SPRINTER

BODY BUILDER INFORMATION BOOK

Model series 906

Date of publication:

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1. Introduction

This is the Body Builders Information Book for Mercedes-Benz USA LLC (MBUSA) and Mercedes-Benz Canada (MBCAN) and Daimler Vans USA LLC (DVUSA) Mercedes-Benz SPRINTER & Freightliner SPRINTER Vans and Chassis Cabs.

This publication provides Body Builders who modify or install equipment in Mercedes-Benz Sprinters & Freightliner Sprinters (**"SPRINTER"**) Engineering specifications and assists them with their regulatory responsibilities.

The specifications and descriptions contained in this book, including regulatory information, are believed to be accurate at time of publication. Nevertheless Body Builders should consult with legal counsel to ensure compliance of pertinent laws and regulations. Periodically, this book will be updated as new products are introduced and additional information regarding these products become available.

Upon written requests MBUSA, MBCAN and DVUSA designee set forth below will provide certain additional technical data.

SPRINTER ENGINEERING USA/Canada

Contact information see page 19.

Prior to making any modifications to or installing any equipment in or on a SPRINTER, read this Information Book, and if necessary consult with SPRINTER ENGINEERING USA/Canada.
Copies of this book and technical bulletins may be obtained through the following website:

www.sprinter-engineeringcompliance.com

For options and model information please visit the following Websites:

www.sprintervansusa.com

1.1. The aim of the Body Builder Information Book

The Design of the Body Builder Information Book is divided into 10 interlinked sections to help find the required information more quickly:

1. Introduction
2. General
3. Planning of bodies
4. Technical Limit in values for planning
5. Damage prevention
6. Electrics/electronics
7. Modifications to the basic vehicle
8. Design of bodies
9. Calculating the center of gravity

Further information and technical data is available in 2D drawings as separate documents in the aforementioned website.

The table of content in this PDF format is linked to help find the required information more quickly.

Ensure that the limiting values selected in Section 4 are observed as design planning must be based on these values.

The sections entitled "Modifications to the basic vehicle" and "Body Design" are the main sources of technical information contained in this Body Builder Information Book.

1.2. Vehicle Safety

Warning

Before installing bodies, attaching, mounting, installing or modifying assemblies, please read the relevant section of the detailed Operating Instructions concerning installation work. You could other wise fail to recognize dangers, which may cause serious injury or death.

Notes on vehicle safety

We recommend that you only use parts, assemblies, conversion parts and accessories that have been recommended by MBUSA MBCAN and DVUSA for the type of vehicle concerned.
Any modifications to the vehicle that change the vehicle's certification could endanger road users, or adversely affect exhaust emissions or noise.

The use of parts, assemblies, conversion parts or accessories that have not been recommended may jeopardize the safety of the vehicle.

Ensure that you comply with all applicable regulations as retrofitted equipment on or modifications the vehicle will change the vehicle and may invalidate the vehicle's certification.

1.3. Operating Safety

Warning

Work incorrectly carried out on equipment and its software could prevent this equipment from working. 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.

Have work on or modifications to electronic components carried out at a qualified specialist workshop which has the necessary expertise and tools to carry out the work required.

We recommend that you use an authorized Mercedes-Benz SPRINTER or Freightliner SPRINTER Service Centers for this purpose. In particular, work relevant to safety or on safety related systems must be carried out by a qualified specialist workshop.

Some of the safety systems only function when the engine is running. For this season, do not switch off the engine when the vehicle is in motion.
Shutting the vehicle off while in motion impairs the vehicle brake system, driving stability and handling characteristics and may cause serious injury or death.

1.4. Regulatory Requirements:

The U.S and Canadian Governments have established emission standards and motor vehicle safety standards for new engines and/or new vehicles and equipment, under the provisions of the Clean Air Act, the Noise Control Act and the National Traffic and Motor Vehicle Safety Act in the U.S., and the Canadian Motor Vehicle Safety Act in Canada ("Acts"). The acts govern original equipment manufacturers of the Mercedes-Benz SPRINTER & Freightliner SPRINTER vans, dealers, Body Builders and others engaged in the manufacturing and marketing of new motor vehicles and equipment.

Specifically, Part 568 of the Title 49 Code of Federal regulations (CFR) specify detailed regulatory requirements for vehicles manufactured in two or more stages, including Final Stage Manufactures. This document is intended to fulfill a part of Daimler AG's obligations as the original equipment manufacturer or as an incomplete vehicle manufacturer. Section Emission and Safety (→ chapter 2.1), identifies regulatory requirements to assist Intermediate and Final Stage Manufacturers, in determining their obligations to conform to these standards.

Completed SPRINTERs "As Delivered", are certified to comply with the aforementioned applicable standards. Compliance labels affixed to SPRINTERs and engines, provide the status of initial compliance at the date of manufactured by Daimler AG (DAG).

Body Builders and Dealers who make any modifications which may affect the final certification of the engine, vehicle or equipment assume the sole responsibility for the vehicle.

Body Builders should consult with legal counsel concerning the final certification status of the vehicle.

Further it is the Body Builder's responsibility to ensure that such modifications do not affect the safety of the vehicle. Contact the Environment Protection Agency (U.S. EPA) & the California Air Resources Board (CARB) concerning the applicable U.S. & California exhaust emissions and noise standards, and the National Highway Traffic Safety Administration (NHTSA) concerning the applicable U.S. vehicle safety standards. For Canadian standards contact Environment Canada and Transport Canada respectively.

1. Upon completion of the modified vehicle, the Body Builder is required by law (Title 49 of the Code of Federal Regulations S567.7 in the United States, the Clean Air Act section 203(a), and under provisions of, EPA CFR Part 86 section 86.09911; Emissions standards for 1999 and later model year diesel heavy duty engines and vehicles) to certify that it continues to comply with all applicable Federal and Canada Motor Vehicle Safety standards/Regulations. In addition, the modified vehicle must continue to comply with all applicable Federal, Canada and/or California Emissions regulations. In the United States, sale of a non-complying new vehicle is illegal and is punishable by a fine of up $25,000 (Federal) and $5,000 (California) per vehicle for emissions non-compliance, $1,000 per vehicle for safety non-compliance, plus a recall and other sanctions.

2. The Body Builder is responsible for certifying the altered vehicle pursuant to Title 49 of the Code of Federal Regulations S567.7 and S568.8 in the United States or to Section 9 of the Canadian Motor Vehicle safety Regulations in Canada.

3. Daimler AG makes no representations with regard to conformity of the altered vehicle to any other Federal or Canada Motor Vehicle Safety Standards or Regulations that may be affected by the vehicle alteration; it is the responsibility of the Body Builder to certify that the vehicle conforms to any other standards affected by the vehicle alteration.

1.5. Definitions

Body Builders include Final-Stage Manufactures, intermediate Manufacturers, incomplete Vehicle Manufacturers, Vehicle Alters and component suppliers.

Complete Vehicle means a vehicle that requires no further manufacturing operations to perform its intended function, other than the addition of readily attachable components, such as mirrors, tires or tire and rim assemblies, of finishing operations such as painting.

Completed SPRINTERs “As Delivered” means SPRINTERs manufactured by Daimler AG reassembled if necessary by Daimler AG’s designee, certified to comply with all applicable laws and regulations and delivered as a complete vehicle (Cargo & Passenger Vans, Chassis Cab) to Dealers, Body Builders and others engaged in the manufacturing and marketing of new motor vehicles and equipment.

Daimler Group (DG) Parts means genuine parts, accessories for installation on or attached to vehicles, components, aggregates, assemblies, including those for exchange or replacement which are supplied by or through MBUSA, MBCAN & DVUSA or any of its parent companies, affiliates or subsidiaries.

Dealers mean entities authorized by MBUSA, MBCAN & DVUSA to sell and/or service SPRINTERs.

Final-Stage Manufacturer means a person who performs such manufacturing operations on an incomplete vehicle that it becomes a completed vehicle.

Incomplete Vehicle means an assembly consisting, as a minimum, of a frame and chassis structure. Power train, steering system, suspension, system and braking system, to the extent that those systems are to be part of the competed vehicle, that requires further manufacturing operations, other than the addition of readily attachable components, such as mirrors or tire and rim assembles, or minor finishing operations such as painting, to become a Completed Vehicle.

Incomplete Vehicle Manufacturer means a person who manufactures an incomplete vehicle by assembling components none of which, taken separately, constitute an incomplete vehicle.

Vehicle Alterer is a person or company who modifies a previously certified vehicle other than by the addition, substitution or removal of readily attachable components. Readily attachable components can mean mirrors, tire and rim assemblies, or minor finishing operations such as painting.

1.6. Warranty and Vehicle Safe Operation:

Daimler AG requires the use of Genuine DG parts and DG replacement & conversion Parts, or replacement & conversion Parts and accessories expressly approved by the SPRINTER Van Manufacturer in order for Body Builders to maintain regulatory compliance of these components or equipment as well as the durable and safe operation of SPRINTERs. In areas beyond regulatory compliance, Body Builders may elect to use other parts or conversion parts or accessories and assume the Manufacturers’ warranty of these parts themselves.

If these conversion parts cause damage to the original DG Parts, the warranty of these original DG Parts is void. It is the Body Builder’s responsibility to ensure that non-approved replacement conversion parts & accessories do not render the vehicle unsafe.

2. General

2.1. Emissions and safety information

A complete SPRINTER Van "As Delivered" or a Chassis Cab, i.e. an incomplete vehicle, delivered by MBUSA, MBCAN & DVUSA to Dealers or Body Builders is certified for by Daimler AG for compliance with the U.S. and Canadian emissions and safety standards at the time of manufacture. If this vehicle is altered, after delivery by MBUSA, MBCAN & DVUSA, Body Builders and/or Dealers assume the regulatory responsibility for certification

This section provides general information concerning applicable emissions and safety standards at the time of the vehicle manufacture. This section is written to assist Body Builders in understanding the U.S. EPA and the CARB exhaust emission and noise standards, Federal Motor Vehicle Safety Standards (FMVSS) and Canadian Motor Vehicle Safety Standards (CMVSS). SPRINTER ENGINEERING neither approves nor recommends any modifications or additions to the SPRINTER vehicle, which may cause noncompliance with any EPA or FMVSS or CMVSS standards, or render the vehicle unsafe.

Questions concerning the content of this Section can be directed to MBUSA, MBCAN or DVUSA designee set forth below:

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Compliance Support Management
SPRINTER Engineering & Compliance
Mercedes-Benz USA
FAX: 843-695-5127

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Product Compliance Manager
Mercedes-Benz Canada, Inc.
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Engine calibrations such as fuel output settings, injection timings, emission control device calibration and location, charge air and cooling system calibration and locations are prohibited from any alterations from the certified configurations.

Provisions of the Cleao Air Act also prohibit any persons, including but not limited to, Dealers or Body Builders to remove or render inoperative any devices or elements of design installed in a motor vehicle engine in compliance with the regulations. Please refer to Section Exhaust System (→ chapter 7.3.2) for further information.

2.1.1. Vehicle noise emission control information

The Noise Control Act of 1972 and the 40 CFR Part 205 U.S. EPA regulations, "Transportation Noise Emission Controls", require new medium and heavy trucks over 10,000lbs. GVWR to comply with an exterior drive-by noise standard of 80 dB(A). In Canada, CMVSS 1106 Noise Emissions Standard requires an additional interior sound level certification at 90 dB(A).

All SPRINTER vehicles come equipped with extensive NVH equipment.

Body Builder should, however, consult with an attorney concerning interpretations of the applicable laws and regulations and determine if the modification Body Builder made the SPRINTER may affect the final certification of compliance of the vehicle. Further, it is the Body Builder's responsibility to ensure modifications do not render the vehicle unsafe.

2.1.2. Exhaust emission control information

The sprinter engines, Mercedes-Benz OM642, are certified with the U.S. EPA, and the Environment Canada and CARB, to comply with the heavy-duty diesel engine exhaust emission standards under Title II, Section 206 of the Clean Air Act and 40 CFR Part 86 regulations. Proof of this EPA certification is shown by an exhaust emission control label, i.e., an "important Engine information" label, (→ chapter 2.6), affixed to the rocker cover of the engine for diesel powered vehicles and VEC I label affixed to the front cross member for gasoline power vehicles.

Provisions of the EPA regulations require that the emission-related components functions in-use over the prescribed full useful life period as certified, i.e., 8 years or 110,000 miles, whichever occurs first. To be certain that these components function properly, the end users are required to use appropriate fuels and lubricants and maintain these components properly in accordance with the Operator's Manual and Service Booklet.

In addition, applicable noise control packages, which were tested at over 100% reduction in noise levels below the aforementioned noise standards. Final Stage Manufactures should consult with their attorney concerning the compliance of their vehicles with appropriate regulations and laws, once they are altered or modified. The law and regulations prohibit tampering with noise control devices or components.

Specifically, the removal or rendering inoperative of any devices or elements of design incorporated into any new vehicle for the purpose of noise control is not permitted. Such devices or elements are identified as noise emission related components, such as engine calibrations including governor settings, exhaust system components, air induction system components, radiator, shield, fan/drive, noise shields or acoustical absorptive material, etc.

The regulations also require maintenance of the noise control performance in use, to comply with the U.S. EPA 40 CFR Part 202, or DOT 49 CFR part 325, Exterior Drive-By Noise Emission Standards for Interstate Motor Carrier.

2.2. Vehicle safety standards information

In the U.S. National Traffic and Motor Vehicle Safety Act of 1966 and NHTSA's FMVSS regulations and in Canada, Motor Safety Act of 1993 and Transport Canada's (TC) CMVSS, identify certain requirements and certification responsibilities for the various stages of vehicle manufacturing.

Therefore, Body Builders and Dealers need to review all regulatory requirements carefully to ensure compliance with applicable standards.

Please consult with an attorney to ensure compliance with applicable laws or standards.

2.2.1. FMVSS 101/CMVSS 101

This vehicle, when completed, will conform to Standard 101. Controls and Displays, provided that no alterations are made to the vehicle controls, which are installed on the vehicle and covered by the standard Alterations include location identification and/or illumination of the controls.

2.2.2. FMVSS 102/CMVSS 102

This vehicle, when completed, will conform to Standard 102, Transmission Shift Level Sequence, Starter Interlock and Transmission Braking Effect, if no alterations are made to the transmission, transmission controls, connecting linkages and cables, starting motor wiring or plumbing, neutral safety switch and ignition or equivalent switch and related wiring, or shift level position identifications.

2.2.3. FMVSS 103/CMVSS 103

This vehicle, when completed, will conform to Standard 103, Windshield Defrosting and Defogging Systems, if no alterations are made to the windshield defrosting and defogging systems, controls, wiring plumbing, vehicle heater assembly, or the airflow to the windshield.

2.2.4. FMVSS 104/CMVSS 104

This vehicle when completed will conform to Standard 104, Windshield Wiper and Washing System, if no alterations are made to the windshield wiper arms, blades, washer, control, wiring, or plumbing.

2.2.5. FMVSS 105/CMVSS 105

This vehicle, when completed, will conform to Standard 105, Hydraulic Brake System, if none of the gross axle (GAWR) or gross vehicle weight ratings (GVWR) are exceeded, and if no alterations are made to affect the braking system, hydraulic system components and fittings, the anti lock system components or electrical circuitry, tire size, or wheelbase. In addition, the center of gravity after modifications, or the combined centers of gravity of all added items by subsequent manufacturers must conform to requirements (→ chapter 9) of the Body builders Information Book on Calculation of Center of Gravity after Modifications.

2.2.6. FMVSS 106/CMVSS 106

This vehicle when completed will conform to Standard 106, Brake Hoses, if no alterations are made to the hydraulic brake hoses, brake hose assemblies, or the brake hose fittings including the labeling on these components.

2.2.7. FMVSS 108/CMVSS 108

This vehicle, when completed, will conform to Standard 108, Lamps, Reflective Devices, and Associated Equipment, if no alterations are made to lamp assemblies and/or their mountings, or Reflective devices and/or their mountings and no obstructions are installed which limit visibility of any items.

2.2.8. FMVSS 110/CMCSS 110

The completed SPRINTER as delivered starting with production date of September 2004 conforms to standard 110, tire selection and rims specially concerning (→ chapter 4.2) placard requirement, if no alterations are made to affect tire, GVWR, seating capacity and combined weight of occupants and cargo.

2.2.9. FMVSS 111/CMVSS 111

This vehicle, when completed, will conform to Standard 111, Rearview Mirrors, if no alterations are made to mirrors, mounts, locations or cab structures, or no obstructions are installed which limits the full function of these mirrors.

2.2.10. FMVSS 113/CMVSS 113

This vehicle, when completed, will conform to Standard 113, Hood Latch Systems, if no alterations are made in the hood latches, including the attachments to the hood latches.

2.2.11. FMVSS 114/CMVSS 114

This vehicle, when completed, will conform to Standard 114, Theft Protection, if no alterations are made to the steering column lock, transmission shift linkage, ignition switch interlock or the audible key-left-in warning systems.

2.2.12. FMVSS 116/CMVSS 116

This vehicle, when completed, will conform to Standard 116, Motor Vehicle Brake Fluids, if no alterations, substitutions, or introduction of foreign materials are made to the brake fluid. Use only heavy duty fluid, DOT 4+, if additional fluid is needed.

2.2.13. FMVSS 118/CMVSS 118

If so equipped, this vehicle, when completed, will conform to standard 118, Power-Operated Window, Partition, and Roof Panel Systems, if no alterations are made to the power window and related electrical systems. Additional compliance with the Standard 118 is necessary, if subsequent alterations or installations are made.

2.2.14. FMVSS 119/CMVSS 119

This vehicle, when completed, will conform to Standard 119, New Pneumatic Tires for Motor Vehicles Other Than Passenger Cars, if tires maximum load ratings are not exceeded, and no alterations or substitutions of tires, including labeling are made.

2.2.15. FMVSS 120/CMVSS 120

This vehicle, when completed, will conform to Standard 120, Tire Selection and Rims for Motor Vehicles Other Than Passenger Cars, if the GAWR or GVWR are not exceeded and no alterations or substitutions are made to tires, rims or labeling.

2.2.16. FMVSS 124/CMVSS 124

This vehicle, when completed, will conform to Standard 124, Accelerator Control Systems, if no alterations are made to any components of the throttle control or fuel metering system.

