GENERAL INFORMATION

INFORMATION ON PREVENTING DAMAGE TO ELECTRONIC COMPONENTS DUE TO ELECTROSTATIC DISCHARGE - AH54.00-P-0001-01A

All models

Electrostatic charge

Every contact and each physical separation of materials or any movement of solid substances, fluids or particulate loaded gases can generate electrostatic charges. Plastics generally produce the highest electrostatic charge.

We come across electrostatic charge or discharge in lots of everyday situations, e.g. with:

- Combs
- Walking on carpets or plastic floors
- Putting on and removing textiles made with synthetic fiber
- Disembarking from the vehicle
- Contact between various electrostatically chargeable packaging materials in shelves or in the transport container

The following electrostatic discharge (**E** lectro **S** tatic **D** ischarge (ESD)) can be so strong that a small electric shock is detected. Even the smallest discharges which people cannot detect can cause lasting damage to electronic components and control units.

Effects and consequences of ESD

Electronic components and control units are very sensitive to ESD. The damage is often not immediately obvious, but becomes apparent some time later. In order to avoid failures and damage due to ESD in vehicle electronics, various procedures and safety precautions must be taken into account and followed.

Risks of damage occur during transport, handling, testing, removal and installation of electronic components in production as well as during repair work.

The following electronic components listed as an example can be damaged by ESD:

- Airbag components
- Control units, in particular their bus connections (Control Area Network (data bus/CAN bus) (CAN), local interconnect network (LIN) etc.)
- Sensors
- Mechatronic components (actuators etc.)
- Antenna amplifier
- Receivers and displays (Radio, TV, GPS, telephone etc.)

Modes of behavior and safety precautions

- Electrostatic discharge from the fitter (e.g. due to brief contact with the vehicle body).
- Suitable clothing, e.g. made of cotton.
- Wear ESD safety shoes with conductive soles.
- Keep workplace clean, remove unnecessary objects such as common plastics.
- Special anti-static seat cushion protectors must be used when performing repair work inside a vehicle.
- Leave replacement parts in the original packaging for as long as possible, Do not cut open seals, but cut open carefully.
- The ESD workplace must conform to the ESD guidelines. ESD protection

  gotis://E 82 04.0

- Before unpacking, discharge ESD protective packaging at the ESD workplace.
- Avoidance of contact with electrostatic chargeable materials such as PE, PVC, styrofoam.
- Use only original packaging or specially labeled and defined packaging and transport materials.
- Electronic components which have been removed must be put down on an ESD workplace.
- Touch connectors on electronic components and in the wiring harness on the housing only. Do not touch the pins and contacts!
- Electronic components must be installed before they are connected so that potential equalization with the body can take place.
- Shelves and worktables must stand directly on the floor, there must not be any insulating materials between the base of the shelves/feet and the floor. If the above mentioned insulators cannot be removed, the shelves and work tables must be grounded (e.g. low-resistance electrical connection/line from metal shelf to a heating pipe).
- Put down conductive transport container/box in a non insulated manner

  (e.g. on a wooden pallet), otherwise no potential equalization takes place.

- Do not place control units and electronic components removed from the vehicle on electrostatically chargeable materials, such as PE, PVC, styrofoam. The electrostatic charge is transferred to the control unit or electronic component. An ESD service kit or a connected ESD table mat must be used.

Training

We strongly advise that each company should appoint a trained ESD officer in accordance with DIN EN 61340-5-1.

The ESD officer can hold employee training courses.

The objective of the training course measures is to familiarize the employees with the essential difficulties and effects of ESD:

- Creation of discharging
- Reasoning behind safety precautions
- Effects and consequences of ESD
- ESD rules of conduct and safety precautions

Returning electronic components in warranty and goodwill cases

When returning electronic components it is absolutely essential to observe the procedure and safety precautions listed. Electrostatic charge or discharge mean the original fault can be falsified or overlaid.

This can lead to distorted fault symptoms in the case of the fault analysis of the component concerned.

NOTES ON BATTERY - AH54.10-P-0001-01A

All models

General information on batteries

- Do not store batteries over a longer period at a storage point with direct solar radiation.
- Discharged or defective batteries can freeze, therefore store free from frost.
- Avoid polarity reversal and short-circuits.
- Do not place tool or other conducting objects on the battery (risk of short-circuit).
- Before removal and installation of batteries all switchable current consumers should be switched off, as well as the engine switched off so that inadvertent arcing is ruled out.
- Always disconnect the **negative terminal first** and always connect **the positive terminal first.**
- Only charge batteries with DC, 10 % of the capacity is recommended as charging current for slow charging and 50 % of the capacity recommended for fast charging.
- Only switch on the charger after connecting to the terminals and switch off before disconnecting.
- We recommend greasing the batteries slightly with battery terminal grease.
- If the battery is to remain in the parked vehicle for a longer time, the negative terminal should be disconnected.
- If possible batteries should be kept clean and dry.
- Batteries should not be stored over a longer period without recharging.

Notes on lead-gel batteries (additional battery for special bodies)

- Lead-gel batteries are free from gassing, acid does not run out of them and are completely independent of position and maintenance free.
- When fast charging ensure that the housing of the lead-gel battery does not heat up excessively otherwise a pressure relief valve will be opened and the lead-gel battery will be defective.

Notes on lead acid batteries

- Always store lead lead-acid batteries horizontally to prevent acid leaking out and do not tilt during transportation.
- When fast charging ensure that the housing of the lead-acid battery does not heat up excessively.

NOTES ON SCN CODING OF CONTROL UNITS - AH54.21-P-0004-01X

Model 129, 163, 164, 168, 169, 170, 171, 199, 203, 204, 208, 209, 211, 215, 216, 219, 220, 221, 230, 240, 245, 251 Model 461, 463 Model 450, 451, 452, 454 Model 636, 639 Model 906

The "Software Calibration Number" (SCN) is specified by law in Europe and USA for all control units relevant to exhaust emission as of model year 2002.

Accordingly the software and coding of such a control unit must be clearly identifiable by means of the SCN. As a number the SCN consists of 16 numbers. The first 10 places correspond to the object number to be coded (mostly object number of control unit software). The next 2 places designate the manufacturing plant or field organization, in which the vehicle has been coded. The last 4 places are a number of the variants of the coding string of the vehicle-specific as-built configuration. This number is serially numbered for each newly formed variant.

If special equipment has been installed or removed in the vehicle (e.g. retrofitting a telephone), these retrofit codes must be added to the central system before requesting the SCN coding data. The appropriate national organization must be contacted (MPC) for this.

MAINTENANCE

BATTERIES - CHECKING AND CORRECTING FLUID LEVEL - AP54.10-P-5410MCC

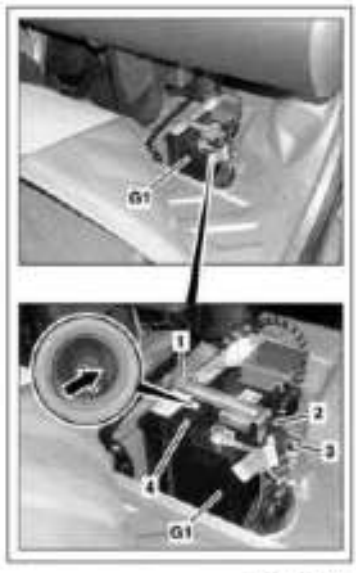
MODEL 451.3 (except 451.334)

MODEL 451.3 (except 451.380)

MODEL 451.4 (except 451.480)

1 Bracket
2 Retaining clip
3 Nut
4 Plug

G1 Battery



P54.10-2759-03

Fig. 1: Identifying Battery Components
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

	Removing		
Danger!	**Risk of explosion** caused by oxyhydrogen gas. **Risk of poisoning and caustic burns** caused by swallowing battery acid. **Risk of injury** caused by burns to	No fire, sparks, open flames or smoking. Wear acid-resistant gloves, clothing and glasses. Only pour battery acid into	**AS54.10-Z-0001-01A**

	skin and eyes from battery acid or when handling damaged lead-acid batteries	suitable and appropriately marked containers.	
	Notes on battery		**AH54.10-P-0001-01A**
1	Remove footrest on the passenger-side	Left-hand drive vehicles Right-hand drive vehicles	**AR68.30-P-1340MCC** AR68.30-P-1340MCE
2	Unscrew nut (3)		
3	Unclip the retaining clip (2) on the bracket (1) and remove bracket (1)	On right-hand drive vehicles the bracket (1) is only raised until the stop plugs (4) are accessible.	
	Checking		
4	Remove stop plugs (4) on the battery (G1) and check fluid level in the battery (G1)	In each cell the fluid must reach the web let into the filler opening (arrow).	
	Correct		
5	Correct the battery acid level with distilled water	Refill distilled water up to the web (arrow).	
6	Screw in plug (4)		
	Install		
7	Insert bracket (1) and clip in retaining clip (2) at the bracket (1)		
8	Tighten nut (3)	**Installation:** Replace self-locking nut (3).	
9	Install footrest on the passenger-side	Left-hand drive vehicles Right-hand drive vehicles	**AR68.30-P-1340MCC** AR68.30-P-1340MCE

TESTING & REPAIR

TESTING AND REPAIR WORK: SMART: ELECTRICAL SYSTEM, EQUIPMENT AND INSTRUMENTS - AR54.00-Z-9451CA

MODEL 451

Perform initial startup of control units	MODEL 451.3/4	**AR54.21-P-0018MCE**
Charge battery	MODEL 451.3/4	**AR54.10-P-1130MCC**
Check condition of battery	MODEL 451.3/4	**AR54.10-P-1129MCC**
Check quiescent current consumption	MODEL 451.3/4	**AR54.10-P-1030MCE**
Control unit flashing	MODEL 451.3/4	AR54.21-P-0012MCC
Control unit flashing	MODEL 451.3/4	**AR54.21-P-0012MCU**
Disable/enable high-voltage system	MODEL 451.391/491 with ENGINE 780.009	AR54.10-P-1160MEV
Disconnect/connect battery ground line	MODEL 451.3/4	**AR54.10-P-0003MCC**
Disconnecting and connecting electrical cables from battery	MODEL 451.3/4	**AR54.18-P-0002MCC**

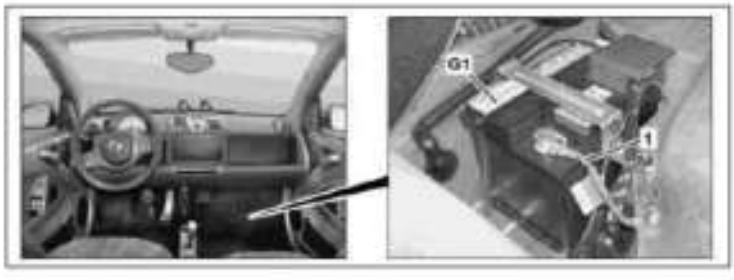
Remove/install additional instruments	MODEL 451.3/4 up to 30.8.10 with CODE (V31) Cockpit clock and tachometer package	**AR54.30-P-6080MCC**
Remove/install additional instruments	MODEL 451.3/4 as of 31.8.10 with CODE (V31) Cockpit clock and tachometer package	**AR54.30-P-6080MCF**
Remove/install battery	MODEL 451.3## /4## 1# with CODE (LHD) Left-hand drive vehicle	**AR54.10-P-0005MCC**
Remove/install battery	MODEL 451.3## /4## 2# with CODE (RHD) Right-hand drive vehicle	AR54.10-P-0005MCE
Remove/install battery charger of high-voltage battery	MODEL 451.391/491 with ENGINE 780.009	AR54.10-P-5106MEV
Remove/install battery sensor	MODEL 451.334 /380 /480	AR54.10-P-0002MCC
Remove/install charger feed socket	MODEL 451.391/491 with ENGINE 780.009	AR54.10-P-5109MEV
Remove/install cockpit switch group	MODEL 451.3/4	**AR54.25-P-1000MCC**
Remove/install combination switch	MODEL 451.3/4	**AR54.25-P-2800MCC**
Remove/install cruise control switch	MODEL 451.3/4 with CODE (V27) Cruise control/Temposet	**AR54.25-P-2803MCC**
Remove/install electric motor charge line to 12-volt battery	MODEL 451.391/491 with ENGINE 780.009	AR54.10-P-5107MEV
Remove/install electric power soft top relay	MODEL 451.4	**AR54.15-P-1000MCO**
Remove/install electrical line from battery to starter/alternator	MODEL 451.3 (except 451.380 /391) MODEL 451.4 (except 451.480 /491)	AR54.18-P-0006MCC
Remove/install electrical line from battery to starter/alternator	MODEL 451.3/4 (except 451.391 /491)	**AR54.18-P-0006MCU**
Remove/install electrical lines from the on-board electrical system battery to the starter-alternator control unit	MODEL 451.334 /380 /480	AR54.10-P-0100MCC
Remove/install external socket communications control unit	MODEL 451.391/491 with ENGINE 780.009	AR54.10-P-5108MEV
Remove/install fanfare horns	MODEL 451.3/4 with CODE (V55) Twin-tone horn	AR54.35-P-1555MCC
Remove/install front SAM control unit	MODEL 451.3/4	AR54.21-P-1254MCC
Remove/install front SAM control unit	MODEL 451.3/4	**AR54.21-P-1254MCU**
Remove/install high-voltage battery	MODEL 451.391/ 491	AR54.10-P-1140MEV
Remove/install high-voltage distributor	MODEL 451.391/491 with ENGINE 780.009	AR54.10-P-1400MEV
Remove/install high-voltage line between high-voltage distributor and PTC heater booster	MODEL 451.391/491 with ENGINE 780.009	AR54.10-P-1402MEV
Remove/install ignition/starter switch lock cylinder	MODEL 451.3/4	AR54.25-P-1030MCC
Remove/install ignition/starter switch lock cylinder	MODEL 451.3/4	**AR54.25-P-1030MCU**

Remove/install inertia switch	MODEL 451.391/491 with ENGINE 780.009	AR54.10-P-0050MEV
Remove/install instrument cluster	MODEL 451.3/4	AR54.30-P-6015MCC
Remove/install instrument cluster	MODEL 451.3/4	**AR54.30-P-6015MCU**
Remove/install main fuse of positive line	MODEL 451.3/4 (except 451.391 /491) Starter/alternator prefuse	**AR54.15-P-0051MCU**
Remove/install main fuse of positive line	MODEL 451.3/4 Main fuse of SAM [signal acquisition and actuation module] control unit	**AR54.15-P-0051MCV**
Remove/install main fuse of positive line	MODEL 451.391/491 with ENGINE 780.009	AR54.15-P-0051MEV
Remove/install main fuse of secondary air injection pump	MODEL 451.3/4 (except 451.391 /491)	**AR54.15-P-0050MCU**
Remove/install outside temperature indicator sensor	MODEL 451.3/4	**AR54.30-P-6341MCC**
Remove/install signaling horn	MODEL 451.3/4 except CODE (V55) Twin-tone horn	AR54.35-P-1556MCC
Remove/install signaling horn	MODEL 451.3/4	**AR54.35-P-1556MCU**
Remove/install starter-alternator control unit	MODEL 451.334 /380 /480	AR54.21-P-0300MCC
Remove/install start/stop switch	MODEL 451.334 /380 /480	AR54.25-P-4000MCC
Remove/install three-phase line from starter-alternator to control unit	MODEL 451.334 /380 /480	AR54.18-P-2000MCC
Remove/install wiper switch	MODEL 451.3/4	**AR54.25-P-0003MCC**
Remove/install 12 Volt socket	MODEL 451.3/4	**AR54.10-P-1000MCC**
Replace desiccant cartridge of high-voltage battery	MODEL 451.391/ 491	AR54.10-P-1171MEV
Replace SAM fuses	MODEL 451.3/4	**AR54.15-P-2001MCC**
Treatment of battery if vehicle taken out of service	MODEL 451.3/4	**AR54.10-P-0006MCC**

DISCONNECT/CONNECT BATTERY GROUND LINE - AR54.10-P-0003MCC

MODEL 451.3/4

1 Ground cable
G1 Battery



P54.10-2839-04

Fig. 2: Identifying Ground Cable And Battery
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

MODIFICATION NOTES

10.6.10	Check condition of battery and enable high voltage system added	Steps 1 and 2
22.9.10	Information on required radio code on vehicles with code (527) High-Line radio, added	
13.1.11	Adaptation of audio settings added	Step 9

	Remove/install		
Danger!	**Risk of explosion** caused by oxyhydrogen gas. **Risk of poisoning and caustic burns** caused by swallowing battery acid. **Risk of injury** caused by burns to skin and eyes from battery acid or when handling damaged lead-acid batteries	No fire, sparks, open flames or smoking. Wear acid-resistant gloves, clothing and glasses. Only pour battery acid into suitable and appropriately marked containers.	**AS54.10-Z-0001-01A**
Danger!	**Risk of death** when touching components on vehicles with high-voltage system	Do not touch components and open lines of high-voltage system. Persons with electronic implants (e.g. cardiac pacemakers) must **never** work on high-voltage systems.	AS54.00-Z-0001-02MEV
	Note on high-voltage battery	Model 451.391/491	AH54.10-P-0006-01MEV
	Note on high-voltage system	Model 451.391/491	AH54.00-P-0011-01MEV
	Notes on battery		**AH54.10-P-0001-01A**
	Notes on AGM battery	Model 451.334/380/480	AH54.10-P-0002-01MCC
	On vehicles with code (527) High-Line radio, before the ground line (1) is disconnected, it must be ensured that the radio code is available to allow the radio to be put into operation at a later stage.		
1	Check condition of battery (G1), if necessary replace battery (G1)	Only with model 451.391/491 if during the further course of work, work is to be conducted on the high voltage vehicle electric system. The high voltage system cannot be enabled if the battery (G1) is defective: Before replacing the battery (G1) on model 451.391/491 no further work may be performed on the high-voltage vehicle electrical system.	**AR54.10-P-1129MCC**
2	Carry out disconnection of high-voltage system	Only with model 451.391/491 if during the further course of work, work is to be conducted on the high voltage vehicle electric system.	AR54.10-P-1160MEV
			AD00.00-P-

3	Connect STAR DIAGNOSIS and read out fault memory	**Installation:** If necessary, delete fault memory.	**2000-04MCC**
4	Remove foot support on passenger side	Left-hand drive vehicles Right-hand drive vehicles	**AR68.30-P-1340MCC** AR68.30-P-1340MCE
5	Disconnect ground line (1) from the negative terminal of the battery (G1)		
6	Install in the reverse order		
7	Set time in the instrument cluster and on the additional instrument		
8	Enter radio code	On vehicles with code (527) High-Line radio	
9	Adapt audio settings	On vehicles with code (527) High-Line radio	
	Notes on audio settings		**AH82.60-P-0002-01MCC**

REMOVE/INSTALL BATTERY - AR54.10-P-0005MCC

MODEL 451.3## /4## 1# with CODE (LHD) Left-hand drive vehicle

1 Cover
2 Clip
3 Positive line
4 Bracket
5 Venting hose
6 Nut

G1 Battery

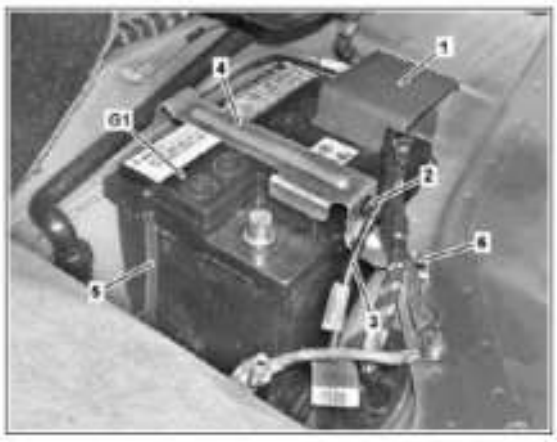


Fig. 3: Identifying Battery Components
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

	Remove/install		
1	Disconnect battery ground line		**AR54.10-P-0003MCC**
2	Take off cover (1)		
3	Disconnect positive line (3) from battery (G1)		
4	Remove clip (2) of the positive line (3) on the bracket (4)	**Installation:** Replace clip (2).	
5	Remove nut (6) and take off	**Installation:** Replace self-locking nut	

	bracket (4)	(6)	
6	Detach vent hose (5) from battery (G1)		
7 OS	Remove battery (G1)	If the battery (G1) is replaced, the defective battery (G1) must be disposed of correctly. See: v Dispose of battery	 **OS54.10-P-0001-01Z**
8	Install in the reverse order		

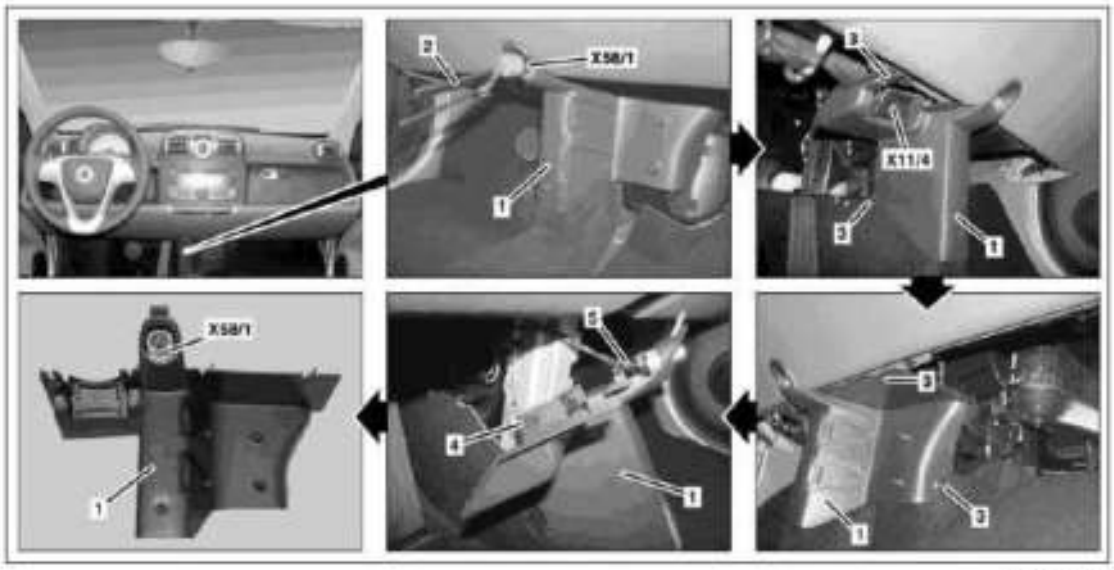
TREATMENT OF BATTERY IF VEHICLE TAKEN OUT OF SERVICE - AR54.10-P-0006MCC

MODEL 451.3/4

Danger!	**Risk of explosion** caused by oxyhydrogen gas. **Risk of poisoning and caustic burns** caused by swallowing battery acid. **Risk of injury** caused by burns to skin and eyes from battery acid or when handling damaged lead-acid batteries	No fire, sparks, open flames or smoking. Wear acid-resistant gloves, clothing and glasses. Only pour battery acid into suitable and appropriately marked containers.	**AS54.10-Z-0001-01A**
	Notes on battery		**AH54.10-P-0001-01A**
1	Check battery condition, charge battery if necessary	On no account leave battery in discharged state otherwise sulfate deposits will form on the plates. Plates with sulfate deposits indicate initial damage to the battery and result in premature failure.	**AR54.10-P-1129MCC**
2	Disconnect battery ground line	This prevents any battery discharge through closed-circuit accessories (e.g. clock).	**AR54.10-P-0003MCC**
3	Charge battery	Every 4 weeks. On no account leave battery in discharged state otherwise sulfate deposits will form on the plates. Plates with sulfate deposits indicate initial damage to the battery and result in premature failure.	**AR54.10-P-1130MCC**

REMOVE/INSTALL 12 VOLT SOCKET - AR54.10-P-1000MCC

MODEL 451.3 /3



1 Vertical strut paneling
2 Pliers
3 Screw
4 Electrical connector
5 Electrical connector
X11/4 Data link connector
X58/1 Interior socket

Fig. 4: Identifying 12 Volt Socket Components
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

	Remove/install		
1	Insert pliers (2) into interior socket (X58/1) and turn until pliers (2) arrest		*169589003700
2	Carefully pull out metal insert in interior socket (X58/1) approx. 1.5 cm with pliers (2)		*169589003700
3	Remove bolts (3)		
4	Swivel the trim of the vertical strut (1) backwards in the lower area and remove until the electrical connector (5) of the interior socket (X58/1) as well as the electrical connector (4) of the data link connector (X11/4) are accessible		
5	Separate the electrical connector (5) of the interior socket (X58/1) and electrical connector (4) of the data link connector (X11/4)		
6	Remove vertical strut paneling (1)		
7	Unclip interior socket (X58/1) from rear of vertical strut paneling (1) and remove toward front	**Installation:** Before installing in the trim of the vertical strut, pull out the metal insert of the interior socket (X58/1) (1) using	

		the pliers (2).	
8	Install in the reverse order		

Fig. 5: Identifying Pliers (169 589 00 37 00)
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

CHECK QUIESCENT CURRENT CONSUMPTION - AR54.10-P-1030MCE

MODEL 451.3/4

1 Ground cable
G1 Battery

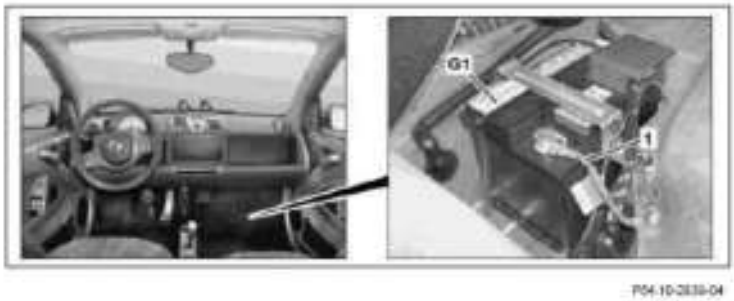


Fig. 6: Identifying Ground Cable And Battery
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

	Removing		
Danger!	**Risk of explosion** caused by oxyhydrogen gas. **Risk of poisoning and caustic burns** caused by swallowing battery acid. **Risk of injury** caused by burns to skin and eyes from battery acid or when handling damaged lead-acid batteries	No fire, sparks, open flames or smoking. Wear acid-resistant gloves, clothing and glasses. Only pour battery acid into suitable and appropriately marked containers.	**AS54.10-Z-0001-01A**
	Notes on battery		**AH54.10-P-0001-01A**
	Notes on AGM battery	Model 451.334/380/480	AH54.10-P-0002-01MCC
1	Connect STAR DIAGNOSIS then read-out and erase diagnostic trouble code memory		**AD00.00-P-2000-04MCC**
2	Close Star Diagnosis		

3	Remove foot support on passenger side	Left-hand drive vehicles Right-hand drive vehicles	**AR68.30-P-1340MCC** AR68.30-P-1340MCE
4	Measure battery voltage at battery terminals	Standard digital multimeter **gotis://E_15/54_06.0** If the battery voltage is less than 12.2 V: v Charge battery (G1)	 **AR54.10-P-1130MCC**
5	Withdraw ignition key		
6	Switch off all consumers on board the vehicle		
7	Disconnect all external consumers (e.g. chargers, MP3 player, amplifier etc.)		
8	Open doors and liftgate		
9	Lock rotary tumblers on doors and liftgate	The interior illumination in the vehicle must go out.	
10	Lock the vehicle using the central locking with open doors and liftgate	A waiting time of at least 6 mins. must be waited after locking the vehicle.	
	Measure		
11	Set multimeter to highest possible current measurement range	Standard digital multimeter **gotis://E_15/54_06.0**	
12	Connect multimeter between ground line (1) and negative terminal on battery (G1) without any interruption	To prevent any voltage reset, the current flow must not be interrupted. When fitting the multimeter, bridge the negative terminal of the battery (G1) beforehand.	
13	Measure no-load current		
14	Remove fuses one by one from the SAM control unit and localize the faulty control unit or defective consumer	If the value for the no-load current measurement: • On vehicles without code (V01) Antitheft alarm system (FFO) exceeds 40 mA. • On vehicles with code (V01) Antitheft alarm system (FFO) exceeds 50 mA. Wait in each case for at least 6 mins. until the next measurement to enable the activated bus to return to idle. If the fuse of the defective	

		consumer or control unit is removed, the no-load current drops immediately. The fuse and relay assignment enables the increased no-load current consumption to be restricted to specific control units and consumers. To restrict the increased no-load current consumption yet further, the consumers and control units protected by the fuse in question must be removed one after the other. * not for USA Fuse and relay box, as-built configuration * for USA only Fuse and relay box, as-built configuration	GF54.15-P-0800MCC **GF54.15-P-0800MCU**
15	Remove multimeter without breaking the circuit and attach ground line (1) to negative terminal		
	Install		
16	Install foot support on passenger side	Left-hand drive vehicles Right-hand drive vehicles	**AR68.30-P-1340MCC** AR68.30-P-1340MCE
17	Open vehicle using central locking system		
18	Unlock rotary tumblers on doors and liftgate		
19	Connect STAR DIAGNOSIS then read-out and erase diagnostic trouble code memory		**AD00.00-P-2000-04MCC**

CHECK BATTERY - AR54.10-P-1129-01A

Risk of explosion caused by oxyhydrogen gas. **Risk of poisoning and caustic burns** caused by swallowing battery acid. **Risk of injury** caused by burns to skin and eyes from battery acid or when handling damaged lead-acid batteries

No fire, sparks, open flames or smoking. Wear acid-resistant gloves, clothing and glasses. Only pour battery acid into suitable and appropriately marked containers.

TEST AND ADJUSTMENT VALUES FOR THE BATTERY

Number	Designation		12 AH	30 AH	35 Ah	46 AH
BE54.10-P-1002-01A	Cold test current as per EN	A	170	540	520	420

TEST AND ADJUSTMENT VALUES FOR THE BATTERY

Number	Designation	60 Ah VRLA	60 AH	62 AH
BE54.10-P-1002-01A	Cold test current as per EN A	680	510	480

TEST AND ADJUSTMENT VALUES FOR THE BATTERY

Number	Designation	70 Ah VRLA	74 AH	80 Ah VRLA	84 AH
BE54.10-P-1002-01A	Cold test current as per EN A	760	680	800	700

TEST AND ADJUSTMENT VALUES FOR THE BATTERY

Number	Designation	90 Ah VRLA	95 Ah VRLA	100 Ah
BE54.10-P-1002-01A	Cold test current as per EN A	950	850	760

On model 414 the battery has to be disconnected for the tests to avoid any damage.

Perform test for remaining vehicles with battery installed and connected where possible. Do not connect tester to jump start or charging terminal point, always connect it directly with the battery.

Battery tester

gotis://E_15/54_02. 0

All test steps and entries must be performed thoroughly, otherwise the test result will be distorted.

Test prerequisites:

- Tester with software release 2.0
- Ignition off
- Rotary light switch in position "0"

If the message "Surface voltage" is displayed during the test, the tester has detected that the battery voltage is apparently too high. This increased voltage can be reduced as follows:

- Battery installed: Decrease increased voltage as per the specifications of the tester (e.g. switch on driving lights).
- Battery removed: reduce increased voltage using a suitable volt/amp(s) tester (load battery for approx. 60 s with 20 A to 30 A amps).

As an example, the test procedure for passenger cars is described below.

- Audio component (e.g. radio) switched off
- Battery voltage higher than 12.4 V
- Good contact of the tester on the battery

1. Clip tester (1) on to battery.

Once the tester is connected the current measured battery voltage is displayed for approx. 2 s. If a so-called "System noise" is detected by the tester, check whether all consumers are switched off and wait (for approx. 2 min), until the quiescent current is minimized and the bus systems are switched off.

Fig. 7: View Of Clip Tester
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

2. Follow the menu and select according to the situation:
   - In vehicle (battery connected to on-board electrical system)
   - Not in vehicle (battery disconnected from on-board electrical system)

   Confirm selection with "Enter".

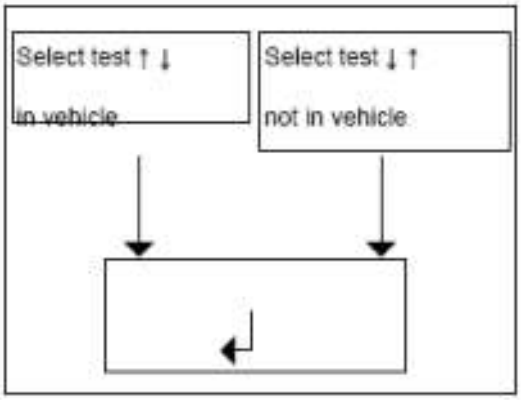


Fig. 8: Display Battery Selection
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

3. Follow the menu and select according to the situation:
   - 12-114 AH (battery capacity 12-114 Ah)
   - AH > (battery capacity > or =115 Ah)

   Confirm selection with "Enter".

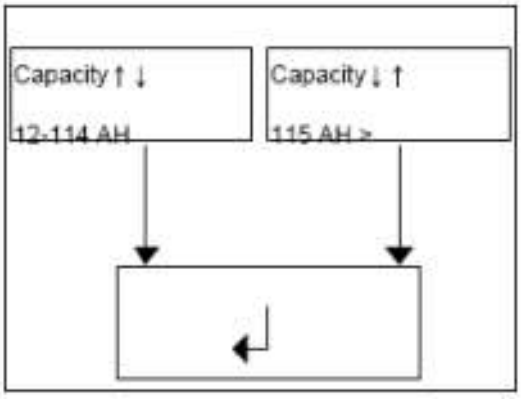


Fig. 9: Display Battery Selection - Battery Capacity
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

4. Follow menu and select battery type:
   - Normal
   - VRLA

   Confirm selection with "Enter".

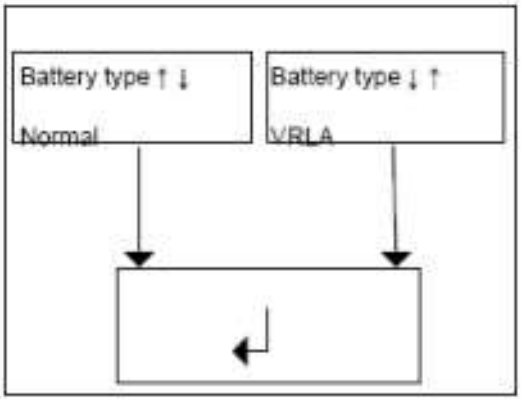


Fig. 10: Display Battery Selection - Battery Type
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

5. Follow the menu selection and select the test standard for the cold cranking amps.

   The test standard is printed on behind the specification of the cold cranking amps.

   If the imprint of the test standard is not available, select the cold cranking amps "EN".

Example: **12 V 46 Ah 420 A** --> Select EN.

Confirm selection with "Enter".

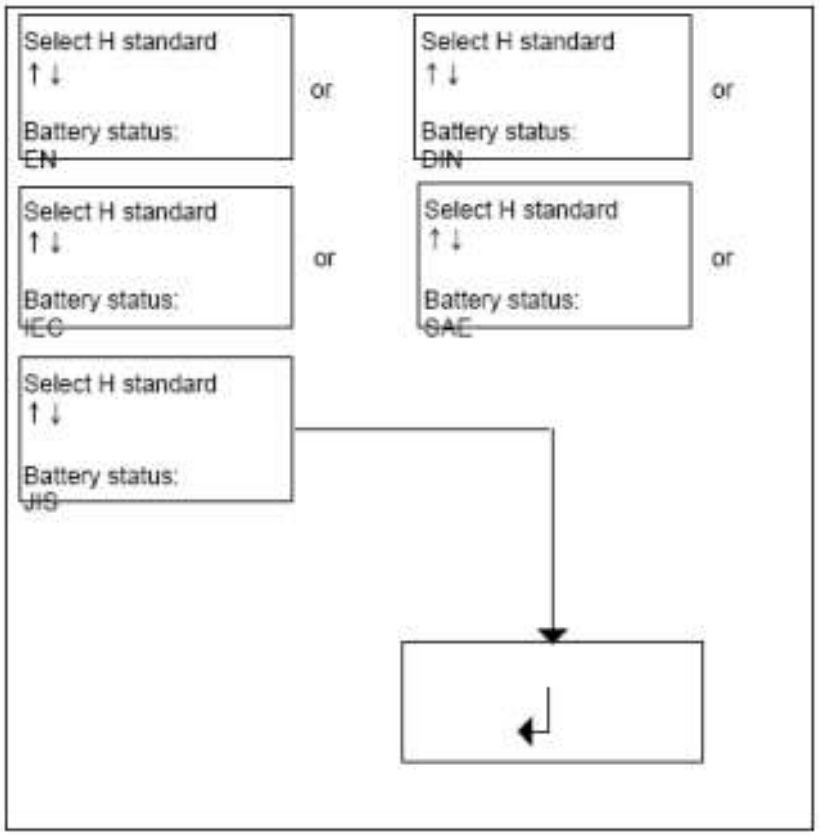


Fig. 11: Display Selection Of Battery Testing For Cold Cranking Amps
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

6. Read off cold cranking amps and enter in tester.

   Example: **12 V 46 Ah 420 cold cranking amps** --> 420 A.

   Confirm input with "Enter".

   The battery test starts after confirmation of the cold cranking amps entry.

   The test result or one of the following messages appears after approx. 15 s:

   - Test code --> Step 7
   - Vehicle model --> Step 9
   - Temperature > 0°C/< 0°C --> Step 10
   - Before charging/After charging --> Step 11
   - Surface voltage DETECTED (see above)

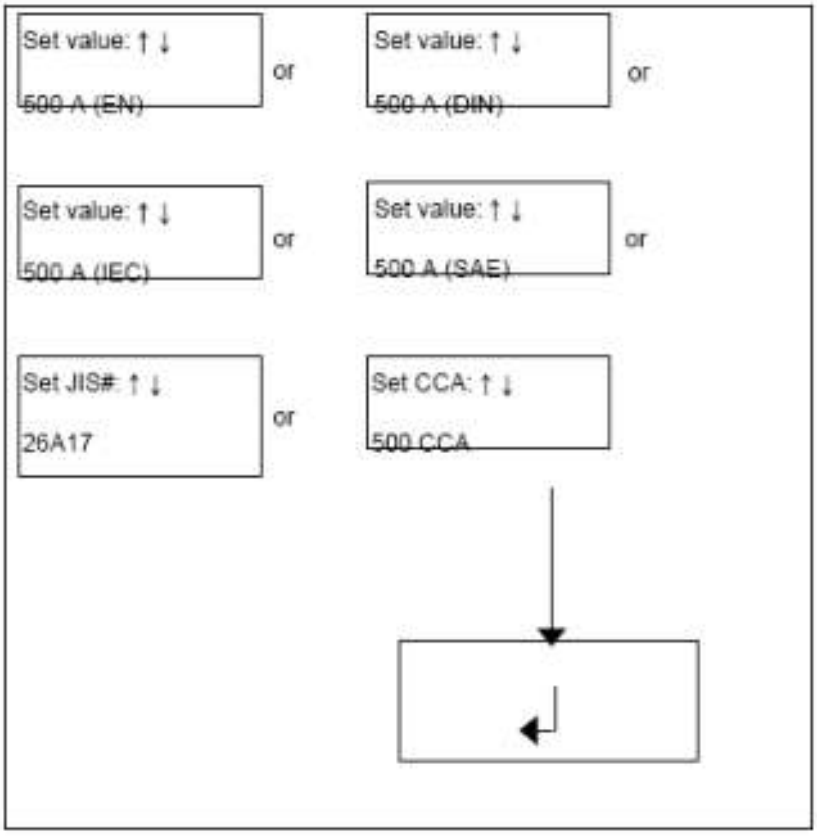


Fig. 12: Display Test Result Of Cold Cranking Amps
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

7. Read off test code with "Enter" and continue accordingly:
   - "Battery in good condition":

     No further measures required.

