

4.7 Model 210.072 up to 06/96

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Note:

IR DAS control module (N54/1):

The IR DAS control module (N54/1) performs the following functions:

a) Infrared Remote Control

- Reception and processing of the IR signal.
- Activation of:
 - Central Locking (CL),
 - Remote Trunk Release (RTR),
 - Anti-theft alarm (ATA),
 - Convenience Feature (CF),
 - Lock/unlock verification signals in interior rearview mirror (A26/7),
 - Lock/unlock verification signal via turn signal system (via locking confirmation relay module [K54]). (i.e.: N54/1, via K54 control module, via turn signal system).

Input and processing of mechanical lock switches (S86/1, S88/2) (incl. M.Y. 1997 E420 as of 01/96 and up to 06/96 production).

b) Drive Authorization System 2 (DAS 2)

(incl. MY 1997 E420, as of 01/96 and up to 06/96 production)

- Activation of coil (for transponder) in steering column.
- Input and processing of transponder signal.
- Activation of engine control module via CAN bus with valid transponder code only.

Note:

The Drive Authorization System (DAS) is independent in function from the of the RCL lock status and battery voltage in the IR transmitter keys.

Deactivation of the motor electronics is accomplished via the IR DAS control module (N54/1). The IR DAS control module (N54/1) is also connected to the engine control module via the CAN data bus. Upon deactivation of the motor electronics (ignition key has been removed from the ignition switch), the engine control module in turn deactivates the fuel injection system.

The IR DAS control module (N54/1) and engine control module are “married” together via an identification code exchange. This identification can not be erased. Therefore, it is impossible to swap control modules (either IR DAS or engine control modules) for troubleshooting purposes.

Actual values:

Via the Hand-Held-Tester (HHT) up to 8 different IR transmitter keys can be tested for locking approval. Additionally, the battery condition and synchronization of each individual IR transmitter can be tested. The Hand-Held-Tester also indicates the number of recently currently used IR transmitter. Lastly, an indication is given if the IR DAS control module (N54/1) is “married” (via an identification code) to the vehicle. The readout of actual values is menu driven.

Blocking IR transmitter keys/ transponder

Via the Hand-Held Tester (HHT), IR transmitter keys can be **revocably** locked. The blocking of individual IR transmitter keys is menu driven. The unlocking of the IR transmitter keys is accomplished via the HHT. The IR transmitter function as well as the transponder function are blocked in unison.

Via the HHT, IR transmitter keys can be **irrevocably** locked (**only upon vehicle owner's consent**). The blocking of individual IR transmitter keys is menu driven. The unlocking of the IR transmitter keys is **not** possible. The IR transmitter function as well as the transponder function are blocked in unison.

Version coding

Replacement of IR DAS control module requires version coding via the HHT. The version coding is menu driven.

CAUTION!

The IR DAS control module (N54/1) and engine control module are “married” together via an identification code exchange. These identification codes can not be changed and this code remains with the vehicle for its service life. Only the mechanical locks can be replaced.

If the customer loses an IR transmitter key (which includes a mechanical key):

The vehicle's RCL identification code remains, the lost IR transmitter key (s) is made invalid via blocking. To maintain vehicle security, all mechanical locks should be replaced using a new mechanical lock number code. You must notify your facing PDC of any mechanical lock changes, by using the Lock Change Notice Form.

If the RCL control module is defective:

A new IR DAS control module must be specially ordered for the specific vehicle, using the same RCL identification code as the previously installed IR DAS control module.

If a mechanical lock or key is defective:

Replace the mechanical lock or key with a new one, using the same mechanical lock code number (special order from your facing PDC).

Diagnosis – Function Test

Preparation for Test:

1. Battery voltage 11 – 14 V,
2. Fuses ok,
3. Central locking system in proper operating condition,
4. Batteries in IR transmitter ok,
5. IR transmitter synchronized,
6. Key removed from steering lock,
7. Side windows lowered approx. 100 mm (4 in.),
8. Sliding/pop-up roof open,
9. All doors and trunk lid closed,
10. Central locking system unlocked.
11. Activation of the turn signal system has **not** been **deactivated** via the HHT.



The locking and unlocking function (RCL) of the vehicle is indicated via the turn signal system.

Flash rate: Lock 3x
 Unlock 1x

Flash frequency: 1.5 Hz

The activation of the turn signal system can be cancelled (as per customer consent) via the HHT menu version coding.

