

4.10 Models 129, 140, 170 as of M.Y. 1998

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Hand-Held Tester (HHT)

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Components

- Radio frequency DAS control module (N54/3) (model 170 only)
- DAS radio frequency/infrared control module (N54/4) (models 129, 140)
- Transmitter key and mechanical key with transponder
- Transponder coil (L11) (located on the steering lock)
- Left/right front door IR receiver (A26/1, A26/2) (models 129, 140)
- Left front door lock switch (CF) (S86/1) 
- Trunk lid lock switch (CF) (S88/2) 




Radio frequency DAS control module (N54/3) or DAS radio frequency/infrared control module (N54/4)

The following functions **a)** and **b)** are carried out with the above noted control modules:



a) Radio frequency/infrared remote central locking

- Evaluation of the radio signal.
- Evaluation of the infrared signal, (models 129 and 140)
- Activation of
 - Central locking (CL)
 - Remote trunk release (RTR) (models 129, 140)
 - Anti-theft Alarm (ATA)
 - Comfort feature (models 129, 140)
 - Verification signal via turn signal system, models 129, 140: via combination relay module (N10/2), model 170 via locking confirmation relay module (K54).
-  Recognition and evaluation of the mechanical locking nut switch.



b) Drive Authorization System (DAS)

- Activation of the coil for the transponder in the steering lock.
- Recognition and evaluation of the transponder signal.
- With a valid transponder code, the release of the engine control module via CAN.



The drive authorization is independent from the infrared remote control and the battery condition in the transmitter key. The requirement is that the transponder in the transmitter key supplies the proper data via the transponder coil (L11) to the radio frequency DAS control module (N54/3), or DAS radio frequency/infrared control module (N54/4). If the data is recognized as correct, then a start signal is given.



If the transponder is invalid or the energy can not be produced for the transponder coil, the release of the engine control module is not granted. This is indicated via the "Start Error" indicator lamp in the instrument cluster, which is in turn activated via the engine control module. Locking of the engine control module is accomplished via the Radio frequency DAS control module (N54/3) or DAS radio frequency/infrared control module (N54/4). These control modules are connected to the engine control module via CAN data bus. After locking the engine control module (ignition key has been removed from the ignition switch), the engine control module renders the fuel injection system inoperative.



Radio frequency DAS control module (N54/3) or DAS radio frequency/infrared control module (N54/4) and the engine control module are "married" to each other via an identification code exchange. For this reason, the identification codes can not be erased. Thus, it is not possible to swap control modules between vehicles for testing purposes.

Actual Values

Via the Hand-Held Tester (HHT) up to 8 different transponders can be tested for locking approval. Additionally, the synchronization of the individual transmitter keys can be tested. The HHT can also indicate the current, last used transmitter key. Additionally, an indication is given if the version coding is locked, which means, that after 250 activations (circuit 15 ON), the Radio frequency DAS control module (N54/3) or DAS radio frequency/infrared control module (N54/4) are "married" and it is then possible to perform only limited version coding changes. The readout of the actual values is menu driven.

Revocable and Irrevocable Deactivation

Transmitter keys can be **revocably** deactivated. This is accomplished via the HHT and is menu driven for individual transmitter keys. Via the HHT, revocably deactivated transmitter keys can be reactivated. Both the transponder and transmitter functions are deactivated or activated together. Transmitter keys can be **irrevocably** deactivated (**only upon the customer's consent**). This is accomplished via the HHT and is menu driven. The reactivation of the irrevocably deactivated transmitter key is not possible. The radio and infrared function as well as the transponder function have been deactivated.

Version Coding

When replacing the radio frequency DAS control module (N54/3) or DAS radio frequency/infrared control module (N54/4), version coding must be performed via the HHT. Upon entry into the actual values menu, the control module number on which the version coding has been performed before is given automatically.

The version coding is menu driven.



The radio frequency DAS control module (N54/3) or DAS radio frequency/infrared control module (N54/4) and the engine control module are "married" to each other via an identification code exchange. For this reason, the identification codes can not be erased and this code remains with the vehicle for the rest of 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 Radio frequency DAS control module (N54/3) or DAS radio frequency/infrared control module (N54/4) must be specially ordered for the specific vehicle, using the same RCL identification code as the previously installed 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

Preliminary work: Check operation of central locking;
Check batteries in infrared transmitter key,
see SMS, Job No. 80-420

Models 129, 140
(Model 140 shown)

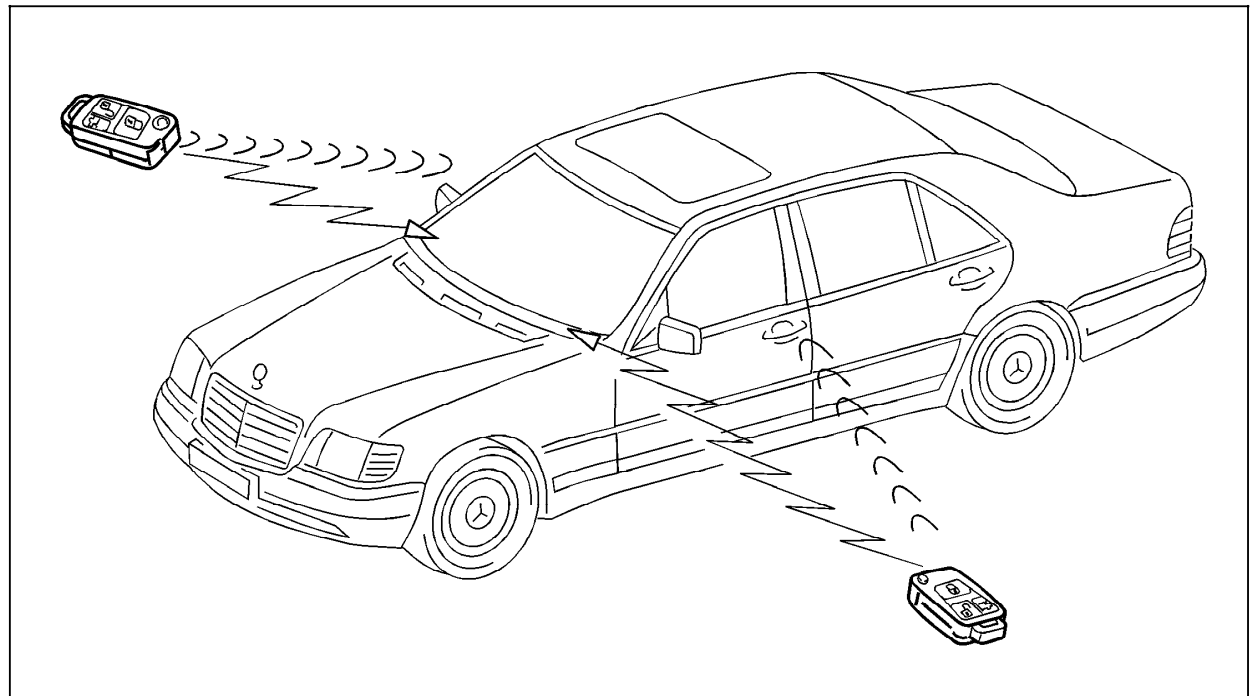
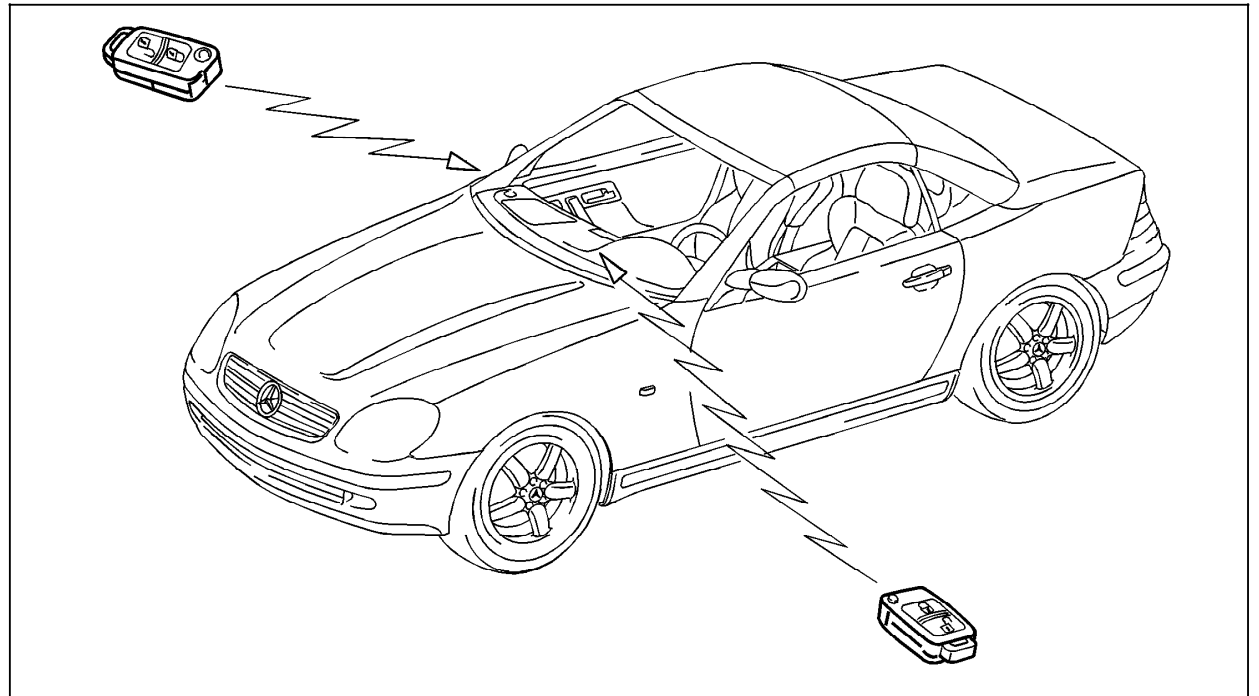


Figure 1

P80.35-0206-05

Diagnosis – Function Test

Model 170



P80.35-0205-05

Figure 2

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 transmitter key ok,
5. Transmitter signals are synchronized,
6. Transmitter key removed from electronic ignition switch,
7. Side windows lowered approx. 100 mm (4 in.),
8. All doors and trunk lid closed,
9. Central locking system is unlocked,
10. Activation of the blinker system has not been cancelled via the HHT.