   - "Charge and test":

     Fully charge battery and retest (battery voltage > 12.4 V).

8. Print out test code and file in a tamperproof manner.
   - "Replace battery":

     Replace battery if this message appears.

9. Follow the menu and select test mode:
   - Cars
   - Taxi

   Confirm selection with "Enter".

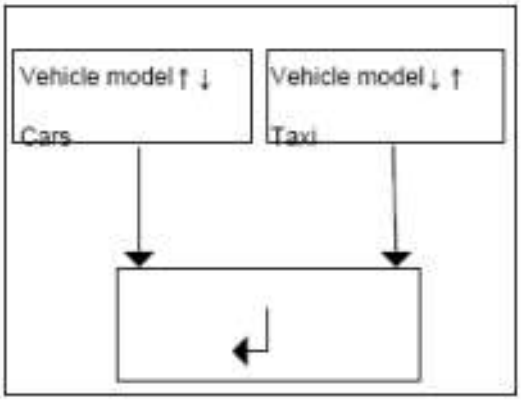


Fig. 13: Display Selection Of Test Mode - Cars And Taxi
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

10. Follow the menu and select test mode:
    - > 0°C
    - < 0°C

    Confirm selection with "Enter".

    If this message appears, the battery condition cannot be evaluated.

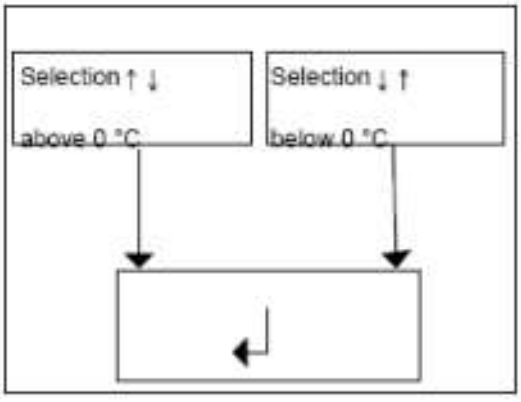


Fig. 14: Display Selection Of Test Mode - Above 0°C And Below 0°C
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

11. Follow the menu and select test mode:
    - BEFORE CHARGE
    - AFTER CHARGE

    Confirm selection with "Enter".

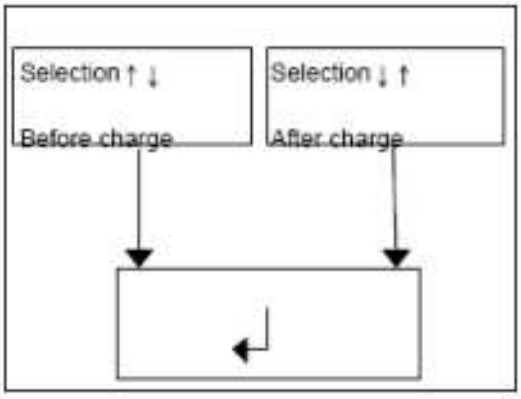


Fig. 15: Display Selection Of Test Mode - Before Charge And After Charge
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

12. Perform additional menu-assisted function (e.g. starting several times and switching on consumers).

    Only in taxi test mode if displayed in menu.

CHECK CONDITION OF BATTERY - AR54.10-P-1129MCC

MODEL 451.3/4

	Remove		
Danger!	**Risk of explosion** caused by oxyhydrogen gas. **Risk of poisoning and caustic burns** caused by swallowing battery acid. **Risk of injury** caused by burns to skin and eyes from battery acid or when handling damaged lead-acid batteries	No fire, sparks, open flames or smoking. Wear acid-resistant gloves, clothing and glasses. Only pour battery acid into suitable and appropriately marked containers.	**AS54.10-Z-0001-01A**
	Notes on battery		**AH54.10-P-0001-01A**
	Notes on AGM battery	Model 451.334/380/480	AH54.10-P-0002-01MCC
1	Connect STAR DIAGNOSIS and read out fault memory	Erase fault memory and eliminate repairing faults.	**AD00.00-P-2000-04MCC**
2	Remove foot support on passenger side	Left-hand drive vehicles Right-hand drive vehicles	**AR68.30-P-1340MCC** AR68.30-P-1340MCE
	Check		
3	Visual inspection of battery for external leaks	The battery must be replaced in the event of leaks. See: v Remove/install battery Left-hand drive vehicles Right-hand drive vehicles	 **AR54.10-P-0005MCC** AR54.10-P-0005MCE
OS	Dispose of battery		**OS54.10-P-0001-01Z**
4	Check fluid level and correct if necessary	Except model 451.334/380/480, Not when the battery has been	**AP54.10-P-5410MCC**

		replaced.	
5	Check battery	Cold test current Midtronics battery tester **gotis://E_15/54_02.0**	**AR54.10-P-1129-01A** ***BE54.10-P-1002-01A**
	Install		
6	Install foot support on passenger side	Left-hand drive vehicles Right-hand drive vehicles	**AR68.30-P-1340MCC** AR68.30-P-1340MCE

TEST AND ADJUSTMENT VALUES FOR THE BATTERY

Number	Designation		42 AH	60 Ah VRLA	61 AH	62 AH
BE54.10-P-1002-01A	Cold test current as per EN	A	340	680	540	480

CHARGE BATTERY - AR54.10-P-1130MCC

MODEL 451.3/4

	Remove/install		
Danger!	**Risk of explosion** caused by oxyhydrogen gas. **Risk of poisoning and caustic burns** caused by swallowing battery acid. **Risk of injury** caused by burns to skin and eyes from battery acid or when handling damaged lead-acid batteries	No fire, sparks, open flames or smoking. Wear acid-resistant gloves, clothing and glasses. Only pour battery acid into suitable and appropriately marked containers.	**AS54.10-Z-0001-01A**
	Notes on battery		**AH54.10-P-0001-01A**
	Notes on AGM battery	Model 451.334/380/480	AH54.10-P-0002-01MCC
1	Remove battery	Pull vent hose out of the hole in the battery recess. Left-hand drive vehicles Right-hand drive vehicles	**AR54.10-P-0005MCC** AR54.10-P-0005MCE
2	Charge battery according to operating instructions of charger	With a battery which is not low-maintenance remove the stop plugs, check acid level and correct if necessary.	
3	Install in the reverse order		

REMOVE/INSTALL MAIN FUSE OF SECONDARY AIR INJECTION PUMP - AR54.15-P-0050MCU

MODEL 451.3/4 (except 451.391 /491)

1 Vertical strut paneling 2 Fuse holder F36 Secondary air injection pump fuse

Fig. 16: Locating Secondary Air Injection Pump Fuse
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

	Remove/install	
1	Remove vertical strut paneling (1)	**AR68.00-P-1500MCC**
2	Pull fuse of secondary air injection pump (F36) out of fuse holder (2)	
3	Install in the reverse order	

REMOVE/INSTALL MAIN FUSE OF POSITIVE LINE - AR54.15-P-0051MCU

MODEL 451.3/4 (except 451.391 /491)

Starter/alternator prefuse

1 Bottom cover
2 Top cover
3 Nut

F58 Starter/alternator fuse

Fig. 17: Locating Starter/Alternator Fuse
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

	Remove/install		
1	Disconnect battery ground line		**AR54.10-P-0003MCC**
2	Unclip top cover (2) from bottom cover (1) and remove top cover (2) as well as bottom cover (1)		
3	Unscrew nuts (3) and remove starter/alternator fuse (F58)	Replace self-locking nuts (3).	
4	Install in the reverse order		

REMOVE/INSTALL MAIN FUSE OF POSITIVE LINE - AR54.15-P-0051MCV

MODEL 451.3/4

Main fuse of SAM [signal acquisition and actuation module] control unit

1 Casing
2 Cover
3 Nut
F91 SAM prefuse

Fig. 18: Locating SAM Prefuse
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

	Remove/install		
1	Disconnect battery ground line		**AR54.10-P-0003MCC**
2	Invert casing (1) backwards		
3	Unlock cover (2) in the marked area (arrow) and fold up		
4	Unscrew nuts (3) and remove SAM prefuse (F91)	Replace self-locking nuts (3).	
5	Install in the reverse order		

REMOVE/INSTALL ELECTRIC POWER SOFT TOP RELAY - AR54.15-P-1000MCO

30.11.06

MODEL 451.4

1 Cover
2 Soft top wiring harness
3 Foam rubber jacketing
K66/1 Open soft top relay
K66/2 Close soft top relay

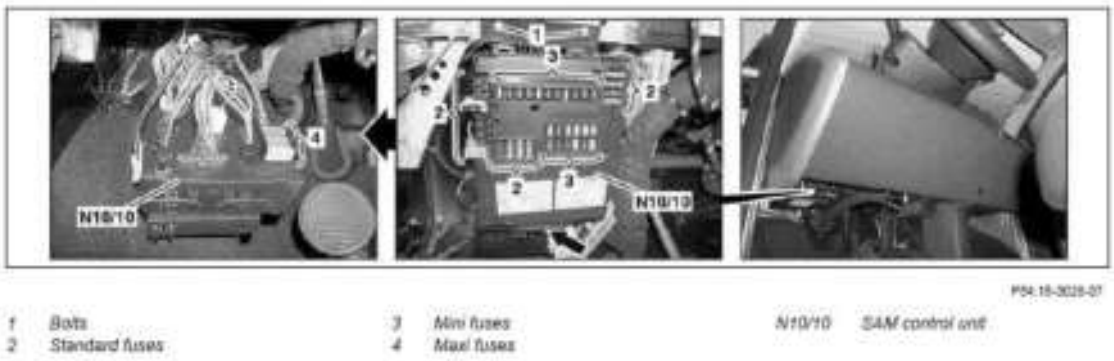
Fig. 19: Identifying Electric Power Soft Top Relay Components
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

	Remove/install
1	Remove cover (1) on the left luggage compartment trim

2	Guide the wiring harness of the soft top (2) out of the body opening and expose
3	Push back the foam casing (3) on the open soft top relay (K66/1) or on the close soft top relay (K66/2)
4	Detach open soft top relay (K66/1) or close soft top relay (K66/2)
5	Install in the reverse order

REPLACE SAM FUSES - AR54.15-P-2001MCC

MODEL 451.3/4



1 Bolts
2 Standard fuses
3 Mini fuses
4 Maxi fuses
N10/10 SAM control unit

Fig. 20: Identifying Bolts, Standard Fuses, SAM Control Unit, Mini And Maxi Fuses
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

1	Turn off ignition
2	Adjust left seat to the rear
	Replace standard fuses (2) or mini fuses (3)
3	Pull out damaged standard fuse (2) or mini fuse (3) and replace
	Replace maxi fuses (4)
4	Unclip SAM control unit (N10/10) in the rear area (arrow) and fold down forwards
5	Unscrew bolts (1) and carefully lower SAM control unit (N10/10) downwards until the maxi fuses (4) are accessible
6	Remove damaged maxi fuse (4) and replace
7	Position SAM control unit (N10/10) on crossmember under instrument panel and fasten in place using the bolts (1)
8	Clip in SAM control unit (N10/10) in correct area (arrow)

DISCONNECTING AND CONNECTING ELECTRICAL CABLES FROM BATTERY - AR54.18-P-0002MCC

MODEL 451.3/4

1 Cover
2 Positive line

G1 Battery

P54.10-4430-11

Fig. 21: Identifying Battery Components
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

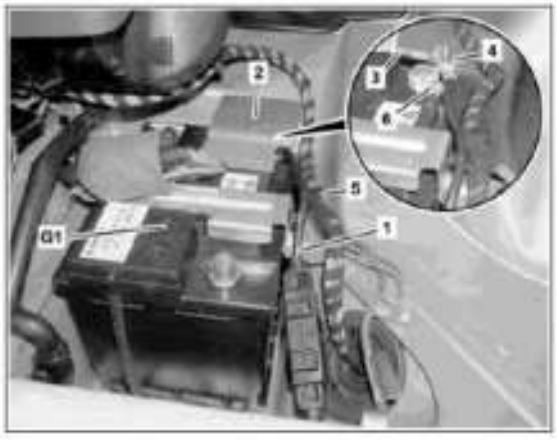
	Remove/install	
1	Disconnect battery ground line	AR54.10-P-0003MCC
2	Take off cover (1)	
3	Disconnect positive line (2) from battery (G1)	
4	Install in the reverse order	

REMOVE/INSTALL ELECTRICAL LINE FROM BATTERY TO STARTER/ALTERNATOR - AR54.18-P-0006MCU

MODEL 451.3/4 (except 451.391 /491)

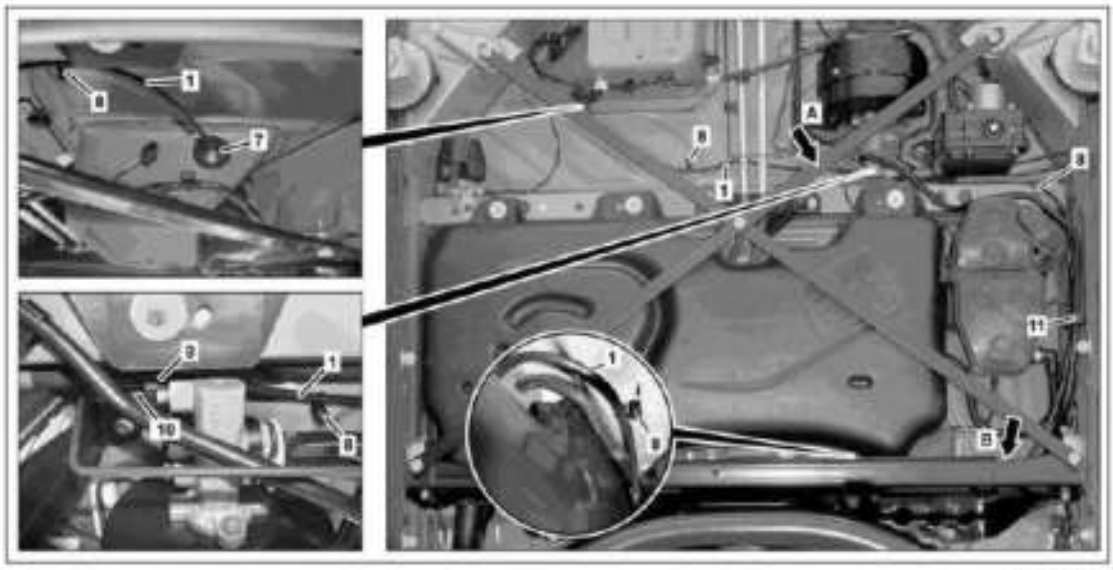
1 Electrical line
2 Cover
3 Electrical line
4 Nut
5 Bracket
6 Positive terminal

G1 Battery



P54.10-4459-11

Fig. 22: Identifying Electrical Line Components
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

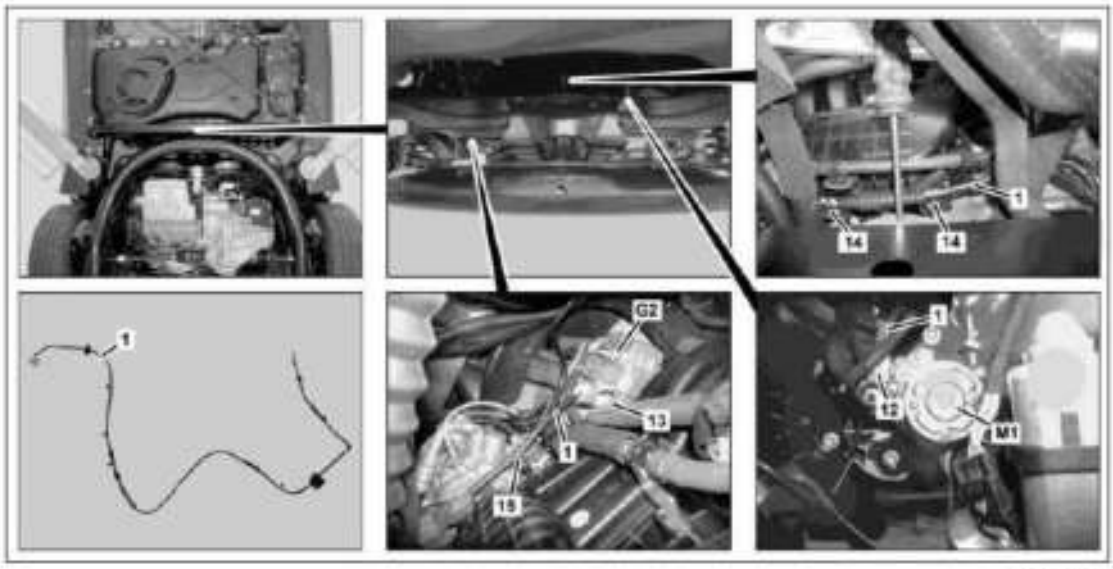


1 Electrical line
7 Grommet
8 Bracket
9 Bracket
10 Brake line
11 Bracket

Fig. 23: Identifying Electrical Line, Grommet, Bracket And Brake Line
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

Shown on model 451.4 with code (I01)

Air conditioning Plus



1 Electrical line
12 Nut
13 Nut
14 Bracket
15 Bracket
G2 Generator
M1 Starter

Fig. 24: Identifying Electrical Line, Nuts, Brackets, Generator And Starter
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

Shown on model 451.4 with code (I01)

Air conditioning Plus

	Remove/install		
1	Disconnect ground line of battery (G1)		**AR54.10-P-0003MCC**
2	Remove cover (2)		
3	Unscrew nut (4) and place electrical line (3) to one side		
4	Detach positive terminal (6) of electrical line (1) to the battery (G1)		
5	Unclip holder (5) of electrical line (1) on battery tray	The brackets (5, 8, 14, 15) and the bracket (arrow A) as well as the protective covers on the electrical line (1) are present on the new electrical line (1), when reusing the old electrical line (1) ensure that it is not damaged.	
Danger! 6	**Risk of death** caused by vehicle slipping or toppling off of the lifting platform. Raise vehicle using the vehicle lift and remove underfloor paneling	Align vehicle between columns of vehicle lift and position four support plates at vehicle lift support points specified by vehicle manufacturer. Rechargeable drill / screwdriver **gotis://G_58.0_01.1**	**AS00.00-Z-0010-01A**
7	Release rear drive module		**AR01.00-P-3050MCU**
8	Release grommet (7) of electrical line (1) from battery recess	**Installation:** Ensure that grommet (7) is seated correctly.	
9	Mark the position of brackets (5, 8, 14, 15), the bracket (arrow A) as well as the bracket (11) and bracket (arrow B) on the electrical line (1)		
10	Unclip bracket (8) and bracket (arrow A) of electrical line (1) on underfloor		
11	Unclip electrical line (1) from holder (9) on brake line (10)		
12	Unclip electrical line (1) from bracket (11) and bracket (arrow B)		
13	Unscrew nut (12) on starter (M1) and remove electrical line (1)		
14	Unclip bracket (14) of electrical line (1) on intake manifold		
15	Unclip holder (15) of electrical line (1)		
	Unscrew nut (13) on alternator		

16	(G2) and remove electrical line (1)		
17	Route electrical line (1) out and then remove	Route electrical line (1) accurately, as otherwise the line may suffer from chafing and crushing. **Installation:** Replace damaged bracket (5, 8, 14, 15) and bracket (arrow A). The new brackets (5, 8, 14, 15) as well as bracket (arrow A) should be attached in exactly the same position of the electrical line (1). Make sure that the new holders (5, 8, 14, 15) and the holder (arrow A) are not twisted through 180° when secured to the electrical line (1).	
18	Transfer all markings made to the electrical line (1) to the new electrical line (1)	When replacing the electrical line (1). This ensures that the brackets (5, 8, 14, 15), the bracket (arrow A) as well as the bracket (11) and bracket (arrow B) are positioned at exactly the same point on the new electrical line (1), their position should be corrected if necessary.	
19	Install in the reverse order		

REPAIR WIRING HARNESS BY MEANS OF AXIAL SOLDER CONNECTORS - AR54.18-P-0100-06A

1. Expose damaged cable or plug/coupling in easily accessible position and cut off.

   Separate cores in wiring harness offset by approx. 45 mm.

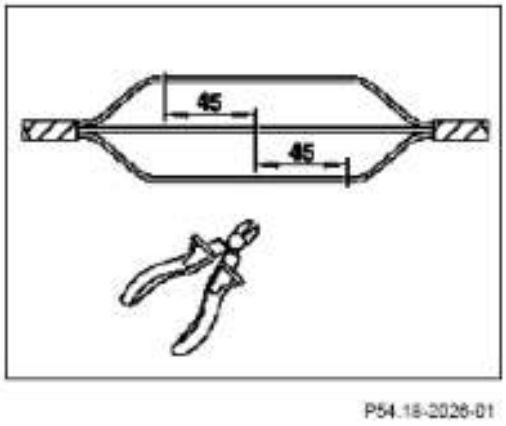


Fig. 25: Identifying Wiring Harness Offset
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

2. Cut new section of cable to match old cable.
3. Remove 15 mm of insulation at end of cables.

   Pull cut-off insulation off the line while turning.

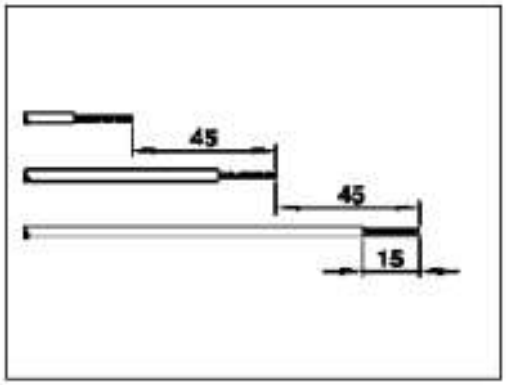


Fig. 26: Identifying Cable Insulation Dimensions
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

4. Select axial solder connector by means of cable cross-section.
5. Push the axial solder connector on line beyond the solder point.

Push on the thinner side of the axial solder connector first.

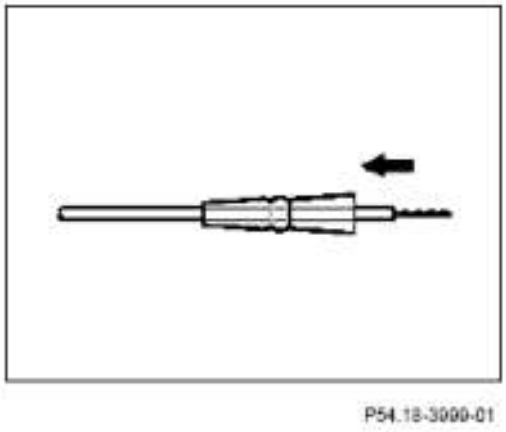


Fig. 27: Pushing On Axial Solder Connector
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

6. Twist the line ends together.
7. Push back the axial solder connector on the transposition while turning.

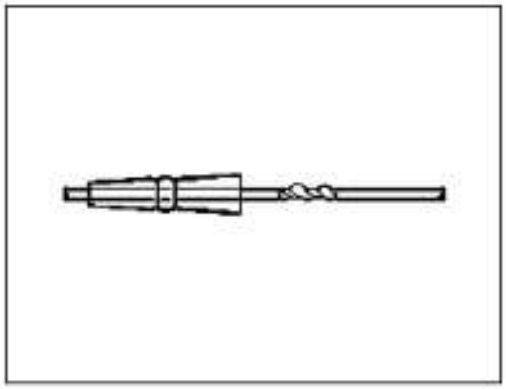


Fig. 28: Twisting Line Ends
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

8. Heat up axial solder connector with a preheated hot air blower (with electronic temperature control) to 400°C.

   Hot air blower

   gotis://E 15/54 12. 0

   Use welding bead catcher in the vehicle interior in order to avoid damage due to liquid solder.

   Until the soldering ring has dissolved and the covering has positioned itself properly around the lines.

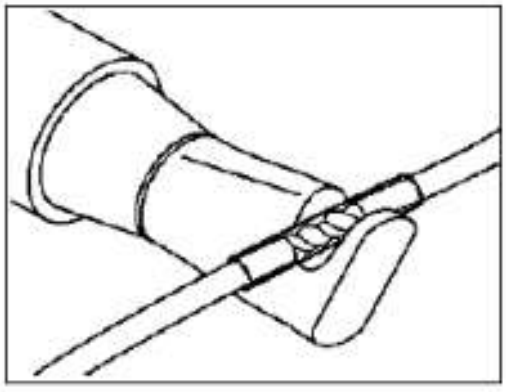


Fig. 29: Heating Axial Solder Connector
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

9. Check soldered point.

   It must not be possible to see the soldering ring of the axial soldered connector any more. The covering must contact the lines properly.

A Correct
B Incorrect

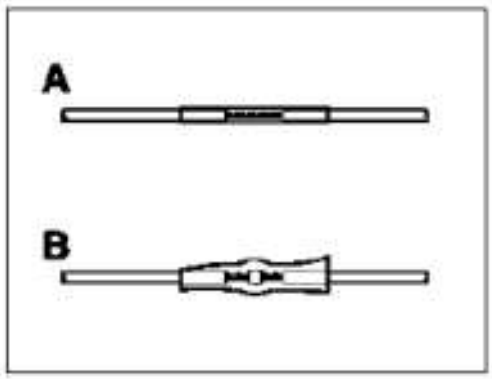


Fig. 30: Identifying Correct And Incorrect Position Of Soldered Point
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

10. Apply axial solder connector to the lines and wrap repaired area round with fabric tape.

The axial solder connectors must not lie directly above one another.

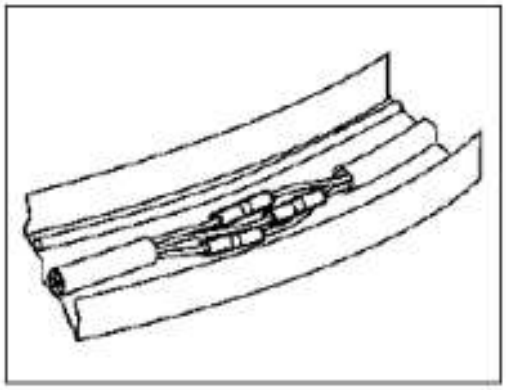


Fig. 31: Wrapping Repaired Area
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

CONTROL UNIT FLASHING - AR54.21-P-0012MCU

MODEL 451.3/4

	Flashing		
1 AD	Connect STAR DIAGNOSIS Connect STAR DIAGNOSIS and read out fault memory		**AD00.00-P-2000-04MCC**
2	Enter vehicle identification number in Diagnosis Assistance system and open main menu with "Button F2"		
3	Select menu "Systems" in main menu and confirm with		

	"Button F3"		
4	Select the control unit to be flashed in the "systems" menu and confirm with the "F3 button"	The following control units can be flashed: • N3/10 (ME-SFI [ME] control unit) • N10/10 (SAM control unit) • N15/6 (Sprintshift control module) • N47-5(ESP control unit)	
5	Select the "Control unit adaptations" in the selected menu of the corresponding control unit and confirm with the "F3 button"		
6	Select the submenu "Program control unit" in the "Control unit adaptations" menu and confirm with the "F3 button"		
7	Select the "hard drive menu: Version Month/ Year (year/month/day)" and confirm with the "F3 button"	The information on the flashing systems appears in the display.	
8	Start the flashing process by pressing the "F3 button"	Programming lasts about 3 minutes.	
9	Select the "online (networked STAR DIAGNOSIS unit)" menu or "offline (no networked STAR DIAGNOSIS unit)" menu and start SCN coding by confirming with the "F3 button"	Only if the SCN coding command appears in the display. We recommend always performing SCN coding with SDflash online. Only perform Offline SCN coding with a non-networked STAR DIAGNOSIS.	
		SCN coding with SDflash Online	**AR54.21-P-0013-02MCC**
		Offline SCN coding	**AR54.21-P-0013-04MCC**
	Notes on SCN coding of control units		**AH54.21-P-0004-01X**
10	Close STAR DIAGNOSIS		

SCN CODING WITH SDFLASH ONLINE - AR54.21-P-0013-02MCC

The following work instructions describes the procedure for Online SCN coding with "SDflash".

"SDflash" is the product designation of the program for determining the SCN coding and parameterization data.

Prerequisite for Online SCN coding with "SDflash":

- Networked STAR DIAGNOSIS diagnosis system
- Access to "SDflash" with corresponding rights

SCN coding with "SDflash"

1. Confirm note on sequence of SCN coding with the "F2 button".
2. Select "Operation step 1: Determine vehicle data for online SCN coding from the vehicle" menu and confirm with the "F3 button".
3. Confirm the correct vehicle identification number with the "F3 button".

   The note that the vehicle data determination was successful appears in the display.

4. Select "Operation step 2: online query SDflash" menu and confirm with the "F3 button".
5. Press "F2 button" for starting the online query.
6. Press "F2 button" for starting the web browser.

   The web page of the aftersales platform appears in the display.

7. Select the symbol (house) which is located in the top third of the web page.
8. Enter user name and password and select logging on symbol.

   The applications available appear in the display.

9. Select "SDflash" in the display.
10. Select symbol (Start) in the display.

    The message that the SCN coding and the coding string formation has been successfully finished appears in the display.

11. After "When the inquiry about the coding data has finished, proceed with the F2 button" appears in the display, press the "F2 button".
12. Select "Operation step 2: Perform SCN coding" menu and confirm with "F3 button".
13. Confirm the correct vehicle identification number with the "F3 button".
14. Press "F3 button" and transfer coding data to the control unit.
15. Once "Switch on ignition" appears in the display, switch on ignition.

    The coding process starts automatically and lasts about 10 seconds.

16. Once "Switch off ignition" appears in the display, switch off ignition.
17. After the coding process has finished the order event log for the documentation of the SCN repair order appears. This order event log must be filled in completely, then printed out with the "F11 button" and enclosed with the repair order.
18. Finish SCN coding by pressing the "F2 button".

    The online SCN coding of the control unit is thus successfully completed.

OFFLINE SCN CODING - AR54.21-P-0013-04MCC

The following work instructions describe the procedure for offline SCN coding.

Precondition for offline SCN coding:

- STAR DIAGNOSIS diagnosis system with printer and fax machine
- Correct adjustment of date and time in STAR DIAGNOSIS
- Special equipment which was subsequently installed in or removed from the vehicle, must be redocumented in the vehicle documentation system (FDOK).

Offline SCN coding

1. Confirm note on sequence of SCN coding with the "F2 button".
2. Prepare the inquiry form by pressing the "F4 button".
3. Print out inquiry form by pressing the "F11 button".
4. Send the printed-out inquiry form to fax number +49 180511 6373.

   The inquiry result must be faxed back immediately.

5. Enter "coding string", "SCN" and "check digit [2]" in the corresponding input fields in the diagnosis assistance system and confirm with the "F3 button".
6. Once the coding process has finished the event log on the documentation of the repair order appears. This event log must be filled in completely, then printed out with the "F11 button" and enclosed with the repair order.
7. Finish SCN coding by pressing the "F2 button".

   SCN coding of the control unit is thus successfully concluded.

PERFORM INITIAL STARTUP OF CONTROL UNITS - AR54.21-P-0018MCE

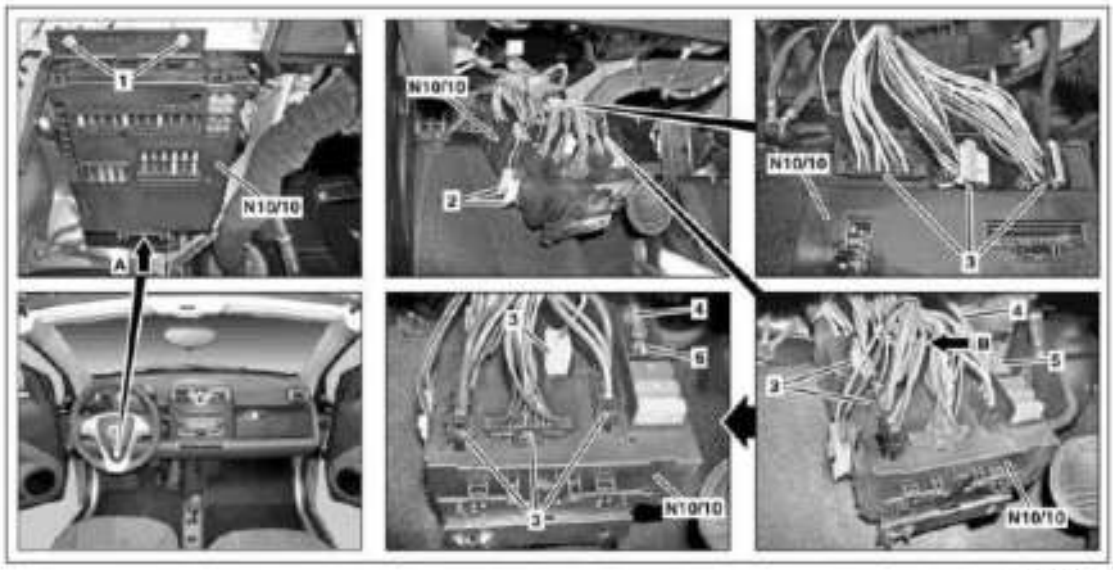
MODEL 451.3/4

	Startup		
1	Connect Star Diagnosis		**AD00.00-P-2000-04MCC**
2	Enter vehicle identification number in Diagnosis Assistance system (DAS) and open main menu with "F2" button		
3	Select menu "Systems" in main menu and confirm with "Button F3"		
4	In the "Systems" menu, select the control unit for initial startup and confirm with the "F3" button	An "initial startup" is required when replacing the following control units: • Instrument cluster (A1)	

		• Weight Sensing System (WSS) control unit (N110) with code (494) USA version Starter-alternator control unit (N129) with model 451.334/380/480 • Electronic selector lever module control unit (N15/5) • Restraint systems control unit (N2/7) • Heater and A/C operating unit (N23) with code (I01) A/C Plus • CDI control unit (N3/9) with engine 660 • ME-SFI [ME] control unit (N3/10) with engine 132 • SAM control unit (N10/10) • Automated manual transmission control unit (N15/6) • ESP control unit (N47-5) • Steering assist control unit (N68) • TPM [RDK] control unit (N88) with code (494) USA version	
5	In the menu for the selected control unit, choose the "Initial startup" menu item and confirm with the "F3" button		
6	Confirm "Notes for initial startup of control unit" with "F2" button		
7	Select the "online (networked STAR DIAGNOSIS unit)" menu or "offline (no networked STAR DIAGNOSIS unit)" menu and start by pressing the "F3" button		
8	Follow the further instructions in DAS.		
9	Close Star Diagnosis		

REMOVE/INSTALL FRONT SAM CONTROL UNIT - AR54.21-P-1254MCU

MODEL 451.3/4



P54.21-2000-09

1	Bolts	4 Positive battery cable	6 Nut
2	Additional fuses	5 Cover	
3	Electrical connectors		N10/10 SAM control unit

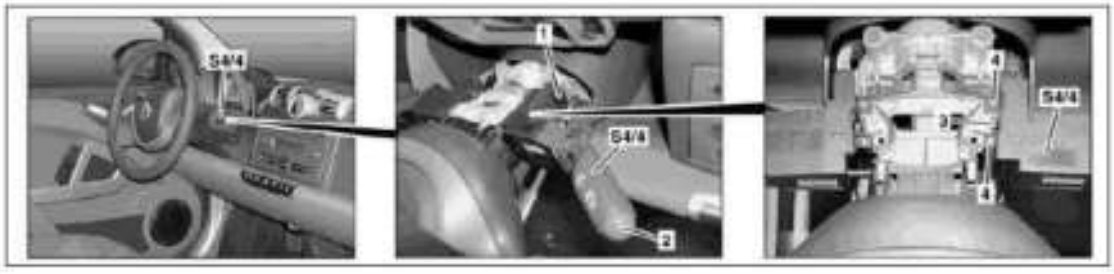
Fig. 32: Identifying Front SAM Control Unit Components
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

	Remove/install		
	Notes on avoiding damage to electronic components due to electrostatic discharge		**AH54.00-P-0001-01A**
1	Turn off ignition		
2	Disconnect ground line of battery		**AR54.10-P-0003MCC**
3	Adjust the left front seat to the rear		
4	Unclip left tweeter from the dashboard and place to one side with the electric line connected	Vehicles up to 30.8.10 with code (C17) Sound package (2 tweeters, 2 bass reflex boxes and diplexer) (FFO) or Vehicles with code (C54) Sound system 2	**AR82.62-P-1000MCC**
5	Unclip SAM control unit (N10/10) in the rear area (arrow A) and fold down forwards		
6	Unscrew bolts (1) and carefully lower the SAM control unit (N10/10) until the electrical connectors (3) are accessible		
7	Unclip cover (5) on SAM control unit (N10/10)		
8	Unscrew nut (6) and remove positive battery cable (4)	If the nut (6) is detached from the positive battery cable (4), it must be replaced by a collar nut.	
	Remove additional fuses (2) with	The number of additional fuses may vary (2) depending on the vehicle model and	

9	connector on SAM control unit (N10/10)	equipment. Remove additional fuses (2) with connector as the connectors are coded.	
10	Separate electrical connectors (3) and electrical connector (arrow B)		
11	Remove SAM control unit (N10/10) from the vehicle		
12	Install in the reverse order		
13	Flash the SAM control unit (N10/10)	When replacing the SAM control unit (N10/10).	**AR54.21-P-0012MCU**

REMOVE/INSTALL WIPER SWITCH - AR54.25-P-0003MCC

MODEL 451.3/4



1 Electrical connector
2 Cap
3 Catch hook
4 Guide
S4/4 Right wiper switch

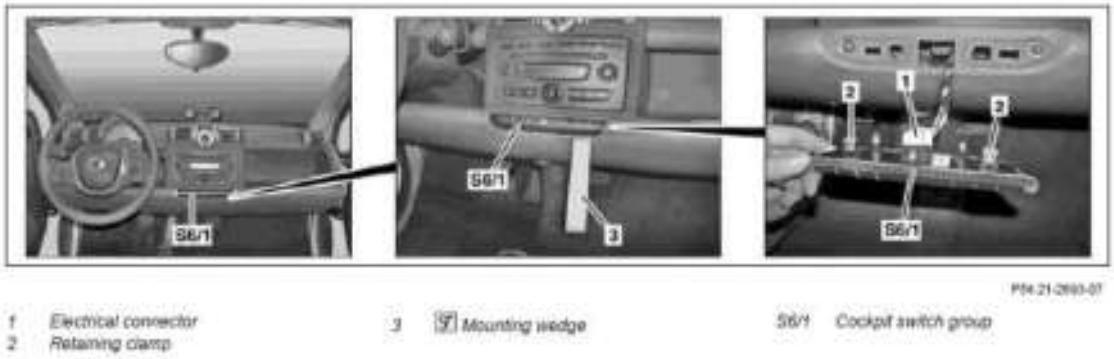
Fig. 33: Identifying Wiper Switch Components
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