Significance of the indicator lamps

Green	Red	Green and red alternating	Green and red simultaneously	Blink time	Significance	Possible cause/Remedy
X				Approx. 3 seconds	Approved deactivation, vehicle is unlocked.	
	X			Approx. 3 seconds	Approved activation, vehicle is locked.	
		X		Approx. 30 seconds	Engine management disabled.	⇒ 7.0
			X	Approx. 30 seconds	IR transmitter batteries-low voltage	Replace IR transmitter batteries

Diagnosis – Function Test

Test step/Test scope	Test condition	Nominal value	Possible cause/Remedy ¹⁾
⇒ 1.0 Locking of vehicle with infrared remote control via RCL receiver (interior rearview mirror) (A26/7).	Lock vehicle using IR transmitter.	Vehicle is locked. Turn signals blink 3x Red indicator lamps (RCL receiver, interior rearview mirror) blink for a maximum of approx. 3 seconds.	23 ⇒ 1.0 – 5.0, 7.0, 9.0, 10.0, 15.0, 16.0, 19.0 – 22.0
⇒ 2.0 Unlocking of vehicle with infrared remote control via RCL receiver (interior rearview mirror) (A26/7).	Unlock vehicle using IR transmitter.	Vehicle is unlocked. Turn signals blink 1x Green indicator lamps (RCL receiver, interior rearview mirror) blink for a maximum of approx. 3 seconds.	23 ⇒ 1.0 – 4.0, 6.0, 8.0 – 10.0, 13.0, 14.0, 17.0, 18.0, 21.0, 22.0
⇒ 3.0 Locking of vehicle with a mechanical lock cylinder.	Lock vehicle using mechanical key via mechanical lock cylinder.	Vehicle is locked.	23 ⇒ 1.0 – 2.0, 11.0, 12.0, 15.0, 16.0, 19.0 – 22.0
⇒ 4.0 Unlocking of vehicle with a mechanical lock cylinder.	Unlock vehicle using mechanical key via mechanical lock cylinder.	Vehicle is unlocked.	23 ⇒ 1.0, 2.0, 11.0 – 14.0, 17.0, 18.0, 21.0, 22.0
⇒ 5.0 Close side windows and sliding/pop-up roof with infrared remote control.	Point IR transmitter towards RCL receiver (interior rearview mirror) (A26/7) and press IR transmitter button for > 1 second.	Side windows and sliding/pop-up roof close.	23 ⇒ 1.0 – 5.0, 7.0, 9.0, 10.0, 15.0, 16.0, 19.0 – 22.0

¹⁾ Observe Preparation for Test, see 22.

Diagnosis – Function Test

Test step/Test scope	Test condition	Nominal value	Possible cause/Remedy ¹⁾
⇒ 6.0 Open side windows with infrared remote control.	After side windows close, within 5 seconds, point IR transmitter towards RCL receiver (interior rearview mirror) (A26/7). And then press transmitter button.	Side windows open.	23 ⇒ 1.0 – 4.0, 6.0, 8.0 – 10.0, 13.0, 14.0, 17.0, 18.0, 21.0, 22.0
⇒ 7.0 Activate engine management.	Turn ignition key right to stop in steering column lock .	Engine starts.	12, 23⇒ 1.0 – 2.0, 23.0 –31.0 DTC memory, engine, Actual values, engine.
⇒ 8.0 Open trunk lid with infrared remote control.	Trunk lid lock key slot is not in 90° (key can be removed) position. Lock vehicle using IR transmitter. Point IR transmitter towards RCL receiver (interior rearview mirror) (A26/7) and press IR transmitter button twice within 0.8 seconds.	Trunk lid opens.	23 ⇒ 1.0 – 4.0, 6.0, 8.0 – 10.0, 13.0, 14.0, 17.0, 18.0, 21.0, 22.0 PSE electrical/pneumatic fault, Trunk lid lock mechanical fault.

1) Observe Preparation for Test, see 22.

Diagnosis – Diagnostic Trouble Code (DTC) Memory

Preliminary work:

Function test 11

Preparation for Test (DTC readout):

1. Fuses OK.
2. Battery voltage >11 V.
3. Unlock vehicle.
4. Ignition ON.
5. Connect Hand-Held Tester (HHT) according to connection diagram shown in section 0.

Note:

The diagnostic trouble codes (DTC's) can only be read out and erased using the Hand-Held Tester (HHT).

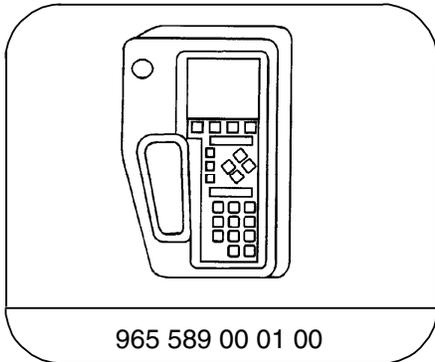
Note regarding Diagnostic Trouble Codes (DTC's):

Current diagnostic trouble codes are highlighted in black on the display. Additional detailed fault information based on fault type is displayed with nearly all diagnostic codes (DTC's) such as:

- > Ω Resistance too great
- < Ω Resistance too low
- ΓΓ- Short circuit to ground (GND)
- ΓΓ+ Short circuit to positive (POS)
- // - Open circuit

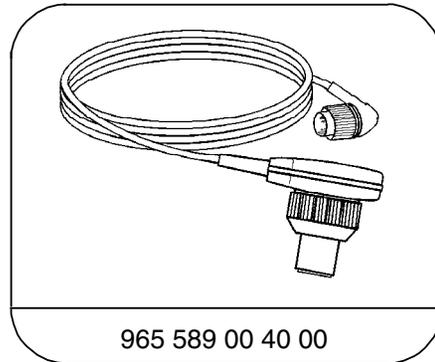
Additionally, further diagnostic info. such as fault frequency is displayed with some of the diagnostic trouble codes.

