

Body and Equipment Guideline



Sprinter – Model Designation 907 (rear/all-wheel drive)

Edition 2024-9

Mercedes-Benz USA, LLC



Changes to the Body and Equipment Guideline BR 907

With the publication of this edition of the Body and Equipment Equipment Guideline (BEG) in the Upfitter Portal, the previous edition is superseded. This new edition controls from the moment of publication.

Previous (old) edition: 2022-3

Current (new) edition: 2024-9

The most important modifications are listed below.

Please note that this list does not contain all of the changes in full. Instead, it serves as an aid for a quick overview of the most important change topics.

Chapter	Title	Changes
1	Introduction	Clarifications and changes to wording of existing contents, note on model designations as of model year 2024
2.1	Advice for upfitters	Advice for upfitters
2.9	Technical Compliance Awareness Package	Inclusion of chapter with new content
3.1/3.2	Vehicle and model designation – model overview	Addition of model designation keys, adjustments to overviews of model designations, vehicle versions, exhaust gas and engine variants, as well as drive concepts from model year 2024
3.3–3.5	Selecting the basic vehicle – Dimensions and weight	Deletion of all model designations with wheelbase R1 /body length A1, vehicle variants with super-high roof (code D05), engines OM642 (code MG5) and OM651 (code MI1, MI2, MG3)
3.11	Maintenance and repair	Clarifications
3.11.2	Maintenance and storage of batteries	Clarifications and addition of new note regarding battery charging
3.13	Adhesive films on the vehicle exterior	Addition to special equipment Sideguard Assist (code JT7), adaptation to new position of Multi-Purpose Camera (MPC), content clarifications
4.1.2	Maximum permissible position of the vehicle center of gravity	Clarification to specifications, note on special equipment code B01
4.2.1	Suspension for model series 907	Clarification for special equipment code B01
4.2.4	Diameter of turning circle	Deletion of wheelbase R1

Chapter	Title	Changes
4.3.8	Roof and roof load	Deletion of super-high roof (code D05) and wheelbase R1, clarification of limit value of static roof load
4.4.3	Engine cooling	Deletion of contents regarding engine OM651, clarification on calculation of the free cross-sectional area for engine cooling with modified vehicle front
4.5.2	Modification to seats	Clarification of specifications
6.1.5	Wheels and tires	Deletion of contents and link to subchapters 3.8 and 4.2.3
6.2.1	General information about the body-in-white and body	Clarification of specifications for welding at the longitudinal frame member
6.2.6	Modifications to the cab	Clarifications regarding the area for the tank filler neck in the B-pillar
6.2.7	Side wall, windows, doors, and flaps	Deletion of sliding door variant wheelbase R1 /body length A1
6.2.11	Panel van and crewbus roof	Deletion of contents regarding wheelbase R1/body length A1 and super-high roof (code D05)
6.3	Engine peripherals and drivetrain	Deletion of contents regarding engines OM642/OM651 in all subchapters
6.3.3	Exhaust systems	Clarification of specifications for modifications to the exhaust system
6.3.5	Engine air intake	Clarification of specifications regarding engine air intake
(6.3.9)	Engine speed regulation	New chapter number 6.3.8, clarification of the descriptions regarding codes M53 and MT4
6.4.1	Interior – General information	Information regarding modified component part contour at B-pillar through catch bearing trim
6.4.2	Safety systems	Clarification to specifications, note on special equipment code SW3
6.4.3	Seats	Reformulation of existing contents, clarification of specifications, note regarding obligation to apply for letter of compatibility
6.4.5	Ventilation	Clarifications
6.5	Additional assemblies	Deletion of contents regarding engines OM642/OM651 in all subchapters
6.5.2	Auxiliary heating	Clarification of specifications
6.6.6	Liftgate (cargo liftgate)	Deletion of contents regarding wheelbase 1/body length A1
6.6.7	Trailer coupling	Clarification of warning
7.3.1	Retrofitting seats	Reformulation of existing contents, note regarding vehicles with registration without front passenger seat (code Z0S)
7.4	Modifications to the panel van	Partitions: Information regarding modified component part contour at B-pillar through catch bearing trim
7.10	Semitrailer trucks	Addition of note regarding necessity of forwarding signals in autonomous brake applications
7.14.6	Multi-Purpose Camera (MPC) on vehicles without windshield	Addition of contents regarding new generation and position of MPC
7.15	Camper vans	Information regarding modified component part contour at B-pillar through catch bearing trim
7.18	Buses	Clarification of contents

Change information

Chapter	Title	Changes
8.1	Electrics and electronics – General information	Specifications for professional electrical work, information on pre-installation for retrofitting of alcohol immobilizer
8.2	Electromagnetic compatibility (EMC)	Clarifications, addition of specifications on electromagnetic compatibility
8.3.1	On-board electrical system battery	Formulations, clarification of specifications on 12V power supply
8.3.2	Auxiliary battery	Formulations, clarification of specifications on permissible total current
8.3.4	Disconnecting the on-board electrical system voltage	Chapter with new content on disconnection of the 12 V on-board electrical system
8.4.2	Electric lines and electrical fuses	Specification on professional electrical work
8.4.7	Alternator	Deletion of contents regarding engines OM642/OM651
8.4.8	Current collector	Clarification of specifications on permissible total current
8.4.11	Travel distance signal	Deletion of contents as of model year 2024
8.5.3	Tail lamps	Adaptation to reversing lamps in the rear bumper on closed model designations 907.6xx/907.7xx
8.9.2	Crosswind Assist	Deletion of contents and note regarding wheelbase 1/body length A1
8.9.3	Active Brake Assist/Active Distance Assist DISTRONIC	Clarification of descriptions, addition of warning regarding front radar and note regarding special body situations
8.9.4	Blind Spot Assist/Rear Cross Traffic Alert/Exit warning function/Sideguard Assist	Update of contents regarding new system generation of radar sensor systems and equipment as of model year 2024, addition to Sideguard Assist (code JT7), update to diagram of detection ranges, deletion of contents regarding pre-installations – description will be subsequently published in additional change information
8.9.5	High Beam Assist, Active Lane Keeping Assist, Traffic Sign Assist, Intelligent Speed Assist	Update of contents regarding new system generation of Multi-Purpose Camera (MPC) and equipment as of model year 2024, clarification of specification regarding MPC calibration Addition of contents and specifications on pre-installations for vehicles without a windshield
8.9.6	Automatic driving lights/rain sensor	Clarification of contents, deletion of special equipment code LA3 as of model year 2024, adaptation of maximum permissible roof overhang
8.9.7	Tire pressure loss warning system	Update to specifications, clarifications, formatting changes
8.9.8	Parking packages/Moving-off information Assist	Addition to moving-off information assist (code JF7), update to contents regarding new system generation of cameras, deletion of contents regarding pre-installations – description will be subsequently published in additional change information
8.9.9	Reversing camera	Update to contents regarding new system generation of cameras, deletion of contents regarding pre-installations for digital camera – description will be subsequently published in additional change information
8.10	Parameterizable special module (PSM)	Update to contents regarding new system generation of PSM in all sub-chapters, diagram of new position in seat box, change to email address for training portal
8.17.1	Infotainment systems	Update of overview with equipment as of model year 2024
8.19	Commissioning of control units	Addition of code X96 obligation for commissioning, clarification of specifications

Change information	2	3	Planning of bodies	34
1 Introduction	9	3.1	Vehicle and model designation	35
1.1 Purpose of Body and Equipment Guideline...	11	3.2	Model overview.....	38
1.2 Conventions.....	12	3.3	Selecting the basic vehicle	39
1.3 Vehicle safety	13	3.4	Vehicle Modifications	40
1.4 Operational safety.....	14	3.5	Dimensions and weights.....	41
1.4.1 Important safety notes	14	3.6	Vehicle identification data	43
1.4.2 Diagnostics connection.....	14	3.6.1	QR code rescue sticker	44
1.4.3 Qualified specialist workshop	15	3.6.2	Safety Label location.....	46
1.4.4 Modifications to the vehicle.....	15	3.6.3	Noise Emission Label	46
1.4.5 High-voltage on-board electrical system	15	3.6.4	Complete Vehicle Identification Label	46
1.7 Contact	17	3.6.5	Incomplete Vehicle Identification Label.....	47
2 General	19	3.6.6	Vehicle Emission Control Information Label	47
2.1 Advice for Upfitters	19	3.6.7	Airbag Warning Label	48
2.1.1 Regulatory Overview	19	3.6.8	Tire and Loading Information Label.....	48
2.1.2 Emissions and safety information	20	3.6.9	Unloaded Vehicle Weight UVW rating and Label	48
2.1.3 Vehicle safety standards information	20	3.7	Vehicle stability.....	49
2.1.4 Exhaust emission control information	21	3.8	Tires	50
2.1.5 Vehicle noise emission control information	21	3.9	Bolted and welded connections.....	51
2.2 Upfitter responsibilities	22	3.9.1	Threaded connections.....	51
2.3 Product and vehicle information for upfitters.....	23	3.9.2	Welded connections.....	52
2.3.1 Upfitter Portal	23	3.10	Soundproofing	55
2.3.2 Startekinfo.....	23	3.11	Maintenance and repairs.....	56
2.3.3 Information for upfitters outside the sales network	23	3.11.1	Storing the vehicle	57
2.3.4 XENTRY Kit	24	3.11.2	Battery maintenance and storage	57
2.3.5 ADVANTAGES product information system	24	3.11.3	Work before handing over the modified vehicle	58
2.4 Product safety and product liability.....	25	3.12	Special equipment	59
2.4.1 Product safety.....	25	3.13	Adhesive decals on the exterior.....	60
2.4.2 Product liability	25	4	Technical limit values for planning	62
2.4.3 Safety-relevant features	26	4.1	Limit values for the basic vehicle	62
2.4.4 Guarantee of traceability.....	26	4.1.1	Steerability	62
2.5 Trademarks.....	27	4.1.2	Maximum permissible position of the center of gravity.....	62
2.5.1 Mercedes-Benz brand in interaction with external upfitters.....	27	4.1.3	Permissible vehicle dimensions	63
2.5.2 The function of the trademark	27	4.1.4	Parts which must not be welded:.....	66
2.5.3 Trademark protection.....	27	4.1.5	Drilling must not take place.....	67
2.5.4 Trademark rights.....	27	4.1.6	Service lift points	69
2.5.5 Advice on applying Mercedes-Benz trade- marks to vans	28	4.1.7	Weights	70
2.5.6 Use of Mercedes-Benz trademarks.....	28	4.1.8	Upfit weight limits	71
2.5.7 Brand separation/identity	28	4.2	Limit values for the suspension	72
2.6 Accident prevention	30	4.2.1	Suspension of Sprinter	72
2.7 Recycling.....	31	4.2.2	Permissible axle loads.....	73
2.8 Quality system	32	4.2.3	Approved tire sizes.....	74
2.9 Key Pre-Upfit Considerations.....	33	4.2.4	Diameter of turning circle.....	75
		4.2.5	Modifications to the axles	75
		4.2.6	Modifications to the steering.....	75

4.2.7	Modifications to the brake system	75	6.1.6	Spare wheel.....	109
4.2.8	Modifications to springs, spring suspension, and dampers.....	75	6.2	Body in white/body.....	110
4.2.9	Wheel alignment	75	6.2.1	General information on the body in white/ body	110
4.3	Limit values for the body-in-white	76	6.2.2	Attachment to the frame	115
4.3.1	Modifications to the body-in-white.....	76	6.2.3	Material for the chassis frame	116
4.3.2	Limit values for the vehicle frame	76	6.2.4	Overhang extension	117
4.3.3	Lower wheel well on rear axle for closed model designations	76	6.2.5	Modifications to the cab.....	120
4.3.4	Lower wheel well on rear axle for open model designations	77	6.2.6	Side wall, windows, doors and flaps.....	121
4.3.5	Vehicle overhang.....	78	6.2.7	Fenders and wheel wells	125
4.3.6	Attachment to the frame	80	6.2.8	Frame end crossmember	125
4.3.7	Modifications to the wheelbase for non-spe- cified body lengths.....	80	6.2.9	Cowl (F50 Cab Base).....	126
4.3.8	Roof/roof load.....	81	6.2.10	Cargo Van/Passenger Van roof	126
4.4	Limit values for engine peripherals and drivetrain	82	6.2.11	Cutting the cab roof and B-pillar roof bow	131
4.4.1	Fuel System	82	6.2.12	Underfloor paneling.....	134
4.4.2	Modifications to engine/drivetrain compo- nents	82	6.3	Engine peripherals/drivetrain.....	136
4.4.3	Engine cooling	82	6.3.1	Fuel system	136
4.5	Limit values for the interior.....	87	6.3.2	SCR exhaust gas aftertreatment system	140
4.5.1	Modifications in the area of the restraint systems	87	6.3.3	Exhaust system.....	142
4.5.2	Modifications to seats.....	87	6.3.4	Engine cooling	145
4.5.3	Seat Reference Point	89	6.3.5	Engine air intake	145
4.6	Limit values for electrics and electronics	90	6.3.6	Clearance for major assemblies	145
4.6.1	Vehicle position lamps and side marker lamps	90	6.3.7	Propeller shafts.....	146
4.6.2	Retrofitting of electrical devices	90	6.4	Interior.....	147
4.6.3	Mobile communications systems.....	90	6.4.1	General information	147
4.6.4	CAN bus	90	6.4.2	Safety equipment.....	148
4.9.1	Assembly frame	92	6.4.3	Seats	157
5	Damage prevention	93	6.4.4	Reducing interior noise.....	158
5.1	Brake hoses/cables and lines	94	6.4.5	Ventilation	159
5.2	Welding work	95	6.4.6	Attachment points for load compartment trim parts on the side wall/roof.....	159
5.3	Anti-corrosion protection measures.....	96	6.5	Additional assemblies	161
5.4	Painting and preservation work	98	6.5.1	Retrofitting an air conditioning system.....	161
5.5	Storing and handing over the vehicle	101	6.5.2	Auxiliary heating	162
6	Modifications to the basic vehicle.....	102	6.5.3	Engine power take-off	163
6.1	Suspension	102	6.5.4	Retrofitting an alternator	165
6.1.1	General information on the suspension.....	102	6.6	Attachments	166
6.1.2	Springs/shock absorbers/stabilizer bars	104	6.6.1	Wind deflectors.....	166
6.1.3	Brake system	104	6.6.2	Attachment above cab	166
6.1.4	Air suspension	108	6.6.3	Roof luggage racks	167
6.1.5	Wheels/tires	108	6.6.4	Shelf systems/vehicle interior installations ...	167
			6.6.5	Loading cranes	175
			6.6.6	Lifting platform (cargo liftgate)	177
			6.6.7	Trailer coupling / Trailer hitch	180
			6.6.8	Underrun protection / underride guard	184
			6.6.9	Positioning placard holders	186
			7	Design of bodies.....	188
			7.1.1	Material quality, general	188
			7.1.2	Design	189

7.1.3	Section dimensions/dimensioning	190	7.14.19	Upfitter conversion with code F50.....	239
7.1.4	Attachment to the chassis bed	191	7.14.20	Temperature sensor with code F50.....	241
7.1.5	Assembly frame as floor assembly	196	7.15	Camper Vans	242
7.2	Self-supporting bodies	197	7.15.1	Body in white of RVs	242
7.3	Modifications to the interior	198	7.15.2	Suspension of camper vans.....	243
7.4	Modifications to closed cargo vans.....	201	7.15.3	Electrics and electronics for camper vans...	244
7.5	Platform bodies	206	7.15.4	Additional main fuses for camper vans (codes E1R and E1Y).....	245
7.6	Box bodies.....	207	7.15.5	Features for camper vans.....	245
7.7	Refrigerated vehicles/temperature-control- led vehicles.....	208	7.15.6	Airbags for camper vans.....	246
7.8	Vehicles for transportation of technical gases	209	7.16	Bodies on chassis with lowered roof	248
7.9	Dump trucks	210	7.16.1	Mounting the auxiliary roof frame	249
7.10	Semitrailer trucks.....	211	7.16.2	Mounting the body on the auxiliary roof frame.....	249
7.11	Recovery vehicles	215	7.17	Semi-integrated bodies and optional moun- ting of free-standing bodies.....	250
7.12	Torsionally stiff body types	216	7.18	Buses	254
7.13	Lifting work platform	217			
7.14	Bodies on chassis with base (F28, F50)	220			
7.14.1	Cab base with cowl (code F50) and cab base with doors (code F28).....	220	8	Electrics/electronics	256
7.14.2	Mechanical equipment.....	222	8.1	General information	256
7.14.3	Wiring harness connecting points.....	224	8.2	Electromagnetic compatibility (EMC)	257
7.14.4	Headlamp Assist (code LA2)	225	8.3	Battery.....	258
7.14.5	Connecting point for automatic driving lights (code LA2)/rain sensor (code JF1) on vehicles without windshield	226	8.3.1	On-board electrical system battery.....	258
7.14.6	Rain sensor (code JF1)	227	8.3.2	Auxiliary battery	260
7.14.7	Multi-purpose camera (MPC) on vehicles without windshield	229	8.3.3	Battery maintenance and storage	263
7.14.8	Connecting point with omission of driver's and front passenger seat for pre-installation for seat belt warning system (code J1D/J1E) and seat occupancy recognition (code E3S)	229	8.3.4	Disconnecting the on-board electrical sys- tem voltage	263
7.14.9	Driver's and front passenger's doors connection point.....	232	8.4	Interfaces	264
7.14.10	Headlamp connecting point - series pro- duction packages and special equipment options	233	8.4.1	CAN bus and networking.....	264
7.14.11	Connecting point for antenna switchover box for third-party antennas (code E4A).....	233	8.4.2	Electric lines/fuses.....	264
7.14.12	Pre-installation for upfitter interface H (code E2A) and upfitter interface M (code E5M)	234	8.4.3	Cable extension	265
7.14.13	Pre-installation for windshield heater (code E2F) with omission of windshield	235	8.4.4	Additional electric circuits.....	266
7.14.14	Pre-installation for rear speakers (code EP7) ..	236	8.4.5	Operating switches (pre-installation).....	266
7.14.15	Overhead control panel (OCP) switch module with code F50.....	236	8.4.6	Retrofitting electrical equipment.....	267
7.14.16	E-call on base vehicles	237	8.4.7	Alternator	267
7.14.17	Fresh-air intake with code F50	238	8.4.8	Power tapping.....	268
7.14.18	Hood contact switch with code F50	238	8.4.9	Interface overview.....	273
			8.4.10	Speed signal	275
			8.4.11	Travel distance signal	275
			8.4.12	Ground bolts.....	275
			8.4.13	Deep discharge protection (standby mode)...	277
			8.4.14	Additional ground weld studs	278
			8.5	Lighting	279
			8.5.1	Headlamps	279
			8.5.2	Mounting additional lamps	279
			8.5.3	Tail lamps.....	279
			8.5.4	Marker lamps.....	282
			8.5.5	Interior lamps.....	286
			8.6	Mobile communications systems.....	288
			8.6.1	Communication equipment	288

8.6.2	Antenna connection and cable routing (radio communication)	289	9	Calculations.....	364
8.7	Electronic ignition lock (EIS)	290	9.1	Center of gravity	364
8.7.1	General information	290	9.1.1	Determination of the center of gravity in the x-direction	364
8.7.2	Central locking system and post-delivery integration of doors of bodybuilder manufacturer.....	290	9.1.2	Determination of the center of gravity in the z-direction	366
8.8	Windows and doors.....	294	9.2	Location of fifth wheel coupling.....	370
8.8.1	Window lifters/window hinges.....	294	10	Technical details.....	371
8.8.2	Electric sliding door to load compartment ...	294	10.1	Bulb ratings of tail lamps	371
8.8.3	Windshield wipers	295	10.1.1	Conventional headlamps	372
8.8.4	Outside mirrors	295	10.1.2	Conventional tail lamps	373
8.8.5	Windshield heating/rear window heating...	295	10.1.3	Conventional tail lamps on cab-chassis with code L90	373
8.9	Driving assistance systems	296	10.1.4	LED tail lamps on cab-chassis with code L91	374
8.9.1	Electronic Stability Program (ESP®)	297	10.1.5	Additional lighting functions	375
8.9.2	Crosswind Assist.....	298	10.2	Trailer hitch hole patterns.....	376
8.9.3	Active Brake Assist/Active Distance Assist (DISTRONIC PLUS)	303	10.2.1	Installation dimensions, version 1	377
8.9.4	Blind Spot Assist/Rear Cross Traffic Alert/exit warning function/Sideguard Assist	307	10.2.2	Installation dimensions, version 2.....	378
8.9.5	High Beam Assist/Active Lane Keeping Assist/Traffic Sign Assist/Intelligent Speed Assist	322	10.2.3	Installation dimensions, version 3.....	379
8.9.6	Rain sensor and Headlamp Assist.....	323	Index.....	380	
8.9.7	Tire pressure loss warning system	325			
8.9.8	Parking packages/Moving-off information Assist	327			
8.9.9	Reversing camera	330			
8.9.10	Parktronic sensors	344			
8.10	Parameterizable Special Module (PSM/MPM).....	345			
8.10.1	PSM (MPM) Functions.....	347			
8.10.2	PSM interfaces	348			
8.10.3	PSM (MPM) Pin Assignment	349			
8.10.4	Additional information on PSM (MPM)	350			
8.11	Signal acquisition and actuation module (SAM)	351			
8.12	Electrical circuit diagrams	352			
8.13	Telematics and Infotainment.....	353			
8.13.1	Overview of the Infotainment system	354			
8.13.2	Antennas	355			
8.13.3	Speakers	359			
8.14	Connectivity solutions Mercedes me connect	360			
8.14.1	Mercedes me connect for personal use.....	360			
8.14.2	Mercedes me connect for business use.....	360			
8.15	Commissioning of control units	361			
8.16	Remote start.....	362			

This Body and Equipment Guideline (BEG) provides upfitters (legal entities) and converters (natural entities), hereinafter referred to collectively as "upfitters", with important technical information which should reflect a vehicle that is safe and compliant. The attachments, bodies, equipment, or modifications installed and implemented by the upfitter are subsequently referred to as "upfit work".

In the Body and Equipment Guideline (BEG) for Mercedes-Benz vans, different models and vehicle variants directly released from a production plant are grouped together under the generic term "basic vehicle".

Mercedes-Benz Sprinter models and vehicle variants are listed in Chapter 3.1 Vehicle and model designation (→ page 35).

! NOTE

This Body and Equipment Guideline (BEG) is based on the development of the Sprinter vehicles - BM 907 for the U.S. and Canada market.

This Body and Equipment Guideline and other applicable documents as well as Supplemental Guidelines for vehicles with an electric drive, are published on the UpfitterPortal:

www.UpfitterPortal.com

- i** As of model year 2024, selected model designations will no longer be manufactured. For this reason, these model designations are no longer included in the present Body and Equipment Guideline, see Chapter 3.2 Model overview (→ page 38). If required, you can find information and specifications in previous Body and Equipment Guidelines in which the model designations are still included. These are still available on the www.upfitterportal.com.
- i** If necessary, you can also obtain information about the Body and Equipment Guideline on the www.upfitterportal.com.

! NOTE

Due to the large number of upfitters and upfit types, Mercedes-Benz USA, LLC, Mercedes-Benz Vans, LLC, Mercedes-Benz Canada, as well as any other corporate entity or affiliate in the United State and Canada (hereinafter "Mercedes-Benz") cannot take into account the consequences of possible modifications to the vehicle – e.g. regarding performance, stability, load distribution, center of gravity, and handling characteristics – that may result from body mounting work. For this reason, Mercedes-Benz is not liable for accidents or injuries sustained as a result of such modifications to its vehicles. The upfitter must observe all relevant country-specific laws, regulations, policies and registration regulations. The upfitter is responsible for ensuring that all body mounting work that it performs adheres to the information and specifications in this Body and Equipment Guideline. The upfitted vehicle must remain fault-free, safe to operate and roadworthy, and must not present any danger to people or property.

If this obligation is violated in any way, the upfitter shall assume full product liability.

This Body and Equipment Guideline (BEG) is aimed at professional upfitters. As a result, BEG assumes that the upfitter has suitable background knowledge.

Moreover, the upfitter shall observe and adhere to the operator's manual that is valid for the vehicle.

- i** You can download Operator's Manuals online from the country-specific Mercedes-Benz websites. If necessary, get in touch with your designated contact at Mercedes-Benz Service.

Please note that certain types of work (e.g. welding work on load-bearing parts) must only be carried out by appropriately qualified personnel. This is to prevent risk of injury and ensure that the degree of quality required for the upfit work is attained.

! NOTE

As an upfitter, you must always bear in mind that only the upfit work described in this Body and Equipment Guideline is permissible. All upfitting not described here is prohibited. If any upfitting not described here is necessary, always consult via www.upfitterportal.com.

! NOTE

Important revisions to Body and Equipment Guidelines, such as updates in the period between two full updates/revisions of the Body and Equipment Guideline, will in future be published as "Revisions" in the www.UpfitterPortal.com. Upon their publication in the Upfitter Portal, these "Revisions to the Body and Equipment Guideline" become an integral part of the current Body and Equipment Guideline or supersede the previous version of the Body and Equipment Guideline and must be complied with.

Other relevant guidelines that supplement the Body and Equipment Guideline can be found in the www.UpfitterPortal.com.

The following supplements are available for model series 907:

Supplemental guideline for eSprinter – model series 907 (electric drive).

1.1 Purpose of Body and Equipment Guideline

The Body and Equipment Guideline (BEG) is divided into 10 interlinked chapters to help you find the information you require more quickly:

Chapter 1 Introduction (→ page 9)

Chapter 2 General (→ page 19)

Chapter 3 Planning of bodies (→ page 34)

Chapter 4 Technical limit values for planning (→ page 62)

Chapter 5 Damage prevention (→ page 93)

Chapter 6 Modifications to the basic vehicle (→ page 102)

Chapter 7 Design of bodies (→ page 188)

Chapter 8 Electrics/electronics (→ page 256)

Chapter 9 Calculations (→ page 364)

Chapter 10 Technical details (→ page 371)

Appendix:

Index (→ page 327)

For more information see 2.3 Product and vehicle information for upfitters (→ page 23).

The index in PDF format is linked to help you find the information you require quickly.

Make certain that you observe the limit values described in Chapter 4 Technical limit values for planning (→ page 62) as planning must be based on these values.

The chapters entitled "Modifications to the basic vehicle", "Design of bodies" and "Electrics/electronics" are the main source of technical information contained in this Body and Equipment Guideline.

i Due to the ongoing technical evolution of Mercedes-Benz van products, upfitters are notified regularly about publication dates concerning the latest topics or contents/updates as part of a "BEG Addendum".

i As with the Body and Equipment Guideline, the "Revision information for the Body and Equipment Guideline" can be retrieved from www.upfitterportal.com

If you are using a printed version of the Body and Equipment Guideline, the following should be noted: important revisions to BEG, such as updates in the time period before a new full BEG release will be published as "Addendums" on the Upfitter Portal.

On the publication in the Upfitter Portal, these revisions to the BEG become a component of the current BEG or supersede the previous version of the BEG and must be complied with.

Illustrations and schematic drawings are examples only and serve to explain the texts and tables.

! NOTE

All graphics are for illustrative purposes only and they do not depict all the technical details faithfully.

i You can obtain further information from any Mercedes-Benz Service Partner.

1.2 Conventions

The following conventions are used in this Body and Equipment Guideline:

WARNING

Warning notices draw attention to dangers that will endanger the health or life of yourself or others.

 Action

NOTE


This note draws your attention to possible damage to the vehicle and/or other objects.

 Action


ENVIRONMENTAL NOTE

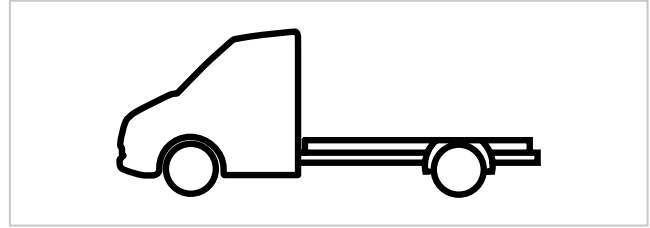
An environmental note provides you with notes on environmental protection.

 Action

 This symbol indicates useful notes or further information and information sources which could be helpful to you.

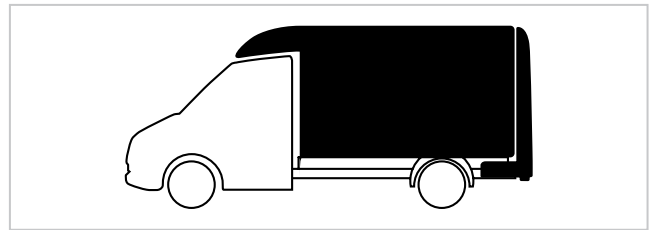
→ This symbol indicates where you can find further information about a topic.

 Action



Basic vehicle

Under this symbol you will find information concerning the delivered basic vehicle (chassis, panel van and crewbus).



Body

Under this symbol you will find information concerning the modification or mounting/attachment of the body by the upfitter.

1.3 Vehicle safety

⚠ WARNING

Before starting to install non-MB bodies or major assemblies please read the relevant chapters of the Body and Equipment Guideline, the instructions and information from the equipment supplier, and the detailed Operator's Manual for the basic vehicle. You could otherwise fail to recognize dangers, which could result in serious injury to yourself or others.

Notes on vehicle safety

We recommend that you only use Mercedes-Benz parts, major assemblies, conversion parts, and/ or accessory parts that are suitable for the vehicle model and that have been tested by Mercedes-Benz.

If parts, major assemblies, conversion parts, or accessory parts that have not been recommended are used, ensure that the safety of the vehicle is verified without delay.

! NOTE

Upfitters must comply with national, state, and local registration regulations as well as Department of Transportation requirements as upfit work to the vehicle may change the vehicle type for registration purposes and may invalidate the operating permit. This applies in particular to:

- modifications which change the vehicle type approved in the general operating permit
- modifications which could endanger road users
- modifications which adversely affect exhaust gas emissions or noise levels.

Vehicle modifications by the upfitter

Before upfitting, the upfitter must check whether

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

The Upfitter must inform the relevant regulatory agencies of any modifications to the basic vehicle. The relevant regulatory agencies will decide on compliance with legislation and regulations after any modifications have been made to the basic vehicle, and therefore on the eligibility for registration of the complete vehicle.

The upfitter must ensure that the vehicle meets the registration requirements with its modifications.

! NOTE

National and local laws, directives and registration regulations must be complied with.

⚠ WARNING

If you fail to have the prescribed service/maintenance work and any necessary repairs carried out, malfunctions or system failures could occur.

There is risk of an accident and danger to life and limb!

⚠ WARNING

If you switch off the ignition while driving, safety-relevant functions will be restricted or no longer available. This can affect functions such as the power steering and brake force boosting. It will then take considerably more effort to steer and brake.

There is risk of an accident and danger to life and limb!

Do not switch off the ignition while driving.

Inspections conducted by official test centers or official approvals do not inevitably guarantee compatibility with all the functions and systems in the basic vehicle.

For any questions regarding the compatibility validation, please contact Mercedes-Benz through the Upfitter Portal. See Chapter 1.7 Contact (→ page 17).

1.4 Operational safety

1.4.1 Important safety notes

⚠ WARNING

If you fail to have the prescribed service/maintenance work and any necessary repairs carried out, malfunctions or system failures could occur.

There is risk of an accident and danger to life and limb!

Always have the prescribed service/maintenance work and any necessary repairs carried out at a qualified specialist workshop.

⚠ WARNING

If you switch off the ignition while driving, safety-relevant functions will be restricted or no longer available. This can affect functions such as the power steering and brake force boosting. It will then take considerably more effort to steer and brake.

There is risk of an accident and danger to life and limb!

Do not switch off the ignition while driving.

⚠ WARNING

If you drive over obstacles at high speed or the vehicle bottoms out when driving off-road, severe impacts can occur on the underbody, tires, or wheels. This may cause both visible and invisible damage to your vehicle. You could lose control of the vehicle, or damaged components could fail.

There is risk of an accident and danger to life and limb!

Therefore, drive slowly over obstacles and avoid bottoming out the vehicle when driving off road.

If driving safety is impaired or you suspect there is damage while driving, stop safely without delay, notify a qualified specialist workshop, and have your vehicle inspected and repaired there.

1.4.2 Diagnostics connection

The diagnostics connection is used to connect diagnostic devices at a qualified specialist workshop.

⚠ WARNING

When you connect devices to a diagnostics connection in the vehicle, the functions of various vehicle systems could be impaired. This can compromise the operational safety of the vehicle.

There is risk of an accident and danger to life and limb!

Only connect devices to the diagnostics connection in the vehicle that have been approved by Mercedes-Benz for your vehicle.

⚠ WARNING

Loose devices or hanging cables from devices connected to a diagnostics connection can obstruct the space for the pedals. During sudden driving or braking maneuvers, the devices or cables could fall between the pedals. This could impede the functioning of the pedals.

There is risk of an accident and danger to life and limb!

For this reason, it is essential to ensure that no devices or cables that could move have been fastened in the driver footwell while driving.

⚠ WARNING

Objects in the driver footwell can restrict pedal travel or block a fully depressed pedal. This compromises the operational and road safety of the vehicle.

There is risk of an accident and danger to life and limb!

Stow all objects in the vehicle securely so that they cannot fall into the driver footwell. Always install floor mats securely and as specified, so that sufficient clearance for the pedals is guaranteed. Do not use loose floor mats and do not place multiple floor mats on top of each other.

! NOTE

If devices are used at the diagnostics connection while the engine is off, the on-board electrical system battery can discharge.

1.4.3 Qualified specialist workshop

A qualified specialist workshop is one that possesses the necessary expertise, tools, and qualifications for the Sprinter. These enable the required work on the vehicle to be carried out properly. This applies, in particular, for safety-relevant work.

Pay attention to the further information in the service booklet.

Mercedes-Benz recommends that you use a specialist workshop that is qualified for the Sprinter.

Always have the following work on the vehicle carried out at a qualified specialist workshop:

- Safety-relevant work
- Service and maintenance work
- Repair work
- Modifications, installations, and conversions
- Work on electrical and electronic component parts

You can get up-to-date information about your vehicle's service at any time from a qualified specialist workshop, e.g. at a Mercedes-Benz Service Center.

1.4.4 Modifications to the vehicle

⚠ WARNING

Improper work or modifications on the vehicle, e.g. the routing of cables behind trim panels, could cause the safety systems in your vehicle to stop functioning correctly. Because of this, the safety systems may not protect you or others as they are supposed to. You could lose control of the vehicle.

There is risk of an accident and danger to life and limb!

Always have all work on the vehicle, particularly safety-relevant work and work on safety-relevant systems and service operations, carried out at a specialist workshop that is qualified for the Sprinter. Mercedes-Benz recommends that you use a Mercedes-Benz Service Center for this purpose.

⚠ WARNING

Improper work on the drive system or modifications to the vehicle could cause systems in your vehicle to stop functioning correctly. The driver may lose control of the vehicle.

There is risk of an accident and danger to life and limb!

Always have work on the drive system and modifications to the vehicle, e.g. installations or conversions, carried out at a specialist workshop that is qualified for the Sprinter.

⚠ WARNING

Modifications to electronic component parts, their software or wiring can impair their functioning and/or the functioning of other networked components. Safety-relevant systems in particular may also be affected. Because of this, they may no longer function properly and/or compromise the operational safety of the vehicle.

There is risk of an accident and danger to life and limb!

Never carry out any modifications to the wiring and electronic component parts or their software. Have all work on electrical and electronic devices carried out at a qualified specialist workshop.

1.4.5 High-voltage on-board electrical system

Due to the design, a high-voltage on-board electrical system is not provided on the Sprinter model designations described in this Body/Equipment Mounting Directive.

- ① Information and specifications regarding the high-voltage on-board electrical system on the eSprinter with an electric drive can be found in the identically named chapter of the Supplemental Directive for the New eSprinter – Model Series 907 (rear wheel drive).

1.5 Note on copyright

All the text, illustrations and data contained in these Body and Equipment Guidelines are protected by copyright.

This also applies for the editions on CD-ROM, DVD or other media.

If you have any questions, please contact Upfitter Management Vans through the Upfitter Portal.
www.UpfitterPortal.com

1.6 Granting of body technical assistance

Modifications by upfitters should not affect the safety of the Sprinter or its occupants. Mercedes-Benz will offer technical assistance concerning Sprinter, including technical data and drawings and product info brochures, but it is the sole responsibility of upfitter to ensure modifications do not affect safety of the vehicle.

Mercedes-Benz neither approves nor disapproves Sprinter modifications or equipment installations made by upfitters, or dealers/agents of upfitters. Mercedes-Benz do not control the actions and manufacturing techniques of such upfitters and disclaims all liability and responsibility with regard to any claims for damages related to any modifications and equipment installations that upfitter performs on any Sprinter.

1.7 Contact

Technical advice on body compatibility and on the basis vehicle

To obtain technical assistance or product/parts information ONLY as it pertains to upfitting and modifying Sprinter vans please contact the Upfitter Management Vans through the Upfitter Portal:

www.UpfitterPortal.com

To contact Upfitter Management Vans, create an inquiry through the Upfitter Portal inquiry center (please allow up to 5 business days for more complex inquiries).

Technical advice on the parameterizable special module (PSM)

The PSM (parameterizable special module) familiar from the Metris BM 447 and Sprinter BM 906 vans has been developed further. For the new Sprinter model designated as BM 907, PSM is now internally labeled as Multi-Purpose Module (MPM). MPM can still be ordered under the option code ED5 (PSM).

Additional information on PSM or MPM can be found under chapter Chapter 8.10 Parameterizable Special Module (PSM/ MPM) (→ page 345)

Advanced support for eXpertUpfitter program members.

Members of the self-certification quality program, or eXpertUpfitters can enjoy a dedicated eXpertUpfitter Dashboard that is reached via a special login on the Upfitter Portal. From the dashboard, eXpertUpfitters can receive VIP Technical Support and have the ability to propose upfit solutions for review by Upfitter Management Vans. Proposed solutions will be considered based on scale and complexity and should fall outside of the contents described in this BEG. For more information about the eXpertUpfitter program please visit

**www.UpfitterPortal.com/en-us/upfitters/
program-overview**

For all other inquiries non-related to upfitting or modifying Sprinter, but pertaining to model availability, ordering/purchasing a van, service center capabilities and to get local support, please contact an authorized dealership authorized by Upfitter Management Vans.

The most current list of dealers can be found here:

Mercedes-Benz USA Dealers	www.mbvans.com
Mercedes-Benz Canada Dealers	www.mercedes-benz-vans.ca

1.8 Definitions

Upfitters include Final-Stage Manufacturers, Intermediate Manufacturers, Incomplete Vehicle Manufacturers, Vehicle Alterers and Equipment Manufacturers.

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” mean Sprinters manufactured by Mercedes-Benz reassembled if necessary by Mercedes-Benz designee, certified to comply with all applicable laws and regulations and delivered as a complete vehicle (cargo, crew, and passenger vans) to dealers, upfitters and others engaged in the manufacturing and marketing of new motor vehicles and equipment.

Mercedes-Benz parts mean genuine parts, accessories for installation on or attached to vehicles, components, aggregates and assemblies, including those for exchange or replacement which are supplied by or through MBUSA, MBCAN, and MBVANS or any of its parent companies, affiliates or subsidiaries.

Dealers mean entities authorized by MBUSA, MBCAN, and MBVANS to sell and/or service Sprinters.

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

Final-stage manufacturers are responsible for ensuring the previously certified vehicle meets all emissions and FMVSS/CMVSS (Federal/Canadian Motor Vehicle Safety Standards) standards.

Incomplete vehicle means an assembly consisting, as a minimum, of a frame and chassis structure. Powertrain, steering system, suspension system and braking system, to the extent that those systems are to be part of the completed vehicle that requires further manufacturing operations, other than the addition of readily attachable components, such as mirrors or tire and rim assemblies, 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 such components that none of the components, taken separately, may 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. Alterers are responsible for ensuring the previously certified vehicle meets all emissions and FMVSS/CMVSS (Federal/Canadian Motor Vehicle Safety Standards) standards; comprehensive regulatory information is available at www.nhtsa.gov.

1.9 Parts Use

WARNING

Mercedes-Benz strongly recommends that upfitters use genuine Mercedes-Benz parts and Mercedes-Benz replacement and conversion parts, or replacement and conversion parts and accessories expressly approved for the Sprinter by Mercedes-Benz in order for upfitters to maintain regulatory compliance of these components or equipment as well as the durable and safe operation of Sprinters. In areas beyond regulatory compliance, upfitters may elect to use other parts or conversion parts or accessories and assume the manufacturers' warranty of these parts themselves.

In the case that these conversion parts cause damage to the original Mercedes-Benz parts, the warranty of the original Mercedes-Benz parts will become void. It is the upfitters responsibility to ensure that non-approved replacement conversion parts and accessories do not render the vehicle unsafe.

2.1 Advice for Upfitters

2.1.1 Regulatory Overview

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 vans, dealers, upfitters and others engaged in the manufacturing and marketing of new motor vehicles and equipment.

Part 568 of the Title 49 Code of Federal regulations (CFR) specifies detailed regulatory requirements for vehicles manufactured in two or more stages, including Final Stage Manufacturers. This document is intended to fulfill a part of Mercedes-Benz obligations as the original equipment manufacturer or as an incomplete vehicle manufacturer. Section 2.1.2 Emissions and safety information (→ page 20) 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 Mercedes-Benz.

Upfitters and dealers who make any modifications that may affect the final certification of the engine, vehicle or equipment assume the sole responsibility for the vehicle.

Upfitters should consult with their legal counsel concerning the final certification status of the vehicle.

Further, it is the upfitters’ responsibility to ensure that such modifications do not affect the safety of the vehicle. Contact the Environment Protection Agency (U.S. EPA) and the California Air Resources Board (CARB) concerning the applicable U.S. and 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.

Upon completion of the modified vehicle, the upfitter 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 to \$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.

Upfitters are 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.

Mercedes-Benz 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 upfitter to certify that the vehicle conforms to any other standards affected by the vehicle alteration.

2.1.2 Emissions and safety information

A complete Sprinter Van “As Delivered” or a Chassis Cab/Cutaway, i.e. an incomplete vehicle, delivered by MBUSA, MBCAN and MBVANS to dealers or upfitters is certified for by Mercedes-Benz 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 and MBVANS, upfitters 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 upfitters 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). Upfitter Management Vans 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 MBVANS designee through the Upfitter Portal:

Contact via website

www.UpfitterPortal.com

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 Clean Air Act also prohibit any persons, including but not limited to, dealers or upfitters to remove or render inoperative any devices or elements of design installed in a motor vehicle engine in compliance with the regulations.

2.1.3 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, upfitters 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.

All vehicles as manufactured by Mercedes-Benz meet all safety and emissions standards as set forth by the National Highway Traffic Safety Administration (NHTSA) and the Environmental Protection Agency (EPA). If any modifications or alterations are made to the vehicle that takes the vehicle out of compliance with federal and local regulations, it is the responsibility of the vehicle alterer, intermediate manufacturer, or final stage manufacturer to ensure the vehicle meets all emissions and FMVSS/CMVSS standards.

For manufacturers who are defined as alterers, please visit www.nhtsa.gov for regulatory direction.

For intermediate or final stage manufacturers please visit www.nhtsa.gov as well as reviewing the Incomplete Vehicle Document (IVD) that is included in each incomplete vehicle as manufactured by Mercedes-Benz. At no time the BEG should ever be used as a regulatory source for certification. Each alterer or modifier is advised to have their own regulatory department or consultant.

2.1.4 Exhaust emission control information

The Sprinter engines, Mercedes-Benz OM642, Mercedes-Benz OM651 and Mercedes-Benz M274 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, 3.6.6 Vehicle Emission Control Information Label (→ page 47), 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 function in-use over the prescribed full useful life period as certified, i.e., 5 years or 100,000 miles (short term emission control system) and 7 years or 70,000 miles (long term emission control system), 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.

Additionally, there is a requirement for applicable noise control packages that were tested at over 100% reduction in noise levels below the aforementioned noise standards. Final Stage Manufacturers should consult with their attorney concerning the compliance of their vehicles with appropriate regulations and laws once they have been 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.

2.1.5 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.

Upfitter should, however, consult with an attorney concerning interpretations of the applicable laws and regulations and determine if the modifications the upfitter made to the Sprinter may affect the final certification of compliance of the vehicle.

Furthermore, it is the upfitter’s responsibility to ensure modifications do not render the vehicle unsafe.

2.2 Upfitter 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 Cab Chassis 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, upfitters assume the responsibility of final certification to all applicable emissions and safety regulations, including labeling and documentation, affected by their modifications.

Chapter 2.1 of these Guidelines provides upfitter with general information concerning modifications. Provisions of 49 CFR Sections 567.5 through 567.7, and 568.8 specifically set the regulatory responsibility for the upfitters to comply with the vehicle safety standards. These provisions are available in full at www.nhtsa.gov. upfitters should consult with legal counsel concerning these responsibilities.

Any alterations or installations by upfitters must comply with the following:

- Do not alter or modify Sprinter components forward of the rear cab wall for Cab Chassis 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 Mercedes-Benz, MBUSA, MBCAN, MBVANS, or their designee, Upfitter Management Vans.
- 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.

Upfitter is responsible for ensuring that modification or equipment installation does not affect the safety of the Sprinter. MBUSA, MBCAN, MBVANS, and Upfitter Management Vans are not responsible for any final certification or claims for damages related to product liability of breach of warranty 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.

2.3 Product and vehicle information for upfitters

As a upfitter, you are also able to obtain detailed information on our products and systems in addition to the possibility of directly contacting the upfitter support staff at 1.7 Contact (→ page 17).

2.3.1 Upfitter Portal

General

The Upfitter Portal is the central communications platform between Mercedes-Benz and you, our partners in the body manufacturing industry. The Upfitter Portal provides information and access to body-related topics for all model series of Mercedes-Benz vans. The portal can be accessed at the following address:

www.UpfitterPortal.com/en-us/

Technical Information

In the Technical Information section of the portal, you can find the relevant technical data sheets, 2D chassis drawings, technical bulletins, and the Body and Equipment Guideline.

Design data

From the beginning of 2018, 3D standard data packages in STEP AP214 format will be available for eXpert-Upfitters to download for the Sprinter BM 907 in the Upfitter Portal.

2.3.2 Startekinfo

The ISP Portal is available under the following website:

<https://www.startekinfo.com/home>

Upfitters can purchase access to ISP Portal also under this link.

For example, ISP Portal contains:

- Workshop Information System (WIS)
- Working hours (XOT)
- ISP Parts Information (ISPPi)
- Repair bulletins (XENTRY TIPS)
- Basic data (WIS)
- Function descriptions (WIS)
- Wiring diagrams (WIS)
- Repair instructions (WIS)
- Maintenance sheets (WIS)

WIS = Workshop Information System

2.3.3 Information for upfitters outside the sales network

Upfitters outside the sales network can find aftersales information on the following topics:

- Mercedes-Benz genuine parts
- Chemical products and care products
- Genuine Mercedes-Benz engine oils
- Genuine Mercedes-Benz tires
- Repair and maintenance information
- Mobile apps

You can access this information at:

<https://www.mbvans.com/en/home>

2.3.4 XENTRY Kit

Existing diagnosis solutions are available to you in the MBUSA ISP Portal

- XENTRY Diagnosis System
- XENTRY PASSTHRU North America (PTNA)
- XENTRY Scope
- XENTRY Update Service
- XENTRY Accessories
- XENTRY Flash/Diagnosis user rights

Xentry kit and XENTRY PASSTHRU are a Mercedes-Benz diagnostic tools that performs a complete vehicle diagnosis. Xentry kit can analyze the electronic control units on the vehicle and read or erase the fault codes on the control units. For example, fault codes that arise while upfitting the vehicle can be detected and deleted using a Xentry kit or XENTRY PASSTHRU can also be used to upload PSM/MPM programs to the connected vehicle.

Xentry kit and XENTRY PASSTHRU are available for purchase to all eXpertUpfitters and customers. For more information on obtaining a Xentry kit and XENTRY PASSTHRU, please visit the following website:

<http://www.startekinfo.com>

For any questions or issues on a XENTRY kit hardware or software, please open One Click XSF ticket via the tablet from Support Tool , or email our support team at mbdiagnosis@mbusa.com

Please provide as much information as possible within your correspondence, including user ID's, system numbers and screen shots of errors where appropriate

2.3.5 ADVANTAGES product information system

You can access the new ADVANTAGES product information system via the Upfitter Portal.

The product information system contains information on vehicle equipment options (codes, suspension variants, overview of products, trailer loads, etc.).

2.4 Product safety and product liability

2.4.1 Product safety

Both vehicle manufacturers and upfitters must always ensure that the products they manufacture are safe when they are brought into service and do not present any danger to persons or property. Otherwise there may be consequences under civil, criminal or administrative law.

The upfitter must guarantee compliance with standards relating to functional safety (preferably ISO 26262).

2.4.2 Product liability

The upfitter bears sole responsibility for the operational characteristics and road safety of the upfit work that it performs, and in particular for:

- Testing and maintaining the operating and driving safety of the vehicle after the body/equipment is mounted (the body and/or equipment must not have a negative effect on the driving, braking or steering characteristics of the vehicle)
- The effects of upfit work on the chassis
- Consequential damage arising from upfit work
- Consequential damage resulting from retrofitted electrical and electronic systems
- Maintaining the functional reliability and unobstructed movement of all moving parts of the chassis (e.g. axles, springs, propeller shafts, steering, gear-shift linkage, etc.) after the upfit work is complete; even in the case of diagonal torsion of the vehicle

Work carried out or modifications on the chassis or body must be entered in the maintenance booklet, section "Confirmations of the upfitter".

2.4.3 Safety-relevant features

Components and systems are safety-relevant when their fault or failure could result in an immediate danger to the life and health of vehicle occupants and other of road users.

Mercedes-Benz recommends that an assessment of the safety relevance of the components or functions be carried out for the following work:

- Modifications to the basic vehicle
- Vehicle installations
- Interface between vehicle and body (mechanical components, electrics/electronics, power take-offs, hydraulic components, pneumatics)

A component or function must be classified as safety-relevant if one of the following ten safety functions in particular is affected:

- Occupant protection in accidents
- Avoiding momentary loss of road view
- Avoiding steering failure
- Avoiding loss or partial failure of braking function
- Avoiding failure of driving function
- Avoiding uncontrolled drive
- Avoiding sudden failure of drive force
- Avoiding leakage of operating fluids/risk of fire
- Avoiding loosening of cargo/trailers/parts/bodies/semitrailers
- Avoiding injury while driving and during alternative operation of the vehicle

The following customer-related influences must be considered when evaluating safety relevance:

- Extreme operating conditions
- Wear and tear
- Ambient conditions

Documentation

If safety relevance is identified according to the ten safety aspects, these aspects are to be appropriately marked as safety-relevant in paper and data records and the associated functions and features documented as well as the measures taken to avoid the dangers.

2.4.4 Guarantee of traceability

There is a possibility that body-related hazards may only be detected after the vehicle is delivered, making retroactive market measures necessary (customer information bulletins, warnings, recalls). To ensure that these measures can be implemented as efficiently as possible, it must be possible to trace the product after delivery.

We strongly recommend that upfitters file the serial number/identification number of their body together with the vehicle identification number of the basic vehicle in their databases for this purpose and to allow them to use the NHTSA or Transport Canada to determine the affected vehicle owners. On this note, the storage of customer addresses is also recommended as is giving subsequent owners the possibility to register their details.

2.5 Trademarks

2.5.1 Mercedes-Benz brand in interaction with external upfitters

In terms of the relationship between Mercedes-Benz and upfitters, it is not just product safety and product liability which are of particularly high importance, but also the usage of the trademark.

The aim of these guidelines is to explain the brand-related interests of Mercedes-Benz for Sprinter vehicles to upfitters.

The individual provisions of the guidelines do not release upfitters from their liability for aftermarket modifications to Mercedes-Benz vehicles.

2.5.2 The function of the trademark

Every company which wishes to operate a successful brand must ensure that the characteristics of the trademark are consistently protected. This applies equally to the Mercedes-Benz Group trademarks.

The trademark indicates the origin of a product and allows the product to be recognized and remembered. The trademark acts as a guarantee for the quality of a product, embodying its characteristic values and identity.

2.5.3 Trademark protection

Trademark protection laws give Mercedes-Benz Group AG the exclusive right to use its trademarks.

In particular, this applies to the use of Mercedes-Benz trademarks on vehicles and vehicle parts/accessories (e.g. rims) and in communication of the brand name.

2.5.4 Trademark rights

The "Mercedes star", the "Mercedes badge" and the "Mercedes-Benz" work mark/lettering and the model series and vehicle designations are registered trademarks of Mercedes-Benz Group AG.



Mercedes-Benz

SPRINTER

2.5.5 Advice on applying Mercedes-Benz trademarks to vans

If you have any questions about applying Mercedes-Benz trademarks to Mercedes-Benz vans, the Upfitter Management Vans will be pleased to assist you. Please contact via Upfitter Portal:

www.UpfitterPortal.com

2.5.6 Use of Mercedes-Benz trademarks

Principle

Only Mercedes-Benz trademarks may be applied to completely unchanged Mercedes-Benz vehicles.

Modification of the Mercedes-Benz trademarks on vehicles of the Mercedes-Benz brand is not permitted.

The application of Mercedes-Benz trademarks to vehicles and parts other than those of the Mercedes-Benz brand is not permitted.

Mercedes-Benz trademarks on vehicles with technical modifications

When vehicles are modified in accordance with the Mercedes-Benz Body and Equipment Guidelines, the Mercedes-Benz trademarks may remain unchanged on the vehicle.

Extensive vehicle modifications significantly change the original condition of the vehicle e.g. through modifications to the suspension, body structure, engine, brake system and on-board electronics. These modifications are generally not covered by the Body and Equipment Guidelines. This can result in deterioration of the overall vehicle with associated risks which Mercedes-Benz is not liable for according to product liability and product safety legislation.

If the vehicle does not meet the requirements of Mercedes-Benz, Mercedes-Benz reserves the right to demand removal of its trademarks.

2.5.7 Brand separation/identity

Principle

Mercedes-Benz model series have specific characteristics and values as well as a brand-specific design. The modifications should be in the style of the Mercedes-Benz design characteristics.

Separating the Mercedes-Benz trademarks from the upfitter trademarks ensures that a distinction can be made between the brands. This applies, in particular, to product origin and the resulting responsibilities.

Mercedes-Benz reserves the right to demand immediate removal of the Mercedes-Benz trademarks if the vehicle fails to comply with the requirements of Mercedes-Benz.

Trademarks on the front of the vehicle

Use of the Mercedes star

- On vehicles with genuine Mercedes-Benz cabs, the Mercedes star must be retained in the as-delivered state.
- On vehicles with a cab designed separately by the upfitter, the Mercedes star may be applied to the front-end assembly in the center in order to identify the base vehicle. If the upfitter brand is also applied, it must be applied at an appropriate distance from the Mercedes star.

Use of the Mercedes badge

- The Mercedes badge signifies an original Mercedes-Benz design. It may only be retained on vehicles with a genuine Mercedes-Benz cab.
- The use of the Mercedes badge is not permissible on vehicles with a cab separately designed by the upfitter.

Model series and vehicle model designation at front of vehicle

The Sprinter does not have any model series designations at the front of the vehicle. Model series designations may not therefore be applied to vehicles modified by upfitters.

Trademarks at the vehicle rear

Use of the Mercedes star

When the Mercedes star is applied to the rear of vehicles whose appearance has been extensively changed by a body or other modifications, Mercedes-Benz reserves the right to demand immediate removal of the Mercedes star. It is recommended that the upfitter should discuss the matter with Upfitter Management Vans before application.

Upfitter trademarks in combination with Mercedes-Benz trademarks

Upfitters that attach their trademarks to their body must ensure that they are located at a suitable distance away from Mercedes-Benz trademarks or badges.

Trademarks in the interior

All interior elements (e.g. seats, interior trims, etc.) that are integrated by the upfitter must not bear any Mercedes-Benz Group AG trademarks (e.g. Mercedes star or the "Mercedes-Benz" lettering).

Use of Mercedes-Benz trademarks in communication

- The use of Mercedes-Benz trademarks in communication instruments is regulated for certified Mercedes-Benz VanPartner/Mercedes-Benz VanSolution partners in the "Brand & Design Style Guide", which is available in the upfitter portal
- The upfitter must be clearly identifiable in all its communication media and channels as the originator of the communication.
- When displaying modified vehicles that comply with the Mercedes-Benz guidelines and that bear our trademarks, care should be taken to ensure that any modification to the vehicle or the vehicle body made by the upfitter is visible in the display. Only the obvious accentuation of Mercedes-Benz trademarks without any visible attachment, extension or conversion is not permissible.

2.6 Accident prevention

The upfit and attached or installed equipment must comply with all applicable laws and regulations, and with health and safety and accident prevention regulations, safety regulations and information sheets issued by accident insurers.

The laws, standards, directives etc. for work safety and accident prevention regulations when operating vehicles, equipment and machines (general machinery directives) are to be complied with to avoid any unsafe operating conditions when using the vehicle, and all necessary technical measures shall comply with the latest state of the art technology.

! NOTE
National and local laws, directives and registration regulations must be complied with.

The upfitter shall be responsible for compliance with these laws and regulations.

2.7 Recycling

**ENVIRONMENTAL NOTE**

When planning bodies or equipment, the following principles for environmentally compatible design and material selection is recommended to be taken into account.

Upfitters shall ensure that attachments and bodies (or conversions) comply with current environmental legislation and applicable regulations.

The installation documentation for the conversions shall be kept by the vehicle owner and, if the vehicle is to be scrapped, handed over to the dismantling company concerned at the time of vehicle handover. This is intended to ensure that even converted vehicles are processed in an environmentally responsible manner.

Materials with risk potential such as halogen additions, heavy metals, asbestos, CFC and CHC, are to be avoided.

- It is preferable to use materials which permit recycling and closed material cycles.
 - Materials and production processes that generate only low quantities of easily recyclable waste during production must be selected.
 - Plastics are to be used only where they provide advantages in terms of cost, function or weight.
 - In the case of plastics, and composite materials in particular, only compatible substances within one material family are to be used.
 - For components which are relevant to recycling, the number of different types of plastics used must be kept to a minimum.
 - It must be assessed whether a component can be made from recycled material or with recycled elements.
 - It must be ensured that components can be dismantled easily for recycling, e.g. by snap connections, predetermined breaking points, easy accessibility, or by using standard tools.
 - It must be ensured that service fluids can be removed simply and in an environmentally responsible manner by means of drain screws etc.
- Wherever possible, components should not be painted or coated; pigmented plastic parts are to be used instead.
 - Components in areas at risk from accidents must be designed in such a way that they are damage-tolerant, repairable and easy to replace.
 - All plastic parts are to be marked in accordance with the VDA Materials Leaflet 260 ("Components of motor vehicles; identification of materials"), e.g. "PP - GF30R".

2.8 Quality system

The requirements for a quality management system are described in DIN EN ISO 9001.

Mercedes-Benz urgently advises all upfitters to set up and maintain a quality management system, based on the specifications in DIN EN ISO 9001, including the following requirements among others:

- To define responsibilities and authorities including organizational planning
- To describe processes and procedures as well as their interactions
- To carry out contractual inspections and structural rigidity checks
- Comprehensible development documentation including risk assessment of process and product for scopes relevant in terms of safety, compliance and emissions (SCE). For further information See Chapter 2.3.3 Safety-relevant features
- Comprehensible management of SCE scopes in production, quality assurance and service
- Definition of product-related quality goals, SCE-relevant scopes here with target value "Zero".
- To carry out product tests in accordance with the specified procedure stated in the test instructions
- To regulate the handling of faulty products
- To document and archive test results
- To ensure that all employees have currently valid proof of the qualification required
- Systematic monitoring of test equipment, including ensuring the process reliability of the retrogressive risk assessment
- To systematically identify materials and parts
- To carry out quality assurance measures at the suppliers
- Ensuring that the instructions for processes, work, and tests are up to date and available in all departments and at all workplaces
- Documentation of customer-specific requirements (AQAP, QMP, FMEA, acceptance test report, measurement reports for individual parts, etc.)
- Verification of data exchange between the contract partners as per an agreed-upon format (data format, exchange server, etc.)

2.9 Key Pre-Upfit Considerations

! NOTE

The following topics represent key pre-upfit considerations based on frequency of exposure during the conversion process. As a result, these considerations are not comprehensive and shall be considered along with all other applicable requirements as stated in the BEG.

- Upfitted vehicle is compliant with the given limit of Unloaded Vehicle Weight (UVW). (Reference: 4.1.8 Upfit weight limits (→ page 71))
- Upfitted vehicle is compliant with the given limit of max. Center of Gravity (CoG). (Reference: 4.1.2 Maximum permissible position of the center of gravity (→ page 62))
- Upfitted vehicle does not exceed/undercut the required axle load. (Reference: 3.5 Dimensions and weights (→ page 41), 4.1.1 Steerability (→ page 62))
- The label information correctly reflects modification to vehicle. (Reference: 3.6 Vehicle identification data (→ page 43))
- No heavy equipment is installed on the doors/ especially rear doors. (Reference: 6.2.6 Side wall, windows, doors and flaps (→ page 121))
- Load attached to the roof does not exceed BEG recommendation. (Reference: 6.6.3 Roof luggage racks (→ page 167), 6.6.4 Shelf systems/vehicle interior installations (→ page 167))
- No equipment is installed in front of sensors/ radar which are located in the front and rear bumper. (Reference: 8.9 Driving assistance systems (→ page 296))
- Painted bumpers are compliant with BEG recommendation in regards to not affecting the sensors/radar. (Reference: 5.4 Painting and preservation work (→ page 98))
- No drilling through the top and bottom chord of the longitudinal members. (Reference: 4.1.5 Drilling must not take place (→ page 67))
- No Mercedes-Benz lift points are blocked by upfitted equipment (Reference: 4.1.6 Service lift points (→ page 62))
- Corrosion protection compliant with BEG. (Reference: 5.3 Anti-corrosion protection measures (→ page 96))
- Aftermarket seats comply with FMVSS/CMVSS 207/210. (Reference: 7.3 Retrofitting additional seats (→ page 198))
- Modifications to upper roof interior comply with FMVSS/CMVSS 201. (Reference: 7.4 Modifications to closed cargo vans (→ page 201))
- When adding an auxiliary power take-off device (alternators, compressors), utilize N62/63 bracket for a connection to the vehicle. (Reference: 6.5.3 Engine power take-off (→ page 163)) (Reference: 6.2.10 Cargo Van/Passenger Van roof (→ page 126))
- For Cargo Vans with Window Prep package, aftermarket Emergency Window Exit is installed for Bus conversions (per FMVSS/CMVSS 217). (Reference: 7.18 Buses (→ page 254))
- Aftermarket rear view camera meets FMVSS 111. (Reference: 8.9.9 Reversing camera (→ page 330))
- Front seats re-installed per BEG seat belt torques. (Reference: 4.5.2 Modifications to seats (→ page 87))
- It is strongly recommended that the upfitter does not modify the seat cover in any way. It is the upfitter's responsibility to ensure that all applicable technical and regulatory requirements are met. (Reference: 6.4.3 Seats (→ page 157))
- EK1 (Upfitter Connector) is utilized, if connection to vehicle power is required. (Reference: 8.4.8 Power tapping (→ page 268))
- Additional batteries to the starter and auxiliary battery connected with a charge limiter of 80A. (Reference: 8.3.2 Auxiliary battery (→ page 260))
- If the discharged demand is above 25A, E21 / E2M (auxiliary battery) and E36 (Cut-off Relay) are utilized. (Reference: 8.3.1 On-board electrical system battery (→ page 258))
- No connection to CAN Bus, ED5 (PSM - Parametric Special Module) is utilized. (Reference: 8.10 Parametrizable Special Module (PSM/MPM) 8.10.1 PSM (MPM) Functions (→ page 347))
- Modifications to safety relevant lights comply with FMVSS/CMVSS108. (Reference: 8.5 Lighting (→ page 279))
- Modifications to the width of the vehicle, which exceed 80 inches, comply with FMVSS/CMVSS108. (Reference: 8.5.5 Interior lamps (→ page 286))

General

The relevant operating conditions of the subsequent complete vehicle are crucial to the selection of a suitable basic vehicle or chassis when planning work on the vehicle body. Observe the following points:

- Customized design of vehicle or chassis
- Body variant
- Standard and special equipment

For better orientation when planning, the identification plate, the model designation and the vehicle identification number (VIN) must be used as well; see 3.6 Vehicle identification data (→ page 43).

For more information on the chassis and body variants on offer, see 3.2 Model overview (→ page 38) or under 1.7 Contact (→ page 17).

For the most up-to date model overview and specifications please visit www.UpfitterPortal.com

! NOTE

It is important when planning bodies that along with a user-friendly and maintenance-friendly design, the materials are chosen carefully and, consequently, the associated anti-corrosion protection measures are observed (→ page 96).

3.1 Vehicle and model designation

- i** For information on the position of the identification plates, see 3.6 Vehicle identification data (→ page 43).

This Body and Equipment Guideline is valid for the following vehicle model designations of the Sprinter BM 907 (see tables on next pages).

Versions and vehicle model designations

Version	Wheelbase	Vehicle model designation by permissible gross mass			
	[in,mm]			4000 kg	5000 kg
Panel van (FKA)	144 3665	-	907.633	907.643	907.653
	170 4325	-	907.635	907.645	907.655
	170 ¹⁾ 4325 ¹⁾	-	907.637	907.647	907.657
Tourer (FKB)	144 3665	907.723	907.733	907.743	-
	170 4325	-	907.735	907.745	-
Chassis with cab (FHS) ²⁾	144 3665	-	907.133	907.143	907.153
	170 4325	-	907.135	907.145	907.155

1) Version with extended overhang

Explanation of vehicle model designations

Model series	Body	Permissible gross mass	Wheelbase [in,mm]	Steering	Version
907 633 13	907 633 13	907 633 13	907 633 13	907 633 13	907 633 13
907 – Sprinter Rear-wheel and all-wheel drive	1 – Chassis with cab (FHS)	4 – 4.0 t	3 – 144 3665	1 – Left-hand drive vehicle	3 – Complete
	6 – Panel van (FKA)	5 – 5.0 t	5 – 170 4325	2 – Right-hand drive vehicle	
	7 – Tourer (FKB)		7 – 170 ¹⁾ 4325		

1) Version with extended overhang

Explanation of Mercedes-Benz Model

Digit 1	Digit 2	Digits 3 and 4	Digit 5	Digit 6
Brand	GVWR	Body Style	Wheelbase	Engine
M (Mercedes-Benz)		CA (Cargo)	4 (144")	S (Standard Output)
E (Mercedes-Benz BEV)	2 (2500)	CV (Crew Van)	7 (170")	H (High Output)
	3 (3500)	PW (Passenger Select)	E (170 EXT")	A (All Wheel Drive)
	X (3500XD)	CC (Cab Chassis)		
	4 (4500)			

3 Planning of bodies

Model Overview

Model	Label/GVWR	Wheelbase	Engine	Roof	Mercedes-Benz Model
Cargo Van	2500 (9,050 GVW)	144" WB	4 Cyl D - SO	Standard roof	M2CA4S
			4 Cyl D - HO	Standard roof	M2CA4H
			AWD - HO	Standard roof	M2CA4A
		170" WB	4 Cyl D - SO	High roof	M2CA7S
			4 Cyl D - HO	High roof	M2CA7H
			AWD - HO	High roof	M2CA7A
		170" WB Ext.	4 Cyl D - SO	High roof	M2CAES
			4 Cyl D - HO	High roof	M2CAEH
			AWD - HO	High roof	M2CAEA
	3500 (9,990 GVW)	144" WB	4 Cyl D - HO	Standard roof	M3CA4H
		170" WB	4 Cyl D - HO	High roof	M3CA7H
		170" WB Ext.	4 Cyl D - HO	High roof	M3CAEH
	3500XD (11,030 GVW)	144" WB	4 Cyl D - HO	Standard roof	MXCA4H
			AWD - HO	Standard roof	MXCA4A
		170" WB	4 Cyl D - HO	High roof	MXCA7H
			AWD - HO	High roof	MXCA7A
		170" WB Ext.	4 Cyl D - HO	High roof	MXCAEH
			AWD - HO	High roof	MXCAEA
4500 (12,125 GVW)	144" WB	4 Cyl D - HO	Standard roof	M4CA4H	
	170" WB	4 Cyl D - HO	High roof	M4CA7H	
	170" WB Ext.	4 Cyl D - HO	High roof	M4CAEH	
Crew Van	2500 (9,050 GVW)	144" WB	4 Cyl D - SO	Standard roof	M2CV4S
			4 Cyl D - HO	Standard roof	M2CV4H
			AWD - HO	Standard roof	M2CV4A
		170" WB	4 Cyl D - SO	High roof	M2CV7S
			4 Cyl D - HO	High roof	M2CV7H
			AWD - HO	High roof	M2CV7A
Passenger Van	2500 (9,050/9,480 GVW)	144" WB 12 seater	4 Cyl D - SO	Standard roof	M2PV4S
			4 Cyl D - HO	Standard roof	M2PV4H
			4 Cyl D - HO SELECT	Standard roof	M2PW4H
			AWD - HO	Standard roof	M2PV4A
			AWD - HO SELECT	Standard roof	M2PW4A
		170" WB 15 seater	4 Cyl D - SO	High roof	M2PV7S
			4 Cyl D - HO	High roof	M2PV7H
			4 Cyl D - HO SELECT	High roof	M2PW7H
Cab Chassis	3500XD (11,030 GVWR)	144" WB	4 Cyl D - HO	n/a	MXCC4H
			AWD - HO	n/a	MXCC4A
		170" WB	4 Cyl D - HO	n/a	MXCC7H
	AWD - HO		n/a	MXCC7A	
	4500 (12,125 GVWR)	144" WB	4 Cyl D - HO	n/a	M4CC4H
		170" WB	4 Cyl D - HO	n/a	M4CC7H

* MSRP excludes destination and delivery \$2,295.

AWD MSRP shown above include upcharge of X55 - All Wheel Drive Package

SO: Standard Output engine 168hp

HO: High Output engine 208hp

Engine variants

Code	Engine	Gas/Diesel	Details	Max. power
MU5	4 cyl. OM654	Diesel	400 Nm (295 lb-ft) at 1300-2400 rpm 9G-TRONIC-SULEV-	168 hp 125 kW
M5N	4 cyl. OM654	Diesel	450 Nm (332 lb-ft) at 1400-2400 rpm 9G-TRONIC-SULEV-	208 hp 155 kW

Special codes and body designs (selection)

Code	Version
D03	High roof

Technical advice on body compatibility and on the basis vehicle (→ page 17)

- i** Vehicles with engines OM651 (6-cylinder Diesel) and OM642 (4-cylinder gas) are no longer available ex factory. For this reason, this information is no longer included in the present Body and Equipment Guideline. If required, you can find corresponding information and specifications in previous Body and Equipment Guidelines, in which the engines are still included. These can be requested via www.upfitter-portal.com.

Code	Weight Variant	US Variant	GVWR
XL8	3.880 kg	1500	8,550 lbs
XL2	4.100 kg	2500	9,050 lbs
X2B	4,300 kg	2500 PV 14+1	9,480 lbs
XB3	4.531 kg	3500	9,990 lbs
X5G	without load uprating/ derating 5.000kg	3500XD	11,030 lbs
XL4	5.500 kg	4500	12,125 lbs IT9 - 4.0 ton ; IT5 - 5.0 ton

Code	Wheelbase / Overhang	US Variant
IR4	3665mm	US 144"
IR7	4325mm / 1615mm	US 170"
IR9	4325mm / 2015mm	US 170" Extended

3 Planning of bodies


3.2 Model overview

You will find detailed and additional drawings and dimensions in the 2D drawings in the Upfitter Portal. Explanations of vehicle model designations and engine codes can be found in the tables (→ page 36).

The following models are available for model series 907 (rear wheel drive):

	2500 GVWR 9,050 lbs Single Tires		3500 GVWR 9,990 lbs Super Single and DRW		3500XD GVWR 11,030 lbs Super Single and DRW		4500 GVWR 12,125 lbs Dual Rear Wheel	
Cargo Van	144"	SR	144"	SR	144"	SR	144"	SR
		HR		HR		HR		HR
	170"	HR	170"	HR	170"	HR	170"	HR
	170" EXT	HR	170"EXT	HR	170"EXT	HR	170"EXT	HR
Crew Van	144"	SR	144"	SR	144"	SR	144"	SR
		HR		HR		HR		HR
	170"	HR	170"	HR	170"	HR	170"	HR
Passenger Van	144" (12 Seater)	SR						
		HR						
	170" (15 Seater)*	HR						
Cab Chassis					144"		144"	
					170"		170"	

* 170" Passenger van (15 Seater) GVWR 9,480 lbs

 Detailed drawings with dimensions are available on the Upfitter Portal under 'Technical Information' in '2D Drawings' page.

Permissible gross mass [t]	Permissible front axle load ¹⁾ [lbs] [kg]	Permissible rear axle load ¹⁾ [lbs] [kg]
4.0	4100 1860	5357 2430
5.0	4078 1850	7716 3500
5.5	4629 2100	7936 3600

Permissible gross mass [lbs] [kg]	Tonnage code
Model designation 4.0 t (IT9)	
9,050 4.10	XL2
9,370 4.25	XG5 ²⁾
9,480 4.30	X2B
Model designation 5.0 t (IT5)	
9,900 4.49	XG9
9,990 4.53	XB3
11,030 5.0	X5G
12,125 5.5	XL4

1) Depending on model designation and equipment

2) Only for eSprinter (M1E)

3.3 Selecting the basic vehicle

General

The operating conditions of the subsequent complete vehicle are crucial to the selection of a suitable basic vehicle when planning work on the vehicle body. Please note with regard to this:

- Requirement-based basic vehicle design
- Body variant
- Series and special equipment

For better orientation, also use the identification plate, model designation, and the Vehicle Identification Number (VIN) when planning; see Chapter 3.6 Vehicle identification data (→ page 43).

More detailed information on the basic vehicles and body variants on offer can be found in Chapter 3.2 Model overview (→ page 38) or obtained from the Technical Consultancy for the Basic Vehicle.

In order to ensure the best possible use and optimal operation of the vehicle, it is essential to choose the basic vehicle carefully in accordance with the intended use.

To this end, please take the following points in particular into consideration during the planning phase and adapt them to the usage:

- Wheelbase
- Engine/transmission
- Permissible axle loads
- Permissible vehicle weight including upfit (UVW limit)
- Permissible gross mass
- Vehicle center of gravity
- Series and special equipment
- Compatibility of the driver assistance systems

! NOTE

When selecting the basic vehicle, take into account the remaining payload after the conversion to ensure it is adequate for the planned typical applications for the body.

! NOTE

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

! NOTE

Along with a user-friendly and maintenance-friendly design, the careful choice of materials and compliance with anticorrosion protection measures (→ page 96) are also of great importance when planning bodies.

Vehicles with raised center of gravity position

! NOTE

For modified vehicles/vehicles with a body that have a center of gravity height greater than 39 in (1000 mm) up to a maximum of 51 in (1300 mm), including when carrying a typical load for the body: When ordering the vehicle, it is essential to factor in special equipment designed specifically for this purpose with code B01, see Chapter 4.1.2 Maximum permissible position of the center of gravity (→ page 62) and 4.2.1 Suspension of Sprinter (→ page 72)

! NOTE

Upfitters that intend to assemble a camper van on the Sprinter must order code X2R "Mandatory for camper van conversion by upfitter".

When code X2R is ordered, code B01 "Vehicle version for high load" is added automatically.

More detailed information on the basic vehicles and body variants on offer can be found in Chapter 3.2 Model overview (→ page 38) or obtained from the responsible department (→ page 19)). Further information can be found on www.upfitterportal.com.

- ① On the Mercedes-Benz homepages, you can assemble your vehicle in the Configurator and view the available items of special equipment:

www.mbvans.com

www.mercedes-benz-vans.ca

3.4 Vehicle Modifications

Before starting vehicle modifications, the upfitter must confirm

- the base vehicle is suitable for the planned body,
- the vehicle and equipment are suitable for the operating conditions even after upfit work has been carried out.

The upfitter can request for 2D chassis drawings, product information, and technical data from the Upfitter Portal (→ page 23).

Furthermore, you should note the special equipment that is available from the factory (→ page 59).

The vehicles must comply with local and national regulations after modifications have been carried out.

In any case, Mercedes-Benz recommends that you clarify the approval and registration requirements of a body or modification with the Technical Service and/or with the relevant type approval authority during the planning phase.

For the disassembly and subsequent reinstallation of series production parts on the basic vehicle when performing modifications and body mounting work, the information and specifications in the WIS must be observed, see Chapter 2.3.2 Startekinfo (→ page 23).

! NOTE

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

⚠ WARNING

Any modifications to the steering and the brake system may result in these systems malfunctioning and ultimately failing. This could cause the driver to lose control of the vehicle.

There is risk of an accident and danger to life and limb!

Do not carry out any modifications to the steering or brake system!

Vehicle inspection

The upfitter must inform the officially recognized approval official or inspector of any modifications to the basic vehicle. Acceptance and inspection organizations will decide on compliance with legislation and regulations after any modifications have been made to the basic vehicle, and therefore on the eligibility for registration of the complete vehicle.

! NOTE

Federal and local laws, directives and registration regulations must be complied with!

Inspections conducted by official test facilities or official approvals do not inevitably guarantee compatibility with all of the functions and systems in the base vehicle.

Should you have any questions about Body and Equipment Guideline conformity or if you require further information about it, please reach out via www.upfitter-portal.com.

3.5 Dimensions and weights

Modifications to the vehicle width, vehicle height or vehicle length must not exceed the limit values specified in the current version of the Body and Equipment Guideline.

Dimensions and weights are located in the 2D chassis drawings and technical data in the Upfitter Portal 1.7 Contact (→ page 17) and in the Technical Limit Values. They are based on a vehicle that is fitted with standard equipment. Items of special equipment are not taken into consideration. Observe weight tolerances of +5% in production (according to DIN 70020 in Germany).

! NOTE

The weight specifications for the vehicle as shown in the vehicle documents and on the identification plate on the vehicle must be observed, see Chapter 3.6 Vehicle identification data (→ page 43).

The permissible axle loads and the maximum permissible gross mass must not be exceeded.

Further information about permissible axle loads and other weight specifications (e.g. permissible gross mass or curb weight) can be found on the www.upfitter-portal.com.

- ▶ Before starting any upfit work, determine the actual curb weight and the corresponding axle loads at curb weight by weighing – see notes on weighing in Chapter 9.1.1 Determination of the center of gravity in the x-direction (→ page 369) – or using the Vehicle Identification Number and the curb weight of your vehicle ex factory and its load distribution via your Mercedes-Benz partner, and then document it.
- ▶ Following completion of all upfit work, measure the actual curb weight again by weighing (Chapter 9.1.1 Determination of the center of gravity in the x-direction (→ page 369)). At the same time, determine the corresponding axle loads by weighing. The three variables of the curb weight, the front axle load and the rear axle load – all in the completed state – must all be documented again.
- ▶ In the case of a permanent axle load increase of 551 lbs (250 kg) or more at the front axle on completion of all body mounting work compared to the actual base vehicle delivered to the upfitter (curb weight in standard configuration), the suspension must be measured and the correct toe and camber values must be set at the front axle.

These values and weights may also be obtained from Mercedes-Benz Service Partners or directly from the Workshop Information System (WIS) documents about wheel alignment. Information on the Mercedes-Benz WIS can be found under Chapter 2.3.2 Startekinfo (→ page 23).

Implement the information on the curb weight and corresponding axle loads before and after body mounting work, " in Chapter 3.11.3 Work before handing over the modified vehicle (→ page 58), Chapter 3.12 Special equipment (→ page 59), Chapter 4.2.9 Wheel alignment (→ page 75) and Chapter 6.1.1 General information on the suspension (→ page 102).

! WARNING

The vehicle tire load capacity must not be exceeded by overloading the vehicle beyond its specified gross vehicle weight. The tires could otherwise overheat and suffer damage. This could cause the driver to lose control of the vehicle. There is risk of an accident and danger to life and limb!

The braking distance may increase considerably when the vehicle is overloaded.

Refer to 3.6 Vehicle identification data (→ page 43) for further information about the vehicle weights.

WARNING

If the permissible axle loads are exceeded, the ESP® system may not function correctly on vehicles equipped with this feature. This could cause the driver to lose control of the vehicle. There is risk of an accident and danger to life and limb!

Comply with the permissible axle loads and gross mass.

WARNING

Do not exceed the unloaded vehicle weight rating (UVW), the gross axle weight rating (GAWR) and the gross vehicle weight rating (GVWR). Information about GAWR and GVWR is contained in the “Technical limiting values” section 4 Technical limit values for planning (→ page 62).

Further information on the operating principle of the ESP® is available in Chapter 8.9.1 Electronic Stability Program (ESP®) (→ page 297).

Take into account here the permissible number of vehicle occupants and a sufficient margin for the payload.

Take the weight of special equipment into consideration when making calculations.

NOTE

Observe all national laws, directives, and registration regulations.

3.6 Vehicle identification data

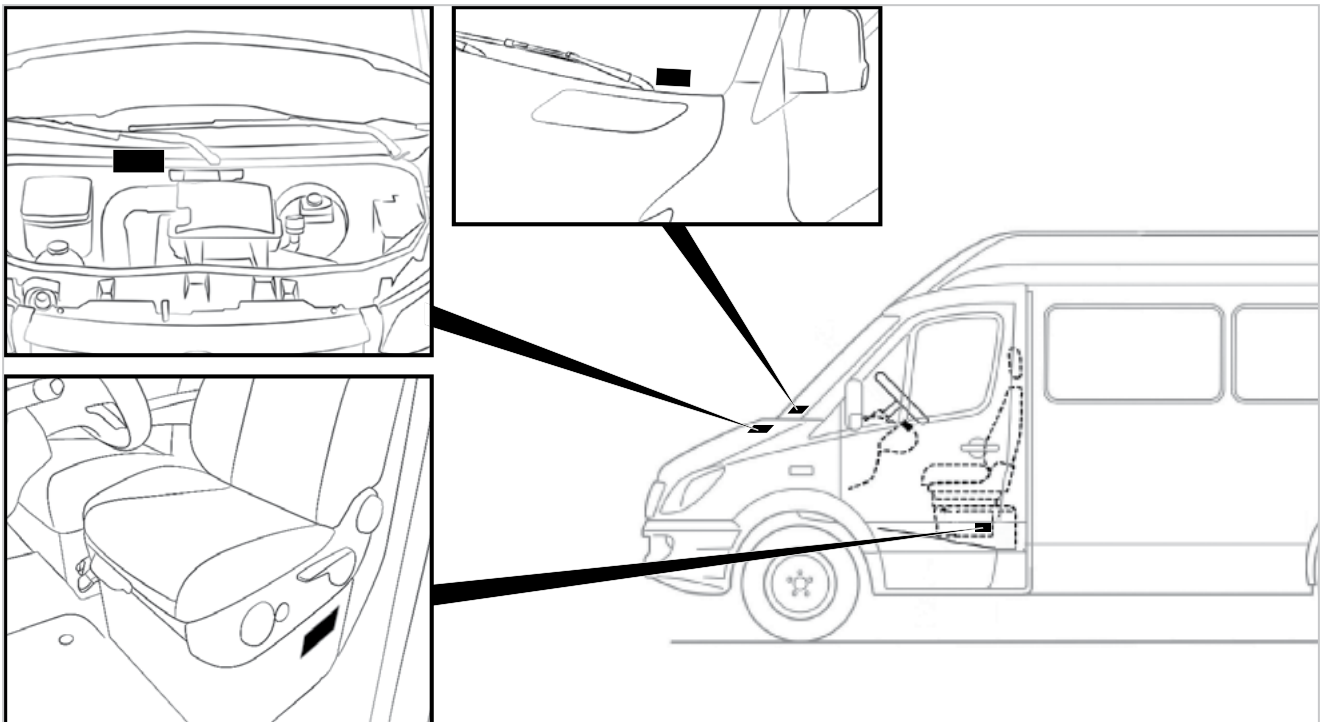
! NOTE

The vehicle identification number (VIN) and identification plate of the vehicle must neither be changed nor be fitted to a different point on the vehicle.

The vehicle identification number is embossed in the belt rail in the engine compartment.

For certain countries, the externally visible vehicle identification number is attached as a plate to the lower end of the windshield.

The identification plate bearing the vehicle identification number and details of the permissible weights is located at the side on the base of the driver's seat.



Position of vehicle identification data

- i** The VIN decoder for the Sprinter is available on the Upfitter Portal www.UpfitterPortal.com

3.6.1 QR code rescue sticker



Attachment (example) of QR code rescue sticker on left B-pillar (driver's side)

All vehicles are supplied with a QR code rescue sticker from production. The rescue stickers in the Sprinter are affixed to the left and right B-pillars.

When the QR code on the sticker is scanned using a smartphone or tablet and there is an existing internet connection, the rescue card for the vehicle is displayed.

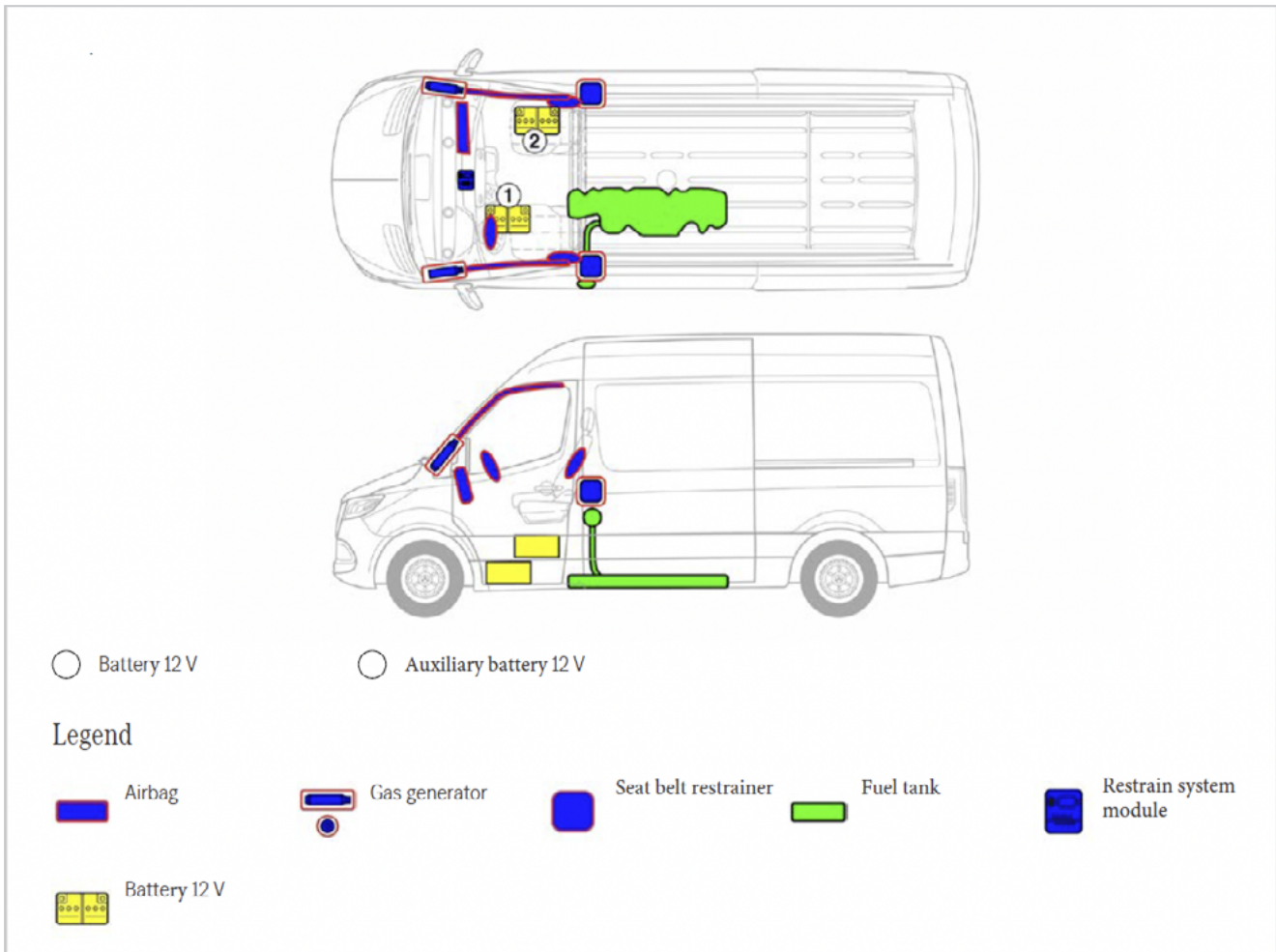
Rescue crews can thus immediately see where airbags, battery, fuel tanks, high-voltage lines (above 30 V AC, above 60 V DC), pressure cylinders and other components critical for the rescue are located, enabling them for example to use rescue shears with low risk.

The rescue card corresponds to the vehicle in the state that it was in when supplied by Mercedes-Benz.

If component parts that are visible on the rescue card (see following depiction) – where changes to these parts are permissible in accordance with the specifications in this Body and Equipment Guideline – are removed, modified, or added in any way whatsoever, then the rescue stickers provided at the factory are then rendered unusable.

In this case, the upfitter must produce a new rescue card that illustrates this information for the modified vehicle as per ISO17840-1 to 4. The rescue cards can be made available either online via a QR code, or can be provided in the vehicle in printed form (preferably behind the driver's sun visor).

If the QR code is destroyed in the course of your upfit work, but the rescue-relevant components remain unchanged, you must obtain a replacement via your Mercedes-Benz Service Partner and affix it to the B-pillars. Alternatively, the same partner can provide you with a printed version of the vehicle's rescue card.



Example rescue card for panel van model series 907 (analogous for open model designations)

If the QR code is destroyed in the course of upfitting but the rescue-relevant components remain unchanged, you must obtain a replacement via your Mercedes-Benz Service Partner and affix it to the previously mentioned positions on the vehicle. Alternatively, the same partner can provide you with a printed version of the vehicle's rescue card.

- Further information on the rescue sticker in Mercedes-Benz vehicles is available from:

<http://rk.mb-qr.com/en/>



- Rescue cards for the various vehicle versions and model series can be viewed at:

<http://rk.mb-qr.com/en/#rescue-card-selector>



3.6.2 Safety Label location

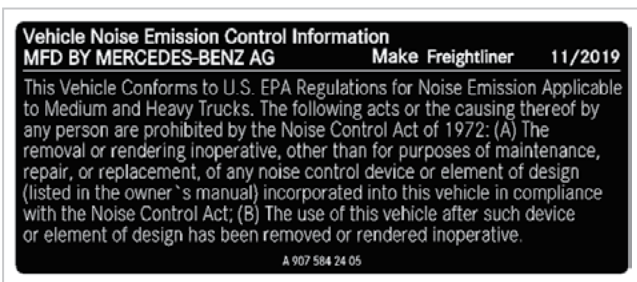


N00.01-2813-00

- 1 Noise Emission Label
- 2 Safety Certification Label

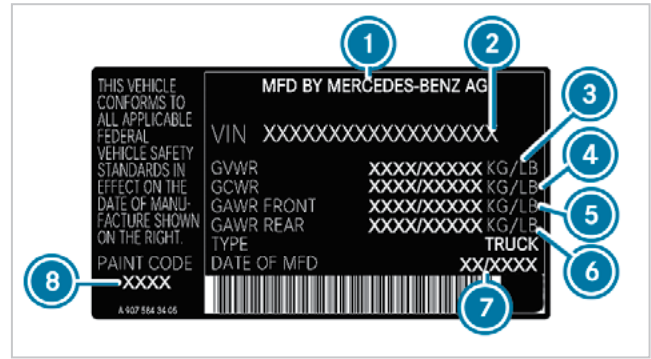
Location: below driver's seat, outward facing

3.6.3 Noise Emission Label



Location: below driver's seat, outward facing

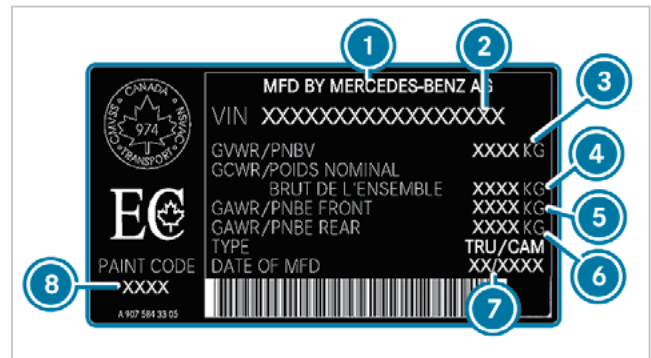
3.6.4 Complete Vehicle Identification Label



Vehicle identification plate, USA

Location: on driver's seat base, outward facing

- 1 Vehicle manufacturer
- 2 VIN (vehicle identification number)
- 3 Permissible gross mass
- 4 Permissible gross mass of vehicle combination
- 5 Permissible front axle load
- 6 Permissible rear axle load
- 7 Date of manufacture
- 8 Paint code

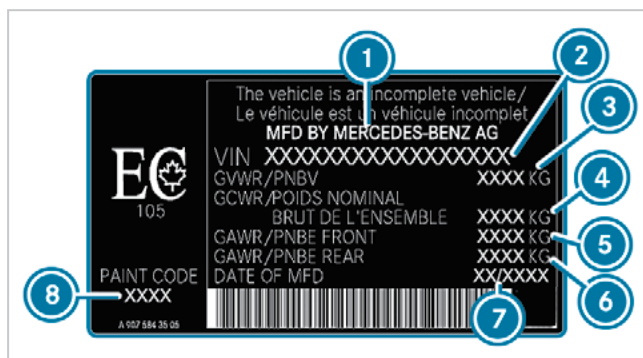


Vehicle identification plate, Canada

Location: on driver's seat base, outward facing

- 1 Vehicle manufacturer
- 2 VIN (vehicle identification number)
- 3 Permissible gross mass
- 4 Permissible gross mass of vehicle combination
- 5 Permissible front axle load
- 6 Permissible rear axle load
- 7 Date of manufacture
- 8 Paint code

3.6.5 Incomplete Vehicle Identification Label

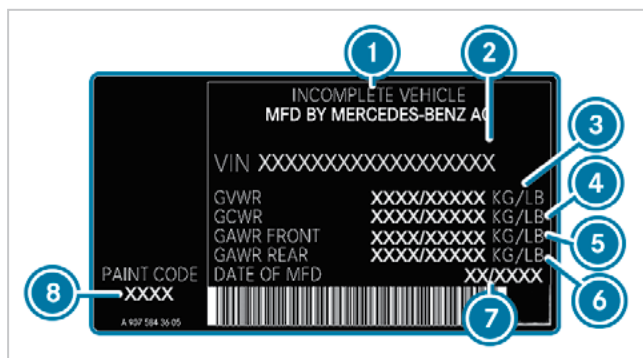
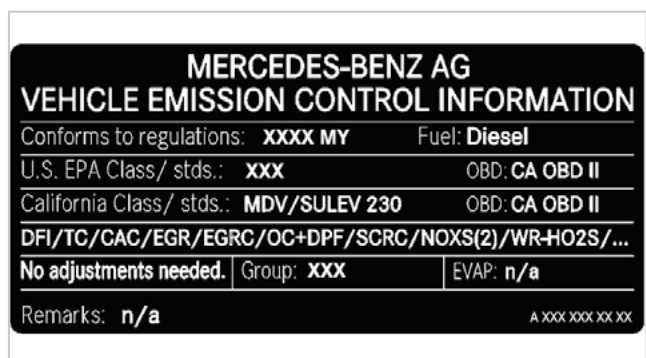


Vehicle identification plate, USA

Location: on driver's seat base, outward facing

- 1 Vehicle manufacturer
- 2 VIN (vehicle identification number)
- 3 Permissible gross mass
- 4 Permissible gross mass of vehicle combination
- 5 Permissible front axle load
- 6 Permissible rear axle load
- 7 Date of manufacture
- 8 Paint code

3.6.6 Vehicle Emission Control Information Label

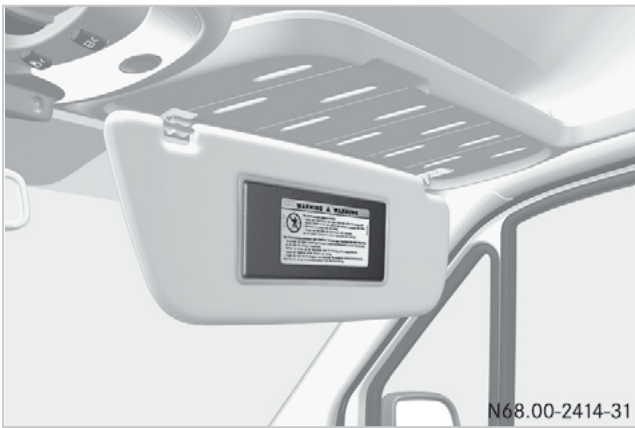


Vehicle identification plate, Canada

Location: on driver's seat base, outward facing

- 1 Vehicle manufacturer
- 2 VIN (vehicle identification number)
- 3 Permissible gross mass
- 4 Permissible gross mass of vehicle combination
- 5 Permissible front axle load
- 6 Permissible rear axle load
- 7 Date of manufacture
- 8 Paint code

3.6.7 Airbag Warning Label

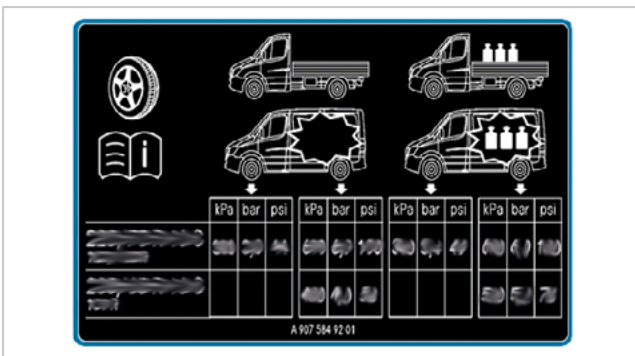


Location: on sun visor



Location: on sun visor

3.6.8 Tire and Loading Information Label



Location: on driver's door frame

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⚠ WARNING

For an alterer, there is a re-labeling required if any of the equipment installed changes

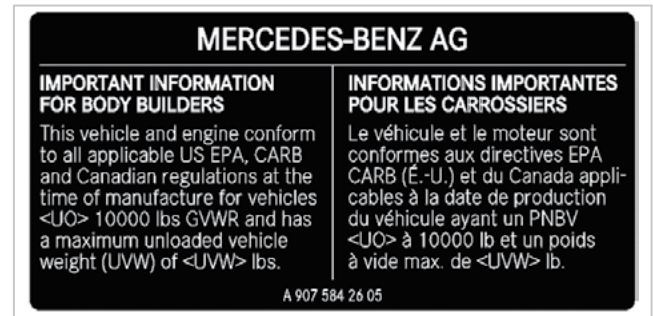
- payload limit data
- seating data

of the vehicle!

Additional Tire and Loading Information:

4.2 Limit values for the suspension (→ page 72).

3.6.9 Unloaded Vehicle Weight UVW rating and Label



N00.01-2819-00

Example UVW Label

Location: engine compartment above grill

The UVW definition is found under FMVSS guidelines in 49 CFR 571.3 and 40 CFR 86.1803-01. This is the curb weight of the base Sprinter vehicle + a maximum upfit weight on the vehicle (including maximum capacity of all fluids necessary for operation of the vehicle but without cargo, passengers or accessories that are usually removed from the vehicle when not in use).

GVWR (Gross Vehicle Weight Rating) is a theoretical maximum weight that can handle the base vehicle weight and upfit weight as well as the weights of the cargo/luggage and passengers.

Do not exceed the maximum permissible gross vehicle weight or the maximum gross axle weight rating for the front or rear axle.

3.7 Vehicle stability

Refer to Chapter 4 Technical limit values for planning (→ page 62) for the permissible center of gravity heights.

In the case of upfitted vehicles with unfavorable centers of gravity (e.g. rear loads, high loads and side loads), Mercedes-Benz will make no statements concerning

- driving characteristics
- braking characteristics
- steering characteristics
- ESP® control response

as these aspects are substantially affected by upfitting, and can therefore only be assessed by the upfitter.

! NOTE

On vehicles equipped with ESP®, where upfitting causes an extreme displacement of the center of gravity, deactivate the ESP® while observing and complying with all country-specific registration requirements.

If ESP® has been deactivated, the driver will then have to adapt their style of driving accordingly (reducing cornering speed, avoiding sudden steering wheel movements, etc.).

When driving dynamics become critical, the vehicle behaves like a vehicle without ESP®. The permissible axle loads, gross vehicle masses, and center of gravity locations must be complied with.

For more information, reach out on the Upfitter Portal. See Chapter 1.7 Contact 1.7 Contact (→ page 17).

The permissible wheel and axle loads and the permissible gross masses must not be exceeded in all situations including after upfit and/or equipment installation.

The technically permissible wheel and axle loads and the permissible gross masses of the vehicle shall in no case be exceeded due to the bodies or loading in the ready-to-drive condition.

⚠ WARNING

If the permissible axle loads are exceeded on vehicles equipped with the ESP® system, this system may no longer function correctly. This could cause the driver to lose control of the vehicle.

There is risk of an accident and danger to life and limb!

Observe the permissible axle loads.

Following modifications to the vehicle that could result in changes to the longitudinal and lateral inclination (e.g. installation of heavy parts), the sensor cluster must be recalibrated in order to ensure that the ESP® functions correctly.

Mercedes-Benz recommends that you have this calibration work performed at a qualified specialist workshop.

Further information on the operating principle of the ESP® is available in Chapter 8.9.1 Electronic Stability Program (ESP®) (→ page 297).

Additional information on permissible weights is available in the identification data on the vehicle (→ page 43).

3.8 Tires

The upfitter must ensure that:

- There is always a sufficient space between the tire and the fender or wheel well, even when snow or anti-skid chains are fitted and the suspension is fully compressed (also allowing for axle twist) (→ page 125) and that the relevant data in the 2D chassis drawings are observed
- Only tire sizes approved by Mercedes-Benz are used (see “Permissible wheel and tire combinations for BM 907 (RWD)”) (→ page 74)

In particular, comply with local and national regulations concerning the approval of tires. These regulations may define a specific type of tire for the vehicle or may restrict the use of certain tire types which are approved in other countries.

⚠ WARNING

Exceeding the specified tire load capacity or the permissible tire maximum speed can lead to tire damage or tire failure. This could cause you to lose control of the vehicle. There is risk of an accident and danger to life and limb!

Therefore, only use Mercedes-Benz approved tires for your vehicle model and observe the tire load capacity required for your vehicle and the tire speed rating.

If you have other wheels (not approved by Mercedes-Benz) fitted:

- The brakes or components of the suspension system could be damaged
- Wheel and tire clearance can no longer be guaranteed
- The wheel brakes or components of the suspension system may no longer function correctly.
- Driving assistance systems may be subject to faults, delays, or may not even react at all.

i For more information, please contact the Upfitter Portal (→ page 23) and chapter 4.2.3 Approved tire sizes (→ page 74).

The determined speed information of the vehicle is displayed in the instrument cluster and is important for controlling the driving assistance systems. The display accuracy of the speedometer and the odometer is governed by law. The determination of the speed information depends on the tire size and the rolling circumference of the wheels and thus on their rim diameter. The rim diameter is always given in inches.

Therefore, the control units of the vehicle can be coded for the following three wheel size groups:

Wheel size group	Tires BR 907
Wheel size group 1:	195/75 R16C 205/75 R16C 235/65 R16C 235/60 R17C
Wheel size group 2:	225/75 R16C
Wheel size group 3:	225/75 R16C FA 285/65 R16C RA

i We recommend that you stay within one wheel size group when changing tires.

- This avoids the need to recode control units.
- If you change the wheel size, e.g. during a wheel change for winter operation, check their assignment to the wheel size group. If the assignment to the wheel size group changes, you must have the control units recoded at a qualified specialist workshop.
- The display accuracy of the speedometer and the odometer will otherwise be outside the legally prescribed tolerance. It can also impermissibly deviate downward, i.e. the current vehicle speed is then higher than the speed indicated by the speedometer.
- Driving assistance systems may be impaired in their function in the event of a deviation outside the tolerance range or may detect a fault and shut down.

! NOTE

Observe specifications for areas which may not be drilled on for threaded connections, in Chapter 6.2.1 General information on the body in white/body (→ page 110).

3.9 Bolted and welded connections

3.9.1 Threaded connections

For the threaded connections between the body and the base vehicle or the vehicle frame, Mercedes-Benz recommend the use of flange bolts and flanged nuts.

If it is necessary to replace standard bolts/nuts, only bolts/nuts

- of the same diameter
- of the same strength
- of the same screw standard or type
- of the same surface coating (anti-corrosion protection, coefficient of friction)
- with the same thread pitch

must be used.

We recommend the use of standard Mercedes-Benz parts.

WARNING


Do not modify any bolted connections that are relevant to safety, e.g. that are required for wheel control, steering or braking functions. They may otherwise no longer function correctly. This could cause the driver to lose control of the vehicle.

There is risk of an accident and danger to life and limb!

Reassembly must be performed in accordance with Mercedes-Benz service instructions and using suitable standard parts. We recommend Mercedes-Benz genuine parts.

- VDI (The association of German Engineers) guideline 2862 must be applied to all installation work.
- It is prohibited to shorten the free clamping length, change to a stretch shank or use bolts with a shorter free thread.
- When re-tightening threaded connections on the vehicle, check that a tightening torque specified by Mercedes-Benz is documented and this must be complied with by the upfitter. Further information can be found on WIS or obtained from your nearest Mercedes-Benz dealer.
- The settling properties of threaded connections must be taken into account.

- Using Mercedes-Benz tightening torques requires the corresponding part that has to be screwed to have a total friction factor in the range $\mu_{\text{tot}} = 0.08-0.14$.
- If bolts are tightened to the required torque and tightening angle by Mercedes-Benz, a constructive modification is not possible.
- The Mercedes-Benz Workshop Information System (WIS) must be used to determine whether bolts and nuts of suspension components must only be tightened when the vehicle is in ready-to-drive condition.
- Additionally clamped components of the body must exhibit an identical or higher strength than the previous clamped assembly.

 Information is available from any Mercedes-Benz Service Center.

WARNING

Bolts or nuts with locking splines, microencapsulated bolts and self-locking nuts must always be replaced after a single use. Before new microencapsulated bolts are screwed in, the mating thread must be recut or the nuts replaced to remove all residual screw locking compound. Finally, the recut through-tapped or blind-tapped holes must be blown out with air because any adhesive residue in the thread would prevent correct tightening of the bolts.

If these instructions are not observed, bending forces could act on the bolt due to the lack of pretension and cause the bolt to break.

There is risk of an accident and danger to life and limb!

⚠ WARNING

There is a risk of injury when micro-encapsulated screws are loosened because of the sudden loosening of the screws. For this reason, ensure you have sufficient freedom of movement when loosening micro-encapsulated screws.

- For special screw connections, refer to the Mercedes-Benz Workshop Information System (WIS) or to 1.7 Contact (→ page 17).

! NOTE

Observe specifications for areas which may not be drilled on for threaded connections, in Chapter 6.2.1 General information about the body-in-white and body (→ page xx).

3.9.2 Welded connections

General

In order to maintain the high standard of welding demanded by Mercedes-Benz, the work must only be carried out by appropriately qualified welders.

For high-quality weld seams, we recommend that you:

- Clean the area to be welded thoroughly
- Make several short welding beads rather than one long bead
- Make symmetrical beads to limit shrinkage
- Avoid more than 3 welds at any one point
- Avoid welding in strain-hardened zones

! NOTE

Prior to carrying out welding work, disconnect the battery.

Protect airbags, the airbag control unit, airbag sensors and components of the seat belts against weld spatters and remove them if necessary.

! NOTE

Observe specifications for areas in which welding is not permitted, in Chapter 6.2.1 General information on the body in white/body (→ page 110).

In addition, observe the information and specifications on preventing damage in Chapter 5.2 Welding work (→ page 95).

Selecting welding procedures

The mechanical properties of weld seams depend on selecting an adequate welding procedure and on the geometry of the elements to be joined.

If overlapping sheet metal is to be welded, the choice of welding method will depend on the access to the sides of the workpiece:

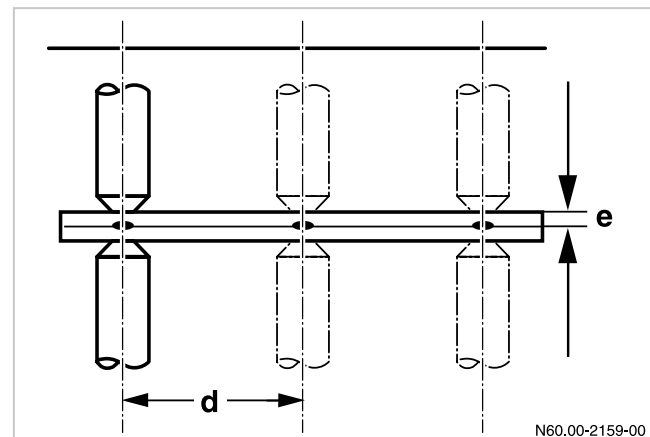
Access to side	1	Shielding gas plug welding
	2	Resistance spot welding

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 ($d = 10e + 10 \text{ mm}$) or ($d = 10e + 0.39 \text{ in.}$).

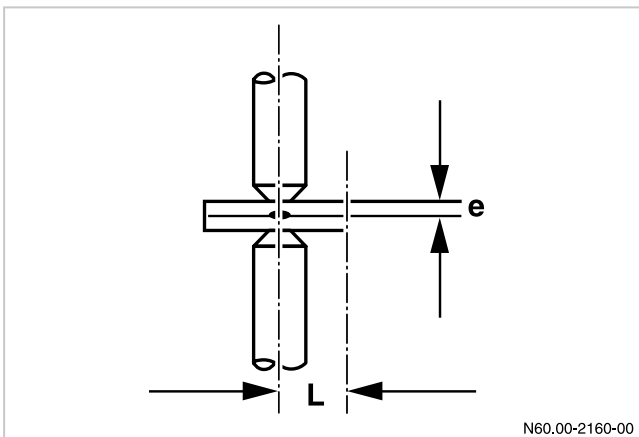


Ratio of sheet thickness to distance between spot welds

- 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) or ($L = 3e + 0.08$ in).



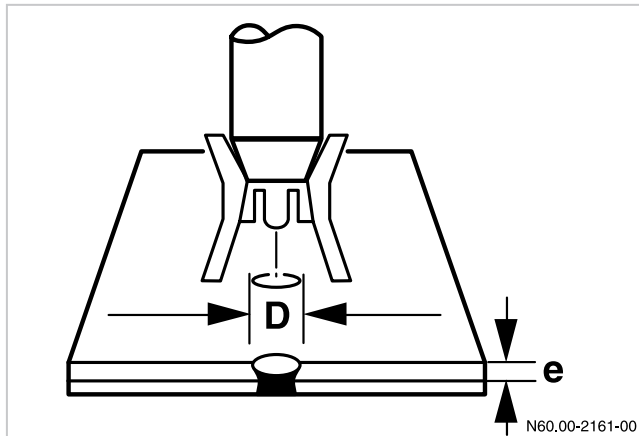
Ratio of sheet thickness to distance from the edge

- e Sheet thickness
- L Distance from sheet edge

Gas-shielded plug welding

If overlapping sheets are only accessible from one side, use either gas-shielded plug welding or tack welding for the weld joint.

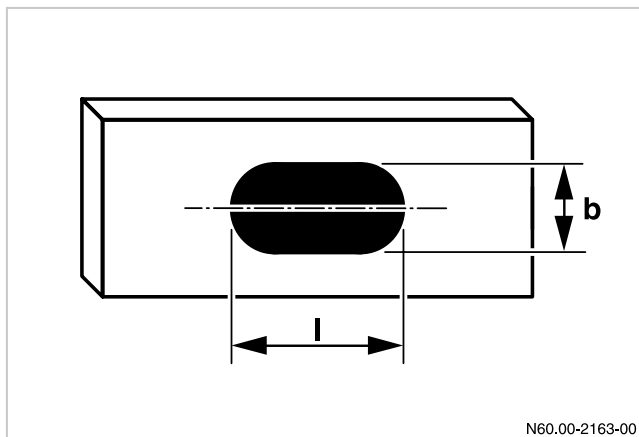
If the joint is produced by stamping or drilling followed by plug welding, the drilled area must be deburred before welding.



Ratio of sheet thickness to plug hole diameter

D = Plug hole diameter	e = Sheet thickness
4.5 mm/0.18 in	0.6 mm/0.02 in
5.0 mm/0.2 in	0.7 mm/0.03 in
5.5 mm/0.22 in	1.0 mm/0.04 in
6.0 mm/0.24 in	1.25 mm/0.05 in
6.5 mm/0.26 in	1.5 mm/0.06 in
7.0 mm/0.28 in	2.0 mm/0.08 in

Mechanical quality can be additionally improved by the use of "elongated holes" ($l = 2b$).



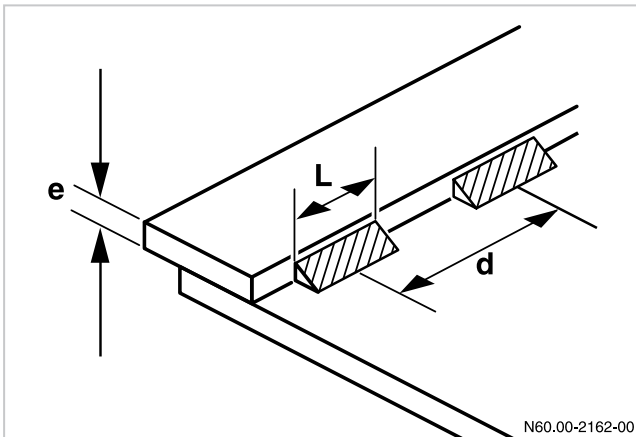
Ratio of width to length of elongated holes

- b Width of elongated hole
- l Length of elongated hole

3 Planning of bodies

Tack welding

In case of sheet thicknesses $> 2 \text{ mm}/0.08 \text{ in}$, overlapping sheets may also be joined by tack welding ($30 \text{ mm}/1.18 \text{ in} < L < 40e$; $d > 2L$).



Dimensions for tack 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 frames except on longitudinal frame members for wheelbase modifications or overhang modifications.

i For additional information, see Chapters 4 Technical limit values for planning (→ page 62) and 5 Damage prevention (→ page 93) as well as the section 6.2.1 General information on the body in white/body (→ page 110) and the Mercedes-Benz Workshop Information System (WIS).

Anti-corrosion protection after welding

On completion of all welding work on the vehicle, you must comply with the specified anti-corrosion protection measures (→ page 96).

! NOTE

When carrying out welding work, observe the instructions specified by Mercedes-Benz under 5.2 Welding work (→ page 95) and "Modifications to the basic vehicle" (→ page 110).

3.10 Soundproofing

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

- Engine
- Exhaust system
- Underfloor paneling
- Air intake system
- Tires, etc.

! NOTE

Observe all national laws, directives, and registration regulations.

Carry out noise measurements.

Federal and local regulations and guidelines must be observed.

Soundproofing parts fitted as standard must not be removed or modified.

The level of interior noise must not be adversely affected.

! NOTE

To ensure that modifications do not change the vehicle's sound levels, the interior sound levels must be minimized when planning bodies 6.4.4 Reducing interior noise (→ page 158).

Observe the information and specifications on the underfloor paneling as a soundproofing measure in Chapter 6.2.11 Underfloor paneling (→ page 134).

3.11 Maintenance and repairs

Maintenance and repair of the vehicle should not be made unnecessarily difficult by the body. The operator's manual must be observed.

- Maintenance points and major assemblies must be easily accessible (→ page 69).
 - Stowage boxes must be fitted with maintenance flaps or removable rear panels.
 - For maintenance and servicing purposes, accessibility to the attachment points of series production parts on the basic vehicle shall be ensured. This also affects parts on the door mechanism (e.g. hinges on hinged doors, guide rails/carriages of load compartment sliding door etc.).
- i** Any additional work that arises due to the body in terms of warranty-related work, maintenance or repair work will be assessed in each instance by Mercedes-Benz and may not accept liability. Should you have any questions, please get in touch with your contact person at Mercedes-Benz Service.
- The battery box 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 (→ page 57).

i NOTE

In the event of extended periods of non-operational time, damage may occur to the on-board electrical system and, depending on the equipment, to the auxiliary batteries as well. This can be avoided by disconnecting the batteries and storing them in an appropriate manner (→ page 57) or by activating hibernation mode (power-saving function) (→ page 258).

If the vehicle is to be started using an external power supply, then either the jump-start connection point or the main battery must be used.

- i** Information and specifications on how to use the jump-start connection point correctly can be found in your vehicle's Operator's Manual.

i NOTE

The auxiliary battery (code E2I, E2M) or other auxiliary batteries connected to the on-board electric system via the battery cutoff relay must not be used to start the vehicle via an external power supply, as this could otherwise result in damage to the vehicle (→ page 258).

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

- Check the headlamp adjustment or have this checked at a qualified specialist workshop. We recommend a Mercedes-Benz Service Center.
- Retighten the wheel nuts/wheel bolts to the specified tightening torque.

Mercedes-Benz recommends adapting the scopes of maintenance work on the body to the vehicle using the Mercedes-Benz maintenance systems. This applies both to the scope and type of maintenance work, and for determining the service due dates based on time elapsed or mileage.

The Operator's Manual and maintenance procedures for the upfit carried out, along with any additional major assemblies installed, must be included in the vehicle by the bodybuilder manufacturer and they must be in the language of the country in which the vehicle is to be used.

3.11.1 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 above the specified tire pressures.
- ▶ Release the parking brake and position the wedges.
- ▶ Chapter 3.11.2 Battery maintenance and storage (→ page 57) must be observed.

Storing the vehicle outside (< 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".
- ▶ Chapter 3.11.2 Battery maintenance and storage (→ page 57) must be observed.

Storing the vehicle outside(> 1 month)

- ▶ Carry out the same procedure as for storing in an enclosed space.
- ▶ Fold the windshield wipers away from the windshield.
- ▶ Close all air inlets and set the heating system to "Off".
- ▶ Chapter 3.11.2 Battery maintenance and storage (→ page 57) must be observed.

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.
- ▶ Observance of manufacturer-specific information on operating fluids (e.g. maximum durability useful life, seasonal use etc.) and, where applicable replacement of respective operating fluids.
- ▶ Adjust the tire pressures to the manufacturer's specifications.
- ▶ Check the state of charge of the on-board electrical system battery – and, depending on the equipment, the auxiliary batteries – and install the batteries.
- ▶ Clean the entire vehicle.

3.11.2 Battery maintenance and storage

For longer non-operational periods or periods of storage, ensure that the 12 V batteries (the on-board electrical system battery and, depending on the equipment, the auxiliary batteries – hereinafter simply referred to as the "batteries") are always in a charged state (more than 80% – corresponds to an open circuit voltage of approx. 12.55 V).

- ▶ For non-operational periods up to 4 weeks, disconnect the batteries at the beginning of the non-operational period, or isolate the battery main switch in vehicles with code E30.
- ▶ For non-operational periods exceeding 4 weeks, remove the batteries and store them in a dry place at temperatures of between 0 °C and 30 °C. Charge the batteries before putting them into storage. The residual charging current should be less than 5 A and the voltage higher than 13.5 V. Recharge the batteries every 4 weeks if installed in the vehicle, or every 6 months if removed from the vehicle, until the residual charging current is less than 5 A.
- ▶ Store the batteries in an upright position.
- ▶ The battery voltage must be kept above 12.55 V at all times.
- ▶ If the battery voltage drops below 12.55 V, but not below 12.1 V, the battery must be recharged.

! NOTE

If the open circuit voltage (unloaded for 4 hours in the removed state) of the battery voltage drops below 11 V, the battery is damaged and will have to be replaced.

Observe further information and specifications on charging the batteries in Chapter 8.3 Battery (→ page 258) and in the Operator's Manual.

! NOTE

Under no circumstances must the batteries be charged by operating the vehicle in engine idle. Otherwise, this could cause irreparable damage to the components of the exhaust system.

3.11.3 Work before handing over the modified vehicle

The work and modifications performed must be confirmed by the Upfitter via an entry in the maintenance booklet.

Checking the overall vehicle

- ▶ Check that the vehicle is in perfect condition.
- ▶ Rectify any damage.

Checking the brake system

- ▶ The brake fluid must be renewed regularly in accordance with the Mercedes-Benz specifications, but at least every two years.
- ▶ If it is not known how long a vehicle equipped with a hydraulic brake system has been non-operational, the brake fluid must be renewed.
- ▶ Check electric and hydraulic lines for damage of any kind and replace these if necessary.

Checking the batteries

- ▶ Check, and correct if necessary, the charge levels of the vehicle battery and the auxiliary battery before handing over the vehicle.

Checking the tires

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

Checking wheel alignment

- ▶ We recommend that the suspension geometry (toe adjustment etc.) be checked if modifications have been made by a body repair workshop.

! NOTE

Always comply with the information under 3.5 Dimensions and weights (→ page 41) on the curb weight and corresponding axle loads before and after body mounting work, 4.2.9 Wheel alignment (→ page 75) and 6.1.1 General information on the suspension (→ page 102).

More detailed information is contained in the Mercedes-Benz Workshop Information System (WIS).