2.2.17. FMVSS 201/CMVSS 201

This vehicle, when completed, will conform to Standard 201, Occupant Protection in Interior Impact, if no alterations are made to the instrument panel, instrument panel interior compartment door, front door-mounted armrests, sun visors, seats and armrests, or other interior trims. Vehicles ordered with a D62 (Cargo Partition Provision) option, must be retrofitted with a partition wall to comply with this Safety Standard.

2.2.18. FMVSS 202/CMVSS 202

This vehicle, when completed, will conform to Standard 202, Head Restraints, if no alterations are made to the seat or heat restraint.

2.2.19. FMVSS 203/CMVSS 203

This vehicle, when completed, will conform to Standard 203, Impact protection for the driver from the steering control system, if no alterations are made to the steering control system or any of its components.

2.2.20. FMVSS 204/ CMVSS 204

This vehicle, when completed, will conform to Standard 204, Steering Control Rearward Displacement, if no alterations are made to the steering control system, including but not limited to steering wheel, steering column assembly, front structure, bumper and attaching parts, or any frontal components.

2.2.21. FMVSS 205/ CMVSS 205

This vehicle, when completed, will conform to Standard 205, Glazing Materials, if no alterations are made in the glazing material installed in the windshield, or windows of the cab, or of the passenger compartment.

2.2.22. FMVSS 206/ CMVSS 206

This vehicle, when completed, will conform to Standard 206, Door Locks and Door Retention Components, if no alterations are made to the door assembly, door latches, door hinges, door locks, door latch posts, door hinge posts, other attachments or supporting cab structure.

2.2.23. FMVSS 207/CMVSS 207

This vehicle when completed will conform to Standard 207, seating systems, if no alterations are made to the seats, seat tracks, and seat adjusters, restraining devices, release and adjustment controls, seat risers and supports, or the cab floor and supporting structure.

2.2.24. FMVSS 208/ CMVSS 208

This vehicle when completed will conform to Standard 208, Occupant Crash protection, if no alterations are made to the seat locations, seat belt assemblies, seat belt anchorages, seats, seating anchorages, cab and supporting structure, cab underbody, or if no change is made in the number of designated occupants' seating positions provided.

2.2.25. FMVSS 209/ CMVSS 209

This vehicle, when completed, will conform to Standard 209, Seat Belt Assemblies, if no alterations are made to the seat belt assemblies, seat belt anchorages and attachments, or the cab structure to which the anchorages are attached.

2.2.26. FMVSS 210/ CMVSS 210

This vehicle, when completed, will conform to Standard 210, Seat Belt Assembly Anchorages, if no additional occupant seats or seat belt assembly anchorages are installed, or if no alterations are made to the anchorages or related structure components.

2.2.27. FMVSS 212/ CMVSS 212

This vehicle, when completed, will conform to Standard 212, Windshield Mounting, if maximum unloaded vehicle weight does not exceed 7,400 lbs., or if no alterations are made to the windshield or the windshield mounting system.

2.2.28. FMVSS 214/CMVSS 214

The doors of the vehicle, when completed, will conform to Standard 214, Side Impact Protection, if no alterations are made to the doors, door frames, door latches, door hinges or mountings.

2.2.29. FMVSS 219/ CMVSS 219

This vehicle, when completed, will conform to Standard 219, Windshield Zone Intrusion, if maximum unloaded vehicle weight does not exceed 7,400 lbs., and if no alterations are made to the hood mounting system and the “protected zone” is not penetrated.

2.2.30. FMVSS 220/ CMVSS 220

This vehicle, when completed, will conform to Standard 220, School Bus Rollover Protection, if no alterations are made to the roof panel and its supporting structure. Including roof rails, front header, roof bows or roof pillars, the door window frames, the windshield or its mounting system or any window frame, subsequent to the delivery by Daimler AG.

2.2.31. FMVSS 301/ CMVSS 301

This vehicle, when completed, will conform to Standard 301, Fuel System Integrity, if the maximum unloaded vehicle weight does not exceed 7,400 lbs., or if no alterations are made to the fuel system or fuel filler pipe assembly. This Standard is not applicable to SPRINTERs rated above 10,000 lbs. GVWR.

2.2.32. FMVSS 302/CMVSS 302

This vehicle, when completed, will conform to Standard 302, Flammability of Interior Materials, if no alterations are made to any interior materials or if no conforming interior materials are added to the interior of the vehicle.

2.3. Vehicle and model designations

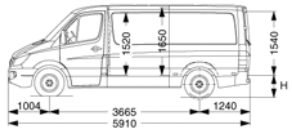
Mercedes Model	Freightliner Model	Description
M2CA144	F2CA144	SPRINTER 2500 Van 144" WB
M2CA170	F2CA170	SPRINTER 2500 Van 170" WB
M2CA170E	F2CA170E	SPRINTER 2500 Van 170" WB Ext
M3CA144	F3CA144	SPRINTER 3500 Van 144" WB
M3CA170	F3CA170	SPRINTER 3500 Van 170" WB
M3CA170E	F3CA170E	SPRINTER 3500 Van 170" WB Ext
M2PV144	F2PV144	SPRINTER 2500 Passenger Van 144" WB
M2PV170	F2PV170	SPRINTER 2500 Passenger Van 170" WB
M3CC144	F3CC144	SPRINTER 3500 Chassis Cab 144" WB
M3CC170	F3CC170	SPRINTER 3500 Chassis Cab 170" WB

Note:
All 3500 SPRINTERs come with Dual Rear Wheels as standard
Roof heights are sales codes
GVWR 11,030 lbs is sales code

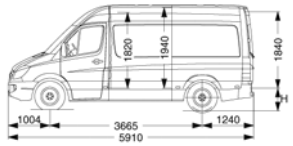
2.4. Vehicle and model designation

2500 Cargo SPRINTER with 8550 GVWR

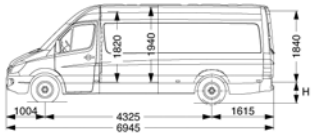
906.633
144” WB Low roof



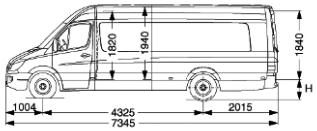
906.633 (D03)
144” WB High Roof



906.635 (D03)
170” WB High Roof

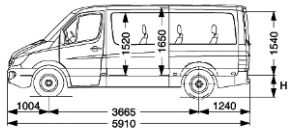


906.637 (D03)
170” WB ext High Roof

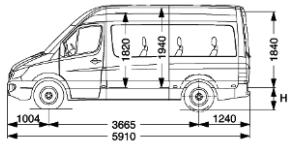


2500 Passenger SPRINTER with 8550 GVWR

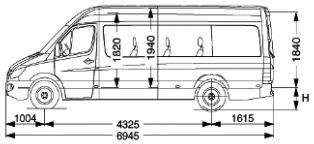
906.733
144” WB Low Roof



906.733 (D03)
144” High Roof

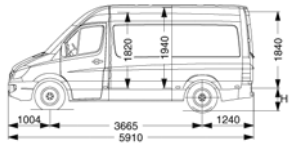


906.735 (D03)
170” WB High Roof

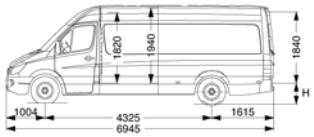


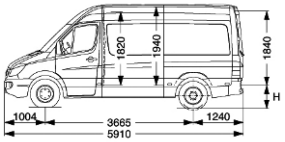
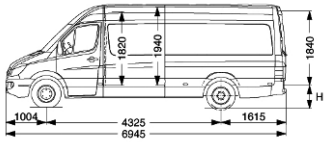
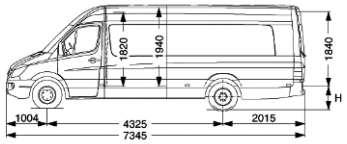
2500 Crew Van SPRINTER with 8550 GVWR

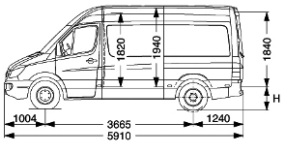
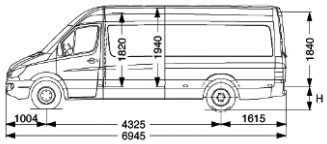
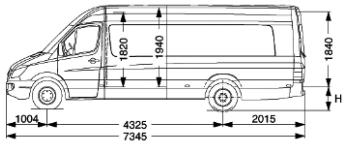
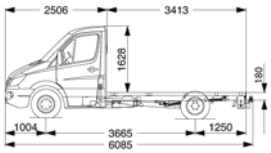
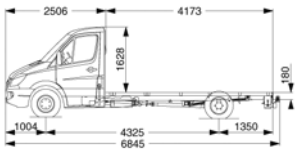
906.633 (D03)
144” WB High Roof



906.635 (D03)
170” WB High Roof



3500 Cargo SPRINTER with 9990 GVWR		
906.653 (D03) 144” WB High Roof	906.655 (D03) 170” WB High Roof	906.657 (D03) 170” WB ext High Roof
		

3500 Cargo SPRINTER with 11030 GVWR		
906.653 (XB5, D03) 144” WB High Roof	906.655 (XB5, D03) 170” WB High Roof	906.657 (XB5, D03) 170” WB High Roof
		
3500 Chassis Cab SPRINTER with 11030 GVWR		
906.153 144” WB Low Roof	906.155 170” WB Low Roof	
		

3500 Heavy Duty Cargo Van is sales code

Body code	GVWR
XB5	11030

2.5. Vehicle Identification Number (VIN) Coding Summary

For Mercedes-Benz SPRINTER / Freightliner SPRINTER Vans

Manufacturer Daimler AG, Stuttgart/Germany

VIN Position	Content
1-3	World Manufacturer Identification (WMI)
4	Chassis Configuration
5-6	Model, Wheelbase, GVWR
7-8	Engines, Brakes
9	Check Digit
10	Model Year
11	Plant of Manufacture
12-17	Vehicle Serial Number

VIN Positions 1, 2, & 3:

Code	Manufacturer	Make	Type
WDA	Daimler AG	Mercedes-Benz	Incomplete Vehicle
WD3	Daimler AG	Mercedes-Benz	Truck
WDZ	Daimler AG	Mercedes-Benz	Bus
WDP	Daimler AG	Freightliner	Incomplete Vehicle
WDY	Daimler AG	Freightliner	Truck
WCD	Daimler AG	Freightliner	Bus

Chassis Configuration - VIN Position 4:

Code	Chassis Configuration / Intended Market
P	All 4x2 Vehicle Types / U.S.
B	All 4x2 Vehicle Types / Canada

Model, Wheelbase, GVWR - VIN Positions 5 & 6:

Code	Model	Wheelbase	Wheel Size	GVWR
E7	C2500/P2500	3665mm	16 in.	8,000lbs to 9,000 lbs. Class G
E8	C2500/P2500	4325mm	16 in.	8,000lbs to 9,000 lbs. Class G
F0	C3500	3665mm	16 in.	9,000lbs to 10,000 lbs. Class H
F1	C3500	4325mm	16 in.	9,000lbs to 10,000 lbs. Class H
F3	C3500/3500C	3665mm	16 in.	10,000lbs to 14,000 lbs. Class 3
F4	C3500/3500C	4325mm	16 in.	10,000lbs to 14,000 lbs. Class 3

Engines, Brake - VIN Positions 7:

Code	Engine	Fuel	Displ./Config.	Brake
A	MP0	Diesel	3.0L/V6	Hydraulic
B	MG5+MH1 EPA 2010	Diesel	3.0L/V6	Hydraulic

Restarint Systems - VIN Positions 8:

Code	Airbag Position:
A	None
B	SA5 airbag for driver
C	SA5 + SA6 airbag for driver and co-driver
D	(SA5 + SA6 + (SH6 / SH7) + SH9) side-airbag for driver or driver and co-driver window airbags

Check Digit - VIN Position 9:

Calculated from a mathematical computation of all other VIN characters

Model Year - VIN Position 10:

Code	Model Year
A	2010
B	2011
C	2012

Plant of Manufacture - VIN Position 11:

Code	Build Location
5	Duesseldorf, Germany
9	Ludwigsfelde, Germany

Vehicle Serial Number - VIN Position 12-17:

Sequentially assigned vehicle serial number at Plant of Manufacture

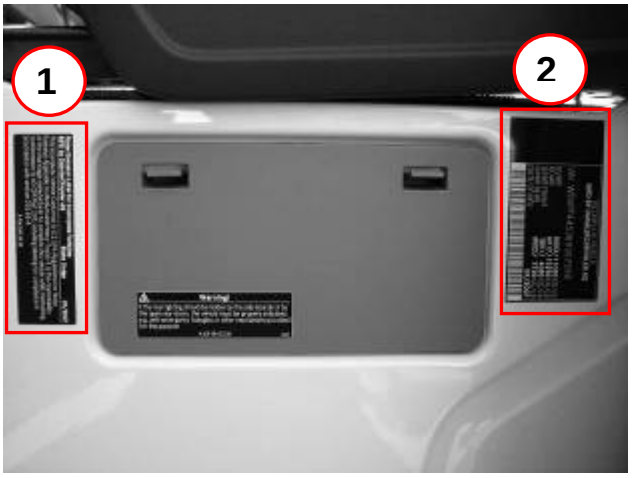
2.6. Labels

The following compliance labels are affixed at the locations noted in diagrams below.

1. VIN Plate
2. Safety Certification Label
3. Exhaust Emission Control Information Label
4. Complete Vehicle Certification Label
5. Incomplete Vehicle Certification Label
6. Air Bag Warning Label
7. Tire and Loading Information Label
8. UVW Unloaded vehicle weight rating

1. VIN Plate

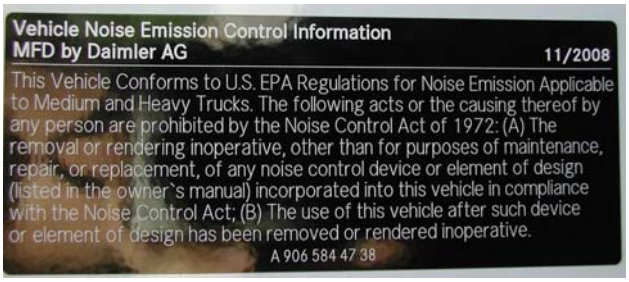
1. Vehicle Identification number
   Location: left lower edge of windshield



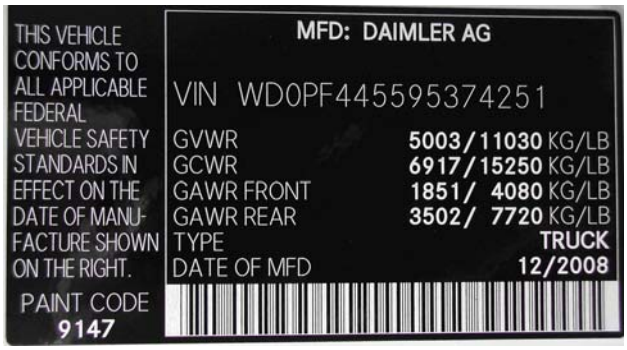
2. Safety Label location

1. Noise Emission Label
2. Safety Certification Label

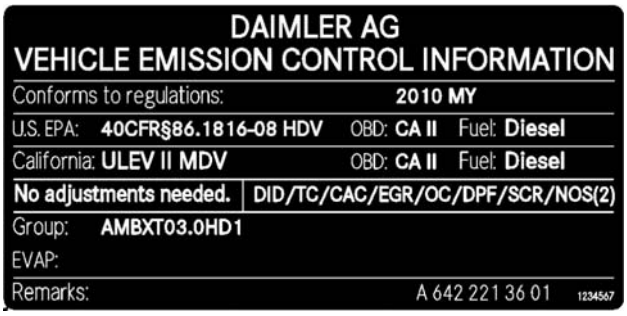
Location: below driver seat, outward facing



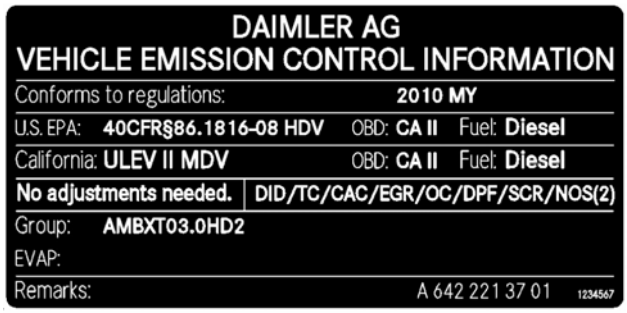
3 Noise Emission Label (example)
Location: below driver's seat, outward facing



4. Complete Vehicle Safety Label (example)
Location: below driver's seat, outward facing

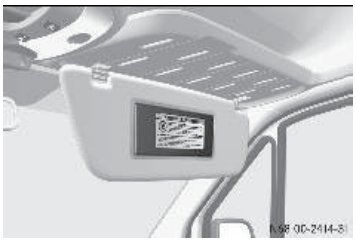


Below 10,000GVWR (radiator cowling)

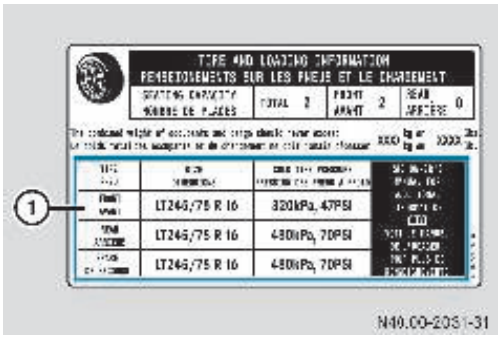


Above 10,000GVWR (radiator cowling)

5. Exhaust Emission Control Information Label
Location: on radiator cowling



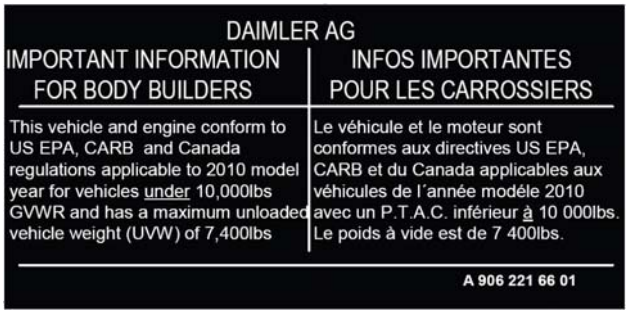
6. Airbag Warning Label
Location: on sun visor



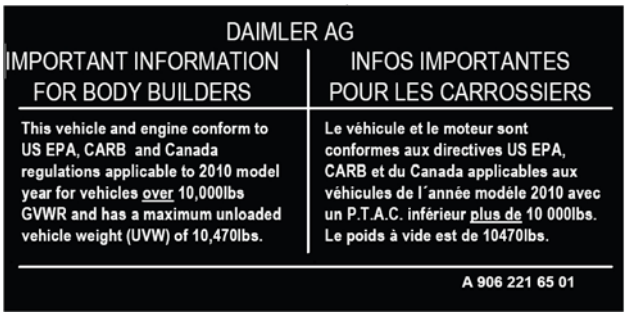
7. Tire and Loading Information (example)
Location: on driver's door frame

NOTE: Data shown on label are for illustration purposes only. Load limit data and seating data are specific to each vehicle and may vary from data shown in the illustration. Refer to label on vehicle for actual data specific to your vehicle.

