

6. Electrics/Electronics

6.1. General Information

Warning

Work incorrectly carried out on equipment and its software could prevent this equipment from working correctly. Since the electronic systems are networked, this might also affect systems that have not been modified.

Malfunctions in the electronic systems could seriously jeopardize the operating safety of the vehicle.

Service or modifications at electronic components must be carried out by a qualified special workshop having the necessary specialist knowledge and tools to carry out the work required.

We recommend that you use an authorized Mercedes-Benz SPRINTER or Freightliner SPRINTER Service Center for this purpose. In particular, work on systems relevant to safety must be carried out at a qualified specialist workshop. Some of the safety systems only function when the engine is running. For this reason, do not switch off the engine when the vehicle is in motion because it may cause an accident with serious injury or death.

A positive total charge balance must be ensured when additional electrical components are installed.

Do not release or remove the battery terminals when the engine is running.

Rapid-charge batteries only after disconnecting them from the vehicle's system. Both the positive and negative terminals must be disconnected.

- Electrical and electronic components must fulfill the test requirements of ISO 16750.
- Observe the directives in (→ chapter [6.3](#)) when installing additional batteries.
- Cables routed in the vicinity of exhaust systems must be insulated against high temperatures (→ chapter [7.3.2](#)).
- Cables must be routed in such a way that there are no chafing points.
- The batteries must be disconnected if the vehicle is not in use for extended periods (more than 20 days). The batteries must have sufficient charge when the vehicle is put into operation again (→ chapter [6.3](#)).
- Observe the Owner's Manual

You can obtain more information from SEC (→chapter [2.7](#)).

6.2. Electromagnetic compatibility (EMC)

Electromagnetic compatibility describes the ability of an electrical system to act neutrally in the vicinity of other systems when operating at full function. It does not interfere with any of the active systems in the vicinity, nor does it suffer any interference.

Electromagnetical Interference EMI occur in the vehicle electrical circuits because of the various incompatible components. At Daimler AG, electronic components installed at the factory are checked for their electromagnetic compatibility in the vehicle. If subsequent modifications are made, this may cause discomfort in some cases. (e.g. radio noise).

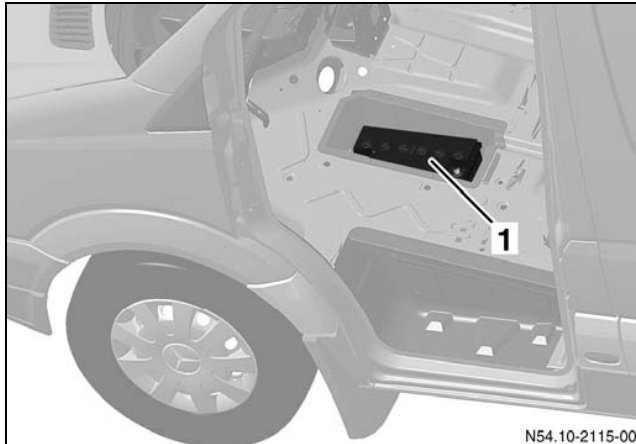
When retrofitting electric or electronic systems, they must be tested for electromagnetic compatibility and this must be documented. The equipment must possess type approval.

The following standards provide information on this:

- CISPR 12
- CISPR 25
- ISO 7637
- ISO 10605
- ISO 11451
- ISO 11452
- MBN10284
- EC Directive 72/245/EEC
- ECE-R 10

6.3. Battery

The main battery is located in the floor on the left-hand side, in front of the driver's seat.



Location of the main battery

A 25 AMP current draw requires the use of the reinforced battery (Option E28). An auxiliary battery must be used for more than 25 AMP current draw.

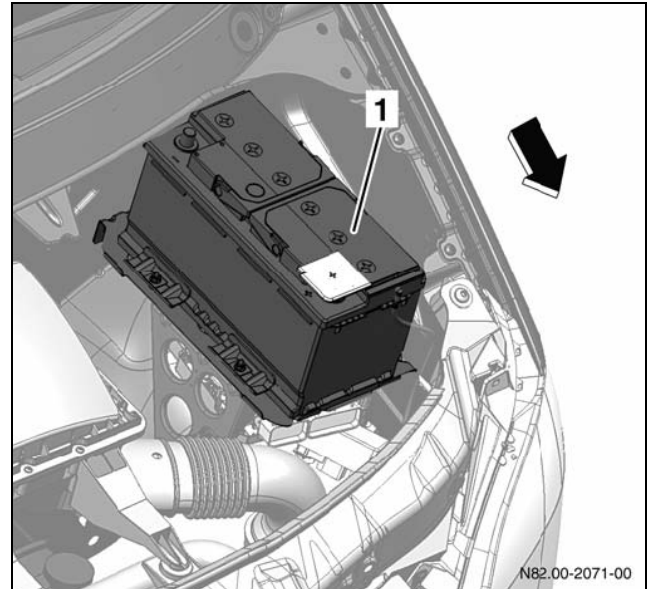
6.3.1. Retrofitting a battery isolating switch

You can obtain more information about optional equipment from your Mercedes Benz SPRINTER & Freightliner SPRINTER Service Center, SES (→chapter 2.7) or in the "Optional equipment" section (→ chapter 3.9).

6.3.2. Retrofitting an additional battery

Do not connect Batteries with a capacity over 100 Ah directly to the vehicle's electrical system due to potential damage to the basic vehicle.

We recommend the use of lead-antimony batteries fitted in the location provided in the engine compartment.



Location of the auxiliary battery

1 Auxiliary battery
Arrow Front of vehicle

If the auxiliary battery is located in the passenger compartment, battery gases must be vented to the outside via a central vent hose.

The auxiliary battery must only be fitted in conjunction with a cut-off relay and fuses suitable for the charge current.

The auxiliary battery may only be used to power auxiliary components such as the auxiliary heating, loading aids or electrical equipment in motor caravans (fridge, etc.).

If the vehicle is already equipped with an auxiliary battery, it not permitted to connect any more auxiliary batteries in parallel.

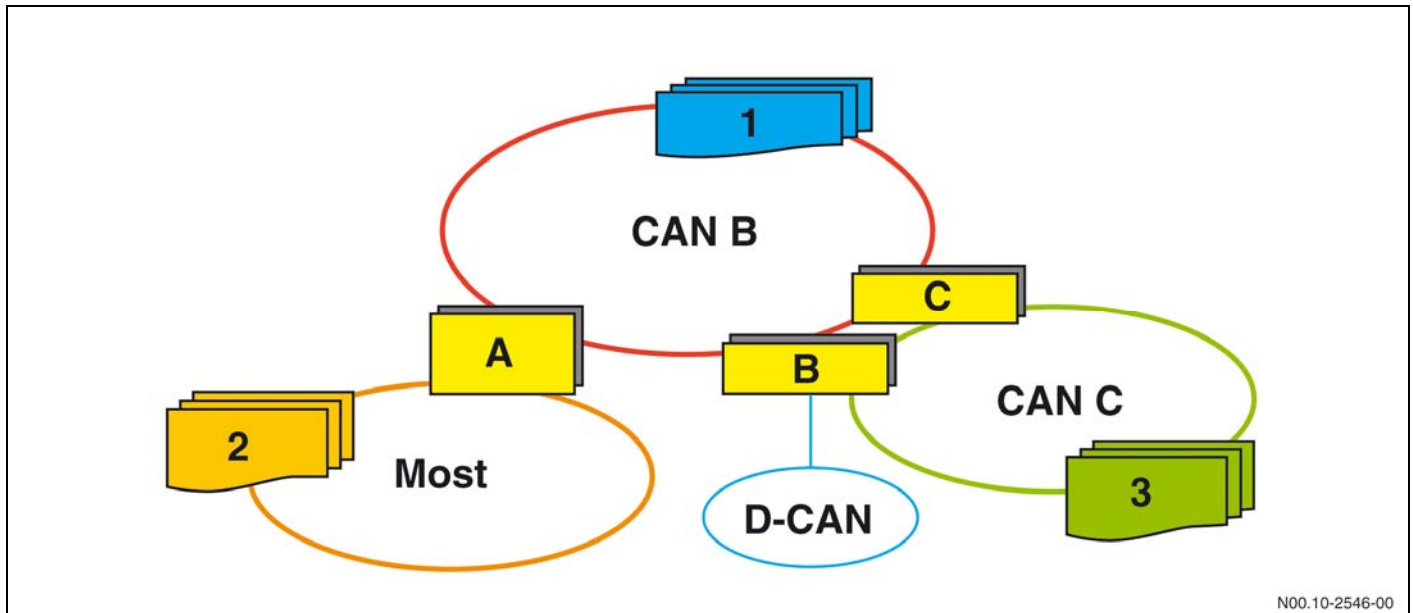
6.3.3. Battery maintenance and storage

Batteries must be checked regularly for voltage loss (self- discharge) even when removed. Only the electrolyte level check is not required with low-maintenance batteries.

You will find information on battery maintenance and storage in the "Planning of bodies" section (→ chapter 3).

6.4. Interfaces

6.4.1. CAN bus and networking



1	2	3
I-CAN = interior CAN (CAN B, 83.333 kBit/s)	MST = optical bus	M-CAN = engine CAN (CAN C, 500 kBit/s) D-CAN = diagnostics CAN (500 kBit/s)
Tire pressure monitor ¹ Electronic restraint system Overhead control panel ¹ Signal acquisition and actuation module Door control unit Fuel-fired heater booster ¹ Upper control panel Trailer control unit ¹ Park-tronic ¹ Programmable special module ¹ Air-conditioning control ¹ PTC heater booster ¹ Auxiliary heating, water ¹	CD changer ¹ Telephone ¹	Brake system Jacket tube module Electronic selector lever module ¹ Transmission selector lever Module ¹ Transmission control unit ¹ Engine control unit Sensor cluster Ax/Ay/wz Diagnostic interface Reduction control unit ¹

- ¹ Optional equipment
- A Head unit/radio, interface between I-CAN and MOST
- B Electronic ignition switch, interface between I-CAN and M-CAN
- C Instrument cluster, interface between I-CAN and M-CAN

Warning

As all components are networked and internally monitored. Do not connect to or modify components on the CAN bus (e.g. breaking, extending, or tapping). Any modifications to the length, cross-section or resistance of the wiring harness can lead to failure of safety-relevant components or to impaired comfort and may cause serious injury or death.

Internal and external vehicle diagnosis can be carried out by means of the OBD diagnostic socket (SAE 1962). All control units are capable of self-diagnosis and have an internal malfunction memory.

Communication with the relevant control unit can be established using the MB STAR DIAGNOSIS and the software developed for this unit.

You can obtain more information from an authorized SPRINTER Service Center or SEC.

6.4.2. Electric wiring/fuses

If the routing has to be altered, avoid routing across sharp edges and through narrow cavities or near moving components.

Only lead-free PVC-sheathed cables with an insulation limit temperature of > 105 °C [221°F] may be used. Connections must be made by qualified personnel.

The electrical wire harness must be dimensioned according to the expected current drawn and protected with fuses.

Please use the following table as reference with an insulating limit temperature of > 105 °C [221°F].

Max. permanent current intensity (A)	Fuse rating (A)	Conductor cross-section (mm ²)
0 - 4.9	5 ¹	0.5
5 - 9.9	10 ¹	1
10 - 18	20 ¹	2.5
19 - 28	30 ¹	4
29 - 35	40 ²	6
36 - 48	50 ²	10
49 - 69	70 ²	16
70 - 98	100	25
99 - 123	125	35
124 - 148	150	50

¹ Shape C; DIN 72581 blade connector

² Shape E; DIN 72581 blade connector

6.4.3. Additional power circuits

If additional power circuits are installed, they must be protected against the main power circuit by fuses of adequate rating. The dimensions of the wiring used must be adequate for the load and the wiring must be protected against the effects of tear, impact and heat.

6.4.4. Control Switches

There are a total of eight switch locations available for additional special purpose bodies and equipment.

6.4.5. Retrofitting electrical equipment

Please observe the following if auxiliary electrical components are retrofitted:

- Alternators with LIN technology approved by Daimler AG must be used for high current draw requirements.
- Do not connect additional alternators to the onboard network.
- Do not connect additional components to fuses already assigned
- Do not connect additional wires (e.g. with insulation piercing devices) to existing wires.
- Provide components with adequate protection by means of additional fuses.

All equipment fitted must be tested in accordance with Electromagnetic Compatibility. Additional electrical components must be connected using the aux electrical connector (EK1) available from the factory as described in the "Power supply" section.

If the vehicle's electrics/electronics are modified or additional equipment is installed incorrectly, this may impair operating safety, cause damage to the vehicle's electrical system or the complete vehicle, and invalidate the vehicle's warranty/certification.

6.4.6. Retrofitting an alternator

If additional electrical components are retrofitted, the increased power requirement can be met by fitting an auxiliary alternator.

As of MY 2010 all Mercedes-Benz and Freightliner Sprinters are delivered with a 220 AMP alternator

Alternator:	U (V)	I (A)
Standard	14.3	220

If additional equipment is fitted, factory-fitted power take-offs must be used (→ chapter 7.5.3).

For retrofitting one additional alternator, we recommend option N62 from the factory as optional equipment.

The following points must be observed if you intend to have other alternators retrofitted:

- Do not install an aux alternator that can impair vehicle parts or their function.
- The battery must have sufficient capacity and the alternator must generate sufficient power.
- The alternator circuit must be provided with additional fuse protection.
- The additional pulley, option N62, is available from the factory as optional equipment for driving aux alternators.
- Electrical lines must be routed correctly (→ chapter 7.3.5)
- There must be no impairment of the accessibility or easy maintenance of installed equipment.
- There must be no impairment of the required engine air supply and cooling (→ chapter 7.3.3).
- The guidelines of the equipment manufacturer for compatibility with the basic vehicle must be observed.
- The operating instructions and the maintenance manual for the additional equipment must be supplied on handing over the vehicle.

A new generation of regulator is used in the new SPRINTER. The alternator regulator is equipped with a LIN (Local Interface Network) interface.