Deactivating transport mode

To avoid excessive discharge of the battery during long periods of non-operation, the electrical system of the Sprinter is in transport mode by default ex-factory, which is only deactivated right before vehicle delivery.

In transport mode, the speed is limited to 40 km/h or 25 mph and limited electrical and electronic systems are active. This results in lower power consumption and reduces battery load.

For eXpertUpfitters where conditions dictate that the vehicles are idling for long periods of time, it is possible to deactivate transport mode at the registered Mercedes-Benz service center just before vehicle operation. Please contact Mercedes-Benz for further information.

It is possible to operate vehicles in transport mode. However, please note that transport mode must always be deactivated before the vehicle is operated on public roads.

To deactivate transport mode with button combinations before the vehicle is taken in to service:

- ▶ Press the starter button once to switch on the ignition (terminal 15R). The emergency blinkers must be switched off.
- ▶ Activate the left turn signal for at least 2 blinking cycles
- ▶ Activate the right turn signal for at least 2 blinking cycles
- ▶ Switch off the turn signals
- ▶ Switch on the emergency blinkers for at least 2 blinking cycles
- ▶ Switch off the emergency blinkers
- ▶ Activate the left turn signals for at least 2 blinking cycles
- ▶ Activate the right turn signals for at least 2 blinking cycles
- ▶ Switch off the turn signals
- ▶ Press the starter button for a second time (terminal 15) and check that the message "Transport Mode" is no longer displayed on the instrument cluster

3.12 Special equipment

⚠ WARNING

The use of unapproved parts, major assemblies, conversion parts, or accessory parts can have detrimental effects on the safety of the vehicle.

Before starting any work on the vehicle, please read the chapters of the vehicle owner's manual relevant to the upfit and the operating and installation guides from the manufacturers of accessories and equipment. You could otherwise fail to recognize dangers which could result in injury to yourself or others.

Not all auxiliary equipment can be installed in every vehicle without problems. This applies particularly to retrofitting.

For additional questions please reach out via www.upfitterportal.com

We recommend the use of special equipment available as Mercedes-Benz option codes, if possible, to ensure that the special equipment is properly fitted to the vehicle.

Information about the special equipment available as codes is available from your Mercedes-Benz Service Center 1.7 Contact (→ page 17).

- ① On the following homepages, you can assemble your vehicle in the Configurator and view the available items of special equipment:

www.mbvans.com

www.mercedes-benz-vans.ca

Special equipment (e.g. reinforced springs, frame reinforcements, additional fuel tanks, stabilizer etc.) or retrofitted equipment increases the curb weight of the vehicle.

- ▶ Determine the actual vehicle mass and axle loads by weighing before mounting.
- ▶ After completion of all body mounting work, determine the actual curb weight and the corresponding axle loads again by weighing. Comply with Chapter 9.1.1 Determination of the center of gravity in the x-direction (→ page 364), for example, to do so.
- ▶ Document the determined values. The specifications in the following chapters must be complied with or implemented using these values:
- ▶ Chapter 3.5 Dimensions and weights (→ page 41) regarding the curb weight and the associated axle loads before and after the body mounting work,
- ▶ Checking wheel alignment as per Chapter 3.11.3 Work before handing over the modified vehicle (→ page 58),
- ▶ Chapter 4.2.9 Wheel alignment (→ page 75),
- ▶ Chapter 6.1.1 General information on the suspension (→ page 102).

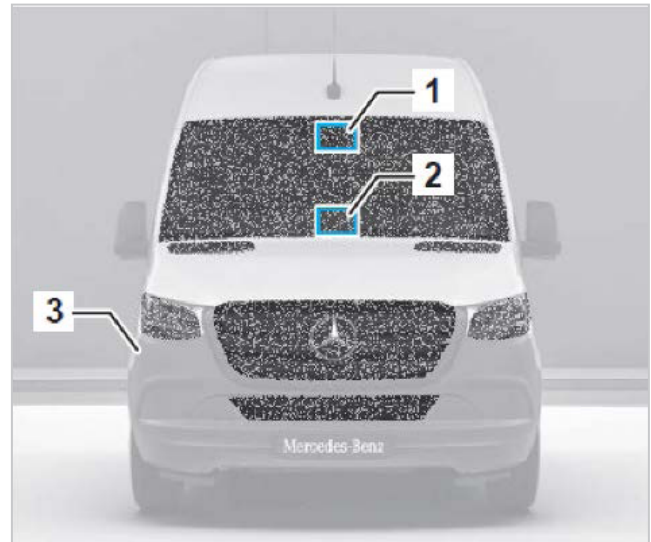
3.13 Adhesive decals on the exterior

The specifications that follow are presented on the base panel van (FKA) closed model designation. They also apply to the corresponding surfaces of the Tourer (FKB) closed model designation and the open model designation of chassis with cab (FHS). For upfits these specifications must be applied accordingly.

With regard to adhesive films, note the following:

- Adhesive films may only be applied to the exterior surfaces of the vehicle that are not labeled as impermissible areas in the schematic illustrations below (FKA panel van by way of example).
- In areas with sensors, the attachment of adhesive film is generally not permitted; also refer to the notes on Blind Spot Assist (code JA7), Sideguard Assist (code JT7) and the pre-installation for Blind Spot Assist (code J1V) in Chapter 8.9.4 Blind Spot Assist/Rear Cross Traffic Alert/Exit warning function/Sideguard Assist (→ page 307).
- When applying special protective films (e.g. improved splinter protection for special purpose vehicles or infrared-absorbing solar protective films), observe the previously mentioned specification too. The attachment of adhesive films in the black printing area with the multi-purpose camera cutout and the light/rain sensor (code LA2/JF1) is not permissible either in such use cases, see following depiction.
- All national legal requirements of any kind pertaining to the application of films or similar materials on vehicles must be observed and complied with. Observe, in particular, the regulations about masking off the windshield, window systems, and lighting systems.

The notes and specifications from the upfitters "Small Conversions" guide and the "Design Quality for Vans" guide must be observed. Both can be found in the Upfitter Portal: www.upfitterportal.com.



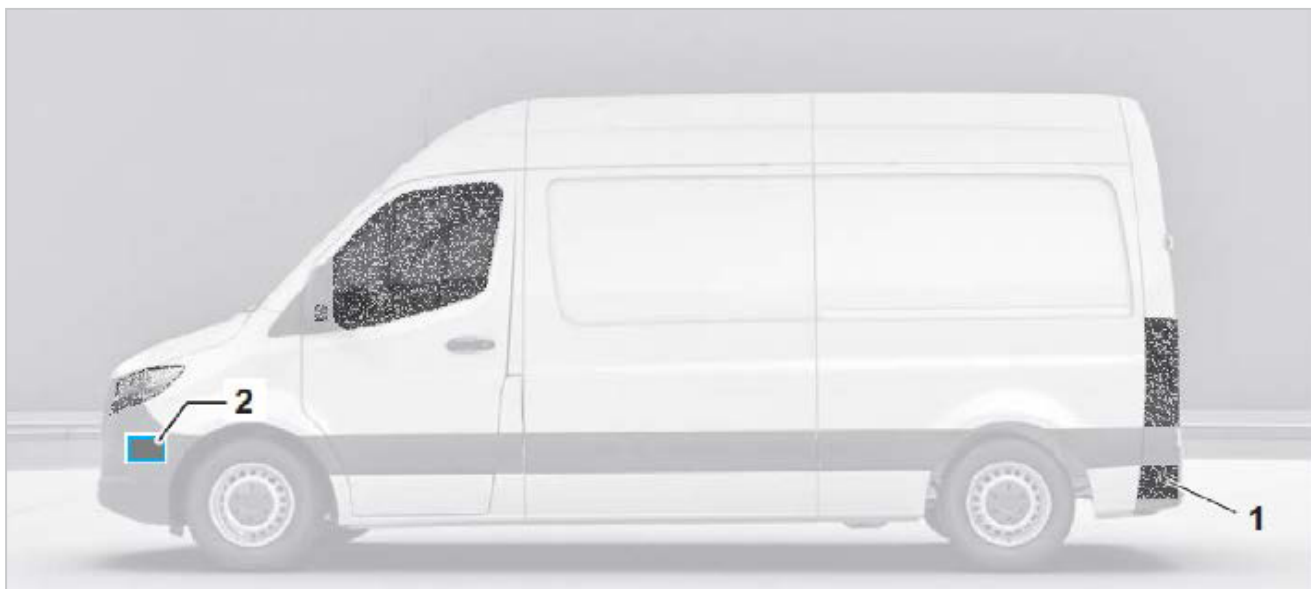
Front of vehicle - speckled areas: Areas where wrapping is not permissible (example cargo van model designation, schematic diagram)

- 1 Impermissible area in black printing with cutout for light/rain sensor (code LA2/JF1)
- 2 Impermissible area in black printing with cutout for multi-purpose camera
- 3 Impermissible area on front passenger side bumper with Sideguard Assist (code JT7)

⚠ WARNING

Depending on the type and thickness, paints or films can cause attenuation of radar waves. This could lead to malfunction or system failure. This could cause the driver to lose control of the vehicle.

There is risk of an accident and danger to life and limb!



Sides of vehicle - speckled areas: Areas where wrapping is not permissible (example cargo van model designation, schematic diagram)

1 With Blind Spot Assist (code JA7): Left/right side position in rear bumper

2 With Blind Spot Assist (code JT7): Side position on front passenger side in front bumper (shown here schematically on driver's side)



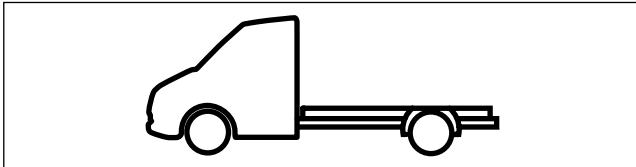
Rear of vehicle - speckled areas: Areas where wrapping is not permissible (example cargo van model designation, schematic diagram)

1 With Blind Spot Assist (code JA7): Left/right side position in rear bumper

4.1 Limit values for the basic vehicle

NOTE

This chapter contains the technical limit values of the basic vehicle which are important for planning an upfit. In addition, you will find more information in the other chapters of the current version of the Body and Equipment Guideline.



4.1.1 Steerability

In all load states, the front axle load must represent at least the following proportion of the gross permissible vehicle mass:

General	Up to 4.2 t: at least 35% of gross vehicle mass
	Up to 5 t: at least 30% of gross vehicle mass

Comply with the permissible axle loads in all load situations.

Sprinter is equipped with electric power steering.

WARNING

Modifications must not be made to the steering system. This includes any change and/or limiting of the steering angle.

Modifications to the steering can cause the electric power steering to fail.

There is risk of an accident and danger to life and limb!

4.1.2 Maximum permissible position of the center of gravity

y-axis:	The maximum wheel load (1/2 the axle load) of the laden vehicle may only be exceeded by 4%.
----------------	---

1) Height of vehicle center of gravity above roadway

Maximum permissible center of gravity height

The overall height of the center of gravity of a vehicle has a significant influence on its braking and handling characteristics. When designing bodies and attachments, care must therefore be taken to ensure that the center of gravity of the base vehicle and of the upfitted or laden vehicle is kept as low as possible.

The height of the overall center of gravity must be a maximum of 51.2 in (1300 mm) above the roadway, since the Electronic Stability Program (ESP®) is only designed to maintain its basic functionality up to this point.

Irrespective of this, the tendency of vehicles to tip over rises as the vehicle center of gravity height increases, due to the laws of physics. The ESP® in the Sprinter is optimized to reduce the vehicle's tendency to tip over at overall vehicle center of gravity heights up to approx. 39.4 in (1000 mm).

NOTE

On vehicles with a vehicle center of gravity height above 39.4 in (1000 mm) up to a maximum of 51.2 in (1300 mm) above the roadway, it is essential to ensure that the vehicles are equipped with the necessary suspension and ESP® variant of the special equipment "Vehicle design for high load" (code B01).

- ① Further information and specifications regarding the special equipment code B01 can be found in Chapter 4.2.1 Suspension (→ page 72)
- ① To determine the vehicle center of gravity height, please observe the procedure in Chapter 9.1.2 Determination of the vehicle center of gravity in the z-direction (→ page 366).

Make sure that the correct variant is selected when ordering the vehicle. The upfitter must ensure that the vehicle centers of gravity are determined and that the instructions in the DOG (Dealer-Ordering-Guide) or the Sprinter Van Equipment Book are observed.

If you have further questions, please reach out via www.upfitterportal.com

4.1.3 Permissible vehicle dimensions

Maximum permissible vehicle width.

The following table contains information on the vehicle width, which is contained in the approval for model series 907 and which must be observed for registration:

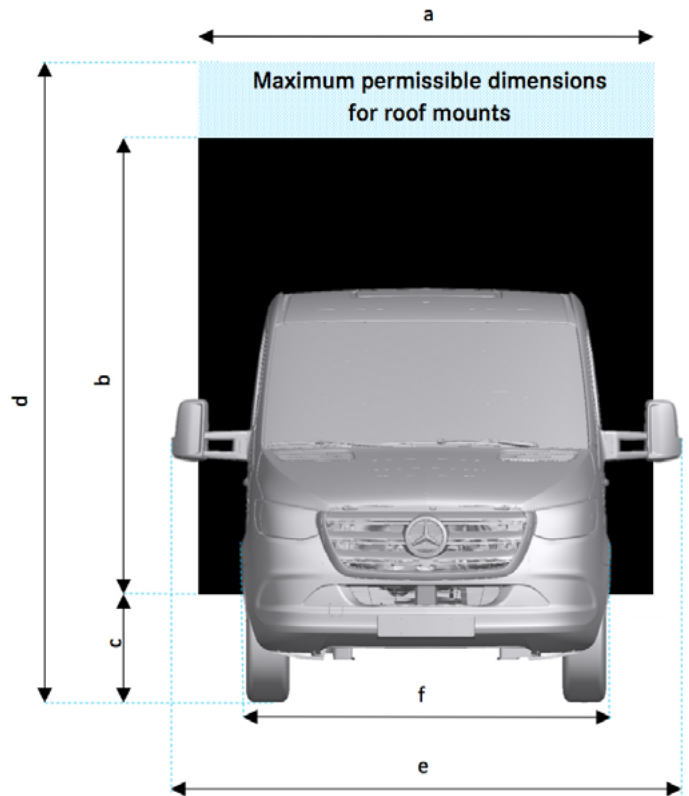
Side mirrors based on vehicle width

Mirror/code	Box/vehicle width
Standard mirror (non-cab chassis)	≤2100 mm/83 in
Special equipment Code FS1 - Extended mirror bracket	2190 mm/86 in to 2300 mm/91 in
Standard mirror for cab chassis Code FS2 - Extra-long mirror bracket	2300 mm/91 in to 2440 mm/96 in

Maximum permissible vehicle dimensions

The maximum dimensions provided in the following tables must not be exceeded:

- The maximum box width is 96 in.
- The maximum box height is 109 in (measured from the top of the chassis frame to the top of the box) or 138 in (measured from the ground level).
- If roof mounts on top of the box exceeds the height of 157 in (measured from the ground level), then option code JA8 needs to be deactivated by activating option code JA0. (Please reach out to the nearest local dealer for deactivation).



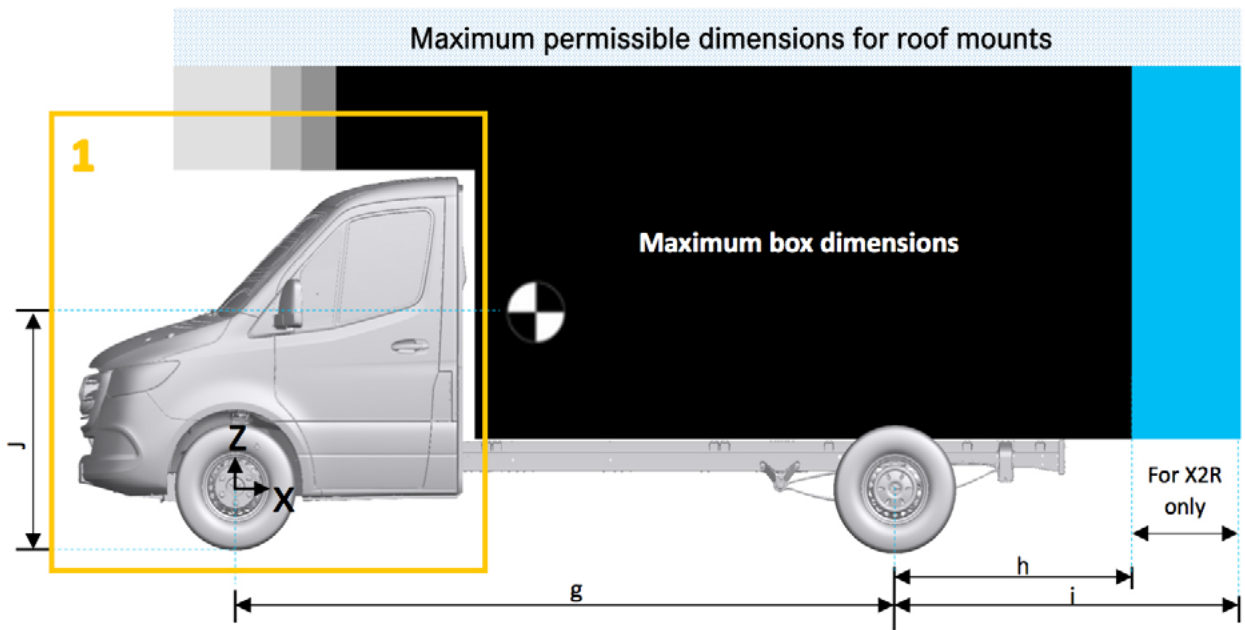
Dimension	Description
a	2440 mm/96 in Maximum permissible width of the upfitted box
b	2770 mm/109 in Maximum permissible distance measured from the top of the chassis frame to the top of the upfitted box
c	735 mm/29 in Body frame height measured from ground level (may vary depending on load, suspension)
b + c	3505 mm/138 in Maximum permissible box height from ground level (excluding roof mounts)
d	4000 mm/157 in Maximum permissible height with roof mounts from ground level (with code JA8)
e	2776 mm/109.3 in Width of the vehicle including the extended mirrors (with code FS2)
f	2019 mm/79.5 in Width of the vehicle without mirrors and upfit

Consider both the maximum box height and width as well as the maximum frontal surface area of the vehicle when determining the measurements of the box.

A nose cone may be installed on the front surface of the box to reduce wind resistance.

Additionally, for frontal surface areas higher than 6.8 m²/10540 in², the following requirements are mandatory (for smaller frontal surface areas these requirements are preferable but not mandatory):

- The transition between cab housing and box has to be chamfered by 45°.
- The box is required to have edge radii ≥ 100 mm/ 3.94 in (especially in the rear area) for improving aerodynamics.



The following diagrams and tables show the general and the maximum side surface areas of Sprinter cab chassis vans. The point of origin for the dimensions as well as for the 3D data (available for eXpertUpfitters on www.UpfitterPortal.com) is located in the middle of the front axle.

	Dimension		Comment
	144"	170"	
g	3665 mm/144 in	4325 mm/170 in	Wheelbase
h	1850 mm/73 in	2200 mm/87 in	Maximum permissible overhang for vehicles equipped without option code X2R. Does not require an UPFITTER MANAGEMENT VANS review. (See chapter 6.2.4 Overhang extension (→ page 117))
i	2200 mm/87 in	2600 mm/102 in	Maximum permissible overhang for vehicles equipped with option code X2R. The overhang value does not include small rear protruding components (e.g. spare tire, bike rack attachments). Does require an UPFITTER MANAGEMENT VANS review. Visit www.UpfitterPortal.com (See chapter 6.2.4 Overhang extension (→ page 117))
j	1300 mm/52 in	1300 mm/52 in	Maximum permissible height of center of gravity (4.1.2 Maximum permissible position of the center of gravity (→ page 62) For vehicles with center of gravity height greater than 1,000 mm, please refer to section 4.2.1 'Suspension of Sprinter - BR907' (→ page 72).

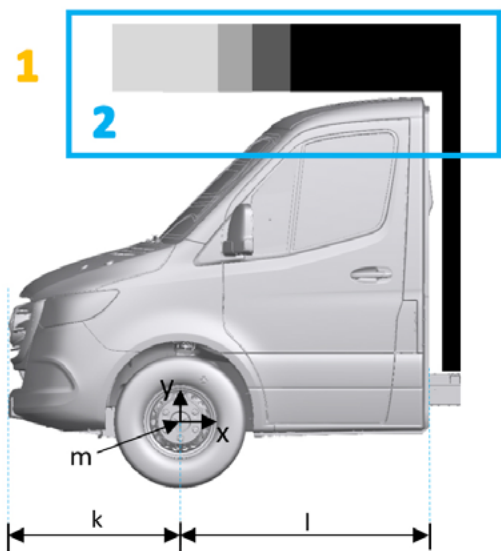
NOTE

RV's (Recreational Vehicle) may have a maximum overhang that is 60% of the wheelbase, but must not exceed 2600 mm/102 in (measured from the middle of the rear axle to the rear of the upfitted box). Please note that auxiliary attachments (e.g. trailer hitch or additional bumpers) are not included in this measurement.

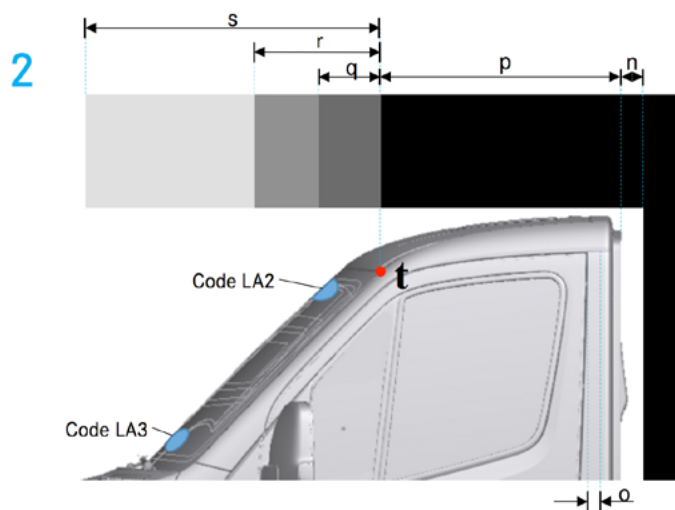
NOTE

The extended permissible overhang with the option code X2R is only available for RV upfits. This is due to the specific drive characteristics of RV's; the relatively even weight distribution; and the predefined high rear axle load with the unladen vehicle. These basic assumptions cannot be made for other upfitted vehicles, so the basic limits must apply to all other vehicles.

i For additional information about Crosswind Assist, please refer to chapter 8.9.2 Crosswind Assist.



Dimension	Comment
k	1021 mm/40 in Distance between front end and point of origin
l	1503 mm/59 in Distance between point of origin and the back of the B-pillar
m	Up to 4.2t > 35% of gross vehicle mass Up to 5t > 30% of gross vehicle mass Front axle load (see chapter 4.1.1 Steerability)



Dimension	Description
n	50 mm/2 in Minimum permissible distance between back of B-pillar and non-integrated body/box upfits (see chapter 4.9 Limit values for the body (→ page 92)).
o	20 mm/0.8 in Minimum permissible distance between the rear edge of the door and an integrated body (see chapter 4.9 Limit values for the body (→ page 92)).
p	726 mm/29 in Distance from back of B-pillar to point 't' (see bottom of table).
q	up to 200 mm/ 7.9 in Alcove length measured from 't' where no sensors are impaired (see chapter 8.9.5 Highbeam Assist, Lane Keeping Assist and traffic sign recognition and 8.9.6 Rain sensor and Headlamp Assist).
r	up to 400mm/ 15.8 in Alcove length measured from 't' where option codes LA2 (Headlamp assist sensor at upper position) and JF1 (Rain sensor) may have impaired functionality. Therefore, option code LA3 (headlamp assist sensor at lower position) can be ordered (see chapter 7.14.4 Headlamp Assist (code LA2) and 7.14.5 Rain sensor (code JF1)). If the option code LA3 is ordered, the rain sensor (code JF1) cannot be ordered.
t	- Accessible start point for measuring the alcove overhang (outer edge of windshield).

4 Technical limit values for planning

Permissible towing capacities when relocating the trailer coupling point

Permissible gross mass	Wheelbase	Relocation of trailer coupling point from standard configuration				
		0-200 mm 0-8 in	201-500 mm/ 8-20 in	501-600 mm/ 20-24 in	601-700 mm/ 24-28 in	> 700 mm/ > 28 in
2500	3665 mm/ 144 in	3500 kg/ 7720 lbs	3000 kg* / 6610 lbs	2500 kg* / 5510 lbs	2000 kg* / 4410 lbs	* +**
	4325 mm/ 170 in	3500 kg/ 7720 lbs	3000 kg* / 6610 lbs	2500 kg* / 5510 lbs	2000 kg* / 4410 lbs	* +**
3500, 3500XD, 4500	3665 mm/ 144 in	3500 kg/ 7720 lbs	3500 kg* / 6610 lbs	3000 kg* / 6610 lbs	2500 kg* / 5510 lbs	* +**
	4325 mm/ 170 in	3500 kg/ 7720 lbs	3500 kg* / 6610 lbs	3000 kg* / 6610 lbs	2500 kg* / 5510 lbs	* +**

* If the trailer coupling point is relocated by > 200 mm/8 in in relation to the standard configuration, the Trailer Stability Assist (TSA) must be deactivated through the use of code O19.

** If the relocation of the trailer coupling point from the standard configuration is > 700 mm/28 in, we recommend seeking the advice of the relevant department 1.7 Contact (→ page 17).

4.1.4 Parts which must not be welded:

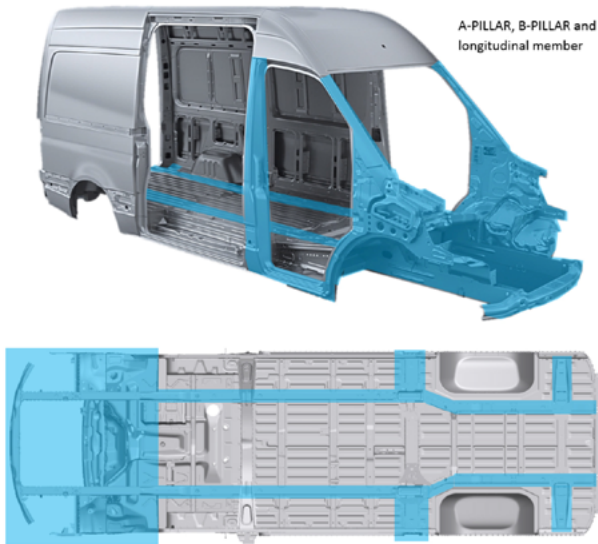
- On the A and B-pillars
- On the upper and lower flange of the frame
- In bending radii
- In the vicinity of the airbags, airbag sensors, airbag control unit, and seat belts
- Plug welding is only permissible in the vertical webs of the longitudinal frame member.
- In the area of the assistance systems, (e.g. front and rear radars for Parktronic or Distronic)

i Additional information can be found under Chapter 3.9 Bolted and welded connections (→ page 51), Chapter 5.2 Welding work (→ page 95), Chapter 6 Modifications to the basic vehicle (→ page 102), 6.2 Body in white/body (→ page 110) and the Mercedes-Benz Workshop Information System (WIS).

4.1.5 Drilling must not take place

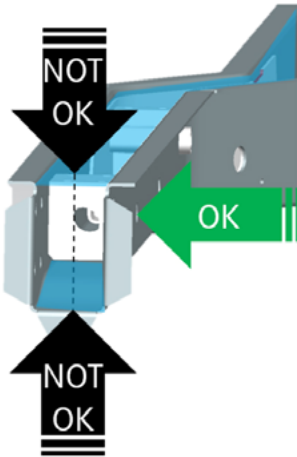
This chapter provides information about areas which should not be modified or changed due to safety and crash reasons.

The following pictures show the safety and crash relevant areas. Mercedes-Benz recommends not to drill into the marked areas.



Safety and crash relevant areas (marked in blue)

The diagram below shows where drilling into the longitudinal member is not allowed.



Longitudinal member, non-drilling areas

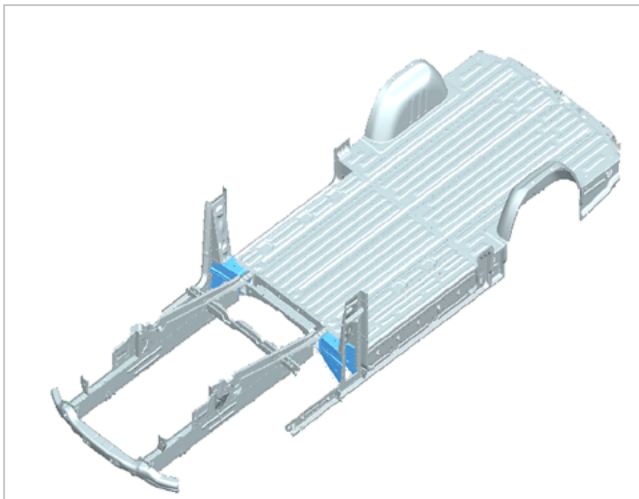
Drilling must not take place:

- On the A and B-pillars
- In the upper or lower flange/chord of the longitudinal frame member
- In the vicinity of load application points (e.g. spring brackets)
- In the vicinity of front axle or rear axle supporting points
- On underbody reinforcement or longitudinal supports under the B-Pillar
- In the vicinity of the airbags, airbag sensors, airbag control unit, seat belts
- In the area of the assistance systems, (e.g. front and rear radars for Parktronic or Distronic)

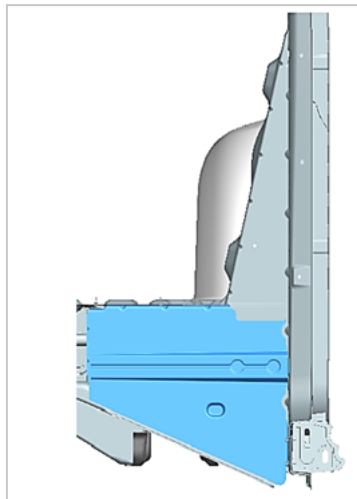
! NOTE

Holes in the longitudinal frame member are the result of the production process and are not suitable for body mounting work. On no account may holes resulting from the production process be used, as this could damage the frame.

For mounting of partition walls, please use existing holes.



Underbody reinforcement non-drilling areas



Underbody reinforcement non-drilling areas

Both views show the reinforcement piece with grooves in the highlighted region. Drilling should not take place in this area because of its structural importance.

In relation to the highlighted zone, an important note about fuel-related part integrity is below.

! NOTE

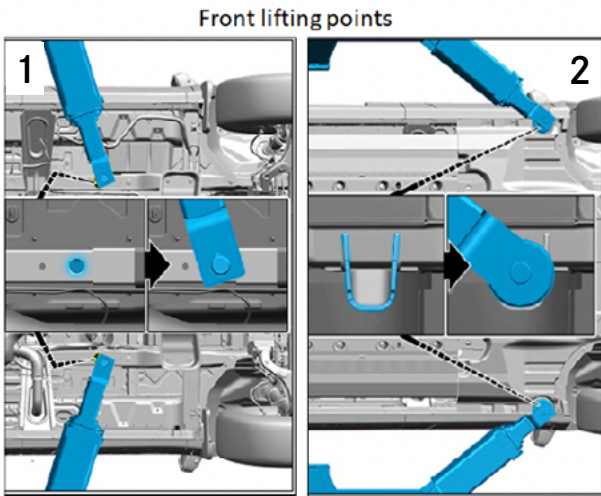
Clearances for fuel filler necks, fuel tank lines and fuel lines must be maintained. Sharp edges of the upfit can impact the fuel integrity of the vehicle.

- i** Additional information can be found under 3.9 Threaded and welded connections (→ page 51) and 5.2 Welding work (→ page 95).

4.1.6 Service lift points

Front lifting points

This section provides information about the location of the lifting points in the front part of the underbody.

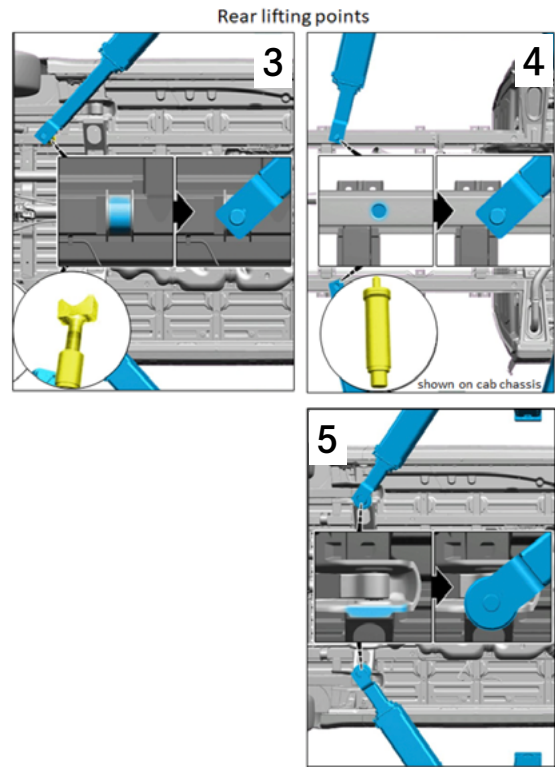


Front lifting points

- 1) Lift arm to longitudinal member (hole)
- 2) Lift arm to support bracket

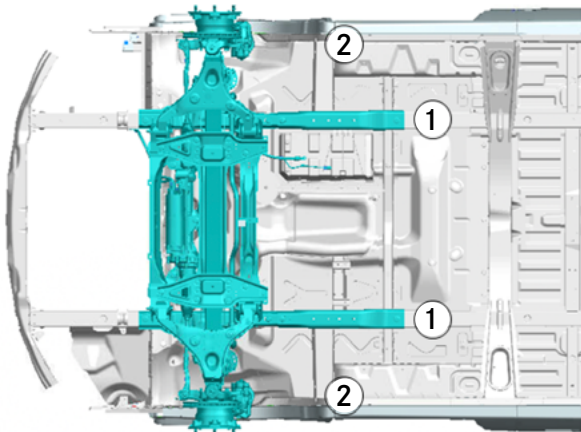
Rear lifting points

This section provides information about the location of the lifting points in the rear part of the underbod

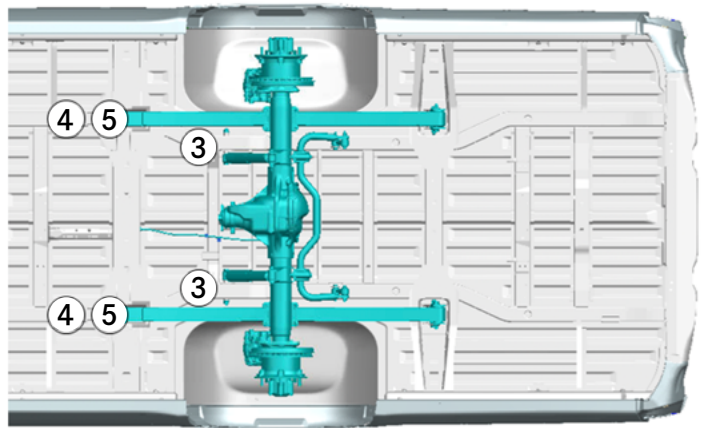


Rear lifting points

- 3) Lift arm to rear jack tube
- 4) Lift arm to longitudinal member (hole)
- 5) Lift arm to rear leaf spring bracket



Front underbody non-modification areas




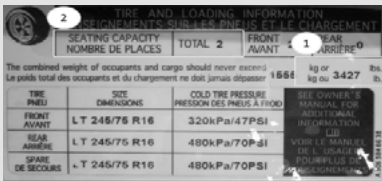
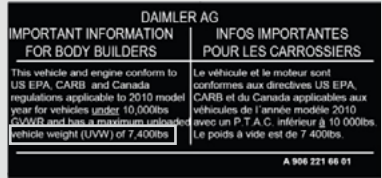
Rear underbody non-modification areas

- Vehicles which have been modified in areas of maintenance points/lifting points are not serviceable at Mercedes-Benz dealerships.
- Due to safety reasons Mercedes-Benz dealerships will not use any other lifting points than those designated by Mercedes-Benz standards (see above).
- Mercedes-Benz highly recommends not to modify the highlighted areas.

4 Technical limit values for planning

4.1.7 Weights

The upfitter has to comply with certain limit values of the vehicle. This subsection explains where the maximum limits can be found and how they are connected to each other.

Nomenclature	Meaning	Description	Location
Gross Vehicle Weight Rating (GVWR ¹)	Gross Vehicle Weight Rating	Permissible total weight of the vehicle (limited)	Can be found on this sticker ² : 
Payload ¹	Payload	Includes driver, passengers, cargo, luggage, etc.	Can be found on this sticker ² : 
Curb Weight (CW ¹)	Curb Weight	Weight of the vehicle, depending on the option code (actual value)	Has to be calculated by formula ¹
UVW ¹	Unloaded Vehicle Weight	Maximum weight of the vehicle including the upfit (limited)	Can be found on this sticker ² : 

1 Specific to vehicle

2 Refer to subsection 3.6 Vehicle identification data (→ page 43) for further information and labels

4.1.8 Upfit weight limits

The diagram below provides an overview of the weight limits that must be considered when upfitting a Sprinter. This chapter serves as a guide to upfitters when modifying their vehicles, but this cannot serve as a replacement for reviewing the latest version of federal and local regulations on weight limitations. It is the upfitter’s responsibility to ensure compliance with all federal and local regulations on weight limitations.

The table below contains the maximum weight limit values for Sprinters based on the model type. Do not exceed the maximum weight limits of UVW, GVWR, and GCWR, listed below.

Sprinter Model	UVW (lbs.)	GVWR (lbs.)	GCWR (lbs.)
2500 (Diesel)	7,401	9,050	13,930
3500 (Diesel)	7,401	9,990	15,250
3500XD (Diesel)	10,470	11,030	15,250
4500 (Diesel)	11,373	12,125	15,250

A = Base Curb Weight (BCW). BCW is the sum of the Sprinter vehicle weight and liquids necessary for vehicle operation at full capacity (e.g. fuel). The weight of the vehicle is variable and depends on the variant of the Sprinter and the option codes included in the specific vehicle. Liquids that are not necessary for vehicle operation should not be included.

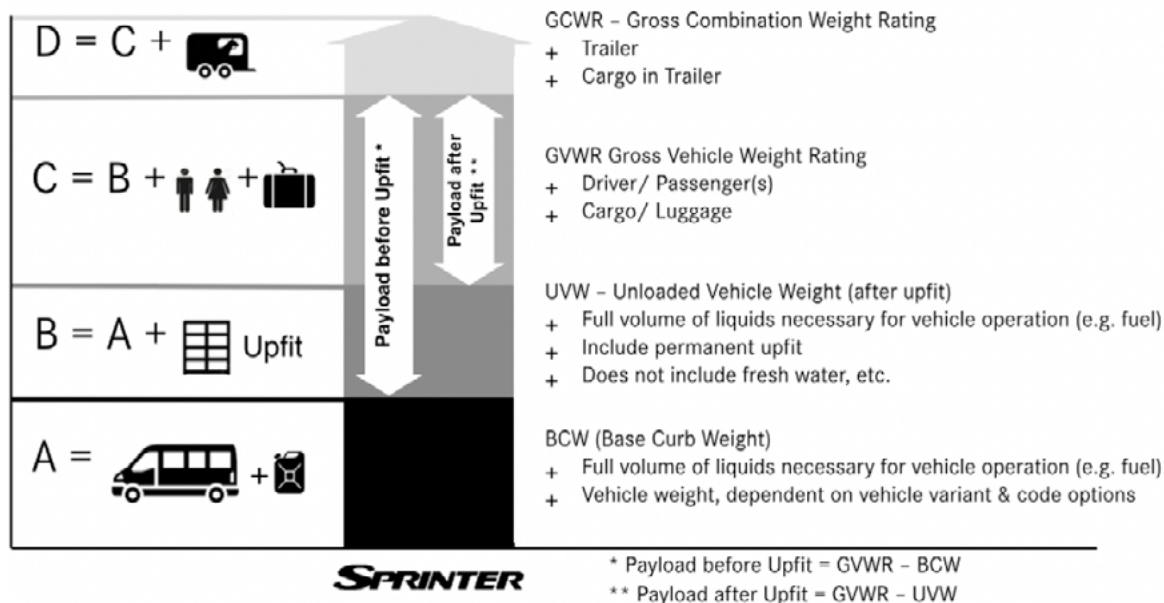
B = Unloaded Vehicle Weight (UVW). UVW is the sum of the BCW value and the weight of permanently installed equipment added by the upfitter. Liquids that are not necessary for vehicle operation as well as any accessories should not be included. The UVW restriction does not include the driver, passengers, cargo/luggage items in its weight limit.

C = Gross Vehicle Weight Rating (GVWR). GVWR is the sum of UVW value and the driver and passenger(s) weights as well as weights of the added cargo and/or luggage.

D = Gross Combination Weight Rating (GCWR). GCWR is the sum of GVWR value and the weight of any attached trailer and the cargo in the trailer.

Payload before the upfit is payload of the vehicle without any upfit modifications and is calculated by subtracting the BCW from the GVWR. The payload value is provided on the tire label located on the B-pillar driver side door.

Payload after the upfit includes the weight of permanently installed equipment added by the upfitter and is calculated by subtracting the weight of the vehicle after the upfit from the GVWR. The label with payload (tire label on the B-pillar driver side door) provided by Mercedes-Benz will need to be updated by the upfitter with the payload after upfit value.



4.2 Limit values for the suspension

4.2.1 Suspension of Sprinter

Use of the suspension design

In order to achieve an optimal suspension design for the wide range of potential bodies, additional suspension configurations are available for customization purposes alongside the base suspension. These are combined in different suspension packages:

Suspension package overview

Code	Description
CB1	Suspension for comfort and load protection
CB7	Stabilization level I - roll stabilization with high body damping
CB8	Stabilization level II - enhanced roll stabilization with higher body damping compared to CB7
CB4	Stabilization level III - maximum roll stabilization with higher body damping compared to CB8
CT1	Rear spring vibration absorbers
A50	Front axle reinforced
CE8	Raised rear body mounts

Code overview

Please find up-to-date suspension packages and codes on the Upfitter Portal:

www.UpfitterPortal.com

Contents of the suspension packages

Code	Benefit
CB1	Enhanced comfort due to adapted damper characteristics and the use of progressive spring characteristics.
CB7	CB7 compensates for rolling behavior due to high centers of gravity of loads or bodies. Torsion bars with an increased diameter are added to the front and rear axles. Furthermore, shock absorbers with an adapted characteristic are installed.
CB8	Additional roll stabilization and body damping compared to CB7. Increases torsion bar diameters at the front and rear axles and provides an adapted shock absorber characteristic. Furthermore, rear axle springs with increased rigidity are installed.
CB4	Suspension with maximum roll stabilization for upfitted vehicles. CB4 includes the stabilization stage II (CB8) with adapted springs/shock absorbers, stabilizer bar characteristics and the use of a progressive spring characteristic.
CT1	Includes vibration absorbers fitted on the left and right rear spring and lowers the resonant vibrations of the rear springs, thus hindering noise development.
A50	Includes an increased load capacity of the front axle, such that heavier bodies and equipment can be fitted. The higher capacity front axle caters for heavier cabs and special equipment (e.g. for fire-fighting vehicles and ambulances).
CE8	Raised body on rear axle (35mm). For RV only.

In addition, a particular special equipment code "Vehicle design for high load" (code B01) is available for vehicles used in high-load applications. This contains a package of suspension, tires, ESP® parameters, and driver assistance system parameters that have been tailored and developed specifically for upfitter vehicles with a vehicle center of gravity more than 1000 mm up to a maximum of 1300 mm above the roadway.

NOTE

The specifications on maximum center of gravity height and the special equipment code B01 in Chapter 4.1.2 Maximum permissible position of the vehicle center of gravity (→ page 62) must be observed.

When ordering code B01 ex works, code CB8 (stabilization level II) is automatically added. With code B01, code CB4 (stabilization level III) is also optionally available.

For the following vehicle configurations, code B01 can only be ordered in combination with code CB4:

- Permissible gross mass 5.2 t (code XH2), 5.38 t (code XH3), and 5.5 t (code XL4) and wheelbase R2 (3665 mm, code IR4)
- Permissible gross mass 5.0 t, wheelbase R2 (3665 mm, code IR4) and reinforced front axle (code A50)

i Further details and recommendations for the uses of code B01 can be found in the DOG (Dealer-Ordering-Guide) or Sprinter Van Equipment Book.

NOTE

For the 144" cab chassis with all-wheel drive (code A4M), additional measures are required for applications involving high loads and a vehicle center of gravity positioned over 39.4 in (1000 mm) above the roadway.

When planning upfits for high loads, please check whether code B01 "Vehicle version for high load" is provided ex factory with the selected vehicle specification. If not, please reach out via www.upfitterportal.com (→ page 17).

Clear recommendations for selecting the right suspension package according to body type and model designation follow. If the modification/body required by the customer is not listed in the following, make your decision based upon the vehicle characteristics listed and select the variant that comes as close as possible to the body in question or contact www.upfitterportal.com

4.2.2 Permissible axle loads

WARNING

If the permissible axle loads are exceeded on vehicles equipped with the ESP® system, this may no longer function correctly. Furthermore, any overloading may result in damage to the suspension and load-bearing parts.

There is risk of an accident and danger to life and limb!

The permissible axle loads as per the vehicle identification plate and vehicle registration documents must be complied with.

NOTE

Observe the permissible axle loads for the vehicle as listed in the vehicle documents and on the identification plate on the vehicle, See Chapter 3.5 Dimensions and weights (→ page 243).

For information on axle loads and maximum permissible gross mass, see 1.7 Contact (→ page 17).

4 Technical limit values for planning

4.2.3 Approved tire sizes

The table below provides a general overview of tires according to tonnage.

Gross mass	Equipment	Tire size	Weight and speed rating
Reference: 2500		LT245/75 R16 120/116Q	See note
	2	LT245/75 R16 120/116Q	
Reference: 3500/3500XD Super Single	1 (on front axle)	225/75 R16 C 121/120R (122L)	
	1 (on rear axle)	285/65 R16 C 131R	
	1 (as spare wheel)	225/75 R16 C 121/120R (122L)	
Reference: 3500/3500XD/4500		LT215/85 R16 115/112Q	
	2	LT215/85 R16 115/112Q	

1 With super single tires special equipment, code R9A

2 All-wheel drive

NOTE

The use of appropriate tire sizes only applies in the context of the weight and speed ratings approved and intended for these. You can obtain information about changes and the latest tire values through www.mbvans.com

The table below outlines the tire pressures on Sprinter vehicles. These tire pressures are the same, regardless of tire brand and are measured as fully laden. Weights quoted are GVWR values.

Tire	Front axle (psi)	Rear axle (psi)	Spare tire (psi)
Vehicles below 10,000 lbs.			
LT 215/85 R16 (without code A50)	55	54	55
LT 215/85 R16 (with code A50)	61	54	61
LT245/75 R16 (without code A50)	46	70	70
LT245/75 R16 (with code A50)	52	70	70
225/75 R16C (without code A50)	49	-	100
225/75 R16C (with code A50)	54	-	100
285/65 R16C	-	67	-
Vehicles above 10,000 lbs. and below 12,125 lbs.			
LT 215/85 R16 (without code A50)	55	58	-
LT 215/85 R16 (with code A50)	61	58	-
285/65 R16C	-	67	-
Vehicles at 12,125 lbs.			
LT 215/85 R16 (with code A50)	65	62	-
285/65 R16C	-	75	-

4.2.4 Diameter of turning circle

Wheelbase	Diameter of turning circle		
	4x2	4x2	AWD
RWD	2500	3500XD, 4500	2500, 3500, 3500XD
3665 mm/144 in	13.4 m/528 in	13.2 m/520 in	14.0 m/551 in
4325 mm/170 in	15.3 m/602 in	15.2 m/598 in	16.1 m/634 in

4.2.5 Modifications to the axles

No modifications may be made to the suspension or the axles (→ page 102).

4.2.6 Modifications to the steering

The Sprinter is equipped with electric power steering.

⚠ WARNING

Do not make modifications to the steering. This includes any change to and/or restriction of the steering angle.

Modifications to the steering can cause the electric power steering to fail.

There is risk of an accident and danger to life and limb!

4.2.7 Modifications to the brake system

Do not make modifications to the brake system.

Do not make modifications to the disk brake air inflow and air outflow (→ page 104).

4.2.8 Modifications to springs, spring suspension, and dampers

Modifications to springs and dampers can only be made if they are matched at the front and rear. Only the combinations provided ex factory must be used.

On no account should springs and dampers be used if they do not correspond to the characteristics of standard parts or parts obtainable as special equipment. We recommend the use of standard Mercedes-Benz parts.

Do not make modifications to the spring suspension (→ page 102).

4.2.9 Wheel alignment

Do not make modifications to the steering geometry, in particular wheel alignment settings (→ page 102).

If the body or any permanent equipment that belongs to the vehicle leads to increased vehicle curb weight or if the vehicle is mostly used in fully loaded state, refer to the notes under 6.1.1 General information on the suspension 6.1.1 General information on the suspension (→ page 102).

This could apply to, for example, recovery vehicles, fire-fighting vehicles, ambulances, semitrailer trucks, workshop vehicles, or RV's.

4.3 Limit values for the body-in-white

4.3.1 Modifications to the body-in-white

See "Modifications to the basic vehicle" (→ page 110) or more information.

Modifications must not be made to the crossmember structure from the front of the vehicle up to and including the B-pillar.

Modifications must not be made to the crossmember structure from the front of the vehicle up to and including the B-pillar.

Do not make modifications to the rear portal including the roof area (→ page 121).

In the event of modifications to the load-bearing structure, the total equivalent rigidity of the structure fitted by the upfitter must at least equate to that of the series production vehicle.

Where bodies and installations are installed that are used for frictional connection to the body-in-white, the upfitter must then submit evidence of the durability.

Clearances for fuel filler necks, fuel tank lines and fuel lines must be maintained.

If modifications are made to the side wall on the panel van or the crewbus, the rigidity of the modified body must be equal to that of the basic vehicle.

If bodies are mounted on basic vehicle cabs, protection of the fuel system may be necessary depending on the body type, See Chapter 6.3.1 Fuel system (diesel) 6.3.1 Fuel system (→ page 136).

4.3.2 Limit values for the vehicle frame

If modifications are made to the wheelbase or the frame is extended, the material of the extension piece must have the same quality and dimensions as the standard vehicle frame, See Chapter 7.1 Assembly frame (→ page 188).

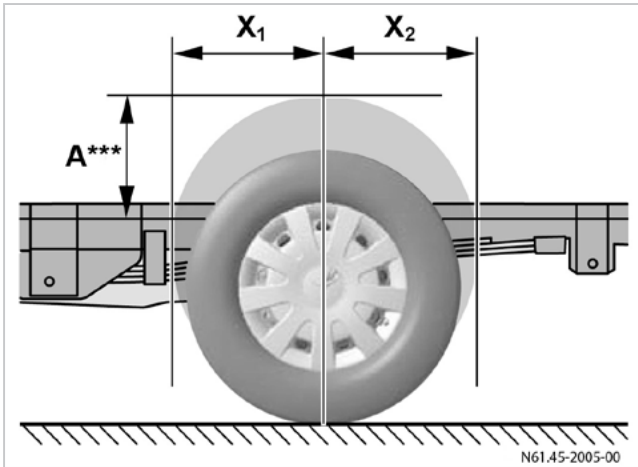
4.3.3 Lower wheel well on rear axle for closed model designations

On closed model designations, the wheel wells are designed for the wheel/tire combinations and the jounce travel (dependent on the vehicle mass and vehicle dynamics).

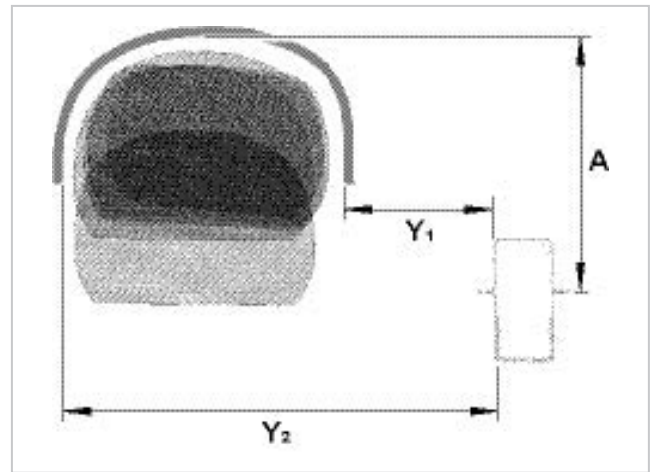
For this reason, modifications to the wheel wells are generally prohibited for closed model designations.

A modification may be possible in exceptional cases, but this requires prior consultation through www.upfitterportal.com

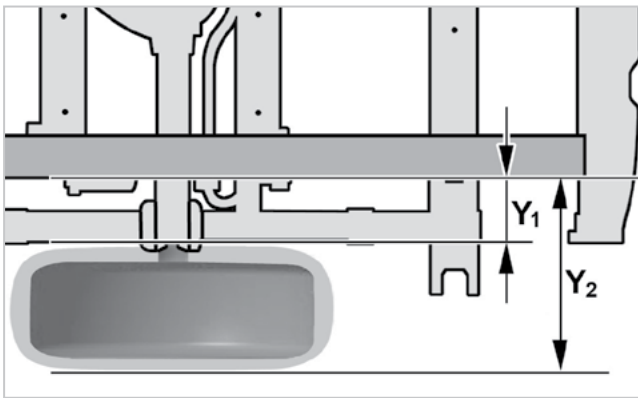
4.3.4 Lower wheel well on rear axle for open model designations



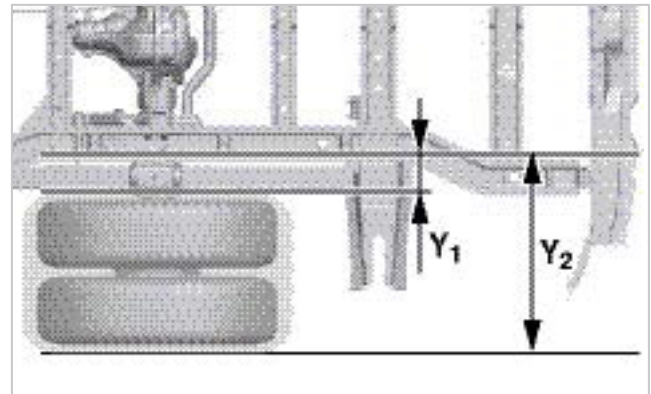
Limit values for chassis wheel wells



Minimum clearance A of the wheel well to the flange between the upper and lower flanges of the longitudinal frame member



The diagram below shows the reference edges for the dimensions Y_1 and Y_2 on vehicles with a tapering frame section (twin tires).



5 t vehicle frame with taper

Limit values/minimum distance between wheel well/fender and vehicle frame

Permissible gross combination mass [t]	Tires	Dimensions [mm]				
		X_1	X_2	Y_1	$Y_2^{2)}$	$A^{3)}$
4.6–5.0 ¹⁾	2 × 195/75 R16 C	405	405	120	630	240
	2 × 205/75 R16 C	410	410	115	635	250
5.0 (all-wheel drive) ¹⁾	2 × 205/75 R16 C	410	410	115	638	190
5.2–5.5 ¹⁾	2 × 205/75 R16 C	410	410	115	635	250

- 1) On vehicles with twin tires, the inside of the inner wheel has been used for Y_1 and the outside of the outer wheel for Y_2 .
- 2) With maximum wheel arch liner to wheel center
- 3) Minimum distance from frame flange to wheel well contour

4 Technical limit values for planning

The minimum distance A of the wheel well is measured from the flange between the upper and lower flanges of the longitudinal frame member up to the lowest point of the wheel well contour.

The dimensions Y_1 and Y_2 are measured from the outer surface at the longitudinal frame member.

Observe the following for dimension A with the following special equipment:

- Omission of vehicle lowering – code CW2: Dimension A is unaffected.
- Raised body for special applications – code CE8: Dimension A can be reduced by 35 mm.

i Observe the additional specifications for modifications to the wheel wells in Chapter 6.2.7 Fenders and wheel wells (→ page 125).

For more information on tires, see 4.2.3 Approved tire sizes (→ page 74).

4.3.5 Vehicle overhang

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

Maximum overhang lengths

Wheelbase I [mm]	Overhang length X [mm]
3665	1850
4325	2200 ¹⁾ /2421 ²⁾

- 1) Overhang length up to 2200 mm: Driving operation with trailer load is permissible. Observe the following specifications on the permissible trailer loads if the trailer coupling point has been relocated.
- 2) Overhang length over 2200 up to max. 2421 mm: Driving operation is only permissible without trailer load. Ensure that the Trailer Stability Assist (TSA) function with O-code O19 is deactivated and "coded out". In the case of camper vans (with code X2R) based on FHS/FHL or wheelbase extensions in combination with code O03, TSA is automatically deactivated by the system. Also observe the further information and specifications on the overhang extension in Chapter 8.10 Parameterizable Special Module (PSM/ MPM) (→ page 345) and on the Crosswind Assist in Chapter 8.9.2 Crosswind Assist (→ page 298).

Special rules for camper vans

The following table of maximum possible overhang lengths for camper vans applies only in combination with code X2R (Mandatory for camper van conversion by upfitter).

The reference dimension for the maximum possible overhang length ranges from the wheel center on the rear axle to the planar rear panel of the camper van body. Protruding component parts such as trailer couplings or bumpers are not taken into account.

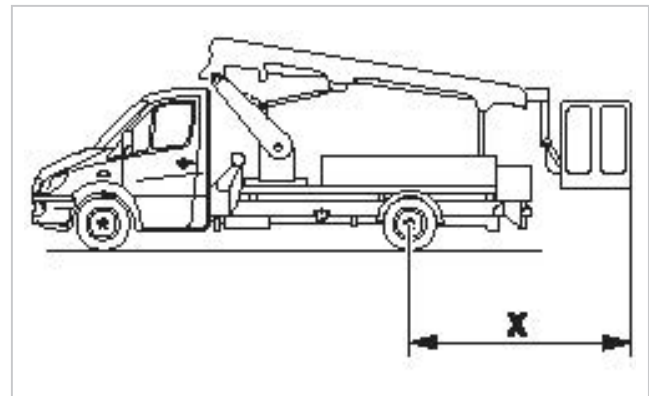
Maximum overhang lengths for code X2R

Wheelbase [in] [mm]	Overhang Y [in] [mm]
144.3 3665 (code IR4)	86.6 2200
170.2 4325 (code IR6)	102.3 2600

- 1) Wheelbase extension only in combination with O-code O03

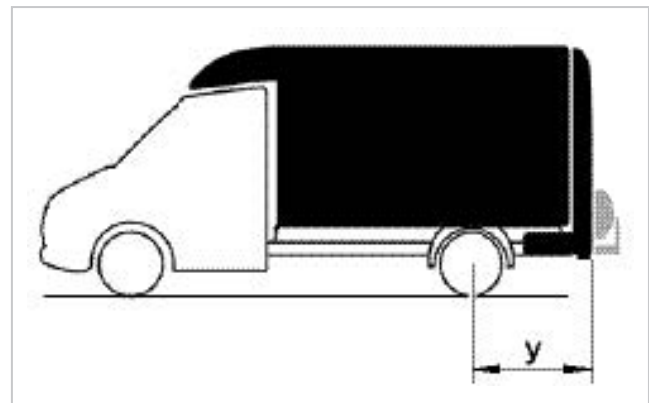
Camper vans may have a maximum overhang of 60% of the wheelbase, up to a maximum of 102.3 in | 2600 mm.

- i** Observe the further information and specifications on the overhang extension in Chapter 8.10 Parameterizable Special Module (PSM/ MPM) (→ page 345) and on the Crosswind Assist in Chapter 8.9.2 Crosswind Assist (→ page 298).



Max. overhang length (example of elevating work platform)

X Vehicle overhang



Maximum overhang length for camper vans up to the planar rear panel without protruding component parts

Y Vehicle overhang

Permissible trailer loads when relocating the trailer coupling point

Permissible gross mass [t]	Wheelbase [in] [mm]	Relocation of trailer coupling point from standard configuration [mm]				
		0-200 mm 0-8 in	201-500 mm 8-20 in	501-600 mm 20-24 in	601-700 mm 24-28 in	> 700 mm > 28 in
1500, 2500	144 3665	3500 kg 7720 lbs	3000 kg* 6610 lbs	2500 kg* 5510 lbs	2000 kg* 4410 lbs	* + *
	170 4325	3500 kg 7720 lbs	3000 kg* 6610 lbs	2500 kg* 5510 lbs	2000 kg* 4410 lbs	* + *
3500, 3500XD, 4500	144 3665	3500 kg 7720 lbs	3500 kg* 6610 lbs	3000 kg* 6610 lbs	2500 kg* 5510 lbs	* + *
	170 4325	3500 kg 7720 lbs	3500 kg* 6610 lbs	3000 kg* 6610 lbs	2500 kg* 5510 lbs	* + *

* If the trailer coupling point is relocated by > 200 mm/8 in in relation to the standard configuration, the Trailer Stability Assist (TSA) must be deactivated through the use of code O19.

** If the relocation of the trailer coupling point from the standard configuration is > 700 mm/28 in, we recommend seeking the advice of the relevant department 1.7 Contact (→ page 17).

4.3.6 Attachment to the frame

- Implement the attachment to the frame as per Chapter 6.2.2 Attachment to the frame (→ page 115) and Chapter 7.1.4 Attachment to the chassis bed (→ page 191).
- At minimum, all the factory-fitted body consoles must be used to fasten bodies to the vehicle frame (→ page 191). These permissible body mounting points are located only on the longitudinal frame members and may be supplemented as required by additional mounting supports on the longitudinal frame members.
- The body must be secured using two screws for each mounting support.

4.3.7 Modifications to the wheelbase for non-specified body lengths

- Do not make modifications to the wheelbase.

4.3.8 Roof/roof load

Maximum roof loads

Cargo van LH1	High roof cargo van LH2 (static)	High roof cargo van LH2 (dynamic)	Cab
300 kg/661 lbs	300 kg/ 661 lbs	150 kg/331 lbs	100 kg/220 lbs

For panel vans with a standard roof (code LH1) and high roof (code LH2), the maximum permissible static roof load is 300 kg, assuming the vehicle is parked on level, horizontal ground. Example: Camper van with pop up roof which is occupied.

For panel vans with a high roof (code LH2), the maximum permissible dynamic roof load is 150 kg. Example: Camper van with pop up roof which is not occupied (while driving).

For Cab Chassis the maximum permissible dynamic roof load is 150 kg.

The information in the table applies with use of the mounting rails available ex factory for roof luggage racks (C rails, code D13) in combination with a carrier system designed for the roof load and with an even load distribution across the entire roof area.

The upfitter must factor in the weight of the carrier systems itself and subtract it from the maximum permissible roof load.

Roof bows or structural parts must not be removed or damaged without being replaced.

If a roof bow must be removed to allow for the installation of a roof hatch or emergency exit, the Upfitter must install a reinforcing frame to compensate for the removed roof bow and structural components.

! NOTE

In case of modifying the roof structure, the Upfitter might have to re-certify applicable FMVSS/CMVSS.

Please also refer to chapter 6.2.10 Cargo Van/ Passenger Van roof (→ page 126) and (→ page 127)

The connection between the roof bow and the side wall must be of sufficient bending resistance (→ page 121).

Wheelbase	Quantity required
3665 mm/144 in	≥ 5 bows
4325 mm/170 in	≥ 6 bows

Roof bows	Position
1	Behind the front doors (B-pillar)
2	At the center of the sliding door to the load compartment (between the B- and C-pillars)
3	At the center of the vehicle behind the load compartment sliding door (C-pillar)
4-6	Between the C-pillar and the rear area of the vehicle (rear pillar)

Roof height increase	Moment of inertia I_x per roof bow
≤ 250 mm/10 in	≥ 40 000 mm ⁴ /0.096 in ⁴
≤ 400 mm/16 in	≥ 65 000 mm ⁴ /0.156 in ⁴
≤ 550 mm/22 in	≥ 86 000 mm ⁴ /0.201 in ⁴

For modifications to the projected side surface area, refer to 8.9.2 Crosswind Assist (CWA) 8.9.2 Crosswind Assist (→ page 298) for modifications to the projected lateral face.

- Observe the additional specifications on modifications to the roof in 6.2.11 Panel van and crewbus roof (→ page 134) and on attachments to the roofs in 6.6.3 Roof luggage racks (→ page 167)

4.4 Limit values for engine peripherals and drivetrain

- ❗ Vehicles with engines OM651 and OM642 are no longer available ex factory. For this reason, this information is no longer included in the present Body and Equipment Guideline. If required, you can find corresponding information and specifications in previous Body and Equipment Guideline in which the engines are still included. These are still available in the Body and Equipment Guideline in the Upfitter Portal.

4.4.1 Fuel System

For modifications to the fuel system, observe the specifications in Chapter 6.3.1 Fuel system (→ page 136)).

4.4.2 Modifications to engine/drivetrain components

Modifications to the engine timing/performance enhancement

! NOTE

Any interference in the engine timing by customers and upfitters is not permitted.

Manipulations or modifications to the engine timing cause changes in the certified engine data and emission values, and thus result in the immediate invalidation of the operating permit.

Modifications to the engine and drivetrain

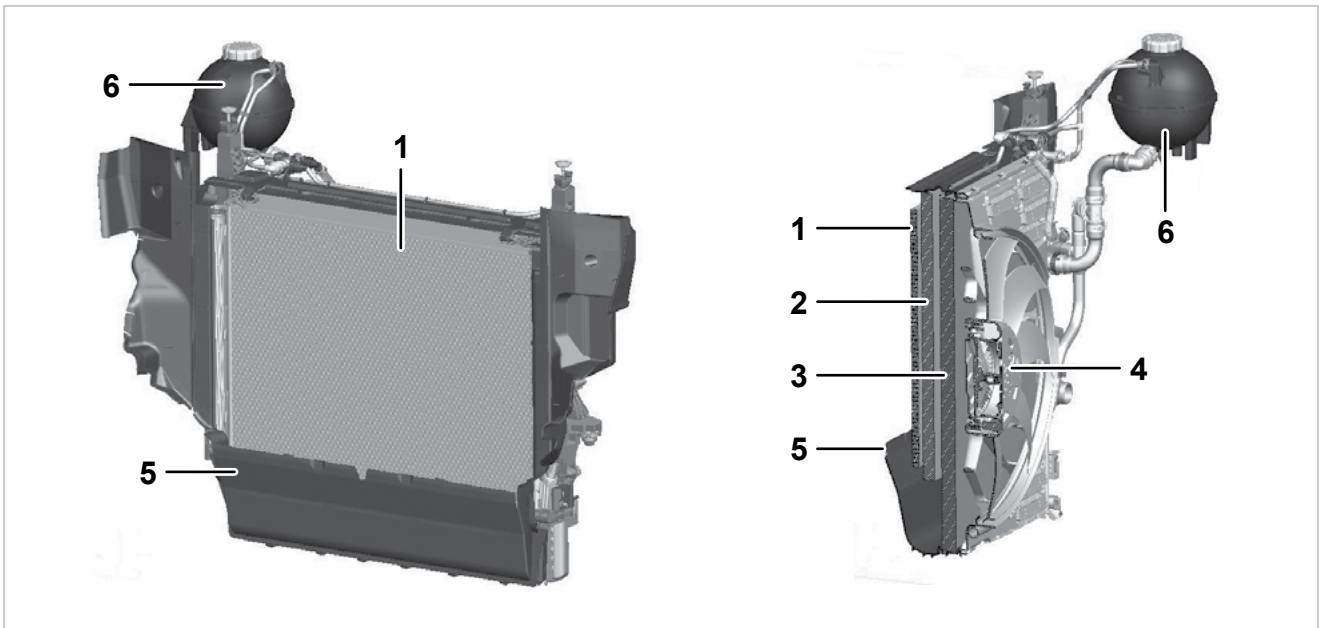
- Do not make modifications to the intake air system, See Chapter 6.3.5 Engine air intake (→ page 145)
- As a general rule, do not make modifications to the propeller shafts, If modifications (e.g. different lengths) are necessary, have these carried out by a company qualified in propeller shaft engineering. This company shall be responsible for the effects on the vehicle (e.g. NVH behavior, durability, package). When modifications are made, the fastening elements must not be reused.
- It is not possible to retrofit any engine speed regulation equipment, other than that which is available as special equipment
- Do not make modifications to the exhaust system, especially in the vicinity of exhaust gas aftertreatment components (diesel particulate filter, catalytic converter, lambda sensor etc.), See Chapter 6.3.3 Exhaust system (→ page 142) .

4.4.3 Engine cooling

The cooling module for the engine OM654 is shown in the following figure.

The cooler components A/C condenser, low-temperature cooler (LT cooler), high-temperature cooler (HT cooler) and electric E suction-type fan are arranged in succession. The new water-cooled charge air cooler and the transmission oil cooler (with automatic transmission) are positioned on the engine and the LT cooler supplies them.

To prevent any return flow of heated recirculated air from the engine compartment, the cooling module with air recirculation partitions or air ducting are sealed off all the way round (for details, see description below).



Cooling module for engine OM654

- 1 A/C condenser
- 2 LT cooler
- 3 HT cooler
- 4 E suction-type fan
- 5 Air recirculation partitions (exemplary, circumferential installation)
- 6 Coolant expansion reservoir

Do not make modifications to the cooling system (cooler components, air ducting, hoses, and other detachable parts that are part of the cooling system).

Modifications to the front of the vehicle can fundamentally be made under the following boundary conditions.

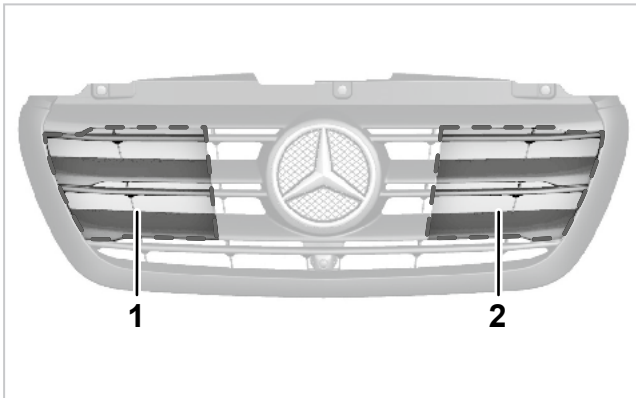
The free cross-sectional area of the cooling air intake opening (as the sum of the top front grille and bottom bumper grate, see figure "Cooling air intake openings at front of vehicle" (→ page 84)) , is defined by the technical design. It is essential to comply with the following limit values:

- Minimum: 18.2 dm² / 282 in²
- Maximum: 26.4 dm² / 409 in²

4 Technical limit values for planning

Mercedes-Benz genuine van vehicle front

For vehicles with a Mercedes-Benz genuine vehicle front, detachable parts (horn, front flasher or similar) can be mounted in areas 1 and 2 of the front grille:



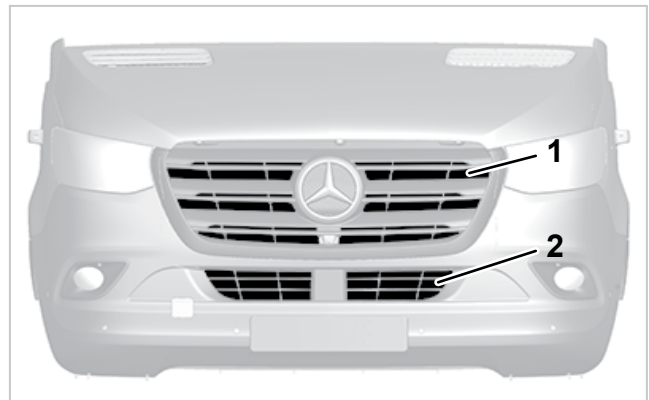
Front grille of genuine Mercedes-Benz Van vehicle front

1/2 Areas in which detachable parts can be mounted (schematic diagram)

If detachable parts are to be placed outside areas 1 and 2 in the front grille, verify the resulting cooling output using the test cycle specified at the end of this chapter.

If the free cooling air intake openings are reduced in size, the cooling output of the air conditioning system is lowered and – depending on the given operating status – the duration and intensity of fan operation is increased.

Do not cover the lower opening area in the bumper grate (see figure).



Cooling air intake openings at front of vehicle

- 1 Front grille
- 2 Bumper grille

Upfitter-specific vehicle front

For vehicle bodies on which the upfitter does not use the genuine Mercedes-Benz Van front end provided ex factory, but integrates a upfitter-specific vehicle front instead (e.g. on fully-integrated camper vans, buses, etc. based on a cab base vehicle, code F50), verify the cooling output of the new vehicle front using the test cycle specified at the end of this chapter.

The upfitter must ensure that the previous mentioned limit values for the free cross-section area of the cooling air intake opening for the basic vehicle are complied with.

To this end, when calculating the free cross-section area of a the upfitter-specific vehicle front, take into account the open air intake area projected in the direction of travel within the effective radiator area at 100% and outside of this at 50%.

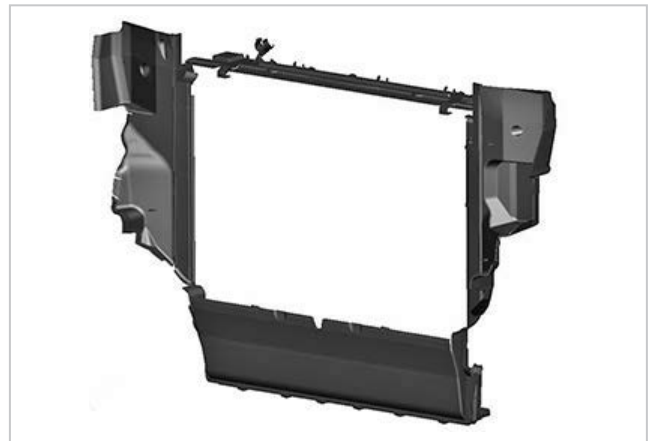
If the free cooling air intake openings are reduced in size, the cooling output of the air conditioning system is lowered and – depending on the given operating status – the duration and intensity of fan operation is increased.

Also observe the following:

- The cooling air intake openings on the vehicle front must be mounted in the immediate airflow surface of the cooler components.
- Additionally, position and design the cooling air intake openings directly in front of the cooling module at the vehicle front so that the cooling air intake is as effective as that of the genuine Mercedes-Benz Van standard component part. The cooler outlet air temperature must not exceed the limit value during the test cycle specified in this chapter.

The complete cooling module must be sealed off against any heated recirculated air from the engine compartment resulting from return flow. In other words, the standard air ducting installed on the cooling module (see figure) toward the upfitter-specific vehicle front must be hermetically sealed off by correspondingly shaped component parts. Design all air ducting so that the engine compartment is completely sealed off between the new vehicle front and the cooling module. The temperature resistance of the materials used must enable component part surfaces to be heated up to a temperature of at least 100 °C.

The upfitter alone shall bear full responsibility for the design of the air ducting component parts, including material selection, its professional implementation in the vehicle and testing under customer service conditions.



Air ducting on cooling module for engine OM654

4 Technical limit values for planning

Test cycle for thermal validation of cooling air intake in engine OM654

Before starting testing, comply with and verify the following boundary conditions using the corresponding measurement technology:

- The vehicle has been pre-conditioned and is at operating temperature, i.e.
 - Coolant temperature 194° F (90° C)
 - Engine oil 203° F (95° C)
 - Transmission oil between 194° F (90° C) and 212° F (100° C)
- Outside air temperature 86° F (30° C)
- Interior pre-conditioned to outside temperature through opening of windows, which then remain open during the tests.
- Air conditioning system with lowest specified value temperature (cooling) is activated and, on a manual air conditioning system, the maximum blower setting is set: These settings are not to be altered during the tests.

The load request and driving profile during the test are as follows:

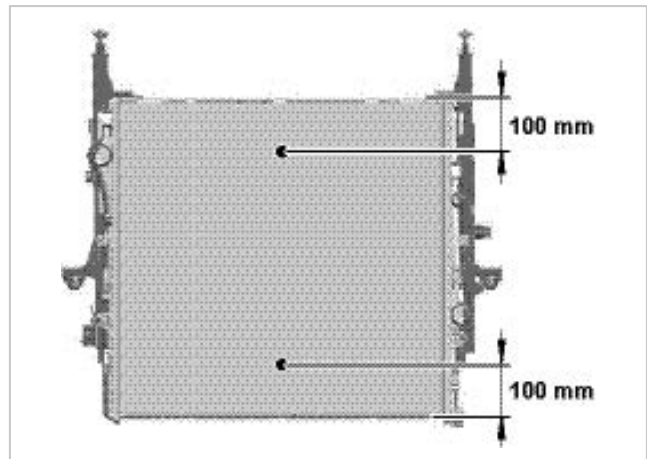
- Permissible gross combination mass (permissible gross mass + maximum trailer load)
- Uphill driving with 10% gradient
- Constant speed of 22 mph (35 km/h) 2nd gear over a distance of 10 miles (15 km)

The test criterion for sufficient cooling efficiency is as follows:

- The cooler outlet air temperature downstream of the HT cooler must not exceed 230° F (110° C) during the entire driving period. Verify this using corresponding temperature measurements.

Observe the following when positioning the measuring points for measuring the cooler outlet air temperature at the coolant radiator:

- Apply the temperature sensors so that they are each located in the middle of the HT cooler at a vertical distance of 3.9 in (100 mm) from the upper and lower edge (see figure). The measuring beads of the temperature sensors must be located at a horizontal distance of 0.039 in (10 mm) to the rear cooler surface.



Positioning of temperature sensors

4.5 Limit values for the interior

NOTE

The information and specifications in Chapter 6.4.1 General information (→ page 147), 6.4.2 Safety equipment (→ page 148) and 6.4.3 Seats (→ page 157) must absolutely be observed.

4.5.1 Modifications in the area of the restraint systems

WARNING

Modifications to or work incorrectly carried out on restraint systems (seat belt and seat belt anchoring points, seat belt tensioners or airbags) or their sensor systems or wiring could cause the restraint systems to stop functioning correctly. This means, for example, that airbags or seat belt tensioners may be activated inadvertently or may fail in the event of an accident, even though the rate of deceleration exceeds the deployment threshold.

There is danger to life and limb!

Do not make modifications to restraint systems.

- Do not make modifications to airbag components and sensors or in the vicinity of them.
- Do not make subsequent modifications to the headliner or its fastenings if the vehicle is equipped with window airbags.
- Design the vehicle interior in such a way that airbags can fully deploy without impediment.
- Do not make modifications in the vicinity of the airbag control unit.

4.5.2 Modifications to seats

WARNING

Only seat combinations that match as-delivered state are permitted. It is not permissible to rotate seats or to create conditions which do not match the series production state.

Modifications to the seat system, particularly in the case of seats with a seat occupancy sensor, or the mounting of seats to the wheel well are not permitted. Otherwise the seats could become detached from their anchorages in the event of an accident.

Furthermore, the functioning of safety-relevant driver assistance systems cannot be guaranteed. (See 8 Electrics/electronics (→ page 256))

Seat covers and protective covers could interfere with the functioning of the thorax/pelvis side airbag and the seat occupancy recognition system.

There is danger to life and limb!

Seat Covers

- Seats with integrated thorax-pelvis-airbags feature security seam with the flag "Airbag".
- Modifications to the seat or seat cover requires compliance with applicable technical and regulatory requirements.
- Aftermarket seat covers may affect the performance of the thorax-pelvis-airbag.



N91.60-2212-00

Front Seat with integrated Thorax-Pelvis-Airbag

More information can be found under "Modifications to the basic vehicle" (→ page 157) and "Modifications to the interior" (→ page 198).

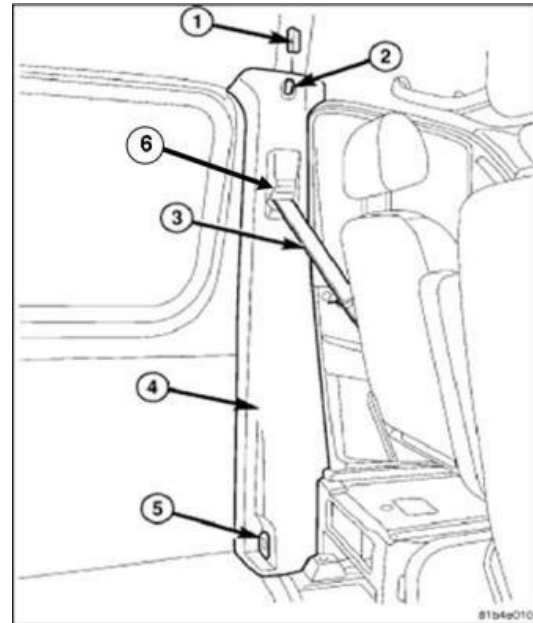
If modifications/alterations to the seats are necessary, refer to 1.7 Contact (→ page 17).

If a rear bench seat with 2 or 3-point seat belts deviates from the standard seat design, it must comply with the requirements from Chapters 6.4.1 General information (→ page 147), 6.4.2 Safety equipment (→ page 148) and 6.4.3 Seats (→ page 157).

If a rear bench seat with 2 or 3-point seat belts deviates from the standard seat design, it must comply with the requirements concerning "Anchoring of seat belts".

Any retrofitted rear bench seat with two- or three-point seat belts must comply with the FMVSS/CMVSS 210.

B-Pillar cover removal and reinstallation



N91.60-2213-00

Image outlining the B pillar cover

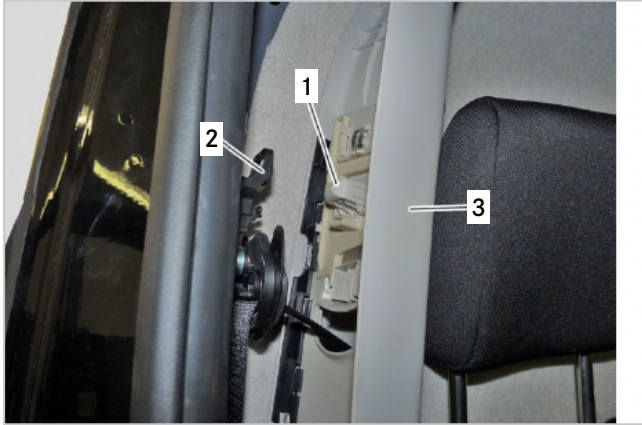
- 1 Trim coat hook
- 2 Coat hook
- 3 Seat belt
- 4 Trim B-pillar
- 5 Cargo tie-down
- 6 Seat belt height adjustment mechanism

Removal of B-Pillar Cover

- ▶ Pull coat hook trim (1) upwards and remove coat hook (2).
- ▶ Remove the cargo tie down (5) or cover.
- ▶ Remove the seat belt (3) from the seat (if needed).
- ▶ Remove the assist handle covers and remove the screws (optional equipment). Remove the assist handle from the passenger side B-pillar.
- ▶ Pull the trim (4) on the B-pillar out of clip connections starting at top and remove downward.
- ▶ Remove the seat belt (3) from the trim (4) (if needed).

Reinstallation of B-Pillar Cover

- ▶ Pull the seat belt through the B-pillar cover.
- ▶ **IMPORTANT:** Slide adjustment part of B-pillar (3) cover to top position before reinstallation. Insert the actuator (1) into the seat belt height adjuster (2). Make sure that the door rubber seals are seated correctly.



N91.60-2214-00

Correct Alignment of B pillar cover

- ▶ Install the trim onto B-pillar and seat clips starting from bottom moving upwards. Install the seat belt to the seat. Install the cargo tie down or cover. Install the coat hook and seat trim fully. Bolt the end fitting to seat. Please refer to WIS or contact the local dealership for the most accurate torque values.
- ▶ Check seat belt and its height adjustment for proper functionality otherwise check step 2 again.

! NOTE

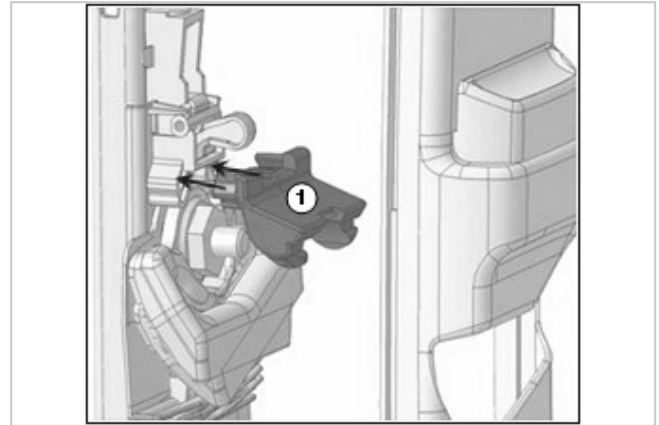
If the seat is removed and reinstalled, please make sure that the seat is torqued to the correct value. The torque value is found on WIS or the local dealership.

Dampening Device on Height Adjustment (Partition Wall Only)

Sprinter Cargo Vans with partition walls (D50, D51, D53, D93 and D64) come with a (1) dampening device (left and right side) on top of the height adjustment mechanism. Make sure dampening device is fitted properly into height adjustment before reassembly.

! NOTE

Dampening devices are not used on Sprinter Cab Chassis and Passenger Vans.



N91.60-2215-00

Left: Dampening Device Interior, Right: B-Pillar Cover Exterior

4.5.3 Seat Reference Point

The rear most Seat Reference Point of the front seats has the following coordinates:

X = 1111 mm/ 43.74 in

Z = 530 mm/ 20.87 in

4.6 Limit values for electrics and electronics

See Chapter 8 Electrics/electronics (→ page 256).

4.6.1 Vehicle position lamps and side marker lamps

Vehicle marker and clearance lamps are required by law on all vehicles with total width of 2032 mm/80 inch and above according to FMVSS/CMVSS standards.

4.6.2 Retrofitting of electrical devices

All electrical equipment fitted must be tested in accordance with FCC, CE and UL in the US, and with CSA and ULC in Canada.

! NOTE

In isolated cases there may be some inconveniences.

4.6.3 Mobile communications systems

The maximum transmission output (PEAK) at the base of the antenna must not exceed the values from the local and federal laws on the maximum transmission output.

4.6.4 CAN bus

On no account should modifications be made to the CAN bus or the components connected to it.

The parameterizable special module (PSM/ MPM, code ED5) can be used to access individual types of data available on the CAN bus (→ page 345).

4.7 Limit values for additional assemblies

Observe the following if additional assemblies (e.g. additional refrigerant compressors, pumps, etc.) are retrofitted:

- The operation of vehicle components must not be adversely affected.
- The freedom of movement of vehicle parts must be guaranteed in all driving situations.

4.8 Limit values for attachments

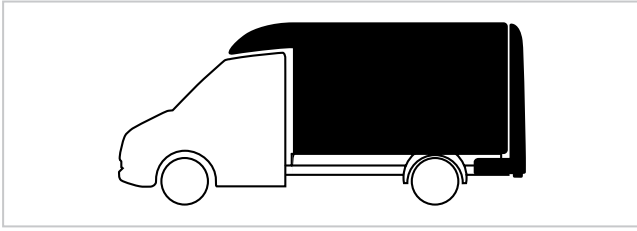
- An underride guard is necessary when:
 - the distance between the rear of the vehicle and the rear axle is more than 39 in (1000 mm).
 - with the vehicle in its unladen condition, the distance between the roadway and the chassis or main parts of the body is greater than 21 in (550 mm) across the entire width of the vehicle.
- The maximum permissible lifting load of a lifting platform is 1102 lbs (500 kg) lbs on a cargo van 2205 lbs (1000 kg) on chassis. Attachment as per section 6.6.6 Lifting platform (cargo liftgate) (→ page 177) is essential.

Attachments on the rear frame section

On open and closed model designations from model series 907, the vehicle comes as standard with reinforcements on the vehicle frame for mounting attachments in the rear longitudinal frame member on the left or right.

If you do not wish to have the reinforcements on account of a higher payload, they can be deselected with code QW1 on closed model designations, depending on the equipment installed on the vehicle. Code QW1 is not available for open model designations.

4.9 Limit values for the body



Body

See Chapter 7 Design of bodies (→ page 188) for more information.

! NOTE

The standard fuel filler cap must not be removed or covered with any "blocking" parts, see Chapter 6.2.5 Modifications to the cab (→ page 120).

! NOTE

The minimum distance between the cab and a separate body must be > 2 in (50 mm)

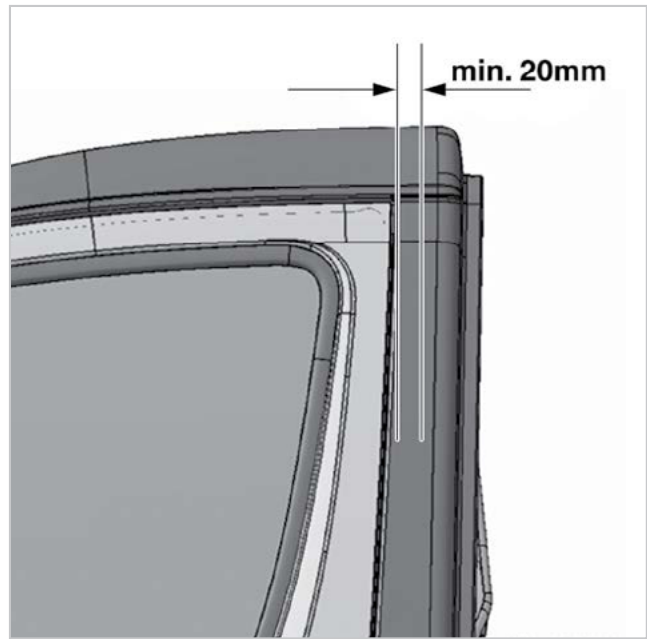
! NOTE

The minimum distance between the rear edge of the door and an integrated body must be > 0.8 in (20 mm). Otherwise, the rear edge of the door may come into contact with the body in the event of an accident, and in extreme cases the door may be jammed.

⚠ WARNING

Do not attach side bars to the outside of the underbody. In the event of an accident (e.g. a side crash), these could bend upwards and block the door. This could mean that the rescue services are not able to open the door and could make recovery of the occupants more difficult.

There is danger to life and limb!



Minimum distance between rear edge of door and integrated body

4.9.1 Assembly frame

Minimum section modulus required for assembly frame W_x^1

Version	Platform/ box body ²	Dumper/ lifting work platform	Loading crane
All weight variants	17 cm ³ / 1.04 in ³	30 cm ³ / 1.83 in ³	40 cm ³ / 2.44 in ³

¹ The minimum section modulus required for assembly frames applies for the material properties specified in the table below, and each individual longitudinal member of the assembly frame must have this section modulus.

² Up to the maximum standard wheelbase; above that: +10%.

i Observe any differing specifications which may apply, see 7.5 Platform bodies (→ page 206) and 7.9 Dump trucks (→ page 210).

Material quality of specified assembly frames made of steel

Material	Yield strength	Tensile strength
CR240LA	260-340 N/mm ² 37700-49300 psi	≥ 240 N/mm ² ≥ 34800 psi
S235JRG2	≥ 235 N/mm ² ≥ 34075 psi	340-510 N/mm ² 49300-73950 psi

General**⚠ WARNING**

Tampering with or unauthorized installations in vehicle systems, safety-relevant components and driver assistance systems can impair the functioning of these systems. This may lead to the failure or malfunctioning of components or safety-relevant component parts.

There is risk of an accident and danger to life and limb!

Always have work on vehicle systems, safety-relevant components and driver assistance systems performed at a qualified workshop.

- ⓘ Tampering with the vehicle, safety or driver assistance systems and safety-relevant components can invalidate the warranty or the operating permit.

5.1 Brake hoses/cables and lines

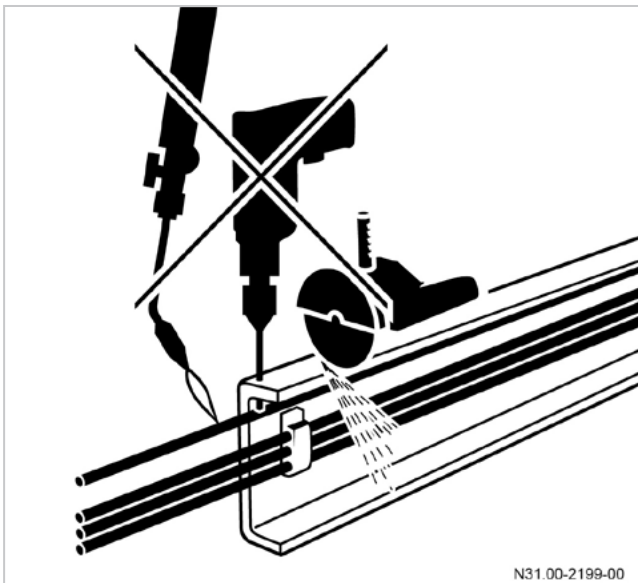
! NOTE

Observe accident prevention regulations when working on the vehicle.

! NOTE

Observe all national laws, directives and regulations.

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



After installing compressed-air lines or hydraulic lines, check/test each of the systems for chafe marks, pressure loss, and leak tightness.

No other lines may be attached to brake hoses and brake lines.

No other lines may be attached to brake lines, other than those installed as standard.

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 safety-relevant component parts.

There is risk of an accident and danger to life and limb!

Have all work on brake hoses and cables carried out at a qualified specialist workshop.

5.2 Welding work

⚠ WARNING

Welding in the vicinity of the restraint systems (airbags, airbag sensors, airbag control unit, or seat belt components) can cause these systems to no longer function correctly.

If restraint systems no longer function correctly, the occupants may be unprotected in the event of an accident. There is a risk of accident, personal injuries and death if such restraint systems no longer function correctly!

Welding is therefore not permitted in the vicinity of the restraint systems.

⚠ 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. There is a risk of accident, personal injuries and death if such work is carried out incorrectly!

Have welding work carried out by a qualified specialist workshop.

⚠ WARNING

If handled incorrectly, welding work can result in a fire. There is a risk of accident, personal injuries and death if such work is carried out incorrectly!

Always comply with the legal requirements when performing welding work.

For welding work, it is essential to observe the following:

Welding work may only be performed by trained personnel.

- Before performing welding work, remove any components that may contain flammable or explosive gases, e.g. the fuel system (→ page xx), or protect them from sparking with a fire-resistant covering.
- Before conducting any welding work in the area of the restraint systems, the component parts must be removed for the duration of the work. Important information about handling, transporting, and storing airbag units is available under 6.4 Interior (→ page 147).
- Before welding, cover springs and air suspension bellows to protect them from weld pearls. Do not touch springs with welding electrodes or electrode arms.

- Welding work is not permitted on major assemblies such as the engine, transmission, axles.
- Remove and cover up the positive and negative clamps of the batteries.
- Connect the ground clamp of the welder directly to the part to be welded. Do not connect the ground clamp to major assemblies such as the engine, transmission, or axles.
- Do not touch electronic component part housings (e.g. control units) and electric lines with the welding electrode or the ground clamp of the welder.
- Weld only with electrodes connected to the positive terminal of a direct current source. Always weld from bottom to top.
- The maximum current may be 40 A per mm of electrode diameter.
- Use only completely dry basic-coated electrodes (diameter 2.5 mm).
- Gas-shielded welding is permissible.
- Only use welding wires with a thickness of between 1 and 1.2 mm.
- The yield 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.
- Weld seams must be ground down and reinforced with angle sections to prevent notching from fusion penetration.
- Avoid weld seams in bending radii.
- There must be at least 15 mm between the weld seams and the outer edges.

i For further information on welding, see Chapter 3.9 Bolted and welded connections (→ page 51) and 6.2 Body in white/body (→ page 110) as well as the Mercedes-Benz Workshop Information System (WIS).

5.3 Anti-corrosion protection measures

After upfit has been performed on the vehicle, surface and anticorrosion protection measures must be carried out on the affected areas.

! NOTE

Only preservation agents tested and approved by Mercedes-Benz may be used for any anti-corrosion protection measures performed.

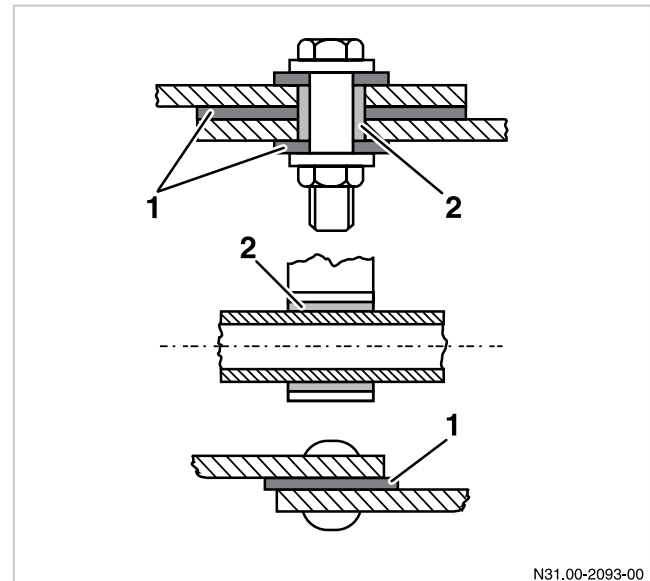
Planning measures

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

i A galvanic 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 component parts 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.

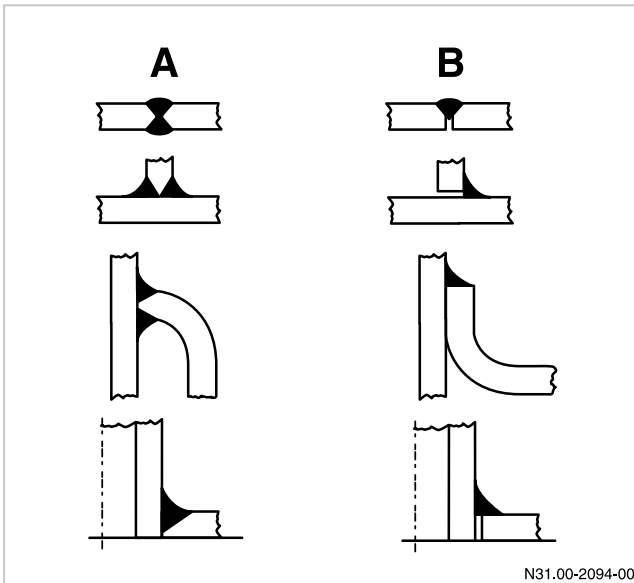
Measures implemented through the design of component parts

Design measures, in particular the design of joints between different materials or the same kind of materials, can help to prevent corrosion.

There is a risk of dirt or moisture accumulating in corners, edges, creases, and folds.

Design measures for counteracting corrosion can be implemented using inclined surfaces, drains, and by avoiding gaps in the joints between components.

Gaps inherent in the design of weld joints and how to avoid them



Examples of types of weld joints

- A Correct (through-welded)
- B Incorrect (gap)

Measures implemented through coatings

The vehicle is protected against corrosion by applying protective coatings (e.g. electroplating, painting, or zinc coating applied by flame) (→ page 98).

After all work on the vehicle

- Remove drill chips.
- Deburr edges.
- Remove any burnt paint and thoroughly prepare surfaces for painting.
- Prime and paint all unprotected parts.
- Preserve cavities with wax.
- Implement anticorrosion protection measures at the underbody and frame section.

5.4 Painting and preservation work

! NOTE

For drying the paint, the object temperature must be a maximum of 140 °F (60 °C) and the drying time must be a maximum of 30 min. At higher temperatures, the control units or other components may be damaged.

Painting or preservation damaged by the upfitter must be repaired by the upfitter.

- Please note with regard to this:
- Adhere to the Mercedes-Benz quality standards for initial painting and refinishing.
- Use only materials tested and approved by Mercedes-Benz or equivalent materials for performing any painting or preservation work.
- Comply with the layer thicknesses set at the factory for the individual paint coats.
- Paintwork compatibility must be guaranteed when over-coating.

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

Mask at least the following areas before painting:

- Disk brakes
- Brake hoses
- Transmission unit of the park brake
- Contact areas between disk wheels and wheel hubs
- Contact surfaces of wheel nuts/wheel bolts
- Brake fluid reservoir
- Breathers on transmissions, axles, etc.
- Sealing surfaces
- Windows
- Door locks
- Door catches in the hinges of the hinged rear door
- Door catches and opening limiters in the center guide rails
- Contact surfaces on the runner rails of sliding doors
- Moving parts of the sliding door carriage
- Airbags and seat belts

- Sensors of the Parking Packages (→ page 99)
- Active Brake Assist/Active Distance Assist (DISTRONIC-PLUS) (→ page 303)
- Blind Spot Assist sensors (→ page 307)
- Parking Package with 360° camera/Parking Package with reversing camera and sensors (→ page 327)

⚠ WARNING

Depending on the type and thickness, paints or films can cause attenuation of radar waves. This could lead to malfunction or failure of the system and may even cause the driver to lose control of the vehicle.

There is risk of an accident and danger to life and limb!

In repair cases, the existing coat of paint must be removed in such a way that the plastic cover is not damaged and the material thickness of the cover is not significantly reduced. The new paint coat structure must not exceed the following limits:

- A maximum of 2 color coats with a thickness of 15 µm plus 2 clearcoats may be applied.
- With metallic silver, only one coat with a thickness of 15 µm plus one coat in white 15 µm thick are permissible.
- The material thickness must be homogeneous in order to prevent distortion of the radar waves.
- Specified thickness for unpainted covers: 2.42 mm (0.095 in) front bumper/ 2.72 mm (0.107 in) rear bumper, each +/-0.1 mm (0.004 in), without paint
- Specified thickness for painted covers: 2.42 mm (0.095 in) front bumper/ 2.72 mm (0.107 in) rear bumper, each +0.1 mm/-0.2 mm (+0.004 in/ -0.008 in), without paint

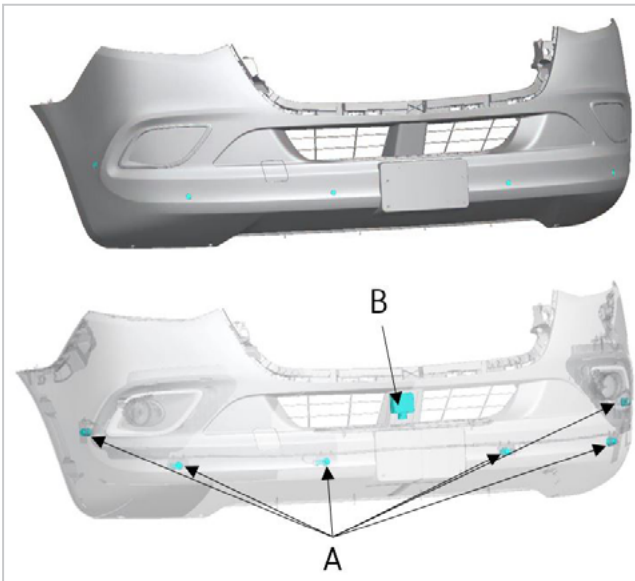
NOTE

For the subsequent painting of sensors, particular instructions in the relevant chapters on the sensors concerned must be observed.

- Active Brake Assist/Active Distance Assist (DISTRONIC PLUS) sensor (→ page 303)
- Blind Spot Assist/Rear Cross Traffic Alert (RCTA) sensors (→ page 307)
- Parking Package with 360° camera/ Parking Package with reversing camera and sensors (→ page 327)

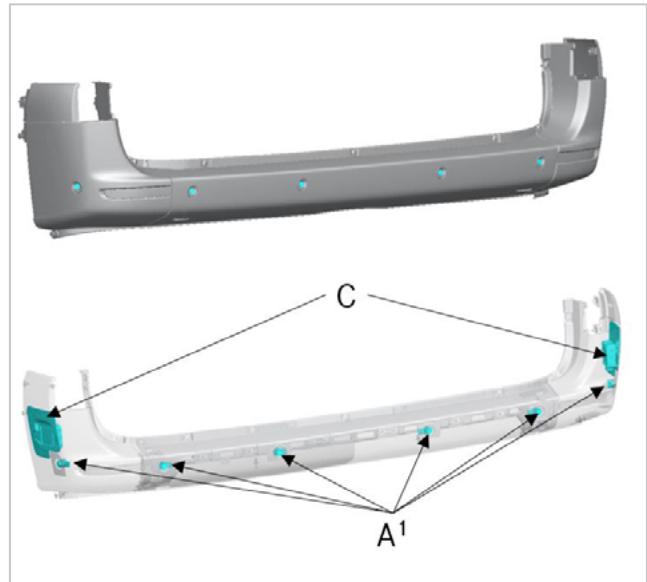
Sensors affected by paint

The “Parktronic”, “Collision Prevent Assist” and “Blind Spot Assist” sensors are located inside and behind the plastic bumpers of the vehicle. Modifications to the bumper exterior surface must comply with Mercedes-Benz standards. All integrated bumper sensors must be accounted for and considered when re-painting.



N88.20-2182-00

Front bumper sensors



N88.20-2183-00

Rear bumper sensors

¹ In case of a step at the rear bumper, the sensors of the Parking Package are located in the step

Legend

	Sensor	Front bumper	Rear bumper
A	Parking Package	6	6
B	Active Brake Assist/ Active Distance Assist	1	0
C	Blind Spot Assist	0	2

Among other things, radar sensors are sensitive to:

- the thickness of the paint layers
- the relative permittivity of the paint
- the amount of conductive materials in the paint (e.g. metals, graphite, etc.)

Available Codes:

- Code CM0: painted metallic front and rear bumper
- Code C72: bumper front/rear primed
- Code CM9: primed side moldings

Recommended paint brands:

- Mercedes-Benz paints only
- USA: Glasurit, R-M, Standox, Spies Hecker, PPG
- Canada: Glasurit, R-M, Standox

Thickness limitation for metallic paint:

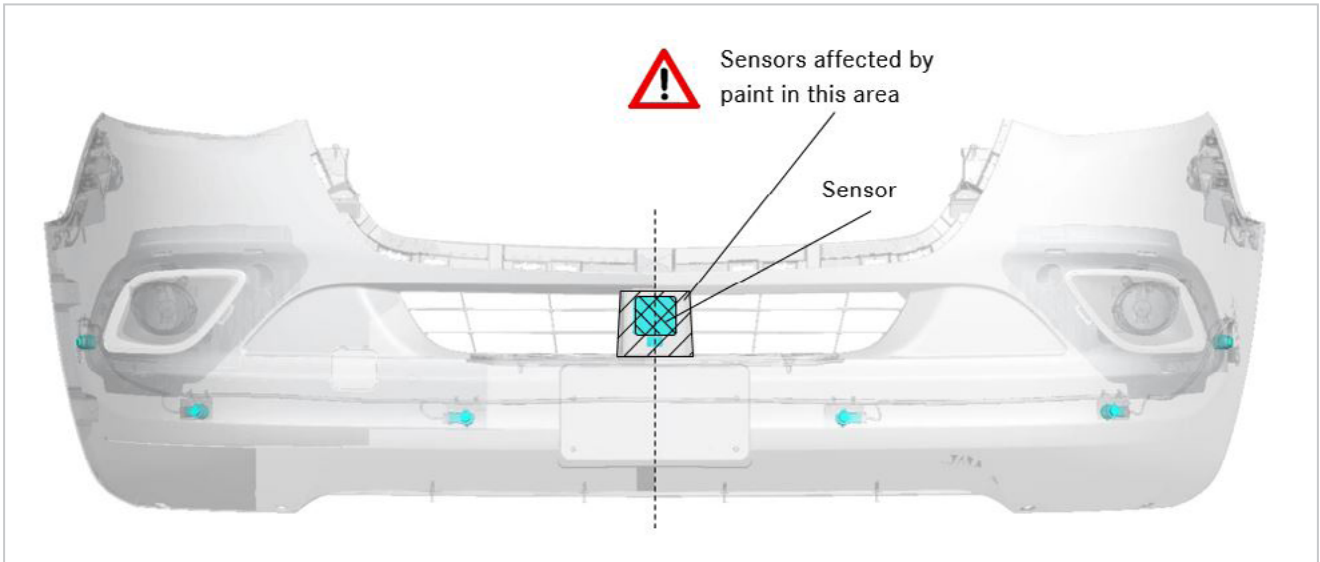
- max. 15 µm/5.9e-4 in of paint + 1 layer of clear coat

Thickness limitation non metallic paint:

- max. 15 µm/5.9e-4 in of paint + 2 layers of clear coat

5 Damage prevention

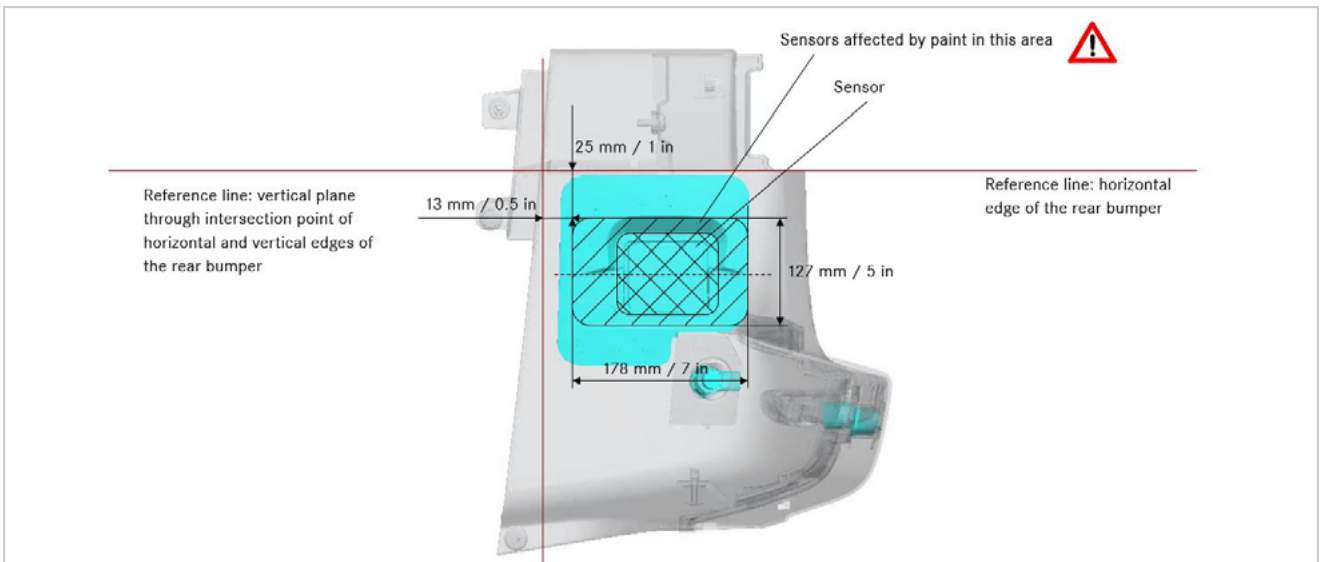
Locations of the sensor affecting areas on the front bumper:



N88.20-2184-00

Front view

Locations of the sensor affecting areas on the rear bumper:



N88.20-2185-00

Side view

5.5 Storing and handing over the vehicle

Storage

To prevent any damage while vehicles are in storage, Mercedes-Benz recommends that they be serviced and stored in accordance with the manufacturer's specifications (→ page 56).

Handover

To prevent damage to the vehicle or to repair any existing damage, Mercedes-Benz recommends that the vehicle be subjected to a full function check and a complete visual inspection before it is handed over.

6 Modifications to the basic vehicle

6.1 Suspension

6.1.1 General information on the suspension

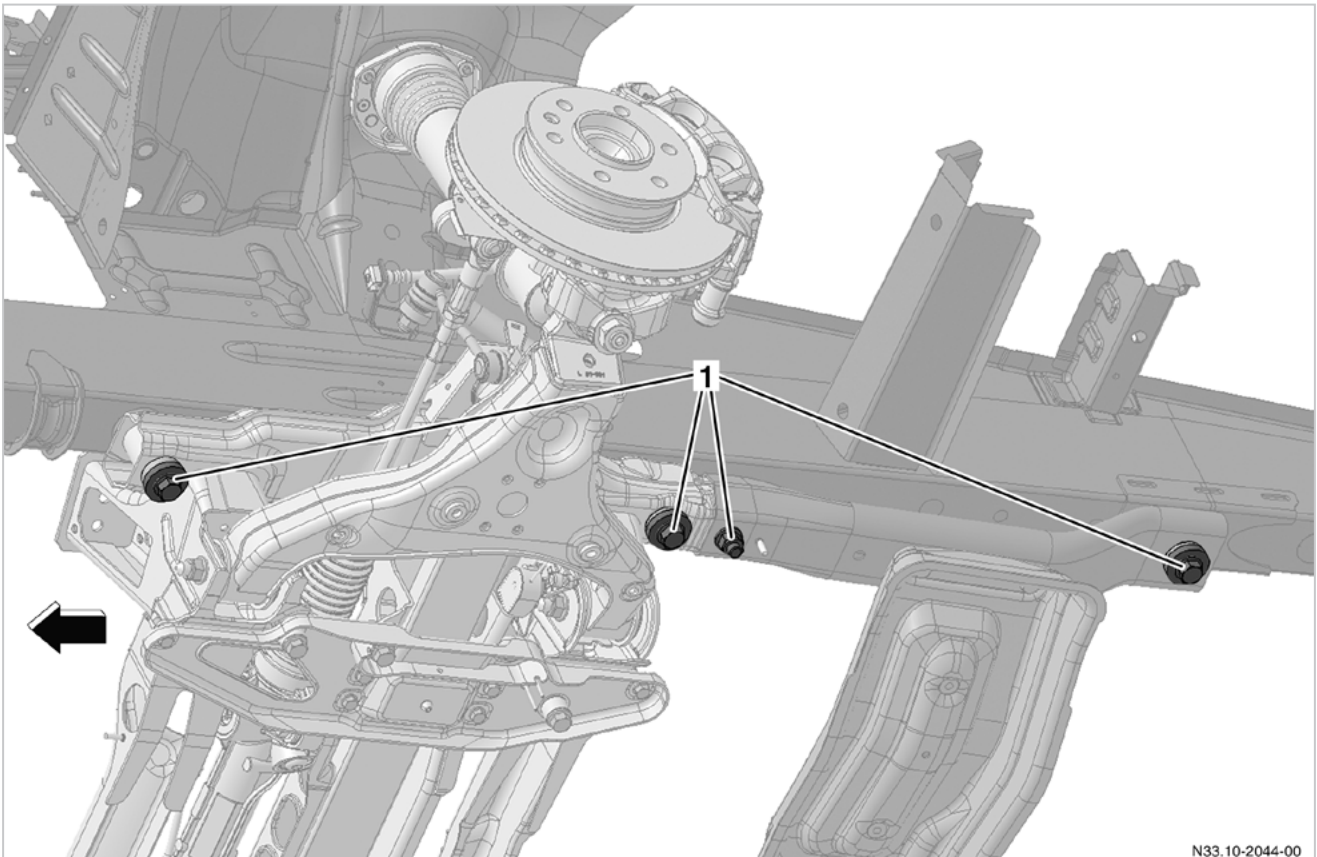
No additional detachable parts may be mounted to the bolted connection points on the front axle.

⚠ WARNING

Modifications to suspension system components can result in impaired and unstable vehicle handling characteristics. This could cause the driver to lose control of the vehicle.

There is risk of an accident and danger to life and limb!

For this reason, no modifications whatsoever may be made to components of the suspension system.




Front axle

1 Bolting points on the front axle

Arrow Direction of travel

In the front axle area, the following should be noted:

- Specifications for steering in Chapter 4.2.6 Modifications to the steering (→ page 75) must be complied with.
- Front transverse control arms: Changes to wheel alignment settings are not permitted.
- The front axle must not be changed in any way or used to mount additional assemblies and other modifications.
- Rigid rear axle: Modifications are not permitted.
- Brakes: Modifications are not permitted.
- Devices, sensors, line installation for ESP®/ABS: Modifications are not permitted.
- New bolts must be used when installing the front axle. All bolts and threaded connections are to be tightened in accordance with the Mercedes-Benz tightening instructions. Information on this is available from your Mercedes-Benz Service Center.
- VDI (The association of German Engineers) guideline 2862, in particular the section entitled "Threaded connections with special safety relevance", must be implemented for all installations.
- Any shortening of the free grip lengths, conversion to a stretch shank or the use of bolts with a shorter free thread cannot be approved.
- The settling properties of threaded connections must be taken into account.

 Information is available from any Mercedes-Benz Service Center.

Additionally clamped component parts must exhibit an identical or higher strength than the previous clamped assembly.

The use of Mercedes-Benz tightening torques assumes coefficients of friction for the bolts in the tolerance range [= 0.08-0.14].

We recommend the use of standard Mercedes-Benz parts.

Note the two different suspension variants for 3.5 t model designation, with which two different loading heights can be achieved. For the planned load capacity increase on these vehicles, please reach out via www.upfitterportal.com (→ page 17)

NOTE

In order to prevent tire wear, a change in the standard wheel alignment values (camber, toe-in) at the front axle can be economical in the case of vehicles with increased curb weight due to upfit or equipment.

The information under 3.5 Dimensions and weights (→ page 41) on the vehicle curb weight and corresponding axle loads before and after body mounting work, "Checking wheel alignment" under 3.11.3 Work before handing over the modified vehicle (→ page 58), 3.12 Special equipment (→ page 59) and under 8.4.9 Interface overview (→ page 273) must be complied with.

Examples of this are recovery vehicles, fire-fighting vehicles, ambulances, semi-trailer tractors, workshop vehicles or motorhomes. For a planned change in the standard wheel alignment values, consulting a Mercedes-Benz partner is recommended. Based on the exact axle load conditions of the complete vehicle, the Mercedes-Benz partner can determine the ideal camber and toe-in values based on the workshop documents stored in the Workshop Information System (WIS) (→ page 23).

The same applies to fully laden vehicles as it can be assumed that the maximum permissible axle loads are mainly marginally utilized here as well.

6.1.2 Springs/shock absorbers/stabilizer bars

General

Several suspension variants are available from ex factory. A suitable suspension variant must be selected depending on the planned body, see 4.2 Limit values for the suspension (→ page 72)

Modifications to springs, shock absorbers and stabilizer bars can only be made in the combinations specified by Mercedes-Benz on the front and rear axle. Any modifications over and above this must be evaluated by the relevant specialist department in each individual case. Please reach out to the Upfitter Portal for more information, refer to 1.7 Contact (→ page 17).

- Only Mercedes-Benz genuine springs must be used.
- Do not damage the surface or anti-corrosion protection of the spring leaves during installation work.
- Before carrying out welding work, springs must be covered to protect them against welding spatter.
- Do not touch springs with welding electrodes or welding tongs.
- For modifications to springs, shock absorbers and stabilizers as a part of the Mercedes-Benz approved combinations on the front and rear axle on vehicles with front radar sensor, code BA3/ET4 – for more detailed explanation see Chapter 8.9.3 Active Brake Assist/Active Distance Assist (DISTRONIC PLUS) (→ page 303) – where applicable, the installation height of the front radar sensor must be compared against and adapted to the value entered there, depending on the type of modification involved. A service calibration of the front radar sensor must also be performed, as this modification also causes the driving axis to change.

WARNING

Do not use springs and dampers if they do not correspond to the characteristics of series production parts or parts obtainable as special equipment. Otherwise, if the vehicle is fitted with ESP®, this system may no longer work correctly and could ultimately fail. This could cause the driver to lose control of the vehicle.

There is risk of an accident and danger to life and limb!

6.1.3 Brake system

WARNING

Work carried out incorrectly on the brake lines or brake hoses may impair their function. This may lead to the failure of components or safety-relevant component parts.

There is risk of an accident and danger to life and limb!

Work on brake lines or brake hoses may only be carried out by an authorized specialist workshop.

After completion of the work, check that the brake system is working correctly. We recommend that the brake system be inspected and approved by a technical inspection station.

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

Hydraulic brake system

- ▶ Hydraulic brake lines must be replaced without additional connecting points using Mercedes-Benz-approved double-walled wrapped tubes of 4.75 mm x 0.7 mm/0.19 in x 0.03 in or fully assembled brake lines with connecting parts (genuine Mercedes-Benz replacement parts).
- ▶ Brake lines between the master brake cylinder and the hydraulic assembly must not be modified.
- ▶ The bending radius must be >18 mm/0.71 in.
- ▶ Lines must only be shaped in a bending machine. The cross-section must not be reduced.
- ▶ Attach nuts (part no. 000 997 66 34) or retaining screws (genuine Mercedes-Benz replacement parts) to the ends of lines and make a flange (F DIN 74234).
- ▶ The inside of the lines must be cleaned before installation.
- ▶ The brake fluid must be renewed regularly in accordance with the Mercedes-Benz specifications, but at least every two years. If necessary, renew the brake fluid before delivery to the customer.
- ▶ If the change interval of the brake fluid has been exceeded or if the age of the brake fluid is unknown, the brake fluid must be replaced.
- ▶ When routing between two component parts that move in relation to each other, use a high-pressure-resistant flexible line (brake hose, Mercedes-Benz genuine brake components if possible). Make sure that the flexible lines are not stretched in any operating statuses and that they cannot chafe against other component parts.

Installation of lines

WARNING


A sufficient distance must be maintained between brake lines and heat sources, sharp-edged or moving parts. Otherwise the brake system function could be impaired or the brake system could suffer total failure as a result of bubbles forming in the brake fluid or from chafe marks in the brake lines.

This could cause the driver to lose control of the vehicle.

There is risk of an accident and danger to life and limb!

Work on brake lines may only be carried out by an authorized specialist workshop.