The locking and unlocking function is indicated via the turn signal system.

Blinker mode:	Locking:	3x
	Unlocking:	1x

Blinkfrequency: 1.5hz

Activation of the blinker system as noted above can be cancelled via the HHT via the version coding menu, upon customer request.

Activation of the hazard flasher system will cancel the verification signal sent via the turn signal system.

Diagnosis – Function Test

Test step/Test scope	Test condition	Nominal value	Possible cause/Remedy ¹⁾
⇒ 1.0 Locking of vehicle with transmitter key (radio signal) via radio antenna.	Do not point transmitter key towards any of the IR receivers. Lock vehicle using transmitter key (radio signal).	Vehicle is locked. Blinker system blinks 3X.	13, 23 ⇒ 1.0, 23 ⇒ 2.0, 23 ⇒ 3.0, 23 ⇒ 4.0, 23 ⇒ 5.0, 23 ⇒ 10.0, 23 ⇒ 16.0, 23 ⇒ 20.0, 23 ⇒ 21.0, Version coding incorrect.
⇒ 2.0 Unlocking of vehicle with transmitter key (radio signal) via radio antenna.	Do not point transmitter key towards any of the IR receivers. Unlock vehicle using transmitter key (radio signal).	Vehicle is unlocked. Blinker system blinks 1X.	13, 14, 23 ⇒ 1.0, 23 ⇒ 2.0, 23 ⇒ 3.0, 23 ⇒ 4.0, 23 ⇒ 5.0, 23 ⇒ 11.0, 23 ⇒ 17.0, 23 ⇒ 18.0, 23 ⇒ 19.0, Version coding incorrect.

1) Observe Preparation for Test, see 22.

4.10 Infrared Remote Central Locking (RCL)

Models 129, 140, 170 as of M.Y. 1998

Diagnosis – Function Test

Test step/Test scope	Test condition	Nominal value	Possible cause/Remedy ¹⁾
⇒ 3.0 Locking of vehicle via left front door IR receiver (A26/1) Model 129/140 only	Open side windows. Point transmitter key towards left front door IR receiver (A26/1). Lock vehicle by pressing lock button on transmitter key for > 1 second and hold.	Vehicle is locked. Blinker system blinks 3X. Side windows close.	13, 14, 23 ⇒ 1.0, 23 ⇒ 2.0, 23 ⇒ 6.0, 23 ⇒ 7.0, 23 ⇒ 10.0, 23 ⇒ 16.0, 23 ⇒ 20.0, 23 ⇒ 21.0, Version coding incorrect.
⇒ 4.0 Unlocking of vehicle via left front door IR receiver (A26/1) Model 129/140 only	Close side windows. Point transmitter key towards left front door IR receiver (A26/1). Unlock vehicle by pressing unlock button on transmitter key for > 1 second and hold.	Vehicle is unlocked. Blinker system blinks 1X. Side windows open (model 129 only).	13, 14, 23 ⇒ 1.0, 23 ⇒ 2.0, 23 ⇒ 6.0, 23 ⇒ 7.0, 23 ⇒ 11.0, 23 ⇒ 17.0, 23 ⇒ 18.0, 23 ⇒ 19.0, Version coding incorrect.

¹⁾ Observe Preparation for Test, see 22.

Diagnosis – Function Test

Test step/Test scope	Test condition	Nominal value	Possible cause/Remedy ¹⁾
⇒ 5.0 Locking of vehicle via right front door IR receiver (A26/2) Model 129/140 only	Open side windows. Point transmitter key towards right front door IR receiver (A26/2). Lock vehicle by pressing lock button on transmitter key for > 1 second and hold.	Vehicle is locked. Blinker system blinks 3X. Side windows close.	13, 14, 23 ⇒ 1.0, 23 ⇒ 2.0, 23 ⇒ 8.0, 23 ⇒ 9.0, 23 ⇒ 10.0, 23 ⇒ 16.0, 23 ⇒ 20.0, 23 ⇒ 21.0, Version coding incorrect.
⇒ 6.0 Unlocking of vehicle via right front door IR receiver (A26/2) Model 129/140 only	Close side windows. Point transmitter key towards right front door IR receiver (A26/2). Unlock vehicle by pressing unlock button on transmitter key for > 1 second and hold.	Vehicle is unlocked. Blinker system blinks 1X. Side windows open (model 129 only).	13, 14, 23 ⇒ 1.0, 23 ⇒ 2.0, 23 ⇒ 8.0, 23 ⇒ 9.0, 23 ⇒ 11.0, 23 ⇒ 17.0, 23 ⇒ 18.0, 23 ⇒ 19.0, Version coding incorrect.

1) Observe Preparation for Test, see 22.

Diagnosis – Function Test

Test step/Test scope	Test condition	Nominal value	Possible cause/Remedy ¹⁾
⇒ 7.0 Locking of vehicle with a mechanical lock cylinder. (USA) (J) only	Lock vehicle using mechanical key via a mechanical lock cylinder.	Vehicle is locked.	13, 23 ⇒ 1.0, 23 ⇒ 2.0, 23 ⇒ 14.0, 23 ⇒ 16.0, 23 ⇒ 20.0, 23 ⇒ 21.0, Version coding incorrect.
⇒ 8.0 Unlocking of vehicle with a mechanical lock cylinder. (USA) (J) only	Unlock vehicle using mechanical key via a mechanical lock cylinder.	Vehicle is unlocked.	13, 23 ⇒ 1.0, 23 ⇒ 2.0, 23 ⇒ 6.0, 23 ⇒ 15.0, 23 ⇒ 17.0, 23 ⇒ 18.0, 23 ⇒ 19.0, Version coding incorrect.

¹⁾ Observe Preparation for Test, see 22.

Diagnosis – Function Test

Test step/Test scope	Test condition	Nominal value	Possible cause/Remedy ¹⁾
⇒ 9.0 Open trunk lid with transmitter key Model 129/140	Trunk lid lock key slot is not in 90° (key can be removed) position. Press unlock trunk lid button on transmitter key.	Trunk lid opens. Retractable trunk lid grip (RTG) extends (model 140 only).	13, 14, 23 ⇒ 1.0, 23 ⇒ 2.0, 23 ⇒ 3.0, 23 ⇒ 4.0, 23 ⇒ 5.0, 23 ⇒ 8.0, 23 ⇒ 17.0, 23 ⇒ 18.0, 23 ⇒ 19.0, Version coding incorrect, Electrical/pneumatic fault in PSE, RTG has mechanical fault.
⇒ 10.0 Activate engine management.	Insert transmitter key and turn key to right to stop in steering column lock.	Engine starts.	23 ⇒ 1.0, 23 ⇒ 2.0, 23 ⇒ 22.0, 23 ⇒ 23.0, 23 ⇒ 24.0, 23 ⇒ 25.0, 23 ⇒ 26.0, 23 ⇒ 27.0, 23 ⇒ 28.0, 23 ⇒ 29.0, 23 ⇒ 30.0, DTC memory, engine, Actual values, engine.

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. Vehicle is unlocked via RCL,
4. Ignition: **ON**
5. Connect Hand-Held Tester (HHT) according to connection diagram shown in section 0.



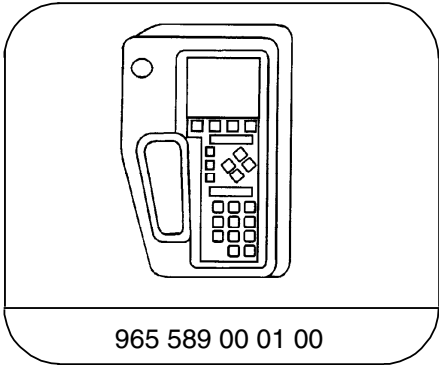
The diagnostic trouble codes (DTC's) can only be read out and erased using the Hand-Held Tester (HHT).

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

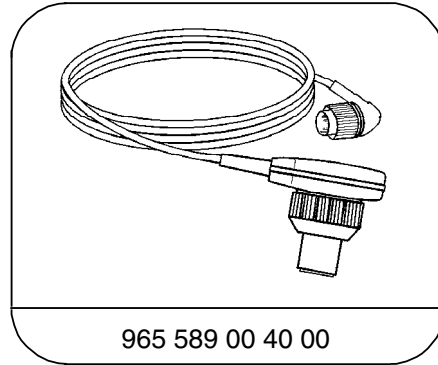
Diagnosis – Diagnostic Trouble Code (DTC) Memory

Special Tools



965 589 00 01 00

Hand-Held-Tester




965 589 00 40 00

Test cable

4.10 Infrared Remote Central Locking (RCL)

Models 129, 140, 170 as of M.Y. 1998

Diagnosis – Diagnostic Trouble Code (DTC) Memory


DTC 	Possible cause	Hints	Test step/Remedy ¹⁾
B1000	Radio frequency DAS control module (N54/3) or DAS radio frequency/infrared control module (N54/4)		Replace N54/3 or N54/4
B1100	Control line deactivation, PSE/CL, CF, ATA Γ1+ or Γ1-, (SN1)		23⇒ 17.0 23⇒ 18.0 23⇒ 19.0
B1101	Control line activation, PSE/CL, CF, ATA Γ1+ or Γ1-, (SN2)		23⇒ 16.0 23⇒ 20.0 23⇒ 21.0
B1102	Control line IR signal from left front door IR receiver (A26/1) Γ1-		23⇒ 7.0
B1103	Control line IR signal from right front door IR receiver (A26/2) Γ1-		23⇒ 9.0

1) Observe Preparation for Test, see 22.

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Diagnosis – Diagnostic Trouble Code (DTC) Memory


DTC 	Possible cause	Hints	Test step/Remedy ¹⁾
B1701	Motor release via faulty release code (CAN)		12, 23⇒ 22.0, 23⇒ 23.0, 23⇒ 24.0, 23⇒ 25.0, 23⇒ 26.0, 23⇒ 27.0, 23⇒ 28.0, 23⇒ 29.0, 23⇒ 30.0
B1702	Motor release for left cylinder bank via faulty release code (CAN)		12, 23⇒ 22.0, 23⇒ 23.0, 23⇒ 24.0, 23⇒ 25.0, 23⇒ 26.0, 23⇒ 27.0, 23⇒ 28.0, 23⇒ 29.0, 23⇒ 30.0

¹⁾ Observe Preparation for Test, see 22.