For Tire and Loading Information, (→ chapter 7.1.5)



Below 10,000 GVWR (radiator cowling)



Above 10,000 GVWR (radiator cowling)

8. Unloaded Vehicle Weight UVW rating

2.7. Granting of body technical assistance

Modifications by Body Builders must not affect safety of the SPRINTER. MBUSA, MBCAN and DVUSA, through their designee, SPRINTER ENGINEERING will offer technical assistance concerning SPRINTER vans and Sprinter Chassis Cab, including technical data & drawings and product info brochures, but it is the responsibility of Body Builders to ensure modifications do not affect safety of the vehicle.

MBUSA, MBCAN and DVUSA, through their designee, SPRINTER ENGINEERING, neither approves nor disapproves SPRINTER modifications or equipment installations made by Body Builders, or Dealers nor others since MBUSA, MBCAN, DVUSA, and their designee, SPRINTER ENGINEERING, do not control such Body Builders, manufacturing techniques nor assume the responsibility as the final stage manufacturer and consequential product liability.

To obtain technical assistance or information, please contact MBUSA, MBCAN and DVUSA's designee:

SPRINTER ENGINEERING
8501 Palmetto Commerce Parkway
Ladson, SC 29456

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

Name:	Andreas J. Brockmann
	Support Engineer
Dept:	SPRINTER Engineering Support
Telephone:	(843) 695-5052
E-mail:	andreas.j.brockmann@daimler.com

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

2.8. Body builder responsibilities

Each completed SPRINTER "As Delivered" in the U.S. is certified for the U.S. EPA or CARB exhaust emissions in accordance with 40 CFR Part 86, or Title 13 of CCR, and an exhaust emission control information label is affixed thereto. While the complete SPRINTER van "As delivered" is certified to comply with the applicable FMVSS safety regulations in accordance with 49 CFR Section 567.4 and a complete vehicle certification label is affixed thereto, the Chassis Cab is certified to comply with the applicable FMVSS safety regulations in accordance with 49 CR Section 567.5 and 568.4 and an incomplete vehicle certification label is affixed thereto.

In addition, every individual SPRINTER Chassis Cab contains an incomplete vehicle documentation information packet. SPRINTER vehicles intended for Canada are similarly certified and labeled in accordance with the Canadian regulations.

Once these SPRINTER vehicles are altered or completed with the installation of additional equipment, Body Builders assume the responsibility of final certification to all applicable emissions and safety regulations, including labeling and documentation, affected by their modifications.

→ Chapter 2.2 of this Book provides Body Builder with general information concerning these modifications. Provisions of 49 CFR Sections 567.5 through 567.7, and 568.8 specifically set the regulatory responsibility for the Body Builders to comply with the vehicle safety standards. Body Builders should consult with legal counsel concerning these responsibilities.

Any alterations or installations by Body Builders must comply with the following:

- Do not alter or modify SPRINTER components forward of the rear cab wall for Chassis Cab or forward of the seating reference point for SPRINTERs, unless modifications are approved component installations (such as air conditioning, radio, etc) which are manufactured, approved or endorsed by Daimler AG, MBUSA, MBCAN, DVUSA or their designee, SPRINTER ENGINEERING.
- Do not alter the location or impair functional reliability and or the clearance of all movable chassis components, i.e., axles, springs, drive shafts, steering systems, braking systems, gearshift linkages, exhaust systems, etc.
- Do not drill, alter, impair or damage the frame top and bottom flanges.
- Do not alter, damage, or relocate the SPRINTER fuel system, seat belt assemblies and anchorages, braking system and steering.
- Do not impair the operational reliability, road worthiness and drivability of the SPRINTER by body or accessory equipment installation of modification.

Body Builder is responsible for ensuring that modification or equipment installation does not affect the safety of the SPRINTER. MBUSA, MBCAN, DVUSA, and SPRINTER ENGINEERING are not responsible for any final certification or claims sounding in product liability or warranty claims, which result from any component, assembly, or system being altered, or which cause non-compliance with any of the emission control standards of motor vehicle safety standards, or which would otherwise cause the vehicle to be or become defective or unsafe.

2.9. Vehicle rollover stability information

Rollover stability is an important consideration in the safety design of a vehicle. Stability is influenced by many factors including chassis and body configuration, suspension, axle track width, tire size, tire pressure, etc. The cargo type and weight (payload), the body size, shape, and center of gravity height are particularly important. Therefore, alterations or installation of additional equipment to the SPRINTER vehicles by any Body Builder or intermediate and/or Final-Stage Manufacturer may affect rollover stability of the vehicle.

The office of Vehicle safety Research at NHTSA has conducted research and established guidelines to improve rollover stability. Body Builders are advised to consult with that Office and / or visit the NHTSA website for more information.

3. Planning of Bodies

When designing bodies in addition to a user-friendly and maintenance friendly design, the careful choice of materials and, in consequence, the associated corrosion protection measures are of great importance.

3.1. Selecting the chassis

In order to ensure safe operation of the vehicle, it is essential to choose the chassis carefully in accordance with the intended use. Planning should therefore consider the following items in particular and adapt them to the intended use:

- Wheelbase
- Engine
- Axle
- Maximum permissible gross vehicle weight (GVWR)
- Position of the center of gravity

Before carrying out any work on the body or modification work, the delivered vehicle must be reviewed to verify whether it fulfills the necessary requirements.

For more information on the chassis and body variants, see the "Model designation" section (→ chapter 2.4) or contact SPRINTER ENGINEERING.

3.1.1. Selecting the suspension package

Suspension Package I


Chassis Cab:
- Ambulance
- Armored Vehicles
- Shuttle Bus
- Box Body
- Refrigeration Vehicle

Cargo Van:
- Shuttle Bus
- Refrigeration Vehicle
- Armored Vehicles
- Tail Lift
- Mobile work shops
- RV's on cargo van

Suspension Package II

Chassis Cab:
- RV's
- Box Bodies with Tail Lift
- All vehicles with high center of gravity will benefit

Suspension Package III


Chassis Cab:
- Platform Bodies
- Stake Bodies

Cargo Van:
- Ambulance

Suspension Package IV

Chassis Cab:
- Refrigeration vehicles with built-in shelving
- Car transporter

Warning

Do not use any aftermarket suspension components not approved by DG or SEC, including but not limited to air suspension. After market suspension components may have an adverse impact on the vehicle's stability, ESP function and may lead to frame damage. The driver could lose control of the vehicle and cause an accident and may cause serious injury or death.

3.2. Vehicle modifications

Before starting work on the body, the body builder must check whether:

- the vehicle is suitable for the planned body
- the chassis model and equipment are suitable for the operating conditions intended for the body

You can plan bodies by requesting 2D drawings from SPRINTER ENGINEERING, product information and technical data or you can retrieve this information from the communications system (→ chapter 1). Furthermore, you must note the optional equipment that is fitted by the Manufacturer.

Federal laws, guidelines and registration regulations must be complied with.

Adequate clearances must be maintained in order to ensure the function and operational safety of assemblies.

Warning

Do not carry out any modifications to the steering or brake system. Any modifications may result in these systems malfunctioning and ultimately failing. The driver could then lose control of the vehicle and cause an accident and may cause serious injury or death.

Under no circumstances should modifications be made to the noise encapsulation.

3.3. Dimensions and weights

On no account should modifications be made to the vehicle width, vehicle height or vehicle length if they exceed the limiting values specified in the current version of the body builder information book for all dimension and weight specifications, please refer to the 2D drawings and technical data in the SPRINTER Body Builder Website (→chapter 1) and to the technical limiting values (→ chapter 4).

They are based on a vehicle that is fitted with standard equipment. Items of optional equipment are not taken into consideration.
Weight tolerances of up to +5% in production must be taken into consideration.

Do not exceed the gross axle weight rating (GAWR) and the gross vehicle weight rating (GVWR). Information about GAWR & GVWR is contained in the "Technical advice on the basic vehicle" section (→ chapter 4)

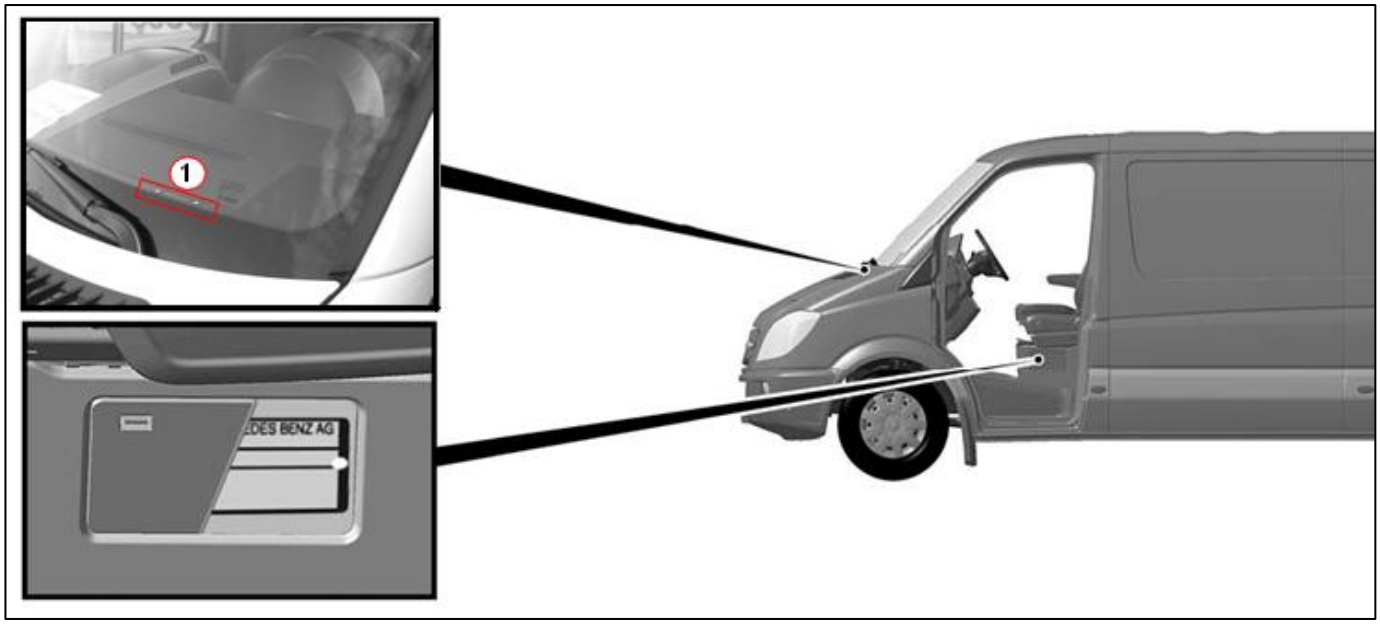
Warning

Make sure that you do not exceed the permissible axle loads. Doing so would prevent the ESP system from functioning correctly. Exceeding the permissible axle loads and / or gross vehicle weights significantly impairs the vehicle driving stability and handling characteristics and may cause serious injury or death.

Information about changes in weight is available from: SPRINTER ENGINEERING (→ chapter 2.7).
All bodies must comply with the individual axle loads and the permissible gross vehicle weight.

3.4. Vehicle type identification date

The vehicle identification number (VIN) and the vehicle identification plate may neither be changed nor fitted to a different point on the vehicle. The vehicle identification number is on the lower windshield support member in the engine compartment. The type plate with the vehicle identification number and details pf permissible weights is on the base of the driver's seat.
Seat pedestal (→chapter 2.6)



Vehicle Identification Data

1. Vehicle Identification number

Location: below driver's seat, outward facing

Vehicle stability

For approval of the vehicle with body / equipment mounted, a calculation of the height of the center of gravity of the laden vehicle must be submitted in accordance with FMVSS / CMVSS standards.

You will find the permissible heights for the center of gravity in the "Technical limiting values for planning" section (→ chapter 4). SPRINTER ENGINEERING will make no statements concerning:

- driving characteristics
- braking characteristics
- steering characteristics, and
- behavior during ESP intervention

of bodies for payloads with an unfavorable located center of gravity (e.g. rear, high and side loads) as attachments, bodies, equipment and modifications will have a considerable impact on the above characteristics. Only the body builder is in a position to make an assessment.

Warning

In extreme driving conditions, the vehicle behaves like a vehicle without ESP. The permissible axle loads, gross weights and center of gravity positions must be complied with. Exceeding the permissible axle loads and / or gross vehicle weights significantly impairs the vehicle driving stability and handling characteristics and may cause serious injury or death.

Neither in curb condition nor with equipment installed nor with modifications having been carried out may the permissible wheel, axle, or gross vehicle weights ever be exceeded.

Warning

Make sure that you do not exceed the permissible axle loads. Doing so would prevent the ESP system from functioning correctly. Exceeding the permissible axle loads and / or gross vehicle weights significantly impairs the vehicle driving stability and handling characteristics and may cause serious injury or death.
Further information regarding permissible weights is contained on the vehicle type identification plates on the vehicle itself (→ chapter 4).

3.5. Tires

The body builder must ensure that:

- there is always sufficient space between the tire and the mud guard or wheel well, even if snow or anti-skid chains are fitted and the suspension is fully compressed (also allowing for axle twist) and that the relevant data in the 2D drawings from website (→ chapter 1) are observed
- only permissible tires with the correct dimension & load rating documents

Warning

Make sure that you do not exceed the permissible tire loads. Doing so would prevent the ESP system from functioning correctly. Exceeding the permissible tire loads and / or gross vehicle weights significantly impairs the vehicle driving stability and handling characteristics and may cause serious injury or death.

3.6. Bolted and welded connections

3.6.1. Bolted connections

If it is necessary to replace standards bolts with longer bolts, use only bolts:

- of the same diameter
- of the same strength grade
- of the same type
- with the same thread pitch

Warning

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

- Federal and State regulation must be applied to all installation work.
- 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.
- No design modification is possible of bolts that are tightened to the required torque and angle by Daimler AG.
- The settling behavior of bolted connections must be observed.

Information about the SPRINTER after sales instructions is available from any authorized SPRINTER dealer.

Additional parts must be of equal or greater strength than the preceding tensioned assembly.
The use of SPRINTER Torque Values assumes coefficients of friction for the bolts in the tolerance range of (=0.08…0.14).
We recommend the use of original SPRINTER spare parts.

3.6.2. Welded connections

General

In order to maintain the high standard of welding demanded by Daimler AG, the work must only be carried out by appropriately qualified welders. The following is recommended in order to achieve high quality welds:

- clean the area to the welded thoroughly
- make several short welding beads rather than one long bead
- make symmetrical beads to limit shrinkage
- avoid more than three welds at any one point
- avoid welding in strain-hardened zones
- spot welds or step welds should be offset

The battery must be disconnected before all welding operations. Airbags, seat belts, the airbag control unit and airbag sensors must be protected from welding splashes or removed if necessary.

Parts of the floor or the roof are laser-welded. The paneling for the sidewall is laser-soldered with the roof edge paneling.

Choice of welding method

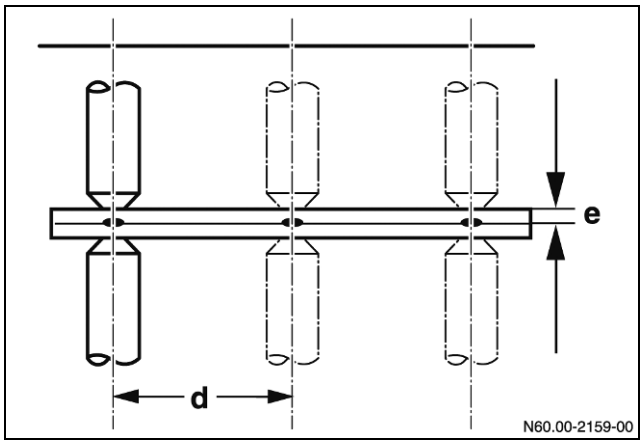
The mechanical properties of weld seams depend on selecting the adequate welding method and on the geometry of the elements to be joined. If overlapping sheets are to be welded, the choice of welding method will depend on whether only one or both sides of the work piece is/are accessible.

Accessible sides	1	Gas-shielded plug welding
	2	Resistance spot welding

Resistance spot welding

Resistance spot welding is used for welding overlapping parts which are accessible from both sides. Spot welding of more than two sheet layers must be avoided.

Distance between spot welds:
To avoid shunt effects, the specified distances between the spot welds must be maintained (d=10e + 10mm).

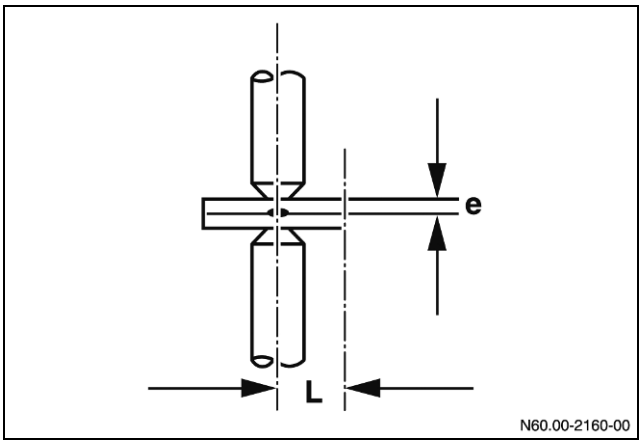


Ratio of sheet thickness to distance between spot welds

d Distance between spot welds
e Sheet thickness

Distance from sheet edge:

To avoid melting core damage, the specified distances to the sheet edge must be maintained (L = 3e + 2 mm).

