	fore RFT	23 ⇒ 1.0

Electrical Test Program – Function Test, Recalling Actual Values with HHT

\Rightarrow		Test scope	Test connection	Activation	Nominal value	Possible cause/Remedy 1)
32.0	DCW 5	Right front door ESA switch group (with memory), front raise lower switch (S92/2s3)		S92/2s3 pressed up: S92/2s1 pressed down:	rrise Lower	23 ⇒ 4.0
33.0	DCW 5	Right front door ESA switch group (with memory), rear raise lower switch (S92/2s2)		S92/2s2 pressed up: S92/2s2 pressed down:	rrise Lower	23 ⇒ 7.0
34.0	DCW 5	Right front door ESA switch group (with memory), backrest fore/aft switch (S92/2s5)		S92/2s5 pressed forward: S92/2s5 pressed aft:	fore Aft	23 ⇒ 10.0
35.0	DCW 5	Right front door ESA switch group (with memory), head restraint raise/lower (S92/2s4)		S92/2s4 pressed up: S92/2s4 pressed down:	rrise Lower	23 ⇒ 13.0
36.0	ocm 2	Right front door ESA switch group (with memory), memory button 1 switch (S92/2s6)		Button 1: Rest position Press button:	NOT ACTIVATED ACTIVATED	23 ⇒ 17.0

1) Observe Preparation for test, see 22.

Electrical Test Program – Function Test, Recalling Actual Values with HHT

\Rightarrow		Test scope	Test connection	Activation	Nominal value	Possible cause/Remedy 1)
37.0	DCW 5	Right front door ESA switch group (with memory), memory button 2 switch (S92/2s7)		Button 2: Rest position Press button:	not RCTIVATED RCTIVATED	23 ⇒ 17.0
38.0	DCW 5	Right front door ESA switch group (with memory), memory button 3 switch (S92/2s8)		Button 3: Rest position Press button:	not Activated Activated	23 ⇒ 17.0
39.0	ocm 2	Right front door ESA switch group (with memory), memory store button (S92/2s9)		Green button: Rest position Press button:	not RCTIVATED RCTIVATED	23 ⇒ 17.0