4.10 Infrared Remote Central Locking (RCL)

Models 129, 140, 170 as of M.Y. 1998

Diagnosis – Diagnostic Trouble Code (DTC) Memory

DTC 	Possible cause	Hints	Test step/Remedy ¹⁾
B1703	Invalid transponder		Transmitter key defective - replace, Erase DTC memory.
B1704	Transponder coil (L11) could not be charged		23⇒ 22.0, 23⇒ 23.0
B1706	Activation of locking confirmation relay module (N54) or combination relay module (N10/2) has Γ1+ or Γ1-		23⇒ 12.0, 23⇒ 13.0

¹⁾ Observe Preparation for Test, see 22.

Diagnosis – Recalling Actual Values with HHT

The following tests and activations are possible **via the Hand-Held Tester**.

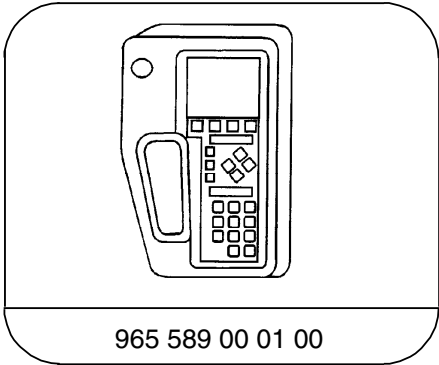
Preparation for Test:

1. Fuses ok,
2. Battery voltage > 11 ,
3. Side windows open,
4. Ignition: **ON**
5. Connect the Hand-Held Tester (HHT) to X11/4, according to diagram, see section 0.
6. After the "Function" Menu in the HHT, the menu point 3 (actual values) appears.
7. The following tests are possible via the HHT (see 13/3).

4.10 Infrared Remote Central Locking (RCL)

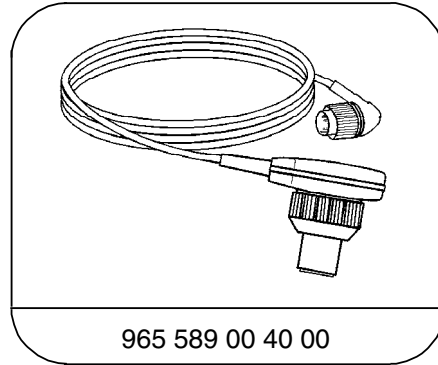
Models 129, 140, 170 as of M.Y. 1998

Special Tools



965 589 00 01 00

Hand-Held-Tester









965 589 00 40 00

Test cable

4.10 Infrared Remote Central Locking (RCL)

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Electrical Test Program – Test Actual Values

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
1.0		Circuit 30			√ F	23 ⇒ 1.0
2.0		Status of radio/infrared remote central locking/unlocking		Using transmitter key: Lock vehicle: Unlock vehicle:	√ F √ F	23 ⇒ 3.0, 23 ⇒ 4.0, 23 ⇒ 5.0
3.0		Recently used transmitter key (number of key listed)		Example (of key):	Key numbered: 02	Transmitter key.
4.0		Recently used transponder (number of transponder listed)		Example (of transponder):	Transponder numbered: 02	Transmitter key.
5.0		Country version			USA, Japan, balance of world countries	See 31/1

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Electrical Test Program – Test Actual Values

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
6.0		Lock switch circuit 1 (USA only)		Insert key into driver's door or trunk lid lock and turn: To left detent: Yes Release key: NO		23 ⇒ 14.0, 23 ⇒ 15.0
7.0		Lock switch circuit 2 (USA only)		Insert key into driver's door or trunk lid lock and turn: To right detent: Yes Release key: NO		23 ⇒ 14.0, 23 ⇒ 15.0
8.0		Transponder amplitude			20-30V	23 ⇒ 22.0, 23 ⇒ 23.0, Transmitter key.
9.0		Transponder inserted in ignition switch		Insert transponder into ignition switch	✓ F	Transmitter key invalid, Transponder invalid.
10.0		Versions within the version coding are locked			YES NO	Test counter for Circuit 15 ON has run out, Radio frequency DAS control module (N54/3), DAS radio frequency/infrared control module (N54/4).

4.10 Infrared Remote Central Locking (RCL)

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Electrical Test Program – Test Actual Values

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
11.0		Radio frequency transmitter key synchronized. (Actual value readout for all 8 transmitter keys is indeed possible)			YES NO	Transmitter key is deactivated, Re-synchronize transmitter keys. Radio frequency DAS control module (N54/3), DAS radio frequency/infrared control module (N54/4).
12.0		Transponder initialized (Actual value readout for all 8 transmitter keys is indeed possible)			YES NO	Transmitter key is deactivated, Radio frequency DAS control module (N54/3), DAS radio frequency/infrared control module (N54/4).
13.0		Transmitter key and transponder are activated (Actual value readout for all 8 transmitter keys is indeed possible)			Activated, Irrevocable deactivation Revocable deactivation	Perform activation or deactivation of the transmitter key, Radio frequency DAS control module (N54/3), DAS radio frequency/infrared control module (N54/4).

Diagnosis – Activation

The following systems/signals can be activated via the HHT:

- Status of Radio frequency/Infrared Remote Central Locking (RCL).
- Convenience Feature (CF)
- Remote Trunk Release (RTR).
- Radio frequency signal.
- Infrared signal.
- Activation of the turn signal system.






Preparation for Test:

1. Fuses ok,
2. Battery voltage > 11,
3. Side windows open,
4. Ignition: **ON**
5. After the "Function" Menu in the HHT, the menu point 4 (activation) appears.
6. The following tests are possible via the HHT (see 14/2).

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Diagnosis – Activation

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
1.0		Status of Radio Frequency/Infrared Remote Central Locking (RCL)		Press F2 Press F3	Vehicle unlocks. Vehicle locks.	23 ⇒ 16.0, 23 ⇒ 17.0, 23 ⇒ 18.0, 23 ⇒ 19.0, 23 ⇒ 20.0, 23 ⇒ 21.0
2.0		Convenience Feature (CF) Opening Model 129 only		Press F2 Press F3	Side windows open. Function is interrupted.	23 ⇒ 17.0, 23 ⇒ 18.0, 23 ⇒ 19.0
3.0		Convenience Feature (CF) Closing Models 129/140		Press F2 Press F3	Side windows open and sliding pop-up roof closes. Function is interrupted.	23 ⇒ 16.0, 23 ⇒ 20.0, 23 ⇒ 21.0
4.0		Remote trunk release Models 129/140		Press F2	Trunk lid opens.	23 ⇒ 17.0, 23 ⇒ 18.0, 23 ⇒ 19.0, Electrical/pneumatic fault in PSE, Trunk lid lock has mechanical fault.

4.10 Infrared Remote Central Locking (RCL)

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Diagnosis – Activation

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
5.0		Radio frequency signal received from transmitter key		Ignition: ON Press button on transmitter key.	YES (for approx. 2 seconds). NO	23 ⇒ 1.0, 23 ⇒ 2.0, 23 ⇒ 3.0, Transmitter key, Radio frequency DAS control module (N54/3), DAS radio frequency/infrared control module (N54/4).
6.0		IR signal received by left front door IR receiver (A26/1) Models 129/140 only		Ignition: ON Point second IR transmitter key at (A26/1) and press button.	YES (for approx. 2 seconds). NO	23 ⇒ 6.0, 23 ⇒ 7.0, Transmitter key, DAS radio frequency/infrared control module (N54/4).

4.10 Infrared Remote Central Locking (RCL)

Models 129, 140, 170 as of M.Y. 1998

Diagnosis – Activation

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
7.0		IR signal received by right front door IR receiver (A26/2) Models 129/140 only		Ignition: ON Point second IR transmitter key at (A26/2) and press button.	YES (for approx. 2 seconds). NO	23 ⇒ 8.0, 23 ⇒ 9.0, Transmitter key, DAS radio frequency/infrared control module (N54/4).
8.0		Activation of turn signal system		Press F2 Press F3	Turn signal system blinks 1x. Turn signal system blinks 3x.	23 ⇒ 10.0, 23 ⇒ 11.0, Version coding incorrect.