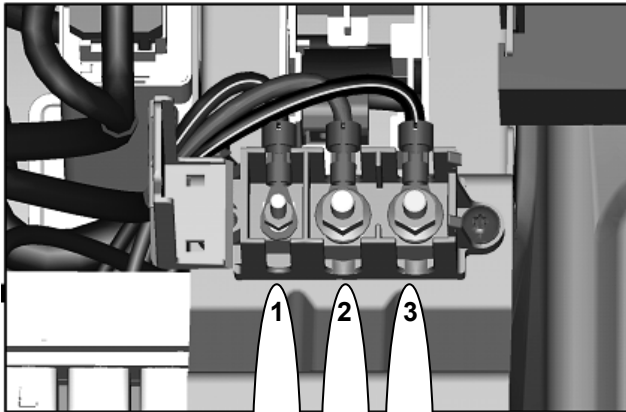
The characteristics of the LIN alternators are fixed in the engine control unit – for this reason the **OEM alternator can not be replaced by an aftermarket alternator.**

The standard equipment for the SPRINTER is 220A.

No D+ (engine running positive signal) output available at alternator with LIN Bus technology, only at Bodybuilder socket EK1 under driver seat.

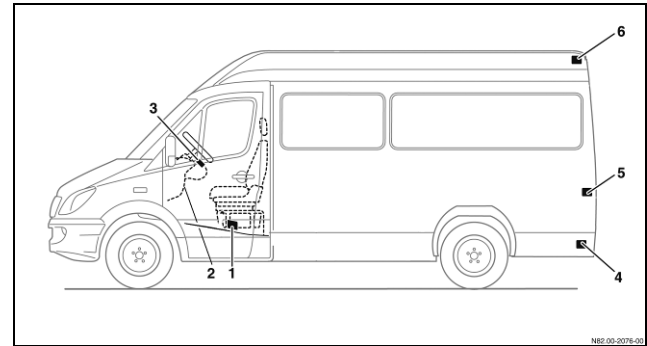
6.4.7. Power supply

Additional electrical components must be connected using an auxiliary electrical connector (EK1) standard from the factory. The electrical connector is installed inside the driver's seat base (at the front, on the left-hand side of the vehicle) and has three terminals:



Terminal	V	A	wire color
1 st power with engine running	12V	10A	blue/yellow
2 nd battery direct power	12V	15A	red/gray
3 rd ignition power	12V	15A	black/yellow

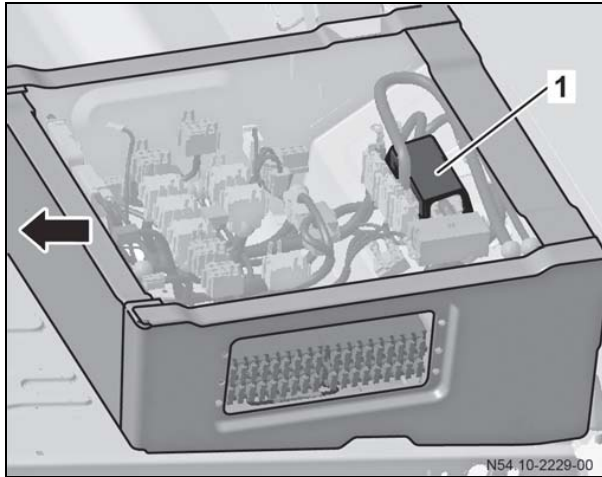
When installing electrical aftermarket equipment with an AMP draw of more than 25A it is necessary to use the optional aux battery 12V/100Ah (CODE E28).



#	Option	Description
1	EK1	Auxiliary electrical connector (standard)
2	E46	12 V socket in instrument panel (max. 15 A) (standard)
3	L72	Connector for body int. lights (Chassis Cab only)
4	V08 / E58	Electrics for trailer power socket
5	L76	Extended tail lamp wiring harness (Chassis Cab only)
5	L77	AUX 12 V Plug Rear Comp (Van only)
6	LB2	Additional electrical equipment

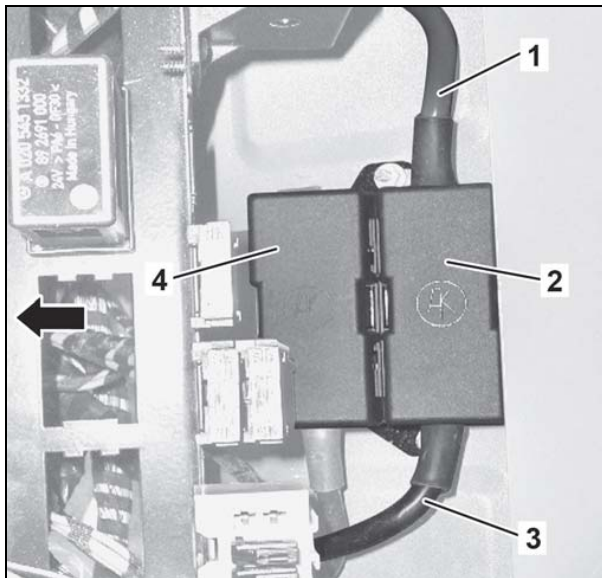
6.4.8. Power supply Aux Battery

If a factory supplied auxiliary battery (option E28) is fitted a connector terminal is already fitted inside the driver seat. When using this terminal, no necessary wire routing from the aux battery is required.



Driver seat pedestal

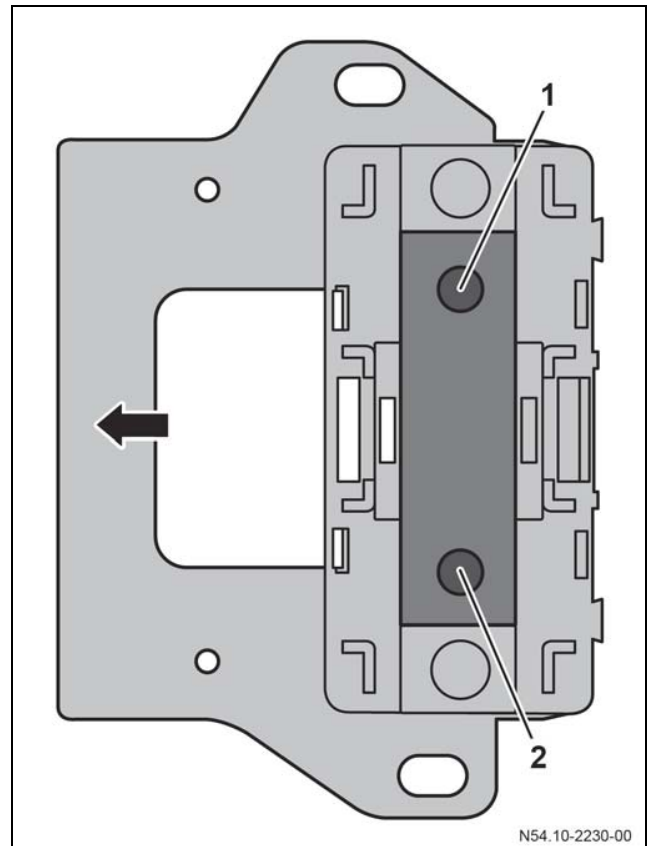
1	connector terminal
Arrow	driving direction



Example fuse box layout

1	wire from cut-off relay
2	Fuse box
3	wire to aux battery
4	additional fuse box (option EV3 only)
Arrow	driving direction

Fuse box ex factory with aux battery (E28)

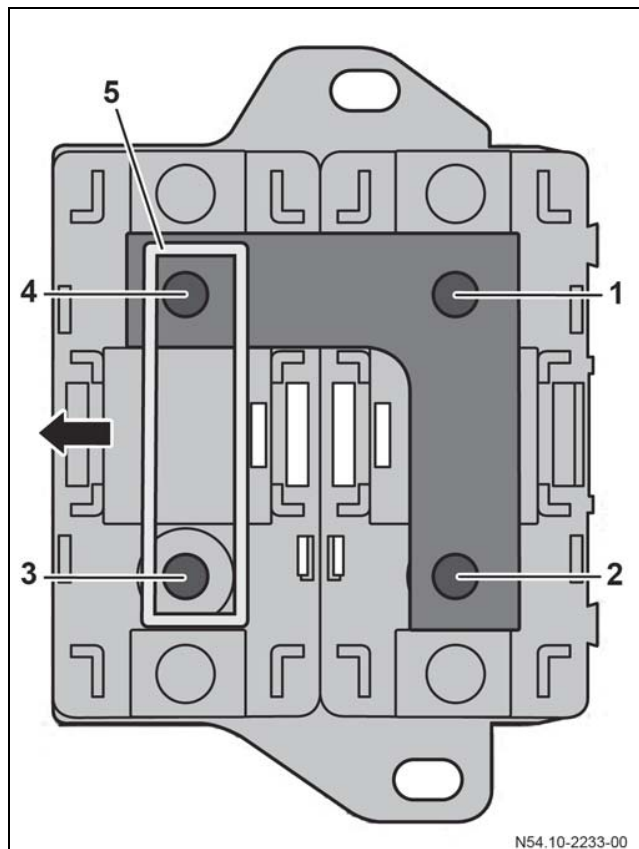


Fuse box (opened)

1	wire from cut off relay
2	12V take off from aux battery
Arrow	driving direction

Tail gate lift pre-wire lay out (option EV3)

Only if a Chassis Cab is ordered with tail gate lift pre-wiring (option EV3) the fuse box lay out is as follow:



2nd fuse box with tail gate lift pre-wire (EV3)

1	wire from cut-off relay
2	wire to aux battery (12V take off)
3	connection
4	additional fuse box (optional)
5	fuse 120A
Arrow	driving direction

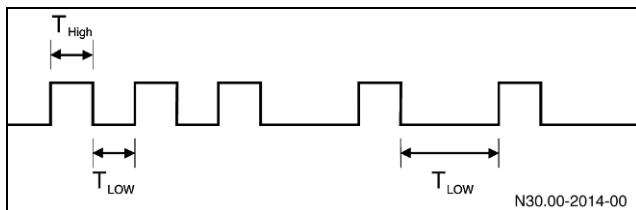
6.4.9. Speed Signal

The "Highline" and "Lowline" instrument clusters output an electronic speed signal at pin 9 of the instrument cluster connector.

The speed signal (positive to ground) acts as a distance and speed signal for external electronics, e.g. taximeters or speed-dependent volume controllers.

The signal is protected against short-circuit to ground and battery voltage and is not monitored. The signal is output at 4 pulses per meter. The pulse width is 4 ms.

At 112.5 km/h [70 miles/h], the pulse duration is the same as the pulse pause. This 1:1 ratio is maintained for higher speeds. This means that, at higher speeds, the pulse length and the pause length become shorter at the same time.



Ratio of pulse duration/pulse pause

Speed signal ($I_{\max} = 20 \text{ mA}$):

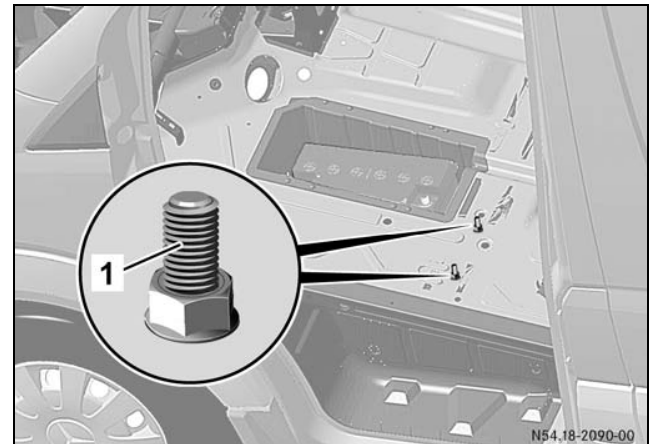
T_{high}	$U_a \geq 8 \text{ V}$
T_{low}	$U_a \leq 1 \text{ V}$

6.4.10. Ground Connections

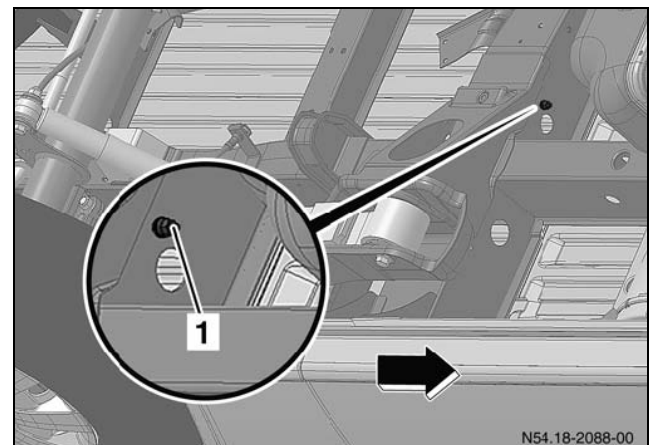
The ground bolts provided by the OEM for retrofitting electrical attachments or installations must be used to ensure the optimum ground connection with the basic vehicle. There are two M6 ground bolts in the seat base of the co-driver's seat; there is a further M6 ground bolt on the underside of the vehicle on the cross member to the front of the rear axle.

- No more than 4 cable connectors may be screwed onto one ground bolt.
- The nuts must be tightened to a torque of 6 Nm / [4.4lft-lbs]
- The use of any other ground bolts may lead to malfunctions in safety systems.
- The ground bolts of the safety systems must not be used for bodies.

For other requirements, please consult with SEC (→ chapter 2.7)



Cab ground connection (inside driver's seat base)
1 ground bolt connection



Frame ground connection in front of rear axle (8550 GVWR)

1 Ground bolt connection
Arrow Front of vehicle

6.5. Lighting

6.5.1. Adjusting the Headlamps

The headlamp basic setting must be observed (see vehicle identification plate). Only check the headlamp setting with the vehicle unloaded (ready to drive—full tank and with the driver or 165 lbs load).

- Park the vehicle on a level, horizontal surface.
- Align the headlamp beam adjuster and the vehicle perpendicular to each other.
- Correct the tire pressures (refer to the tire pressure table).
- Switch on the headlamps.
- Check each headlamp separately; when doing so, cover the other headlamp and lights.

The light-dark boundary of the low-beam headlamp at a distance of 10 m [32.8ft] can be calculated from the height of the headlamp (center of headlamp to ground) minus the specified headlamp basic setting.

Bi-xenon headlamp basic setting

The basic setting on vehicles with bi-xenon headlamps must be adjusted by an authorized SPRINTER Dealer using MB STAR DIAGNOSIS tool.

Headlamp basic setting:

1% = 10 cm, 1.5% = 15 cm, 2% = 20 cm
[1% = 3.9 in, 1.5% = 5.9 in, 2% = 7.9 in]

Warning

There is a risk of fatal injuries from the high voltage in the xenon headlamps. Do not touch any components under high voltage which may cause serious injury or death.

On no account may persons with electronic implants (e.g. pacemakers) carry out any work on xenon headlamps which may cause serious injury or death.