- Genuine Mercedes-Benz brake line brackets for the attachment of the brake lines must be used.
- The distance from bracket to bracket may not exceed a maximum of 500 mm/19.7 in.

 The brake lines must be routed without kinks.


Routing lines along the brake hoses and brake lines

No other lines may be attached to brake hoses and brake lines.

Brake cable for the parking brake/modifying the length of the brake cable

 If a new brake cable is required for the parking brake, the new length of the cable must be determined and a suitable new cable must be procured.

The brake cable retainers are moment-optimized; modifications are not permitted.

 The brake cables must be routed without kinks.

There must be no angle changes at the end pieces of the brake cable conduit.

No other lines may be attached to brake lines, other than those installed as standard.

Disk brakes

Cooling must not be impaired by attaching spoilers below the bumper, additional wheel trims or splash shields, etc.

For fully integrated bodies (7.14 Bodies on chassis with base (F28, F50) (→ page 220), it must be ensured that the ventilation of the wheel wells, for cooling the brakes, functions in the same way as the corresponding BM 907 cargo van.

WARNING

On no account should modifications be made to the air inflow and air outflow of the brake system. Any modifications to the steering and the brake system may result in these systems malfunctioning and ultimately failing. This could cause the driver to lose control of the vehicle.

There is risk of an accident and danger to life and limb!

Therefore, make sure there is always a sufficient flow of cooling air present.

WARNING

Any modifications to brake components may result in these systems not functioning correctly and ultimately failing. This could cause the driver to lose control of the vehicle.

There is risk of an accident and danger to life and limb!

Modifications to brake components are not permissible.

6 Modifications to the basic vehicle

Trailer Brake Control Preparation

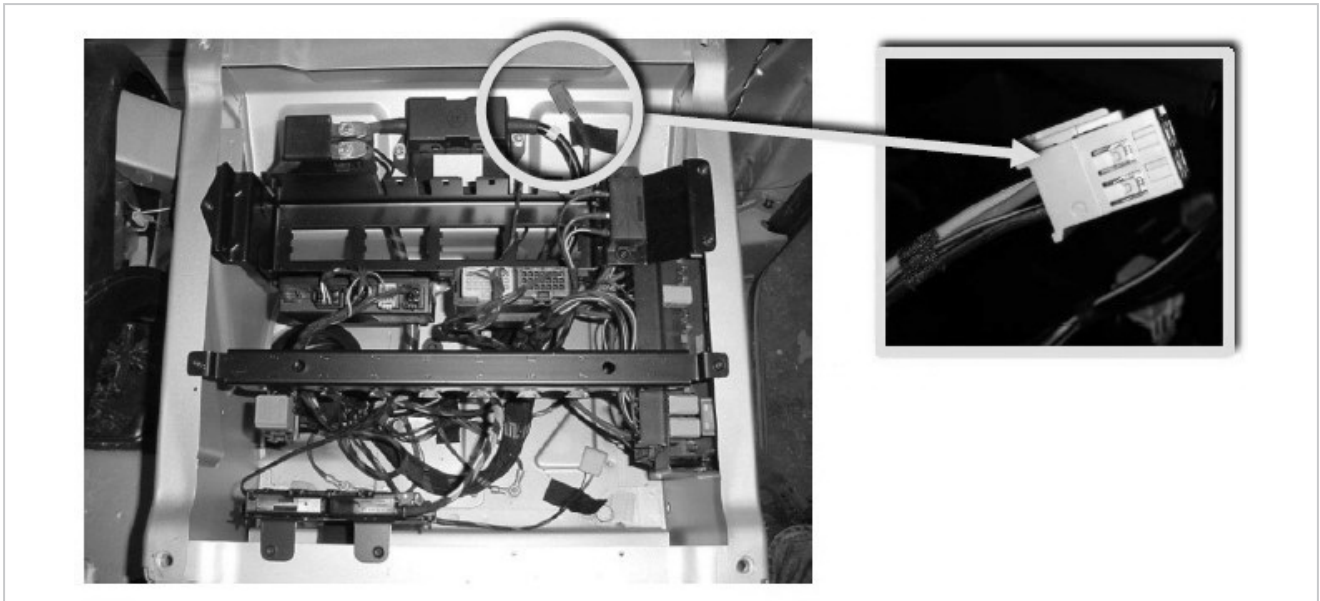
The brake signal from the trailer control module is not directly hardwired to the 7-way trailer tow connector. Instead, the brake signal circuit is routed to the green 4-pin connector (pin 3) and from there a separate wire (pin 4) is routed to the trailer tow 7-way connector.

The green connector has power, ground, and brake signal input and output. Use the green connector for aftermarket trailer brake control.

⚠ WARNING

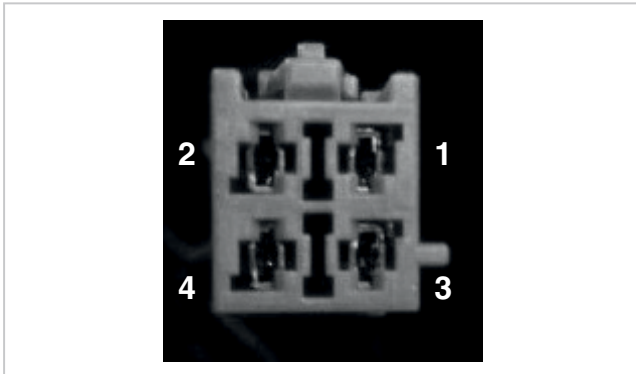
All cables for fitting a trailer brake controller should be routed using the green connector only. Maximum circuit warning may not be exceeded.

Pin	Color	Size	Description
1	Red/Yellow	2.5 mm ² /0.004 in ² , max 18 A	12 V Positive fused via F55/6 (max. 30 A) on position 30
2	Brown	2.5 mm ² /0.004 in ² , max 18 A	Ground (via Seatbase)
3	Blue	0.75 mm ² /0.001 in ² , max 7 A	Brake Signal from vehicle (via Trailer Control Unit Code E40) Output Only
4	Blue	2.5 mm ² /0.004 in ² , max 18 A	Signal to 7-pin Connector at Trailer Hitch



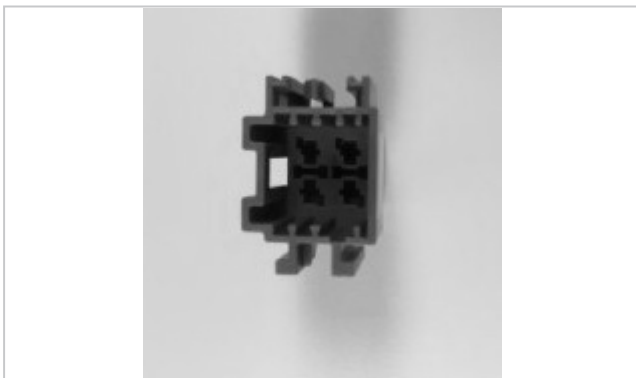
Trailer brake control preparation driver seat box

▶ Crimp pins to your wiring harness and attach to the plug connector making sure that your wires match the female connector pin layout as outlined:



N42.70-2022-00

Plug Connector (completed)



N42.70-2023-00

Fig. 1: Plug Connector housing



N42.70-2024-00

Fig. 2: Flag plug terminal



N42.70-2025-00

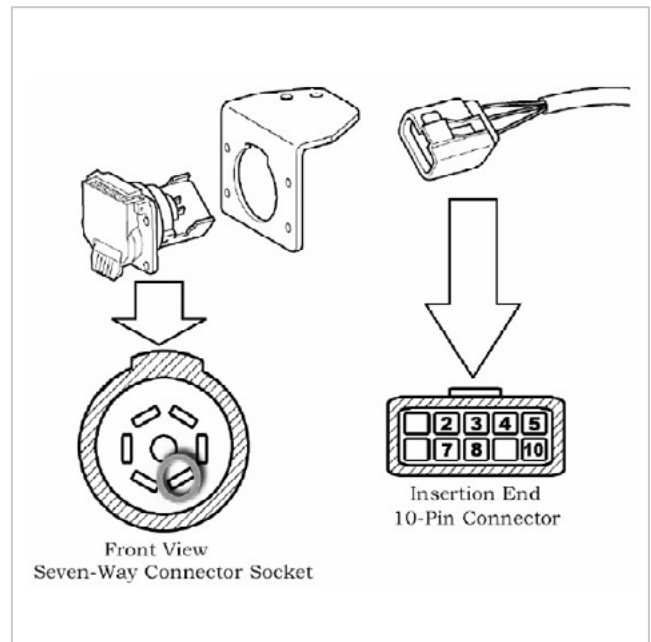
Fig. 3: Flag plug terminal

Figure	Part Number	Description
1	A0395453528	Plug Connector 4-pin
2	A0355457428	Flag plug terminal (male) 1.5 mm ² - 2.5 mm ² / 0.002 in ² - 0.004 in ²
3	A0465454028	Flag plug terminal (male) 0.75 mm ² - 1.0 mm ² / 0.001 in ² - 0.002 in ²

Circuit Description	Cavity Number (10 Pin Connector)
Electric Brakes	7
RH Stop Turn	2
Backup Lamps	3
LH Stop Turn	10
Running Lamps	5
Power (+)	4
Ground (-)	8

N42.70-2026-00

Electric Brakes



N42.70-2027-00

Front view and insertion end connectors

6 Modifications to the basic vehicle

6.1.4 Air suspension

For latest information on Mercedes-Benz air suspension option, please refer to the most current Dealer Ordering Guide (DOG).

Please note that retrofitting an air suspension to the front axle is not permitted due to potential impairment to the front crash structure.

⚠ WARNING

Do not use springs and dampers if they do not correspond to the characteristics of series production parts, certified components, or parts obtainable as special equipment. This applies in particular to the retrofitting of air suspension systems. Otherwise, if the vehicle is fitted with ESP®, this system may no longer work correctly and could ultimately fail. This could cause the driver to lose control of the vehicle. There is risk of an accident and danger to life and limb!

⚠ WARNING

If attachments are fitted to the front part of the frame, this modified crash structure may cause the airbag units to function incorrectly on vehicles with this equipment.

Retrofitting of air suspension systems at the front axle must therefore only be carried out following consultation with the specialist unit.

6.1.5 Wheels/tires

! NOTE

The information and specifications in Chapter 3.8 Tires (→ page 50) and 4.2.3 Approved tire sizes (→ page 74) must absolutely be observed

- ① More information about tires and wheels is available from any Mercedes-Benz Service Center or under 3.12 Special equipment (→ page 59)..

6.1.6 Spare wheel

As standard, the Sprinter – BR 907 is not equipped with a spare wheel or a flat tire repair system, such as the TIREFIT kit. A spare wheel can be ordered as special equipment at extra cost under code R87. Country-specific equipment or special equipment may include a spare wheel.

When a vehicle is equipped with a spare wheel, the spare wheel itself must be fitted with a functioning sensor and a sensor battery that is neither discharged nor too old for the tire pressure loss warning system (code RY2).

The position under the frame in the rear area can be selected for the attachment of the spare wheel (code R65); see your vehicle operator's manual.

For incomplete chassis, see Chapter 7.14 Bodies on chassis with cab base (code F28) (→ page 220), a temporary mounting of the spare wheel on the longitudinal frame member is also available for delivery of the vehicle (code R60).

! NOTE

The temporary attachment is not permitted for operation of the vehicle on public roads, therefore the upfitter is responsible for attaching the spare wheel in a suitable, alternative position for this variant before the vehicle is brought into service. Ensuring road safety in all operating situations of the vehicle is the responsibility of the upfitter.

Observe the following in this respect:

- Attachment is only permitted on frame or structural components with sufficient strength and rigidity.
- For attachment systems in the rear area or on the roof, observe the maximum permissible loads in Chapter 6.2 Body-in-white and body (→ page xx).
- The spare wheel must be easily accessible and it must be easy to use the attachment mechanism.
- Secure the spare wheel two-fold against falling off.

! NOTE

Observe all national laws, directives, and registration regulations.

6.2 Body in white/body

6.2.1 General information on the body in white/body

Modifications to the body must not have a negative effect on the function nor on the strength of the vehicle equipment, controls, or load-bearing parts.

When converting vehicles and mounting bodies, it is not permissible to make modifications that affect the function or freedom of movement of chassis parts (e.g. during maintenance and inspection work) or accessibility to these parts.

Observe the following:

- Wheelbase modifications are only permissible for the model designations specified in Chapter 6.2.5 Wheelbase modifications for open and closed model designations (→ page 120) and in compliance with the specifications listed therein.
- The tire pressure loss warning system (Tire Pressure Management System, TPMS) may malfunction if modifications are made in the immediate vicinity of the antennas and wheels, See Chapter 8.9.7 Tire pressure loss warning system (→ page 325).
- On no account should modifications be made to the structure of the longitudinal members and cross members from the front to 1 m (3.28 ft) behind the B-pillar because this can disrupt the structure necessary for passive safety. See Chapter 4.3.1 Modifications to the body in white(→ page 76).

! NOTE

Longitudinal frame members are crash-relevant structures.

If work is performed in these areas, the structure necessary for passive safety can be disrupted.

Ex-factory holes on the longitudinal frame member are not suitable for securing attachments, bodies, equipment, and conversions; there is a risk of damage to the frame.

- The clearance for the fuel filler neck, fuel tank and fuel lines must be maintained (→ page 136).
- Do not change the rigidity in the area of the filler necks
- Avoid sharp-edged corners.
- It is not permissible to make cuts in the A-pillar or

B-pillar, including the associated roof bows.

- It is not permissible to make cuts in the C-pillar or D-pillar, including the associated roof bows.
- If the roof skin and roof bows are removed and it is not possible to install a continuous sectional frame, then additional roof bows must be fitted. The overall design of the side, front and rear roof structure must be retained, and sufficient rigidity of the modified parts must be guaranteed. 6.2.11 Cutting the cab roof and B-pillar roof bow (→ page 131))
- Modifications in the roof area and to the rear portal are permitted only when adequate equivalent rigidity can be provided. Modifications in these areas must be coordinated with Mercedes-Benz.
- The following applies to panel vans: Modifications in the roof area and to the rear portal are permitted only when adequate equivalent rigidity can be provided.
- The attachment of additional equipment to the longitudinal frame members and crossmembers must take place using mounting consoles (plug welding). These require a review by Mercedes-Benz. Please reach out via technical inquiry on www.UpfitterPortal.com.
- Trailer connections must be checked for correct operation.
- If a trailer hitch is installed, the necessary reinforcements must be present.
- If bodies are mounted on basic vehicle “chassis”, a fuel level sensor shield may be necessary depending on the body type see 6.3.1 Fuel system (→ page 136).

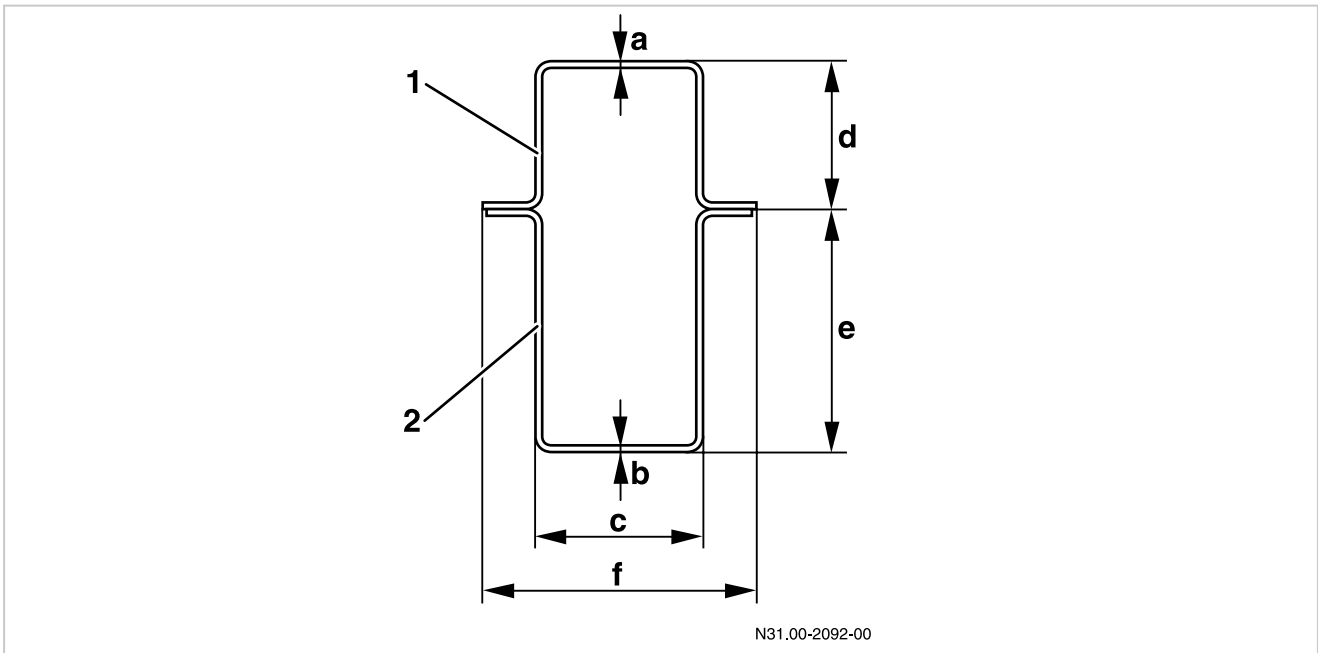
As part of the eXpertUpfitter program please refer to www.UpfitterPortal.com.

! NOTE

The factory-fitted wooden or plastic floors, including the integrated tie-down eyes, represent a certified as-built configuration in the cargo van.

If the wooden or plastic floor is removed from these vehicles, it must be ensured that an equivalent substitute is restored for securing loads in accordance with the international requirements of ISO 27956.

Section dimensions of longitudinal frame members



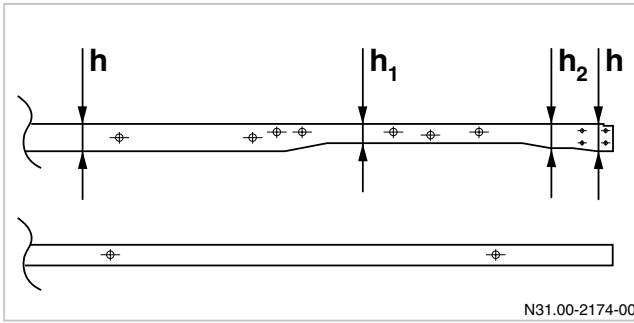
Dimensions of the upper flange and lower flange

- 1 Upper flange
- 2 Lower flange

Permissible gross mass [t]	a	b	c	d	e	f
3500, 3500XD, 4500 Chassis	3 mm/ 0.12 in	3 mm/ 0.12 in	70 mm/ 2.76 in	80 mm/ 3.15 in	120 mm/ 4.72 in 100 ¹ mm/ 3.93 in	126 mm/ 4.96 in
2500 Cargo van/passenger van	-	1.5 mm/ 0.06 in	70 mm/ 2.76 in	-	120 mm/ 4.72 in 85 ¹ mm/ 3.35 in	93 mm/ 3.66 in
3500, 3500XD, 4500 Cargo van/passenger van	-	3 mm/ 0.12 in	70 mm/ 2.76 in	-	120 mm/ 4.72 in 100 ¹ mm/ 3.93 in	118 mm/ 4.65 in

¹ In the area of the rear axle

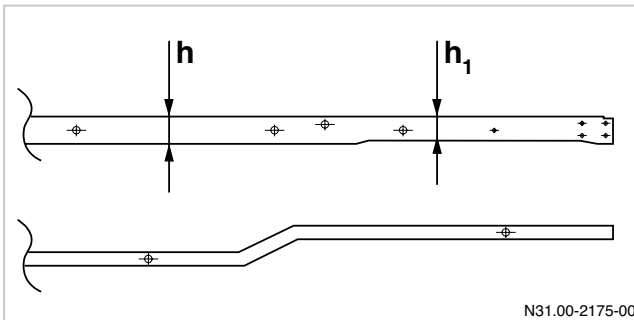
2500 longitudinal frame member



Dimensions of the lower flange of the longitudinal frame member

h	120 mm / 4.72 in
h1	85 mm / 3.35 in
h2	110 mm / 4.33 in

3500, 3500XD, 4500 longitudinal frame member



Dimensions of the lower flange of the longitudinal frame member

h	120 mm / 4.72 in
h1	100 mm / 3.94 in

Welding work on the body in white

Welding work may only be performed by trained personnel.

NOTE

Areas where welding work is not permitted:

- On the A-pillar and B-pillar
- In the upper or lower flange of the longitudinal frame member (horizontal surfaces)
- In bending radii
- On major assemblies such as the engine, transmission, axles, etc.
- In the area of the airbags, airbag sensors, airbag control unit, seat belts
- In the area of the driver assistance systems, e.g. the front and rear radars

Only plug welding is permitted on the vertical surfaces of longitudinal frame members for material thicknesses of up to 0.07 in (2 mm). Tack welding can also be used for material thicknesses over 0.07 in (2 mm).

i For additional information on welding work, see Chapters 3 Planning of bodies (→ page 34), 5 Damage prevention (→ page 93) and 6.2.1 General information on the body in white/body (→ page 110) and the Mercedes-Benz Workshop Information System (WIS).

NOTE

On no account should welding work be carried out on the upper and lower flanges of the chassis frame (including the front end longitudinal members).

Plug welding is only permissible in the vertical webs of the longitudinal frame member.

Do not perform any welding work in bends.

⚠ WARNING

Welding in the vicinity of the restraint systems (airbag or belts) can cause these systems to no longer function correctly.

If restraint systems no longer function correctly, the occupants may be unprotected in the event of an accident. There is a risk of accident, personal injuries and death if such restraint systems no longer function correctly!

Drilling or welding is therefore not permitted in the vicinity of the restraint systems.

The handling, transportation and storage of airbag units are subject to the hazardous materials law regulated by FMCSA under 49 CFR Part 173 in the US, and to the Transportation of Dangerous Goods Act (Transport Canada) in Canada.

Drilling work on the frame**! NOTE**

After completion of all work on the vehicle, observe the anticorrosion protection measures (→ page 96)

Areas that must not be drilled:

- On the A-pillar and B-pillar Exception: See Chapter 7.17 Semi-integrated bodies and optional mounting of free-standing bodies (→ page 250)
- In the upper or lower flange of the longitudinal frame member (horizontal surfaces)
- Areas with a load-bearing function for the front and rear axle or parts fastened to the frame
- At load application points (e.g. spring brackets, holders etc.)
- In the area of the airbags, airbag sensors, airbag control unit, seat belts
- In the area of the driver assistance systems, e.g. the front and rear radars

⚠ WARNING

Drilling in the vicinity of the restraint systems (airbag or belts) can cause these systems to no longer function correctly.

If restraint systems no longer function correctly, the vehicle occupants may be unprotected in the event of an accident.

There is danger to life and limb!

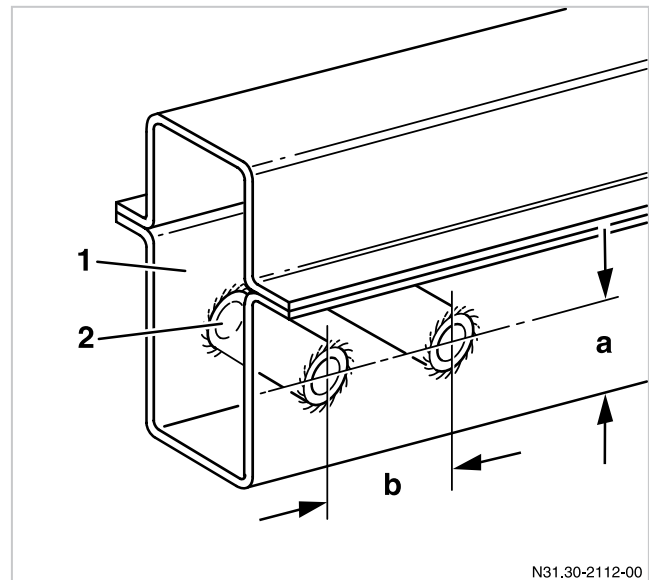
Therefore, never drill in the area of the restraint systems.

! NOTE

Existing holes in the longitudinal frame member result from the production process and are not suitable for upfitting.

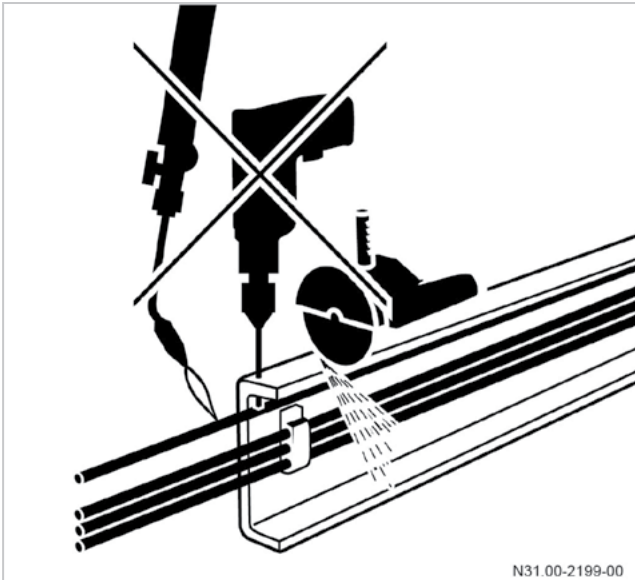
Never use the holes produced during the production process, as otherwise frame parts may be damaged.

Drilling in the longitudinal member web is only possible in accordance with the following illustration and if spacer bushings welded to the longitudinal member are used. The steel spacer sleeves must have adequate strength to absorb the screwdriving forces and be welded to the longitudinal frame member.



Drilling work on the longitudinal frame members (at the rear end only)

- 1 Chassis frame
- 2 Spacer bushings
- a Distance of at least 20% of the frame height
- b Distance between drill holes at least 50 mm/1.97 in



On closed model designations (panel van or Tourer), holes in the previously mentioned areas and in compliance with the specifications may only be implemented after aligning with Mercedes-Benz via the upfitter portal. (→ page 17)

On open model designations (chassis or cab base vehicles code F28), it is only permissible to introduce bores in the longitudinal frame members (in compliance with the previously mentioned specifications) in the areas shown below. When doing so, a sufficient distance of at least 0.8 in (20 mm) must be maintained from existing ex-factory holes, reinforcements, the connecting flanges for the component parts, and in areas where other components are attached, etc. (list not exhaustive).



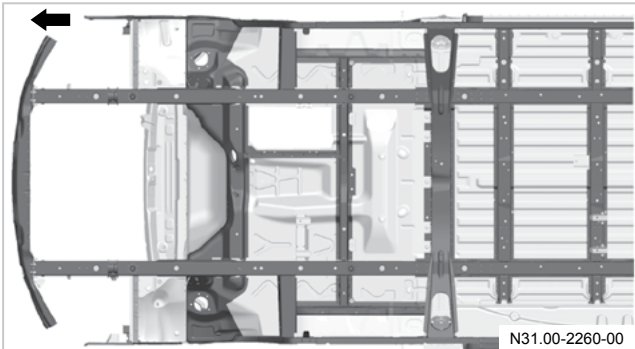
Marking: permissible areas for bores in the longitudinal member web on open model designations with body length A2 (schematic)

- ▶ After drilling, deburr and ream all bores.
- ▶ Remove chips from the frame and treat the bores with cavity preservation.
- ▶ Restore the anticorrosion protection in accordance with Mercedes-Benz guidelines.

6.2.2 Attachment to the frame

Attachment to the front frame section

On no account should modifications (holes, cuts, etc.) be made to the structure of the longitudinal members and crossmembers from the front through to 1 m / 39.4 in" behind the B-pillar (see picture), or to the attachment of major assemblies, brackets, components etc. in the area of the front-end assembly and front axle, because this can disrupt the structure necessary for passive safety.



Longitudinal member and crossmember structure in the area of the front-end assembly (viewed from below)

Arrow Direction of travel

⚠ WARNING

If attachments are mounted on the front frame section, the function of the forward crash structure and the airbag units may be impaired.

Attachments are therefore only permitted to be mounted on the front section of the frame after evaluation with the responsible department. As part of the eXpertUpfitter program please refer to www.UpfitterPortal.com.

! NOTE

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

Attachment to the rear frame section

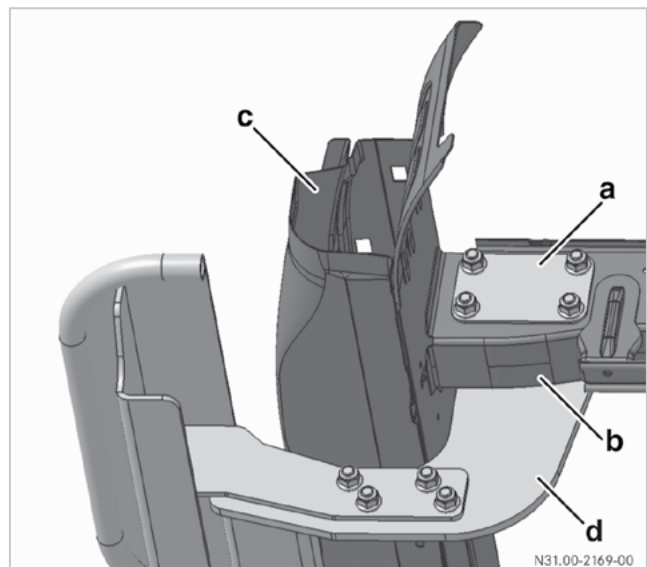
On open and closed model designations from model series 907, the vehicle comes as standard with reinforcements on the vehicle frame for mounting attachments in the rear longitudinal frame member on the left or right.

If you do not wish to have the reinforcements on account of a higher payload, they can be deselected with code QW1 on closed model designations, depending on the equipment installed on the vehicle. Code QW1 is not available for open model designations.

If this special equipment is not included, attachment of a trailer coupling is not permissible (see warning notice).

The attachment of additional assemblies or bodies to the rear frame section must be analogous to the attachment of the trailer hitch available as special equipment.

For the application of greater forces and moments, an additional support on the end frame crossmember is required.



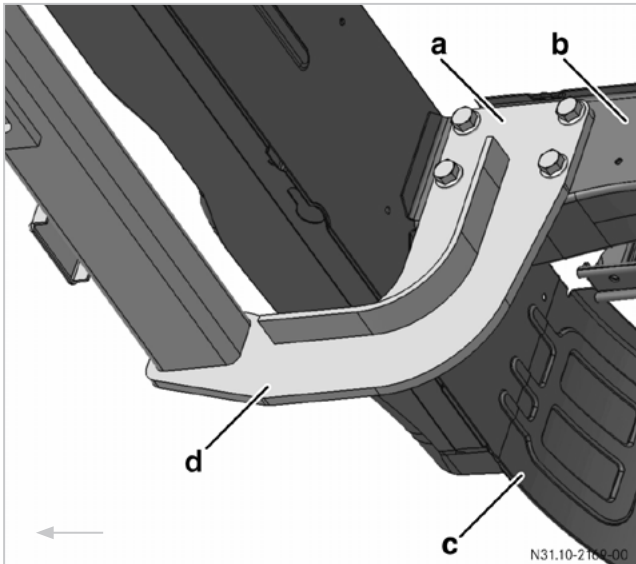
End crossmember on longitudinal frame member (right)

- a Attachment of mounting plate to longitudinal frame member
- b Lower flange of longitudinal frame member
- c Frame end crossmember
- d Mounting plate for trailer hitch

⚠ WARNING

If a trailer hitch is retrofitted and you attach a trailer hitch or other components, the longitudinal frame member will be weakened and can break. In this case, the trailer can detach from the vehicle.

There is risk of an accident and danger to life and limb!
Only retrofit a trailer hitch if this is permissible.



Inside view of end crossmember on right longitudinal frame member

- a Attachment of mounting plate to longitudinal frame member
- b Lower flange of longitudinal frame member
- c Frame end crossmember
- d Mounting plate for trailer hitch

An evaluation with the responsible department is necessary. As part of the eXpertUpfitter program please refer to www.UpfitterPortal.com.

Attachment using mounting supports

installed mounting supports for attaching bodies to the vehicle frame. The bodies must rest on the mounting supports and may also rest on the longitudinal frame members. Mercedes-Benz recommends that the body should not rest on the end crossmember. Further information is available in 7.1.4 Attachment to the frame (→ page 191).

6.2.3 Material for the chassis frame

If modifications are made to the wheelbase or the frame is extended, the element must have the same quality and dimensions as the standard chassis frame (only permissible in the underfloor area).

! NOTE

Lengthening in the area of the front-end assembly is not permissible (impact load path)!

Material	Yield Strength [N I mm ²]	Tensile Strength [N I mm ²]
Steel	235-340	240-510

6.2.4 Overhang extension

Modifications to the vehicle overhang are possible and must always take the permissible axle loads and the minimum front axle load into account.

For crew, passenger, and cargo vans, an overhang extension is only permitted to upfitters in the eXpertUp-fitter program for whom the possible deviations can be evaluated by the responsible department.

Frame extensions are possible for cab-chassis when the following requirements are met:

- Implement a frame extension with reinforcements in accordance with the following schematic illustrations.
- A screw connection (in the X-direction) of a frame extension on the screw-on brackets at the frame end is not permitted.
- It is recommended to select the following special equipment for bodies with frame extension:
 - Frame end without screw-on brackets code Q74
 - Omission of end crossmember code Q72

- ▶ For a frame extension of over 350 mm/14 in, an additional crossmember must be installed.
- ▶ Any additional crossmembers must have the same functionality as standard crossmembers.
- ▶ Standard mounting supports must be used at the end of the frame.
- ▶ The interval between the mounting supports must not exceed 500 mm/20 in
- ▶ If the frame overhang is extended, the function of Trailer Stability Assist (TSA) and the permissible trailer load specified in the vehicle registration document must be checked and, if necessary, be reduced or even omitted, see 4.3.5 Vehicle overhang (→ page 78).
- ▶ Reinforce the frame overhang.

- ▶ If the overhang is lengthened, the new overhang dimension and the distance of the rear end radar from the rear axle must be entered in both rear radars (BSM) by new SCN coding with O-codes.
- ▶ On no account may the original positions of the radar sensors in the bumpers be changed. This adjustment must be performed by a Mercedes-Benz Service Center. More information is given in Chapter 8.9.4 Blind Spot Assist/Rear Cross Traffic Alert/exit warning function/Sideguard Assist (→ page 307).
- ▶ Have the bodybuilder manufacturer calculate the positions of the center of gravity in the vehicle following the modification in accordance with the information in Chapter 9.1 Center of gravity (→ page 364).

- Comply with the technically permissible axle loads.
- Comply with the minimum front axle load under all load conditions (→ page 78).

More information is available from the department responsible(→ page 19).

- ① Information on the section dimensions of the longitudinal frame member (→ page 111).

Maximum overhang lengths

If the limit values given in Chapter 4.3.5 Vehicle overhang (→ page 78) for overhang lengths and the technically permissible maximum rear axle load are complied with, the original trailer load will still apply and ESP® operation will not be influenced if the trailer coupling point is not relocated. If the trailer coupling point is relocated, observe the additional information in chapter 4.3.5 Vehicle overhang (→ page 78)

If the underride guard needs to be repositioned due to the overhang extension, the attachment must be the same as that of the original vehicle (→ page 184)

Observe the country-specific legal regulations pertaining to the underride guard.

Observe the information and specifications on the commissioning of control units after the completion of body mounting work or modification work, before the vehicle is put into service, see Chapter 8.15 Commissioning of control units (→ page 361).

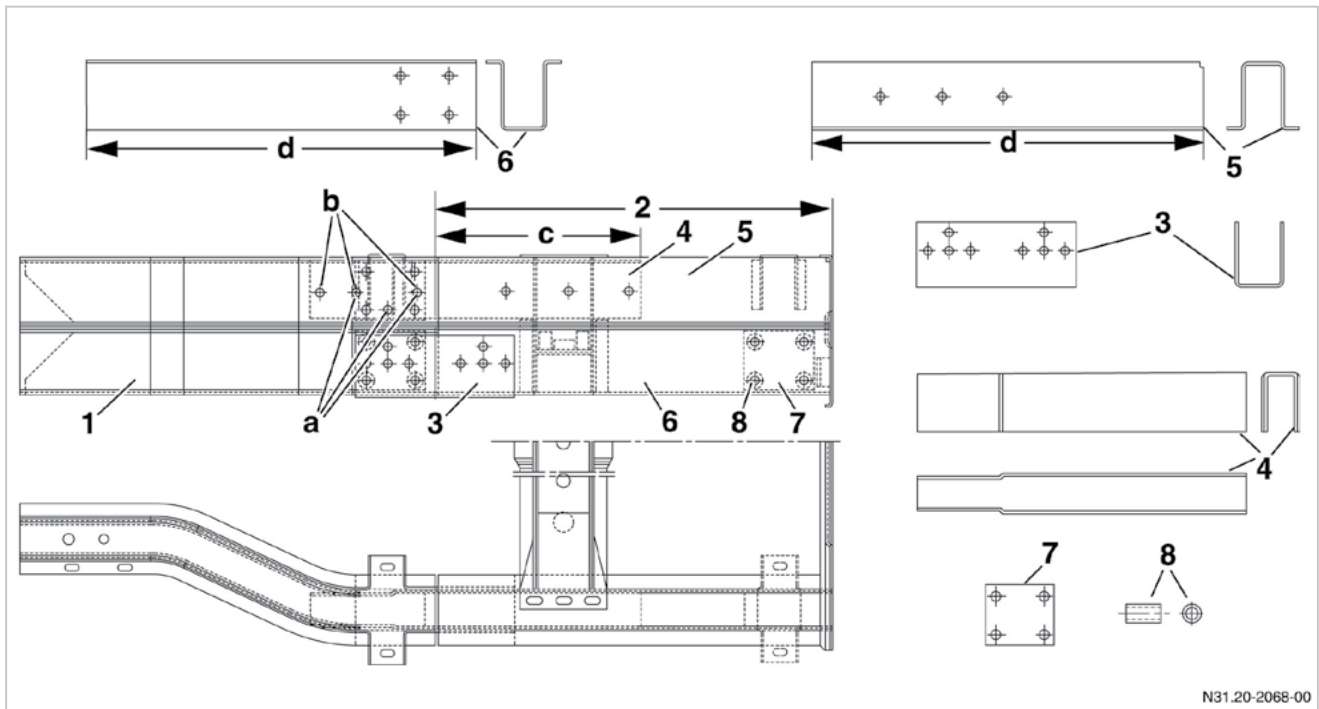
For the design of the frame extension in the case of an overhang extension, see the following illustrations.

Check the effects on the permissible trailer load and the Trailer Stability Assist (TSA) function, see 4.3.5 Vehicle overhang (→ page 78).

Maximum overhang lengths

Wheelbase I	Overhang length X
3665 mm/144 in	1850 mm/73 in
4325 mm/170 in	2200 mm/87 in

Vehicles with 4.6 t and 5.0 t



N31.20-2068-00

Frame extension with overhang extension

- 1 Chassis frame longitudinal member
- 2 Frame extension
- 3 Outer reinforcement
- 4 Inner reinforcement
(wall thickness 11030 lbs: 3 mm/0.12 in)
- 5 Body support extension
- 6 Chassis frame extension
(wall thickness 11030 lbs: 3 mm/0.12 in)
- 7 Reinforcement plate min. 2 mm/0.08 in
- 8 Spacer bushing, tube 24 x 4
M steel or St 35 NBK

A longitudinal member reinforcement (see 7 and 8) is required when attachments are fitted (e.g. trailer coupling or underride guard).

- a Bore holes, 3665 mm/144 in wheelbase
- b Bore holes, 4325 mm/170 in wheelbase
- c 350 mm/13.8 in (3665 mm/144 in wheelbase),
300 mm/11.8 in (4325 mm/170 in wheelbase)
- d Dimension defined by upfitter

! NOTE

Comply with all applicable FMVSS/CMVSS guidelines and regulations.

! NOTE

Upon completion of all work on the vehicle, observe the specified anti-corrosion protection measures (→ page 96).

6.2.5 Modifications to the cab

For modifications on the cab, an evaluation with the responsible department is necessary.

As part of the eXpertUpfitter program please refer to www.UpfitterPortal.com.

Rigidly installed equipment or conversions must satisfy the requirements of legislation relating to head-on impact as specified in FMVSS/CMVSS 201.

⚠ WARNING

Modifications to the cab must not impair the function of any components relevant to safety (e.g. airbag units, sensors, pedals, gearshift lever, lines or others). This may lead to the failure of components or safety-relevant component parts.

There is risk of an accident and danger to life and limb!

⚠ WARNING

If aftermarket modifications are made to the headliner or the roof paneling between the A-pillar and the B-pillar, the deployment of the window airbag may no longer function correctly.

If window airbags no longer function correctly, the vehicle occupants may be insufficiently protected in the event of an accident.

There is danger to life and limb!

Do not make subsequent modifications to the headliner or the roof paneling between the A-pillar and the B-pillar if the vehicle is equipped with window airbags.

! NOTE

If the fuel filler cap is removed or parts are attached to the fuel filler cap, blocking may occur in the event of an accident. Because of this, the protrusion space in the B-pillar may no longer function correctly. On no account should the cap be covered with paneling parts, and "blocking" parts must never be mounted on the B-pillar.

The strength and rigidity of the cab structure must not be impaired.

The intake of air into the engine must not be hindered.

Modifications to the cab will cause a change in the center of gravity. The permissible center of gravity limits and axle loads must be maintained.

! NOTE

Upon completion of all work on the vehicle, you must comply with the specified anti-corrosion protection measures (→ page 96).

Changes to cab roof, general

Modifications to the cab roof (e.g. lowering the roof height) may only be undertaken after consulting with Mercedes-Benz via www.upfitterportal.com

Plastic roofs are suitable for the installation of roof hatches only to a limited extent.

The roof load-bearing capacity is limited (→ page 81).

! NOTE

Roof bows or supporting parts may not be removed or modified without being replaced.

i You will find information on over-cab attachments and wind deflectors in the chapter "Attachments" (→ page 166).

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

Modifying the cab rear panel

If it is necessary to cut through the cab rear panel, it is possible to do this in connection with a continuous surrounding frame. The equivalent rigidity of the frame must be at least equal to the original rigidity.

Partitions may be totally or partially removed. Also observe 7.4 Modifications to closed cargo vans (→ page 201).

The statutory standards (ISO, etc.) and the relevant licensing regulations must be complied with.

6.2.6 Side wall, windows, doors and flaps

Side wall

If modifications are made to the side wall of the cargo van or the passenger van, the rigidity of the modified body must be equal to that of the basic vehicle.

The front of the roof frame, the roof bow at the B-pillar, and the A-pillar and the B-pillar themselves must be retained and their function may not be impaired in any way.

Refer to 8.9.2 Crosswind Assist (→ page 298) for modifications to the projected lateral face.

An evaluation with the responsible department is necessary. As part of the eXpertUpfitter program please refer to www.UpfitterPortal.com.

! NOTE

Upon completion of all work on the vehicle, you must comply with the specified anti-corrosion protection measures (→ page 96).

Windows

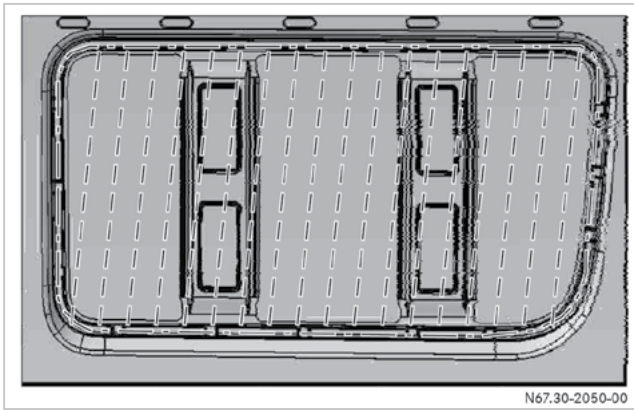
- ▶ Windows must be inserted with a stable frame.
- ▶ The frame must then be joined by a non-positive attachment to other body elements.
- ▶ If modifications need to be carried out to the supporting structure of the basic vehicle (pillars, reinforcements, attachment of roof bows) in order to retrofit windows (panoramic glazing), the rigidity of the modified body must be equal to that of the basic vehicle.

If the upfitter installs window panes on his or her own, the code W94 "Window openings w/o glass - side and rear" is available from the factory.

- ① Additional information on modifications to the side wall can be found under 6.6.4 Shelf systems/vehicle interior installations (→ page 167).

! NOTE

It is not permissible to install panoramic glazing on a cargo van basic vehicle by cutting out the stamped window shape without ensuring equivalent rigidity. Otherwise there is a risk of damage to the side wall.



Example for cargo van/passenger van side wall body in white structure and glass area

- i** For modifications which involve cutting out the stamped window shape and adding reinforcements, an evaluation with the responsible department is necessary. As part of the eXpertUpfitter program please refer to www.UpfitterPortal.com.
- i** A design proposal with reinforcement measures can be provided by the department responsible 1.7 Contact (→ page 17). Please also observe 7.4 Modifications to closed cargo vans (→ page 201).

If the upfitter is going to install its own windows in the hinged rear doors, the following should be noted in connection with code W78 "Windshield wiper on hinged rear door":

- To guarantee proper functioning of the rear window wipers, the geometry of the windows supplied by the upfitter must match that of the windows available as standard equipment.
- The wiper blades of the rear window wipers must make contact with the windows across the entire swept area.
- The rear windows must be 3 mm/0.1 in thick.
- The rear windows must not protrude above the door paneling.

Doors and flaps

⚠ WARNING

Modifications to

- door kinematics
- guidance systems (rails, sliding carriages etc.)
- locking systems (closing assists, anti-entrapment strips, locks, arresters etc.)
- end stop systems (buffers etc.)
- body-in-white structure

may result e.g. in the door opening unintentionally.

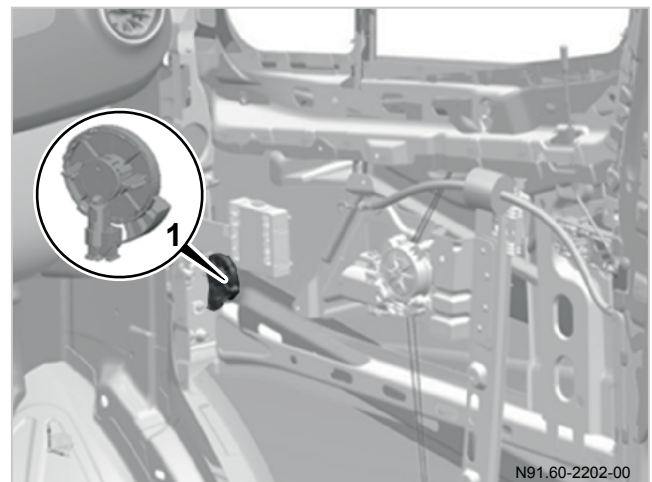
There is risk of an accident and danger to life and limb!

Do not make any modifications to these systems.

If modifications need to be carried out to the supporting structure of the basic vehicle (frame crossmembers, pillars, reinforcements, attachment of roof bows) in order to retrofit doors, the rigidity of the modified body must be equal to that of the basic vehicle.

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

The trigger sensor of the occupant protection systems is located in the door body on vehicles with window airbags or thorax/pelvis side airbags. On no account should modifications be made to the door body (see illustration).



Door body with sensor system

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

Seats in the living and passenger compartment must be directly accessible from the outside by a door or from the cab.

It must be possible to open locked doors quickly and easily from the inside.

The doors must open wide enough and the door entrances must be shaped in such a way as to enable persons to get in and out of the vehicle safely and comfortably.

The maximum permitted height of the bottom step above the roadway is 400 mm/15.75 in.

Installations must allow a sufficient clearance from the inside handles in all positions (anti-pinch protection).

Take into account the new trim parts as of model year 2025 for the additional measure "catch bearing" (front catch, Code T01) of the load compartment sliding door in the center area of the B-pillar when installing or modifying, see information on the partition in Chapter 7.4 Modifications to closed cargo vans (→ page 201)

! NOTE

After completion of all work on the vehicle, observe the anticorrosion protection measures (→ page 96).

! NOTE

For all versions of vehicle doors (front doors, sliding doors, hinged rear doors), modifications to the locking system, in the immediate vicinity of the door and in the area of pillars/crossmembers must be avoided. The attachment of additional mechanical locks (e.g. latch locks/"slam-locks") is not permitted.

Sliding door to load compartment

The system for the load compartment sliding door was designed for a maximum door weight of 143.3 lbs./ 65 kg. Modifications must not cause this weight to be exceeded.

The ex-factory weight of the load compartment sliding door for each vehicle model and wheelbase is listed in the table. The delta corresponds to the maximum permissible additional weight on the sliding door to the load compartment.

Maximum permissible additional weight

(total weight of load compartment sliding door - basic equipment = additional weight)

Roof height	
LH1	143.30 - 108.03 = 35.27 lbs, 65 - 49 = 16 kg
LH2	143.30 - 119.05 = 24.25 lbs, 65 - 54 = 11 kg

For the special equipment items with the codes listed below, the following weights must be added to the basic equipment (see table).

If items of equipment are removed, they must be taken into account in the weight calculation.

- Electric closing assist (code T50/T51): 6.61 lbs./ 3 kg
- Electric operation (code T55/T56): 13.23 lbs./ 6 kg (including code T50/T51)
- Window at front of sliding door (code W17): 8.82 lbs./ 4 kg
- Laminated glass (code W17+F43): 15.43 lbs./ 7 kg
- Sliding window in side wall (code W18): 14.33 lbs./ 6.5 kg
- Luxury door trim (code V21): 4.41 lbs./ 2 kg (only for RWD A2LH2 RE)
- Speakers (code EL9): 4.41 lbs./ 2 kg

6 Modifications to the basic vehicle

Rear-end doors (HDT)

The system for the hinged rear doors was designed for a maximum weight of 83.78 lbs./ 38 kg per hinged rear door, and this must not be exceeded due to modifications.

The ex-factory weight of the hinged rear door for each vehicle model and roof height is listed in the table. The delta weight, including special equipment, corresponds to the maximum permissible additional weight on the hinged rear door.

Maximum permissible additional weight

(total weight of rear doors - basic equipment = additional weight)

Roof height	Hinged rear door	
	Left [lbs], [kg]	Right [lbs], [kg]
LH1	83.78 - 60.63 = 23.15, 38 - 27.5 = 10.5	83.78 - 57.32 = 26.46, 38 - 26 = 12
LH2	83.78 - 66.14 = 17.64, 38 - 30 = 8	83.78 - 61.73 = 22.05, 38 - 28 = 10

For the special equipment items with the codes listed below, the following weights must be added to the basic equipment (see table).

If items of equipment are removed, they must be taken into account in the weight calculation.

- Window (code W61/W78): 4.41 lbs./ 2 kg
- Luxury interior trim (code V21): 3.31 lbs./ 1.5 kg
- Window washer system (code W78): 2.20 lbs./ 1 kg

Furthermore, care must be taken to ensure an extensive connection and CoG distribution at the doors.

The upfitter is responsible for his/her conversions and modifications on the vehicle.

! NOTE

When selecting a carrier system for bicycles or other transported items on the rear end, observe the specified restrictions on additional masses on the hinged rear doors. The mass of the carrier system including the transported items, e.g. bicycles, must be taken into account.

If the additional mass restriction cannot be complied with, it is recommended to use a suitable carrier system supported by or attached to the ball head of the trailer coupling.

Rear portal

Any modifications to the rear door opening including the roof area are only permitted in exceptional cases and an UIS must be requested online via the Upfitter Portal (→ page 23).

! NOTE

Upon completion of all work on the vehicle, you must comply with the specified anti-corrosion protection measures (→ page 96).

6.2.7 Fenders and wheel wells

Ensure that there is sufficient space between the tire and the fender or wheel well even with snow or the suspension completely compressed (allowing for axle twist). Pay attention to the dimensional data in the 2D chassis drawings (offer drawings).

⚠ WARNING

If modifications are made to the mountings of seats on the wheel well or to lowered wheel wells, the vehicle (e.g. the wheel well and tires) could be damaged.

There is risk of an accident and danger to life and limb!

On no account may seats be mounted on the wheel well.

! NOTE

Upon completion of all work on the vehicle, you must comply with the specified anti-corrosion protection measures (→ page 96).

Upon completion of all work on the vehicle, you must comply with the specified anti-corrosion protection measures

Reductions in the width of the wheel wells are not permitted.

Wheel wells (side wall and substructure scope)

It is possible to lower the wheel wells as long as the following preconditions and limit values are complied with:

- No components or sharp edges (e.g. folded seams or edges) may protrude into the wheel well.
- The maximum permitted lowering dimension may not be exceeded by any component in the wheel well.
- Unrestricted use of snow chains is not possible: The entry "Use of snow chains subject to limitations" must be entered in the vehicle documents.

! NOTE

For modifications to the wheel wells, observe the information and specifications in chapters 4.3.3 Lower wheel well on rear axle for closed model designations 4.3.3 Lower wheel well on rear axle for closed model designations (→ page 76) and 4.3.4 Lower wheel well on rear axle for open model designations 4.3.4 Lower wheel well on rear axle for open model designations (→ page 77)

6.2.8 Frame end crossmember

If special bodies are mounted, the end panel crossmember acting as a rear underrun may be omitted at the factory (code Q72) (→ page 166).

You will find more information on the underrun protection in the chapter 6.6.2 Attachment above cab (→ page 166)

! NOTE

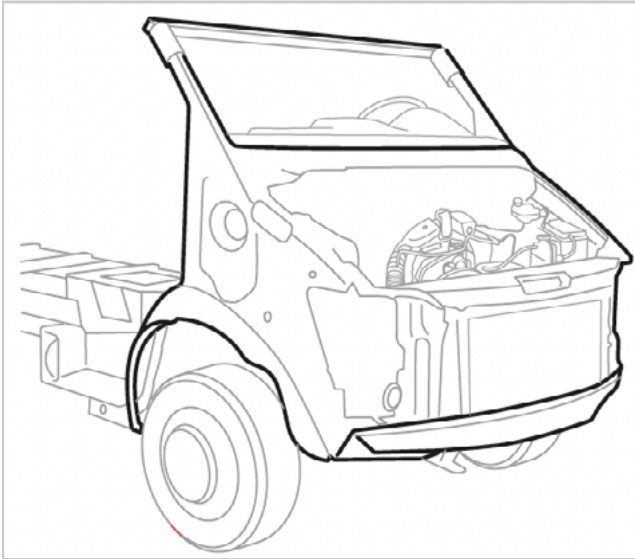
Upon completion of all work on the vehicle, you must comply with the specified anti-corrosion protection measures (→ page 96).

! NOTE

Observe all national laws, directives, and registration regulations.

6.2.9 Cowl (F50 Cab Base)

The cowl (chassis cab base) offers upfitters a basis for producing fully integrated bodies (e.g. camper vans) or special-purpose bodies. It is available from the factory under code F50 "Cab base" (→ page 59).



Cowl chassis (schematic)

Observe the specifications on setting up cowl chassis in 7.14 Bodies on chassis with base (F28, F50) (→ page 220).

! NOTE

On F50 vehicles, the jack support point on the body-in-white is not to be used before and during the body mounting phase, because the structure does not have the required stability.

! NOTE

After completion of all work on the vehicle, observe the anticorrosion protection measures (→ page 96).

6.2.10 Cargo Van/Passenger Van roof

If modifications are made to the roof structure of Cargo Vans/Passenger Vans, the following points must be observed:

- If the roof skin and roof bows are removed and if no continuous sectional frame is possible, additional roof bows must be fitted. The overall design must be retained, and sufficient rigidity of the modified parts must be guaranteed.
- In order to prevent function impairments, the body limits for camera-based support systems must be observed; see 8.9.5 High Beam Assist/Active Lane Keeping Assist/Traffic Sign Assist/Intelligent Speed Assist (→ page 322) and 8.9.6 Rain sensor and Headlamp Assist (→ page 323).
- Refer to 8.9.2 Crosswind Assist (→ page 298) for modifications to the projected lateral face.
- Observe the limit values for the suspension (→ page 72).

! NOTE

The rigidity of the new roof structure must be equal to that of the original standard roof.

On no account should modifications be made to the rear portal including the roof area.

Upon completion of all work on the vehicle, you must comply with the specified anti-corrosion protection measures (→ page 96).

Attachment to the roof

Fastenings similar to roof luggage racks can be used as an option for retrofitting attachments (→ page 167).

Attachment to the roof

Securing elements similar to roof racks are possible for retrofitting attachments (→ page 167).

For attachments to the roof skin and to roof bows, an evaluation with the responsible department is necessary. As part of the eXpertUpfitter program please refer to www.UpfitterPortal.com.

⚠ WARNING

If aftermarket modifications are made to the headliner or the roof panel between the A-pillar and the B-pillar, the deployment of the window airbag may no longer function correctly.

If window airbags no longer function correctly, the occupants may be unprotected in the event of an accident. There is a risk of accident, personal injuries and death if such systems no longer function correctly!

On no account should any subsequent modifications be made to the headliner or the roof panel between the A-pillar and the B-pillar if the vehicle is equipped with window airbags.

Cutouts in the roof

Cutouts in the roof are permissible when the following specifications are observed:

- A distance of at least 0.8 in (20 mm) must be maintained between structural components of the roof (roof bows, side wall attachment) and the cut out.
- The roof structure may only be modified in accordance with the above-mentioned specifications.
- The corners of the roof cutout must have a radius of at least 2.9 in (75mm).
- In the case of plastic roofs, particular attention must be paid to the material properties due to possible susceptibility to cracking.
- All edges must be deburred and sealed with anti-corrosion protection.
- For deviating designs, an evaluation with the responsible department is necessary. As part of the eXpertUpfitter program please refer to www.UpfitterPortal.com.
- For cutouts in the cab roof, the specifications in Chapter 6.2.10 Cutting the cab roof and B-pillar roof bow (→ page 131) must be observed.

Roof height increase

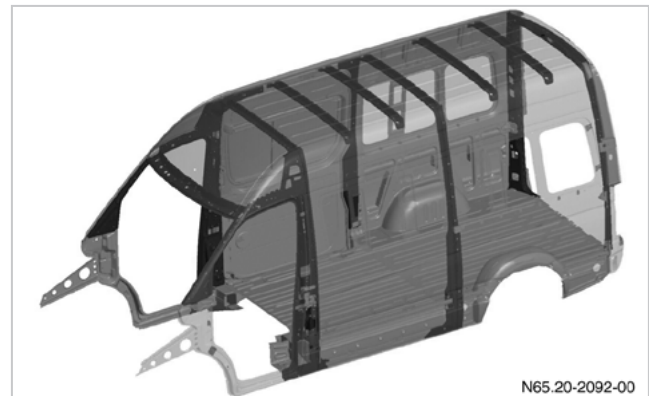
Any modifications to the rear door opening including the roof area are only permitted in exceptional cases and an evaluation with the responsible department is necessary. As part of the eXpertUpfitter program please refer to www.UpfitterPortal.com.

The rigidity of the new roof structure must be equal to that of the original standard roof.

Number of roof bows

Wheelbase	Quantity required
3665 mm/144 in	≥ 5 bows
4325 mm/170 in	≥ 6 bows

Location of roof bows



Cargo van roof bows

6 Modifications to the basic vehicle

NOTE

The bows must be secured to the side walls in such a way that a non-positive connection is guaranteed (bend-resistant connection of bow and roof frame).

The roof bows must be reinforced in the event of any increase in the height of the roof.

The minimum moment of inertia required I_x per roof bow can be seen in the table below:

Roof height increase	Moment of inertia I_x per bow
250/10 in	$\geq 40,000 \text{ mm}^4 / 0.09 \text{ in}^4$
400/16 in	$\geq 65,000 \text{ mm}^4 / 0.15 \text{ in}^4$
550/22 in	$\geq 86,000 \text{ mm}^4 / 0.20 \text{ in}^4$

If the roof height is either reduced or not modified, a minimum required moment of inertia per roof bow of

$$I_x = 33000 \text{ mm}^4 / 0.08 \text{ in}^4 \text{ must be maintained.}$$

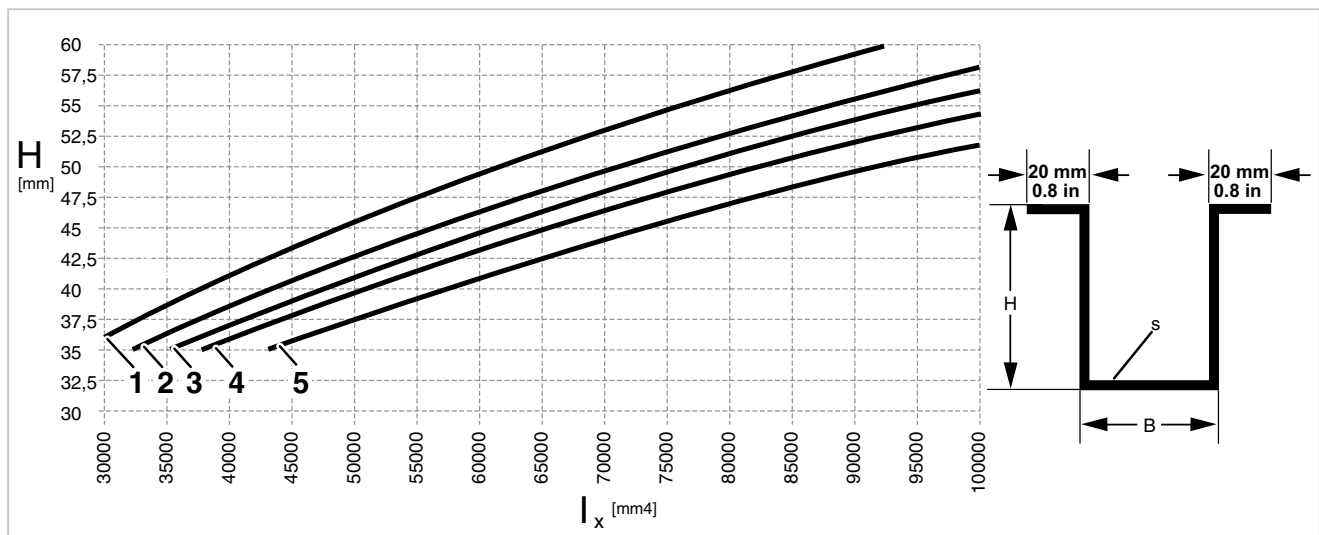
The maximum roof load of the high panel roof is 150 kg/331 lbs if the load is evenly distributed over the entire roof surface (→ page 167).

WARNING

If the maximum permissible center of gravity is exceeded on vehicles with ESP®, this system may no longer work correctly and could ultimately fail. This could cause the driver to lose control of the vehicle. There is a risk of accident, personal injuries and death if such systems no longer function correctly!

Make sure that the permissible height for the center of gravity is not exceeded.

Refer to 8.9.2 Crosswind Assist (→ page 298) for modifications on the projected lateral face (increase in the height of the roof).



N65.20-2101-00

Required moments of inertia for roof bows with 20 mm/0.8 in flange with the roof skin

- 1 B: 50 x s: 0.8
- 2 B: 40 x s: 1.0
- 3 B: 50 x s: 1.0
- 4 B: 60 x s: 1.0
- 5 B: 50 x s: 1.2

Retrofitting of roof hatch and pop-up roof

⚠ WARNING

If aftermarket modifications are made to the headliner or the roof panel between the A-pillar and the B-pillar, the deployment of the window airbag may no longer function correctly.

If window airbags and thorax/pelvis side airbags no longer function correctly, the occupants may be unprotected in the event of an accident.

There is danger to life and limb!

On no account should any subsequent modifications be made to the headliner or the roof panel between the A-pillar and the B-pillar if the vehicle is equipped with window airbags.

! NOTE

Roof bows or supporting parts may not be removed or damaged without being replaced (→ page 131).

Maximum roof loads

Cargo van LH1	High-roof cargo van LH2	Cab
300 kg/661 lbs	150 kg/330 lbs	100 kg/220 lbs

lbsPlease also refer to chapter 4.3.8 Roof/roof load (→ page 81).

The limit value of the vehicle's maximum center of gravity must not be exceeded.

The following points must be observed for the installation of roof hatches/lifting roofs:

- The specifications regarding cutouts in the roof and changes to the roof structure must be observed.
- Roof hatches should be positioned as centrally as possible (symmetrically to the longitudinal axis of the vehicle).
- The roof load limit values given below must be complied with, see table.
- Plastic roofs are suitable for the installation of roof hatches only to a limited extent. The roof hatch must be glued over the entire surface in the area of the overlap to stiffen the roof section. The component weight must not exceed 8 kg or 17.64 lbs. It is recommended to use a suitable solution from the camper van sector.
- If a lifting roof (pop-up roof) is fitted, at least 2/3 of the original roof area must be retained.
- A seal between the installation and the roof surface against water and dust ingress must be provided.

For any deviations to above points, an evaluation with the responsible department is necessary. As part of the eXpertUpfitter program please refer to www.UpfitterPortal.com.

6 Modifications to the basic vehicle

Retrofitting of roof hatch or emergency exit

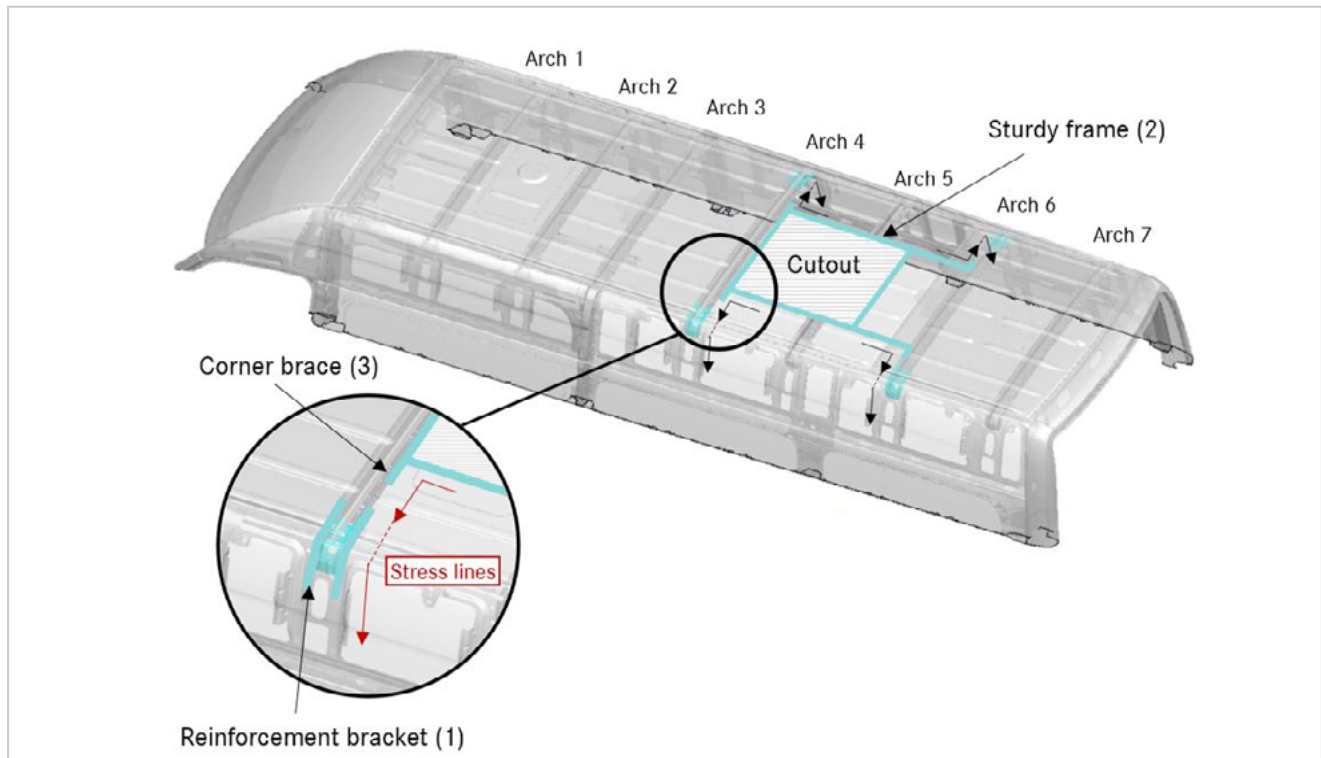
If the Upfitter installs a roof hatch or intends to install an emergency exit to comply with FMVSS/CMVSS 217 for bus upfits, a reinforcing frame/sturdy frame must be installed to compensate for removed structural roof components.

The roof is part of the body which forms a self-supporting unit. By modifying the roof structure, the upfitter might have to re-certify applicable FMVSS/CMVSS including but not limited to FMVSS 216 and FMVSS 201.

To insert a roof hatch, it might be necessary to have a cutout in the roof (skin and arch) of the van.

If the Upfitter must cut the roof, ensure corrosion protection. 5.3 Anti-corrosion protection measures (→ page 96)

The Upfitter must reinforce the remaining body and consider the extra weight of the added parts to ensure a stable structure.



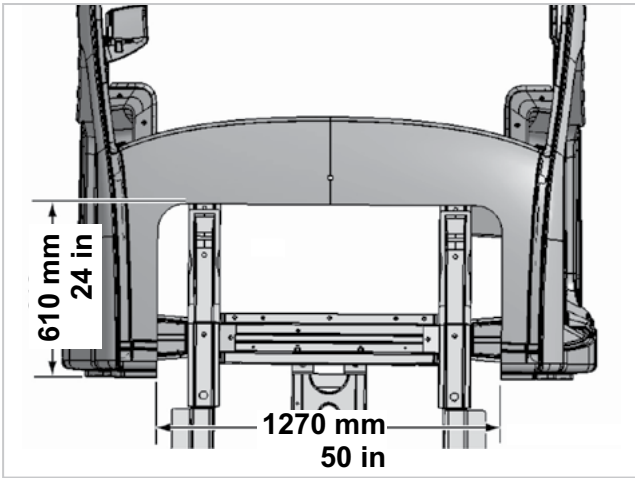
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Roof hatch

- ▶ Reinforcement brackets (1) must be installed at both ends of the arches which are located next to the cutout (see “Stress lines”).
- ▶ Corner braces (3) connected to the arches next to the cutout must be installed.
- ▶ The sturdy frame (2) must be integrated without deforming the arches next to the cutout. Avoid tension or pressure.
- ▶ Ensure sealing.

6.2.11 Cutting the cab roof and B-pillar roof bow

For semi-integrated bodies, e.g. RVs or integral box bodies, the cab roof including B-pillar roof bow can be cut out in the indicated area (see illustration) where necessary:



N60.80-2473-00

Permissible roof cut

NOTE

When cutting the B-pillar roof bow, it is essential to ensure equivalent rigidity in one of the ways listed below.

For alternative methods of ensuring equivalent rigidity developed by the upfitter, an evaluation with the responsible department is necessary. As part of the eXpertUpfitter program please refer to www.UpfitterPortal.com.

Equivalent rigidity when cutting B-pillar roof bow

For the following variants, an evaluation with the responsible department is necessary.

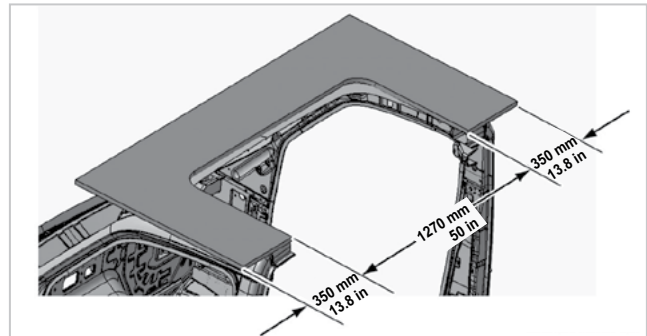
As part of the eXpertUpfitter program please refer to www.UpfitterPortal.com.

Variant 1: Sandwich construction/wooden board

When the B-pillar roof bow is cut, the equivalent rigidity requirements can be met by means of a wooden board or sandwich construction bonded to the basic vehicle over its entire surface (e.g. with Sikaflex 221). The arched roof contour must be adapted to form a non-positive fit with the sandwich construction or wooden board by means of an auxiliary construction.

Required bending resistance of sandwich construction/wooden board

y-axis	$EI_2 = 7 \times 10^8 \text{ N/mm}^2; 1015 \times 10^8 \text{ psi}$
z-axis	$EI_1 = 2 \times 10^{11} \text{ N/mm}^2; 290 \times 10^{11} \text{ psi}$



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Simulating structure (sandwich construction/wooden board) bonded to cut roof structure over entire surface

Material characteristics

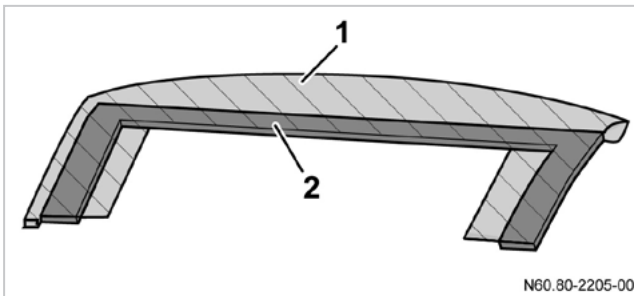
Sandwich construction	Wooden board
Structure: 2.0 mm/0.08 in GRP 26.0 mm/1 in foam 2.0 mm/0.08 in GRP	Structure: 20.0 mm/0.8 in wood
$E_{GRP} = 12000 \text{ N/mm}^2;$ 1740000 psi	$E_{Wood} = 3000 \text{ N/mm}^2$ 435000 psi
$E_{Foam} = 80 \text{ N/mm}^2;$ 11600 psi	

6 Modifications to the basic vehicle

Variant 2: Welded structure under cab roof

When the B-pillar roof bow is cut, the equivalent rigidity requirements can be met by means of a welded structure installed in the basic vehicle under the cut cab roof.

Required bending resistance for welded structures	
y-axis	$EI_2 = 8.35 \times 10^9 \text{ N/mm}^2$ $1.21 \times 10^{12} \text{ psi}$
z-axis	$EI_1 = 2.36 \times 10^{11} \text{ N/mm}^2$ $3.42 \times 10^{13} \text{ psi}$
4325 mm/170.3 in	≥ 6 bows

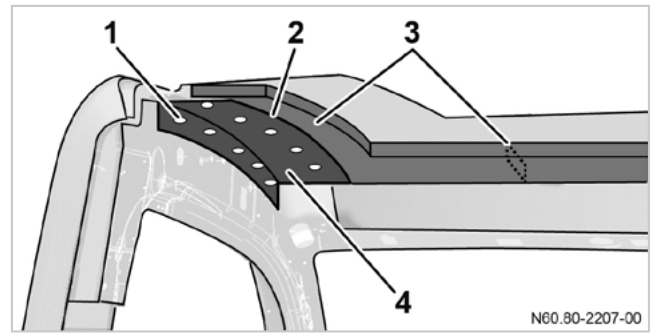


Welded structure

- 1 Roof paneling
- 2 Rectangular profile

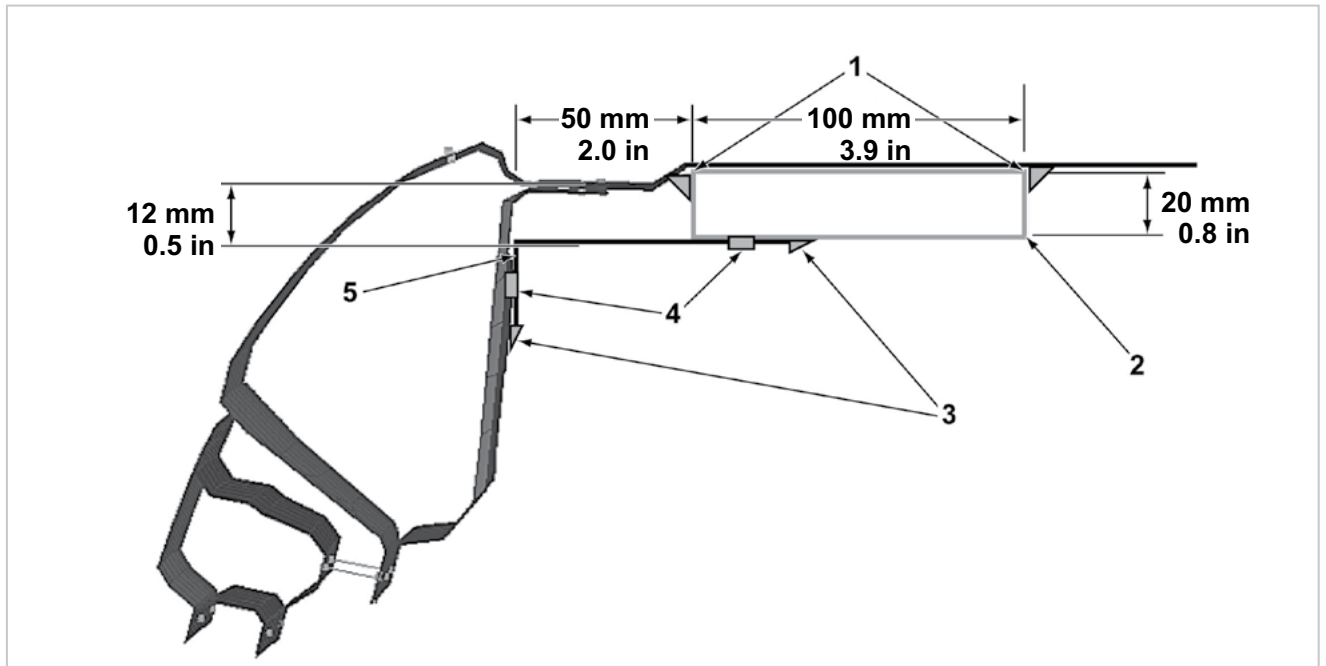
Material characteristics of subframe

Material	At least DC01 or S235JRG2
Height	20 mm/0.8 in
Width	100 mm/3.9 in
Wall thickness	1.5 mm/0.06 in
E	210000 N/mm^2 ; $3.045 \times 10^7 \text{ psi}$



Welded structure

- 1 Plug weld
- 2 Overlap seam
- 3 Rectangular profile
- 4 End plate



N60.80-2475-00

Cross-section of welded structure

- | | | | |
|---|---|---|-----------|
| 1 | Fillet weld | 4 | Plug weld |
| 2 | Rectangular profile (2 mm/0.08 in wall thickness) | 5 | End plate |
| 3 | Overlap seam | | |

6.2.12 Underfloor paneling

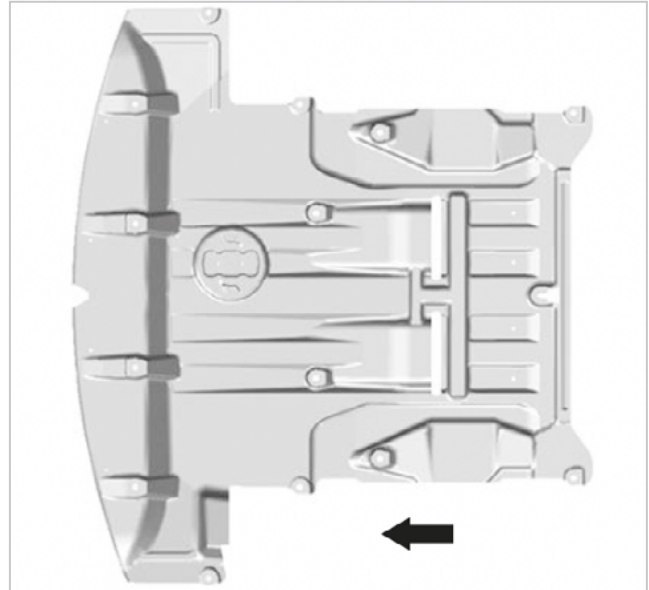
In the Sprinter, different types of underfloor paneling are available for soundproofing. Depending on the registration type and the country-specific laws and regulations, these are already available in the standard scope as single-piece or three-piece noise capsule. The one-piece noise capsule is available as special equipment with Code XM1.

On vehicles with M1 /N1 registration and OM654 engine, the front, one-piece underfloor paneling is fitted ex works.

A larger, three-part underfloor paneling is only fitted ex works with N2 registration and engine OM654, automatic transmission code G43 and in combination with axle ratio code AR5 for countries with statutory requirements.

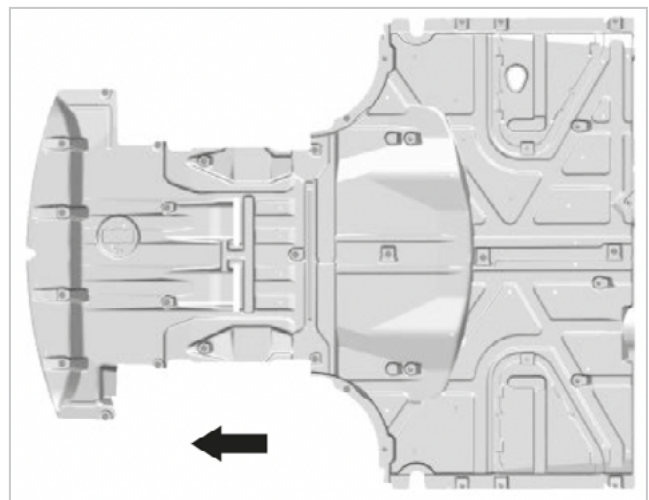
Further adjustments to the soundproofing with regard to different types of registration due to new legal requirements are currently under review. If you have any questions, please contact the Technical Consultancy for Upfitters (→ page 23).

If the vehicle is ordered with the "Transmission power take-off" special equipment (code N05/07) and the associated exhaust system variants, no underfloor paneling will be installed for thermal reasons, see Chapter 6.3.3 Exhaust system (→ page 142).



One-piece noise capsule at front under engine

Arrow Direction of travel



Three-piece noise capsule under engine and transmission and behind front axle

Arrow Direction of travel

! NOTE

The underfloor paneling installed ex works represents a certified vehicle status. For this reason, no modifications shall be made to these component parts.

Bodies or modifications that result in a change to the underfloor paneling can cause the type approval of the basic vehicle to cease to be valid with regard to external noises according to UN-R51.

You can clarify whether and how the certified limits for the basic vehicle can be observed with the relevant technical registration service and/or the government authority during the planning phase.

! NOTE

If modifications to the underfloor paneling parts or to the attachment of an underride guard are necessary for bodies or conversions of vehicles for a specific purpose, it is imperative that you contact the Technical Consultancy for Upfitters(→ page 19) in the planning phase to request a Letter of Compatibility, see Chapter 3.9.1 Threaded connections (→ page 51).

Additional soundproofing measures for compliance with the legal specifications are available in the vehicle at different additional locations depending on the registration type and the country-specific laws and regulations.

It is recommended to not modify or replace the component parts installed ex factory.

If the registration type will be changed as a result of the body or conversion, additional or modified soundproofing measures may be required. The upfitter has the overall responsibility in this respect for compliance with the country-specific laws and regulations (e.g. UNECE regulation UN-R51), see Chapter Checking the tires (→ page 58).

Where a Letter of Compatibility(→ page 51) is requested, provide the verification regarding compliance with the legal regulations upon request.

6.3 Engine peripherals/drivetrain

! NOTE

Maintenance and repair of the vehicle must not be hindered by the body (→ page 56).

- i** Vehicles with engines OM651 and OM642 are no longer available ex factory. For this reason, this information is no longer included in the present Body/Equipment Mounting Directive. If required, you can find corresponding information and specifications in previous Body/Equipment Mounting Directives in which the engines are still included. These are still available in the Body and Equipment Guideline in the upfitter portal

Modifications to the engine timing/performance enhancement

! NOTE

Any interference in the engine timing by customer and upfitter is not permitted.

Manipulations or modifications to the engine timing cause changes in the certified engine data and emission values and thus result in the immediate invalidation of the operating permit.

6.3.1 Fuel system

General

Modifications to the fuel system may only be carried out with the approval of the department responsible 1.7 Contact (→ page 17).

! WARNING

Fuels are highly flammable. There is a risk of fire and explosion if fuels are improperly handled!

There is a risk of fire and explosion if fuels are improperly handled!

Avoid all fire, open flames, smoking and sparks.

! NOTE

Non-approved modifications to the fuel system (fuel tank, lines, etc.) may lead to impaired performance and engine limp-home mode.

Note the following when working on the fuel system:

- The attachment of heat-conducting components or components which restrict installation space is not permitted.
- Modifications to the fuel pump, fuel line length and fuel line routing are not permitted. Any changes here to components that are matched to each other may impair engine operation.
- Modifications and attachments (e.g. additional eye-lets) are not permitted in the vicinity of the fuel filler neck in the area of the B-pillar.
- If bodies are mounted on basic vehicle cabs, protection of the fuel system is necessary if the fill level sensor is not protected by the body. The delivery module is protected by the body ex factory.
- When installing fuel-fired auxiliary heating, observe the specifications in Chapter 6.5.2 Auxiliary heating 6.5.2 Auxiliary heating (→ page 162).
- Observe the type-approval procedures when connecting the fuel supply to auxiliary heating systems

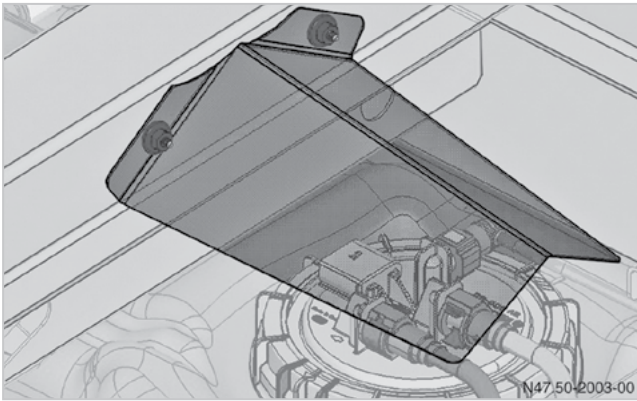
! NOTE

As a general rule, do not place any load on the fuel tank, for example by using it as a step.

In the case of bodies based on an open model designation, it is necessary to protect the system components on the top of the fuel tank (fill level sensor and vent valve) from falling cargo or objects as shown in the following illustration.

Without such protection in the area illustrated, these system components and the fuel tank may become damaged, rendering the vehicle unusable.

The planning and implementation of the protection, taking into account the specific vehicle attachment, is the sole responsibility of the upfitter.

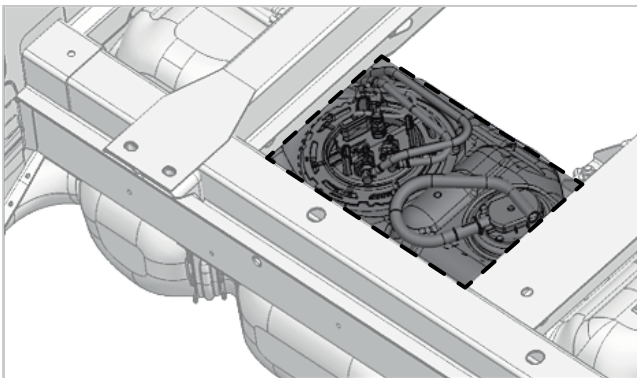


Fuel level sensor shield



Fuel level sensor shield

Protection of the fuel system



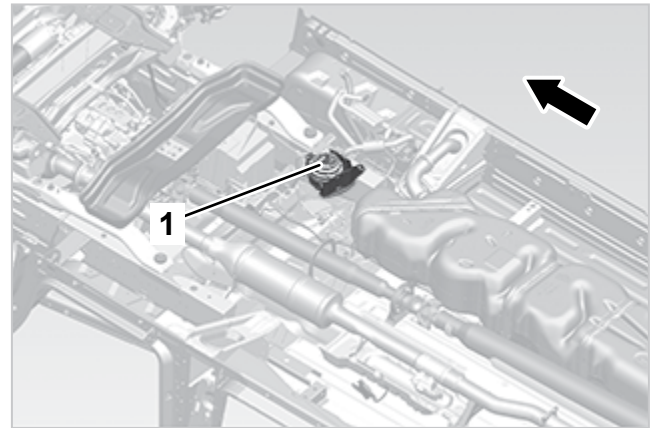
Protection of the fuel system

Fuel filter

On engine OM654, the fuel filter is located in the substructure, in the direction of travel upstream of the fuel tank (see illustration). The position differs for the vehicles with rear wheel drive and with all-wheel drive in the X-direction.

Details on the position and component geometry can be found in the CAD data that is available via the Upfitter Portal.

No modifications may be made to the fuel filter, its position and mounting, and the related detachable parts. Ensure that access to the fuel filter for servicing and repair purposes is provided and that it is not restricted by body-manufacturer-specific detachable parts



Position of fuel filter on OM654 engine (schematic, rear wheel drive)

1 Fuel filter for OM654
Arrow Direction of travel

NOTE

Any unapproved modifications to the fuel filter and hindrance to the access of fuel filter may lead to functional impairments or to component failure, and consequently to the engine running in limp-home mode.

Fuel-powered heater booster

The following must be observed if fuel-powered heater boosters are retrofitted:

- No sharp edges permitted
- The fuel tank must not be subjected to load in the event of an impact. Deflection plates must be fitted if necessary
- Fuel lines must be designed safely
- Exhaust gases must not be directed into the vehicle interior

When connecting the fuel supply for auxiliary heating, the type approval procedure must be followed.

Connection of heater booster (code KL1)

Code KL1 is available as special equipment and consists of the following components:

- 1 ea. transport protection with connector coupling
- 1 ea. auxiliary heater line

! NOTE

Operation of additional external consumers

When the fuel level is at the reserve level, do not tap fuel from externally operated consumers via the auxiliary heater line.

! NOTE

Fuel display (code J51)

Modifications to the fuel tank are not permitted. If the upfitter installs a tank of a different size, the fill level will no longer be displayed correctly on the instrument cluster.

Modifications to the tank system are only permissible in consultation with the vehicle manufacturer Mercedes-Benz.

When using externally operated consumers via the auxiliary heater line in vehicles with code J51 "Fuel gauge, adapted for additional fuel tapping", the indicated range remaining varies from the series production configuration.

🔥 ENVIRONMENTAL NOTE

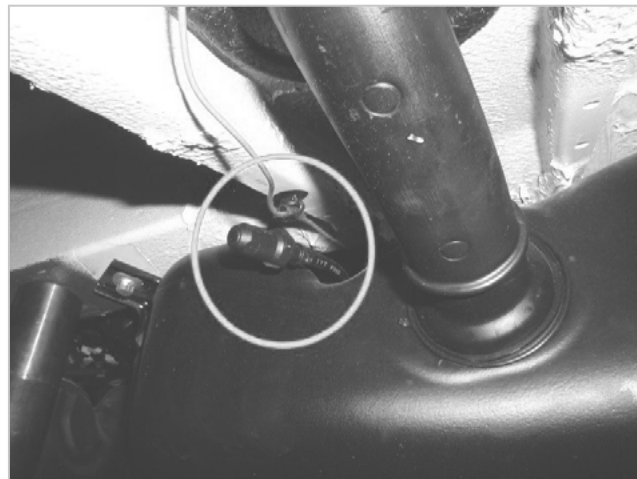
Modifications carried out incorrectly to the fuel system may have a detrimental effect on the environment.

A fuel tap is standard equipment on Diesel engines. This fuel tap prevents the fuel tank from running empty.

KL1 Auxiliary Diesel Fuel Tap (standard)

The fuel gauge sensor is fitted with an additional fuel connection to facilitate retrofitting of a fuel-powered auxiliary heater. The fuel tank can be consumed down to approximately 5 gallons.

The picture shows a cap which can be removed. The connector piece is \varnothing 7.89 mm/0.31in. Aftermarket quick connects have to be compatible with SAEJ2044 specified tube end forms.



N47.00-2059-00

View from underneath without a fuel fired heater



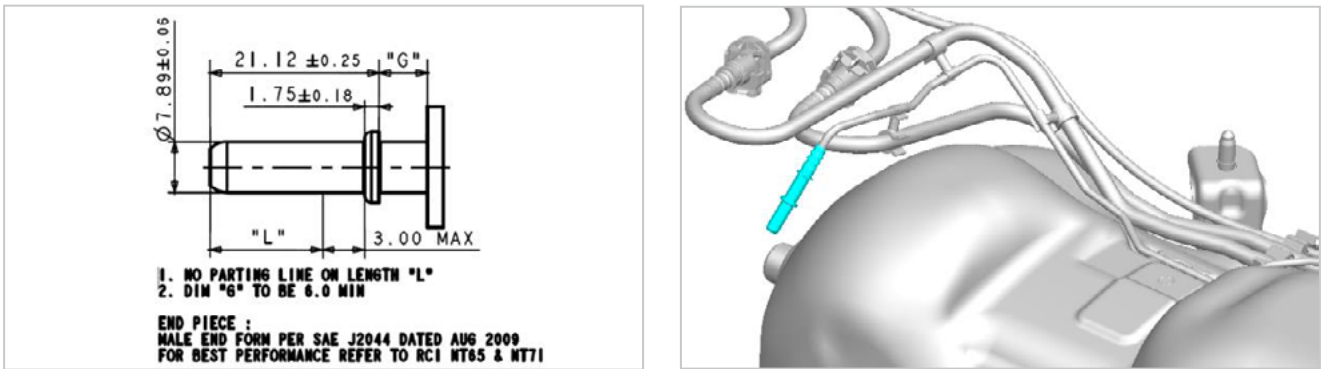
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Top view showing a fuel pump unit on a chassis cab

🔥 ENVIRONMENTAL NOTE

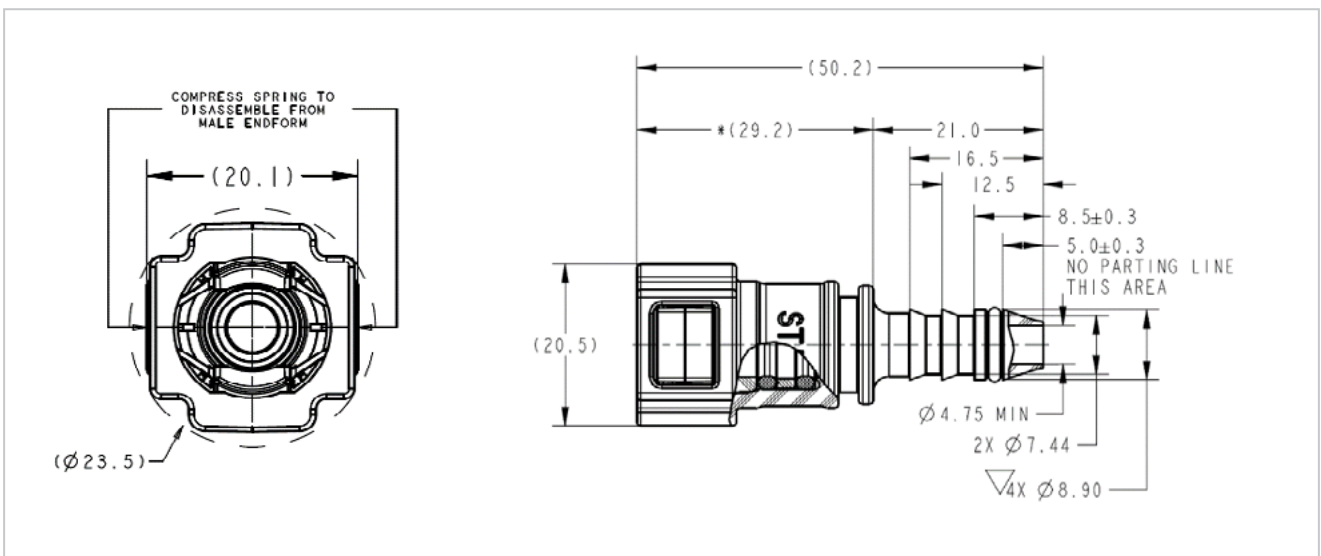
Modifications carried out incorrectly to the fuel system may have a detrimental effect on the environment.

The male connector piece which is coming with KL1 is shown in detail below. The measurements are shown in metric (mm).



Male connector piece drawing

For connecting an aftermarket fuel line the upfitter can order the female connector from the supplier Rayconnect Incorporated (<https://catalog.araymond-automotive.com>).



Female connector drawing



Example for a female connector for KL1

6.3.2 SCR exhaust gas aftertreatment system

The SCR (Selective Catalytic Reduction) exhaust gas aftertreatment system is the most important element for complying with the Euro 6/VI emissions regulations. The SCR exhaust gas aftertreatment system reduces nitrogen oxide (NOx) through exhaust gas aftertreatment.

! NOTE

Modifying the components of the SCR system or changing their installation positions is not permitted. This includes the AdBlue® tank, the AdBlue® lines and all other SCR system components.

Apart from electronic control units and sensors, the SCR system requires a catalytic converter and the additive AdBlue®/DEF.

AdBlue®/DEF

AdBlue®/DEF is a solution of urea (32.5%) and water. AdBlue®/DEF is a noncombustible, nontoxic, colorless, odorless and water-soluble liquid.

AdBlue®/DEF has a limited shelf life, which is affected by the ambient temperature and air humidity. When filling it from containers, the following points must be observed.

Information on handling AdBlue® and its material characteristics can be found in ISO 22241.

Local and national laws and regulations for proper and correct disposal and handling must be observed.

If AdBlue®/DEF comes into contact with painted surfaces or aluminum, the affected area must immediately be cleaned with water.

Any AdBlue®/DEF pumped out of the SCR tank must not be reused. As the AdBlue®/DEF that is pumped out is not always pure, it must be properly disposed of.

i For further information, observe the operator's manual of the vehicle.

AdBlue®/DEF tank

The AdBlue®/DEF tank system is part of the SCR exhaust gas aftertreatment system.

The AdBlue®/DEF tank system is designed for all common AdBlue containers and delivery nozzles.

The tank flange module (preheater package) with pumps, heating and sensors, which is part of the SCR system, is welded together with the AdBlue®/DEF tank. The AdBlue®/DEF tank is located in the front-end assembly on the right side in front of the front axle, and is connected to the longitudinal frame member and the inside of the A-pillar.

On the series production vehicle, the components of the AdBlue® tank and tank flange module, as well as the electrical and hydraulic connections, are protected against damage by the front apron, e.g. when driving over low curbs or other obstacles.

If the factory-fitted front apron is omitted, measures must be taken to protect the components on the underside of the SCR exhaust gas aftertreatment system.

The filler neck is located in an opening at the front of the front module carrier under the hood.

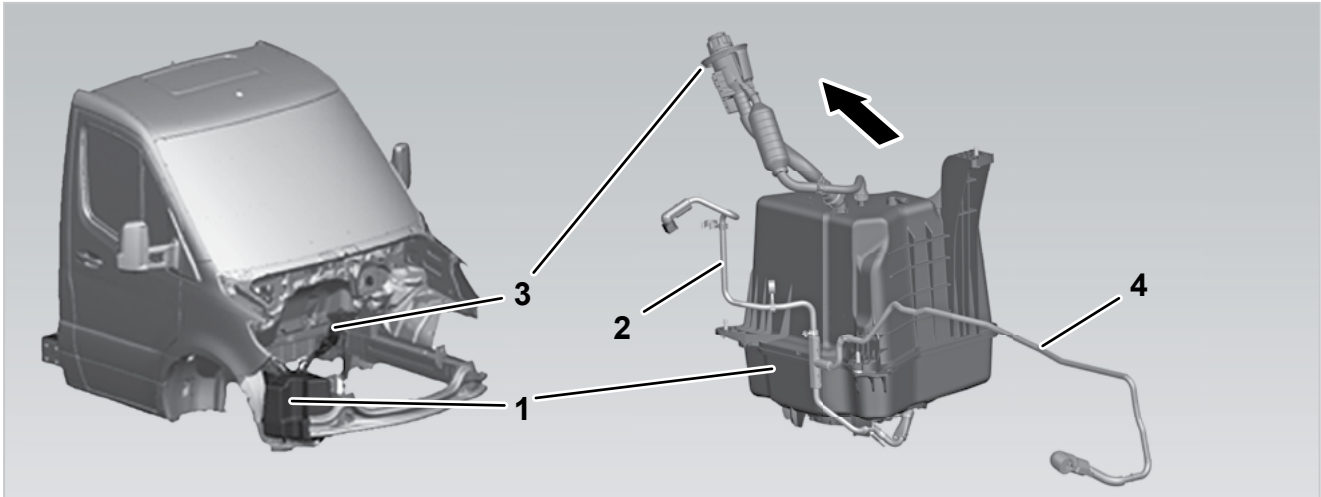
Modifications to the tank flange module may only be permitted with the approval of Mercedes-Benz.

The AdBlue® line connects the AdBlue® tank to the injection valves for metering. The line is electrically heated and designed for this system according to the line rigidity.

Modifications to the heated AdBlue® line are only permitted with the approval of Mercedes-Benz.

The AdBlue® tank for OM654 is located at the same position in the engine compartment as in the previous engines.

The injection of AdBlue® into the exhaust system nevertheless takes place at two positions in the vicinity of the engine and in the area of the substructure.



SCR system for engine OM654

- 1 AdBlue® tank
- 2 AdBlue® line for metering near engine
- 3 AdBlue® filler neck
- 4 AdBlue® line for metering in substructure area

Arrow Direction of travel

6.3.3 Exhaust system

Mercedes-Benz AG recommends that you refrain from modifying the exhaust system of Sprinter vehicles. The upfit scope should be planned according to the available special equipment of exhaust system variants.

If a vehicle's exhaust system is replaced, we recommend the use of Mercedes-Benz genuine parts. When selecting a different exhaust system as special equipment, ensure that it is also available for the same engine variant and emissions rating from the production plant of Mercedes-Benz. This guarantees that the planned special exhaust system has been certified in this vehicle configuration. Further information can be obtained from the local Mercedes-Benz Service Center.

! NOTE

Observe all national laws, directives, and registration regulations.

General

Any modification to the exhaust system in the permissible area must be designed in such a way that it is possible for the material to expand due to heating during operation. The attachment of the exhaust system and surrounding component parts must also be taken into account for this.

As part of such modifications, measurements of the exhaust gas back pressure must be taken (before/after) to ensure that it has not increased in comparison to the unmodified exhaust system. The upfitter concerned must be able to provide evidence of these measurements to Mercedes-Benz on request.

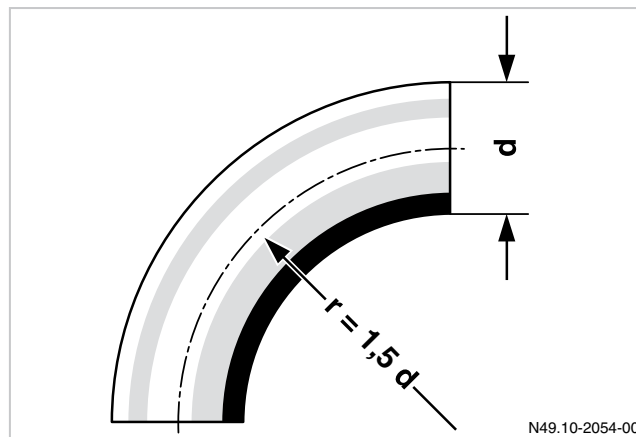
All modifications above and beyond these constitute an alteration of a certified state in terms of emissions and noise levels.

! NOTE

Upon completion of all work on the vehicle, you must comply with the specified anti-corrosion protection measures (→ page 96).

Exhaust system geometry

The following dimensions must be observed when modifying the geometry of the exhaust system:



Example of a pipe bend design

- Maximum pipe bend 90°
- Avoid the use of additional pipe bends
- Bending radii >1.5 d

! NOTE

It is important to note that modifications to the geometry of the exhaust system and its piping are only permissible under the boundary conditions described below.

The specifications on the area of the exhaust system in which modifications are permissible must be observed, see section Exhaust system with SCR exhaust gas aftertreatment system.

Minimum clearances to lines

When the vehicle is in operation, the temperature between the exhaust system (diesel particulate filter, catalytic converter or main muffler) and the floor panel may rise above 80°C/ 176°F depending on the location. During regeneration, the diesel particulate filter can reach a surface temperature in excess of 500°C/ 932°F. For this reason, shielding or insulation must be mounted on the substructure to reduce the effects of radiated heat.

Specification for minimum clearances for fuel lines, plastic lines, electrical cables and spare wheels, and for all components made of non-heat-resistant materials:

- 200 mm/ 7.87 in. for exhaust systems without shielding
- 80 mm/ 3.15 in. in areas with sheet metal shielding
- 40 mm/ 1.57 in. in areas with sheet metal shielding with additional insulation

⚠ WARNING

If the minimum distances to fuel lines, plastic lines and electrical cables are not maintained, severe heat can result in a fire.

There is a risk of fire and explosion!

Always comply with the specified minimum clearances.

It is important to not only consider the radiant heat emitted by the exhaust system, but also the jet of exhaust emitted behind the exhaust pipe outlet under all operating conditions.

! NOTE

When using the power take-off, refer to the information and notes in the operator's manual of the vehicle regarding regeneration of the diesel particulate filter in the exhaust system.

Additional shielding is required

- Near control panels
- Near major assemblies, attachments and equipment, unless they are made of heat-resistant material.

Exhaust gas emission

It must be ensured that the exhaust gases emitted from the tailpipe cannot enter the passenger compartment. Particular attention must be paid to this in the layout of accesses and doors.

Ex-factory exhaust system variants

The following exhaust system versions are available from the factory as special equipment:

Code	Description
K63	Exhaust, to the side behind the rear axle
KA3	Exhaust, to the side in front of the rear axle

- ① Additional information on special equipment can be obtained from your Mercedes-Benz Service Center, under 1.7 Contact (→ page 17) or under 3.12 Special equipment (→ page 59).

Exhaust system without SCR system (gas engine)

The length and installation position of the flexible metal hose between the exhaust manifold and the exhaust pipe must not be changed.

The free cross-section of the exhaust pipe behind the main muffler must not be reduced.

⚠ WARNING

The lengths and routings, e.g. between the diesel particulate filter and the main muffler, are optimized with regards to temperature characteristics. Modifications could lead to higher or extreme temperatures in the exhaust system and surrounding components (propeller shafts, fuel tank, floor panel, etc.). There is a risk of fire!

Modifications to the exhaust system are not permissible up to the point of the main muffler.

6 Modifications to the basic vehicle

Exhaust system with SCR system

A modification to the exhaust system with SCR exhaust gas aftertreatment system is only permissible on vehicles with engine OM654 as of a clearance of 3.8 in (100 mm) behind the throttle flap (measured from the rear welding edge).

The positions and installation positions of the sensors and the throttle flap, as well as the spatial geometry of the overall system or other components, must not be modified, as this is part of the vehicle registration criteria.

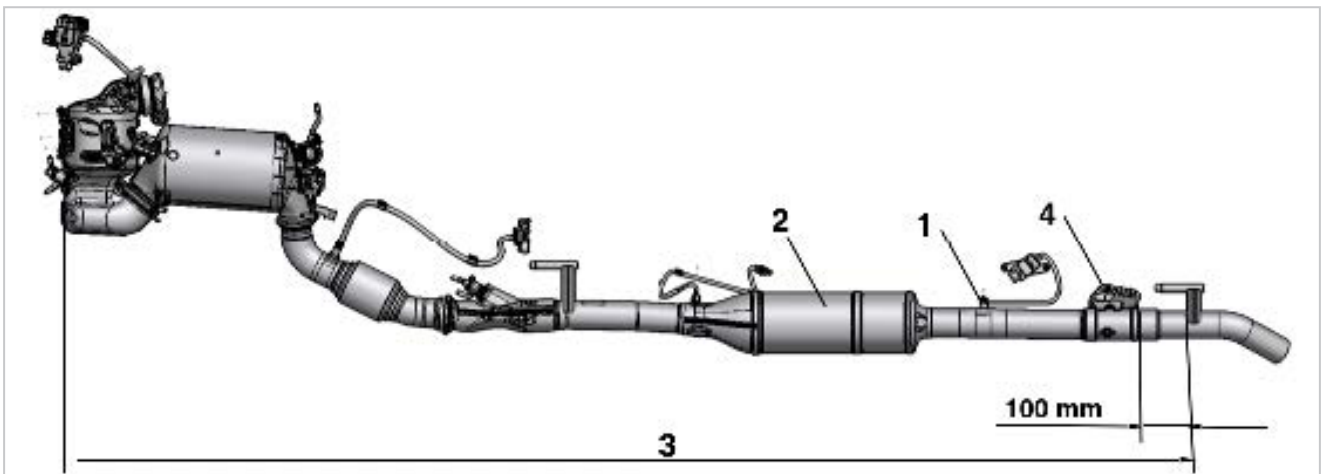
It is the upfitter's sole responsibility to guarantee adequate clearance between the exhaust system and all the components relative to its body scopes. The above-mentioned minimum distances to the exhaust system components must be observed.

! NOTE

A modification of the exhaust systems in combination with the special equipment for manual regeneration when stationary (code K1M) is not permitted as a whole.

! NOTE

After any components carrying AdBlue® have been opened, they must then be hermetically sealed against the ambient air. Otherwise, AdBlue® can crystallize and clog the system components.



Schematic diagram of exhaust system OM654

- 1 NOx sensor
- 2 SCR catalytic converter
- 3 Area in which modifications are not permitted
- 4 Throttle valve

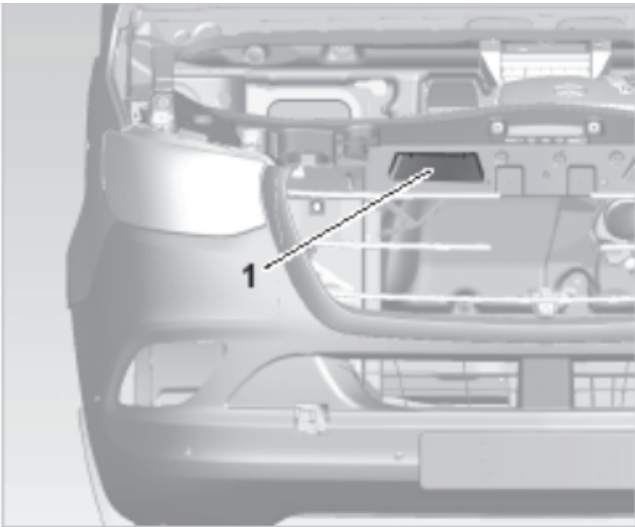
6.3.4 Engine cooling

! NOTE

The information and specifications for cooling engine OM654 in (→ page 82) must be observed.

6.3.5 Engine air intake

In engine OM654, the engine air intake is integrated into the area of the upper crossmember of the new front module.



1 Area of engine air intake

! NOTE

The engine air intake constitutes a certification-relevant state and must therefore remain unchanged.

Any modifications to the intake system or its surroundings are not permissible, as otherwise the emissions certification will no longer be valid.

If attachments or conversions are implemented in the area of the vehicle front, the upfitter bears sole responsibility for adhering to the legal certification requirement.

The air filter is secured by two rubber-mounted holders in the front module.

The design of the attachment of the air filter must be retained in the event of any modification to the front module.

Warm air

The intake of warm air will lead to a loss of engine power. A bulkhead between the engine compartment, the vehicle interior and the intake point is therefore essential. The intake temperature should not exceed the outside temperature by more than 10 °C/50 °F.

Water

When being drained off, water, splash water or car wash water must not flow directly past the intake area from the body. Make sure that water cannot reach the intake points through any fresh air supply inlets. The flow velocity at the intake points must not be increased by modifications to the opening of the intake points.

Dust/dirt

Increased dust intake will lead to shorter maintenance intervals for the air filter.

6.3.6 Clearance for major assemblies

To guarantee proper functioning and operational safety of the major assemblies, sufficient clearance must be maintained (in particular to electrical, brake and fuel lines).

The dimensional data in the 2D chassis drawings (offer drawings) must be observed (→ page 23).

The distance between the cab and the body must be at least 50 mm/2.0 in.

6.3.7 Propeller shafts

The correct layout of the propeller shaft drive prevents noise and the development of vibrations. We recommend the use of genuine Mercedes-Benz parts.

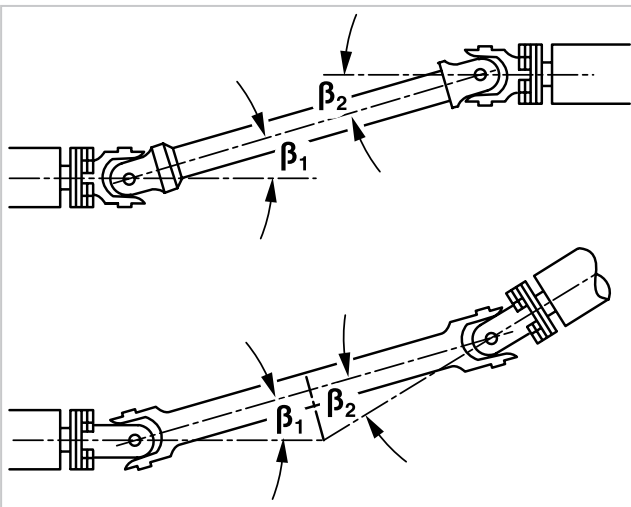
Working angles

If necessary, use several propeller shafts with intermediate bearings.

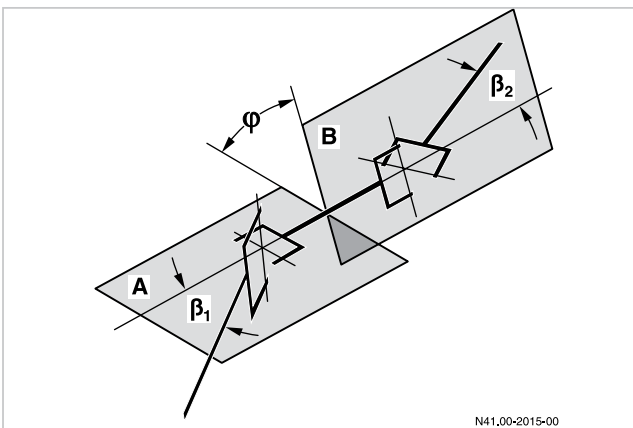
The working angles must be identical at both universal joints ($\beta_1 \neq \beta_2$). The working angles must generally not exceed 4.5° and in exceptional cases must be no greater than 6° (proper functioning of the universal joints must be assured). The angular difference should not exceed 1° .

NOTE

Working angles greater than 6° and angle errors ($\beta_1 \neq \beta_2$) lead to vibrations on the drivetrain. They shorten the service life of major assemblies and may cause damage. In addition, complaints regarding noise and vibrations that are transferred to the cab and the body are to be expected.



Types of angular offset



$$\beta_1 = \beta_2$$

Angle in one plane (two-dimensional offset):

- “W” or “Z” layout

Angles in two planes (three-dimensional offset):

- Angles in two planes (three-dimensional offset): The power input and power output shafts intersect in different planes (combined W and Z-offset).

In order to compensate for any irregularities, the inner joint forks can be offset. This fork offset must be designed and secured by a company qualified in propeller shaft engineering.

Propeller shafts must be balanced before installation.

Do not make modifications that are outside the limit values. Align with Mercedes-Benz via www.upfitterportal.com if modifications to the propeller shaft are planned.

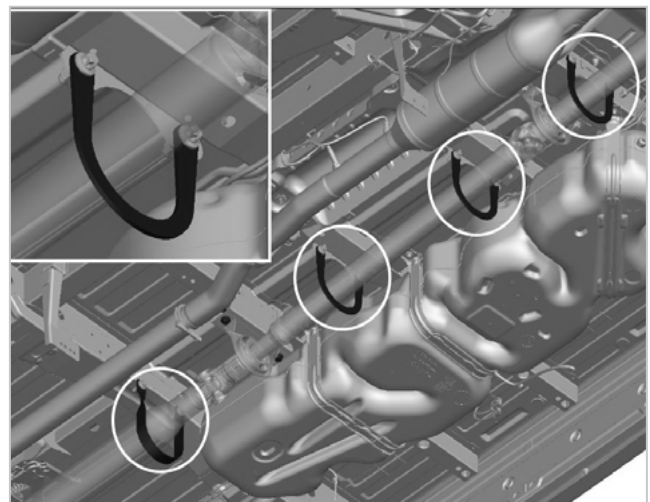
NOTE

Any temporary dismantling of the rebound straps during the upfit must be returned to the Mercedes-Benz specification before returning to use.

The Mercedes-Benz screws must be bolted at the designated points with a tightening torque of 70 Nm +/- 7 Nm (52 ft lb +/- 5 ft lb). The number of rebound straps varies depending on the length of the body.

All Mercedes-Benz passenger vans come standard with the option code AP2 (protection bar for driveshaft). The option code AP2 ensures compliance with all federal regulations for driveshaft protection regarding passenger vans and bus conversions. If any conversion of a non-passenger van to a passenger van is carried out, the upfitter is obligated to ensure that the van is compliant with all relevant driveshaft protection regulations and may order the option code AP2.

The driveshaft underneath the cab must be secured with at least one bracket.



Rebound straps

6.4 Interior

6.4.1 General information

! NOTE

Observe all national laws, directives, and registration regulations.

! NOTE

It is essential to observe the information, notes, and warnings regarding safety equipment and the pyrotechnical components, see Chapter 6.4.2 Safety equipment (→ page 148).

When redesigning the interior through installation, conversion, or removal, the upfitter shall be solely responsible for complying with all relevant legal requirements.

! NOTE

Modifications in the cockpit area and above the belt rail line must fulfill the criteria of the head impact tests in accordance with UN R 21 as well as FMVSS 201.

In the vicinity of the airbag deployment areas, see Chapter 6.4.2 Safety equipment (→ page 148), modifications to the surface of the cockpit, interior trims and seats (wooden trims, additional installed parts, mobile phone cradle, bottle holder or similar) are not permitted.

As a general principle, nothing may be installed on moving parts (e.g. storage compartment lid) in the cockpit area.

i You can find further information on camper van conversions in Chapter 7.15 Camper Vans (→ page 242).

! WARNING

If paint or surface treatment is applied to the instrument panel, the window airbags, the steering wheel impact absorber and the airbag tear seams, chemical reactions can occur on the treated surfaces. This could weaken or damage the materials, meaning that the restraint systems no longer operate properly.

There is danger to life and limb!

Painting or surface treatment is not permissible on the instrument panel, window airbags, steering wheel impact absorber or airbag tear seams.

In the event of modifications in the interior, the permissible vehicle center of gravity as well as the axle loads must not be exceeded.

In general, observe the following for installations or modifications in the interior:

- Upfits must be made of flame-resistant materials with soft edges and surfaces and be installed securely.
- Uncompromised access to the seats must be ensured. There must not be any protruding parts, edges, or corners that could cause injury in the area of the seats.
- Please Note that as of model year 2024 the area at the lock of the load compartment sliding door on vehicles with rear seats or with preparation for a retrofitting of rear seats comes with an updated locking geometry (special equipment code V40 or T01, See Chapter 7.3.1 Retrofitting seats (→ page 216)). Upfitter specific installation or conversion (e.g. partition, trim or similar) must be adapted accordingly to ensure the function of the new sliding door lock.
- For easy access to screw connections or when replacing series-production parts (for maintenance and service), it is advisable to provide sufficient openings at appropriate positions for conversions or work on the body with interior equipment specific to the upfitter, e.g. in the middle of the side wall for bolting on the load compartment sliding door track or in the area of the rear portal at bottom left for replacement of the interior pollen filter.

6.4.2 Safety equipment

⚠ WARNING

Any systems or components that influence passive safety must not be modified. In particular, if alterations were to be made to the vehicle's structure or components, the safe operation of restraint systems would no longer be guaranteed.

There is danger to life and limb!

Modifications such as these could also result in the vehicle registration being revoked.

Therefore, the following modifications are not permissible:

- Modifications to seats, seat belts, and their mounts
- Modifications to the front-end assembly
- Modifications to the interior by installing parts in the vicinity of outlet openings and in the airbag deployment areas; see the illustrations in the section on airbags (→ page xx).
- Modifications to the instrument panel (cockpit), the steering wheel, or the trim, as well as their lamination with coverings or other types of trim, in particular in the areas of airbags.
- Modifications to the A-pillar and B-pillar, the roof frame, and its trim
- Modifications to the doors

In the case of the following interventions in the structure of the vehicle, pay attention to the particular provisions of Mercedes-Benz in Chapter 6.4.3:

- Modifications to the seats
- Installation of non-Mercedes-Benz seats

! NOTE

Attachments with rigid connections to the front, side and rear of the vehicle at the height of possible accident zones could modify the characteristics of the vehicle's passive safety.

⚠ WARNING

Any modifications to restraint systems or their wiring could result in these restraint systems not functioning correctly. A restraint system can fail or unintentionally activate.

There is danger to life and limb!

Modifications to restraint systems or their wiring are therefore not permitted. This includes modifications to the belt mounting points and their positioning on the B-pillar and any modification of Mercedes-Benz genuine belt system components.

! NOTE

Attachments with rigid connections to the front, side, and rear of the vehicle at the height of possible accident zones could modify characteristics of the vehicle's passive safety.

Airbag control unit and sensors

It is not permitted to modify the installation location, installation position and attachment of the airbag control unit and satellite sensors by comparison with the standard equipment on vehicles equipped with window airbags and thorax/pelvis side airbags. No modifications of any kind are permitted to the lines of these components.

Other vehicle components must not be attached to the airbag control unit, acceleration sensors, their lines or the attachment points. Comply with a minimum distance of 6 mm during the installation of component parts in the vicinity of these components.