	Remove/install		
1	Remove steering column cover		**AR68.30-P-2000MCC**
2	Unclip catch hook (3) on right wiper switch (S4/4)		
3	Lift right wiper switch (S4/4) upwards from the guides (4) and remove to one side until the electrical connector (1) is accessible		
4	Detach electrical connector (1) on the right wiper switch (S4/4) and remove the right wiper switch (S4/4)		
5	Release cap (2) by applying suitable knife to right wiper switch (S4/4) and remove	When replacing right wiper switch (S4/4).	
6	Install in the reverse order		
7	Conduct function test of		

	right wiper switch (S4/4)		

REMOVE/INSTALL COCKPIT SWITCH GROUP - AR54.25-P-1000MCC

MODEL 451.3/4



1 Electrical connector
2 Retaining clamp
3 Mounting wedge
S6/1 Cockpit switch group

Fig. 34: Removing/Installing Cockpit Switch Group
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

	Remove/install		
1	Loosen cockpit switch group (S6/1) using assembly wedge (3) and remove until the electrical connector (1) is accessible		*110589035900
2	Separate electrical connector (1) and remove cockpit switch group (S6/1)	Check retaining clips (2), replace is necessary.	
3	Install in the reverse order		

Wedge tool

Fig. 35: Identifying Wedge Tool (110 589 03 59 00)
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

REMOVE/INSTALL IGNITION/STARTER SWITCH LOCK CYLINDER - AR54.25-P-1030MCU

MODEL 451.3/4

1 Ignition switch lock cylinder
2 Clamp
3 Transmitter key
4 Feeler gauge
5 Fuse

N15/5 Electronic selector lever module control unit

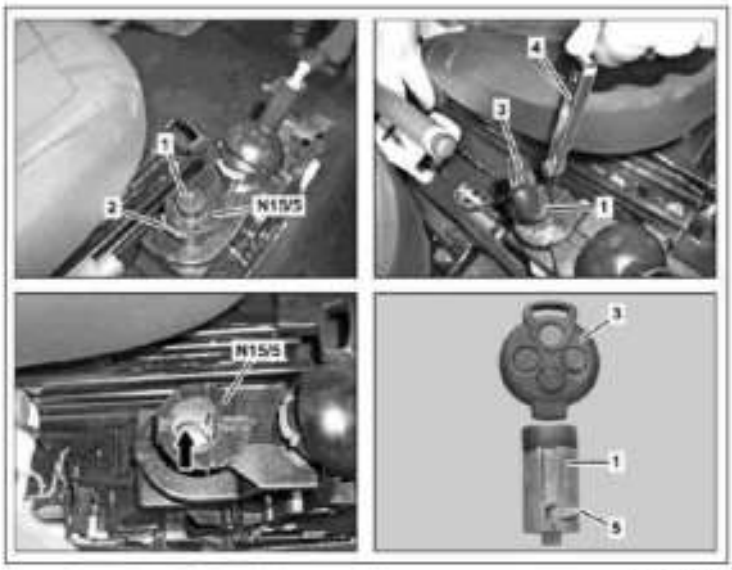


Fig. 36: Identifying Ignition/Starter Switch Lock Cylinder Components
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

	Removing		
1	Remove transponder coil and put to one side with electrical line connected		**AR80.35-P-4515MCU**
2	Remove clamp (2)		
3	Insert transmitter key (3) into the lock cylinder of the ignition/starter switch (1) and switch on ignition (circuit 15)	Ensure that the selector lever is located in position "P".	
4	Slide in feeler gauge (4), on the left side as shown, between the lock cylinder of the ignition/starter switch (1) and electronic selector lever module control unit (N15/5)	Use blade of feeler gauge (4) with the thickness of 0.15 mm.	
5	Pull out lock cylinder of ignition/starter switch (1) with transmitter key (3) upwards	If necessary move the feeler gauge (4) slightly, so that the locking device (5) is released from the bracket (arrow).	
	Install		
6	Insert lock cylinder of ignition/starter switch (1) with transmitter key (3) in the electronic selector lever module control unit (N15/5)	Ensure that the selector lever is located in position "P". The lock cylinder of the ignition/starter switch (1) must engage audibly in the electronic selector lever module (N15/5) control unit.	
7	Remove transmitter key (3)		
8	Install transponder coil		**AR80.35-P-**

			4515MCU

REMOVE/INSTALL COMBINATION SWITCH - AR54.25-P-2800MCC

MODEL 451.3/4

P54.25-6859-07

1 Electrical connector
2 Cap
3 Catch hook
4 Guide
S4 Combination switch

Fig. 37: Identifying Combination Switch Components
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

	Remove/install		
1	Remove steering column cover		**AR68.30-P-2000MCC**
2	Unclip catch hook (3) on combination switch (S4)		
3	Lift combination switch (S4) upwards from the guides (4) and remove to one side until the electrical connector (1) is accessible		
4	Detach electrical connector (1) on the combination switch (S4) and remove combination switch (S4)		
5	Release cap (2) by applying suitable knife to combination switch (S4) and remove	When replacing the combination switch (S4).	
6	Install in the reverse order		
7	Conduct function test of combination switch (S4)		

REMOVE/INSTALL CRUISE CONTROL SWITCH - AR54.25-P-2803MCC

MODEL 451.3/4 with CODE (V27) Cruise control/Temposet

1 Front cover
2 Bolts
3 Wiring harness

S112s4 Left cruise control switch
S112s5 Right cruise control switch

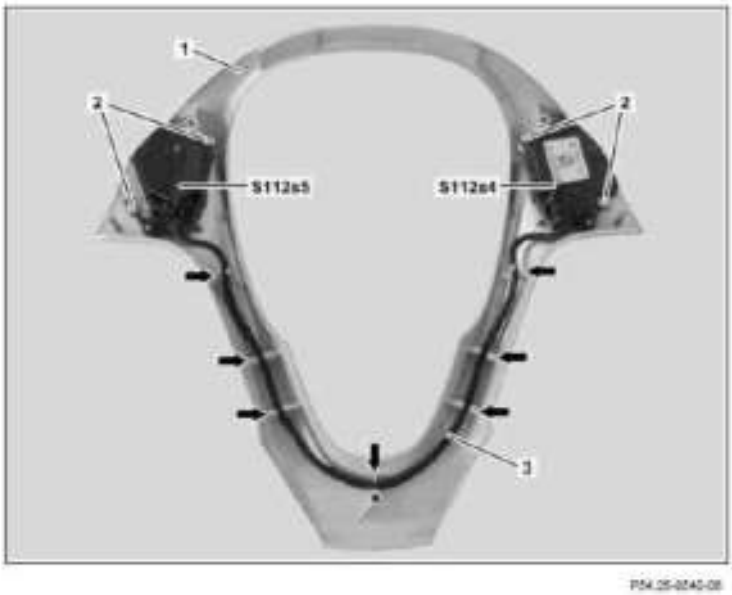
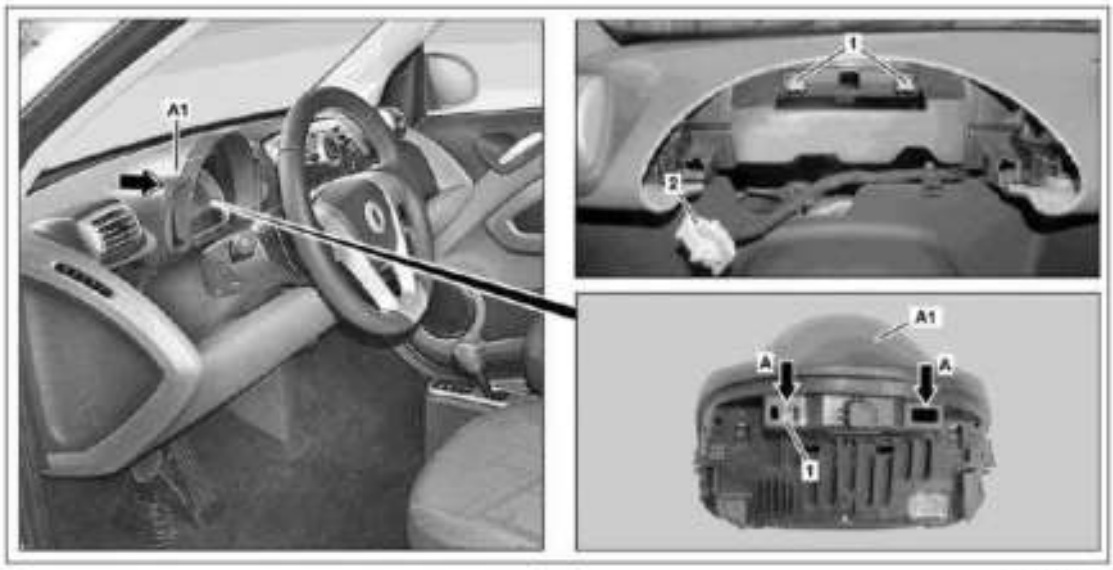


Fig. 38: Identifying Cruise Control Switch Components
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

	Remove/install		
1	Remove front cover (1) from steering wheel spokes		**AR46.10-P-0105MCC**
2	Unclip electrical wiring harness (3) from mounting (arrows) of front cover (1)		
3	Unscrew left and right bolts (2)	**Installation:** Carefully tighten bolts (2) and make sure that the front covering (1) is not damaged as otherwise it will have to be replaced.	
4	Remove left cruise control switch (S112s4) and right cruise control switch (S112s5)	The left cruise control switch (S112s4) and right cruise control switch (S112s5) are designed as a unit and they cannot be separated. **Installation:** Check left cruise control switch (S112s4) and right cruise control switch (S112s5) are correctly seated in the front cover (1).	
5	Install in the reverse order		

REMOVE/INSTALL INSTRUMENT CLUSTER - AR54.30-P-6015MCU

MODEL 451.3/4



1 Clips 2 Connector A1 Instrument cluster

Fig. 39: Identifying Instrument Cluster, Clips And Connector
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

	Remove/install		
	Notes on avoiding damage to electronic components due to electrostatic discharge		**AH54.00-P-0001-01A**
1	Pull the instrument cluster (A1) in the direction of the arrow out of the dashboard upper section until the connector (2) on the instrument cluster (A1) is accessible	Check position of clamps (1). When removing the instrument cluster (A1) there is the danger that the clamps (1) can fall through the openings (arrows A) in the instrument cluster (A1).	
2	Unlock connector (2) on the instrument cluster (A1), detach and remove instrument cluster (A1) backwards	Clamps (1), which have fallen into instrument cluster (A1) when removing, must be got out again otherwise a short circuit in the instrument cluster can occur (A1). This must only take place through the opening a (arrow A). Disassembling the instrument cluster (A1) is not permissible.	
3	Remove clamps (1) on top part of dashboard or on instrument cluster (A1)	**Installation:** The clamps (1) are to be replaced by the clamps (1) listed in the Parts ordering notes table. Insert new clamps (1) in the top part of the dashboard.	
4	Install in the reverse order		
5	Set clock in the instrument cluster (A1)		

PARTS ORDERING NOTES

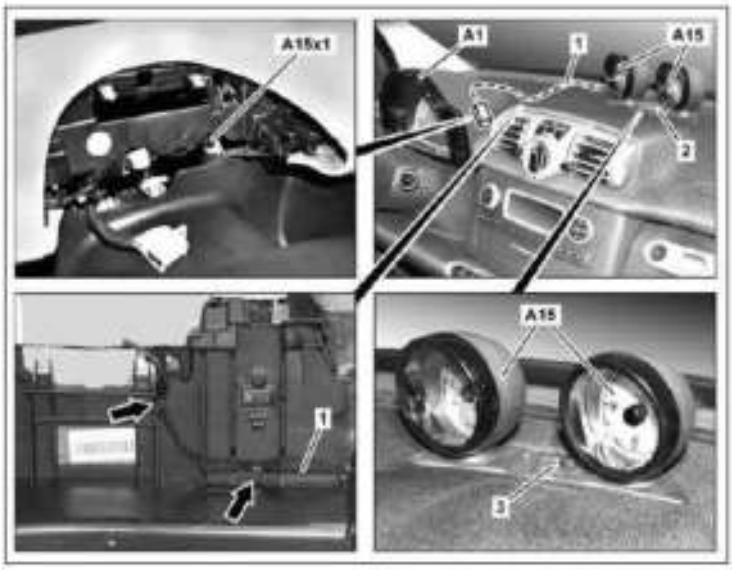
Part no.	Designation	Quantity
A 203 988 28 78	Clamp	2

REMOVE/INSTALL ADDITIONAL INSTRUMENTS - AR54.30-P-6080MCC

MODEL 451.3/4 as of 31.8.10 with CODE (V31) Cockpit clock and tachometer package

1 *Wiring harness for additional instruments*
2 Cover
3 Screw

A1 *Instrument cluster*
A15 *Additional instruments*
A15x1 *Additional instruments connector*



P54.30-6028-08

Fig. 40: Identifying Additional Instruments Components
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

	Remove/install		
1	Remove instrument cluster (A1)	* not for USA * for USA only	AR54.30-P-6015MCC **AR54.30-P-6015MCU**
2	Remove covering (2) of additional instruments (A15)		
3	Remove bolt (3) of additional instruments (A15)		
4	Adjust driver seat to the rear		
5	Unhook wiring harness for additional instruments (1) from holders (arrows) at bottom of instrument panel upper section	The wiring harness additional instrument (1) can be accessed from the driver footwell.	
6	Detach the additional instrument connector (A15x1) located in the installation opening of the IC (A1)		
7	Remove additional instruments (A15)		
8	Install in the reverse order		
9	Set clock of additional instruments (A15)		

REMOVE/INSTALL ADDITIONAL INSTRUMENTS - AR54.30-P-6080MCF

MODEL 451.3/4 as of 31.8.10 with CODE (V31) Cockpit clock and tachometer package

1 Wiring harness for additional instruments
2 Cover
3 Screw

A1 Instrument cluster
A15 Additional instruments
A15x1 Additional instruments connector

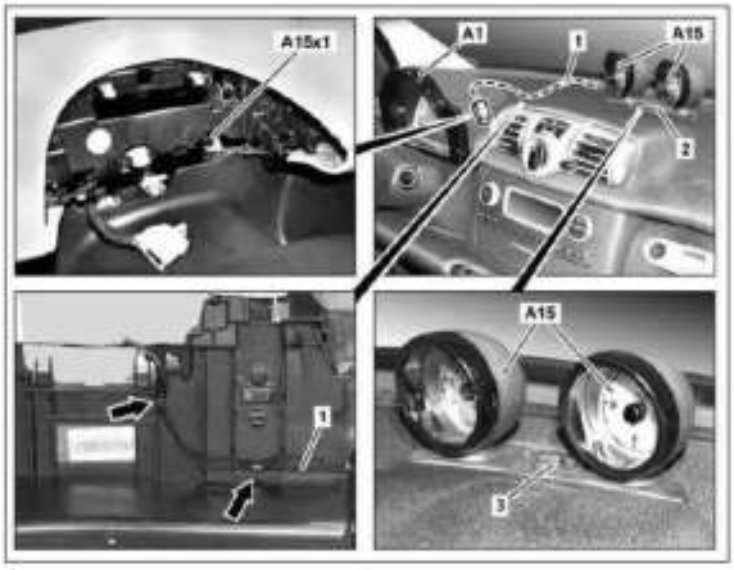


Fig. 41: Identifying Additional Instruments Components
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

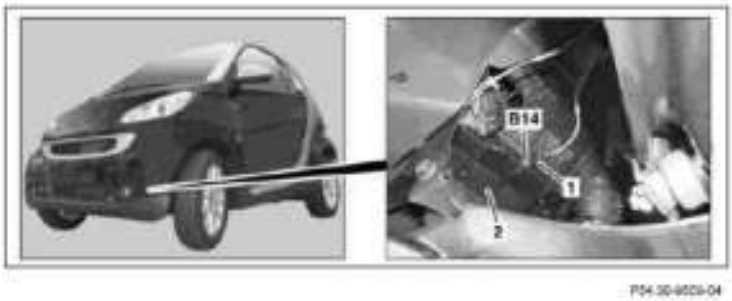
	Remove/install		
1	Remove instrument cluster (A1)	* not for USA	AR54.30-P-6015MCC
		* for USA only	**AR54.30-P-6015MCU**
2	Remove covering (2) of additional instruments (A15)		
3	Remove bolt (3) of additional instruments (A15)		
4	Adjust driver seat to the rear		
5	Unhook wiring harness for additional instruments (1) from holders (arrows) at bottom of instrument panel upper section	The wiring harness additional instrument (1) can be accessed from the driver footwell.	
6	Detach the additional instrument connector (A15x1) located in the installation opening of the IC (A1)		
7	Remove additional instruments (A15)		
8	Install in the reverse order		
9	Set clock of additional instruments (A15)		

REMOVE/INSTALL OUTSIDE TEMPERATURE INDICATOR SENSOR - AR54.30-P-6341MCC

MODEL 451.3/4

1 Electrical connector
2 Front Module

B14 Outside temperature display temperature sensor



P54.30-9509-04

Fig. 42: Identifying Outside Temperature Indicator Sensor Components
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

	Remove/install
1	Turn the steering to the left
2	Pull the outside temperature display temperature sensor (B14) out of the front module (2)
3	Unplug electrical connector (1) and remove outside temperature indicator temperature sensor (B14).
4	Install in the reverse order

REMOVE/INSTALL SIGNALING HORN - AR54.35-P-1556MCU

MODEL 451.3/4

1 Screw
H2 Horn

P54.35-2144-04

Fig. 43: Identifying Horn And Screw
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

	Remove/install		
1	Remove front CBS		**AR88.00-P-1010MCC**
2	Disconnect electrical connectors from horn (H2)	**Installation:** Carry out a function test after connecting the electrical connectors to the horn (H2).	
3	Unscrew bolt (1) and remove horn (H2)		
4	Install in the reverse order		

SAFETY PRECAUTIONS

SAFETY INFORMATION: ELECTRICAL SYSTEM, EQUIPMENT AND INSTRUMENTS - AS54.00-Z-9999ZZ

MODEL all

Danger!	Risk of death when touching components on vehicles with high-voltage on-board electrical system	MODEL all	AS54.00-Z-0001-01A
Danger!	Risk of death when touching components on vehicles with high-voltage system	MODEL 451.391/491	AS54.00-Z-0001-02MEV
Danger!	Risk of explosion from gas. Risk of poisoning and burns from swallowing battery electrolyte. Risk of injury to eyes and skin as result of caustic burns from battery electrolyte or from handling damaged lead-acid batteries.	MODEL all	**AS54.10-Z-0001-01A**
Danger!	Risk of injury caused by contact with battery gel when handling damaged lead-gel batteries	MODEL all	**AS54.10-Z-0001-02A**

RISK OF EXPLOSION FROM GAS. RISK OF POISONING AND BURNS FROM SWALLOWING BATTERY ELECTROLYTE. RISK OF INJURY TO EYES AND SKIN AS RESULT OF CAUSTIC BURNS FROM BATTERY ELECTROLYTE OR FROM HANDLING DAMAGED LEAD-ACID BATTERIES. - AS54.10-Z-0001-01A

No fire, sparks, naked flames or smoking. Wear acid-resistant gloves, clothing and eye protection. Pour battery electrolyte only into suitable and appropriately marked containers.

Possible hazards

Risk of explosion

A highly explosive gas mixture is produced when charging lead-acid batteries.

Risk of poisoning

If battery electrolyte is swallowed , this can result in manifestations of poisoning such as headaches, dizziness, stomach pain, respiratory paralysis, unconsciousness, vomiting and cramps.

Battery electrolyte mist causes caustic burns to the eyes.

If swallowed, this can result in caustic burns to the mucous membranes and respiratory passages.

The absorption of lead in the body can cause damage to blood, nerves and kidneys; in addition, lead compounds are considered to represent a reproductive hazard.

Injury hazard

Battery electrolyte contains sulfuric acid which can cause severe caustic burns to skin and eyes. Strict caution is required when handling damaged lead-acid batteries (removing from vehicle damaged in accident)

because of the sharp edges on the fractured housing and direct contact with the lead plates.

Protective measures/rules of conduct

- Charge lead-acid batteries only in well ventilated areas.
- No fire, sparks, naked flames or smoking.
- Do not place any tool or other conducting objects onto the lead-acid battery (risk of short-circuit).
- Disconnect and remove lead-acid batteries for charging.
- Always **disconnect negative terminal** first of all; always **connect positive terminal** first of all.
- Do not switch on the charger until after it has been connected to the terminals; switch it off before disconnecting.
- Keep lead-acid batteries and battery electrolyte away from unauthorized persons.

  Pour battery electrolyte only into suitable and appropriately marked containers.

- Always store lead-acid batteries horizontally.
- Ensure the gassing line is properly connected.
- Ensure the gassing line does not have any kinks and is not blocked at any point.
- Pay attention to instructions for use of the particular lead-acid battery and the operating instructions of the vehicle.
- Wear acid-resistant clothing and eye protection with side guards.

First-aid measures

Eye contact

- Rinse out eyes immediately with plenty of water. Skin contact

  Take off moistened clothing.

- Immediately neutralize acid splashes on skin or clothing with acid converter or soap suds and rinse off with plenty of water.

  Inhaling battery electrolyte mist

- Take the affected person out into the fresh air.

  Swallowing battery electrolyte

- Have the person affected drink plenty of water with the addition of activated charcoal.

As a general rule, the person affected should consult a medical service or doctor after first-aid has been rendered.

Fire protection measures

Suitable extinguishing agents

- CO_2 and dry extinguishing agent

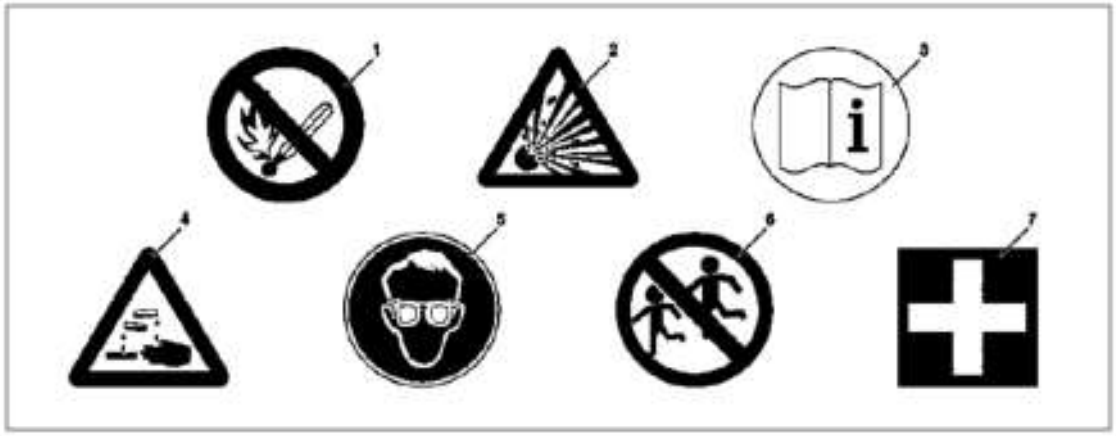


Fig. 44: Identifying Warning Instructions For Lead-Acid Batteries
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

Warning instructions for lead-acid batteries

RISK OF INJURY CAUSED BY CONTACT WITH BATTERY GEL WHEN HANDLING DAMAGED LEAD-GEL BATTERIES - AS54.10-Z-0001-02A

No fires, sparks, open flames or smoking. Wear acid-resistant gloves, clothing and safety glasses.

Potential risks

Risk of poisoning

If battery gel is swallowed this can cause poisoning symptoms such as headaches, dizziness, stomach aches, respiratory paralysis, unconsciousness, vomiting, caustic burns and cramps.

The absorption of lead in the body can cause damage to blood, nerves and kidneys; in addition, lead compounds are considered to represent a reproductive hazard.

Risk of injury

Battery electrolyte gel is just as caustic as normal electrolyte fluid and can cause serious caustic burns to the skin and eyes. Strict caution is required when handling damaged lead-gel batteries (e.g. when removing from a vehicle damaged in an accident) due to the sharp edges on a broken housing and direct contact with the lead plates.

Safety precautions and rules of conduct

- No fires, sparks, open flames or smoking.
- Keep tools and other conductive objects away from lead-gel batteries (risk of short-circuit).
- Disconnect and remove lead-gel batteries for charging.

- Always **disconnect negative terminal before positive terminal** and always **connect positive terminal before negative terminal**
- Switch on the charging equipment only after connecting to the terminals and switch off the charging equipment before disconnecting from the terminals.
- Keep lead-gel batteries away from unauthorized persons (especially children).
- Observe the instructions of the particular lead-gel battery and the operator's manual of the vehicle.
- Wear acid-resistant clothing and eye protection with side guards.
- Only fill gel into suitable and appropriately marked containers.

First aid measures

Eye contact

- Rinse out eyes immediately with plenty of water.

Skin contact

- Remove affected clothing.
- Immediately neutralize acid or gel on skin or clothing with acid converter or soap suds and rinse off with plenty of water.

Swallowing battery gel

- Have the person affected drink plenty of water with the addition of activated charcoal.

As a general rule, always consult a medical service or doctor after first-aid has been rendered.

Fire protection measures

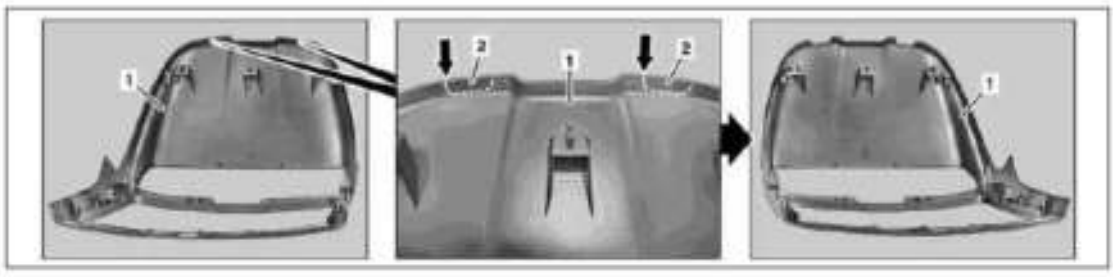
Suitable extinguishing agents

- CO_2 and dry extinguishing agent

RETROFITTING & CONVERSION

RETROFIT ADDITIONAL INSTRUMENTS - AZ54.30-P-0001MCC

MODEL 451.3/4 up to 30.8.10



1 Cover 2 Cutout

Fig. 45: Identifying Cover And Cutouts
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

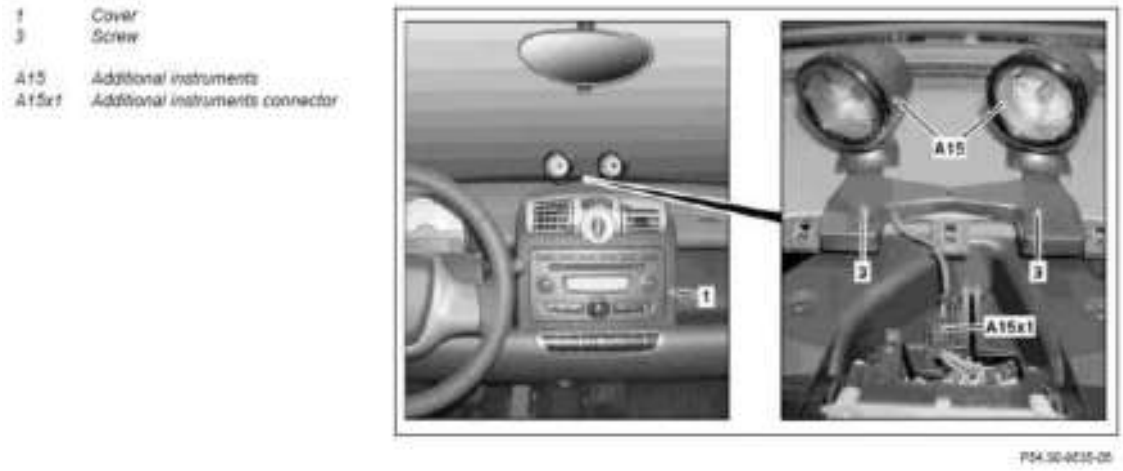


Fig. 46: Identifying Additional Instruments Components
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

	Remove		
1	Remove cover (1) on center console		**AR68.20-P-2350MCC**
	Install		
2	Make the cutouts (2) to match the perforation (arrows) on the cover (1)		
3	Position additional instruments (A15) on dashboard upper section and fasten in place using the bolts (3)		
4	Connect additional instruments connector (A15x1)	The plug for the additional instrument connector (A15x1) is located in the attachment between the air vents. If the plug for the additional instrument connector (A15x1) has not been clipped into the attachment, then the wiring harness is to be tied back and down in a loop.	
5	Fit cover (1) onto center console		**AR68.20-P-2350MCC**
6	Set clock of additional instruments (A15)		
7	Add special equipment to the vehicle data card and to the online vehicle data card	Code (V31) Cockpit clock and tachometer package to be added.	

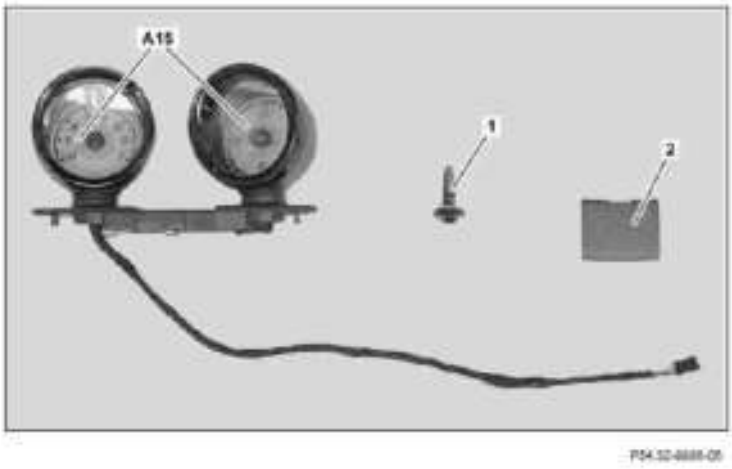
RETROFIT ADDITIONAL INSTRUMENTS - AZ54.30-P-0001MCD

MODEL 451.3/4 as of 31.8.10

Parts scope for additional instrument (A15)

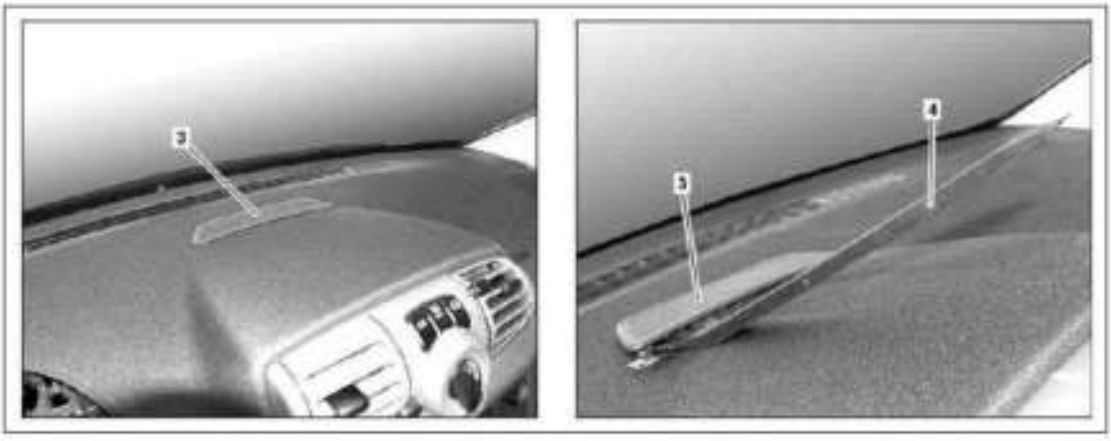
1 Screw
2 Cover

A15 Additional instruments



P54.32-6668-08

Fig. 47: Identifying Cover, Screw And Additional Instruments
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

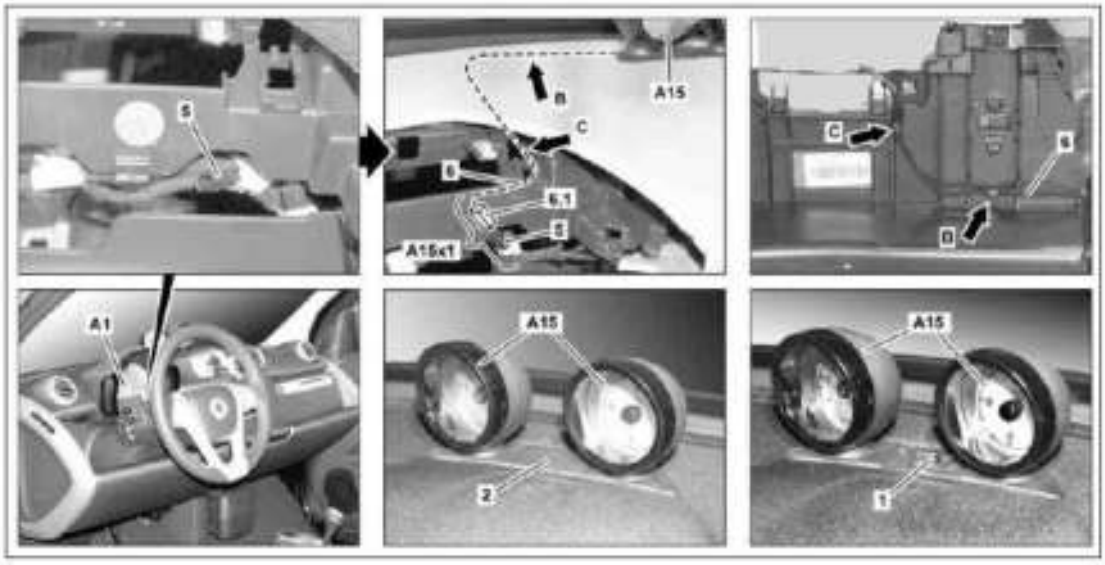


P54.32-6667-08

3 Cover

4 Snap-release tool

Fig. 48: Removing Cover
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.



1 Screw
2 Cover
5 Black 3-pin connector
6 Wiring harness for additional instruments
6.1 Black, 3-pin coupling
A1 Instrument cluster
A15 Additional instruments
A15x1 Additional instruments connector

Fig. 49: Identifying Additional Instruments Components
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

	Remove		
1	Adjust driver seat to the rear		
2	Remove instrument cluster (A1)	* not for USA * for USA only	AR54.30-P-6015MCC **AR54.30-P-6015MCU**
3	Detach covering (3) with clip remover, as shown, and remove	Clip remover	*452589016300
	Install		
4	Slide wiring harness for additional instruments (6) through the left opening and under the covering (3) towards the instrument cluster		
5	Clip additional instruments (A15) into instrument panel		
6	Bend into the footwell and route wiring harness for additional instrument (6) at the bottom of the instrument panel upper section towards the instrument cluster		
7	Hook wiring harness for additional instruments (6) into holders (arrow C and B) at bottom on instrument panel upper section		
8	Detach black, 3-pin connector (5) from vehicle wiring harness in area of instrument cluster (A1)		
9	Connect black, 3-pin connector (5) and black, 3-pin coupling (6.1) of	The additional instruments connector	

	wiring harness for additional instruments (6)	(A15x1) is now complete.	
10	Use bolt (1) to tighten additional instruments (A15)		
11	Clip cover (2) over the bolt (1) on the additional instruments (A15)		
12	Move driver seat back to its default position		
13	Install in the reverse order		
14	Set clock of additional instruments (A15)		
15	Connect Star Diagnosis		**AD00.00-P-2000-04MCC**
16	Enter special equipment on the vehicle data card and the online vehicle data card	Code (V31) Cockpit clock and tachometer package to be added.	
17	Disconnect Star Diagnosis		**AD00.00-P-2000-04MCC**
18	Document retrofitted equipment using vehicle documentation (VeDoc)	Attach "Additional instruments (A15) retrofitted as per **AZ54.30-P-0001MCD**" note under field organization text for design group 54.	