6.5.2. Tail lamps

Observe FMVSS/CMVSS standards.

The following optional equipment is available from the factory as option codes to carry out retrofitted modifications to the vehicle tail lamps.

Option	description	Description/function
L90	Omission of tail lamps	Possible to retrofit other lamps and turn signals; the connectors and wiring harness are retained
L76	Tail lamp wiring	The lengthened tail lamp wiring harness approx. 2m [6 ft]) acts as provision for retrofitting tail lamps in a different location
L77	Additional electrical equipment for turn signal lamps	On Chassis Cab the additional wiring at the vehicle rear end is provided for additional turn signal lamps on the body.

6.5.3. Marker Lamps

Vehicle clearance lamps/identification lamps

Clearance lamps increase passive safety and are required by law on vehicles with a width of 80 inches and wider. The 5 clearance lamps/identification lamps are standard equipment.

6.5.4. Exterior lamps

In order to ensure that the standard bulb failure monitor functions correctly, only bulbs of the same type and same output rating as standard bulbs may be installed.

On Chassis Cab starting MY2009 the lamp out feature is disabled.

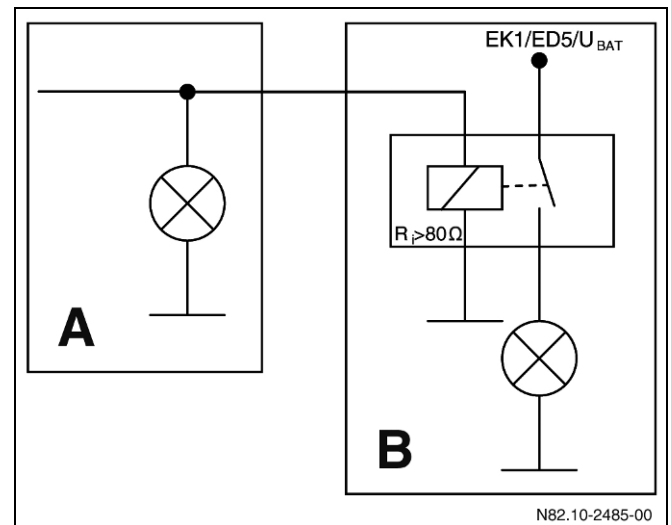
Lamp monitoring

The signal acquisition and actuation module (SAM) monitors all outputs for open load (wire break) and short circuit. If a lamp is not connected or is overloaded, a fault entry is stored in the memory of the SAM control unit.

The fault entry must be addressed by an authorized Mercedes Benz SPRINTER & Freightliner SPRINTER service dealer with a MB STAR DIAGNOSIS.

Additional Lamps

Additional lamps must be connected via the PSM or a separate cubic relay. A standard cubic relay ($R_i > 80 \text{ Ohms}$) can optionally be connected in parallel with the exterior lamps (with the exception of the third brake lamp, turn signals, license plate illumination side markers and perimeter lamps). This will not have any negative effect on lamp monitoring.



Connection of an additional lamp

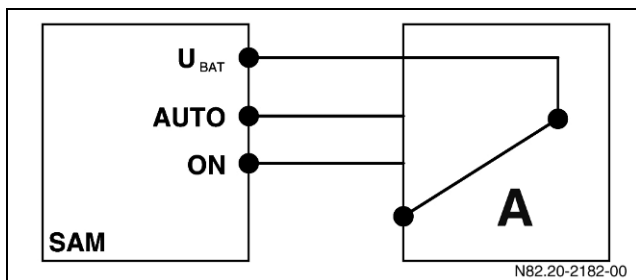
- A Scope of the basic vehicle
- B Scope of the body builder

A warning buzzer can be optionally connected in parallel with the reversing lamps. The current rating of the warning buzzer must be no more than 300 mA. We recommend the use of a warning buzzer with piezo technology.

The third brake lamp is an LED with a rating of approximately 1.8 W and cannot be replaced by an incandescent bulb.

6.5.5. Interior Lamps

All interior lamps can be replaced by other body-manufacturer-specific lamps. The interior lamps are operated via read-back switches networked by the SAM (signal acquisition and actuation module). Monitoring is only carried out for short circuits, maximum load 80W. Lamps are normally switched on dimmed. Dimming must be deactivated in the SAM if fluorescent lighting or load relief relays are used. This is achieved by means of the "Working Lamps" option (Option L68). The read-back switch must always be connected to the SAM, otherwise the interior lamps cannot function.



Read-back switch switching principle

U_{BAT}	Interior lightning power supply (+ 12 V)
AUTO	Lightning controlled by SAM, e.g. when door opened
ON	Interior lamp permanently lit
A	Read-back switch (interior lighting)

6.5.6. Rain-light sensor

It is only permitted to fit the rain-light sensor (Option JA5 in conjunction with the standard/optional WSS variants provided. There is otherwise a risk of malfunction.

The standard ceiling light has to be replaced by an overhead console with lights. The overhead control panel (DBE, Option LD0) must also be fitted (contains the interface).

6.6. Mobile communication systems

If mobile communication systems (e.g. telephone, CB radio) are retrofitted (→ chapter [4.6.3](#)), the following requirements must be fulfilled in order to avoid malfunctions developing on the vehicle at a later stage:

- All electronic equipment fitted requires type approval regarding electromagnetic compatibility.
- The ring-shaped MOST network uses a fiber-optic cable as a data carrier for transferring audio and control signals. This system supports the synchronous transfer of data at high baud rates, is insensitive to electromagnetic interference (EMC), does not cause electromagnetic interference and can transfer both audio and control data simultaneously. The system is available with the ignition OFF and is activated by a separate wake-up line.

Do not kink the fiber-optic cable. The minimum bending radius is 25 mm [1.0 inch].

6.6.1. Equipment

- The maximum transmission output must not be exceeded.

Waveband	Maximum transmission output (W)
Short wave < 50 MHz	100
4 m band	20
2 m band	50
Trunked radio / Tetra	35
70 cm band	35
GSM	10
3G	10

- Do not install mobile communications systems and brackets in the deployment area of the airbags (→ chapter [7.4.2](#)).
- The equipment must be permanently installed. Mobile devices may only be operated inside the cab if they are connected to an exterior aerial which has been installed in such a manner that it is reflection free.

- The transmitter unit must be installed as far away from the vehicle's electronic system as possible.
- The equipment must be protected from humidity and severe mechanical vibrations; the permissible operating temperature must be observed.

6.6.2. Connecting and routing the wiring for the radio antenna

- Comply with manufacturer's notes and installation instructions.
- The connection should be made directly to terminal 30 via an additional fuse. Disconnect the unit from the electrical system before jump-starting.
- The wiring routes must be kept as short as possible. The wires must be twisted and screened (coaxial cable). Chafing points must be avoided.
- Ensure that the system has a good ground connection to the body (aerial equipment).
- The antenna and connecting cables between the transmitter, receiver and operating panel must be routed separately from the vehicle wiring harness in the vicinity of the body ground.
- Route the antenna cable in such a way that it is not kinked or pinched.

6.7. Electronic ignition switch (EZS)

6.7.1. General Information

- The processes involved in the access authorization for the central locking (ZV) are verified and controlled by the signal acquisition and actuation module (SAM) and the door control unit (TF).
- When the key is inserted, infrared communication with the radio remote control key is achieved by inductive energy transmission.
- When the radio remote control values are transmitted to the drive authorization system III (FBS III), the electronic steering lock (ELV) and the engine control unit are released.
- When the radio remote control key is removed, the ELV is locked if the last recorded speed signal was <3 km/h [1.86 mph] and the key is withdrawn by at least 4 mm. If the last recorded speed signal was >3 km/h [1.86 mph], the ELV is only locked if the door contact switch signals that the driver's door has been open for longer than 1 second.
- The radio remote control key activates the individual terminals (15, 15R) depending on the position in the ignition lock to which it is turned.
- The radio remote control key is mechanically locked when turned.
- If key identification is unsuccessful (invalid key), the lifting solenoid in the electronic ignition switch prevents the radio remote control key from turning.
- If key identification is successful, the memory functions are assigned.
- The electronic ignition switch acts as an interface (gateway) between the interior CAN (CAN B) and the engine compartment CAN (CAN C) for data exchange between the two bus systems.
- The diagnostics CAN acts as a central diagnostic interface with all control units with diagnostics capability.
- An HF receiver is integrated.
- Where control units are networked, the electronic ignition switch sends global information such as the model series and the country variant to the CAN-B and CAN-C control units (global variant coding) on the network.

6.7.2. Central locking/rescue vehicle

To guarantee faultless operation, it is only permitted to use central locking elements supplied by Daimler AG. If these cannot be used, please consult with SEC (→ chapter [2.7](#)) for further information. By means of EZS variant coding, the doors can be programmed to be present or not present. Activating automatic locking using MB STAR DIAGNOSIS Tool.

- Speed (adjustable, default 15 km/h [9.4 mph]).
- Ignition ON
- Automatic locking when last open door is closed (post function)

Deactivating automatic unlocking using MB STAR DIAGNOSIS Tool. On emergency vehicles it is possible to deactivate automatic central unlocking. This is a function that can be set by means of variant coding in the electronic igniting switch (EZS) using the MB STAR DIAGNOSIS Tool. You can obtain further information from SEC (→ chapter [2.7](#)).

Rescue vehicle fittings

The settings required for rescue vehicles, e.g. passive circuits for rear-door and sliding Door actuators, can be carried out using MB STAR DIAGNOSIS Tool and using the following settings:

Right-hand sliding door "not present"
Left-hand sliding door "not present"
Rear door "not present"
Common enable for control circuits 1 and 2
Co-driver's door "not present"

6.8. Windows and doors

6.8.1. Power windows/window hinges

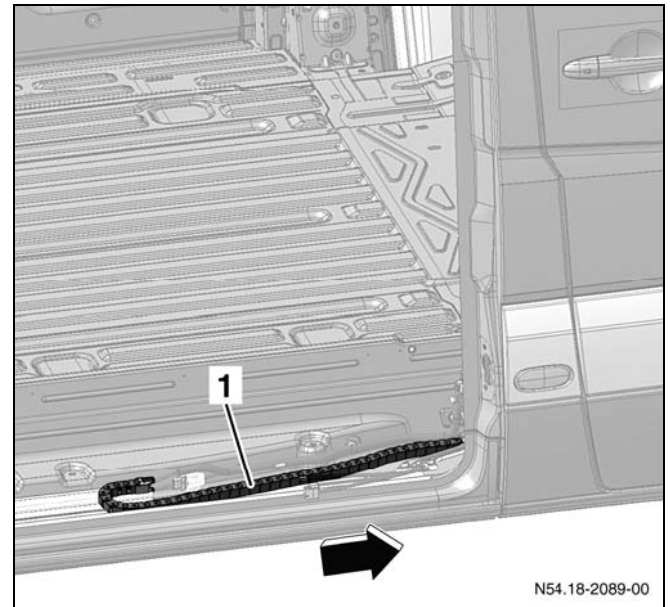
The gearing ratio for heavier windows must be adjusted to ensure that the motor draws the same electrical power. The time required to open/close the windows must not exceed 10 seconds. The motor is thermally protected i.e. the availability of the power window function may be restricted after long operating periods. The power windows and the window hinges can only be controlled using the door control panel. The switches are voltage coded and must only be replaced with equivalent genuine parts.

6.8.2. Load compartment sliding door

The electrical components of the cargo compartment sliding door. The cable track must be taken into consideration in the event of any modifications around the doorway. The cable track can be used for the requirements of the body builder following consultation with SEC (→ chapter 2.7).

On no account should modifications be made to the door kinematics or the locks, rails, carriages, closing aids and trap guard strips.

Correct operation of the integrated trap guard (trap guard strip and path/time monitoring) must be ensured in the event of any modifications in this area, e.g. the window installation.



Load compartment sliding door with energy chain

- 1 Cable track (drag chain)
- Arrow Front of vehicle

6.8.3. Sliding sunroof

An OEM sliding sunroof can only be fitted in conjunction with an overhead control panel (DBE). The length of the wiring harness between the sliding sunroof motor and the DBE must not be more than 6 m [19.5 ft].

6.8.4. Windscreen wipers

We recommend the use of genuine OEM wiper motors. If necessary, a second wiper motor can be connected via a load relief relay ($R_i > 80 \text{ Ohms}$). The wiper motor must be connected to the signal acquisition and actuation module (SAM) by means of a read back line. If only one wiper motor is connected, the SAM stores a fault in the malfunction memory.

6.8.5. Exterior mirrors

The output of the mirror heater (12 V / 20 W) is monitored by the door control unit. The mirror heating is deactivated if a fault entry is stored. The door control unit must be modified if different mirrors without a heater or with a different heater are used. The mirror adjustment is load switched and can be routed if required.

6.8.6. Windscreen heating/rear window heating

The original heaters can be replaced with heaters with the same power rating:

- Windscreen heating
 $P = 942 \text{ W} + 15\%$ at 13 V
- Rear window heating
 $P = 2 \times 151 \text{ W} + 15 \text{ W}$ at 13.5 V

If higher heat outputs are required, the relays, lines and fuses must be modified accordingly.

6.9. Electronic Stability Program (ESP)

ESP is a dynamic vehicle control system which controls both dynamic directional and transverse forces acting on the vehicle.

Greater driving stability is provided by ESP with an extended sensor system that constantly compares the current actual vehicle direction with the desired direction of movement.

ESP improves vehicle stability in all driving situations, e.g. when accelerating, braking and coasting, when driving in a straight line and cornering.

Together with the signals of other sensors, a processor monitors that the direction specified by the driver is maintained.

If the vehicle deviates from the correct path (over steering or under steering), The system produces a stabilizing counteraction by applying the brakes on individual wheels.

6.10. Signal acquisition and actuation module (SAM)

The power circuit on the SPRINTER comprises the signal acquisition and actuation module (SAM) in conjunction with a fuse and relay block (SRB). This power circuit supplies the systems and control units with power, depending on the function sequence. Requirements are sent to the SAM either on the CAN or via directly read switches and sensors. The fuses on the fuse and relay blocks also provide protection for individual components. You will find information about other functions in the "Technical details" section.