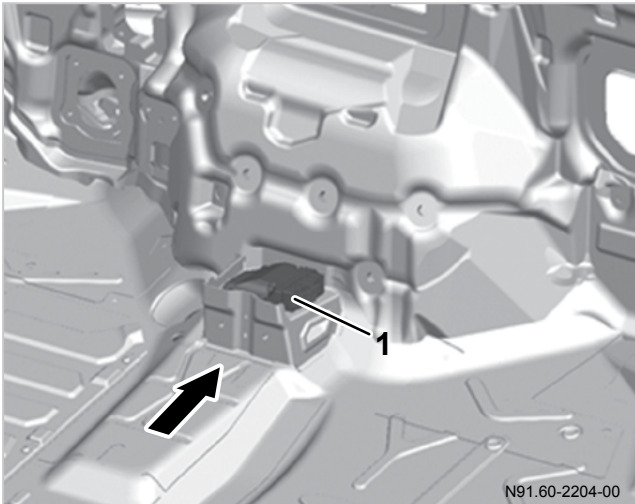
⚠ WARNING

No modifications of any kind are permitted to the components of the restraint systems (airbag control unit, acceleration sensors, airbags, seat belt tensioners, etc.), as well as to their lines or attachments.

Vehicle parts that generate vibrations must not be mounted in the proximity of the airbag control unit or the sensor installation locations. Nor may modifications be made to the floor structure in the proximity of the airbag control unit or the acceleration sensors. Otherwise, the safe operation of restraint systems is no longer guaranteed.

There is danger to life and limb!

The airbag control unit is located on the center tunnel under the center console.

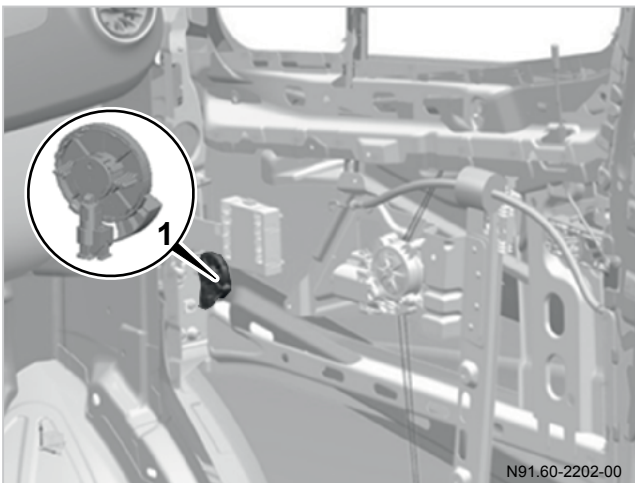


Location of airbag control unit

- 1 Airbag control unit
- Arrow Direction of travel

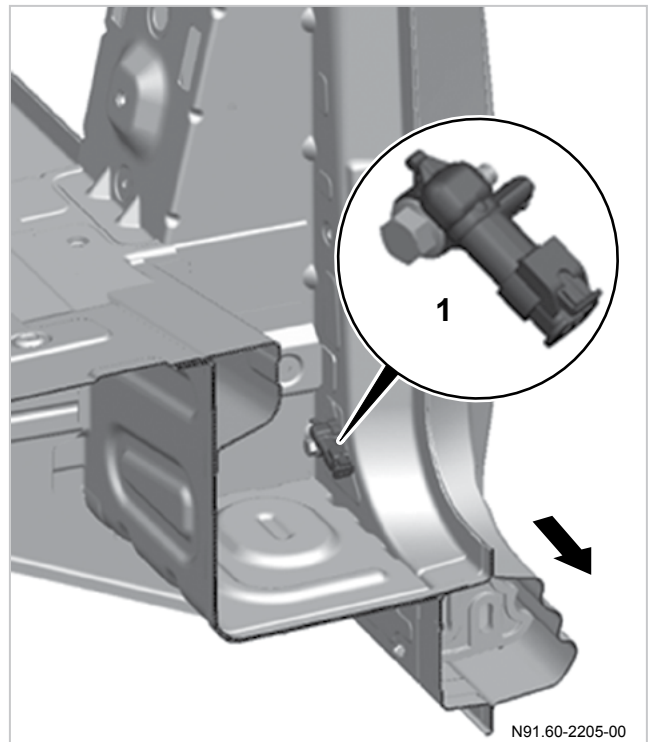
In vehicles equipped with window airbags and/or thorax/pelvis side airbags, the satellite sensors are located towards the bottom of the B-pillar behind the door sill trim in the driver's and front passenger's entrance boxes.

The pressure sensors are located in the driver and/or front passenger door.



Front pressure sensor

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



Sectional view of left entrance box at B-pillar

- 1 Satellite sensor (trigger sensor of the occupant protection systems)
- Arrow Direction of travel

⚠ WARNING

For safety reasons, airbag sensor systems, airbag control units or acceleration sensors that have been dropped onto the floor must no longer be installed. Replace these parts with the corresponding Mercedes-Benz genuine parts. Otherwise, the safe operation of these systems is no longer guaranteed. There is danger to life and limb!

Seat belts

⚠ WARNING

Parts relevant to safety such as seat belts or belt anchorages and seat belt tensioners must not be damaged or soiled when work is carried out on the vehicle. Otherwise these restraint systems may no longer function properly, and in the event of an accident they would fail to provide sufficient protection.

There is danger to life and limb!

ℹ NOTE

Only the original seat belts may be fitted, otherwise the general operating permit of the vehicle would be invalidated.

For seat belts, seat belt tensioners and seat belt anchoring points, the specifications of the FMVSS/CMVSS, plus the national regulations concerning seat belts must be complied with and verified insofar as the FMVSS/CMVSS do not completely cover the national regulations or have priority over them.

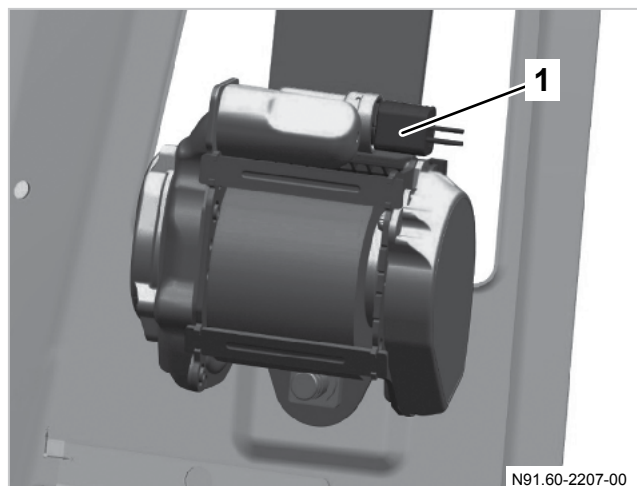
Vehicles must be equipped with seat belts.

The anchoring of the seat belts must be tested as per FMVSS/CMVSS 210.

Vehicles with a maximum design speed in excess of 25 km/h must be equipped with seat belts.

All vehicles, except vehicles without front airbags and with special attachments (e.g. snowplow), are fitted with pyrotechnical seat belt tensioners in the retractors on the front seats.

The retractors are located in the B-pillars. There is an additional retractor in the seat backrest of the bench seat on vehicles with two-seater front passenger bench seat.

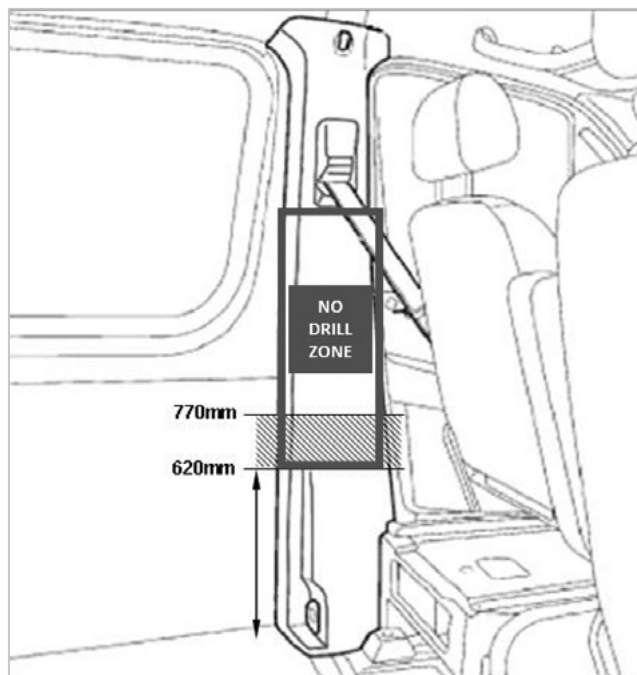


Retractor with pyrotechnical seat belt tensioner

1 Connector

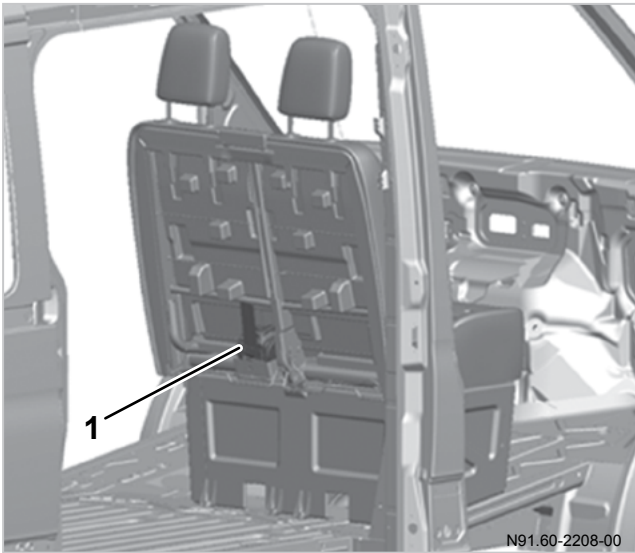
⚠ WARNING

When installing an aftermarket partition do not drill or attach any fasteners in the area between the bottom of the seat belt retractor and the bottom of the seat belt height adjustment.



N91.40-2195-00

Location of seat belt retractor between 620-770 mm/
24.25–30.5 in above floor



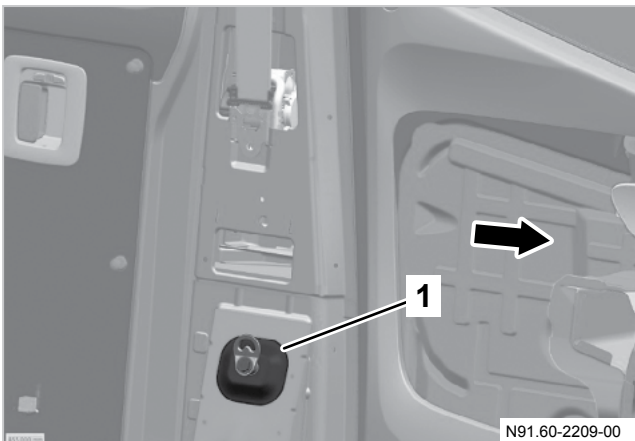
Front passenger bench seat with retractor

1 Retractor

! NOTE

Please ensure to comply with local and federal regulations.

There is also a securing point for a seat belt end fitting at the bottom of the B-pillar, which has been tested in accordance with UN R 14, R 16 and R 17, and with a folding seat rigidly connected to the body-in-white.



Securing point for seat belt end fitting in B-pillar

1 Seat belt end fitting


Arrow Direction of travel

6 Modifications to the basic vehicle

Airbags

All airbag units are labeled with the word "AIRBAG":

- The driver's airbag at the padded boss
- The front passenger airbag (code SA6) on the cockpit
- The window airbags (code SH9) on the A-pillar trims
- The thorax/pelvis side airbags (codes SH1/SH2) at the sides on the backrests of the driver's seat and front passenger seat facing the vehicle exterior

An additional identifying feature is the red indicator lamp  in the instrument cluster.

The indicator lamp signals a malfunction in the restraint system, which includes functions of the seat belt warning and the ESP® sensor system.


The following illustrations show the positions and deployment areas of the driver's and front passenger airbags as well as those of the window airbag and thorax/pelvis side airbag.

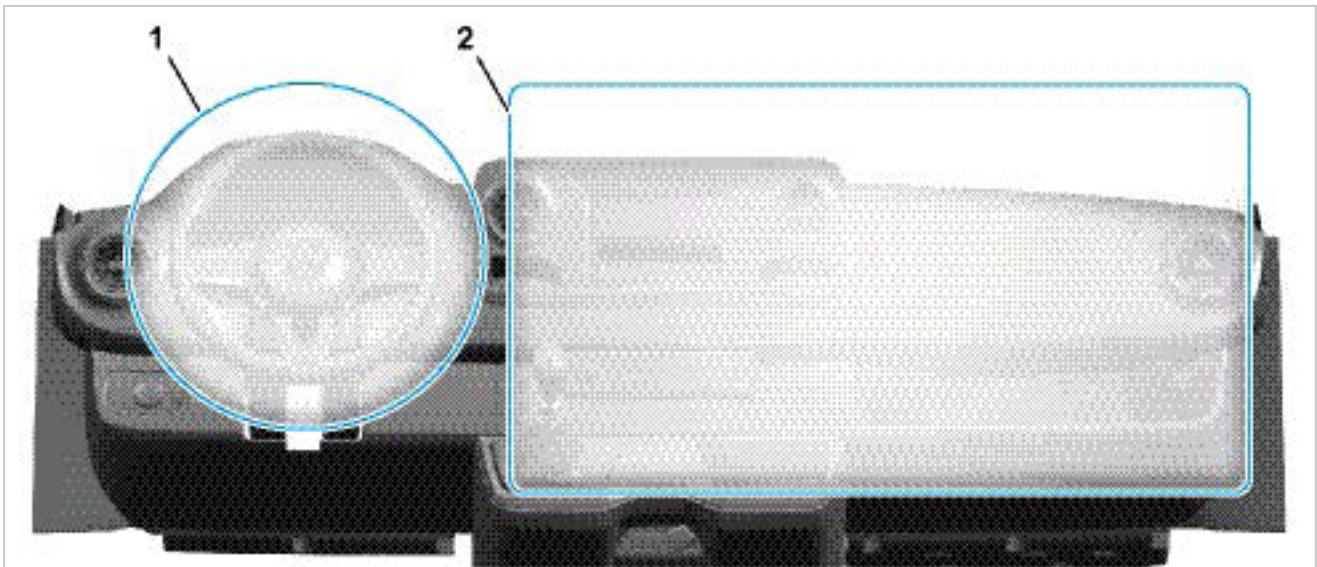
The deployment areas shown are greater than the actual volume of the airbag because space is required for airbag rebound as it deploys.

NOTE

No installations are permissible in the deployment areas of all airbags.

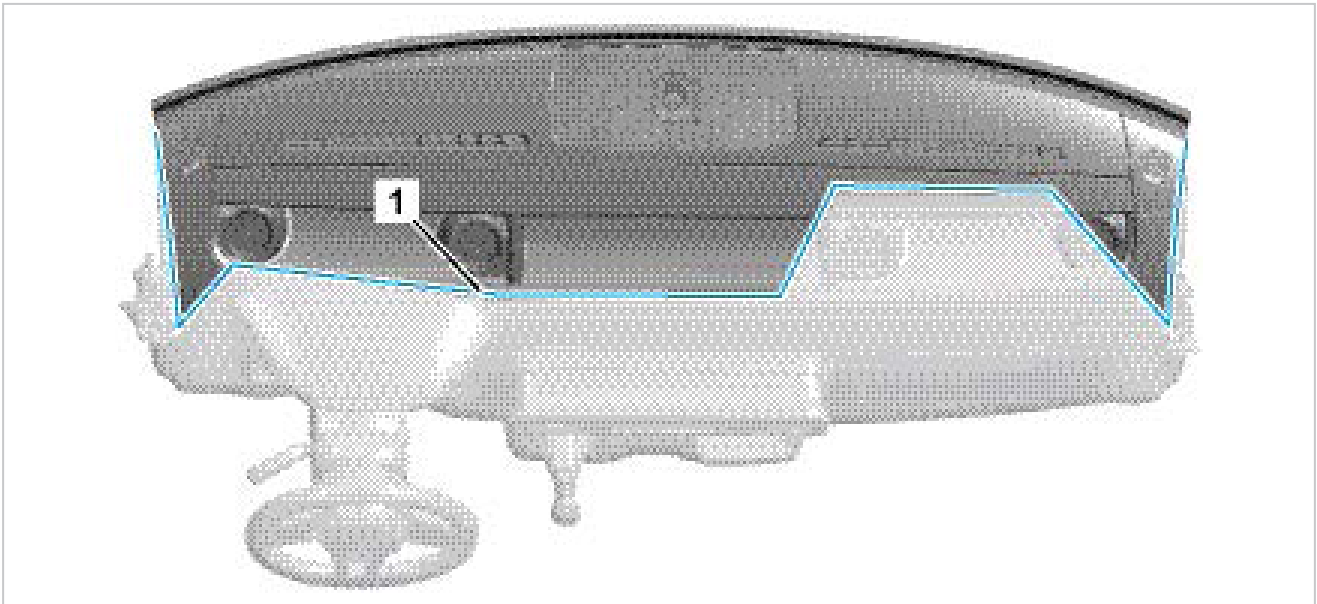
A minimum distance of 20 mm must be maintained between installations and surrounding parts (e.g. trim on A-pillar or windshield).

-  If you have any questions regarding installations in the vehicle interior, contact the Advice for Upfitters (→ page 19) during the planning phase.



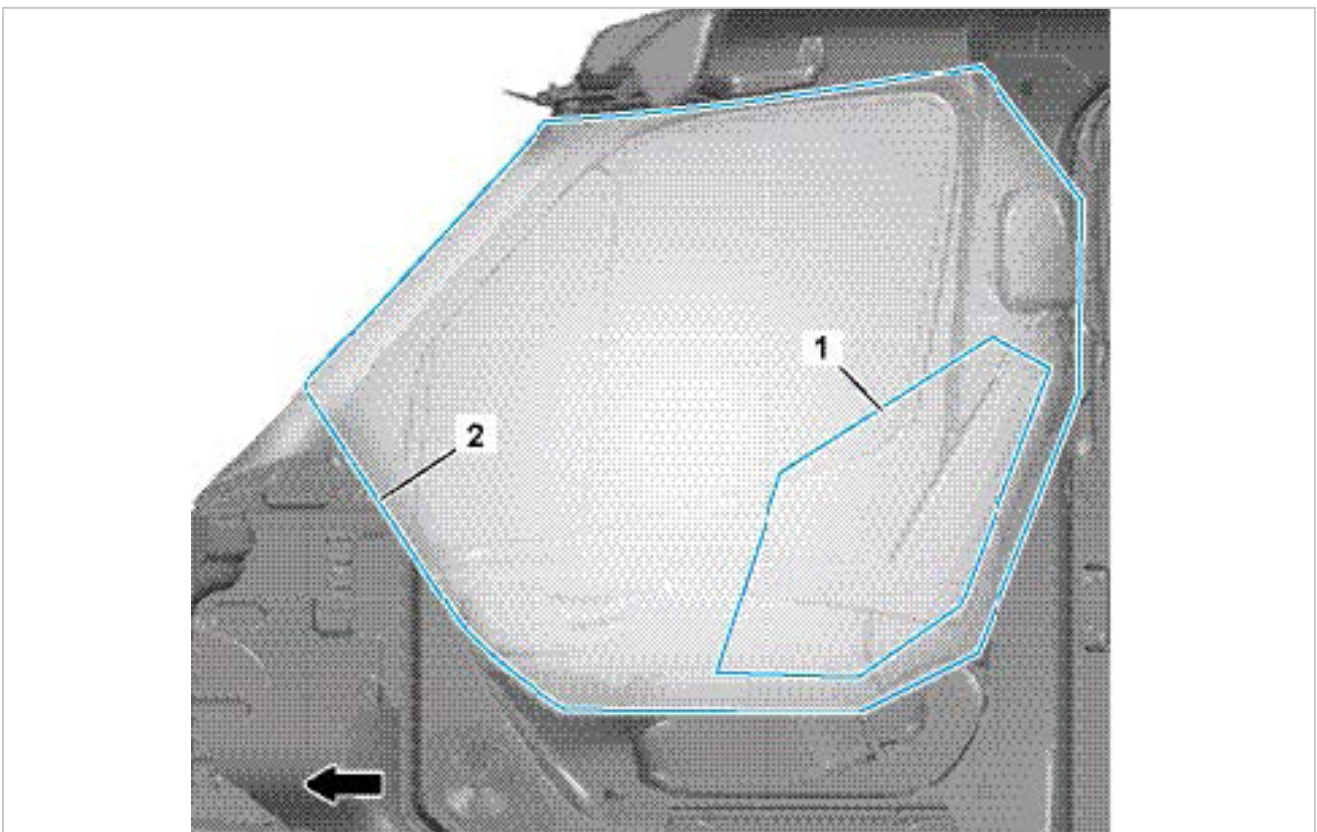
Boundary of deployment area for driver's and front passenger airbag (left-hand drive vehicle, mirror-inverted for right-hand drive vehicle, schematic)

- 1 Driver's airbag
- 2 Front passenger airbag



Boundary of deployment area for driver's and front passenger airbag (left-hand drive vehicle, mirror-inverted for right-hand drive vehicle, schematic)

- 1 Driver's and front passenger airbags



Boundary of deployment areas for side airbags (front passenger side, mirror-inverted for driver's side, schematic)

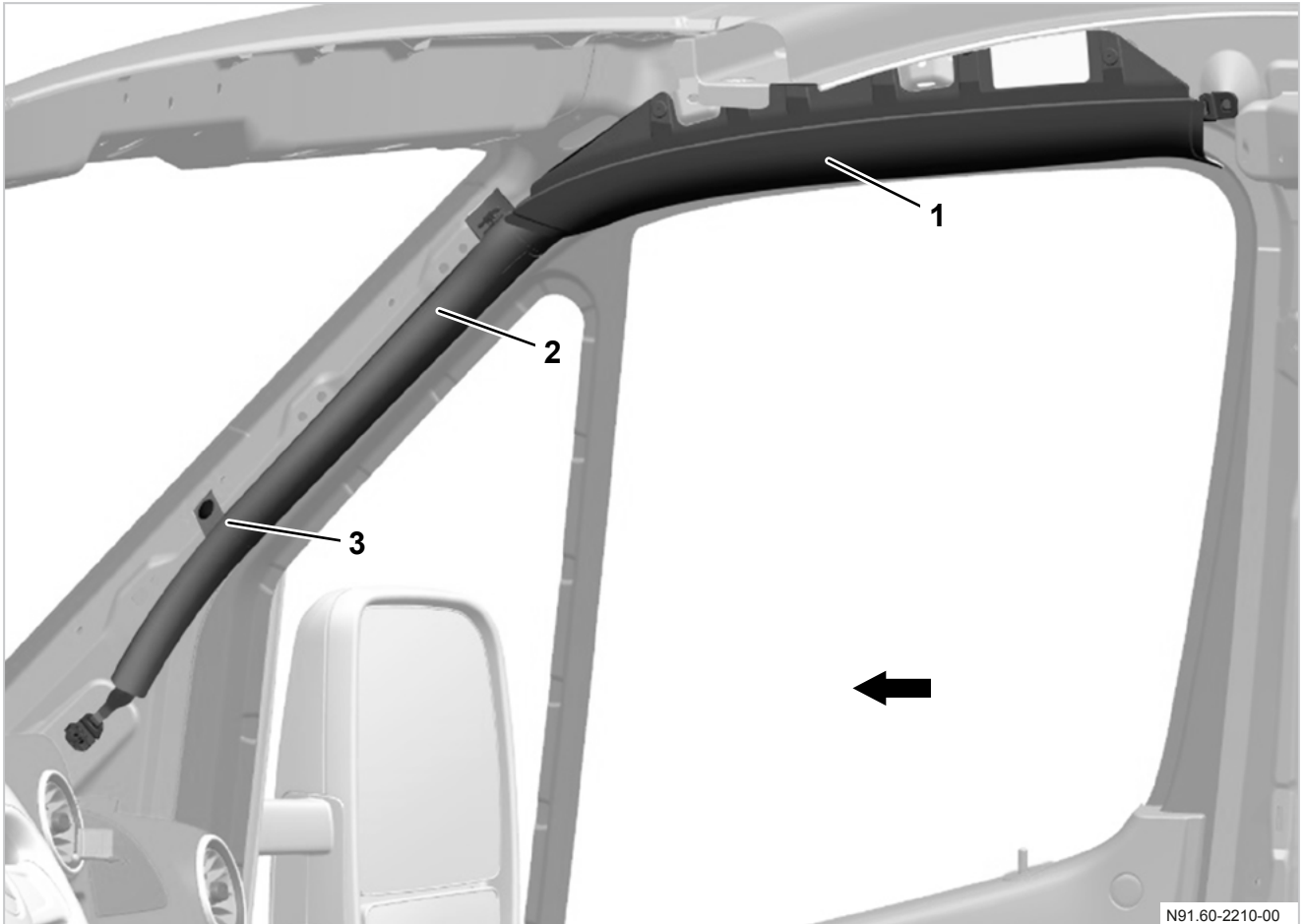
- 1 Thorax/pelvis side airbag
 - 2 Window airbag
- Arrow Direction of travel

6 Modifications to the basic vehicle

⚠ WARNING

Working on the A-pillar can cause damage to the window airbag. This can result in the window airbag no longer functioning properly and it may not provide adequate protection in the event of an accident.

There is danger to life and limb!



Window airbag installation position

- 1 Cover
- 2 Window airbag in protective sleeve
- 3 Gas generator in window airbag
- Arrow Direction of travel

Handling pyrotechnical components

⚠ WARNING

Airbag units and seat belt tensioner units are pyrotechnical components.

There is a risk of explosion when handling pyrotechnical components!

There is danger to life and limb!

Handling (installation, removal, transportation, storage, and disposal) of airbag units and seat belt tensioner units must therefore only be carried out by personnel who are appropriately qualified. Always observe the accident prevention regulations.

- Do not treat with grease, cleaning agents or similar agents.
- Do not expose components to temperatures over 100°C/ 212°F.
- Replace any pyrotechnical components that have been dropped to the floor.
- The pyrotechnical components must only be electrically tested in the installed condition with the prescribed test equipment. For safety reasons, the test should only be performed at a Mercedes-Benz Service Center or at a specialist workshop that has been specially trained to service these safety systems.

Removed airbag units must always be stored in such a way that the padded side faces upward. If the padded side faces downward, the airbag unit will be a potential projectile hazard if it is triggered accidentally.

There is danger to life and limb!

Working with airbag and seat belt tensioner units

⚠ WARNING

Removed airbag units must always be stored in such a way that the padded side faces upward. If the padded side faces downward, the airbag unit will be catapulted through the air if it is triggered accidentally.

There is danger to life and limb!

Observe the following specifications when handling airbag and seat belt tensioner components:

- Only qualified personnel may work with removed components and perform testing and assembly operations.
- Electrical inspection is to be conducted in installed condition only, using specified test equipment. We recommend that tests be carried out at a Mercedes-Benz Service Center.
- Assembly and disassembly are to be conducted only when the battery is disconnected, with covered up negative terminal or covered up negative clamp, and disconnected test coupling/ connector.
- After disassembling, components must be stored in a suitable storeroom only and must only be removed just before they are to be assembled.
- If work has to be interrupted, store components involved under lock and key.

Transporting and storing pyrotechnical components

Transportation should always be carried out using the replacement part packaging in the vehicle trunk or load compartment and in observance of the below warning notice.

! NOTE

Do not transport storing pyrotechnical components units in the passenger compartment.

Transportation should always be carried out using the replacement part packaging in the vehicle trunk or load compartment and in observance of the previously mentioned warning notice.

Class T1 pyrotechnical materials must only be stored in limited quantities on premises used for commercial purposes.

Annex 6 of the appendix to the "Second Ordinance of the German Explosives Law" specifies that the following maximum storage quantities are permissible without obtaining special approval from the relevant authority, where materials are stored on premises used for commercial purposes and certain conditions are fulfilled (e.g. steel cabinet):

- General storage space: 20 kg gross
- The gross mass of the component part that has been approved in accordance with the act concerning explosives is used to calculate the actual stored mass.

Gross mass of pyrotechnical component parts

Driver's airbag	1.5 kg/3.3 lbs
Front passenger airbag	3.3 kg/7.3 lbs
Window airbag	2.1 kg/4.6 lbs
Thorax/pelvis side airbag	0.7 kg/1.5 lbs
Seat belt	1.4 kg/3.1 lbs

Disposing of pyrotechnical components

! NOTE

Have pyrotechnical components disposed of by qualified personnel. Comply with the country-specific accident prevention regulations.

Dispose of airbag and seat belt tensioner units in accordance with the local and country specific laws and guidelines.

- ▶ If seat belt tensioners that have not been triggered require detonation for disposal purposes, place them in the footwell of a vehicle which has been sent for scrapping, and connect them directly using a 2-pin connector coupling.
- ▶ If the bolster plates on the airbag units have not been destroyed, the airbag units must be detonated by trained personnel using the 2-pin connector coupling.

These safety measures are necessary because flammability materials could cause injury if activated incorrectly.

- ⓘ Airbag and seat belt tensioner units must be disposed of by personnel who have undergone special training for this task. Accident prevention regulations must be observed.

Hazards arise from disposal using cutting torches, by smelting, or if primed parts are disposed of on open fires or smoldering fires on waste disposal sites.

In order to ensure that no additional work arises due to these safety measures, we recommend that you entrust the disposal of pyrotechnical substances to an external waste disposal company, which will implement the required safety measures (incl. 10 m/39.4 in safe distance, special ignition equipment).

When the materials are handed over, the waste disposal company must sign a declaration containing the obligation to dispose of the pyrotechnical materials in accordance with accident prevention regulations. Agreements of this kind must ensure that it is not possible to extract pyrotechnical materials after disposal and to pass them on for repairs.

6.4.3 Seats

Proof of the strength of the seats delivered from the factory is only valid if the seats are secured in original mountings.

As part of the eXpertUpfitter program, possible deviations can be evaluated with the responsible (→ page 17).

The test reports in relation to FMVSS 202a /CMVSS 202, FMVSS/CMVSS 207, FMVSS/CMVSS 209 and FMVSS/CMVSS 210 are a requirement to be an eXpertUpfitter.

It is essential to observe the H-point for each seat. The seats installed ex factory (driver/front passenger) must not be secured directly to the low seat base when the vehicle is delivered to the end customer. The H-point on seats available ex factory (driver/front passenger) in combination with the low seat base can be achieved using the swivel console available ex factory.


A rear seat system with 2- or 3-point seat belts that deviates from the standard seating arrangement must meet the requirements of the FMVSS/CMVSS 207 (seating systems) and the FMVSS/CMVSS 210 (seat belt assembly anchorages) standard. Furthermore, the standard FMVSS/CMVSS 209 (Seat belt assemblies) must be adhered to. For the headrests, proof of compliance with the FMVSS 202a/CMVSS 202 (Head restraints) standard is required. Always comply with local and national regulations.

Seats without belts are not permitted.

When seat belts and seats (including seat bases) are reinstalled, new bolts must be tightened, tested, and documented to the specified torque, including tolerance.

In the case of vehicle orders where the driver's seat (Code S90) or front passenger seat (Code S91) is deleted, it is not possible to retrofit standard seats in the body-in-white, as there are no reinforcements or suitable connection points. However, retrofitting after-market seats is possible, see Chapter 7.3 Modifications to the interior (→ page 198).

Test certificates for seats on a rigid plate are not permissible. Mercedes-Benz reserves the right to request these test certificates at any time as part of its product monitoring processes.

 Information on retrofitting seats can be found under Retrofitting additional seats (→ page 198).

WARNING

Unsuitable seat covers could hinder or even prevent the deployment of the airbags integrated in the seats. The airbags would then not protect the vehicle occupants as intended.

There is danger to life and limb!

Only use seat covers approved by Mercedes-Benz for the seat in question.

NOTE

If standard seats with integrated thorax/pelvis side airbags are upfitted with new seat covers or seat protectors (protective covers), verification must be provided that confirms that the deployment of the airbag does not deviate in any way from the series production configuration.

Seats with seat occupancy recognition must have this function verified in the event that a new seat cover in general or a protective cover with seat padding made of thick and/or rigid material is used.

If other seat covers or protective covers are used on seats without integrated airbags and without seat occupancy recognition, the upfitter must ensure compliance with the legal specifications and demonstrate this upon request (e.g. H-point seat layout, flame-retardant properties, etc.).

WARNING

Do not mount seats on the wheel well. This also applies for subsequently lowered wheel wells. Otherwise, the vehicle could be damaged (e.g. wheel wells and tires).

There is risk of an accident and danger to life and limb!

6.4.4 Reducing interior noise

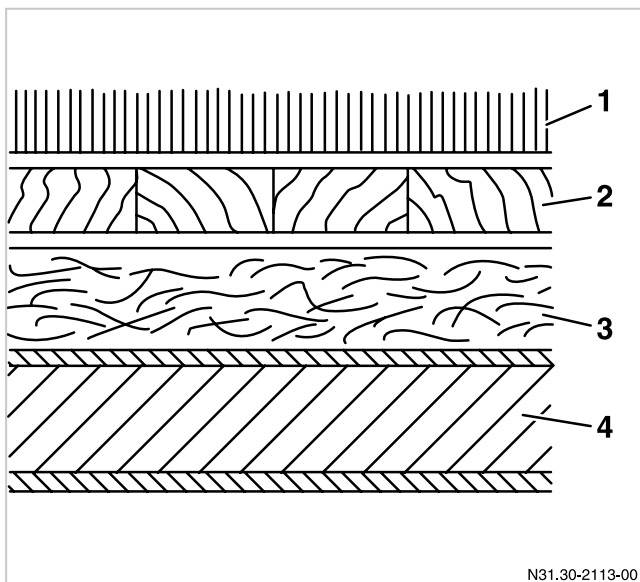
Soundproofing material can be installed in order to reduce the noise level in the vehicle interior. It must not be flammable.

Floor area

A structure as shown in the illustration is advisable for insulation and soundproofing. An additional covering with heavy-duty insulating foil may be provided in the area of the wheel wells.

! NOTE

Insulating foils, e.g. bituminous felt, have limited temperature resistance. They should therefore not be installed in the immediate vicinity of the engine or exhaust system.



- 1 Carpet (rubberized underside)
- 2 Wooden floor (12 mm/0.47 in plywood)
- 3 Heavy-duty insulating foil (weight per unit area 8-10 kg/m²; 1.636-2.045 lbs/ft²)
- 4 Load-bearing construction

Roof and side walls

Apart from providing insulation, the materials used for insulation should exhibit the following properties:

- Not hygroscopic
- Not water-retaining
- Not water-absorbing
- Not water-attracting
- Water-repellent

Arrangements are to be made for the rapid and unhindered drainage of accumulated moisture or condensation in order to avoid conditions that promote corrosion.

The standard drain holes must be preserved intact. If necessary, additional drain holes must be created with the responsible department. As part of the eXpertUpfitter program please refer to www.UpfitterPortal.com.

The inside must be covered with a sound-transmitting material (perforated card, plastic, fabric cover).

▲ WARNING

On no account should any subsequent modifications be made to the headliner or the roof panel between the A-pillar and the B-pillar if the vehicle is equipped with window airbags. Otherwise the window airbag may no longer function correctly (e.g. window airbag deployment is delayed or incomplete).

There is danger to life and limb!

Seals

Openings, gaps and slots between the engine compartment or the vehicle underside or the firewall and the vehicle interior must be carefully sealed with elastic material. Vent openings must not be fitted in the immediate vicinity of sources of noise.

In addition, manufacturers or suppliers of soundproofing materials should be consulted.

They will be able to provide you with suggestions on how to design optimum noise insulation for your modified vehicle body.

6.4.5 Ventilation

The driver's seat and all other areas in which persons can be situated must be able to be sufficiently ventilated.

The defrosting of the windshield and side windows must remain effective, particularly for special conversions or bodies such as camper vans or other special-purpose vehicles for which the driver's seat is incorporated without a partition to the rear passenger compartment in the open interior.

When modifying/removing the standard windshield, adequate defrosting/deicing must be provided and the solar sensor must be reinstalled (standard with HH4 Front automatic air conditioning). An incorrectly installed solar sensor or a different inclination of the windshield results in deviations in the climate control with HH4 (Front automatic air conditioning).

New vehicles can be delivered from the factory with the special equipment code HH9 (Manual front air conditioning), code HH4 (Front automatic air conditioning), code HH9 (Manual front air conditioning), code HH9/HH4+H08 (Front air conditioning + roof-mounted air conditioning system) and code HH9/HH4+HK4 (Front air conditioning + roof-mounted air conditioning system).

Observe 6.5 Additional assemblies (→ page 161) when retrofitting major assemblies.

- To prevent cracks from occurring when drilling extra mounting holes, a distance of at least 15 mm/ 0.59 in. must be maintained from the edge of the hole to all cuts and joints, openings, other holes and panel edges of the body-in-white.
- Proper execution of the drilled holes must be assured, with the avoidance of shavings, the deburring of holes and subsequent anti-corrosion protection.
- On completion of the upfit, all shavings must be entirely eliminated from joints, profiles and cavities.
- The specifications in these Body and Equipment Guideline for the work to be performed must be observed, see Chapter 3.9.1 Threaded connections (→ page 51), Chapter 4.1.5 Drilling must not take place (→ page 67), Chapter 5.3 Anti-corrosion protection measures (→ page 96), Chapter 5.4 Painting and preservation work (→ page 98) and Chapter 6.2.1 General information on the body in white/body (→ page 110).

For any questions, please reach out to the Upfitter Portal:

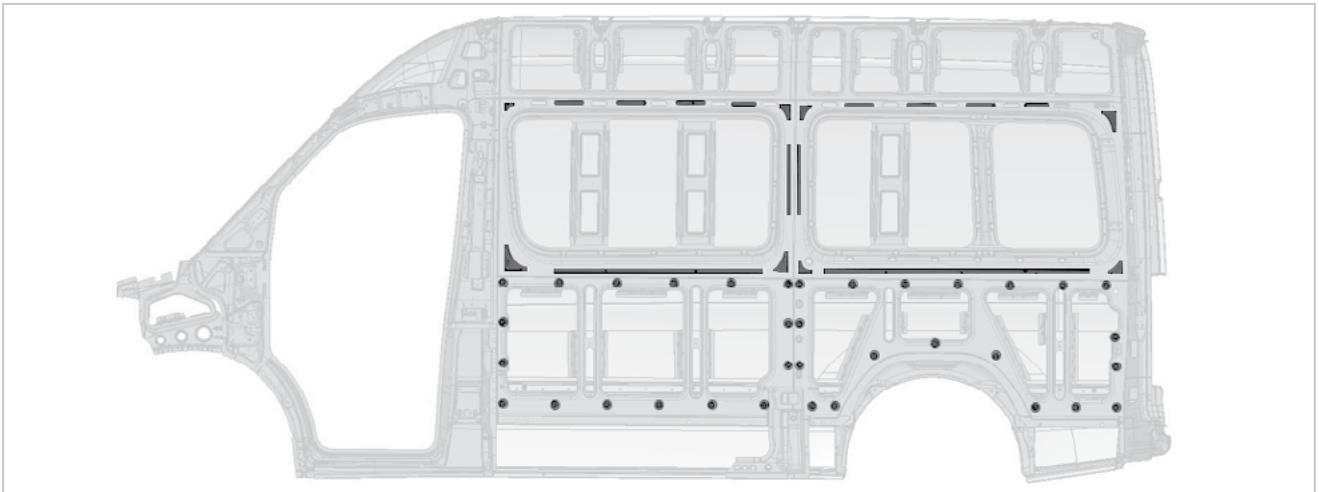
www.UpfitterPortal.com

6.4.6 Attachment points for load compartment trim parts on the side wall/roof

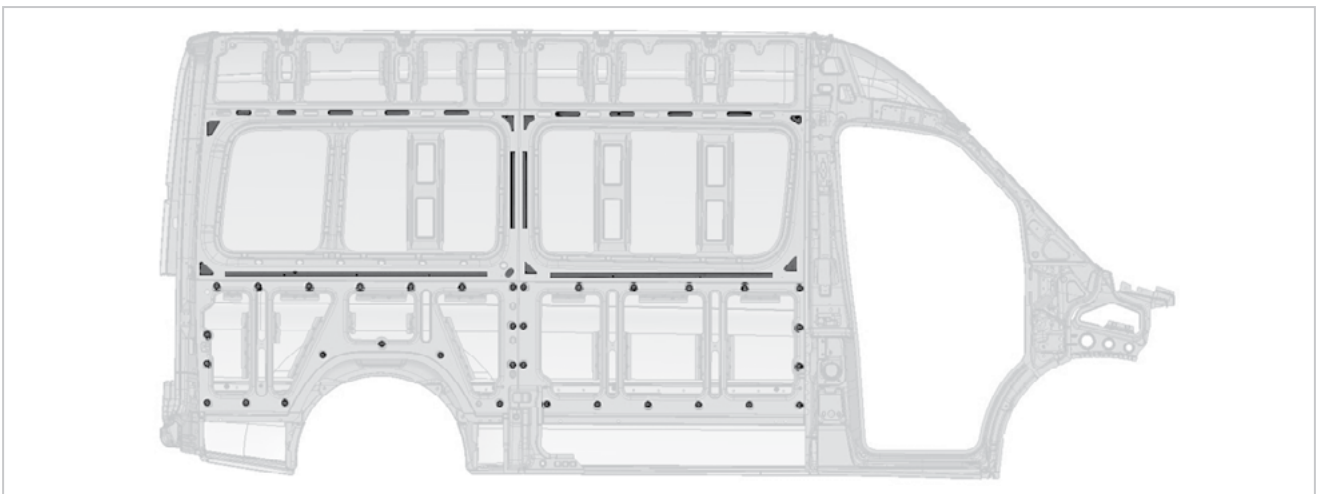
To line the load compartment in cargo van model designations, it is recommended to use the load compartment trim parts available from Mercedes-Benz ex factory.

If the upfitter installs specific load compartment trim parts, the following specifications must be observed:

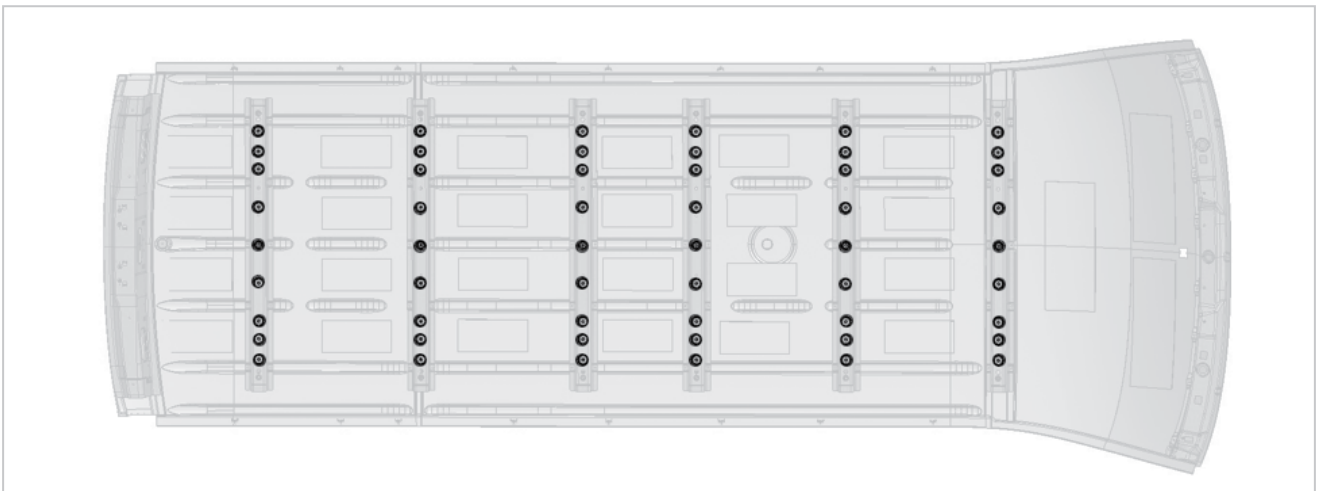
- Load compartment trim parts in the lower area of the side wall and on the roof are to be fastened at existing mounting holes in the body-in-white (for clips, expansion rivets or similar fasteners) for the inner parts of the side wall and the cross bows of the roof, see schematic diagram.
- In places where there are no existing mounting holes (e.g. the upper part of the side wall), additional mounting holes are permissible only in the marked areas of the side wall inner parts, see schematic diagram.



Cargo van model designation, inside of right side wall: Permissible areas for the attachment of load compartment trim parts (dark markings, schematic diagram)



Cargo van model designation, inside of left side wall: Permissible areas for the attachment of load compartment trim parts (dark markings, schematic diagram)



Cargo van model designation, inside of roof: Permissible areas for the attachment of load compartment trim parts at the cross bows (dark markings, schematic diagram)

6.5 Additional assemblies

If additional assemblies are fitted, the factory-fitted power take-offs or auxiliary drives must be used (→ page 142).

Vehicles with engines OM651 and OM642 are no longer available ex factory. For this reason, this information is no longer included in the present Body and Equipment Guideline. If required, you can find corresponding information and specifications in previous Body and Equipment Guideline in which the engines are still included. These are still available in the Body and Equipment Guideline in the Upfitter Portal.

6.5.1 Retrofitting an air conditioning system

⚠ WARNING

Prior to all mechanical and electrical work, the vehicle must be rendered free of voltage/current (disconnecting the battery is absolutely essential).

All electrical equipment fitted must be tested in accordance with FCC, CE and UL in the US, and with CSA and ULC in Canada.

The installation of additional air conditioning components (compressor, evaporator, lines etc.) on the air conditioning systems available as special equipment ex factory is not permissible.

Air conditioning system special equipment options

- HH9 (Manual front air conditioning)
- HH4 (Front automatic air conditioning)
- HH9 (Manual front air conditioning)
- HH9/HH4+H08 (Front air conditioning + roof-mounted air conditioning system)
- HH9/HH4+HK4 (Front air conditioning + roof-mounted air conditioning system)

If other air conditioning systems are installed, the equipment manufacturer's guidelines must be observed.

The following points must be observed with regard to compatibility with the base model vehicle:

- On no account should the installation of an air conditioning system impair vehicle parts or their function.
- The battery must have sufficient capacity and the alternator must generate sufficient power.
- Additional fuse protection for the air conditioning power circuit (→ page 264).

- Air conditioning compressors must be attached using the major assembly carrier provided (→ page 164).
- The additional pulley for driving air conditioning compressors is available from the factory as special equipment under code N63 (maximum output 8 kW) (→ page 163).
- Ensure that all lines (→ page 94) and electrical lines (→ page 264) are routed correctly.
- There should be no impairment of the accessibility or easy maintenance of installed equipment.
- The operating instructions and the maintenance manual for the additional assemblies must be supplied on handing over the vehicle.
- The air supply and cooling required for the engine must not be impaired (→ page 145).
- If compact systems are mounted on the cab roof (evaporator, condenser and blower), the permissible roof loads must not be exceeded (→ page 129).
- For attachments to the roof, an evaluation with the responsible department is necessary.
As part of the eXpertUpfitter program please refer to www.UpfitterPortal.com.

! NOTE

When using refrigeration systems/components in combination with the refrigerant R1234yf, all applicable laws, regulations and safety specifications must be observed.

In particular, compliance with the safety regulations according to ISO 13043 at both the component and overall system level (FMEA, leaktightness requirements, concentration measurements etc.) must be guaranteed.

Along with this, also observe the safety requirements with regard to inflammability and risk of combustibility in combination with R1234yf (maintain best-possible packaging or largest-possible distance to hot parts, if necessary, install additional devices for assuring the required safety).

If R1234yf is used, a specific information label with details of the quantity and combustion risk must be considered or installed in a visible location.

Belt tensioning for engine OM654

! NOTE
 Modifications must not be made to the belt pulley diameter in the main belt drive (primary chain drive) on engine OM654.

The belt tensioning method for the engine-mounted power take-off is described in Chapter 6.5.3 Engine power take-off (→ page 163).

6.5.2 Auxiliary heating

The following special equipment is recommended ex factory for the auxiliary heating:

Description	Code
Hot-air auxiliary heater electric (PTC)	HH2
Hot-water auxiliary heater (stationary heater)	H12
Hot-water auxiliary heater (only as heater booster)	HZ9
Additional heat exchanger on sub-structure	H13

Code H88 (Preparation for additional heat exchanger), available as special equipment ex factory, allows an aftermarket auxiliary heat exchanger to be connected to the existing heater circuit (including the stationary heater). The mechanical and electrical requirements, including adjustment of the coolant quantity for reliable engine operation, must be taken into account.

! NOTE
 Do not modify the cooling system or splice into the coolant lines of the engine. Coolant line modification might have a negative impact on the coolant flow leading to engine overheating or to not reaching the coolant temperature required for optimum engine operation. Risk of engine damage!

Retrofitting auxiliary heating

! NOTE
 When retrofitting a fuel-powered auxiliary heating system (stationary heater), the "Fill level sensor for auxiliary heating" special equipment (code KL1) is required. This provides an additional connection for taking fuel on the fill level sensor.
 If this instruction is ignored, the following problems can occur:

- Inadequate fuel supply to the fuel injection system
- Faulty fuel return
- Undesirable vaporization in the supply system
- Risk of damage to auxiliary heating through increased pressure in vehicle fuel system

When using the special equipment for auxiliary heating ex factory, this type of fuel connection is already present.

! NOTE
 If you are planning to install an auxiliary heating system other than the special equipment that is available ex factory, meaning that this will affect the cooling, hot water, and oil circuits of engine OM654, the upfitter must contact the Consultancy for Upfitters (→ page 19) during the planning phase.

! NOTE
 The specifications for fire protection, impact performance, and accident protection must be observed when retrofitting an auxiliary heating system.
 Risks of poisoning or asphyxiation due to gaseous substances must be prevented through suitable selection of the installation location and sealing measures.
 Exhaust gases must not penetrate into the vehicle interior while the auxiliary heating is in operation.

The vehicle floor must be gas-tight if exhaust gases are routed out under the vehicle.

Openings in the vehicle floor provided for control elements must be sealed with sealing bellows.

The following components of the auxiliary heating must not be mounted within the cab, the passenger compartment, or load compartment:

- Exhaust pipes of the auxiliary heating
- Vents for components of the auxiliary heating system
- Fuel lines
- Fuel tank and filler neck

Route all pipes, hoses, and electric lines so that they are free of mechanical stress.

Observe the specifications with regard to the distance to the exhaust system in Chapter 6.3.3 Exhaust system (→ page 142).

- ① Further information is available in Chapter 3.12 Special equipment (→ page 59).

6.5.3 Engine power take-off

Additional assemblies (e.g. an A/C compressor or an additional alternator) can be driven by an additional pulley on the front of the crankshaft, see also 6.5 Additional assemblies (→ page 161).

The following codes are available for power take-offs:

Code N62	Front engine bracket for additional alternator
Code N63	Front engine bracket for auxiliary A/C compressor

These power take-offs can be obtained from the factory as special equipment.

For the power take-off with code N62, an alternator with freewheeling belt pulley must be used.

These are available only for Diesel.

The maximum transferable torques for each of the power take-offs are guide values for shock-free and vibration-free operation.

These figures are based on a highly durable gearing design and a service life calculated in compliance with the German standard DIN 622. The additional inertia forces of the driven major assemblies are not taken into account.

The ratio chosen should ensure that a minimum engine speed of 1200 rpm with a power output of $P = 28$ kW is maintained. The power output should be within the range of the maximum engine torque.

! NOTE

Mercedes-Benz does not provide any power take-off options (e.g. auxiliary alternator or AC compressor) for gas engines (engine type M274).

Mercedes-Benz does not permit any after-market power take-off options for gas engines (engine type M274).

6 Modifications to the basic vehicle

Maximum transferable output


Code N62	8.5 kW
Code N63	8.0 kW

Required belt pulley for additional assemblies

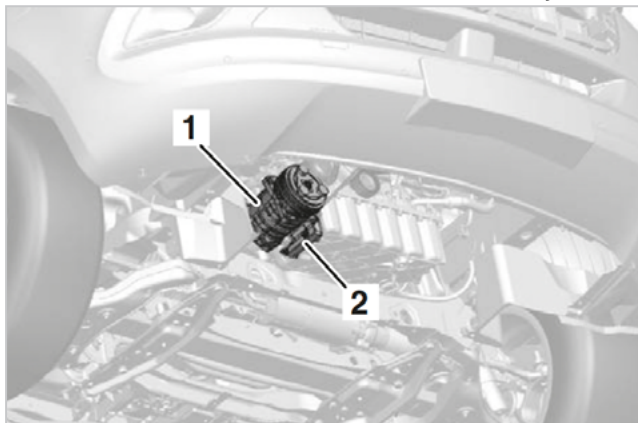
- V-ribbed belt pulley, 6-groove
- Outside diameter
 - Code N62: 50 mm/ 1.97 in
 - Code N63: 119 mm/ 4.69 in

The following Mercedes-Benz genuine parts must be used as belts:

OM654	
Code N62	A000 993 58 00
Code N63	A000 993 57 00

 Please consult your Mercedes-Benz Service Partner for advice regarding successor item numbers if the above item number is unavailable.

Additional assemblies can be mounted on a major



assembly carrier fixed to the engine. Additional assembly on engine-mounted major assembly carrier

- 1 Additional refrigerant compressor
- 2 Major assembly carrier

Maximum weight of additional assemblies

Code N62	7.3 kg/16.1 lbs
Code N63	7.3 kg/16.1 lbs

NOTE

The following limit values must be taken into account when installing an auxiliary alternator/generator:

1. Only Mercedes-Benz genuine parts must be used for the N62 assembly including the bracket, engine mounted belt pulley, eccentric belt tensioner and belt.
2. Only alternators with a freewheel alternator pulley are permitted. Outside diameter: 50 mm/ 1.97 in
3. Do not transfer power from the engine while the engine is running below 1200 rpm.
4. Do not transfer more than 8.5 KW while engine is running above 1200 rpm.
5. Do not install an alternator assembly with a weight higher than 16.1 lbs.
6. Optimum belt alignment and belt tension must be ensured by positioning the centerline and pulley of the auxiliary alternator correctly. Mercedes-Benz provides a 3D-model of the N62 assembly includes an example alternator for eXpertUpfitters on the upfitter portal.
7. WIS retrofit instructions must be used when retrofitting the N62 assembly. Please consult our Mercedes-Benz Service Partner.

WARNING

Sustained idling of diesel engines can lead to damage to the Diesel Particulate Filter (DPF). Idling for extended periods prevents the DPF from reaching the high temperatures necessary to burn off accumulated soot, leading to blockages, reduced engine performance, increased fuel consumption and costly repairs.

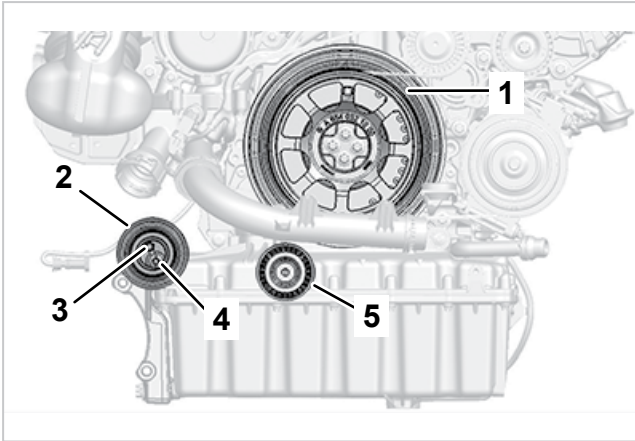
The DPF cannot be regenerated while the vehicle is parked.

Please check the DPF gauge fill level in the instrument cluster and pay close attention to DPF fill level warnings. Please keep in mind that if the DPF is not regenerated in time, the vehicle may go into "limp mode." In such event, the vehicle would then need to be examined by a Mercedes-Benz Service Partner for DPF maintenance or DPF replacement if already damaged.

In order to power secondary/aftermarket electrical devices, Mercedes-Benz recommends installing high capacity auxiliary batteries instead of idling the vehicle. With option code N62 a secondary alternator can be installed to allow recharging the batteries while driving the vehicle with at least 1200 rpm.

Adjust of belt tension on engine power take-off OM654

The tension of the belt on the engine-mounted power take-off can be adjusted using the eccentric pulley, which is known as an eccentric belt tensioner (eccentric RSP) (see following figure).



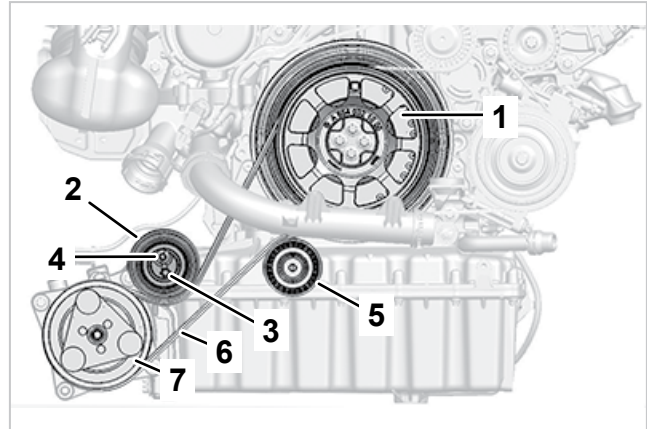
Belt tensioner on engine OM654 in as-delivered state (with code N63)

- 1 Engine-mounted belt pulley
- 2 Eccentric belt tensioner in as-delivered state
- 3 Internal Torx bolt (T55)
- 4 External Torx bolt (E12)
- 5 Guide pulley only with power take-off, code N63 (not available with code N62)

In the as-delivered state (still without belt), the eccentric belt tensioner is in a position in which the belt can be easily placed over the guide pulley and the belt pulley of the power take-off and auxiliary assembly. In this assembly state, the internal Torx bolt (T55) of the eccentric belt tensioner is set to an 11 o'clock position, which is the upper end stop, and the eccentric belt tensioner is preset at this position.

After fitting the belt and checking if the belt is correctly positioned, the eccentric belt tensioner is rotated clockwise using the internal Torx bolt (T55) up to the lower end stop, which is just after the dead center position, so that the eccentric belt tensioner then remains in this position (see following figure).

After fixing the eccentric belt tensioner in place by tightening the external Torx bolt (E12) to a torque of 30 Nm, the belt then has the required preload force.



Belt tensioner in final state after assembly and tensioning of belt (with code N63)

- 1 Engine-mounted belt pulley
- 2 Eccentric belt tensioner in final state
- 3 Internal Torx bolt (T55)
- 4 External Torx bolt (E12)
- 5 Guide pulley only with power take-off, code N63 (not available with code N62)
- 6 Belt in tensioned assembly state
- 7 Auxiliary assembly (example here of refrigerant compressor with power take-off, code N63)

6.5.4 Retrofitting an alternator

For the subsequent drive of an additional alternator, the power take-off special equipment with code N62 must be used. Only alternators with a freewheel alternator pulley are permitted.

More detailed information on additional alternators can be found under 8.4.7 Alternator (→ page 267).

6.6 Attachments

For attachments to the frame, an evaluation with the responsible department is necessary.
As part of the eXpertUpfitter program please refer to www.UpfitterPortal.com.

Make sure that you adhere to the permissible axle loads in all cases.

Attachments must not impair the function of vehicle parts.

! NOTE

Observe all national laws, directives, and registration regulations.

Winch

Attach winches behind the cab on an assembly frame of sufficient size and strength.

! NOTE

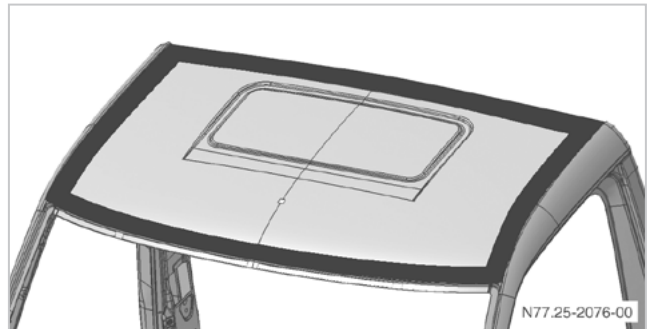
On no account should a winch be attached to the front section of the frame.

6.6.1 Wind deflectors

Wind deflectors may only be fitted onto the cab roof by applying high-strength adhesive to the whole area around the lateral roof frame, the front roof frame and the 1st roof bow (level with the B-pillar).

The load applied by air resistance or contact pressure must be taken into consideration. The deflectors must only be fitted in such a way that the basic vehicle is not damaged.

Make allowance for any interference with driving assistance systems, see Chapter 8.9 Driving assistance systems (→ page 296).



Area for applying adhesive when fitting wind deflectors

! NOTE

Additional holes for mounting in the cab roof are not permitted.

For other roof attachments, an evaluation with the responsible department is necessary.
As part of the eXpertUpfitter program please refer to www.UpfitterPortal.com.

6.6.2 Attachment above cab

- Observe the permissible vehicle center of gravity position and front axle load (→ page 62).
- Observe the specifications in Chapter 6.2.11 Cutting the cab roof and B-pillar roof bow (→ page 131).
- If the conversion causes vibrations or noise, extend the assembly frame through the cab rear panel to underneath the seat boxes and secure it. An auxiliary battery as per code E2I "Auxiliary battery for retrofitted consumers, vehicle interior" (accommodated in the front passenger seat box) is not possible with this design.
- Make allowance for any interference with driving assistance systems, see Chapter 8.9 Driving assistance systems Chapter 8.9 Driving assistance systems (→ page 296).

! NOTE

Observe and adhere to the information and specifications on body limits for driving assistance systems, Chapter 8.9 Driving assistance systems Chapter 8.9 Driving assistance systems (→ page 296)

6.6.3 Roof luggage racks

Sprinter cargo and passenger vans

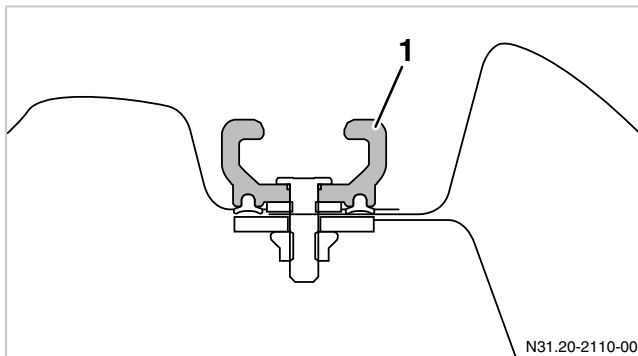
- Make sure that the load is distributed evenly across the entire roof area.
- Support feet must be spaced at regular intervals. 50 kg/110 lbs per pair of feet and strut is recommended as a basic rule.
- With shorter roof racks, the load must be reduced proportionally.
- Observe the limit values for the maximum roof load and the minimum number of roof bows, see Chapter 4.3.8 Roof and roof load Chapter 4.3.8 Roof/roof load (→ page 81).

i Further information can also be found in the ADVANTAGES product information system via the Upfitter Portal (→ page 23).

To make it possible to fit roof rack systems, the Sprinter BM 907 can be equipped with C-rails (special equipment code D13).

! NOTE

Mounting rails (code D13) are not available ex factory for the open model designations cab (FHS) and crew-cab (FHL).



Mounting of roof luggage racks

1 Mounting rail (roof luggage rack)

! NOTE

There may be interference with driving assistance systems due to large objects on the roof rack; see 8.9 Driving assistance systems (→ page 296).

6.6.4 Shelf systems/vehicle interior installations

Shelf systems must not collapse in the event of a crash. Shelf systems must have no negative influences on the base model vehicle and its functions (passive safety in particular).

General

Shelf systems must:

- be sufficiently strong and self-supporting
- rest on the crossmembers and longitudinal members of the vehicle floor
- distribute forces evenly
- be attached to the load rails and tie-down eyes or to the entire contact surface on the body-in-white in the same way as the standard rails or to the pre-installation for shelf systems (code ZE6)
- be installed free of mechanical stresses (including the installations with the shelving preparations (code ZE6) as well as without this pre-installation. The gap between the roof bow bracket and the longitudinal tube of the shelving must be reduced and must not exceed 1 mm/ 0.04 in, before fastening the shelf system onto the vehicle body.

! NOTE

Do not use attachments that apply force only to the vehicle side wall, the roof or to isolated points of the vehicle wall. The weight of the shelving and loaded cargo has to rest on the vehicle floor.

Otherwise, there is a risk of damage to the side wall and the roof.

It is recommended to order the load rails available as a special equipment option for mounting and attaching shelves (code VC4 or code V42).

i For further information about the side wall (→ page 121).

Stability

Ensure the stability of the shelf system by mounting it to the vehicle floor and supporting it at the vehicle side wall. We recommend reinforcing the shelf construction with diagonal struts.

In order to test shelf constructions with respect to their stability and installation in the vehicle, it is recommended that the upfitters carries out appropriate testing. Documented evidence of the validation tests is to be submitted when requested by Mercedes-Benz.

6 Modifications to the basic vehicle

Load rails ex factory (L-Track)

Load rails are available ex factory in two heights on the vehicle

- Code VC4 - Load rails on roof frame
- Code V42 - Load rails on belt rail (underneath the window stamping)



Load rails in the panel van

- 1 Load rails at the roof frame
 2 Load rails at the belt rail
 Arrow Direction of travel

Maximum tensile forces of genuine Mercedes-Benz load rails

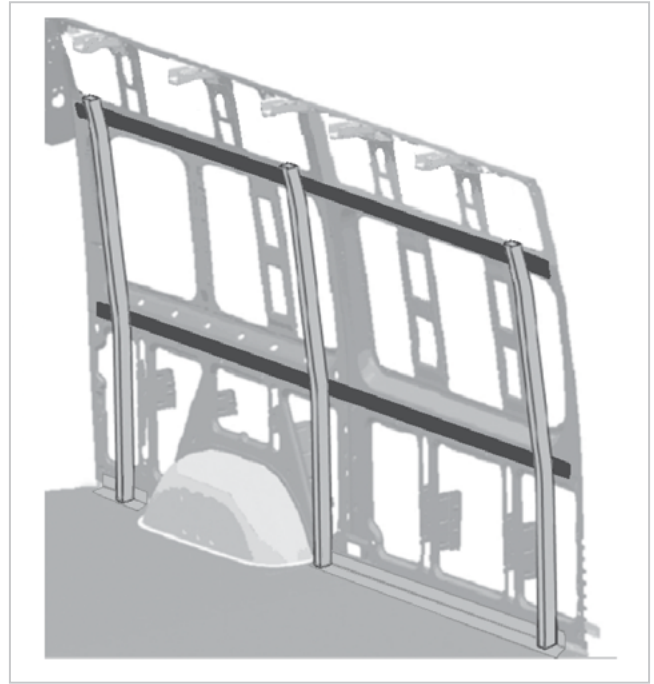
	Permissible rated tensile force
Upper load rail Code VC4	150 daN/337 lb f
Lower load rail Code V42	250 daN/562 lb f

The stated values only apply if the following conditions are met:

- The load must be standing on the floor.
- The load must be secured at two tie-down points of the rail.
- The distance to the next load securing point on the same rail may be max. 1 m/3.3 ft.

i Observe the operator's manual supplied with the load rails available ex factory.

Shelf mounting using V42 and VC4



Example: Shelving mounted with V42 and VC4

- ▶ The codes V42 and VC4 can be retrofitted if not installed ex-factory.
- ▶ V42 and VC4 offer a flexible mounting solution for mounting shelving or other upfits.
- ▶ The vertical support structure of the shelving must be standing on the vehicle floor.
- ▶ The threaded holes of the tie-down eyes (D-rings) can be used to mount the shelving to the vehicle floor.
- ▶ The tie-down eyes must be reinstalled to comply with the technical standard DIN ISO 27956 for cargo security measures.
- ▶ The shelving must be mounted to the lower load rail (V42) and upper load rail (VC4) using threaded bolt double stud fittings.
- ▶ It is recommended to design a shelving that prevents cargo from moving (sliding forward) in case of emergency braking.
- ▶ Do not connect the shelving to the roof/roof bows.



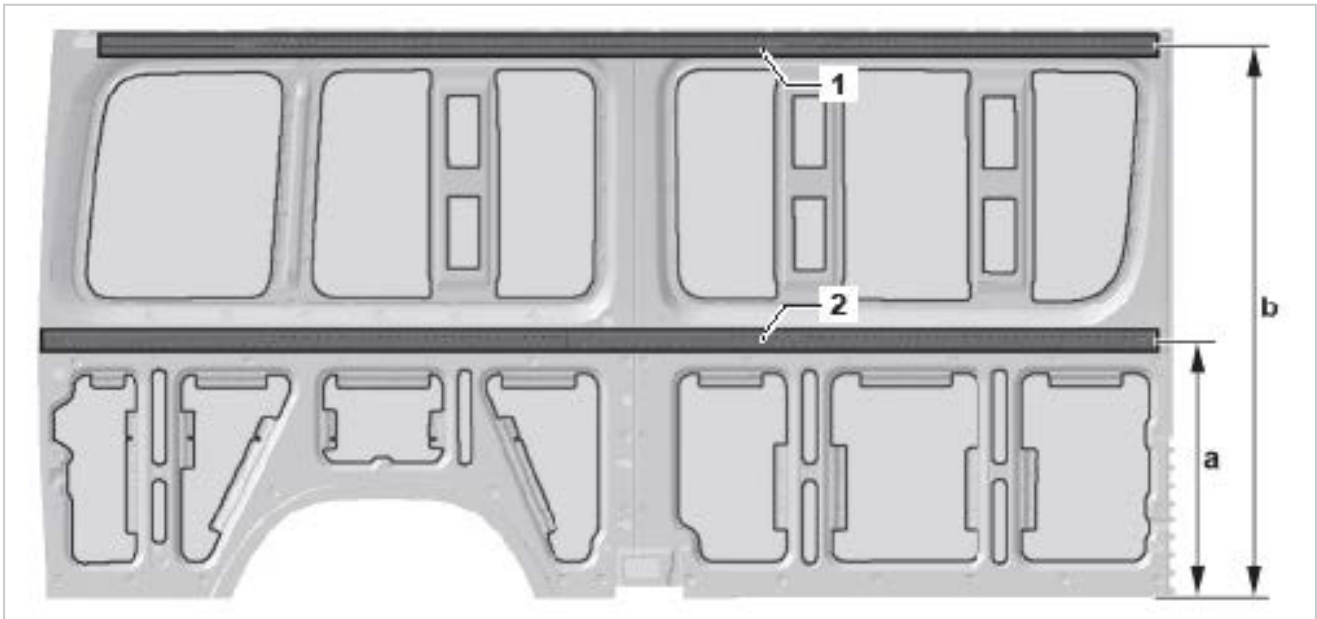
Example: L-Track double lug threaded stud fitting 3/8" to fit V42 and VC4.

Retrofitting load rails/tie-down rails

! NOTE

Load rails or tie-down rails may only be retrofitted to the areas of the vehicle side wall designed for this purpose in the same way as the load rails available ex factory.

The maximum tensile forces (see table) must be complied with in all driving conditions. Otherwise there is a risk of damage to the side wall.



Position for retrofitting tie-down rails to vehicle side wall

- 1 Load rails at the roof frame
- 2 Load rails at the belt rail

Center of load rail	Dimension	
Based on standard wooden floor	a = 718 mm/28 in	b = 1552 mm/61 in
Based on vehicle floor (upper ribbing)	a = 729 mm/29 in	b = 1563 mm/62 in

The following points must be observed with respect to retrofitting load rails to the vehicle side wall:

- The instructions of the load rail manufacturer must be observed.
- The maximum tensile forces (see table) must be clearly indicated in the area of the load rails (e.g. using adhesive labels) and enclosed in a suitable form with the operator's manual in the vehicle.

6 Modifications to the basic vehicle

Connection to vehicle side wall through riveting plus adhesive bonding

	Permissible rated tensile force
VC4 (Load rails at roof frame)	120 daN/270 lb f
V42 (Load rails at the belt rail)	200 daN/450 lb f

Connection to vehicle side wall through riveting

	Permissible rated tensile force
VC4 (Load rails at roof frame)	60 daN/135 lb f
V42 (Load rails at the belt rail)	100 daN/225 lb f

The stated values only apply if the following conditions are met:

- The load must be standing on the floor.
- The load must be secured at two tie-down points of the rail.
- The distance to the next load securing point on the same rail may be max. 1 m/ 3.28 ft.

Requirements of rivets

When retrofitting load rails on the vehicle side walls with rivets, the following values must be complied with:

- Cross-tension strength min. 3800 N
- Shear strength min. 3300 N
- Rivet diameter = 4.8 mm/0.19 in
- Head diameter = 9.3 mm/0.37 in
- Clamping range = 3.5 mm/0.14 in to 6.0 mm/0.24 in

Recommended process adhesives

Körapur 140	
Use	Adhesive
Supplier	Kömmerling, Suppl. no. 110/75074
Part no.	A 009 989 17 71
Chemical base	1K-PU that hardens in air humidity
Use-by date	6 months, date specified on container

Köracur 110	
Use	Accelerator paste
Supplier	Kömmerling, Suppl. no. 110/75074
Part no.	A 009 989 18 71
Chemical base	Water-based gel paste
Use-by date	9 months, date specified on container

Körabond HG8 1	
Use	Activator
Supplier	Kömmerling, Suppl. no. 110/75074
Part no.	A 001 986 90 71
Chemical base	Silane, artificial resin
Use-by date	12 months

Recommended process steps for adhesive bonding

- Roughen load rail

▶ The entire length of the bonding surface at the rear of the mounting rail must be roughened with a wire brush. Roughened rails must be activated immediately.

- Activate bonding surface

▶ The entire roughened bonding surface must be activated with a PE bottle with a felt insert. Straight afterwards, the activator that has not yet evaporated must be completely wiped off with a cleaning cloth (wipe on/wipe off procedure).

- Flash-off time:

At least 10 minutes

- Time until application of adhesive:

Max. 24 hours

- Replacement cycle for felt insert:

When no longer functional

- Replacement cycle of PE bottle:

At least once daily

- Bonding mounting rail

▶ The adhesive must be applied to the entire length of the activated bonding surface as a straight, round bead. There must be a gap in the adhesive bead of approx. 10 mm/0.39 in at the rivet holes to prevent adhesive from being squeezed out in the visible area.

- Adhesive application

- Bead geometry:

Round bead

- Bead diameter:

Approx. 6 mm/0.24 in

- Dwell time of adhesive in static mixer:

Max. 15 minutes

- Time between adhesive application and joining:

Max. 15 minutes

- Dwell time of adhesive on rail:

Max. 15 minutes

- Time until load may be applied (curing time)

Approx. 7 days

! NOTE

The handling instructions of the adhesive manufacturer must be followed. If the specified bonding instructions are not followed, the bond will not be of the required quality.

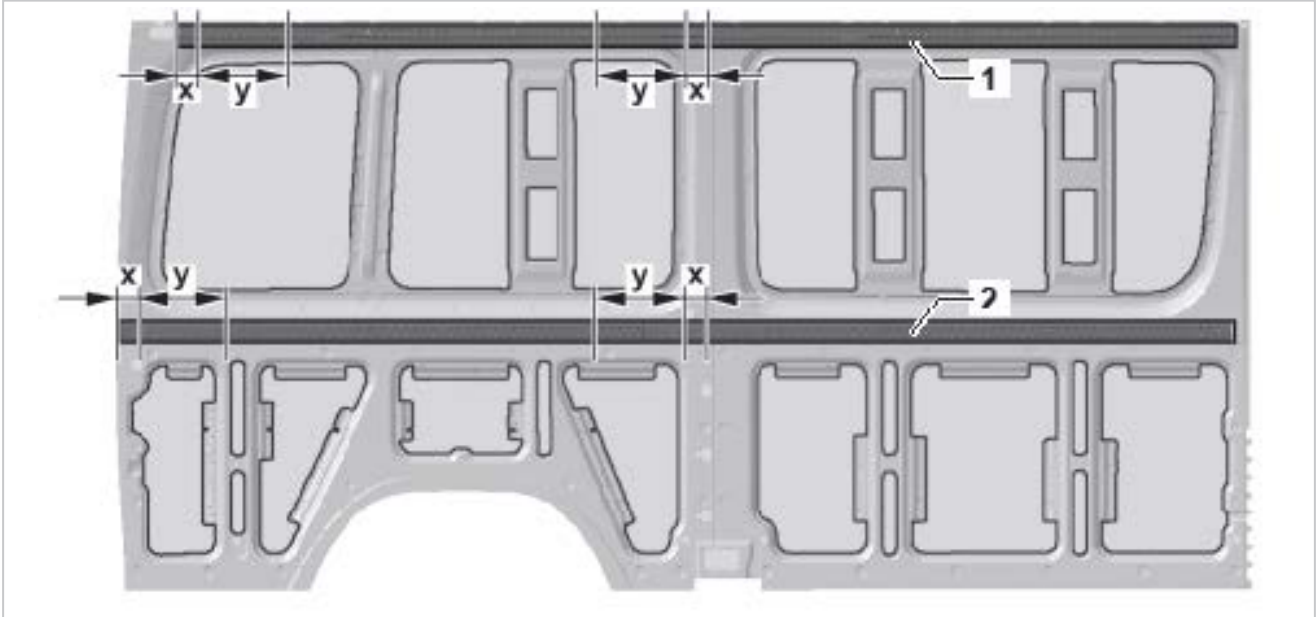
The mounting rail with adhesive must be bonded to the inside of the vehicle within 15 minutes. Otherwise excessive forces may result, causing damage to the side wall.

6 Modifications to the basic vehicle

Rivet distances for load rails retrofitted to vehicle side wall

! NOTE

The maximum rivet distances (see table) must be complied with in all driving conditions. Otherwise excessive forces may result, causing damage to the side wall.



Rivet distances for load rails retrofitted to vehicle side wall

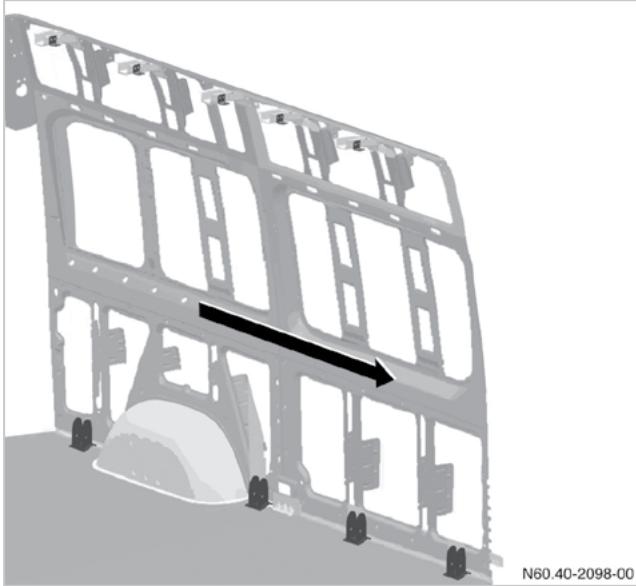
- 1 Load rails at the roof frame
- 2 Load rails at the belt rail

Rivet distance	Dimension x max.	Dimension y max.
Riveting plus adhesive bonding	75 mm/3 in	450 mm/18 in
Riveting (without adhesive bonding)	25 mm/1 in	225 mm/9 in

Pre-installation for fitted shelving

If the load rails (Code V42 and VC4) are not ordered/retrofitted to mount a shelving, the code ZE6 "Pre-installation for fitted shelving" is available ex factory. The package includes brackets attached to the roof bows and body consoles mounted on the vehicle floor. ZE6 cannot be retrofitted.

The code ZE6 must be used only if the shelving is designed to fit the ZE6 roof bow and body consoles on the vehicle floor by following the technical requirements outlined below:



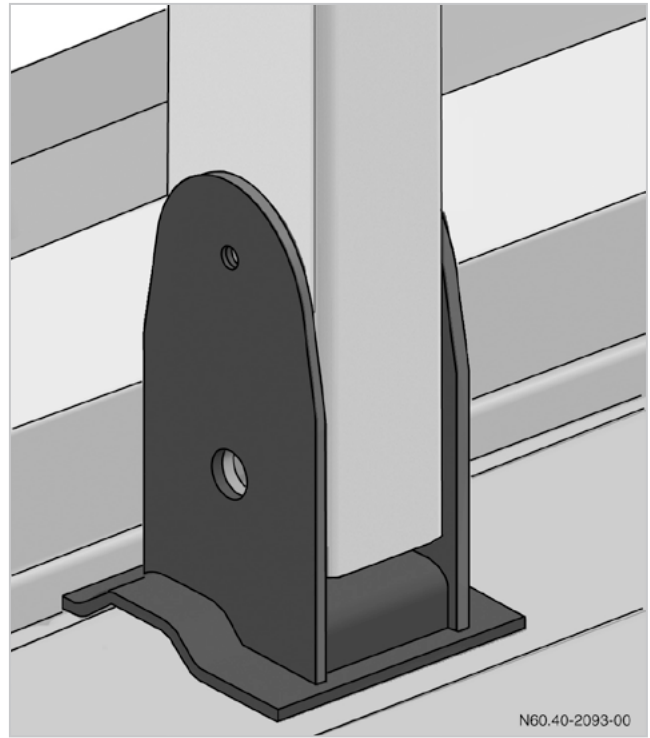
ZE6 package contents in shaded areas

Arrow Direction of travel

The following must be observed when using the shelf pre-installation:

- Shelves must not be wider than 450 mm/17.7 in.
- The max. load-bearing capacity is 80 kg/m; 53.7 lbs/ft.
- The shelf supports must be made of steel (at least ST235JO according to DIN EN 10025) complying with the US SAE/ASTM standards can be used with a minimum cross-section of 60 mm x 40 mm x 3 mm/2.4 in x 1.6 in x 0.1 in (length x width x thickness).

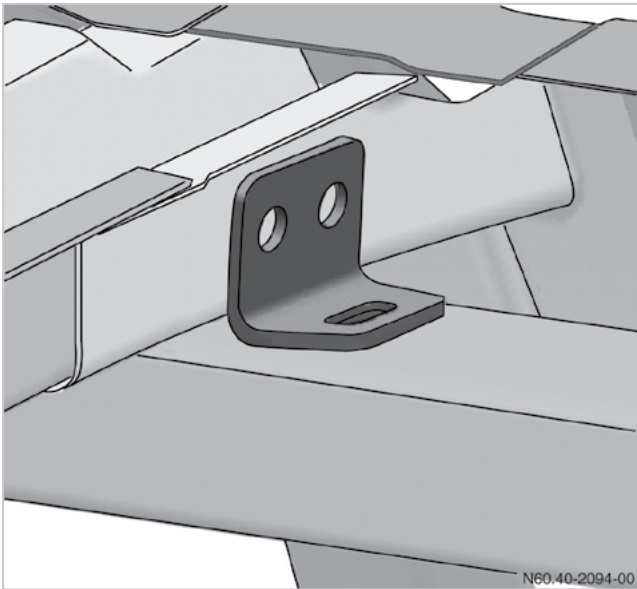
- ▶ Bolt the shelf supports to the floor with the mounting supports.



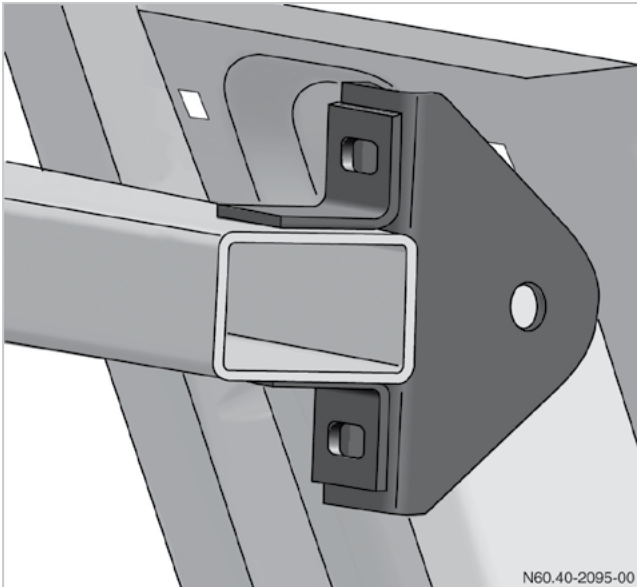
Bolting the mounting consoles to the floor

- ▶ To fix the wooden floor, 2 angles per support must be mounted at the bolt connection between the support and the mounting console (contact surface per angle at least 1200 mm²/1.9 in², dimensions 60 mm x 20 mm/2.4 in x 0.8 in).
- ▶ A steel tube with a rectangular profile measuring 60 mm x 40 mm x 3 mm/2.4 in x 1.6 in x 0.1 in is bolted onto the brackets on the roof bows. The shelf supports are bolted to this rectangular profile at the top.

6 Modifications to the basic vehicle

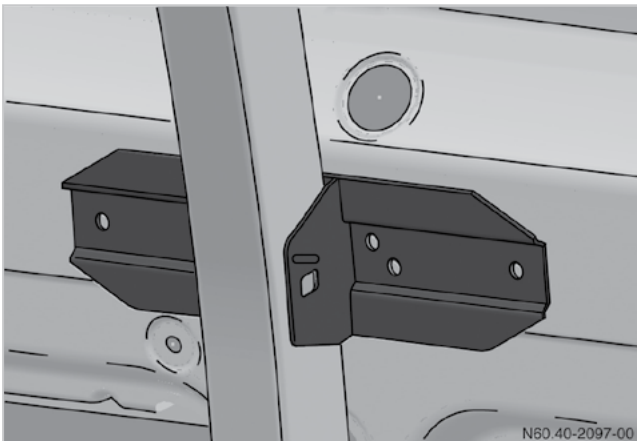


Connecting the shelf longitudinal tube to the roof bow bracket



Connecting the longitudinal tube to the support

- The longitudinal tube must not be connected with the partition wall or the rear door frame.

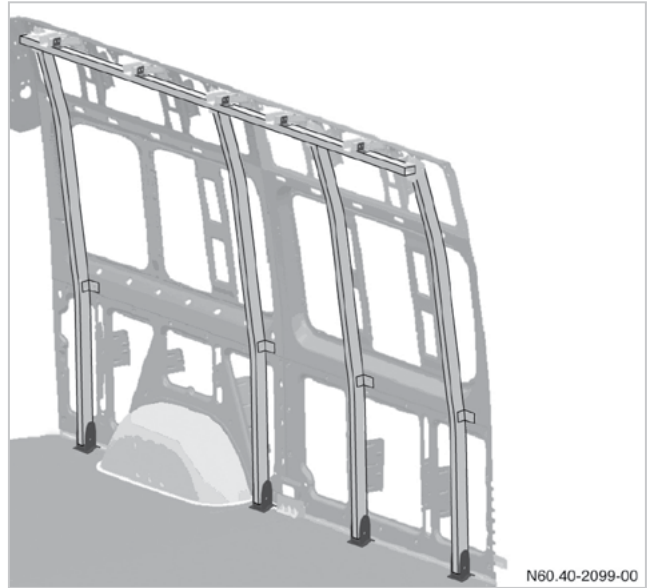


Design for mounting console on belt rail

▶ In addition to fixing the shelf supports to the floor or to the roof bows, it is necessary to fix them to the belt rail by means of a mounting console.

▶ The connection must be made by bonding and riveting. A minimum bonding surface area of $7000 \text{ mm}^2 / 10.85 \text{ in}^2$ is required.

▶ If the first or last support is more than $300 \text{ mm} / 11.8 \text{ in}$ away from the roof bow, the longitudinal tubes must be connected together.



Shelf attachment with ZE6

6.6.5 Loading cranes

The size of the crane must be selected in accordance with the chassis size.

Loading cranes must be secured on an assembly frame to relieve the load acting on the frame (→ page 188).

The permissible axle loads must be verified by calculating a weight balance.

The vehicle's stability must be ensured by the upfitter. The slewing range of the crane must be limited accordingly.

Comply with local and national legal requirements.

The mounting instructions of the crane manufacturer must be observed.

i If additional platform or dump trucks are mounted, the dimensions of the assembly frame longitudinal members must be taken from the table for platform bodies (→ page 206) or dump trucks (→ page 210).

! NOTE

Outriggers must be provided for every loading crane. We recommend using hydraulic outriggers.

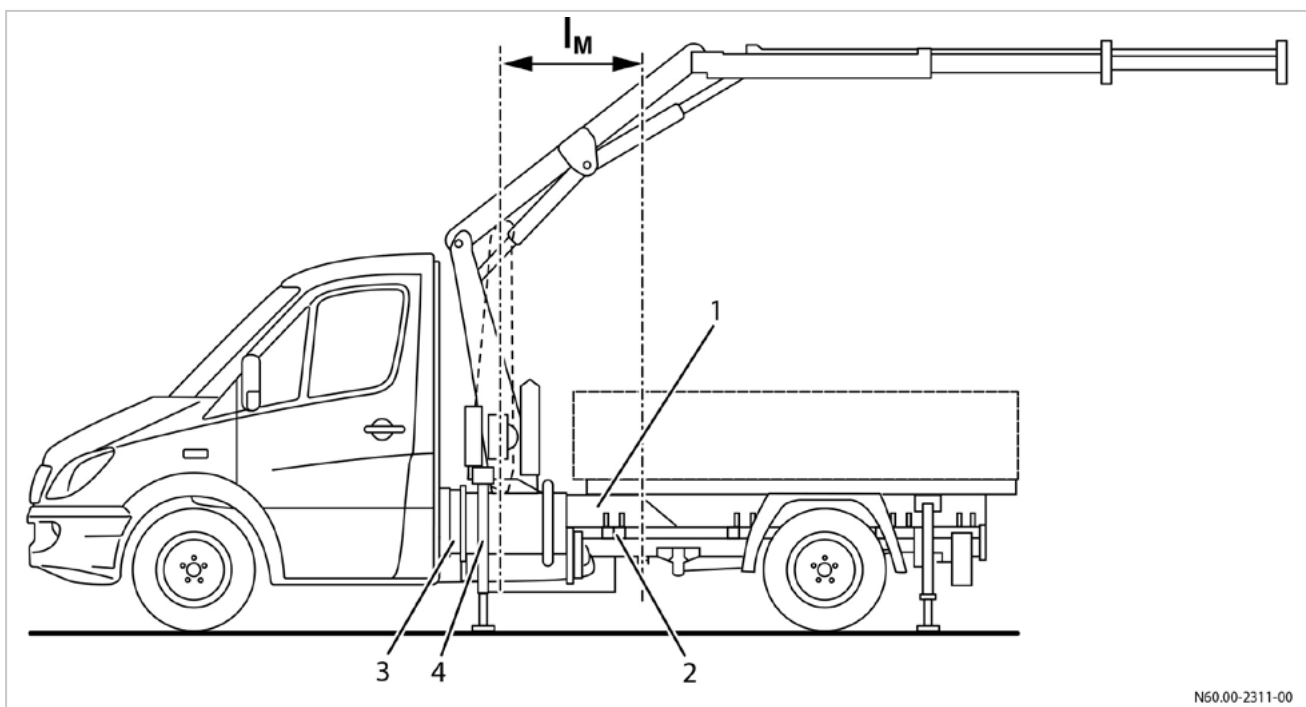
The vehicle must not be raised using the outriggers, as this would damage the frame.

Loading crane mounted behind the cab

Loading cranes and outriggers must not impair the function of other major assemblies. Mercedes-Benz recommends a rigid connection for connecting the assembly frame to the vehicle frame.

Assembly frame

- Maximum crane load moment (kN x l):
25 kNm/51 75 ft lb
- Section moduli (W_x) and material properties can be found under 7.1 Assembly frame (→ page 188).
- Assembly frame longitudinal member section dimensions (→ page 188).
- While the crane is in operation, vehicle stability must be ensured by extending support feet.
 - ▶** Indicate supports that protrude beyond the vehicle when the vehicle is stationary by means of conspicuous colors, rear reflectors and warning lights.
 - ▶** Determine the platform length according to the position and weight of the loading crane, complying with the permissible axle loads.
- If the maximum crane load moments are exceeded, an evaluation with the responsible department is necessary. As part of the eXpertUpfitter program, please refer to www.UpfitterPortal.com.
- The vehicle may only be used on flat, paved roads.
- A frame extension may become necessary as a result of the load distribution.
- If a stronger assembly frame is required than for the body when a loading crane is mounted behind the cab, the loading crane can be secured on a shorter assembly frame (see illustration below). The short chamfered assembly frame must have a length l_M corresponding to 35% of the wheelbase.
- For this type of attachment, an evaluation with the responsible department is necessary. As part of the eXpertUpfitter program please refer to www.UpfitterPortal.com.



N60.00-2311-00

Loading crane

- 1 Loading crane assembly frame
- 2 Body consoles
- 3 Loading crane attachment
- 4 Outrigger
- l_M Length of loading crane assembly frame

Loading crane mounted at end of frame

⚠ WARNING

Comply with the minimum front axle load (→ page 62) under all load conditions. Otherwise, adequate driving stability is no longer guaranteed.

There is risk of an accident and danger to life and limb!

- Loading cranes must be secured to an assembly frame made of steel. The assembly frame is to be joined to the vehicle frame by a shear-resistant connection.
- Maximum crane load moment (kN x l):
25 kNm/5175 ft lb
- Section moduli (W_x) and material properties can be found under 7.1 Assembly frame (→ page 188).
- For the section dimensions of assembly frame longitudinal members, see (→ page 188).
- While the crane is in operation, vehicle stability must be ensured by extending support feet, which must be designed as described on (→ page 175).

6.6.6 Lifting platform (cargo liftgate)**General information**

Before installing a cargo liftgate, the available installation space must be checked by the upfitter. Note the limitations in the installation space due to the installed exhaust system and tank system.

Mounting a lifting platform to chassis

To power a lifting platform please order a more powerful alternator (M61) and an auxiliary battery (code E2M or E2I).

Mounting a lifting platform to a panel van

If fitting a liftgate as part of the vehicle order, take into account the following codes:

Code requirements (mandatory)

Code	Equipment
Q11	Longitudinal frame member reinforcement
EK1	Terminal strip for electric connection
E2I or	Auxiliary battery in the interior
E2M	Auxiliary battery in the engine compartment

Code recommendations

Code	Equipment
M61	Alternator 14 V/280 A
W54	Double-wing rear-end door that opens as far as side wall

Prerequisites

! NOTE

Use an alternator and a battery with higher capacity, as well as an auxiliary battery as a matter of principle, if an electrohydraulic liftgate is fitted.

- Liftgates must comply with the accident prevention and general machinery directives, see (→ page 30).

! NOTE

Observe all national laws, directives, and registration regulations.

- The rear axle load must not exceed the permissible limit value, see Chapter 3.2 Model overview (→ page 38).
 - Comply with the minimum front axle load under all load conditions, see Chapter 4.1.1 Steerability (→ page 62).
 - Ensure vehicle stability in all operating statuses.
 - ▶ Use calculations to determine the load distribution. Take all special equipment into account when doing so.
 - ▶ If necessary, shorten the body length and the rear chassis overhang accordingly (chassis).
 - ▶ Hydraulic outriggers are recommended.
 - Observe the legal requirements in the individual countries relating to "Underride guard" and "Lighting system" when a liftgate is mounted.
 - Maximum load clearance is 23.6 in (600 mm), relative to the standard rear portal/standard rear crossmember
 - Cuts in the end crossmember are only permitted after consultation with the responsible department (→ page 17).
 - Vehicle stability when loading and unloading the vehicle must be ensured by the user.
- i* Further information can also be found in the ADVANTAGES product information system via the Upfitter Portal (→ page 23).

! NOTE

The permissible nominal live load on the liftgate used must not be exceeded and the load clearance must be observed.

! NOTE

The standard tail lamps of the chassis must only be installed in the approved horizontal installation position as in the original condition.

For other installation positions, alternative tail lamps are available from the manufacturer of the standard tail lamps, see (→ page 279).

- i* For information on the connection to ground for the liftgate/cargo liftgate with code EV3, see Chapter 8.4.12 Ground bolts (→ page 275).

Liftgate attachment

The Liftgate platform must be attached as per Attachment to the rear frame section (→ page 115).

Additional torque support must be provided by means of at least two bolted connections fitted with spacer bushes (e.g. on the assembly frame).

- ▶ Extend the assembly frame as far forwards as possible and attach it with a non-positive connection to the chassis frame.

- No assembly frame is required on vehicles with a standard cargo van body.

At the least, all the factory-installed body consoles, and in particular those at the rear end of the frame, must be used to connect the assembly frame (body and lifting platform) to the vehicle frame.

Attention must also be paid to the need for reinforcements in the left and right rear longitudinal members in vehicles with trailer coupling or the pre-installation for a trailer coupling, see note in Chapter 6.6.7 Trailer coupling / Trailer hitch (→ page 180).

If modifications are required to the rear underrun protection due to the attachment of a Liftgate platform, the strength and bending resistance of the rear underrun protection must not be changed (→ page 184).

! WARNING

The vehicle must not be raised using the outriggers, as this would damage the frame.

Type	Wheelbase	Permissible lifting force of lifting platform		Minimum dimension of assembly frame
		Maximum lifting force [kN] ²		
		Chassis	Cargo van ¹	
2500	144"	5	5	None
	170"	5	5	
3500, 3500XD, 4500	144"	7.5	5	80 x 45 x 3 mm (3.15 x 1.77 x 0.12 in) or factory platform, code P02
	170"	7.5	5	
	144"	10	5	120 x 50 x 4 mm (4.72 x 1.97 x 0.16 in)
	170"	10	5	

¹ Without assembly frame

² For rated load distance of 600 mm/23.5 in

6 Modifications to the basic vehicle

6.6.7 Trailer coupling / Trailer hitch

For trailer couplings or for their pre-installation, the following special equipment is available depending on the vehicle model designation:

Code	Description
E40	Trailer Plug Socket 7-pin Provides power for trailer lightning systems (tail lights, brake lights, direction indicators, rear fog lights and reversing light) and allows electrical operation. It is installed with the corresponding wire harness and trailer control unit. Required for: trailer couplings (QA2/Q24)
QA9	Cross Member with Integral Step Step (on right side of the trailer hitch) consisting of a tubular steel frame with welded-on anti-slip tread surface is bolted onto the right-hand side of the trailer coupling cross member Step dimensions: 520 mm x 190 mm/20.5 in x 7.5 in
Q24	Trailer Cross Member (towing capacity 2268 kg/5000 lbs) Enables retrofit of a trailer coupling. Trailer socket (E40) is included. Max. permissible tongue weight is 500 lbs (227 kg) Max. towing capacity is 5000 lbs (2268 kg) Not for 170EXT cargo van. Available in combination with QA9.
QA2	Trailer Cross Member (towing capacity 3402 kg/7500 lbs) Enables retrofit of a trailer coupling. Trailer socket (E40) is included. Max. permissible tongue weight is 750 lbs (340 kg) Max. towing capacity is 7500 lbs (3402 kg) Not for cargo van with length 170EXT. Available in combination with QA9.

! NOTE

The reinforcement of the trailer hitch (Q11) in the rear longitudinal member on the left/right is available as standard for model designation 907 and can not be deleted.

! NOTE

In order to install a trailer coupling, reinforcements in the left and right rear longitudinal frame members are absolutely essential.

Code Q11 must be ordered on model series 907 for closed and open models. For other ex-factory special equipment, see table (→ page 180).

If it is not planned to install a trailer coupling, the omission of this reinforcement on closed model designations can be ordered under code QW1. Code QW1 is not available for open model designations.

! NOTE

Never attach a trailer hitch to the end crossmember of the frame.

! NOTE

For the retrofitting of a trailer coupling, it is essential to take into account the special equipment "Pre-installation for trailer coupling" (code QA3 or QA5) in the vehicle configuration.

After a trailer coupling has been retrofitted, the code O71 "Third-party accessory trailer hitch" must be entered in the vehicle data card. SCN coding must then be performed for the trailer coupling control unit.

In addition, SCN coding is required for other control units in accordance with the commissioning specifications, see Chapter 8.15 Commissioning of control units (→ page 361).

- Only trailer hitches which are offered by Mercedes-Benz or equivalently safe trailer hitches which are attached to the special mounting points on the body-in-white (rear longitudinal member) must be used (→ page 376).
- Access to the spare wheel must be guaranteed if a trailer hitch with a non-detachable ball head is fitted (especially with a fully laden vehicle).
- The trailer hitch attachment and clearance dimensions must comply with FMVSS/CMVSS 110 for the Sprinters below 10,000 lbs GVWR (model 1500, 2500, 3500).

⚠ WARNING

If the retrofitting of a trailer coupling is impermissible and you nevertheless attach a trailer coupling or other components, the component parts affected by this attachment may fail and result in the trailer or the other components becoming detached from the vehicle.

There is risk of an accident and danger to life and limb!

Only retrofit a trailer coupling if this is permitted.

- For vehicles with engine OM654 and a planned permissible gross combination mass greater than 5.55 t, observe the note in Chapter 3.3 Selecting the basic vehicle (→ page 39) regarding code QA5/QA3.
 - We recommend only using trailer couplings that have been approved by Mercedes-Benz or equivalently safe trailer couplings at the specifically intended mounting points on the body-in-white (rear longitudinal frame member) (→ page 254).
 - Make sure that there is access to the spare wheel on trailer couplings with a non-removable ball head (on a fully laden vehicle in particular).
 - The trailer coupling attachment and clearance dimensions must comply with the regulations in the countries
- i** For information on the relationships between towing capacity, vehicle overhang and Trailer Stability Assist (TSA), see 4.1.3 Permissible vehicle dimensions (→ page 63).

Dimensioning the trailer hitch

The size of the trailer hitch is defined by the drawbar ratio.

$$D = g \times \frac{m_k \times m_a}{m_k + m_a} \quad (kN)$$

D = Drawbar ratio

m_k = Permissible gross mass of tractor unit (vehicle) in t

m_a = Permissible gross mass of trailer in t

g = 9.80665 m/s²; 386 in/s²

In order to allow the trailer to be exchanged when used in international transport, the clearance between the center of the trailer hitch and the end of the towing vehicle must be no more than 300 mm/11.8 in.

Please refer to FMVSS/CMVSS 110.

Clearance dimensions of trailer hitch

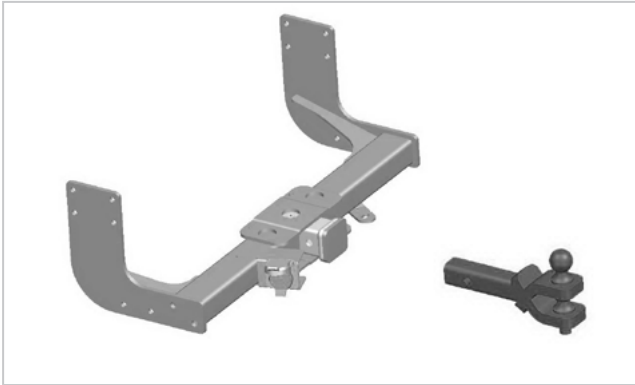
Clearance dimensions of FMVSS/CMVSS 110 must be taken into account.

The height of the trailer hitch above the ground must be between 350 mm and 420 mm/12 in and 18 in when the vehicle is laden to the permissible gross mass.

The reliable operation of the hitch must not be impaired. Do not install an open-jaw hitch fitted to the front of the vehicle. The specified clearances must be maintained.

Trailer hitch

In the USA and Canada, the following trailer hitch is used:



Trailer hitch

N31.10-2335-00

The ball neck (orange) for the specific trailers can be purchased as an accessory.

⚠ WARNING

If the towing vehicle is unladen, only an unladen trailer may be towed. Otherwise, the vehicle may become unstable.

There is risk of an accident and danger to life and limb!

! NOTE

If trailer hitches have removable ball heads, the operating instructions must be supplied in the vehicle and they must refer to the special features and operation of the hitch.

Attachment of the trailer hitch

Only secure trailer hitches/trailer brackets to the special mounting points on the body in white (rear longitudinal member) (→ page 376).

- Do not mount the trailer hitch to the underrideguard.
- Modifications to the underride guard must be agreed upon with the national testing center or the Technical Service department. The strength or the bending resistance must not be impaired.
- If the frame needs extending, spacer bushes must be fitted to the frame to attach the mounting plate or the rear crossmember (→ page 113). They may lead to a reduction in the towing weight or the tongue weight.

⚠ WARNING

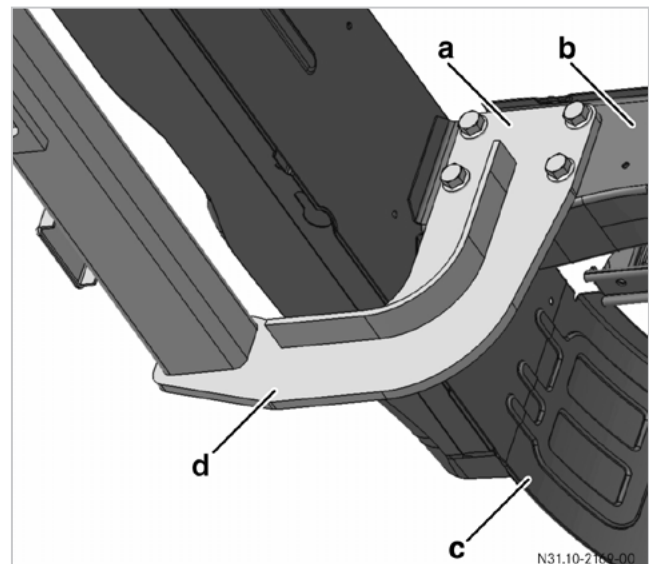
Risk of accident due to the impermissible attachment of a trailer hitch!

If a trailer hitch is retrofitted and you attach a trailer hitch or other components, the longitudinal frame member will be weakened and can break. In this case, the trailer can detach from the vehicle.

There is a risk of accident, personal injuries and death as a result of the improper attachment of a trailer hitch!

Only retrofit a trailer hitch if this is permissible.

Hole patterns with dimensions for attaching trailer hitches can be found under 10.2 Trailer hitch hole patterns (→ page 376)



.Interior view

N31.10-2108-00

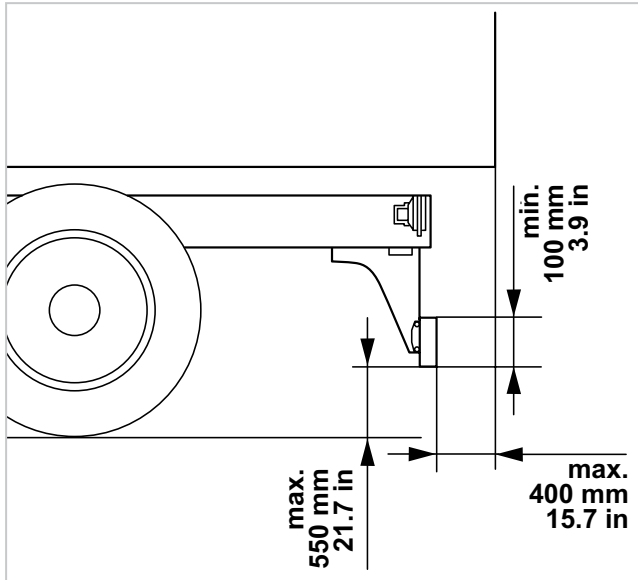
- a Attachment of mounting plate to longitudinal frame member
- b Lower flange of longitudinal frame member
- c Frame end crossmember
- d Mounting plate for trailer hitch

6.6.8 Underrun protection / underride guard

Rear underride guard

The rear underrun protection or underride guard fitted at the factory (except on cargo vans and passenger vans) complies with the regulation UN R 58.

Rear underrun protections are based on state level regulations.



N31.30-2336-00

Side view of the rear underrun protection location

On no account should modifications be made to the underrun protection.

The regulation UN R 58 stipulates a underrun protection when:

- with the vehicle in its unladen condition, the distance between the roadway and the chassis or main parts of the body in the area between the insides of the tires -100 mm/4 in per side, is more than 550 mm/22 in

The upfitter must clarify any potential exceptions to this specification for special purpose vehicles with the relevant national registration authority.

Exceptions to this regulation are semitrailer trucks, working machines and vehicles whose purpose cannot be fulfilled if an rear underrun protection is fitted.

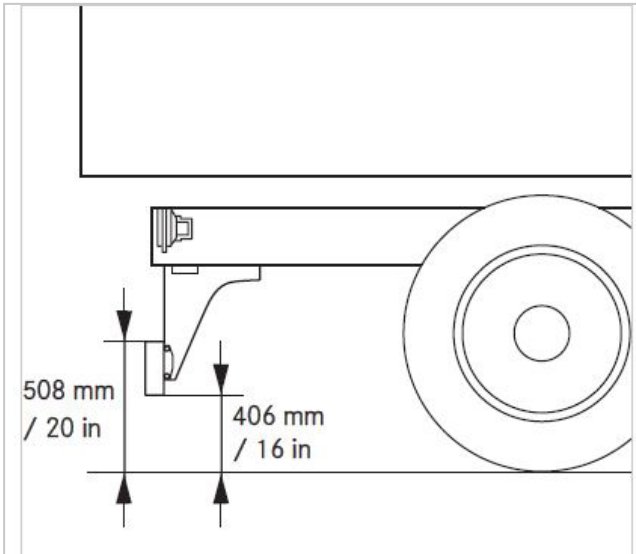
The underride guard must be mounted as far back as possible.

Dimensions of the rear underrun protection

- Maximum height of rear underrun protection (unladen vehicle) above roadway: 550 mm/22 in.
- Width:
 - E Maximum = Width of the rear axle (outer tire edges).
 - E Minimum = Width of rear axle minus 100 mm/4 in on each side. The decisive factor is the widest axle.
- The crossmember must have a section height of at least 100 mm/4 in.
- Edge radius at least 2.5 mm/0.1 in.

Front underrun protection

Front underrun protections are based on state level regulations. Please refer to CMVSS 215/US 49 CFR Part 581.



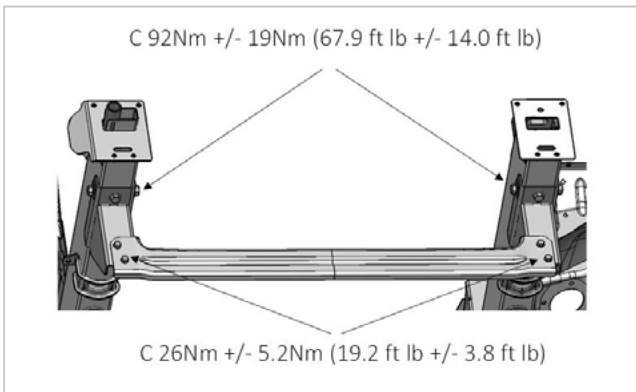
N31.30-2337-00

Side view of the front underrun protection location

Dimensions of the front underrun protection:

- Height of front underrun protection above roadway: 406 mm/16 in.
- The crossmember must have a section height of at least 100 mm/4 in.
- In case of code ZG1/ZG3 (4x4), the front underrun protection lies 74 mm/2.9 in lower.

Torques for remounting:



N31.30-2338-00

Torques for remounting front underrun protections

Modifications to the underrun protection

If the underrun protection needs to be repositioned due to the overhang extension, the attachment must be the same as that of the original vehicle.

If modifications are required to the underrun protection (e.g. due to the attachment of a lifting platform), the strength and bending resistance of the underrun protection must not be modified.

! NOTE

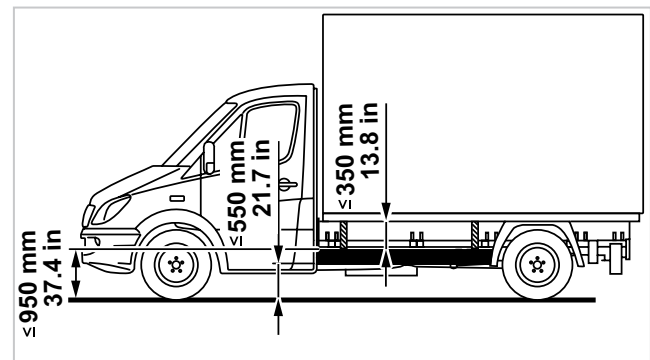
Observe all national laws, directives, and registration regulations.

Reinforcements are required to fasten to the underrun protection to the vehicle frame, See Chapter 6.2.2 Attachments on the frame (→ page 115)

! NOTE

On cab-chassis, the reinforcement of the trailer coupling in the left/right rear longitudinal member for BR 907 is installed in the vehicle as standard. If this is not required, it must be deleted when the vehicle is ordered (code QW1). For cargo, crew, and passenger vans, the longitudinal member reinforcement must be ordered at the same time (code Q11).

Lateral protections



N31.30-2339-00

Side view of the underride guards location

According to regulation UN R 73, a side underride guard is stipulated for vehicles with a permissible gross mass in excess of 3.5 t.

The upfitter must clarify any potential exceptions to this specification in relation to special purpose vehicles with the relevant national registration authority.

Protective equipment on the sides has to comply with applicable legal regulations.

Components may be mounted within the lateral protections, e.g. battery box, air tank, fuel tank, lamps, reflectors, spare wheel and tool box, provided that the specified clearances are maintained.

Brake, air or hydraulic lines and other parts must not be fastened to the underride guards.

The function and accessibility of all equipment on the vehicle must not be impaired.

If underride guards are retrofitted

- The dimensions specified in the illustration may not be exceeded.
- Protective equipment must comply with applicable legal regulations.
- The underride guards must extend continuously from the front to the rear wherever possible.

Adjacent parts may overlap. The overlapping edge must point to the rear or downwards. The maximum permissible width of any gap between segments is 25 mm / 0.98 in, provided the rear part does not protrude significantly beyond the front part.

The underride guards may consist of a continuous level surface. The outer surface must be smooth and generally flat. The underride guards parts must be rigid and permanently fixed into place. They must be made of metal or another suitable material. The distance between the outer surface of the underride guards and the outer edge of the vehicle must not be more than 120 mm/4.7 in. The edge radius must be at least 2.5 mm/0.1 in.

6.6.9 Positioning placard holders

This chapter provides information about positioning and fastening methods to add aftermarket placard holders to the Sprinter vehicle.

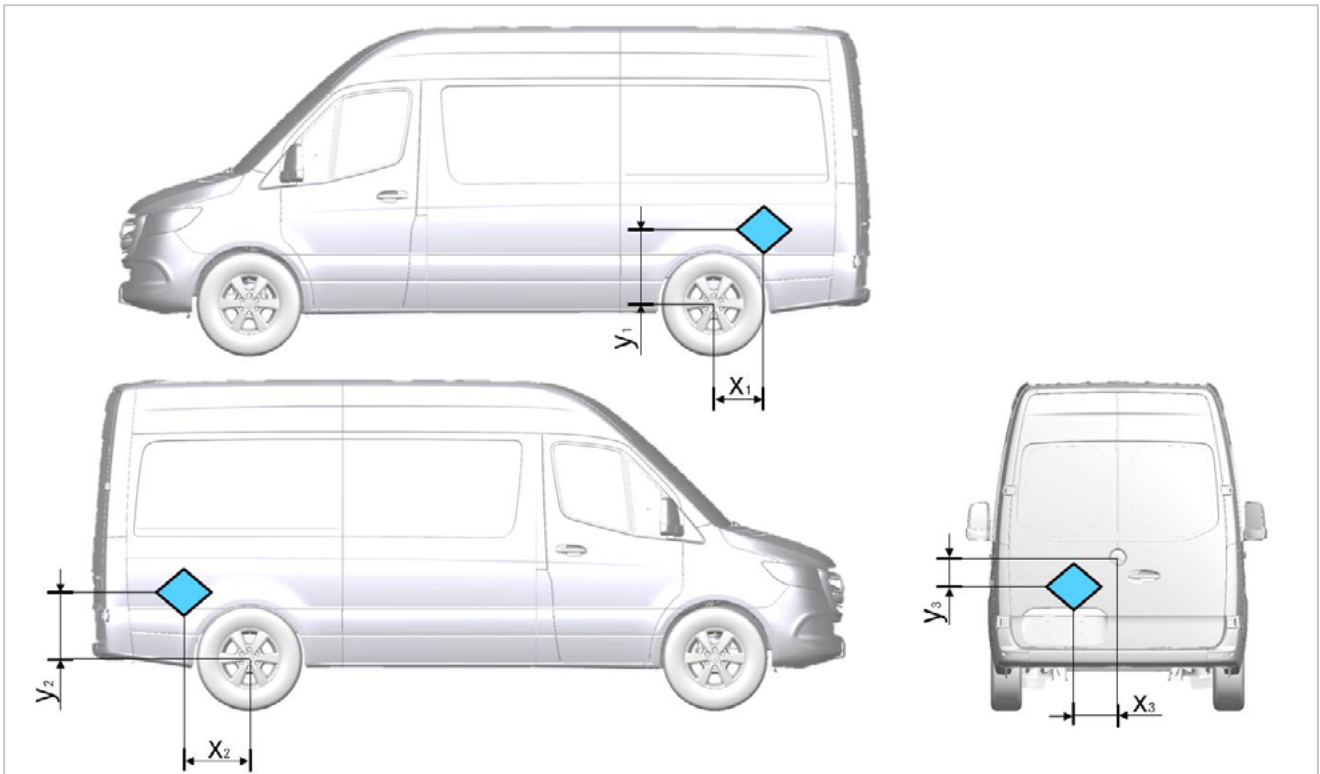
! NOTE

It is the upfitter's responsibility to adhere to all applicable rules and regulations, particularly Canadian laws mandated by Transport Canada regarding the Transportation of Dangerous Goods.

The upfitter may choose the below mentioned positions. For fastening the placard holders, it is recommended to use a gluing method to reduce the risk of corrosion due to drilling through the body shell. If the upfitter fastens the placard holders by drilling holes and using bolts, please refer to Chapter 5.3 Anti-corrosion protection measures (→ page 96). The upfitter needs to ensure enough clearance between the sliding door and the placard holder. The upfitter needs to ensure that the equipment installed to the exterior of the vehicle must not become loose and be lost during the vehicle operation.

The following picture indicates the Mercedes-Benz recommended left, right, and rear position of the placard holders. For positioning the placard holder to the front-bumper of the vehicle, it needs to be ensured that no sensors are covered or impaired if the vehicle is equipped with Parktronic or Collision Prevent Assist/Active Brake Assist - code BA3/Active Distance Assist - ET4. The sensor positions are described in chapter 5.4 Painting and preservation work (→ page 98), chapter 8.9.3 Active Brake Assist/Active Distance Assist (DISTRONIC PLUS) (→ page 303) and chapter 8.9.10 Parktronic sensors (→ page 344).

	144"	170"	170"EXT
x1	450 mm / 17.7 in	450 mm / 17.7 in	450 mm / 17.7 in
Y1	584 mm / 23 in	584 mm / 23 in	584 mm / 23 in
x2	485 mm / 19 in	485 mm / 19 in	485 mm / 19 in
y2	584 mm / 23 in	584 mm / 23 in	584 mm / 23 in
x3	289 mm / 11.3 in	289 mm / 11.3 in	289 mm / 11.3 in
y3	181 mm / 7.1 in	181 mm / 7.1 in	181 mm / 7.1 in



Positioning of placard holders (left, right, and rear position)

General information

NOTE

This chapter contains information and specifications for different designs of bodies. The specifications are based partially on existing vehicle equipment and partially on empirical values.

Please note that the upfitter assumes overall individual responsibility for the design and execution of the upfitter specific vehicle body.

All specifications in this Body and Equipment Guideline must be observed.

7.1 Assembly frame

All upfits require a continuous assembly frame or a substructure that acts as a continuous assembly frame in order to ensure a flawless connection between the chassis and upfit, see 7.1.5 Assembly frame as floor assembly (→ page 196) and 7.2 Self-supporting bodies (→ page 197).

The attachment to the frame must run along the frame using the body consoles attached to the frame at the factory, see 7.1.2 Design (→ page 189) and 7.1.4 Attachment to the chassis bed (→ page 191). Exception: On vehicles with a dropped frame (model designation 907.x5x) (7.1.2 Design (→ page 189)), the assembly frame longitudinal members can run continuously in a straight line.

7.1.1 Material quality, general

Material quality of specified assembly frame made of steel:

- Assembly frame mounted with mounting consoles (non-positive) = CR240LA or S235JRG2.
- For CR240LA or S235JRG2 steels complying with the DIN EN standard, analogous materials complying with the US SAE/ASTM J403/J412/J413 standards, the Japanese JIS G3445 standards or the UK BS 970 standards can be used. .

Material	Yield strength	Tensile strength
CR240LA	260-340 N/mm ² ; 37700 psi- 49300 psi	≥ 240 N/mm ² ; ≥ 34800 psi
S235JRG2	≥ 235 N/mm ² ; ≥ 34075 psi	340-510 N/mm ² ; 49300 psi- 73950 psi

Material specifications should correspond to DIN standard MBN11251

Minimum section modulus required for assembly frame W_x ¹

Version	Platform/ box body	Dumper/ lifting work platform	Loading crane
All weight variants	17 ^[2] cm ³ / 1.0 in ³	30 cm ³ / 1.8 in ³	40 cm ³ / 1.0 in ³

- ¹ The minimum section modulus required for assembly frames is relevant to the material characteristics specified in the table of materials above, and each individual assembly frame longitudinal member must have this section modulus.
- ² Up to the maximum standard wheelbase; above that: +10%.

- When using an assembly frame made of aluminum, for example, it must have at least the bending strength ($E \times I$) of a steel assembly frame. Observe the specifications of the manufacturer.

Guideline values for modulus of elasticity:

- Aluminum: 70000 N/mm²; 1015000 psi
- Steel: 210000 N/mm²; 3045000 psi

If a lifting platform (cargo liftgate) is being fitted, observe the relevant chapter and refer to the overview (→ page 177).

- ⓘ Observe any deviations in the specifications in this chapter, see 7.5 Platform bodies (→ page 206) and 7.9 Dump trucks (→ page 210).