Fig. 50: Identifying Snap-Release Tool (452 589 01 63 00)
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

PARTS ORDERING NOTES

Part no.	Designation	Quantity
DG 54 (see EPC)	Additional instruments	1
DG 54 (see EPC)	Screw	1
DG 54 (see EPC)	Cover	1

TORQUE SPECIFICATIONS

TIGHTENING TORQUES: SMART: ELECTRICAL SYSTEM, EQUIPMENT AND INSTRUMENTS

- BA54.00-Z-9999CZ

MODEL all

Battery	MODEL 454.0, 451.391 /491	BA54.10-P-1000-01E
Battery	MODEL 451.391/491	BA54.10-P-1000-01H
Control units/base module	MODEL 450, 451.334 /380 /480	BA54.21-P-1000-01B
Signaling system	MODEL 450.3	BA54.35-P-1000-01B
Wiring harness	MODEL 450.3 /4	BA54.18-P-1000-02A

TEST & ADJUSTMENT VALUES

TEST AND ADJUSTMENT VALUES: SMART: ELECTRICAL SYSTEM, EQUIPMENT AND INSTRUMENTS - BE54.00-Z-9999CZ

MODEL all

Test values for battery, voltage supply	MODEL all	**BE54.10-P-1000-01A**

TEST VALUES FOR BATTERY, VOLTAGE SUPPLY - BE54.10-P-1000-01A

All

MODIFICATION NOTES

24.2.06	Cold test current	12 AH	

TEST AND ADJUSTMENT VALUES FOR THE BATTERY

Number	Designation			12 AH	30 AH	35 Ah	42 AH
BE54.10-P-1001-01A	Battery test at 20°C	Acid density	kg/dm^3	-	> or =1,24	> or =1,24	-
		Maximum permissible difference between individual battery cells	kg/dm^3	-	0,04	0,04	-
		Load current	A	-	90	100	-
		Load time	s	-	10	10	-
		Voltage	VV	-	approx.10	approx.10	-
BE54.10-P-1002-01A	Cold test current	as per EN	A	170	540	520	340

TEST AND ADJUSTMENT VALUES FOR THE BATTERY

Number	Designation			46 AH	60 Ah VRLA	60 AH	61 AH
BE54.10-P-1001-01A	Battery test at 20°C	Acid density	kg/dm^3	> or =1,24	-	-	-
		Maximum permissible	kg/dm^3	0,04	-	-	-

		difference between individual battery cells					
		Load current	A	140	-	-	-
		Load time	s	10	-	-	-
		Voltage	VV	approx.10	-	-	-
BE54.10-P-1002-01A	Cold test current	as per EN	A	420	680	510	540

TEST AND ADJUSTMENT VALUES FOR THE BATTERY

Number	Designation			62 AH	70 Ah VRLA	74 AH	80 Ah VRLA
BE54.10-P-1001-01A	Battery test at 20°C	Acid density	kg/dm^3	> or =1,24	-	> or =1,24	-
		Maximum permissible difference between individual battery cells	kg/dm^3	0,04	-	0,04	-
		Load current	A	190	-	265	-
		Load time	s	10	-	10	-
		Voltage	VV	approx.10	-	approx.10	-
BE54.10-P-1002-01A	Cold test current	as per EN	A	480	760	680	800

TEST AND ADJUSTMENT VALUES FOR THE BATTERY

Number	Designation			84 AH	90 Ah VRLA	95 Ah VRLA	100 Ah
BE54.10-P-1001-01A	Battery test at 20°C	Acid density	kg/dm^3	-	-	-	> or =1,24
		Maximum permissible difference between individual battery cells	kg/dm^3	-	-	-	0,04
		Load current	A	-	-	-	300
		Load time	s	-	-	-	approx.10
		Voltage	VV	-	-	-	approx.10
BE54.10-P-1002-01A	Cold test current	as per EN	A	700	950	850	760

BASIC KNOWLEDGE

FUSE AND RELAY BOX, AS-BUILT CONFIGURATION - GF54.15-P-0800MCU

MODEL 451.3/4

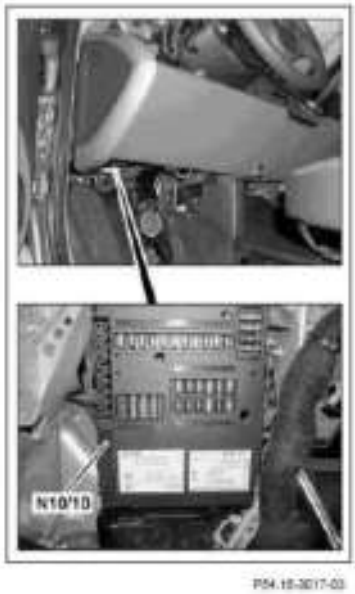


Fig. 51: Locating SAM Control Unit
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

	Fuse and relay box fuse assignment	Engine 132.9 Engine 780.0	**GF54.15-P-1255-20MCU** GF54.15-P-1255-20MEV
	Fuse and relay box relay assignment	Model 451.3/4 (except 451.391/491) Model 451.391/491	**GF54.15-P-1255-21MCU** GF54.15-P-1255-21MEV
	Fuse assignment of fuses in the interior on passenger side	Model 451.3/4 (except 451.391/491) Model 451.391/491	**GF54.15-P-1256-24MCU** GF54.15-P-1256-24MEV
PE	Wiring diagram electrical center	Sheet 1 Sheet 2 Sheet 3	**PE54.25-P-2000MCU** **PE54.25-P-2000MCV** **PE54.25-P-2000MCW**

FUSE AND RELAY BOX FUSE ASSIGNMENT - GF54.15-P-1255-20MCU

Fuse and relay assignment of SAM control unit (N10/10) (front side)

1 to 31	Fuse sockets
R1 to R9	Fuse sockets

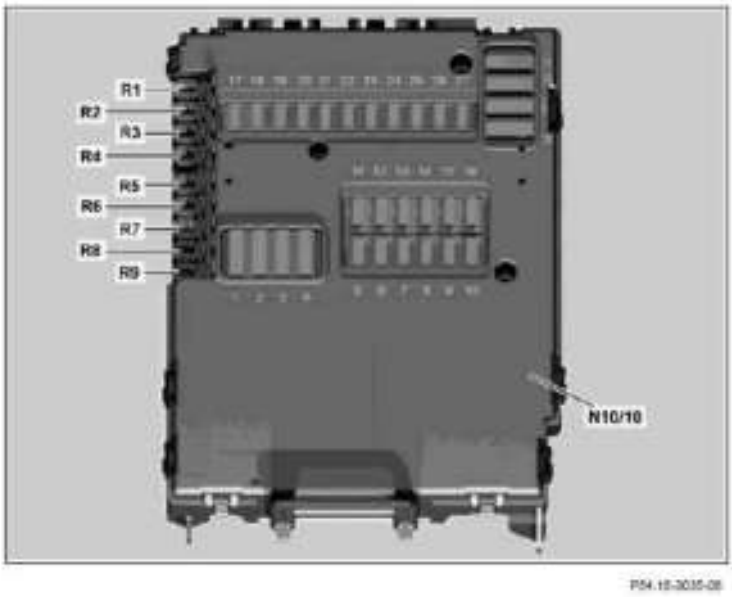


Fig. 52: Identifying Fuse Sockets Of Front Side SAM Control Unit
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

Fuse and relay assignment of SAM control unit (N10/10) (back side)

32 to 35	Fuse sockets
N10/10-1	Electrical connector
N10/10-2	Electrical connector
N10/10-3	Electrical connector
N10/10-4	Electrical connector
N10/10-5	Electrical connector
N10/10-6	Electrical connector
N10/10-7	Electrical connector
N10/10-8	Electrical connector
N10/10-9	Electrical connector
N10/10-10	Electrical connector
N10/10-11	Electrical connector

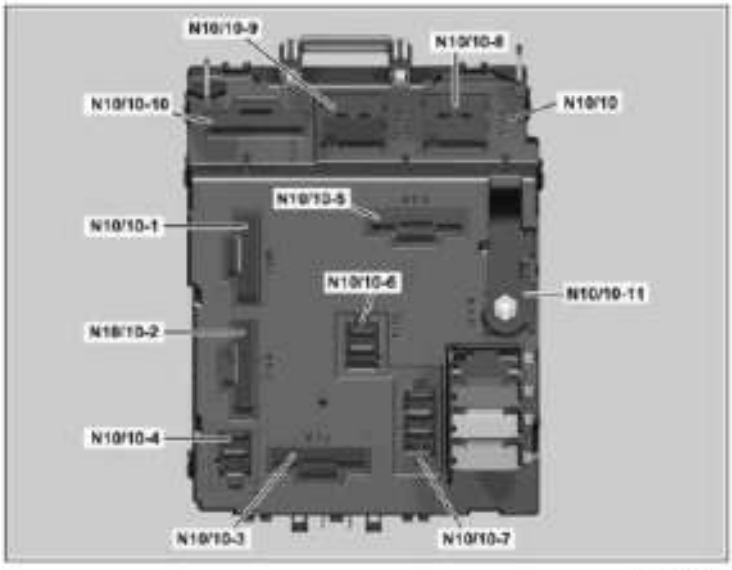


Fig. 53: Identifying Fuse Sockets And Electrical Connectors Of Back Side SAM Control Unit
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

Position	Fuse	Identification color	Fused function	Fuse rating in amperes (A)
1	N10/10f1	transparent	Starter (M1)	25
2	N10/10f2	transparent	Wiper motor (M6/1)	25
3	N10/10f3	Yellow	Power window convenience feature control unit (N57/2) (with code (V43) Power window)	20
4	N10/10f4	transparent	Blower motor (M2)	25

5	N10/10f5	red	Left front fog lamp (E5/1) (with code (V07) front fog lamp (FFO)) Right front fog lamp (E5/2) (with code (V07) Front fog lamp (FFO))	10
6	N10/10f6	brown	Right taillight (E4e2) Right parking lamp (E6/14) Left license plate lamp (E19/1) Right license plate lamp (E19/2)	7.5
7	N10/10f7	brown	Left taillight (E3e2) Left parking light (E6/13)	7.5
8	N10/10f8	transparent	Secondary air injection pump relay (K64) ME-SFI [ME] control unit (N3/10) Electronic selector lever module control unit (N15/5) Automated manual transmission control unit (N15/6) Cylinder 1 ignition coil (T1/1) Cylinder 2 ignition coil (T1/2) Cylinder 3 ignition coil (T1/3)	25
9	N10/10f9	brown	O2 sensor downstream of CAT (G3/1) Adjustable camshaft timing solenoid (Y49) External air shutoff valve (Y50) Activated charcoal canister shutoff valve (Y58)	7.5
10	N10/10f10	blue	O2 sensor upstream of CAT (G3/2) Secondary air injection pump switchover valve (Y32) Cylinder 1 fuel injection valve (Y62/1) Cylinder 2 fuel injection valve (Y62/2) Cylinder 3 fuel injection valve (Y62/3)	15
11	N10/10f11	transparent	ESP control unit (N47-5)	25
12	N10/10f12	red	Instrument cluster (A1) Additional instruments (A15) Microwave sensor (B32) (with code (V01) Vehicle theft alarm (FFO)) Rain sensor / light sensor (B38) (with code (V54) Rain/light sensor) Alarm siren with inclination sensor (H3/2) (with code (V01) Vehicle theft alarm (FFO)) Left turn signal lamps/brake light relay (K52/11) Right turn signal lamps/brake light relay (K52/12) Mirror heater relay (K97) Automated manual transmission control unit (N15/6) TPM [RDK] control unit (N88) Combination switch (S4)	10

			Cockpit switch group (S6/1) Data link connector (X11/4)	
13	N10/10f13	blue	Spare fuse	15
14	N10/10f14	blue	Refrigerant compressor (A9) (with code (I01) Air conditioning Plus) Charge air fan motor (M44)	15
15	N10/10f15	blue	smart radio 9 (A2/1) (with code (C57) smart radio 9) smart radio 10 (A2/2) (with code (C50) smart radio 10) Front interior lamp (E15/4) (with vehicles up to production date 1.9.10) Soft top OPEN relay (K66/1) (on model 451.4) Soft top CLOSE relay (K66/2) (on model 451.4)	15
16	N10/10f16	blue	Fuel pump with fuel gauge sensor (M3/3) ME-SFI [ME] control unit (N3/10)	15
17	N10/10f17	blue	Rear-end door wiper motor (M6/4) (with model 451.3)	15
18	N10/10f18	red	Instrument cluster (A1) Yaw rate sensor for lateral and longitudinal acceleration (B24/15) Seat occupied recognition pressure sensor (B48/4) Automatic child seat recognition airbag OFF indicator lamp (E16) Restraint systems control unit (N2/7) ESP control unit (N47-5) Steering angle sensor (N49) Steering assist control unit (N68) (with code (V26) Power steering, EPS (FFO)) Driver side seat belt buckle restraint systems switch (S68/3) Front passenger-side seat belt buckle restraint systems switch (S68/4)	10
19	N10/10f19	Brown	ME-SFI [ME] control unit (N3/10) Automated manual transmission control unit (N15/6) Data link connector (X11/4) TPM [RDK] control unit (N88)	7,5
20	N10/10f20	red	smart radio 9 (A2/1) (with code (C57) smart radio 9) smart radio 10 (A2/2) (with code (C50) smart radio 10) Heater/air conditioning operating unit (N23) (for code (I01) Air conditioning Plus) Front seat heater (SIH) control unit (N25/5) (with code (S17) Seat heater	10

			(FFO)) Right wiper switch (S4/4) Outside mirror adjustment switch (S50) (with code (V21) Electrically adjustable and heated outside mirrors (FFO)) Soft top operation (S84) (on model 451.4)	
21	N10/10f21	blue	Interior socket (X58/1)	15
22	N10/10f22	brown	Left low beam (E1e2)	7.5
23	N10/10f23	brown	Right low beam (E2e2)	7.5
24	N10/10f24	blue	Electronic selector lever module control unit (N15/5)	15
25	N10/10f25	brown	Right high beam (E2e1)	7.5
26	N10/10f26	brown	Left high beam (E1e1)	7.5
27	N10/10f27	brown	ME-SFI [ME] control unit (N3/10)	7.5
28	N10/10f28	orange	Heated rear window (R1)	40
29	N10/10f29	green	Soft top OPEN relay (K66/1) (on model 451.4) Soft top CLOSE relay (K66/2) (on model 451.4)	30
30	N10/10f30	orange	Automated manual transmission control unit (N15/6)	40
31	N10/10f31	Yellow	Horn (H2) Right door CL motor (M14/5) Left front door central locking motor (M14/6) Rear-end door CL [ZV] motor (M14/7) Fuel filler flap CL [ZV] motor (M14/10) Horn switch (S4/2)	20
32	-	-	vacant	-
33	N10/10f33	red	Ignition/starter switch (S2/1)	50
34	N10/10f34	orange	ESP control unit (N47-5)	40
35	N10/10f35	green	Steering assist control unit (N68) (with code (V26) Power steering, EPS (FFO))	30
36	N10/10f36	orange	Secondary air injection pump (M33)	
R1	-	brown	Mirror heater relay (K97) (with code (V21) Electrically adjustable and heated outside mirrors (FFO))	7.5
R2	-	brown	Stop light switch (S9/1)	7.5
R3	-	-	VACANT	-
R4	-	-	vacant	-
R5	-	-	vacant	-
R6	-	-	vacant	-
R7	-	-	Front interior lamp (E15/4) (with vehicles as of production date 2.9.10)	-
R8	-	Yellow	Sound system amplifier (for vehicles as of production date 2.9.10 with code (C17) Sound package (2 tweeters, 2 bass reflex boxes and diplexer) (FFO))	20

R9	-	transparent	Front seat heater (SIH) control unit (N25/5) (with code (S17) Seat heater (FFO))	25

FUSE AND RELAY BOX RELAY ASSIGNMENT - GF54.15-P-1255-21MCU

N10/10 SAM control unit
A to C Relay sockets

Fig. 54: Identifying SAM Control Unit And Relay Sockets
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

Position	Relay	Switched function
A	K52/11	Left turn signal/stop lamp relay
B	K52/12	Right turn signal/stop lamp relay
C	K97	Mirror heater relay (with code (V21) Electrically adjustable and heated outside mirrors (FFO))

FUSE ASSIGNMENT OF FUSES IN THE INTERIOR ON PASSENGER SIDE - GF54.15-P-1256-24MCU

F36 Secondary air injection pump fuse
F58 Starter/alternator fuse
F91 SAM prefuse

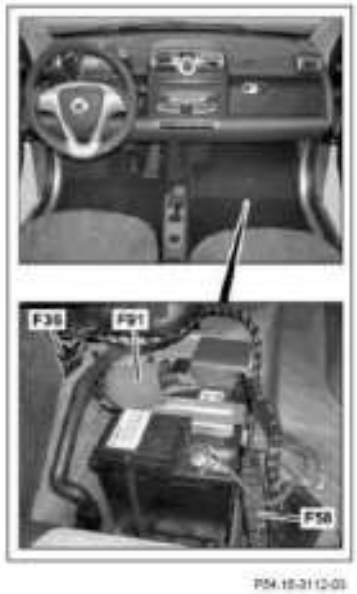


Fig. 55: Locating Secondary Air Injection Pump Fuse, Starter/Alternator Fuse And SAM Prefuse

Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

Fuse	Clamping device	Wire Identification	Fused function	Rating in amperes (A)
F36	30	4.0 RD	Secondary air injection pump (M33)	50
F58	30	16.0 RD	Starter (M1), alternator (G2)	200
F91	30	16.0 RD	SAM control unit (N10/10)	100

COMPONENT DESCRIPTION FOR THE SAM CONTROL UNIT - GF54.21-P-4157MCU

MODEL 451.3/4

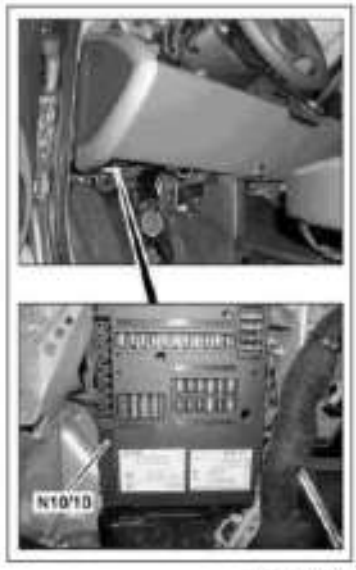
Location

The SAM control unit is located in the footwell on the passenger side.

Task

The SAM control unit supplies control units and electrical components with voltage via limit switches. The individual control units and electrical components are fused via the fuse and relay blocks contained in the SAM control unit.

N10/10 SAM control unit



P54.10-3017-03

Fig. 56: Locating SAM Control Unit
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

The SAM control unit controls the following functions:

- Drive authorization
- Central locking
- Exterior lighting
- Interior lighting

- Wiper system
- Rear window defroster
- Heated outside mirror (with code (V21) Electrically adjustable and heated outside mirror (FFO))
- Anti-theft alarm system (with code (V01) Anti-theft alarm system (FFO))
- Soft top (with model 451.4)

Requests are conveyed to the SAM control unit via data bus systems or via read-in switches and sensors.

The SAM control unit is a subscriber on the Controller Area Network (data bus/CAN bus) (CAN).

The following components are read in to control the functions:

Via local interconnect network interior 1 (LIN B):

- Rain sensor / light sensor (B38) (with code (V54) Rain/light sensor)
- Tachometer (A15p4) (with code (V31) Cockpit clock and tachometer package)

Via local interconnect network interior 2 (LIN C):

- Alarm siren with inclination sensor (H3/2) (with code (V01) Vehicle theft alarm (FFO))
- Microwave sensor (B32) (with code (V01) Vehicle theft alarm (FFO))

Components read in directly:

- Transmitter key
- Transponder coil (L11)
- Wiper motor (M6/1)
- Rear-end door wiper motor (M6/4) (on model 451.3)
- Heated rear window switch (N23s1)
- Ignition/starter switch (S2/1)
- Combination switch (S4)
- Fanfare horns switch (S4/2) (except code (I75) Leather sport steering wheel incl. steering wheel rocker switch system)
- Right wiper switch (S4/4)
- Hazard flasher switch (S6/1s1)
- Front fog lamp switch (S6/1s8) (with code (V07) Front fog lamp (FFO))
- (S6/1s9TPM [RDK] switch)
- Tow-away protection /Interior protection switch (S6/1s10) (with code (V01) Vehicle theft alarm (FFO))
- Inside unlock CL (ZV) switch (S6/1s11)
- Inside lock CL (ZV) switch (S6/1s12)
- Stop light switch (S9/1)
- Remote trunk opening switch (S15) (on model 451.3)
- Trunk lid rotary tumbler microswitch (S17/8) (on model 451.4)

- Soft top operation (S84) (on model 451.4)
- Soft top microswitch (S84/37) (on model 451.4)
- Left roof cassette microswitch (S84/38) (on model 451.4)
- Right roof cassette microswitch (S84/40) (on model 451.4)
- Right door rotary tumbler microswitch (S87/6)
- Left door rotary tumbler microswitch (S87/7)
- Right rear soft top microswitch (S84/39) (on model 451.4)
- Left rear soft top microswitch (S84/41) (on model 451.4)
- Tailgate handle switch (S88/9)

The following components are actuated directly to carry out the functions:

- Refrigerant compressor (A9) (with code (I01) Air conditioning Plus)
- Left front lamp unit (E1)
    - Left high beam (E1e1)
    - Left low beam (E1e2)
    - Left turn signal lights (E1e5)
    - Left standing lights (E6/13)
- Right front lamp unit (E2)
    - Right high beam (E2e1)
    - Right low beam (E2e2)
    - Right turn signal lights (E2e5)
    - Right standing lights (E6/14)
- Left taillamp (E3)
    - Left turn signal lights (E3e11)
    - Left taillight (E3e2) - Left brake light
- Right taillamp (E4)
    - Right brake light/turn signal lights (E4e11)
    - Right taillight (E4e2)
- Left front fog lamp (E5/1) (with code (V07) front fog lamp (FFO))
- Right front fog lamp (E5/2) (with code (V07) Front fog lamp (FFO))
- Front interior lamp (E15/4)
- Left license plate lamp (E19/1)
- Right license plate lamp (E19/2)
- Center high-mounted stop lamp (E21)
- Left auxiliary turn signal lamp (E22/1)
- Right auxiliary turn signal lamp (E22/2)
- Horn (H2)
- Open soft top relay (K66/1) (model 451.4)
- Close soft top relay (K66/2) (model 451.4)
- Left turn signal lamps/brake light relay (K52/11)

- Right turn signal lamps/brake light relay (K52/12)
- Blower motor (M2)
- Fuel pump with fuel gauge sensor (M3/3)
- Wiper motor (M6/1)
- Rear-end door wiper motor (M6/4) (model 451.3)
- Electrical soft top motor (M12/6) (model 451.4)
- Left soft top drive (M12/7) (model 451.4)
- Right soft top drive (M12/8) (model 451.4)
- Right door CL motor (M14/5)
- Left front door central locking motor (M14/6)
- Rear-end door CL [ZV] motor (M14/7)
- Fuel filler flap CL [ZV] motor (M14/10)
- Mirror heater (M21/1r1) (with code (V21) Electrically adjustable and heated outside mirror (FFO))
- Mirror heater (M21/2r1) (with code (V21) Electrically adjustable and heated outside mirror (FFO))
- Heated rear window (R1)

RAIN/LIGHT SENSOR, COMPONENT DESCRIPTION - GF54.21-P-6000MCC

MODEL 451.3/4 with CODE (V54) Rain/light sensor

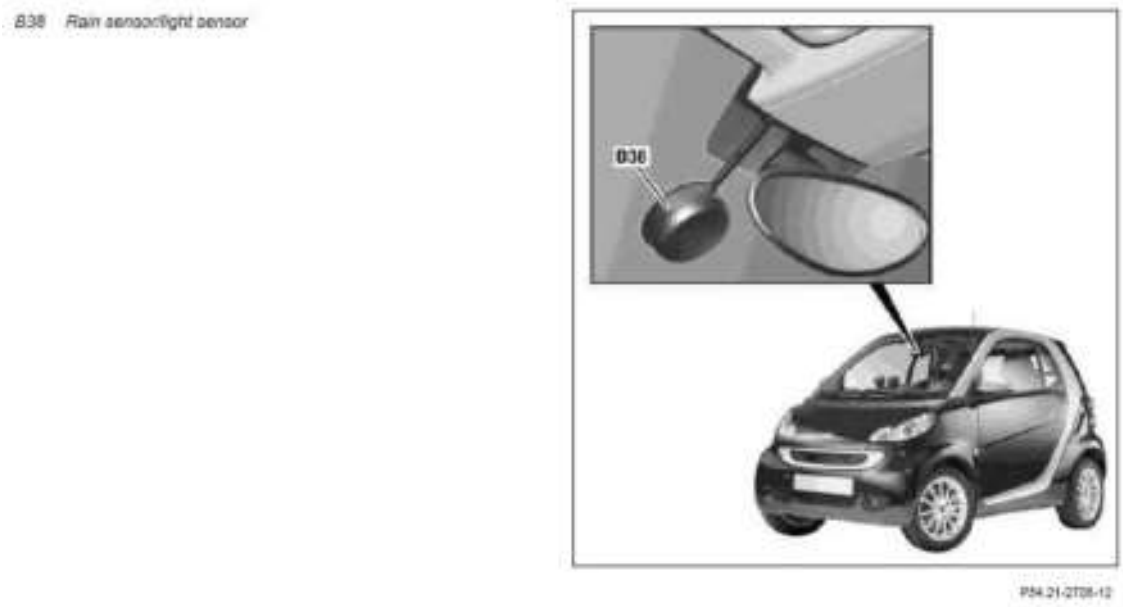


Fig. 57: Locating Rain Sensor/Light Sensor
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

Location

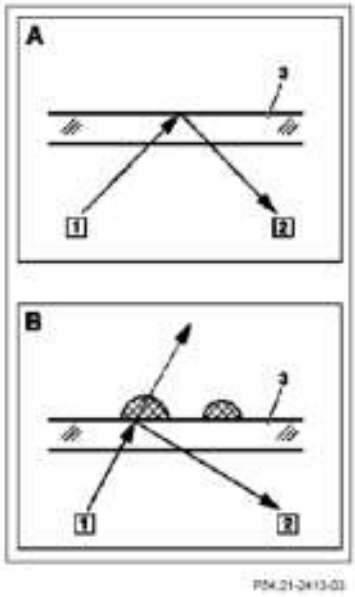
The rain/light sensor is located on the inside of the windshield below the inside rearview mirror.

Task

To measure the light intensity and degree of wetting of the windshield

Function principle of rain sensor

1 Infrared transmitter unit
2 Infrared receiver unit
3 Windshield



P54.21-2413-03

Fig. 58: Identifying Rain Sensor Principle Function
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

Infrared light is radiated from the infrared transmitter unit and led to the windshield. The intensity of the light reflected at the windshield is measured by the infrared receiver unit If the windshield is dry in the area of the rain/light sensor (picture A), then the light is reflected almost completely and the infrared receiver unit measures a high light intensity If the windshield is wetted in the area of the rain/light sensor (picture B), then part of the light is scattered from the windshield glass. As a result the intensity of the reflected light reduces and the infrared receiver unit measures a lower light intensity.

The light intensity measured by the infrared receiver unit represents a measure for the degree of wetting of the windshield. The smaller the measured light intensity the greater the degree of wetting of the windshield.

Function principle of light sensor

The light sensor measures the light intensity striking it from outside. The resistance in the light sensor drops as the light intensity reduces.

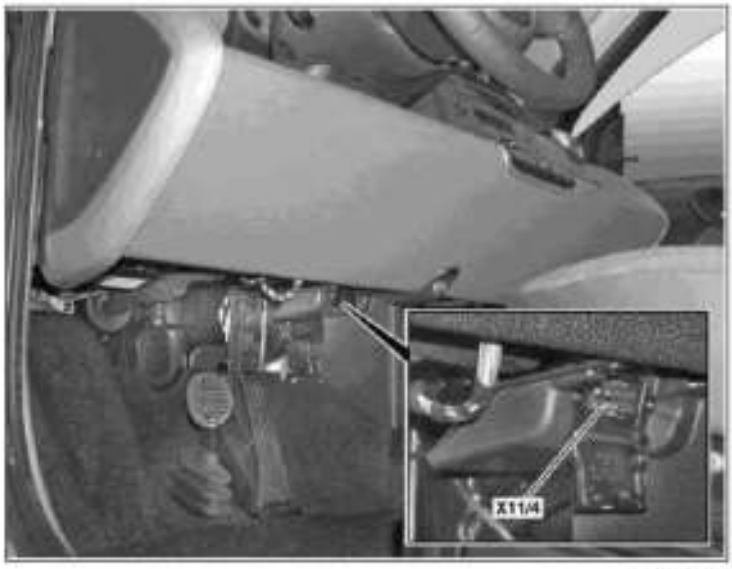
The information from the rain/light sensor is passed on to the SAM control unit (N10/10) via the local interconnect network interior 1 (LIN B).

DATA LINK CONNECTOR COMPONENT DESCRIPTION - GF54.22-P-2200MCC

MODEL 451.3/4

Shown on LHD model

X11/4 Data link connector



P54.22-2049-08

Fig. 59: Locating Data Link Connector
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

Location

The data link connector is located in the footwell on the driver-side.

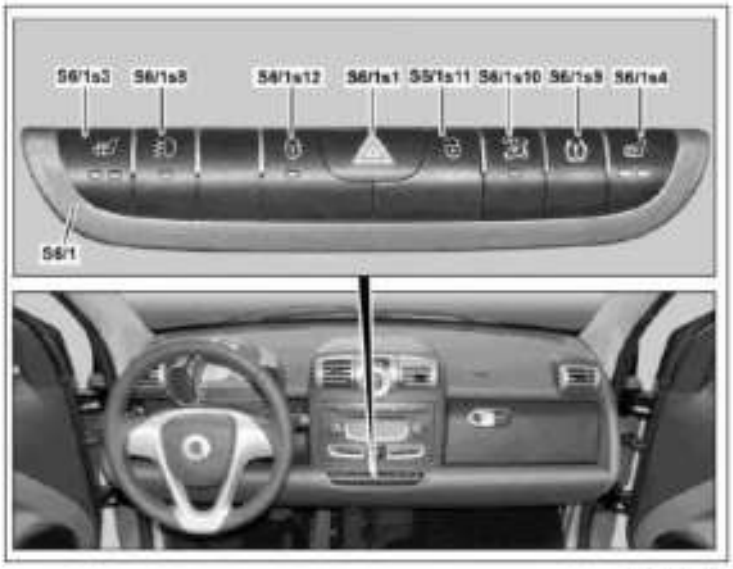
Task

The data link connector is the interface for the connection of STAR DIAGNOSIS to the Controller Area Network (data bus/CAN bus) (CAN).

COCKPIT SWITCH GROUP, COMPONENT DESCRIPTION - GF54.25-P-4300MCU

MODEL 451.3/4

S6/1 Cockpit switch group
S6/1s1 Hazard warning switch
S6/1s3 Left seat heater switch (with code (S17) Seat heaters (FFO))
S6/1s4 Right seat heater switch (with code (S17) Seat heaters (FFO))
S6/1s8 Front fog lamps switch (with code (V07) Front fog lamps (FFO))
S6/1s9 TPM [RDK] switch



P54.25-4337-08

S6/1s10 Tow-away protection /interior protection switch (with code (V01) Vehicle theft alarm (FFO))
S6/1s11 Inside unlock CL [ZV] switch
S6/1s12 Inside lock CL [ZV] switch

Fig. 60: Identifying Cockpit Switch Group Components
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

Location

The cockpit switch group is located in the center console.

Task

The cockpit switch group reads in the switching requirements and passes these on to the following control units:

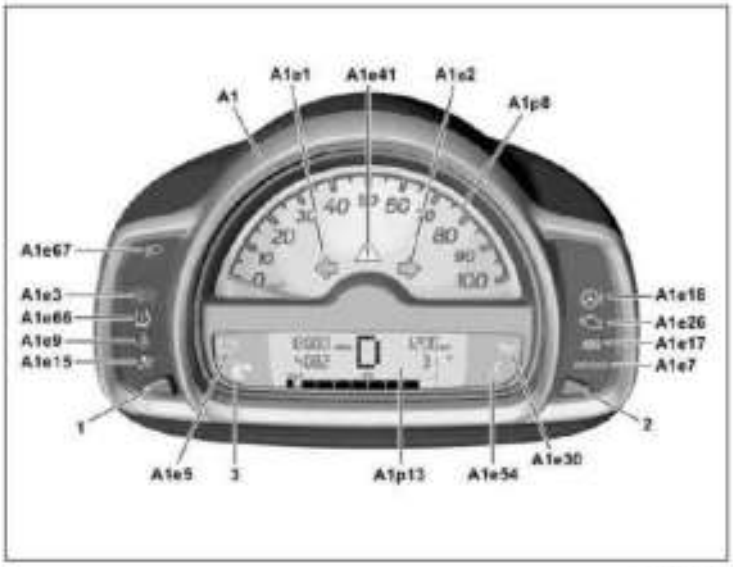
- Front HS [SIH] control unit (N25/5) (with code (S17) Seat heaters (FFO))
  - Left seat heater switch
  - Right seat heater switch
- SAM control unit (N10/10)
  - Hazard warning flasher switch
  - Inside unlock CL [ZV] switch
  - Inside lock CL [ZV] switch
  - Rear fog lamp switch - Front fog lamps switch
  - Towing-away protection switch

INSTRUMENT CLUSTER (IC [K]), DISPLAY INSTRUMENT AND WARNING SYSTEMS - GF54.30-P-0002-08MCU

Shown on code (K07) Speedometer (miles)

1 Left button, switchover multifunctional display/set clock
2 Right button, instrument illumination/ set clock
3 Warning lamp for fuel tank cap monitoring (as of vehicle ident end number 208455)

A1 Instrument cluster
A1e1 Left turn signal indicator lamp
A1e2 Right turn signal indicator lamp

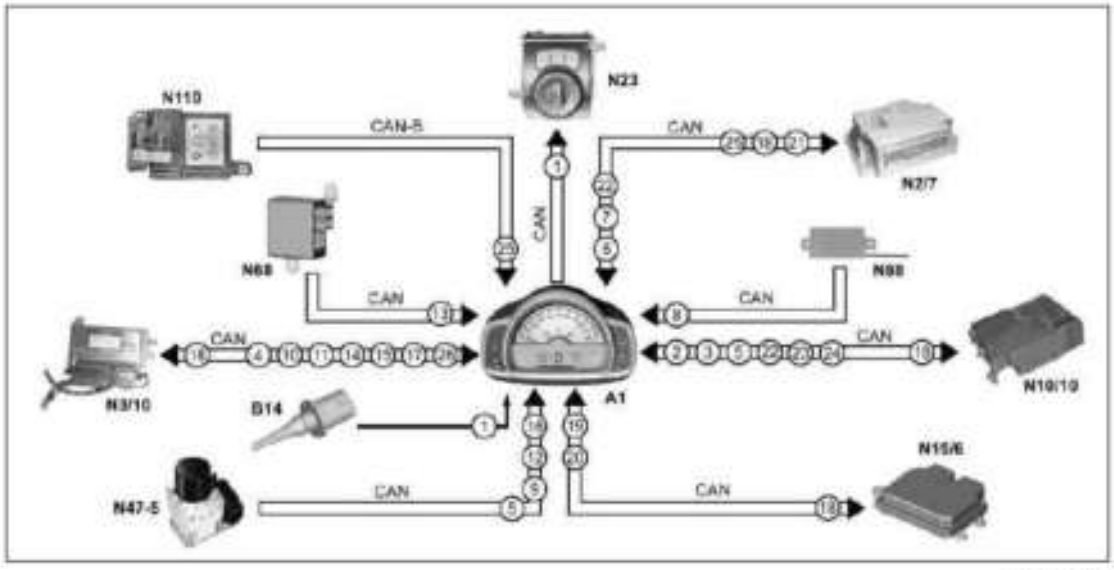


A1e3 High beam indicator lamp
A1e5 Alternator charge monitoring and warning lamp
A1e7 Brake fluid and parking brake warning lamp
A1e9 Seat belt warning lamp
A1e15 Airbag indicator and warning lamp
A1e17 ABS indicator lamp
A1e18 Electric steering indicator lamp (with code (V26) Power steering, EPS (FFO))
A1e26 "CHECK ENGINE" MIL
A1e30 Oil pressure warning lamp
A1e41 ESP warning lamp
A1e54 Coolant temperature warning lamp
A1e66 Tire pressure monitor warning lamp
A1e67 Low beam indicator lamp
A1p8 Electronic speedometer
A1p13 Multifunction display

Fig. 61: Identifying Instrument Cluster And Warning Switch Systems Displays
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

INSTRUMENT CLUSTER (IC), FUNCTION - GF54.30-P-0002MCU

MODEL 451.3/4



1	Ambient temperature	9	Actuation of ABS indicator lamp (A1e17)	18	Vehicle speed
2	Actuation of left turn signal indicator lamp (A1e1) or right turn signal indicator lamp (A1e2)	10	Actuation of CHECK ENGINE indicator lamp (A1e26)	19	Shifting system warning message
3	Actuation of high beams indicator lamp (A1e3)	11	Actuation of oil pressure warning lamp (A1e30)	20	Transmission mode/gear indicator request
4	Actuation of charge indicator and warning lamp for alternator (A1e5)	12	Actuation of ESP warning lamp (A1e41)	21	Status of airbag indicator and warning lamp (A1e13)
5	Actuation of brake fluid warning lamp and parking brake warning lamp (A1e7)	13	Actuation of electric steering indicator lamp (with code (A1e18V26) Power steering, EPS (FFO))	22	Actuation of chime
6	Actuation of seat belt warning lamp (A1e9)	14	Actuation of coolant temperature warning lamp (A1e54)	23	Actuation of low beams indicator lamp (A1e67)
7	Actuation of airbag indicator and warning lamp (A1e13)	15	Coolant temperature	24	Drive authorization system warning message
8	Actuation of tire pressure monitor warning lamp (A1e66)	16	Wheel speed	25	Weight category
		17	Fuel-tank level	26	Warning lamp for fuel tank cap monitoring (as of vehicle ident end number 208455)

A1	Instrument cluster	N23	Heater/AC operating unit	CAN	Controller Area Network (data bus/CAN bus) (CAN)
B14	Outside temperature display temperature sensor	N47-5	ESP control unit	CAN-B	Controller area network bus class B (interior compartment) (CAN B)
N2/7	Restraint systems control unit	N68	Steering assist control unit (for code (V26) Power steering, EPS (FFO))		
N3/10	ME-SFI [ME] control unit	N88	TPM (RDK) control unit		
N10/10	SAM control unit	N110	Weight Sensing System (WSS) control unit		
N15/6	Automated manual transmission control unit				

Fig. 62: Instrument Cluster Function Diagram
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

General

The instrument cluster has the following tasks:

- Vehicle speed display
- Output of the important operating condition of the vehicle
- Warning at critical vehicle operating conditions (visual and acoustic)

- Information display for various systems
- Display for maintenance interval display

Networking

The instrument cluster functions as a gateway between CAN and CAN-B.

Display elements

- Left turn signal indicator lamp
- Right turn signal indicator lamp
- High beam indicator lamp
- Alternator charge monitoring and warning lamp
- Brake fluid and parking brake warning lamp
- Seat belt warning lamp
- Airbag indicator and warning lamp
- ABS indicator lamp
- Electric steering indicator lamp
- "CHECK ENGINE" MIL
- Oil pressure warning lamp
- ESP warning lamp
- Coolant temperature warning lamp
- Tire pressure monitor warning lamp
- Low beam indicator lamp
- Electronic speedometer (A1p8)
- Multifunction display (A1p13)
- Tank cap monitoring warning lamp

All indicator and warning lamps are light emitting diodes.

Operation

The lower left button in the instrument cluster can be used to switchover the multifunction displays.

The lower right button in the instrument cluster can adjust the instrument cluster illumination at circuit 15 ON and circuit 58 ON in five dimmer stages to match individual requirements.

Activate

Circuit 15 ON activates the instrument cluster. The multifunction display shows the current content at any given time, switches on the instrument cluster illumination and the needle for the speed display is shown on the display field.

After circuit 15 OFF the instrument cluster remains active for another 30 s. The speed display needle disappears from the display field behind a cover.

For circuit 15 OFF the instrument cluster can be activated under the following preconditions:

- Circuit 58 ON

  The instrument cluster illumination is switched on and the current contents of the multifunction display are displayed. After circuit 58 OFF the instrument cluster remains active for another 30 s.

- By pressing a button on the instrument cluster.

  The multifunction display illumination is switched on for 30 s and the current content displayed.

Acoustic signals

The following acoustic signals are produced and output via the sound signal generator integrated in the instrument cluster:

- Turn signal indicator
- Warning and information signals

Turn signal indicator

The turn signal indicator is always accompanied by an acoustic clicking sound generated in the same rhythm. The acoustic turn signal indicator is actuated with:

- Turn signaling (at double frequency if a turn signal lamp fails)
- Hazard warning flashing

Warning and information signals

A warning or signal tone is emitted:

- When the standing lights are switched on, the transmitter key removed and the driver door open (light warning)
- When the driver door is opened while the engine is running and a gear engaged (door warning)
- As confirmation that the daytime running lights have been activated or deactivated (with code (K06) Daytime running lights)
- If at circuit 15 On and with the doors closed, the driver seat belt buckle restraint systems switch (S68/3) is not closed (seat belt reminder warning)
- If the driver seat belt buckle restraint systems switch or the front passenger seat belt buckle restraint systems switch (S68/4) is not closed when the front passenger seat is occupied and the vehicle speed is v > 25 km/h (seat belt reminder warning)
- After circuit 15 Off and after removing the transmitter key, when the vehicle was locked using the emergency function

Actuation in each instance is via the CAN by the SAM control unit.