Electrical Test Program – Component Locations

Model 129 shown

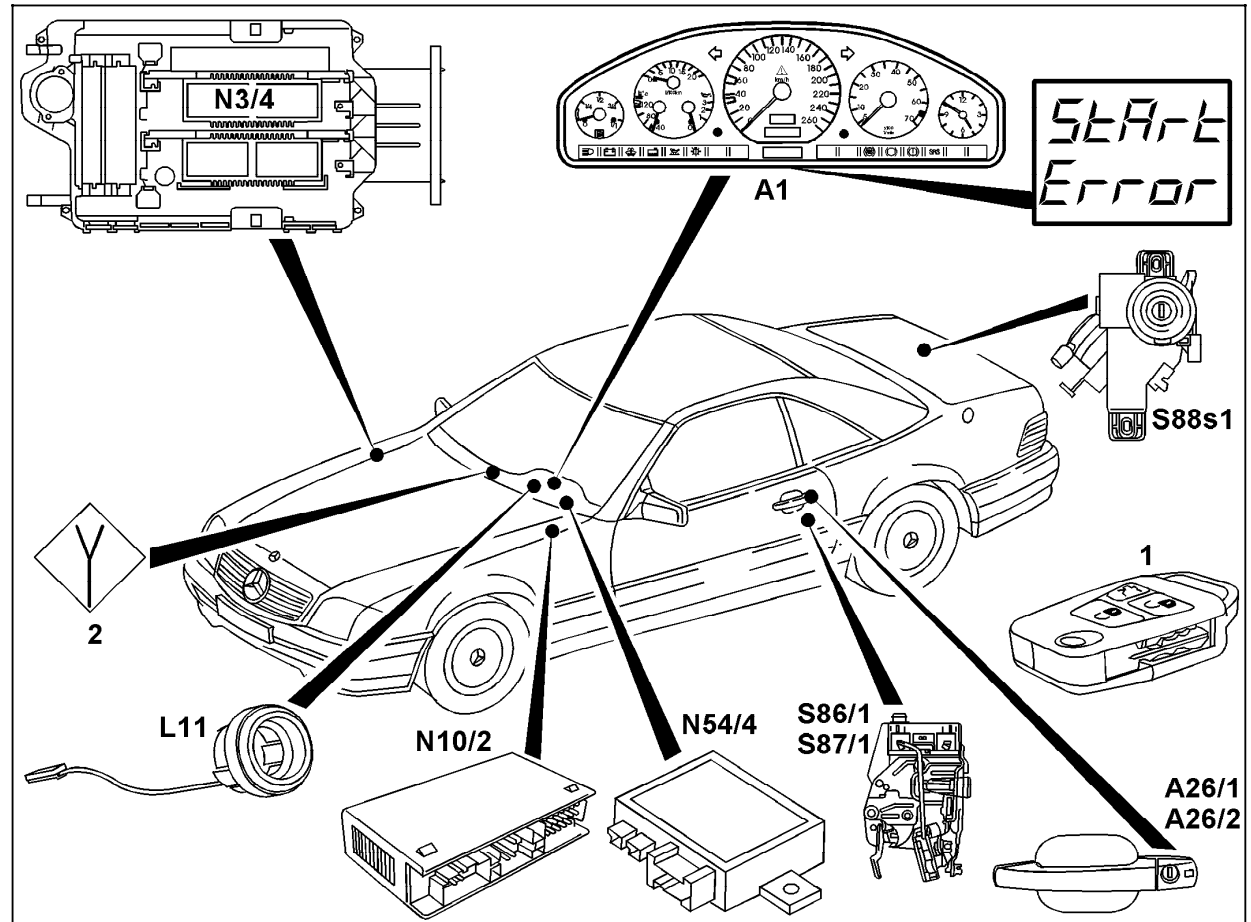


Figure 1

- A1 Instrument cluster
- A26/1 Left front door IR receiver
- A26/2 Right front door IR receiver
- L11 Transponder coil
- N3/4 Engine control module (HFM-SFI)
- N10/2 Combination relay module (turn signal with trailer coupling, rear window defroster, wiper motor, ATA)
- N54/4 DAS radio frequency/infrared control module (located behind instrument cluster)
- 1 Transmitter key with transponder
- 2 Antenna
- S86/1 Left front door lock switch (CF) (USA)
- S87/1 Right front door lock switch (CF) (USA)
- S88s1 ATA/CF microswitch (USA)

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4.10 Infrared Remote Central Locking (RCL)

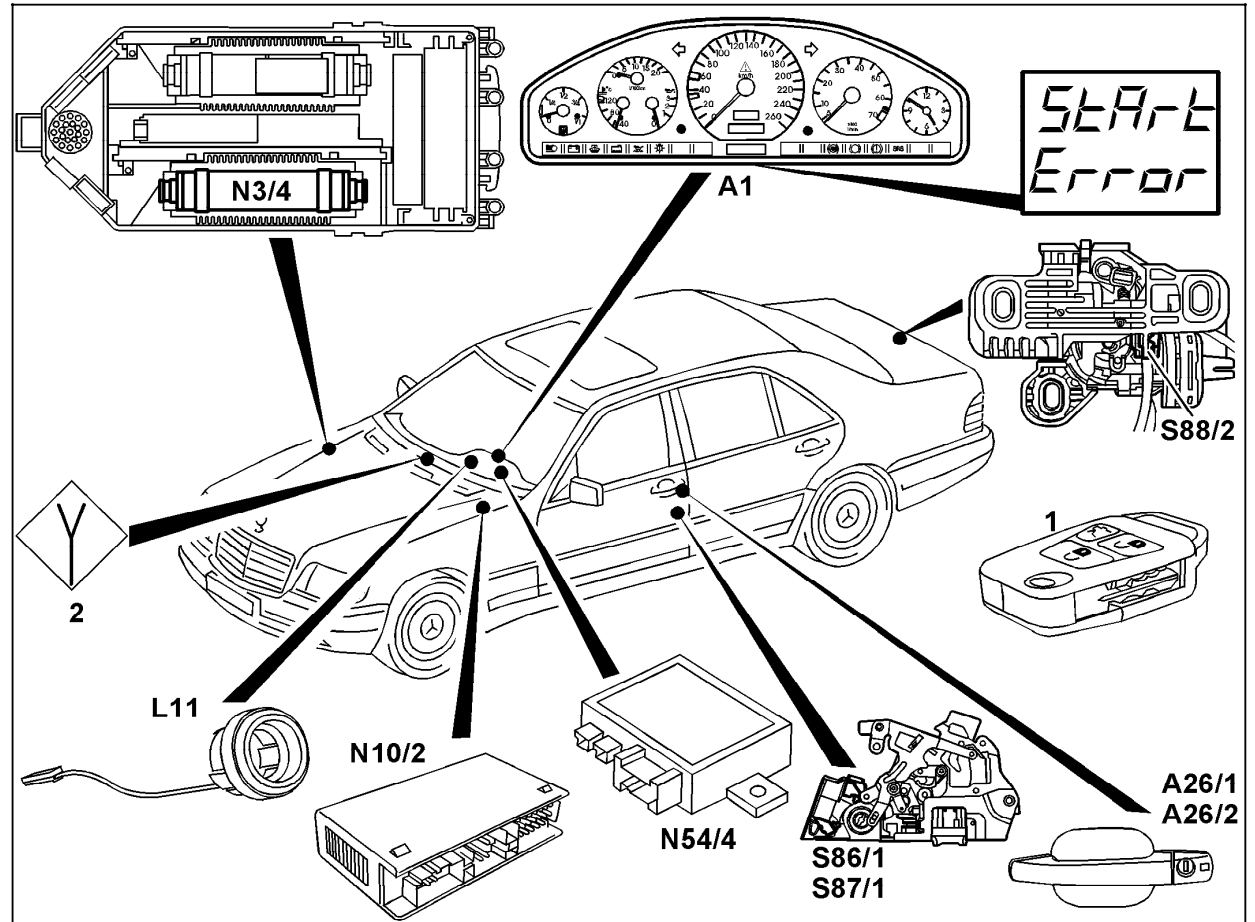
Models 129, 140, 170 as of M.Y. 1998

Electrical Test Program – Component Locations

Model 140 sedan with HFM-SFI shown

Figure 2

- A1 Instrument cluster
- A26/1 Left front door IR receiver
- A26/2 Right front door IR receiver
- L11 Transponder coil
- N3/4 Engine control module (HFM-SFI)
- N10/2 Combination relay module (turn signal with trailer coupling, rear window defroster, wiper motor, ATA)
- N54/4 DAS radio frequency/infrared control module (located behind instrument cluster)
- 1 Transmitter key with transponder
- 2 Antenna
- S86/1 Left front door lock switch (CF) 
- S87/1 Right front door lock switch (CF) 
- S88/2 Trunk lid lock switch (CF) 



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Electrical Test Program – Component Locations

Model 170 with HFM-SFI shown

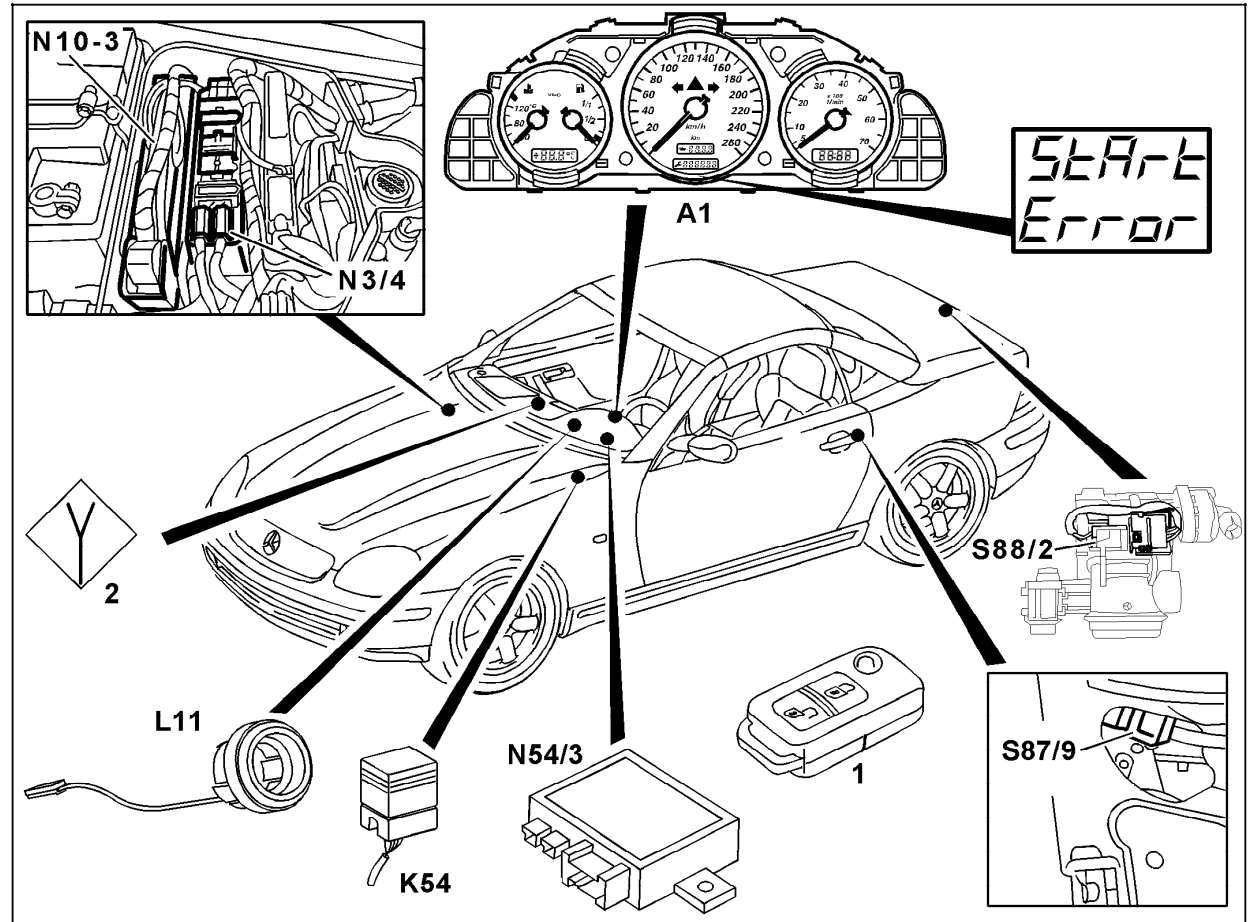


Figure 3

- A1 Instrument cluster
- L11 Transponder coil
- K54 Locking confirmation relay module
- N3/4 Engine control module (HFM-SFI)
- N10-3 Combination control module
- N54/3 Radio frequency DAS control module (located behind instrument cluster)
- 1 Transmitter key with transponder
- 2 Antenna
- S87/9 Left front door lock switch (CF) (USA)
- S88/2 Trunk lid lock switch (CF) (USA)