7.1.2 Design

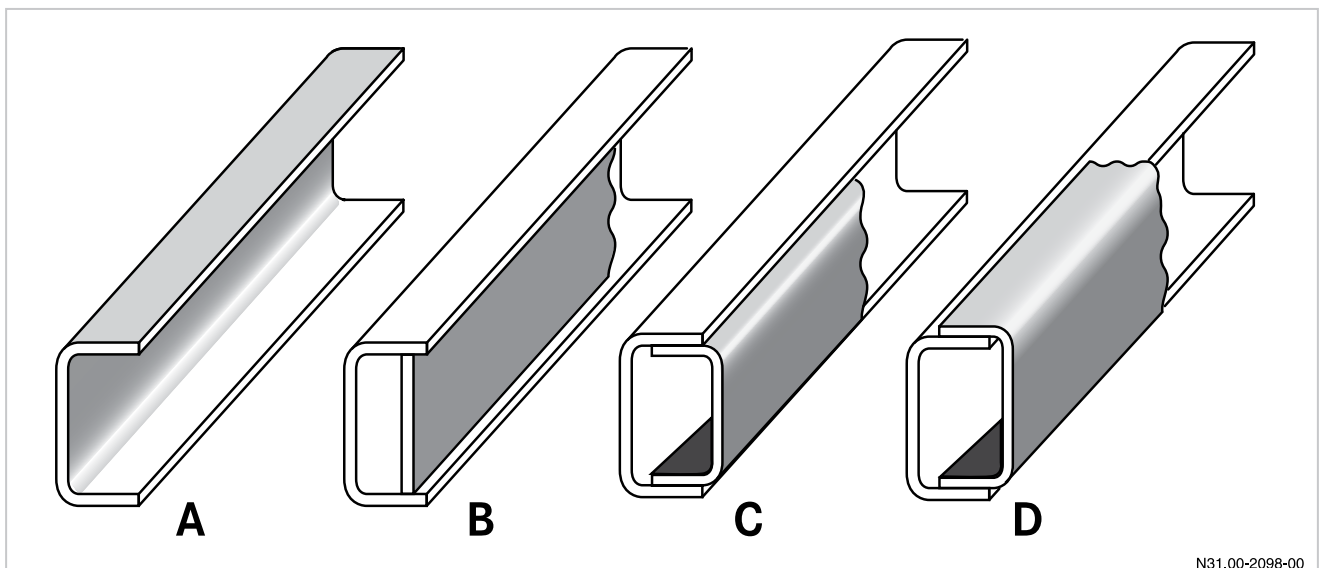
General information

- ▶ On model designations 907.X2X, 907.X3X and 907.X4X, the mounting frame longitudinal members must be arranged above the straight chassis frame longitudinal members.
- ▶ On model designation 907.X5X, the mounting frame longitudinal members can be straight through, see note on offset frames at the end of this chapter.
- ▶ At the position of the double body brackets (see 2 in illustration Chapter 6.2.2 Attachment to the frame (→ page 115)), the mounting frame cross-members must be positioned about the chassis frame cross-members.
- ▶ For the other mounting frame cross-members, an arrangement above the chassis frame cross-members is recommended.
- ▶ The assembly frame longitudinal members must extend as far towards the front of the vehicle as possible, to reinforce the point behind the cab which is critical with regard to bending stress, as well as to prevent vibration problems.
- ▶ The body must have a torsion-free attachment to the body consoles on the longitudinal frame member.
- ▶ Place the vehicle on a flat, horizontal surface before mounting the body.

If very high longitudinal members are required, or if low overall frame heights are achieved, the following non-positive connections are possible for U-sections:

- Closed as a box
- Nested
- Overlapping

This increases the section modulus and torsional stability.



Frame sections

- A Open U-section
- B Closed U-section
- C Nested U-section
- D Overlapping U-section

Assembly frame with dropped frame

On vehicles with a dropped frame (permissible gross mass ≥ 4.6 t/10141 lbs), the assembly frame longitudinal members can run continuously in a straight line.

7 Design of bodies

7.1.3 Section dimensions/dimensioning

Folded U sections or commercially available U sections for vehicle construction (not rolled steel sections) are to be used for the longitudinal members. Box sections are also permitted as longitudinal member sections.

The dimensions of the longitudinal members are a function of the section modulus (W_x) required for the body and the chassis (→ page 188).

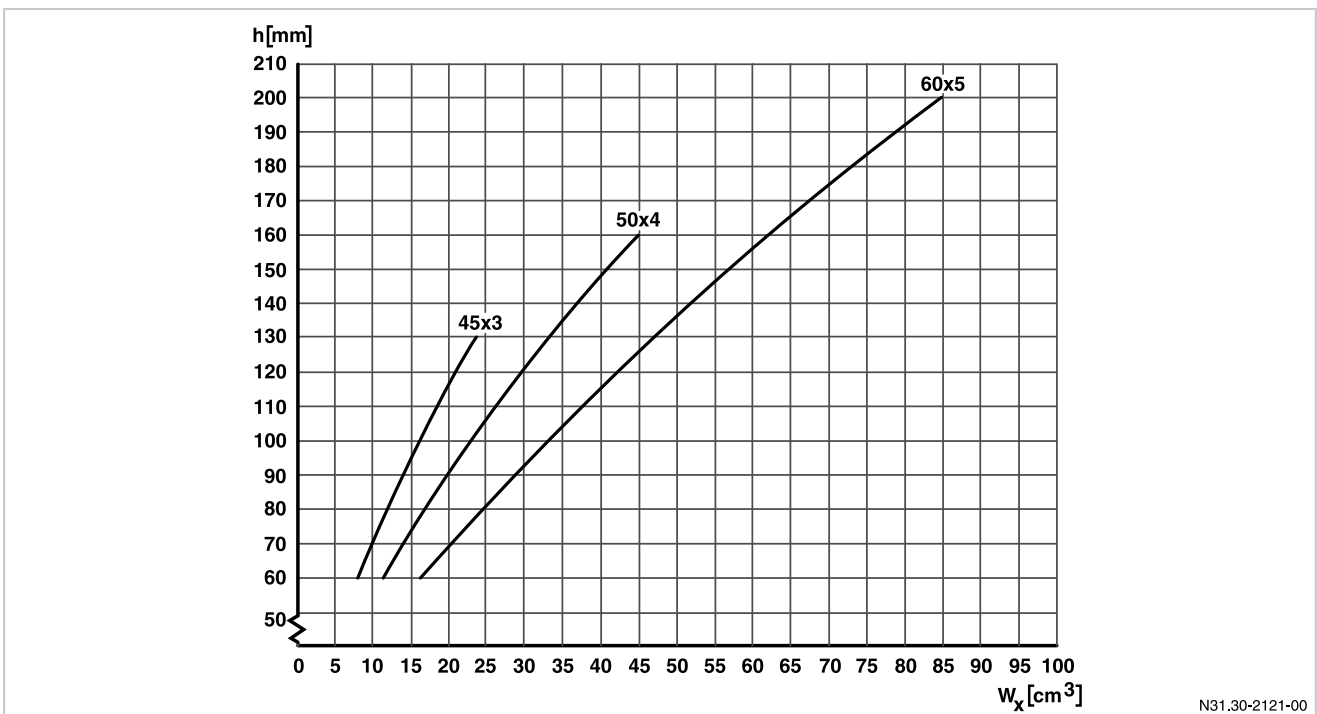
The specified section moduli and section dimensions refer to longitudinal frame members subjected to identical loads on both sides.

Please refer to the table below for the section dimensions of assembly frame longitudinal members (open section).

The assembly frame and the chassis frame should have approximately the same flange width.

! NOTE

If more than one body is mounted on the same chassis (e.g. platform and lifting platform), the larger of the specified section moduli must be taken to determine the assembly frame.



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Dimensioning of the assembly frame longitudinal member

h:	Section height in mm
W_x:	Section modulus in cm ³

7.1.4 Attachment to the chassis bed

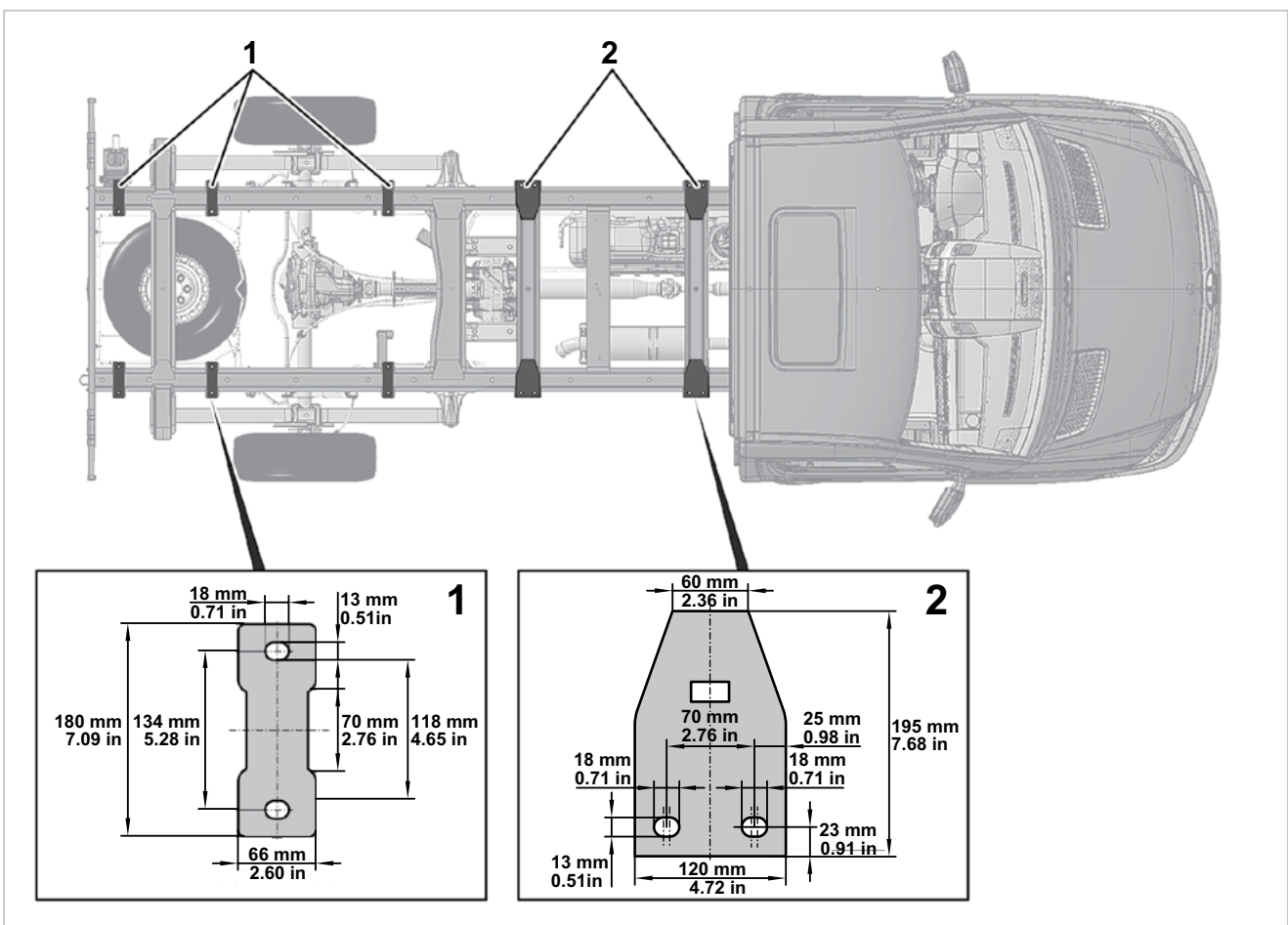
As a minimum, all the factory-installed body consoles must be used for attaching bodies to the vehicle frame. The consoles are located on the longitudinal frame members and additional body consoles may be fitted to the longitudinal frame members as required. All the body consoles, in particular those at the rear end of the frame, must be used to attach a lifting platform (cargo liftgate) and the body.

NOTE

The minimum distance between the body and the cab must be $> 50 \text{ mm}/2 \text{ in.}$

The bodies must rest on the body consoles and may also rest on the frame crossmembers. It is recommended that the body should not rest on the end crossmember. If prefabricated assembly frames are used, the production tolerances of the chassis frame width (maximum $+6/-3 \text{ mm}; +0.2/-0.1 \text{ in}$) must be taken into consideration.

i The positions for the body consoles are indicated in the 2D chassis drawings (offer drawings) depending on the model series (\rightarrow page 23).



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Designs of attachment points on the frame

Additional body consoles

If it is necessary to fit additional body consoles, make sure that you comply with the welding directives (→ page 95).

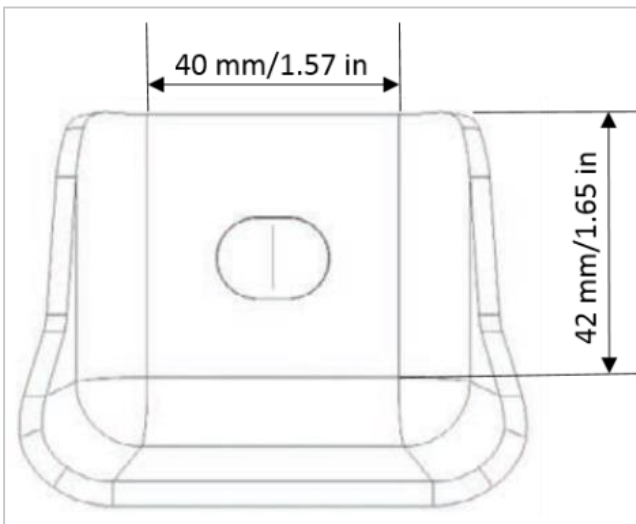
- Plug welding is only permissible in the vertical webs of the longitudinal frame member.
- Do not perform any welding work in bending radii.

The body consoles must be attached using two bolts for each body console.

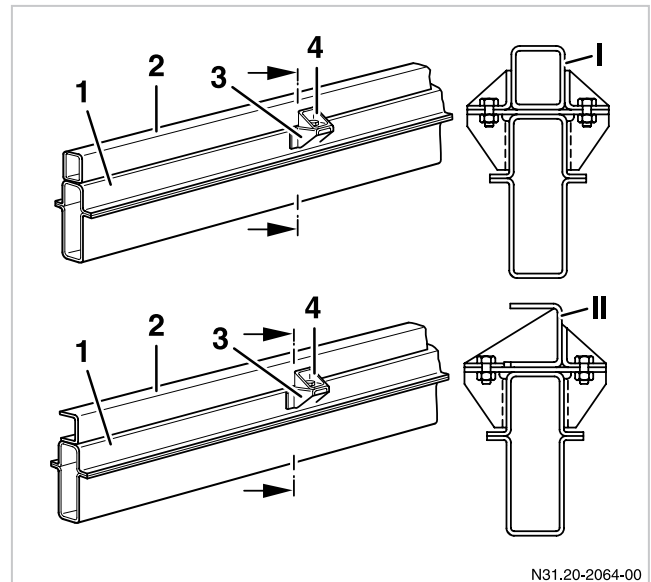
Attachment of the body consoles

For rigid bodies in particular, to ensure optimal transmission of force into the mounting supports on the vehicle (see illustration "Designs of attachment points on the frame") as well as at the longitudinal member, make sure that the subframe brackets of the subframe rest against a flat support. If possible, the mounting supports of the subframe should have identical dimensions to the body consoles on the vehicle.

- ▶ Distribute the application of force at screw connections across the maximum possible surface area by using washers with a diameter of approx. 1.37 - 1.57 in (35-40 mm) or square shims with a length along each edge of approx. 1.37 - 1.57 in (35-40 mm).

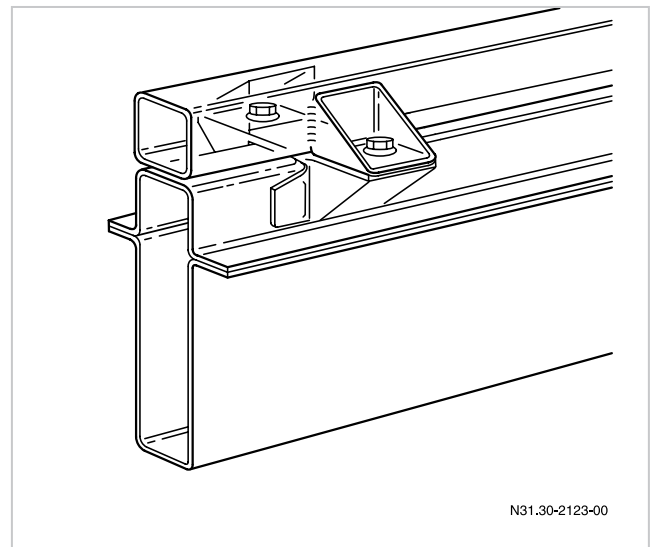


Body consoles (dimensions in mm/in)

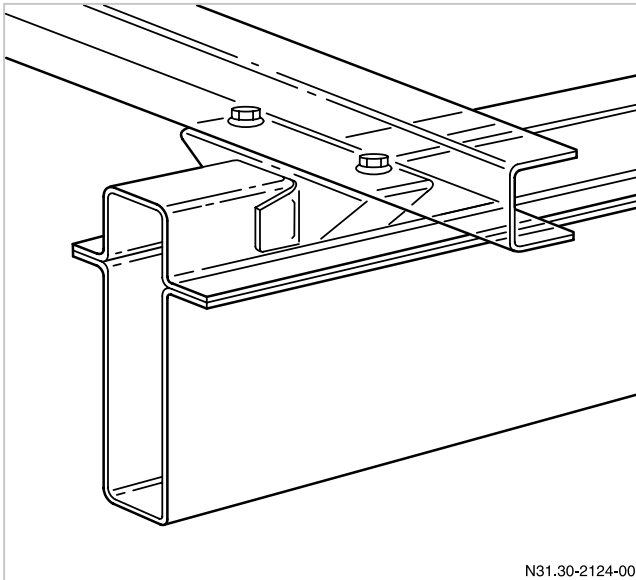


Example of a body console design

- I Box section
- II U-section
- 1 Chassis frame
- 2 Assembly frame
- 3 Standard mounting console
- 4 Mounting console

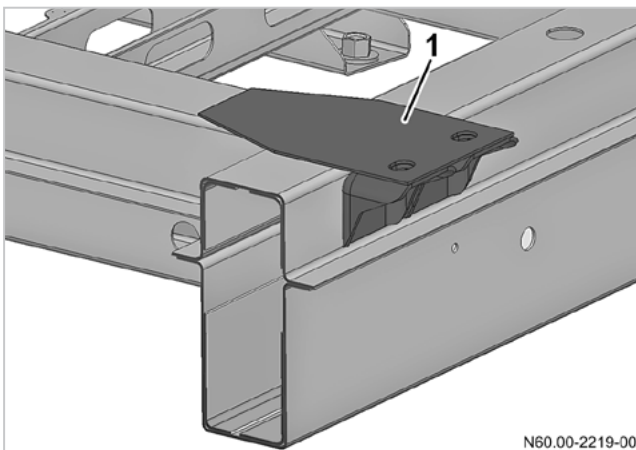


Attachment to a longitudinal member



N31.30-2124-00

Attachment to a crossmember



N60.00-2219-00

Attachment to a crossmember

1 Body console

Select the number of attachments to ensure adequate transfer of all longitudinal and lateral forces.

Correct attachment is a decisive factor for:

- vehicle handling and operating safety
- the durability of the chassis frame and the body

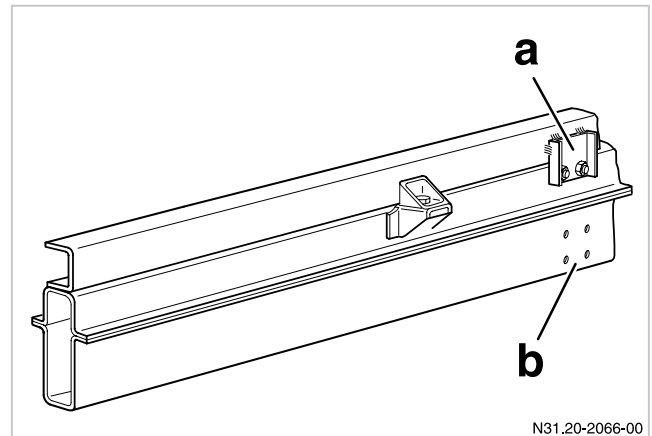
Rigid connection

i Also refer to 7.10 Semitrailer trucks (→ page 211).

For a rigid connection, the assembly frame longitudinal members must be secured in both longitudinal and transverse directions. This will allow movement of the assembly frame longitudinal member only under specific conditions.

The body can be secured to the sides of the upper flanges on the longitudinal frame member. Spacer bushings are required for reinforcement; these must be welded to the frame.

For rigid connections, a double support is required for each longitudinal frame member as depicted in the figure below. The rigid connection is required e.g. for "Loading crane at frame end" and is recommended for "Loading crane behind the cab".



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Double support (rigid connection)

- a Rigid connection at frame end
- b Standard holes at frame end

Chassis connection for rigid body upfits

For **fully integrated** bodies (continuous connection between the upfit and the rear of the B-pillar):

It is recommended to utilize standard bolted or rigid connections with maximized grip length between all mounting consoles and the mounting frame (the upfitter's frame connecting to the chassis frame).

For **non-fully integrated** bodies (no connection between the upfit and the rear of the B-pillar) and upfits with a **rigid mounting frame**, please follow the outlined recommendations below.

The upfitter needs to ensure that the equipment installed to the vehicle must not become loose and be lost during the vehicle operation.

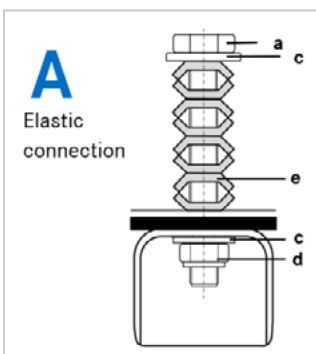
! NOTE

Definition of rigid body upfits: Mounting frames or box upfits connected to the longitudinal members of the cab chassis frame which substantially modify the torsional rigidity and bending behavior of the vehicle frame particularly in the area behind the B-Pillar.

The following mounting concept is recommended to decrease potential stress peaks directly behind the B-Pillar (transition between rear of cab and longitudinal members) by using a combination of elastic and rigid connections:

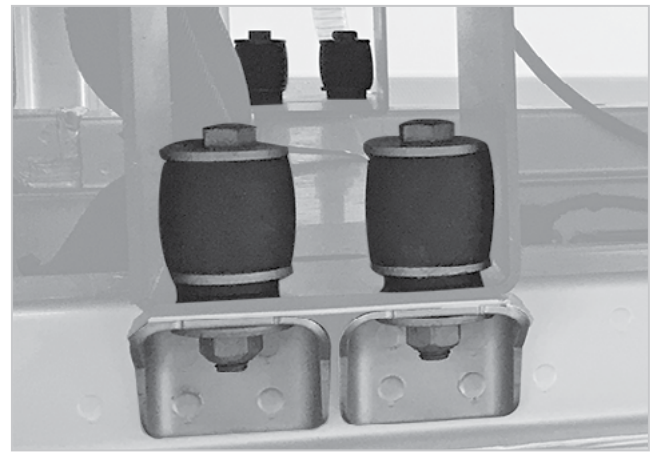
- An elastic connection should be used for the first and second mounting consoles to prevent stress peaks in the transition area between the rear of the cab and the longitudinal members (see pictures on following page).

The picture below shows an example using multiple disc springs. As an alternative, an elastic element out of elastomer material (e.g. rubber) may be used as well.



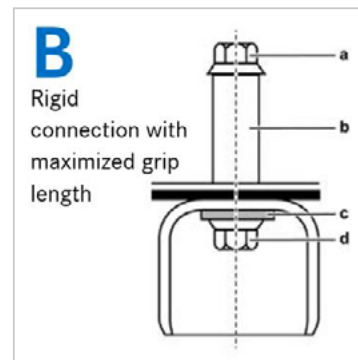
Elastic connection with spring discs

- a Flanged bolt M12 x 90, strength 10.9
- b Spacer sleeve 22-13 x 50
- c Washer DIN 7349-13-ST
- d Nut with flange M12, strength 10.9
- e Elastic element (e.g. multiple disc springs or polymer springs)



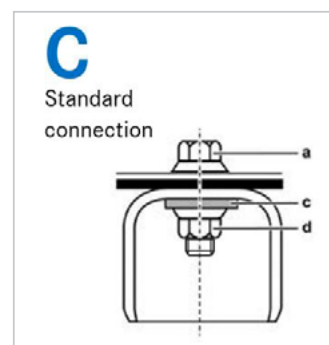
Elastomer bearings/ bushings"

- A rigid connection with maximized grip length should be used at the last connecting console of the chassis frame, and if necessary, place the rigid connections with maximized grip length from the third console to the mounting console immediately behind the rear axle. The spacer sleeve is used to maximize the grip length to prevent connection from loosening. The dimensions of the spacer sleeves must be thick enough to ensure they do not deform. These rigid connections should also be used for attaching bodies such as garbage presses or box bodies ≥ 1000 mm/39.8 in (measured from behind the B-pillar) in combination with a dump bed or platform on the chassis frame



Rigid connection with maximized grip length


- A standard bolted should be used from the third console to the mounting console immediately behind the rear axle. Also a rigid connection with maximized grip length (described in B) may be used in this area.



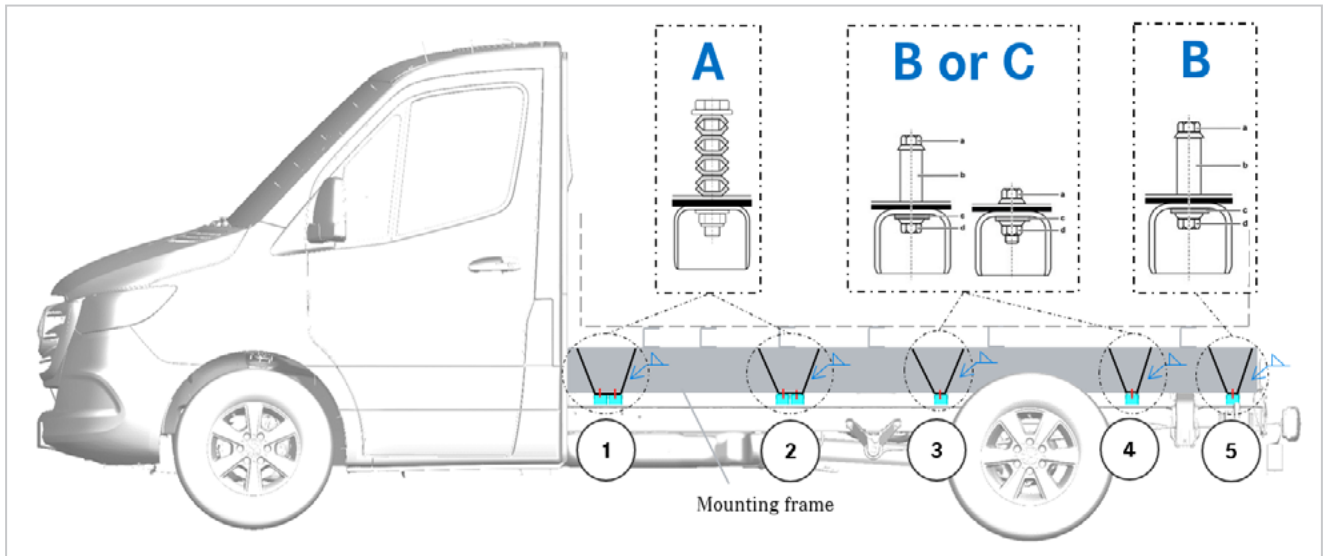
Standard bolted connection

If there are additional loads on the chassis frame besides the body upfit, then it may be required to reinforce the rear end of the mounting frame by fitting a diagonal cross.

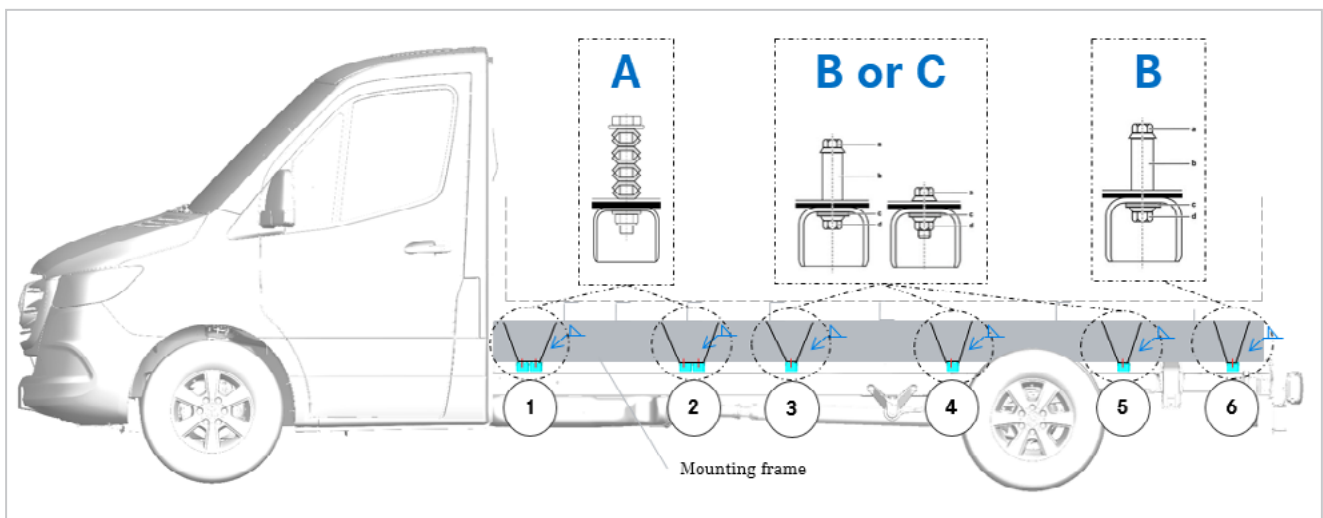
Please also observe Chapter 8.4.6 Retrofitting electrical equipment (→ page 267)

 If additional information is required, please refer to www.UpfitterPortal.com.

Mounting concept for body upfits with rigidity:



Sprinter cab chassis with 144" wheelbase – recommended attachment to the chassis frame/longitudinal members

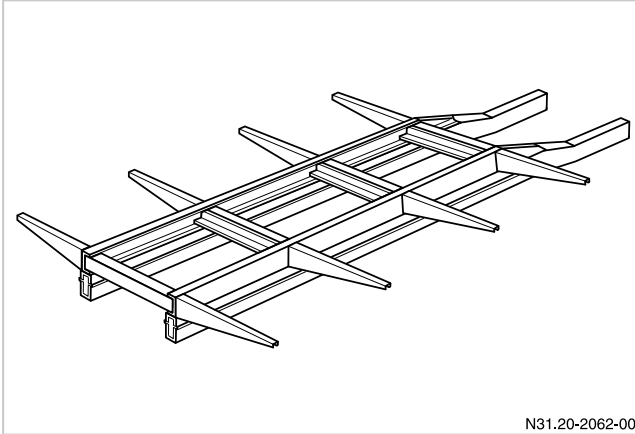


Sprinter cab chassis with 144" wheelbase – recommended attachment to the chassis frame/longitudinal members

7.1.5 Assembly frame as floor assembly

An assembly frame with continuous longitudinal members is not required if the body floor assembly can take on the function of the assembly frame.

The longitudinal members can also be integrated in the body. If the assembly frame longitudinal members are intersected by the crossmembers, the connection between the longitudinal and crossmembers must be rigid and resistant to torsion and bending.

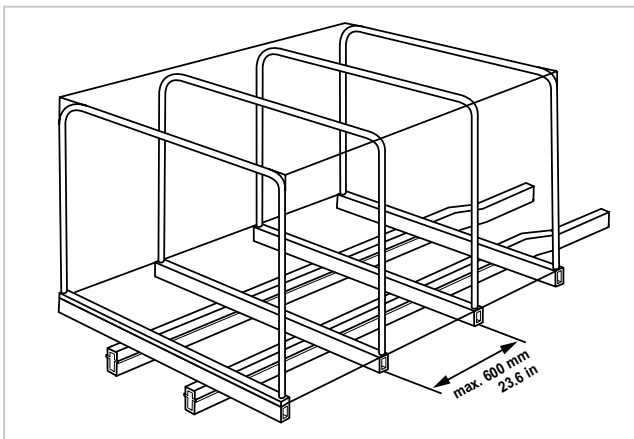


Example of a floor assembly design

7.2 Self-supporting bodies

An assembly frame with continuous longitudinal members is not required if the body's floor assembly can assume the functions of the assembly frame.

Self-supporting bodies must comply with the properties of the specified assembly frame. The body's floor assembly must have equivalent rigidity and a section modulus similar to the assembly frame. The floor assembly of the self-supporting body must be attached to the vehicle frame in the same way as a body frame/assembly frame by means of a stretch bolt connection locked to prevent loosening (→ page 196).



N31.20-2200-00

Example of a body design

7.3 Modifications to the interior

Retrofitting additional seats

! NOTE

All seats that deviate from the standard seating must satisfy the requirements in chapters 6.4.1 General information (→ page 147), 6.4.2 Safety equipment (→ page 148), and 6.4.3 Seats (→ page 157).

⚠ WARNING

If seats are subsequently mounted on thin-walled sheet metal parts of the vehicle without reinforcement, the seats could become detached from their anchoring points in the event of an accident. Passengers cannot be protected as intended.

There is danger to life and limb!

Retrofitting seats, their seat fastenings and seat belts must therefore always be tested in accordance with legal specifications and a sufficient strength must be proven, siehe Kapitel 6.4.3 Seats (→ Seite 157).

! NOTE

Retrofitting a seat on the front passenger side or that fastens to the partition (including folding seat or another seat option) is not permissible in vehicles with registration without front passenger seat (code Z0S).

This affects vehicles with special equipment "Removal of front passenger seat" (code S91) in combination with "Removal of front passenger airbag" (code SW3), as well as the consequent "Removal of front passenger side seat belt" (code SW1) ex factory, delivered in countries where GSR II (General Safety Regulation) is valid.

The strength of the seats delivered from the factory is only valid if the seats are secured in their original mountings

When retrofitting seats, it is absolutely essential to keep to the H-point. The seat adjustment range must not be enlarged. For up to date documentation, see 1.7 Contact (→ page 17).

If a rear bench seat with 2 or 3-point seat belts deviates from the standard seat design, it must comply with the requirements from chapters 6.4.1 General information (→ page 147), 6.4.2 Safety equipment (→ page 148) and 6.4.3 Seats (→ page 157).

A rear seat system with 2- or 3-point seat belts that deviates from the standard seating arrangement must meet the requirements of the FMVSS/CMVSS 207 (seating systems) and the FMVSS/CMVSS 210 (seat belt assembly anchorages) standard. Furthermore, the standard FMVSS/CMVSS 209 (Seat belt assemblies) must be adhered to. For the headrests, proof of compliance with the FMVSS/CMVSS 202a (Head restraints) standard is required. The test reports in relation to FMVSS/CMVSS 202a, FMVSS/CMVSS 207, FMVSS/CMVSS 209 and FMVSS/CMVSS 210 must be submitted for approval by Mercedes-Benz.

When reinstalling seat belts, the specified bolts must be replaced and tightened to the original torque with the tolerances for connecting and fastening elements including the classification (A/B/C) as per VDI 2862 (The Association of German Engineers).

⚠ WARNING

It is not permitted to mount seats on the wheel well, partitions or other sheet metal parts of the vehicle as they could become detached from their anchorages in the event of an accident. Passengers will not be protected as intended. There is a risk of accident, personal injuries and death if such systems no longer function correctly.

In the case of vehicle orders where the driver's seat (code S90) or front passenger seat (code S91) is omitted, subsequent installation of standard seats (driver's or front passenger seat) in the body-in-white is not permitted, as no reinforcements or suitable connection points are available. However retrofitting of aftermarket seats is possible.

For modifications to the seat attachments (including seat bases) and seat belt anchorages or for the installation of seats other than those available from the factory, an evaluation with the responsible department is necessary. As part of the eXpertUpfitter program please refer to www.UpfitterPortal.com.

⚠ WARNING

If seats other than those fitted at the factory are fitted in conjunction with seat belts available from the factory, only seat belt buckles that are compatible with the belt tongues of the factory-supplied seat belts may be used. Otherwise the seat belt cannot be locked in the seat belt buckle as intended. Passengers will not be protected as intended.

There is danger to life and limb!

Only use latch plates which are approved for the factory-fitted seat belts.

Only the components of the series production supplier may be used for the installation of seat belts and seat belt buckles:

Contact details

Postal address:	Autoliv B.V. and Co. KG Postfach 109 D-25333 Elmshorn, Germany
Telephone:	+49 (0)4121 - 797-0

All regulations relevant to approval (e.g. seat belt buckle position) must be observed when fitting seat belts and seat belt buckles other than those available from the factory.

**Rear seats in the passenger compartment/
cargo area**

On cargo vans of model series BR 907, the body-in-white floor assembly is available from the factory as special equipment under code V40 (Crewbus floor assembly) for retrofitting bench seats. The number of mounting options for the crewbus floor assembly depends on the model series and the equipment or registration variants (the mounting shells for the bench seats are not included in the scope of delivery).

! NOTE

The upfitter is responsible for ensuring compliance with the legal requirements for transporting passengers in the rear.

With the body-in-white floor assembly for crewbus vehicles (code V40), for camper vans (code X2R), and for special-purpose vehicles (code ZB7), additional measures necessary for this purpose are installed, among other things, on the sliding door to the load compartment.

! NOTE

In all cases deviating from this, it is essential to order the additional measures on the sliding door to the load compartment with the special equipment "Load compartment sliding door for upfitter conversion of passengers behind B-pillar" (code T01) for installation ex works.

In this regard, in countries where GSR II applies, note that for vehicles with a partition at the B-pillar ex factory (code D50, D51 and D64), the equipment code T01 cannot be ordered due to the additional measure "catch bearing". Retrofitting of seats in the rear passenger compartment is not permissible on such vehicles. Alternatively, the special equipment "Pre-installation for retrofitting a partition" (code D62) can be selected and a upfitter-specific partition can be retrofitted, see Chapter 7.4 Modifications to closed cargo vans (→ page 201).

i For further information on special equipment, please contact your Mercedes-Benz Service Center or the relevant department (→ page 17).

Additional information on special equipment code V40 can be obtained from your Mercedes-Benz Service Center, the relevant department (→ page 19) or under 3.12 Special equipment (→ page 59).

If rear seats with 2 or 3-point seat belts deviate from the standard seat design, they must comply with the requirements of the regulations UN-R 14 (seat belt anchoring), UN-R 16 (seat belts) and UN-R 17 (seats and head restraints).

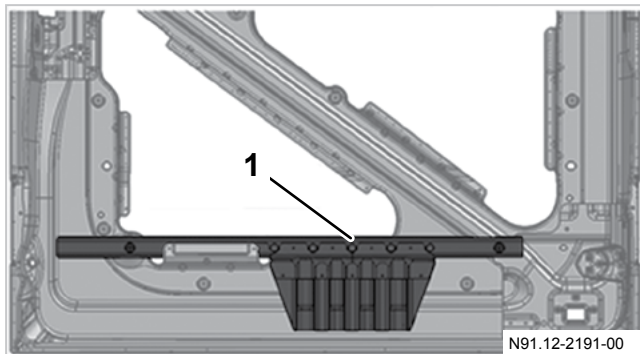
⚠ WARNING

If seats other than those fitted at the factory are fitted in conjunction with seat belts available from the factory, only seat belt buckles that are compatible with the belt tongues of the factory-supplied seat belts may be used. Otherwise the seat belt cannot be locked in the seat belt buckle as intended. Passengers cannot be protected as intended. There is a risk of injury!

Only use latch plates which are approved for the factory-fitted seat belts.

Reinforcement of sliding door to load compartment with rear seats

For the Sprinter BR 907 the impact protection reinforcement is added automatically as required for vehicles with a long sliding door to the load compartment (vehicle length A2 and over) and vehicles with crewbus floor assembly (code V40) for countries with appropriate legislation which requires the installation of this reinforcement.



Right load compartment sliding door from outside without paneling

1 Assembly part "impact protection reinforcement"

The reinforcement is required when installing rear seats in the cargo van and crewbus in the following countries:

- Mexico, USA, Canada
- GCC Arab States of the Gulf (Kuwait, Bahrain, Saudi Arabia, Qatar, United Arab Emirates, Oman)
GCC = Gulf Cooperation Council

If the upfitter retrofits of rear seating for these countries, it must be ensured that the impact protection reinforcement is installed.

In combination with the special equipment crewbus floor assembly (code V40), the impact protection reinforcement is already installed at the factory.

For retrofit installation, the assembly part is available from your Mercedes-Benz Service partner under the following item numbers:

- A 910 730 47 00 left reinforcement
- A 910 730 48 00 right reinforcement

! NOTE

The upfitter must check and comply with all national laws, directives and registration regulations.

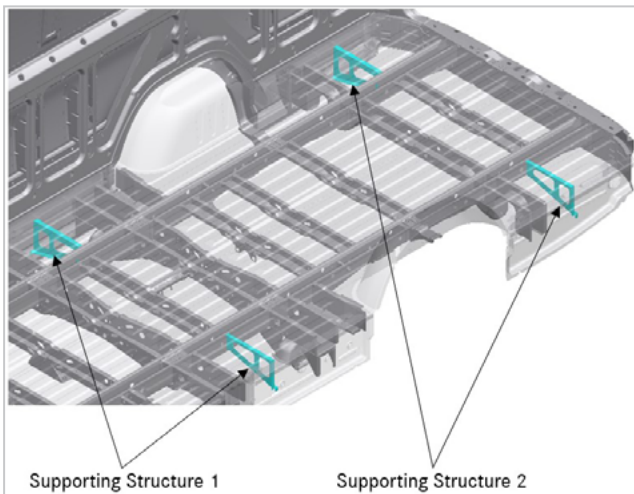
7.4 Modifications to closed cargo vans

Floor assembly/side walls

On cargo vans, the body and the chassis frame form a self-supporting unit. If body parts are modified or fitted, they must only be welded if a bonded connection is not possible.

For this reason, windows, roof hatches and vent openings must be mounted in a sturdy frame. The frame must then be joined by a non-positive attachment to other body elements.

Underbody Supporting Structure



Underbody Supporting Structure

N61.00-2035-00

Supporting structure 1 and 2 are installed or partially installed ex factory until these codes are ordered:

Code	Description	Supporting Structure 1	Supporting Structure 2
UT1	Seat Attachment Fond, Fixing Point	No	Yes
V39	Artificial Surface People Mover	No	No
V43	Wooden Floor	No	No
ZE6	Structure for the Installation of Shelves	No	No

Depending on the coding, there is an underbody supporting structure (A 906 312 16 61) in the cargo van and passenger van integrated. The amount of installed structures at the different positions for different configurations is shown in the following table:

Tonnage	Wheelbase			
	170		170 EXT	
	Support- ing struc- ture 1	Support- ing struc- ture 2	Support- ing struc- ture 1	Support- ing struc- ture 2
2500	1	1	1	3
3500, 3500 EXT	1	1	1	1

Cab rear panel

If an opening is made in the cab rear panel, it must be surrounded by a sectional frame.

The remaining braces and pillars must be reinforced by additional gussets and connected to the sectional frame (e.g. by bonding).

Also please refer to 6.2.5 Modifications to the cab (→ page 120).

Partitions

Vehicles upfitted as commercial vehicles without a partition do not satisfy the requirements of ISO 27956, which describes the fixtures for the proper securing of cargo in delivery vans. If the vehicle is used to transport goods, the installation of a ISO 27956 compliant partition is recommended.

If retrofits, modifications, or attachments of any kind are performed on the partition, compliance with ISO 27956 is recommended.

If the partition is removed, the vehicle will no longer comply with ISO 27956. In this case, the tie-down eyes must be installed. If the partition/divider is modified or removed or has parts attached to the partition wall, the functionality of safety equipment (e.g. the deployment areas of airbags) must not be affected (see Chapter 6.4.2 Safety equipment (→ page 148)).

In these cases the upfitter must ensure that the product satisfies the requirements of a safe product, if necessary by means of other measures as he or she sees fit. In this respect, the ISO standard represents only the technical minimum standard.

The following partition walls are available as special equipment from the factory:

Code	Description
D50	Full-width partition wall (standard)
D51	Full-width partition wall with window
D56*	Full-width partition wall at C-pillar
D64	Partition wall with sliding door
D93	Omission of partition wall

* Only available in Canada

Additional information on special equipment can be obtained from your Mercedes-Benz Service Center or under 3.12 Special equipment (→ page 59).

Head Impact

Certain precautionary measures are necessary to ensure the safety of all passengers.

Mercedes-Benz offers two different approaches:

1. Mercedes-Benz partition wall meeting the FMVSS 201 requirements.
2. If there is no Mercedes-Benz partition wall installed, foam pads are provided in order to meet FMVSS 201.

i In the case you are installing an aftermarket partition wall, please ensure to meet FMVSS 201 requirements.

It is upfitter's ultimate responsibility to review and comply with FMVSS 201 as it relates to its installation of Mercedes-Benz partition walls and foam pads, as well as its decision to use and install non-Mercedes-Benz partition walls and parts.

- If the vehicle has no partition wall installed and has a GVWR $\leq 10,000$ lbs, it is fitted with foam pads (see pictures below)



High roof



Standard roof

- If the vehicle has a partition wall installed, it is not fitted with foam pads (see pictures below)



High roof



Standard roof

i NOTE

Following FMVSS 201 requirements, all Mercedes-Benz vehicles $\leq 10,000$ lbs and without a partition wall are fitted with foam pads (see picture). Vehicles $> 10,000$ lbs with and without a partition wall are fitted without foam pads.

It is not recommended to modify the foam pads and their surrounding area in order to comply with FMVSS 201.

7 Design of bodies

- If the vehicle has no partition wall installed and has a GVWR $\geq 10,000$ lbs, it is not fitted with foam pads (see pictures below)



High roof

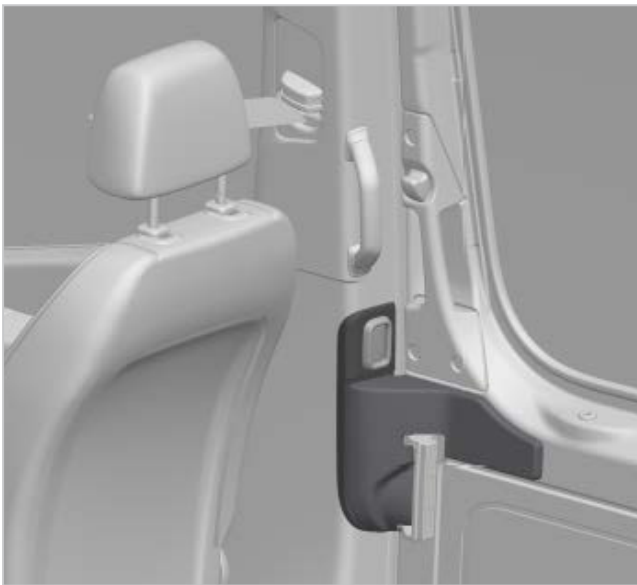


Standard roof

Also note the new trim parts as of model year 2025 for the additional measure "catch bearing" (front catch) of the load compartment sliding door in the center area of the sliding door lock at the B-pillar, see following illustration.

A upfitter-specific partition or other parts planned for the installation must be adapted to the new component part contours in this area.

- i For details, the 3D design data is available to you in the Upfitter Portal, see Chapter 2.3 Product and vehicle information for upfitters (→ page 23).



Additional measure "catch bearing" (schematic)

For retrofits, modifications, or any kind of attachments to the partition, the upfitter must ensure that the previously mentioned specifications are complied with and provide documented evidence of this when requested to do so. We recommend having this documented evidence confirmed by an authorized testing organization.

If the partition is removed, the vehicle will no longer comply with the previously mentioned specifications. In this case, as a requirement for registration, at least the tie-down eyes must be installed.

If the partition/divider is modified or has parts attached to it, or if it is retrofitted or removed, the functioning of safety equipment (e.g. the deployment areas of airbags) must not be affected, see Chapter 6.4.2 Safety equipment (→ page 148).

In these cases, the upfitter must ensure that the product satisfies the requirements of a safe product; if necessary, by means of other measures as the upfitter sees fit. In this respect, the ISO standard represents only the technical minimum standard.

For the attachment of seats at the partition (e.g. folding seats), observe the specifications in Chapter Retrofitting additional seats (→ page 198).

- i You can obtain further information on special equipment from your Mercedes-Benz Service Center, from the department responsible (→ page 17), or in 3.12 Special equipment (→ page 59).

Roof

Information on roof modifications is available at Chapter 6.2.10 Cargo Van/Passenger Van roof (→ page 126).

7.5 Platform bodies

To ensure the uniform loading of the chassis frame, the body must be attached to the chassis frame by means of an assembly frame (U-section longitudinal members) (→ page 188).

At the least, all the factory-installed body consoles must be used for attaching platforms to the vehicle frame.

If the standard platform is subjected to point loads (e.g. for the transportation of cable drums, coils, etc.), the substructure and the platform floor must be reinforced to support the load.

Before start of installation:

▶ Weigh the chassis and establish body length.

Chassis with crewcab:

▶ If necessary, shorten the rear frame overhang to prevent the permissible rear axle load from being exceeded and to ensure that the minimum front axle load is maintained.

▶ Install reflectors on the body in accordance with the legal requirements.

- Section moduli (W_x) and material properties can be found under 7.1 Assembly frame (→ page 188).
- For the section dimensions of the assembly frame longitudinal members, see the diagram (→ page 190).

! NOTE

Where bodies include detachable parts which move independently, ensure that there is adequate clearance between the detachable parts and the basic vehicle, otherwise they may collide with the basic vehicle, resulting in damage.

7.6 Box bodies

To ensure the uniform loading of the chassis frame, the box body must be attached to the chassis frame by means of an assembly frame (U-section longitudinal members) (→ page 188). In the case of self-supporting box bodies, its function and the equivalent rigidity of the floor assembly of the box body must be guaranteed. Refer to the chapters 7.1.5 Assembly frame as floor assembly (→ page 196) and 7.2 Self-supporting bodies (→ page 197).

At the least, all the factory-installed body consoles must be used for attaching box bodies to the vehicle frame. The information on mounting on the vehicle frame in chapters 6.2.2 Attachment to the frame (→ page 115) and 7.1.4 Attachment to the chassis bed (→ page 191) must be implemented.

The floor assembly, see Chapter 7.1.5 Assembly frame as floor assembly (→ page 196), and a self-supporting body, see Chapter 7.2 Self-supporting bodies (→ page 197), must be attached to the vehicle frame in the same way as a body assembly frame is mounted on the vehicle frame.

On self-supporting or box bodies with assembly frames, stretch bolt connections locked to prevent loosening and spacer sleeves must be provided behind the cab at the first and second body consoles. The dimensions of the spacer sleeves must be adequate to ensure that they cannot become deformed (→ page 196).

Section moduli (W_x) and material properties can be found under 7.1 Assembly frame (→ page 188).

! NOTE

The minimum distance between the cab and a separate body must be > 50 mm or 1.97 in.

i For integral box bodies (→ page 250).

7.7 Refrigerated vehicles/temperature-controlled vehicles

Refer also to the following chapters:

- 6.5.1 Retrofitting an air conditioning system (→ page 161).
- 6.5.3 Engine power take-off (→ page 163)
- 6.2.10 Cargo Van/Passenger Van roof (→ page 126).
- 8.4.6 Retrofitting electrical equipment (→ page 267).
- 6.4.4 Reducing interior noise (→ page 158).

With cargo vans, easy access to the components of the door mechanism (e.g. guide rails and hinges) must be retained so as not to hinder possible repair work see Chapter 3.11 Maintenance and repair (→ page 56).

! NOTE

On cargo vans, the insulation increases the weight of the doors and therefore the load on the hinges, carriages and locking systems.

Observe the specifications for the maximum permissible additional weights on the doors, see Chapter 6.2.6 Side wall, windows, doors and flaps (→ page 121).

These requirements and notes are also applicable for vehicles used to transport loads under constant conditions within the load compartment, for example with a constant temperature higher than 0 °C/32 °F.

! NOTE

People working inside the vehicle may inadvertently become trapped by doors closing by themselves or being closed by other persons.

The bodies of refrigerated/temperature-controlled vehicles must be designed so that any persons shut inside can open the door outwards from the inside in every situation.

We recommend fitting the doors of refrigerated bodies with an emergency release so that they can be opened easily from the inside at any time even when locked.

! NOTE

When using refrigeration systems/components in combination with the refrigerant R1234yf, all applicable laws, regulations and safety specifications must be observed.

In particular, compliance with the safety regulations according to ISO 13043 at both the component and overall system level (FMEA, leaktightness requirements, concentration measurements etc.) must be guaranteed.

Along with this, also observe the safety requirements with regard to inflammability and risk of combustibility in combination with R1234yf (maintain best-possible packaging or largest-possible distance to hot parts, if necessary, install additional devices for assuring the required safety).

If R1234yf is used, a specific information label with details of the quantity and combustion risk must be considered or installed in a visible location.

7.8 Vehicles for transportation of technical gases

Vehicles for transporting technical gases with tanks and lines for liquefied gases must be equipped with adequate heat insulation from the rest of the vehicle. This is even more important for lines that are passed through the vehicle chassis or the body in white.

To allow venting of supercooled liquefied gases, a distance of at least three meters is required between the vent opening and the vehicle. If venting is necessary, make sure that the vent opening points away from the vehicle. Any escaping condensation must be caught in a suitable container.

Transport of gases is subject to the hazardous materials law regulated by FMCSA under 49 CFR Part 173 in the US, and to the Transportation of Dangerous Goods Act (Transport Canada) in Canada.

7.9 Dump trucks

Vehicles with dump trucks are subject to local and country-specific directives and laws.

Vehicles with dump bodies can only be used under normal operating conditions. As part of the eXpertUpfitter program, possible deviations can be evaluated with the responsible department.

Make sure that you do not exceed the permissible axle loads.

i Also see Chapter 6.6.8 Underrun protection / underride guard (→ page 184) and see subsection Lateral protections (→ page 185)

i Tilt support

- ▶ The rear tilt support for three-way and rear-end dump trucks should be mounted as close as possible to the rear axle.
- ▶ The dropside must not impact the frame end, the lighting equipment or the trailer hitch when folded down.
- ▶ Provide guide brackets for the front pivots, so that the pivots are guided when the dump body is lowered.

Safety devices

- ▶ Local and country-specific directives and laws must be observed.
- ▶ Install a support (fold-out support) to prevent the dump body from dropping.
- ▶ Secure operating devices against accidental operation.
- ▶ Connect a "Dump truck" indicator lamp to provide a visual warning that the dump truck has not tilted back completely (in driving position).

Tilting press

- ▶ The press carrier is attached to crossmembers in the assembly frame.
- ▶ Position the crossmembers of the assembly frame and those of the chassis above each other where possible.
- ▶ On three-way dump trucks, the application point of the tilting press must be in front of the center of gravity of the body and the payload.

Assembly frame

If chassis are provided with dump trucks, the assembly frame must have the correct dimensions to support the high loads to which the vehicle will be subjected.

Pay attention to the following points:

- ▶ Attach assembly frames to body consoles as per 7.1.4 Attachment to the chassis bed (→ page 191).
- ▶ Make sure that the steel longitudinal and crossmembers have the correct dimensions.
- ▶ Close off the rear area of the assembly frame to form a box and, if necessary, reinforce the assembly frame by installing a diagonal cross or by taking other appropriate measures.
- ▶ At the least, all the factory-installed body consoles must be used for attaching dump trucks to the vehicle frame.
- ▶ Vehicles with dump trucks can only be used under normal operating conditions. As part of the eXpertUpfitter program, possible deviations can be evaluated with the responsible department.
- ▶ Section moduli (Wx) and material properties can be found under 7.1 Assembly frame (→ page 188).

7.10 Semitrailer trucks

Chassis may generally be converted into semitrailer truck vehicles provided that this conversion complies with national regulations and laws. The registration eligibility of a Sprinter converted to a semitrailer vehicle must be assured by the bodybuilder manufacturer carrying out the work according to the country-specific registration requirements.

Obtain and comply with the specific state and national vehicle registration requirements with regard to the topics "Electronic Stability Program (ESP®)" and "Tire pressure loss warning system".

A functioning electronic stability program is required by law in the EU for all classes of vehicle.

Operation of the Sprinter as a semitrailer truck with functioning Electronic Stability Program ESP® is possible under the following conditions:

1. The semi-trailer used must be equipped with an anti-lock braking system (ABS) as a minimum. Combining the Sprinter with a semi-trailer without ABS is not permitted.
2. The brake systems of the semitrailer truck and semitrailer, the compressed air supply, and the compressed air reservoir must be designed in accordance with UN R 13, observe Annex 10 of UN R 13 in particular.
3. When using conventional trailer control valves, **without** additional sensing of the actual wheel braking forces, the following specifications apply to the special equipment of the driving assistance systems:
 - a) Code restrictions that are not permitted to be selected:
 - Active Brake Assist (code BA3)
 - Active Distance Assist DISTRONIC (code ET4)
 - Cruise control (code MS1)
 - b) Code requirements that must be selected:
 - Omission of Active Brake Assist (code BW6)

4. Check country-specific legal specifications on the obligation to install and use active emergency brake assists with autonomous brake applications as of the application of GSR II (General Safety Regulation).

Autonomous brake applications may be triggered, for example, by the driving assistance systems available ex factory:

- Active Brake Assist (BA3)
- Cruise control (MS1)
- Active Distance Assist DISTRONIC (code ET4)

! NOTE

It is not permissible to mount a semitrailer truck body without the forwarding of autonomous brake application signals from the driving assistance systems to the semitrailer through the trailer control valve.

5. The use of the driving assistance systems mentioned under 4. (codes BA3, ET4 and MS1) is only possible with sensing and processing of the actual wheel braking forces (sensing of hydraulic pressure per wheel on the base model vehicle or CAN signal via PSM). Reach out via the upfitter portal for more information

7 Design of bodies

Consult your local licensing authority/office if you are unsure whether a semitrailer without ABS can continue to be used in your registration area.

It is not permitted to combine the Sprinter BR 907.xxx with a semitrailer without ABS.

To convert a chassis to a light duty truck, an evaluation with the responsible department is necessary. As part of the eXpertUpfitter program please refer to www.UpfitterPortal.com.

The longitudinal frame members must be reinforced by a subframe or a semitrailer bracket.

The vehicle must be equipped with stabilizer bars on the front and rear axles.

! NOTE

It is not permissible to mount install semitrailer hitches without forwarding of autonomous brake application signals from the driving assistance systems to the semitrailer through the trailer control valve.

However, in order to achieve optimum handling characteristics, we recommend the use of an RSC system (Roll Stability Control) in the semitrailer that will automatically intervene whenever the trailer becomes unstable.

Since the RSC of the semitrailer acts autonomously, no provision is made for signal transmission from the towing vehicle. No additional electrical connections are necessary. The manufacturer of the semitrailer brake system must be consulted to ascertain whether it is possible to retrofit an RSC system on a semitrailer with ABS.

If an increase in the gross combination mass is planned, please contact the technical consulting department (→ page 19).

! NOTE

For vehicles with engine OM654 and a planned permissible gross combination mass greater than 12200 lbs (5.55 t), a pre-installation for trailer coupling must be provided to ensure sufficient engine cooling.

For this purpose, select one of the special equipment codes QA5 or QA3 in accordance with the weight requirement when ordering the vehicle, see the following overview of code specifications and Chapter 6.6.7 Trailer coupling / Trailer hitch (→ page 180).

Alternatively, a combination of the special equipment codes IT5 + MU6 + GD9 + AR5 can be selected for the vehicle configuration, see code specifications below.

Vehicles without this special equipment cannot be retrofitted.

More information on the ESP® is available in 8.9.1 Electronic Stability Program (ESP®) (→ page 297).

For the conversion of chassis to a semitrailer truck in combination with the previously mentioned driving assistance systems, via the Upfitter Portal (→ page 23), a Letter of Compatibility (→ page 51) must be applied for online from the responsible department (→ page 17).

The longitudinal frame members must be reinforced by an appropriate subframe or a semitrailer bracket.

Furthermore, take into account the notes in Chapter 4.3.1 Modifications to the body-in-white (→ page 76) and Chapter 4.3.6 Attachment to the frame (→ page 80).

Code requirements for conversion to a semitrailer truck

With trailer control valves between master brake cylinder and ESP hydraulic unit:

Code requirements (mandatory)

Code	Equipment
BW6	Omission of Active Brake Assist
CB7 or CB2	Stabilization stage I Comfort suspension with air suspension
QA5 or QA3	Pre-installation of trailer coupling for trailer load up to 2800 kg Pre-installation of trailer coupling for trailer load up to 3500 kg

Alternative code combination to QA5 or QA3 (all 4 codes must be selected)

Code	Equipment
IT5	Model designation 5.0 t
AR5	Axle ratio $i = 4.727$

Code recommendations

Code	Equipment
A50	Front axle with increased load capacity
ED4	Up-rated battery (12 V/92 A)
E2I or E2M	Auxiliary battery in vehicle interior Auxiliary battery in the engine compartment
EK1	Terminal strip for auxiliary consumers

Code restrictions (not usable)

Code	Equipment
BA3	Active Brake Assist
ET4	Active Distance Assist DISTRONIC
JA7	Blind Spot Assist
JB6	Parking package with 360° camera
JB7	Parking package with reversing camera
MS1	Cruise control
R9A	Ultrawide-base tires (front axle 225/75 R16C, rear axle 285/65 R16 C)
A4M	All-wheel drive

Gross combination mass

The technically permissible gross combination mass (in regard to the drivetrain) is limited to a maximum of 15400 lbs (7000 kg).

! NOTE

The maximum technically possible gross combination mass refers only to the drivetrain. A brake approval in connection with a conversion to a semitrailer truck is not available. This must be obtained by the upfitter.

For a change in weight of the incomplete vehicle contact Mercedes-Benz via the upfitter portal. (→ page 23).

Assembly frame for semitrailer truck

If the vehicle is used as a semitrailer truck, a steel assembly frame made of rectangular tube, 4 x 2.4 x 0.1 in (100 x 60 x 3 mm) (or s = 0.15 in (4 mm)) with a section modulus W_x of at least 1.5 in³ (25 cm³) is required, see also Chapter 7.1.1 Material quality, general (→ page 188). The assembly frame must extend rearward as far as the standard chassis end and, toward the front, as far as the first mounting support behind the cab.

The assembly frame must be mounted according to 7.1.4 Attachment to the frame (see Chapter 7.1.4 Attachment to the chassis bed (→ page 191)) using, at the least, all the factory-installed mounting supports.

In addition, the connection between the frame and the assembly frame must be rigid at the frame end. This should be executed at the upper flange of the longitudinal frame member (→ page 191).

Make an additional shear-resistant connection at the front end of the longitudinal frame member.

Electrical connection for the light duty truck

All additional electrical consumers must be connected as per 8.4 Interfaces (→ page 264) and 8.4.6 Retrofitting electrical equipment (→ page 267).

- The connection lines must not chafe against body components.
- The upfitter must ensure freedom of movement when cornering.
- Connection lines must not get caught on the light duty truck or pull on the trailer socket.
- When the tractor is driven without a light duty truck, the connection lines must be secured correctly.

Brake system

The semitrailer brake system must be connected to the brake system of the semitrailer truck. It is not permitted to use inertia-activated brakes in combination with a semitrailer truck of model series 907.

The upfitter must guarantee the following:

- A certified hydraulic-pneumatic control valve must be installed in the vehicle brake system for the actuation of the semitrailer brake.
- The hydraulic-pneumatic control valve must be integrated into the standard brake system between the master brake cylinder and the ABS/ASR hydraulic unit, with a maximum volume absorption of the control valve of 0.6 cm³ per brake circuit.
- When using hydraulic-pneumatic control valves, observe the previously mentioned code specifications. When using the previously mentioned driving assistance systems, signal processing of the actual wheel braking forces (hydraulic pressure per wheel or CAN signal via PSM) is required. Please reach out to Mercedes-Benz via the upfitter portal.

Mounting plate and fifth wheel coupling

The upfitter must ensure that the mounting plate and fifth wheel coupling are adequately dimensioned.

Comply with all national directives and laws.

The mounting plate and the fifth wheel coupling must be mounted in compliance with the manufacturer's specifications and mounting instructions.

7.11 Recovery vehicles

Vehicles with bodies for rescue or recovery equipment must be attached with assembly frames of adequate dimensions (→ page 191).

In addition, the bodies must be fitted with two rigid connections for each longitudinal frame member.

For bodies for recovery and towing vehicles, an evaluation with the responsible department is necessary.

As part of the eXpertUpfitter program please refer to www.UpfitterPortal.com.

For the attachment of winches, also see the sections Winch (→ page 166), Side underride guards (→ page 184) and Chapter 6.6.8 Underrun protection / underride guard (→ page 184)

National/Country-specific regulations, as well as accident prevention regulations and general machinery directives must be observed. Lateral protections (→ page 185) and 6.6.8 Underrun protection (→ page 184)

7.12 Torsionally stiff body types

Torsionally stiff bodies can be found, for example, in municipal vehicles, refuse presses, closed box bodies \geq 39.4 in (1000 mm) behind the cab in combination with a dumper or platform, fire department cases or road cleaning vehicles. With torsionally stiff bodies, attach the body and assembly frame in the front area of the frame via stretch bolt connections consisting of spacer sleeves and stretch bolts that are locked to prevent loosening (→ page 219). As a minimum, use all the factory-in-stalled mounting supports

If required, the assembly frame must be additionally reinforced at the rear by fitting a diagonal cross.

Please also observe 8.4.6 Retrofitting electrical equipment (→ page 267).

An evaluation with the responsible department is necessary. As part of the eXpertUpfitter program please refer to www.UpfitterPortal.com.

7.13 Lifting work platform

General Information

To ensure an optimum suspension design for vehicles from model series 907 please consult via the upfitter portal which suspension options to order. With an increased center of gravity, a suspension stabilization package (Code CB4) + ESP Software for high center for gravity (Code B01) is required.

! NOTE

Where bodies include detachable parts which move independently, ensure that there is adequate clearance between the detachable parts and the basic vehicle, otherwise they may collide with the basic vehicle, resulting in damage.

! NOTE

The lifting work platform may only be used when the vehicle is fully raised on its outriggers. When the platform is raised, there must be no additional loads in or on the cab. There is otherwise a risk of damage to the frame. The vehicle must not be moved with the lifting work platform extended. The frame may be damaged if the vehicle is moved with the lifting work platform extended. The upfitter must implement a safety facility to prevent the vehicle from being moved with the lifting work platform extended. This may be done through the control system of the lifting work platform, for example, or in conjunction with the parameterizable special module (PSM, Code ED5) (→ page 345).

! NOTE

Observe country-specific regulations, accident prevention regulations (UVV) and general machinery directives, see Chapter 2.6 Accident prevention (→ page 30).

If chassis are equipped with lifting work platforms, the following points must be observed due to high loads:

- Retrofitting of lifting work platforms, an evaluation with the responsible department is necessary. As part of the eXpertUpfitter program please refer to www.UpfitterPortal.com.
- The stability of the lifting work platform must be ensured by the upfitter.
- The outriggers must comply with the information (→ page 175) on outriggers for loading cranes.
- The upfitter must produce additional operating instructions for the lifting facility, which are to be supplied with the vehicle. The operating instructions must contain the warning that no persons or loads are permitted in the cab when the vehicle is in the raised state.
- To ensure the uniform loading of the chassis frame, the body must be attached to the chassis frame by means of an assembly frame.
- At the least, all the factory-installed body consoles must be fastened to the assembly frame.
- An additional body console must be installed for each longitudinal frame member in the area behind the cab (see example illustration).
- The attachment of the first and additional mounting consoles must be with threaded connections locked to prevent loosening and spacer sleeves (→ page 196).
- The introduction of force onto the supports must be exactly halfway between the two standard double bracket pairs behind the cab on the assembly frame. In addition, the assembly frame must be sufficiently protected against torsion in the area of force introduction by means of a crossmember.

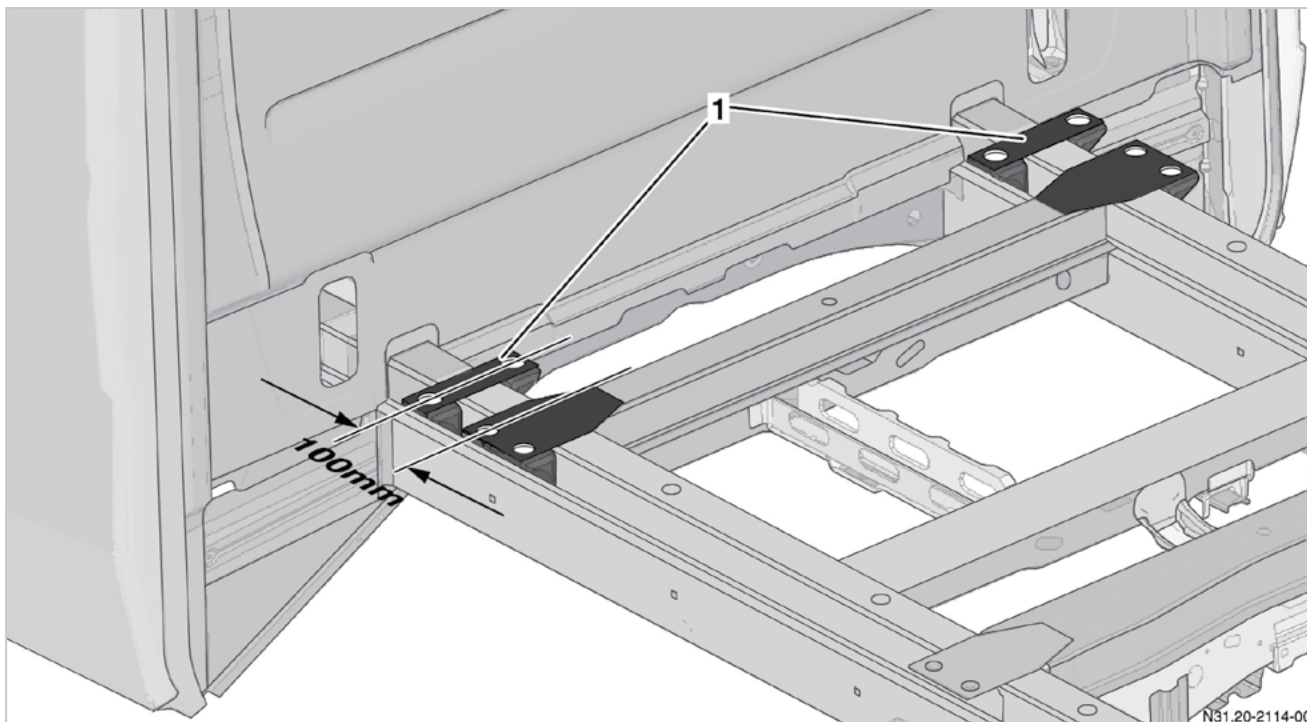
7 Design of bodies

Required additional body console

To ensure a uniform introduction of force onto the chassis frame, one additional body console is required for each longitudinal frame member in the area behind the cab.

The body consoles must be of at least the same quality as the standard material CR240LA and have a wall thickness of 3 mm/0.19 in.

The hole spacing of the additional body console to the next adjacent hole in the existing body console must measure 100 mm/3.94 in.



Body consoles

1 Additional body consoles

When installing additional body consoles, we recommend the use of genuine Mercedes-Benz parts.

For more detailed information on the standard positions and dimensions of the body consoles, see 2.3.1 Upfitter Portal (→ page 23) and 7.1.4 Attachment to the chassis bed (→ page 191).

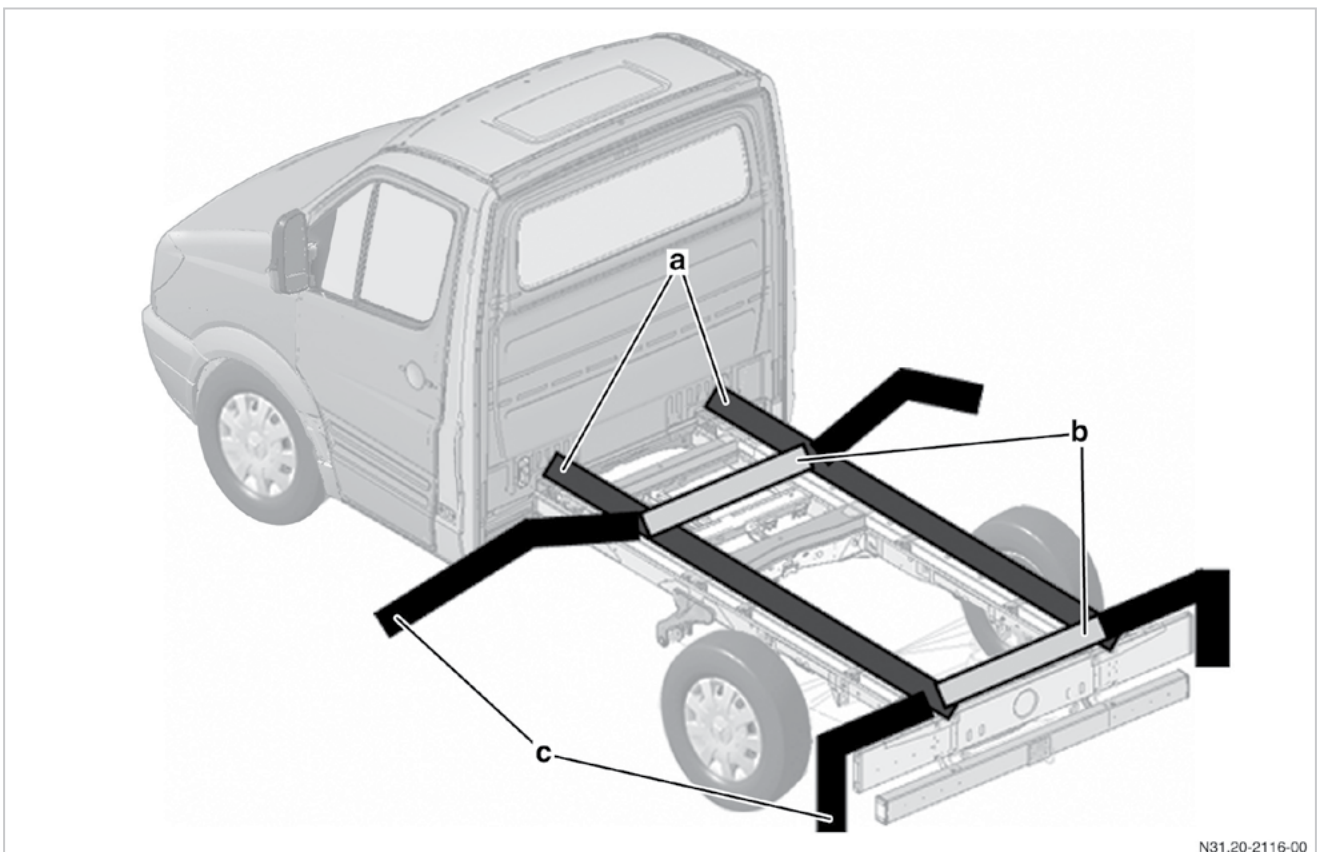
Assembly frame

The installation of lifting work platforms on a chassis requires an assembly frame of sufficient size.

Section moduli (W_x) and material properties can be found under 7.1 Assembly frame (→ page 188).

The assembly frame must be attached in the same way to all body consoles. The attachment of the assembly frame at the first and additional mounting consoles must be with threaded connections locked to prevent loosening and spacer sleeves (→ page 345). The introduction of force onto the assembly frame by the outriggers must take place exactly halfway between the two double bracket pairs installed behind the cab as standard.

In the area of the introduction of force onto the assembly frame by the outriggers, a rigid crossmember (front and rear) must be installed to protect the assembly frame against torsion.



Attachment of assembly frame to body consoles

- a Area of additional mounting consoles
- b Required crossmembers for assembly frame in area of force introduction from outriggers
- c Outriggers

7.14 Bodies on chassis with base (F28, F50)

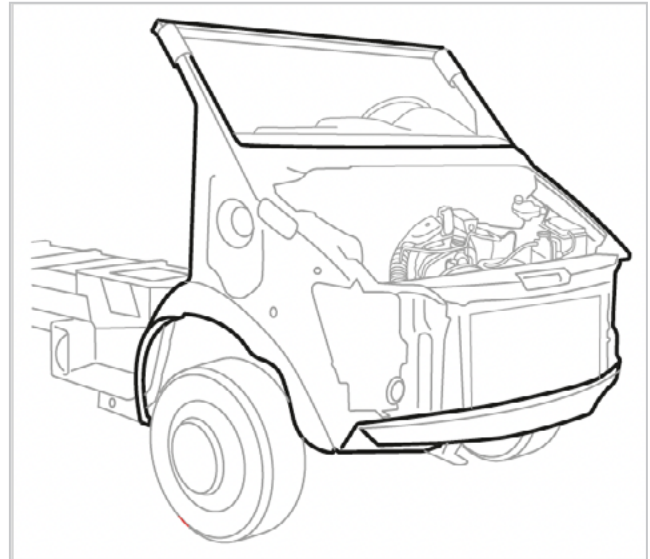
7.14.1 Cab base with cowl (code F50) and cab base with doors (code F28)

Commissioning of control units

Observe the information and specifications on the commissioning of control units after the completion of upfit work or modification work, before the vehicle is put into circulation, see Chapter 8.15 Commissioning of control units (→ page 361).

a) Cab base and cowl (code F50)

The chassis base (cowl) offers upfitters a base for producing fully integrated bodies (e.g. camper vans) or special-purpose bodies. It is available from the factory under code F50 (→ page 59).



Cowl chassis (schematic)

! NOTE

For bodies on cowl chassis, observe all country-specific laws, directives and registration regulations.

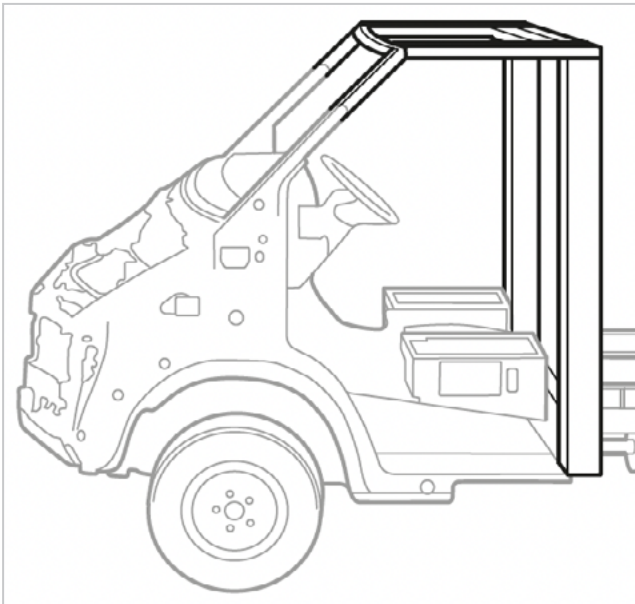
If bodies are mounted on cowl chassis, ensure that the cab structure has the same rigidity as the series production vehicle.

The front body part must be designed as a self-supporting structure through to the B-pillar.

To provide equivalent rigidity, it is strongly recommended to reproduce a new cell structure comprising

- A-pillar
- B-pillar
- Roof crossmembers
- B-pillar substructure crossmembers

that is identical with the original structure.



Cowl with cell structure (schematic)

The attachments between the crossmembers and the cab A-pillars or B-pillars must be positively connected. Make a separate, non-positive connection between the headlamp frame and the inner part of the A-pillar – do not bond this connection.

Do not connect a non-steel fender by means of a common connection to the headlamp frame and the inner part of the A-pillar.

For bodies on cowl chassis, also observe the following chapters:

- 3.11 Maintenance and repairs (→ page 56)
- 6.1.3 Brake system (→ page 104)
- 6.3.2 SCR exhaust gas aftertreatment system (→ page 140)
- 6.3.4 Engine cooling (→ page 145)
- 6.3.5 Engine air intake (→ page 145)

! NOTE

After completion of all work on the vehicle, observe the anticorrosion protection measures (→ page 96).

Installation of an engine compartment flap by the Upfitter

If modifications are made to the engine compartment flap (installed by the upfitter), make sure that the functions integrated there, such as the water separation feature for the air heating system, are not affected. If necessary, the water separation feature must be replaced by parts with the same function. All functions of the modified engine compartment flap must be equivalent to those of the series production component part.

Also observe Chapter 7.14.18 Hood contact switch with code F50 (→ page 238) and 7.14.19 Upfitter conversion with code F50 (→ page 239).

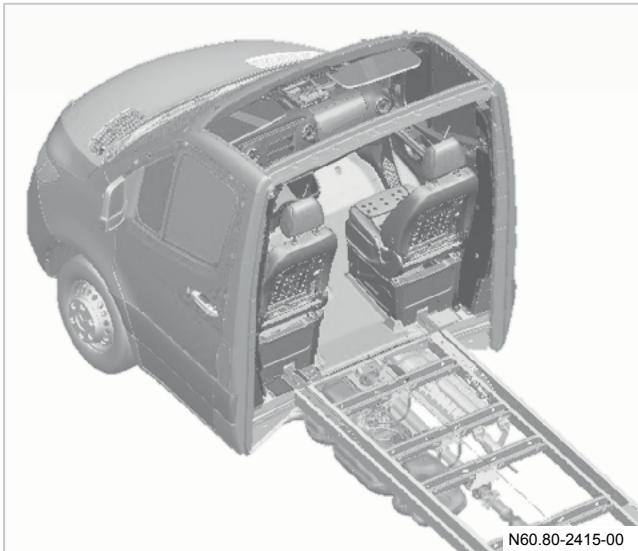
Windshield wiper system

Cowl cab base vehicles (code F50) are assembled as standard without a windshield wiper system.

The wiper arms and wiper blades must be completed by the upfitter depending on the windshield design.

Base with doors F28

On vehicles with cab base and doors, the cab rear panel and cab roof are omitted ex factory. In addition, an auxiliary roof bow is fitted above the B-pillars to stiffen the cab.



Base with doors F28

Omission/cutting of B-pillar auxiliary roof bow

If the B-pillar auxiliary roof bows are cut or omitted, reinforcement measures (→ page 131) are necessary.

! NOTE

For alternative methods of ensuring equivalent rigidity developed by the upfitter, an evaluation with the responsible department is necessary.

As part of the eXpertUpfitter program please refer to www.UpfitterPortal.com.

For the design of the measures ensuring equivalent rigidity, an evaluation with the responsible department is necessary. As part of the eXpertUpfitter program please refer to www.UpfitterPortal.com.

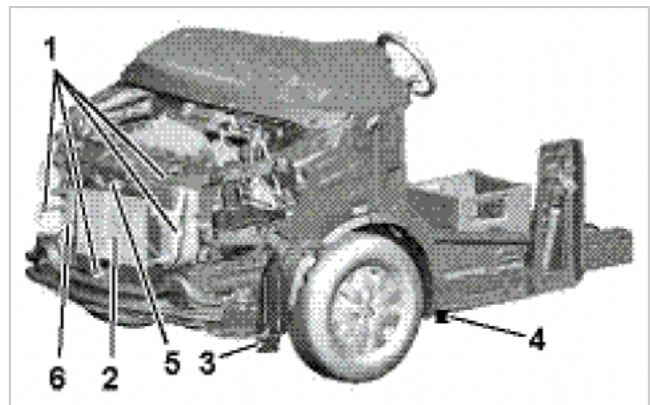
7.14.2 Mechanical equipment

The following information is relevant to all upfitters who use base vehicles (F28) as a basis, even if the text addresses specific upfitters, e.g. RV manufacturers.

Integration in the cab base vehicle

When designing cowl cab base vehicles (code F50), take into account the following:

- Radiator opening area and radiator section sealing to ensure the required cooling output in the engine compartment
- Brake ventilation to achieve the optimum braking effect
- Position of the jack support point to ensure access to it and its strength
-

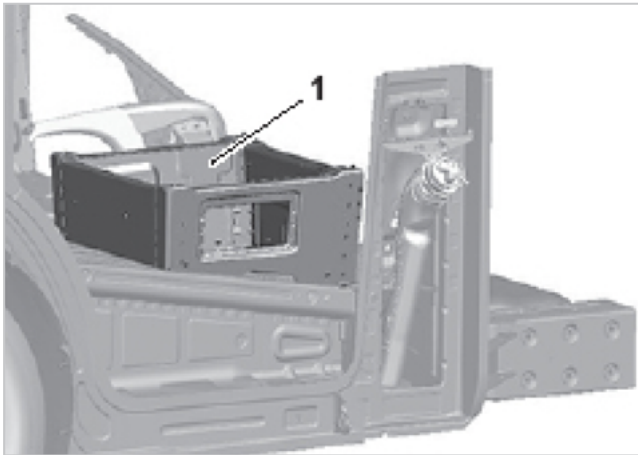


Cab base vehicle (schematic)

- 1 Radiator section sealing
- 2 Radiator opening area
- 3 Brake ventilation
- 4 Jack support
- 5 Intake air system
- 6 SCR (AdBlue® tank) including electronic component

Reinforced seat base for seat with integrated three-point seat belt (code S86)

The seat with integrated three-point seat belt is not included in the delivery package supplied by Mercedes-Benz.



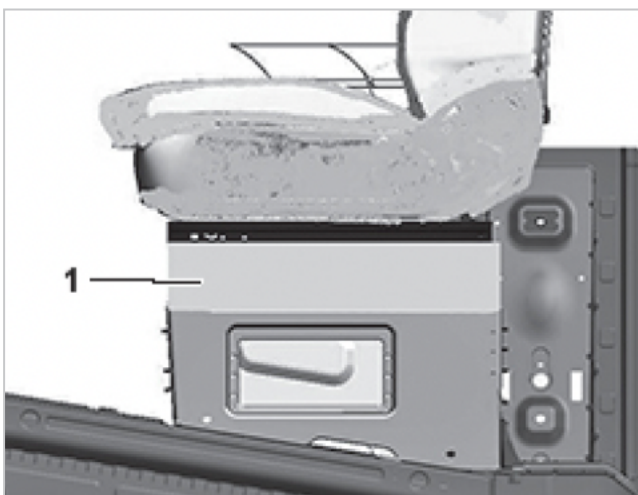
Reinforced seat box (schematic)

1 Reinforced seat base

The reinforced seat base is designed to absorb increased forces (caused by the seat with integrated three-point seat belt).

Boundary conditions

- FMVSS Testing/Certification of the seat has to take place when the complete seat system is installed to the vehicle (seat + seat base + body) and has to be performed by the upfitter.
- The assumed point of load application on the seat (when designing the reinforced seat base) must be considered when selecting the seat.



Side view of reinforced seat base

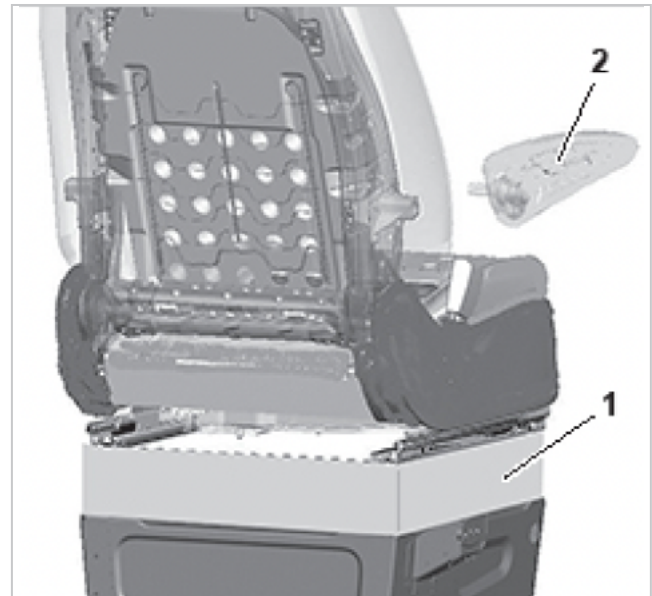
1 Swivel console

Pre-installation inside of the seat (driver and front passenger) for mounting second armrest

The seats (driver and front passenger) of the Sprinter can be ordered by the upfitter with an additional mount for a second armrest.

Boundary conditions

- The geometry of the connection element of the Sprinter armrest must be adopted.
- The second armrest is a retrofit.



Seat (schematic)

1 Swivel console
2 Armrest

For further information on seats and seat boxes see Chapter 4.5 Limit values for the interior (→ page 87) and 6.4 Interior (→ page 147).

7 Design of bodies

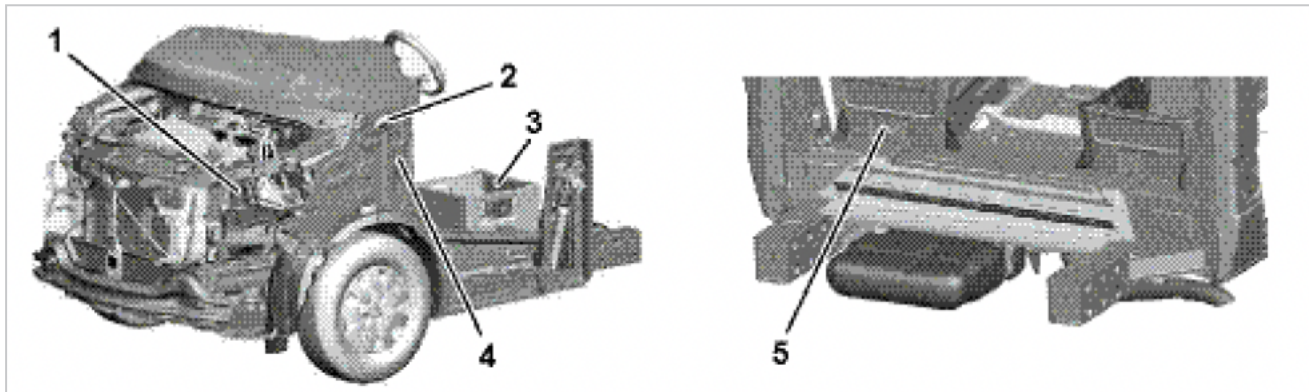
7.14.3 Wiring harness connecting points

The connecting points shown below, divided into series production packages and special equipment options, mainly concern the chassis with cab base versions (code F28, F50).

Certain connecting points are only relevant in the case

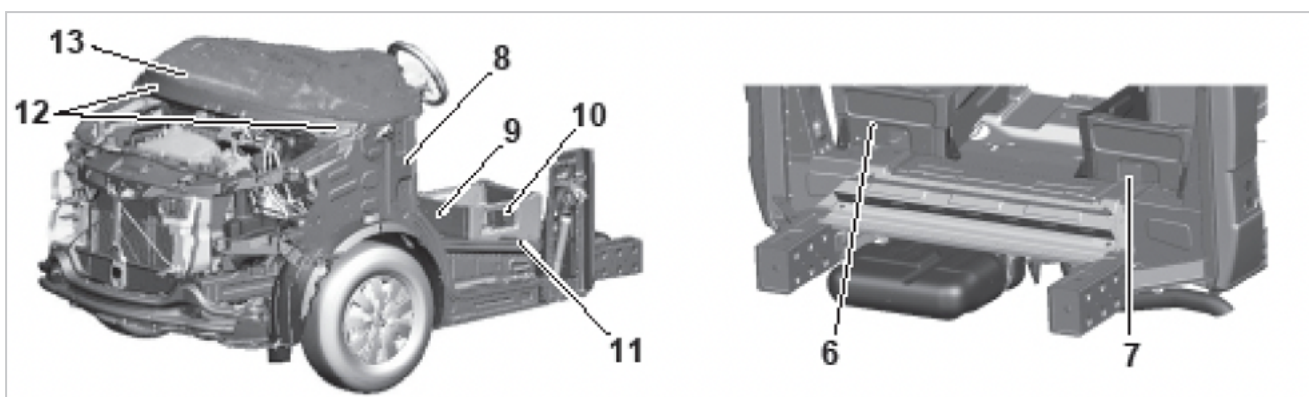
of conversion to camper vans. Other connecting points are specific to the traction head. They are shown in the overview, but are not described in further detail.

Details on the specific topics of the traction head can be found in the Body/Equipment Mounting Directive for model series 910 in chapter 7.15.



Connecting points for series production packages

- 1 Wiring harness connecting point for headlamps (front passenger in mirror reverse)
- 2 Wiring harness connecting point for automatic driving lights (code LA2) and rain sensor (code JF1) with omission of windshield
- 3 Wiring harness seat connecting point for driver-side with omission of seat (front passenger in mirror reverse) for seat belt warning system and seat belt buckle pre-installation
- 4 Wiring harness door connecting point for driver and front passenger side with omission of door (front passenger in mirror reverse)
- 5 Wiring harness bodybuilder manufacturer connecting point A, B, and C = traction-head-specific connecting point (model series 910 only; for details, see the Body/Equipment Mounting Directive for model series 910, chapter 7.15)



Connecting points for special equipment options

- 6 Wiring harness of connecting point for pre-installation for Blind Spot Assist (code J1V), electrics of rear speaker (code EP7), reversing camera (code FR7), rearview camera for digital inside mirror (code F85), and parking system cameras with 360° all-around visibility (code JB1, JB2, JB3)
- 7 Antenna switch box/GPS interface wiring harness connecting point (code E4A),
- 8 Bodybuilder manufacturer interface H (code E2A); for traction-head-specific details, see Body/Equipment Mounting Directive for model series 910, chapter 7.15
- 9 Bodybuilder manufacturer interface M (code E5M); for traction-head-specific details, see Body/Equipment Mounting Directive for model series 910, chapter 7.15
- 10 Wiring harness seat connecting point for driver with omission of seat (front passenger in mirror reverse) for seat heating pre-installation
- 11 Additional fuses for camper vans (code E1R and E1Y)
- 12 Wiring harness for windshield heater pre-installation (code E2F) with omission of windshield
- 13 DSP Box wiring harness connecting point (code E3D), for details (→ page 235)

7.14.4 Headlamp Assist (code LA2)

Relevance

- On cab base vehicles (code F28) with windshield: When the vehicle leaves the factory, these systems are fully functional.
- On cowl cab base vehicles (code F50) and with omission of windshield (code F92), a kit is supplied for the upfitter. For an installation description, see Chapter 7.14.5 Connecting point for automatic driving lights (code LA2)/rain sensor (code JF1) on vehicles without windshield (→ page 226).

Automatic driving lights function

If the brightness value drops below a certain value, the automatic driving lights function switches on the driving lights automatically. If the value measured by the light sensor increases to a certain level, the automatic driving lights switch off again.

Weather-related visibility impediments such as snow or rain are automatically taken into account by the automatic driving lights function.

The automatic driving lights function increases visibility and safety in road traffic.

Rain sensor function

When the windshield wiper lever is set to the appropriate position, the windshield wipers are activated.

The rain sensor transmits infrared light at a certain angle into the windshield, which then reflects the light differently depending on how wet it is. An electronics system uses the amount of light detected to control the wiping cycle, from a single wipe through to continuous wiping. This ensures relaxed driving even in varying levels of rainfall, by doing away with the need to manually adjust the wiping interval.

Boundary conditions and completion

If a superstructure is fitted (e.g. on alcove vehicles), this can have a negative effect on the automatic driving lights and rain sensor.

Observe the further information and specifications in chapter 7.14.6 Rain sensor (code JF1) (→ page 227) and 8.9.6 Rain sensor and Headlamp Assist (→ page 323).



Example of sensor on windshield

7.14.5 Connecting point for automatic driving lights (code LA2)/rain sensor (code JF1) on vehicles without windshield

Relevance

- Cowl cab base vehicles (code F50), e.g. fully integrated camper vans

Automatic driving lights/rain sensor connecting point

The special equipment "Connecting point for automatic driving lights (code LA2)/rain sensor (code JF1)" is available ex factory. The appropriate light/rain sensor incl. retaining plate and cover is supplied with the vehicle.

The upfitter needs to assemble and install a wiring harness between the connecting point and the sensor.

When the vehicle is ordered with code F50 the sensor system for the sensor cannot be installed at the factory. This system must therefore be completed by the upfitter before the vehicle is brought into service. To do this, three lines must be routed from the connecting points (X130/3*1-B, tml. 30 and tml. 31) to the sensors.

For a description, see Chapter 7.14.3 Wiring harness connecting points (→ page 224).

Boundary conditions

Adhere to the following specifications regarding the installation of the light/rain sensor.

In addition, observe the specifications regarding the length of a roof overhang, see Chapter 8.9.6 Rain sensor and Headlamp Assist (→ page 323).

i NOTE

An application for checking the compatibility and approval with the specialist department is an essential requirement in the event of deviations from the following specifications (→ page 51).

- i** Please get in touch via the upfitterportal during the planning phase.

Completion

For completion, the following components are supplied with the vehicle:

- Light/rain sensor
- Covers and mounting plates:
 - Mounting plate for light/rain sensor
 - Cover for the sensor
 - Cover M-part

7.14.6 Rain sensor (code JF1)

Relevance

- On base vehicles (code F28) with windshield: When the vehicle leaves the factory, this system is fully functional.

Function description of rain sensor

When the windshield wiper lever is set to the appropriate position, the windshield wipers are activated.

The rain sensor transmits infrared light at a certain angle into the windshield which then reflects the light differently depending on how wet it is. An electronics system uses the amount of light detected to control the wiping cycle from a single wipe to continuous wiping. This means relaxed driving even under unfavorable weather conditions by doing away with manual actuation of the wiping interval.

Boundary conditions/completion

If a superstructure is fitted (e.g. on alcove vehicles), this can have a negative effect on the Headlamp Assist.

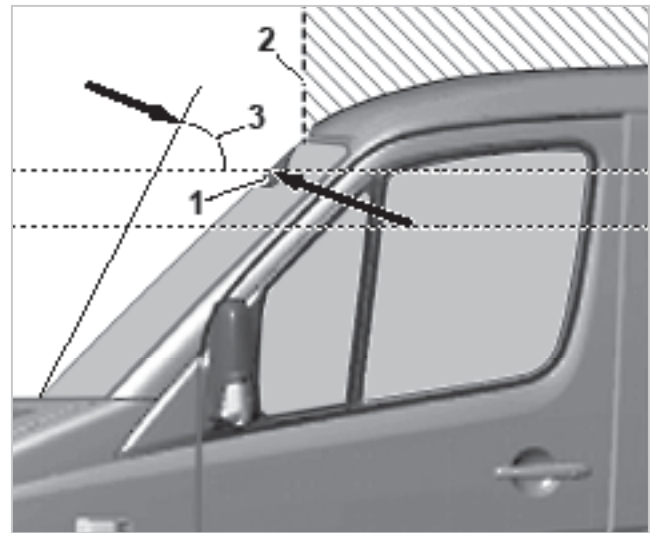
For detailed information on the Headlamp Assist and rain sensor, see Chapter 8.9.6 Rain sensor and Headlamp Assist (→ page 323) in this guideline.

Information on installation

The installation of a light/rain sensor can only be implemented using the standard sensor type, because the sensor communicates with the vehicle over the VCS LIN interface.

When installing the sensor, observe the following boundary conditions:

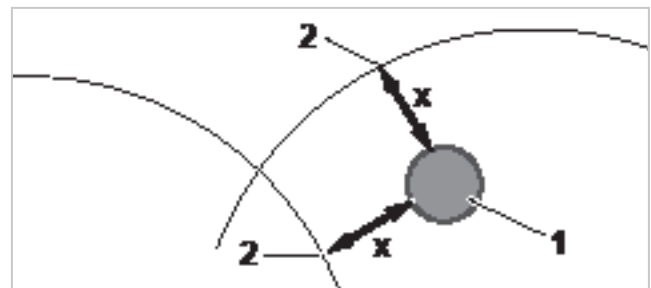
1. In order to guarantee that all functions operate without restrictions, the angle of the windshield relative to the roadway at the sensor position must be within the specified limit values between 37° and 53°.
 - If the upfitter installs the sensor at a greater windshield angle up to max. 70°, the convenience functions may be impaired due to the deviation from the angle limits (e.g. the driving lights or the wipe cycle of the windshield wipers may be activated/deactivated at different times).
 - The windshield thickness at the sensor location must be between 0.2 and max 0.21 in (4.5 and max 6 mm). If the windshield is thicker, the upfitter must contact the Mercedes-Benz (→ page 17) to request a Letter of Compatibility.
2. The horizontal and vertical curvature radius of the windshield must be ≥ 55.1 in (1400 mm) in the area of the sensor.



Limit for bodies on vehicles with light/rain sensor

- 1 Light/rain sensor
- 2 Body limit – ideal state without roof overhang. Further information on roof overhangs see Chapter 8.9.6 Rain sensor and Headlamp Assist (→ page 323).
- 3 Angle limit of the windshield

3. The sensor must be positioned on the windshield in accordance with the specifications below. Deviations will result in function impairments or even failure of the sensor. To mount the sensor holder on the windshield, the distance X between the sensor position and the end of the wiper blade must be at least 1.4 in (35 mm) (see following illustration).



Distance from sensor to end of wiper blade (schematic)

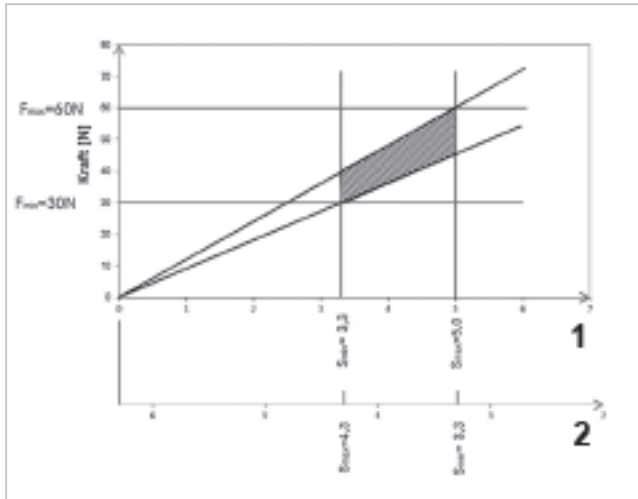
- 1 Sensor
- 2 End of wiper blade
- x Distance > 1.4 in (35 mm)

- Further information on commissioning the automatic driving lights (code LA2) and rain sensor (code JF1) can be found in the Workshop Information System (WIS) (→ page 23).
4. The transmission value of the windshield must not differ from that of the standard windshield.
 - The transmission in the IR range (800–1100 nm) must not drop below 23%. If you have further questions, please get in touch via upfitterportal.com

Attachment of the carrier plate

If the windshield is screen-printed on the inside (layer 4), the opening for the sensor must be at least >1.2 in (28 mm) in diameter. If the screen printing is on a different layer of the windshield, the diameter must be adjusted accordingly.

The following contact pressure of the sensors on the windshield must be guaranteed.



Spring characteristic

- 1 Travel referred to spring
- 2 Travel referred to windshield

Adhesive bonding

- ▶ The carrier plate/mounting plate must be primed or plasma-treated in the gluing area before it is stuck to the windshield.
- ▶ The holding ability of the bond between the carrier plate and the windshield must be tested with a dummy subjected to a tensile force of 80 N at a temperature of 20 °C in the opposite direction to the windshield.
- ▶ The holding ability of the bond between the carrier plate and the windshield at high temperature must be tested with a dummy subjected to 4 times the static load at 90 °C in the opposite direction to the windshield.

Commissioning and attachment of the sensors

- ⓘ Further information on installing and commissioning the automatic driving lights (code LA2) and rain sensor (code JF1) can be found in the Workshop Information System (WIS) (→ page 23) and in Commissioning of control units (→ page 256).

7.14.7 Multi-purpose camera (MPC) on vehicles without windshield

Relevance

- On cab base vehicles (code F28) with windshield: This system is supplied functionally capable ex factory. Nevertheless, calibration of the MPC is an essential requirement following completion of the mounting or conversion work.
- On cowl cab base vehicles (code F50) the MPC including wiring harness is supplied as a kit for the upfitter, see following section.

Function

Description see Chapter 8.9.5 High Beam Assist/Active Lane Keeping Assist/Traffic Sign Assist/Intelligent Speed Assist (→ page 322).

Boundary conditions and completion

The MPC including wiring harness is supplied with the vehicle for subsequent completion by the bodybuilder manufacturer, e.g. for fully integrated camper vans.

For the installation of the MPC in connection with a upfitter-specific windshield, a detailed running-in note is available with the required information and specifications.

A test and startup specification applies for the commissioning and calibration.

- ① Further information and specifications on the installation and commissioning of the MPC can be obtained by reaching out via the upfitterportal. (→ page 23).
- ① Details regarding MPC and the associated components for standard vehicles (e.g. camera holders) can be found in the CAD data available on request, siehe Kapitel 2.3.1 Upfitter Portal (→ Seite 23).

7.14.8 Connecting point with omission of driver's and front passenger seat for pre-installation for seat belt warning system (code J1D/J1E) and seat occupancy recognition (code E3S)

Relevance

- Cab base vehicles (code F28) without seats ex factory
- Cowl cab base vehicles (code F50) without seats ex factory

NOTE

The additional information and specifications in Chapter 6.4.1 General information (→ page 147), 6.4.2 Safety equipment (→ page 148) and Retrofitting additional seats (→ page 198) must absolutely be observed.

Function

With code S90 (Omission of driver's seat) and code S91 (Omission of front passenger seat), it is possible to order a vehicle without driver's/front passenger seat ex factory and use upfitter-specific seats.

In this case, due to the legal requirements relating to the seat belt warning in accordance with UN-R16.07, the pre-installation for the seat belt warning system with code J1D (for driver's seat) and code J1E (for front passenger seat) will be installed ex factory in such vehicles.

7 Design of bodies

In addition, the signal from the seat belt buckle is needed to trigger restraint systems such as seat belt tensioners or airbags.

The pre-installation for a seat belt warning system enables the upfitter to install third-party seats with electronic seat belt buckles. The seat belt warning system for the front passenger seat additionally requires the seat occupancy recognition system, which must be connected into the pre-installation for the front passenger seat belt warning system.

Seat	Description (code)
Front passenger seat	Pre-installation for seat belt warning system for front passenger seat (code J1E): The vehicle has a connecting point with plug to which the upfitter's seat belt buckle as well as a seat occupancy recognition mat are connected.
Driver's seat	Pre-installation for seat belt warning system for driver's seat (code J1D): In the vehicle, there is a connection point with a plug to which the seat belt buckle is connected by the upfitter.

The connection point allows the use of upfitter-specific seats while ensuring compliance with legal requirements.

In addition, there is a pre-installation for driver's seat occupancy recognition (code E3S); this must be completed in order for the electric parking brake (code B25), and HOLD function (code BH1) systems to function.

The connecting point includes a plug to which the seat occupancy recognition mat from IEE is connected (the upfitter can be given direct purchase rights for this). Please get in touch with your designated contact at Mercedes-Benz Service or via the upfitterportal (→ page 23).

Boundary conditions and information on installation

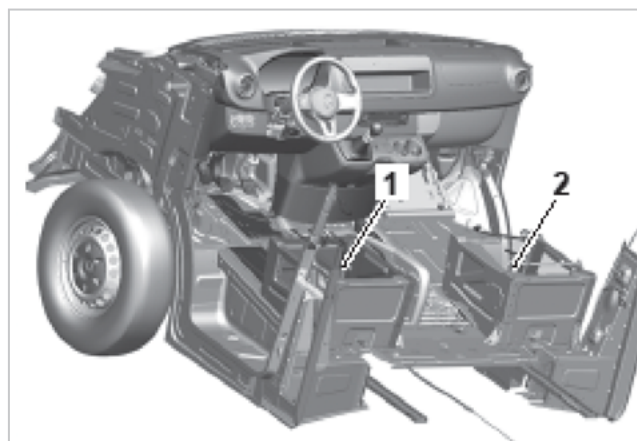
A connecting point for the seat belt buckle and for the seat occupancy recognition system is provided ex factory.

The upfitter is responsible for installing the seat belt buckle and the seat occupancy recognition mat.

Usage is only permitted if the upfitter is able to present proof that the seat occupancy recognition system functions correctly.

Completion

- Each seat belt warning system must be connected to one plug.
- More information about the seats is available in Chapter 6.4.3 Seats (→ page 157).

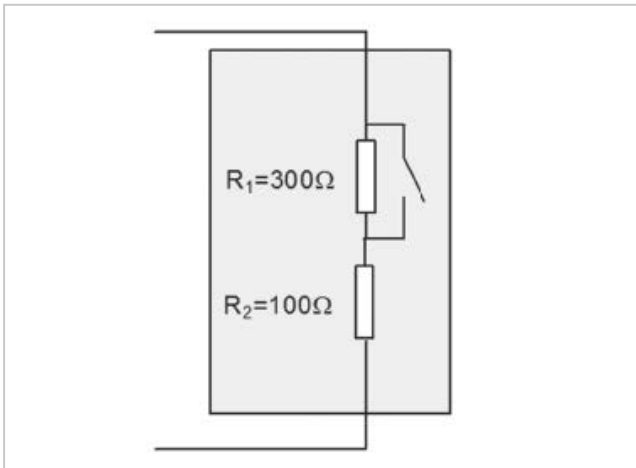


Electrical interfaces for seat belt warning system pre-installations

- 1 Driver-seat side
- 2 Front passenger seat-side

Requirements

- ▶ The bodybuilder manufacturer must install the seat belt buckle. Dimension the seat belt buckle so that the requirements for the signal are satisfied.
- Logic of driver and front passenger seat belt buckle on individual seats:
 - Switch open: unbelted
 - Switch closed: belted
- Resistances R1, R2: max. 10% tolerance.



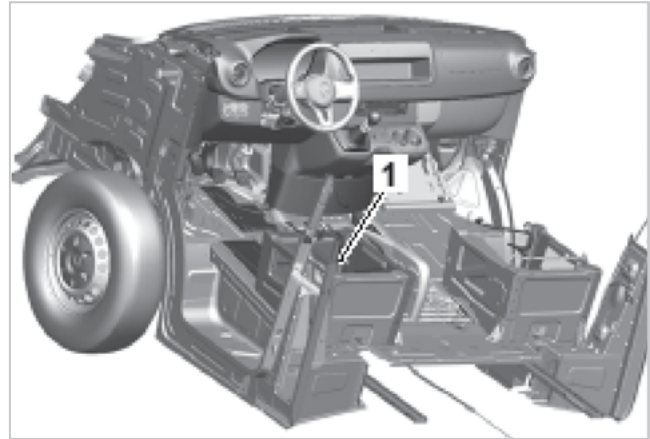
Connection scheme for seat belt buckle switch

Seat belt buckle switch

	Min.	Typ.	Max.	Unit
Scanning current	-	12	20	mA
Repeat rate	-	50	210	ms
Pulse width	-	784	800	μs

Completion

- The seat occupancy recognition system must be connected to the plug.
- Coordinate further details on completion and installation with the relevant specialist unit.
- More information about the seats is available in Chapter 6.4.3 Seats (→ page 157).



Electrical interfaces

- 1 Pre-installation for seat occupancy recognition

Special equipment options that require seat occupancy recognition include:

- ECO automatic start/stop (code MJ8)
- Electric parking brake (code B25)
- HOLD function (code BH1)
- Active Distance Assist DISTRONIC (code ET4)

7.14.9 Driver's and front passenger's doors connection point

Relevance

- Cab base vehicles (code F28) and all other vehicles with omission of left cab door (code FW8) and right cab door (code FW9)
- Cowl cab base vehicles (code F50)

Function

The two vehicle doors ensure reliable operation of a wide variety of functions which can or must be implemented in combination with the door control unit.

The door control unit is connected to the body CAN and sends or receives necessary vehicle information via this CAN.

The installation and commissioning of both door control units is also necessary if only a side panel without access is implemented instead of the driver's or front passenger door.

The door connecting point is an interface used for completing the following scopes.

- Door control unit and functions implemented by the door control unit
- Speaker connection (special equipment, added via radio)

Functions which are implemented by the door control unit

- Exterior light functions: Entrance lamp, exit warning lamp (only with code JB6)
- Exterior mirror functions: Turn signals, Blind Spot Assist display (only with code JA7/JV1+OB2), heater, motors
- Actuators: Power window motor, central locking system
- Rotary tumbler door contact
- Actuation: Window lifter, seat heating, central locking, mirror adjustment
- Front side turn signal lamps with code L44 (instead of mirror indicators, pin assignment must be observed)

Boundary conditions and information on installation

1. The door control unit must be connected and put into operation. Observe the current coding. Without the door control unit, the vehicle is not operational.
2. A door connecting point (right and left) is provided ex factory. The door control unit is supplied with the vehicle.
3. The code FX3 can be used to additionally order the door wiring harness from the door connecting point to the door control unit and to the optional special equipment.
4. The listed functions only function in combination with the door control units.
5. Further components such as switches and electric motors can be provided on request.
6. The door control unit and the other components must be installed and put into operation by the upfitter.

Observe the further information and specifications in Commissioning of control units (→ page 256).

7.14.10 Headlamp connecting point - series production packages and special equipment options

Relevance

- Chassis cab base vehicles (code F50)

Function

The headlamp connecting point is an interface used for completing the following scopes.

- Series production packages: Headlamps and turn signals
- Special equipment option: Front fog lamps (code L13)

It is possible to use own halogen or LED headlamps if the performance data (table) given in chapter 10.1 Bulb ratings of tail lamps (→ page 371) is complied with.

The provision of Mercedes-Benz series production headlamps can be requested.

The vehicle can be registered on completion of the series production packages.



Example of Sprinter light sources

Boundary conditions/completion

Power output data specified for light sources by Mercedes-Benz must be complied with. This is necessary to ensure that the lamp failure indicator functions correctly.

For power output data, see Chapter 8.5 Lighting (→ page 279) and Chapter 10.1 Bulb ratings of tail lamps (→ page 371) in this guideline.

7.14.11 Connecting point for antenna switchover box for third-party antennas (code E4A)

Relevance

- All vehicles without roof ex factory including cab chassis with doors with code F28 and F50.

Function

With the special equipment option “Antenna interface for radio, navigation and mobile radio (code E4A)”, Mercedes-Benz provides an interface for connecting a third-party antenna with AM/FM and DAB. This interface is located in the driver’s seat frame.

An antenna switchover box is connected downstream to this connecting point ex factory. The signals from the external antenna are adapted to the Mercedes-Benz-specific signal environment using the antenna switch box.

A 12 V power supply for the third-party antenna is provided at this connecting point.

For the upfitter, the connecting point enables simple connection of a third-party to the Mercedes-Benz head unit by means of a defined interface.

Boundary conditions/completion

The antenna switchover box must be supplied with the following signals.

- FM (87–108 MHz)/AM (531–1720 kHz and 5.9–26.1 MHz)
- DAB band III (174–240 MHz)
- Impedance 50 ohms

The connection of the navigation system must be supplied with the following signal:

- GNSS 1575 MHz – 1606 MHz
- RHC (right-hand circulation) polarization
- Impedance 50 ohms
- Operating voltage 4.5 V – 5.5 V
- Power consumption 20 mA ±3 mA

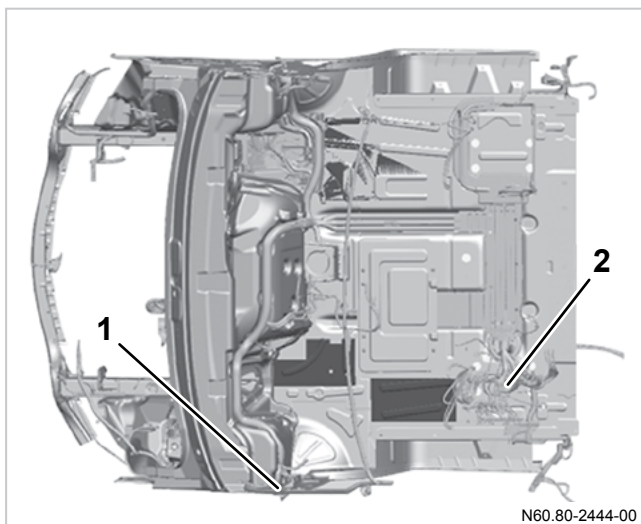
For further information on the upfitter antenna interface, see Chapter 8.13.2 Antennas (→ page 355).

7.14.12 Pre-installation for upfitter interface H (code E2A) and upfitter interface M (code E5M)

Pre-installation for upfitter interfaces H and M

The pre-installation for upfitter interface H (tapping of upfitter special signals in cockpit, code E2A) and for upfitter interface M (expansion of MPM (PSM) standard contact, code E5M) allows the upfitter to tap the following signals in the cockpit.

- Battery network
- Tail lamps
- Instrument lighting
- Signal lines routed through from interface H. In combination with the MPM/PSM (code ED5), vehicle signals can also be supplied.



Upfitter interfaces

- 1 Upfitter interface H
- 2 Upfitter interface M

Function description of upfitter interface H

Upfitter interface H (code E2A) provides an additional interface in the area of the A-pillar on the driver's side. Upfitter interface H allows the signals described below to be tapped more easily.

In addition, 5 signals are routed from interface H through to interface M. These signals are freely available to the upfitter. They can be used to, for example, send signals from the PSM (code ED5) to interface M (code E5M).

Boundary conditions/completion

The plug can be fitted with a wiring harness from the upfitter according to requirements.

The following lines/signals are provided:

- Five signal lines
- Left and right turn signal indicators and one reversing light
- Tml. 58d dimmable instrument lighting
- Tml. 15, tml. 30T (shutoff on weak battery) and tml. 31.

The max. performance data and parameters of the connections must be complied with.

Function description of upfitter interface M

Upfitter interface M (code E5M) allows the signals from the PSM to be tapped more easily without the need for complex cable routing.

Upfitter interface M provides an additional interface in the driver's seat box. The signals from the MPM/PSM are routed out from this interface. In addition, 5 signals can be routed from upfitter interface M through to upfitter interface H. These signals are freely available to the upfitter.

See section 8.10.2 (→ page 349) for more information on the upfitter interface M plugs

Details on the following interfaces can be obtained from the respective specialist unit.

- Upfitter interface M - plug 1
- Upfitter interface M - plug 2
- Upfitter interface M - plug 3

Requirements

- The fuse ratings can be found in the "Supplement - Fuse assignments", see Chapter 8.4.2 Electric lines and electrical fuses (→ page 264).
- Access to the signals from the tail lamps is only permitted in combination with the additional turn signal module.
- Access to the reversing light signal is only permitted in combination with the additional turn signal module.
- Tml. 58d driver module requests (battery voltage): Maximum current ≤ 1 A

7.14.13 Pre-installation for windshield heater (code E2F) with omission of windshield

Relevance

With code F92 "Omission of windshield", the windshield can be omitted ex factory on cab base vehicles. This enables the bodybuilder manufacturer to install a third-party windshield.

The vehicle special equipment "Pre-installation for windshield heater" (code E2F) provides the pre-installation for the heated windshield.

Function description

The control unit, the control switch, and two connecting points on the left and right in the area of the A-pillar are installed ex factory.

The bodybuilder manufacturer can install a heated windshield with integrated heating wires that complies with the relevant specification (see boundary conditions).

A switch with indicator lamp is used to switch on the windshield heater. It can only be operated when the engine is running. The heater is activated by a switch and switches off automatically after a certain time, or can be switched off manually using the rocker switch.

The window heating helps to keep the windshield free of condensation, snow and ice during winter.

Boundary conditions and completion

The heated windshield is installed by the bodybuilder manufacturer.

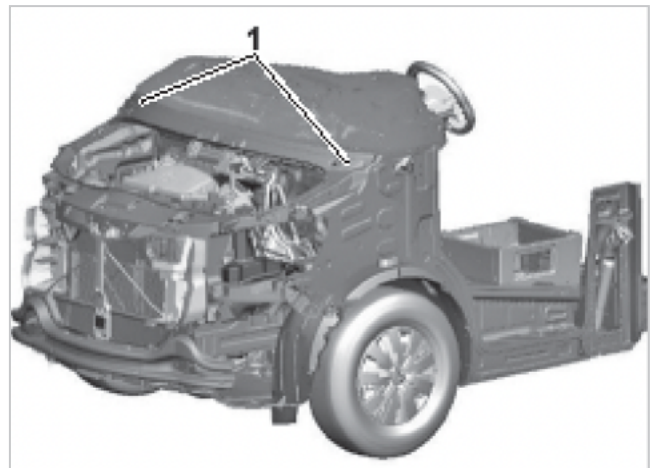
The heated windshield must be connected to the two plugs.

The maximum current of the windshield heater must not exceed 33.5 A at each connecting point.

The fuse ratings can be found in the "Supplement - Fuse assignments", see Chapter 8.4.2 Electric lines/fuses (→ page 264).

Comply with the following electrical parameters for the heated windshield:

- Power 790 W \pm 15%
- Maximum current per connection is 33.5 A
- U = 13.5 V



Electrical interfaces

- 1 Connecting points for heated windshield

7.14.14 Pre-installation for rear speakers (code EP7)

The electrical pre-installation for rear speakers, code EP7, provides an additional electrical interface.

This interface enables the bodybuilder manufacturer to install its own rear speakers.