Special Tools



965 589 00 01 00

Hand-Held-Tester



965 589 00 40 00

Test cable

Diagnosis – Diagnostic Trouble Code (DTC) Memory

DTC 	Possible cause	Test step/Remedy ¹⁾
B1000	IR DAS control module (N54/1)	Replace N54/1
B1100	Control line deactivation, Γ1+ or Γ1-, (SN1)	23 ⇒ 17.0, 18.0, 21.0, 22.0
B1101	Control line activation, Γ1+ or Γ1-, (SN2)	23 ⇒ 19.0 – 22.0
B1103	Red indicator lamp, Γ1+ or Γ1-	23 ⇒ 5.0
B1104	Green indicator lamp, Γ1+ or Γ1-	23 ⇒ 6.0
B1701	Incorrect authorization code, motor electronics (CAN)	11 ⇒ 7.0
B1702	Incorrect authorization code, engine control module, left cylinder bank, (CAN)	11 ⇒ 7.0
B1703	Attempt was made to start vehicle with invalid transponder identification code	IR transmitter key fault – replace key. Erase DTC's.
B1704	Coil for transponder (coil will not saturate)	23 ⇒ 23.0, 24.0
B1705	Activation of locking confirmation relay module [K54], turn signal system, Γ1+ or Γ1-	23 ⇒ 9.0, 10.0

¹⁾ Observe Preparation for Test, see 22.

Electrical Test Program – Component Locations

Model 210.072 with HFM sequential
multiport fuel injection/ignition (HFM-SFI)