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4.10 Infrared Remote Central locking (RCL)

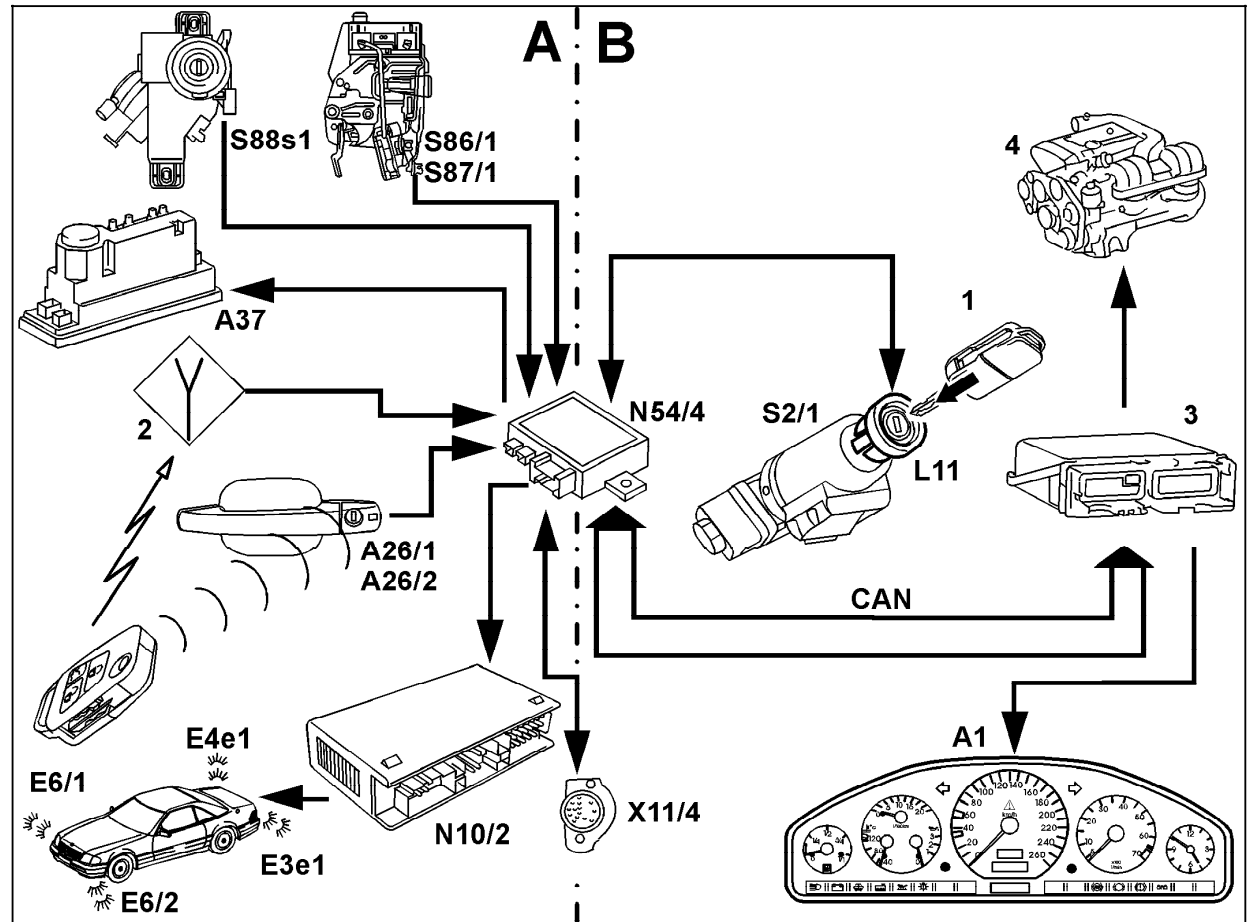
Models 129, 140, 170 as of M.Y. 1998

Electrical Test Program – Connection of Components

Model 129

Figure 1

- A Radio/Infrared remote control for central locking
- B Drive authorization stage (DAS)
(release of motor management via transponder)
- A1 Instrument cluster
- A26/1 Left front door IR receiver
- A26/2 Right front door IR receiver
- A37 PSE control module, combined functions
- CAN Control-Area-Network
- E3e1 Turn signal lamp
- E4e1 Turn signal lamp
- E6/1 Left turn signal/side marker lamp (USA)
- E6/2 Right turn signal/side marker lamp (USA)
- L11 Transponder coil
- N10/2 Combination relay module (turn signal with trailer coupling, rear window defroster, wiper motor, ATA)
- N54/4 DAS radio frequency/infrared control module
- S2/1 Ignition/starter switch
- S86/1 Left front door lock switch (CF) (USA)
- S87/1 Right front door lock switch (CF) (USA)
- S88s1 ATA/CF microswitch (USA)
- X11/4 Data link connector (DTC readout)
- 1 Transmitter key with transponder
- 2 Antenna
- 3 Engine control module
- 4 Engine



P80.30-0442-06

4.10 Infrared Remote Central locking (RCL)

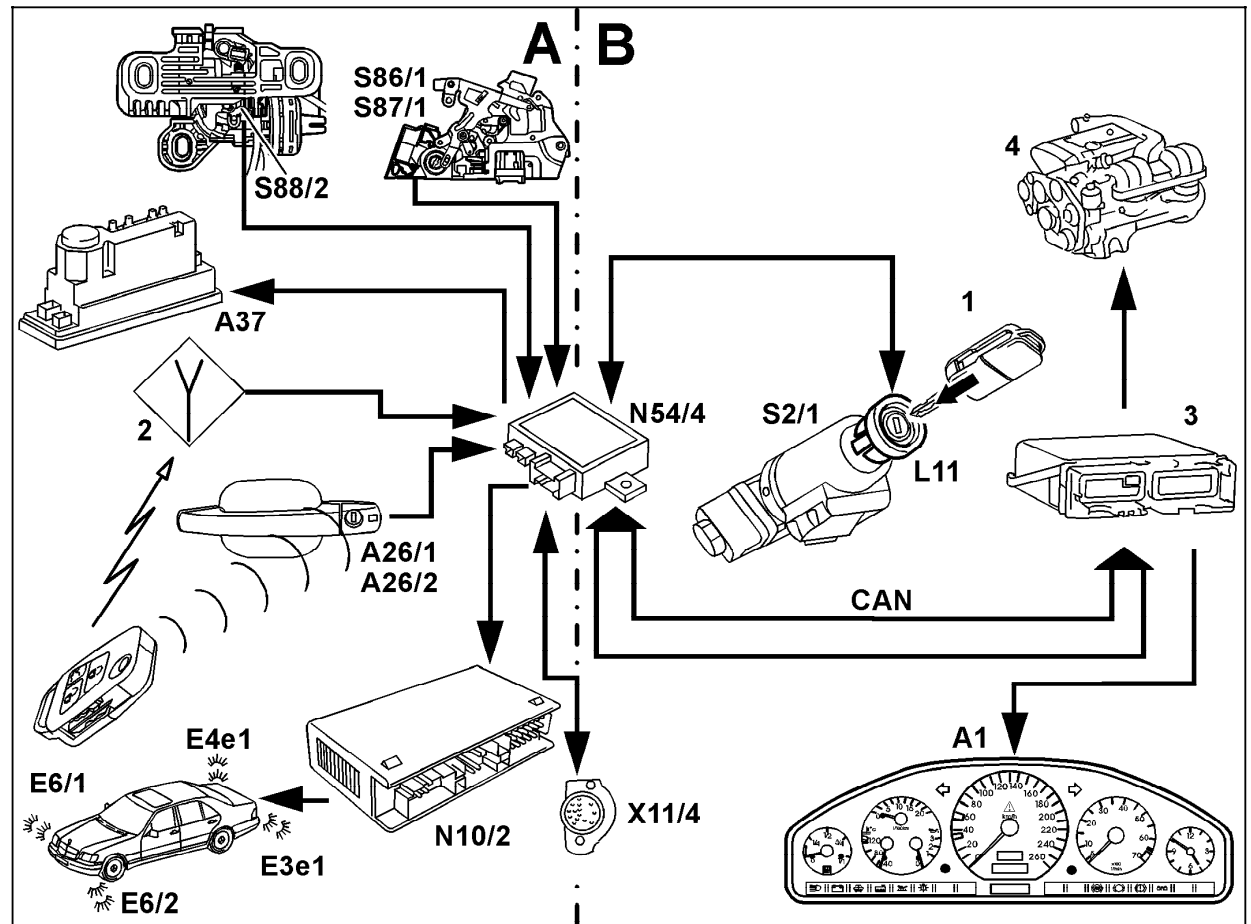
Models 129, 140, 170 as of M.Y. 1998

Electrical Test Program – Connection of Components

Model 140 sedan shown

Figure 2

- A Radio/Infrared remote control for central locking
- B Drive authorization stage (DAS)
(release of motor management via transponder)
- A1 Instrument cluster
- A26/1 Left front door IR receiver
- A26/2 Right front door IR receiver
- A37 PSE control module, combined functions
- CAN Control-Area-Network
- E3e1 Turn signal lamp
- E4e1 Turn signal lamp
- E6/1 Left turn signal/side marker lamp (USA)
- E6/2 Right turn signal/side marker lamp (USA)
- L11 Transponder coil
- N10/2 Combination relay module (turn signal with trailer coupling, rear window defroster, wiper motor, ATA)
- N54/4 DAS radio frequency/infrared control module
- S2/1 Ignition/starter switch
- S86/1 Left front door lock switch (CF) (USA)
- S87/1 Right front door lock switch (CF) (USA)
- S88/2 Trunk lid lock switch (CF) (USA)
- 1 Transmitter key
- 2 Antenna
- 3 Engine control module
- 4 Engine