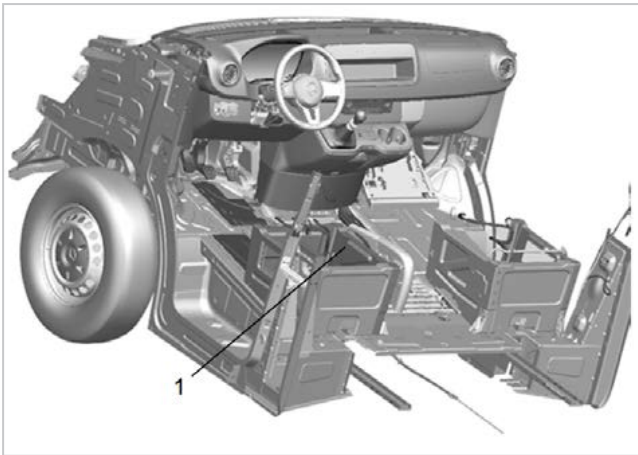
Completion

The pre-installation provides a plug that is connected to the speakers.

Coordinate further details on completion and installation with the relevant specialist unit.

Requirements

In combination with the telematics and infotainment system of Mercedes-Benz, the speakers must satisfy certain requirements. For this, see Chapter 8.13.3 Speakers (→ page 359)



Electrical interface

1 Connectors for additional rear speakers.

For more information, please use bulletin, Sprinter MY2019+ Additional Speaker (code EP7), on Upfitter Portal.

7.14.15 Overhead control panel (OCP) switch module with code F50

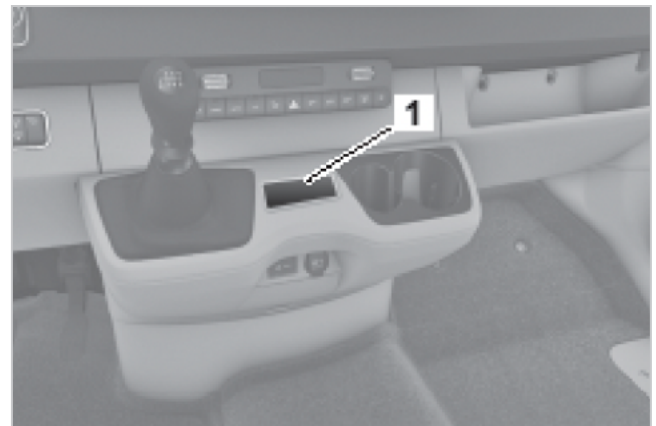
In contrast to the production version, cowl cab base vehicles (code F50) have no overhead control panel in the roof because the interior lighting is implemented via the PSM. Instead, the OCP switch module is accommodated in the covering shell of the center/shift console.

Completion

The electronics housed in the OCP switch module for cab base vehicles are required for the roof LIN and for the power supply to the light sensor on the windshield. In cab base vehicles, upfitter must position and connect the LRSM sensor (automatic driving lights function) on the windshield according to the specifications. For details, see the description for positioning/attaching the solar sensor.

Boundary conditions

Furthermore, the OCP switch module holds the SOS pushbutton switch for the Mercedes-Benz emergency call system (code EY5) and the pushbutton switch for Mercedes-Benz roadside assistance call management (code EY6). In combination with code EY5, the microphone of the E-call emergency call system is accommodated on the left-hand side of the OCP switch module.



Center/shift console in cowl cab base vehicles (code F50)

1 OCP module with code F50

7.14.16 E-call on base vehicles

The Mercedes-Benz emergency call system can help to decisively reduce the time between an accident and the arrival of emergency services at the site of the accident. The data is relayed via the communications module for Mercedes PRO in the vehicle. The emergency call is thus not dependent on whether a mobile phone is switched on, but requires a GSM connection and the ability to locate the vehicle via GPS. It can be triggered automatically by the crash sensors or manually by the driver pressing the SOS button. The emergency call will then be directed to the Mercedes-Benz emergency call number or to a local emergency call center.

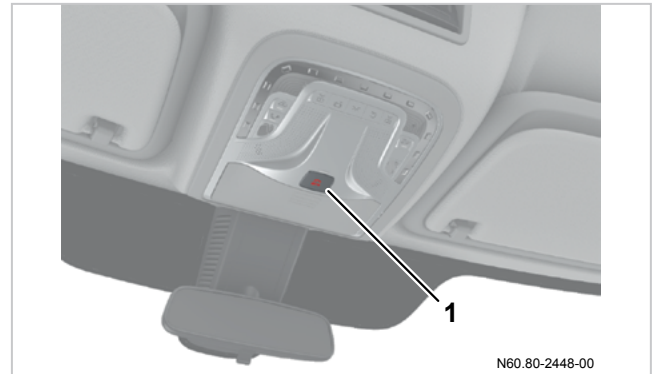


SOS push button switch

Completion

On F28 base vehicles (cab without roof and rear panel), the SOS button and the associated microphone are integrated in the overhead control panel. This is supplied ex factory. For integration in the body, particular attention must be paid to the accessibility of the push button switch for the driver and front passenger.

In a cowl cab base vehicle (code F50), the SOS button is located in the OCP shift module in the center of the covering shell of the center/shift console in the cockpit. The microphone for the E-call emergency call system is installed on the left-hand side of the OCP module. For a more detailed description, see Chapter 7.14.15 Overhead control panel (OCP) switch module with code F50 (→ page 236).



Position of SOS button in overhead control panel

- 1 Position of SOS push button switch

Boundary conditions

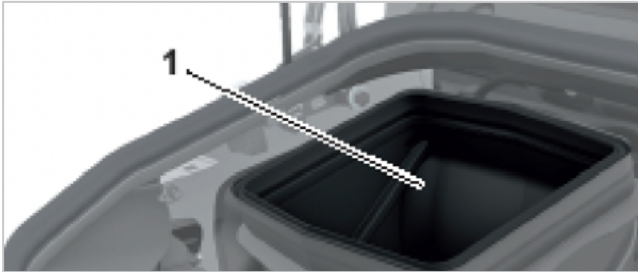
In emergency call mode the center speaker is actuated for voice output. It is located centrally at $y=0$ (in the center of the vehicle) at the front of the cockpit shell directly behind the windshield (F28 and standard). The upfitter must take particular care to ensure that the acoustics of the center speaker are not altered by installations mounted over it, because this is a certified system. Likewise the center speaker must not be replaced or modified in any vehicles with MB emergency call system (code EY5).



Position of center speaker

7.14.17 Fresh-air intake with code F50

Cowl cab base vehicles (code F50) are not fitted with a hood ex factory. The geometry and position of the factory-installed air intake box have been adapted to the standard hood of the Sprinter in order to guarantee a fresh-air intake.



Fresh-air intake with code F50

- 1 Air conditioning system air intake box

Completion

Design the vehicle body so that no air is drawn in from the engine compartment (i.e. including hermetic sealing). Failure to comply with this can result in health hazards for the occupants and/or serious traffic accidents.

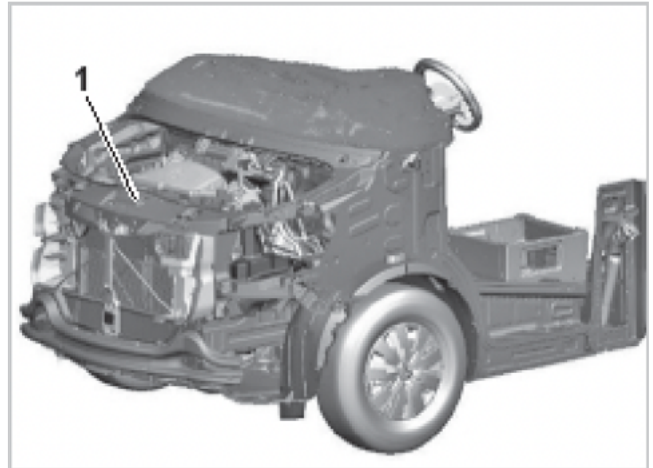
! NOTE

The pollen filters are located inside the air conditioning unit.

7.14.18 Hood contact switch with code F50

Cowl cab base vehicles (code F50) are delivered without hood, front apron, front lights, fenders, windshield, roof, A- and B-pillars, doors, rear panel as well as other parts.

A switch monitors whether the hood is closed to ensure various assistance systems (including Active Distance Assist DISTRONIC code ET4) operate properly. The switch is installed and electrically connected in the hood catch in the front module carrier.

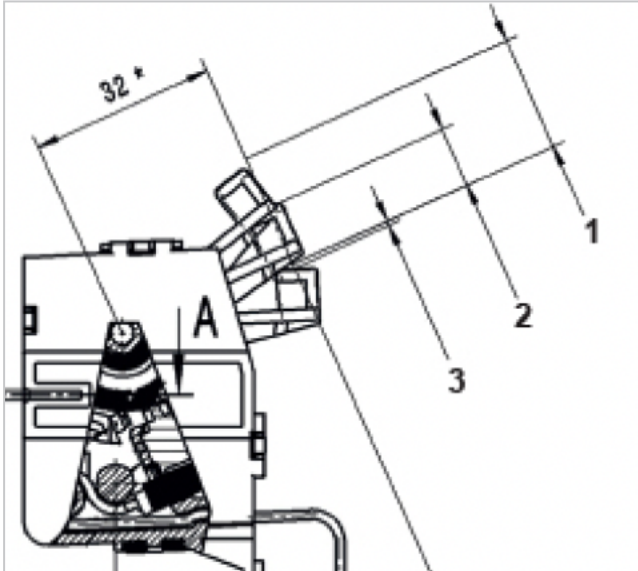


Electrical interface

- 1 Position of hood contact switch

Boundary conditions

The hood contact switch must not be replaced. It must be ensured that the kinematics of the replacement operating system installed by the upfitter match the standard production version of the Sprinter and that the following switch points are attained and not exceeded.



Hood contact switch switch points

- 1 Rest position 20
- 2 Switch point 10.6 ± 0.2
- 3 Permissible end position 0.8

7.14.19 Upfitter conversion with code F50

Sprinter vehicles are equipped as standard with the Keyless Start system. Drive authorization is obtained by pressing the start/stop pushbutton switch (see illustration) by means of Keyless Start.

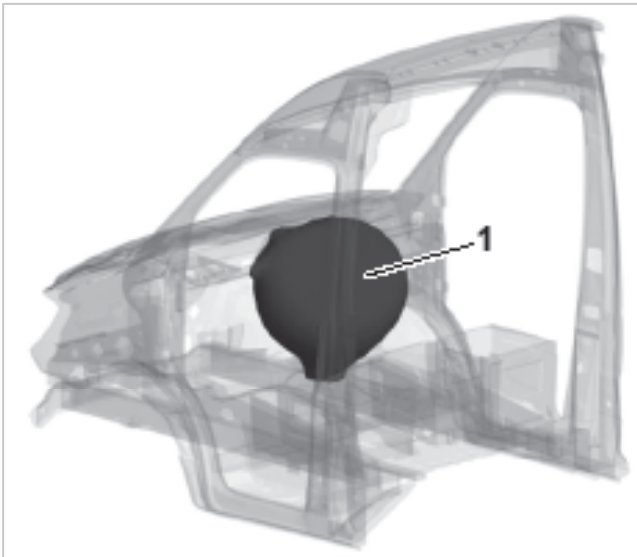


Sprinter center/shift console

- 1 Start/stop button

Boundary conditions

On vehicle bodies based on a cowl cab base (code F50), the non-standard body environment means that there is a danger that the Keyless Start system may not be able to make a correct and verified differentiation between the interior and the exterior. To ensure that the key is inside the vehicle during every trip, the signal range of the radio frequency antenna in the cockpit of cowl cab base vehicles (code F50) has been reduced to a smaller radius. This equipment is added automatically ex factory via code FX8, reduced Keyless-Start detection for bodybuilder manufacturer conversions, to every cowl cab base vehicle (code F50). The following illustration shows the reduced signal range of the radio antenna in the center cockpit area in which the radio signal of the Keyless Start key can be detected.



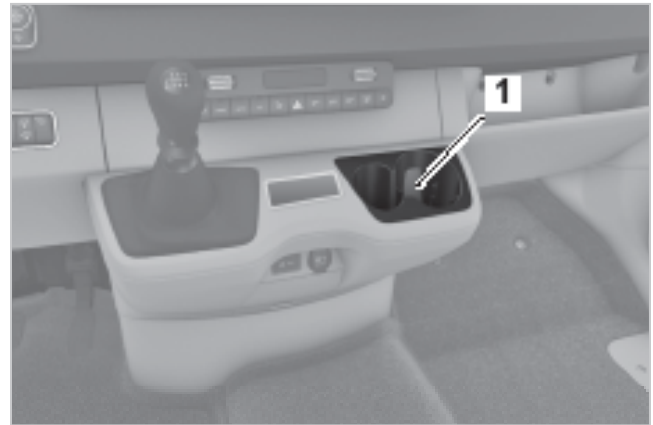
Interior area (schematic)

1 Detection area of key radio antenna

For trouble-free driving operation in vehicles with this reduced signal range for the radio antenna (code FX8), the key must always be positioned in the designated key holder. Designed specifically to be a plug-in key holder, it is part of the code FX8 scope and is installed at the factory in the small cup holder in the center console, see figures.



Key holder in the cup holder (schematic)



Sprinter center/shift console

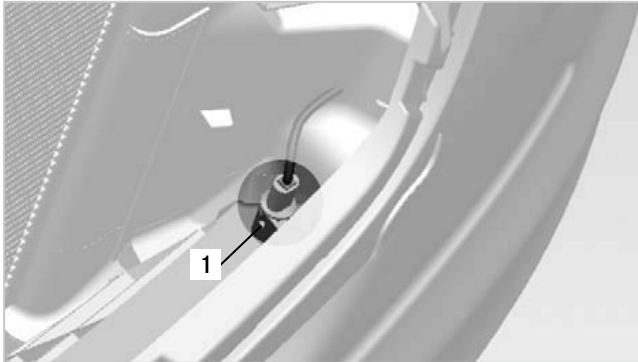
1 Position of key holder

! NOTE

It is not permissible to modify the position of the key holder.

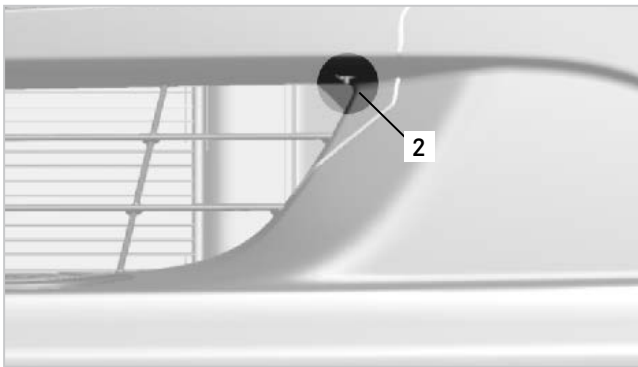
7.14.20 Temperature sensor with code F50

In the Sprinter, a temperature sensor is integrated in the front bumper on the left-hand side of the vehicle in the area of the top left corner of the air inlet grille; this has an important function for the engine timing, see figure.



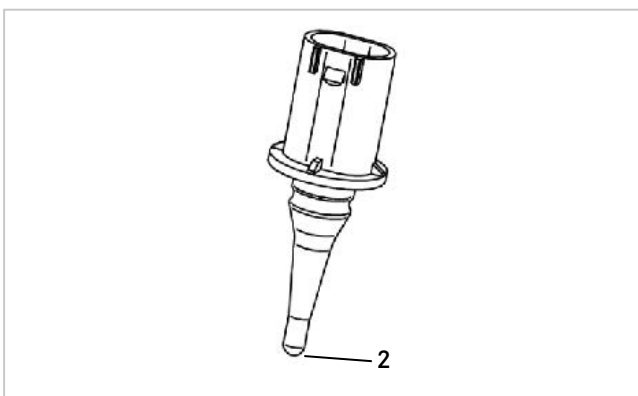
Temperature sensor position in vehicles with bumper

1 Temperature sensor in front bumper



Outer temperature sensor position

2 Sensor tip



Temperature sensor (without line)

2 Sensor tip

For all vehicles with the standard bumper, the position of the temperature sensor must not be changed and the free air flow around the sensor tip must not be restricted.

For cowl cab base vehicles (code F50) without bumper, this temperature sensor cannot be installed ex factory.

In this case, the temperature sensor with associated wiring harness is pre-fastened with a cable tie for vehicle delivery; the upfitter must then position and install this.

Install the temperature sensor in a similar position to that in vehicles with bumper so that the measurement results are not influenced. Observe the following specifications in particular:

- The function of the temperature measurement must be ensured by a free flow of ambient air around the sensor tip.
- The sensor tip must not be exposed to any return flow due to heated exhaust air from the cooler or engine, as well as direct solar radiation.
- The temperature sensor must be fixed so that it is reliably installed in all driving situations, and so that the free sensor tip does not come into contact with surrounding component parts.

7.15 Camper Vans

General

Prior to conversion into a camper van, please note:

- All relevant national laws and specifications regarding the operating permit that are valid in the location of use must be complied with.
- The legal requirements for interior design and equipment for camper vans must be fulfilled.
- When installing camper-van-specific additional scopes in the area of the B-pillar, e.g. darkening systems, take into account the new trim parts as of model year 2025 for the additional measure "catch bearing" (front catch) of the load compartment sliding door in the center area of the B-pillar, See Chapter 7.4 Modifications to the panel van (→ page 201).

Information on registration eligibility of RVs

On leaving the factory, the base vehicles (F28, F50) initially only have incomplete vehicle documents.

The upfitter must ensure that the vehicle has complete type approval.

Modifications or conversions to standard vehicles (e.g. the installation of a pop-up roof) may invalidate the operating permit. Please refer to country and/or state-specific legal regulations. For US operating permits, the approval conditions and requirements of the motor vehicle authority must be met. For Canadian operating permits, please refer to provincial transportation ministries.

The vehicle registration documents must be presented. After the modifications have been entered, the vehicle registration documents must be submitted to the relevant registration office so that a new type approval can be issued.

! NOTE

Upfitters that intend to assemble a camper van on the Sprinter must order code X2R "Mandatory for camper van conversion by upfitter".

When code X2R is ordered, code B01 "Vehicle version for high load" is added automatically.

Commissioning of control units

Observe the information and specifications on the commissioning of control units after the completion of upfit work or modification work, before the vehicle is put into service, see Chapter 8.15 Commissioning of control units (→ page 361).

7.15.1 Body in white of RVs

Boundary conditions/notes

- Easy access to the engine, drivetrain, suspension, door mechanism (e.g. guide rails and hinges), and other components) must be ensured so as not to hinder possible repair work, see Chapter 3.11 Maintenance and repairs (→ page 56).
- The standard fuel filler cap must not be removed or covered with any "blocking" parts.

! NOTE

If the fuel cap is removed or parts are attached to the fuel cap, blocking may occur in the event of an accident. Because of this, the protrusion space in the B-pillar may no longer function correctly. On no account should the cap be covered with paneling parts, and "blocking" parts must never be mounted on the B-pillar.

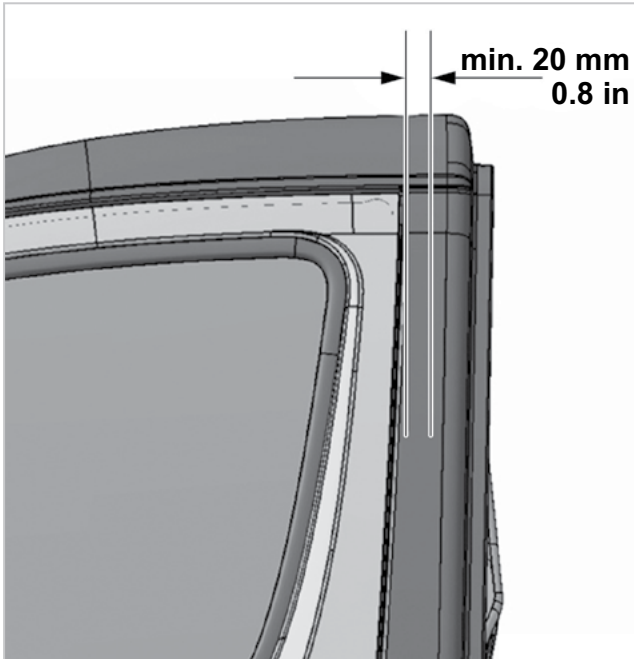
Attachment to the frame

- Chassis must be attached to the basic vehicle using at the least all of the factory-fitted body consoles (→ page 191). These permissible upfitter points are located only on the longitudinal frame members and may be supplemented as required by additional body consoles on the longitudinal frame members.
- The body brackets must be secured using two bolts for each body bracket.
- For information on integrated RVs, see Chapter 7.17 Semi-integrated bodies and optional mounting of free-standing bodies (→ page 250).

NOTE

The minimum distance between the rear edge of the door and an integrated body must be > 20 mm/0.79 in.

Otherwise, the rear edge of the door may come into contact with the body in the event of an accident, and in extreme cases the door may be jammed.



N40.00-2053-00

Minimum distance between rear edge of door and integrated body

Particular attention must be paid to the following sections of the Body and Equipment Guidelines:

- 3.5 Dimensions and weights (→ page 41)
- 4.2 Limit values for the suspension (→ page 72)
- 4.2.2 Permissible axle loads (→ page 73)
- 6 Modifications to the basic vehicle (→ page 102)
- 6.2.7 Fenders and wheel wells (→ page 125)
- 6.4.3 Seats (→ page 157)
- 7.4 Modifications to closed cargo vans (→ page 201): ensure compliance with FMVSS/CMVSS for head impact
- 8 Electrics/electronics (→ page 256)
- 8.9.2 Crosswind Assist (→ page 298)
- 8.9.5 High Beam Assist/Active Lane Keeping Assist/Traffic Sign Assist/Intelligent Speed Assist (→ page 322)
- 8.9.6 Rain sensor and Headlamp Assist (→ page 323)

7.15.2 Suspension of camper vans

Detailed information on the suspension of RVs can be found under Chapter 4.2 Limit values for the suspension (→ page 72).

Special considerations for RVs

For upfitters who build a RV on the Sprinter chassis, the option code X2R - Conversion to RV requirement must be ordered. When the code X2R is ordered, the code B01 (Vehicle version for high center of gravity) will be automatically added.

Make sure that the correct variant is selected when ordering the vehicle. Observe the information on the position of the vehicle center of gravity in Chapter 9.1 Vehicle center of gravity (→ page 364)

Additional information on the suspension selection and basic vehicle configuration can be found in the ADVANTAGES product information system, see Chapter 2.3.5 ADVANTAGES product information system (→ page 24).

Detailed information on base vehicles can be found in 7.14 Bodies on chassis with base (F28, F50) (→ page 220).

! NOTE

Mercedes-Benz recommends a reinforcement of the front axle using an option code A50 (Front axle reinforced)

7.15.3 Electrics and electronics for camper vans

Overviews of wiring harness connecting points for series production packages and special equipment options.

A detailed presentation of all connecting points can be found in Chapter 7.14.3 Wiring harness connecting points (→ page 224) for cab base vehicles

Particular attention must be paid to the following chapters of the Body and Equipment Guideline:

- 6.5 Additional assemblies (→ page 161)
- 8 Electrics/electronics (→ page 256)
- 8.3 Battery (→ page 258)
- 8.4 Interfaces (→ page 264)
- 8.9.2 Crosswind Assist (→ page 298)
- 8.9.3 Active Brake Assist/Active Distance Assist (DISTRONIC PLUS) (→ page 303)
- 8.9.4 Blind Spot Assist/Rear Cross Traffic Alert/exit warning function/Sideguard Assist (→ page 307)
- 8.9.5 High Beam Assist/Active Lane Keeping Assist/Traffic Sign Assist/Intelligent Speed Assist (→ page 322)
- 8.9.6 Rain sensor and Headlamp Assist (→ page 323)
- 8.9.7 Tire pressure loss warning system (→ page 325)
- 10.1 Bulb ratings of tail lamps (→ page 371)

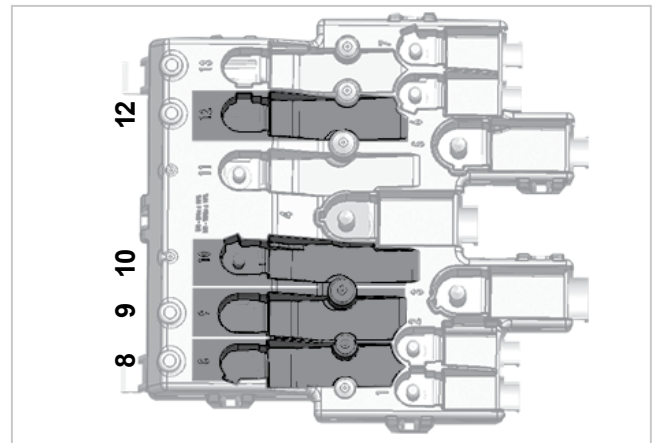
7.15.4 Additional main fuses for camper vans (codes E1R and E1Y)

Function

The main fuse box contains 4 additional fuses that are not used by the basic vehicle. These are available to the upfitter with code E1R and E1Y with different fuse ratings at fuse slot F9 (see table at the end of the chapter) in order to connect defined consumers.

Three 30 A output fuses are provided in the seat base, which are connected to F8 via a line (see illustration "Additional fuse for camper vans").

This facilitates the connection of electrical consumers to terminal 30T.

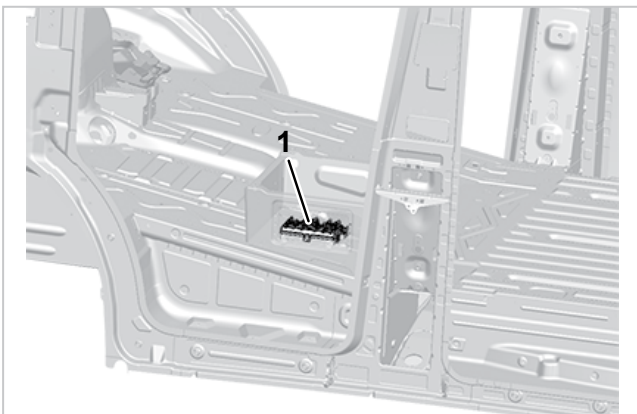


Additional fuse for camper vans

! **NOTE**
Do not connect any consumers to the additional main fuses (code E1R and E1Y1, with connection to terminal 30T) which require a quiescent current > 1 mA when the engine is off. (terminal 15 or D+ inactive/engine standstill).

Fuse location F10 is occupied if the special equipment rear air conditioning system with code HH7, HK4 or H08 is used, and is therefore no longer available.

Fuse location F12 is occupied if the special equipment air spring (code CB2) is used, and is therefore no longer available.



Position of fuse box in BR 907 vehicle

1 Position of fuse box

Code	E1R	E1Y
Main fuse locations	$I_{max.}$ [A]	
F8	100	100
F9	150	80
F10	80	80
F12	40	40

i The valid fuse assignments and values for each of the vehicles are available in the supplement "Fuse assignment", which is part of the accompanying vehicle documents and which is available at Startekinfo p 23

<https://www.startekinfo.com>

7.15.5 Features for camper vans

Pre-installation for switch panel (code E3J)

The Sprinter is equipped with two switch panels ex factory: A two-switch panel and a six-switch panel. The switch frames have dummy covers.

The upfitter can use special switches (switches available from Eugen Kurz KG), i.e. instead of installation of blind plugs and actuating via the PSM (MPM).

Advantage: By using the available switch panels and switches, upfitters can utilize their own functions in the Sprinter design.

For further information on operating switches, see Chapter 8.4.5 Operating switches (pre-installation) (→ page 266) in this guideline.

Radio operating time

With the special equipment code E1X (MBUX multimedia system with longer shutoff delay), the radio operating time has been increased to 6 hours (depending on the battery state of charge).

For a long radio operating time, we recommend fully charging the on-board electrical system battery. .

For camper vans with code X2R (Mandatory for camper van conversion by upfitter), this code E1X is added automatically.

! NOTE

In order to use multimedia systems while stationary with an external power supply, a power feed to the on-board electrical system battery of at least 140 W is required.

Long-term startability

To ensure startability even with long non-operational times, an extra function has been developed for the Sprinter. When the battery reaches a critical value, this function becomes active and maintains the startability of the vehicle.

Own points of interest (POIs) in navigation system

Upfitters for RVs have the option of integrating their own points of interest (POIs) in the Mercedes-Benz vehicle navigation system. This allows the end customer of the RV manufacturer to navigate directly to the nearest Mercedes-Benz service point or contract partner.

Pre-installation for rear speakers

A pre-installation for rear speakers (code EP7) is available to allow RV manufacturers to connect additional speakers to the radio in their body.

For further information on this pre-installation, see Chapter 7.14.12 Pre-installation for upfitter interface H (code E2A) and upfitter interface M (code E5M) (→ page 234).

Retrofitting rear seats

For the retrofitting of seats in the rear, the information and specifications in Chapter 7.3 Retrofitting seats (→ page 198) must be observed.

7.15.6 Airbags for camper vans

Additional airbag systems can be ordered for RVs under the following special equipment codes:

- Driver thorax/pelvis side airbag (code SH1)
- Front passenger thorax/pelvis side airbag (code SH2)
- Window airbags for driver and front passenger (code SH9)

Special requirements and information apply to the use of these special equipment options in camper vans, which can be found in the following chapters and must be observed:

- Chapter 4.5.1 Modifications in the area of the restraint systems (→ page 87)
- Chapter 5.2 Welding work (→ page 95)
- Chapter 5.4 Painting and preservation work (→ page 98)
- Chapter 6.1.4 Air suspension (→ page 108)
- Chapter 6.2.1 General information on the body in white/body (→ page 110))
- Chapter 6.2.2 Attachment to the frame (→ page 115)
- Chapter 6.4.1 General information (→ page 147)
- Chapter 6.4.2 Safety equipment (→ page 148)
- Chapter 7.4 Modifications to closed cargo vans (→ page 201)
- Chapter x.xx.xx Connecting point with omission of driver's and front passenger seat for pre-installation for seat belt warning system (code J1D / J1E) and seat occupancy recognition (code E3S)
- Chapter x.xx.xx Pre-Installation for a digital signal processor (DSP) box (code E3D) (page xx)

Additional requirements for window airbags**(code SH9):**

- Code SH9 can only be ordered in combination with code F28 or for panel vans.
- Side window blackout curtains or awnings on side windows are not permitted in combination with this equipment.
- Installed windshield blackout curtains/awnings/shelves and their retaining systems must not impede the deployment areas of the airbags.
- All work on an A-pillar with window airbags is prohibited.
- Holders on the A-pillar trim are not permitted.

Additional requirements for thorax/pelvis side airbags (code SH1/SH2):

- Code SH1/SH2 can only be ordered in combination with code F28 or for panel vans.
- Installed window blackout curtains/awnings and their retaining systems on driver/front passenger side windows must not impede the deployment areas of the airbags.
- The use of armrests on both sides of the seat is not permitted in combination with this system.
- Upfitter-specific seat covers or protective covers are only permissible in combination with the thorax/pelvis side airbag system with proof that the deployment of the airbag does not deviate from the standard condition; see Chapter 6.4.3 Seats (→ page 157)
- Safe routing of the airbag ignition lines must be guaranteed by means of dedicated seat swivel consoles (no twisting/pressure points on ignition lines).

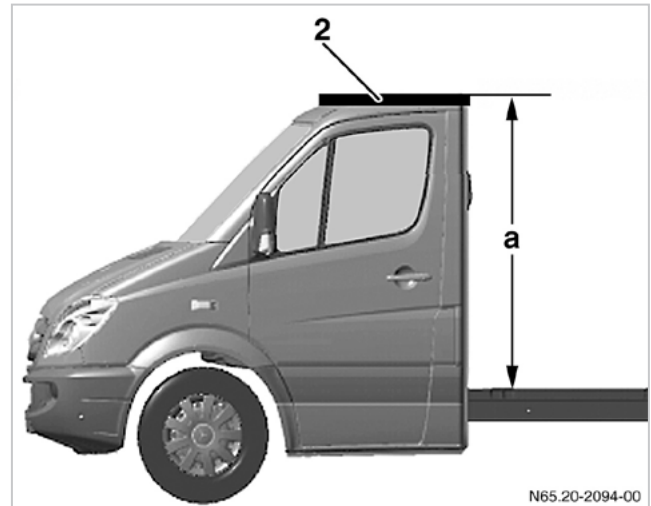
7.16 Bodies on chassis with lowered roof

Code FA1 "Lowered roof" is available for semi-integrated and alcove bodies on vehicles with code F28 "Base with doors". Code FA1 comprises the following changes from the standard version:

- The height of the roof is reduced by approx. 70 mm/2.76 in.
- The vehicle is cut in the area of the roof/door portal, reinforced by means of body in white modifications and then painted in the area of the body in white modifications.
- The standard-equipment sun visors and grab handles are mounted in the same position at modified attachment points.
- The headliner can be attached at the previous attachment points, but must be trimmed and adjusted to fit the interior at the front and sides by the upfitter.
- The vehicle is fitted with a temporary roof bow for transportation.
- Before the body is erected it is necessary for the upfitter to install the auxiliary roof frame supplied at the attachment points provided in order to ensure adequate equivalent rigidity. This provides a lowered attachment plane for bodies.

! NOTE

Observe and adhere to the information and specifications on body limits for driving assistance systems, See Chapter 8.9 Driving assistance systems(→ page 296).



Location of auxiliary roof frame

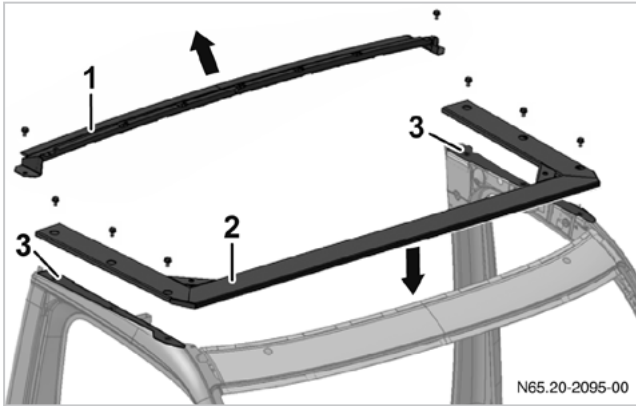
- 2 Auxiliary roof frame
- a Distance between top edge of longitudinal frame member and top edge of auxiliary roof frame:

3500XD, 4500	a = 1540 mm/60.47 in
---------------------	----------------------

7.16.1 Mounting the auxiliary roof frame

The temporary roof bow (1) must be detached before mounting the auxiliary roof frame (2).

The auxiliary roof frame (2) must then be mounted at the points provided using six M10 x 20 10.9 round headed bolts (tightening torque 40 Nm +/- 2 Nm; 8.28 ft lb +/- 0.41 ft lb).



Mounting of auxiliary roof frame

- 1 Transport roof bow
- 2 Auxiliary roof frame
- 3 Cutting area with reinforcements (body in white modifications)

7.16.2 Mounting the body on the auxiliary roof frame

The body can be attached to the auxiliary roof frame by

- Bolts
- Rivets
- Adhesive bonding
- Welding

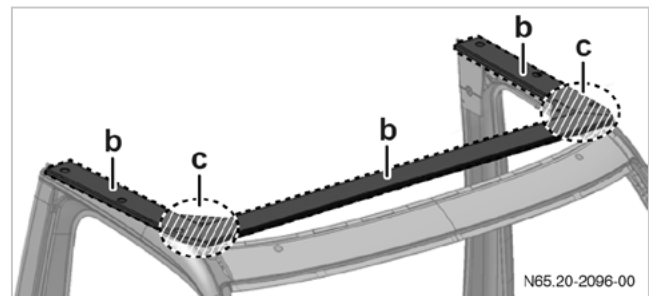
! NOTE

Holes must not be drilled in the corners of the auxiliary roof frame.

The auxiliary roof frame must not be cut.

The introduction of force to the auxiliary roof frame must occur by way of an area load (line load). Point loads must not be introduced into the auxiliary roof frame.

The load on the auxiliary roof frame while driving must not exceed 100 kg/220.5 lbs. When the vehicle is stationary, a load of 200 kg/491 lbs is permissible.



Attachment areas for auxiliary roof frame on vehicles with lowered roof

- b Attachment area
- c No drilling allowed

Please also observe 5.3 Anti-corrosion protection measures (→ page 96). The department responsible will be happy to answer any questions 1.7 Contact (→ page 17).

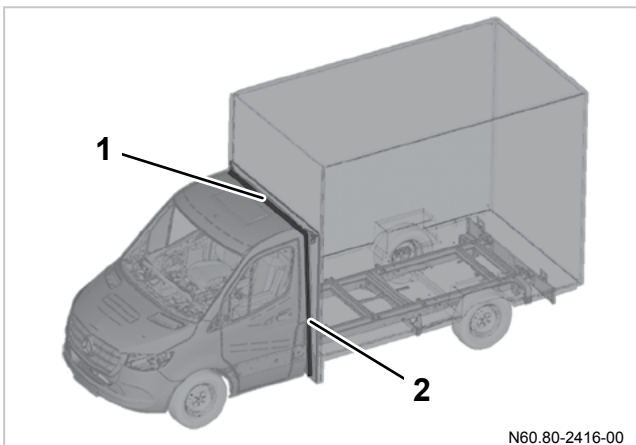
7.17 Semi-integrated bodies and optional mounting of free-standing bodies

A non-positive connection between cab and body is required on vehicles with semi-integrated bodies e.g. semi-integrated RVs, integral box bodies etc.

For vehicles with free-standing bodies (e.g. box bodies), it is also possible to optionally connect it to the cab. For this, the same specifications apply as for semi-integrated bodies. The body must have adequate inherent rigidity in the attachment area (avoid local compression).

The connection between the cab and the body must be continuous at the B-pillars and the roof frame (either full length or in sections). For a specific implementation and other measures, an evaluation with the responsible department is necessary. As part of the eXpertUpfitter program, please refer to www.UpfitterPortal.com.

The descriptions apply for cabs both with and without rear panel.



Attachment of body to B-pillar and roof (example of free-standing body, schematic diagram)

- 1 Roof
- 2 B-pillar

Attachment of body to B-pillar (z-axis)

The body side wall must always be connected to the B-pillar. The connection between the body and the basic vehicle must be non-positive.

It must be assured that forces are transmitted between the body and the B-pillar. This can be achieved by e.g.:

Variant 1

Attachment of body to B-pillar via a stay plate with

$$t = 2 \text{ mm}/0.08 \text{ angled at approx. } 2 \times 45^\circ.$$

The stay plate must be bonded across its entire surface area.

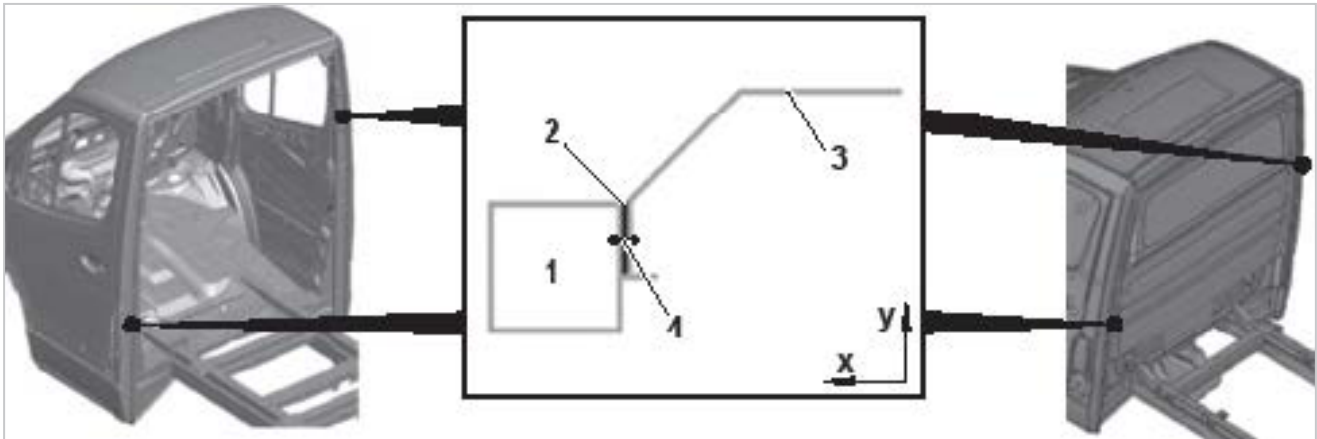
In addition to full-surface bonding, rivets can also be used for fastening purposes.

Observe the following specifications in this respect:

- A rivet connection without full-surface bonding is not permitted.
- Only use steel blind rivets.
- Maximum rivet diameter is 6 mm
- When riveting, only apply a rivet force in the longitudinal direction, not in the radial direction.
- Only position the bores and rivets on the rear of the B-pillar (opposite to the direction of travel).
- A maximum of 6 bores are permissible at regular intervals between the top of the roof frame and the bottom connection between the B-pillar and floor/frame.
- To drill the bores, use a drilling template with depth limiter set according to the sheet thickness.
- Under no circumstances must internal component parts (e.g. parts of the seat belt or left tank filler neck) be damaged by the drilling work.

- Fully suction off all drill chips.
- When drilling holes in the vicinity of the seat belt retractor (height approx. $Z = 600$ mm in CAD data), remove this component part, store it safely and without damage, and re-install it once drilling is complete.

i Further information and details can be obtained from your designated contact at the Technical Consultancy for Upfitters (→ page 17).

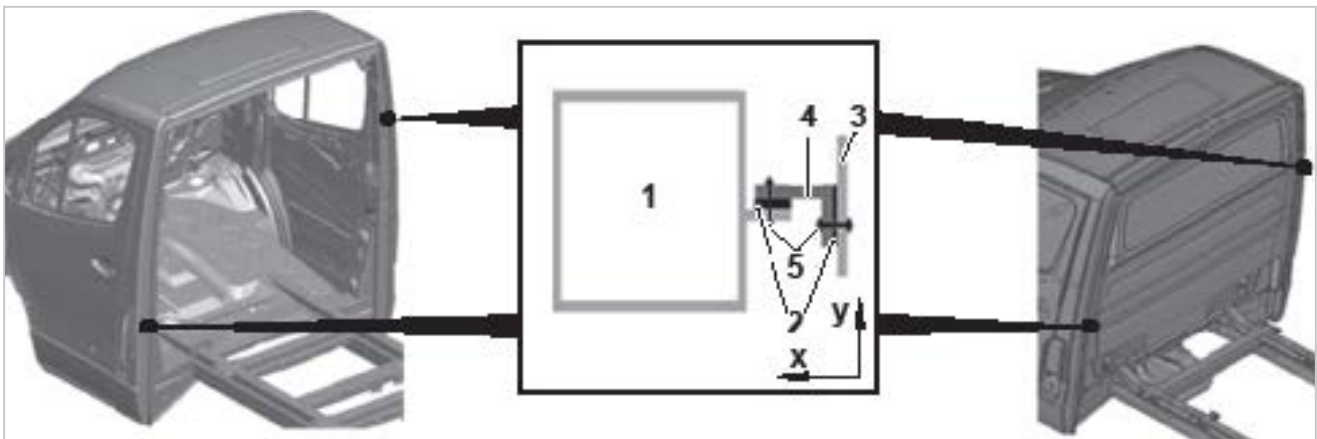


Variant 1: Attachment of body to B-pillar via stay plate (example with and without rear panel)

- 1 B-pillar
- 2 Bonding flange
- 3 Stay plate
- 4 Rivet (optional extra)

Variant 2

Attachment of body to welding flange of B-pillar with angle pieces.



Variant 2: Attachment of body to B-pillar via bracket (example with and without rear panel)

- 1 B-pillar
- 2 Bonding flange
- 3 Firewall of body
- 4 Angle piece
- 5 Rivet

Attachment of body to roof frame (y-axis)

In addition to the connection between the body side wall and the basic vehicle, it is necessary to form a non-positive connection between the body and the basic vehicle in the area of the roof frame on vehicles with integral bodies. This can be achieved by e.g.:

Variant 1

Attachment of body to roof frame via a stay plate with

$t = 2 \text{ mm}$ angled at approx. $2 \times 45^\circ$.

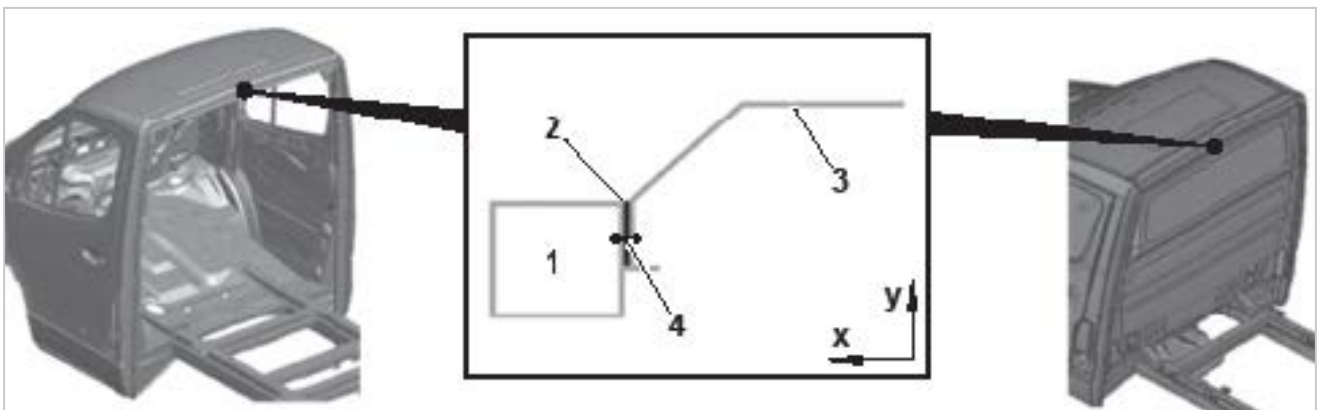
The stay plate must be bonded across its entire surface area.

In addition to full-surface bonding, rivets can also be used for fastening purposes.

Observe the following specifications in this respect:

- A rivet connection without full-surface bonding is not permitted.
- Only use steel blind rivets.
- Maximum rivet diameter is 6 mm
- When riveting, only apply a rivet force in the longitudinal direction, not in the radial direction.
- Only position the bores and rivets on the rear of the roof frame (opposite to the direction of travel).
- A maximum of 6 bores are recommended at regular intervals between the B-pillar on the left and right.
- To drill the bores, a drilling template with depth limiter is recommended.
- Fully suction off all drill chips.

i Further information and details can be obtained from your designated contact at the Technical Consultancy for Upfitters (→ page 17).

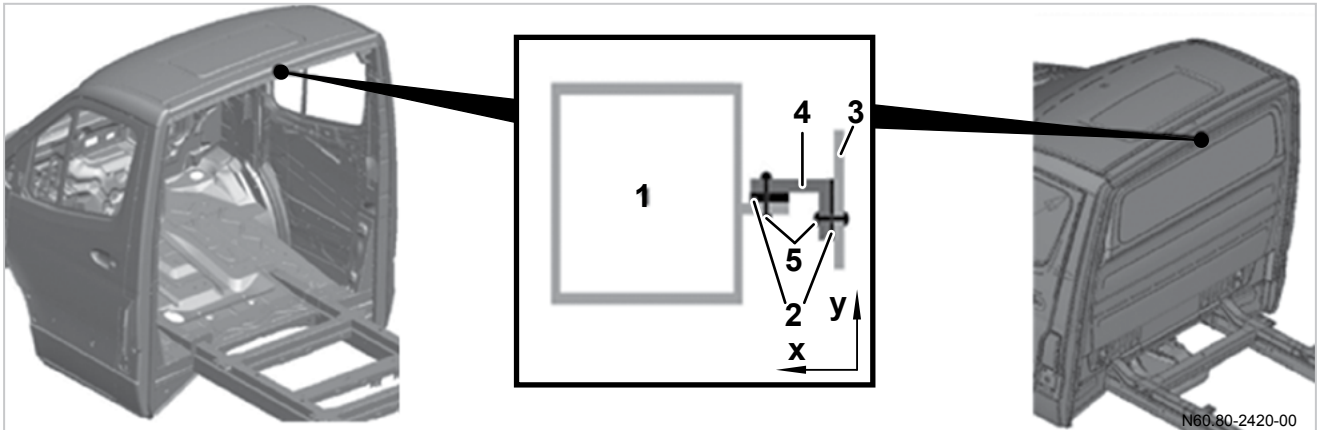


Variant 1: Attachment of body to roof frame via stay plate (example with and without rear panel)

- 1 Roof frame
- 2 Bonding flange
- 3 Stay plate
- 4 Rivet (optional extra)

Variant 2

Attachment of body to welding flanges of roof frame using angle pieces.



Variant 2: Attachment of body to roof frame welding flange via bracket (example of with and without rear panel)

- 1 Roof frame
- 2 Bonding flange
- 3 Front wall of body
- 4 Bracket
- 5 Rivet

On vehicles with cut roof frame, the upfitter must ensure force transfer to the simulating structure (→ page 131). Therefore, an evaluation with the responsible department is necessary.

As part of the eXpertUpfitter program please refer to www.UpfitterPortal.com.

7.18 Buses

Prior to conversion into a bus, please note:

Conversions to standard vehicles may invalidate the operating permit. Please refer to country and/or state-specific legal regulations. For US operating permits, the approval conditions and requirements of the Department of Motor Vehicles (DMV) must be met. For Canadian operating permits, please refer to provincial transportation ministries.

Further general technical information:

- Local and country-specific laws and regulations must be observed.
- Ensure an equivalent replacement structure in the body-in-white for modifications to the roof and roof bow structure.
- Ensure that all installed components are not under static load.
- All solutions must be coordinated with Mercedes-Benz (development, calculation, rough roads, durability, NVH, anti-corrosion protection, sealing, etc.).

As part of the eXpertUpfitter program please refer to www.UpfitterPortal.com.

Body-in-white

If the body-in-white is modified or cut, e.g. to lower the vehicle floor in order to gain cargo capacity, to install emergency exits or similar, the anti-corrosion protection measures specified by Mercedes-Benz (as per the currently valid Sprinter Body and Equipment Guideline) must be carried out and all other specifications in the current Body and Equipment Guideline regarding modifications to the body-in-white must be observed.

Particular attention must be paid to the following chapters of the BEG:

- Chapter 4.3.1 Modifications to the body-in-white (→ page 76)
- Chapter 4.3.2 Limit values for the vehicle frame (→ page 76)
- Chapter 4.3.8 Roof/roof load (→ page 81)
- Chapter 6.2 Body in white/body (→ page 110)
- Chapter 6.3.3 Exhaust system (→ page 142))

Installation of third-party windows

If the upfitter is going to install aftermarket windows, code W94 "Window openings w/o glass - side and rear" is available from the factory. It is not permissible to install panoramic windows on a cargo van without code W78 by cutting out the stamped window shape without ensuring equivalent rigidity.

Ensure compliance with FMVSS/CMVSS regarding escape windows.

For cargo vans with window prep package, aftermarket emergency window exit needs to be installed for bus conversions. Please ensure that all applicable regulations pertaining to FMVSS/CMVSS 217 are followed.

Retrofitting an air conditioning system

See Chapter 6.5.1 Retrofitting an air conditioning system (→ page 161)

- The additional belt pulley, code N63, is available ex factory as special equipment for driving refrigerant compressors.
- All electrical equipment installed must be tested in accordance with EC Directive 72/245/EEC and must bear the EC mark.
- If other air conditioning systems are to be retrofitted, observe the guidelines issued by the device manufacturer.
- Do not impair vehicle parts or their function by installing an air conditioning system.
- If compact systems (evaporator, condenser, and blower) are mounted on the cab roof, do not exceed the permissible roof loads: Chapter 4.3.8 Roof and roof load (→ page 90).
- Attachments to the roof require a Letter of Compatibility from the department responsible (→ page 19).
- Ensure that pipes and electric lines are routed correctly.

As part of the eXpertUpfitter program, please refer to www.UpfitterPortal.com.

Interior

Refer to local and country-specific legal regulations.

See also the following chapters on the vehicle interior:

- Chapter 4.5.1 Modifications in the area of the restraint systems (→ page 87)
- Chapter 4.5.2 Modifications to seats (→ page 87)
- Chapter 6.4 Interior (→ page 147)

Doors and entrances

All modifications to doors or entrances must comply with the specifications described in this Body and Equipment Guideline:

- Chapter 8.8 Windows and doors (→ page 294)
- Chapter 6.2.6 Side wall, windows, doors and flaps (→ page 121)
- Chapter 6.4.2 Safety equipment (→ page 148)

Local and country-specific legal regulations for door locks and hinges as well as for rearview mirrors (especially in the case of modifications which affect the view of the rearview mirror) must be observed in particular.

Further information on subsequent modifications (e.g. to the body in white, interior, and doors and entrances) can be obtained from the Upfitter Portal (→ page 17).

8.1 General information

⚠ WARNING

Modifications to electronic components, their software, or wiring can impair the functioning of those electronic components and/or of other networked components. Safety-relevant systems in particular may be affected. Because of this, they may no longer function properly and/or compromise the operational safety of the vehicle.

There is risk of an accident and danger to life and limb!

There is a heightened risk of accident and injury! Never carry out any modifications to the wiring and electronic components or their software. Have all work on electrical and electronic equipment carried out at a qualified specialist workshop.

! NOTE

A positive total charge balance must be ensured when additional electrical consumers are installed (see Chapter 7.17 Semi-integrated bodies and optional mounting of free-standing bodies (→ page 250) and Chapter 8.4.6 Retrofitting electrical equipment (→ page 267)).

Do not release or remove the battery terminals when the engine is running. If the vehicle is equipped with code E30 (1-pin battery main switch), the isolator must not be actuated while the engine is running.

Use rapid charger on the batteries only after disconnecting them from the vehicle's electrical system. Both the positive and negative terminals must be disconnected.

! NOTE

When carrying out work on the electrical system of the basic vehicle, e.g. at the electrical interfaces in the seat box (retrofitting of electric lines and/or components), ensure that the lines are routed appropriately, that the electrical connections and fasteners are appropriately designed.

If electrical installation or modification work is not executed correctly, this may result in unnecessary fault sources and/or considerable additional work in the event of a repair; the cost of such additional work shall be borne by the upfitter that executed the installation/modification work (e.g. swapped connections, damage to the lines or fire damage as result of insufficient clearances).

- 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.
- Electrical and electronic components must fulfill local and national test requirements as well as ISO 16750 test requirements.
- Observe the notes on (→ page 258) when installing auxiliary batteries.
- Cables routed around the exhaust systems must be insulated against high temperatures (→ page 279).
- Cables must be routed in such a way that there are no kinked points (→ page 105).
- Before any long non-operational periods (> 20 days), the chapter on maintenance and storage of batteries (→ page 57) must be observed.
- Observe the operator's manual.

i You can obtain more information from the department responsible 1.7 Contact (→ page 17).

! NOTE

The upfitter is responsible for functional safety of the body modification work performed by the upfitter as well as for the observance of the applicable standard and regulations. Furthermore, the upfitter must guarantee compliance with the international standard ISO 26262 concerning functional safety, if applicable. Please also refer to 49 CFR 567.5 in the US and to Motor Vehicle Safety Regulation 6(1)-6(7) in Canada for requirements for manufacturers of vehicles manufactured in two or more stages.

See Chapter 2.4 Product safety and product liability (→ page 25).

Commissioning of control units

Observe the information and specifications on the commissioning of control units after the completion of body mounting work or modification work, before the vehicle is put into service.

8.2 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. The system in question does not interfere with any of the active systems in the vicinity, nor does it suffer any interference.

Electrical interference occurs in vehicle on-board electrical systems because of the various consumers.

Mercedes-Benz tests all factory-installed electrical and electronic components for their electromagnetic compatibility in the vehicle. If subsequent modifications are made, this may cause a reduction in comfort in some cases (e.g. radio noise).

WARNING

In isolated cases, safety-critical conditions (e.g. influence on the accelerator pedal) may also occur.

There is danger to life and limb!

Therefore, observe and adhere to the following note.

NOTE

The electromagnetic compatibility of electrical and electronic systems must be ensured when such systems are retrofitted.

Mercedes-Benz recommends that the upfitter coordinates the assessment of the EMC with a Technical Service for EMC.

For EMC relevance, the upfitter must apply for certification as per UN R 10 with a Technical Service for EMC.

The following standards provide information on this:

- CISPR 12
- CISPR 25
- DIN EN 55012
- DIN EN 55025
- ISO 7637
- ISO 10605
- ISO 11451
- ISO 11452
- MBN 10284
- UN R 10

When retrofitting electrical or electronic systems, they must be tested for electromagnetic compatibility and this must be documented.

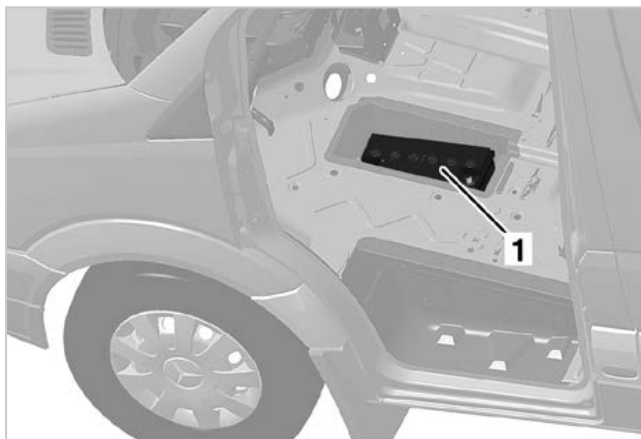
All electrical equipment fitted must be tested in accordance with FCC, CE and UL in the US, and with CSA and ULC in Canada.

The notes under Chapter 8.4.6 Retrofitting electrical equipment (→ page 267), Chapter 8.6 Mobile communications systems (→ page 288), and Chapter 4.6 Limit values for electrics/ electronics (→ page 90) must be observed.

8.3 Battery

8.3.1 On-board electrical system battery

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



Installation position of on-board electrical system battery

1 On-board electrical system battery

The following on-board electrical system batteries are available ex factory depending on the equipment (model AGM):

Series/option	Code	Size	Capacity [Ah]
Series	ED1	H6	70
Option	ED4	H8	92

In the event of high electricity demand and current collection for additional electrical consumers, use an auxiliary battery, see Chapter 8.3.2 Auxiliary battery (→ page 260).

! NOTE

No electric lines are permitted to additionally be connected directly to the negative terminal of the on-board electrical system battery.

The positive terminal of the on-board electrical system battery must not be modified and connecting additional electrical consumers there is not permissible.

! NOTE

The vehicle systems (standard and factory-fitted special equipment) are powered by the on-board electrical system battery.

The on-board electrical management system monitors the voltage of the on-board electrical system battery and stops the vehicle systems functioning when the state of charge drops below the 40% limit in order to preserve the startability of the vehicle. The electronic ignition lock and the tachograph are not affected by this.

Where an auxiliary battery is used, see Chapter 8.3.2 Auxiliary battery (→ page 260), the consumers connected to it are also not impaired in their function.

If one or more vehicle systems are operated while the vehicle is stationary (e.g. audio devices or interior lamps), note the state of charge and the limited capacity of the on-board electrical system battery.

External power supply in the 12 V on-board electrical system

Time-restricted charging of the on-board electrical system battery or permanent power supply through an external power supply into the on-board electrical system battery may only take place with a charger in compliance with the following specifications:

- A connection to the on-board electrical system is only permitted via terminal 30.
- The jump-start connection point in the engine compartment is recommended for charging the on-board electrical system battery.
- An external power supply is only permitted during engine standstill (terminal 15 or D+ inactive).
- The charger must be approved for AGM batteries and must also be restricted to the following values:
 - Start charging voltage maximum 14.8 V
 - Quiescent current consumption below 1 mA
- It is essential that the charging process or external power supply complies with DIN EN 50342-1, Section 5.1.
- The charging cable must be secured immediately at the connection point to the on-board electrical system with a fuse in accordance with the specifications in Chapter 8.4.2 Electric lines/fuses (→ page 264).
- Any other types of external power supply, for example via solar-powered chargers (solar controllers), are not permissible for charging the on-board electrical system battery.

- ④ Before starting the charging process, please familiarize yourself with the specifications and further information in the Operator's Manual for the vehicle and charger.

8.3.2 Auxiliary battery

General

! NOTE

Capacities > 100 Ah must not be connected directly to the on-board electrical system, because this may damage the basic vehicle.

A positive total charge balance must be ensured through selection of a suitable alternator.

When consumers are powered by the auxiliary battery, ensure that the permissible total current of 80 A across the battery cutoff relay in total is not exceeded. Take into account the battery charging current with the engine running here.

In the event of a higher total current, even briefly (peak), get in touch with your designated contact via www.upfitterportal.com for additional technical consultation.

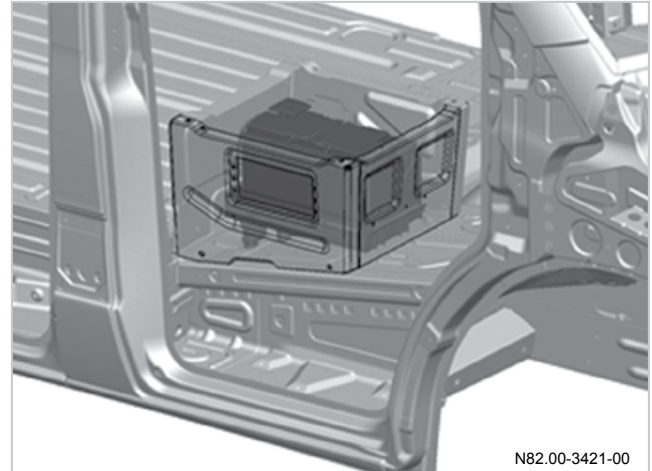
Use only the same type of battery (AGM) for the on-board electrical system battery and auxiliary battery.

It is recommended to always use the special equipment options offered by Mercedes-Benz ex factory if these are required for an auxiliary battery.

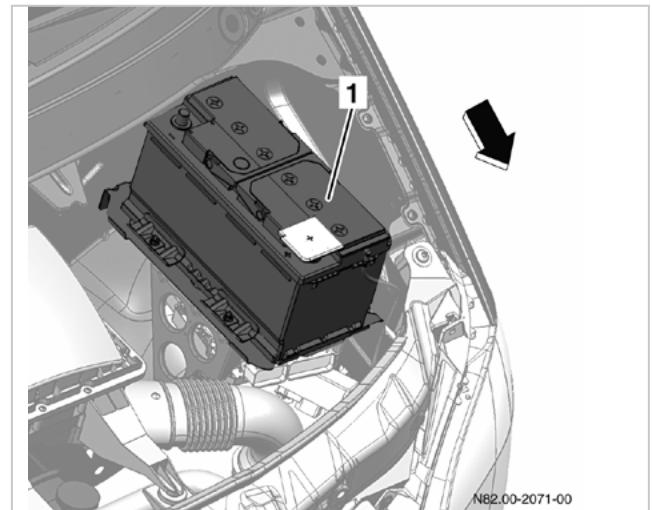
Code	Size	Capacity [Ah]	Installation location
E21	H8	92	Front passenger seat box
E2M	H6	70	Engine compartment

The required battery cutoff relay (code E36) is installed automatically along with the auxiliary batteries.

In order to facilitate current collection from the auxiliary battery (code E21 or E2M), a current collector (fuse box) is available in the driver seat frame. This means that it is not necessary to route additional lines from the vehicle interior (bodybuilder manufacturer consumers) to the auxiliary battery in the engine compartment, see (→ page 260)



Auxiliary battery in the front passenger seat box (code E21), example for left-hand drive vehicle



Auxiliary battery in the engine compartment (code E2M), example for left-hand drive vehicle

If the vehicle is to be started using an external power supply, then either the jump-start connection point or the main battery must be used.

- i Information and specifications on how to use the jump-start connection point correctly can be found in your vehicle's Operator's Manual.

! NOTE

The auxiliary battery (code E2I, E2M) or other auxiliary batteries connected to the on-board electrical system via the battery cutoff relay must not be used to start the vehicle via an external power supply, as this could result in damage to the vehicle.

Retrofitting auxiliary batteries

Auxiliary batteries specific to the upfitter must be connected to the vehicle on-board electrical system using the E36 cutoff relay and fuse. It is not permitted to retrofit an aftermarket cutoff relay.

! NOTE

The necessary special equipment code E36 must be taken into account when ordering the vehicle to ensure that the battery cutoff relay is installed ex-factory.

It is not possible to retrofit E36.

- i You can obtain further information by reaching out via www.Upfitterportal.com.

When installing an auxiliary battery, ensure that the same type of battery (AGM) is used as the on-board electrical system battery.

If the auxiliary battery is located in the passenger compartment, sufficiently dimensioned ventilation must be realized through a central vent hose leading into the atmosphere. If necessary, the second channel in the battery should be sealed with a stop plug.

The auxiliary battery may only be used to power auxiliary consumers such as the stationary heater, loading aids or electrical equipment in RVs (refrigerator, etc.).

! NOTE

If the vehicle is already equipped with an auxiliary battery, no further auxiliary batteries may be connected in parallel without a charging current limiter.

This can be realized through supplementary electronics. A maximum charging current for batteries of 80 A in total must be ensured by the Upfitter. If this is not the case, the basic vehicle may be damaged.

A positive total charge balance is to be assured through selection of a suitable alternator.

For additional questions when retrofitting more than one auxiliary battery, please reach out via www.upfitterportal.com.

! WARNING

If you (the Upfitter) install multiple DC/DC converters, you (the Upfitter) are responsible to design an electrical system that eliminates ANY risk for voltage oscillation/fluctuation between the converters.

Example:

All eSprinter models are equipped with a 400V to 12V DC/DC converter. If you (the Upfitter) install additional auxiliary batteries which per the BEG require a current limitation system (secondary DC/DC converter), then there is a high risk of voltage oscillation/fluctuation.

On all eSprinter models, the risk for voltage fluctuation is very high if the current limitation system is adjusted to more than 40A. If you install additional auxiliary batteries on eSprinter models, you (the Upfitter) must install a current limitation system with a maximum of 40A and also ensure that you test the system to ensure there is no voltage oscillation/fluctuation.

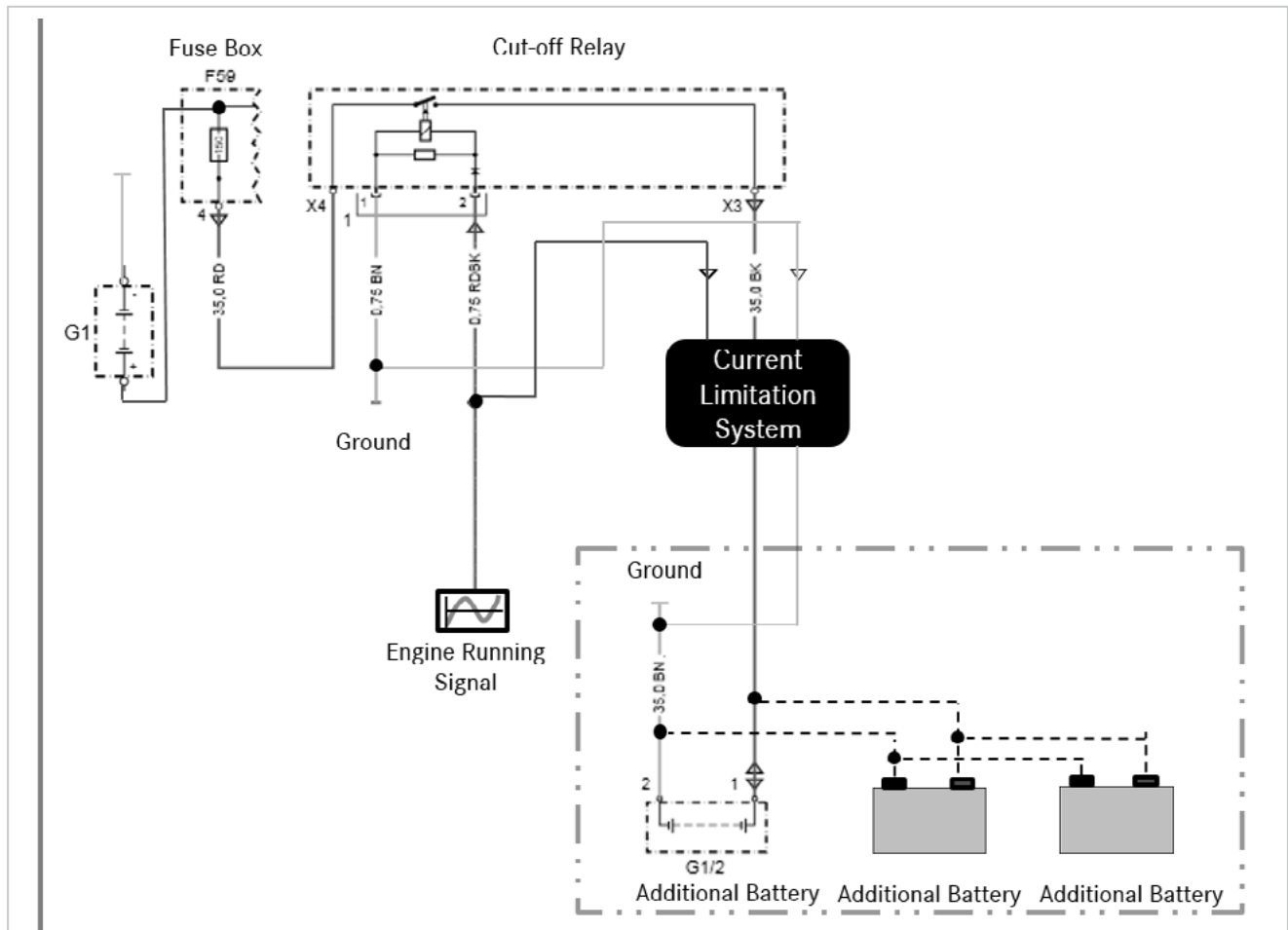
Summary for current limitation:

1. Sprinter: max. 80A
2. eSprinter: max. 40A plus testing required.

Severe voltage fluctuation can lead to overheating and electrical arcing which can result in damage to the vehicle, as well as a DANGER TO LIFE AND LIMB!

A current limitation system (DC/DC converter or charger) must be installed between the cutoff relay (E36: Fuse connection A4) and additional batteries to allow for different battery technologies or additional batteries other than E2I or E2M to be installed.

The charging current limiter must be set to a maximum of 80A. It allows for multiple batteries to be added in parallel if the batteries are the same type, have the same capacity and same age in cross connection.



N82.00-2212-00

⚠ WARNING

Tampering with and unauthorized installations in the electrics or on-board electronics can impair the functioning of these systems. This can lead to the failure or malfunctioning of components or component parts relevant to safety, and may result in accidents or damage to the vehicle.

There is risk of an accident and danger to life and limb!

Do not tamper with or perform any unauthorized installations in the electrics or on-board electronics.

Charging the auxiliary battery by external power supply

An external power supply to charge the auxiliary battery with battery cutoff relay code E36 via a suitable charger or a solar controller may only be used during engine standstill (battery cutoff relay open, or terminal 15 or D+ inactive).

8.3.3 Battery maintenance and storage

Batteries must be regularly checked for voltage drop (self-discharge) - even when removed. With low-maintenance batteries, only the fluid level does not need to be checked.

Further information on maintaining and storing batteries is available under Chapter 3.11.2 Battery maintenance and storage (→ page 57).

8.3.4 Disconnecting the on-board electrical system voltage

Whenever the vehicle is to be stored for long periods of non-operational time - see Chapter 3.11 Maintenance and repair (→ page 56) - or if work is to be carried out on electrical systems, it is recommended that the onboard electrical system be de-energized by disconnecting the 12 V power supply at the terminals of the on-board electrical system battery and auxiliary battery or by actuating the single-terminal battery main switch (special equipment code E30).

- ⓘ For this, observe the information and specifications regarding the procedure in the operator's manual of your vehicle.

8.4 Interfaces

8.4.1 CAN bus and networking

⚠ WARNING

As all consumers are networked and internally monitored by the system, no modifications should be made to the CAN bus (e.g. breaking, extending or tapping). Any change to the cable harness in terms of length, cross-section or resistance can result in safety-relevant component failures or comfort impairments.

Internal and external vehicle diagnosis can be carried out by means of the OBD diagnostic socket (SAE 1962). Every control unit is capable of self-diagnosis and is equipped with an internal fault memory.

Communication with the control units can be established using a diagnostic device and the software developed for this unit. At Mercedes-Benz, this diagnostic tool is called the "XENTRY" diagnostic system and has the associated hardware and software.

i You can obtain further information on this topic from your Mercedes-Benz Service Center.

! NOTE

Do not make any permanent connection to the OBD diagnostic socket as this can impair vehicle functions.

8.4.2 Electric lines/fuses

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

! NOTE

All existing line routings in the vehicle must not be impaired by any modification measures in terms of properties such as current and signal transmission, insulation, EMC, component part quality, line attachment, etc. (incomplete list).

! NOTE

When carrying out work on the electrical system of the basic vehicle, e.g. at the electrical interfaces in the seat box (retrofitting of electric lines and/or components), ensure that the lines are routed appropriately, that the electrical connections and fasteners are appropriately designed.

If electrical installation or modification work is not executed correctly, this may result in unnecessary fault sources (e.g. confusing connections, damage to lines, or risk of fire as a consequence of insufficient distances) and/or considerable additional work in the event of a repair. The cost of this shall be borne by the upfitter.

Only unleaded PVC-jacketed cables with an insulation operating temperature limit > 105 °C/221 °F may be used. Connections must be made in a professional manner and must be watertight.

The line must be dimensioned in accordance with the current level drawn and protected with fuses.

Please do not block any access points to fuse box.

The following table applies to cables with an insulating limit temperature of > 105 °C/221 °F

Max. permanent current [A]	Fuse rating	Line cross-section	
	[A]	[mm ²]	[in ²]
0 - 4.9	5 ¹	0.5	0.001
5 - 9.9	10 ¹	1	0.002
10 - 18	20 ¹	2.5	0.004
19 - 28	30 ¹	4	0.006
29 - 35	40 ²	6	0.009
36 - 48	50 ²	10	0.015
49 - 69	70 ²	16	0.025
70 - 98	100	25	0.039
99 - 123	125	35	0.054
124 - 148	150	50	0.078

- 1 Type C; DIN 72581 male spade connector
- 2 Type E; DIN 72581 male spade connector

The fuse assignments and values that are valid for the vehicle are available in the supplement "Fuse assignment", which is part of the accompanying vehicle documents and which is available in at Startekinfo, see Chapter 2.3.4 XENTRY Kit (→ page 24)

8.4.3 Cable extension

If cables are lengthened (e.g. in connection with a wheelbase extension), cables of the same or a greater cross-section must be used. We recommend the use of lines complying with LV112. The protective effect of retaining elements must not be impaired.

Connections between electric lines and electrical components (e.g. plugs) are to be secured against rocking to and fro, through the use of suitable mounting material.

All connections must be made professionally and water-tight in accordance with IP 69k (protected for high-pressure cleaning).

Lines to the ABS sensors of the rear axle must be adapted for the specific vehicle and may be lengthened by maximum 2.7 m (8.86 ft). The lines to each sensor must be twisted with a loop length of 30 ± 5 mm (1.18 ± 0.2 in).

Lengthening of wiring harnesses - Comfort and passive safety systems, on-board electrical system, bus system

The Mercedes-Benz work instructions on the repair of cables also apply for the lengthening of cables. The instructions can be found in WIS (→ page 23). Work on the vehicle must always be carried out using the latest workshop aids from the manufacturer for the vehicle in question. The safety notes and safety precautions must be observed and precautions against electrostatic discharge (ESD) must be taken. Please get in touch with the contact person responsible for your market. ESD protection is only effective when the safety regulations/safety precautions are complied with. All operation steps, including test procedures, must be carried out in accordance with the WIS instructions. Information about ESD are available in the WIS.

The following must not be modified or extended:

- Airbag control unit connector coupling
- ESP® control unit connector coupling
- Engine control unit connector coupling
- High-voltage lines
- Antenna lines
- Fiber-optic cables
- Lines of bus systems, see Chapter 8.4.1 CAN bus and networking (→ page 264)
- Lines with a cross-section $> 4 \text{ mm}^2$ (0.0062 in^2)

Refer to the WIS document AH00.19-P-1000-08A, e.g. an ESP® plug must not be "modified".

Further information on lengthening wiring harnesses can be found in the WIS documents:

- AR00.19-P-0100A (Wiring harness, general methods)
- AH00.19-P-1000-08A (Parts solutions and what may/may not be repaired/extended)

If the prescribed methods are followed and approved materials and tools are used, it is possible to lengthen lines without any loss in quality.

The following repair methods are approved:

- Soldering
- Raychem (use of solder connectors)
- Raychem in combination with electrical wiring harness (pigtail)
- Crimping


Refer to the WIS document AR00.19-D-0100A to select the suitable work method.

Soldering

Select the line connectors or solder sleeves. Solder the stripped lines in accordance with the WIS

Crimping

Crimp the stripped lines in accordance with the WIS

 For further information consult the Workshop Information System (WIS) and also see Chapter 2.3.2 Startekinfo (→ page 23)

WIS can be accessed at the following address:

www.startekinfo.com

The methods focus on soldering (specifically Raychem) and crimping.

Soldering (specifically Raychem):

In the Raychem method, special solder connectors are used. The solder connectors contain the solder and are insulated and sealed. A special hot-air blower is used to heat them. Do not use a cigarette lighter!

The connections must be checked for a resistance of less than 0.5 ohms using Fluke meter according to the circuit diagram.

8.4.4 Additional electric circuits

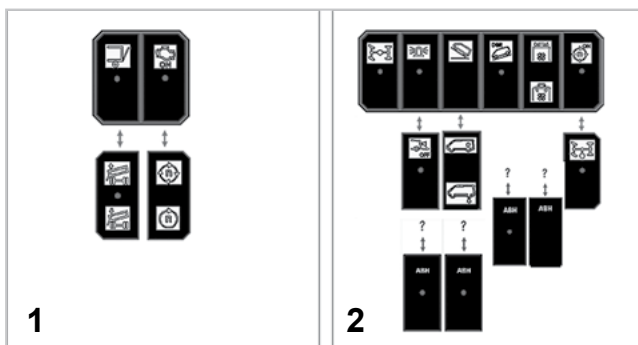
If additional electric circuits are installed, they must be protected against the main power circuit by fuses of adequate rating.

The lines used must be rated for the load and they must be protected against the effects of breakaway, impact and heat.

8.4.5 Operating switches (pre-installation)

Switch panel pre-installation

As a pre-installation for operating switches installed by the upfitter, two switch panels are available in the area of the steering wheel. These contain two slots on the left of the steering wheel and six slots on the right of the steering wheel. Depending on the equipment installed, these may be added automatically and partially populated with switches. If they are not added automatically due to the vehicle equipment, the pre-installation can be ordered separately under the code E3J (Switch panel pre-installation).



Switch panels

- 1 Van switch panel to left of steering wheel (LHD vehicle)
- 2 Van switch panel to right of steering wheel (LHD vehicle)

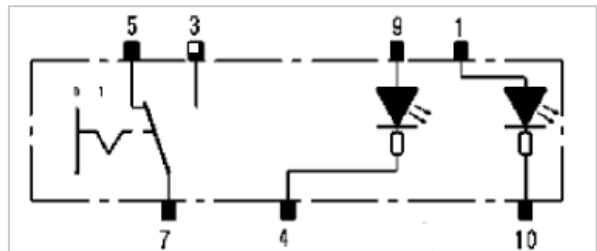
These switches are load switches which supply the interface for the upfitter. The switches bear no symbols and can be individually inscribed with laser lettering at a size of 8x8 mm.

- i** For information regarding the procurement of the operating switches, reach out to local Mercedes-Benz Service Center.

The reserved load switch part numbers are:

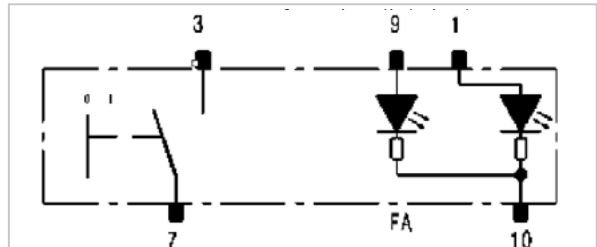
Three different versions of load switches are available from factory for installation in the aforementioned switch panel for upfit functions:

- A907 905 3902 9107 (Single pole changeover (CO) contact, latching, function lighting)



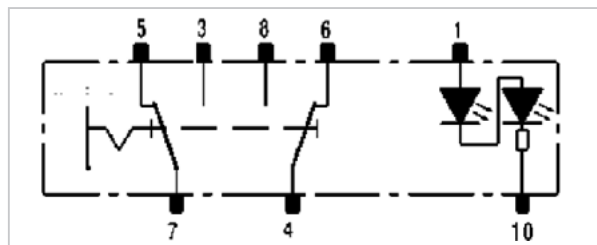
A907 905 3902 9107

- A907 905 4002 9107 (Sing pole normally open (NO))



A907 905 3902 9107

- A 907 905 4102 9107 (Double pole changeover contact (CO), latching, NO function lighting)



A907 905 4102 9107

Part numbers for mating parts to the switch:

- Connector (housing): A013 545 4026
- Contact for wires 0.35 qmm: A008 982 2426
- Contact for wires 0.5 qmm: A011 545 7826
- Contact for wires 0.75 qmm: A011 545 7926

Parts can be ordered directly from the supplier through the following contact:

Eugen Kurz KG

Ulrich Pflüger

Rebengasse 12

D-89073 Ulm

Tel. +49 731 66535 / Fax +49 731 601283

Mail: info@stempel-kurz.de

8.4.6 Retrofitting electrical equipment

Please observe the following if electrical accessories are retrofitted:


- A positive charge balance must be ensured by the upfitter.
- For higher electrical power requirements, the alternators reviewed by Mercedes-Benz must be used, see the following Chapter 8.4.7 Alternator (→ page 267).
- Do not connect additional alternators to the existing on-board electrical system; the electrical systems should be galvanically isolated.
- Do not connect additional consumers to fuses already assigned.
- Do not connect additional lines (e.g. with insulation piercing devices) to existing lines.
- Provide sufficient protection for consumers using additional fuses.
- Do not block access to any fuse box
- All electrical consumers installed must have been tested in accordance with UN R 10 in its current version and must bear the CE marking and/or another comparable marking depending on the national regulations, see Chapter 8.2 Electromagnetic compatibility (EMC) (→ page 257).
- Additional electrical consumers must be connected by means of the terminal strip for auxiliary consumers (code EK1) available from the factory as described under 8.4.8 Power tapping (→ page 268).

WARNING

Tampering with or unauthorized installations in the vehicle electrical/electronic systems can impair the functioning of these systems. This can lead to failure or malfunctioning of components or of parts relevant to safety, and may result in accidents or damage to the vehicle.

There is risk of an accident and danger to life and limb!

Do not tamper with or perform any unauthorized installations in the electrics or on-board electronics.

-  Furthermore, tampering with the vehicle electrical/electronic systems can invalidate the implied warranty or the general operating permit.

8.4.7 Alternator

If additional electrical consumers are retrofitted, the increased power requirement can be met by fitting higher-rated alternators.

The following alternators are available as special equipment (option codes) from the factory:

Alternator availability

Code	I [A]	OM654
M61	280	Optional
M60	250	Series

When using additional assemblies, use the factory-installed power take-offs, see Chapter 6.5.3 Engine power take-off (→ page 163).

If a secondary alternator is required, the upfitter must order or retrofit the option code N62 (front engine power take off with carrier for addition alternator).

For retrofitting of N62 WIS document must be followed.

It is recommended that a Mercedes-Benz qualified technician performs the retrofit. Please visit the local Mercedes-Benz Dealership for servicing.

For retrofitting N62 or N63, Mercedes-Benz recommends that a Mercedes-Benz qualified technician performs the retrofit. Please visit the local Mercedes-Benz dealership for servicing. For eXpertUpfitters, the installation guide for retrofitting N62 or N63 is available on WIS.

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

- Only alternators with a freewheeling belt pulley are permissible.
- The installation of a generator must not impair vehicle parts and 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 (→ page 264).
- Dimension the line cross section in accordance with the tapped amperage Chapter 8.4 Interfaces (→ page 264). The higher power draw may necessitate the replacement of the starter/alternator wiring harness. For this, we recommend the use of Mercedes-Benz genuine parts.
- Electric lines must be routed correctly (→ page 264).
- 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 (→ page 145).
- 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 assemblies must be supplied on handing over the vehicle.

8.4.8 Power tapping

Depending on the vehicle's as-built configuration, there are different possibilities for auxiliary consumers to tap current. Power can be tapped via the terminal strip for electrical connection (special equipment EK1) or at the auxiliary battery tapping point.

- ① For more information on tapping power for special equipment, refer to 1.7 Contact (→ page 17).

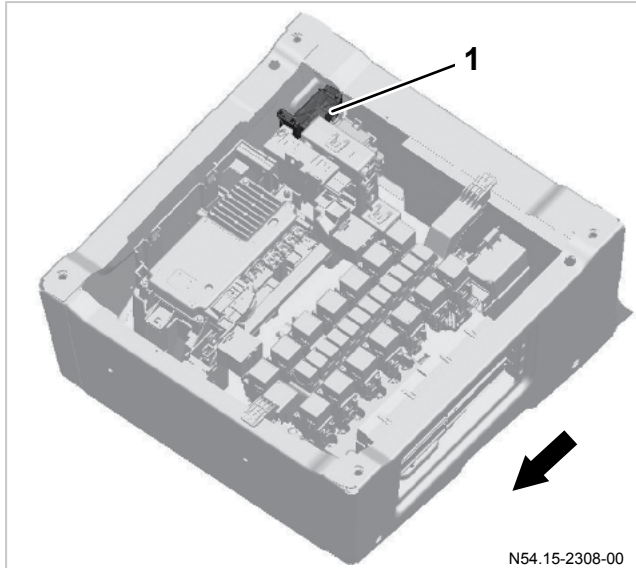
! NOTE

When installing additional electrical consumers, especially on vehicles with special equipment installed ex factory which uses the auxiliary battery (fuse box in driver seat frame), the upfitter must ensure a positive overall charging balance.

Additional information on special equipment can be obtained from your Mercedes-Benz Service Center or under 3.12 Special equipment (→ page 59).

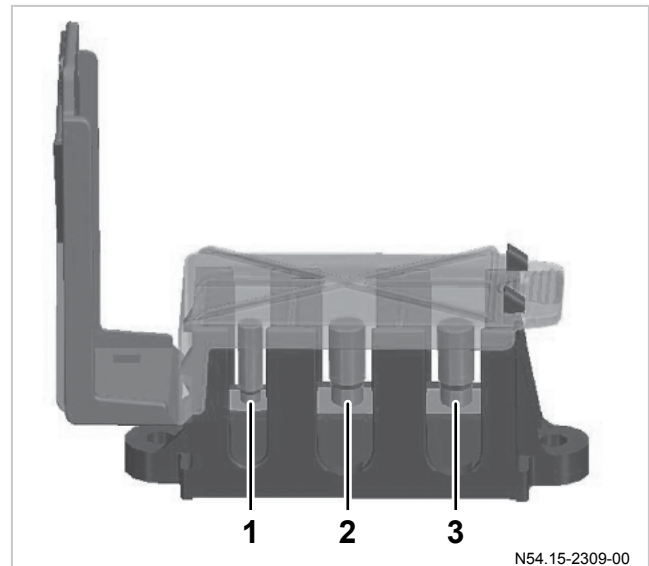
Power tapping via terminal strip for electrical connection

The terminal strip (special equipment code EK1) is installed inside the driver seat frame (at the center, on the left-hand side in direction of travel) and has three connectors:



Position of terminal strip EK1 in driver seat base (LHD vehicle)

- 1 Terminal strip (code EK1)
Arrow Direction of travel



Terminal strip EK1 (X145/1)

	Terminal	Voltage/fuse rating
1	Terminal D+	12 V/10 A
2	Terminal 30T	12 V/25 A
3	Terminal 15	12 V/15 A

Electrical joint bolts in the fuse box must be tightened to the following torques:

Bolt size	Tightening torque [Nm]
M4	3 ±0.3
M6	6 ±0.6

The terminal strip EK1 is supplied directly from the main battery and is the supply point in the main on-board electrical system at which the upfitter may connect his or her consumers. Other consumers can be connected via the PSM (MPM) and the auxiliary battery.

! NOTE

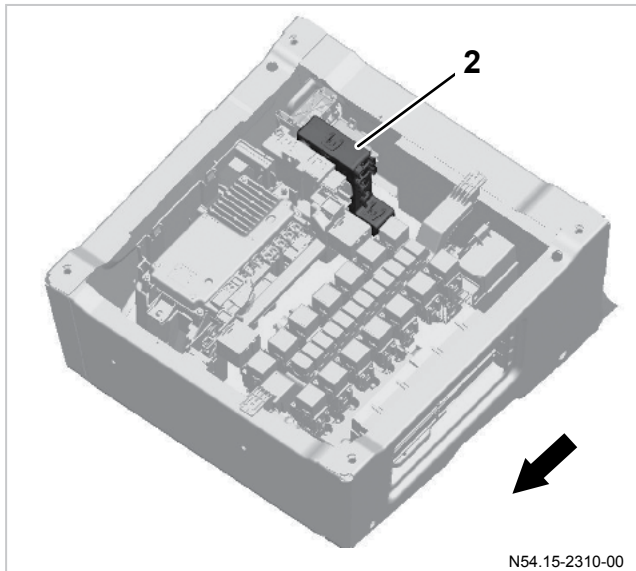
Note that no consumers are permitted to be connected to terminal 30T of the terminal strip (code EK1) that require a quiescent current > 1 mA when the vehicle is stopped (terminal 15 or D+ inactive and engine standstill).

In the event of a higher total quiescent current, even briefly (peak), get in touch with your designated contact via www.upfitterportal.com

Power tap at auxiliary battery tapping point

In order to facilitate tapping power from the auxiliary battery (code E2I or E2M), a tapping point (fuse box) is available in the driver seat frame. The tapping point is the busbar in the fuse box with the direct line from the auxiliary battery (positive terminal).

The cover must be removed to connect and install the fuse.

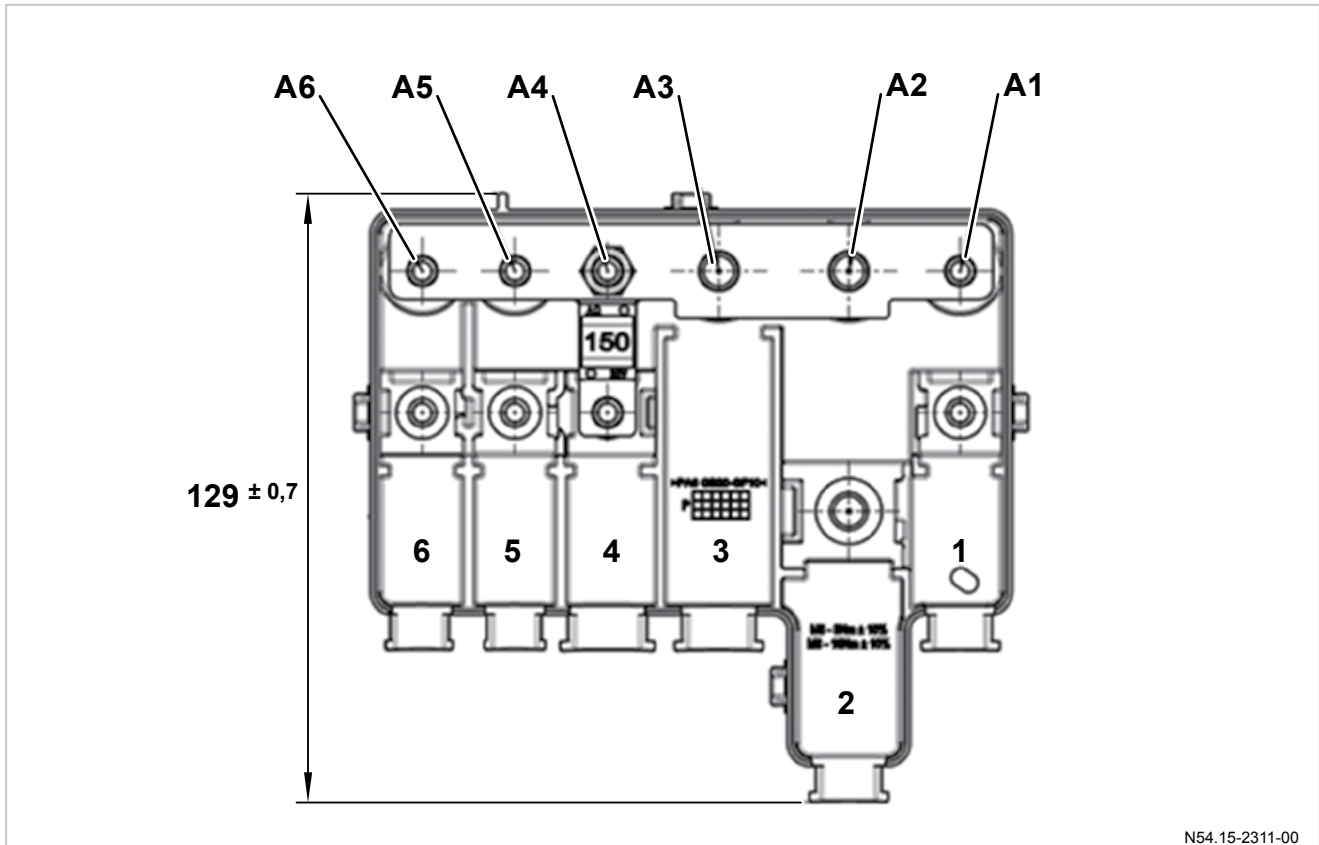


Position of auxiliary battery fuse box in driver seat base (LHD vehicle)

2 Fuse box

Arrow Direction of travel

Fuse box



N54.15-2311-00

Assignment of fuse box (top view)

Conne- ction no.	Min./max. permissible fuse rating	Fuse type	Function	Maximum line cross-sec- tion	Cable lug	Coding	Bolt
A1	-/100A	SF30	Open slot	25 mm ² / 0.039 in ²	Complies with work spec., see drawing	2	M6
A2	-/250A	SF51	Open slot	35 mm ² / 0.054 in ²	Complies with work spec., see drawing	8	M8
A3	-	-	Auxiliary battery positive supply line	35 mm ² / 0.054 in ²	Complies with work spec., see drawing	2	M8
A4	125A/150A	SF30	Battery cutoff relay (option code E36)	35 mm ² / 0.054 in ²	N046234006005	-	M6
A5	-/80A	SF30	Sockets, auxiliary heating	2 x 16 mm ² / 2 x 0.025 in ²	Complies with work spec., see drawing	8	M6
A6	-/80A	SF30	Sockets, auxiliary heating	2 x 16 mm ² / 2 x 0.025 in ²	Complies with work spec., see drawing	7	M6

Cable lugs complying with the work specification (see table) are preferred. Torque relief on these is through the housing. If other cable lugs are used, separate torque reliefs (A 907 545 52 00) must be used at the M6 bolt.

Work specification for cable lugs		
M6	A0030002599	ZGS001
M8	A0040024499	ZGS002

The electrical connecting bolts in the fuse box must be tightened to the following torques:

Bolt size	Tightening torque
M6	8 Nm/1.66 ft lb ±10%
M8	16 Nm/3.31 ft lb ±10%

! NOTE

If a vehicle is already equipped at the factory with a consumer which uses the fuse box in the seat box, this is only available under certain conditions. The sum of the individual currents must not exceed the maximum current-carrying capacity of the fuse box of 300 A. There is otherwise a risk of overload.

Fuse

The auxiliary consumer can be connected to the auxiliary battery with a suitable fuse as per ISO 8820 SF30 (contact cavities 1, 5 and 6) or SF51 (contact cavity 2).

Preconditions for connection to the auxiliary battery include:

- Auxiliary battery fuse box ex factory in seat base
- Use of the following retaining plates (busbar side), part number M6 A 907 545 60 00 or M8 A 907 545 61 00 for torque relief
- Suitable fuses as per ISO 8820 (SF30 or SF51)

Please note:

- No additional consumers may be connected to factory-installed fuses.
- If all the connections at the fuse box are fully occupied, the positive pole of the auxiliary battery is to be used for connecting further consumers.
- A suitable fuse box with fuse is required for these additional consumers.
- A positive total charge balance must be ensured in all vehicle conditions.

8.4.9 Interface overview

The electrical interfaces available as special equipment on the vehicle are depicted in the illustration below:



Schematic diagram: Electrical interfaces on the vehicle

	Code	Description
1	EK1	Terminal strip for the electrical connection on the driver's seat base
2	L72	Electrics for body interior lighting, 3-pin connecting point in the left seat base (applies only for Cab Chassis)
3	LC4	Push button switch in overhead control panel (OCP)
4	L76	Extended tail lamp wiring harness (2 m/78.7 in)
5	L77	Additional electrical equipment for turn signal lamps
6	E5M	Expansion of PSM (MPM) standard contact

Code table for Sprinter BM 907 (further special equipment)

Code	Description
LV4	PRE-INSTALLATION FOR FRONT FOG LAMPS WITH CORNERING LIGHT FUNCTION
LV6	PRE-INSTALLATION OF ELECTR. EQUIPMENT FOR 3RD BRAKE LAMP
FR7	PRE-INSTALLATION OF ELECTRICS FOR REVERSING AID
FV1	PRE-INSTALLATION FOR REVERSING CAMERA WITH INSIDE REARVIEW MIRROR DISPLAY
E3J	PRE-INSTALLATION FOR SWITCH PANEL
ED8	PRE-INSTALLATION OF ELECTRICS, PARAMETERIZABLE SPECIAL MODULE
E2A	TAPPING OF BODY MANUFACTURER SPECIAL SIGNALS IN COCKPIT.
EP7	PRE-INSTALLATION OF ELECTRICS FOR REAR SPEAKERS
E4A	ANTENNA INTERFACE FOR RADIO, NAVIGATION AND MOBILE RADIO
JH6	PRE-INSTALLATION OF COM MODULE FOR DIG. SERVICES (LTE)
ER0	RADIO PRE-INSTALLATION
J1V	PRE-INSTALLATION FOR BLIND SPOT ASSIST
L90	OMISSION OF TAIL LAMPS
L91	PRE-INSTALLATION FOR LED TAIL LAMPS

! NOTE

The regulatory requirements for installing lighting systems must be observed, see Chapter 8.5 Lighting (→ page 279).

A description of the codes and specifications for exterior lights can be found in Chapter 10.1 Bulb ratings of tail lamps (→ page 371).

8.4.10 Speed signal

The analog vehicle speed signal in the instrument cluster has been discontinued. If required, a digital signal can be provided by the PSM (MPM) via a special data entry.

NOTE

The digital speed signal is not suitable for gauged taximeters or other measuring devices.

The digital speed signal (positive to ground) acts as a distance and speed signal for external electronics, e.g. speed-dependent volume control. 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/1.22 pulses per foot. The pulse duration is 4 ms.

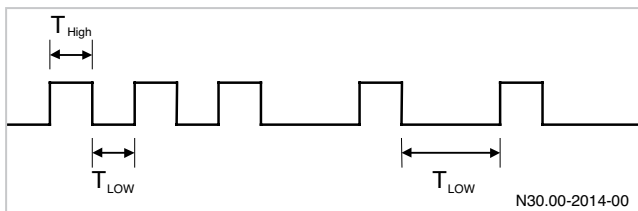
At 112.5 km/h or 69.9 mph, the pulse duration is the same as the pulse pause. This 1:1 ratio is maintained for higher speeds. This means that, at higher speeds, the pulse length and the pause length become shorter at the same time.

The speed signal is made available on the upfitter CAN in a format complying with SAE-J1939.

Value range: 0 - 250,996 km/h or 156.0 mph

Resolution: 1/256 km/h or 0.0024 mph

Note: This signal is not suitable for calibrated taximeters or similar



Ratio of pulse duration/pulse pause

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

$T_{\text{High}} U_a \geq 8 \text{ V}$

$T_{\text{Low}} U_a \leq 1 \text{ V}$

8.4.11 Travel distance signal

There is no digital travel distance signal available anymore at the PSM from model year 2024. If necessary, reach out to your contact via www.upfitterportal.com for further information (→ page 23).

8.4.12 Ground bolts

For retrofitted electrical bodies or implements, the ground bolts approved by Mercedes-Benz must be used to achieve an optimum ground connection to the basic vehicle.

There are two ground bolts (M6) in the area of the driver seat in the left seat base; a further ground bolt (M6) is located under the vehicle on the crossmember in front of the rear axle.

For the electrical connection to the ground connection of electrical consumers of the upfitter, use either the ground bolts described below, or additional ground bolts must be installed by the upfitter at suitable points in the body-in-white.

When doing so, always observe:

- Only the ground bolts available ex factory listed in the following may be used for the connection of further electrical consumers.

WARNING

The use of any other ground bolts may lead to malfunctions of safety systems. This in turn can lead to the failure of components or safety-relevant component parts and to fault messages in the instrument cluster.

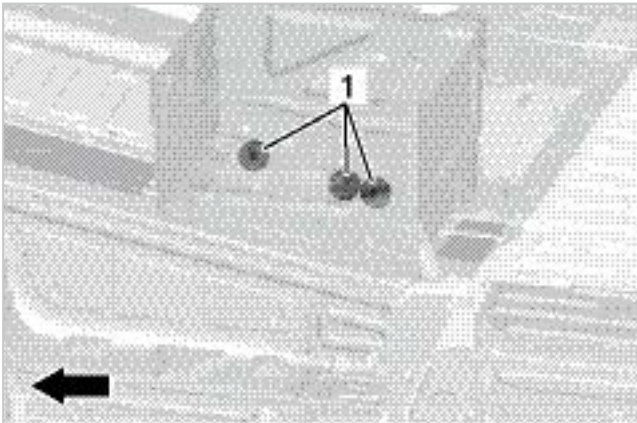
- The screw connections to ground bolts of the safety systems must not be released.
- Max. four cable lug connections may be connected to one ground bolt; these must be distributed in a uniform radial manner (e.g. 120 degrees for three or 90 degrees for four cable lug connections).
- The upfitter must independently specify the type of cable lug connection in accordance with the electrical requirements and the ground bolt diameter.

8 Electrics/electronics

- For the screw connection at the ground bolts, observe:
 - Torque for M6: 8 Nm \pm 0.8 Nm
 - Torque for M8: 16 Nm \pm 1.6 Nm
 - Type of screw connection: Class A (safety-relevant, documentation required)
 - Maintain a thread protrusion of at least three complete turns. If the thread protrusion is less, the number of cable lug connections envisaged at the affected ground bolt must be reduced.
- In the event of additional requirements or planned deviations, please get in touch with your designated contact at the Technical Consultancy for Upfitters (\rightarrow page 23).

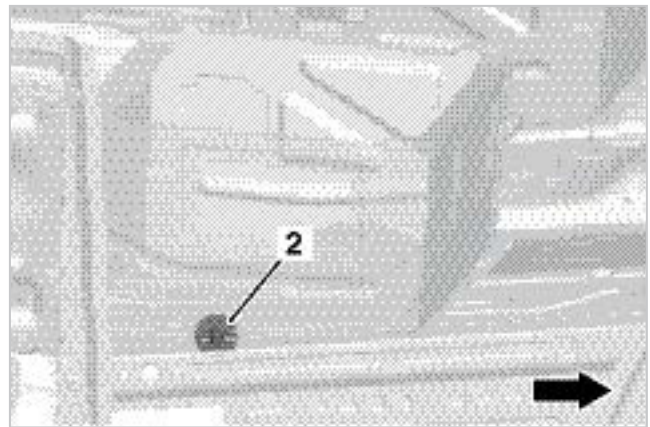
The following ground bolts are available for upfitters, taking into account the previously mentioned specifications:

- 3 M6 ground bolts in driver seat box
- 1 M8 ground bolt in front passenger seat box for auxiliary battery in the vehicle interior (code E2I) and additional fuses for camper vans (codes E1R/E1Y), as well as with code VV4 (only NAFTA)
- 1 M6 ground bolt at the crossmember in front of the rear axle



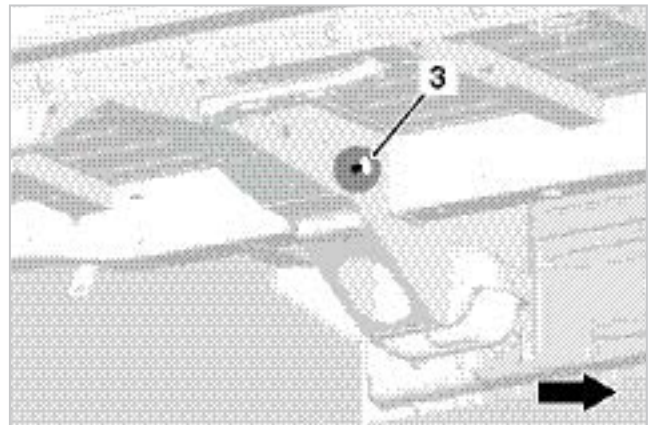
Ground bolt in driver seat box

1 M6 ground bolt
Arrow Direction of travel



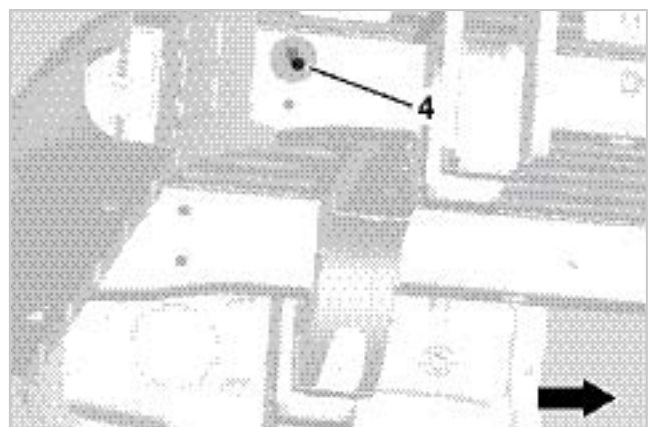
Ground bolt in front passenger seat box for codes E2I, E1R/E1Y, VV4

2 M8 ground bolt
Arrow Direction of travel



Ground bolt at crossmember in front of rear axle

3 M6 ground bolt
Arrow Direction of travel



Ground bolt at rear longitudinal member for code EV3

4 M6 ground bolt
Arrow Direction of travel

8.4.13 Deep discharge protection (standby mode)

The deep discharge protection system can prevent impermissible deep discharging of the battery with the vehicle at a standstill (no-load phase). This function should ensure the startability of the vehicle over an extended period of time or in the event of elevated quiescent currents.

In addition, excessive quiescent currents caused by faulty components are minimized by hardware resets of the components.

The functions of the system are distributed between the vehicle locking system (the component is the electronic ignition lock (EIS)) and the on-board electrical system management system (the component is the Body Controller (BC)). The hardware component responsible is the battery disconnect switch (BTS).

Terminal 30 (BR 906) is transformed into a switchable terminal 30T (BR 907).

Another function in the deep discharge protection system is the "standby mode" function. This opens the battery disconnect switch prematurely, allowing the vehicle to be parked for long periods.

The mode can be selected in the instrument cluster (standby mode). If a head unit has been installed, it is activated there.

The standby mode allows almost all of the control units to be switched off. Subsequently, almost the only signal present at terminal 30T is the EIS or the control unit that is necessary to receive the signal of the radio remote control. The PSM and the anti-theft alarm system also continue to be supplied depending on their operating status.

8.4.14 Additional ground weld studs

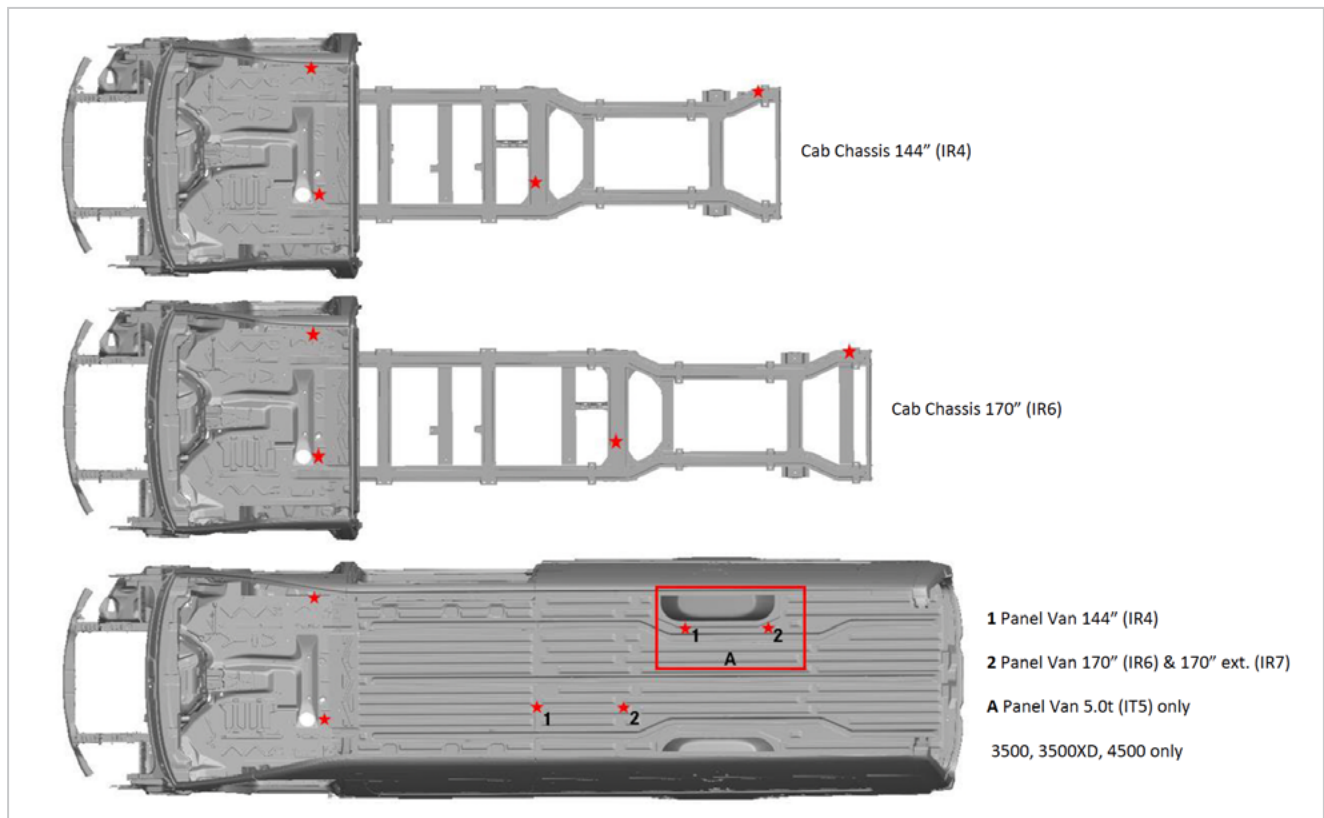
This chapter provides information for optional ground studs in addition to the ones installed as a standard.

The code VV4 includes, depending on the weight variant of the vehicle, three to four additional ground studs (M6/M8) located in the area of the front seat bases and under the vehicle on the cross members. This allows upfitters to attach auxiliary electrical equipment to the base vehicle.

For specific model variants, 3D CAD data for additional ground weld studs (code VV4) is available for eXpertUpfitters on the Upfitter Portal (www.UpfitterPortal.com).

! NOTE

The use of any other ground studs may lead to malfunctions of safety systems. This in turn can lead to the failure of safety-relevant components and fault messages in the instrument cluster.



8.5 Lighting

Local and national regulations must be observed. All applicable FMVSS/ CMVSS guidelines and regulations must also be complied with.

! NOTE

Observe the specifications and information in Chapter 10.1 Bulb ratings of tail lamps (→ page 371) for all tail lamps.

8.5.1 Headlamps

The following special equipment is available from the factory as option codes to carry out retrofitted modifications to the vehicle headlamps:

Code	Equipment	Description
L93	Pre-installation for LED headlamps	Retrofitting of other lamps and turn signal units in LED technology is possible. Actuation occurs without pulse width modulation (PWM)
L92	Omission of front lamp unit	Retrofitting of other lamps and turn signal units with conventional bulbs is possible. Actuation occurs with pulse width modulation (PWM).
LV4	Pre-installation for front fog lamp with cornering light	Retrofitting of other lamp units with conventional bulbs or LED technology (in combination with code L93) is possible. Actuation occurs either with or without pulse width modulation (PWM).

! NOTE

Once body mounting work has been completed, the bodybuilder manufacturer, under its own responsibility, must adjust the headlamps or check their factory settings and correct them if they deviate from the specified values.

For the following model designations, the headlamp adjustment for the type-approval certificate must always be carried out by the bodybuilder manufacturer:

- Chassis (open model designations without platform ex factory)
- Cowl cab base vehicles (code F50)
- Cab base vehicles with cab (code F28)

The adjustment instructions with the set values for the finished vehicle in combination with the version of headlamp used are implemented by your Mercedes-Benz Service Partner. The WIS system (→ page 23) also allows you to determine the currently applicable adjustment specifications for headlamp adjustment.

! NOTE

Observe all national laws, directives, and registration regulations.

Observe the headlamp basic setting as per the identification plate.

8.5.2 Mounting additional lamps

! NOTE

Observe all national laws, directives, and registration regulations.

If moving vehicle parts cover a lighting system by more than 50% during operation, the vehicle must be safeguarded accordingly.

Reflectors at the rear of the vehicle must not be obscured by moving parts. If this is the case, additional reflectors must be attached.

An appropriate note must be attached at a point where it can easily be seen by the driver of the vehicle.

8.5.3 Tail lamps

! NOTE

Observe all national laws, directives, and registration regulations.

In the case of any bodies or conversions that could lead to the tail lamps being obscured, observe the specifications from UN R 48.

The following special equipment is available ex factory as option codes to carry out retrofitted modifications to the vehicle tail lamps:

Code	Equipment	Description/function
L76	Extended tail lamp wiring harness	The lengthened tail lamp wiring (approx. 2 m) acts as pre-installation for retrofitting tail lamps in a different location.
L77	Electrical equipment for additional turn signal lamps	On chassis with cab and crewcab, the additional line at the rear area of the vehicle is provided for additional turn signal lamps on the body.
L90 ¹⁾	Discontinuation of tail lamps	Retrofitting of other lamps and turn signal units in conventional technology (bulbs) is possible. Actuation occurs with PWM (pulse width modulation).
L91 ¹⁾	Pre-installation for LED tail lamps	Retrofitting of other lamps and turn signal units in LED technology is possible. Actuation occurs without pulse width modulation (PWM).

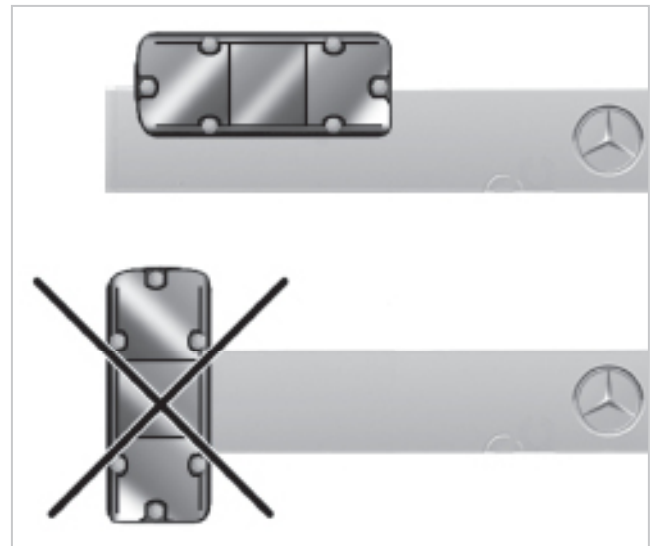
- The upfitter must guarantee that the loads occurring when the tail lamps function is active consume a constant current of at least 20 mA via the respective channel. The channels of the brake/tail lights and the turn signal lights must only be used to operate the associated functions. In other words, the parallel connection of e.g. side marker lamps to the tail light channel is not permitted.

Observe the specifications and information in Chapter 10.1 Bulb ratings of tail lamps (→ page 371) for all tail lamps.

! NOTE

On open model designations, the standard tail lamps must be installed in a horizontal position. The standard tail lamp of the open model designations is not approved for vertical installation. Avoid allowing water to enter through the ventilation holes, as this can lead to the failure of the standard tail lamps or malfunctions in the electronic systems.

If tail lamps are to be used in any other position, the upfitter must use suitable tail lamps of its own.



Standard tail lamps of the open model designations (schematic)

Tail lamps for liftgate (cargo liftgate) for open model designations

If – due to the installation of a liftgate – the use of the standard tail lamps in the rear area with the license plate lighting is no longer possible due to the installation location, the company Vignal has special tail lamps available (manufacturer designation "LC5").

These tail lamps are already equipped with the appropriate electrical connectors, which facilitates their use with the standard connectors present on the wiring harness of the basic vehicle.

Depending on the installation situation, the tail lamps may be installed horizontally or vertically. In addition, the vehicle license plate can also be attached independently of the tail lamps, e.g. in the vehicle center, via separate license plate lamps.

! NOTE

Observe all national laws, directives, and registration regulations.

The following type LC5 variants of the tail lamps from Vignal are available with the indicated manufacturer part numbers (or corresponding successor numbers) from specialist stores or directly via Vignal:

Variant	Vignal #	Installation location/direction of installation	License plate lamp
1	154100	Left/horizontal	Integrated in tail lamp
2	154120	Left/horizontal	Without, with supply line for separate license plate lamp EPP98 (#196010)
3	154110	Right/horizontal	None
4	154130	Right/horizontal	Without, with supply line for separate license plate lamp EPP98 (#196010)
5	154140	Left+right/vertical	Without, with supply line for separate license plate lamp EPP98 (#196010)

Further information on the procurement sources and the technical details can be found on the Internet:

<https://www.vignal-group.com>



Or send an email to:

contact@vignal-group.com



! NOTE

Depending on the assembly position, it is recommended to protect tail lamps that are installed in the direct stone chipping area of the wheels against possible damage via a separate protection device (e.g. via the attachment of a suitable protective metal sheet).

These tail lamps are equipped with bulb illuminants. Depending on the vehicle equipment, therefore have the lamp failure indicator recoded by an authorized Mercedes-Benz workshop.

A recoding of the lamp failure indicator is required if the basic vehicle contains any of the following special equipment:

- Code L22, tail lamps in partial LED technology
- Code L91, pre-installation for LED tail lamps

To avoid recoding, we recommend to take this into account accordingly when you order the vehicle.

- ⓘ These tail lamps can also be used for other body-manufacturer-specific bodies or conversions. Please contact the manufacturer about this.

8.5.4 Marker lamps

Clearance lamps/vehicle position lamps Clearance lamps increase passive safety and are required by law on vehicles with a width of over 2.032 m/80 in (FMVSS/CMVSS 108).

The Upfitter is responsible to ensure that the upfit complies with FMVSS/CMVSS 108 by retrofitting additional lights if required.

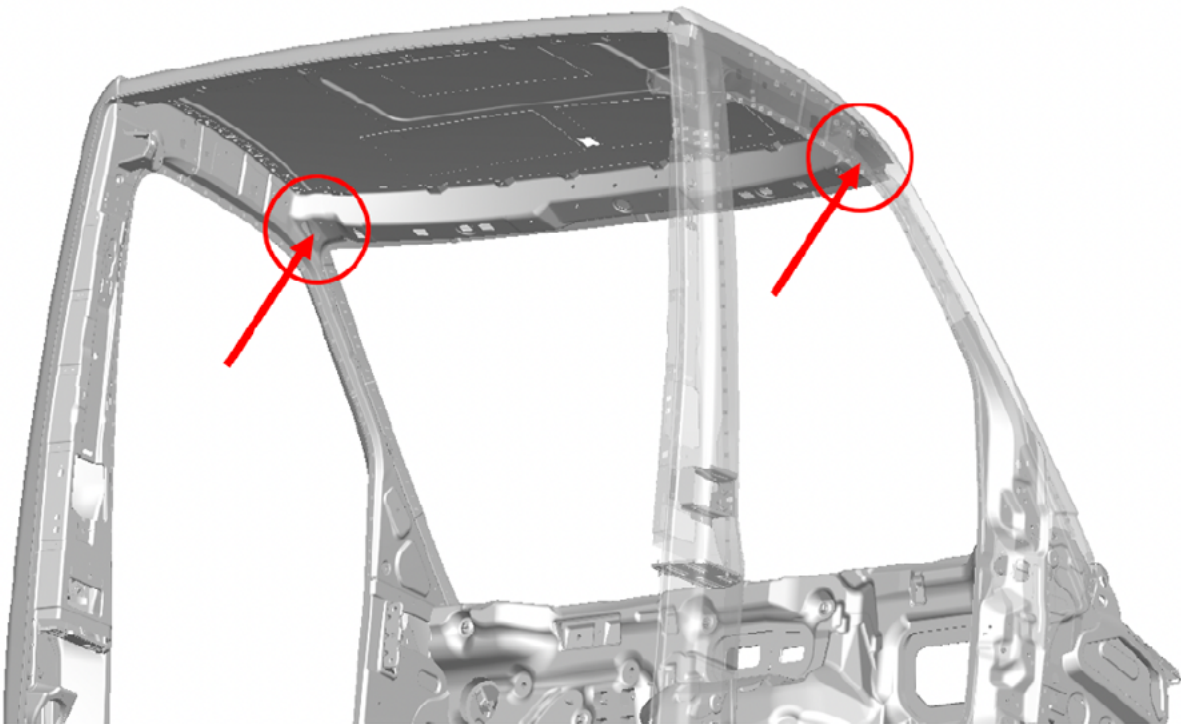
For cab chassis, there are two options provided by Mercedes-Benz to support the upfitter to comply with FMVSS/CMVSS 108:

1. Code L49 (Identification lights) includes five identification lamps mounted above the windshield on top of the vehicle roof.