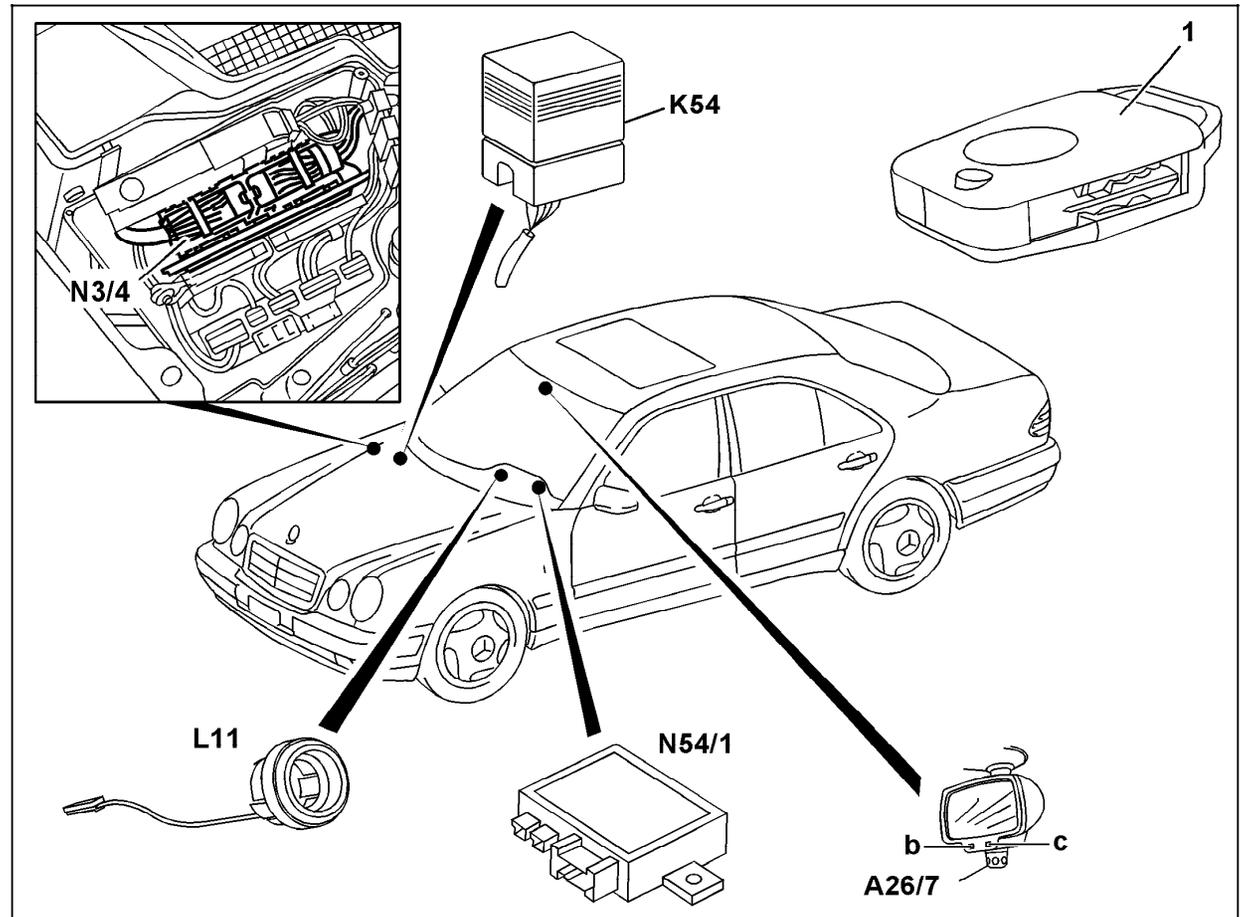


Figure 1

- 1 IR transmitter with transponder
- A26/7 RCL receiver (interior rearview mirror)
- L11 Transponder coil (on ignition/starter switch)
- K54 Locking confirmation relay module
(on right front passenger floor board)
- N3/4 Engine control module (HFM-SFI)
- N54/1 IR DAS control module
(behind instrument cluster)

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Electrical Test Program – Connection of Components

Model 210.072

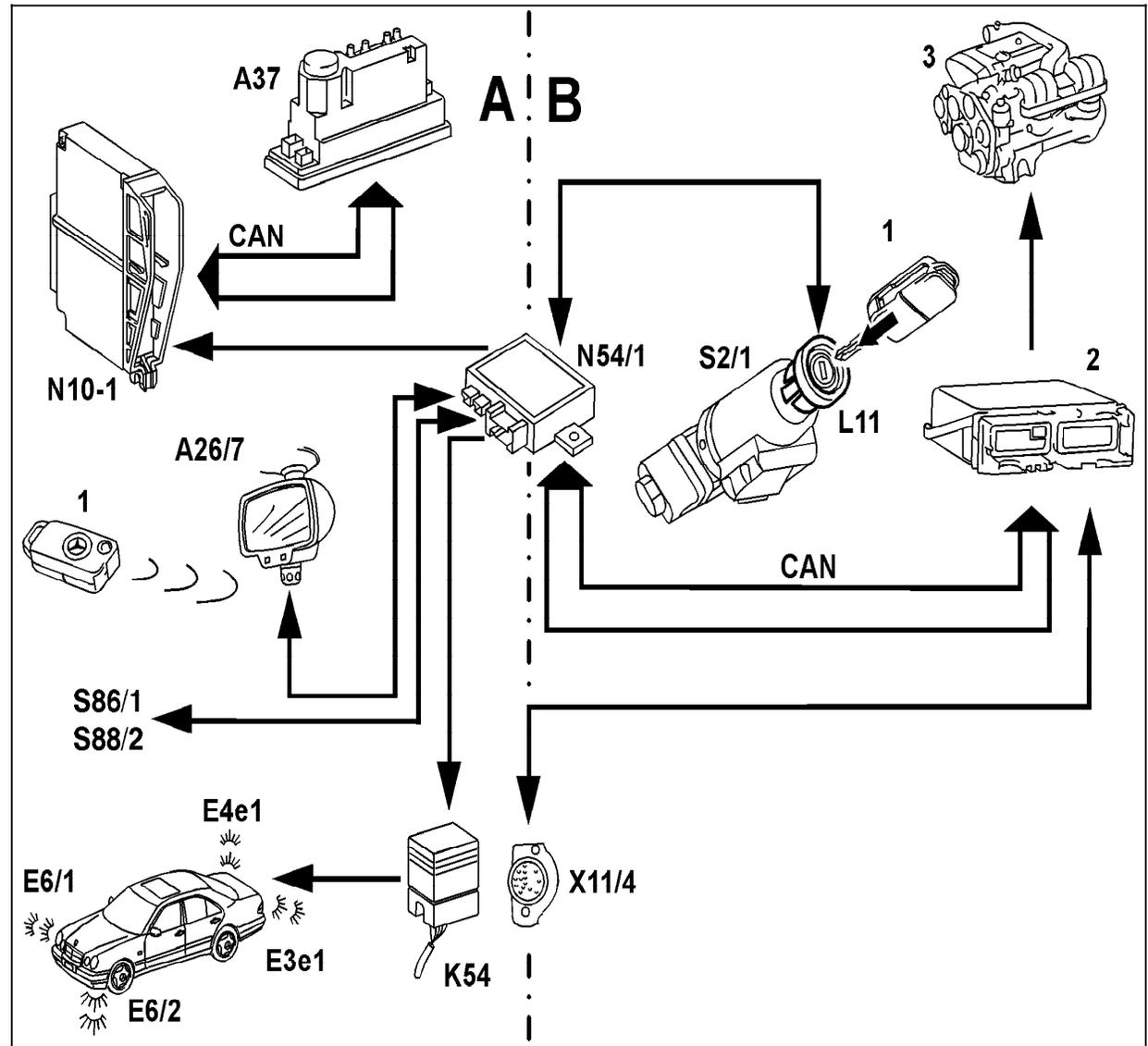


Figure 1

- A Infrared remote central locking (RCL), (entry authorization)
- B Drive authorization system 2a (activation of motor electronics via transponder)
- A26/7 RCL receiver (interior rearview mirror)
- A37 PSE control module, combined functions
- CAN Control-Area-Network
- E3e1 Turn signal lamp
- E4e1 Turn signal lamp
- E6/1 Left turn signal lamp
- E6/2 Right turn signal lamp
- K54 Locking cofirmation relay module
- L11 Coil for transponder
- N10-1 Combination control module
- N54/1 IR DAS control module
- S2/1 Ignition/starter switch
- X11/4 Data link connector (DTC readout)
- 1 IR transmitter key
- 2 Engine control module
- 3 Engine

