

### 2.3 Model 163 Trip Computer as of M.Y. 1998

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### Diagnosis – Function Test




#### General Note:

The trip computer control module (N41) has the following functions:

- Calculate and display momentary and average fuel consumption
- Calculate and display estimated range
- Display time
- Display date
- ATA monitoring with glass break sensor
- ATA monitoring with incline sensor

Trip computer control module (N41) receives all the information via CAN data bus (Figure 1 11)

### Diagnosis – Function Test

Test step/Test scope	Test condition	Nominal value	Possible cause/Remedy <sup>1)</sup>
<b>Trip computer control module (N41)</b> Display, Voltage supply	Ignition: <b>On</b> switch (S2) in position 1 circuit 15R	All functions of trip computer will be activated in display for about 1 sec. (Figure 1 21)	If no function is activated: Voltage supply 23 ⇒ 1 If only some functions are not activated: Trip computer control module (N41)
<b>Trip computer control module (N41)</b> Fuel consumption signal	Engine: <b>On at idle</b> Momentary fuel consumption mode on the trip computer display. Speedometer display in the instrument cluster (A1) operational  Engine: <b>On</b> Momentary fuel consumption mode. Speedometer operational. Vehicle coasting with engine speed of approx. 2000 rpm	Trip computer displays maximum fuel consumption value (0.0 mil/gal; 99l/km)  Trip computer displays minimum fuel consumption value (70 mil/gal; 0.0 l/km)   The values correspond to the time of supplement edition (August 97) and they may change	Engine control module (N3/10) Trip computer control module (N41)

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

### Diagnosis – Function Test

Model 163

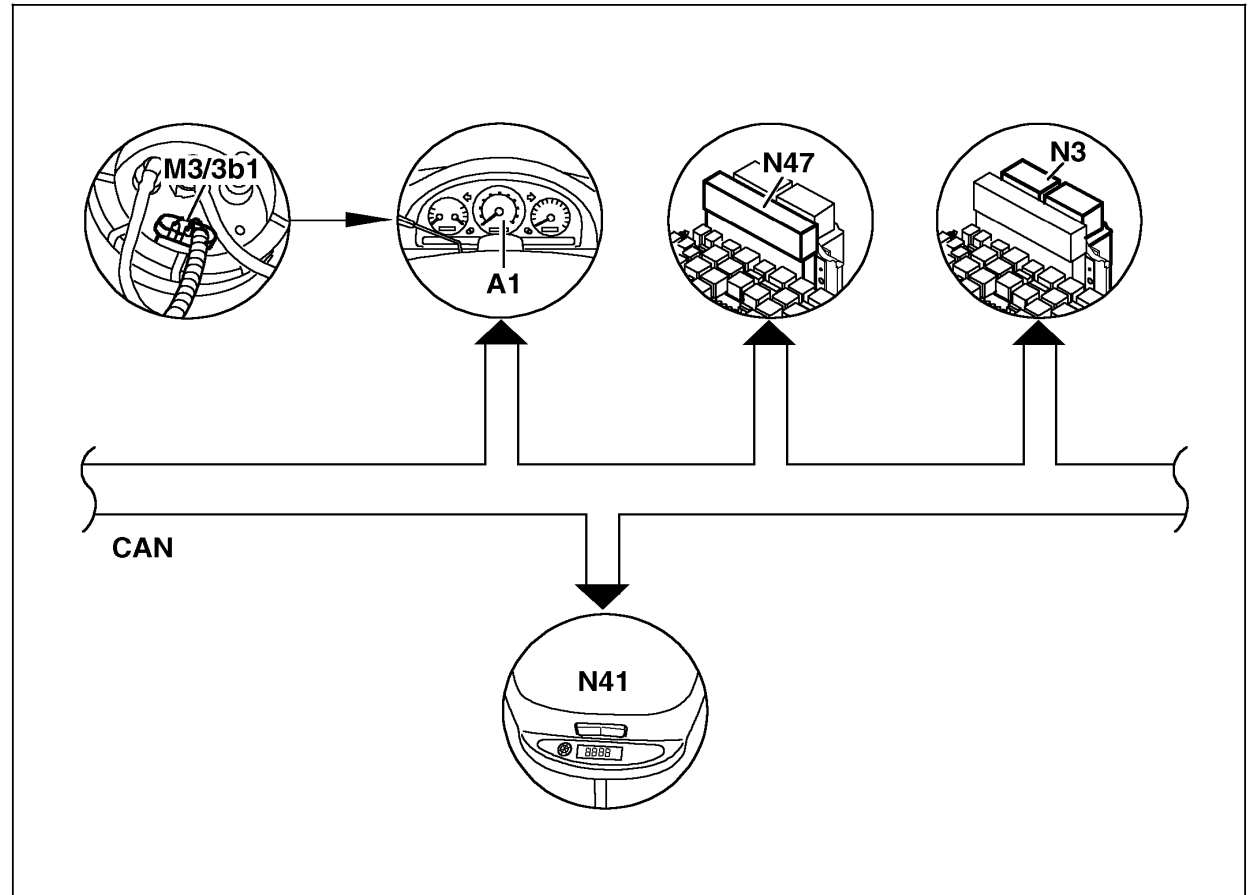


Figure 1

- A1 Instrument Cluster (IC)
- M3/3b1 Fuel level sensor
- N3/10 Engine control module (ME-SFI)
- N41 Trip computer control module
- N47 Traction systems control module