Warning

On no account may any of the following modifications be made to vehicles equipped with ESP:

- Modifications to the permissible gross vehicle weight
- Modifications to the wheelbase
- Modifications to the sensors (steering angle sensor, yaw rate sensor, wheel rotational speed sensor)
- Changes to the vibration characteristics at the installation location of the yaw rate sensor by modifications of the body.
- Changes to the position of components
- Modifications to the suspension
- Modifications to wheels and tires
- Modifications to the engine
- Modifications to the steering system
- Modifications to the brake system
- Conversion to a semi-trailer tractor vehicle

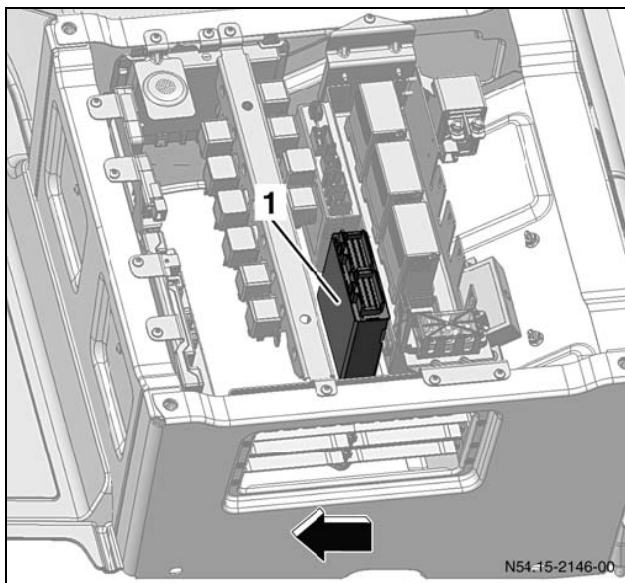
Modifications to vehicles with ESP may cause this system to stop functioning correctly and may lead to system shutdowns and incorrect control interventions. The driver could then lose control of the vehicle and cause an accident.

6.11. Parametric special module (PSM)

The PSM is the gateway to the CAN Bus. The PSM can be used to read and program vehicle functions.

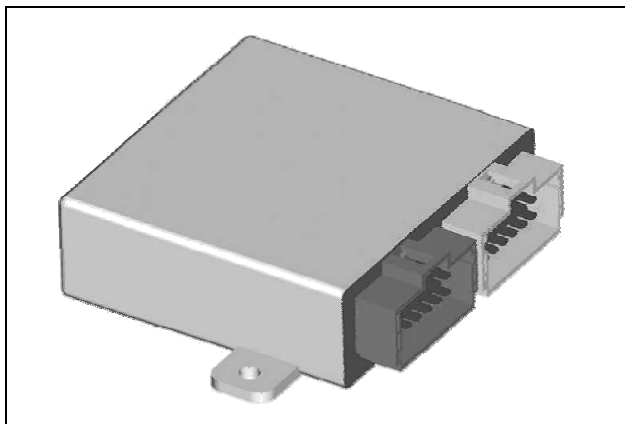
The term “networking” refers to the interaction between different control units.

The PSM was developed to give body builders access to individual types of CAN bus data. The PSM is available with option code ED5 and can be retrofitted.



PSM location inside the driver's seat pedestal

Arrow Front of vehicle



PSM Module

The PSM is able to read messages of the various bus data and translate them into signals. The outputs provide high, low or PWM (**P**ulse **W**idth **M**odulation) signals.

The wiring on the vehicle can not be tapped, as this would lead to failure messages from other control units on the CAN bus.

The PSM provides a defined, diagnostic-compatible and EMC (Electro Magnetic Compatibility) -tested interface between the vehicle and the body.

Customer-specific requirements may be special inputs, or special outputs, such as pulse pause-modulated engine speed or CAN bus compatible control units in bodies or trailers.

Example:

The engine control unit sends the speed information to the PSM. The PSM converts speed information into a PWM signal and makes this available at an output.

When writing a standard coding, all previous parameters are deleted. We recommend a PSM data back up.

A PSM program is uploaded by using the dealer STAR Diagnostic Tool. Information about this can be obtained from your authorized SPRINTER dealer or SEC. For PSM programming, please contact SEC:

Name:	Walther F. Bloch
Dept:	SPRINTER Engineering Manager
Telephone:	(843)-695-5053
Fax:	(843)-695-5127
E-mail:	walther.bloch@daimler.com

Name:	Jochen Hornikel
Dept:	SPRINTER Engineering Test Engineer
Telephone:	(843)-695-5064
Fax:	(843)-695-5127
E-mail:	jochen.hornikel@daimler.com

6.11.1. Inputs/Outputs

Inputs:

A total of 10 inputs are available: 3 high active, 3 low active and 4 analog. The analog inputs can also be used as digital inputs.

Input devices can be:

- a) Switch
- b) Pushbutton

Outputs:

A total of 20 Outputs are available: this includes terminal 30 (+12 volt) and ground switch. Outputs values are in the range of 0.5A and 10A. All outputs are internally fused.

General information

- Short-circuit detection
- In the case of high-side outputs, the PSM provides (+12V). The consumer load must be connected to the body ground or battery ground.
- In the case of low-side outputs, the PSM provides (Ground)

6.11.2. Parameterization with Logic Blocks

PSM outputs and certain vehicle functions can be controlled by logical combinations of vehicle (CAN) signals and or switches

Logic contributions include:

- AND
- NAND (**not and**)
- OR
- NOR (**not or**)
- XOR (**exclusive or**)
- XNOR (**exclusive not or**)

Logic Blocks include:

- Timer Block
- Counter Block
- Flip Flop Block
- Threshold Switch
- Hysteresis Block

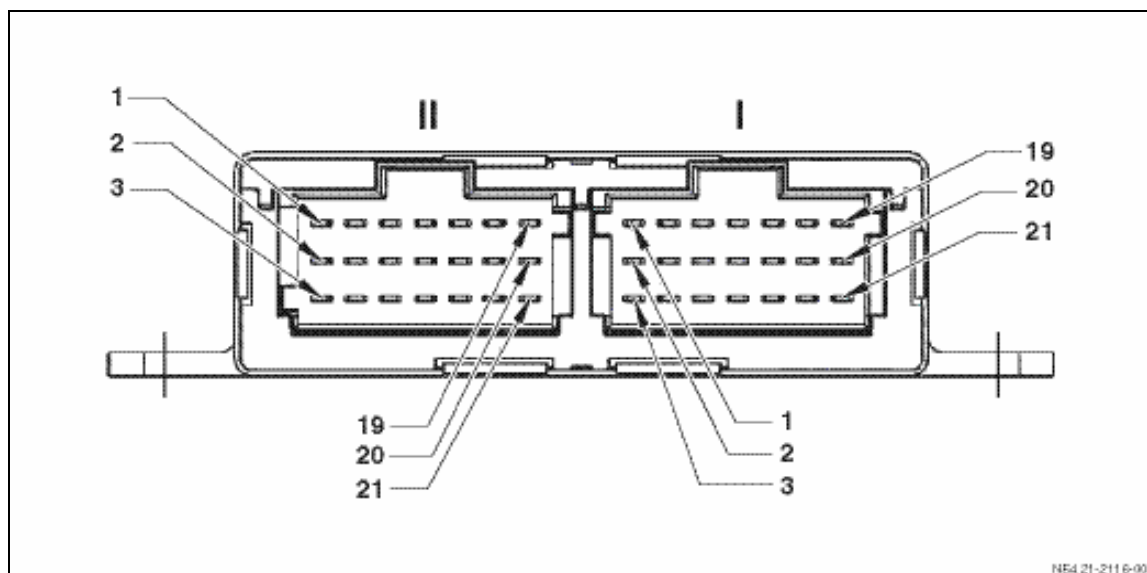
Logic combinations and logic blocks can be combined to reflect the desired function

Example:

The hazard warning buzzer turns on if

- a switch is activated
- the parking brake is not activated
- and the vehicle is in "Gear"

6.11.3. Contacts and pin allocation



I Connector 1

- 1 Pin 1
- 2 Pin 2
- 3 Pin 3

II Connector 2

- 19 Pin 19
- 20 Pin 20
- 21 Pin 21

Connector 1

No.	Application	
1	Input 6	low-active
2	Input 4	low-active
3	N/A	
4	Input 1	high-active
5	Input 5	low-active
6	Input 2	high-active
7	Input 3	high-active
8	Input 7	analog
9		
10	Input 9	analog
11	Input 8	analog
12		
13	Output 1	H-bridge / 5A
14	Input 10	analog
15		
16	Output 2	H-bridge / 5A
17	Output 20	negative / 0.5A
18		
19	Output 19	negative / 0.5A
20		
21		

Connector 2

No.	Application	
1	Not assigned/reserve	
2	Output 18	Negative / 0.5A
3	N/A	
4	Output 7	Positive / 5A
5	Output 17	Negative / 0.5
6	N/A	
7	Output 8	Positive / 5A
8	Output 9	positive, PWM compatible / 1A
9	Output 16	Positive / 0.5A
10	Output 5	positive, wake-up capability / 5A
11	Output 10	positive, PWM-compatible / 1A
12	Output 15	Positive / 0.5A
13	Output 6	positive, wake-up capability / 5A
14	Output 11	Negative / 1A
15	Output 14	Positive / 0.5A
16	Output 3	positive, wake-up capability / 10A
17	Output 12	negative / 1A
18	N/A	
19	Output 4	positive, wake-up capability / 10A
20	Output 13	Positive / 0.5A
21	N/A	

6.11.4. PSM signals

Vehicle status

Outputs

- Clamping device
- Circuit 15R
- Circuit 15
- Terminal 50
- Terminal 61
- Emergency lighting switched on
- Hand brake applied
- Front interior lights switched on
- Rear interior lights switched on
- Vehicle moves
- * Battery voltage from EZS [EIS] electronic ignition switch
- * Outside temperature
- * Interior temperature
- * Vehicle speed
- * Fuel tank level

CAN

Outputs

- Selector lever in position "R"
- Selector lever in position "P"
- Selector lever in position "D"
- Selector lever in position "N"
- Anti-theft alarm system "armed"
- AC compressor switched on
- Crash signal received
- Audio muting
- Active starter lockout
- Motion detector has detected motion
- * Engine temperature

* Signals that can only be used to trigger outputs and can not deliver actual values.

Central locking

Outputs

- Left front door open
- Right front door open
- Sliding door or left crewcab hinged door open
- Tailgate or rear-end door open
- Left sliding door unlocked
- Right sliding door unlocked
- Tailgate or rear-end door unlocked
- Right front door unlocked
- Left front door unlocked
- Load compartment unlocked
- Cab unlocked
- Load compartment and cab unlocked
- Load compartment locked
- Cab locked
- Load compartment and cab locked
- Engine Hood is open

Inputs

- Unlock vehicle
- Lock vehicle
- Unlock front doors
- Lock front doors
- Unlock load compartment
- Lock load compartment

Illumination and signaling horn

Outputs

Front fog lamp switched on
High beam switched on
Signaling horn operated
Side lights switched on
Low beam switched on
Rear fog lamp switched on
Hazard warning flasher (light phase) active
Left turn signal (light phase) active
Right turn signal (light phase) active
Light sensor "Night"
Daytime running lamps active
Brake lights actuated

Inputs

Switch on front fog lamps (alarm)
Switch on high beams (alarm)
Synchronous flashing of front fog lamp and high beams (alarm)
Switch on hazard warning flasher(alarm)
Signaling horn operated
Switch on left flasher
Switch on right flasher
Switch on high beam
Switch on headlamp flasher
Switch on hazard warning flasher
Switch on buzzer
Switch on front interior lights
Switch on rear interior lights
Switch on standing lights
Switch on low beams
Switch on fog lamps
Switch on rear fog lamp
Switch on signaling horn (alarm)

Indicators and warning indicators

Outputs

"Brake wear" indicator lamp switched on
"Coolant level too low" warning lamp switched on
"Washer fluid level too low" indicator lamp switched on
"Brake fluid level too low" indicator lamp switched on
Left low beam defective
Right low beam defective
Center high-mounted brake lamp defective
Left stop lamp defective
Right stop lamp defective
Left turn signal lamp
Right turn signal defective
Left high beam defective
Right high beam defective
License plate lamp defective
Rear fog lamp defective
Left front fog lamp defective
Right front fog lamp defective
Left front parking lamp defective
Right front parking light defective
Backup light defective
Left tail lamp defective
Right tail lamp defective
Left side-marker lamp defective
Right side-marker lamp defective
Clearance illumination defective
Tank fill level in RESERVE

PWM signals (Pulse Width Modulation)

Outputs

Wheel speed
Engine speed
Vehicle speed
Outside temperature
Inside temperature
Display dimming

6.12. Tire pressure monitoring system

Warning

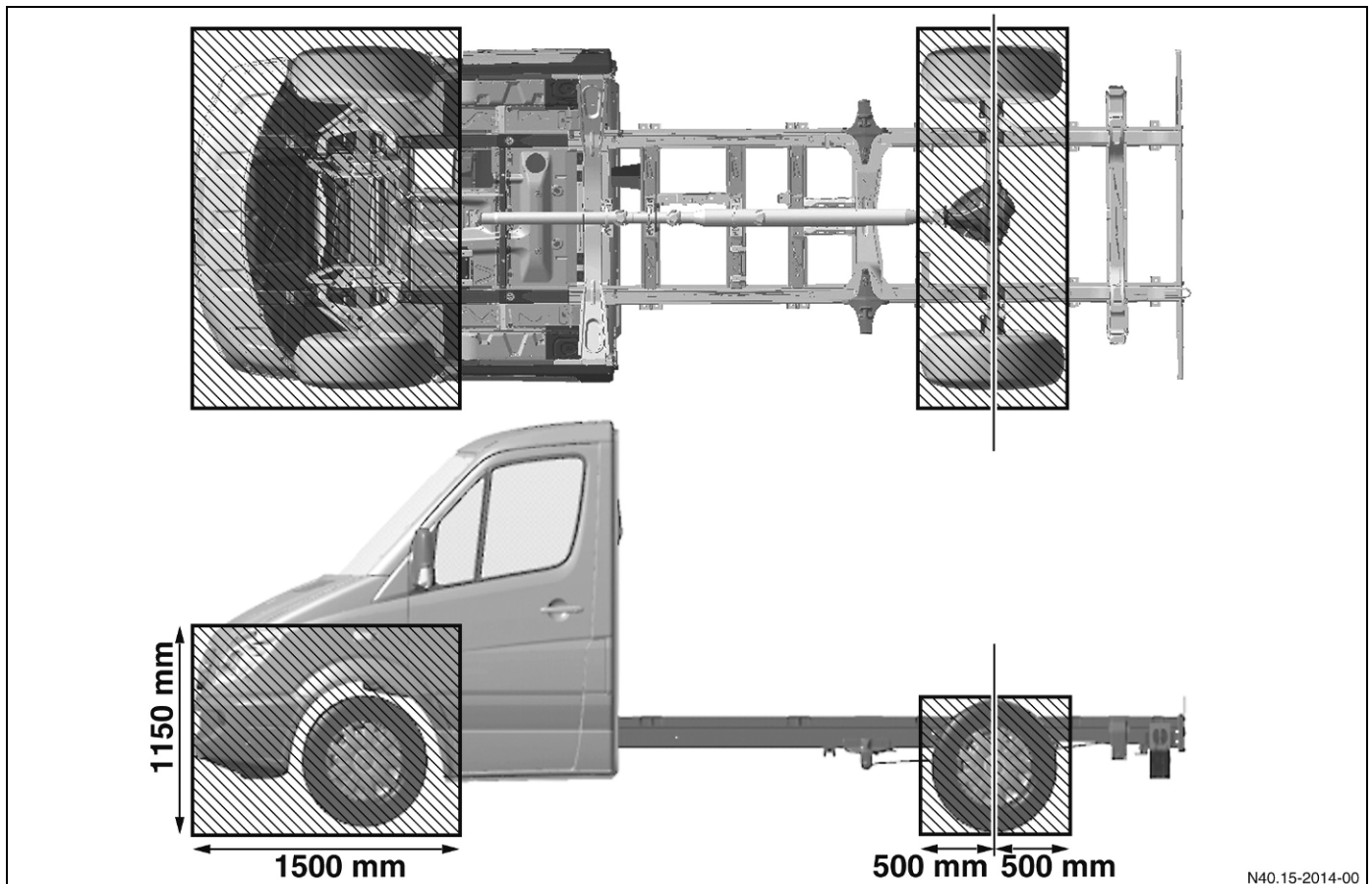
Do not carry out any modifications in the grey-shaded areas of the vehicle substructure (see illustration). Otherwise, the function may be compromised by the effect of reflections. This might result in the driver being unaware of any tire pressure loss, and could cause an accident that may cause serious injury or death. Furthermore the vehicle will lose its certification.