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Electrical Test Program – Preparation for Test

Preliminary work:
Diagnosis - Diagnostic Trouble Code (DTC) Memory 12

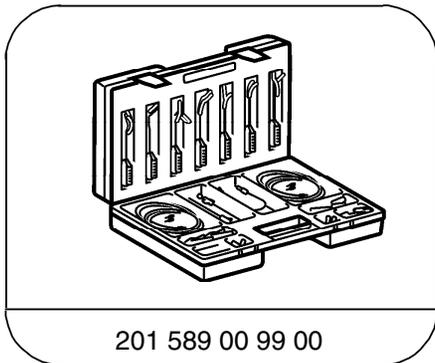
Preparation for Test:

1. Fuses OK.
2. Battery voltage >11 V.
3. Install model specific HHT module into HHT.

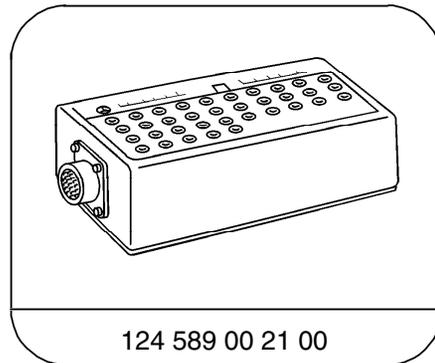
4. Connect Hand-Held Tester (HHT) according to connection diagram shown in section 0.

Electrical wiring diagrams :
Electrical Troubleshooting Manual, Model 210, Volume 2, group 80.

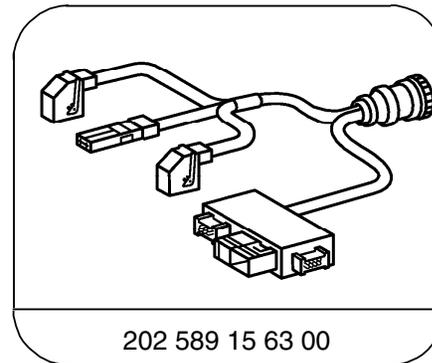
Special Tools



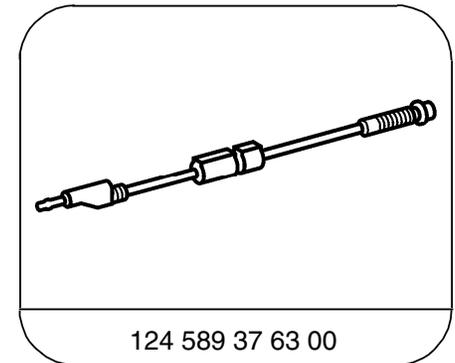
Electrical connecting set



35-pin socket box



18-pin and 12-pin CAN test cable

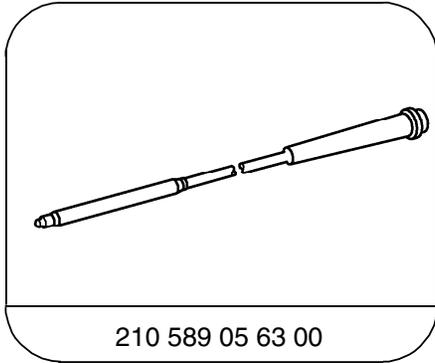


Fused cable

4.7 Infrared Remote Central Locking (RCL)

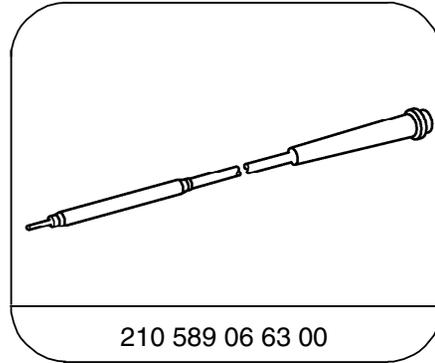
Model 210.072 up to 06/96

Special Tools



210 589 05 63 00

Adapter cable



210 589 06 63 00

Adapter cable

Conventional tools, test equipment

Description	Brand, model, etc.
Multimeter ¹⁾	Fluke models 23, 83, 85, 87

¹⁾ Available through the MBUSA Standard Equipment Program.

Electrical Test Program – Test

Connection Diagram - Socket Box

Note:

- Model 210: IR DAS control module located behind instrument cluster.
- Using the Hand-Held tester (HHT), erase DTC'S for SRS Airbag after installation of instrument cluster and steering wheel.