	Instrument cluster (IC [K]), display instrument and warning systems	**GF54.30-P-0002-08MCU**
PE	Wiring diagram large instrument (instrument cluster)	**PE54.30-P-2001MCU**

PE	Electrical function schematic for instrument cluster (KI)	**PE54.30-P-2051MCU**
	Indicator/warning messages, function	**GF54.30-P-2001MCU**
	Display speed, function	**GF54.30-P-3025MCU**
	Display operating conditions, function	**GF54.30-P-3041MCU**

TABLE OF CONTENTS FOR FUNCTION DESCRIPTION OF INSTRUMENT CLUSTER (IC) - GF54.30-P-0997MCU

MODEL 451.3/4

	Instrument cluster (IC), function	**GF54.30-P-0002MCU**
	Instrument cluster (IC [K]), display instrument and warning systems	**GF54.30-P-0002-08MCU**
PE	Wiring diagram large instrument (instrument cluster)	**PE54.30-P-2001MCU**
PE	Electrical function schematic for instrument cluster (KI)	**PE54.30-P-2051MCU**
	Indicator/warning messages, function	**GF54.30-P-2001MCU**
	Display speed, function	**GF54.30-P-3025MCU**
	Display operating conditions, function	**GF54.30-P-3041MCU**
	Overview of system components, instrument cluster (IC) component description	**GF54.30-P-9996MCU**

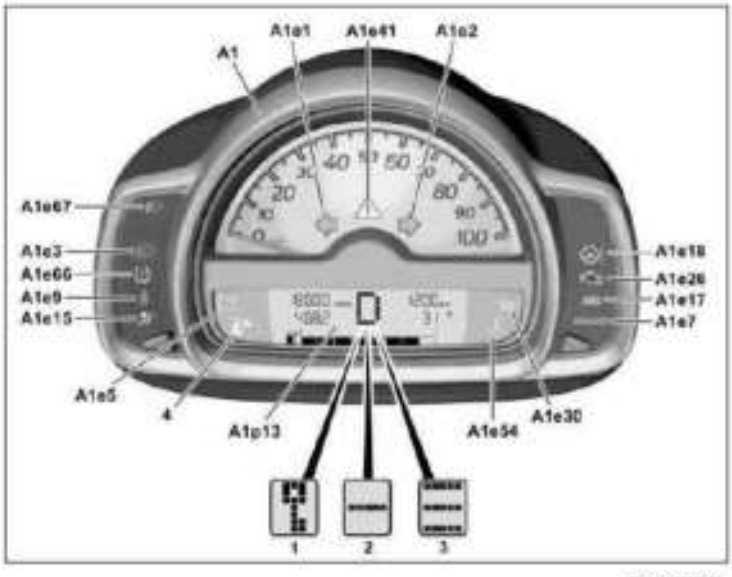
INDICATOR/WARNING MESSAGES, FUNCTION - GF54.30-P-2001MCU

MODEL 451.3/4

Shown on code (K07) Speedometer (miles)

1 Drive authorization system
2 CAN failure
3 Shifting system
4 Warning lamp for fuel tank cap monitoring (as of vehicle ident end number 208455)

A1 Instrument cluster
A1e1 Left turn signal indicator lamp
A1e2 Right turn signal indicator lamp
A1e3 High beam indicator lamp



P54.30-0005-08

A1e5 Alternator charge monitoring and warning lamp
A1e7 Brake fluid and parking brake warning lamp
A1e9 Seat belt warning lamp
A1e15 Airbag indicator and warning lamp
A1e17 ABS indicator lamp
A1e18 Electric steering indicator lamp (with code (V26) Power steering, EPS (FFO))

A1e26 "CHECK ENGINE" MIL
A1e30 Oil pressure warning lamp
A1e41 ESP warning lamp
A1e54 Coolant temperature warning lamp
A1e66 Tire pressure monitor warning lamp
A1e67 Low beam indicator lamp
A1p13 Multifunction display

Fig. 63: Identifying Indicator/Warning Messages Displays
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

Function

Various alternatives are available to the instrument cluster for the output of messages:

Visual indicator/warning message via

- Indicator/warning lamps
- Multifunction display

Acoustic indicator/warning messages via

- internal tone signal generator

Visual indicator/warning messages via indicator/warning lamps

Turn signal indicator lamps

These are activated differently according to function:

- Turn signaling
- Hazard warning flasher

The turn signal flasher is always accompanied by an acoustic clicking sound generated in the same rhythm.

Turn signaling:

During turn signaling the corresponding turn signal indicator lamp is actuated. Actuation takes place via the Controller Area Network (data bus/CAN bus) (CAN) by the SAM control unit (N10/10).

If one of the following lamps malfunctions, the corresponding turn signal indicator lamp is then actuated at doubled-up frequency by the SAM control unit.

- Left turn signal lamp (E1e5)
- Right turn signal lamp (E2e5)
- Left additional turn signal lamp (E22/1)
- Right additional turn signal lamp (E22/2)
- Left brake/turn signal lights (E3e11)
- Right brake/turn signal lights (E4e11)

Hazard warning flasher:

When the hazard warning flashers are on the two turn signal indicator lamps in the instrument cluster are actuated.

High beam indicator lamp

Actuation is conducted when the high beam is switched on over CAN by the SAM control unit.

Alternator charge indicator/warning lamp

If there is a fault in the alternator (G2) the alternator charge monitoring and warning lamp is actuated. Actuation take place via the CAN from the ME control unit (N3/10).

Brake fluid and parking brake warning lamp

Actuation takes place over the CAN under the following preconditions:

- From the SAM control unit for an actuated parking brake
- From the ESP control unit (N47-5) at a minimum brake fluid level in the reservoir
- From the ESP control unit for a fault of the Electronic Stability Program (Electronic-Stability-Program)

Seat belt warning lamp

The seat belt warning lamp lights permanently for t = 6s when at circuit 15 ON the driver seat belt buckle restraint systems switch (S68/3) is not closed. A warning tone is also emitted for t = 6 s. As from a vehicle speed of 25 km/h the seat belt warning lamp starts to flash on and off for t = 60 s, when the driver seat belt buckle restraint systems switch or the front passenger seat belt buckle restraint system switch (S68/4) (when front passenger occupied) is not closed. A warning tone is emitted in parallel. The warning tone is emitted in three phases, whereby the frequency changes every 20 s.

After this, only the seat belt warning lamp is permanently actuated. The seat belt reminder warning (optical and acoustic) is terminated, as soon as the seat belt buckle restraint system switches are closed by putting on the seat belts. Furthermore, the seat belt reminder warning is also canceled, when the vehicle speed is 0 km/h and the driver door open.

The cycle is restarted:

- If at v > 25 km/h one of the seat belts which is being applied is removed again and as a result one of the seat belt buckle restraint systems switch is opened
- when the driver door is closed again and the vehicle speed is > 25 km/h

The signal for activating the seat belt warning lamp comes from the restraint systems control unit (N2/7) via CAN-B.

Airbag indicator and warning lamp

The airbag indicator and warning lamp is actuated when there is a fault in the supplemental restraint system (SRS) or the supplemental restraint system has been triggered. Actuation takes place by the restraint systems control unit via CAN.

ABS indicator lamp

The ABS indicator lamp is actuated when a malfunction occurs in the antilock brake system. Actuation takes place over CAN by the ESP control unit.

Electric steering indicator lamp

The electric steering indicator lamp is activated, when a malfunction in the electric steering is given. Actuation takes place by the power steering control unit via CAN (N68).

"CHECK ENGINE" indicator lamp

The CHECK ENGINE indicator lamp is actuated if a fault is present in the injection system, ignition system or exhaust emission system. Actuation takes place by the ME control unit via CAN.

Oil pressure warning lamp

The oil pressure warning lamp is actuated, if there is no or little oil pressure built up in the engine's oil circuit.

Actuation takes place by the ME control unit via CAN.

ESP warning lamp

Actuation takes place over CAN by the ESP control unit under the following preconditions:

- The ESP warning lamp flashes on and off during a system control intervention at a frequency of 2.5 Hz.
- The ESP warning lamp comes on when there is a system fault or when the system is switched off

Coolant temperature warning lamp

The warning lamp is actuated, when the coolant temperature is too high.

Actuation takes place by the ME control unit via CAN.

Tire pressure monitor warning lamp

Actuation takes place via CAN from the TPM [RDK] control unit (N88) under the following preconditions:

- when a manual reset has taken place or
- when a pressure loss was determined

A manual reset is indicated by repeated flashing of the tire pressure monitor warning lamp, a pressure loss through the lamp being permanently on.

Low beam indicator lamp

Actuation is conducted when the low beam is switched on over CAN by the SAM control unit.

Tank cap monitoring warning lamp

If the ME control unit detects a tank cap which is not closed, it sends a corresponding signal on the.

The instrument cluster receives the signal and actuates the tank cap monitoring warning lamp constantly.

Indicator lamp test

An indicator lamp test is carried out for "terminal 15 ON". In doing so all indicator and warning lamps are actuated with the exception of the following lamps:

- Left tern signal indicator lamp
- Right turn signal indicator lamp
- High beam indicator lamp

The indicator lamp test is terminated as soon as an engine speed of > 480 RPM is reported by the ME control unit via CAN.

Visual indicator/warning messages via the multifunction display

The multifunction display's gear indicator shows the following warning message when the instrument cluster is actuated:

- Drive authorization system:

  The system is activated or a malfunction has occurred.

  Actuation takes place over CAN by the SAM control unit.

- CAN failure:

  flashes when the CAN is inoperative.

  Actuation takes place, when the instrument cluster does not receive any data or only implausible data from the CAN.

- Shifting system:

A malfunction has occurred in the shifting system.

Actuation takes place by the automated manual transmission control unit via CAN.

Acoustic indicator/warning message over internal tone signal generator

The acoustic warning and information signals are produced by an internal tone signal generator. An acoustic feedback occurs for the following function states:

- Flasher ON

  With direction flashing and warning flashing, in parallel with the visual feedback, an acoustic feedback takes place in the form of flasher clicking. Actuation takes place via the SAM control unit.

- Lights on reminder warning (warning tone)

  If the driver door is opened when the standing light or low beams are switched on, a warning tone is output. The status of the left door rotary tumbler microswitch (S87/7) is read in by the SAM control

unit which requests acoustic feedback.

- Door warning (warning tone)
- Daytime running lights activated or deactivated (signal tone) (with code (K06) Daytime running lights)
- Seat belt reminder warning

Instrument cluster, component description	A1	**GF54.30-P-6000MCU**
Restraint systems control unit, component description	N2/7	**GF91.60-P-4048MCU**
ME-SFI [ME] control unit, component description	N3/10	**GF07.61-P-6000MCU**
SAM control unit, component description	N10/10	**GF54.21-P-4157MCU**
ESP control unit, component description	N47-5	**GF42.45-P-5118MCU**
Electric steering control unit, component description	N68 For vehicles with code (V26) Power steering, EPS (FFO)	**GF46.35-P-7100MCU**
Tire pressure monitor control unit, component description	N88	**GF40.15-P-5124MCU**

DISPLAY SPEED, FUNCTION - GF54.30-P-3025MCU

MODEL 451.3/4

Shown on code (K07) Speedometer (miles)

A1 Instrument cluster
A1p8 Electronic speedometer

Fig. 64: Identifying Instrument Cluster And Electronic Speedometer
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

Vehicle speed display

The electronic speedometer is used to display vehicle speed. The speedometer is driven by a stepper motor.

Measuring the vehicle speed

The instrument cluster receives from the ESP control unit (N47-5) the wheel speeds required for the computation of vehicle speed via the Controller Area Network (data bus/CAN bus) (CAN). The tire size is taken into account when calculating the speed. Coding takes place using STAR DIAGNOSIS.

Assessment of wheel speed signals:

- The wheel speed signals are compared against each other and thus checked in terms of plausibility. If there are no significant deviations, the vehicle speed is calculated from the rotational speed of the left front wheel.
- If the individual wheel speed signals vary substantially, the speed signals may be faulty or the vehicle may be cornering. If, by comparing the wheel speeds on both sides of the vehicle, the instrument cluster determines that the car is cornering, the vehicle speed is calculated from the mean value of the front wheel speeds.
- If the comparisons indicate one or more faulty wheel speed signals, the vehicle speed is then calculated on the basis of highest wheel speed. This also applies if an error message is received instead of a wheel speed signal.

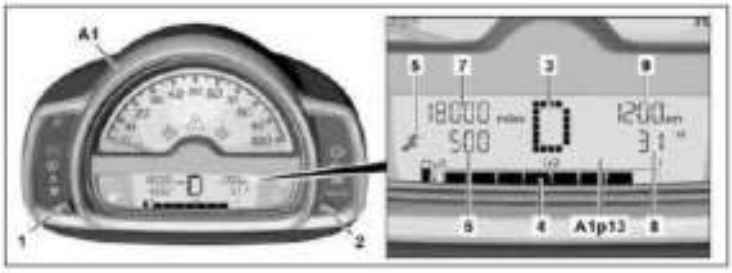
The travel distance is determined as for the vehicle speed.

Instrument cluster, component description	A1	**GF54.30-P-6000MCU**
ESP control unit, component description	N47-5	**GF42.45-P-5118MCU**

DISPLAY OPERATING CONDITIONS, FUNCTION - GF54.30-P-3041MCU

MODEL 451.3/4

Shown on code (K07) Speedometer (miles)



1 Left button, switchover multifunctional display/set clock
2 Right button, instrument illumination/ set clock
3 Gear display
4 Fuel gauge
5 Service interval display
6 Trip odometer
7 Main odometer
8 Ambient temperature display
9 Time display
A1 Instrument cluster
A1p13 Multifunction display

Fig. 65: Identifying Indicator Displays
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

Gear indicator in manual mode

The gear indicator displays the current gear engaged.

The corresponding information from the automated manual transmission control unit (N15/6) is read in over the Controller Area Network (data bus/CAN bus) (CAN) from the instrument cluster. If the automated manual transmission control unit establishes that a higher gear would be better for the current engine speed, accelerator pedal position and vehicle speed, a gear change is suggested in the gear indicator:

- Arrow up: Shift up one gear
- Arrow down: Shift down one gear

The gearshift recommendation is oriented towards a consumption-specific driving style.

Gear indicator in automatic mode

The selected driving stage is shown in the gear indicator.

The following displays are possible:

- "P": Parking position
- "R": Reverse gear
- "N": Neutral
- "D": Drive position

The corresponding information from the automated manual transmission control unit is read in over CAN by the instrument cluster.

Fuel level and reserve indicator

The fuel supply is shown to the driver over the fuel level and reserve indicator by means of eight segments.

The data sent from the fuel level sensor (M3/3b1) to the ME-SFI [ME] control unit (N3/10) is read in over the CAN by the instrument cluster.

The reserve area is equivalent to an amount of 1 gal.

If the reserve area is reached, the fuel pump symbol starts to flash on and off and the remaining fuel is displayed in increments of 0.13 gal in the multifunction display.

In the event of any malfunction the segments in the fuel level and reserve indicator start to flash on and off.

Maintenance interval display

The maintenance interval display draws the driver's attention to a service that is due soon. Roughly one month beforehand and every time the engine is started, the maintenance interval display is displayed for 10 seconds, and the line of the main odometer shows the remaining distance or remaining time.

Meaning of maintenance interval displays:

- One wrench = Oil service plus
- Two wrenches = Maintenance

The left button on the instrument cluster can be used to confirm the display on the maintenance interval display.

The maintenance interval display is shown for 10 s by briefly pressing the button in the right of the instrument cluster twice.

Trip odometer

The display area for the trip odometer is 0 to 9999.9 kilometers or miles (with code (K07) Speedometer (miles)). Once the maximum reading is reached the display is automatically reset to zero.

Manual reset:

Keep pressing the left button until the trip odometer appears in the multifunction display. After pressing the left button again for 1 s the display starts to flash on and off. Continue to press and hold the left button. The display is reset to zero.

The trip distance remains stored even when the battery (G1) is disconnected.

Odometer

The main odometer reading is shown either in kilometers or miles, as soon as the instrument cluster is activated.

The range for the main odometer is from 0 to 999,999 kilometers or miles. If the maximum mileage is reached, the counter is not reset to zero.

In this case, the instrument cluster should be replaced. The internal counter continues to operate however.

The main odometer reading is stored for at least 10 years, even if the voltage supply is disconnected.

Outside temperature indicator

The instrument cluster takes the following data into consideration when determining the outside temperature value:

- Outside temperature value directly from outside temperature display temperature sensor (B14)
- Internal vehicle speed signal from instrument cluster
- Coolant temperature value via CAN from the ME-SFI [ME] control unit
- Engine running time over CAN from ME-SFI [ME] control unit

The instrument cluster processes this data and actuates the outside temperature indicator accordingly.

The dependency of the outside temperature indicator on the speed, the engine running time and the coolant temperature prevents too high a temperature being displayed through radiant heat when the vehicle is stationary or moving slowly. Falling temperature values are always allowed.

The display's response pattern varies as temperature rises, according to coolant temperature and engine running time:

- Coolant temperature < 60°C:

  The current outside temperature value is always displayed when the instrument cluster is activated.

- Coolant temperature > 60°C:

  When the instrument cluster is activated rising outside temperature values are displayed with a delay.

- Coolant temperature > 60°C and circuit 15 OFF:

The last measured temperature value is stored for a period of t = 60 min. When the instrument cluster is activated, the stored temperature value is shown in the outside temperature display.

If the coolant temperature sensor (B11/4) is defective or if it provides implausible coolant temperature value, the ME-SFI [ME] control unit sends a corresponding message over CAN to the instrument cluster. A coolant temperature of > or = 60°C is assumed.

Set the time

After pressing the left button on the instrument cluster for > 5 s the colon in the time display starts to flash on and off. Now the left button or the right button can be used to set the time.

If one of the two buttons is not pressed again within the next 5 s, the set value is stored and the colon stops flashing.

Instrument cluster, component description	A1	**GF54.30-P-6000MCU**
Outside air temperature sender component description	B14	**GF83.57-P-4000MCC**
ME-SFI [ME] control unit, component description	N3/10	**GF07.61-P-6000MCU**
SAM control unit, component description	N10/10	**GF54.21-P-4157MCU**
Automated manual transmission control unit, component description	N15/6 Transmission 717.482	**GF26.19-P-1010MCU**

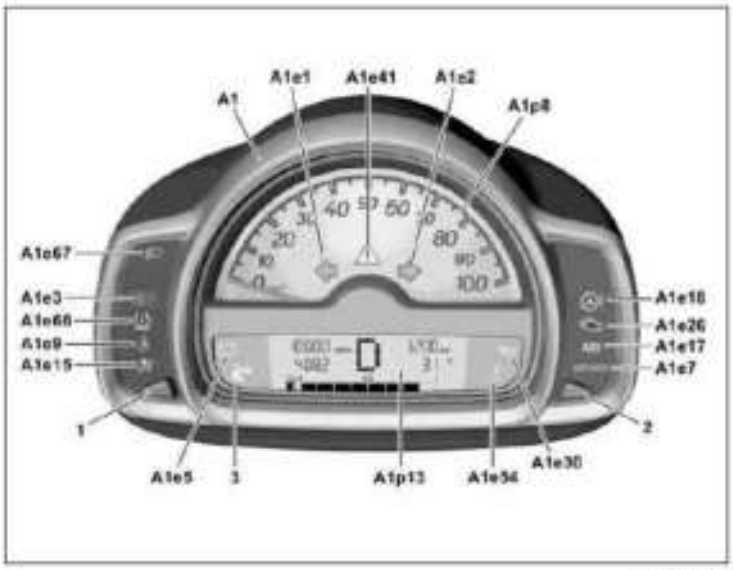
INSTRUMENT CLUSTER, COMPONENT DESCRIPTION - GF54.30-P-6000MCU

MODEL 451.3/4

Shown on code (K07) Speedometer (miles)

1 Left button, switchover multifunctional display/set clock
2 Right button, instrument illumination/ set clock
3 Tank cap monitoring warning lamp (as of vehicle identification end number 208455)

A1 Instrument cluster
A1e1 Left turn signal indicator lamp
A1e2 Right turn signal indicator lamp



A1e3 High beam indicator lamp
A1e5 Alternator charge monitoring and warning lamp
A1e7 Brake fluid and parking brake warning lamp
A1e9 Seat belt warning lamp
A1e15 Airbag indicator and warning lamp
A1e17 ABS indicator lamp
A1e18 Electric steering indicator lamp (with code (V26) Power steering, EPS (FFO))
A1e26 "CHECK ENGINE" MIL
A1e30 Oil pressure warning lamp
A1e41 ESP warning lamp
A1e54 Coolant temperature warning lamp
A1e66 Tire pressure monitor warning lamp
A1e67 Low beam indicator lamp
A1p8 Electronic speedometer
A1p13 Multifunction display

Fig. 66: Identifying Instrument Cluster Components
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

Location

The instrument cluster is located in the dashboard on the driver-side.

Task

The instrument cluster has the following tasks:

- Gateway between Controller Area Network (data bus/CAN bus) (CAN) and Controller Area Network bus Class B (interior) (CAN-B)
- Receive the input signals from the CAN and CAN-B for the various displays and warning messages
- Reading in of the paddle shift for steering wheel gearshift (SAL) (S112) over the fanfare horns and airbag clock spring contact (A45) (with code (I75) Leather sport steering wheel with steering wheel rocker switch system)
- Reading in the outside temperature display temperature sensor (B14)
- Determining and displaying the vehicle speed
- Illumination of the multifunction display, the dial face, the pointers and displays depending on the dimmer stage
- Display of dimmer stage over circuit 58d
- Actuation of warning and indicator lamps
- Output of acoustic signals

Acoustic signals

The acoustic warning and information signals and the turn signal indicator clicking are generated by means of an audio signal generator:

- Turn signal ON (turn signal knocking sound)
- Light warning (warning tone)
- Door warning (warning tone)
- Daytime running lights activated or deactivated (signal tone) (with code (K06) Daytime running lights)
- Seat belt reminder warning

Actuation of stepper motors

The electronic speedometer is driven by a stepper motor.

Variable displays in the multifunction display

The following displays are shown in the multifunction display:

- Fuel level and reserve indicator
- Transmission mode display in automatic mode
- Gear indicator or gearshift recommendation in manual mode
- Main odometer
- Multifunction display for remaining fuel, trip odometer and maintenance interval display
- Time display
- Ambient temperature display
- Transmission mode display
- Display of gear engaged or gearshift recommendation in manual mode

Instrument cluster, component description	A1	**GF54.30-P-6000MCU**
Outside air temperature sender component description	B14	**GF83.57-P-4000MCC**
Restraint systems control unit, component description	N2/7	**GF91.60-P-4048MCU**
ME-SFI [ME] control unit, component description	N3/10	**GF07.61-P-6000MCU**
SAM control unit, component description	N10/10	**GF54.21-P-4157MCU**
Automated manual transmission control unit, component description	N15/6	**GF26.19-P-1010MCU**
ESP control unit, component description	N47-5	**GF42.45-P-5118MCU**
Electric steering control unit, component description	N68 For vehicles with code (V26) Power steering, EPS (FFO)	**GF46.35-P-7100MCU**
Tire pressure monitor control unit, component description	N88	**GF40.15-P-5124MCU**
Table of contents for function description of		**GF54.30-P-0997MCU**

instrument cluster (IC)		

OVERVIEW OF SYSTEM COMPONENTS, INSTRUMENT CLUSTER (IC) COMPONENT DESCRIPTION - GF54.30-P-9996MCU

MODEL 451.3/4

Instrument cluster, component description	**A1**	**GF54.30-P-6000MCU**
Outside air temperature sender component description	B14	**GF83.57-P-4000MCC**
Restraint systems control unit, component description	N2/7	**GF91.60-P-4048MCU**
ME-SFI [ME] control unit, component description	N3/10	**GF07.61-P-6000MCU**
SAM control unit, component description	N10/10	**GF54.21-P-4157MCU**
Automated manual transmission control unit, component description	N15/6	**GF26.19-P-1010MCU**
ESP control unit, component description	N47-5	**GF42.45-P-5118MCU**
Electric steering control unit, component description	N68 For vehicles with code (V26) Power steering, EPS (FFO)	**GF46.35-P-7100MCU**
Tire pressure monitor control unit, component description	N88	**GF40.15-P-5124MCU**
Table of contents for function description of instrument cluster (IC)		**GF54.30-P-0997MCU**

WIRING DIAGRAM FOR DATA LINK CONNECTOR/DIAGNOSTIC SOCKET - PE54.22-P-2000-97MCU

Code:	**Designation:**	**Position:**
A1	Instrument cluster	9L
N10/10	SAM control unit	4L
N10/10f12	Fuse 12	2L
N10/10f19	Fuse 19	6L
W26	Ground (transmission tunnel)	6E
X11/4	Data link connector	11A
X11/4	Data link connector	4A
Z3/24	Circuit 15 (fused) connector sleeve, function	5E
Z37/2	CAN engine bus (low) connector sleeve	9E
Z37/3	CAN engine bus (high) connector sleeve	8E
Z45	ATA [EDW] sensor supply circuit 30 connector sleeve	2E

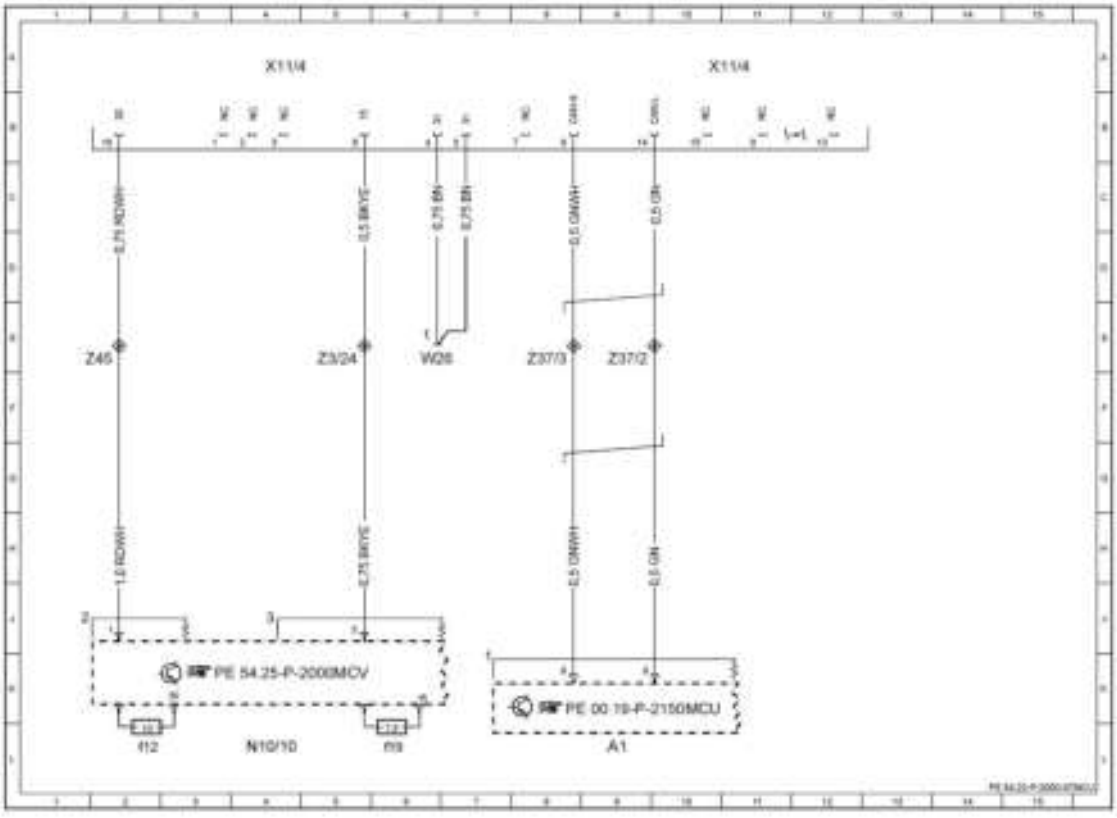


Fig. 67: Data Link Connector/Diagnostic Socket - Wiring Diagram
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

WIRING DIAGRAM ELECTRICAL CENTER - PE54.25-P-2000-97MCV

Code:	Designation:	Position:
A2/1	smart radio 9	24L
A2/2	smart radio 10	25L
A2/3	smart Entry radio	24L
A2/4	smart Premium radio	25L
E1	Left front lamp unit	54L
E15/4	Front interior lamp	32L
E1e1	Left high beam	
E1e2	Left low beam	
E2	Right front lamp unit	57L
E2e1	Right high beam	
E2e2	Right low beam	
E3	Left taillamp	53L
E3e2	Left taillamp	
E6/13	Left standing lamp	51L
E6/14	Right standing lamp	50L
K116	Relay for shutoff-capable interior lamp	29L
K52/11	Left turn signal/stop lamp relay	60L
K52/12	Right turn signal/stop lamp relay	61L
K61	Blower motor relay 1	18L
K62	Blower motor relay 2	20L

K66/1	Open soft top relay	37L
K66/2	Close soft top relay	39L
K87/1	Rear fog lamp relay	79L
M2	Blower motor	16L
M4/2	Coolant fan motor	48L
N10/10	SAM control unit	76A
N10/10	SAM control unit	19A
N10/10	SAM control unit	61A
N10/10	SAM control unit	52A
N10/10	SAM control unit	44A
N10/10	SAM control unit	11A
N10/10	SAM control unit	68A
N10/10	SAM control unit	4A
N10/10	SAM control unit	28A
N10/10	SAM control unit	37A
N10/10f11	Fuse 11	70A
N10/10f15	Fuse 15	24A
N10/10f20	Fuse 20	12A
N10/10f22	Fuse	22
N10/10f23	Fuse	23
N10/10f24	Fuse 24	75A
N10/10f25	Fuse	25
N10/10f26	Fuse 26	54A
N10/10f28	Fuse 28	46A
N10/10f29	Fuse 29	40A
N10/10f3	Fuse 3	13A
N10/10f34	Fuse 34	67A
N10/10f35	Fuse 35	64A
N10/10f37	Fuse 37 (slot R2)	59A
N10/10f4	Fuse	4
N10/10f42	Fuse 42 (slot R7)	31A
N10/10f6	Fuse	6
N10/10f7	Fuse 7	51A
N10/10k1	Heated rear window relay	
N10/10k11	Heater blower relay	
N10/10k12	Standing lamps relay	
N10/10k2	Soft top "open" and soft top "closed" relay	
N10/10k2	Soft top "open" and soft top "closed" relay	
N10/10k6	High beam relay	
N10/10k8	Low beam headlamp relay	
N15/5	Electronic selector lever module control unit	71L
N15/5	Electronic selector lever module control unit	75L
N23	Heater/AC operating unit	6L
N47-5	ESP control unit	68L
N57/2	Power window convenience feature control unit	13L
N68	Steering assist control unit	64L
R1	Heated rear window	47L

	Heated rear window	45L
S4	Combination switch	2L
S4/4	Right wiper switch	10L
S84	Power soft top switch	43L
S84/37	Soft top microswitch	40L
S84/38	Left roof cassette microswitch	41L
S84/39	Right rear soft top microswitch	44L
S9/1	Stop lamp switch	59L
S9/1	Stop lamp switch	78L
U1000	Valid for model 451.391/491	17E
U1000	Valid for model 451.391/491	73F
U1001	Not valid for model 451.391/491	15E
U1001	Not valid for model 451.391/491	77F
U1001	Not valid for model 451.391/491	70F
U101	Valid up to 02/2009	36E
U101	Valid up to 02/2009	34E
U1010	Valid for radio with Premium sound system	22K
U1012	Valid up to 30/08/2010	35E
U1012	Valid up to 30/08/2010	32E
U1012	Valid up to 30/08/2010	23K
U1013	Valid as of 31/08/2010	36E
U1013	Valid as of 31/08/2010	31E
U1013	Valid as of 31/08/2010	23K
U102	Valid as of 03/2009	35E
U102	Valid as of 03/2009	32E
U102	Valid as of 03/2009	26C
U14	Valid for rain/light sensor	79G
U23	Valid for convertibles	35D
U492	Valid for power steering	62A
U606	Valid for all except convertibles	46D
U606	Valid for all except convertibles	8E
U656	Valid for interior lights package	27L
U861	Valid for versions without interior light package	27K
U865	Valid for Entry radio	22K
W43	Ground (outside left fire wall)	48G
W43	Ground (outside left fire wall)	52G
W43	Ground (outside left fire wall)	50G
W9	Ground (left front, at lamp unit)	48F
X18/19	Trunk lid connector	46G
X23/7	Soft top connector	43G
X23/7	Soft top connector	40G
X85/10	Heating or air conditioning connector	16H
Z29/4	Circuit 58R (fused) connector sleeve	49G
Z29/4	Circuit 58R (fused) connector sleeve	18G
Z3/44	Instrument cluster - radio circuit 15 (fused) connector sleeve	11G
Z7/59	Tml. 30 connector sleeve	33F

Z7/59	Tml. 30 connector sleeve	35F
Z7/59	Tml. 30 connector sleeve	31F

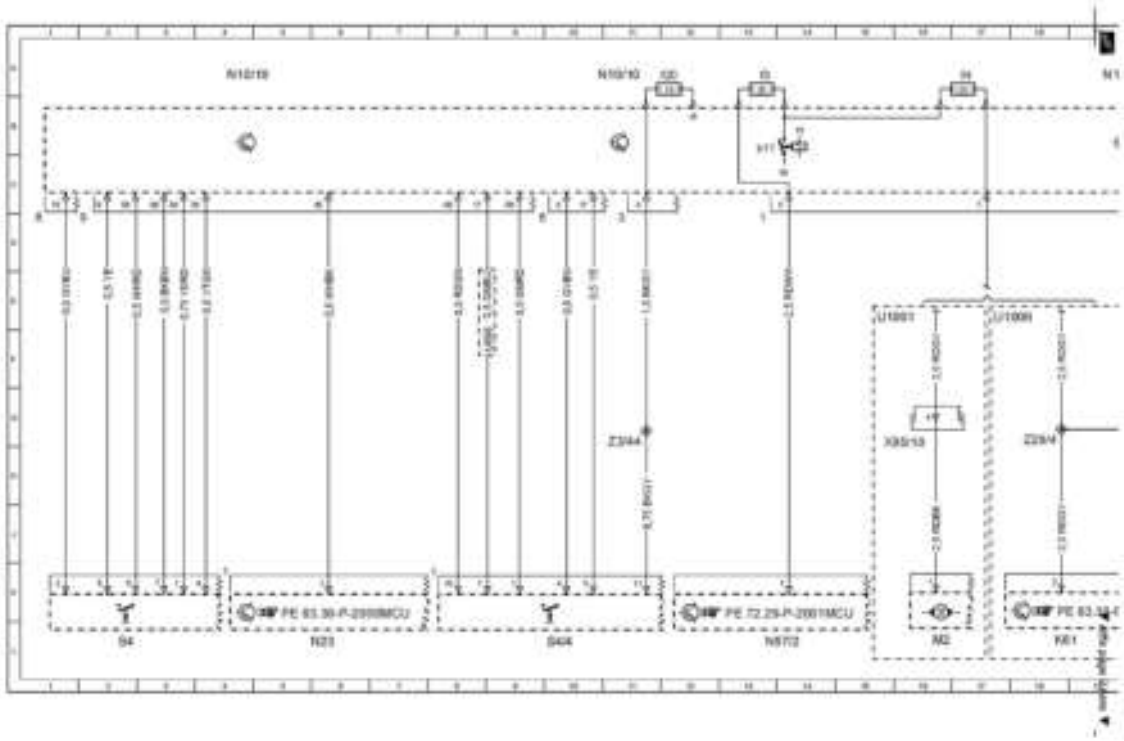


Fig. 68: Electrical Center - Wiring Diagram (1 Of 5)
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

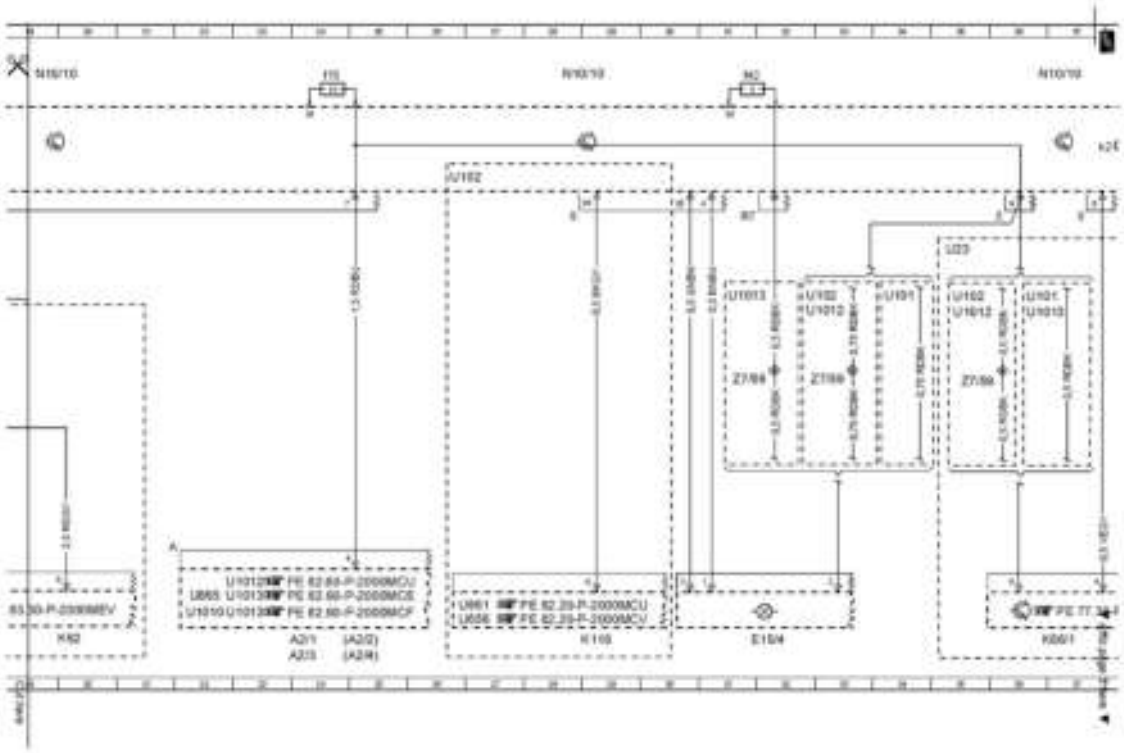


Fig. 69: Electrical Center - Wiring Diagram (2 Of 5)
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