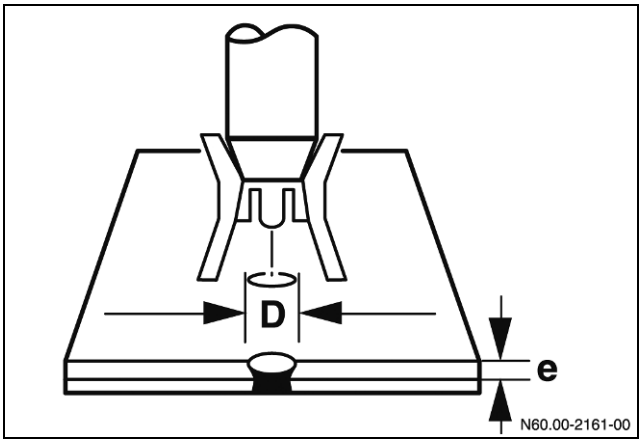


Ratio of sheet thickness to distance from the edge

e Sheet thickness
l Distance from sheet edge

Gas-shielded plug welding

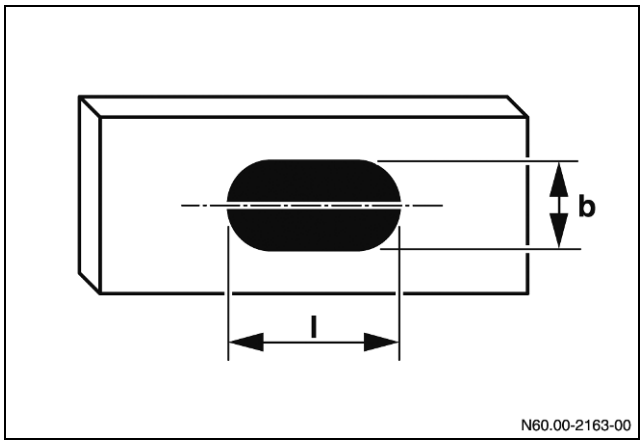
If overlapping sheets can only be welded from one side, use either inert gas plug welding or tack welding. If the joint is produced by stamping or drilling followed by plug welding, the drilled area must be de-burred before welding.



Ratio of sheet thickness to plug hole diameter

D = plug hole diameter (mm)	4.5	5	5.5	6	6.5	7
e = sheet thickness (mm)	0.6	0.7	1	1.25	1.5	2

Mechanical quality can be additionally improved by the use of slotted holes
(l = 2 * b).

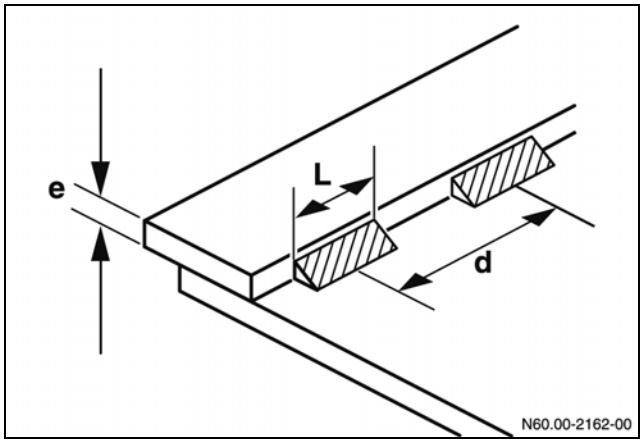


Ratio of width to length of slotted holes

b Width of slotted hole
l Length of slotted hole

Tack welding

If sheet thickness is >2mm [3/32 in], overlapping sheets can also be joined by tack welding
(30mm <L<40 * e; d>2L)
[1 ¼ in <L<40*e; d>2L]



Ratio of sheet thickness to distance between spot welds

d Distance between tack weld centers
e Sheet thickness
l Length of tack weld

Do not perform welding work on:

- Assemblies such as the engine, transmission, axles, etc
- Chassis, except on chassis frame extensions

More information is contained in the “Limiting values for planning” (→ chapter 4) and “Damage prevention” (→ chapter 5) sections, the “body shell” (→ chapter 7) section.

Anti-corrosion protection after welding

On completion of all welding work on the vehicle, it’s important to comply with the specified corrosion protection measures (→ chapter 5.3).

When carrying out welding work, note the instructions specified “Damage prevention” (→ chapter 5) and “Modifications to the basic Vehicle” sections (→ chapter 7).

3.7. Noise Insulation

If modifications are carried out on any parts whose operations produces noise, e.g.

- engine
- exhaust system
- air intake system
- tires, etc

Sound level measurements must be made and Federal and State regulations and guidelines shall apply.

Do not remove or modify noise-insulating parts fitted to vehicle to prevent modifications from changing the vehicle's sound levels applicable to FMVSS/CMVSS regulations

Do not adversely affect the level of interior noise.

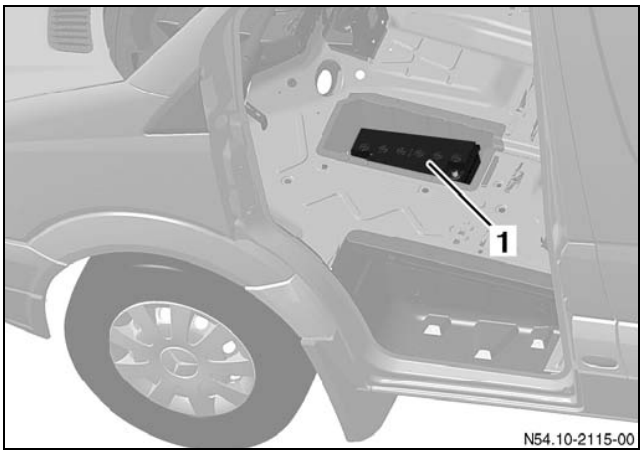
All modifications to the vehicle must comply with vehicle sound levels applicable to FMVSS/CMVSS regulations.

3.8. Maintenance and repairs

Maintenance and repair of the vehicle must not be hindered by the body, modifications or additional equipment. The Operating Instructions must be observed.

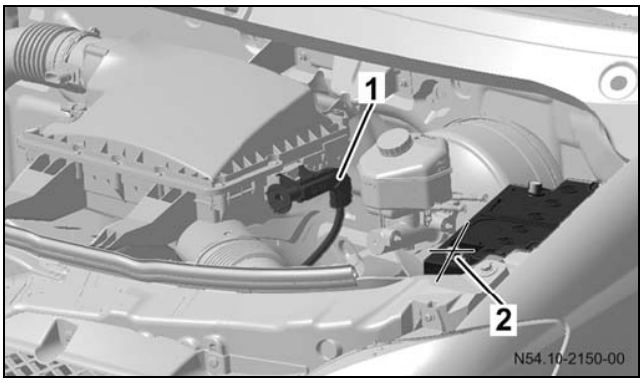
- Maintenance points and assemblies must remain easily accessible
- Stowage boxes must be fitted with maintenance flaps or removable rear panels.
- The battery compartment must be sufficiently ventilated, with provision for air to enter and exit.
- Check the condition and capacity of batteries and service them in accordance with the manufacturer's specifications (→ chapter 6.3)

Leaving the vehicle parked up for long period of time can lead to battery damage. This can be avoided by disconnecting the battery and storing it. For more information consult the owner's manual.



Installation location of the main battery

1. Main battery



Installation location of the jump-starting / charging connection

1. Jump-starting / charging connection
2. Positive terminal, auxiliary battery – not suitable for jump-starting

The jump-starting connection for the main battery must be used if you intend to use an external power source to start or charge the vehicle's battery.

Do not use the auxiliary battery in the engine compartment for connection to an external power supply as this could result in damage to the vehicle.

Daimler AG, MBUSA LLC, MBCA and Daimler Vans USA LLC are not responsible for the cost of any additional work made necessary by the body builder which has to be performed during warranty, maintenance or repair work.

The following must be observed by the body builder before delivery of the vehicle:

- Check the headlamp setting or have this checked at an authorized Sprinter workshop.
- SPRINTER ENGINEERING recommends an authorized Mercedes-Benz SPRINTER or Freightliner SPRINTER Dealer.
- Retighten the wheel nuts to the specified torque.

The body builder must provide the vehicle with operating instructions and maintenance instructions for the body and any additional equipment installed.

3.8.1. Storing the vehicle

Storage in an enclosed space:

- Clean the entire vehicle
- Check the oil and coolant levels
- Inflate the tires to 0.5 bar / 7.25 PSI above the specified tire pressures
- Release the handbrake and chock the wheels
- Disconnect the battery and grease battery lugs and terminals

Storing the vehicle in the open (<1 month):

- Carry out the same procedure as for storing in an enclosed space
- Close all air inlets and set the heating system to “off”

Storing the vehicle in the open (>1 month):

- Carry out the same procedure as for storing in an enclosed space
- Fold the windshield wipers away from the wind shield
- Close all air inlets and set the heating system to “Off”
- Remove the battery and store it in accordance with the battery manufacturer’s specifications (→ chapter 6.3.3).

Maintenance work on the stored vehicle (in storage for > 1 month)

- Check the oil level once a month
- Check the coolant once a month
- Check the tire pressures once a month

Removing the vehicle from storage

- Check the fluid levels in the vehicle
- Adjust the tire pressures to the manufacturer’s specifications
- Check the battery charge and install the battery
- Clean the entire vehicle

3.8.2. Battery maintenance and storage

To avoid damage to the battery, disconnect the battery if the vehicle is to be parked for a period longer than one week. If the vehicle is parked for periods of longer than one month, remove the battery and store it in a dry place at temperatures between 32°F to 86°F [0°C to 30°C]. Store the battery in an upright position. The battery charge must be kept above 12.55V at all times. If the voltage drops below 12.55V but not below 12.1V, the battery must be recharged.

If the battery voltage drops below 12.1V, the battery is damaged and it will have to be replaced.

3.8.3. Work before delivering the modified vehicle

Checking the entire vehicle

Check the vehicle for perfect condition. Damage must be repaired where necessary.

Checking the brake system

The brake fluid must be renewed every two years. If it is not known how long a vehicle equipped with a hydraulic brake system has been in storage, the brake fluid must be renewed. Check electrical and hydraulic lines for all types of damage and replace if necessary.

Checking the battery

Check, and correct if necessary, the battery charge before delivering the vehicle.

Checking the tires

Before delivering the vehicle, check that the tires are inflated to the specified pressure and check the tires for damage. Damaged tires must be replaced

Checking wheel alignment

We recommend that the wheel alignment be checked if modifications have been made by an authorized SPRINTER repair shop. More detailed information is contained in the SPRINTER Service Manual.

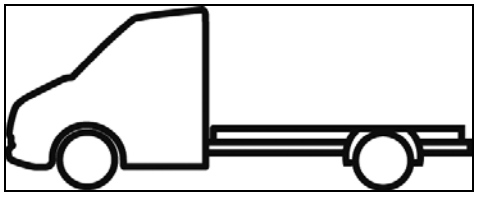
3.9. Optional Equipment

We recommend ordering available optional equipment from the factory. Information about all optional equipment available as an option is available from your authorized Mercedes-Benz SPRINTER and Freightliner SPRINTER Dealer. Optional equipment (e.g. reinforced springs, frame reinforcement, anti-roll bars, etc.) or retrofitted equipment increases the unladen weight of the vehicle. The actual vehicle weight and axle loads must be determined by weighing before mounting.

4. Technical limiting values for planning

4.1. Limiting values of the basic vehicle

This section contains the basic vehicle technical limiting values which are important for planning the vehicle's layout. In addition, you will find more information in the other sections of the current version of the Body Builder Information Book.



4.1.1. Maneuverability

- Under all loading conditions, the front axle load must represent at least the following proportion of the gross permissible weight:

With cargo lift	at least 30% of the gross vehicle weight
Without cargo lift	at least 25% of the gross vehicle weight

Warning

Do not exceed the maximum Center of Gravity limits. Do not exceed the maximum axle or wheel loads. Failure to adhere to the maximum Center of Gravity limits, axle loads and wheel loads, may lead to an accident with injury or death.

4.1.2. Extreme permissible positions of center of gravity

y-axis:	Never exceed the maximum side to side difference of the laden / unladen vehicle of 4%. **Do not exceed the maximum permissible wheel or axle loads.**

Maximum Center of Gravity heights:

Gross vehicle weight Rating (GVWR)	Center of gravity heights, z-axis
8,550 lbs	1300 mm [51.2 in]
9,990 lbs	1300 mm [51.2 in]
11,030 lbs	1300 mm [51.2 in]

4.1.3. Center of gravity Chassis Cab

Center of gravity of a factory Chassis Cab at curb weight (CW) without options.

Chassis Cab wheelbase mm / [inch]	Center of Gravity x / y / z CG [mm]	Center of Gravity x / y / z CG [in]
3665 / [144]	1203 / 0 / 650	47.3 / 0 / 25.6
4325 / [170]	1356 / 0 / 650	53.3 / 0 / 25.6

4.1.4. Vehicle dimensions Chassis Cab

Maximum Chassis Cab vehicle width:

Mirror	Max upfit width mm / [inch]
FS2 (standard)	[96.0]

Max vehicle height:	Never exceed the maximum center of gravity (CG).

Wheelbase mm / [inch]	Max. upfit length BL body length [in / ft]
3665 / [144]	155.2 / 13.0
4325 / [170]	194.1 / 16.2

4.2. Chassis limiting values

4.2.1. Permissible axle loads

Warning

Make sure that you do not exceed the permissible axle loads. Doing so would prevent the ESP system from functioning correctly on vehicles which are equipped with this feature. The driver could then lose control of the vehicle and cause an accident and may cause serious injury or death.
In addition, overloading could damage the suspension system and load-bearing parts.

Information about axle loads and the maximum permissible gross vehicle weight is contained in the "Technical advice on the basic vehicle" section.

4.2.2. Approved tire sizes

Gross vehicle Weight [lbs]	Rim	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

4.2.3. Diameter of turning circle

Wheelbase (mm / in)	Diameter of turning circle (ft) curb to curb / wall to wall
3665 / 144	45.2 / 47.6
4325 / 170	52.5 / 54.6

4.2.4. Modifications to the Axles

No modifications whatsoever may be made to the suspension or the axles.

4.2.5. Modifications to the steering system

On no account may any modifications be made to the steering system (→ chapter 4.1.1)

4.2.6. Modifications to the brake system

On no account may any modifications be made to the brake system. On no account may any modifications be made to disc brake air inflow and air outflow.

4.2.7. Modifications to springs, spring mountings/shock absorbers

On no account should springs or 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 Mercedes Benz SPRINTER & Freightliner SPRINTER parts. On no account should modifications be made to the spring mountings (→ chapter 7.1.2)

4.2.8. Wheel alignment

No modifications whatsoever may be made to wheel alignment settings (→ chapter 7.1.5)

4.3. Body shell limiting values

4.3.1. Modifications to the body shell

Refer to the "Modifications to the basic vehicle" section (→ chapter 7).

- No modifications whatsoever may be made to the cross-member structure from the front of the vehicle back to, and including, the B-pillar.
- On no account should modifications be made to the rear door opening including the roof area
- In the event of modifications to the load-bearing structure, the total equivalent rigidity of the structure fitted by the body builder must at least equate to that of the standard vehicle.
- Clearances for fuel filler necks, fuel tank lines and fuel lines must be maintained
- It is not permissible to drill holes in or perform welding work on the A-pillar or B-pillar.
- If modifications are made to the sidewall of the panel van or the passenger van, the rigidity of the modified body must be equal to that of the basic vehicle.

4.3.2. Limiting values of the vehicle frame

If the frame is extended, the material of the extension element must have the same quality and dimensions as the standard chassis frame (→ chapter 7.2.3).

4.3.3. Vehicle overhang

The maximum vehicle overhang without exceeding the permissible axle loads and centers of gravity is:

Maximum overhang lengths	
Wheelbase l mm / [inch]	Overhang length mm / [inch]
3665 / [144]	1830 / [72.0]
4325 / [170]	2160 / [85.0]

Extensions to overhang lengths may make it necessary to reduce the maximum permissible trailer load or tongue weight. In such cases, we recommend that you consult SPRINTER ENGINEERING (→ chapter 2.7).

4.3.4. Attachment points on the frame

Attachment to the frame must be carried out as described in the "Attachment to the frame" section (→ chapter 7.2.2)

4.3.5. Vehicle roof/roof load

Maximum roof loads		
Standard roof Cargo kg [lbs]	High roof Cargo kg [lbs]	Chassis Cab kg [lbs]
300 [660]	150 [330]	100 [220]

Do not modify or remove roof bows structural parts

Wheelbase mm / [inch]	Quantity required
3665 / [144]	> 5 roof arches
4325 / [170]	> 6 roof arches

Roof arches	Position
1	to the rear of the front doors (B-pillar)
2	at the center of the load compartment sliding door (between the B- and C- pillars)
3	in the center of the vehicle behind the load compartment sliding door (C-pillar)
4-6	between the C-pillar and the rear end of the vehicle (rear pillar)

Roof height (mm)	Moment of inertia 1 per roof arch (mm)
< 250	> 40 000
< 400	> 65 000
< 550	> 86 000

4.4. Modifications of engine peripherals / drive train

4.4.1. Fuel system

Do not modify fuel system (→ chapter 7.3.1)

4.4.2. Modifications to the engine/drive train components

- Do not modify the engine air intake
- Do not modify the drive shaft
- Do not retrofit any engine speed regulation equipment, other than OEM equipment.
- Do not modify the exhaust system, exhaust gas after treatment components (diesel particle filter, catalytic converter, Lambda probe, etc)

4.4.3. Engine cooling system

Do not modify the cooling system including but not limited to radiator, radiator grille, air ducts, etc. (→ chapter 7.3.3)

The complete cross-section of the cooling air intake surfaces must remain unobstructed. This means:

- at least 11 dm^2 [170 in^2]for the front grille (radiator and condenser)
- at least 7dm^2 [109 in^2]for the opening in the bumper (charge-air cooler flow)

4.5. Modification to the interior

4.5.1. Modifications to airbags and belt tensions

Warning

Do not modify the airbag system or the belt tension system.
Modification to or work incorrectly carried out on a restraint system (seat belt and seat belt anchorages, belt pretensioner or airbag) or its wiring could cause the restraint systems to malfunction. This means, for example, that airbags or belt tensions may be activated inadvertently or may fail in the event of an accident even though the rate of deceleration exceeds the deployment threshold and may cause serious injury or death.