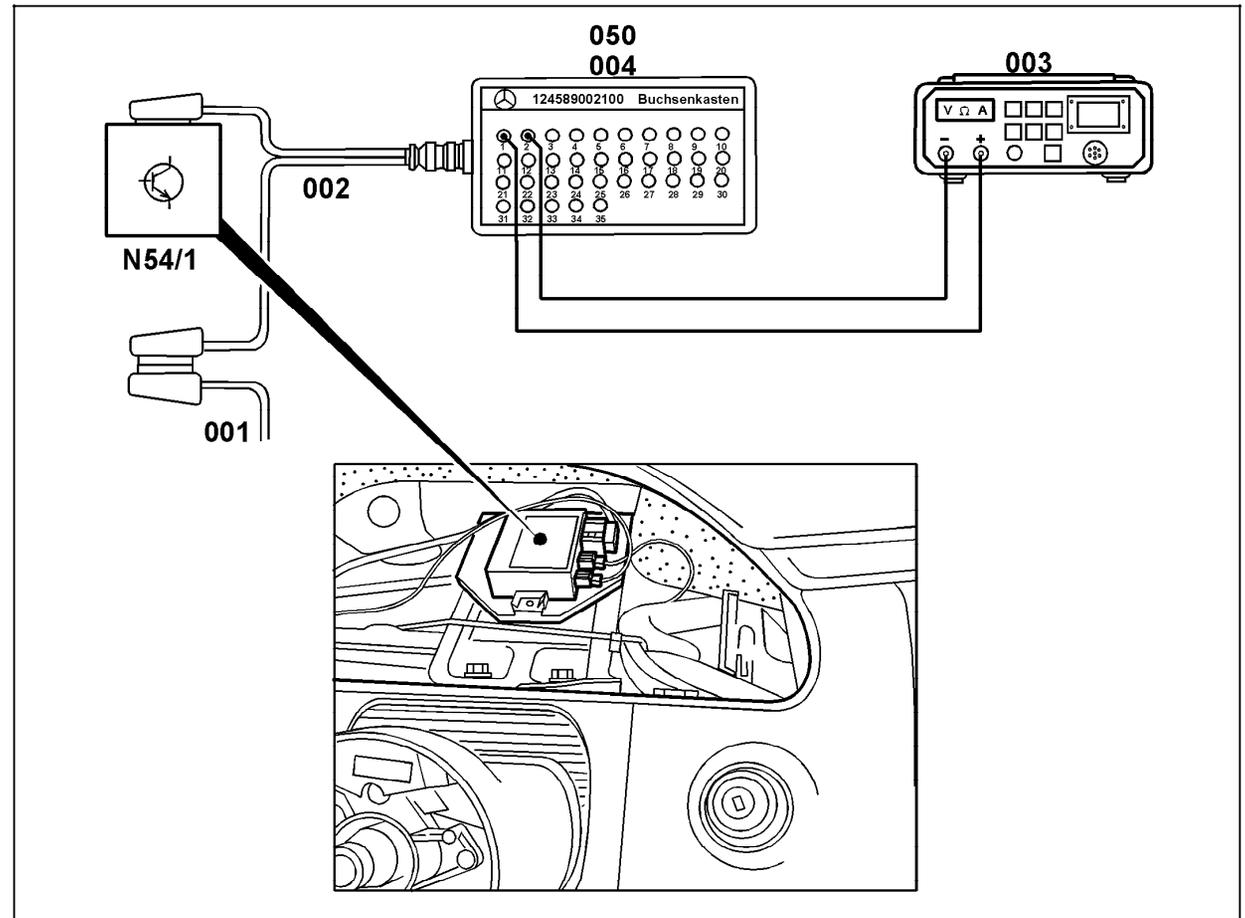


Figure 1

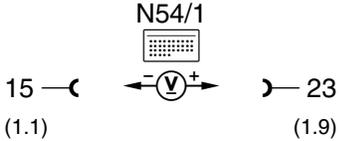
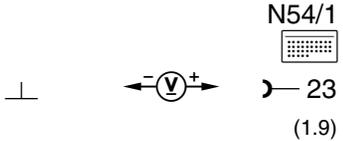
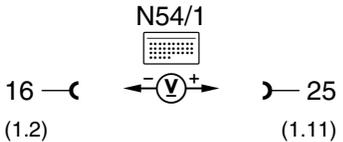
- | | |
|---------|---------------------------------|
| 001 | IR DAS control module connector |
| 002 | Test cable |
| 003 | Multimeter |
| 004/050 | Socket box (35-pole) |
| N54/1 | IR DAS control module |

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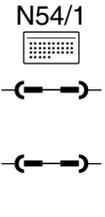
4.7 Infrared Remote Central Locking (RCL)