Tire Pressure Monitoring System is only available on Mercedes Benz SPRINTER & Freightliner SPRINTER 2500.

Correct operation of the tire pressure monitor, or Tire Pressure Monitoring Systems (TPMS), can only be guaranteed if no modifications are made to the underbody (as the effect of reflections cannot be correctly evaluated). Modifying the vehicle substructure may adversely affect the tire pressure monitoring system.

The antenna position for the front axle is in the front of the engine compartment on the right-hand longitudinal member near the jack support bracket and behind the right-hand headlamp on the inside of the A-pillar.

The antenna position for the rear axle is to the rear on the underbody between the wheels (Cargo Van and Passenger Van). You can obtain more information about the tire pressure monitoring system from SEC (→ chapter [2.7](#)).



Restricted area for tire pressure monitoring system. TPMS only available on 2500 SPRINTERs. Picture above reflects 2500 SPRINTER Chassis-Cab for illustration purposes only.

6.13. Parktronic

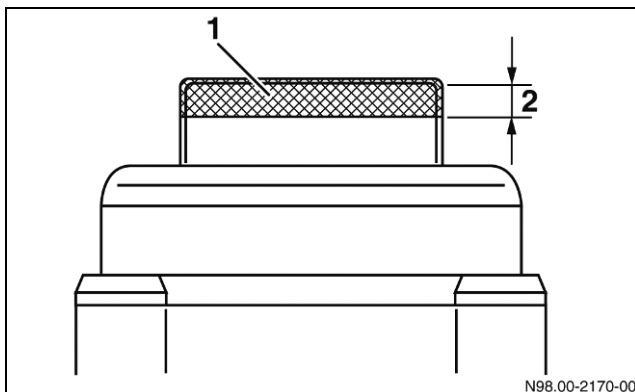
- If approved attachments are retrofitted, it is necessary to have Parktronic coded with the appropriate parameter record by Daimler AG.
- After market painting of the bumper is not permitted with the Parktronic ultrasonic sensors fitted. The coat of paint impairs the emission and reception of the ultrasonic signals.

Sensors which are already painted must not be repainted or touched up. In order to ensure that they function correctly throughout their operating life, sensors must be painted before being installed. Unpainted sensors and sensors painted in a range of colors are available from your authorized SPRINTER Dealer.

The maximum thickness of paint on the cover may have without impairing sensor operation is 120µm. This also includes repeated painting applications and the coat of cathodic dip paint. The paint coat thickness is between 12µm and 25µm.

It is therefore necessary to make spot checks of the paint thickness to ensure faultless operation of the sensors.

It is essential that not only the cover itself but also the cylinder edge of the sensor cover be coated with paint evenly all the way around and covering at least 2 mm.



Area of cylindrical edge of the sensor cover to be painted

- 1 Area to be painted
- 2 Maximum coat thickness 120 µm.

The coat of paint may not be ground off mechanically, as this could damage the chromate layer or the cathodic dip paint layer or the sensor covering.

If the surface has been cathodically electro primed, the paint must not be removed by chemical means as this could damage the cataphoretic electropimer layer. A new layer cannot be applied afterwards. Nor is it permitted to touch up damaged areas chemically or mechanically.

Attachment parts fitted in the detection range of the sensors may impair operation of the parktronic system (e.g. trailer hitch, overhangs of bodies, wheel carriers, steps, brush guards).

6.14. Lifting platform connection

The following electrical components are available to install a lifting platform. Prewiring option EV3 is available:

- Control current fittings
- On/off switch in the cab, which closes or opens the control current circuit of the lifting platform
- Main current fittings
- 35 mm [1 3/8 in] ground line, secured to the vehicle frame, with a blue 1-pin ITT Cannon main current connector on the lifting platform end
- 35 mm [1 3/8 in] positive line, with a 10 mm [3/8 in] cable shoe on the battery end of reconnecting the main current fuse directly to the positive terminal, with a red 1-pin ITT Cannon high current connector on the lifting platform end
- Both lines have an excess of 1000 mm [39.4 in] at the end of the right-hand longitudinal member. The loose lengths of line are tied back in the left-hand longitudinal member.

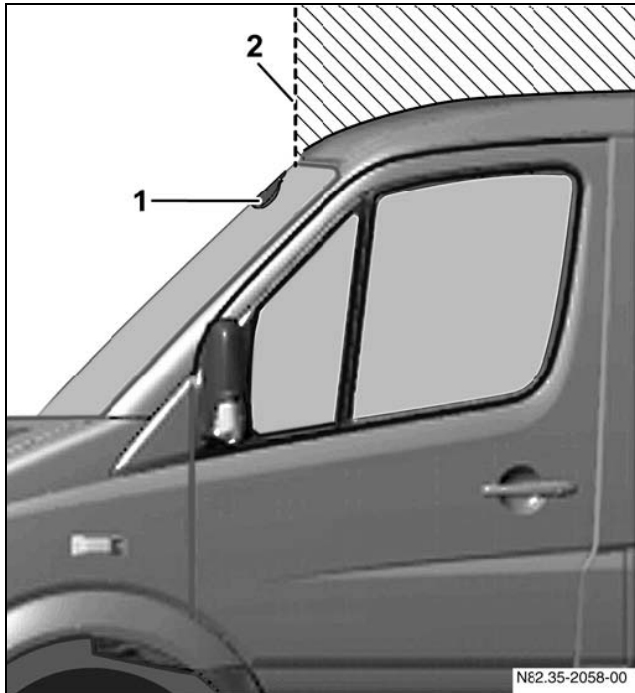
A battery with higher capacity as well as an auxiliary battery must be fitted if an electro hydraulic lifting platform is fitted. Before the lifting platform is used for the first time, the body builder must insert a fuse in the appropriate location in the driver's seat base.

For notes on the mechanical connection, see the "Attachments to the rear frame section" (→ chapter [7.2.2](#)) and the "Lifting platform" (→ chapter [7.6.6](#)) sections.

6.15. Rain / light sensor

On vehicle with bodies that protrude beyond the limit shown below (e.g. motor caravans with alcove bodies), the function of the rain / light sensor may be impaired.

Therefore, it is not recommended to install a rain / light sensor on vehicles with bodies that protrude beyond this limit.



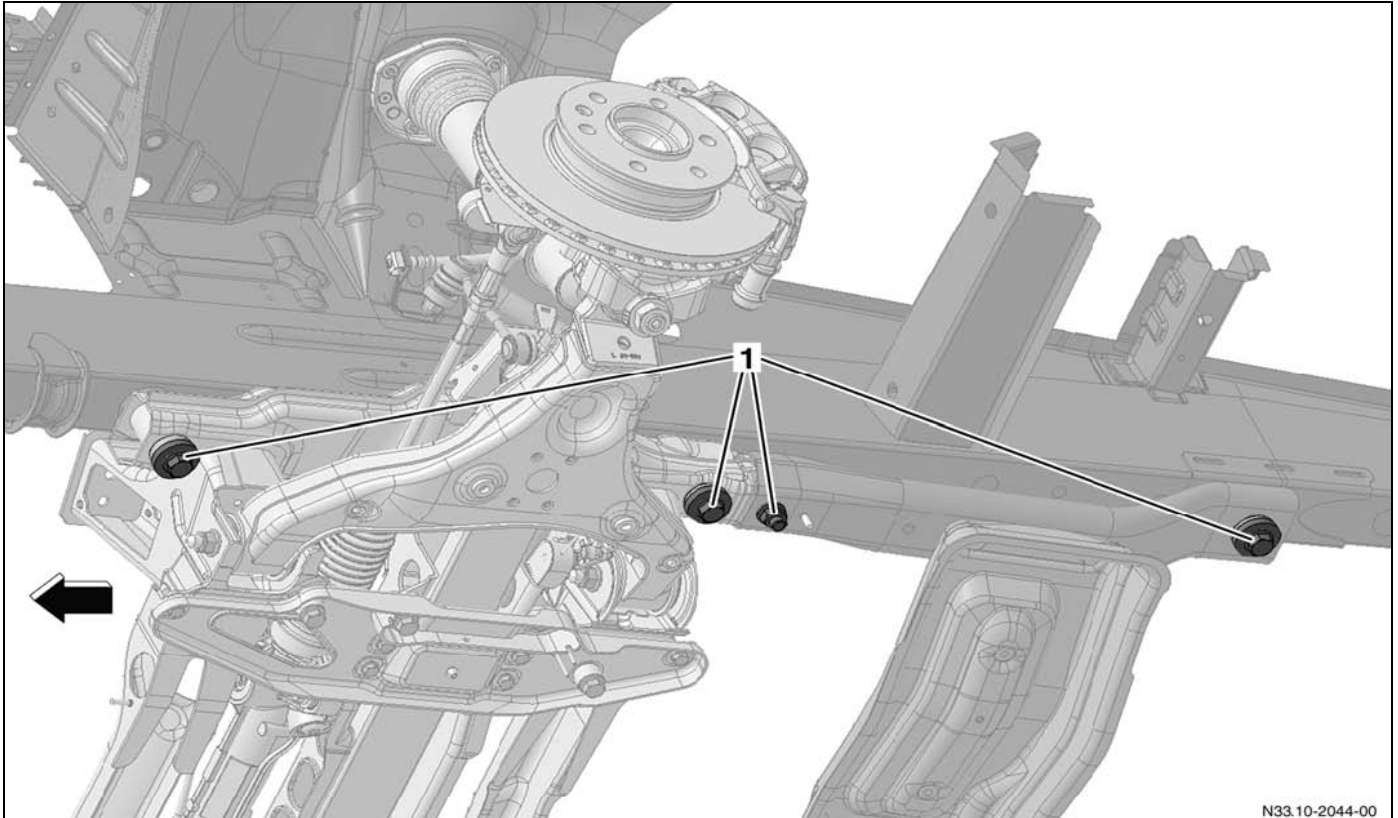
Limit for bodies on vehicles with rain / light sensor

On no account should any modification be made to the position of the rain / light sensor or the surrounding area (e.g. changing the standard wind screen), otherwise the rain / light sensor may no longer function correctly.

7. Modifications to the basic vehicle

7.1.1. General information on the suspension

Additional attachment parts are not permitted to be secured to the bolting points on the front axle.



Front axle

1 Bolting points on the front axle

This is especially valid for:

- Front transverse link: Do not modify wheel position values
- Do not modify or use the front axle to mount additional equipment or make other modifications.

Arrow Front of vehicle

- Rigid rear axle: do not modify rear axle.
- Brakes: do not modify the brake system
- Do not modify: equipment, sensors, line routing for ESP/ABS.

Warning

Modifications to components of the suspension system can result in impaired and unstable vehicle handling characteristics. The driver may lose control of the vehicle and cause an accident that may cause serious injury or death. For this reason, no modifications whatsoever may be made to components of the suspension system.

Warning

Do not change any bolted connections that are relevant to safety, e.g. that are required for wheel alignment, steering or braking functions. They may otherwise no longer function correctly. The driver may lose control of the vehicle and cause an accident that may cause serious injury or death. Parts must be refitted in accordance with MB after sales service instructions and using suitable standard parts. We recommend the use of genuine MB SPRINTER parts.

- It is strictly prohibited to shorten the length of the free clamping bolt, change to the reduced shaft or use bolts with a shorter thread.
- The settling behavior of bolted connections must be observed.

Information is available from any authorized SPRINTER Service Center. Additional tensioned parts must be of equal or greater strength than the preceding tensioned assembly.

The use of MB tightening torques assumes coefficients of friction for the bolts in the tolerance range of $[\approx 0.08 \dots 0.14]$.

We recommend the use of standard MB SPRINTER parts.

7.1.2. Springs/shock absorbers/anti-roll bars

Modifications to springs, shock absorbers and anti-roll bars can only be made in the combinations specified by Daimler AG on the front and rear axle.

You can obtain more information from SEC (→ chapter [2.7](#)).

We recommend the use of genuine MB SPRINTER springs

- Do not damage the surface or corrosion protection of the spring leaves during installation work
- Before carrying out welding work, springs must be covered to protect them against welding spatter.
- Do not touch springs with welding electrodes or welding tongs.

On no account should springs and shock absorbers be used if they do not correspond to the characteristics of standard parts or parts obtainable as optional equipment. We recommend the use of standard MB SPRINTER parts.