It remains the Upfitters responsible to add additional FMVSS/CMVSS 108 compliant lights in the rear of the vehicle i.e. on top of the upfitter installed box body upfit.

2. Code LV7 (clearance lights pre-wiring) includes wiring harness tied to the roof and allows easy installation of after-market lights on the roof.

It remains the Upfitters responsible to add additional FMVSS/CMVSS 108 compliant lights in the front and rear of the vehicle i.e. on top of the upfitter installed box body upfit.



Connector location for Code LV7 (black 2-pole connector).

The table below provides an overview of the individual lighting functions.

Explanations of the following function descriptions

- Ignition in terminal 15 position: Ignition "ON", engine start possible and/or engine running
- Ignition in terminal 15r position: Radio position, ignition "OFF", engine not running, radio operation possible and/or on-board electrical system voltage "ON"
- Ignition in terminal 15c position: Ignition "OFF", engine not running, driver's door open, on-board electrical system voltage "ON"

Exterior lighting functions in headlamps

Hardware output at body controller	Front									
	Low beams		Position lamp		Daytime running lights		High beams		Turn signal indicators	
Function	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right
Side										
Plug	MR1	MR2	MR2	MR1	RBA1	RBA2	MR2	MR1	MR1	MR2
Pin	20	02	01	21	17	56	04	18	01	05
Light pattern, open model Conventional (UNECE)										
Left parking light			X							
Right parking light				X						
Standing lights			X	X						
Low beams	X	X								
High beam/headlamp flashing							X	X		
Daytime running lights					X	X				
Turn signal lamps (left/right)/hazard warning light system									X	X

Low beams

Requirements for activation:

- Ignition in terminal 15 position
- Engine running.
- Rotary light switch in AUTO position
- Light sensor detects NIGHT.
- OR rotary light switch in MAN position (manual driving lights)

Standing lights/position lamp

Requirements for activation:

- Rotary light switch in STL position (standing lights); the standing lights are activated regardless of the state of the vehicle.
- OR rotary light switch in AUTO position, ignition in terminal 15r position and light sensor detects NIGHT. If the light sensor detects DAY, no lighting function is activated.
- OR rotary light switch in MAN position and ignition in terminal 15r position

NOTE
 In the Sprinter, the standing lights are not activated when the daytime running lights or low beams are active. Only the above requirements apply.

Parking lights

Requirements for activation:

- Ignition at terminal 15c or below, i.e. ignition off and driver's door open

Daytime running lights

Requirements for activation:

- Ignition in terminal 15 position
- Engine running.
- Rotary light switch in AUTO position
- Light sensor detects DAY.

High beam/headlamp flasher

Requirements for activation of headlamp flasher:

- Ignition in terminal 15 position

Requirements for activation of high beams:

- Low beams active

Turn signal indicators

Requirements for activation:

- Ignition in terminal 15r or terminal 15 position

Rear end:

Tail lamps with bulbs and pre-installation for LED tail lamp

The exterior lighting functions in the tail lamp are actuated discretely by the signal acquisition and actuation module (SAM). This means that each exterior lighting function in the tail lamp has a separate line.

The exception to this rule are the parking and standing lights functions. These functions are actuated via the same lines, i.e. they are implemented by the same lamps.

On cab-chassis the lines for the license plate lighting are not included (See Chapter 10.1 Bulb ratings of tail lamps (→ page 371).

Fault monitoring is implemented via the signal acquisition and actuation module (SAM) control unit and is always active when the relevant function is active and the corresponding light source is actuated. This implemented function is to be taken into account particularly when designing and using the upfitter's own electronic ballasts, otherwise faults will be logged in the control unit.

Overview of exterior lighting functions in tail lamps

Hardware output at body controller	Rear end													
	Brake light		Tail light		Turn signals		Reversing light		License plate lamp		Rear fog light	Side marker lamp		
	Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	RBA1	Left	Right	
Function	RBA1	RBA2	RBA1	RBA2	RBA1	RBA2	RBA1	RBA2	RBA1	RBA2	RBA1	RBA1	RBA2	
Side	09	50	13	60	12	61	11	62	16	57	14	15	59	
Plug														
Pin														

Light pattern														
Left parking light			X											
Right parking light				X										
Standing lights			X	X					X ¹⁾	X ¹⁾		X ²⁾	X ²⁾	
Low beams			X	X					X ¹⁾	X ¹⁾		X ²⁾	X ²⁾	
Turn signals (left/right)/hazard warning light system					X	X								
Brake light	X	X												
Reversing light							X	X						
Rear fog light											X			

1) Only FKA/FKB/FHT
 2) Only FHS/FHL

Brake light

Requirements for activation:

- Ignition in tml. 15 position
- Brake pedal operated

Tail light

Requirements for activation:

- Ignition in tml. 15 position
- Engine running.
- Rotary light switch in AUTO position
- Light sensor detects NIGHT.
- OR rotary light switch in MAN position (manual driving lights)
- OR standing lights are active.
- OR parking lights are active (left or right).

Turn signal lights (indicators)

Requirements for activation:

- Ignition in tml. 15r or tml. 15 position

Reversing light

Requirements for activation:

- Ignition in tml. 15 position
- Reverse gear is engaged.

License plate lamps

Requirements for activation:

- Low beams are active.

Rear fog light

Requirements for activation:

- Ignition in tml. 15 position
- Rear fog light activated via pushbutton switch
- Rotary light switch in MAN position
- OR rotary light switch in STL position and front fog lamps are active.
- OR rotary light switch in AUTO position and engine is running (the low beams are activated automatically).
- OR rotary light switch in AUTO position and standing lights and front fog lamps are active.

Side marker lamps

Requirements for activation:

- Low beams are active.

See Chapter 10.1 Bulb ratings of tail lamps (→ page 371).

Additional exterior lighting functions:**Front fog lamps**

Requirements for activation:

- Ignition in tml. 15 position
- Rotary light switch in STL or MAN position
- OR rotary light switch in AUTO position (AUTO: If the light sensor detects DAY, the standing lights are activated automatically too. If the light sensor detects NIGHT, the low beams are already active and no further automatic activations occur.)

! NOTE

In the Sprinter, the cornering light function is implemented in the control unit as standard. This also applies for the pre-installation for front fog lamps with cornering light function (LV4). For these the upfitter may only use his or her own, certified front fog lamps.

Side marker lamps

Requirements for activation:

- The side marker lamps are activated as described under "Tail lights". The same conditions and notes apply.

Clearance lamp

Requirements for activation:

- The side marker lamps are activated as described under "Tail lights". The same conditions and notes apply.

8.5.5 Interior lamps

The information about the lamps and switches installed and the switching commands for the interior lights are transmitted by the Body Controller via LIN to the overhead control panel.

The overhead control panel also transmits the information about whether and which push button switches are actuated over LIN to the Body Controller.

The following SA codes for interior lighting are available ex factory.

SA code	Name/description
L65	Additional LED dome lamps in the load compartment of cargo vans provide more light in the load compartment. One or two additional lamps are installed, depending on the wheelbase. The lamp above the hinged rear door has one push button switch.
L71	Motion detector, available for cargo van. The interior light is activated when a valid movement is detected.
L72	Interface for electrics of body interior lighting for cab-chassis.
LD0	Overhead control panel with 2 reading spotlamps.
LC4	Comfort overhead control panel (LED), including cockpit incident illumination.
LC2	Two LED light strips/work lamps in the load compartment of the cargo van.
LB9	Exit lamps are integrated in the door on the driver or front passenger side. These shine down onto the floor when the doors are opened. The sliding door has another step illumination lamp (only in BM 907).
L1D	Overhead control panel with bus interior lighting control

! NOTE

All interior lamps can be replaced by other upfitter-specific lamps. In order to ensure that the standard lamp failure indicator functions correctly, only light sources of the same type and same output rating as standard bulbs may be installed.

Lamp monitoring

The overhead control panel or the Body Controller 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 fault memory of the Body Controller. The owner or driver of the vehicle must be informed about this. The fault entry must be addressed during a service if the fault memory is read.

The interior lights can also be actuated via the PSM (MPM). See Chapter 8.10 Parameterizable Special Module (PSM/ MPM) (→ page 345)

Electrical interface for body interior lighting (code L72)

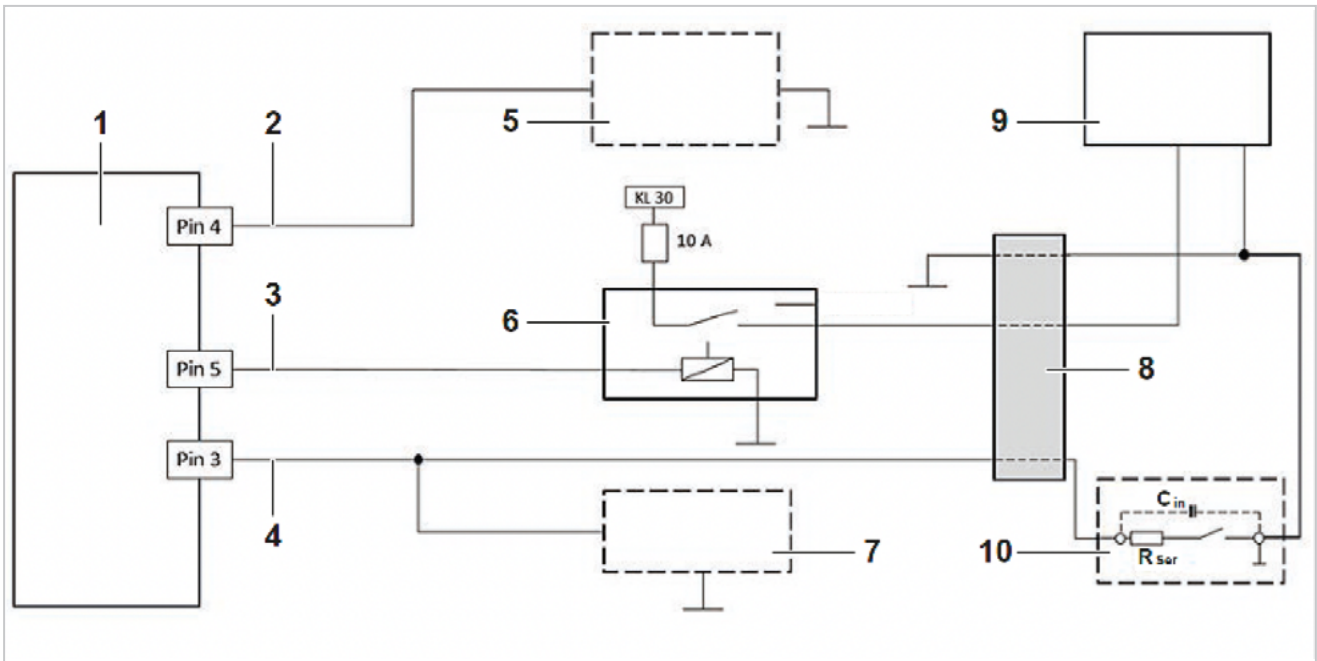
In the case of cab-chassis models, the upfitter is offered an electrical interface in the driver's seat base for further body modification in the rear of the vehicle via the special equipment with code L72.

Aftermarket lamps (upfitter lamps) can be connected to this interface in accordance with the following specifications.

Optionally, it is possible to connect a pushbutton switch in the vehicle upfit, which can be used to activate and deactivate these aftermarket lamps. Functionally, this pushbutton switch corresponds to the rear light button in the overhead control panel. If the aftermarket lamps in the body/ equipment are active, the symbol for the rear light button in the overhead control panel is illuminated red and thus serves as a function feedback.

Function description:

- The aftermarket lamps can only be activated by pressing a button manually and do not react to automatic light functions (door opening, unlocking, etc.).
- After the manual activation of the aftermarket lamps, they remain active for approx. 20 minutes, provided that the on-board electrical system does not detect any undervoltage (battery protection). The time runs independently of the locking status of the vehicle in particular.
- After the aftermarket lamps have been deactivated due to undervoltage by the on-board electrical system, an engine start is required before the aftermarket lamps can be reactivated manually.
- The aftermarket lamps are actuated via a relay and are protected by a 10 A fuse.



Schematic diagram: Circuit diagram of interface of code L72

- 1 Overhead control panel (with 10-pin connection)
- 2 Interior lamp connection in rear passenger compartment
- 3 Relay actuation connection special equipment code L72
- 4 Pushbutton switch connection in rear passenger compartment (input)
- 5 Interior lamp in rear passenger compartment for FHL model designation
- 6 Relay
- 7 Pushbutton switch for rear passenger compartment for FHL model designation
- 8 ABH lamps interface special equipment code L72
- 9 ABH lamps (scope of body/equipment of upfitter)
- 10 ABH lamps pushbutton switch

Parameter	Symbol	Min	Type	Max	Unit	Remarks
Series resistor to pushbutton switch	R_{Ser}		Ω			At $R_{Ser} < 390 \Omega$, reliable diagnosis of a short circuit to ground is no longer possible
Input voltage (normal mode)	$U_{ILL_RS_Norm}$	3.1	3.3	3.5	V	Pushbutton switch not actuated
Input voltage (sleep mode)	$U_{ILL_RS_Sleep}$	4.1	4.3	5	V	Pushbutton switch actuated
Input capacitance	C_{in}			10	nF	
Pushbutton switch current	I_T			10	mA	$R_{Ser} = 0 \Omega$, pushbutton switch actuated
Pushbutton switch current with pushbutton switch stuck	I_H			150	μA	$R_{Ser} = 0 \Omega$, pushbutton switch stuck
Short-circuit current	I_k			10	mA	Short circuit to ground
Permissible shunt resistance	R_S	5			k Ω	Permissible shunt resistance to ground and tml. 30

8.6 Mobile communications systems

If mobile communication systems (→ page 90) (e.g. telephone, CB radio) are retrofitted, the following requirements must be fulfilled in order to avoid malfunctions developing on the vehicle at a later stage:

All electrical equipment fitted must be tested in accordance with FCC, CE and UL in the US, and with CSA and ULC in Canada.

! NOTE

The fiber-optic cable must not be kinked. The minimum bending radius is 25 mm/0.98 in.

8.6.1 Communication equipment

The maximum transmission outputs (PEAK) at the base point of the antenna must not exceed the following values. National and local laws regarding the maximum allowed transmission output must be observed.

- The mobile communications systems and brackets must not be positioned in the deployment areas of the airbags (→ page 152).
- The equipment must be permanently installed. Mobile devices may only be operated inside the cab if they are connected to an exterior antenna 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 unit must be protected against moisture and heavy physical shocks; the permissible operating temperature must be observed.

8.6.2 Antenna connection and cable routing (radio communication)

- Comply with manufacturer's notes and installation instructions.
- An antenna can be installed anywhere on the roof. The maximum transmission output according to the installation specifications must not be exceeded.
- ▶ The connection should be made directly to terminal 30T via an additional fuse. Disconnect the unit from the electrical system before starting assistance.
- ▶ The lines must be kept as short as possible. The lines must be twisted and screened (coaxial cable). Chafe marks must be avoided.
- ▶ Ensure that the system has a good ground connection to the body (antenna and equipment).
- ▶ The antenna and connecting cables among 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 line in such a way that it is not kinked or pinched.
- ▶ Comply with the local and national regulations on the transport of hazardous goods.

8.7 Electronic ignition lock (EIS)

8.7.1 General information

- The processes involved in the access authorization for the central locking system (CL) are verified and controlled by the signal acquisition and actuation module (SAM) and the door control unit (DCU).
- Access is authorized at the press of a button on the remote control key.
- Drive authorization is obtained by pressing the start/stop push button switch by means of Keyless-Start. The remote control key must be located in the area between the A- and B-pillars.
- Where control units are networked, the electronic ignition lock sends global information such as the model series and the country variant to the control units (global variant coding) on the network.

! NOTE

Drive authorization via Keyless-Start only operates when the body is not modified in the areas of the A- and B-pillars, and the roof frame in between. (See Chapter 4.3.1 Modifications to the body-in-white (→ page 76).

The vehicle keys must be stored in such a way that the engine cannot be started unintentionally. In the case of RVs, special attention must be paid to the storage of the keys on account of the design features of these vehicles. This means that it is particularly important not to store the keys in the area between the A- and B-pillar including the roof area between the A and B-pillar, see the further notes in Chapter 7.14.19 Upfitter conversion with code F50 (→ page 239).

In case of a planned modification to the previously mentioned component parts, the special equipment code FX8, see Chapter 7.14.19 Upfitter conversion with code F50 (→ page 239), can be ordered.

For aftermarket modifications, code FX8 must be retrofitted and the EIS must be coded via SCN coding, see notes in Chapter 7.14.19 Upfitter conversion with code F50 (→ page 239). If you have further questions, please reach out via upfitterportal (→ page 19).

8.7.2 Central locking system and post-delivery integration of doors of bodybuilder manufacturer

General information

Upfitters have the option of adapting the central locking system to the aftermarket equipment. The following functions can be implemented via variant coding in the electronic ignition lock (EIS) with XENTRY:

- Automatic locking when last open door is closed (post function)
- Post-delivery integration of upfitter doors into the central locking system

An automatic locking function for speeds above 15 km/h or 9.3 mph is implemented in the vehicle as standard. Further details on this function can be found in the operator's manual.

Automatic locking when last open door is closed (post function)

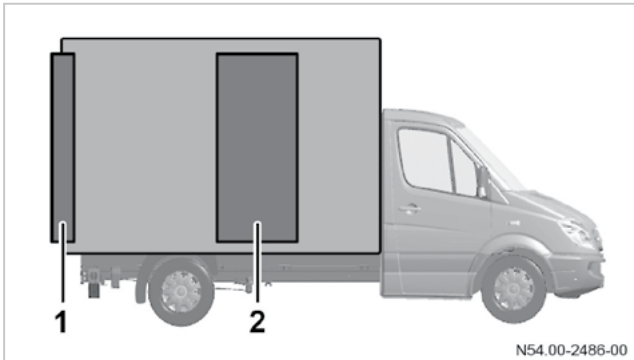
It is possible to use the O-code O22 to implement automatic locking when the last open door is closed. The function provides that when the ignition is in the radio position (terminal 15r) and the last door is closed, the vehicle is globally locked, but in the ignition "on" (terminal 15) position, no locking of the doors is triggered.

This function requires the use of door locks with a feedback function, as the open/ closed state of each door is polled and monitored. If aftermarket doors are integrated via the PSM, it is not recommended to use the O22 function.

This code can be parametrized via XENTRY, e.g. at a Mercedes-Benz Service Center. The O-code must first be entered in the vehicle data card, and then a new SCN coding of the EIS must be carried out.

Post-delivery integration of upfitter doors

Depending on the vehicle equipment, it is possible for upfitters to integrate additional doors in the body into the central locking system of the chassis. They are operated via the ignition key of the basic vehicle.



Example of upfitter doors

- 1 Hinged rear door
- 2 Side door

There are two options for integrating additional doors into the central locking system of the chassis:

- Integration of additional doors via PSM (MPM)
- Integration of additional doors via SAM

Integration of additional doors via PSM (MPM)

The PSM (MPM) can be used to read out signal IDs (e.g. "close door", "open door") from the vehicle CAN in order to actuate additional central locking system elements or relays in the body via a PSM (MPM) output.

- ❗ Information on parametrization can be found on the PSM/ MPM (ED5) Information page on the Upfitter Portal.

www.UpfitterPortal.com

Advantage:

- Upfitters can use their own door locks and components.

Disadvantage:

- The additional doors actuated via the PSM (MPM) are not monitored for their "open" or "closed" state. The vehicle is thus not able to recognize whether all additional doors are closed and locked after a locking procedure and no indications are given on the instrument cluster. Furthermore, the vehicle locks itself automatically 40 seconds after unlocking if only the aftermarket door is opened. The reason for this is that the opening of the rotary tumbler is not detected.

Condition:

- The special equipment PSM (MPM) (code ED5) and a custom PSM (MPM) program are required.

Integration of additional doors via SAM

Ordering the special equipment code EA5 "Pre-wiring central locking (upfitter doors rear)" allows you to integrate additional doors in the central locking system of the basic vehicle.

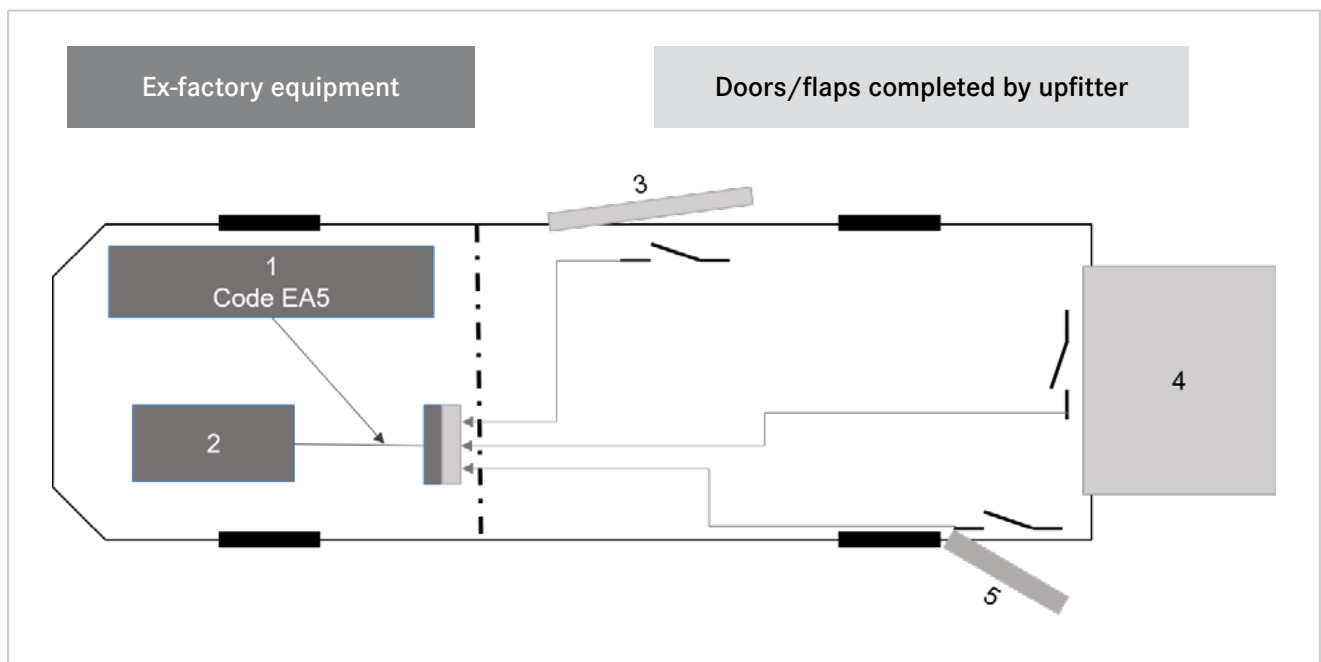
This means that a wiring harness connection point is installed in the vehicle near the seat on the left for connecting up to three aftermarket doors behind the B-pillar. Activation of the door signals must be configured individually via XENTRY using O-codes. These codes can be parameterized via XENTRY at a Mercedes-Benz Service Center. The desired O-code must first be written in the vehicle data card, and then an SCN coding of the signal acquisition and actuation module must be carried out.

The O-codes for body doors are:

- OA5 - Parameterization for left side door present
- OA6 - Parameterization for right side door present
- O04 - Parameterization for hinged rear door present

Now all the doors can be opened and closed with the vehicle key. The locks used must have an appropriate feedback function so that the central locking system in the SAM can poll the door status and the instrument cluster can display this door status correctly.

Schematic diagram of an example for a body with three aftermarket doors in combination with the special equipment "Pre-wiring central locking (upfitter doors rear)" code EA5:



Schematic diagram: Top view of open model with box or RV body

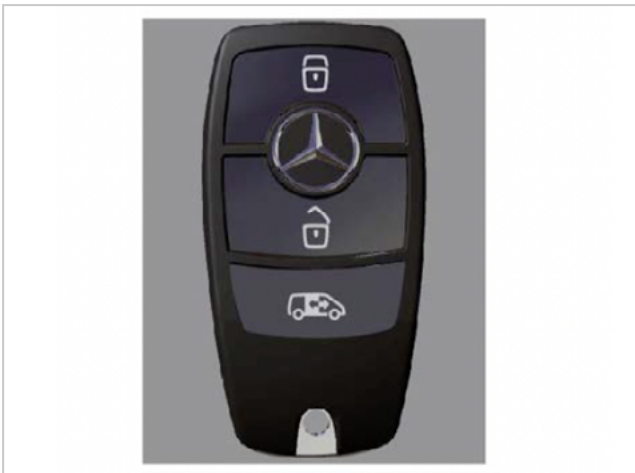
- 1 Electrical connecting point with code EA5
- 2 Body Controller
- 3 Door
- 4 Tailgate
- 5 Flap

Advantage:

- Parameterization and installation of a PSM is not required.
- The additional doors actuated via the signal acquisition and actuation module (SAM) are monitored for their "open" or "closed" state. The vehicle is thus able to recognize whether all additional doors are closed and locked after a locking procedure and an indication is given in the instrument cluster.

Disadvantage:

The door status indicators in the instrument cluster are as represented in the Sprinter panel van and have not been adapted to different body situations (e.g. box body, RV etc.).

In combination with the three-button key, code FY7:

Three-button key, code FY7

With correct use of the interfaces and parameterization, the three-button key (code FY7) makes it possible to unlock the body door which is being used as a tailgate separately, although the body doors can only be locked globally, i.e. all doors and the tailgate.

Conditions:

- Vehicle configuration with special equipment "Pre-wiring central locking (upfitter doors rear)", code EA5
- Locks with a feedback function must be used. The use of genuine Mercedes-Benz locks is recommended.
- Max. three additional doors (right door, left door, rear doors) are possible

i More detailed information on the integration of additional doors can be found on the Upfitter Portal as a bulletin under Technical Documents, Sprinter MY2019+ Electric preparation for additional door (Code EA5).

Ambulance pre-installation

The settings required for ambulances, e.g. passive circuits for rear-end door and sliding door actuator motors, can be applied with XENTRY as follows:

- Right-hand sliding door "not present"
- Left-hand sliding door "not present"
- Rear-end door "not present"
- Common unlocking of control circuits 1 and 2
- Front passenger door "not present"

8.8 Windows and doors

8.8.1 Window lifters/window hinges

Anti-pinch protection and automatic window raising can only be guaranteed with the original power window equipment.

The motor is thermally protected, i.e. the availability of the power window function may be restricted after long operating periods.

The window lifters and the window hinges can be controlled using the switches in the door control panel. The switches in the driver's door are electronically controlled and are connected to the LIN bus. The switches in the front passenger door are voltage coded. All switches may only be replaced with equivalent genuine parts.

Actuation can also occur via the parameterizable special module (PSM/MPM).

8.8.2 Electric sliding door to load compartment

The electrical components of the sliding door on the Sprinter BM 907 (only for the electric load compartment sliding door and particular special equipment) are connected to the on-board electrical system via a fixed electrical connection in the form of a cable track (drag chain). This is located under the step for the sliding door.

The cable track must be taken into consideration in the event of any modifications around the entrance. If the upfitter wants to use the cable track, an evaluation with the responsible department is necessary. As part of the eXpertUpfitter program, please refer to www.Upfitter-Portal.com.

The system for the electric sliding door has been designed for a maximum door weight of 65 kg/143 lbs, and this value must not be exceeded due to modifications.

⚠ WARNING

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

The ex-factory weight of the load compartment sliding door for each vehicle model and wheelbase, and additional weights for some items of special equipment, is listed in Chapter 6.2.6 Side wall, windows, doors and flaps (→ page 121).

The delta corresponds to the maximum permissible additional weight on the sliding door to the load compartment.

Certain weights must be added to the basic equipment depending on the special equipment installed.

If some items of equipment are removed, they must be taken into account in the weight calculation.

Additional data and information can be found in Chapter 6.2.6 Side wall, windows, doors and flaps (→ page 121)).

Furthermore, the specifications on "Reinforcement of the sliding door load compartment with rear seats" for the countries in question must be observed, see Chapter 6.4.3 Seats (→ page 157)

⚠ WARNING

Modifications to

- door kinematics
- guidance systems (rails, sliding carriages, etc.)
- locking systems (closing assists, anti-entrapment strips, locks, arresters, etc.)
- end stop systems (buffers etc.)
- extensive modification of the body-in-white structure

may result in the door opening unintentionally.

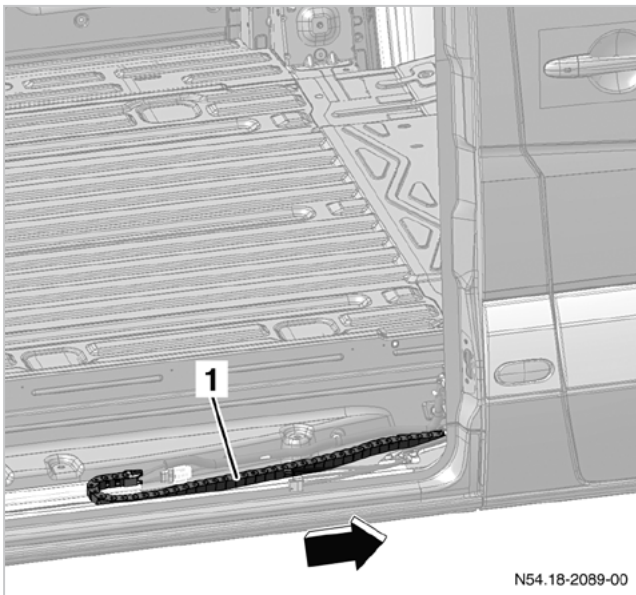
There is a risk of accident!

No modifications may be made to any of these systems. Furthermore, care must be taken to ensure an extensive connection and center of gravity (CoG) distribution at the doors.

- ⓘ The upfitter is responsible for the conversions and modifications on the vehicle.

! NOTE

Correct operation of the integrated anti-pinch protection function (anti-entrapment strip and path/time monitoring) must be ensured in the event of any modifications in this area, e.g. the window installation.



Sliding door with cable track

1 Cable track (drag chain)

Arrow Direction of travel

8.8.3 Windshield wipers

Mercedes-Benz recommends the use of genuine Mercedes-Benz wiper motors.

If necessary, a second wiper motor can be connected via a relief relay ($R_i > 80$ ohms).

The wiper motor must be connected to the signal acquisition and actuation module (SAM) by means of a readback line. If there is no readback line, a fault message will be stored in the fault memory of the SAM.

8.8.4 Outside mirrors

The output of the mirror heater (12 V/20 W) is monitored by the door control unit. The mirror heater (if a genuine part) is deactivated if a fault entry is stored.

The mirror heater must be designed to be equivalent to the genuine part.

The door control unit must be modified by coding if different mirrors (without heating) are used.

The mirrors are adjusted via the operating switch in the driver's door and the adjustments are transmitted via the LIN bus to the door control unit. The door control unit in turn actuates the actuator motors.

The mirror adjustment drives must be designed to be equivalent to the genuine drives.

! NOTE

The Upfitter is fully responsible for ensuring compliance with the legal requirements for outside mirrors (fields of view, length of mirror base dependent on the maximum vehicle width, etc.).

The design of the outside mirror (with or without Blind Spot Assist (→ page 307)) must be observed.

8.8.5 Windshield heating/rear window heating

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

- Windshield heater:
 $P = \text{max. } 790 \text{ W at } 13 \text{ V}$
- Rear window heater:
 $P = 2 \times 151 \text{ W} \pm 15 \text{ W at } 13.5 \text{ V}$

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

If the vehicle has the battery management function, it may be necessary to adapt this function.

8.9 Driving assistance systems

⚠ WARNING

Driving safety and driver assistance systems are merely aids.

If you fail to adapt your driving style or if you are inattentive, the driving safety systems and driver assistance systems can neither reduce the risk of an accident nor override the laws of physics. The driver is responsible for driving safely and in keeping with traffic regulations. The driver's driving style must always be adapted to suit the current road, traffic and weather conditions.

! NOTE

Always observe the information and specifications in the Operator's Manual of your vehicle. Make yourself familiar with the functions of the driving assistance systems.

The driving safety systems described only work as effectively as possible when there is adequate contact between the tires and the roadway. Refer in particular to the information on tires, recommended minimum tread depths etc. under 3.8 Tires (→ page 50), Checking the tires (→ page 58), 4.2 Limit values for the suspension (→ page 72) with 4.2.3 Approved tire sizes (→ page 74), 6.1.5 Wheels/tires (→ page 108), 6.2.7 Fenders and wheel wells (→ page 125).

In wintry driving conditions, always use winter tires (M+S tires) and, if necessary, snow chains. Only in this way will the driving safety systems described in this section work as effectively as possible.

⚠ WARNING

Tampering with or unauthorized installations in vehicle systems, safety-relevant components and driver assistance systems can impair the functioning of these systems. This can lead to failure or malfunctioning of components or of parts relevant to safety, and may result in accidents or damage to the vehicle.

There is risk of an accident and danger to life and limb!

i Furthermore, tampering with the vehicle safety or driver assistance systems and safety-relevant components can invalidate the warranty or the general operating permit.

i For information regarding the equipment on vehicles with driving assistance systems and the combinations thereof, please refer to 1.7 Contact (→ page 17).

Commissioning of control units

Before the vehicle is put into service, observe the information and specifications on commissioning of control units following completion of the body mounting or conversion work, see Chapter 8.15 Commissioning of control units Chapter 8.15 Commissioning of control units (→ page 361).

8.9.1 Electronic Stability Program (ESP®)

ESP® is a dynamic vehicle control system which regulates both the longitudinal and lateral dynamics of 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® can improve vehicle stability in all driving situations, e.g. when accelerating, braking and coasting, when driving in a straight line and cornering.

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

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

A new ESP® variant is available for Sprinter. This variant can be ordered with the vehicle version for high load (code B01) separately for specific applications.

Detailed information can be found in Chapter 4.2.1 Suspension of Sprinter (→ page 72)

This code is only recommended for upfitted vehicles with high center of gravity according to the specifications in Chapter 9.1 Center of gravity (→ page 364)

ESP® is required on passenger cars, multipurpose passenger vehicles, trucks and buses with a gross vehicle weight rating of 4536 kg/10000 lbs or less (according to FMVSS/CMVSS 126).

For vehicles where exceptions apply, the ESP® can be deactivated under certain conditions. More information can be requested from the Upfitter Portal (→ page 23)

If there are any deviations from the specifications on the ESP®, UIS must be requested online via the Upfitter Portal (→ page 23).

For more information on the mandatory ESP®, please reach out on the Upfitter Portal (→ page 23).

www.UpfitterPortal.com

! NOTE

The special equipment code B01 is prescribed for upfitter vehicles with a high center of gravity in accordance with the specifications in Chapter 4.1.2 Maximum permissible position of the vehicle center of gravity (→ page 62)).

WARNING

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

- Modifications to the permissible gross mass
- Wheelbase modifications
- Modifications to the sensors (steering angle sensor, yaw rate sensor, wheel speed sensor)
- Changes to the vibration characteristics at the installation location of the yaw rate sensor by modifications to the body
- Changes to the position of ESP® components
- Modifications to the suspension
- Modifications to wheels and tires
- Modifications to the engine
- Modifications to the steering
- Modifications to the brake system
- Changes to the installation position of the hydraulic assembly, its bracket and its mounting on the basic vehicle
- Fastening of any vibration-generating devices in the vicinity of the ESP® control unit

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 lose control of the vehicle and cause an accident.

Following vehicle modifications which can result in changes to the longitudinal and lateral inclination (e.g. the installation of heavy parts), the sensor cluster must be recalibrated in order to ensure that the ESP is functioning correctly.

NOTE

Changes to the center of gravity height of more than 51.18 in/ 1300 mm (for more information, see Chapter 4.1.2 Maximum permissible position of the center of gravity (→ page 62)) require an inspection of the vehicle body by the responsible technical department of Mercedes-Benz (see Chapter 2.1 Advice for Upfitters (→ page 19)).

In addition, the explanation in Chapter 8.9.2 Crosswind Assist (→ page 298) must be observed.

It is recommended to have the recalibration of the sensor cluster carried out at a Mercedes-Benz Service Center.

8.9.2 Crosswind Assist

Crosswind Assist (code JA8) detects the influence of crosswind (lane keeping) through the installed ESP® components and can counteract it by applying the brakes on individual wheels with the help of the ESP®.

Crosswind Assist (code JA8) is added automatically as standard in combination with ESP® 9.3 for the Sprinter BR 907.

All modifications to the vehicle crosswind area should not exceed the maximum permissible dimensions of the Crosswind Assist function.

WARNING


Modifications that increase the vehicle crosswind area include (but not limited to), changes to the overhang or retrofitting of roof mounts. Increasing the maximum permissible dimensions of the crosswind area can impair the intended function of the system.

NOTE

It is only permissible to deactivate the cross wind assist if there are modifications that exceed the maximum permissible dimensions of the crosswind area, the O-code OB3 (deviation from the Crosswind Assist test body) must be added to the vehicle data card in addition to deleting the code JA8 and adding the code JA0. After this step, the ESP must be recoded by Mercedes-Benz certified technicians.

The Crosswind Assist can be deactivated under the following conditions:

- When the code JA0 "Omission of CrosswindAssist" is ordered
- For post-delivery deactivation of CrosswindAssist code JA8, this code JA8 must be deleted from the data card and the JA0 must be added. After the data card has been updated, the ESP® must be recoded by Mercedes-Benz certified technicians.
- Finally, the ESP® must be recoded. This work must be performed at a qualified specialist workshop.

 For further questions please reach out to Mercedes-Benz on www.UpfitterPortal.com.

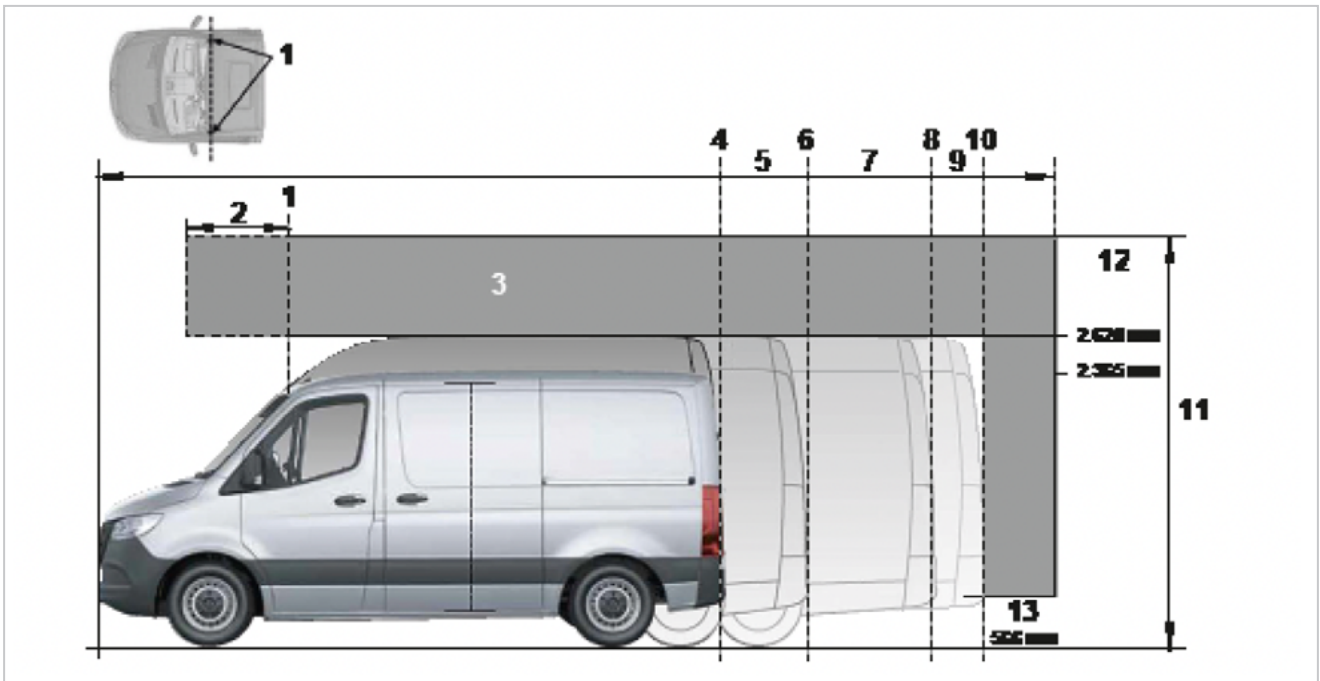
! NOTE

The Electronic Stability Program (ESP® 9.3) is a prerequisite for the Crosswind Assist function. The addition of code JA8 ex-factory or as a retrofitting option code is valid for all vehicle variants. With vehicle modifications that require the deactivation of the ESP® 9.3 the Crosswind Assist function must be deactivated as well (see chapter 8.9.1 Electronic Stability Program (ESP®) (→ page 297)

- ① The local and federal registration regulations must be observed and complied with when working on the body of the vehicle.
- ① For further questions please reach out to Mercedes-Benz on www.UpfitterPortal.com.

The following general considerations must be followed:

- Option code JA8 is valid for a vehicle width (without side mirrors) of up to 2500 mm/98 in, but needs to be deactivated with option code JA0 if this value is exceeded. Please note that the maximum permissible box width is 2300 mm/96 in (see chapter 4.1.3 Permissible vehicle dimensions (→ page 63).
 - The body/vehicle width limit values (→ page 62) in terms of the installation of headlamps and outside mirrors on the vehicle are the responsibility of the upfitter and must be guaranteed by them.
 - The upfit body must be within the parameters outlined in the maximum permissible dimension chapter 4.1.3 Permissible vehicle dimensions (→ page 63).
- ① For further information regarding permissible vehicle dimensions please refer to chapter 4.1.3 Permissible vehicle dimensions (→ page 63).



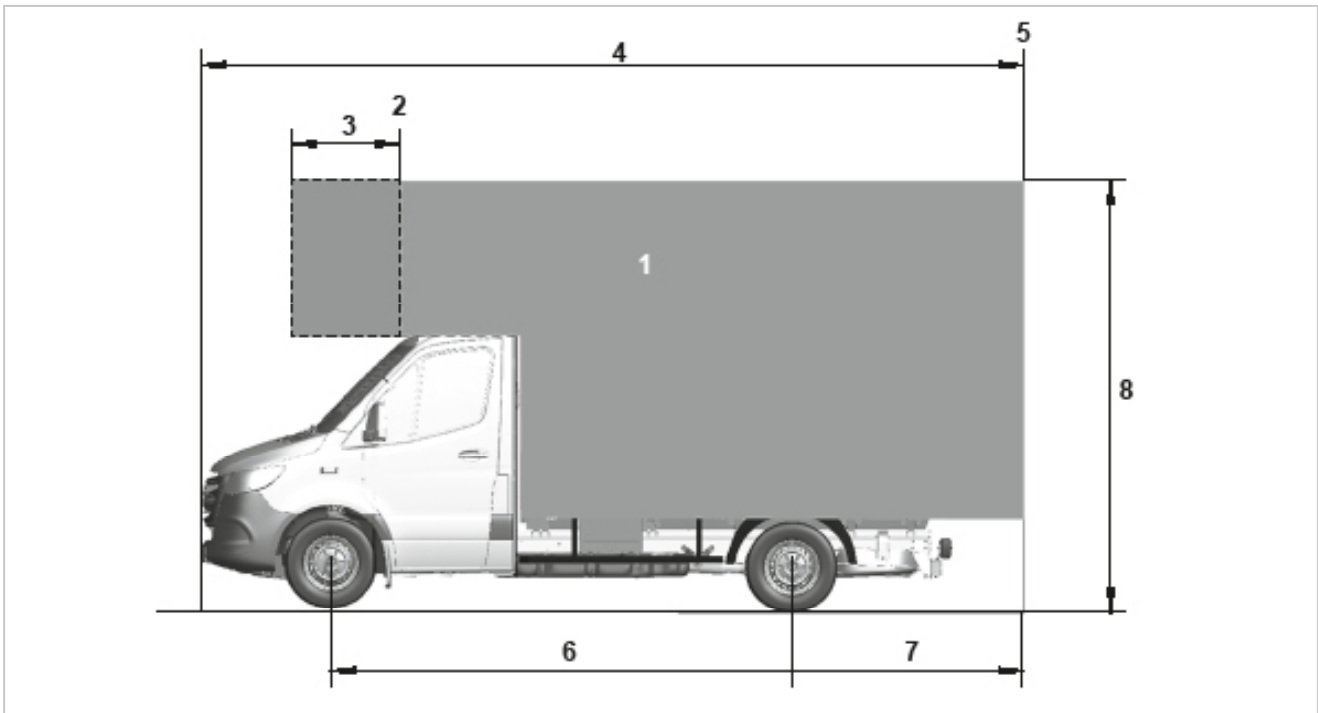
Test envelope for Crosswind Assist on panel van, bus, crewbus (schematic)

- | | | | |
|---|--|----|--------------------------------|
| 1 | Outside edge of windshield | 7 | Maximum vehicle length for A2 |
| 2 | Max. overhang over windshield | 8 | Body length A3 |
| 3 | CWA test envelope maximum dimensions | 9 | Maximum vehicle length for A3 |
| 4 | Body length A1
(no longer available as of model year 2024) | 10 | Body length A4 |
| 5 | Maximum vehicle length for A1
(no longer available as of model year 2024) | 11 | Maximum vehicle height |
| 6 | Body length A2 | 12 | Vehicle heights |
| | | 13 | Minimum height of loading sill |

Dimensions of CWA test envelope for panel van, bus, crewbus model series 907

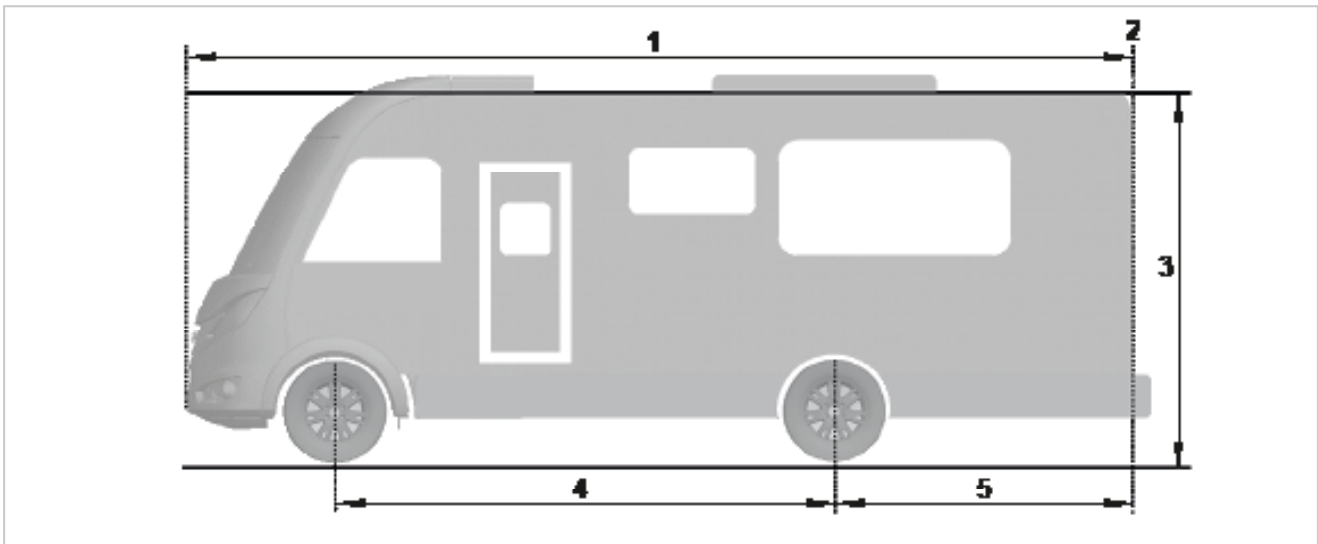
Tonnage	4 t			5 t			
	A2	A3	A4	A2	A3	A4	
Body length/length class							
Length	[mm]	5932	6967	7367	5932	6967	7367
Wheelbase	[mm]	3665	4325	4325	3665	4325	4325
Maximum overhang ¹⁾	[mm]	1850	2200	2200	1850	2200	2200
Maximum vehicle length within CWA test envelope	[mm]	6536	7546	7546	6536	7546	7546
Maximum vehicle length within CWA test envelope for camper vans	[mm]	6885	7941	7941	6885	7941	7941
Maximum vehicle length within CWA test envelope	[mm]	4000	4000	4000	4000	4000	4000
Maximum overhang of body over windshield (e.g. alcoves) ²⁾	[mm]	1150	1150	1150	1150	1150	1150

- 1) See Chapter 4.3.5 Vehicle overhang (→ page 78)
 2) See Chapter 8.9.6 Rain sensor and Headlamp Assist (→ page 323)



Test envelope for Crosswind Assist chassis with platform vehicles, box body vehicles, semi-integrated camper vans (schematic)

- | | | | |
|---|---|---|------------------------------|
| 1 | CWA test envelope maximum dimensions | 5 | Outside edge of vehicle body |
| 2 | Outside edge of windshield | 6 | Wheelbase (variable) |
| 3 | Max. overhang over windshield | 7 | Maximum overhang |
| 4 | Maximum vehicle length within CWA test envelope | 8 | Maximum vehicle height |



Test envelope for Crosswind Assist chassis with fully integrated camper vans (schematic)

- | | | | |
|---|---|---|------------------|
| 1 | Maximum vehicle length within CWA test envelope | 4 | Wheelbase |
| 2 | Outside edge of vehicle body | 5 | Maximum overhang |
| 3 | Maximum vehicle height | | |

Dimensions of CWA test envelope for chassis model series 907 platform vehicles, box body vehicles, camper vans etc.

Tonnage	4 t		5 t	
Body length/length class	A2	A3	A2	A3
Length	[mm] 6046	6946	6246	6946
Wheelbase	[mm] 3665	4325	3665	4325
Maximum overhang ¹⁾	[mm] 1850	2200	1850	2200
Maximum vehicle length within CWA test envelope	[mm] 6536	7546	6536	7546
Maximum vehicle length within CWA test envelope for camper vans	[mm] 6885	7941	6885	7941
Maximum vehicle length within CWA test envelope	[mm] 4000	4000	4000	4000
Maximum overhang of body over windshield (e.g. alcoves) ²⁾	[mm] 1150	1150	1150	1150

1) See Chapter 4.3.5 Vehicle overhang (→ page 78)

2) See Chapter 8.9.6 Rain sensor and Headlamp Assist (→ page 323)

Comply with the generally applicable boundary conditions:

- For the Crosswind Assist function to be used or enabled, the body width of the vehicle without outside mirrors (symmetrical in the longitudinal direction) must be no more than max. 98 in (2500 mm).
- The body/vehicle width limit values relevant for registration in terms of the installation of headlamps and outside mirrors on the vehicle are the responsibility of the upfitter and must be guaranteed by them, see Chapter 4.1.3 Permissible vehicle dimensions (→ page 63).
- The maximum body width must be less than or equal to the distance between the outside edges of the long-arm outside mirrors on the right and left.
- These test envelope guidelines do not apply to bodies on which the outer surface exhibits substantial aerodynamic differences, particularly at the front as far as the B-pillar (special bodies).
- Exceptions to this exist for fully integrated camper van bodies. Such vehicles must be assessed individually (if necessary by a practical test drive) by the department for vehicle dynamics of Mercedes-Benz at the upfitter's expense.
- The (additional) body area must be within the marked ranges and comply with the maximum values specified in the vehicle tables.

8.9.3 Active Brake Assist/Active Distance Assist (DISTRONIC PLUS)

The Active Brake Assist (code BA3) is legally prescribed depending on the country and can assist the driver in avoiding collisions with vehicles traveling or crossing ahead as well as pedestrians, and also reduce the severity of consequences from accidents.

The Active Distance Assist DISTRONIC (code ET4) automatically maintains distance from vehicles traveling in front and can therefore relieve the burden on the driver when driving on highways or in frequently stopping and starting traffic, for example.

! NOTE

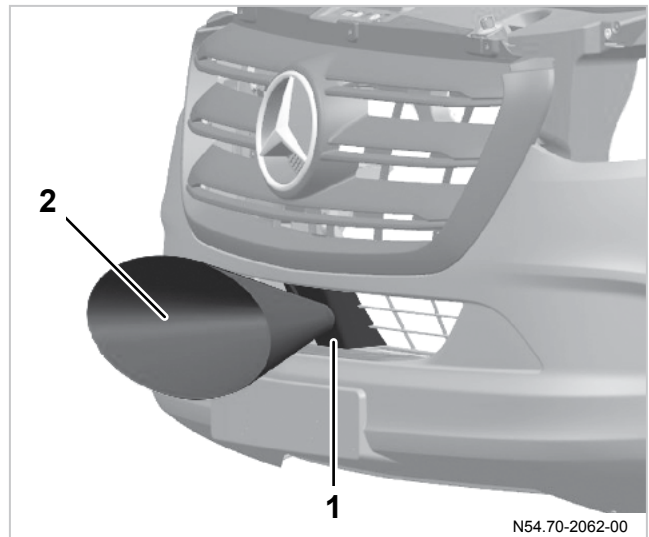
The information and specifications in the operator's manual for your vehicle must be adhered to. Please make yourself familiar with the functions of the driving assistance systems.

For the purposes of these driving assistance systems, a radar sensor is installed behind the air inlet grille in the step plate of the bumper. This front radar works together with the signals from the ultrasonic sensors in the bumper and from the multi purpose camera (MPC, Chapter 10.2.1 Installation dimensions, version 1 (→ page 382)) in the lower area of the window to identify potentially dangerous situations.

! NOTE

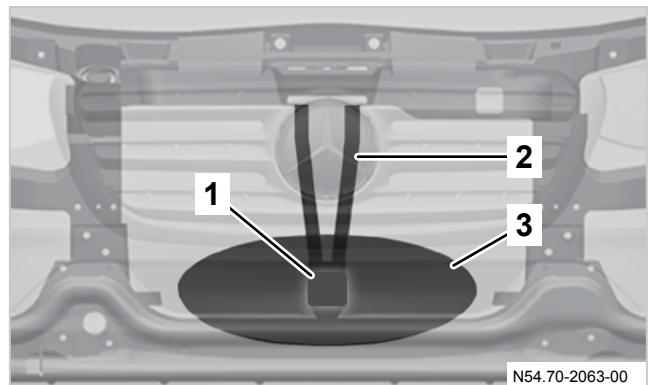
After changes to the vehicle width or overhang length, the corresponding O-codes must be entered in the vehicle documentation via XENTRY, an SCN coding of the control unit must be carried out and, in the case of changes to the vehicle position due to a change in vehicle weight, the height of the radar sensor above the roadway must be corrected and system calibration routine to be complete.

The following note on changing the inclination of the vehicle in the longitudinal direction must also be observed.



Position of Active Brake Assist sensor

- 1 Position of sensor
- 2 Signal funnel



Position of Active Brake Assist sensor (front view)

- 1 Position of sensor
- 2 Sensor holder
- 3 Signal funnel

i Further information on this can be found in Chapter 8.15 Commissioning of control units (→ page 361).

⚠ WARNING

Any modifications to the front radar, its attachment to the vehicle and surrounding area, as well as any bodies, installations or conversions that affect the functionality of the front radar, are impermissible.

Otherwise, driving assistance systems may no longer work as intended.

There is danger to life and limb!

To ensure that the functioning of the driving assistance systems is not affected, the following changes are not permissible:

- Changing the position of the radar sensor
- Replacing the original holder with a different one
- Removing the original front bumper or the original cover
- Replacing the original front bumper or the original cover with others
- Installing detachable parts that protrude into the signal funnel
- Installing metallic detachable parts that could shade or affect the area around the sensor

! NOTE

The area in front of the sensor (viewed in the direction of travel) also includes parts that are located beside, above, or below the sensor, but that protrude further forward than the front edge of the radar itself.

- Metal or metal-plated pipes (see note) or rounded metal or metalized surfaces located in front of or beside the radar sensor when viewed in the direction of travel. Exception: When these are covered with an insulating or radar-wave-absorbing plastic or paint in the direction of the radar sensor.
- Parallel metal surfaces (see note) on both sides of the radar sensor. Exception: When these are covered with an insulating or radar-wave-absorbing plastic or paint in the direction of the radar sensor.
- No metal or metalized surfaces perpendicular to each other (see note) beside, above and below the radar sensor, where the opening of the 90° angle is "visible" to the radar sensor. Exception: When these are covered with an insulating or radar-wave-absorbing plastic or paint in the direction of the radar sensor.
- Additional paintwork on the cover in front of the radar sensor. See warning!
- Application of adhesive film (wrapping) in the vicinity of the radar sensors, see Chapter 3.13 Adhesive decals on the exterior (→ page 60).
- Application of filler on the cover in front of the radar sensor. See warning!

⚠ WARNING

Depending on the type and thickness, paints or films can cause damping of radar waves. This could lead to malfunctions or system failure. This could cause the driver to lose control of the vehicle.

There is risk of an accident and danger to life and limb!

The area of or around the sensor must not be painted or covered with a film.

In repair cases, the existing coat of paint must be removed in such a way that the plastic cover is not damaged and the material thickness of the cover is not significantly reduced. The new paint coat structure must not exceed the following limits:

- A maximum of 2 color coats with a thickness of 15 µm/ 5.9e-4 in plus 2 clearcoats may be applied.
- With metallic silver, only one coat with a thickness of 15 µm/ 5.9e-4 in plus one coat in white 15 µm/ 5.9e-4 in thick are permissible.
- The material thickness must be homogeneous in order to prevent distortion of the radar waves.
- Specified thickness for unpainted covers: 2.42 mm +/-0.1 mm (0.095 in +/- 0.004 in), without paint.
- Specified thickness for painted covers: 2.42 mm +0.1 mm/-0.2 mm (0.095 in +0.004 in/ -0.008 in), without paint.
- Further information on painting can be found in Chapter 5.4 Painting and preservation work (→ page 98).
- For suspension modifications (e.g. number of axles), see Chapter 6.1 Suspension (→ page 102).

! NOTE

The area in front of the sensor also includes parts which are located beside, above or below the sensor, but which protrude further forward than the front edge of the sensor itself.

! NOTE

For special body situations, e.g. fully integrated camper vans on the basis of cowl cab base vehicles (code F50) or government vehicles (list not exhaustive) with deviations from the previously mentioned specifications, it is essential to comply with all Mercedes-Benz specific technical requirements.

! NOTE

Active Brake Assist is a certified system. Modifications of any kind made to the individual components, the system or the basic vehicle (including the wheel-base, track width etc.) which are not explicitly covered by the Body and Equipment Guideline constitute an alteration of the certified state.

! NOTE

The Active Distance Assist (DISTRONIC PLUS) requires the installation of a functioning driver seat occupancy recognition system which has been approved by Mercedes-Benz. This can be done by ordering either the standard equipment "Driver's seat occupancy recognition" (code SK2).

Further information in Chapter 4.5.2 Modifications to seats (→ page 87), Chapter 6.4.1 General information (→ page 147) and Chapter 7.14.9 Driver's and front passenger's doors connection point (→ page 232).

Active Brake Assist (code BA3) can be temporarily deactivated via the instrument cluster. The system is always reactivated after an ignition off/on cycle.

Active Distance Assist (DISTRONIC PLUS, code ET4) can be temporarily activated and deactivated via a pushbutton switch on the steering wheel (refer to the description in the operator's manual for instructions on activating/deactivating Active Distance Assist).

! NOTE

If a significant weight is upfitted to the vehicle, it is required to measure the upfitted vehicle height and recalibrate the DISTRONIC PLUS sensor height accordingly. Please visit a local Mercedes-Benz dealership.

! NOTE

If a body installed by the upfitter changes the inclination of the vehicle in the longitudinal direction by more than 1.5°, a service calibration of the front radar system must be performed. If this is not done, the intermittent or permanent failure of Active Brake Assist and Active Distance Assist can be expected in subsequent operations.

Observe the following when determining the change in angle:

- For the angle measurement, either the vehicle must be standing on a leveled surface or the angle measurement should always be taken at the same measuring station.
- The spirit level must have an accuracy of at least 0.1°.
- The spirit level must output or display the angles digitally.
- The angle measurement before and after the conversion of the vehicle must always be taken at the same point on the chassis. Therefore, select a point that will remain accessible for the angle measurement after the conversion work. Measuring at different points on the chassis or at points on the body (indirect angle measurement) is not permissible.

! NOTE

After any damage to the front of the vehicle, have the setting and function of the radar sensor checked and recalibrated at a qualified specialist workshop. This also applies to mild collisions at low speeds, where no damage to the front of the vehicle is visible.

Adjust the parameterization of the front radar after the following changes:

- Springs: Observe Chapter 4.2.8 Modifications to springs, spring suspension, and dampers (→ page 75).
- Tire size: Observe Chapter 4.1.3 Permissible vehicle dimensions (→ page 63).
- Axle distance: Observe Chapter 6.2.5 Modifications to the cab (→ page 120)).
- Track width: only in combination with a Letter of Compatibility, Chapter 2.1.1 Regulatory Overview (→ page 19).
- Vehicle width (without outside mirrors/detachable parts)

8.9.4 Blind Spot Assist/Rear Cross Traffic Alert/exit warning function/Sideguard Assist

Available special equipment

Code	Equipment ¹⁾
JA7	Blind Spot Assist, Rear Cross Traffic Alert (RCTA) and exit warning
JT7	Sideguard Assist
J1V	Pre-installation for Blind Spot Assist (only for open model designations)

1) The description is intended as an explanation and is not the same as the code designation.

i Blind Spot Assist is also known as Blind Spot Monitoring (BSM) and, in combination with Sideguard Assist, as Blind Spot Information System (BSIS).

i NOTE

The information and specifications in the operator's manual for your vehicle must be adhered to. Please make yourself familiar with the functions of the driving assistance systems.

⚠ WARNING

The outer contours of the vehicle body, detachable parts that protrude from the outer surface of the body or retrofitted vehicle equipment must not lead to any restriction of the detection ranges or penetration of the signal funnels of the radar sensors, as otherwise the complete function of the driving assistance system is no longer ensured.

There is risk of an accident and danger to life and limb!

Ensure that there are no restrictions to the detection ranges during planned body or modification work, when positioning and retrofitting the radar sensors and when driving.

i NOTE


Upfitter-specific operator's manuals must contain appropriate warnings and information for the vehicle user, which at least refer to:

- Possible danger from retrofitted detachable parts or vehicle equipment that protrude into the detection range of the radar sensors, e.g. bicycle rack at the rear of the vehicle
- Possible impairment of the function of the driving assistance system if the radar sensors and their surroundings on the vehicle are damaged
- Obligation to have the function of the driving assistance system checked by a qualified specialist workshop if damage is detected and after accidents affecting the radar sensors or their surroundings on the vehicle. It is recommended that you have this check carried out by your Mercedes-Benz Dealership/Service Center.
- The following specifications for covering the radar sensors or subsequent painting.

1) Equipment ex factory with code JA7 and JT7

As of model year 2024, a new system generation of radar sensors for Blind Spot Assist (code JA7) is installed on a country-dependent basis as standard equipment:

- On closed model designations with Passenger Van configuration ex-factory. (European registration code: M1)

 Please get in touch with your Mercedes-Benz sales partner to inquire about the availability of the special equipment options.

Blind Spot Assist can warn the driver of vehicles on the adjacent lane when changing lanes.

The Rear Cross Traffic Alert function can warn the driver of traffic crossing behind the vehicle while reversing, e.g. when moving out of a parking space.

The exit warning system can warn of traffic passing at the side when the driver's door or front passenger door are opened; on vehicles with a crewcab, it can also warn of traffic passing behind when the rear doors are opened.

In order for the exit warning system to operate correctly, ensure that the door sensor signals (open or closed state) are available on the CAN bus.

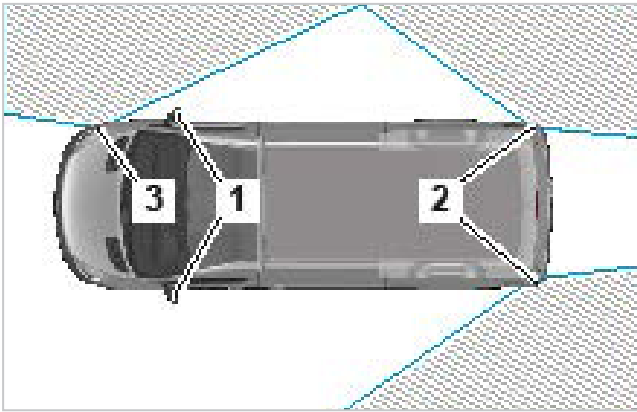
The Sideguard Assist can warn the driver of other road users in the restricted area of vision when maneuvering around corners in the direction of the front passenger side. In addition to Blind Spot Assist, the warning area is extended to the front of the vehicle, see the following illustration of the detection ranges.

The radar sensors of the Blind Spot Assist (code JA7) in combination with Rear Cross Traffic Alert and the exit warning system are installed on the left and right side of the vehicle under the rear bumper trim on closed model designations (panel van and Tourer).

The Rear Cross Traffic Alert function is generally not available for open model designations.

For Sideguard Assist (code JT7), a radar sensor is installed under the front bumper on the front passenger side, see the following illustration.

The signal is conveyed to the driver by means of a light-up symbol in the outside mirrors, a warning on the instrument cluster and an acoustic warning tone. The Rear Cross Traffic Alert warning is also displayed in the head unit if the Parking Package special equipment (code JB6/JB7) is installed.



Positions and detection ranges of the radar sensors for code JA7 and JT7 (schematic), by way of example for closed model designations, same for open model designations

- 1 Display of the warning in the outside mirror
- 2 Positions of rear radar sensors (code JA7), on both sides
- 3 Position of front radar sensor (code JT7), front passenger side

To ensure the proper function of the driving assistance systems, do not make the following changes:

- Changing the warning lamps in the outside mirror (if no custom warning lamps are used, e.g. with omission of the doors, code FW8/FW9)
- Changing the positions of the radar sensors or the original holder and its covers
- Bodies or modifications, attachment of detachable parts or retrofitting of vehicle equipment that restrict the detection ranges or protrude into the signal funnel of the radar sensors. It is essential to observe the warning. Details on the signal funnel can be found in the 3D design data.
- Application of filler on the cover or bumper corner in front of the radar sensor. Observe the following warning and specifications for painting!

If these changes are not omitted, the system may have to be deactivated. Observe all national laws, directives, and registration regulations. The deactivation of the system can only be carried out at a qualified specialist workshop and requires the following actions:

- Deletion of codes JA7 and JT7 from the vehicle data card
- Recoding of the control units: EIS, instrument cluster, head unit, door control units and radar sensors
- Replacement of the mirrors with a variant without warning display

▲ WARNING

Paint, films or other covering materials (e.g. filler) can cause attenuation of the radar waves depending on the design and thickness. This could lead to malfunctions or system failure. This could cause the driver to lose control of the vehicle.

There is risk of an accident and danger to life and limb!

The sensor area must not be covered by other materials.

When painting in the area of the radar sensor (bumper for closed model designations or cover trim for open model designations), the following specifications must be observed.

Observe the information and specifications in chapter 3.13 of the corresponding Body and Equipment Guidelines for film wrapping on the outside of the vehicle.

In repair cases, remove the existing coat of paint in such a way that the plastic cover is not damaged and the material thickness of the cover is not significantly reduced.

The new paint coat structure must not exceed the following coat thicknesses:

Paint layer	Maximum coat thickness [µm]	
	std (single-coat, non-metallic)	metallic (two-coat)
Primer (2C)	10-15	
Base coat	None	15
Topcoat	30	15
Clearcoat	30-40	

The material thickness must be homogeneous in order to prevent distortion of the radar waves.

- General information on painting can be found in chapter 5.4 of the corresponding Body and Equipment Guidelines.

NOTE

If the rear radar sensors are damaged, have the function of the driving assistance system checked at a qualified specialist workshop. This also applies to collisions at low speeds, where no damage to the front or rear area of the vehicle is visible.

Adjust the parameterization of the rear radar sensors after the following changes:

- Rear overhang, see chapter 6.2.4 of the corresponding Body and Equipment Guidelines.
- Wheelbase, see chapter 6.2.5 of the corresponding Body and Equipment Guidelines
- Vehicle width (without outside mirrors/detachable parts)

2) Pre-installation for Blind Spot Assist/exit warning system on open model designations (code J1V)

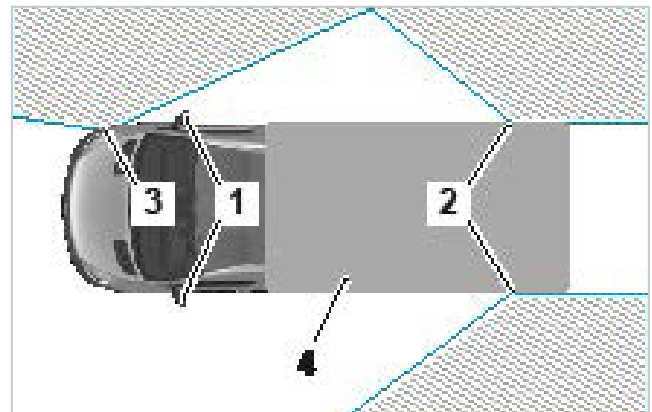
The pre-installation for Blind Spot Assist/exit warning system (code J1V) is available ex-factory for open model designations. It is automatically assigned as standard to vehicles registered in countries with GSR-II (General Safety Regulation) and as well as in a vehicle configuration with Sideguard Assist (code JT7).

This pre-installation J1V is, in principle, not available for closed model designations.

The Rear Cross Traffic Alert function is not available with pre-installation with code J1V.

From model year 2025, a new system generation of radar sensors will be used. New information and specifications are described below.

- If you have further questions, please reach out to Mercedes-Benz via the Upitter Portal.
- If necessary, you can obtain information and specifications on vehicles with radar sensors prior to model year 2025 from previous Body and Equipment Guidelines.

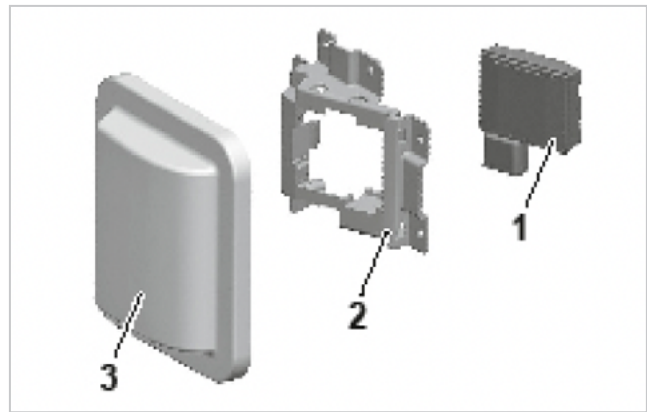


Positions and detection ranges of the radar sensors for code JT7 and J1V (schematic)

- Display of the warning in the outside mirror
- Rear radar sensor positions (code J1V) in the permitted installation area on the right and left side of the vehicle, see illustration in section 3 (→ page 313)
- Position of front radar sensor (code JT7), front passenger side
- Upfitter-specific body

The delivery package of the Blind Spot Assist pre-installation (code J1V) includes the following component parts, which are included with the vehicle delivery.

Due to a design tilt of the radar sensors of 20° to the longitudinal axis of the vehicle, see figure (→ page 307), the component parts for the left and right side of the vehicle are different.



Delivery package of the Blind Spot Assist pre-installation (code J1V), by way of example on left-hand side of the vehicle

- 1 Radar sensor
- 2 Holder
- 3 Cover trim

Component	Quantity	Item number	Remarks
Radar sensor CU package compl.	2	A907 900 27 11	Same component part for left and right side of vehicle Item number of individual part: A907 901 79 04
Holder, outer left	1	A907 884 05 00	Only for left side of vehicle
Holder, outer right	1	A907 884 06 00	Only for right side of vehicle
Cover trim, outer left	1	A907 885 13 01	Only for left side of vehicle
Cover trim, outer right	1	A907 885 14 01	Only for right side of vehicle

i Mercedes-Benz item numbers are valid at the time of publication of this change information. Please contact your Mercedes-Benz Dealership/Service Center for information on successor numbers if the specified item numbers are invalid.

i Details on components parts of the pre-installation code J1V can be found in the 3D design data and 2D drawings.

i For special bodies and questions, please reach out to Mercedes-Benz via the Upfitter Portal.

! NOTE

These components may only be retrofitted when the vehicle is fitted with the pre-installation code J1V.

It is essential to pay attention to the different component parts for the left and right side of the vehicle during installation and electrical connection, otherwise commissioning will not be possible.

The radar sensors must be positioned and installed according to the specifications in the following sections 3 to 5 using the enclosed genuine holders and cover trim parts and a suitable mounting on the Upfitter-specific body, the electrical connection must be established and the driving assistance system must be put into operation.

WARNING

For vehicles with special equipment code J1V, commissioning must always be carried out, otherwise malfunctions and fault messages may occur. For this purpose, code X96 "Mandatory commissioning" is automatically assigned, see chapter 8.15 of the Body and Equipment Guideline.

Commissioning must be carried out by the Upfitter before delivery to the customer, as the vehicle is only preconfigured ex factory with code J1V and is not fully functional without commissioning.

There is risk of an accident and danger to life and limb.

When using the radar sensors, the notes and specifications on EMC must be observed, see section 4 (→ page 257).

To ensure the proper function of the driving assistance system, observe the following note in addition to the specifications for code J1V listed in section 1 (→ page 307):

NOTE

The cover trim is made of a plastic specially designed for radar signals. For this reason, the driving assistance system with radar sensors may only be used with the genuine component parts from the Mercedes-Benz delivery package. Replacing the cover trim pieces with other component parts is not permitted.

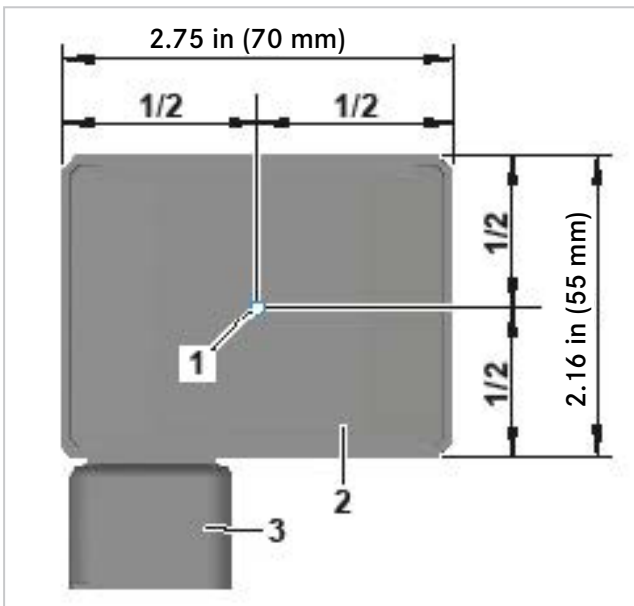
Also observe the specifications for painting the cover trim pieces in section 1 (→ page 307).

3) Positioning and installation of the radar sensors for open model designations (code J1V)

Radar sensors reference point

In order for the system to function correctly, the position of the radar sensor in the overall vehicle must be known.

The reference point for the dimensioning is the center of the sensor surface. This is located in the immediate vicinity of the visible injection point in the plastic housing of the sensor. To simplify matters, this injection point can be used as a reference point:



Reference point of radar sensor (not to scale)

- 1 Reference point in the visible injection point
- 2 Housing of the radar sensor
- 3 Electrical connection (socket)

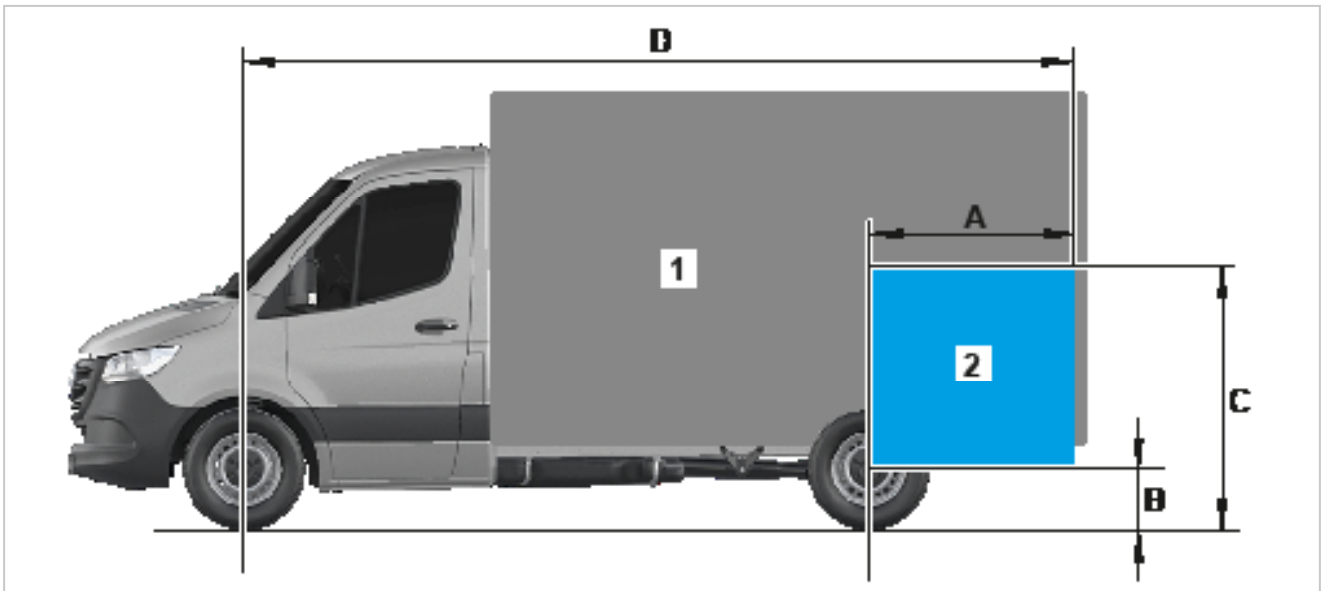
i Details can be found in the 3D design data and in the 2D drawing.

Positioning and alignment specifications

- Note the different component parts for the left and right side of the vehicle, see table of item numbers in section 2 (→ page 228). Details of the component geometry can be found in the 3D design data.
- Always position the radar sensors so that the electrical connection points downwards.
- Never install radar sensors on doors, flaps, other moving parts or thin-walled structures without sufficient rigidity. Position the sensors so that they are connected to the body at a fixed, torsionally rigid and immovable point in all operating statuses.
- If a bridge to the body or a structural part is required for correct installation of the radar sensor with the plastic holder, this bridging part must also be designed with high strength and torsional rigidity.
- It is recommended that only unmodified genuine component parts from the delivery package are used. For special bodies, however, it is permissible to reduce the component contour along predefined, recognizable cut lines on the component parts by mechanical processing, see figure in section Specifications for installation (→ page 317). Details of the dimensions can be found in the 3D design data and 2D drawings.

i NOTE

The following limit values for the permissible installation position and alignment of the radar sensors on the vehicle must be observed.



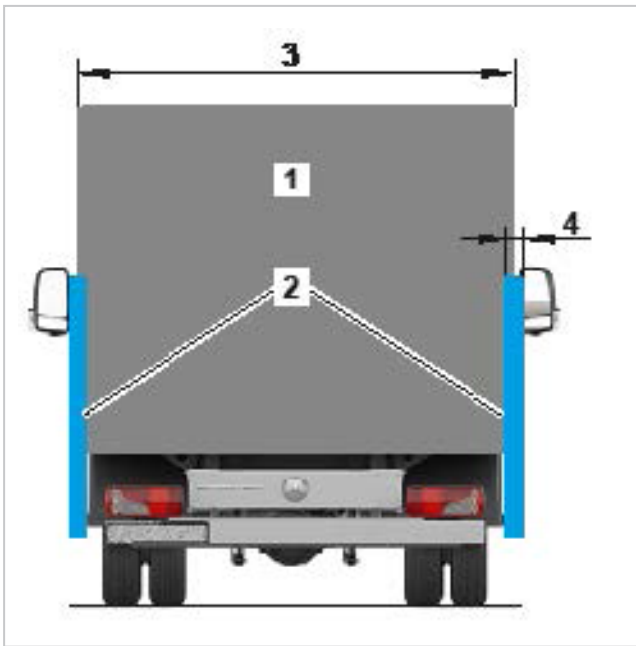
Permissible range for the installation position of the radar sensors in the X and Z directions (schematic)

- 1 Example of any upfitter-specific body
- 2 Permissible range for the installation position

Permissible range for the installation position

	Installation position	Limit value [in] [mm]
A	Maximum distance from the center of the rear axle	Max. 118 3000
B	Minimum height above roadway ¹⁾	Min. 11.8 300
C	Maximum height above roadway ¹⁾	Max. 47.2 1200
D	Maximum distance from center of front axle	Max. 246 6250

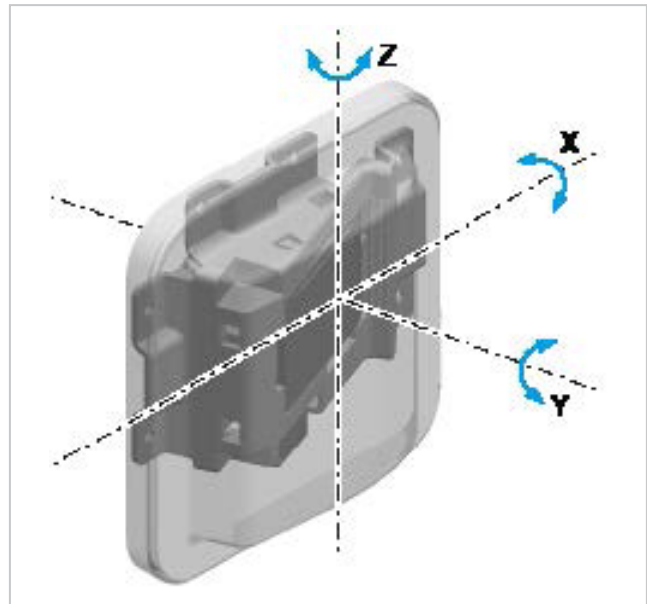
- 1) The height in the Z-direction above the roadway must be measured for the curb weight of the complete vehicle with completed body.



Permissible range for the installation position of the radar sensors in the Y and Z directions (schematic)

- 1 Example of any Upfitter-specific body
 - 2 Permissible range for the installation position on the outer surfaces of the body or on a structural part
 - 3 Vehicle/body width
 - 4 Maximum deviation ± 1.9 in (50 mm) from the vehicle/body width
- In the Y direction, the installation position of the radar sensor on the outer surface of the body or on a structural part must not exceed a maximum deviation of ± 1.9 in (50 mm) from the vehicle/body width. If necessary, the mounting on the vehicle side must position the radar sensor further out than would be necessary due to the body width in its surroundings. Also observe the following specifications for the detection range or signal funnel.
 - The installation positions on the left and right side of the vehicle must be as mirror-inverted as possible.

- For installation positions with differences between the left and right side of the vehicle, the specifications for documenting the installation position with O-codes must be observed, see section 5 on commissioning with the available O-codes and their installation areas (\rightarrow page 320): The installation positions of the left and right radar sensor must be defined so that both positions are within the permissible installation range of a common O-code.
- The permissible limit value of the tolerance for the alignment of the radar sensors in the installation position is a maximum of $\pm 1^\circ$ in all directions.

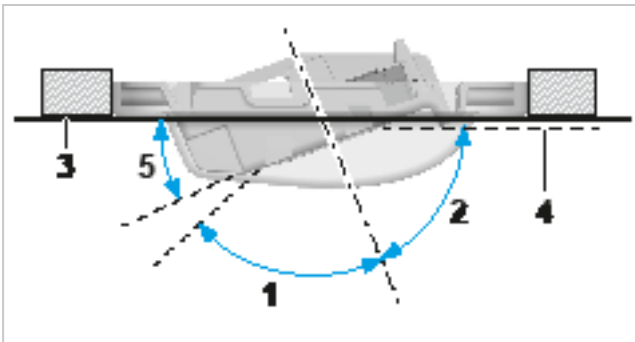


Permissible tolerance of the alignment of the radar sensor in all directions max. $\pm 1^\circ$, by way of example on left side of vehicle, for details see 3D design data

- Z-axis: Alignment to the vehicle's longitudinal axis or X-axis on the vehicle side
 X-axis: Alignment to the vertical or Z-axis on the vehicle side
 Y-axis: Orientation of the electrical connection (socket) downwards or rotation around the center axis of the component part

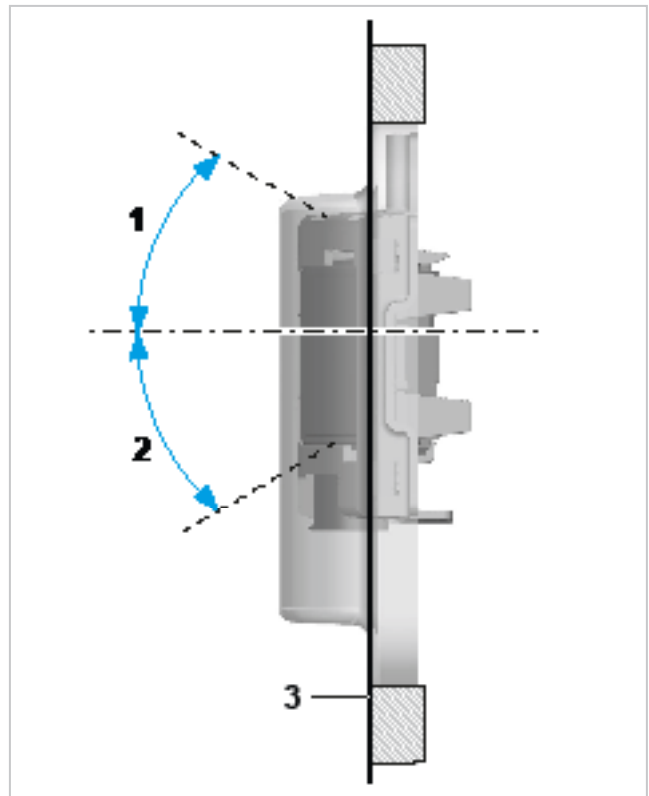
8 Electrics/electronics

- With regard to the vehicle surroundings, observe the maximum beam angles or signal funnels of the radar sensor in all directions, see the following illustrations. It is essential to observe the warning .
- Special attention must be paid to the radar signal emitted to the rear parallel to the outer surface. There must be no contours or detachable parts protruding from the outer surface between the radar sensor and the rear of the vehicle that could restrict the detection range.
- Details on the signal funnel of the radar sensors can be found in the 3D design data.
- It is recommended to check the vehicle surroundings during the design and development of the body using the available 3D design data.



Horizontal beam angles (schematic), view from above, by way of example on left side of vehicle, for details see 3D design data

- 1 Beam angle 75° to the front
- 2 Beam angle 70° to the rear
- 3 External surface of body
- 4 Radar signal emitted parallel to the outer surface to the rear
- 5 Design tilt 20°



Vertical beam angles (schematic), view from behind, by way of example on left side of vehicle, for details see 3D design data

- 1 Beam angle 30° upwards
- 2 Beam angle 30° downwards
- 3 External surface of body

Specifications for installation

⚠ WARNING

The radar sensors are very sensitive component parts, especially when exposed to external influences such as shocks or pressure loads. Sensors with visible damage to the plastic housing or sensors that have fallen from a low height onto a hard surface must no longer be used.

There is risk of an accident and danger to life and limb.

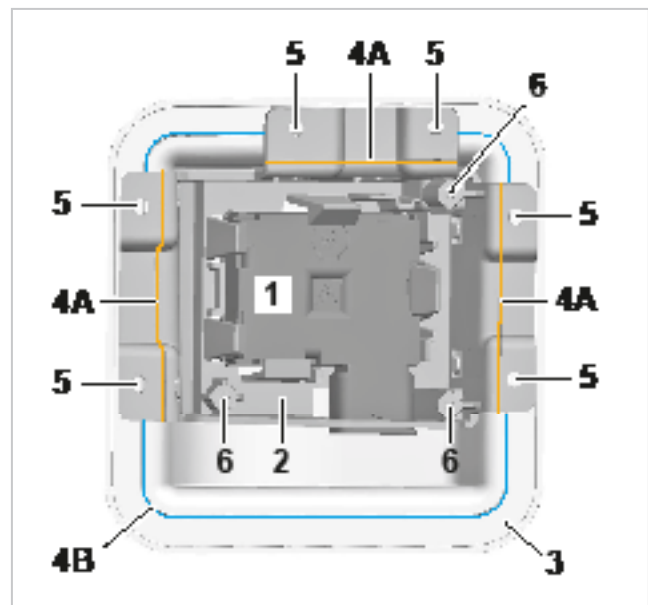
In the event of damage, replacement with new genuine Mercedes-Benz parts is absolutely essential, as otherwise the function of the driving assistance system is no longer guaranteed.

Install the sensors in the following order:

- ▶ Snap the radar sensor into the holder using clips.
- ▶ Establish electrical connection, see section 4 (→ page 318).
- ▶ Screw the holder with radar sensor to the body or structural part.
- ▶ Snap the cover trim into place using clips.
- ▶ Seal the cut-out and apply anticorrosion protection.

Please note with regard to this:

- To attach the holder with the radar sensor to the body or structural part, the upfitter must select suitable screws with sufficient strength and durability to suit the body situation.
- Fixing points are available for two variants, see the following illustration:
Original component contour: Screw connection from the outside via six screw holes **5**
Reduced component contour **4** for special bodies: Screw connection from the inside via three screw bosses **6**



Fastening points for variants of the component contour (schematic), example shows holder on left side of vehicle

- 1 Radar sensor
 - 2 Holder
 - 3 Cover trim
 - 4 Cut lines on 3 flanges of the holder (**4A: orange**) and all around the cover trim (**4B: blue**) to reduce the component contour
 - 5 6 screw holes on flanges for screw connection from outside
 - 6 3 screw bosses for screw connection from the inside with reduced component contour
- Observe the cutting lines visible on the component parts **4A** and **4B** for the reduction of the component contour.
 - Always use all the fixing points provided for both variants.
- ⓘ Details and dimensions of the component variants and fixing points can be found in the 3D design data.

- Additionally seal against water and dirt ingress (protection class IP6K) and provide anticorrosion protection between the body and holder.
- At the lower edge of the installation position on the body, provide an opening for the electric cable passage and as a condensation drain.
- The wiring to connect radar sensor with the vehicle connection point located in the rear of the vehicle (left side) must be designed and installed by the upfitter, see (→ page 318).
- After installation and electrical connection, carry out commissioning with documentation of O-codes, see section 5 (→ page 320).

4) Electrical connection of the radar sensors (code J1V)

! NOTE

The workplace and personal equipment of the personnel must be equipped with ESD protection (against electrostatic discharge) when installing, electrically connecting and testing the radar sensors. This also applies for the shipping container and the warehouse areas where the sensors are packed or unpacked.

Without ESD protection, it can be assumed that the radar sensors will be damaged by electrostatic discharges. As a rule, only preliminary damage occurs at first, which only gradually expands during further operation until the sensor fails repeatedly and finally permanently.

Therefore, warranty and goodwill costs for cases of failing radar sensors in combination with code J1V in the case of non-compliance with the ESD protection specifications and a hardware failure due to this will not be borne by Mercedes-Benz, unless it can be demonstrated that the component part damage occurred before or during delivery to the upfitter.

The installed radar sensors must be electrically connected directly to the connecting point located in the rear of the vehicle (left side) by a qualified electrician using a wiring harness.

The wiring harness must satisfy the following requirements:

- The wiring harness (cable with plug) made by a qualified electrician or wiring harness manufacturer must be checked for electrical connections and functionality before use (according to DS characteristic: Mandatory documentation relevant to safety). It must be possible to submit the test results at the request of Mercedes-Benz.
- Ensure a watertight connection and proper installation of the lines, see chapter 8.4.3 of the corresponding Body and Equipment Guidelines.
- The radar sensors must not be disturbed by EMC influences from other electrical components in the body.

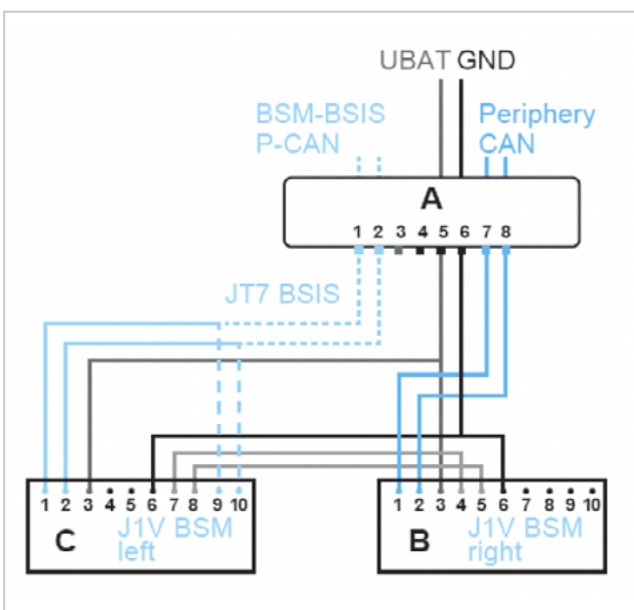
Note when completing the wiring harness:

- Electric lines:
 - Power supply: Diameter 0.19 in² (0.5 mm²)
 - CAN lines: Diameter 0.13 in² (0.35 mm²)
 - Maximum cable length: 393.7 in (10 m)

- Electrical connections:

Position	Parts category	Supplier, MB item number	Type, coding	Pin assignment
Connecting point on seat box on vehicle side	Socket (8 pin)	Hirschmann, A0005454133	Female, Coding A	See illustration
Connecting point on seat box on line side	Plug (8 pin)	Hirschmann, A0005459833	Male, Coding A	Identical with socket
Connection to the radar sensor	Plug (10 pin)	Hirschmann, A2365400339	Male, Coding B	See illustration, Note differences!

- i** Please contact your Mercedes-Benz Dealership/ Service Center for information on successor numbers if the specified item numbers are invalid.



Connection scheme for radar sensors
 Connection pin 1 and 2 of SLAVE radar sensor **C**: Dotted with BSIS (with JT7), dashed without BSIS (without JT7)

A Connecting point in the seat box

Pin	Function
1	CAN1-L BSIS
2	CAN1-H BSIS
3-4	-
5	UBAT
6	GND
7	Periphery CAN-L
8	Periphery CAN-H

B MASTER radar sensor connection (right)

Pin	Function
1	Periphery CAN-L
2	Periphery CAN-H
3	UBAT
4	CAN-L (connection to SLAVE)
5	CAN-H (connection to SLAVE)
6	GND
7-10	-

C SLAVE radar sensor connection (left)

Pin	Function
1	CAN-L (connection to BSIS)
2	CAN-H (connection to BSIS)
3	UBAT
4-5	-
6	GND
7	CAN-L (connection to pin 4 MASTER)
8	CAN-H (connection to pin 5 MASTER)
9	Termination without BSIS, connection to pin 1
10	Termination without BSIS, connection to pin 2

i NOTE

The radar sensor on the right-hand side of the vehicle must be connected electrically as MASTER **B** and the radar sensor on the left-hand side of the vehicle as SLAVE **C**, otherwise correct commissioning will not be possible.

- i** Further information on connecting points for the BR 907 can be found in the Upfitter Portal.

5) Commissioning of the driving assistance system (code J1V)

After installation of the two radar sensors and their electrical connection to the connecting point in the driver seat box, commissioning must be performed via the XENTRY Kit Mercedes-Benz diagnostic tool before the vehicle is put into use. In addition to activating the driving assistance system with O-code OB2 and other information on vehicle modifications (e.g. overhang length, wheelbase, etc.), the exact position of the radar sensors must be supplied to the vehicle data card for the respective VIN and corresponding O-codes.

- ❶ Information on XENTRY can be found in chapter 2.2.4 of the corresponding Body and Equipment Guidelines.
- ❷ Further information on the procedure for commissioning control units can be found in chapter 8.19 of the BR 907 Body and Equipment Guidelines or 8.18 of the BR 910 Body and Equipment Guidelines.
- ❸ It is recommended to have the commissioning performed by a Mercedes-Benz Dealership/Service Center..

Overview of the O-codes for commissioning the radar sensors with code J1V

For commissioning the radar sensors in XENTRY, the O-code OB2 is required to activate the driving assistance system. Other input values are also relevant, for which O-codes are assigned by the system. During commissioning, the control units are coded with the reported O-codes. The O-codes assigned when entering the position are listed in the following tables for planning the body and determining the installation position.

In addition to the specifications and illustrations in section 3 (→ page 313), the following points must be observed:

- The O-codes for the X, Y and Z positions must be unique and identical for both left and right radar sensors. It is therefore not possible to use two different O-codes with different installation areas for the documentation of a vehicle-specific installation situation.
Example: When planning an installation height above the roadway of 25.59 in ± 1.96 in (650 mm ± 50mm) with the use of O-code O8N, the positions of both radar sensors must be between a minimum of 23.62 in (600 mm) and a maximum of 27.55 in (700 mm).

- If the input value corresponds exactly to the limit value between two O-codes, the higher installation range must be selected.

Example: For the installation height of 27.55 in (700 mm) above the roadway, O8O 27.55 to 31.49 in (700–800 mm) must be selected, not O8N 23.62 to 27.55 in (600–700 mm).

- The specifications in the following tables apply to vehicles with a fully completed body in running order without load.

! NOTE

Always ensure that the detection ranges or signal funnels of the radar sensors are not impaired, see section 3 (→ page 313).

- i** Please reach out to Mercedes-Benz via the Upitter Portal (→ page 23) if you have any questions about the O-codes or cannot find the right O-codes for your body situation in this overview.

a) Position of radar sensor in Z direction: Height above roadway

O-code	Rear blind spot radar: Position Z above roadway [in] [mm]	Permissible height [in] [mm]
O8K	13.77 ± 1.96 350 ± 50	11.81 - 15.74 300 - 400
O8L	17.71 ± 1.96 450 ± 50	15.74 - 19.68 400 - 500
O8M	21.65 ± 1.96 550 ± 50	19.68 - 23.62 500 - 600
O8N	25.59 ± 1.96 650 ± 50	23.62 - 27.55 600 - 700
O8O	29.52 ± 1.96 750 ± 50	27.55 - 31.49 700 - 800
O8P	33.46 ± 1.96 850 ± 50	31.49 - 35.43 800 - 900
O8Q	37.40 ± 1.96 950 ± 50	35.43 - 39.37 900 - 1000
O8R	41.33 ± 1.96 1050 ± 50	39.37 - 43.30 1000 - 1100
O8S	45.27 ± 1.96 1050 ± 50	43.30 - 47.24 1100 - 1200

b) Position of radar sensor in X direction: Distance to center of rear axle (RA)

O-code	Rear blind spot radar: Position X relative to rear axle [in] [mm]	Permissible distance [in] [mm]
O7K	3.93 ± 3.93 100 ± 100	0 - 7.87 0 - 200
O7L	11.81 ± 3.93 300 ± 100	7.87 - 15.74 200 - 400
O7M	19.68 ± 3.93 500 ± 100	15.74 - 23.62 400 - 600
O7N	27.55 ± 3.93 700 ± 100	23.62 - 31.49 600 - 800
O7O	35.43 ± 3.93 900 ± 100	31.49 - 39.37 800 - 1000
O7P	Additional X to RA +39.37 1000	39.37 - 78.74 1000 - 2000
O7Q	Additional X to RA +78.74 2000	78.74 - 118.11 2000 - 3000

- 1) The value ranges of the O-codes O7P or O7Q must also be selected.
Examples: 39.37 in (1000 mm): O7K+O7P; 94.48 in (2400 mm): O7L+O7P; 118.11 in (3000 mm): O7O+O7Q (maximum permissible distance with extended overhang on three-axle vehicle)

- i** For vehicles with two rear axles (three-axle or dual axle, code ZC4 or X5T), the distance in the X direction is measured from the center between the two axle centers.

c) Position of radar sensor in Y direction: Reference to maximum vehicle width (without outside mirrors)

O-code	Body width outer edge [in] [mm]	Vehicle width [in] [mm]
O94	84.64 ± 1.96 2150 ± 50	82.67 - 86.61 2100 - 2200
O95	88.58 ± 1.96 2250 ± 50	86.61 - 90.55 2200 - 2300
O96	92.51 ± 1.96 2350 ± 50	90.55 - 94.48 2300 - 2400
O9K	96.45 ± 1.96 2450 ± 50	94.48 - 98.42 2400 - 2500

8.9.5 High Beam Assist/Active Lane Keeping Assist/Traffic Sign Assist/Intelligent Speed Assist

As of model year 2024, a new system generation of the multi purpose camera (MPC) is being installed as standard on all vehicles with a windshield at the lower windshield position; see position 2 of the illustration in Chapter 8.9.6 Rain sensor and Headlamp Assist (→ page 323).

On vehicles without a windshield, the necessary components for a subsequent installation are supplied along with the vehicle; see following section and Chapter 7.14.7 Multi-purpose camera (MPC) on vehicles without windshield (→ page 229).

In combination with the front radar, see Chapter 8.9.5 High Beam Assist/Active Lane Keeping Assist/Traffic Sign Assist/Intelligent Speed Assist (→ page 322) and other sensors in the front of the vehicle, this camera ensures the functionality of various driving assistance systems.

The function of the MPC is ensured in combination with the windshields installed ex factory or as a Mercedes-Benz genuine part.

Driving assistance systems with MPC:

- High Beam Assist (code LA1)
- Active Lane Keeping Assist (code JB4)
- Traffic Sign Assist (code JA9)
- Intelligent Speed Limit Assist (code JS2)

As well as the driving assistance systems described in chapter 8.9.3:

- Active Brake Assist (code BA3)
- Active Distance Assist DISTRONIC (code ET4)

The High Beam Assist (code LA1) automatically switches the high beam on and off according to the traffic situation and therefore relieves the driver of the need to brighten and dim the headlamps manually.

The Lane Keeping Assist (code JB4) can help to avoid accidents caused by the vehicle leaving the lane unintentionally.

The Traffic Sign Assist (code JA9) assists the driver in identifying traffic signs.

The intelligent Speed Limit Assist (code JS2) makes it easier for the driver to adhere to stipulated speed limits.

NOTE

The information and specifications in the operator's manual for your vehicle must be adhered to. Please make yourself familiar with the functions of the driving assistance systems.

WARNING

Any changes to the MPC and the surrounding area (e.g. changes to the windshield, including the inclination of the windshield), as well as any bodies, installed parts or modifications impacting the function of the MPC, are not permitted.

The cutouts in black print on the windshield for the MPC must not be covered by film applications, see Chapter 3.13 Adhesive decals on the exterior (→ page 60).

Otherwise, driving assistance systems may no longer work as intended.

There is risk of an accident and danger to life and limb!

As exceptions for vehicles delivered without a windshield, observe the information in the following section.

! NOTE

In the event of changes to the vehicle that permanently modify the inclination in the longitudinal direction, e.g. bodies or conversions with an increase in weight, modification to the weight distribution, or modifications to the suspension (list not exhaustive), the camera must be readjusted.

- ① More detailed information can be obtained when reaching out via the Upfitter Portal

MPC on vehicles without a windshield

- ① Information and specifications for the MPC can be found in Chapter 7.14.7 Multi-purpose camera (MPC) on vehicles without windshield (→ page 229)
- ① Please get in touch with your designated contact at the Technical Consultancy for Upfitters during the planning phase (→ page 19).

8.9.6 Rain sensor and Headlamp Assist

The automatic driving lights (code LA2) is installed as standard depending on the country or available as special equipment.

The rain sensor (code JF1) is already integrated and is added in its function depending on the country. A sensor for measuring the humidity and solar radiation is automatically integrated for automatic regulation of the air conditioning system.

! NOTE

The light/rain sensor must, with exception of the cab base vehicles (codes F50 see following section), only be used with the windshields installed ex factory or available as a Mercedes-Benz genuine part.

▲ WARNING

Any changes to the light/rain sensor, its attachment to the vehicle and the surrounding area (e.g. changes to the windshield), as well as any bodies, installed parts or modifications impacting the function of the sensor, are not permitted.

The cutouts in black print on the windshield for the sensor must not be covered by film applications (including shatter protection films or infrared-absorbing films), See Chapter 3.13 Adhesive films on the vehicle exterior (→ page 60).

Otherwise, driving assistance systems may no longer work as intended.

There is risk of an accident and danger to life and limb!

Installation on cowl cab base vehicles (code F50) and vehicles with omitted windshield (code F92)

Information and specifications on installation siehe Kapitel 7.14.5 Connecting point for automatic driving lights (code LA2)/rain sensor (code JF1) on vehicles without windshield (→ Seite 226).

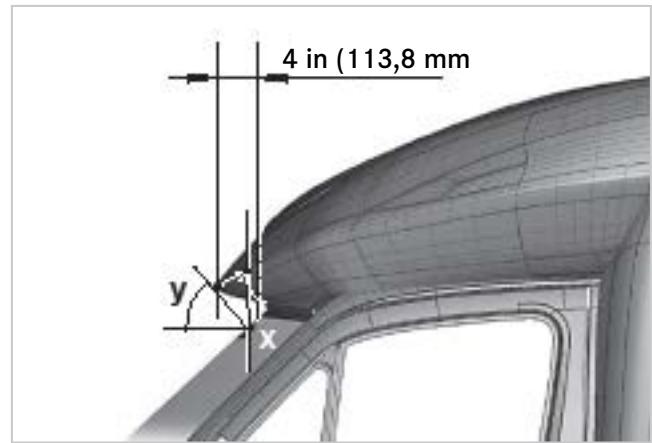
Installation of a light/light sensor can only be implemented using the standard sensor type, because the sensor communicates with the vehicle over the VCS LIN interface.

Vehicles with roof overhang (e.g. alcoves)

Proper functioning can be impaired by overhanging parts:

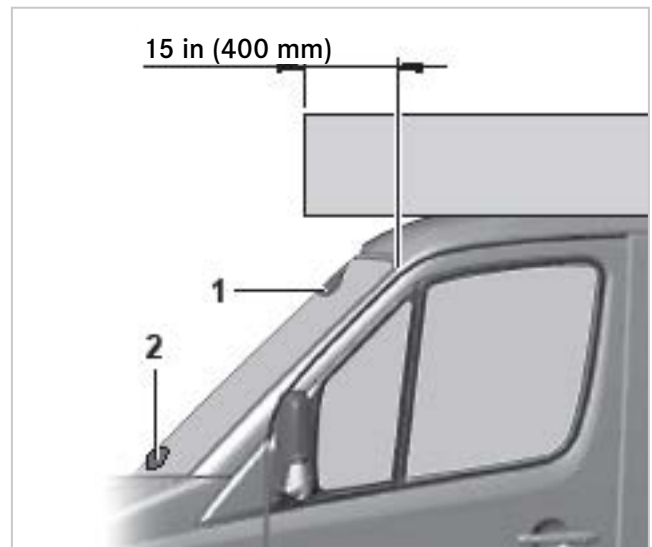
- Deviations from the standard equipment occur depending on the overhang. Please note that there may be other effects on the system depending on the driving situation, weather situation, shade, or seasons (height of the sun).
- The complete functionality of the light/rain sensor is ensured up to a small roof overhang according to the following illustration without limitations.
- With a roof overhang of over 200 mm in length, the following impairments can manifest more significantly:
 - Unnecessary activation of the driving light due to erroneous measurement of the light intensity
 - Lack of automatic activation of the windshield wipers as a result of insufficient detection of moisture
 - Manual intervention from the driver may be required depending on the situation.

i Further information on use of the driving assistance systems can be found in the operator's manual for your vehicle.



Torsioning play

- x Position of sensor
- y Torsioning play (ideally 90°)



Maximum roof overhang

- 1 Position of light/rain sensor
- 2 Position of multi purpose camera (as of model year 2024)

- With a roof overhang up to max. 400 mm (measured from the outer edge of the windshield, see picture), the fundamental functionality of the rain sensor (code JF1) and Headlamp Assist (code LA2) can still function correctly in accordance with the situation.

As of model year 2024, relocation of the light/rain sensor to the lower windshield position with the previously recognized special equipment code LA3 is no longer possible, since the multi purpose camera is installed at this position, see Chapter 8.9.5 High Beam Assist/Active Lane Keeping Assist/Traffic Sign Assist/Intelligent Speed Assist (→ page 322).

! NOTE

On vehicles with automatic driving lights/rain sensor, the limit value of maximum 400 mm must therefore be adhered to for the roof overhang (measured from the outer edge of the windshield).

8.9.7 Tire pressure loss warning system

! WARNING

Do not make any modifications in the area under the vehicle floor, including the vehicle axles and the system components of the tire pressure monitoring system (see following illustration). Otherwise, the function of the tire pressure monitoring system may be compromised by the effects of electromagnetic reflections. This might result in the driver being unaware of any tire pressure loss and, as a consequence, critical driving situations could occur.

There is risk of an accident and danger to life and limb!

Furthermore, the vehicle may no longer meet registration requirements.

Regulations (EU) 2019/2144 and UN regulation UN R 141 specify which vehicles must be equipped with a tire pressure loss warning system. Also observe Regulation (EU) 2018/858 with regard to certain special bodies.

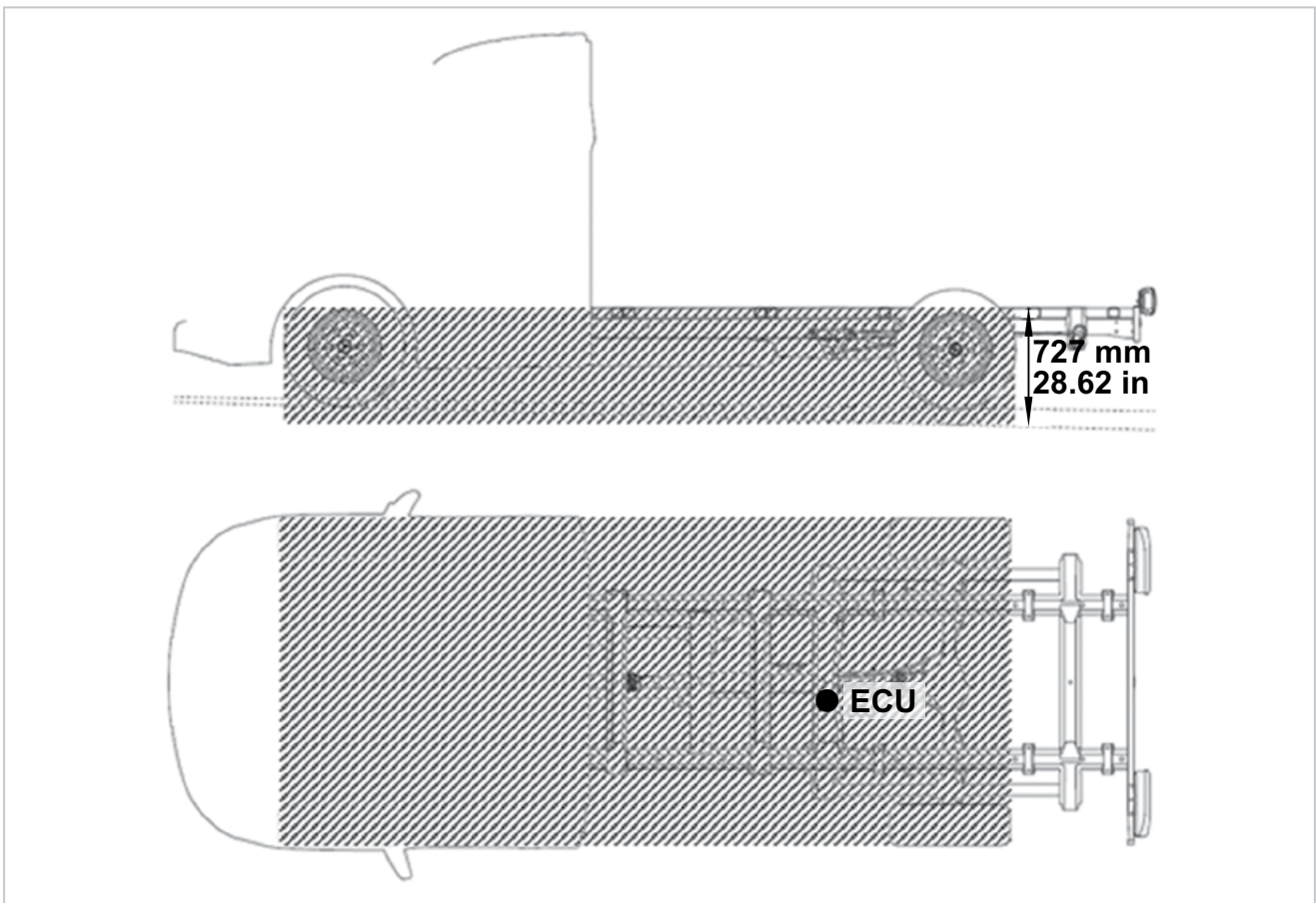
! NOTE

The approval of the tire pressure monitoring system must be observed as per UN R 141 in all countries in which EU regulations and UN regulations are applicable.

Also make sure to observe all national laws, directives and registration regulations.

These specifications apply to all mounted wheels, including in the event that a spare wheel is used, as well as for conversion to winter tires or other wheel types.

Non-adherence constitutes a deviation from the legal specifications and can result in the operating permit becoming invalid.



N40.15-2032-00

Prohibited areas for tire pressure monitoring system, applies to both versions of the system used in the Sprinter

The wireless tire pressure loss warning system on the front and rear axle (code RY2) installed ex factory complies with the specifications outlined previously.

The system includes a receiver module in the control unit (ECU), which is positioned on the underbody between the axles, and tire pressure sensors, which are screwed into the rims together with the valve and measure the tire pressure there. These transmit the measured pressure via 433 MHz radio to the control unit.

Screening plates, timed consumers or other detachable parts in the area of the underbody can impair the radio reception, potentially resulting in individual tire pressures not being displayed. A maximum of 4 sensors (6 sensors on twin tires at the rear axle) are assigned to the system and monitored simultaneously.

! NOTE

It is essential to observe the specifications in the above warning notice and the additional specifications in Chapter 8.2 Electromagnetic compatibility (EMC) (→ page 257).

If, despite this, body mounting work is planned for the vehicle underbody, the functioning of the system must be checked by the upfitter. All criteria of UN R 64 or 141 must be fulfilled.

After a maximum of 10 minutes' driving (over 25 km/h), the tire pressure of all fitted wheels must be evident in the instrument cluster. If this is the case, then the control unit has received signals from all of the sensors. It is recommended that the vehicles be tested with maximum equipment. All electrical consumers should be switched on during the test.

- ① If you have any questions, please get in touch with your designated contact via www.upfitterportal.com (→ page 19).

Additionally, after body modifications in this area, another inspection of the tire pressure loss warning system by an officially recognized testing organization may be required in accordance with UN R 64 or 141; the costs for this must be borne by the upfitter. This serves to prove that the vehicle is eligible for registration as per the legal specifications because the tire pressure loss warning system has not been affected.

- ① Further information and specifications on the display and operation of the tire pressure loss warning system can be found in the operator's manual for your vehicle.

8.9.8 Parking packages/Moving-off information Assist

The parking packages with the Parking Assist can make things easier for the driver when moving in and out of parking spaces or maneuvering, by indicating obstacles in the immediate vicinity of the vehicle.

The new Moving-off information Assist (code JF7, moving-off information system MOIS) can warn of a dangerous situation in the immediate vicinity in front of and to the side of the vehicle front when moving off at low speed.

! NOTE

The information and specifications in the operator's manual for your vehicle must be adhered to. Please make yourself familiar with the functions of the driving assistance systems.

Available special equipment for closed model designations (section 1)

Code	Equipment ¹⁾
JB6	Parking package with 360° camera for closed model designations (FKA/FKB) without rear attachments
JB7	Parking package with reversing camera for closed model designations (FKA/FKB) without rear attachments

- 1) The description is intended as an explanation and is not the same as the equipment description.

Pre-installations for open model designations (section 2)

Observe the information in section 2.

The variants of the parking package systems require a vehicle equipped with the MBUX multimedia system, see Chapter Infotainment system (→ page 354). The views and visual warnings are shown on the screen of the MBUX multimedia system.

1) Parking packages for closed model designations

The special equipment options of the Parking package with 360° camera (code JB6) and parking package with reversing camera (code JB7) are available ex factory for closed model designations (FKA panel van or FKB crewbus) without rear attachments and are delivered fully assembled in the vehicle.


If special equipment approved by Mercedes-Benz is subsequently installed at the rear end of vehicles with code JB6 or JB7, the appropriate parameter set for the parking system must be coded at a Mercedes-Benz service workshop.

WARNING

Any modifications to the cameras and sensors, their attachment to the vehicle and their surrounding area, as well as any bodies, installations or conversions with an impact on the function and detection ranges of the cameras and sensors, are not permissible.

Otherwise, driving assistance systems may no longer work as intended

There is risk of an accident and danger to life and limb!


-  For further information on the parking package, please refer to the relevant sales information and contact your Mercedes-Benz sales partner.

2) Parking packages for open model designations

NOTE

As of model year 2024, a new system generation of the digital camera and the control unit is being used, the development and validation of which has not yet been finalized as at the copy deadline for this Body/Equipment Mounting Directive. For open model designations with pre-installation for the 360° camera, we refer you to separate change information that will be promptly drafted and published upon completion of the development phase.

Please also observe communication in upfitter information bulletins that you will receive from the Upfitter Center.

-  If you require additional information or have further questions, please get in touch with your designated contact at the Consultancy for Upfitters (→ page 19).

If necessary, you can obtain information and specifications on vehicles with the special equipment options JB1/JB2/JB3 and the digital camera prior to model year 2024 from previous Body/Equipment Mounting Directives. These are still available in the Body/Equipment Mounting Directives Archive in the Upfitter Portal.

3) Ultrasonic sensors

! NOTE

Detachable parts fitted in the detection range of the ultrasonic sensors may impair operation of the Park Assist system (e.g. trailer coupling, overhangs of bodies, wheel carriers, steps, front brush guard brackets).

The bumper must not be subsequently painted with ultrasonic sensors installed. The coat of paint impairs the emission and reception of the ultrasonic signals.

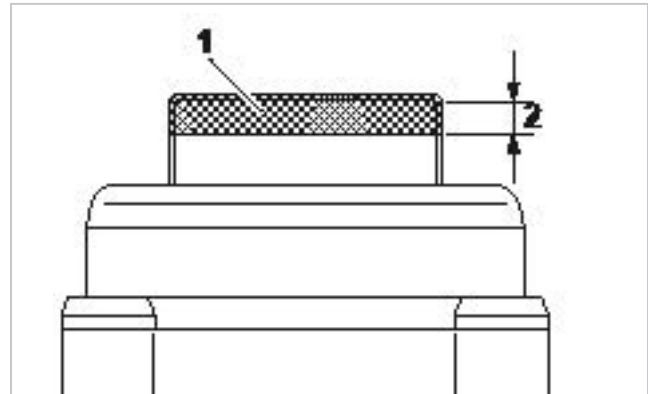
! NOTE

Sensors that have already been painted must not be repainted or touched up.

Unpainted sensors and sensors painted in a range of colors are available from your Mercedes-Benz partner.

The maximum thickness that the paint coat on the diaphragm can be without impairing sensor operation is 120 µm. This also includes repeated paint applications and the coat from cathodic electrodeposition (KTL coat). The KTL coat thickness is between 12 µm and 25 µm.

- ▶ To ensure proper functioning of the sensors, check the coating thickness at random points.
- ▶ When painting, it is essential that not only the diaphragm itself, but also the cylindrical edge of the sensor diaphragm is coated with paint evenly all the way round and covering at least 2 mm.



Area to be painted on sensor diaphragm cylindrical edge

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

! NOTE

The coat of paint must not be ground off mechanically. This could damage the cathodic dip coating or the sensor diaphragm.

! NOTE

If the surface has been primed with cathodic dip coating, the paint must not be removed by chemical means. This could damage the cathodic dip coating and a new coating would not be able to be applied afterward. Nor is it permitted to touch up damaged areas chemically or mechanically.

8.9.9 Reversing camera

Available special equipment

Code	Equipment ¹⁾
FR3	Analog reversing camera with inside rearview mirror display
FR8	Digital reversing camera with display via central display
FV1	Pre-installation for analog reversing camera with inside rearview mirror display
FR7	Pre-installation for digital reversing camera with display via central display

1) This description is intended as an explanation and is not the same as the code designation.

! NOTE

The information and specifications in the operator's manual for your vehicle must be adhered to. Please make yourself familiar with the functions of the driving assistance systems.

! NOTE

External contours of the vehicle body, detachable parts that protrude from the outer surface of the body or retrofitted vehicle equipment can lead to a restriction of the viewing area behind the vehicle or can disturb the visual impression in the display and thus lead to a limited function of the driving assistance system

! NOTE

Upfitter-specific operator's manuals must contain appropriate warnings and information for the vehicle user, which at least refer to:

- Possible restriction due to retrofitted detachable parts or vehicle equipment that protrude into the viewing area of the reversing camera, e.g. bicycle rack at the rear of the vehicle
- Possible impairment of the function of the driving assistance system if the reversing camera and its surroundings on the vehicle are damaged
- Obligation to check the function of the driving assistance system if damage is detected and after accidents affecting the reversing camera or its surroundings on the vehicle. It is recommended that you have this check carried out by your Mercedes-Benz Dealership/Service Center.