Model 210.072 up to 06/96

Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
1.0		IR DAS control module (N54/1) Voltage supply  Circuit 		Ignition: ON	√ F	Wiring, Battery.
2.0		IR DAS control module (N54/1) Voltage supply Circuit 15		Ignition: OFF Ignition: ON	< 1 V 11 – 14 V	Wiring, Circuit 31, ⇒ 2.1
2.1		Circuit 15		Ignition: OFF Ignition: ON	< 1 V 11 – 14 V	Wiring, Circuit 15.
3.0		RCL receiver (interior rear view mirror) (A26/7) Voltage supply		–	4.5 – 5.5 V	Wiring, A26/7, N54/1, ⇒ 3.1
3.1		(A26/7) Voltage supply		Remove A26/7.	4.5 – 5.5 V	Wiring, N54/1

Electrical Test Program – Test

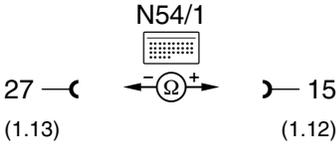
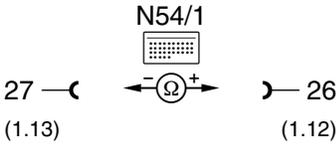
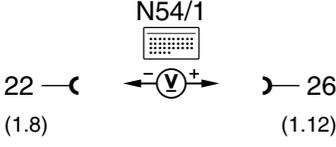
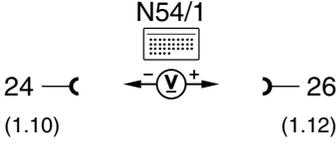
⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
4.0		RCL receiver (interior rear view mirror) (A26/7) IR signal control line		Lock vehicle by pointing IR transmitter at RCL receiver (interior rear view mirror), keep IR transmitter button pressed. After vehicle completes locking process, read value. Afterwards, release button and read second value.	Difference of values between button depressed and button released approx. 0.3 – 1.0 V	Wiring, A26/7, IR transmitter.
5.0	81103	RCL receiver (interior rear-view mirror) (A26/7) Red indicator lamps		Disconnect N54/1 from  No or only 1 bridge (part no. 124 589 37 63 00) connected. Both bridges connected.	Red indicator lamps off. Red indicator lamps light.	Wiring, A26/7

Electrical Test Program – Test

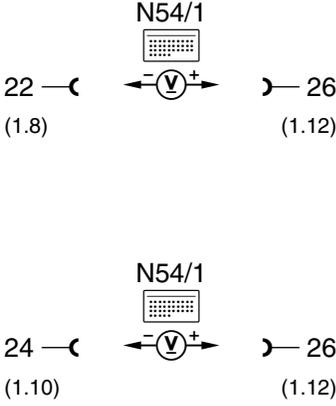
⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
6.0	81104	RCL receiver (interior rear-view mirror) (A26/7) Green indicator lamps	<p>N54/1</p> <p>15 (1.1) ←→ 16 (1.2) 20 (1.6) ←→ 26 (1.12)</p>	<p>Disconnect N54/1 from .</p> <p>No or only 1 bridge (part no. 124 589 37 63 00) connected.</p> <p>Both bridges connected.</p>	<p>Green indicator lamps off.</p> <p>Green indicator lamps light.</p>	Wiring, A26/7
7.0 ¹⁾		Locking confirmation relay module (K54), activation turn signal system Locking	<p>N54/1</p> <p>27 (1.13) ←(V)→ 26 (1.12)</p>	Lock vehicle via infrared remote central locking.	11 – 14 V voltage intermittent for approx. 2 seconds.	Wiring, N54/1
8.0 ¹⁾		Locking confirmation relay module (K54), activation turn signal system Unlocking	<p>N54/1</p> <p>27 (1.13) ←(V)→ 26 (1.12)</p>	Unlock vehicle via infrared remote central locking.	11 – 14 V for approx. 0.5 seconds.	Wiring, N54/1

1) Test step not valid if lock/unlock verification via turn signal system has been deactivated via HHT.

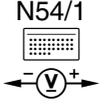
Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
9.0	B1705	Locking confirmation relay module (K54), activation wiring Γ1-		Disconnect N54/1 from  Disconnect K54.	> 20 kΩ	Wiring.
10.0	B1705	Locking confirmation relay module (K54), activation or combination control module (N10-1) wiring Γ1+		Disconnect N54/1 from  Disconnect ground wire from  Disconnect K54.	> 20 kΩ	Wiring.
11.0		Left front door lock switch (S86/1)	 	Disconnect N54/1 from  Disconnect trunk lid lock switch (S88/2) (CF). S86/1: Rest position S86/1: Hold: unlock S86/1: Rest position S86/1: Hold: lock	< 1V 11 – 14 V < 1V 11 – 14 V	Wiring, S86/1

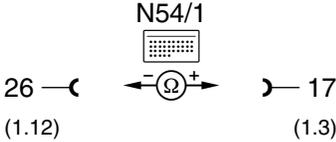
Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
12.0		Trunk lid lock switch (S88/2)		Disconnect N54/1 from  . Separate left front door separation point (X35/1). S88/2: Rest position S88/2: Hold: unlock S88/2: Rest position S88/2: Hold: unlock	 < 1V 11 – 14 V < 1V 11 – 14 V	Wiring, S88/2