Warning

On no account should springs and shock absorbers be used if they do not correspond to the characteristics of standard parts or parts obtainable as optional equipment. Otherwise, this system may no longer work correctly and could ultimately fail. The driver may lose control of the vehicle and cause an accident that may cause serious injury or death. Refer also to the optional equipment Information (→ chapter [3.9](#)).

7.1.3. Brake system

Warning

Work carried out incorrectly on the brake hoses, lines and cables may impair their function. This may lead to the failure of components or parts relevant to safety, the driver may lose control of the vehicle and cause an accident that may cause serious injury or death.

Have work on brake shoes, lines and cables only carried out by an authorized SPRINTER dealer.

Warning

Do not modify brake system components e.g. discs, calipers, sensors, etc. Any modifications to brake components may result in these systems not functioning correctly and ultimately failing. The driver may lose control of the vehicle and cause an accident that may cause serious injury or death.

Routing lines

Warning

A sufficient distance must be maintained between brake lines and heat sources, sharp-edged or moving parts. Otherwise, the brake system function could be impaired or the brake system could suffer total failure as a result of bubbles forming in the brake fluid or from chafing points in the brake lines the driver may lose control of the vehicle and cause an accident that may cause serious injury or death.

Routing lines along the brake hoses

- No other lines may be attached to the brake hoses.

Brake cable for the parking brake

- Do not modify the length of the brake cable.

Disc brakes

- Do not impair cooling by attaching spoilers below the bumper, additional hub caps or brake disc covers, etc.

Warning

Do not modify air inflow and air outflow of the brake system. Any modifications may result in these systems not functioning correctly and ultimately failing. The driver may lose control of the vehicle and cause an accident that may cause serious injury or death.

Brake system overheating will not only impair braking ability, it can also cause tire damage. For this reason, make sure that there is a sufficient supply of cooling air at all times.

7.1.4. Wheels and tires

Warning

Only fit tires of a type and size approved for your vehicle and observe the tire load-bearing capacity required for your vehicle and the tire speed index. In particular, comply with FMVSS/CMVSS regulations concerning the approval of tires. These regulations may define a specific type of tire for your vehicle. If you have other wheels fitted:

- The brakes or components of the suspension system could be damaged
- Wheel and tire clearance can no longer be guaranteed
- The brakes or components of the suspension system can no longer function correctly

The driver may lose control of the vehicle and cause an accident that may cause serious injury or death.

Gross vehicle Weight [lbs]	Wheel	Tire size	Load Index
8,550	6.5Jx16	245/75R16	120/116
9,990	5.5Jx16	215/85R16	115/112
11,030	5.5Jx16	215/85R16	115/112

The body builder must ensure the following:

- There must be sufficient space between the tire and the mudguard or wheel arch even with snow chains fitted and the suspension completely compressed (allowing for axle twist). The relevant data (→ chapter [7.2.6](#)) must be observed.
- It is only permissible to fit approved tire sizes see the vehicle documents, 2D drawings website (→ chapter [1](#)) or the above table.
- It is only permissible to fit approved wheels with the correct dimension & load rating document.

You can obtain more information about tires and wheels from any authorized SPRINTER dealer or in the “Optional equipment” section (→ chapter [3.9](#)).

7.1.5. Spare wheel

The SPRINTER is equipped with a spare wheel. When mounting a spare wheel, observe the following:

- Fit under the frame, on the side of the frame or on the body in accordance with the chassis drawing.
- Observe legal requirements
- It must be easily accessible and easy to handle
- It must be double – secured against detachment.

7.2. Body shell / Body

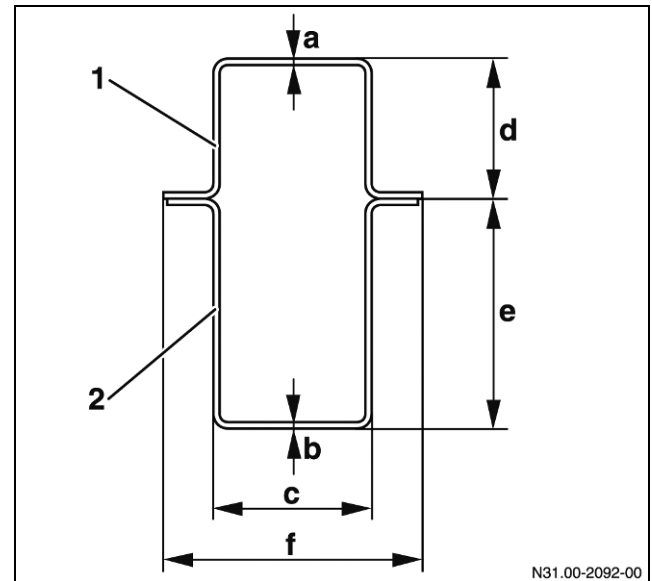
7.2.1. General information on the body shell/body

Modifications to the body must not have a negative effect on the function or strength of vehicle equipment or controls or on the strength of structural parts. In the case of vehicle conversions and mounting bodies, do not make modifications that affect the function or clearance of movement of chassis parts (e.g. during maintenance and inspection work) or accessibility to these parts.

Observe the following:

- The TPMS (Tire Pressure Management System) may malfunction if modifications are made in the direct proximity of the aerials and wheels.
- Do not modify the cross member structure from the front of the cross member through to the rear of the B-pillar.
- Do not modify the rear door opening or to the roof area.
- The clearance for the fuel filler neck, fuel tank and fuel lines must be maintained.
- Avoid sharp-edged corners.
- Do not drill holes in or perform welding work on the A-pillar or B-pillar.
- Do not cut in the C or D-pillar (rear door opening), including the associated roof arch.
- Do not exceed the maximum permissible axle loads.
- Trailer connections must be checked for correct operation.
- If a trailer hitch is installed, the necessary reinforcements must be present.
- Holes on the longitudinal frame member are the result of the production process and are not suitable for securing attachments, bodies, equipment and conversions as there is otherwise a risk of damage to the frame.

Section dimension of longitudinal frame members. (mm)



Dimensions of the upper chord and lower chord

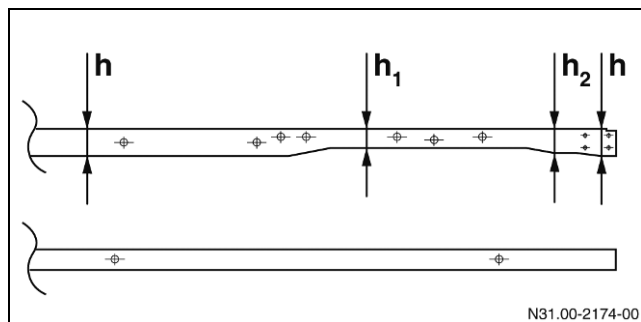
- 1 Upper chord
2 Lower chord

Model	a	b	c	d	e	f
3500 Chassis Cab	3	3	70	80	120 100 ¹	126
2500 Cargo Van		1.5	70	-	120 85 ¹	93
3500 Cargo Van		3	70	-	120 100 ¹	118

Dimensions in [mm]

¹ In the area of the rear axle

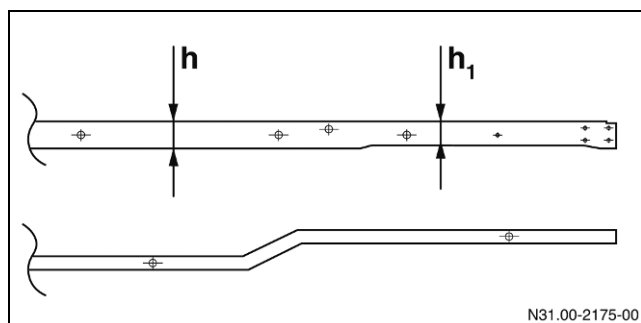
8,550 Longitudinal frame member



Dimensions of the lower chord of the longitudinal frame member

h	120 mm
h_1	85 mm
h_2	110mm

9,990 & 11,030 longitudinal frame member



Dimensions of the lower chord of the longitudinal frame member

h	120 mm
h_1	100 mm

Welding work on the body shell

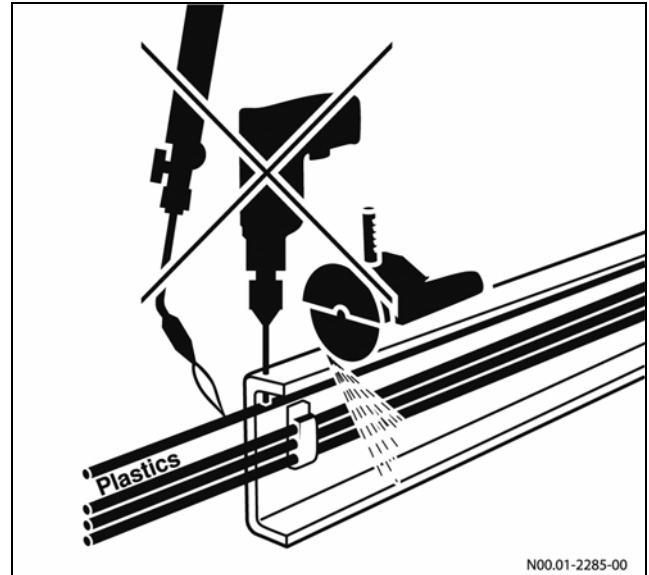
Welding work may only be performed by skilled personnel.

You will find further information about welding operations in the “Planning of bodies” (→ chapter [3](#)), “Damage prevention” (→ chapter [5](#)) and “Body shell” (→ chapter [7.2](#)) sections and in the SPRINTER Repair Manual.

Do not weld upper and lower chords of the chassis frame. Plug welding is only permissible in the vertical webs of the longitudinal frame member, contingent upon approval from SEC. Do not perform any welding work in bends.

Warning

Unauthorized drilling or welding work carried out in the area of deployment of the airbags could cause them to function incorrectly, e.g. they could be triggered unpredictably while the vehicle is in motion or they might fail completely and in case of an accident may cause serious injury or death. For this reason, do not weld or drill near air bags.



Drilling work on the frame

Existing holes in the longitudinal frame member result from the production process and may only be used if approved by SEC (→ chapter [2.7](#)).

On completion of all work on the vehicle, you must comply with the specified corrosion protection measures (→ chapter [5.3](#)).

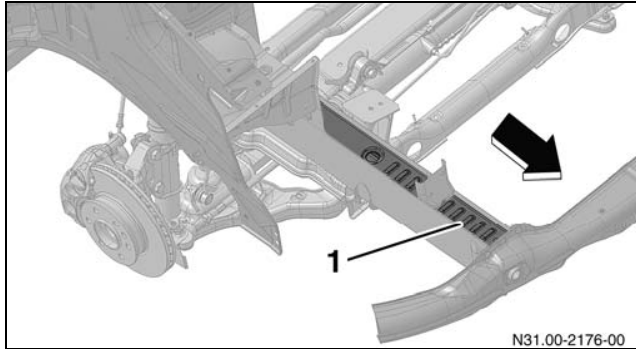
Do not drill holes:

- On the upper and lower chords of the frame (except if drill holes are at the rear end of the frame)
- In areas with a load-bearing function for the rear axle or parts fastened to the frame
- At load application points (e.g. spring supports, brackets, etc.)

7.2.2. Attachment to the frame

Attachment to the front frame section

On no account should assemblies, bars, etc. be secured near the frame fore-structure or the front axle as this may interfere with the necessary structure for passive safety.



Structure for passive safety

1 crumple zone on the sub-frame
Arrow Front of vehicle

Warning

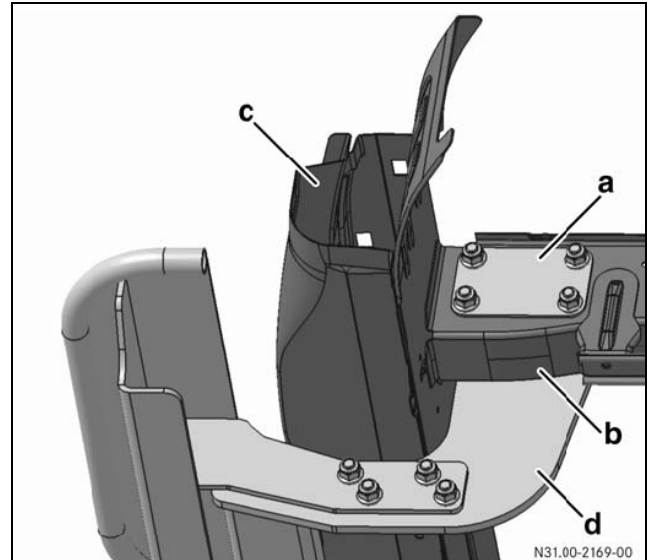
If attachments are mounted on the front frame section, the function of the forward impact structure and the airbag units may be impaired and in case of an accident and may cause serious injury or death.

For the aforementioned reasons, do not install assemblies & bars to the front structure of the SPRINTER.

The modifications must not hinder possible repair work on the standard vehicle.

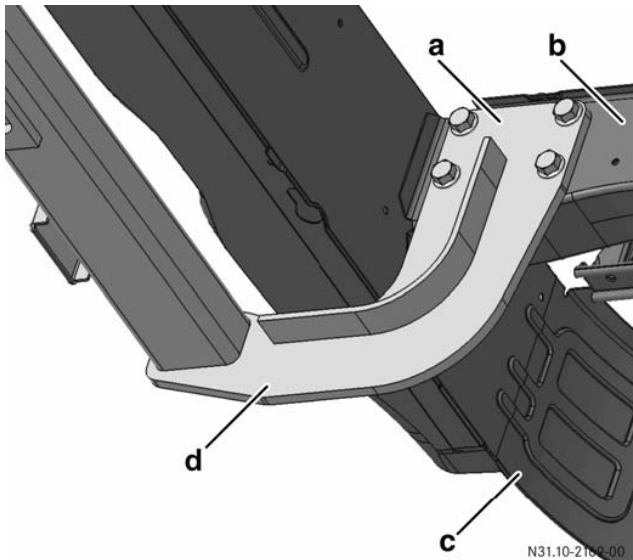
Attachment to the rear frame section

The attachment of additional equipment or bodies to the rear frame section must be equal to the attachment of the trailer hitch available as optional equipment. For the application of greater forces and moments, an additional support on the end frame cross member is required.