P54.50-0213-06

### Diagnosis – Diagnostic Trouble Code (DTC) Memory



#### Note regarding HHT:

The trip computer control module (N41) receives all the signals from the external sources via CAN data bus. Direct diagnosis of the incoming signals using HHT is therefor not possible.

To narrow the search for the possible fault cause it is important to observe functionality of other systems. In this case for the faulty instrument cluster (A1) indicators gauges or displays. For example incorrect vehicle speed displayed on the speedometer in the instrument cluster can be caused by the faulty traction systems control module (N47) which sends VSS signal via CAN data bus. Incorrect VSS signals would cause erroneous displays of fuel consumption and range on the trip computer.

It is recommended to read-out the respective actual values (VSS signal) using HHT with the instrument cluster (A1) or traction systems control module (N47) options.

The incorrect fuel consumption can be caused by the incorrect signal from the engine control module (N3/10). It is important therefor to readout with HHT the actual values from the engine control module (N3/10).

Incorrect reading of the fuel gauge in the instrument cluster (A1)) which could be caused by the faulty fuel level sensor (M3/3b1) will hinder the operation of the trip computer.

If the problem with the trip computer lies only in the trip time function, it indicates faulty trip computer control module (N41) since the needed information for that function is determined within control module itself. Refer to the trip computer function description.



#### Note

The values correspond to the time of supplement edition and they may change

### Diagnosis – Complaint Related Diagnostic Chart

Complaint/Problem	Possible cause	Notes	Test step/Remedy <sup>1)</sup>
Trip computer control module (N41) not functioning at all	Voltage supply, trip computer control module (N41)		23 ⇒ 1.0
Date in display does not function	If the clock in the instrument cluster (IC) does not function: Instrument cluster (IC) otherwise: N41	Synchronization signal for advancing the date comes from the instrument cluster (A1) via CAN data bus	Instrument cluster (IC) section 1.15 A1 N41
Trip time in display does not function	N41	This function is calculated entirely within the trip computer control module (N41)	N41
Following functions of trip computer not possible: <ul style="list-style-type: none"> <li>• momentary fuel consumption</li> <li>• average fuel consumption</li> <li>• range function</li> </ul>	If the speed display in the instrument cluster also does not function: Traction system control module (N47) otherwise:  Engine control module (N3/10)  CAN data bus	The required signals for these function of the trip computer come from the traction systems control module (N47) and from the engine control module (N3/10) via CAN data bus	DM AD42.35-P-1001BZ Read out VSS actual value signal using HHT from instrument cluster (A1) or traction systems control module (N47) Read out fuel consumption actual value signal using HHT from engine control module (N47) 23 ⇒ 2.0
Following functions of trip computer not possible: <ul style="list-style-type: none"> <li>• momentary fuel consumption</li> <li>• average fuel consumption</li> </ul> or <ul style="list-style-type: none"> <li>• both functions</li> </ul>	N41		N41

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

### Diagnosis – Complaint Related Diagnostic Chart

Complaint/Problem	Possible cause	Notes	Test step/Remedy <sup>1)</sup>
Only range functions of trip computer not possible	If the fuel gauge in the instrument cluster also does not function: Fuel level sensor (M3/3b1) A1 otherwise: N41	The required signals come from the instrument cluster (A1), traction systems control module (N47) and from the engine control module (N3/10) via CAN data bus	Instrument cluster (IC) section 1.15 Read out fuel level sensor actual value signal using HHT from instrument cluster (A1) option  N41
"FUEL" flashes in display with trip computer in the range function although, fuel level is above the reserve due to refueling	If the fuel gauge in the instrument cluster also does not function: Fuel level sensor (M3/3b1) A1 otherwise: N41		Instrument cluster (IC) section 1.15 Read out fuel level sensor actual value signal using HHT from instrument cluster (A1) option  N41
"FUEL" does not flashes in display with trip computer in the range function although, fuel level is clearly in the reserve range	If the fuel gauge in the instrument cluster also does not function: Fuel level sensor (M3/3b1) A1 otherwise: N41		Instrument cluster (IC) section 1.15 Read out fuel level sensor actual value signal using HHT from instrument cluster (A1) option  N41