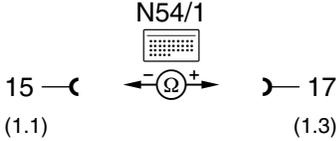
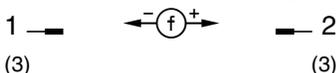
Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
13.0		Non-USA vehicles only, continue to next test step.				
14.0		IR DAS control module (N54/1), output deactivation (PSE/CL, CF, ATA)		<p>All doors closed and locked.</p> <p>Unlock vehicle by pointing IR transmitter at RCL receiver (interior rearview mirror) (A26/7), keeping IR transmitter button pressed.</p>	<p>< 1V</p> <p>6 – 8 V Green indicator lamps blink, vehicle unlocks.</p>	<p>Wiring, N54/1, Combination control module (N10-1).</p> <p>Wiring, ⇒ 3.0–5.0, N54/1</p>
15.0		IR DAS control module (N54/1), output activation (PSE/CL, CF, ATA)		<p>All doors closed and unlocked.</p> <p>Lock vehicle by pointing IR transmitter at RCL receiver (interior rearview mirror) (A26/7), keeping IR transmitter button pressed.</p>	<p>< 1V</p> <p>11 – 14 V Red indicator lamps blink, vehicle locks.</p>	<p>Wiring, N54/1, Combination control module (N10-1).</p> <p>Wiring, ⇒ 3.0–5.0, N54/1</p>

Electrical Test Program – Test

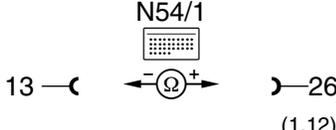
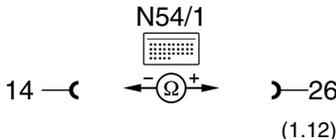
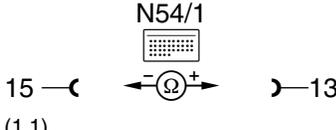
⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
16.0		Non-USA vehicles only, continue to next test step.				
17.0		Non-USA vehicles only, continue to next test step.		.		
18.0		Non-USA vehicles only, continue to next test step.		.		
19.0		Non-USA vehicles only, continue to next test step.		.		
20.0		Non-USA vehicles only, continue to next test step.		.		
21.0		Control line deactivation/ activation (PSE/CL, CF, ATA) Γ1+		Disconnect N54/1 from  Disconnect combination control module (N10-1). Disconnect ground wire from  .	>20 kΩ	Wiring.

Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
22.0	 B1100 B1101	Control line deactivation/activation (PSE/CL, CF, ATA) Γ-		Disconnect N54/1 from  Disconnect combination control module (N10-1).	>20 kΩ	Wiring.
23.0		Coil for transponder (L11)		Disconnect connector 3 from N54/1	4 – 6 Ω	L11.
24.0		Coil for transponder (L11) activation		Disconnect connector 3 from N54/1 Ignition: ON	125 kHz for approx. 0.2 – 0.8 seconds. (values measurable by using Fluke 83, 88).	N54/1.
25.0		CAN L data line Motor electronics activation -//- (CAN only)		Disconnect N54/1 from  Disconnect engine control module.	<1 Ω	Wiring.

2) Prior to testing, please see appropriate ETM (group 7) to determine control module harness socket number.

Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
26.0		CAN H data line Motor electronics activation -//- (CAN only)	N54/1 	Disconnect N54/1 from  Disconnect engine control module.	<1 Ω	Wiring.
27.0		CAN L data line Motor electronics activation Γ1+ (CAN only)	N54/1 	Disconnect N54/1 from  Disconnect engine control module.	>20 kΩ	Wiring.
28.0		CAN H data line Motor electronics activation Γ1+ (CAN only)	N54/1 	Disconnect N54/1 from  Disconnect ground wire from  Disconnect engine control module.	>20 kΩ	Wiring.
29.0		CAN L data line Motor electronics activation Γ1- (CAN only)	N54/1 	Disconnect N54/1 from  Disconnect engine control module.	>20 kΩ	Wiring.

²⁾ Prior to testing, please see appropriate ETM (group 7) to determine control module harness socket number.

Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
30.0		CAN H data line Motor electronics activation Γ1- (CAN only)		Disconnect N54/1 from  Disconnect engine control module.	>20 kΩ	Wiring.
31.0		CAN H/CAN L data line Motor electronics activation Γ1 to each other (CAN only)		Disconnect N54/1 from  Disconnect engine control module.	>20 kΩ	Wiring.

Version Coding**Version coding**

- For control modules which must be coded, menu item 6 appears on the HHT's display. These control modules must be coded accordingly.
- During the coding process, the convenience feature (CF) is automatically coded.
- The version coding is menu-driven.

Possible version coding

Version	Model 210.072
Motor electronics	X
Vehicle version	X
Country version	X
Convenience Feature (CF)	X
Remote trunk lid release (RTR)	X
Locking/unlocking verification via turn signal system	X