Outside view

- a Attachment of mounting plate to the longitudinal frame member
- b Lower chord of the longitudinal frame member
- c End frame cross member
- d Mounting plate for the trailer hitch



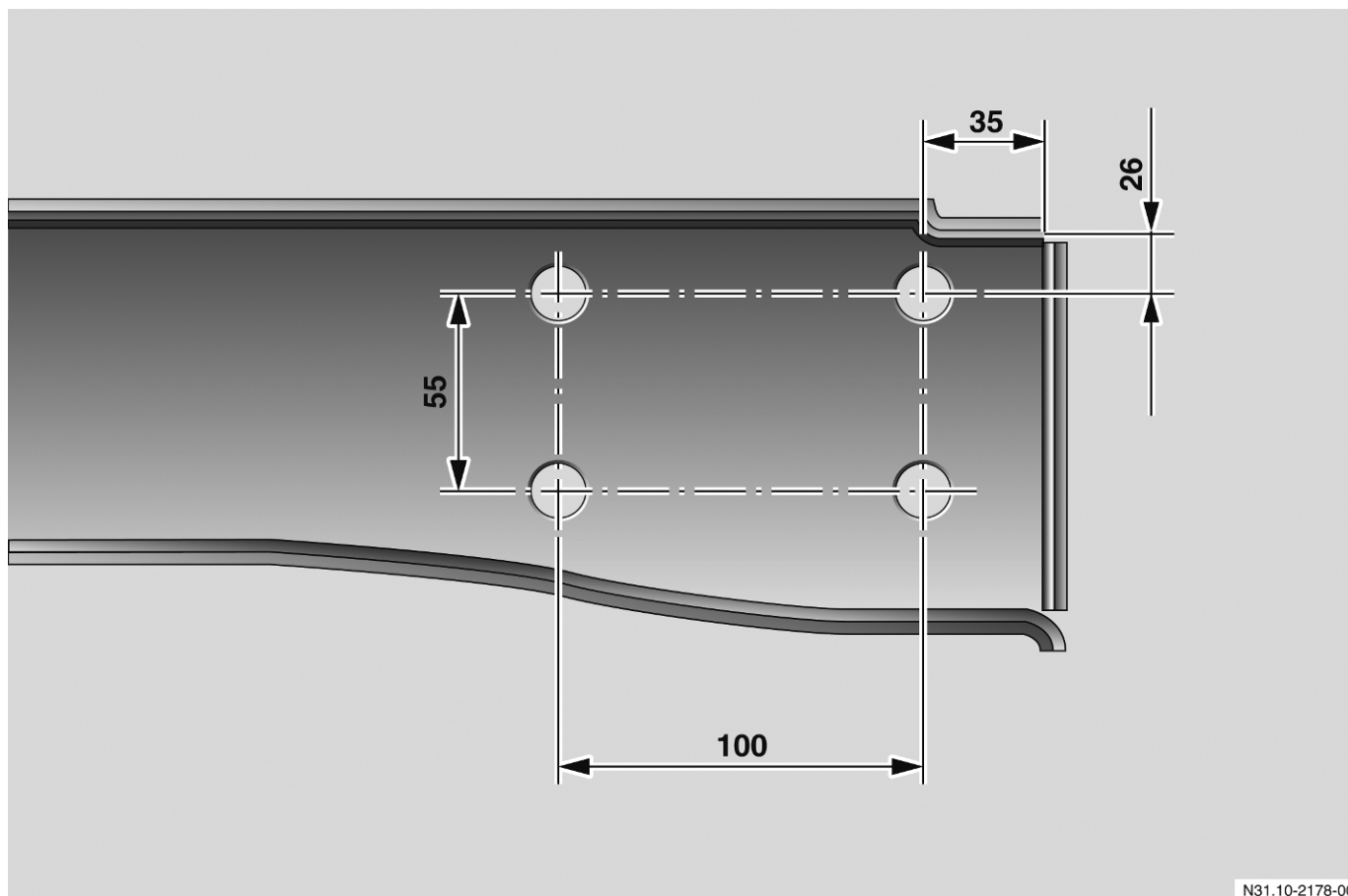
Inside view

- a Attachment of mounting plate to the longitudinal frame member
- b Lower chord of the longitudinal frame member
- c End frame cross member
- d Mounting plate for the trailer hitch

Attachments by means of body support brackets

The body support brackets fitted at the factory must be used for attaching bodies to the vehicle frame. More information is contained in the "Attachment to the frame" section (→ chapter [7.2.2](#)).

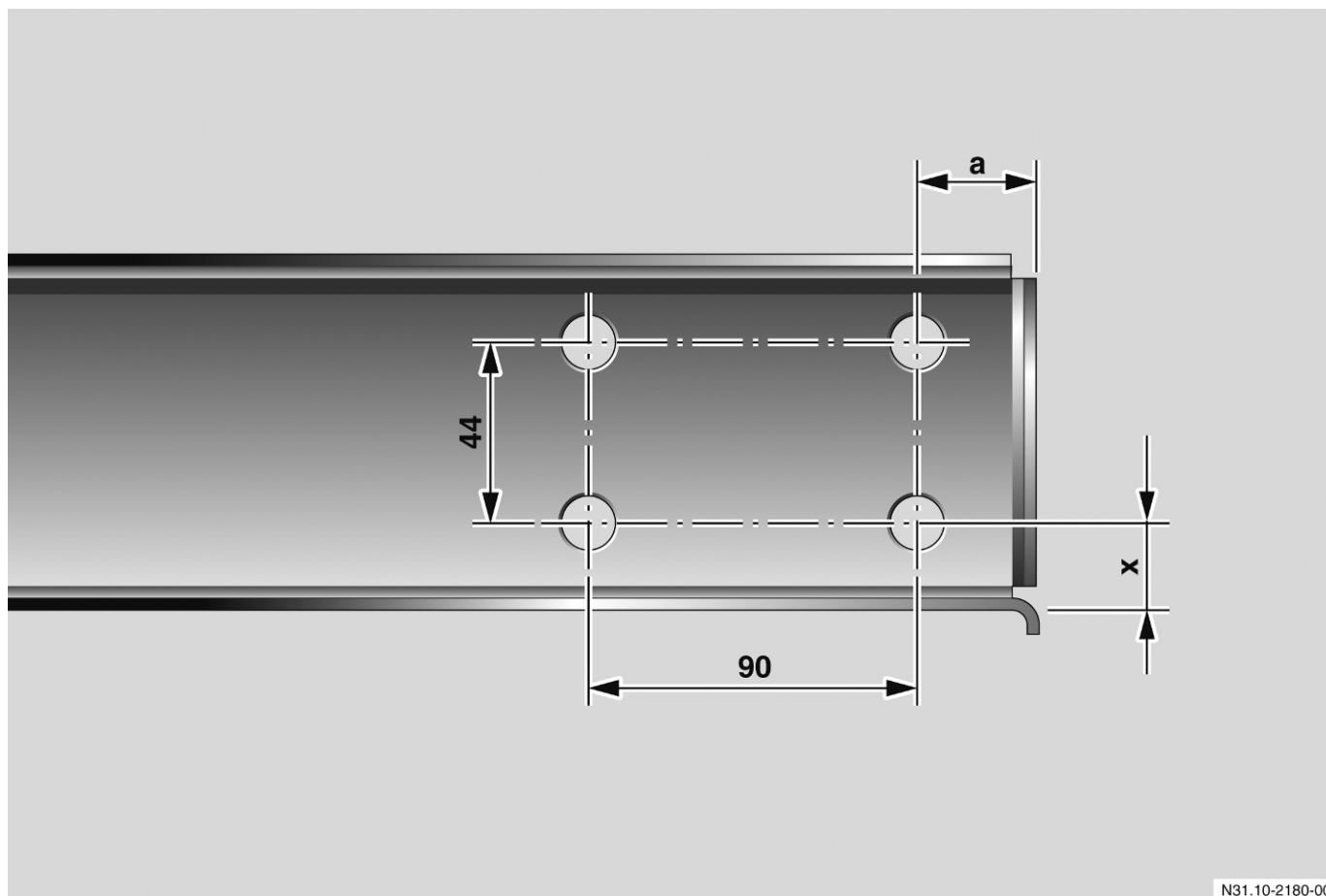
2500 and 3500 SPRINTER Cargo and Wagon Vans



N31.10-2178-00

Vehicle type	Wheelbase	Dim a	Dim x	Overhang
2500 and 3500 cargo and passenger vans	144 in	-	-	1150 mm / 45.3 in
	170 in	-	-	1250 mm / 49.2 in

3500 Chassis Cab



N31.10-2180-00

Vehicle type	Wheelbase	Dim a	Dim x	Overhang
3500 Chassis Cab	144 in	27 mm / 1.1 in	34 mm / 1.3 in	1250 mm / 49.2 in
	170 in	27 mm / 1.1 in	34 mm / 1.3 in	1350 mm / 53.2 in

7.2.3. Chassis frame material

If the frame is extended, the material of the extension element must have the same quality and dimensions as the standard chassis frame.

Material quality:	
Material	Tensile Strength (N/mm ²) Yield Strength (N/mm ²)
H240LA (DIN EN 10268-1.0480)	350-450 260-340
S235JRG2 (DIN EN 10025-1.0038)	340-510 >235

7.2.4. Overhang extension

Modifications to the vehicle overhang are possible for the Chassis Cab and must always take the permissible axle loads and the minimum front axle load into account. On vehicles with a closed body (Cargo van or Passenger van), an overhang extension is not allowed.

- An additional cross member must be fitted if the frame extension exceeds 350mm [13.8in].
- Any additional frame cross members must have the same functionality as standard cross members.
- If the frame overhang is extended, the permissible trailer load specified in the vehicle registration document must be checked and, if necessary, be reduced or even omitted.
- The frame overhang must be reinforced accordingly.
- Make sure that you do not exceed the permissible axle loads.
- Ensure that you maintain the position of the center of gravity within the permissible limits.
- The minimum front axle load must be complied under in all load conditions.

You can obtain more information from SEC (→ chapter [2.7](#)).

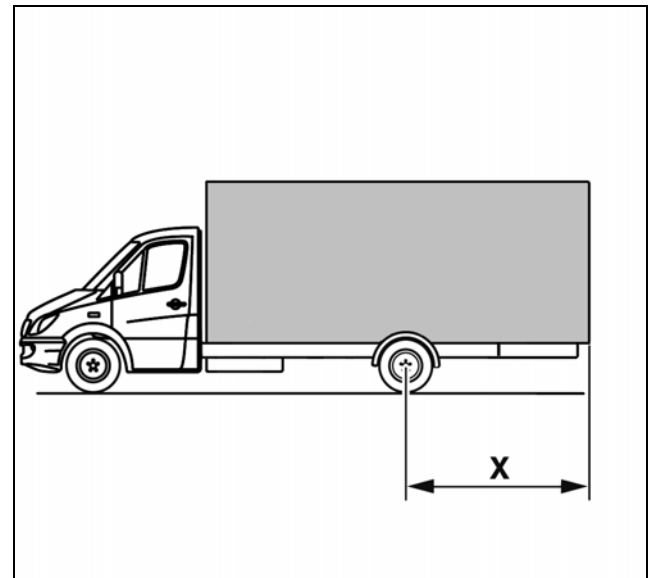
Maximum overhang lengths

If you stay within the limits of the following overhang lengths and the maximum rear axle load, the original trailer load still applies and ESP operation is not affected.

Wheelbase l (in)	Max. overhang length x(mm) [in]
144	1850 [72]
170	2200 [85]

The vehicle overhang length is part of the total overhang referring to the rear axle, including the frame overhang extension and the body and attachments.

For information on the section dimensions of the longitudinal frame member see (→ chapter [7.2.1](#)).

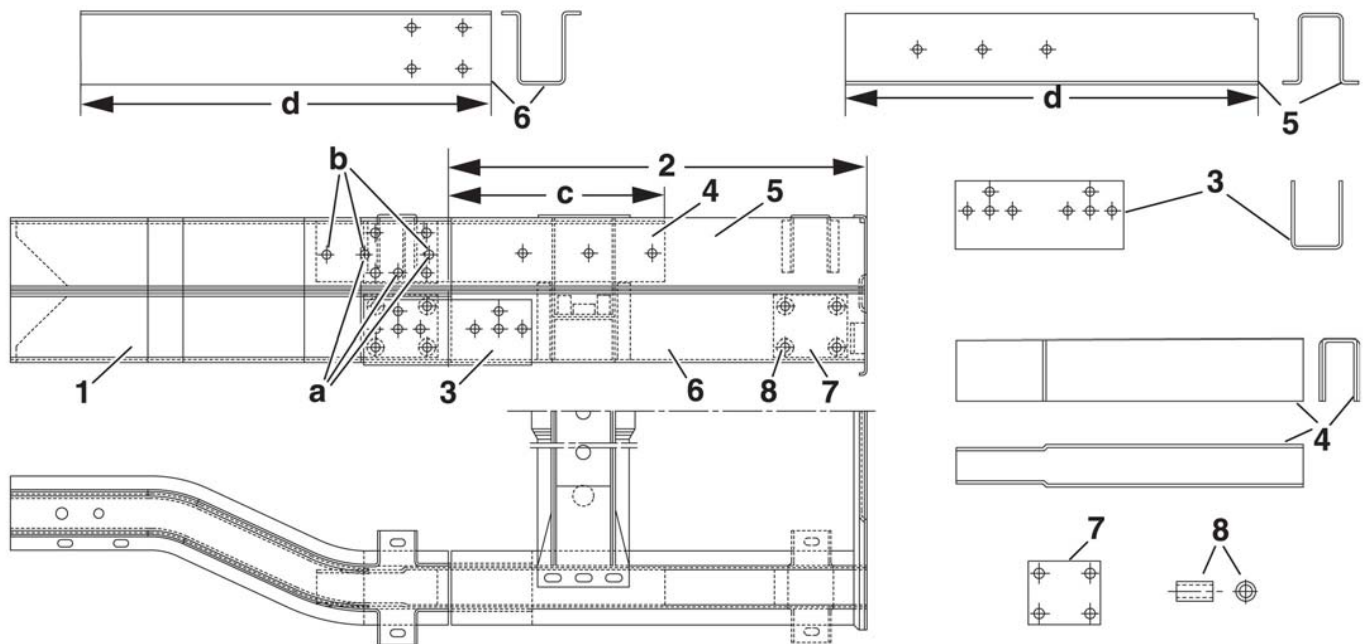


Maximum overhang lengths

X Maximum vehicle overhang

The illustration above depicts the implementation of a frame extension for an overhang extension. On completion of all work on the vehicle, you must comply with the specified corrosion protection measures (→ chapter [5.3](#)).