- Do not modify the airbag components or the vicinity of airbag components and sensors.
- Do not modify the roof trim or its attachment if the vehicle is equipped with window bags.
- Stay clear of the airbag deployment areas (→ chapter 7.4.2)
- Do not modify areas around the airbag control unit

More information is contained in the “Modifications to the basic vehicle” section (→ chapter 7).

4.5.2. Modifications to seats

Warning

It is not permitted to modify the seats or mount seats on the wheel wells. In the event of an accident, the seats could become detached from their anchorages and may cause serious injury or death.

More information is contained in the “Modifications to the basic vehicle” (→ chapter 7) and “Modifications to the interior” sections (→ chapter 8.3).

Any retrofitted rear bench seat with two- or three-point seat belts must comply with the FMVSS/CMVSS requirements.

4.6. Limits to Electrics / Electronics

Refer to the “Electrics / Electronics” section
(→ chapter 6)

4.6.1. Vehicle Marker and Clearance lamps

Vehicle marker and clearance lamps are required by law on all vehicles with total width of 80 inch and above according to FMVSS/CMVSS standards.

4.6.2. Retrofitting electrical equipment

All equipment fitted must meet FMVSS standards.

Comfort may be impaired in individual cases.

4.6.3. Mobile communication systems

Do not exceed the maximum transmission output

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

4.6.4. CAN bus

Do not modify the CAN bus or the components connected to it. The programmable special module (Code ED5) can be used to access individual types of data available on the CAN bus.

4.6.5. Electronic Stability Program

Do not modify the location, position and mounting of the ESP yaw rate sensor.
Do not modify the wiring or ESP components.
Do not modify the wheel base.

4.7. Design Limits for additional equipment

If auxiliary equipment (e.g. additional air-conditioning compressors, pumps, etc) is retrofitted, the following must be observed:

- The operation of vehicle components must not be adversely affected
- The clearance to moving vehicle parts must be guaranteed in all driving situations.
- Please refer to option code N62 and N63.

4.8. Design Limits for attachments

The maximum load capacity of a lifting platform is 500kg [1100 lbs] on a Cargo Van model and 750kg [1650 lbs] on a Chassis Cab. Mounting in accordance with the “lifting platform” section (→ chapter 7.6.6) is imperative.

4.9. Design Limits for the body

Refer to the “Design of bodies” section.

4.9.1. Design Limits of the mounting frame

Required moment of resistance of mounting frame:	
Up to maximum standard wheelbase	30 cm ^{3}

[1] Each individual mounting frame longitudinal member must have the moment of resistance specified.

For further information about mounting frames for dump bodies see (→ chapter 8.1)

Material quality of specified frame made of steel	
Material	Tensile Strength (N/mm^2) Yield Strength (N/mm^2)
H240LA (DIN EN 10268-1.0480)	350-45 260-340
S235JRG2 (DIN EN 10025-1.0038)	340-510 >235

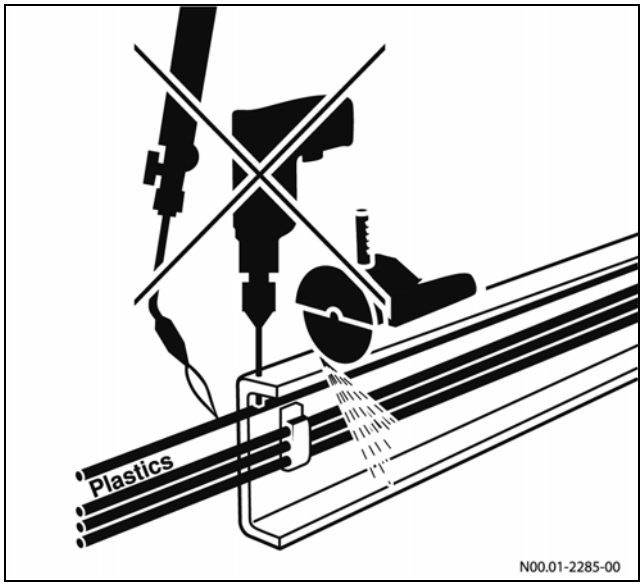
5. Damage prevention

Any work carried out on the vehicle must comply with accident prevention regulations

Comply with all FMVSS/CMVSS regulations and laws.

5.1. Brake hoses / cables and lines

Cover plastic lines and brake hoses before carrying out any welding, drilling and grinding work or before working with cutting discs. If necessary, the plastic lines and brake hoses should be removed.



Test each of the systems for pressure loss and leaks after installing compressed-air lines and hydraulic lines. No other lines may be attached to brake hoses. Lines must be protected from heat by means of insulation.

Warning

Work carried out incorrectly on the brake hoses or cables may impair their function. This may lead to the failure of components or parts relevant to safety and may cause serious injury or death.

5.2. Welding Work

Warning

Welding work that is not performed correctly could lead to failure of components relevant to safety. It would then not be possible to rule out the risk of an accident and may cause serious injury or death.
For this reason, the following safety precautions must always be observed during any work involving welding.

- Welding work on the frame may only be carried out by trained personnel and with prior approval of SPRINTER ENGINEERING.
- Do not weld on assemblies such as the engine, transmission, axles, etc.
- Disconnect the positive and negative terminals from the battery and cover them.
- Connect the welding-unit ground terminal directly to the part being welded. Do not connect the ground clamp to assemblies such as the engine, transmission or axles.
- Do not touch electronic component housings (e.g control modules) and electric lines with the welding electrode or the ground contact clamp of the welding unit.
- Before welding operations in the vicinity of the seat belts, airbag sensors or the airbag control unit, these components must be removed for the durations of the work. You will find important information about handling, transporting and storing airbag units in the “Interior” (→ chapter 7.4)
- Before welding, cover springs and air bellows to protect them from welding spatter. Do not touch springs with welding electrodes or welding tongs.
- Cover the fuel tank and fuel system (lines, etc) before carrying out welding work.
- Use only completely dry lime basic jacket electrodes (2.5 mm diameter).
- The maximum current maybe 40 A per mm of electrode diameter.
- Weld only with electrodes connected to the positive pole of a direct current source. Always weld from bottom to top.

- MIG welding is permissible
- Only use welding wires with a thickness of between 1 and 1.2mm.
- The yield point and tensile strength of the welding material must be at least equal to that of the material to be welded.
- Plug welding is only permissible in the vertical webs of the longitudinal frame member.
- Avoid welds in bends
- There must be at least 15 mm [0.6 inch] between the weld and the outer edges.

You will find further information about welding operations in the “Planning of bodies” section (→ chapter 3), “Modifications to the basic vehicle” section (→ chapter 7) and the “Body shell” section (→ chapter 7.2). More information can be found in the SPRINTER Repair Manual.

Warning

Welding in the vicinity of the restraint systems (airbag and belts) can cause these systems to no longer function correctly. Welding is therefore not permitted in the vicinity of the restraint systems. Welding near restraint system components may cause serious injury or death.

5.3. Corrosion protection

Surface and anti-corrosion protection measures must be carried out on the areas affected after modifications and installation work have been performed on the vehicle.

Only protective agents tested and approved by SPRINTER ENGINEERING may be used for anti-corrosion protection measures performed.

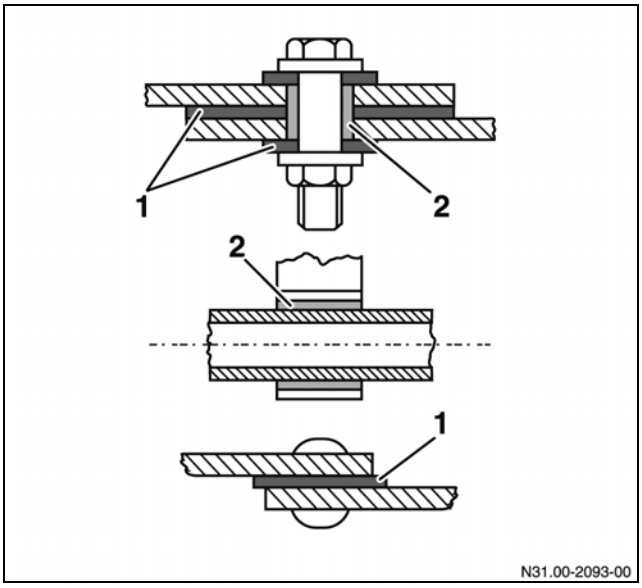
Planning Measures

Anti-corrosion protection measures should be included in the planning and design stages by selecting suitable materials and designing components accordingly.

A conductive connection occurs if two different metals are brought into contact with each other through an electrolyte (e.g. air humidity). This causes electrochemical corrosion and the less noble of the two metals is damaged. The further apart the two metals are in the electrochemical potential series, the more intense electrochemical corrosion becomes.

For this reason, electrochemical corrosion must be prevented by insulation or by treating the components accordingly or it can be minimized by selecting suitable materials.

Preventing contact corrosion by means of electrical insulation



Preventing contact corrosion

1. Insulating washer
2. Insulating sleeve

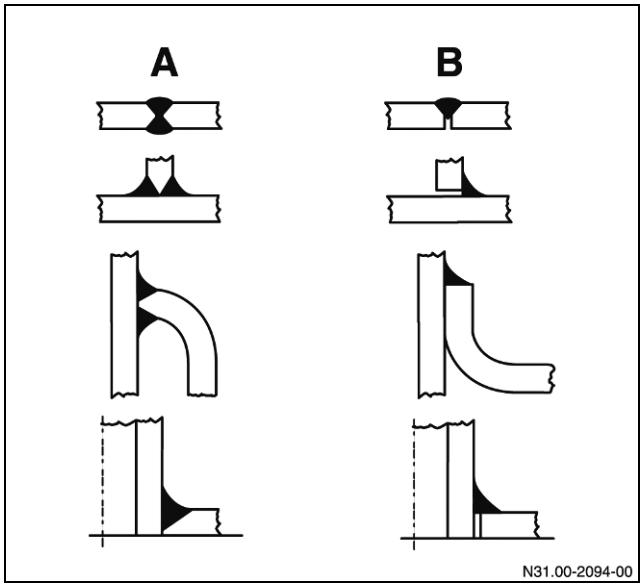
Contact corrosion can be prevented by using electrical insulation such as washers, sleeves or bushings.

Avoid welding work on inaccessible cavities.

Component design measures

Corrosion can be prevented by design measures, in particular the design of joints between different materials by using the same kind of materials. There is a risk of dirt or humidity accumulating in corners, edges, beads and folds. Design measures for counteracting corrosion can be implemented using inclined surfaces and drains, and by avoiding gaps in the joints between components.

Gaps inherent in the design of welded connections and how to avoid them



Examples of types of welded connections

A = correct (through-welded)	B = incorrect (gap)

Coating Measures

The vehicle can be protected by applying protective coatings (e.g. galvanization, painting or zinc coating applied by flame).

After all work on the vehicle is completed:

- Remove drilling chips
- Deburr sharp edges
- Remove any burned paintwork and thoroughly prepare surfaces for painting
- Prime and paint all unprotected parts
- Preserve cavities with wax preservative
- Carry out corrosion protection measures on the underbody and frame parts

5.4. Painting work

Paintwork damaged by the body builder must be repaired by the body builder.

Observe the following points:

- Daimler AG quality standards for initial painting and paintwork repairs must be adhered to
- Only painting materials tested and approved by Daimler AG paint may be used for any paintwork which may be necessary
- The body builder must observe the coat thickness for each individual coat as specified by the factory.
- Paint compatibility must be guaranteed when repainting

You can obtain information on the paint materials and coat thicknesses used at the factory and Mercedes-Benz SPRINTER & Freightliner SPRINTER paint numbers from any Mercedes-Benz SPRINTER & Freightliner SPRINTER Service Center.

Mask the following areas before painting:

- Sealing surfaces
- Windows
- Contact areas between wheels and wheel hubs
- Contact areas for wheel nuts
- Vents on transmission, axles, etc.
- Disc brakes
- Door Locks
- Door retainers in the rear door hinges
- Contact surfaces on the guide rails for the sliding doors
- Door retainers and opening limiters in the center guide rails
- Moving parts of the sliding door carriage
- Airbags and seat belts
- Parktronic sensors (→ chapter 6.13)

To dry the paint, a temperature of 80°C [176°F] must not be exceeded because high temperatures can cause damage to the control units and other components.

5.5. Towing

Warning:

Before towing, please make sure that you read the "Towing" section in the detailed Owner's Manual. You could otherwise fail to recognize dangers, which may cause serious injury or death.

Failure to observe the instructions in the Owner's Manual can result in damage to the vehicle.

5.6. Storing and delivery of the vehicle

Storing

To prevent any damage while vehicles are in storage, we recommend that they be serviced and stored in accordance with the manufacturer's specifications (→ chapter 3.8)

Delivery

To prevent damage to the vehicle or to repair any existing damage, we recommend that the vehicle be subjected to a full function check and a complete visual inspection before it is delivered.

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 SPRINTER ENGINEERING
(→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.

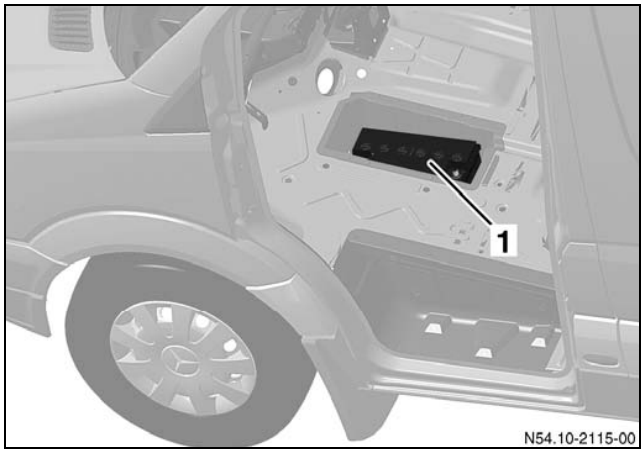
Electromagnetic Interference EMI occurs in the vehicle electrical circuits because of the various incompatible components. At Daimler AG, electronic components installed at the factory are checked for their electromagnetic compatibility in the vehicle. If subsequent modifications are made, this may cause 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

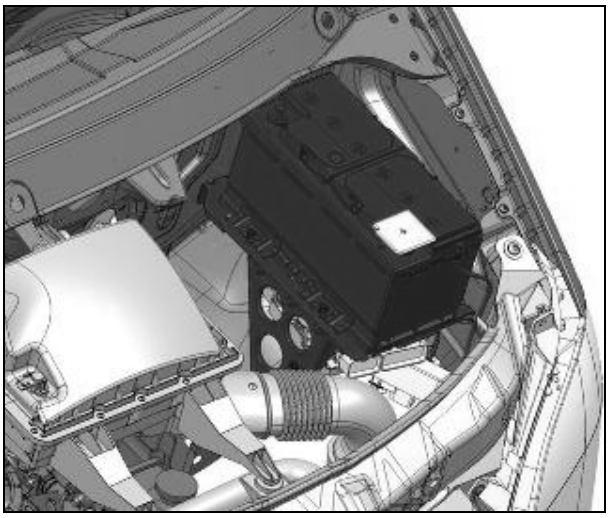
A 25 AMP current draw requires the use of the reinforced battery (Option E28). An auxiliary battery must be used for more than 25 AMP current draw.

6.3.1. Auxiliary battery retrofit guidelines

When installing electrical aftermarket equipment with a current draw of more than 25A in Mercedes-Benz Sprinters & Freightliner Sprinters it is necessary to use the optional aux battery 12V/100Ah (CODE E28).

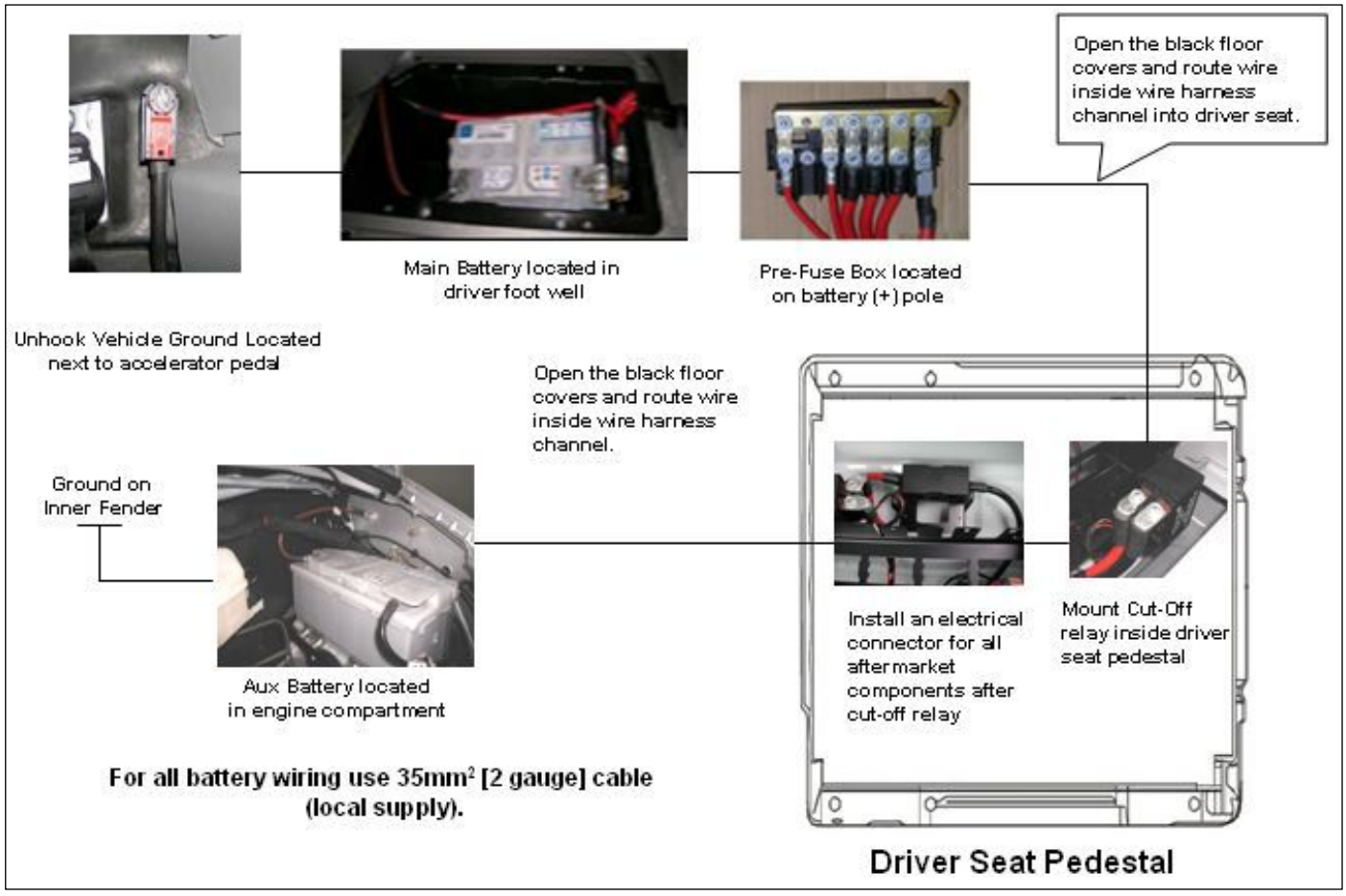
For cost and practical reason we recommend ordering this option directly from the plant.