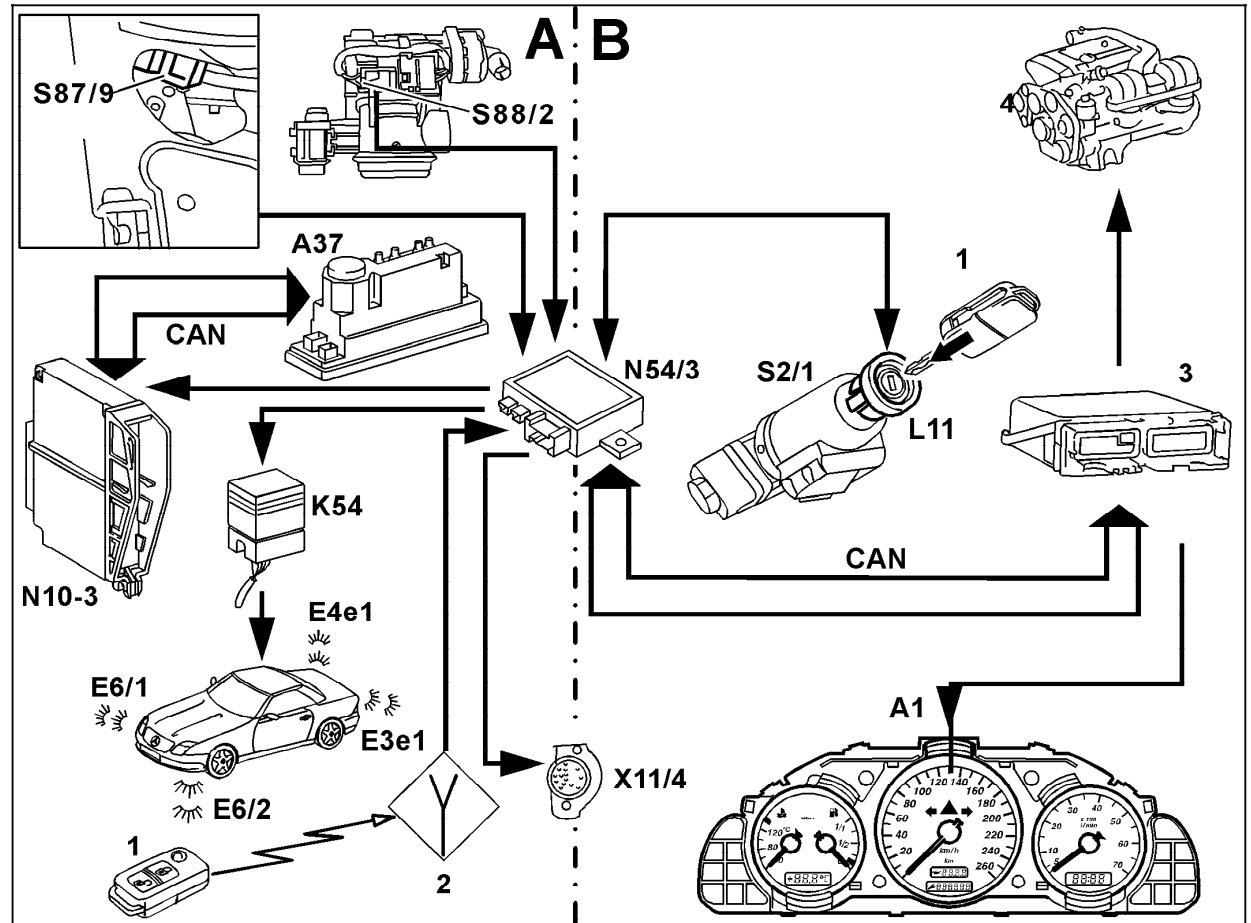
P80.30-0383-06

Electrical Test Program – Connection of Components

Model 170

Figure 3

- A Radio/Infrared remote control for central locking
- B Drive authorization stage (DAS)
(release of motor management via transponder)
- A1 Instrument cluster
- A37 PSE control module, combined functions
- CAN Control-Area-Network
- E3e1 Turn signal lamp
- E4e1 Turn signal lamp
- E6/1 Left turn signal/side marker lamp (USA)
- E6/2 Right turn signal/side marker lamp (USA)
- L11 Transponder coil
- K54 Locking confirmation relay module
- N10-3 combination control module
- N54/3 Radio frequency/infrared control module
- S2/1 Ignition/starter switch
- S87/9 Left front door lock switch (CF) (USA)
- S88/2 Trunk lid lock switch (CF) (USA)
- X11/4 Data link connector (DTC readout)
- 1 Transmitter key with transponder
- 2 Antenna
- 3 Engine control module
- 4 Engine



P80.30-0381-06

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 the Hand-Held Tester (HHT) to X11/4, according to diagram, see section 0.

Electrical wiring diagrams:

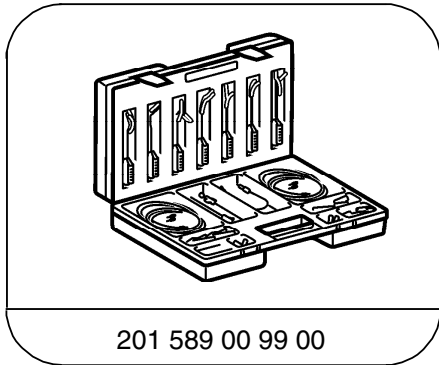
Electrical Troubleshooting Manual, Model 129, Volume 2, group 80,
Model 140, Volume 2, group 80,
Model 170, Volume 2, group 80

4.10 Infrared Remote Central Locking (RCL)

Models 129, 140, 170 as of M.Y. 1998

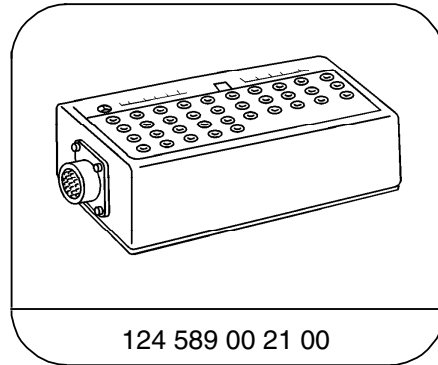
Electrical Test Program – Preparation for Test

Special Tools



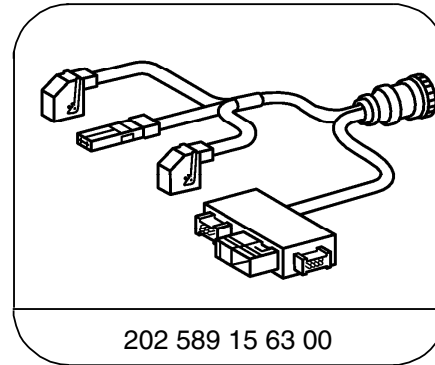
201 589 00 99 00

Electrical connecting set



124 589 00 21 00

35-pin socket box



202 589 15 63 00

18-pin and 12-pin CAN test cable

Conventional tools, test equipment

Description	Brand, model, etc.
Multimeter ¹⁾	Fluke models 23, 83, 85, 87, 88

¹⁾ Available through the MBUSA Standard Equipment Program.

Electrical Test Program – Preparation for Test

Connection Diagram - Socket Box



Location of Radio frequency DAS control module (N54/3) and DAS radio frequency/infrared control module (N54/4) is behind instrument cluster (A1), Model 170 shown

After reinstallation of the instrument cluster and the steering wheel, the DTC fault codes for the SRS Airbag are to be erased via the HHT.

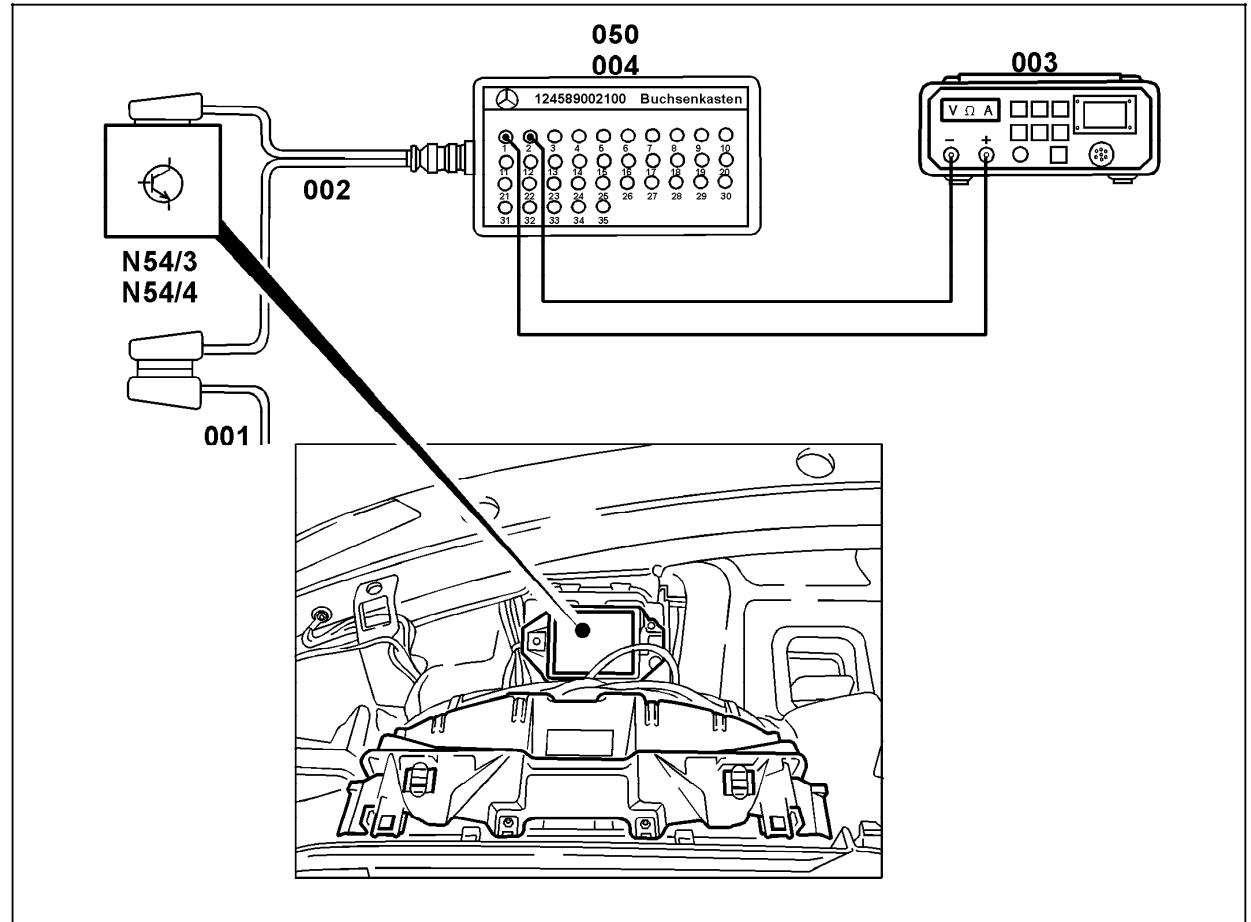


Figure 1




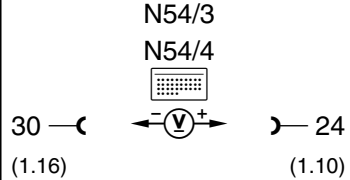
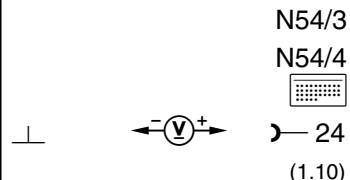
- 001 Radio frequency DAS/DAS radio frequency /IR DAS control module connector
- 002 Test cable (202 589 15 63 00)
- 003 Multimeter
- 004/050 Socket box (35-pole)
- N54/3 Radio frequency DAS control module
- N54/4 DAS radio frequency/infrared control module