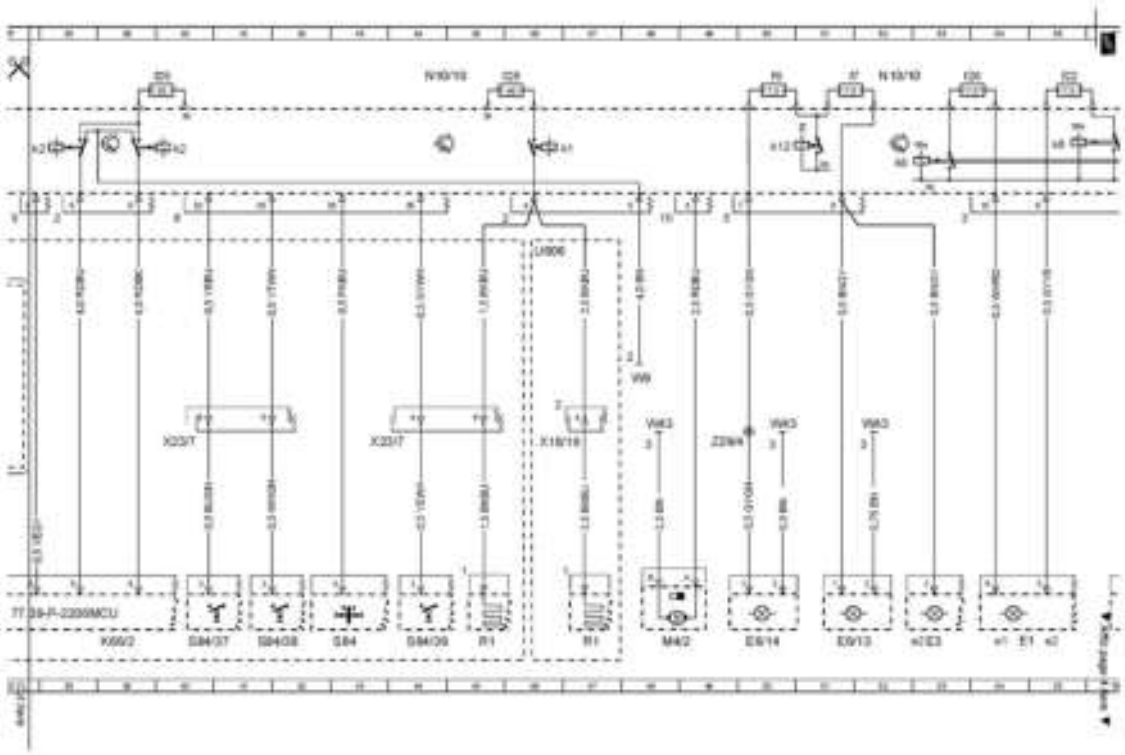


Fig. 70: Electrical Center - Wiring Diagram (3 Of 5)
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

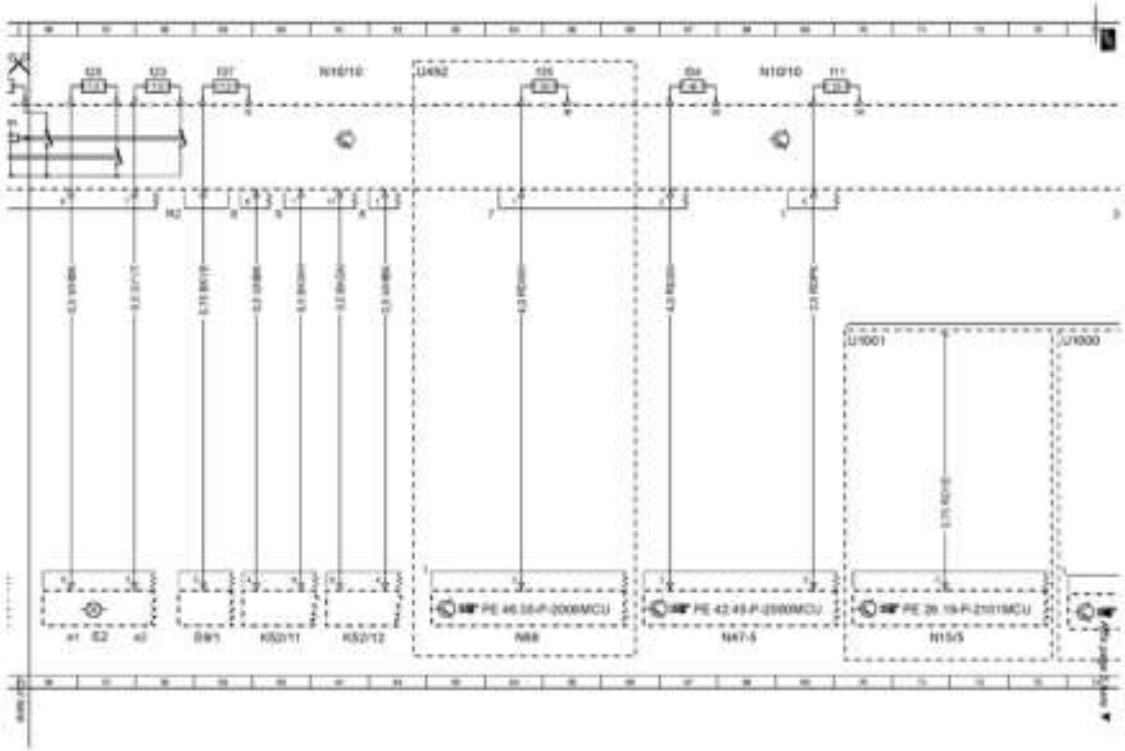


Fig. 71: Electrical Center - Wiring Diagram (4 Of 5)
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

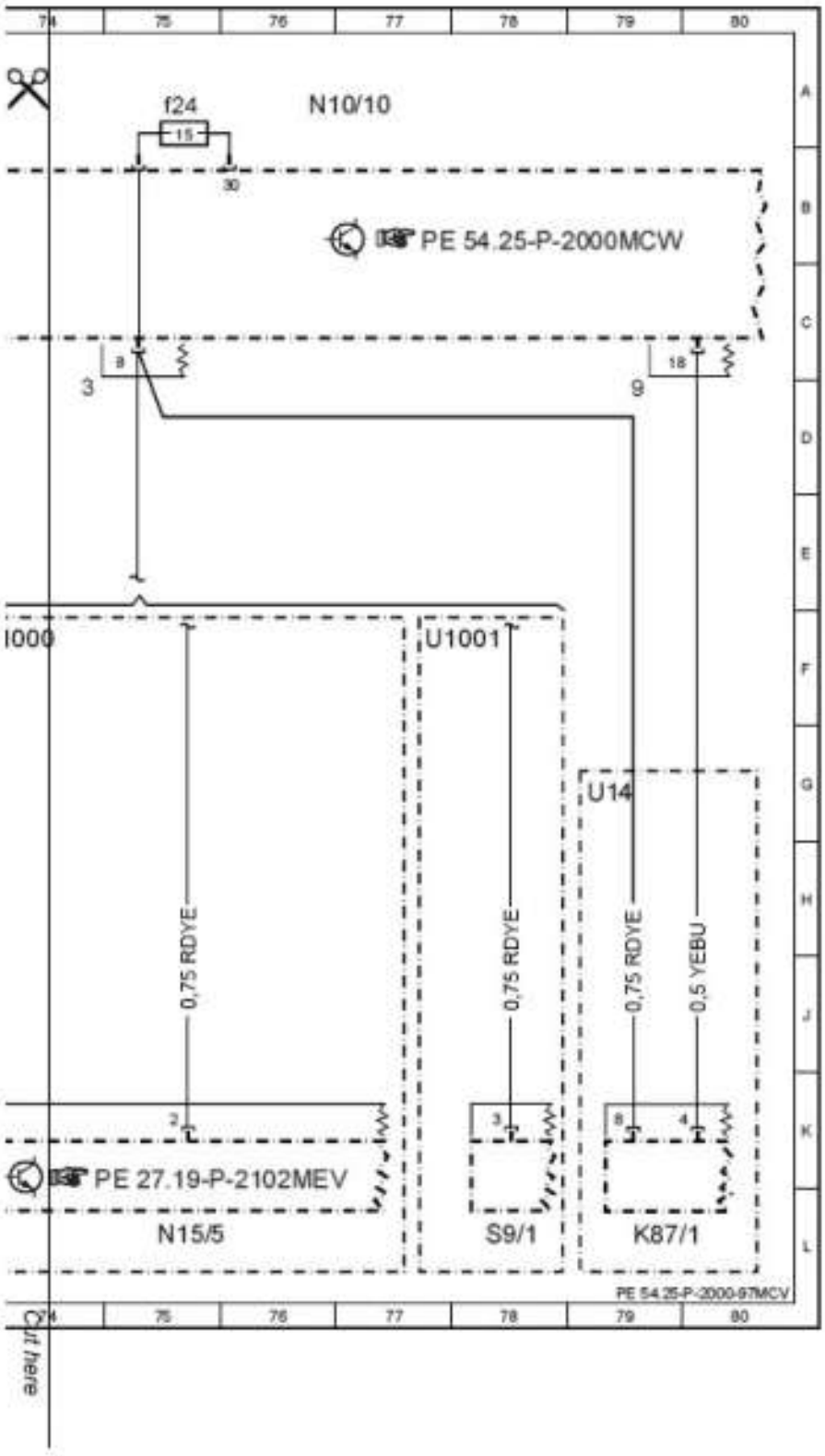


Fig. 72: Electrical Center - Wiring Diagram (5 Of 5)
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

MISCELLANEOUS NOTES

DISPOSE OF BATTERY - OS54.10-P-0001-01Z

All models

Information on recycling and disposing of lead-acid batteries and lead-gel batteries

- Old lead batteries up to 31.12.1998 are not classed as recyclable waste requiring special monitoring and control. They bear the ISO symbol for return and recycling.
- The electrolyte, diluted sulfuric acid or acid gel should never be emptied in a careless manner. This procedure must be carried out by specialist companies.

Picture shows ISO symbol for return and recycling

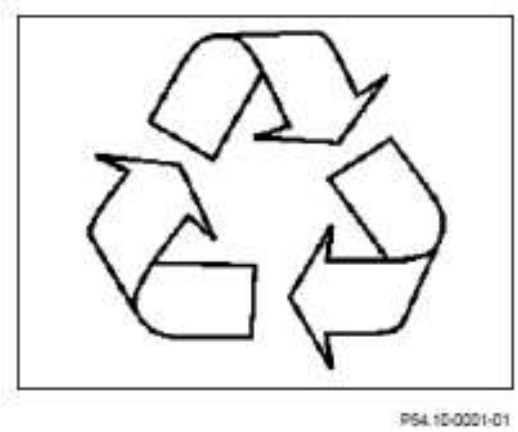


Fig. 73: View Of ISO Symbol For Return And Recycling
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

- Old lead-acid batteries and lead-gel batteries should not be mixed together as this would make recycling more difficult.

  Always store lead-acid batteries horizontally and do not tilt during transport.

- Lead batteries can be taken back to the respective manufacturer, to sales outlets and to scrap metal dealers and are recycled at lead recycling plants. Recycled lead is fed back into the production process. **The disposal of batteries as domestic waste is not permitted and is forbidden by law.**

WIRING DIAGRAMS

OVERVIEW OF WIRING DIAGRAMS FOR ELECTRICAL SYSTEM, EQUIPMENT AND INSTRUMENTS - PE54.00-P-1100MCU

MODEL 451

Wiring diagram for battery charger control unit for high-voltage battery	MODEL 451.391/ 491	PE54.10-P-2003MEV
Wiring diagram, socket for charger feed	MODEL 451.391/ 491	PE54.10-P-2011MEV
Wiring diagram for battery management control unit	MODEL 451.391/ 491	PE54.10-P-2104MEV
Wiring diagram for Communications control unit for external socket	MODEL 451.391/ 491	PE54.21-P-2132MEV

Wiring diagram for high-voltage distributor control unit	MODEL 451.391/ 491	PE54.21-P-2133MEV
Wiring diagram for data link connector/diagnostic socket	MODEL 451 except 451.391/491	**PE54.22-P-2000MCU**
Wiring diagram for data link connector/diagnostic socket	MODEL 451.391/ 491	PE54.22-P-2000MEV
Wiring diagram electrical center	MODEL 451 Sheet 1	**PE54.25-P-2000MCU**
Wiring diagram electrical center	MODEL 451 Sheet 2	**PE54.25-P-2000MCV**
Wiring diagram electrical center	MODEL 451 Sheet 3	**PE54.25-P-2000MCW**
Electrical function schematic for electrical center	MODEL 451	**PE54.25-P-2050MCU**
Wiring diagram large instrument (instrument cluster)	MODEL 451 except 451.391/491	**PE54.30-P-2001MCU**
Wiring diagram large instrument (instrument cluster)	MODEL 451.391/ 491	PE54.30-P-2001MEV
Wiring diagram of auxiliary instruments	MODEL 451 / (except 451.391 /491) up to 30.8.10	**PE54.30-P-2003MCU**
Electrical function diagram for instrument cluster (KI)	MODEL 451	**PE54.30-P-2051MCU**
Wiring diagram for signaling system	MODEL 451	**PE54.35-P-2000MCU**

WIRING DIAGRAM FOR DATA LINK CONNECTOR/DIAGNOSTIC SOCKET - PE54.22-P-2000MCU

MODEL 451 / (except 451.391 /491)

Wiring diagram for data link connector/diagnostic socket	**PE54.22-P-2000-97MCU**
Use of wiring diagrams	**OV00.01-P-1901-03MCC**
Search aid for all wiring diagram groups	**OV00.01-P-1901MCU**
Abbreviations for wiring diagrams	**OV00.01-P-1001-27MC**
Abbreviations of signal and circuit designations for wiring diagrams	**OV00.01-P-1001-28MC**
Location and assignment of line and connectors	**GF00.19-P-1000MCU**
Location and assignment of ground points	**GF00.19-P-2000MCU**
Location and assignment of Z connector sleeves (line connectors in wiring harness)	**GF00.19-P-3000MCU**
Further wiring diagrams	**PE54.00-P-1100MCU**

WIRING DIAGRAM ELECTRICAL CENTER - PE54.25-P-2000-97MCU

Code:	Designation:	Position:
A1	Instrument cluster	46L
A15	Additional instruments	28L
A15x1	Additional instruments connector	
A6/1	STH radio remote control receiver	32L

K61	Blower motor relay 1	66L
M3/3	Fuel pump with fuel level sensor	69L
M4/9	Battery cooling fan motor	22L
M6/1	Wiper motor	14L
M6/4	Tailgate wiper motor	17L
N10/10	SAM control unit	45A
N10/10	SAM control unit	36A
N10/10	SAM control unit	68A
N10/10	SAM control unit	53A
N10/10	SAM control unit	28A
N10/10	SAM control unit	61A
N10/10	SAM control unit	76A
N10/10	SAM control unit	12A
N10/10	SAM control unit	20A
N10/10	SAM control unit	5A
N10/10f1	Fuse 1	4A
N10/10f10	Fuse 10	8A
N10/10f12	Fuse 12	34A
N10/10f16	Fuse 16	73A
N10/10f17	Fuse 17	17A
N10/10f18	Fuse 18	42A
N10/10f19	Fuse 19	1A
N10/10f2	Fuse 2	14A
N10/10f27	Fuse 27	2A
N10/10f30	Fuse 30	21A
N10/10f44	Fuse 44 (slot R9)	60A
N10/10f8	Fuse 8	7A
N10/10f9	Fuse 9	
N10/10k10	Front wiper relay	
N10/10k13	Rear wiper relay	
N10/10k3	Starter relay	
N10/10k4	Electric fuel pump relay	
N10/10k7	Main relay	
N10/10k9	Automated manual transmission relay	
N15/6	Automated manual transmission control unit	20L
N3	EVCM electric vehicle control unit	37L
N3	EVCM electric vehicle control unit	75L
N3	EVCM electric vehicle control unit	24L
N3/10	ME-SFI [ME] control unit	72L
N47/5	ESP control unit	42L
N65/3	Brake booster vacuum pump control unit	63L
S6/1	Cockpit switch group	53L
S6/1s1	Hazard warning flasher switch	
S6/1s10	Tow-away protection/interior protection switch	
S6/1s11	Inside unlock CL [ZV] switch	
S6/1s12	Inside lock CL [ZV] switch	
S6/1s3	Left seat heater switch	

	Right seat heater switch	
S6/1s8	Front fog lamps switch	
S6/1s9	TPM [RDK] switch	
U1000	Valid for model 451.391/491	6G
U1000	Valid for model 451.391/491	30G
U1000	Valid for model 451.391/491	44F
U1000	Valid for model 451.391/491	61D
U1000	Valid for model 451.391/491	65G
U1000	Valid for model 451.391/491	74G
U1000	Valid for model 451.391/491	45L
U1000	Valid for model 451.391/491	21F
U1001	Not valid for model 451.391/491	1G
U1001	Not valid for model 451.391/491	46F
U1001	Not valid for model 451.391/491	68G
U1001	Not valid for model 451.391/491	55E
U1001	Not valid for model 451.391/491	45K
U1001	Not valid for model 451.391/491	44F
U1012	Valid up to 30/08/2010	26H
U1012	Valid up to 30/08/2010	43G
U1013	Valid as of 31/08/2010	41G
U114	Valid for front fog lamps	50F
U21	Valid for heated seats	55D
U30	Valid for diesel engines	18F
U492	Valid for power steering	44E
U493	Not valid for power steering	46E
U606	Valid for all except convertibles	15D
U75	Valid for gasoline engines	70G
U75	Valid for gasoline engines	26H
U75	Valid for gasoline engines	18G
W10	Ground (battery)	50G
W10	Ground (battery)	22G
X11/4	Data link connector	39L
X18/19	Trunk lid connector	16H
X99/3	Vehicle wiring harness connector	62H
Y19/1	Interior air conditioning expansion valve	34L
Y19/3	Battery air conditioning expansion valve	35L
Z3/17	Circuit 15 (fused) connector sleeve	42E
Z37/4	Power steering CAN bus connector sleeve (low)	45G
Z37/5	Power steering CAN bus connector sleeve (high)	46G
Z45	ATA [EDW] sensor supply circuit 30 connector sleeve	34G
Z45	ATA [EDW] sensor supply circuit 30 connector sleeve	20G
Z7/24	Circuit 87/1 connector sleeve	18G
Z78	Cockpit LIN connector sleeve	27G
Z81	Circuit 58d connector sleeve	48G

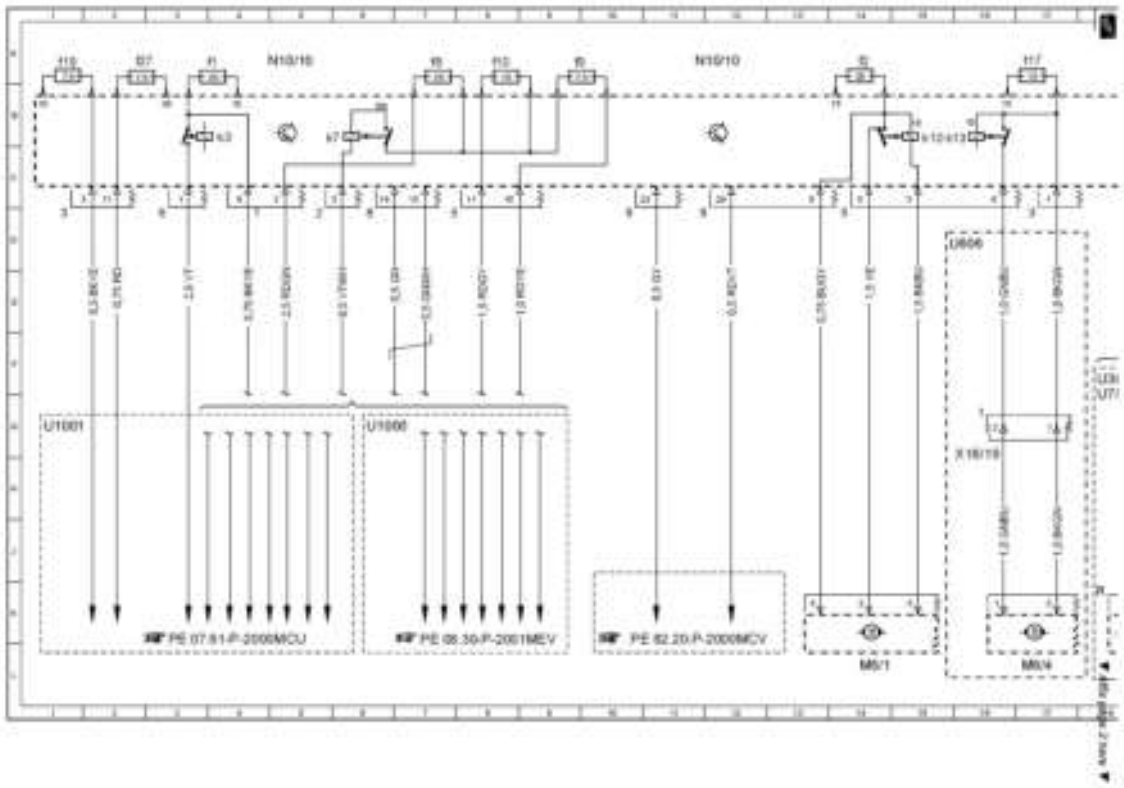


Fig. 74: Electrical Center - Wiring Diagram (1 Of 5)
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

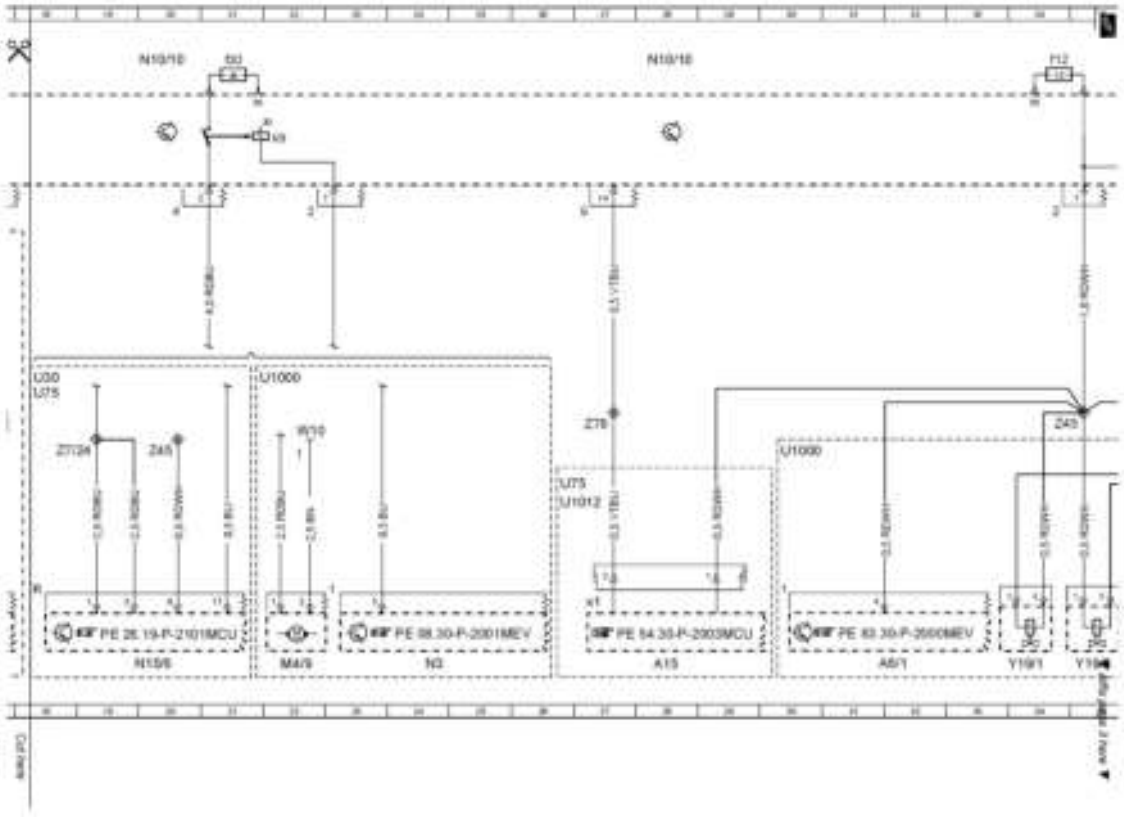


Fig. 75: Electrical Center - Wiring Diagram (2 Of 5)
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

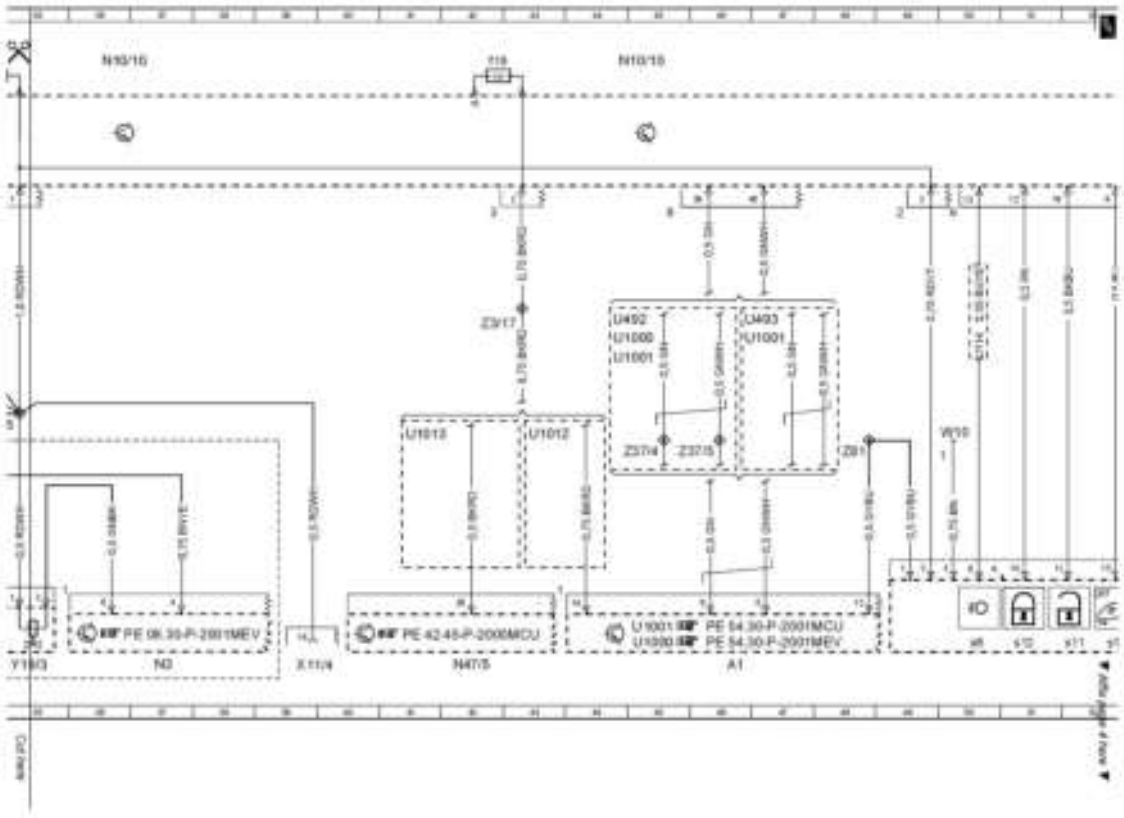


Fig. 76: Electrical Center - Wiring Diagram (3 Of 5)
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

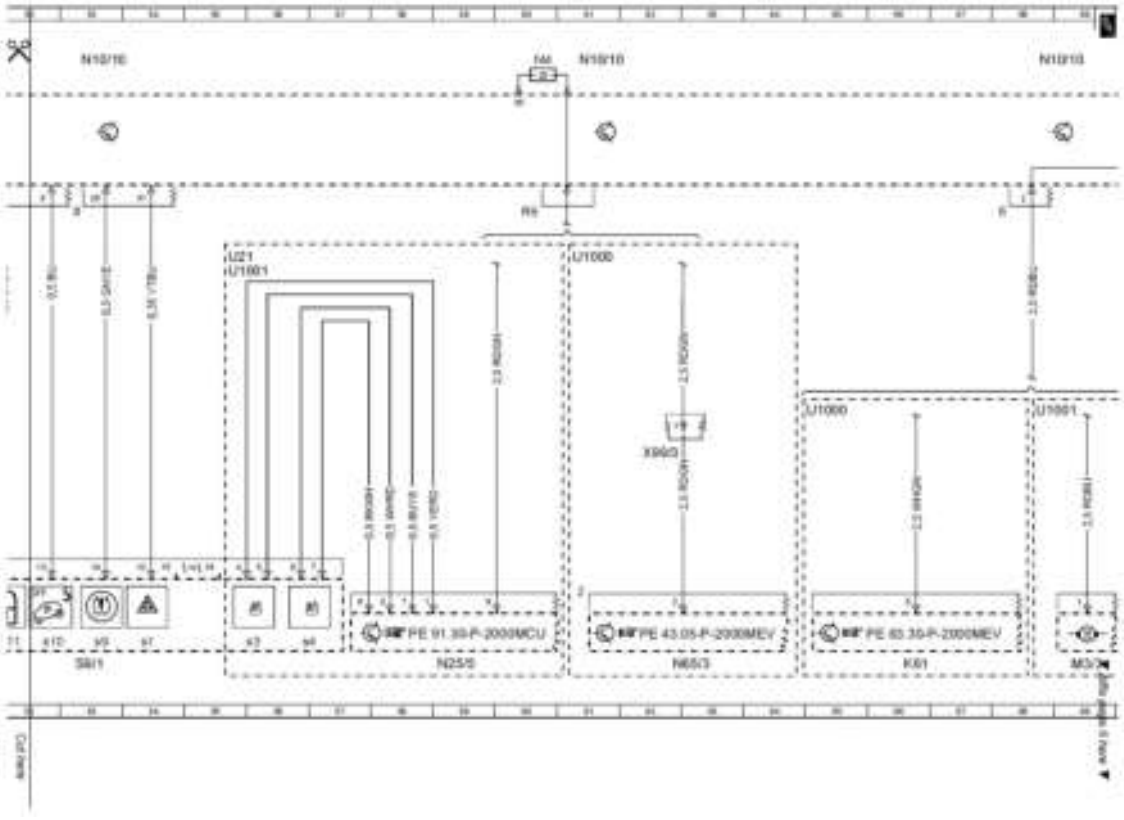


Fig. 77: Electrical Center - Wiring Diagram (4 Of 5)
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

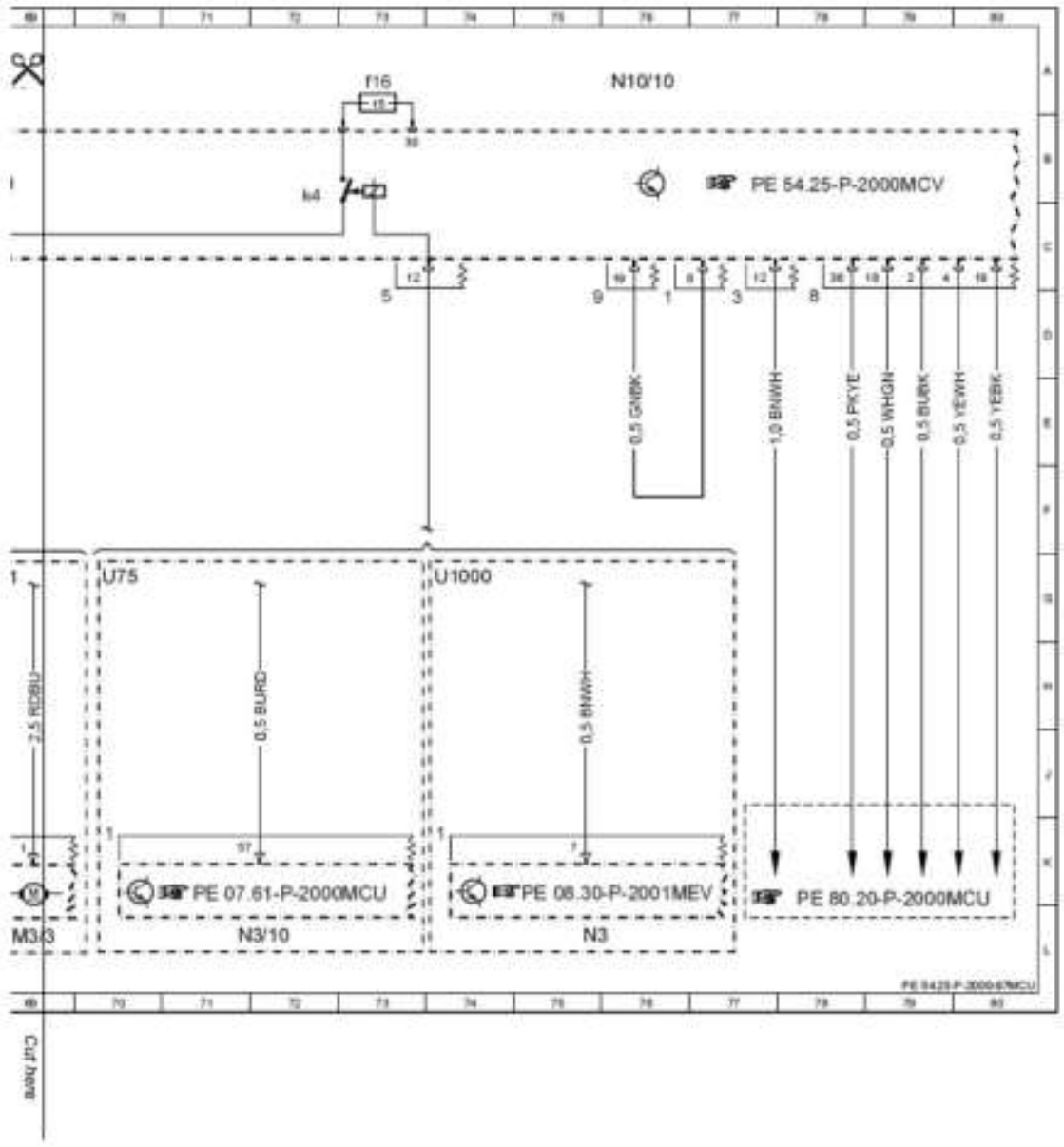


Fig. 78: Electrical Center - Wiring Diagram (5 Of 5)
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

WIRING DIAGRAM ELECTRICAL CENTER - PE54.25-P-2000-97MCW

Code:	Designation:	Position:
A45	Fanfare horns and airbag clock spring contact	26L
A9	Refrigerant compressor	15L
B32	Microwave sensor	73L
E34	Charger feed socket indicator LED	47H
E5/1	Left front fog lamp	65L
E5/2	Right fog lamp	66L
F90	12 V charge line prefuse	3H
F91	SAM prefuse	8H
G1	Battery	7L
G1	Battery	5L

G1	Battery	9L
H2	Horn	17L
H3/2	Alarm siren with inclination sensor	71L
K97	Mirror heater relay	61L
L11	Transponder coil	76L
M14/10	Fuel filler flap CL [ZV] motor	18L
M14/6	Left door CL [ZV] motor	20L
M21/1	Left electrically adjustable and heated outside mirror	57L
M21/1x1	Left electrically adjustable and heated exterior mirror connector	
M21/2	Right electrically adjustable and heated outside mirror	58L
M21/2x1	Right electrically adjustable and heated exterior mirror connector	
M44	Charge air fan motor	14L
M57/4	Trunk lid opening assist motor 1 (cabriolet)	23L
M57/5	Trunk lid opening assist motor 2 (cabriolet)	24L
M57/6	Trunk lid opening assist motor (cabriolet)	21L
M6/1	Wiper motor	52L
M6/4	Tailgate wiper motor	55L
N10/10	SAM control unit	20A
N10/10	SAM control unit	27A
N10/10	SAM control unit	36A
N10/10	SAM control unit	44A
N10/10	SAM control unit	52A
N10/10	SAM control unit	62A
N10/10	SAM control unit	69A
N10/10	SAM control unit	12A
N10/10	SAM control unit	76A
N10/10	SAM control unit	4A
N10/10f14	Fuse 14	13A
N10/10f17	Fuse 17	55A
N10/10f2	Fuse 2	53A
N10/10f21	Fuse 21	51A
N10/10f31	Fuse 31	22A
N10/10f33	Fuse 33	8A
N10/10f36	Fuse 36 (slot R1)	61A
N10/10f39	Fuse 39 (slot R4)	78A
N10/10f39	Fuse 39 (slot R4)	60A
N10/10f40	Fuse 40 (slot R5)	40A
N10/10f41	Fuse 41 (slot R6)	68A
N10/10f42	Fuse 42 (slot R7)	33A
N10/10f43	Fuse 43 (slot R8)	30A
N10/10f5	Fuse 5	65A
N10/10k10	Front wiper relay	
N10/10k13	Rear wiper relay	

N10/10k14	Front fog lamp relay	
N10/10k820	Charge air fan motor and horn relay	
N10/10k820	Charge air fan motor and horn relay	
N10/10k830	CL [ZV] "open" and CL [ZV] "locked" relay	
N10/10k830	CL [ZV] "open" and CL [ZV] "locked" relay	
N10/10k840	Rear-end door/trunk lid CL [ZV] relay	
N116/5	High-voltage distributor control unit	30L
N116/5	High-voltage distributor control unit	79L
N145	Electric motor control unit	33L
N145	Electric motor control unit	3L
N24/3	High-voltage AC/DC battery charger control unit	41L
N24/4	Smart battery charger control unit	44L
N3	EVCM electric vehicle control unit	47L
N3	EVCM electric vehicle control unit	68L
N82/2	Battery management system control unit	37L
S2/1	Ignition/starter switch	11L
U100	Valid as of 12/2008	59F
U1000	Valid for model 451.391/491	28A
U1000	Valid for model 451.391/491	66E
U1000	Valid for model 451.391/491	1C
U1001	Not valid for model 451.391/491	6C
U1001	Not valid for model 451.391/491	8C
U1012	Valid up to 30/08/2010	73E
U1012	Valid up to 30/08/2010	6C
U1012	Valid up to 30/08/2010	60C
U1013	Valid as of 31/08/2010	74E
U1013	Valid as of 31/08/2010	8C
U1013	Valid as of 31/08/2010	61C
U114	Valid for front fog lamps	64A
U180	Valid for ATA [EDW] with siren	70D
U23	Valid for convertibles	20G
U606	Valid for all except convertibles	54D
U606	Valid for all except convertibles	22G
U75	Valid for gasoline engines	13G
U99	Valid up to 12/2008	57C
W10	Ground (battery)	6G
W10	Ground (battery)	71G
W10	Ground (battery)	51G
W10	Ground (battery)	5G
W10	Ground (battery)	73F
W10	Ground (battery)	75E
W10	Ground (battery)	9G
W12	Ground (center console)	12F
W43	Ground (outside left fire wall)	17G
W43	Ground (outside left fire wall)	53G
W6	Ground (left wheelhouse in luggage compartment)	14G

W6	Ground (left wheelhouse in luggage compartment)	23G
W6	Ground (left wheelhouse in luggage compartment)	24G
W6	Ground (left wheelhouse in luggage compartment)	21G
W9	Ground (left front, at lamp unit)	17F
W9	Ground (left front, at lamp unit)	27D
X18/19	Trunk lid connector	54H
X26	Interior/engine connector	13F
X35/1	Left door separation point	57H
X35/1	Left door separation point	19G
X35/2	Right door separation point	58H
X58/1	Interior socket	50L
X99/3	Vehicle wiring harness connector	29H
Z17	Connector sleeve 9	74G
Z19/1	CL [ZV] "open" connector sleeve	18G
Z19/2	CL [ZV] "closed" connector sleeve	17G
Z212	Circuit 30 supply connector sleeve	68G
Z4/3	Tml. 30 connector sleeve	40E
Z45	ATA [EDW] sensor supply circuit 30 connector sleeve	60G
Z45	ATA [EDW] sensor supply circuit 30 connector sleeve	73H
Z45	ATA [EDW] sensor supply circuit 30 connector sleeve	71G
Z78/1	ATA [EDW] LIN connector sleeve	72G