Note:
This guideline is not intended as a complete work instruction but as an aid for body builders and upfitters that need to retrofit Mercedes-Benz / Freightliner Sprinters with an aux battery.

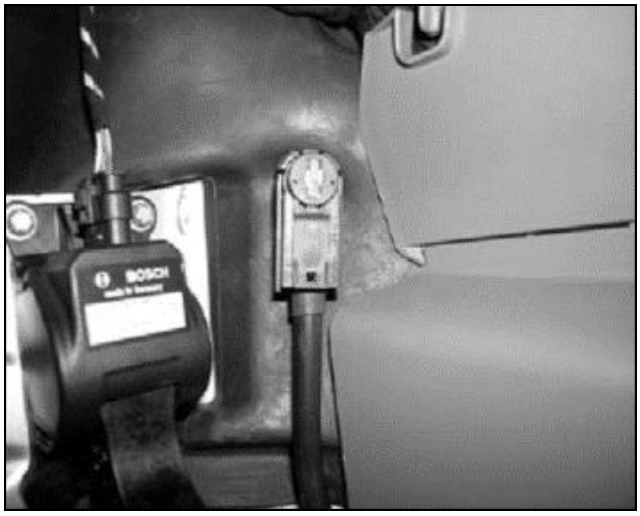


Auxiliary battery location

Work Flow Chart:



Disconnect main battery



Main Battery Connector (Next To Accelerator Pedal)

Warning

Before working on the electrical system disconnect the main battery using the quick connect located right to the accelerator pedal in the driver foot well. Failure to disconnect the battery may cause serious damage to the electrical system and its components. Do not disconnect the battery before ensuring that the vehicle ignition key is in position 0 (off) or the key is removed, otherwise serious damage to the electrical system and its components may occur.

VERY IMPORTANT:
Do not install an auxiliary battery without a battery cut-off relay and suitable fuses for the charge current.

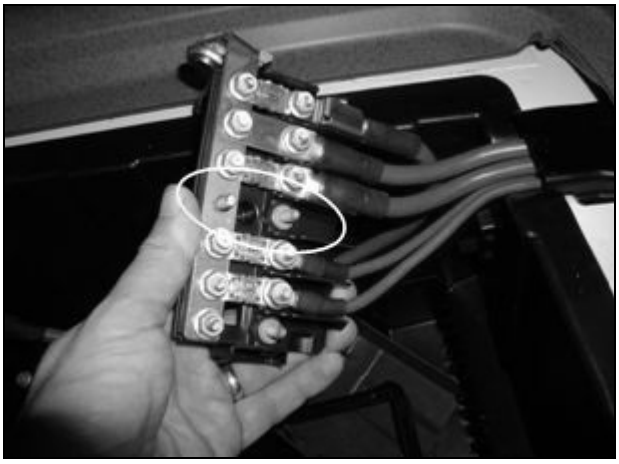
Prefuse box at main battery

Warning

Do not use aux battery as a start aid. Using an auxiliary battery as a start aid may lead to severe damage to electrical components.

Starter Battery (under driver floor)

Locate starter battery under driver floor matt. Disconnect all electrical seat connectors. Remove driver seat (4 screws).

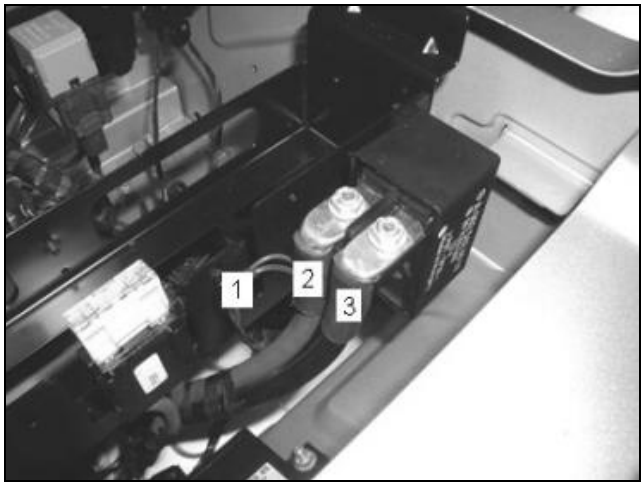


From Main Battery

Unhook prefuse box and use existing empty terminal Position #4. See owners manual for fuse locations. Use OEM 150A fuse (MB# N 000000 000432).

For all battery wiring use 35mm^2 [2 gauge] cable (local supply).

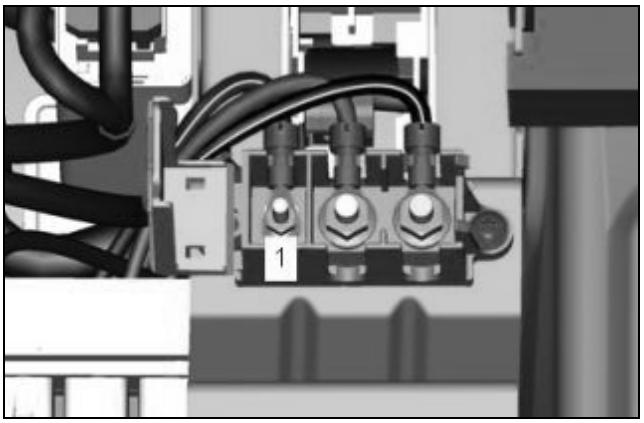
Battery cut-off relay mounting inside seat pedestal



Cut-off relay inside seat base

1. To Terminal 1
2. From prefuse box (red)
3. To aux battery (black)

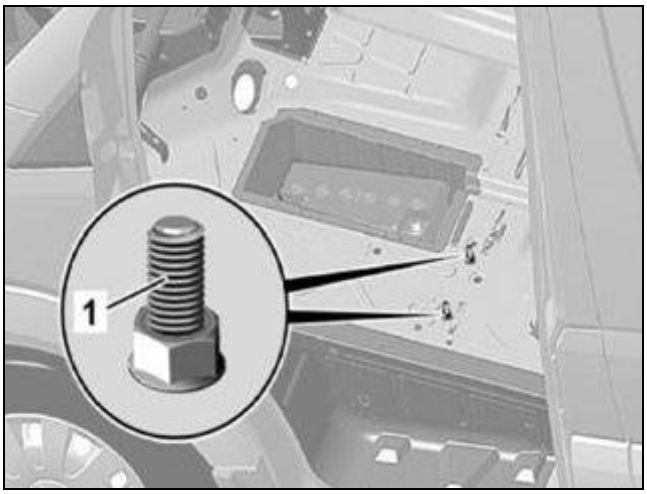
- Mount a battery cut-off relay (MB#: A 002 542 40 19 or equivalent) inside driver seat pedestal
- Route a red cable from cut-off relay to prefuse terminal using provided wire harness channel
- Route a black cable from cut-off relay to aux battery through provided opening in firewall. (Stay clear of steering column and use convoluted tubing or equivalent)
- Connect circuits switching wire to the EK1 Terminal 1 and use only existing ground terminals on driver seat base floor (1) (power with engine running)



EK1 terminal (under driver seat)

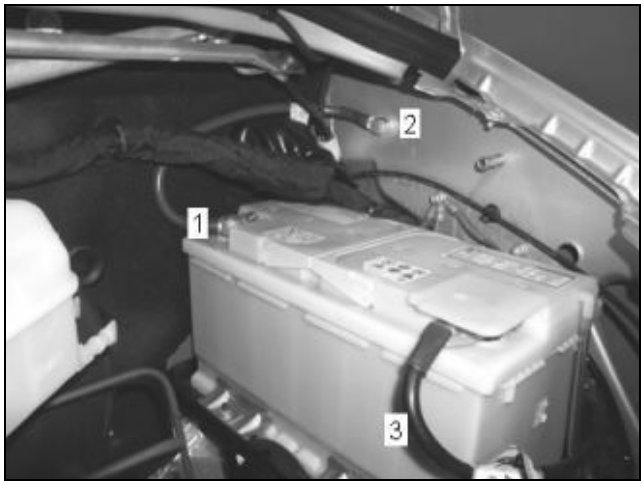
1. X145/1 Terminal 1 (D+)
   Power with engine running
   Wire color: blue/yellow
   12V / 10A (120W)

For more information see Chapter 6.4.7.



Ground Terminal

Only recommended aux battery location



Location for auxiliary battery

1. Ground (-) Battery
2. Ground to inner fender
3. Black wire from cut-off relay (+)

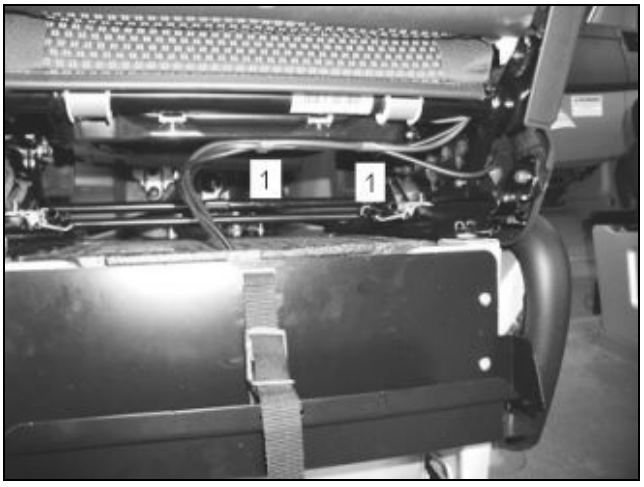
For all battery wiring use 35mm2 [2 gauge] cable (local supply).

Warning

Only install aux battery under hood on driver side. Always ground battery first.

- Use battery support bracket (MB# A 906 540 00 23)
- Aux Battery 12V / 100Ah (MB# A 906 982 00 08)
- Connect battery ground cable (-) only to provided ground terminal inside inner fender
- Connect black wire coming from cut-off relay to the auxiliary battery terminal (+).

Seat reinstallation



Rear view of driver seat and pedestal

1. Reattach wire harness with provided clips located on the seat.

Attach driver seat to pedestal (4 screws) and torque with 37Nm [27.3 ft-lbs].

Slide the seat all the way forward and very carefully reassemble foam seat riser cover. Hole has to be in the back.

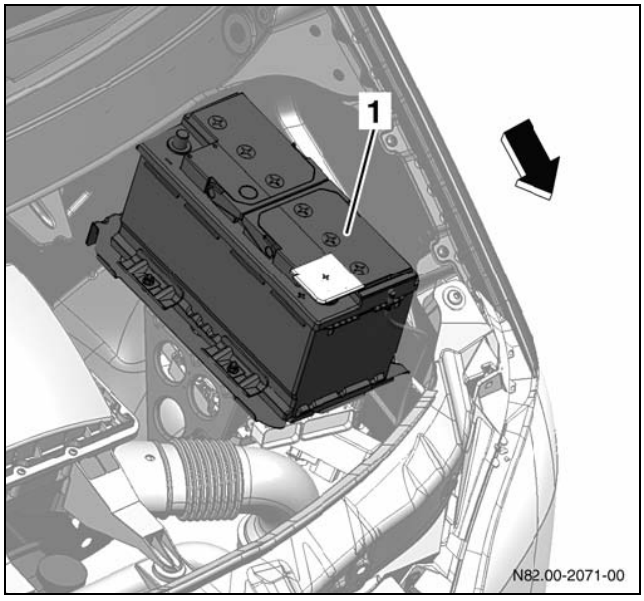
Reconnect all seat connectors:
- Seat belt warning
- Heated seat (optional equipment)
- Seat airbag (optional equipment)

Reconnect main battery

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

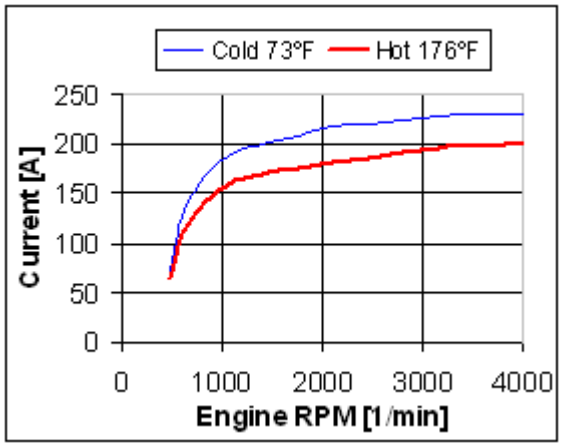
Batteries must be checked regularly for voltage loss (self- discharge) even when removed. Only the electrolyte level check is not required with low-maintenance batteries.

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

6.3.4. Alternator

220 Amp

Values are estimates and can differ slightly from manufacturer.

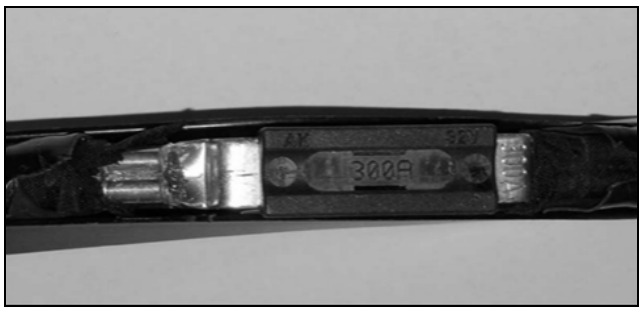


Engine RPM (1/min)	Current Cold 73°F (A)	Current Hot 176°F (A)
650	137	116
700	149	125
800	162	137
900	175	148
1000	183	154
1200	194	165
1400	201	169
1500	203	171
1600	205	173
1800	210	177
2000	215	180
2500	222	188
3000	226	193
3500	230	198
4000	231	199

Note:
A new generation of regulators is used in the 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 **aftermarket alternators can not be retrofitted.** The only available alternator for the Sprinter starting model year 2010 is 220 Amp alternator (standard equipment).

No D+ (engine running positive signal) output is available at alternator with LIN Bus technology, only at the body builder connector EK1 (see Chapter 6.3.1.) under driver seat.

F57 (300A) Alternator Fusing

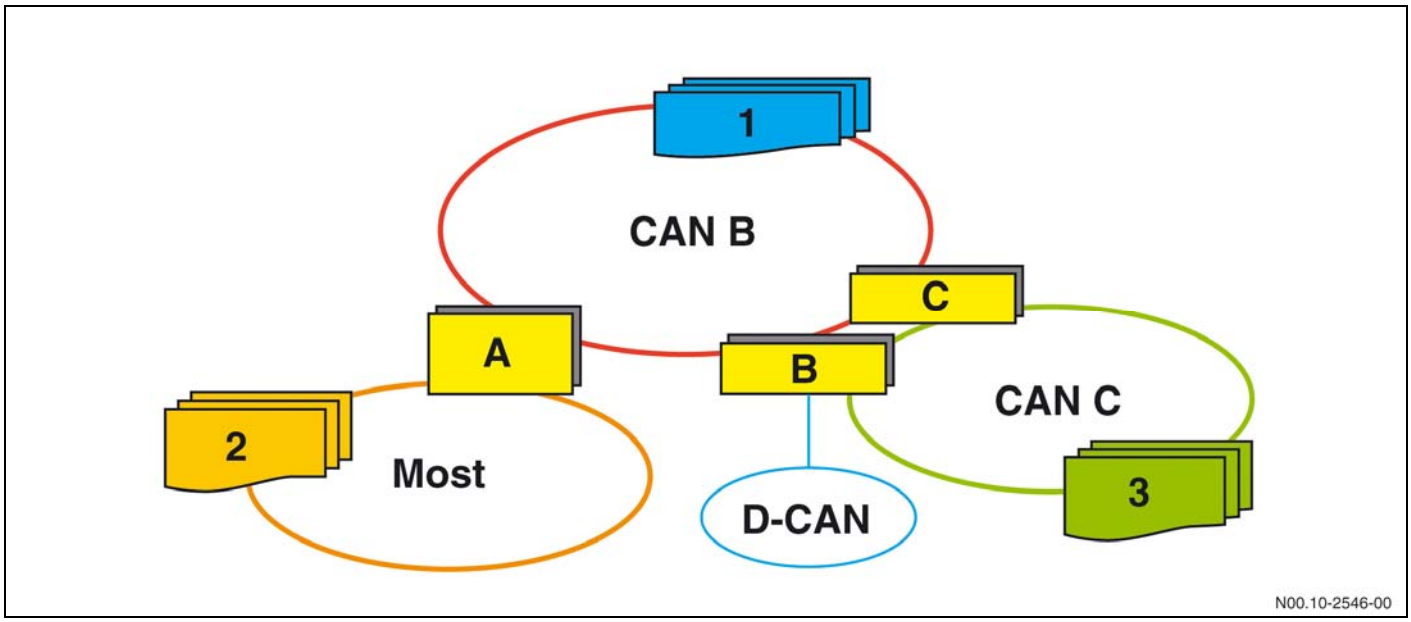


- The alternator wiring harness is fused with a 300A. The fuse is integrated in the wiring harness
- The fuse location is at the rear of the engine at bell house

In case a short occurs and the fuse blows, then the alternator wiring harness has to be completely replaced!