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

Electrical Test Program – Component Locations

Model 163

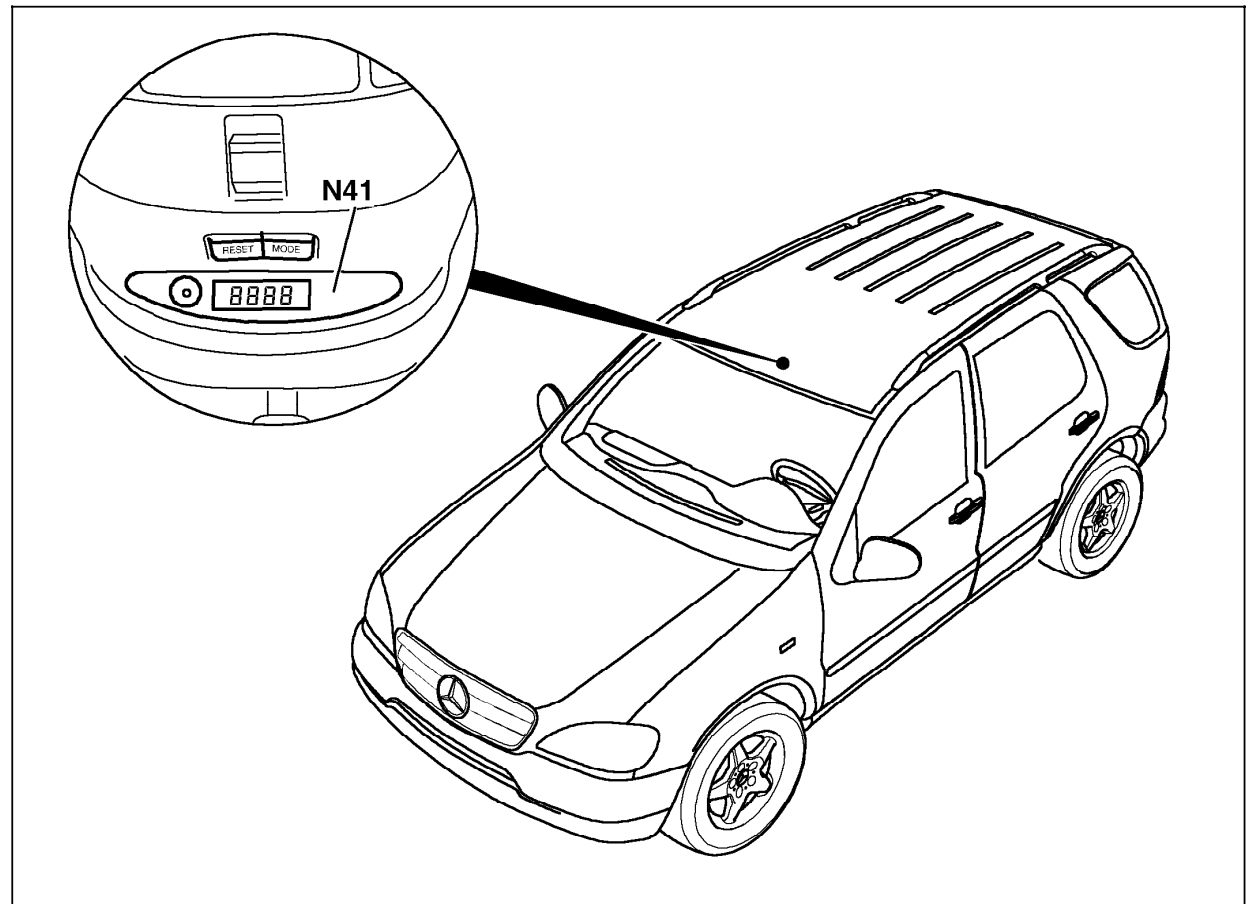


Figure 1

N41 Trip computer control module

P54.50-0212-06



### Electric Test Program – Preparation for Test

1. Battery voltage 11 – 14 V.
2. Check fuses.
3. All systems functional.

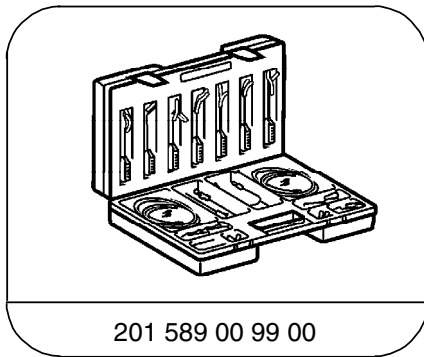
#### Electrical wiring diagrams:

Refer to Workshop Information System (WIS)

#### Caution:

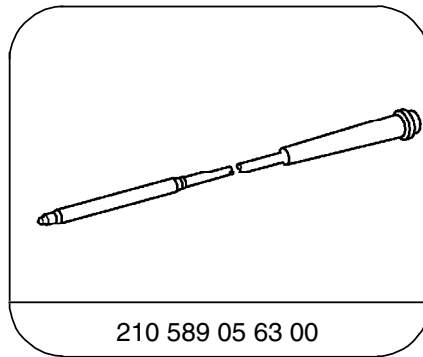
To prevent damage to the control modules, the connectors on the control modules must only be removed or connected with the ignition **OFF**.