3500 SPRINTER Chassis Cab 11,030 GVWR frame extension with overhang extension



N31.20-2068-00

Frame extension with overhang extension

- 1 Longitudinal chassis frame member
- 2 Frame extension
- 3 Outer reinforcement
- 4 Internal reinforcement (wall thickness on 3500: 3mm)
- 5 Body mounting frame extension
- 6 Chassis frame extension (wall thickness on 3500: 3mm)
- 7 Reinforcement plate minimum 2 mm
- 8 Spacer bush, tube 24x4 M steel or ST 35 NBK
- a Bore holes, 3665mm [144 in] wheelbase
- b Bore holes, 4325mm [170 in] wheelbase
- c 350mm (3665mm [144 in] wheelbase)
300mm (4325mm [170 in] wheelbase)
- d Dimension defined by body builder

Comply with all applicable FMVSS / CMVSS guidelines and regulations

On completion of all work on the vehicle, you must comply with the specified corrosion protection measures (→ chapter 5.3).

Modifications to the cab roof

Warning

On no account should any subsequent modifications be made to the roof or the roof skin between the A-pillar and the B-pillar of the vehicle is equipped with window bags. Otherwise, the window bag may no longer be able to work correctly (e.g. window bag deployment is delayed or incomplete) which may lead in case of an accident to serious injury or death.

The “electric sliding sunroof”, (Option D27), is available from the factory as optional equipment (→ chapter [7.5](#)).

The roof load-bearing capacity is limited.

Roof arches or supporting parts may not be removed or modified.

You will find information on over cab attachments and wind deflectors in the “Attachments” section (→ chapter [7.6](#)).

Observe the permissible center of gravity and the permissible axle loads must be maintained.

Modifying the cab rear panel

If it is necessary to cut through the cab rear panel, it is possible to do this in connection with a continuous surrounding frame. The equivalent rigidity of the frame must be at least equal to the original rigidity. Partitions may be totally or partially removed. Refer also to the “Modifications to closed Cargo vans” section (→ chapter [8.4](#)).

Warning

Do not modify the roof lining or the roof skin between the A-pillar and the B-pillar if the vehicle is equipped with window bags. Otherwise, the window bag may no longer be able to work correctly (e.g. window bag deployment is delayed or incomplete) which may lead in case of an accident to serious injury or death.

7.2.5. Side wall, windows, doors and flaps

Sidewall

Body structure or reinforcement conversions which alter the sidewall structure of the Cargo Van or the Passenger Van need written approval from SEC. The body builder must meet all applicable FMVSS / CMVSS and warranty responsibility for those modifications. Do not modify the roof frame or structural components.

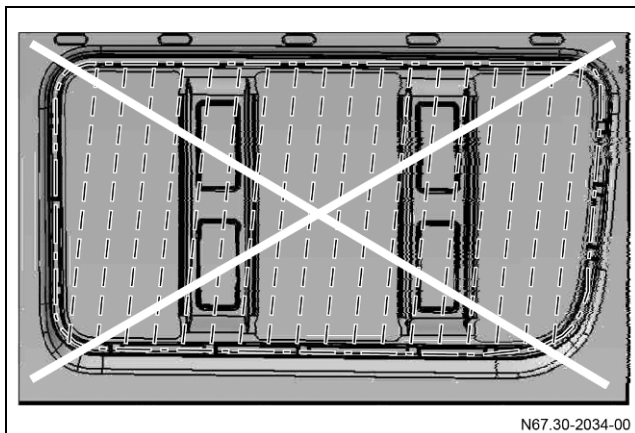
Upon completion of all work on the vehicle, body builders must comply with the specified corrosion protection measures (→chapter 5.3).

Windows

Do not retrofit windows on Cargo vans delivered without windows, except in the following areas: rear doors & sliding doors. For Cargo van conversions with specific application windows (RV, shuttle bus, etc.), you must order the Cargo van either with windows or option "window opening without glass" (Option F27 fleet only).

When installing windows in existing openings, ensure that the windows are installed with a stable frame. If modifications need to be carried out to the supporting structure of the basic vehicle (pillars, reinforcements, attachment of roof arches) in order to retrofit windows (panorama glazing), the rigidity of the modified body must be equal to that of the basic vehicle.

More information about modifications to the sidewall can be found in the "fitting shelving/installations" section.



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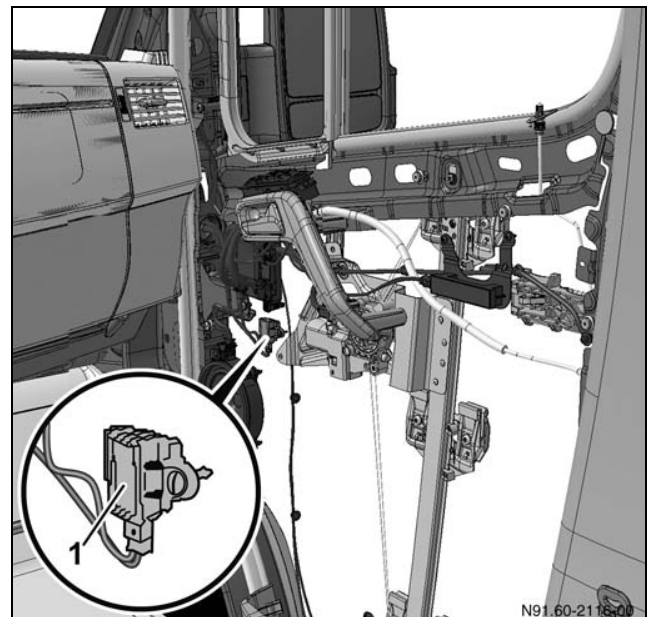
Doors and flaps

Body structure or reinforcement conversions to the supporting structure of the basic vehicle (frame cross members, pillars, reinforcements, attachment of roof arches) in order to retrofit doors, requires prior written approval from SEC.

The body builder must comply with all applicable FMVSS / CMVSS and warranty responsibility for those modifications. The rigidity of the modified body must be equal to that of the basic vehicle.

The trigger sensor of the occupant protection systems is located in the door body on vehicles with window or thorax bag.

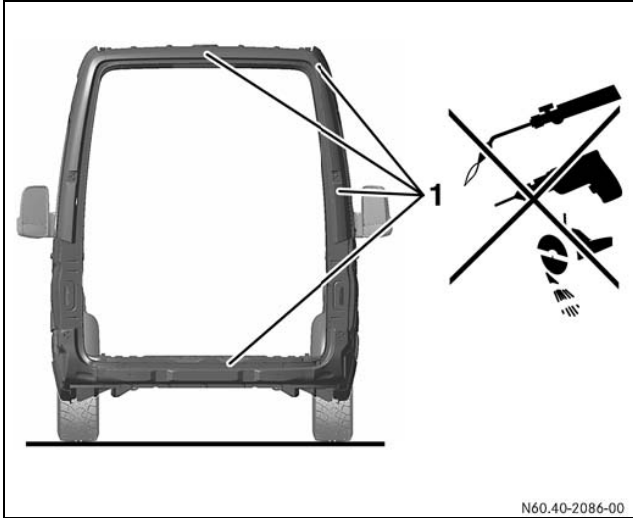
Do not modify the door body (see illustration).



Door, showing sensor system

- 1 Pressure sensor (trigger sensor of the occupant protection systems)

Do not modify the rear door opening including the roof area.



Rear door opening and roof area

- 1 Do not modify the above mentioned areas
- Seats in the passenger compartment or cabin must be directly accessible from the outside by a door or from the cab.
 - It must be possible to open locked doors quickly and easily from the inside.
 - The doors must open wide enough and the door entrances must be shaped in such a way as to enable persons to get in and out of the vehicle safely and comfortably.
 - The maximum permitted height of the bottom step above the road surface is 400mm [15.75 in].
 - Fittings must allow sufficient clearance to the interior door handles regardless of door position (trap guard).
 - Do not modify the central locking system or the immediate area around the door or in the area of the pillars or cross members.

Upon completion of all work on the vehicle, body builder must comply with the specified corrosion protection measures (→ chapter 5.3).

7.2.6. End frame cross member

If special-purpose bodies are mounted, the end panel cross member can be ordered as an option. (Option Q18).

Upon completion of all work on the vehicle, body builder must comply with the specified corrosion protection measures (→ chapter 5.3).

Comply with all applicable FMVSS/CMVSS guidelines and regulations.

7.2.7. Roof structure

Warning

Do not modify the roof lining or the roof skin between the A-pillar and the B-pillar if the vehicle is equipped with window bags and thorax bags. Otherwise, the window bag and thorax bag deployment may be delayed or incomplete, in case of an accident it may lead to serious injury or death. The roof load-bearing capacity is limited (see table).

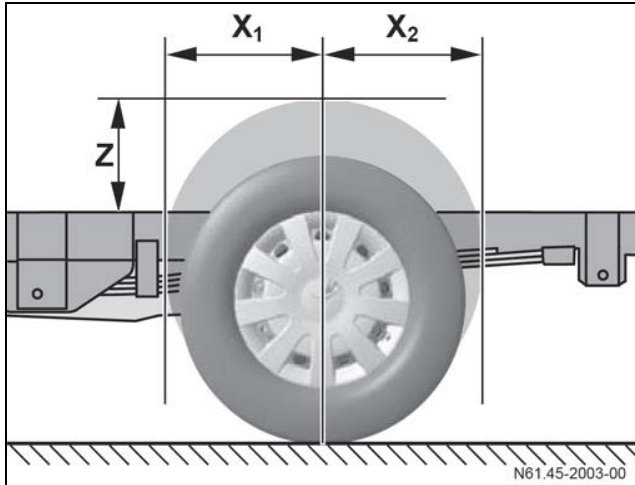
Do not remove or modify roof bows or roof structure.

Maximum roof loads		
Cargo Van kg / [lbs]	High Roof Cargo Van kg / [lbs]	Mega Roof Cargo Van kg / [lbs]
300 / [660]	150 / [330]	0

Do not exceed the vehicle's maximum center of gravity limits.

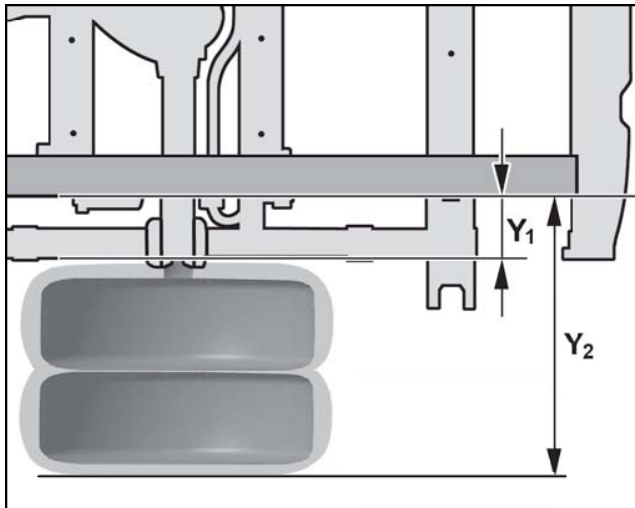
7.2.8. Tire Clearance Chassis-Cab

Ensure that there is sufficient space between the tire and the mudguard or wheel wells with snow chains fitted and the suspension completely compressed (allowing for axle twist).



Tire clearance (side view)

- X_1 clearance from center of rear axle forward
- X_2 clearance from center of rear axle backward
- Z dimension from top of frame



Tire clearance (top view)

- Y_1 clearance from frame to inner tire
- Y_2 clearance from frame to outside of outer tire

The minimum required wheel clearance is measured from the closest body member to the upper and lower chord of the longitudinal frame member on Chassis Cab vehicles including snow chain clearance on outer tire.

Rear Axle Chassis Cab 215/85 R16	Dimensions mm [in]	Dimension for snow chain mm [in]
X_1	425 [16.75]	425 [16.75]
X_2	425 [16.75]	425 [16.75]
Y_1	110 [4.3]	110 [4.3]
Y_2	640 [25.2]	640 [25.2]
Z	245 [9.75]	280 [11.0]

7.2.9. Wheel well Cargo-Van

Warning

Do not modify the wheel wells on Cargo and Passenger vans.

Warning

Do not install seats on the wheel wells. Otherwise, the vehicle could be damaged as a result (e.g. wheel wells and tires).

Upon completion of all work on the vehicle, body builder must comply with the specified corrosion protection measures (→ chapter 5.3).

Modifications to the width of the wheel wells are not permitted.

7.3. Engine peripherals/drive train

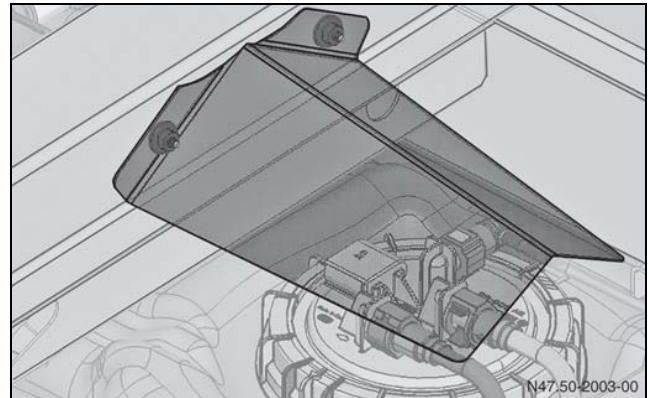
Maintenance and repair of the vehicle must not be hindered by the body.

7.3.1. Fuel system

Do not modify the fuel system

- The installation of heat conducting components, or of components that restrict the installation space, is not permitted.
- Do not modify the fuel pump, fuel line length or fuel line routing. Modifications to these components could impair engine operation because these components are matched to each other.
- Modification and attachments (e.g. additional eyelets) are not permitted in the vicinity of the fuel filler neck.
- If bodies are mounted on a Chassis Cab, a fuel level sensor shield is necessary when the fuel level sensor is not protected by the body.

If bodies are mounted on a Chassis Cab, the fuel level sensor may have to be protected against any falling cargo, depending on the body type. Otherwise damage could occur, rendering the vehicle unserviceable.



Fuel level sensor shield

The following must be observed if auxiliary Diesel powered generators are retrofitted:

- No sharp edges permitted
- Fuel lines must be secured
- Exhaust fumes must not be directed into the vehicle interior

For connections supplying fuel to the auxiliary power generator, contact SEC.

A fuel tap is standard equipment on Diesel engines. A small 'pig tail' is routed to the right side of the fuel tank. This fuel tap will prevent the fuel tank from running empty.