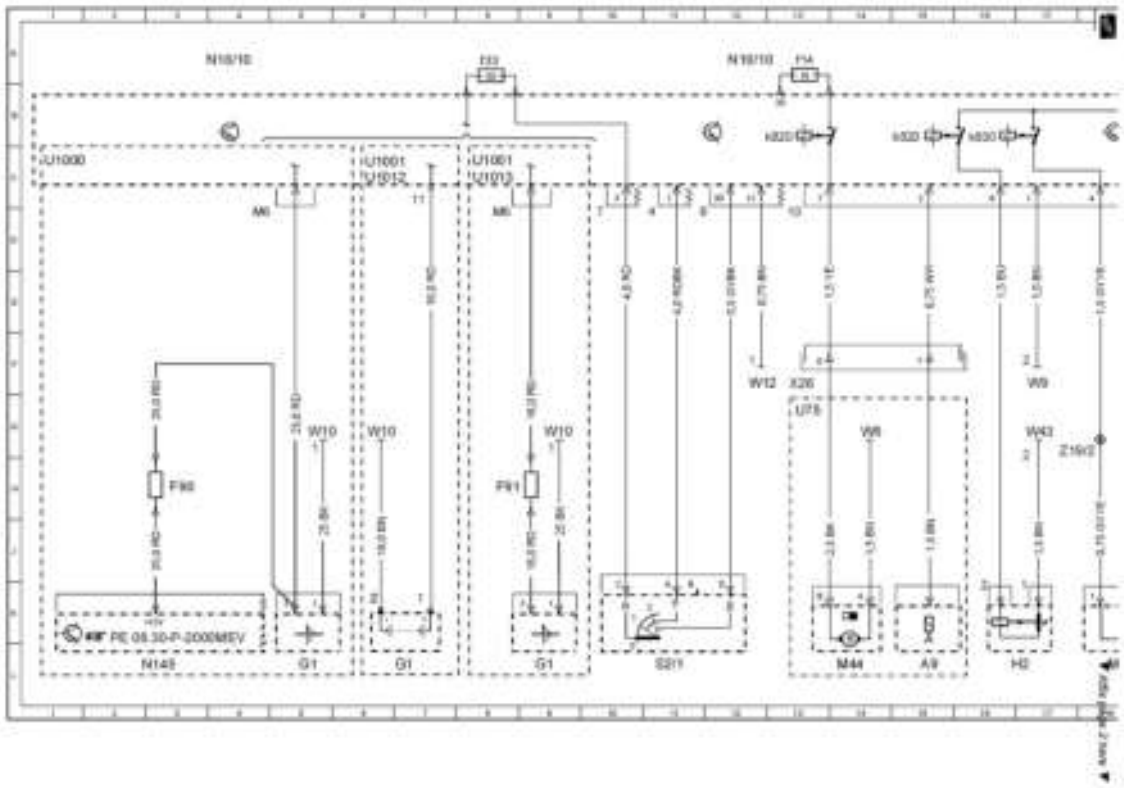


Fig. 79: Electrical Center - Wiring Diagram (1 Of 5)
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

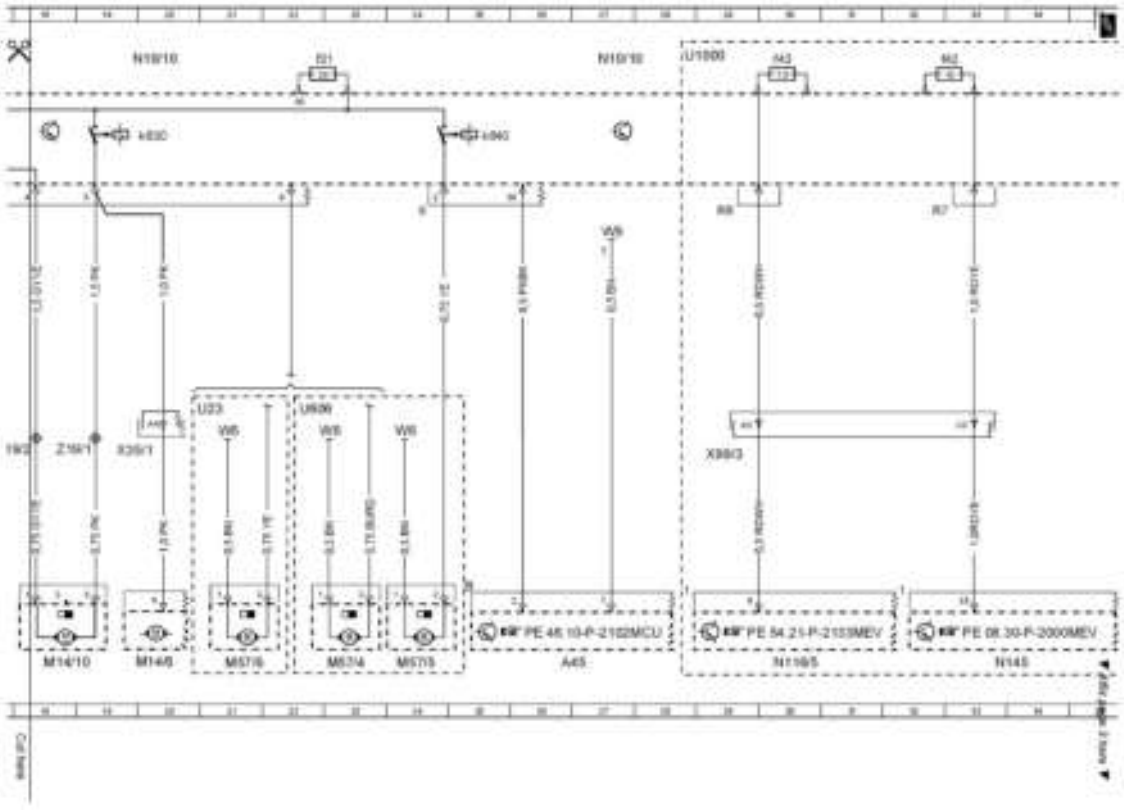


Fig. 80: Electrical Center - Wiring Diagram (2 Of 5)
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

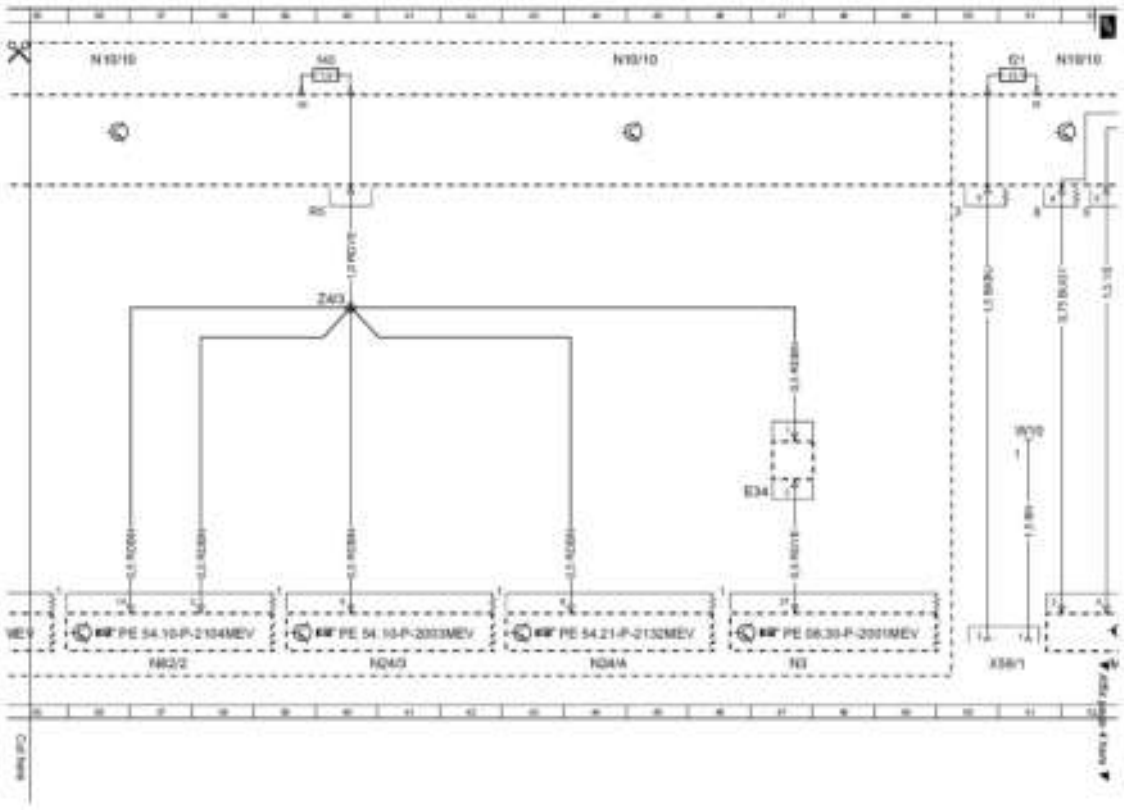


Fig. 81: Electrical Center - Wiring Diagram (3 Of 5)
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

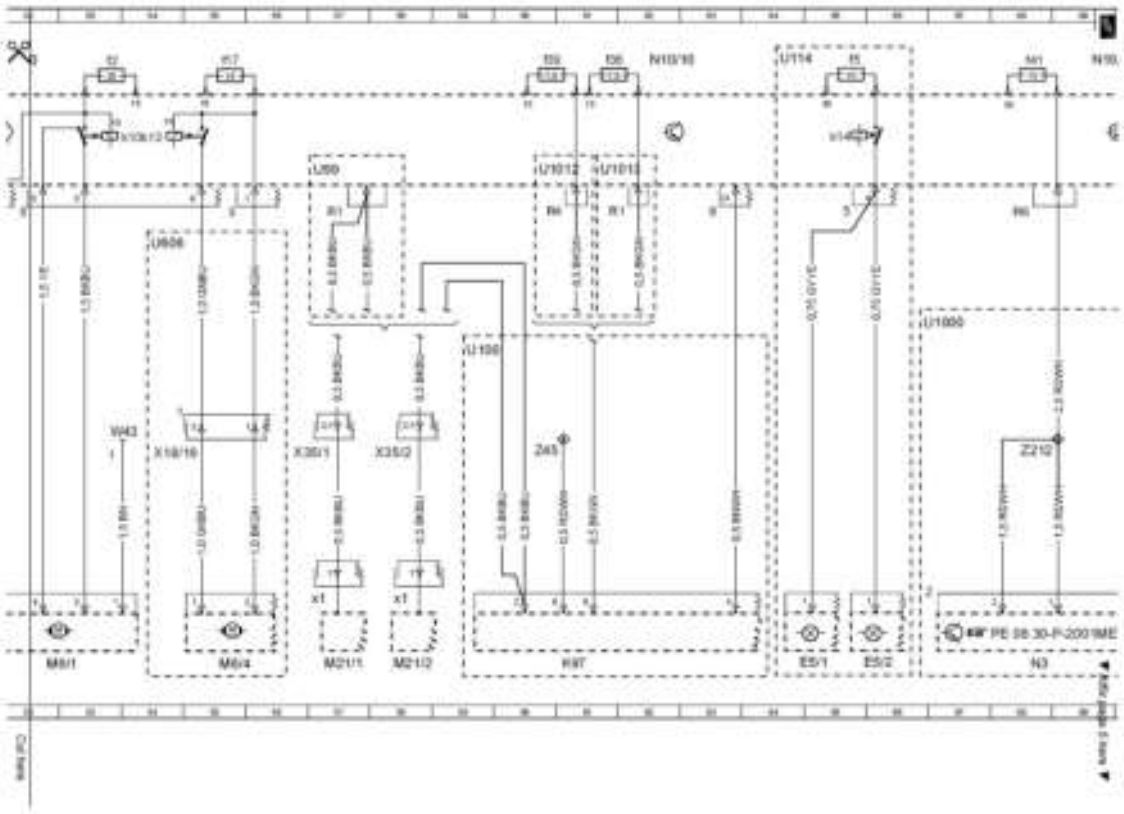


Fig. 82: Electrical Center - Wiring Diagram (4 Of 5)
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

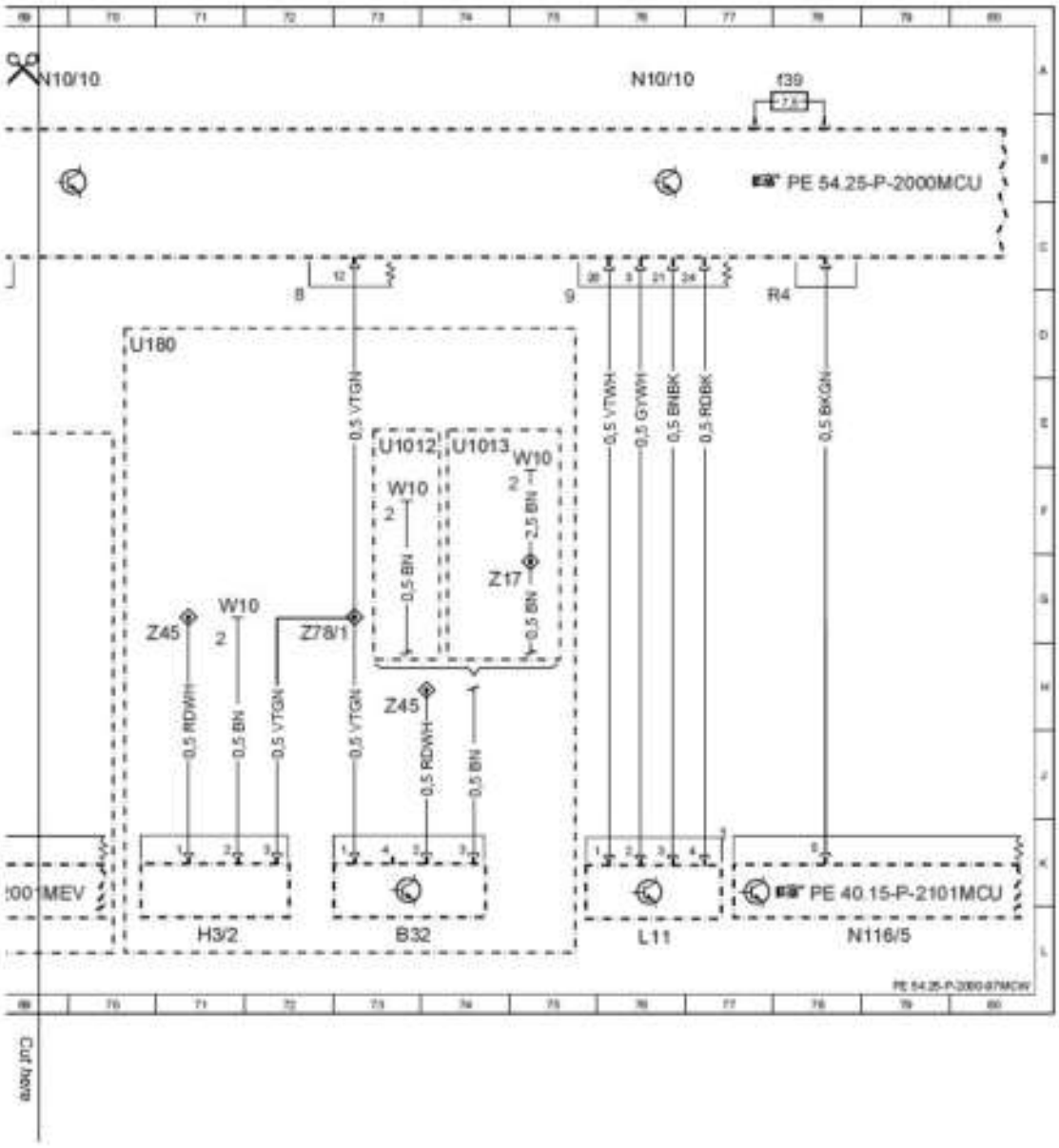


Fig. 83: Electrical Center - Wiring Diagram (5 Of 5)
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

WIRING DIAGRAM ELECTRICAL CENTER - PE54.25-P-2000-99MCV

Code:	Designation:	Position:
A2/1	smart radio 9	24 L
A2/2	smart radio 10	25 L
E1	Left front headlamp unit	52 L
E15/4	Front interior lamp	27 L
E1e1	Left high beam	51 L
E1e2	Left low beam	52 L
E2	Right front headlamp unit	54 L
E2e1	Right high beam	54 L
E2e2	Right low beam	55 L

E3	Left taillamp	50 L
E3e2	Left tail light	49 L
E6/13	Left standing lamp	48 L
E6/14	Right standing lamp	46 L
K52/11	Left turn signal/stop lamp relay	58 L
K52/12	Right turn signal/stop lamp relay	60 L
K66/1	Open soft top relay	30 L
K66/2	Close soft top relay	32 L
M2	Blower motor	22 L
M21/1	Left electrically adjustable and heated exterior mirror	15 L
M21/1x1	Left electrically adjustable and heated exterior mirror connector	15 K
M21/2	Right electrically adjustable and heated exterior mirror	16 L
M21/2x1	Right electrically adjustable and heated exterior mirror connector	16 K
M4/2	Coolant fan motor	44 L
N10/10	SAM control unit	4 A
N10/10	SAM control unit	12 A
N10/10	SAM control unit	20 A
N10/10	SAM control unit	28 A
N10/10	SAM control unit	36 A
N10/10	SAM control unit	44 A
N10/10	SAM control unit	52 A
N10/10	SAM control unit	61 A
N10/10	SAM control unit	68 A
N10/10	SAM control unit	75 A
N10/10f11	Fuse 11	70 A
N10/10f15	Fuse 15	24 A
N10/10f20	Fuse 20	14 A
N10/10f22	Fuse 22	52 A
N10/10f23	Fuse 23	55 A
N10/10f24	Fuse 24	72 A
N10/10f25	Fuse 25	54 A
N10/10f26	Fuse 26	50 A
N10/10f28	Fuse 28	40 A
N10/10f29	Fuse 29	32 A
N10/10f3	Fuse 3	18 A
N10/10f34	Fuse 34	67 A
N10/10f35	Fuse 35	64 A
N10/10f37	Fuse 37	16 A
N10/10f38	Fuse 38	57 A
N10/10f4	Fuse 4	21 A
N10/10f6	Fuse 6	46 A
N10/10f7	Fuse 7	49 A

N10/10k1	Rear window defroster relay module	41 C
N10/10k11	Heater blower relay	19 C
N10/10k12	Standing lamps relay	46 B
N10/10k2	Soft top "open" and soft top "closed" relay	30 C
N10/10k2	Soft top "open" and soft top "closed" relay	32 C
N10/10k6	High beam relay	50 C
N10/10k8	Low beam headlamp relay	52 B
N15/5	Electronic selector lever module control module	72 L
N23	Heater/AC operating unit	7 L
N47-5	ESP control module	68 L
N57/2	Power window convenience feature control unit	19 L
N68	Steering assist control module	64 L
R1	Heated rear window	40 L
R1	Heated rear window	42 L
S4	Combination switch	3 L
S4/4	Right wiper switch	12 L
S84	Power soft top switch	37 L
S84/37	Soft top microswitch	33 L
S84/38	Roof cassette microswitch	35 L
S84/39	Rear soft top microswitch	38 L
S9/1	Stop lamp switch (4-pin)	57 L
U23	Valid for cabriolet	29 D
U492	Valid for power steering	62 A
U606	Valid for all except convertibles	11 F
U606	Valid for all except convertibles	41 D
W43	Ground (outside left fire wall)	44 G
W9	Ground (at left headlamp unit)	43 G
X18/19	Trunk lid connector	41 H
X23/7	Soft top connector	33 H
X23/7	Soft top connector	38 H
X35/1	Left door separation point	15 H
X35/2	Right door separation point	16 H
X85/10	Heating or air conditioning connector	21 H
Z29/4	Circuit 58R (fused) connector sleeve	45 H
Z3/44	Instrument cluster - radio circuit 15 connector sleeve (fused)	13 H

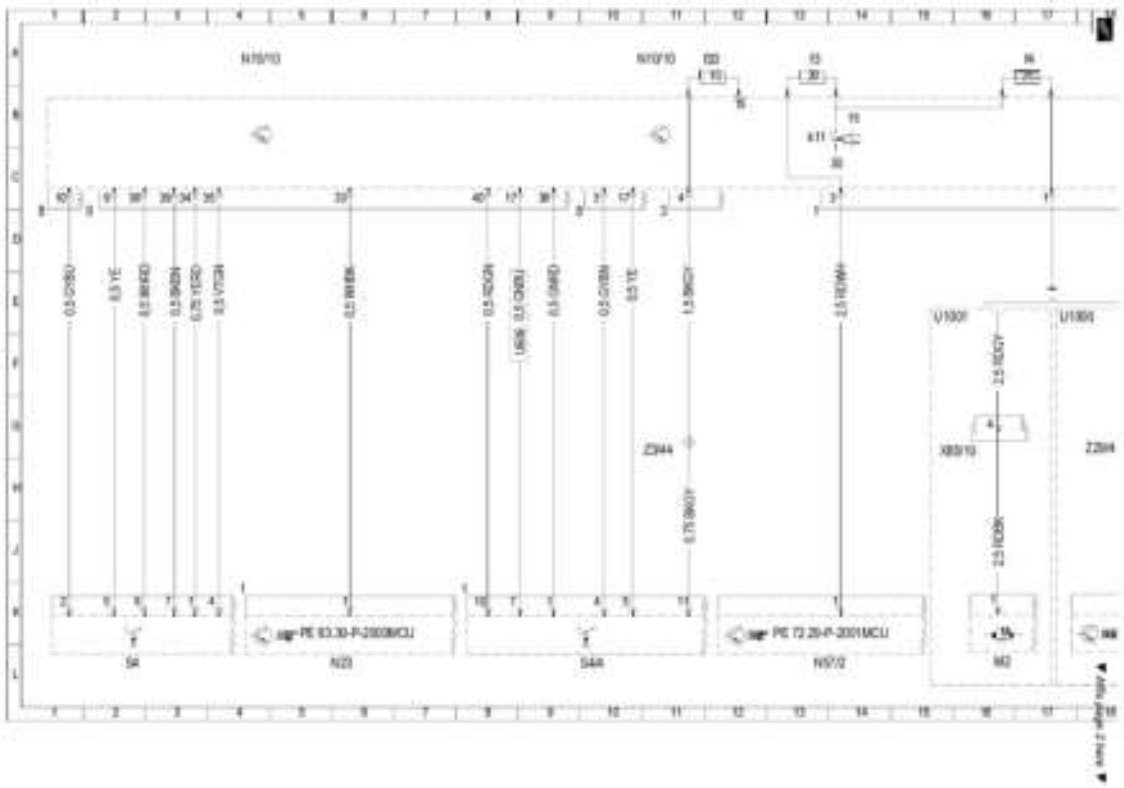


Fig. 84: Electrical Center - Wiring Diagram (1 Of 5)
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

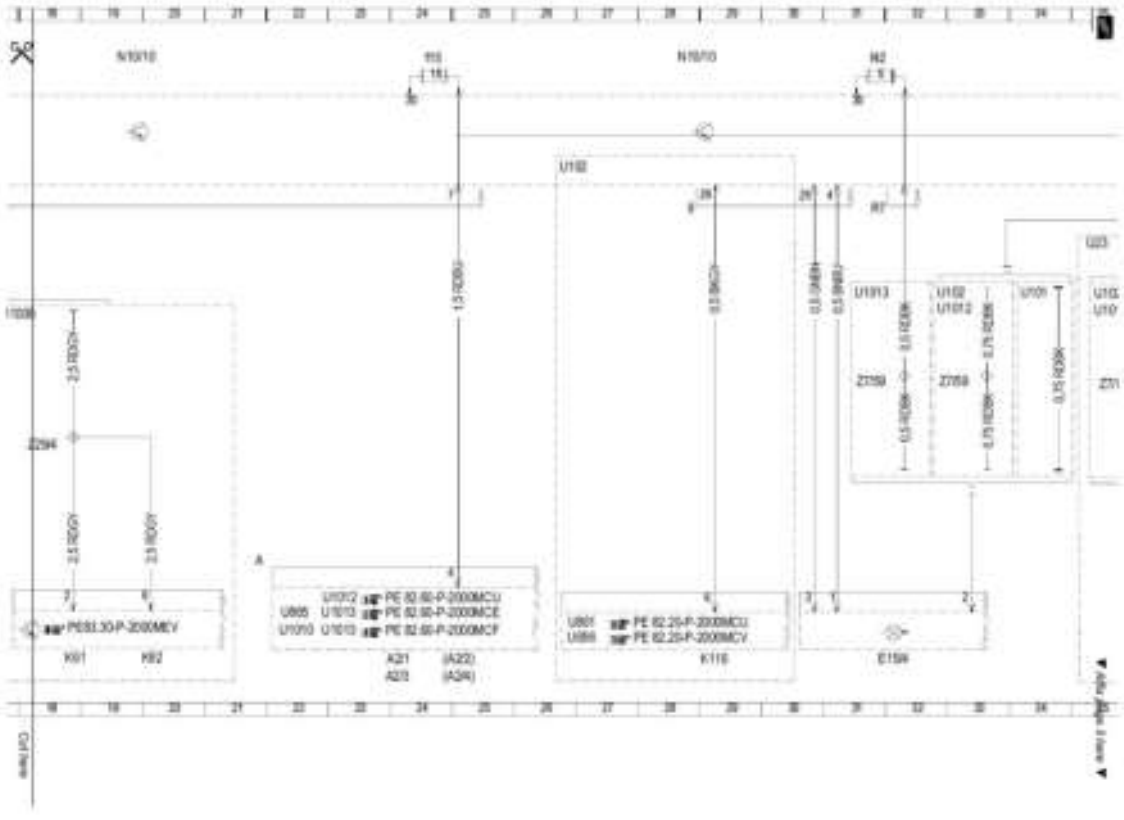


Fig. 85: Electrical Center - Wiring Diagram (2 Of 5)
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

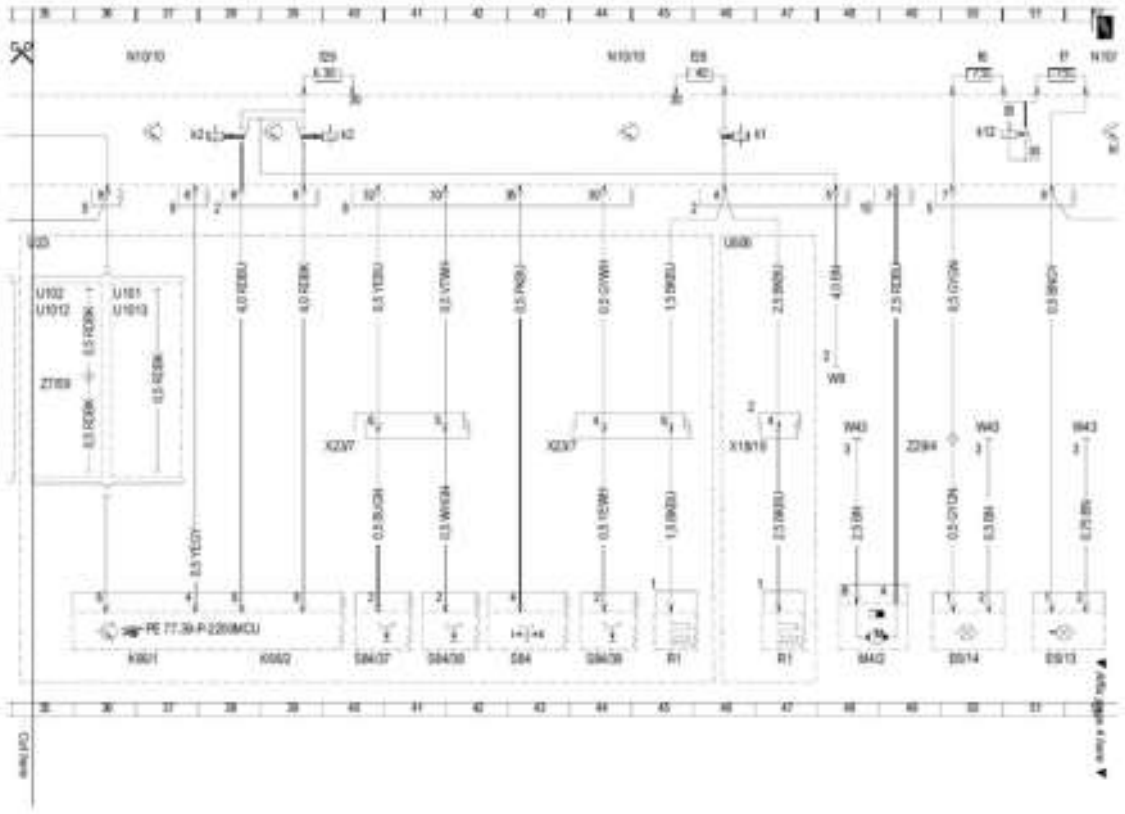


Fig. 86: Electrical Center - Wiring Diagram (3 Of 5)
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

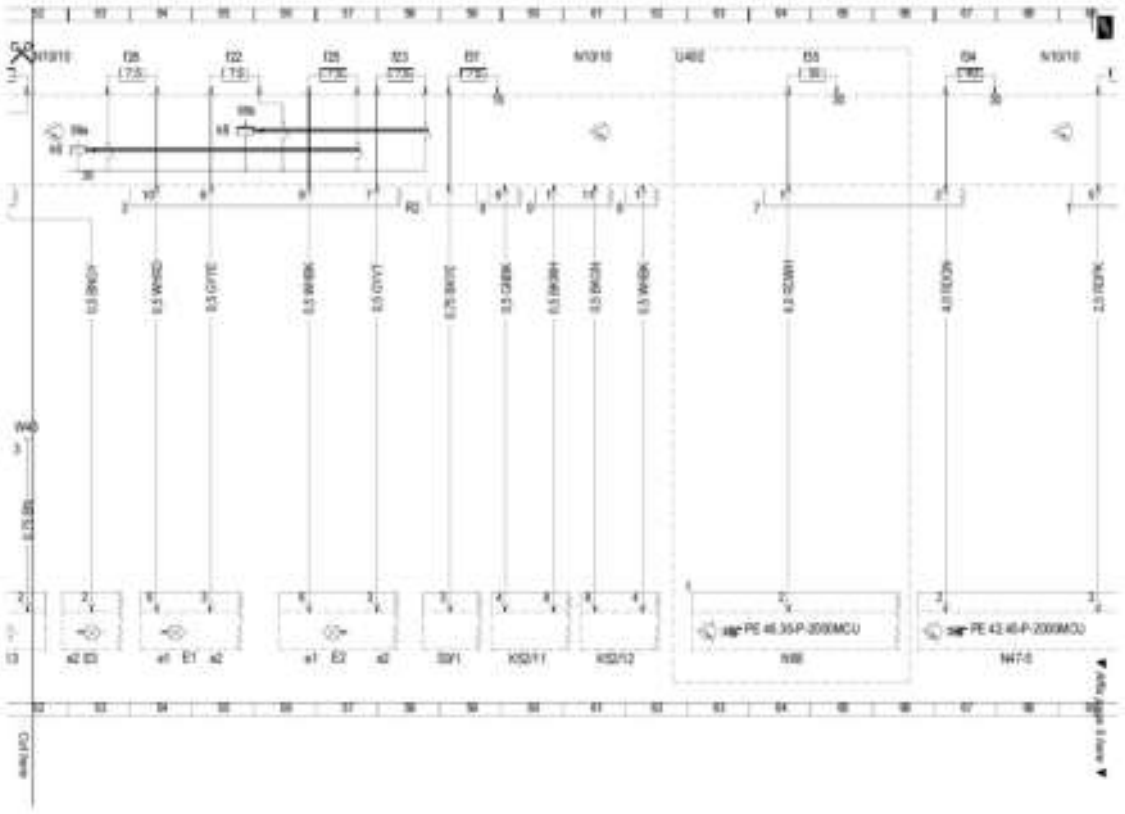


Fig. 87: Electrical Center - Wiring Diagram (4 Of 5)
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

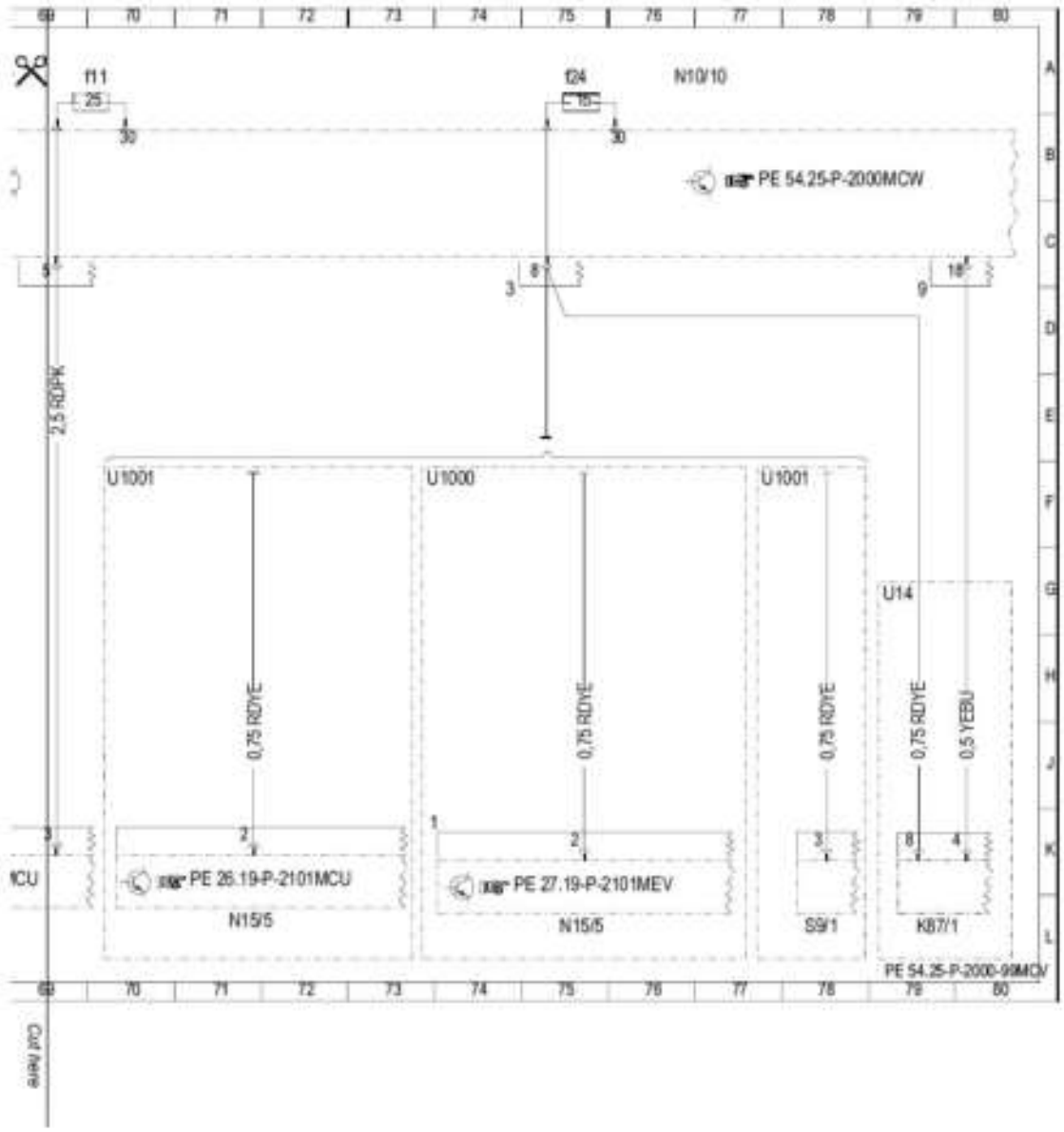


Fig. 88: Electrical Center - Wiring Diagram (5 Of 5)
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

WIRING DIAGRAM ELECTRICAL CENTER - PE54.25-P-2000MCU

MODEL 451

Sheet 1

Wiring diagram electrical center	**PE54.25-P-2000-97MCU**
Use of wiring diagrams	**OV00.01-P-1901-03MCC**
Search aid for all wiring diagram groups	**OV00.01-P-1901MCU**
Abbreviations for wiring diagrams	**OV00.01-P-1001-27MC**
Abbreviations of signal and circuit designations for wiring diagrams	**OV00.01-P-1001-28MC**
Location and assignment of line and plug connectors	**GF00.19-P-1000MCU**
Location and assignment of ground points	**GF00.19-P-2000MCU**

Location and assignment of Z connector sleeves (line connectors in wiring harness)	**GF00.19-P-3000MCU**
Engine 132 Further wiring diagrams	**PE07.00-P-1100MCU**
Engine 780.009 Further wiring diagrams	PE08.00-P-1100MCC
Transmission 717 (except model 451.391/491) Further wiring diagrams	**PE26.00-P-1100MCU**
Model 451.391 / 491 Further wiring diagrams	PE27.00-P-1100MCC
Further wiring diagrams	**PE42.00-P-1100MCU**
Model 451.391 / 491 Further wiring diagrams	PE43.00-P-1100MCC
Further wiring diagrams	**PE46.00-P-1100MCU**
Further wiring diagrams	**PE54.00-P-1100MCU**
Further wiring diagrams	**PE72.00-P-1100MCU**
Further wiring diagrams	**PE80.00-P-1100MCU**
Further wiring diagrams	**PE82.00-P-1100MCU**
Further wiring diagrams	**PE83.00-P-1100MCU**
Further wiring diagrams	**PE91.00-P-1100MCU**

WIRING DIAGRAM ELECTRICAL CENTER - PE54.25-P-2000MCV

MODEL 451

Sheet 2

Wiring diagram electrical center	**PE54.25-P-2000-97MCV**
Use of wiring diagrams	**OV00.01-P-1901-03MCC**
Search aid for all wiring diagram groups	**OV00.01-P-1901MCU**
Abbreviations for wiring diagrams	**OV00.01-P-1001-27MC**
Abbreviations of signal and circuit designations for wiring diagrams	**OV00.01-P-1001-28MC**
Location and assignment of line and plug connectors	**GF00.19-P-1000MCU**
Location and assignment of ground points	**GF00.19-P-2000MCU**
Location and assignment of Z connector sleeves (line connectors in wiring harness)	**GF00.19-P-3000MCU**
Engine 132 Further wiring diagrams	**PE07.00-P-1100MCU**
Engine 780.009 Further wiring diagrams	PE08.00-P-1100MCC
Transmission 717 (except model 451.391/491) Further wiring diagrams	**PE26.00-P-1100MCU**
Model 451.391 / 491 Further wiring diagrams	PE27.00-P-1100MCC
Further wiring diagrams	**PE42.00-P-1100MCU**
Model 451.391 / 491 Further wiring diagrams	PE43.00-P-1100MCC