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4.10 Infrared Remote Central Locking (RCL)

Models 129, 140, 170 as of M.Y. 1998


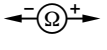

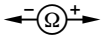

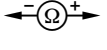

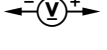
Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
1.0		Radio frequency DAS control module (N54/3) or DAS radio frequency/infrared control module (N54/4) Voltage supply Circuit 30		Ignition: ON	✓ F	Wiring, Battery.
2.0		Radio frequency DAS control module (N54/3) or DAS radio frequency/infrared control module (N54/4) Voltage supply Circuit 15	N54/3 N54/4  30 —((1.16) —) 24 (1.10)	Ignition: OFF Ignition: ON	<1 V 11 – 14 V	Wiring, Circuit 31, ⇒ 2.1
2.1		Circuit 15	N54/3 N54/4  ⊥ —) 24 (1.10)	Ignition: OFF Ignition: ON	<1 V 11 – 14 V	Wiring, Circuit 15

4.10 Infrared Remote Central Locking (RCL)

Models 129, 140, 170 as of M.Y. 1998


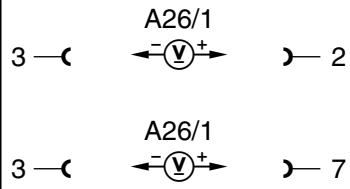
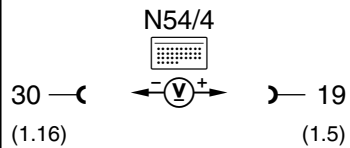
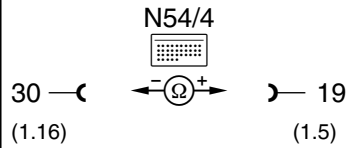

Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
3.0		Antenna HF line Γ shield	<p>N54/3 N54/4</p> 	Disconnect N54/3 or N54/4 from  .	>20 kΩ	Wiring.
4.0		Antenna HF line Γ+	<p>N54/3 N54/4</p> 	Disconnect N54/3 or N54/4 from  .	>20 kΩ	Wiring.
5.0		Antenna HF line Γ-	<p>N54/3 N54/4</p> 	Disconnect N54/3 or N54/4 from  .	>20 kΩ	Wiring.
6.0		Left front door IR receiver (A26/1) Voltage supply Models 129/140 only	<p>N54/4</p> 		4.4 – 5.5 V	Wiring, 23 ⇒ 1.0, 23 ⇒ 2.0, N54/4

4.10 Infrared Remote Central Locking (RCL)

Models 129, 140, 170 as of M.Y. 1998


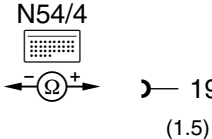

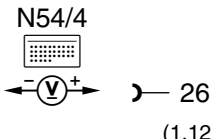
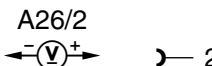
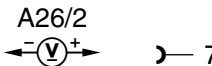
Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
6.1		A26/1 Voltage supply Model 140 Model 129		Remove A26/1	4.4 – 5.5 V	Wiring, 23 ⇒ 1.0, 23 ⇒ 2.0, N54/4
7.0	B1102	Left front door IR receiver (A26/1) IR signal control line Models 129/140 only		Lock vehicle by point transmitter key at driver-side IR receiver, keep button pressed. Read value after locking sequence has completed. Release button, and then read second value.	Difference of values between button pressed and button released approx. 0.1 – 1.0 V (less than button released value).	Wiring, 23 ⇒ 6.0, 23 ⇒ 7.1.0, 23 ⇒ 7.2.0, A26/1, Transmitter key.
7.1	B1102	Left front door IR receiver (A26/1) IR signal control line Γ1 – Models 129/140 only		Disconnect N54/4 from  Disconnect A26/1	>20 kΩ	Wiring.

4.10 Infrared Remote Central Locking (RCL)

Models 129, 140, 170 as of M.Y. 1998



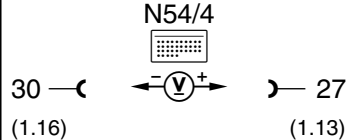

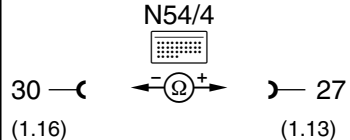

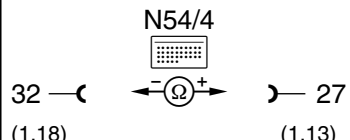

Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
7.2		Left front door IR receiver (A26/1) IR signal control line Γ1 + Models 129/140 only		Disconnect N54/4 from  Disconnect A26/1	>20 kΩ	Wiring.
8.0		Right front door IR receiver (A26/2) Voltage supply Models 129/140 only			4.4 – 5.5 V	Wiring, 23 ⇒ 1.0, 23 ⇒ 2.0, N54/4
8.1		A26/2 Voltage supply Model 140		Remove A26/2	4.4 – 5.5 V	Wiring, 23 ⇒ 1.0, 23 ⇒ 2.0, N54/4
		Model 129				

4.10 Infrared Remote Central Locking (RCL)

Models 129, 140, 170 as of M.Y. 1998


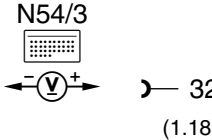
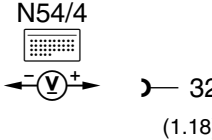
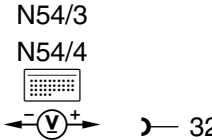
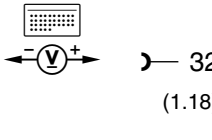
Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
9.0		Right front door IR receiver (A26/2) IR signal control line Models 129/140 only	 30 —◀ —(V)—▶ 27 (1.16) (1.13)	Lock vehicle by point transmitter key at passenger-side IR receiver, keep button pressed. Read value after locking sequence has completed. Release button, and then read second value.	Difference of values between button pressed and button released approx. 0.1 – 1.5 V (less than button released value).	Wiring, 23 ⇒ 8.0, 23 ⇒ 9.1.0, 23 ⇒ 9.2.0, A26/2, Transmitter key.
9.1		Right front door IR receiver (A26/2) IR signal control line Γ1 – Models 129/140 only	 30 —◀ —(Ω)—▶ 27 (1.16) (1.13)	Disconnect N54/4 from  Disconnect A26/2	>20 kΩ	Wiring.
9.2		Right front door IR receiver (A26/2) IR signal control line Γ1 + Models 129/140 only	 32 —◀ —(Ω)—▶ 27 (1.18) (1.13)	Disconnect N54/4 from  Disconnect A26/2	>20 kΩ	Wiring.

4.10 Infrared Remote Central Locking (RCL)

Models 129, 140, 170 as of M.Y. 1998


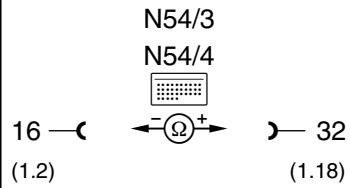

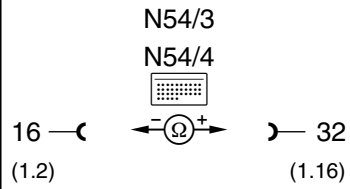

Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
10.0		Locking conformation relay module (K54) Activation Model 170		Locking of the vehicle via RCL	11 – 14 V intermittent for approx. 2 seconds.	Wiring, 23 ⇒ 12.0, 23 ⇒ 13.0, N54/3, N54/4
		Combination relay module (N10/2) Activation of blinker system Locking Models 129/140			11 – 14 V For approx. 2 seconds.	
11.0		Locking conformation relay module (K54) Activation Model 170		Unlocking of the vehicle via RCL	11 – 14 V for approx. 0.5 seconds.	Wiring, 23 ⇒ 12.0, 23 ⇒ 13.0, N54/3, N54/4
		Combination relay module (N10/2) Activation of blinker system Unlocking Models 129/140				

4.10 Infrared Remote Central Locking (RCL)

Models 129, 140, 170 as of M.Y. 1998


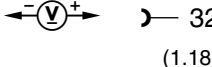
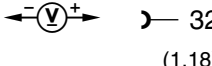
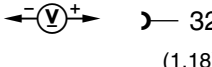

Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
12.0	B1706	Locking conformation relay module (K54) OR Combination relay module (N10/2) Activation Wiring Γ Γ-		Disconnect N54/3 or N54/4 from  Disconnect K54 or N10/2	>20 kΩ	Wiring.
13.0	B1706	Locking conformation relay module (K54) OR Combination relay module (N10/2) Activation Wiring Γ Γ+		Disconnect N54/3 or N54/4 from  Disconnect K54 or N10/2	>20 kΩ	Wiring.