6.4. Interfaces

6.4.1. CAN bus and networking



1 I-CAN = interior CAN (CAN B, 83.333 kBit/s)	2 MST = optical bus	3 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 SPRINTER ENGINEERING.

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 personel.

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 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 delivery of the vehicle.

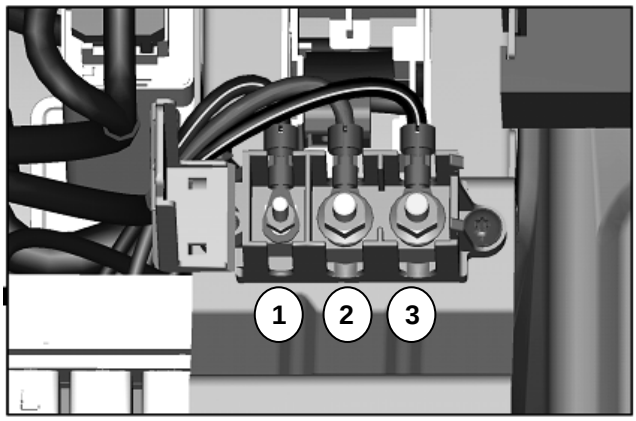
A new generation of regulator is used in the new SPRINTER. The alternator regulator is equipped with a LIN (Local Interface Network) interface.
The characteristics of the LIN alternators are fixed in the engine control unit – for this reason the **OEM alternator can not be replaced by an aftermarket 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.

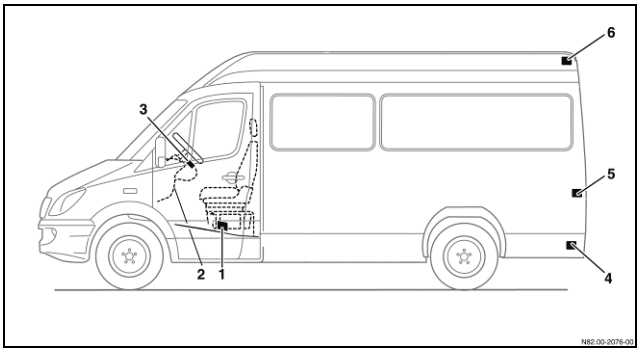
6.4.7. Power supply

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	U [V] / I [A]	wire color
1st power with engine running	12V / 10A	blue/yellow
2nd battery direct power	12V / 25A	red/gray
3rd ignition power	12V / 15A	black/yellow

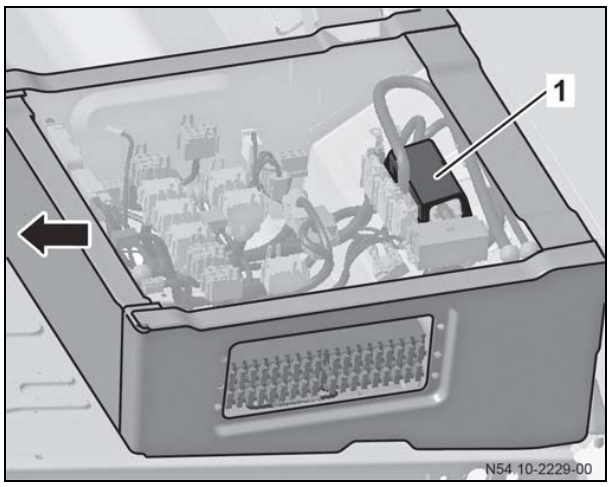
When installing electrical aftermarket equipment with an AMP draw of more than 25A it is necessary to use the optional aux battery 12V/100Ah (CODE E28).



#	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

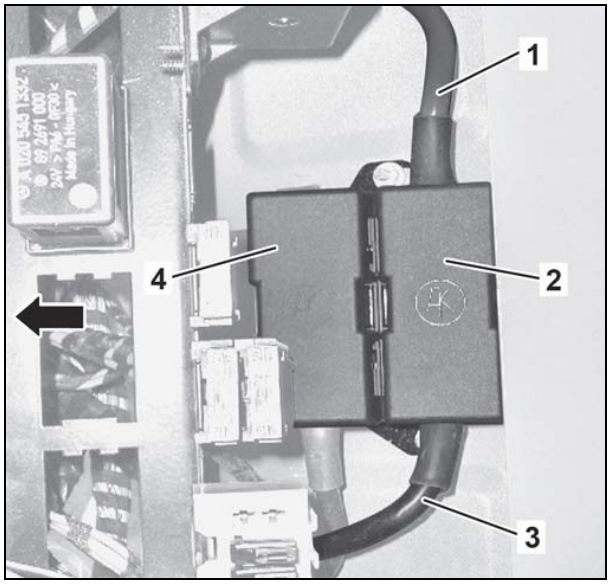
6.4.8. Power supply Aux Battery

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

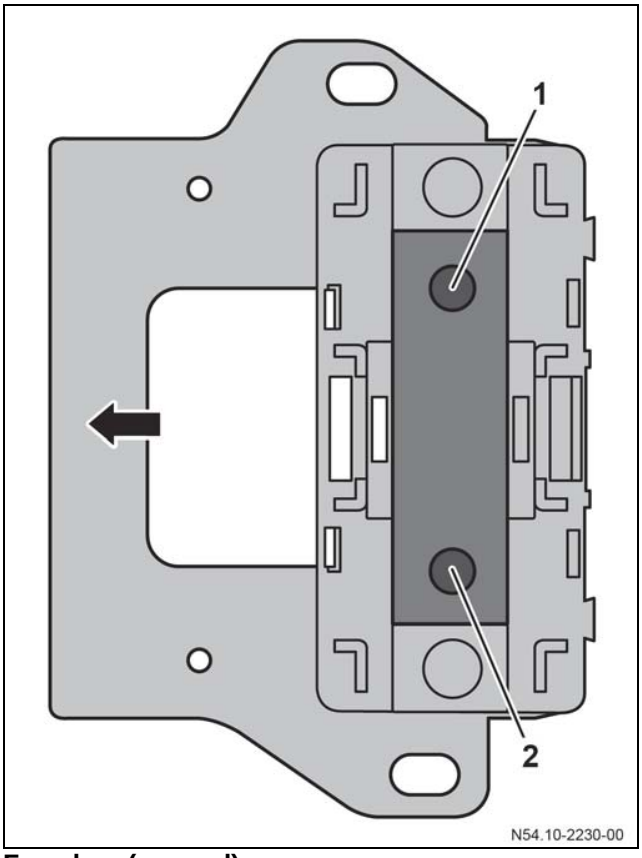
1	connector terminal
Arrow	driving direction



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

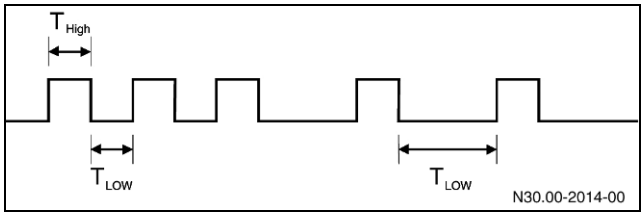
6.4.9. Speed Signal

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

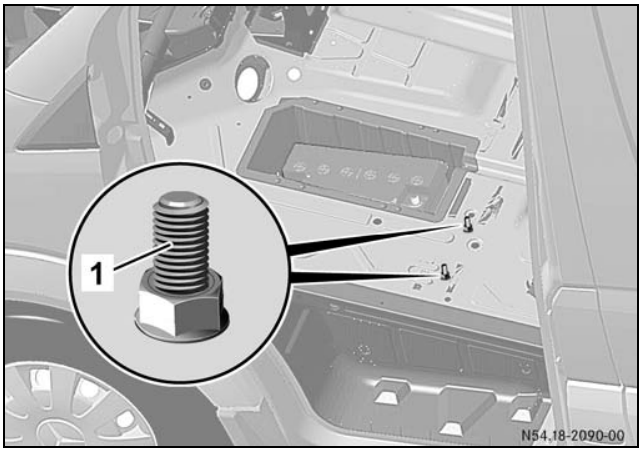
Speed signal (I_{max} = 20 mA):
T_{high} Ua > = 8V
T_{low} Ua < = 1V

6.4.10. Ground Connections

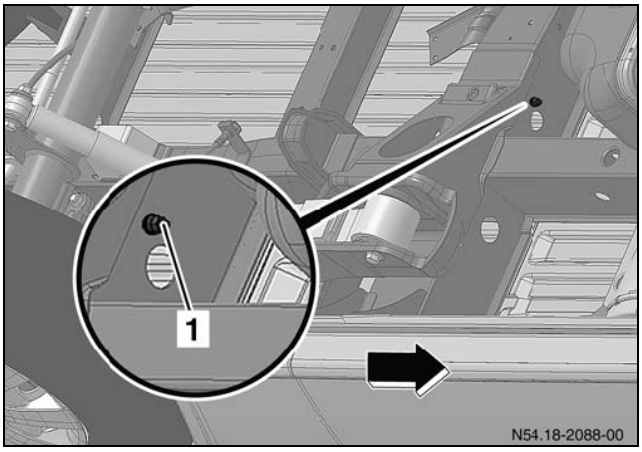
The ground bolts provided by the OEM for retrofitting electrical attachments or installations must be used to ensure the optimum ground connection with the basic vehicle. There are two M6 ground bolts in the seat base of the co-driver’s seat; there is an additional M6 ground bolt on the underside of 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 SPRINTER ENGINEERING (→ chapter 2.7)



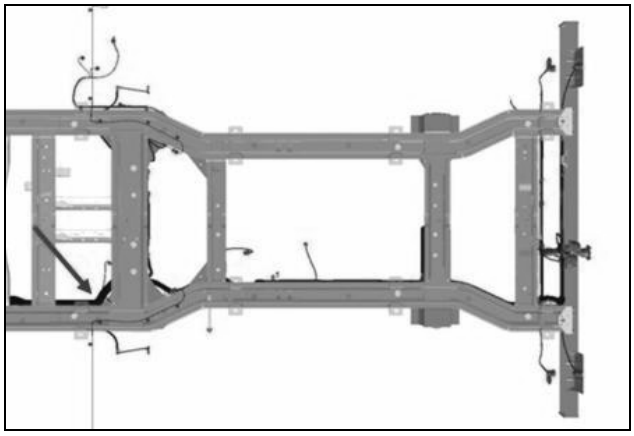
Cab ground connection (inside driver’s seat base)
1 ground bolt connection



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

1 Ground bolt connection
Arrow Front of vehicle

Chassis Cab Ground Terminal



Location of Chassis Cab Ground Terminal

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.

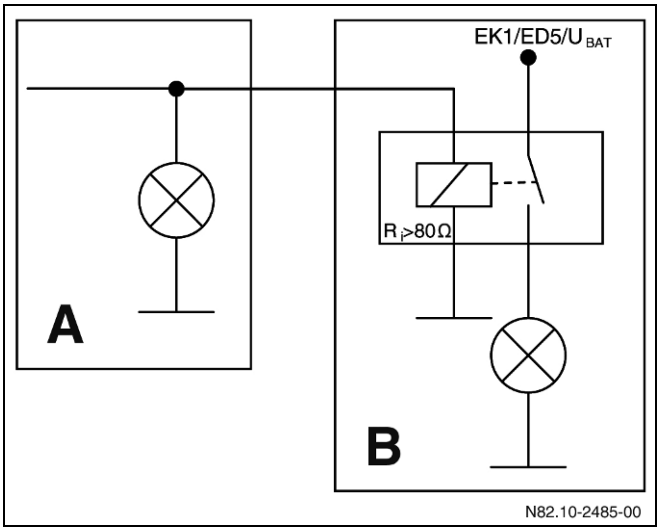
Lamp monitoring

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 (Ri > 80 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

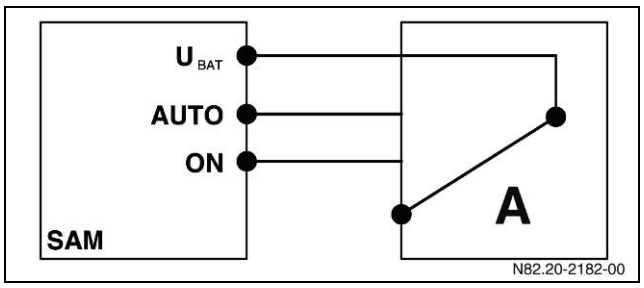
A Scope of the basic vehicle
B Scope of the body builder

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 lightning 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).

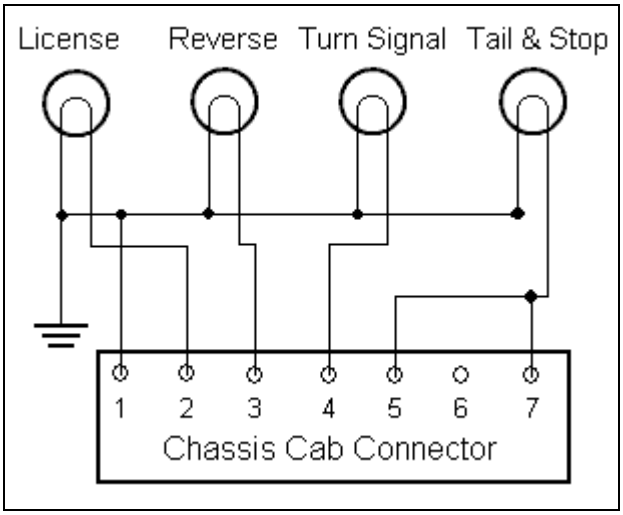
6.5.7. Aftermarket tail light installation

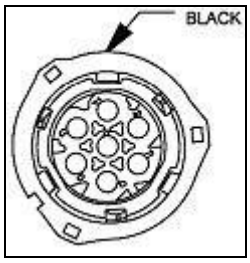
When installing aftermarket tail lights it is necessary to have Lamp Out Recognition disabled. This is standard for Sprinter MY2009 and later.

This example was done with readily available aftermarket sealed polycarbonate lens & housing with incandescent dual filament bulb. The Stop, Turn and Backup light had 2.1 Amp @ 12.8 V and the Tail Light had 0.48 Amp @12.8 V.

Note:
Verify that the lower draw Tail lights are hooked up to the correct wire otherwise rapid flashing will occur. (Sometimes battery needs to be disconnected to reset.)

LED: When using LED's, a resistor must be used to compensate for the lower AMP draw. Turn signal LED's AMP draw must be between 1.75 A – 2.1 A otherwise rapid flashing will occur.





Chassis Cab Connector

LAMP-TAIL-LEFT

Cavity	Color	Function	max. Amp	Extension Cable (L76) Color
1	BR	Ground		BR
2	GY/DG	License Light	1.0A	DG
3	WT/DB	Backup Light	2.4A	WT/DB
4	BK/WT	Turn Signal	2.1A	BK
5	BK/RD	Stop Light	2.4A	RD
6	GY/BR	Fog Light	N/A	GY/BR
7	GY/BK	Tail Light	1.0A	GY

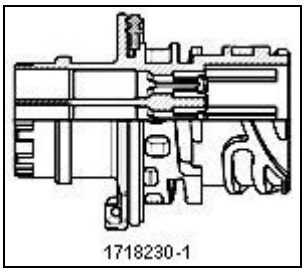
LAMP-TAIL-RIGHT

Cavity	Color	Function	max. Amp	Extension Cable (L76) Color
1	BR	Ground		BR
2	GY/DG	License Light	1.0A	DG
3	WT/DB	Backup Light	2.4A	WT/DB
4	BK/DG	Turn Signal	2.1A	BK
5	RD/BK	Stop Light	2.4A	RD
6	-	-	-	GY/BR
7	GY/RD	Tail Light	1.0A	GY

Note:
Wire colors on CODE L76 “Tail Light Extension Cable” have different colors (see tables).

Cable Color Abbreviations

BR	Brown
GY	Grey
DG	Dark Green
WT	White
DB	Dark Blue
BK	Black
RD	Red



Male Connector

Fitting male connector: company Tyco (www.tycoelectronics.com)
Connector: 1718230-1
Terminal: 1703014-1

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.

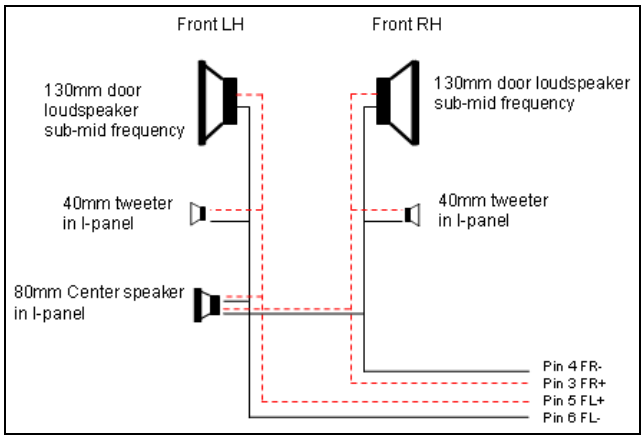
6.6.2. Connecting and routing the wiring for the radio antenna

- 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.