Further wiring diagrams	**PE46.00-P-1100MCU**
Further wiring diagrams	**PE54.00-P-1100MCU**
Further wiring diagrams	**PE72.00-P-1100MCU**
Further wiring diagrams	**PE80.00-P-1100MCU**
Further wiring diagrams	**PE82.00-P-1100MCU**
Further wiring diagrams	**PE83.00-P-1100MCU**
Further wiring diagrams	**PE91.00-P-1100MCU**

WIRING DIAGRAM ELECTRICAL CENTER - PE54.25-P-2000MCW

MODEL 451

Sheet 3

Wiring diagram electrical center	**PE54.25-P-2000-97MCW**
Use of wiring diagrams	**OV00.01-P-1901-03MCC**
Search aid for all wiring diagram groups	**OV00.01-P-1901MCU**
Abbreviations for wiring diagrams	**OV00.01-P-1001-27MC**
Abbreviations of signal and circuit designations for wiring diagrams	**OV00.01-P-1001-28MC**
Location and assignment of line and plug connectors	**GF00.19-P-1000MCU**
Location and assignment of ground points	**GF00.19-P-2000MCU**
Location and assignment of Z connector sleeves (line connectors in wiring harness)	**GF00.19-P-3000MCU**
Engine 132 Further wiring diagrams	**PE07.00-P-1100MCU**
Engine 780.009 Further wiring diagrams	PE08.00-P-1100MCC
Transmission 717 (except model 451.391/491) Further wiring diagrams	**PE26.00-P-1100MCU**
Model 451.391 / 491 Further wiring diagrams	PE27.00-P-1100MCC
Further wiring diagrams	**PE42.00-P-1100MCU**
Model 451.391 / 491 Further wiring diagrams	PE43.00-P-1100MCC
Further wiring diagrams	**PE46.00-P-1100MCU**
Further wiring diagrams	**PE54.00-P-1100MCU**
Further wiring diagrams	**PE72.00-P-1100MCU**
Further wiring diagrams	**PE80.00-P-1100MCU**
Further wiring diagrams	**PE82.00-P-1100MCU**
Further wiring diagrams	**PE83.00-P-1100MCU**
Further wiring diagrams	**PE91.00-P-1100MCU**

ELECTRICAL FUNCTION DIAGRAM FOR ELECTRICAL CENTER - PE54.25-P-2050MCU

MODEL 451

Electrical function diagram for electrical center	PE54.25-P-2050-99MCU
Legend of electrical function diagram for electrical center	PE54.25-P-2050-60MCU
Use of wiring diagrams	**OV00.01-P-1901-03MCC**
Search aid for all wiring diagram groups	**OV00.01-P-1901MCU**
Abbreviations for wiring diagrams	**OV00.01-P-1001-27MC**
Abbreviations of signal and circuit designations for wiring diagrams	**OV00.01-P-1001-28MC**
Location and assignment of line and connectors	**GF00.19-P-1000MCU**
Location and assignment of ground points	**GF00.19-P-2000MCU**
Location and assignment of Z connector sleeves (line connectors in wiring harness)	**GF00.19-P-3000MCU**
Further wiring diagrams	**PE07.00-P-1100MCU**
Further wiring diagrams	**PE26.00-P-1100MCU**
Further wiring diagrams	**PE42.00-P-1100MCU**
Further wiring diagrams	**PE46.00-P-1100MCU**
Further wiring diagrams	**PE54.00-P-1100MCU**

WIRING DIAGRAM LARGE INSTRUMENT (INSTRUMENT CLUSTER) - PE54.30-P-2001-97MCU

Code:	Designation:	Position:
A1	Instrument cluster	25A
A1	Instrument cluster	5A
A1	Instrument cluster	43A
A1	Instrument cluster	12A
A1	Instrument cluster	36A
A1e1	Left tern signal indicator lamp	29A
A1e15	Airbag indicator and warning lamp	21A
A1e17	ABS indicator lamp	15A
A1e18	Electric steering indicator lamp	45A
A1e2	Right turn signal indicator lamp	30A
A1e26	"CHECK ENGINE" MIL	31A
A1e3	High beam indicator lamp	12A
A1e30	Oil pressure warning lamp	20A
A1e41	ESP warning lamp	22A
A1e5	Alternator charge monitoring and warning lamp	24A
A1e54	Coolant temperature warning lamp	32A
A1e66	Tire pressure monitor warning lamp	26A
A1e67	Low beam indicator lamp	10A
A1e7	Brake fluid and parking brake warning lamp	14A
A1e8	Instrument illumination	3A
A1e9	Seat belt warning lamp	23A
A1p13	Multifunction display	18A
A1p8	Electronic speedometer	19A
A2/1	smart radio 9	21L
A2/2	smart radio 10	22L
A2/3	smart Entry radio	25L

A2/4	smart Premium radio	26L
A45	Fanfare horns and airbag clock spring contact	32L
A45	Fanfare horns and airbag clock spring contact	44L
B14	Outside temperature display temperature sensor	18L
N10/10	SAM control unit	9L
N10/10f12	Fuse 12	7L
N10/10f18	Fuse 18	6L
N23	Heater/AC operating unit	36L
S111/2	Right steering wheel pitman arm	3L
S6/1	Cockpit switch group	30L
U1010	Valid for radio with Premium sound system	25K
U1011	Valid for radio without Premium sound system	25L
U1012	Valid up to 30/08/2010	4E
U1012	Valid up to 30/08/2010	20G
U1012	Valid up to 30/08/2010	38K
U1013	Valid as of 31/08/2010	2E
U1013	Valid as of 31/08/2010	24G
U1013	Valid as of 31/08/2010	31G
U1013	Valid as of 31/08/2010	38K
U492	Valid for power steering	10E
U493	Not valid for power steering	12E
U494	Valid for SAL	42E
U865	Valid for Entry radio	25K
W9	Ground (left front, at lamp unit)	9G
Z3/17	Circuit 15 (fused) connector sleeve	5G
Z37/4	Power steering CAN bus connector sleeve (low)	11G
Z37/5	Power steering CAN bus connector sleeve (high)	11G
Z45	ATA [EDW] sensor supply circuit 30 connector sleeve	7G
Z81	Circuit 58d connector sleeve	29E

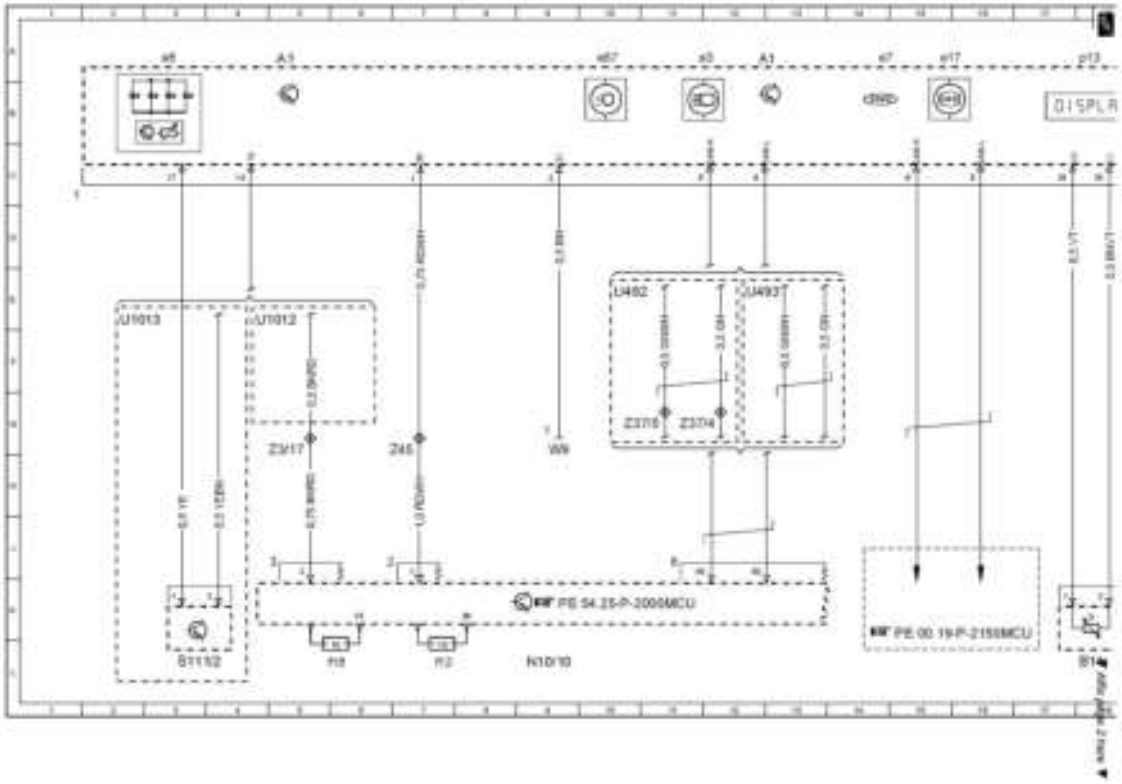


Fig. 89: Large Instrument (Instrument Cluster) - Wiring Diagram (1 Of 3)
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

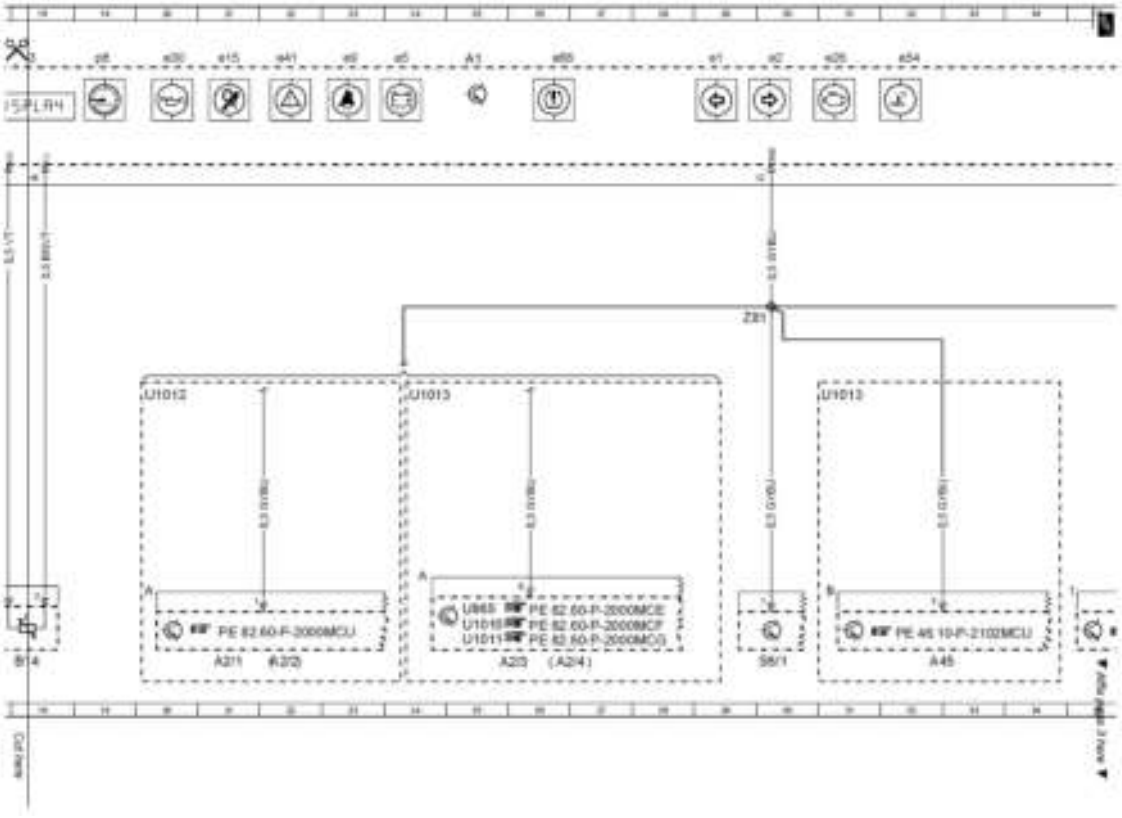


Fig. 90: Large Instrument (Instrument Cluster) - Wiring Diagram (2 Of 3)
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

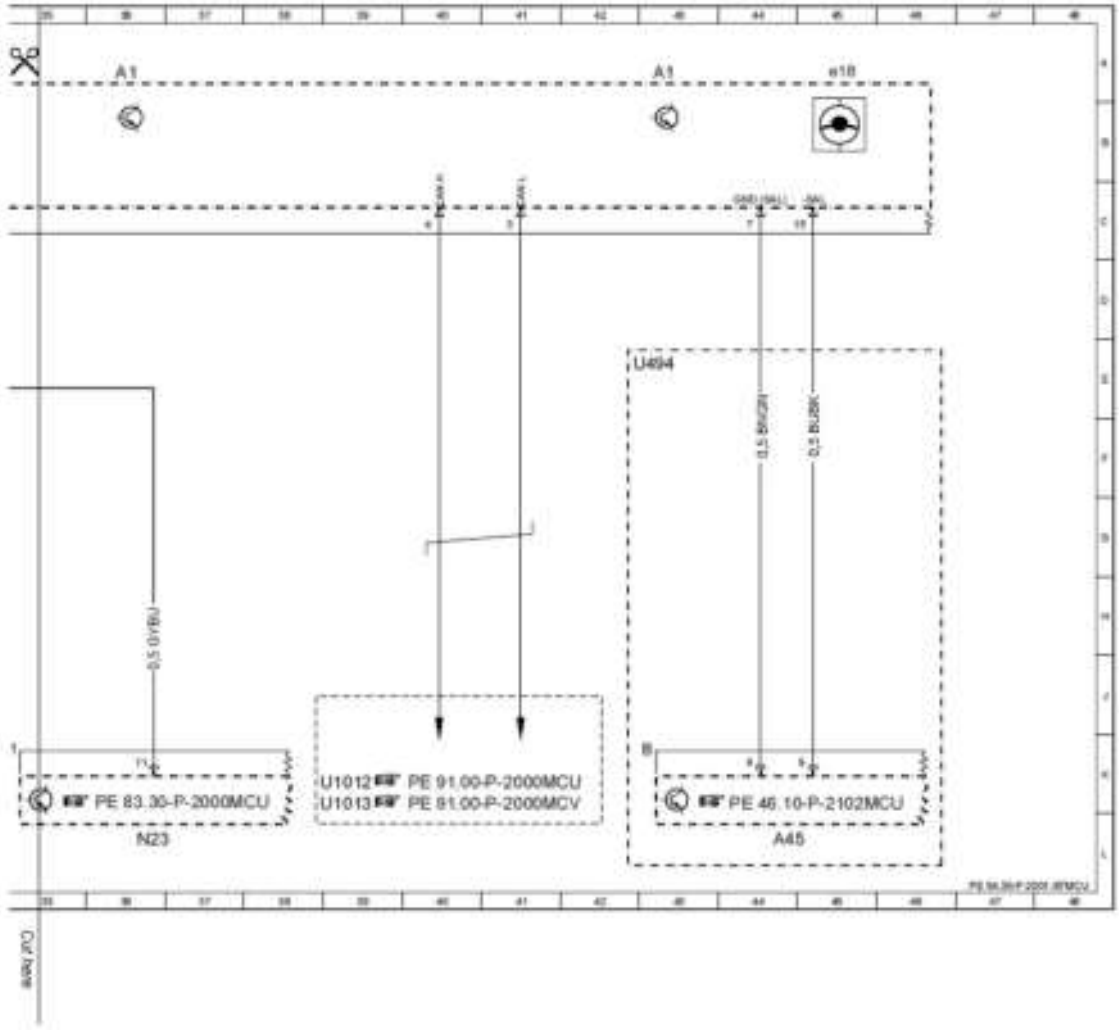


Fig. 91: Large Instrument (Instrument Cluster) - Wiring Diagram (3 Of 3)
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

WIRING DIAGRAM LARGE INSTRUMENT (INSTRUMENT CLUSTER) - PE54.30-P-2001MCU

MODEL 451 / (except 451.391 /391)

Wiring diagram large instrument (instrument cluster)	**PE54.30-P-2001-97MCU**
Use of wiring diagrams	**OV00.01-P-1901-03MCC**
Search aid for all wiring diagram groups	**OV00.01-P-1901MCU**
Abbreviations for wiring diagrams	**OV00.01-P-1001-27MC**
Abbreviations of signal and circuit designations for wiring diagrams	**OV00.01-P-1001-28MC**
Location and assignment of line and plug connectors	**GF00.19-P-1000MCU**
Location and assignment of ground points	**GF00.19-P-2000MCU**
Location and assignment of Z connector sleeves (line connectors in wiring harness)	**GF00.19-P-3000MCU**
Further wiring diagrams	**PE54.00-P-1100MCU**

WIRING DIAGRAM OF AUXILIARY INSTRUMENTS - PE54.30-P-2003-97MCU

Code:	Designation:	Position:
A15	Additional instruments	11A
A15	Additional instruments	6A
A15	Additional instruments	3A
A15p3	Clock	
A15p4	Tachometer	
A15p5	Display	
A15x1	Additional instruments connector	1D
A15x2	Additional instruments connector	10D
A34/7	Bluetooth module	11L
N10/10	SAM control unit	5L
N10/10f12	Fuse 12	2L
U31	Valid on vehicles with Bluetooth with display	9A
U32	Not valid on vehicles with Bluetooth with display	5A
W9	Ground (left front, at lamp unit)	3G
Z45	ATA [EDW] sensor supply circuit 30 connector sleeve	2G
Z78	Cockpit LIN connector sleeve	4G

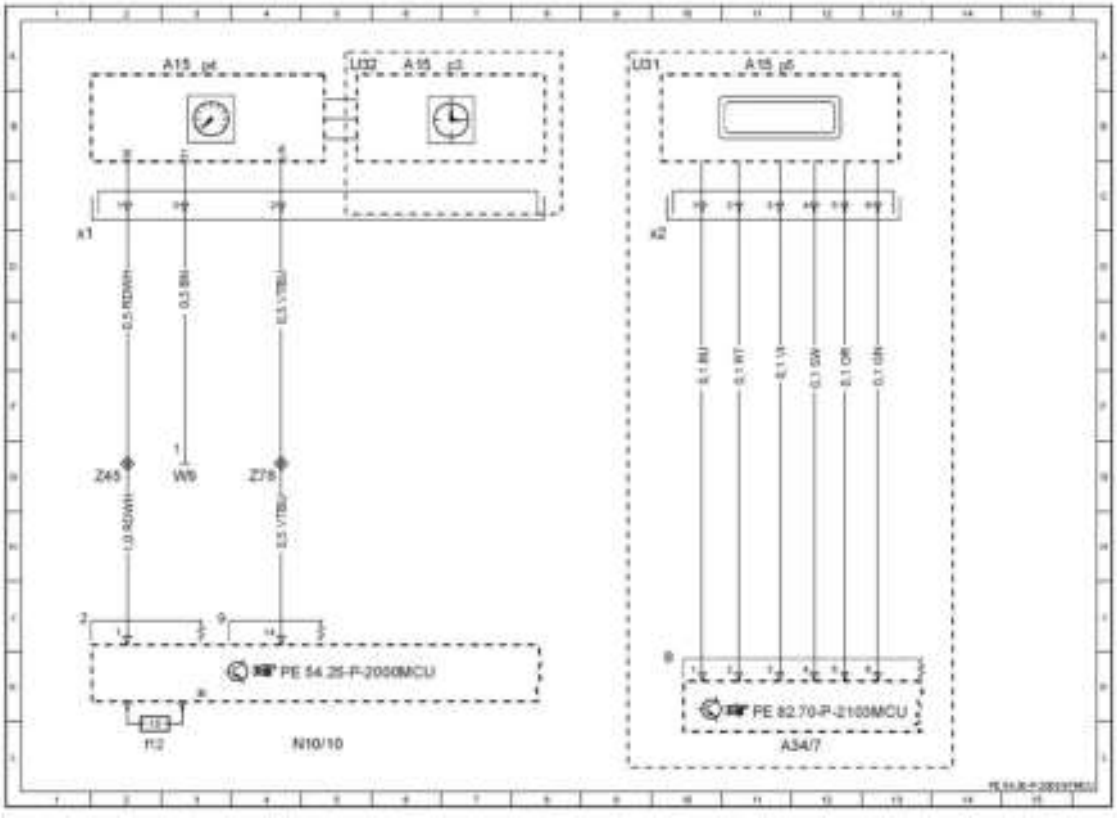


Fig. 92: Auxiliary Instruments - Wiring Diagram
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

WIRING DIAGRAM OF AUXILIARY INSTRUMENTS - PE54.30-P-2003MCU

MODEL 451 / (except 451.391 /491) up to 30.8.10

Wiring diagram of auxiliary instruments	**PE54.30-P-2003-97MCU**
Use of wiring diagrams	**OV00.01-P-1901-03MCC**
Search aid for all wiring diagram groups	**OV00.01-P-1901MCU**
Abbreviations for wiring diagrams	**OV00.01-P-1001-27MC**
Abbreviations of signal and circuit designations for wiring diagrams	**OV00.01-P-1001-28MC**
Location and assignment of line and plug connectors	**GF00.19-P-1000MCU**
Location and assignment of ground points	**GF00.19-P-2000MCU**
Location and assignment of Z connector sleeves (line connectors in wiring harness)	**GF00.19-P-3000MCU**
Further wiring diagrams	**PE54.00-P-1100MCU**

ELECTRICAL FUNCTION DIAGRAM FOR INSTRUMENT CLUSTER (KI) - PE54.30-P-2051MCU

MODEL 451

Electrical function diagram for instrument cluster (KI)	PE54.30-P-2051-99MCU
Legend of function diagram of instrument cluster (KI) electrical system	PE54.30-P-2051-60MCU
Use of wiring diagrams	**OV00.01-P-1901-03MCC**
Search aid for all wiring diagram groups	**OV00.01-P-1901MCU**
Abbreviations for wiring diagrams	**OV00.01-P-1001-27MC**
Abbreviations of signal and circuit designations for wiring diagrams	**OV00.01-P-1001-28MC**
Location and assignment of line and connectors	**GF00.19-P-1000MCU**
Location and assignment of ground points	**GF00.19-P-2000MCU**
Location and assignment of Z connector sleeves (line connectors in wiring harness)	**GF00.19-P-3000MCU**
Further wiring diagrams	**PE07.00-P-1100MCU**
Further wiring diagrams	**PE26.00-P-1100MCU**
Further wiring diagrams	**PE42.00-P-1100MCU**
Further wiring diagrams	**PE54.00-P-1100MCU**
Further wiring diagrams	**PE83.00-P-1100MCU**
Further wiring diagrams	**PE91.00-P-1100MCU**

WIRING DIAGRAM FOR SIGNALING SYSTEM - PE54.35-P-2000MCU

MODEL 451

Wiring diagram for signaling system	PE54.35-P-2000-97MCU
Use of wiring diagrams	**OV00.01-P-1901-03MCC**
Search aid for all wiring diagram groups	**OV00.01-P-1901MCU**
Abbreviations for wiring diagrams	**OV00.01-P-1001-27MC**
Abbreviations of signal and circuit designations for wiring diagrams	**OV00.01-P-1001-28MC**
Location and assignment of line and plug connectors	**GF00.19-P-1000MCU**
Location and assignment of ground points	**GF00.19-P-2000MCU**
Location and assignment of Z connector sleeves (line connectors in wiring harness)	**GF00.19-P-3000MCU**

SPECIAL TOOLS

129 589 00 21 00 126-PIN SOCKET BOX - WS54.00-P-0008B

FG 00/42/54/91 / Set B

MODEL all

Use:

126-pin socket box for contacting electrical systems in combination with model-specific test cable sets.

Fig. 93: Identifying 126-Pin Socket Box (129 589 00 21 00)
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

220 589 00 99 00 ELECTRICAL CONNECTION KIT - WS54.00-P-0050B

FG 00

FG 01/13/15/20/25/42/43/47/54/72/Set B

MODEL all

MODIFICATION NOTES

22.11.04 6.8.07	Replacement for 201 589 00 99 00 Replaced by 220 589 05 99 00	 WS00.00-P-0279Z

Part	220 589 00 99 01 Adapter line		WS54.00-P-0050-01B
Part	220 589 00 99 02 Adapter line		WS54.00-P-0050-02B
Part	220 589 00 99 03 Adapter line		WS54.00-P-0050-03B

Part	220 589 00 99 04 Adapter line		WS54.00-P-0050-04B
Part	220 589 00 99 05 Adapter line		WS54.00-P-0050-05B
Part	220 589 00 99 06 Adapter line		WS54.00-P-0050-06B
Part	220 589 00 99 07 Adapter line	FG 25/42/43/54/Set B	WS54.00-P-0050-07B
Part	220 589 00 99 08 Adapter line		WS54.00-P-0050-08B
Part	220 589 00 99 09 Adapter line		WS54.00-P-0050-09B
Part	220 589 00 99 10 Adapter line		WS54.00-P-0050-10B
Part	220 589 00 99 11 Adapter line		WS54.00-P-0050-11B
Part	220 589 00 99 12 Adapter line		WS54.00-P-0050-12B
Part	220 589 00 99 13 Adapter line		WS54.00-P-0050-13B
Part	220 589 00 99 20 Test cable	FG 25/42/43/54/Set B	WS54.00-P-0050-14B
Part	220 589 00 99 21 Alligator clip		WS54.00-P-0050-15B
Part	220 589 00 99 22 Safety clamp	FG 25/42/43/54/Set B	WS54.00-P-0050-16B
Part	220 589 00 99 23 Clamp test probe		WS54.00-P-0050-17B
Part	220 589 00 99 24 Connector		WS54.00-P-0050-18B
Part	220 589 00 99 25 Empty case	FG54/Set B	WS54.00-P-0050-26B
Part	220 589 00 99 30 Adapter cable		WS54.00-P-0050-19B
Part	220 589 00 99 31 Adapter cable		WS54.00-P-0050-20B
Part	220 589 00 99 33 Safety cable		WS54.00-P-0050-22B
	140 589 12 21 00 Baseline current draw test adapter 1		WS54.00-P-0015B
	140 589 13 21 00 Quiescent current test adapter 2		WS54.00-P-0016B
	000 581 06 54 Pliers		
	Further use	FG 42/Set B	WS42.00-N-3062B
	Further use	FG 43/Set B	WS43.00-N-3053B

Use:

Electrical connection kit for contacting during voltage/current/resistance measurements and for connection of the compression tester.

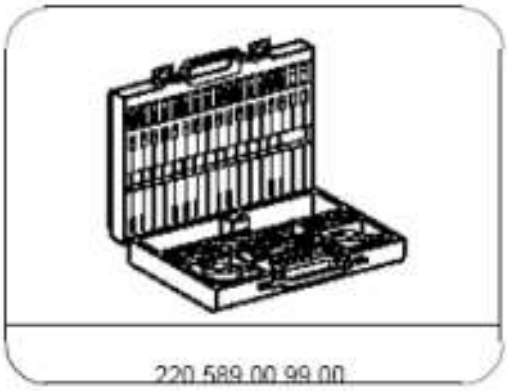


Fig. 94: Identifying Electrical Connection Kit (220 589 00 99 00)
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

450 589 01 63 00 HOT AIR BLOWER - WS54.00-P-0062B

FG 54/Set B

MODEL 450, 451, 452, 454

Use:

Hot air blower for soldering cable connection at solder connectors.

NOTE: Hot air blower
Smart No. 0005029.

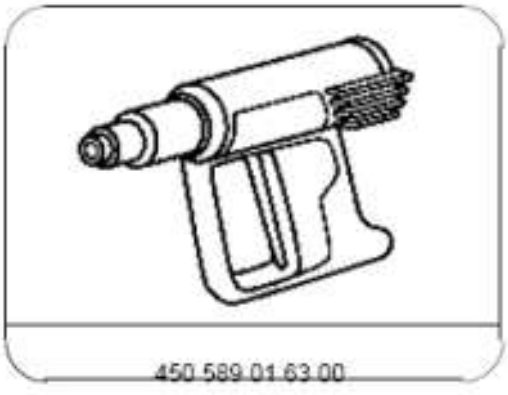


Fig. 95: Identifying Hot Air Blower (450 589 01 63 00)
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

450 589 04 63 01 MEASURING RESISTOR - WS54.00-P-0064-01B

FG54/Set B

MODEL 450, 451, 452

Use:

Precision resistor for fault limitation with e.g faulty lines, control units or triggering components e.g. a simulation of a sidebag.

NOTE: Separate part for 450 589 04 63 00

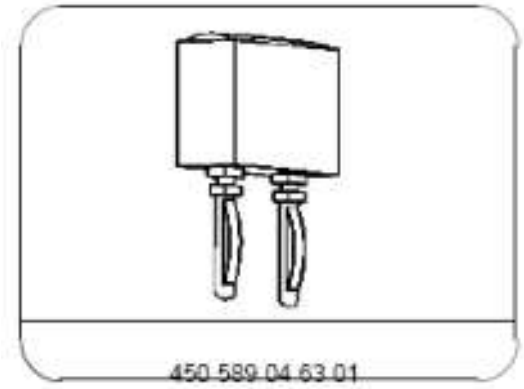


Fig. 96: Identifying Measuring Resistor (450 589 04 63 01)
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

450 589 04 63 02 PROBE - WS54.00-P-0064-02B

FG54/Set B

MODEL 450, 451, 452

Use:

Probe for contacting measuring points.

NOTE: Separate part for 450 589 04 63 00

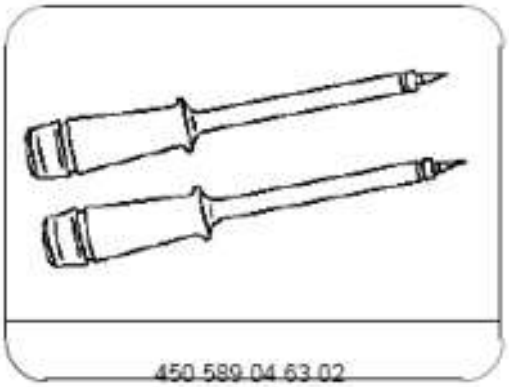


Fig. 97: Identifying Probe (450 589 04 63 02)
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

450 589 04 63 00 CABLE SET WITH DIAGNOSIS CASE - WS54.00-P-0064B

FG 54/Set B

MODEL 450, 451, 452

Part	450 589 04 63 01 Measuring resistor	FG54/Set B	**WS54.00-P-0064-01B**
Part	450 589 04 63 02 Probe	FG54/Set B	**WS54.00-P-0064-02B**

Use:

Cable set with diagnosis case for contacting measuring instruments and design of measuring circuits, including decade resistor.

NOTE: Cable set with diagnosis case incl. decade resistor Smart No. 0005111.

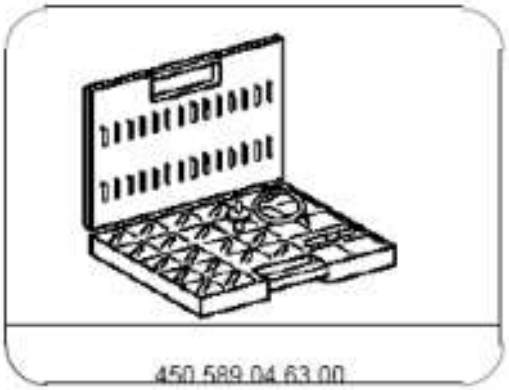


Fig. 98: Identifying Cable Set With Diagnosis Case (450 589 04 63 00)
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

450 589 15 21 00 BATTERY TESTER - WS54.00-P-0066A

FG 54/Set A

MODEL 450, 451, 452, 454

Use:

Battery tester for checking battery voltage.

NOTE: Battery tester Smart no. 0006967.

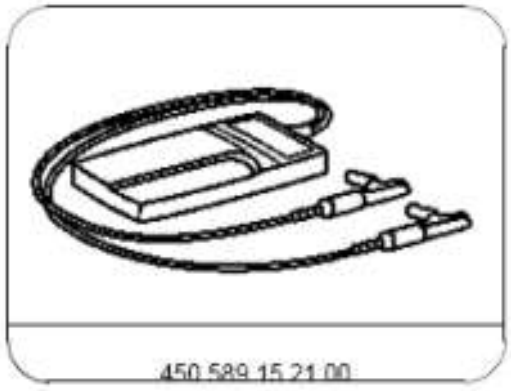


Fig. 99: Identifying Battery Tester (450 589 15 21 00)
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

169 589 00 37 00 PLIERS - WS54.00-P-0073B

FG 54/Set B

MODEL 163, 164, 168, 169, 170, 171, 172, 197, 203, 204, 207, 208, 209, 210, 211, 212, 216, 218, 219, 221, 230, 245, 251, 451

Use:

Pliers for removing 12V sockets and cigar lighters with an SAE standard

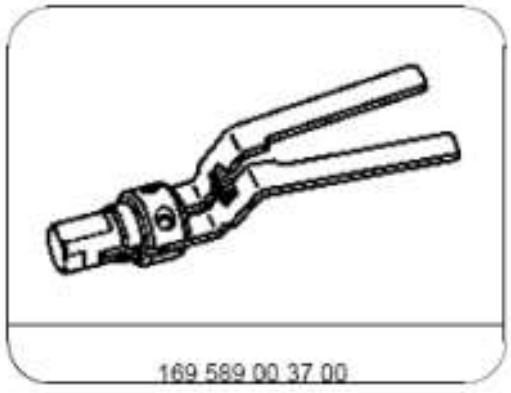


Fig. 100: Identifying Pliers (169 589 00 37 00)
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

SPECIAL TOOLS: SMART: ELECTRICAL SYSTEM, EQUIPMENT AND INSTRUMENTS - WS54.00-Z-9999CZ

MODEL all

000 589 13 99 00 Wiring harness repair kit, basic	FG 00 FG 14/46/47/54/82/83/ Set B	**WS00.19-P-0007B**
000 589 13 99 10 MCP 2.8 ELA crimping set	FG00/54/Set B	**WS00.19-P-0007-10B**
000 589 13 99 30 MCP 2.8 / Fl. blade 2.8 / JPT / SPT	FG00/54/83/Set B	**WS00.19-P-0007-30B**
001 589 01 91 00 Set of protective covers	FG 01/08/09/14/15/ 54/83/ Set B	**WS01.00-P-0111B**
110 589 03 59 00 Mounting wedge	FG 00/01/05/13/18/ 26/54/67/68/72/77/80/82/83/88/91/ Set K	**WS00.00-P-0274K**
129 589 00 21 00 126-pin socket box	FG 00/42/54/91 / Set B	**WS54.00-P-0008B**
156 589 00 31 00 Guide pins	FG 54/Set B	WS54.00-P-0081B
169 589 00 37 00 Pliers	FG 54/Set B	**WS54.00-P-0073B**
220 589 00 99 00 Electrical connection kit	FG 00 FG 01/13/15/20/25/42/ 43/47/54/72/ Set B	**WS54.00-P-0050B**
220 589 01 99 05 JPT crimping set	FG 00/54/83/Set B	**WS00.19-P-0001-05B**
220 589 01 99 10 Crimp pliers	FG 00/14/54/83/Set B	**WS00.19-P-0001-09B**
220 589 01 99 20 Unlocking device with RK 1.5 ejector	FG00/54/Set B	**WS00.19-P-0001-18B**
220 589 01 99 30 Unlocking device with RK 2.5 ejector	FG00/14/54/Set B	**WS00.19-P-0001-20B**
220 589 01 99 40 Wire stripper	FG 00/54/83/Set B	**WS00.19-P-0001-22B**
220 589 01 99 41 Reflector	FG 00/54/83/Set B	**WS00.19-P-0001-23B**
220 589 01 99 42 Adapter	FG 00/54/83/Set B	**WS00.19-P-0001-24B**
220 589 01 99 50 Blade holder with clamping pliers	FG00/14/54/83/Set B	**WS00.19-P-0001-25B**
220 589 01 99 60 MQS blade	FG00/54/Set B	**WS00.19-P-0001-35B**
220 589 01 99 82 JPT ELA crimp set	FG00/54/Set B	**WS00.19-P-0002-08B**
220 589 01 99 85 MQS crimping set	FG00/54/Set B	**WS00.19-P-0002-11B**
220 589 01 99 86 MQS ELA crimping set	FG00/54/Set B	**WS00.19-P-0002-12B**
220 589 02 99 00 Wiring harness repair kit	FG 00 FG 54/83/Set B	**WS00.19-P-0002B**

220 589 04 99 00 New passenger car wiring harness repair kit	FG 00 FG 46/47/54/82/83/Set B	**WS00.19-P-0006B**
450 589 00 63 00 Press-out pin	FG 54/Set B	WS54.00-P-0060B
450 589 01 63 00 Hot air blower	FG 54/Set B	**WS54.00-P-0062B**
450 589 04 63 00 Cable set with diagnosis case	FG 54/Set B	**WS54.00-P-0064B**
450 589 04 63 01 Measuring resistor	FG54/Set B	**WS54.00-P-0064-01B**
450 589 04 63 02 Probe	FG54/Set B	**WS54.00-P-0064-02B**
450 589 04 99 00 Cable repair set	FG 54/Set B	WS54.00-P-0063B
450 589 05 37 00 Pliers	FG 54/Set B	WS54.00-P-0061B
450 589 07 21 07 Adapter	FG 01/20/54/Set B	WS01.00-P-0074-07B
450 589 12 63 00 Measuring instrument/tester	FG 54/Set B	WS54.00-P-0065B
450 589 15 21 00 Battery tester	FG 54/Set A	**WS54.00-P-0066A**
450 589 19 21 00 Pin socket box 126-pin	FG 54/Set B	WS54.00-P-0071B
452 589 02 99 00 Wiring harness repair kit	FG 00/54/77/83/ Set B	**WS00.00-P-0243B**
452 589 02 99 01 Crimper 0.35 - 1.0	FG00/54/Set B	**WS00.00-P-0243-01B**
452 589 02 99 02 Crimper 1.5 - 2.5	FG00/54/Set B	**WS00.00-P-0243-02B**
452 589 02 99 03 Crimper 4.0 - 6.0	FG00/54/Set B	**WS00.00-P-0243-03B**
452 589 02 99 04 Wire stripper	FG00/54/Set B	**WS00.00-P-0243-04B**
452 589 02 99 05 Box with connectors 0.35 - 1.0	FG00/54/Set B	**WS00.00-P-0243-05B**
452 589 02 99 06 Box with connectors 1.5 - 2.5	FG00/54/Set B	**WS00.00-P-0243-06B**
452 589 02 99 07 Box with connectors 4.0 - 6.0	FG00/54/Set B	**WS00.00-P-0243-07B**
452 589 02 99 08 Small box with heat-shrinkable tubes 5.75 mm	FG00/54/Set B	**WS00.00-P-0243-08B**
930 589 00 99 00 Supplemental truck wiring harness repair kit	FG 00/14/54/67 / Set B	**WS00.19-N-0004B**
930 589 00 99 07 MCP 6.3 crimp set	FG 00/54/67/Set B	**WS00.19-N-0004-13B**
930 589 00 99 08 MCP 6.3 crimp set	FG 00/54/67/Set B	**WS00.19-N-0004-14B**
930 589 00 99 25 MCP 6.3 positioner	FG00/54/67/Set B	**WS00.19-N-0004-15B**
930 589 00 99 26 MCP 6.3 positioner	FG00/54/67/Set B	**WS00.19-N-0004-16B**