1) Reversing camera ex factory

Two reversing camera systems are available ex factory, which, depending on the country-specific legal regulations, are either already installed in the vehicle as standard or are available as special equipment:

- Analog reversing camera with inside rearview mirror display (code FR3)
- Digital reversing camera with display via the central display (code FR8)

For other markets, the analog or the digital camera is available as special equipment depending on the country.

On closed model designations (Panel van and Tourer), the installation is implemented with a holder on the rear roof frame;



Position of reversing camera on closed model designations

For open model designations without platform ex-factory, pre-installations are available for the analog or digital camera (code FV1 or FR7), see section 2 (→ page 332).

⚠ WARNING

Any modifications to the camera systems and their surrounding areas, as well as any bodies, installations or conversions with an impact on the function and detection range of the camera, are not permissible.

Otherwise, driving assistance systems may no longer function as intended and legal requirements may no longer be met.

There is risk of an accident and danger to life and limb!

! NOTE

The guide lines of the digital reversing camera (code FR8) in the central display are designed exclusively for the basic vehicle.

If approved detachable parts are retrofitted to the rear area of the vehicle, it is necessary to have the relevant parameter set coded in the reversing camera by your Mercedes-Benz Dealership/Service Center.

If the vehicle is lengthened at the rear with the upfitter's own detachable parts so that it deviates from this configuration, the guide lines of the reversing camera must be deactivated.

To hide the guide lines, perform SCN coding using O-code O1N "Activation of reversing camera without guide lines" via XENTRY, see chapter 2.2.4 of the corresponding Body and Equipment Guidelines.

2) Retrofitting the reversing camera

There are two options for retrofitting a reversing camera:

- Pre-installation for analog reversing camera with inside rearview mirror display (code FV1)
- Pre-installation for digital reversing camera with display via the central display (code FR7)

! NOTE

Compliance with country-specific laws and guidelines on the visibility area behind the vehicle (e.g. UN-R 158) and the fulfillment of the obligation to provide evidence for the registration and driving operation of the converted vehicle is the sole responsibility of the upfitter.

2a) Analog reversing camera: Pre-installation of reversing camera with inside rearview mirror display (code FV1)

It is recommended to use the analog camera offered by Mercedes-Benz AG. It is not supplied with the vehicle on delivery and is therefore available as an individual part without wiring harness from a Mercedes-Benz Dealership/Service Center:

Item number **A 000 905 68 15**

- Please contact your Mercedes-Benz Dealership/Service Center for information on successor numbers if the specified item number is invalid.

- Information on the geometry of the camera can be found in the CAD data. This can be obtained upon request via the Upfitter Portal.

! NOTE

If you are using analog cameras other than those offered by Mercedes-Benz, these must comply with the same standard NTSC 60 Hz.

This pre-installation provides interfaces for connecting the analog reversing camera in the driver seat frame on open model designations and in the area of the 3rd brake lamp (on the roof at the top of the rear area) on closed model designations, see section 4 (→ page 338).

! NOTE

The reversing camera system is classified as ASIL Level A according to ISO 26262. For all the components involved, it must be ensured that no delayed or frozen images can occur, see section 5 (→ page 343). Upon request from Mercedes-Benz, provide appropriate verification of this to your contact via the Upfitter Portal (→ page 23).

2b) Digital reversing camera: Pre-installation for electric reversing aid (code FR7) for retrofitting of a digital reversing camera with display via head unit display

This special equipment is only available for open model designations. For closed model designations, the special equipment code FR8 must be used; see section 1 (→ page 330).

! NOTE

Only the digital reversing camera offered by Mercedes-Benz must be used for the digital reversing camera system.

Any other digital camera is not permitted, because it is not approved for combining with the other system components (e.g. the central display).

Code FR7 is only possible in combination with the MBUX multimedia system special equipment with 10.25-inch touchscreen (code E7M or E7H).

This pre-installation provides the interface for connecting the reversing camera in the driver seat frame of open model designations; see section 4 (→ page 338).

From model year 2024, a new system generation of the digital reversing camera (RVC5) and control unit will be used. New information and specifications are described below.

- i If you have further questions, please reach out to Mercedes-Benz via the Upitter Portal (→ page 23).
- i If necessary, you can obtain information and specifications on vehicles with the special equipment code FR7 and the digital reversing camera prior to model year 2024 from previous Body and Equipment Guidelines. These are still available in the Body and Equipment Guideline in the Upfitter Portal.

3) Retrofitting the digital reversing camera with pre-installation code FR7

The digital reversing camera is not included when the vehicle is delivered and is therefore available (with hardware and software in the delivery package) without wiring harness via a Mercedes-Benz Dealership/Service Center.

Item number **A 000 900 85 50**

The 3D design data of the camera with the 3D cone of vision is available for the digital planning and design of the body:

Item number **A 177 901 06 04**

If required, an adapter wiring harness with electric couplings and a cable length of 11.81 in (300 mm) is available, for details see section 4b (→ page 340):

Item number **A 907 820 83 01** (with cable grommet)

Item number **A 907 820 75 01** (without cable grommet)

A holder (with reversing camera included in the delivery package) is also available for the closed model designations, details at the end of the following section (→ page 337).

Item number **A 907 820 93 01**

- i Item numbers for other versions of this holder, e.g. variants depending on the type of steering or in combination with the rearview camera for digital inside mirror (code F84/F85, see chapter 8.9.10 of the corresponding Body and Equipment Guidelines), can be obtained from your Mercedes-Benz Dealership/Service Center.
- i Please contact your Mercedes-Benz Dealership/Service Center for information on successor numbers if the specified item numbers are invalid.

i Details of the component geometry can be found in the 3D design data and 2D drawings. This can be obtained upon request via the Upfitter Portal.

Specifications for the reversing camera holder

The Upfitter must produce a separate holder for positioning and installing the reversing camera, which must meet the following specifications:

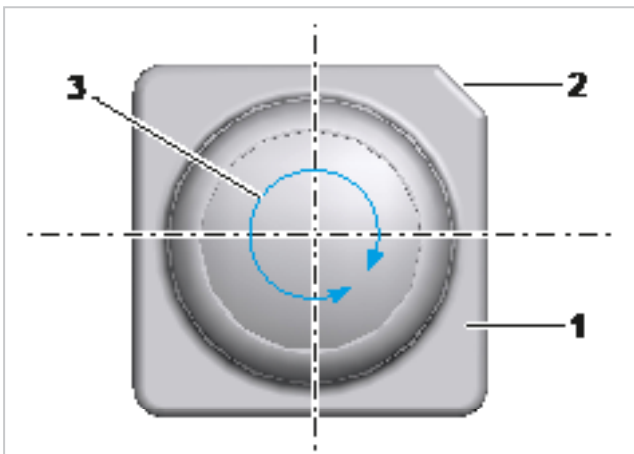
- The holder must be specially adapted for installation on the upfitters specific body and be suitable for the intended use of the camera while driving.

i The holders of the reversing camera for closed and open model designations ex-factory with code FR3 or FR8 (→ page 330) can possibly be used for installation on the upfitter-specific body or as a basis for the structural design of your own holder, see information at the end of the following section (→ page 337).

! NOTE

The camera must be attached to the body with the holder so that the beveled corner is exactly at the top right (when viewed from behind), see the following illustration.

A maximum deviation in the installation position of $\pm 1^\circ$ (rotation around the center axis of the camera) is permitted.



Alignment of the reversing camera on the body, view from behind

- 1 Reversing camera (RCV5)
- 2 Beveled corner at top right
- 3 Permissible tolerance of the installation position around the axis of rotation: max. $\pm 1^\circ$

- For consistently good image quality, design the holder with high component rigidity to reduce camera vibrations as much as possible.
 - Comply with IP protection class IP6K7K for the camera and electrical connections.
 - Observe the electrical connection specifications (→ page 338) also when planning, manufacturing and installing the holder.
 - The plugs of the cables must be located in the interior of the body.
 - Take precautions to ensure that no liquid collects in the holder or in the cut-out in the body.
 - Take suitable measures to protect the line from damage in the area of the cable run into the body interior. Also seal the cable run against water and dirt ingress.
- When using the adapter wiring harness, a variant with cable grommet is available, see section 4b (→ page 340). This seals the opening of a cable run with a sheet metal part.

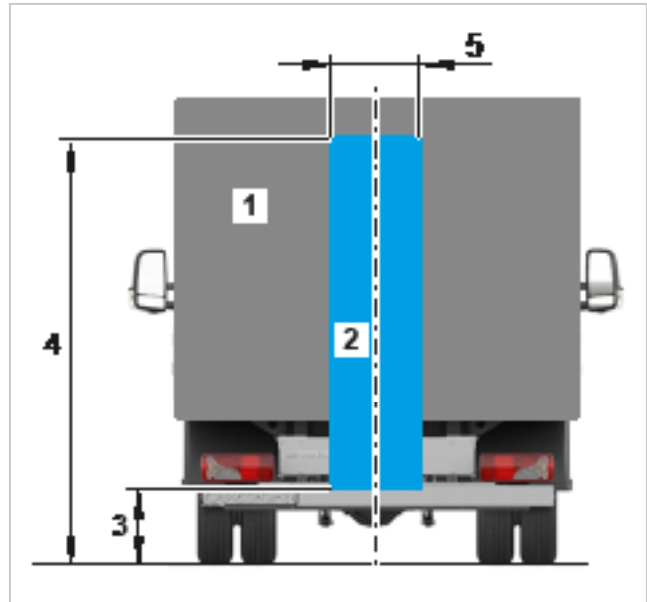
Positioning and installation specifications

! NOTE

The limit values for the installation position and alignment of the reversing camera on the vehicle must be observed.

Deviations are only permitted after inspection and approval by the specialist department. For this purpose, the upfitter must submit an application for compatibility testing. Also observe the information in section 2 (→ page 332).

- Depending on the upfitter-specific body, a position in the marked area **2** of the rear of the vehicle can be selected for the installation of the camera.
- Positioning and installation of the reversing camera on the upper roof frame is permitted if the limit value for the maximum height is not exceeded.
- The reference point for positioning the camera is the center of the camera lens.



Permissible range for the installation position of the reversing camera in the Y and Z directions (schematic)

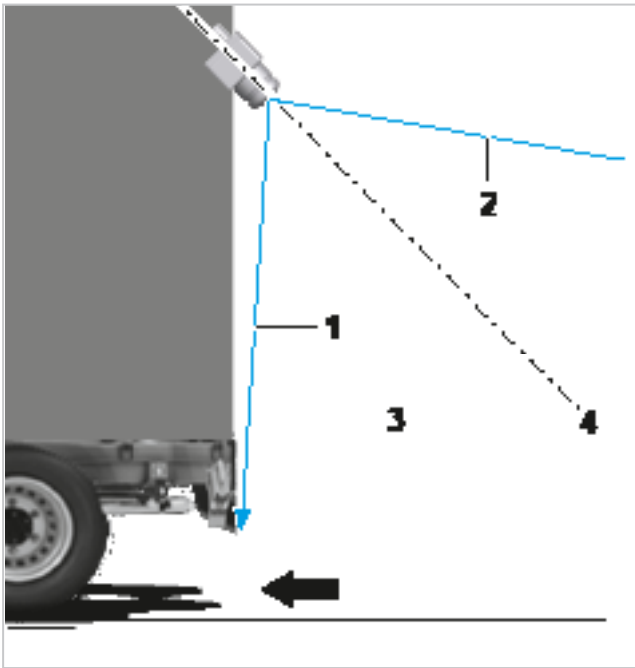
- 1 Example of any upfitter-specific body
- 2 Permissible range for the installation position
- 3 Minimum height above roadway: 21.25 in (540 mm)
- 4 Maximum height above roadway: 118.11 in (3000 mm)
- 5 Maximum deviation ± 7.87 in (± 200 mm) relative to the center of the vehicle

Permissible range for the installation position

	Installation position	Limit value [in] [mm]
A	Minimum height above roadway ¹⁾	Min. 21.25 540
B	Maximum height above roadway ¹⁾	Max. 118.11 3000
C	Maximum deviation, in relation to the center of the vehicle	Max. ± 7.87 200

- 1) The height in the Z-direction above the roadway must be measured on the vehicle with a fully completed body in running order without load.

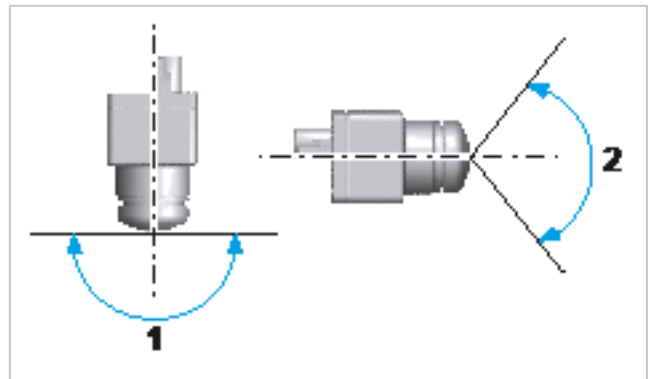
- Align the camera so that the rearmost contour in the lower area of the rear of the vehicle is clearly visible on the central display.



Installation position and alignment of the camera on the body (schematic)

- 1 View to the rearmost point in the lower area of the rear of the vehicle (lower viewing angle limit)
- 2 Upper viewing angle limit to the rear
- 3 Viewing area (asymmetrical)
- 4 Center line of camera lens

- Vibrations and movements of the camera while driving can have a negative effect on the image quality and must therefore be reduced as much as possible. It is therefore recommended that the holder with camera is only installed on structural components and/or in vehicle surroundings with high inherent rigidity.
- When positioning and installing the camera, ensure that the viewing area to the rear is not restricted. Observe the notes on impermissible restrictions of the viewing area, see chapter 8.9.9 Reversing camera (→ page 330) and the legal requirements for the viewing area and permissible interfering contours in accordance with section 2 (→ page 332).

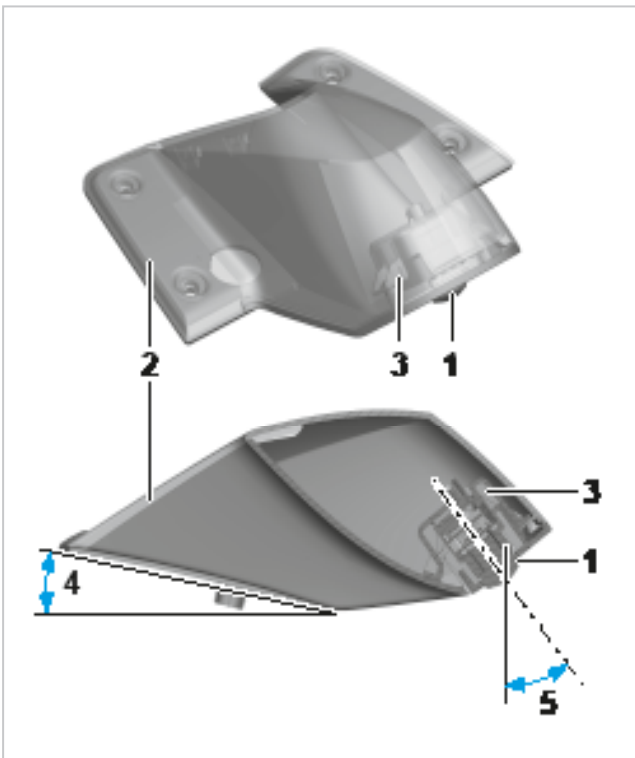


Horizontal **1** and vertical **2** viewing area or viewing angle limit (schematic), see 3D design data for details of the viewing cone

The holder of the reversing camera with code FR8 for closed model designations ex-factory on the rear roof frame – see figure (→ page 330) – can be used for a upfitter-specific body solution or as a basis for the design of a new holder.

Note that this holder has an inclination and a curvature on the underside due to the vehicle contour and that the camera is attached to the holder with a tilt to the vertical **5**. This must be taken into account when planning to use the holder.

i Details can be found in the 3D design data and 2D drawings.



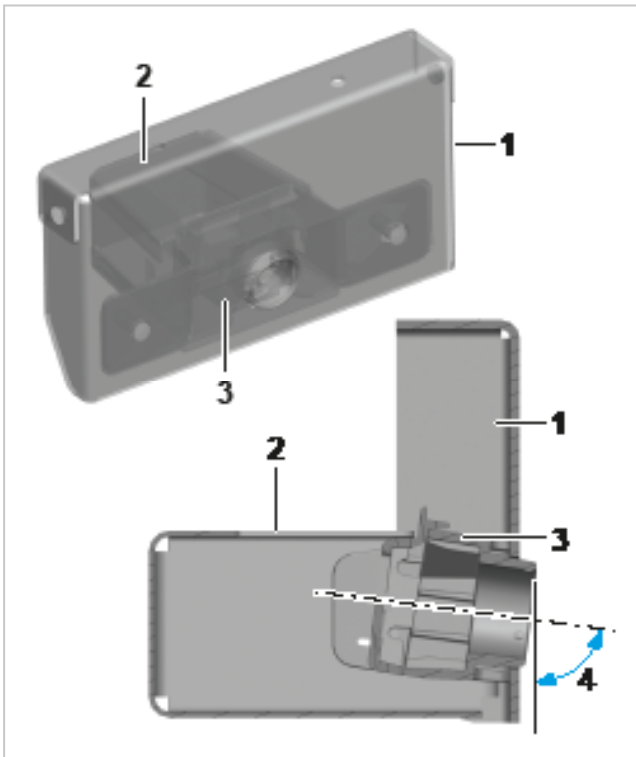
Reversing camera holder (code FR8) for closed model designations, installation on the rear roof frame

- 1 Reversing camera
- 2 Holder
- 3 Camera mounting
- 4 Inclination of holder approx. 13°
- 5 Tilt of camera approx. 40°

See below an image of how the FR3 or FR7 camera can be mounted to the open model designation using a separate holder.

These component parts can be used for a upfitter-specific body solution or as a basis for the design of a new holder.

Make sure that the camera is mounted in the holder with a tilt to the vertical **4**. This must be taken into account when planning to use the holder.



Mounting and cover parts for reversing camera on open model designations, installation on structural part

- 1 Holder plate under platform
- 2 Camera cover with electrical connection
- 3 Camera attachment (illustration without reversing camera)
- 4 Camera tilt approx. 82°

i Details can be found in the 3D design data and 2D drawings.

4) Electrical connection

After installation, the reversing camera must be electrically connected directly to the vehicle's connecting point by a qualified electrician using a video cable and, in the case of the analog camera, also using a power supply cable.

On open model designations, the connecting point on the vehicle for the analog and digital reversing camera is located in the driver seat frame; for the analog reversing camera on closed model designations, it can be found in the area of the 3rd brake lamp (in the roof area at the rear end).

There is no connecting point for the digital reversing camera on closed model designations as no pre-installation is available for this, only the standard design (code FR8).

The wiring harness must satisfy the following requirements:

- The wiring harness (cable with plug) made by a qualified electrician or wiring harness manufacturer must be checked for electrical connections and functionality before use (according to DS characteristic: Mandatory documentation relevant to safety). It must be possible to submit the test results at the request of Mercedes-Benz.
- An additional connecting point along the entire length of the cable between the camera or adapter cable (if used) and the vehicle's connecting point is not permitted.

- The connector couplings of the camera are only approved for a dry environment. The upfitter must ensure a watertight connection of the lines to the camera.
- When laying the video cable, the minimum bending radius must not be less than $3 \times d$ (d = cable diameter).
- Ensure that the lines are laid correctly in the vehicle, see chapter 8.4.3 of the corresponding Body and Equipment Guidelines.
- The quality of the video/high-frequency line must correspond at least to the values specified by LEONI Dacar.
- The line quality was designed for the lengths of line specified in sections 4a (→ page 339) and 4b (→ page 340) from the connecting point to the camera. If a longer line is required, its functional capability must be assured by means of tests conducted at the upfitter's expense. It must be possible to submit the test results at the request of Mercedes-Benz.
- The reversing camera system must not be disrupted by EMC influences, e.g. by 230 V systems, actuators etc.

4a) Analog reversing camera (code FV1)

For the video line, use only cables of the following type and observe the maximum line length:

Cable type	Maximum line length ¹⁾
	[in] [mm]
Leoni Dacar 360-KOAX-B (105)-75-1.68-2.7	377.95 9600

1) Required line quality verified up to maximum length of line. For specifications see section 4 (→ page 338).

For the electrical connection, observe the following information on the connecting point and camera:

Position, Connection type	Parts category	Supplier, Order number (MB item number)	Type, coding	Pin assignment
Seat box connecting point, Power supply line	Plug housing	Tyco Electronics, 1-1394 450-2 (A 042 545 92 28)	Male, MQS 4-pin black	Pin 1: Power supply (terminal 15) Pin 2: Battery (terminal 31) Pin 3: not used Pin 4: not used
Seat box connecting point, Video line	Socket housing	Rosenberger 59Z063-DC0F (A 023 545 60 26)	Female, Coding F	Pin 1 (center): RV_OUT Pin 2 (shield): RV_OUT_GND
Reversing camera, Power supply line	Plug housing	Hirschmann, 872-863-501 (A 211 545 15 28)	Male, Coding A MLK 2-pin black	Pin 1: Power supply (terminal 15) Pin 2: Battery (terminal 31)
Reversing camera, Video line	FAKRA radio-frequency male connector	Rosenberger, 59Z176-C01F (A 000 545 93 12)	Male, Coding F	Pin 1 (center): RV_OUT Pin 2 (shield): RV_OUT_GND

- i** The supplier order numbers and Mercedes-Benz item numbers are not subject to any change management as part of updates to the Body and Equipment Guidelines.
Please contact the supplier directly for information on successor numbers if the item numbers given are invalid.

It is permissible to vary the length of the adapter cable.

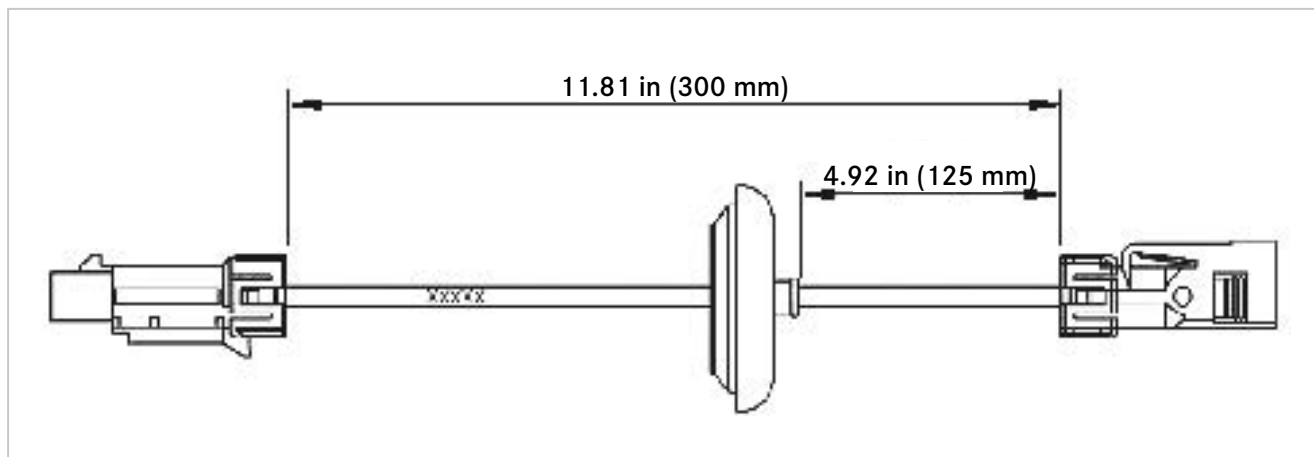
Do not configure any other interfaces in the video line up to the connecting point in the driver's seat box.

- i** Further information on connecting points for the BR 907 can be found in the Upfitter Portal.

4b) Digital reversing camera (code FR7)

For easier assembly of the camera with holder on the body, an adapter wiring harness with electric couplings and a cable length of 11.81 in (300 mm) is available, see following illustration, for item numbers see section 3 (→ page 333).

The cable grommet can be slid on the cable, is suitable for sheet metal parts from 0.02 to 0.11 in (0.6 to 3 mm) and requires a round opening with a diameter of 0.98 in (25 mm) (see 2D drawing of cable grommet A000 998 55 02).



Adapter wiring harness that can be moved along the cable with electric couplings and cable grommet for cable run in sheet metal part, value in brackets depending on the sliding position of the cable grommet

For the video cable between the camera (or the adapter video cable, if used) and the connecting point on the vehicle, only use cables of the following type and observe the maximum cable length:



Cable type	Maximum line length ¹⁾
	[[in] [mm]
LEONI Dacar 462	551.18 14000

1) Required line quality verified up to maximum length of line. For specifications see section 4 (→ page 338).

8 Electrics/electronics

For the electrical connection, observe the following information on the connecting point and camera:

Position, Connection type	Parts category	Supplier, Order number (MB item number)	Type, coding	Pin assignment
Seat box connecting point, Video line	FAKRA radio-fre- quency male connector	Rosenberger, 59Z064-DC0 F (A053 545 40 28)	Male, Coding F	Pin 1 (center): SIGNAL Pin 2 (shield): GND
Reversing camera, Video line	FAKRA radio-fre- quency female connector	Rosenberger, 59Z163-DC0 F (A00 545 91 12)	Female, Coding F	Pin 1 (center): SIGNAL Pin 2 (shield): GND

-  The supplier order numbers and Mercedes-Benz item numbers are not subject to any change management as part of updates to the Body and Equipment Guidelines.
Please contact the supplier directly for information on successor numbers if the item numbers given are invalid.
-  Further information on connecting points for the BR 907 can be found in the Upfitter Portal.

5) Requirements for commissioning

The digital reversing camera must be commissioned by coding using the XENTRY Kit, see chapter 2.2.4 of the corresponding Body and Equipment Guidelines.

We recommend that you have this carried out in a Mercedes-Benz workshop.

! NOTE

In addition to code FR7, O-code O1N "Activation of reversing camera without guide lines" must be coded in the vehicle and documented in the vehicle data card.

The reversing camera system must be tested and must function flawlessly under real-life conditions (including upfitter requirements):

- When reverse gear is engaged, the picture from the reversing camera is displayed completely and without errors in the central display.
- No guide lines are displayed.
- The rear of the vehicle is clearly visible.
- Noise, distortion, reflections, delayed or frozen images must not occur.

! NOTE

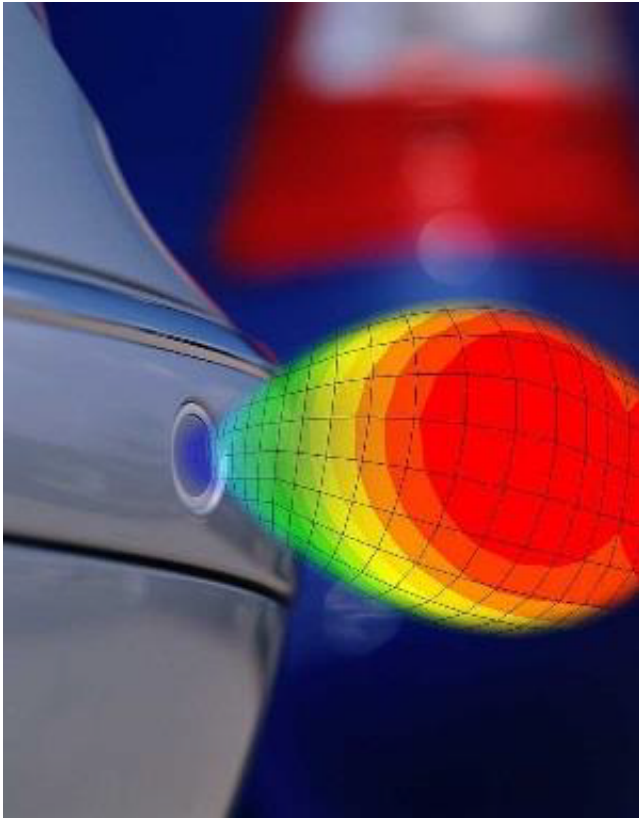
The reversing camera system is classified as ASIL Level A according to ISO 26262. For all the components involved, it must be ensured that no delayed or frozen images can occur (see the section on commissioning at the end of this chapter). Appropriate verification of this must be provided to Mercedes-Benz via your contact on the Upitter Portal (→ page 23).

- ① Further information on commissioning the control units can be found in chapter 8.19 of the corresponding Body and Equipment Guidelines.
- ① If you have further questions, please reach out to Mercedes-Benz via the Upitter Portal (→ page 17).

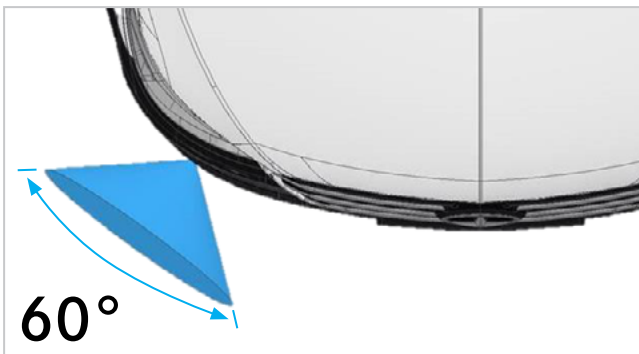
8.9.10 Parktronic sensors

Parktronic is an electronic parking aid with ultrasound and uses six distance sensors in the front bumper and six distance sensors in the rear bumper to monitor the vehicle's surroundings. The Parktronic provides a visual and acoustic indication of the distance between the vehicle and an obstacle.

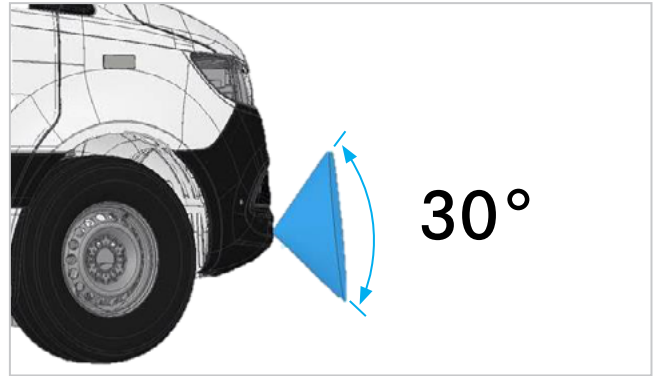
The following pictures show the field of vision and the signal funnel of one Parktronic sensor.



Field of vision



Example of field of vision of one sensor



Example of one sensor

To ensure that the system function is not affected, on no account should the following changes be made:

- Changing the position of the sensor
- Mounting of detachable parts that can shadow the area of or around the sensor
- No additional painting and no foils (also refer to the warning)
- Range of ultrasonic is about 1.2 m/47.2 in

⚠ WARNING

Depending on the version and thickness, paints or film coatings and installed equipment in front of the bumpers causes dampening of waves. This could lead to malfunction or system failure. The driver could lose control of the vehicle and cause an accident.

The area of or around the sensor must not be painted, covered with a film or covered by any after-market equipment.

! NOTE

After any damage to the rear of the vehicle or after any modification to the

- rear overhang
- axle distance
- height of the rear bumper
- new parameters for the sensor

has been made, the setting and function of Parktronic sensor has to be checked at a qualified specialist workshop. This setting also needs to be checked if mild collisions at low speeds has occurred where no damage to the front end of the vehicle is visible.

8.10 Parameterizable Special Module (PSM/MPM)

The parameterizable special module PSM (internal designation: Multi-Purpose Module MPM) is available as special equipment (code ED5).

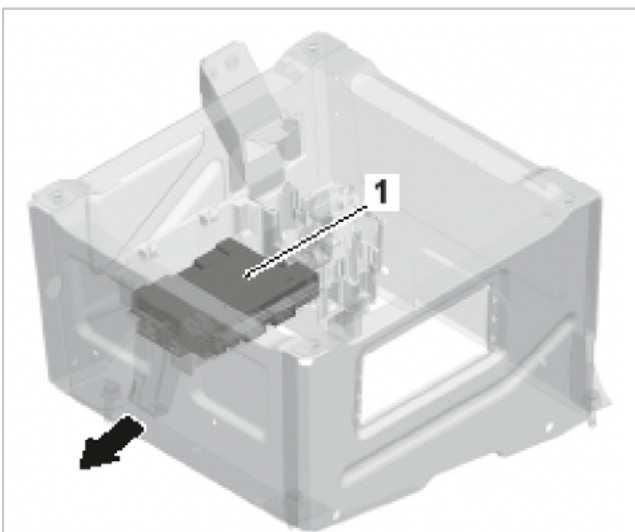
The PSM is an electronic control unit that connects to the vehicle's CAN bus system and can read and control various vehicle functions and is EMC-tested. Because Mercedes-Benz restricts modifications of the CAN bus system and direct access to the vehicle networks, PSM has been developed to provide an indirect access to the vehicle CAN bus. PSM can be purchased under the option code ED5 and part number A907 900 53 03. Pre-wiring for PSM (MPM) can be ordered using the option code ED8 for the customer who wishes to install PSM in the future. Without the option code ED8, PSM cannot be retrofitted onto the vehicle.

! NOTE

The wirings on the vehicle must not be tampered with for this could lead to fault messages from the other control units on the CAN bus.

Please utilize fuses for any electronic consumers connected to PSM.

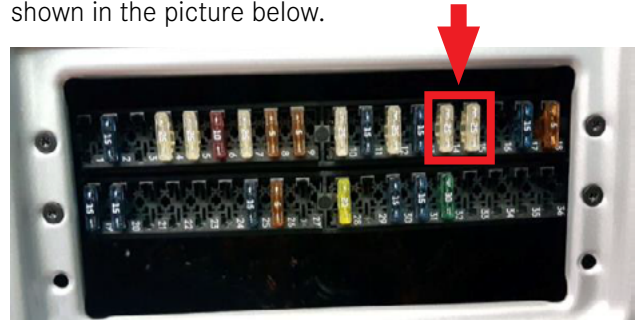
The PSM control unit is located in the driver seat box. PSM can be installed or removed by first removing the driver's seat and then the driver seat base cover. Once the seat has been removed, the bracket for PSM control unit can be found directly beneath the parking system control unit.



PSM installation position

1 Position of PSM in driver's seat box
Arrow Direction of travel

PSM is connected to two fuses in the fuse box on the driver's seat frame. Fuses for PSM, F14 and F15 are shown in the picture below.



Location of fuses for PSM (MPM)

PSM is connected to the vehicle network via the body CAN bus and therefore has access to the specific messages sent by the linked control units (e.g. door status, vehicle speed, engine speed, parking brake active). PSM can translate the messages from various bus data into switching signals at the outputs provided ("high" or "low") or PWM signals (pulse width modulation). Individual signals is monitored or generated at analog and digital inputs and outputs.

PSM provides a clearly defined, diagnostics-compatible and EMC-tested interface between the vehicle and the body.

PSM provides an interface, not a system. The PSM functionality available via the interface is protected as per ISO 26262, generally by a QM process. The protection of functions in which the PSM is involved and compliance with applicable standards (e.g. ISO 26262 on functional safety) and specifications are always the responsibility of the upfitter.

! NOTE

When uploading a new PSM coding, all previous parameterizations are erased. We recommend backing up stored PSM program beforehand.

- i** Model year 2025 marks the introduction of a new generation of PSM with a larger capacity (increased data storage, faster data processing), as well as greater parameterization possibilities and correspondingly adapted software. Observe the information and specifications from the previous Body and Equipment Guideline and Function Descriptions of the PSM for all vehicles with an older generation of PSM.
- i** For additional information, please refer to the Upfitter Portal technical bulletin: Sprinter MY2019+ Parameterizable Special Module (ED5). Inquiries on PSM programs as well as requests for customized PSM programs for eXpertUpfitters can be requested on www.UpfitterPortal.com.
- i** PSM is parameterized using XENTRY. Further information on XENTRY (→ page 24).
- i** Information on standard PSM programs can be obtained from your local Mercedes-Benz Service Center.

⚠ WARNING

The wiring of the vehicle must not be tampered with, as this may lead to fault messages and malfunctions in other control units.

There is risk of an accident and danger to life and limb!

Changes to the wiring of the on-board electronics are therefore not permitted.

For vehicles with a communication module installed ex factory:

! NOTE

Based on the Group-wide decision of the steering committee for "Autonomous driving ethics and law", Mercedes-Benz only makes vehicle data available via internal back ends. Internal back ends are Mercedes me connect or the Extended Vehicle Backend. External vehicle data transmission via the PSM is no longer available as standard.

Exceptions continue to exist for multi-brand applications, fleet applications, car sharing – these are also applications in which the PSM serves as the basis for an additional vehicle body and no vehicle data is sent to a third-party back end.

Mercedes-Benz will continue to support individual PSM queries for use in the vehicle environment. For further information, please get in touch with the designated contact for PSM matters, see Chapter 2.1 Advice for Upfitters (→ page 19).

In relation to data transfer to third-party back ends, observe:

! NOTE

Since 2006, data publication in the vehicle via the PSM or the FMS (Fleet Management Standards) interface has been a common feature for Mercedes-Benz. This data transfer to third parties is no longer possible.

It is important to check first whether the data can be used via Mercedes-Benz alternative interfaces/API (Application Programming Interface) solutions, e.g. Connect Your Fleet.

If data transfer via these interfaces is no longer possible, exceptions may be requested. Consult your designated contact at the Consultancy for Upfitters for this (→ page 19).

Exceptions to this rule are the use cases in which the PSM serves as the basis for an additional vehicle body and no vehicle data is sent to a third-party back end.

Also excepted are vehicles >3.5 tonnes that use the PSM in order to follow the Fleet Management Standard (FMS).

8.10.1 PSM (MPM) Functions

Some of the functions provided by PSM (MPM) using the interior CAN bus (CAN B) are reading and controlling:

- Inputs
 - Digital
 - Analog
- Outputs
 - Pulse-Width-Modulation (PWM) signals
- Illumination and signaling horn
 - Low beams
 - High beams
 - Headlight flasher
 - Horn
- Central locking
 - Lock/ unlock vehicle
 - Lock/ unlock cab
 - Lock/ unlock cargo
- Windshield wipers
 - Speed control of windshield wipers
- Electric sliding door
- Displays in instrument cluster
- Further data from interior CAN
 - Audio muting
 - Acoustic warning tone (internal buzzer)
- Electric step

The above list is not a complete list of all the functions offered by PSM (MPM). More information on the PSM (MPM) functions are available on the Upfitter Portal.

The mini-PLC (mini programmable logic controller) used in PSM programming is a module with freely programmable and freely interconnectable function blocks for creating any signal links that may be required:

- 96 AND/ NAND/ OR/ EXOR/ NOR/ EXNOR
- 24 RS and D flip-flops
- 12 retriggerable/ non-retriggerable timer stages
- 12 hysteresis links with adjustable thresholds
- 24 threshold switches with 3 stages
- 12 counters

Upfitters cannot utilize the PSM to lock/unlock the vehicle after the vehicle is shut off and CAN Bus is in sleep mode.

! NOTE

Lock/ unlock function by PSM is internal lock/ unlock feature cannot override the external lock/ unlock function by the key FOB.

! NOTE

For vehicles with a factory-installed communication module:

Based on the group-wide resolution from the control committee on fully automated driving, ethics and the law, Mercedes-Benz only makes vehicle data available via internal back ends. Internal backends are Mercedes me connect or the Extended Vehicle Backend. External vehicle data transmission via the PSM is no longer available as standard.

Exceptions continue to exist for multi-brand applications, fleet applications and car-sharing. This is also so for use cases in which the PSM serves as the basis for an additional vehicle body and no vehicle data are sent to a third-party back end. The Mercedes-Benz will continue to support for individual PSM request for usage inside the vehicle environment. For more information, please reach out to: www.UpfitterPortal.com.

For individual support, please use the inquiry function on www.UpfitterPortal.com.

8.10.2 PSM interfaces

- I/O module
 - 25 parameterizable inputs
 - 25 parameterizable outputs, of which 2 outputs are for actuation of relay changeover contacts
- Logic functions (mini-PLC)

The mini-PLC (PLC: Programmable Logic Controller) is a module with freely programmable and freely interconnectable function blocks for creating any signal links:

 - 224 AND/NAND/OR/EXOR/NOR/EXNOR
 - 56 RS and D flip-flops
 - 84 retriggerable/non-retriggerable timer stages
 - 28 hysteresis elements with adjustable thresholds
 - 56 threshold switches with 4 stages
 - 28 counters
- Arithmetic unit
 - 40 computing blocks
 - 16 filters
 - 16 comparators
 - 8 characteristics
 - 32 non-volatile memories
 - 40 freely definable constants

8.10.3 PSM (MPM) Pin Assignment

With MY25 Software and Hardware of the PSM (MPM) has been updated.

Software Update:

Upfitters who would like to carry over their existing PSM program from MY24 and younger to MY25 must request a software update via the upfitterportal.

Hardware Update:

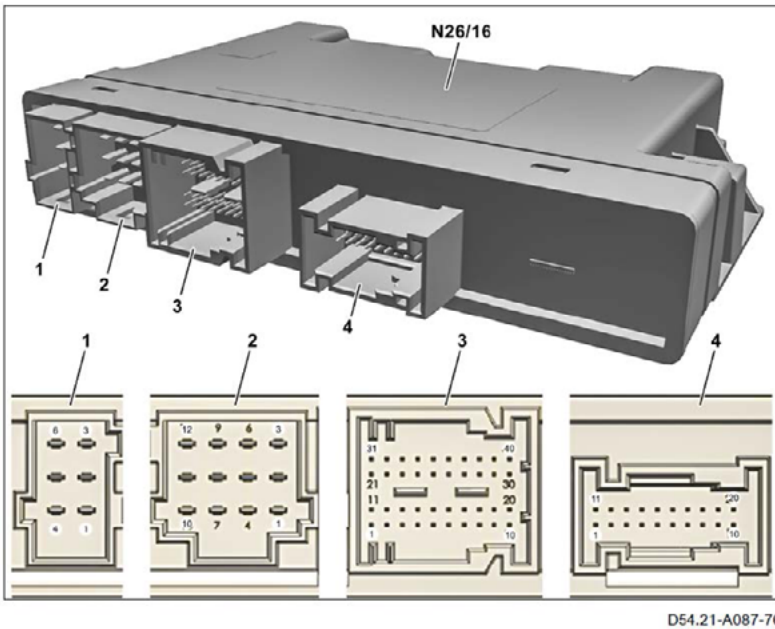
Upfitters who are ordering E5M (PSM extension plugs) already on MY24 and previous models can carry over

their existing wiring harness. Upfitters who are connecting to the PSM without E5M must modify the wiring harness to match the new connectors and pin assignment of the new MY25 PSM.

! NOTE

Mercedes-Benz recommends to order option code E5M to ensure a proper connection to the PSM and does not recommend to connect to the pins of the MY25 PSM directly without E5M.

Pin assignment, general 1-4 Slot designation N26/16
Parameterizable special module (PSM) control unit



D54.21-A087-76

E5M input and output extension plugs pin assignment

Plug Inputs

Pin	Circuit
1	Input 1
2	Input 2
3	Input 3
4	Input 4
5	Input 5
6	Input 6
7	Input 7
8	Input 8
9	Input 9
10	Input 10
11	-
12	Ground (Plug 2)
13	Ground (Plug 2)
14	ABH CAN-H
15	ABH CAN-L
16	Ground (Plug 1)
17	-
18	-

Plug Outputs

Pin	Circuit
1	Output 1
2	Output 2
3	Output 3
4	Output 4
5	Output 5
6	Output 6
7	Output 7
8	Output 8
9	Output 9
10	Output 10
11	Output 11
12	Output 12
13	Output 13
14	Output 14
15	Output 15
16	Output 16
17	Output 17
18	Output 18
19	Output 19
20	Output 20
21	-

8.10.4 Additional information on PSM (MPM)

PSM (MPM) programs are parameterized using XENTRY (→ page 24)

Programming of PSM (MPM) software can only be performed by trained and authorized Mercedes-Benz personnel. Uploading of PSM (MPM) software can be performed by any individual trained and authorized by Mercedes-Benz personnel.

- ① Additional information on standard parameterization possibilities can be obtained from Mercedes-Benz Service Center. Standard PSM programs for Sprinters are available at local dealerships. Inquiries on PSM programs as well as requests for customized PSM programs for eXpertUpfitters can be requested on www.UpfitterPortal.com.

8.11 Signal acquisition and actuation module (SAM)

The power circuit on the Sprinter BM 907 comprises the signal acquisition and actuation module (SAM) in connection with a fuse and relay block (SRB). These limit switches supply the systems and control units with power, depending on the function sequence. The requirements are relayed to the SAM either over CAN or via directly scanned switches and sensors. The fuses on the fuse and relay blocks also provide protection for individual components.

The fuse and relay box acts as a monitor for electromechanical switching units.

With the update to the existing Body/Equipment Mounting Directive to model year 2024, the overview of the functions in the SAM are omitted.

If additional information is required, please get in touch with your contact person via www.upfitterportal.com (→ page 19).

8.12 Electrical circuit diagrams

Electrical circuit diagrams can be made available to eXpertUpfitters as part of the eXpertUpfitter Program.

As part of the eXpertUpfitter program please refer to www.UpfitterPortal.com.

Electrical circuit diagrams can also be called up in the Workshop Information System (WIS) (→ page 23).

<https://www.startekinfo.com>

8.13 Telematics and Infotainment

The table below lists the abbreviations used in the field of telematics.

Abbreviation	Meaning/description
HU	Head Unit
NTG7	Multimedia system incl. navigation with 7" or 10.25" display
DVI	Digital Visualization Interface
CAN	Controller Area Network
CAR PC	Control unit or PC installed in the vehicle
TMD5	Transition-Minimized Differential Signaling
RGB signal	Red, Green and Blue signal
PSM	Parameterizable Special Module
DAB	Digital Audio Broadcasting
LTE	Long Term Evolution
AM/FM	Amplitude Modulation/Frequency Modulation
SDARS	Satellite Digital Audio Radio Services
HDMI	High-Definition Multimedia Interface
RHC	Right hand circulation polarization
MBUX	Mercedes-Benz User Experience (multimedia system based on Connect5 or NTG6)
AUB	Antenna switchover box
GPS	Global Positioning System
GNSS	Global Navigation Satellite System

8.13.1 Overview of the Infotainment system

The new NTG6 telematics generation has been integrated in the Sprinter and thus offers the entertainment convenience familiar from the passenger car model series. Numerous entertainment and user experience applications are available with the Mercedes-Benz User Experience MBUX special equipment.

In addition to the radio pre-installation special equipment (Code ERO) and radio pre-installation with DAB (Code E7A), the following infotainment systems are also available:

Code	Infotainment system	Telephony (Bluetooth®)	Smartphone integration	Navigation	Reversing camera	360° camera	Voice control ("Hey Mercedes")
E1O	MB audio system	Yes	No	No	No	No	No
E3M	MBUX multimedia system with 7" touchscreen (Connect5)	Yes	Yes ¹⁾	No	Yes	Yes	No
E3M + E1E	MBUX multimedia system including navigation with 7" touchscreen (NTG6)	Yes	Yes ²⁾	Yes	Yes	Yes	Yes
E4M	MBUX multimedia system including navigation with 10.25" touchscreen (NTG6)	Yes	Yes ²⁾	Yes	Yes	Yes	Yes

- 1) Smartphone integration via Apple CarPlay® (ACP) and Android Auto® (AA) wireless, country-dependent availability only in combination with the "Communication module for digital services" in the vehicle (Code JH3), see Chapter 8.14 Connectivity solutions (→ page 360)
- 2) Smartphone integration via Apple CarPlay® (ACP) and Android Auto® (AA) via cable (USB-C)

Further details on the Infotainment systems, the other special equipment and the equipment packages can be obtained from the corresponding sales information and from your Mercedes-Benz sales partner.

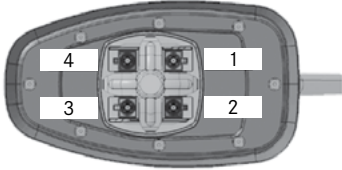
The functions of the various telematics equipment are described in the operator's manual for your vehicle.

- i** The information and specifications on operating multimedia and vehicle systems in Chapter 7.15.f New features for RVs (→ page 245) and Chapter 8.3.1 Main battery (→ page 258) must be observed.

The functions of the various head units are described in the operator's manual.

- i** The notes and specifications for operating the multi-media and vehicle systems in Chapter 7.15.5 New features for RVs (→ page 245) and Chapter 8.3.1 Main battery (→ page 258) must be observed.

8.13.2 Antennas

Antenna variants with equipment ex factory		
Equipment, function	Antenna type (item number)	Explanation
		
Radio pre-installation Entry-level radio	Antenna for radio (A9079051702)	1 AM/FM1: FAKRA code A 2 FM2: FAKRA code E 3 Not provided 4 Not provided
Navigation	Antenna for radio TEL GNSS (A9079051802)	1 TEL: FAKRA code D 2 FM2: FAKRA code E 3 GNSS: FAKRA code C 4 AM/FM1: FAKRA code A
DAB	Antenna for radio TEL GNSS DAB (A9079051902)	1 TEL: FAKRA code D 2 FM2/DAB2: FAKRA code E 3 GNSS: FAKRA code C 4 AM/FM1/DAB1: FAKRA code B

Antennas for vehicles with and without cab roof ex factory

For vehicles without a cab roof (cab base vehicles code F28 or F50), a pre-installation for antennas is available as special equipment (code E4A) instead of the ex-factory antenna, (→ page 242).

This special equipment contains an antenna switchover box in the driver's seat box as an interface for an accessory antenna used by the upfitter and the associated wiring harness for the power supply.

The antenna switchover box serves solely for the modulation of signals of an accessory antenna for the further signal processing in the Mercedes-Benz head unit. A connection of the antenna installed ex factory and available via Mercedes-Benz Service is not permissible with the antenna switchover box.

Observe the following illustrations of the connection schematics. Also observe the installation instructions and specifications of the accessory antenna manufacturer.

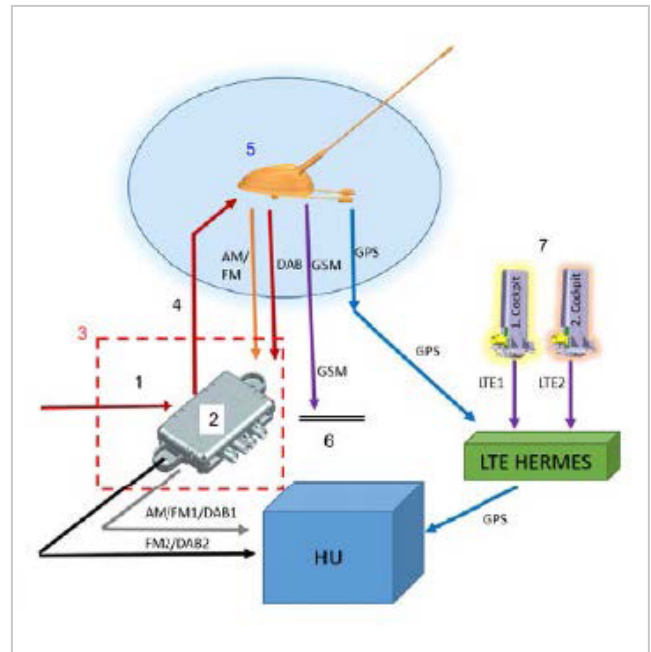
Overview of antennas for vehicles with and without cab roof ex factory

For vehicles without cab roof (cab base vehicles code F28) a pre-installation for antennas is available as special equipment (code E4A) instead of the antenna ex works, see Chapter 7.14.8 Connecting point for antenna switchover box for third-party antennas (code E4A) (→ page 233).

This special equipment includes an antenna switchover box in the driver's seat base as an interface for an accessory antenna used by the upfitter and the associated cable set for the power supply.

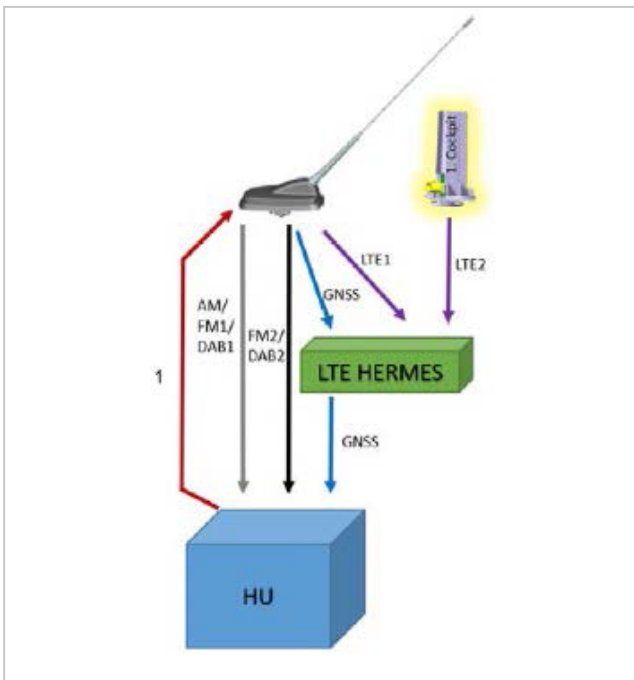
The antenna switchover box serves solely for the modulation of signals of an accessory antenna for the further signal processing in the Mercedes-Benz head unit. A connection of the antenna installed ex factory and available via Mercedes-Benz Service is not permissible with the antenna switchover box.

Observe the following illustrations of the connection schematics. Also observe the installation instructions and specifications of the accessory antenna manufacturer.



Connection diagram: Vehicles with pre-installation for antenna (code E4A)

- 1 Power supply 12 V (tml. 30 from wiring harness)
- 2 Antenna switch box (AUB)
- 3 Antenna ABH interface (code E4A)
- 4 Power supply 12 V through AUB
- 5 Accessory antenna
- 6 GSM interface in radio slot
- 7 Two LTE antennas in the cockpit (second antenna always with code F28/F50)



Connection diagram: Vehicles with ex factory antenna

- 1 Power supply (external feed) through HU (Head Unit)

Requirements on antenna switchover box for upfitter antenna

The antenna switchover box must be supplied with the following signals:

- FM (87 MHz – 108 MHz)
- AM (531 kHz – 1720 kHz and 5.9 MHz – 26.1 MHz)
- DAB band III (174–240 MHz)
- Impedance 50 ohms

Global Navigation Satellite System (GNSS)

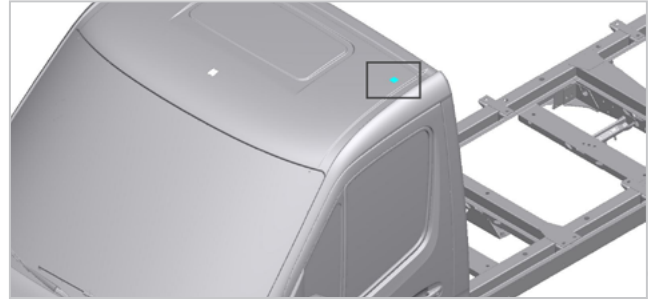
The connection of the navigation system must be supplied with the following signal:

Antenna	
Antenna type	Patch
Frequency	1575 MHz – 1606 MHz
Gain in antenna	2 dBic, mean value Theta 0 – 20°
Polarization	RHC
Amplifier	
Reinforcement	28 dB core
Noise factor	≤1 dB (without filter)
Impedance	50 ohm
Power supply	
Operating voltage	4.5 V – 5.5 V
Power consumption	20 mA ± 3 mA
Phantom power	Yes

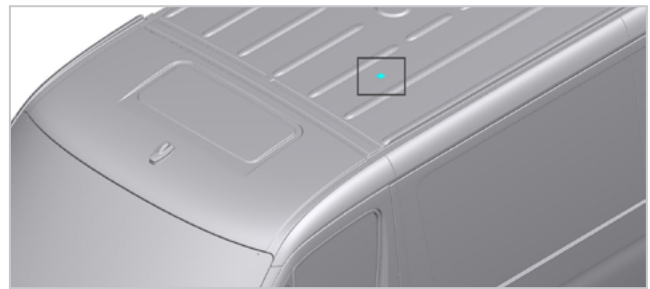
Satellite radio for USA/Canada

For SDARS (Satellite Digital Audio Radio Services), the antenna A2139055105 and the antenna dome A2388270100 must be used. Please contact your Mercedes-Benz Service Partner to obtain these components. The design specifications can be found in the current SiriusXM guideline, which can be requested from this antenna manufacturer.

There are two positions associated with the location of the above parts depending on the vehicle type.



Position of antenna for the cab chassis



Position of antenna for the cargo van

! NOTE

To ensure that no interference with the satellite signals occurs due to upfitting, the antenna must be positioned at the highest point on the vehicle.

! NOTE

For vehicles that do not have code E1S (Sirius XM satellite radio), satellite antenna can be installed by following WIS.

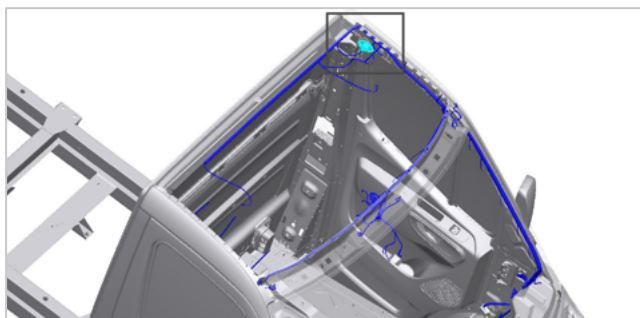
Modification Guidelines:

If the vehicle is equipped with a roof cut-out (option code FA1 or F28), please adhere to the following points:

- Do not modify the wiring connections around the roof cut-out. Please use the following figures for reference.
- A portable antenna is provided as an additional part which is located in the glovebox.

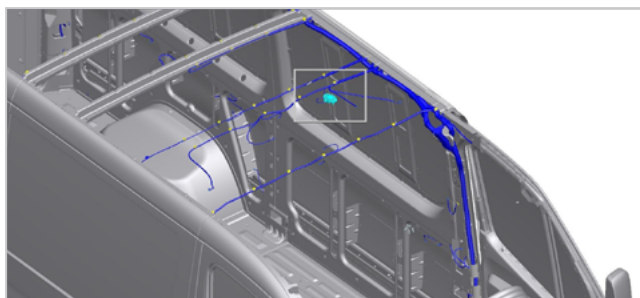
If the vehicle is equipped with an antenna but the position needs to be modified, please adhere to the following points:

- The cable connection to the antenna is a FAKRA connector with a female connection. Extension cables are available from third party sources and can be used to reposition the wiring harness.
- Ensure that the new antenna position complies with Sirius XM requirements. (http://pixelsatradio.com/content/pdfs/antenna_aiming.pdf)



N82.62-2063-00

Cable harness layout for cab chassis



N82.62-2064-00

Cable harness layout for cargo van

8.13.3 Speakers

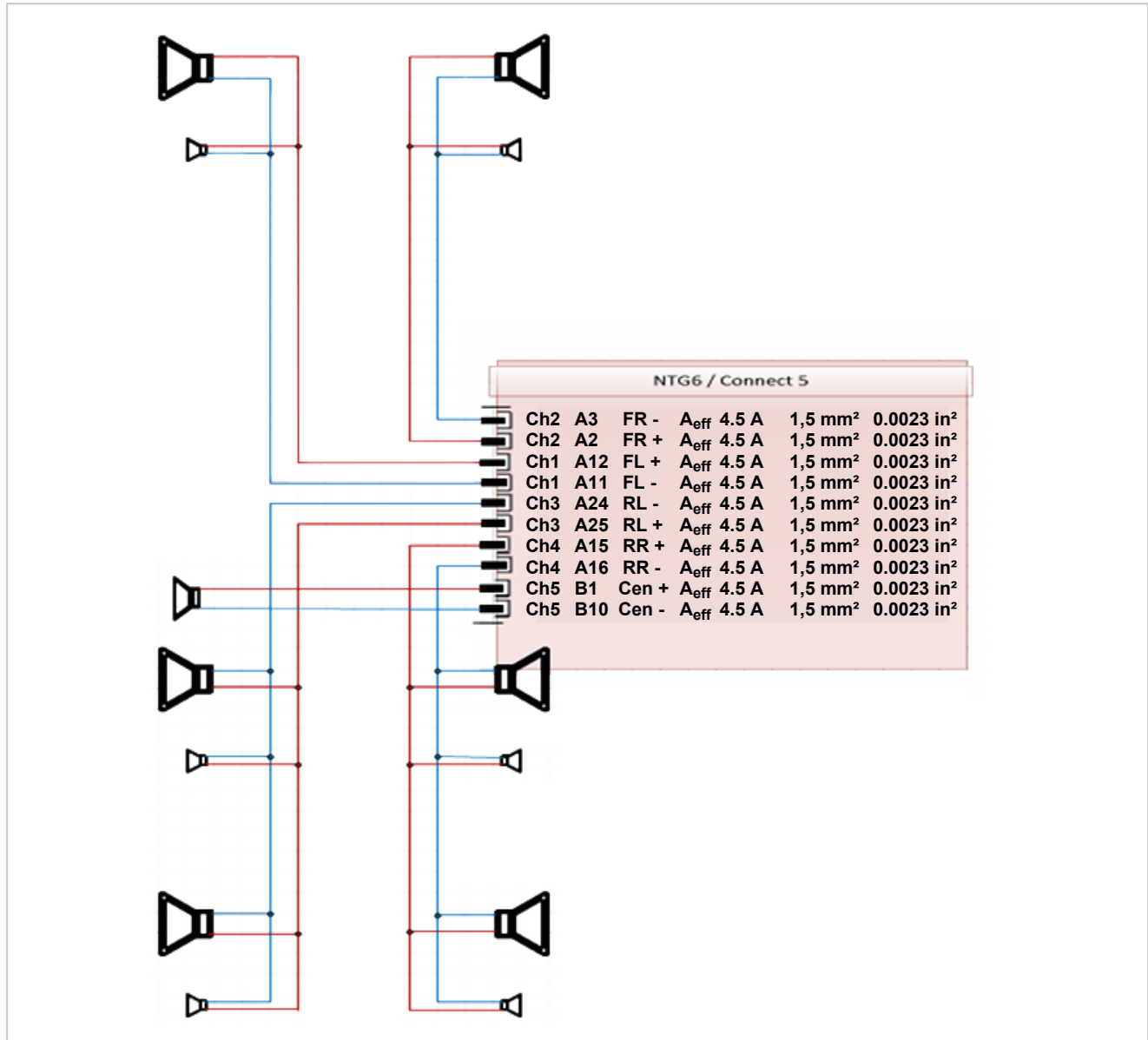
NTG7 has 5 channels for connecting speakers to the system.

Two pairs of speakers (woofer/mid-range speaker and tweeter) are installed as standard in the doors at the front left (FL) and front right (FR). A mid-range speaker (Cen) ensures a better sound experience.

Additional speaker pairs are available for the cargo and crew van model designations as a special equipment (Code EL9) in the rear passenger compartment.

This enables fade-in/fade-out of the rear left (RL) and rear right (RR) audio sources in Connect5 and NTG6.

The total impedance per channel must not be less than 2 ohms.



N82.62-2065-00.

Connections for speakers

1) Only with NTG6

8.14 Connectivity solutions Mercedes me connect

Mercedes me connect

8.14.1 Mercedes me connect for personal use

Mercedes-Benz Vans offers Mercedes me connect for individual customers². Mercedes me connect provides an individual experience through the vehicle-integrated Communication Module (LTE)³ and the Mercedes me connect App. Your Mercedes me connect equipped Van will enhance your experience during purchase, service, and throughout your ownership. Mercedes me connect is focused on your comfort and individual experience.

Mercedes me connect consists of a multitude of services^{1,3}. Because your safety is our priority, we encourage you to take advantage of Software Updates for your Van and to stay connected with our Customer Assistance Center in case of an emergency or breakdown. Keep track of your Van's location status when parked by using the Mercedes me connect App. Easily lock/unlock doors remotely through the App. If your Van is equipped with an MBUX Multimedia System, Mercedes me connect provides you with online services such as Live Traffic Information⁴ and Online Map Updates⁴ to keep your Van's navigation system up to date.

8.14.2 Mercedes me connect for business use

As a commercial customer you also have the opportunity to use Mercedes me connect for your business. The Mercedes me connect services for commercial customers ensure that you and your company remain connected to your Van(s) at all times and from anywhere^{1,2,3}. With the Mercedes me connect App, you will have the most up to date and important information about your vehicle right at the palm of your hands². Take advantage of software updates, maintenance information and more with Mercedes me connect for business use.

As a company administrator, you can reach out to your preferred dealer and register for a new Mercedes me connect company profile. The dealer can assist with adding your company vehicles to your new company profile. Upon completion of your newly created company profile the company admin listed on the account will be able to manage company vehicles, users and services, and more in the Mercedes me connect Portal. Additional users, such as drivers, will be able to use many of the Mercedes me connect services that are already available for personal use in the Mercedes me connect App and the Van¹.

▲ WARNING

Using the Mercedes me connect App while driving will distract you from traffic conditions. This could cause you to lose control of the vehicle, which could result in an increased risk of endangering yourself and others, including the risk of accidents, personal injuries and death. In order to help prevent distracted driving, the use of the Mercedes me connect App is not permitted while operating a motor vehicle. Please follow all applicable federal, state and local laws and restrictions and observe the legal requirements of the country in which you are currently located.

For further information on Mercedes me connect visit <https://www.mbvans.com/en/connectivity>.

For information on service availability and eligibility of your Van^{1,2,3}, visit <https://www.mbusa.com/en/legal-notices/connected-vehicle> or contact your dealer.

- 1 Models shown may include options/packages not standard on a Sprinter (as of MY19 and newer) or a Metris (as of September 2019 production, MY 20). Specifications are subject to change. Services require vehicle cellular connectivity and availability of vehicle GPS signal.
- 2 Mercedes me connect is available for the United States of America for Sprinter (as of MY19 and newer) and Metris equipped with a Communication Module (LTE) (as of September 2019 production, MY20). Contact an authorized Mercedes-Benz Vans dealership for more information.
- 3 The availability of services in addition to the integrated Communication Module for Digital Services (LTE) depends on the network coverage of the mobile network provider. The Communication Module for Digital Services (LTE) is not available in the US Virgin Islands or Puerto Rico. The Communication Module for Digital Services (LTE) is equipped in the Sprinter (as of MY 19 and newer) and optionally equipped in the Metris (as of September 2019 production, MY20 and newer). The availability of certain features may be impacted at the current time.
- 4 The information from this service is shown on the touchscreen of the MBUX Multimedia System. Live Traffic Information can only be used in conjunction with the MBUX Multimedia System with 17.8 cm (7-inch) touchscreen and navigation or the MBUX Multimedia System with 26 cm (10.25-inch) touchscreen options. While the navigation system provides directional assistance, the driver must remain focused on safe driving behavior, including paying attention to traffic and street signs. The driver should utilize the system's audio cues while driving and should only consult the map or visual displays once the vehicle has been stopped in a safe place. Maps do not cover all areas or all routes within an area. Please follow all applicable federal, state and local laws and restrictions.

8.15 Commissioning of control units

On model series 907, in general, for all open model designations (FHS) without platform ex factory (code P02) as well as for closed model designations for vehicles with the special equipment omission of driver's seat (code S90)/front passenger seat (code S91), a commissioning of control units is required/

For camper vans (code X2R), an automated commissioning process has been introduced in XENTRY for this purpose, which is being documented with the internal control code X96 "Obligation for commissioning by upfitter" (see upfitter information 20/2023). With this, upon delivery of the vehicle, the warning message "Commissioning by upfitter incomplete" appear in the instrument cluster, which disappears again once the commissioning has been properly and fully implemented.

You can find the guideline for the commissioning of the control units with all relevant information and a description of the procedure from the Upfitter Portal:

- ▶ Select "Vans" on the home screen (dashboard).
- ▶ Click on the "Engineering and Information" button, and then click on the vehicle image of the required model series.
- ▶ Under "Technical data", click on the tile "Electrics and electronics",
- ▶ Select the guideline for the "Commissioning of control units" and select the desired language.

As the final build status, such as the wheelbase length or also the body width, is not yet known at the point in time of delivery, not all control units can be accordingly configured in the plant, and must instead be adjusted to the actual vehicle status after body or modification work carried out by the upfitter.

! NOTE

The upfitter is responsible for ensuring that the O-codes documented in the vehicle data card that are necessary for the commissioning also correspond to the actual body status of the vehicle.

If the commissioning is implemented by Mercedes-Benz Service, the upfitter must provide the required information regarding the body condition of the vehicle, so that the specialist workshop can add the correct O-codes to the vehicle data card.

Extensive previous knowledge and preparations are required so that the correct control unit configuration and a flawless function of the individual E/E systems are ensured.

This includes checking the vehicle properties including all equipment codes and vehicle dimensions as well as the comprehensive identification of all control units that need to be adjusted due to the vehicle build status.

If SCN coding is performed for a control unit, the diagnostic system checks all recorded vehicle characteristics (code) in the vehicle data card and, based on the codes, sets the recorded parameters from the Mercedes-Benz development system.

If the vehicle build status is changed or expanded by the upfitter, the modification to the vehicle will need to be recorded via code by amending the vehicle data card in the first step of control unit commissioning.

This is the only way in which the diagnostic system can determine the correct parameters and carry out the required SCN coding of the control unit properly.

- ⓘ It is recommended that the completion of the vehicle is carried out by Mercedes-Benz Service. Alternatively, the upfitter can implement the completion of the vehicle themselves. For this, observe the following information.

! NOTE

An essential prerequisite for independent commissioning of the control units is successful participation in the corresponding training at Mercedes-Benz and acquisition of the Mercedes-Benz diagnostic tool XENTRY.

In addition, the upfitter commits to comply with and fully implement the Mercedes-Benz specifications.

- ⓘ If you have further questions or need further information, please create a query in the XENTRY system via an XSF ticket.

8.16 Remote start

With option code EC8 the vehicle can be started remotely using the MercedesMe app.

WARNING

The Remote Start feature is intended only for pre-heating or pre-cooling the vehicle and must never be used for charging auxiliary batteries.

More detailed information on additional alternators can be found under 6.5.3 Engine power take-off alternator (→ page 163).

Depending on the vehicle model and vehicle equipment, different control units can be affected by the commissioning:

i Further information can be found in the latest edition of the guideline for "Commissioning of control units".

System name	Control unit designation in XENTRY	Commissioning scope (example)
Electronic Stability Program	N30/4 - ESP	Calibrate sensor for longitudinal and lateral acceleration. SCN coding for changes to the wheelbase or rear axle track width
Brake Assist System and Active Distance Assist	B92/1 - DTR	SCN coding for change of body width and vehicle overhang with code BA3 or ET4
Blind Spot Assist	B92/11 and B92/21 - IRS-HRA/-HLA	SCN coding in the event of a modification to the body width and vehicle overhang with code J1V
Multifunction camera	B84/13 - MFK	SCN coding and initial calibration for code JW5, JB4, JA9, or LA1
Reversing camera	B84/3 - RFK	SCN coding for installation of a reversing camera with code FR7
360-degree camera	N62/3 - parking system	SCN coding for installation of the three cameras for code JB1, JB2, JB3
Signal acquisition and actuation module	N10 - SAM	Carry out SCN coding in general.
Headlamp control unit	E1/2N9 and E2/2N9 - SG-LEDSW-L/-R	Zero position calibration for Mercedes-Benz LED headlamps with code LG7
Tire pressure monitoring system (TPM)	N88/2 - RDK	When installing tire pressure monitoring system code RY2, the tire pressure sensors must be activated.
MBUX multimedia system	A26/17 - Head unit	SCN coding when installing a reversing camera with code FR7
Telematics services communication module	N112/9 - HERMES	Where a upfitter side GPS antenna (GPS reception and activation) is installed
Rain/light sensor	B38/2 - RGLS	SCN coding for code F50
Airbag control unit	N5/2 - SRS	SCN coding must always be carried out for code F50. Always check the ACTUAL values for bodybuilder-manufacturer-specific seats with code F28.
Door control unit	N69/1 and N69/2 - TSG-VL/-VR	SCN coding for code F50

9.1 Center of gravity

General

The position of the vehicle center of gravity in the longitudinal direction of the vehicle (x-direction) is specified relative to the center of the front axle. The center of gravity height (z-direction) is specified with reference to the roadway.

Mercedes-Benz recommends that you have the position of the center of gravity checked by a recognized and experienced testing institution (e.g. DEKRA, Technical Inspection Association (TÜV)). The department responsible (→ page 17) can provide the support you may need. .

If the center of gravity is determined by the upfitter, the procedures described under 9.1.1 Determination of the center of gravity in the x-direction (→ page 364) and 9.1.2 Determination of the center of gravity in the z-direction (→ page 366) must be followed and qualified person must perform the services to achieve realistic and useful results.

The vehicle must be measured in a load condition appropriate for its intended purpose. (See the following pages for examples.)

! NOTE

Practical determination of the center of gravity position in the x and z-directions may only be carried out by appropriately qualified staff using suitable and calibrated vehicle scales.

In order to reduce measuring errors, each measurement value should be determined at least three times and the average should be calculated from these three values.

! NOTE

The calculated center of gravity position in the z-direction (CoG height) must not exceed the limit values specified under Chapter 4.1.2 Maximum permissible position of the center of gravity (→ page 62)

9.1.1 Determination of the center of gravity in the x-direction

Center of gravity coordinates in x-direction (front/rear axle load distribution)

Recommended Procedure:

- ▶ In the first series of measurements, the vehicle should be weighed with the complete equipment or body but without payload.
- ▶ In the second series of measurements, the vehicle should be weighed with the complete equipment or body and with a payload appropriate for its intended purpose, taking into account the permissible gross mass and the permissible axle loads.
- ▶ For the measurements, the tire pressure at all wheels should be set to 6 bar.
- ▶ Completely fill all fluid reservoirs for operating fluids (fuel tank, AdBlue® tank, washer fluid reservoirs and, if installed, hydraulic fluid reservoir).
- ▶ Shut off the engine on the scales, shift the transmission to neutral position and release the brakes.
- ▶ The vehicle must be parked horizontally on level ground for weighing.
- ▶ First weigh the individual axle loads (front and rear axle loads) and then the gross vehicle mass.
- ▶ Using these measurements, the position of the center of gravity in the longitudinal direction of the vehicle can be calculated using equations (3) and (4).
- ▶ Use (2) to check the results from (3) and (4).

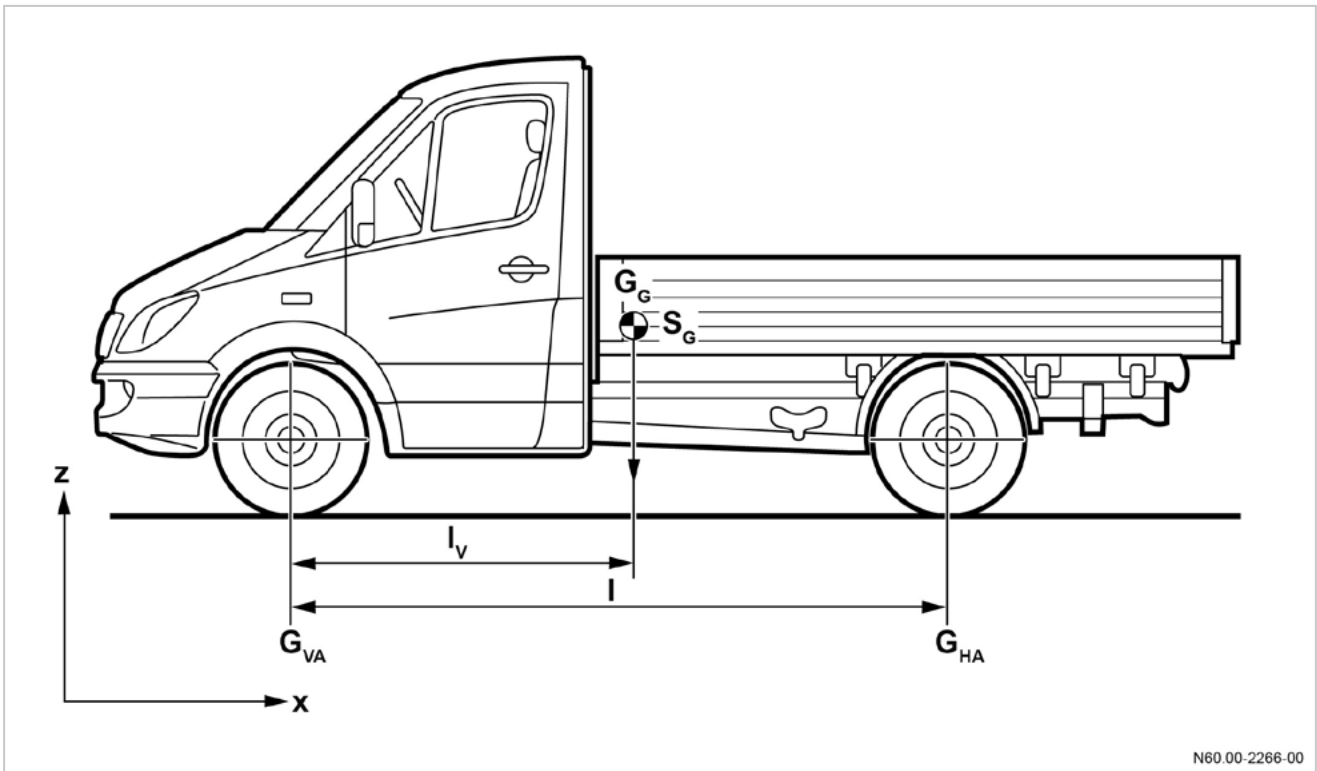


Illustration of coordinates and dimensions

Axle load calculation

$$G_G = G_{HA} + G_{VA} \quad (1)$$

$$l = l_V + l_H \quad (2)$$

Calculation of the center of gravity in the x-direction

$$l_V = \frac{G_{HA} \times l}{G_G} \quad (3)$$

$$l_H = \frac{G_{VA} \times l}{G_G} \quad (4)$$

Weights:

G_G Gross mass of vehicle

G_{VA} Front axle load of empty vehicle
(specification or weighing of the chassis in question)

G_{HA} Rear axle load of empty vehicle
(specification or weighing of the chassis in question)

Dimensions

l_V Distance of overall center of mass of empty vehicle from front axle

l_H Distance of overall center of mass of empty vehicle from rear axle

l Wheelbase

S_G Overall vehicle center of gravity

i The wheelbase "l" is defined by the vehicle model designation (see order) or must be determined by means of a length measurement according to country and/or state specific regulations.

9.1.2 Determination of the center of gravity in the z-direction

Center of gravity coordinates in z-direction (height of center of gravity h_s for the overall vehicle)

For determination of the overall center of gravity height of the vehicle above the roadway h_s by the upfitter, Mercedes-Benz recommends the following procedure after completion of the vehicle:

After conversion, the vehicle should be weighed on a plate-type scale or suitable wheel load scale in two different drive positions in succession. Here, the axle loads measured when the vehicle stands horizontal and level (G_{VA} or G_{HA} , see 9.1.1 Determination of the center of gravity in the x-direction (→ page 364)) and the axle loads for an axle raised by h' (Q_{HA} or Q_{VA}) must be determined. The lift height h' should be as large as possible in accordance with the front and rear overhang angle of the vehicle (also known as the angle of approach or departure). The target value is $h' > 1100$ mm/43 in (wheelbase 3250 mm/144 in) and 1400 mm/55 in (wheelbase 4325 mm/170 in).

In order to reduce measuring errors, at least six individual measurements must be performed for each vehicle axle when measuring the axle load: three per axle when the vehicle is in a level state and three when an axle is raised. Based on the three measurements in each condition, an average should be calculated for each axle.

For this, the equations (5) to (7) are to be used. Important: The measurement results must be close together. If individual measurements vary widely from each other, the deviating individual measurement must be repeated. The total value between the raised front and rear axles is then calculated.

In order to improve the accuracy of the final result, the axle load change should be determined both with a raised rear axle and with a raised front axle.

! NOTE

In order to avoid erroneous measurements, please note:

- ▶ When weighing with the vehicle level, the vehicle must be exactly horizontal. Any height differences between the axles caused by the scales must be compensated for accordingly.
- ▶ Both axles must be blocked to prevent suspension jounce and rebound when raising to the required lift height.
- ▶ When raising, the left and right sides must be raised in parallel.
- ▶ No part of the vehicle may bottom out when raising to the required lift height.
- ▶ All vehicle wheels must be able to roll: Gearshift system in neutral position, all brakes including parking brake released, chocks placed at a sufficient distance from the wheels if necessary.
- ▶ Set all tires to an internal pressure of 6 bar.
- ▶ Between the individual measurements and to turn it around (in order to weigh the other axle), move the vehicle under its own power so that any stresses in the vehicle are relaxed.
- ▶ Make sure that no objects inside the vehicle can move during the measurements.
- ▶ It must be ensured that all fluids (operating fluids and other media specified/required for the intended purpose (e.g. hydraulic oil, fresh water etc.)) and the gear and equipment required for operation as well as the necessary counter ballasts are all topped up and present.

Recommended Procedure

- ▶ In the first series of measurements, the vehicle should be weighed with the complete equipment or body with axle blocking but without payload.
 - ▶ In the second series of measurements, the vehicle should be weighed with the complete equipment or body with axle blocking and with a payload appropriate for its intended purpose, taking into account the permissible gross mass and the permissible axle loads.
 - ▶ Inflate the tires up to an internal pressure of 6 bar.
 - ▶ Completely fill all fluid reservoirs or operating fluids (fuel tank, washer fluid reservoirs, hydraulic fluid reservoir, coolant reservoir, AdBlue® tank etc.) and load or attach all the gear and equipment required for operation as well as the necessary counter ballasts.
 - ▶ Shut off the engine on the scales, shift the transmission to neutral position and release the brakes.
 - ▶ Position the vehicle with the rear axle (HA) at a horizontal and level position on the scales and determine the axle load.
 - ▶ Raise the front axle (VA) by the lift height h' . Increasing the height h' while taking the other boundary conditions of the vehicle into account improves the final result. The value h' must be determined for all individual measurements with raised axle and should be identical wherever possible. As an alternative to measuring the raised height h' , the angle α between the wheel hubs can be determined.
 - ▶ Determine the resulting axle load shift (Q_{HA}) at the rear axle (HA) on the scales.
 - ▶ Lower the vehicle and perform lifting measurements 2 and 3. Between all the individual measurements and to turn it around (in order to weigh the other axle), move the vehicle under its own engine power so that any stresses in the vehicle/chassis are relaxed.
 - ▶ After the third measurement, lower the vehicle, turn it around, and carry out corresponding measurements on the front axle (initially G_{VA} with the vehicle level, and then Q_{VA} with the rear axle raised by height h').
- ▶ Using the calculated values, the height of center of gravity can be calculated using equations (5) to (7).
 - ▶ When calculating using the equations (3) to (9), use all length measurements in millimeters (mm) and all weights in decanewtons (1 daN = 10 N). $G = 1 \text{ daN} = 10 \text{ N}$ is the weight force corresponding to the mass $m = 1 \text{ kg}/2.2 \text{ lbs}$.

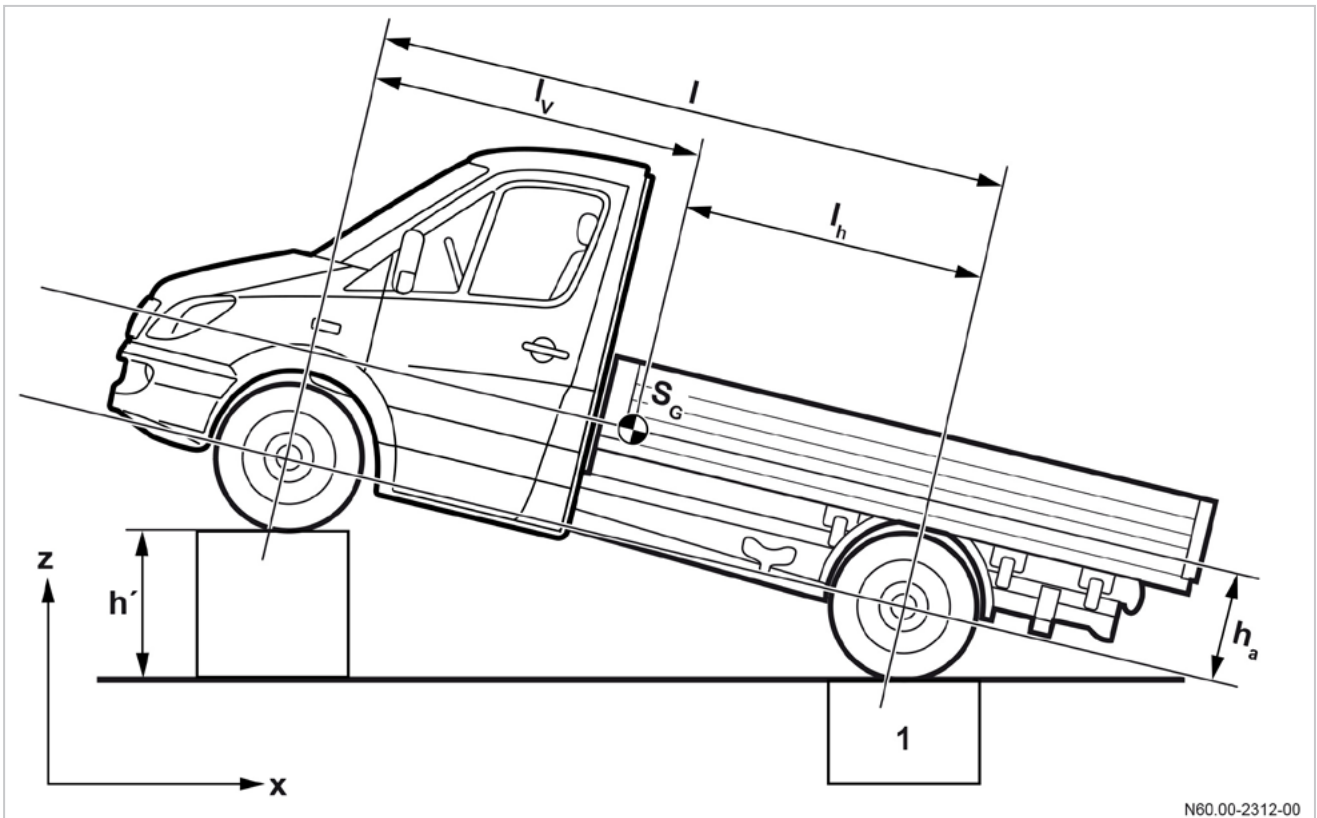


Illustration of coordinates and dimensions

Determining the height of the center of gravity

$$h_S = h_a + r_{stat} \quad (5)$$

- r_{stat} Loaded tire radius
- Q_{VA} Front axle load with vehicle raised at rear
- Q_{HA} Rear axle load with vehicle raised at front
- h_S Height of center of gravity above roadway
- h_a Height of center of gravity above wheel center
- h' Height by which the vehicle was raised
- S_G Overall vehicle center of gravity
- 1 Weighing device

i The wheelbase "l" is defined by the vehicle model designation (see order), or to be determined by means of a length measurement according to DIN 70020, Part 1.

Formulas for raised front axle:

$$h_S = \left(\frac{l}{h'} \times \frac{Q_{HA} - G_{HA}}{G_G} \times \sqrt{l^2 - h'^2} \right) + r_{stat} \quad (6)$$

Formulas for raised rear axle:

$$h_S = \left(\frac{l}{h'} \times \frac{Q_{VA} - G_{VA}}{G_G} \times \sqrt{l^2 - h'^2} \right) + r_{stat} \quad (7)$$

! NOTE

The calculated center of gravity must not exceed the limit values specified under 4.1.2 Maximum permissible position of the center of gravity (→ page 62).

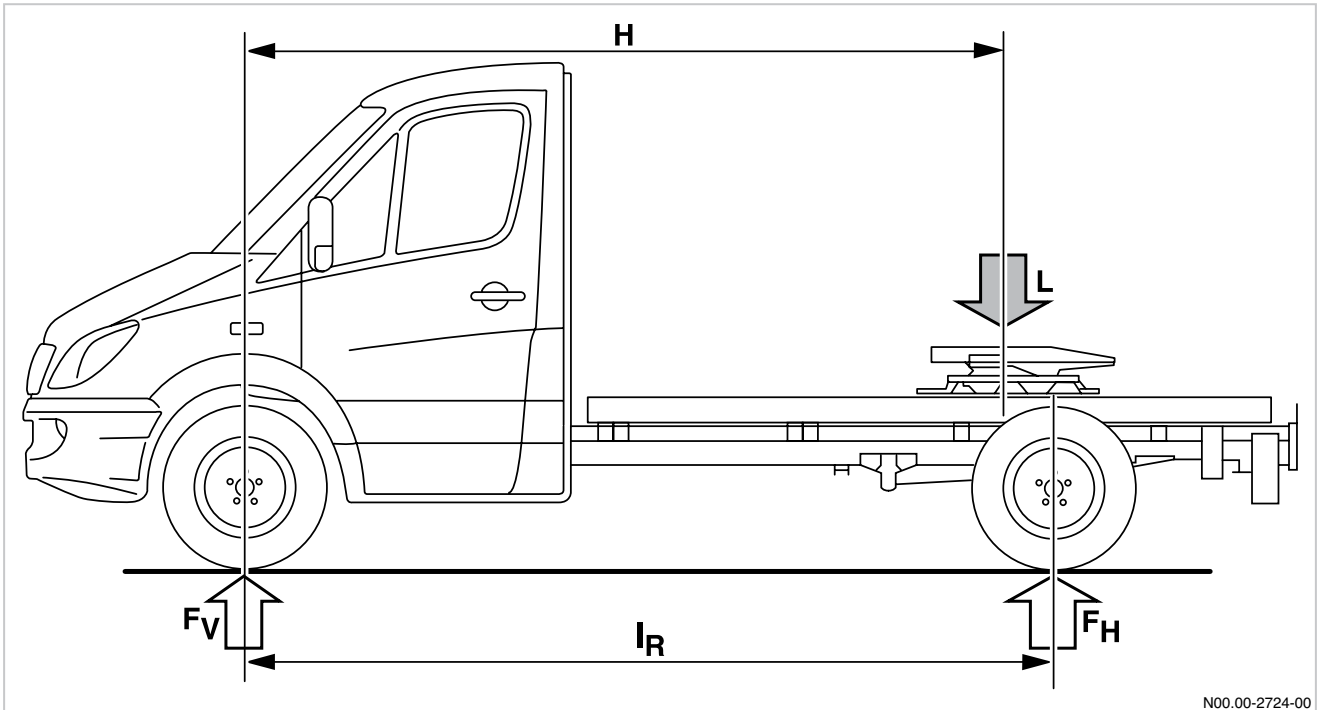
Examples for loads appropriate for the intended purpose for:

- RVs
 - All reservoirs for operating fluids 100% full, including fuel tanks
 - Number of registered seats each loaded with 80 kg/ 176.37 lbs.
 - Fresh water tank empty if located in the underbody, full if located above the vehicle floor (depending on the layout of the vehicle)
 - Waste water tank empty
 - All cabinets, stowage boxes and the rear hold with typical RV loads, if appropriate up to the maximum possible load capacity of the stowage compartments
 - Including all planned and available special equipment (e.g. awning, roof-mounted air conditioning system, bicycle rack, SAT system, solar system, pop-up roof etc.)
 - Unavailable special equipment is to be simulated by appropriate dummy weights at the corresponding installation location.
- Touring coaches
 - All reservoirs for operating fluids 100% full, including fuel tanks
 - 1x driver 80 kg/ 176.37 lbs.
 - All registered seats and standing room occupied with 80 kg/ 176.37 lbs.
 - The luggage compartment must be loaded appropriately for the intended purpose in terms of weight and load height.
 - Stowage areas above the passengers filled
 - For roof-mounted air conditioning systems, simulate the weight and installation location
- Box bodies
 - All reservoirs for operating fluids must be 100% full, including fuel tanks
 - 1x driver 80 kg/ 176.37 lbs.
 - The box body must be loaded appropriately for the intended purpose in terms of weight and load height.
 - Including the refrigeration unit, if planned for the body

9.2 Location of fifth wheel coupling

Calculating the position of the fifth wheel coupling

i For information on modifications to the light duty truck, see 7.10 Semitrailer trucks (→ page 211).



Drawbar ratio of fifth wheel coupling

$$D = \frac{0,6 \times 9,81 \times Z \times A}{Z + A - L} \quad (8)$$

To avoid exceeding the maximum axle loads, the position of the fifth wheel coupling is calculated as follows:

$$H = \frac{F_{H^*} \times I_R}{L} \quad (9)$$

$$F_{H^*} = F_H - F_{HL} \quad (10)$$

$$L = Z + A - \frac{0,6 \times 9,81 \times Z \times A}{D} \quad (11)$$

- A Permissible gross mass of semitrailer
- D Drawbar ratio of coupling
- F_H Maximum permissible rear axle load
- F_{HL} Rear axle load of unladen vehicle
- F_{H*} Resulting max. rear axle load

The permissible axle loads must be maintained at the front and rear axles.

- H Distance between front axle and fifth wheel coupling
- I_R Wheelbase
- L Max. fifth wheel load
- Z Permissible gross mass of towing vehicle

10.1 Bulb ratings of tail lamps

The tables below describe the different variants of the exterior lights with the corresponding light source types and power output data. Differences between panel van models and cab-chassis models are described in each case.

These specifications must be observed when installing lighting systems, see Chapter 8.5 Lighting (→ page 279).

Special equipment scope "Deactivation of lamp failure indicator" (code JW2) - Notes on the meaning of the entries in the tables in the following chapters:

- "Yes" means that, in the event of a malfunction of the lamp, e.g. due to bulb failure, there is no message in the instrument cluster and no entry in the fault memory of the diagnostic interface.
- "No" means that this function is not available and therefore there is still a message in the instrument cluster and an entry in the fault memory of the diagnostic interface.

Light sources of the conventional exterior lighting are actuated via pulse width modulation. An effective value is always set. The frequency varies according to country, and is 100 Hz for all countries except for the USA and Canada where it is 120 Hz.

- ① Information on plugs/mating connectors on the basic vehicle is available from the department responsible (→ page 19) or in Chapter 2.3.2 Startekinfo (→ page 23).

10.1.1 Conventional headlamps

Function	Type	Power [W]	Remarks	Deactivation of lamp failure indicator Code JW2
High beams	H15	2×55	Operated via control unit BCMFA2	Yes
Low beams	H7	2×55	Operated via control unit BCMFA2	No
Daytime running lights	H15	2×21	Operated via control unit BCMFA2	Yes
Standing lights	W5 W	2×5	Operated via control unit BCMFA2	Yes
Turn signals	PY21 W	2×21	Operated via control unit BCMFA2	No

In cab base vehicles (code F50, cowl), the omission of headlamps (code L92) is added automatically as standard.

Code L92 is not available for other vehicles.

When conventional headlamps are retrofitted by the bodybuilder manufacturer, adhere to the power values specified in the table.

10.1.2 Conventional tail lamps

Function	Type	Power [W]	Remarks	Deactivation of lamp failure indicator Code JW2
Turn signals	PY21 W	2×21	Standard in tail lamp, panel van/ cab-chassis	No
Tail light	P21 W	2×21	Standard in tail lamp, panel van	No
	R5 W	4×5	Standard in tail lamp, cab-chassis	No
Reversing light	P21 W	2×21	Standard in tail lamp, panel van/ cab-chassis	Yes
Rear fog lamp	P21 W	1×21	Standard in tail lamp, panel van/ cab-chassis	Yes
Brake light	P21 W	2×21	Standard in tail lamp, panel van/ cab-chassis	No
Rear license plate lamp	-	-	Standard in cab-chassis: Illuminated via a windows in the bottom of the left tail lamp panel van: See table of additional lighting functions	Code JW2 not available

10.1.3 Conventional tail lamps on cab-chassis with code L90

Code L90 causes the tail lamp to be omitted and also the coding in the Body Controller to be adapted to suit

the installation of conventional tail lamps (bulbs) on cab-chassis.

Function	Type	Power [W]	Remarks	Deactivation of lamp failure indicator Code JW2
Turn signals	PY21 W	2×21 ¹⁾		No
Tail light	R5 W	2×5 ¹⁾		No
Reversing light	P21 W	2×21 ¹⁾		Yes
Rear fog lamp	P21 W	1×21 ¹⁾		Yes
Brake light	P21 W	2×21 ¹⁾		No
Rear license plate lamp	-	-		Code JW2 not available

- 1) The current dropping below a minimum value of 60 mA results in fault entries and fault messages in the instrument cluster if the code JW2 is not used.

10.1.4 LED tail lamps on cab-chassis with code L91

Code L91 causes the tail lamp to be omitted and also the coding in the Body Controller to be adapted to suit the installation of LED tail lamps on cab-chassis models.

Function	Type	Power [W]	Remarks	Deactivation of lamp failure indicator Code JW2
Turn signals	LED	2×6 ¹⁾		No
Tail light	LED	2×9 ¹⁾		No
Reversing light	LED	2×3.5 ¹⁾		Yes
Rear fog lamp	LED	1×3.5 ¹⁾		Yes
Brake light	LED	2×6 ¹⁾		No
Rear license plate lamp	LED	-		Yes

- 1) The current dropping below a minimum value of 60 mA results in fault entries and fault messages in the instrument cluster if the code JW2 is not used.

10.1.5 Additional lighting functions

Function	Type	Power [W]	Remarks	Deactivation of lamp failure indicator Code JW2
Third brake light	LED	1×1.3	Standard for closed model Pre-installation for 3rd brake lamp, code LV6, available for open models ¹⁾	No
Clearance lamps	LED	2×1	Open model, special equipment code L07	Yes
Side marker lamp	LED	6×1	Closed/open model, code LB1 Pre-installation for side marker lamps, code LB2	Yes
Rotating beacon	H1	2×55	Closed model, code LB7 Rotating beacon, yellow, front left/rear right Open model, code LB8 Rotating beacon, yellow, front left Closed/open model, code LV1 Pre-installation for rotating beacon	Code JW2 not available ⁷⁾
Fog light with cornering light function	H11	2×55	Closed/open model, integrated in bumper, code L13 Pre-installation for fog light, code LV4 ²⁾ LED fog light with code L93 ³⁾	Yes
	LED	2×55		Yes
Fog light without cornering light function	H11	2×55	Closed/open model, integrated in bumper, code L16 Pre-installation is not available LED fog light in combination with code L93 ³⁾	Yes
	LED	2×55 ³⁾		Yes
Additional turn signal lights	LED	2×5	Open model, special equipment, additional turn signal lamps, code L77 ⁴⁾	Code JW2 not available ⁷⁾
	W16W	2×16	Closed/open model designation, standard in outside mirror ⁵⁾	No
	LED	2×3.8	Closed model, special equipment, additional turn signal lamps on roof, code LB3 ⁶⁾	Code JW2 not available ⁷⁾
	P21 W	2×21	Closed/open model designation, side turn signals on fender with code L44 (without turn signal light in outside mirror) ⁵⁾	No
Rear license plate lamp	W5W	2×5	Standard in license plate holder, closed model	Yes

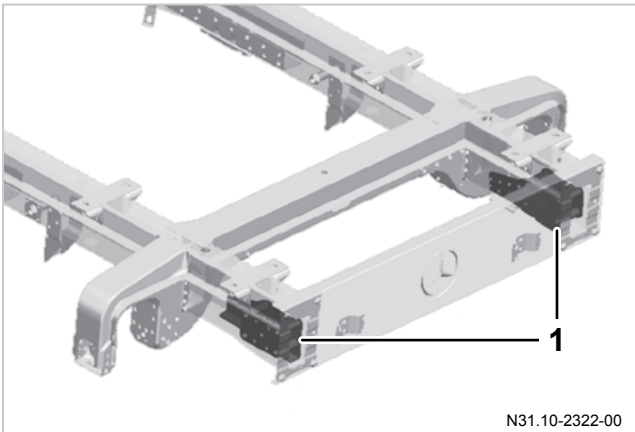
- Note that the fault monitoring for the pre-installation is always active, so the installation and use of a 3rd brake light are required.
- The current dropping below a minimum value of 500 mA results in fault entries and fault messages in the instrument cluster if the code JW2 is not used.
- The current dropping below a minimum value of 100 mA results in fault entries and fault messages in the instrument cluster if the code JW2 is not used.
- Additional turn signal lights with the code L77 can only be ordered on open models. They are actuated via the additional turn signal module. There is no failure monitoring of these additional turn signal lights.
- It is possible to actuate a turn signal light either in the outside mirror or on the fender. The same connection on the door control unit is used. Therefore, it is not possible to combine turn signal lights in the outside mirror and on the fender.

- Additional turn signal lights with the code LB3 can only be ordered on closed models. These are mounted on the roof at the rear. They are actuated in parallel with the turn signal lights in the tail lamp. Due to the failure monitoring of the turn signal lights in the tail lamp, the specified power rating of the additional turn signal lamps must not be exceeded. There is no failure monitoring of these additional turn signal lights.
- Fault monitoring does not occur.

10.2 Trailer hitch hole patterns

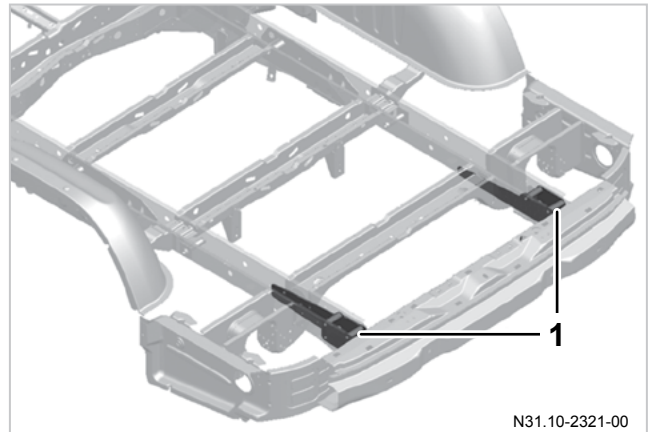
On open and closed model designations (cab chassis) from model series 907, the reinforcement of the trailer coupling in the left/right rear longitudinal member (code Q11) is installed in the vehicle as standard.

If you do not wish to have this reinforcement, it can be deselected for closed model designations (panel van) with code QW1 when ordering the vehicle. Code QW1 is not available for open model designations. If these reinforcements were not installed at the factory, it is not permissible to fit a trailer hitch. .



Longitudinal member on BM 907 Cab Chassis with code Q11

1 Trailer hitch insert, code Q11



Longitudinal member on BM 907 Crew, Passenger and Cargo Van model with code Q11

1 Trailer hitch insert, code Q11

▲ WARNING

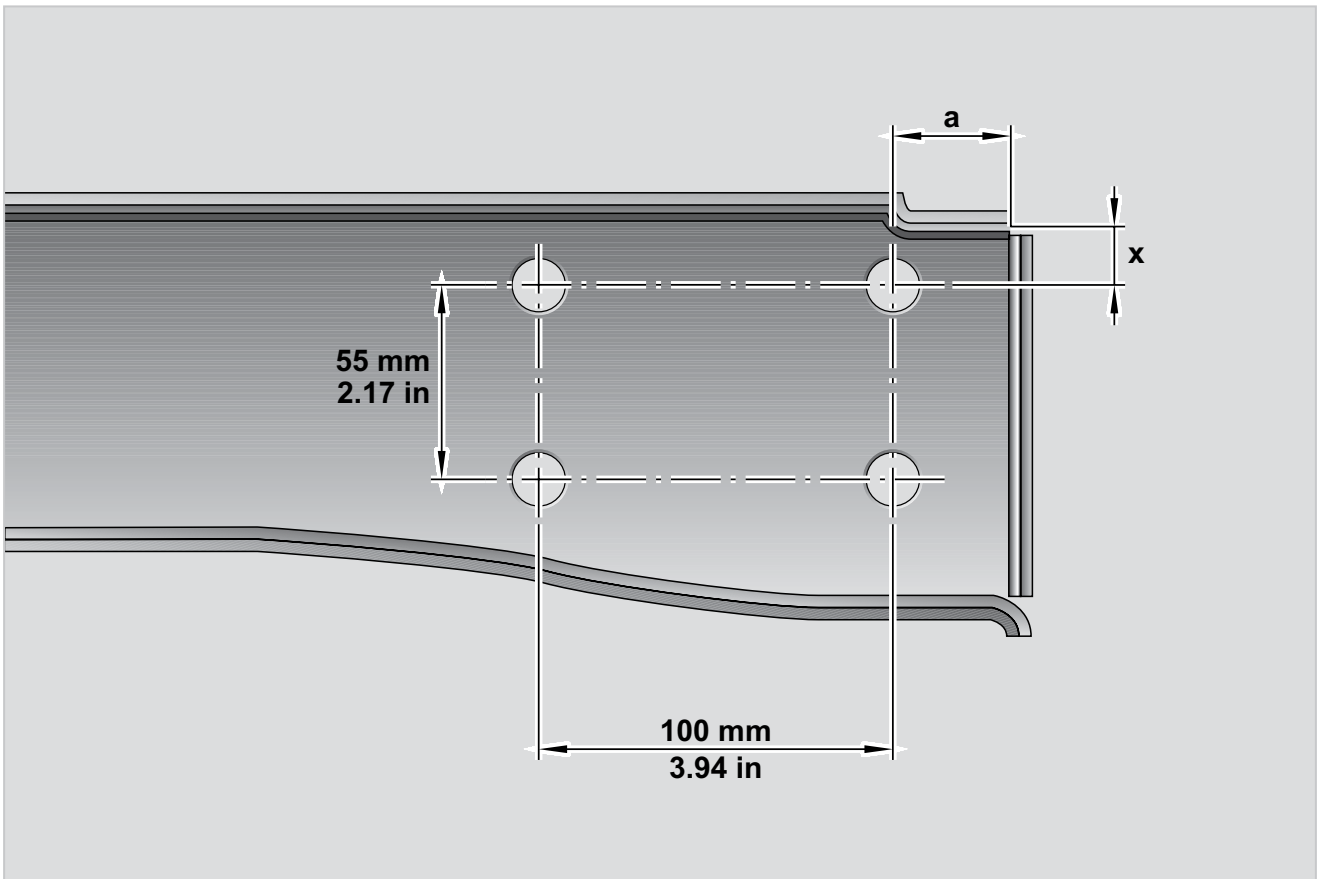
Risk of accident due to the impermissible attachment of a trailer hitch!

If a trailer hitch is retrofitted and you attach a trailer hitch or other components, the longitudinal frame member will be weakened and can break. In this case, the trailer can detach from the vehicle.

There is a risk of accident!

Only retrofit a trailer hitch if this is permissible.

10.2.1 Installation dimensions, version 1

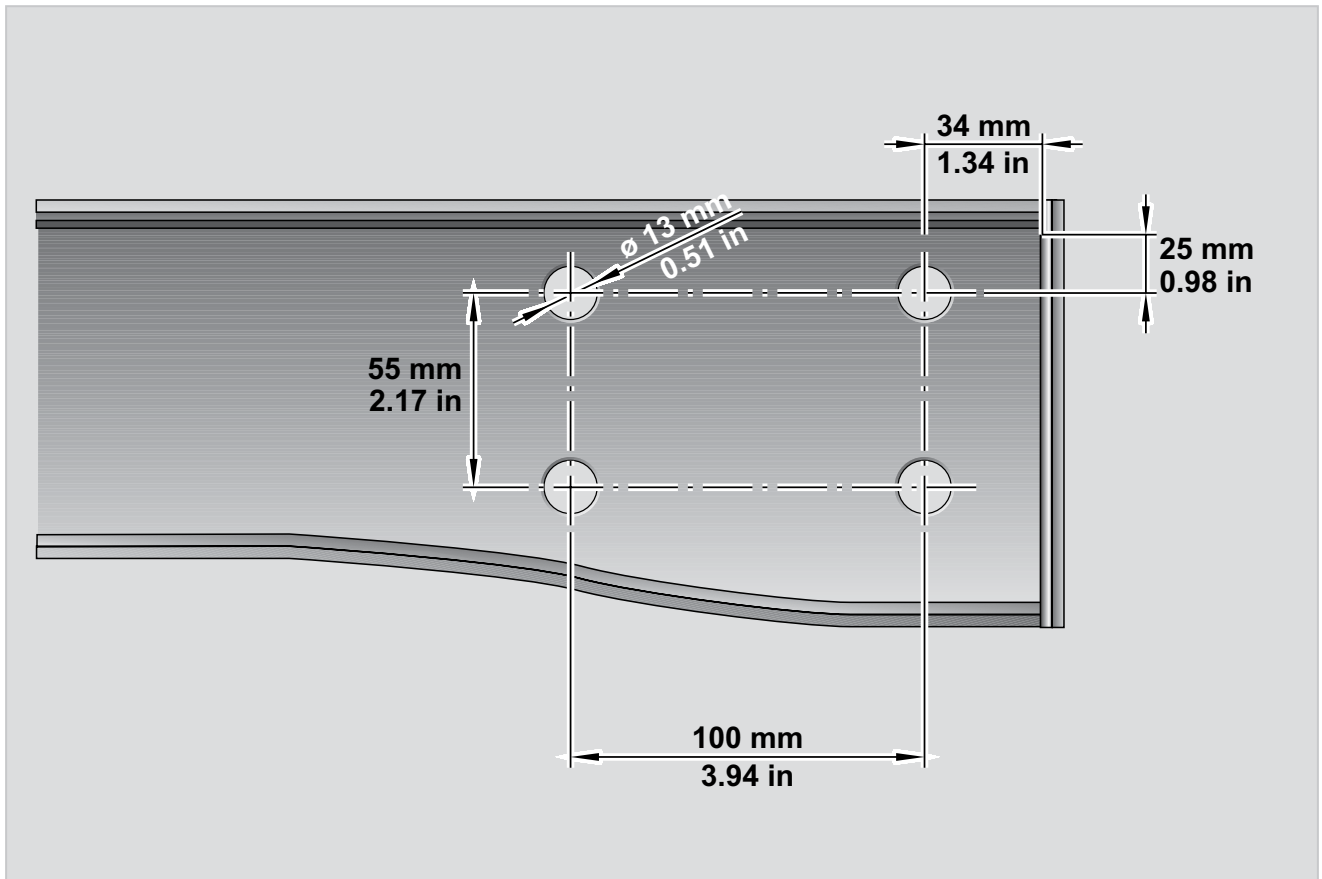


N31.10-2340-00

Vehicle model	Wheelbase	Dimension a	Dimension x	Overhang dimension
Cargo van/ passenger van	3665 mm/144 in (A2)	35 mm/1.4 in	26 mm/1.02 in	1246 mm/49 in
	4325 mm/170 in (A3)	35 mm/1.4 in	26 mm/1.02 in	1621 mm/64 in
8550 lbs to 11030 lbs	4325 mm/170 in (A3)	35 mm/1.4 in	26 mm/1.02 in	2021 mm/80 in

Overhang dimension = vehicle overhang

10.2.2 Installation dimensions, version 2

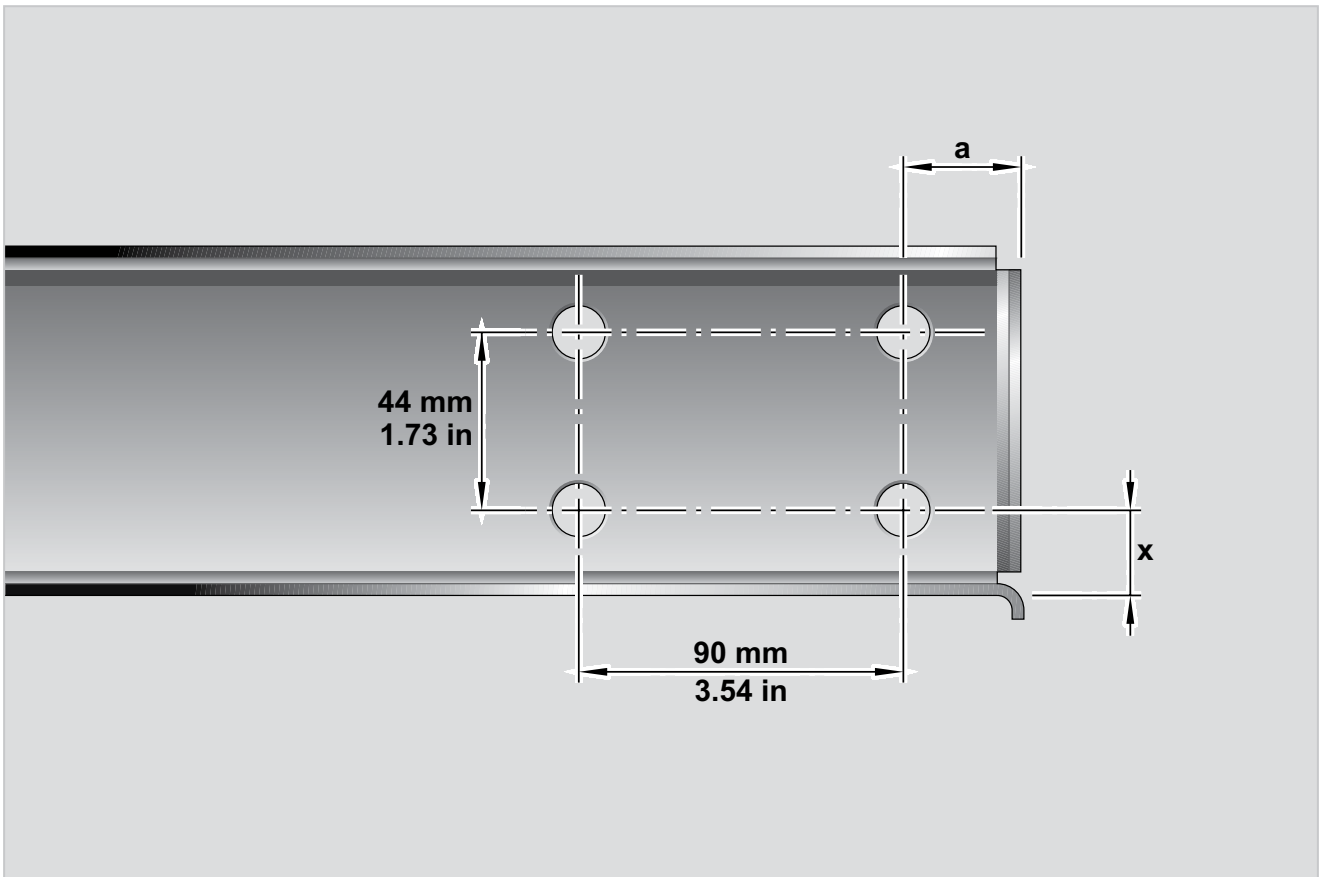


N31.10-2341-00

Single cab; basic variants 3.5 t (2.8 t - 4.1 t)/8550 lbs (8550 lbs - 9040 lbs)

Overhang dimension = vehicle overhang including rear lamp

10.2.3 Installation dimensions, version 3



N31.10-2342-00

Vehicle model	Wheelbase	Dimension a	Dimension x	Overhang dimension
Chassis/platform	3665 mm/144 in (A2)	27 mm/1.1 in	34 mm/1.3 in	1418 mm/55.8 in
with cab 11030 lbs	4325 mm/170 in (A3)	27 mm/1.1 in	34 mm/1.3 in	1518 mm/59.8 in

Overhang dimension = vehicle overhang including rear lamp

A		D	
Additional assemblies	90, 91	Damage prevention	93
Airbag.....	155	Deep discharge protection.....	277
Airbag control unit.....	148	Design data.....	23
Air conditioning system	161	Design of bodies	188
Air intake.....	120, 145	Diagnostics connection.....	14
Air suspension	108	Doors.....	294
Alternator.....	165, 267	Drivetrain	136
Antenna.....	288	Drivetrain limit values	82
Anti-corrosion protection	54, 96	Driving assistance systems	296
Area to be painted	329	Dump trucks	210
Assembly frame as floor assembly.....	196	E	
Assembly frame limit values.....	92	Electrical circuit diagrams	352, 353
Assembly frame section dimensions.....	190	Electric lines	264
Attachment above cab	166	Electrics	256
Attachments	166	Electrics/electronics limit values.....	90
Attachment to the frame.....	115, 191	Electromagnetic compatibility (EMC).....	257
Auxiliary heating.....	162	Electronic ignition lock (EZS).....	290
Auxiliary lamps	279	Electronic Stability Program (ESP)	297
Axle loads.....	73	Engine air intake	145
B		Engine compartment flap.....	221
Battery	258	Engine cooling	145
Bodies on chassis with cab base	220	Engine cooling system	145
Body	110	Engine peripherals.....	82, 136
Body in white	76, 110	Exhaust system	142
Body limit values	92	F	
Box bodies	207	Fenders	125
Brake hoses	94	Fifth wheel coupling	214, 370
Brake system	75, 104	Frame end crossmember	125
Bulb ratings of exterior lights	371	Front axle (FA).....	102
C		Front axle load	62
Cab	120	Fuel.....	136
Cable extension	265	Fuel system.....	136
Cables and lines	94	Functional reliability.....	296
Cab roof	120	Fuses	264
CAN bus	90, 263, 264	G	
Cargo liftgate	177	Gas-shielded plug welding	53
Cargo Van.....	201	Ground bolts	275
Cargo Van/Passenger Van roof	126	H	
CB radio	288	Handover.....	58
Center of gravity calculation.....	364	Headlamps.....	279
Central locking system.....	290	High beam and Lane Keeping Assist	322
Collision Prevention Assist	303, 307	High Beam Assist	322
Commissioning of control units.....	361, 362	I	
Conventions	12		
Copyright	16		
Crosswind Assist	298		

Identification data	43	Moving-off information Assist.....	327
Installations	167	N	
Intelligent Speed Limit Assist	322	Noise level	158
Interface overview.....	273	O	
Interfaces.....	264	On-board electrical system battery	258
Interior	198	Operational safety	14
Interior lamps	282, 286	Outside mirrors	295
Interior noise	158	Overhang extension.....	117
J		P	
Jaw-type coupling.....	182	Painting work.....	98
L		Parking packages	327
Lane Keeping Assist	322	Platform bodies	206
Lifting platform	177	Position of the center of gravity	62
Lifting work platform.....	217	Power tapping.....	268
Lighting	279	Product liability	25
Limit values for additional assemblies.....	91	Product safety	25
Limit values for attachments.....	91	Programmable logic controller (PLC).....	348
Limit values for electrics/electronics	90	Propeller shafts	146
Limit values for engine peripherals/drivetrain	82	PSM interfaces	348
Limit values for the basic vehicle	62	Q	
Limit values for the body	92	Qualified specialist workshop.....	15
Limit values for the body in white	76	R	
Limit values for the suspension.....	72	Rain and light sensor.....	323
Limit values for tire sizes	74	Recovery vehicles	215
Load compartment sliding door	294	Refrigerated vehicles.....	208
Loading cranes	175	Remote control key	290
Load rails	167	Repair	56
Lowering the roof height.....	120	Rescue card/QR code rescue sticker.....	44
Lower wheel well on rear axle	76	Retrofitting electrical equipment.....	266
M		Reversing camera	330
Maintenance	56	Roof loads	81
Major assemblies	145	Roof racks.....	167
Material quality.....	188	RV - Recreational vehicles.....	242
Maximum permissible position of the center of gravity	62	S	
Mercedes PRO	360	Safety equipment	148
Mini PLC.....	348	Safety notes.....	14
Mobile communications systems	90, 288	Seats	157, 198
Model code	35	Selecting the basic vehicle	39
Model designation	38	Self-supporting bodies	197
Model overview.....	38	Semitrailer tractors	211
Modifications to seats.....	87	Shelf systems	167
Modifications to the basic vehicle	102	Shock absorbers.....	75, 104
Modifications to the interior	198	Side marker lamps.....	90
Modifications to the vehicle.....	15	Signal acquisition and actuation module (SAM)	351
Motorhomes.....	242		
Mounting plate.....	214		

Sliding door.....	294	Welded connections.....	52
Soundproofing.....	55	Welding work.....	95
Special equipment.....	59	Wheel alignment.....	75
Specialist workshop.....	15	Wheelbase modifications.....	80
Springing.....	75, 104	Wheels.....	108
Stabilizer bars.....	104	Wheel wells.....	125
Steerability.....	62	Wind deflectors.....	166
Storing and handing over.....	101	Window airbag.....	154
Storing the vehicle.....	57	Window heater.....	295
Suspension.....	102	Window lifters/window hinges.....	294
Suspension limit values.....	72	Windows.....	294
T			
Tack welding.....	54	Windshield wipers.....	295
Tail lamps.....	279	Windshield wiper system.....	221
Technical limit values for planning.....	62	Wiring harness connecting points.....	224
Telephone.....	288	Workshop Information System (WIS).....	23
Thorax/pelvis side airbags.....	152	X	
Threaded connections.....	51	XENTRY Kit.....	24
Tie-down eyes.....	167		
Tire load capacity.....	41		
Tire pressure loss warning system.....	325		
Tire pressure monitoring.....	325		
Tires.....	50, 108		
Tire sizes.....	74		
Torsionally stiff body types.....	216		
TPMS.....	325		
Trademarks.....	27		
Traffic Sign Assist.....	322		
Trailer hitch.....	115, 180, 184		
Trailer hitch hole patterns.....	376		
Transmission output.....	90, 288		
Two-way radio.....	288		
U			
Ultrasonic sensors.....	329		
Underfloor paneling.....	134		
Underrun protection.....	184		
Upfitter Portal.....	23		
V			
Vehicle identification data.....	43		
Vehicle overhang.....	78		
Vehicle position lamps.....	90		
Vehicle safety.....	13		
Vehicle speed signal.....	275		
Vehicle stability.....	49		
Ventilation.....	159		
W			