6.6.3. Radio

5 Front Speakers (EL8)

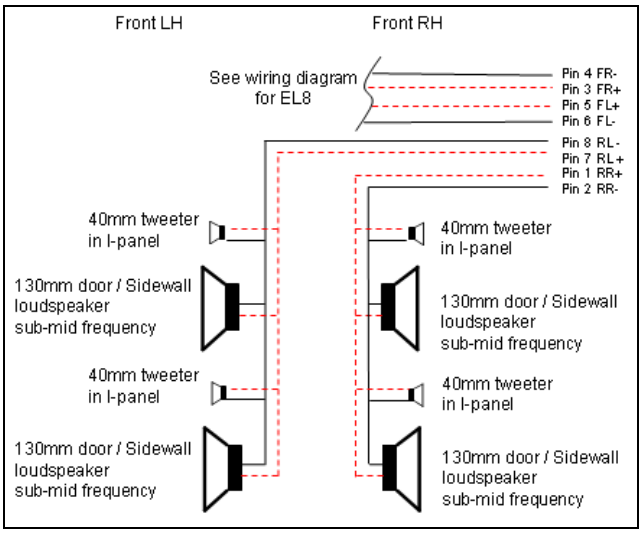
This option includes a two-way loudspeaker system plus one center speaker. One mid-range woofer is fitted in the driver's door and one is fitted in the co-driver's door. The center speaker and the tweeters are integrated in the instrument panel. (Standard on cargo vans and chassis-cab with radio prep CODE ER0)



5 Front Speakers – Wiring Diagram (EL8)

5 Front, 8 Rear Speakers (EL9)

Two-way loudspeaker system: the 5 front speakers are extended with a further four tweeters and four mid-range woofers fitted in the sidewall/sliding door and in the left and right-hand rear side paneling in the passenger compartment. (Standard on passenger van with radio and passenger van radio prep CODE ER0)



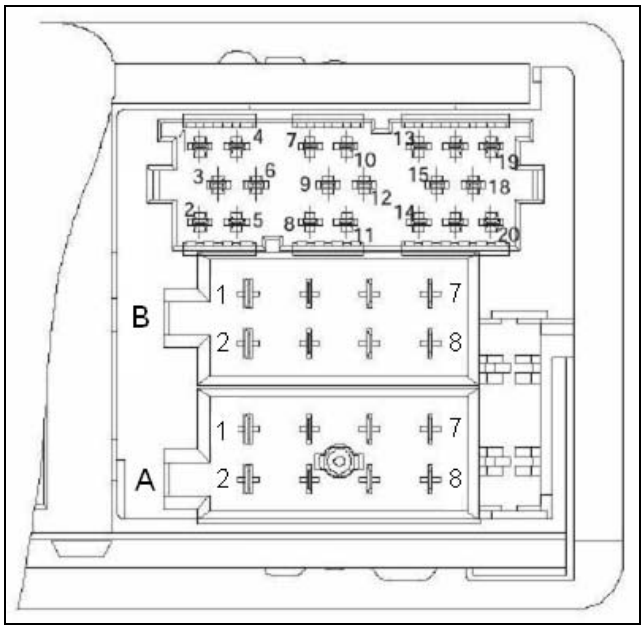
5 Front, 8 Rear Speakers – Wiring Diagram (EL9)

CODE ER0 pin layout radio connector

A1 no connection
A2 no connection
A3 no connection
A4 KI30 (+12V battery direct power)
A5 switch `Antenna´
A6 terminal 58D (display illumination)
A7 terminal 15R (ACC accessory power on)
A8 KI31 (Ground)

B1 Loud Speaker rear right +
B2 Loud Speaker rear right -
B3 Loud Speaker front right +
B4 Loud Speaker front right -
B5 Loud Speaker front left +
B6 Loud Speaker front left -
B7 Loud Speaker rear left +
B8 Loud Speaker rear left -

Note:
If the radio was not setup for the eight rear speakers from the factory, a dealer must update the radio programming by activating a fader to activate the rear loudspeaker terminals.



Rear View of Radio

Antenna Relocation

When relocating the roof antenna use:
Antenna hole plug: A 906 820 01 12
The plug is black and will be screwed onto the factory location. An extension cable for the antenna wiring (local supply) can be used to relocate the antenna. The antenna has to be properly grounded.

CODE ER0 Preparation for Radio Retrofit

Pre-installation for radio

Pre-wiring (12 V) for retrofitting a (commercially available) radio, plus short-range interference suppression and a flexible stub antenna on roof. Chassis Cab and Cargo Vans have 5 front loudspeakers (EL8), Passenger Vans come with 5 front and 8 rear loudspeakers (EL9).

Note:
The pre-installation for radio does not support CAN/MOST technology. After market radios will not work with highline steering wheel and cluster. Additional wiring must be retrofitted in order to retrofit a factory supplied radio. Without this wiring, functions such as recognition of the key position (radio continues to operate after the ignition key has been removed etc.) as well as control of the radio via the multifunction steering wheel and display of radio information in the instrument cluster are not supported.

As the factory-supplied radios are larger than the DIN slot, the radio opening must also be replaced when retrofitting a factory-supplied radio.

Preparation for Radio Retrofit

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 bys 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 SPRINTER ENGINEERING
(→ 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 SPRINTER ENGINEERING (→ 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

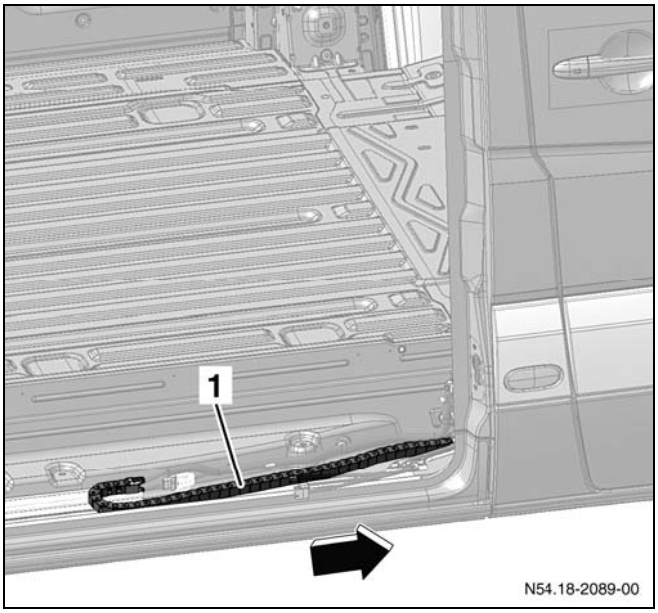
The gearing ratio for heavier windows must be adjusted to ensure that the motor draws the same electrical power. The time required to open/close the windows must not exceed 10 seconds. The motor is thermally protected i.e. the availability of the power window function may be restricted after long operating 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 SPRINTER ENGINEERING (→ 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 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 W+15% at 13 V
- Rear window heating
  P = 2 X 151 W + 15 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 of under steering), The system produces a stabilizing counteraction by applying the brakes on individual wheels.

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.

6.10. Signal acquisition and actuation module (SAM)

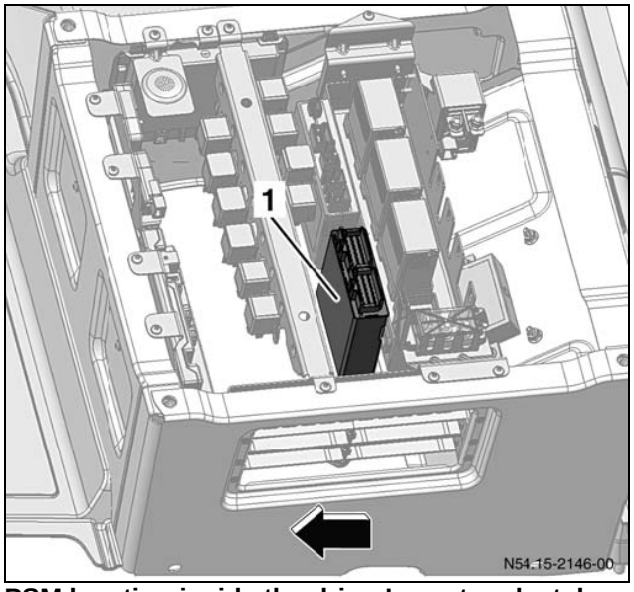
The power circuit on the SPRINTER comprises the signal acquisition and actuation module (SAM) in conjunction with a fuse and relay block (SRB). This power circuit supplies the systems and control units with power, depending on the function sequence. Requirements are sent to the SAM either on the CAN 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.

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.

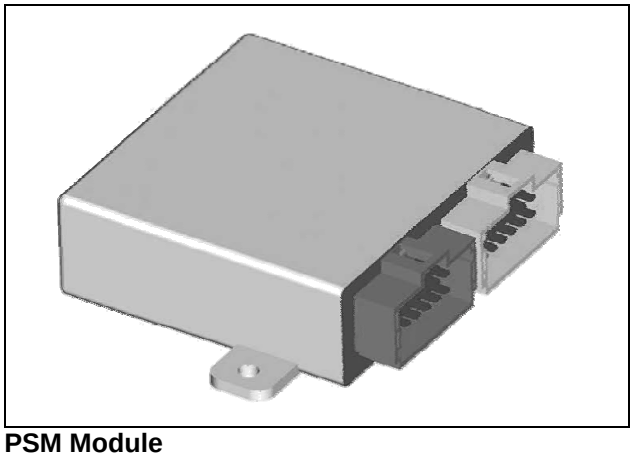
The term “networking” refers to the interaction between different control units.

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 Diagnistic Tool. Information about this can be obtained from your authorized SPRINTER dealer or SPRINTER ENGINEERING. For PSM programming, please contact SPRINTER ENGINEERING:

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 (**n**ot **and**)
- OR
- NOR (**n**ot **or**)
- XOR (e**x**clusive **or**)
- XNOR (e**x**clusive **n**ot **or**)

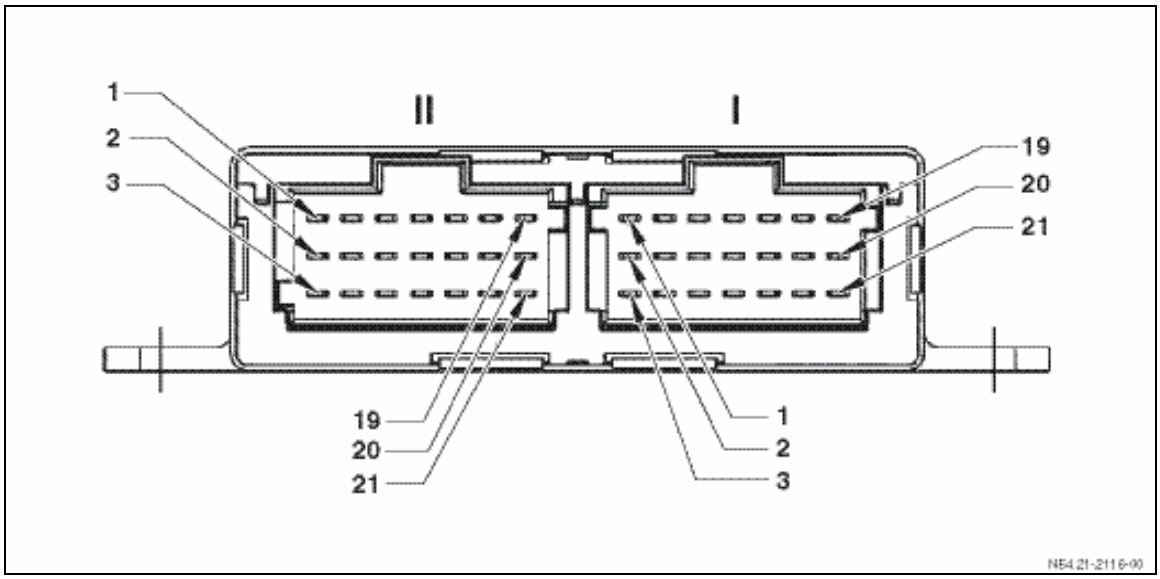
Logic Blocks include:
- Timer Block
- Counter Block
- Flip Flop Block
- Threshold Switch
- Hysteresis Block

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



II Connector 2
1 Pin 1
2 Pin 2
3 Pin 3

I Connector 1
19 Pin 19
20 Pin 20
21 Pin 21

Connector 2

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 1

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

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

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

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)

PWM signals (Pulse Width Modulation)

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

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

6.12. Tire pressure monitoring system

Warning

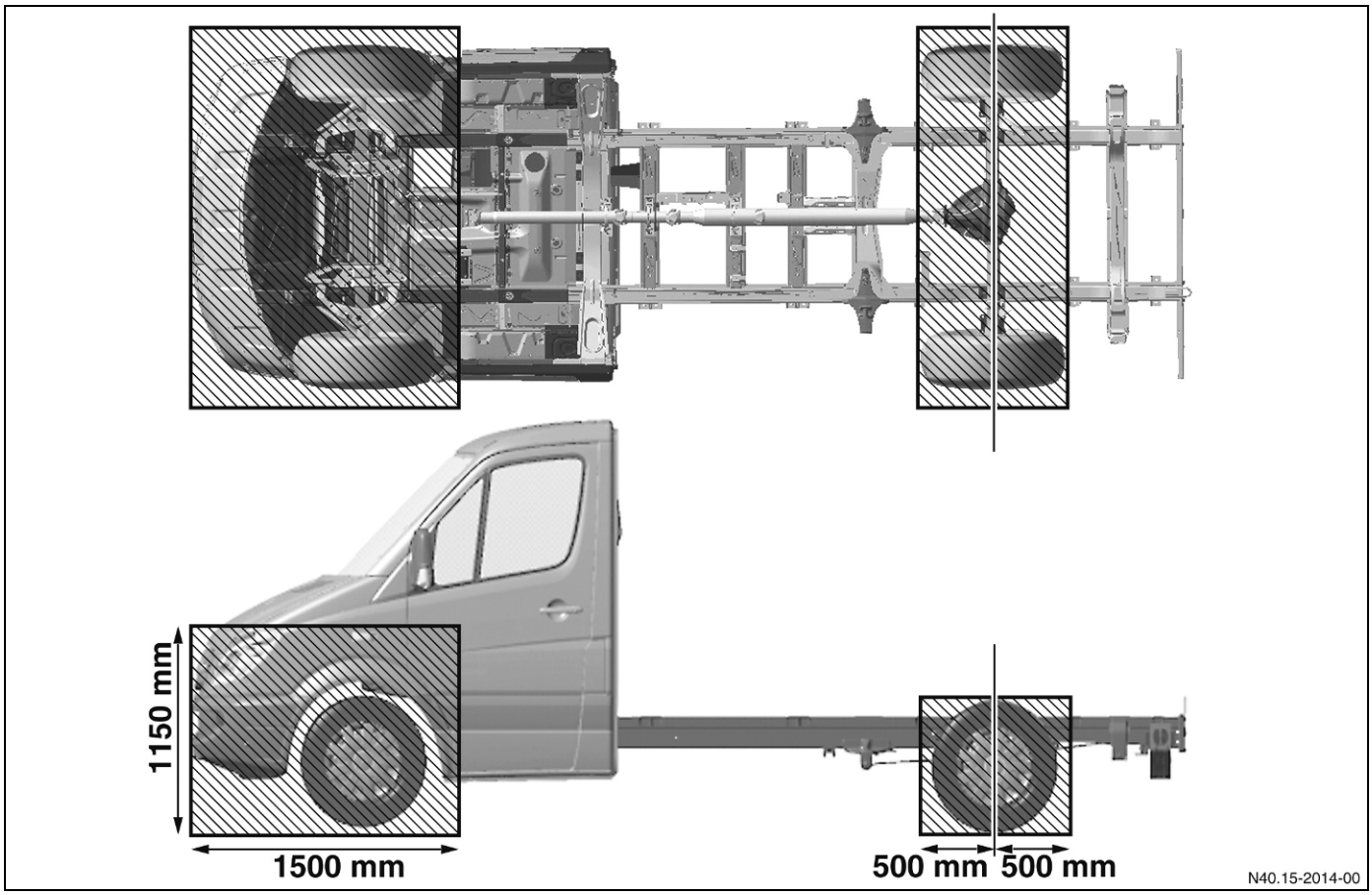
Do not carry out any modifications in the grey-shaded areas of the vehicle substructure (see illustration). Otherwise, the function may be compromised by the effect of reflections. This might result in the driver being unaware of any tire pressure loss, and could cause an accident that may cause serious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

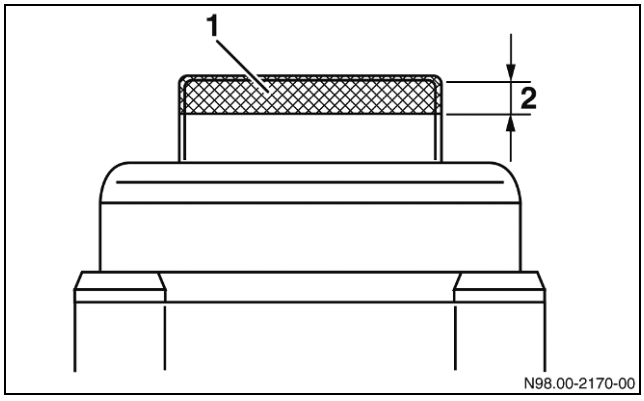
- If approved attachments are retrofitted, it is necessary to have Parktronic coded with the appropriate parameter record by Daimler AG.
- After market painting of the bumper is not permitted with the Parktronic ultrasonic sensors fitted. The coat of paint impairs the emission and reception of the ultrasonic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

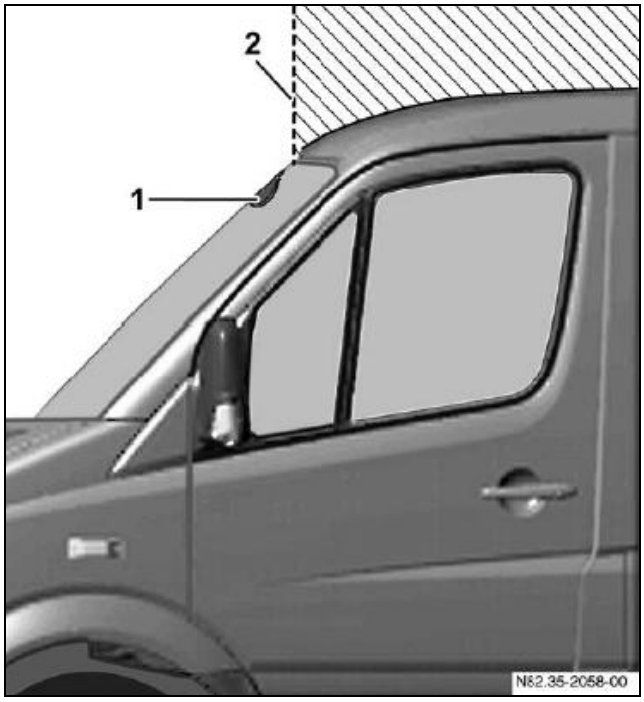
- Control current fittings
- On/off switch in the cab, which closes or opens the control current circuit of the lifting platform
- Main current fittings
- 35 mm [1 3/8 in] ground line, secured to the vehicle frame, with a blue 1-pin ITT Cannon main current connector on the lifting platform end
- 35 mm [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.