#### Special Tools



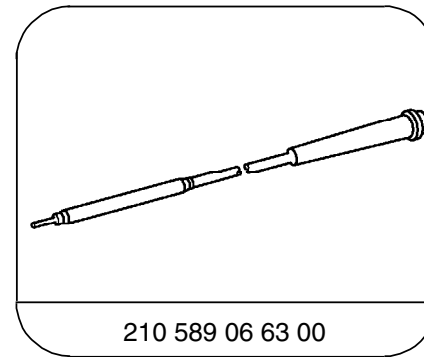
201 589 00 99 00

Electrical connecting set



210 589 05 63 00

Adapter cable



210 589 06 63 00






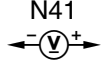

Adapter cable

#### Conventional tools, test equipment


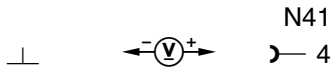
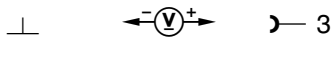
Description	Brand, model, etc.
Multimeter	Fluke models <sup>1)</sup> 23, 78, 87, 88, 98 II

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

Electrical Test Program – Test Model

⇒ 	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
1.0	<b>Trip computer control module (N41)</b> Voltage supply Circuit 30	6 —   N41  7	Ignition: <b>OFF</b> Remove Trip computer control module (N41) and disconnect 8-pole connector	11 – 14 V	Wiring, Fuse 13 in fuse and relay box (F1) Values O.K.: ⇒ 1.1
1.1	Voltage supply Circuit 15R, fused	6 —   N41  8	Disconnect 8-pole connector from N41 Starter switch (S2) in position "1" or "2"	11 – 14 V	Wiring, Fuse 10 in fuse and relay box (F1), Values O.K.: ⇒ 1.2

### Electrical Test Program – Test

⇒	Test scope	Test connection	Test condition	Nominal value	Possible cause/Remedy
2.0	<b>CAN bus data lines resistance</b>		Ignition: <b>OFF</b> Disconnect 8-pole connector from N41 (Instrument cluster (A1) and engine control module (N3/10) are connected to CAN)	around 60 Ω (Control modules N3/10 and A1 contain 120 Ω resistance respectively for CAN data bus termination. Parallel connection results in 60 Ω.	CAN: -//-, Γ Γ - N3/10 A1 Values around 120 Ω: A1 AD54.30-P-6000-5GH in WIS N3/10 (check CAN input resistance ) Values O.K.: ⇒ 2.1
2.1	<b>CAN bus data lines Low-Voltage data line</b>		Ignition: <b>ON</b> 8-pole connector disconnected from N41	around 2.3 V	A1 N3/10 Values O.K.: ⇒ 2.2
2.2	<b>CAN bus data lines High-voltage data line</b>		Ignition: <b>ON</b> 8-pole connector disconnected from N41	around 2.6 V	A1 N3/10

### Electrical Test Program – Test

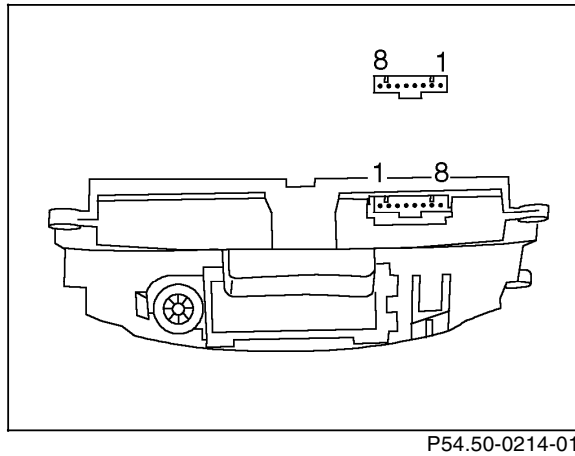


Figure 1

- |   |                                    |
|---|------------------------------------|
| 1 | ATA interface                      |
| 2 | -                                  |
| 3 | CAN H                              |
| 4 | CAN L                              |
| 5 | -                                  |
| 6 | Ground (circuit 31)                |
| 7 | Voltage supply (circuit 30)        |
| 8 | Voltage supply (circuit 15R fused) |