4.10 Infrared Remote Central Locking (RCL)

Models 129, 140, 170 as of M.Y. 1998


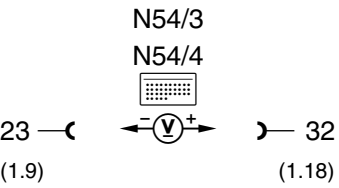

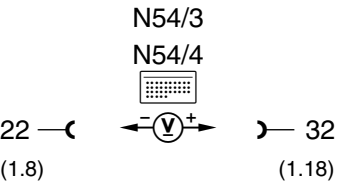
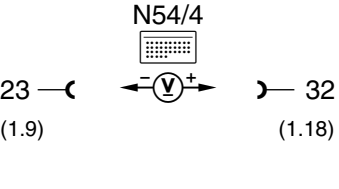
Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
14.0		Lock nut switch (S86/1) Circuit (USA) only Models 129/140	<p>N54/3 N54/4 </p> <p>N54/3 N54/4 </p> <p>N54/4 </p>	Disconnect N54/3 or N54/4 from  . Disconnect S88/2 S86/1: Rest position: <1 V Press and hold unlock: 11 – 14 V S86/1: Rest position: <1 V Press and hold lock: 11 – 14 V S86/1: Rest position: <1 V Press and hold lock: 11 – 14 V		Wiring, S86/1

4.10 Infrared Remote Central Locking (RCL)

Models 129, 140, 170 as of M.Y. 1998



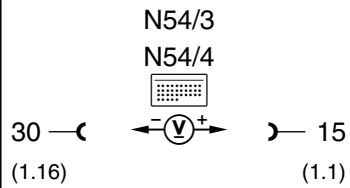

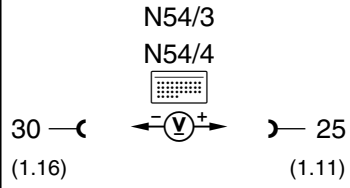
Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
15.0		Lock nut switch (S86/1) and Trunk lid lock switch (S88/2) Circuit (USA) only Models 140/170		Disconnect N54/3 or N54/4 from  . S88/2: Rest position: Press and hold unlock:	<1 V 11 – 14 V	Wiring, S88/2
		Lock nut switch (S86/1) and ATA/CF microswitch (S88s1) circuit (USA) only Model 129		S88/2: Rest position: Press and hold lock:	<1 V 11 – 14 V	Wiring, S88s1
		Lock nut switch (S86/1) and ATA/CF microswitch (S88s1) circuit (USA) only Model 129		S88s1: Rest position: Press and hold lock:	<1 V 11 – 14 V	Wiring, S88s1

4.10 Infrared Remote Central Locking (RCL)

Models 129, 140, 170 as of M.Y. 1998



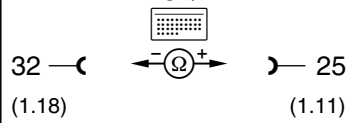


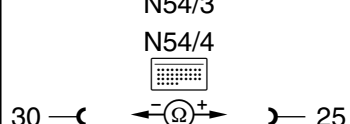

Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
16.0		Radio frequency DAS control module (N54/3) OR DAS radio frequency/infrared control module (N54/4) Output activation (PSE/CL, CF, ATA)		All doors closed and vehicle is unlocked. Lock vehicle using transmitter key.	11 – 14 V <1 V (approx. 0.5 seconds) Turn signal system blinks 3X, vehicle locks.	Wiring, 23 ⇒ 20.0, 23 ⇒ 21.0, N54/3, N54/4, PSE (A37), Model 170: Combination control module (N10-3)
17.0		Radio frequency DAS control module (N54/3) OR DAS radio frequency/infrared control module (N54/4) Output deactivation (PSE/CL, CF, ATA)		All doors closed and vehicle is locked. Unlock vehicle using transmitter key.	11 – 14 V <1 V (approx. 0.5 seconds) Turn signal system blinks 1X, vehicle unlocks.	Wiring, 23 ⇒ 18.0, 23 ⇒ 19.0, N54/3, N54/4, PSE (A37), Model 170: Combination control module (N10-3)

4.10 Infrared Remote Central Locking (RCL)

Models 129, 140, 170 as of M.Y. 1998



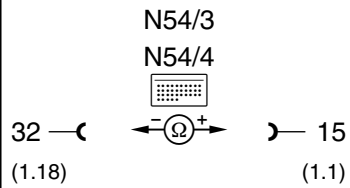


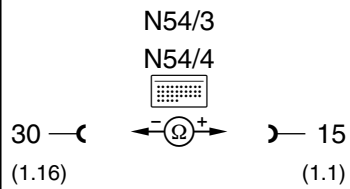

Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
18.0		Control line deactivation (PSE/CL, CF, ATA) Γ Γ +	N54/3 N54/4 	Disconnect N54/3 or N54/4 from  Disconnect PSE (A37). Disconnect grnd cable for battery. Disconnect ATA control module. Model 129 only: Disconnect power soft top control module (N52).	>20 kΩ	Wiring.
19.0		Control line deactivation (PSE/CL, CF, ATA) Γ Γ -	N54/3 N54/4 	Disconnect N54/3 or N54/4 from  Disconnect PSE (A37). Disconnect grnd cable for battery. Disconnect ATA control module. Model 129 only: Disconnect power soft top control module (N52).	>20 kΩ	Wiring.

4.10 Infrared Remote Central Locking (RCL)

Models 129, 140, 170 as of M.Y. 1998


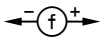
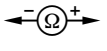
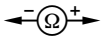
Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
20.0		Control line activation (PSE/CL, CF, ATA) Γ 1+	<p>N54/3 N54/4</p> 	<p>Disconnect N54/3 or N54/4 from .</p> <p>Disconnect PSE (A37).</p> <p>Disconnect grnd cable for battery.</p> <p>Disconnect ATA control module.</p> <p>Model 129 only: Disconnect power soft top control module (N52).</p>	>20 kΩ	Wiring.
21.0		Control line activation (PSE/CL, CF, ATA) Γ 1-	<p>N54/3 N54/4</p> 	<p>Disconnect N54/3 or N54/4 from .</p> <p>Disconnect PSE (A37).</p> <p>Disconnect ATA control module.</p> <p>Model 129 only: Disconnect power soft top control module (N52).</p>	>20 kΩ	Wiring.

4.10 Infrared Remote Central Locking (RCL)

Models 129, 140, 170 as of M.Y. 1998









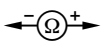



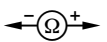


Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy	
22.0	B1704	Coil for transponder (L11) Activation	N54/3 N54/4 1 — (3)	 N54/3 N54/4 — 2 (3)	Disconnect connector 3 from N54/3 or N54/4 Ignition: ON	125 kHz for approx. 0.2 – 0.8 seconds. (measureable by Fluke 83, 88)	23 ⇒ 1.0, 23 ⇒ 2.0, N54/3, N54/4
23.0	B1704	Coil for transponder (L11) Resistance	L11 1 — (2)	 L11 — 2 (2)	Disconnect connector 3 from N54/3 or N54/4 Ignition: ON	4 – 6 Ω	L11
24.0		CAN H/CAN L data line Motor electronics activation Γ to each other	N54/3 N54/4 1 — (2)	 N54/3 N54/4 — 2 (2)	Disconnect connector 2 from N54/3 or N54/4 Disconnect engine control module.	>20 kΩ	Wiring.

4.10 Infrared Remote Central Locking (RCL)

Models 129, 140, 170 as of M.Y. 1998

Electrical Test Program – Test




⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
25.0		CAN L data line Motor electronics activation -//-	N54/3 N54/4 1 —  ←  →  2) (2)	Disconnect connector 2 from N54/3 or N54/4 Disconnect engine control module, see foot note.	>1 Ω	Wiring.
26.0		CAN H data line Motor electronics activation -//-	N54/3 N54/4 1 —  ←  →  2) (2)	Disconnect connector 2 from N54/3 or N54/4 Disconnect engine control module, see foot note.	>1 Ω	Wiring.
27.0		CAN L data line Motor electronics activation Γ 1 +	N54/3 N54/4 1 —  ←  →  32 (2)	N54/3 N54/4  Disconnect connector 2 from N54/3 or N54/4 Disconnect engine control module. (1.18)	>20 kΩ	Wiring.
28.0		CAN H data line Motor electronics activation Γ 1 +	N54/3 N54/4 2 —  ←  →  32 (2)	N54/3 N54/4  Disconnect connector 2 from N54/3 or N54/4 Disconnect engine control module. (1.18)	>20 kΩ	Wiring.

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

4.10 Infrared Remote Central Locking (RCL)

Models 129, 140, 170 as of M.Y. 1998

Electrical Test Program – Test

⇒		Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy	
29.0		CAN L data line Motor electronics activation Γ Γ-	N54/3 N54/4 1 ← Ω → (2)	N54/3 N54/4  30 (1.16)	Disconnect connector 2 from N54/3 or N54/4 Disconnect engine control module.	>20 kΩ	Wiring.
30.0		CAN H data line Motor electronics activation Γ Γ-	N54/3 N54/4 2 ← Ω → (2)	N54/3 N54/4  30 (1.16)	Disconnect connector 2 from N54/3 or N54/4 Disconnect engine control module.	>20 kΩ	Wiring.

Version Coding

- Control modules which need to be version coded, the menu point 6 appears in the HHT display. These control modules are to be version coded as necessary.
- The version coding is menu-driven.

Possible version coding

Version	
Vehicle version	129/140, 170
Convenience feature via IR signals (settings with "locked" version codes can not be changed)	Activated/Deactivated
Remote trunk release	Activated/Deactivated
Locking confirmation signal via turn signal system	Activated/Deactivated
Activation of turn signal system via	Locking conformation relay module (K54)/Combination relay module (N10/2)
Drive authorization via transponder (settings with "locked" version codes can not be changed)	Activated/Deactivated
Engine CAN adjustment (baudrate): IFI, DFI, HFM-SFI, ME-SFI	IFI, DFI, HFM-SFI as of HHT step 50, ME-SFI/HFM-SFI as of HHT step 49
Motor electronics activation	HFM-SFI, IFI, DFI, ME1.0, ME2.0
Radio frequency	Activated/Deactivated

Continued on next page

Version Coding

Possible version coding (continued)

Version	
Key-in-Test	Activated/Deactivated
Panic alarm	Activated/Deactivated
Locking nut switch (settings with "locked" version codes can not be changed)	Activated/Deactivated
Convenience feature activated via locking nut switch	Yes/No
Unlocking via valid transponder	Yes/No
Vehicle identification number (only if the VIN has not been locked)	WDB