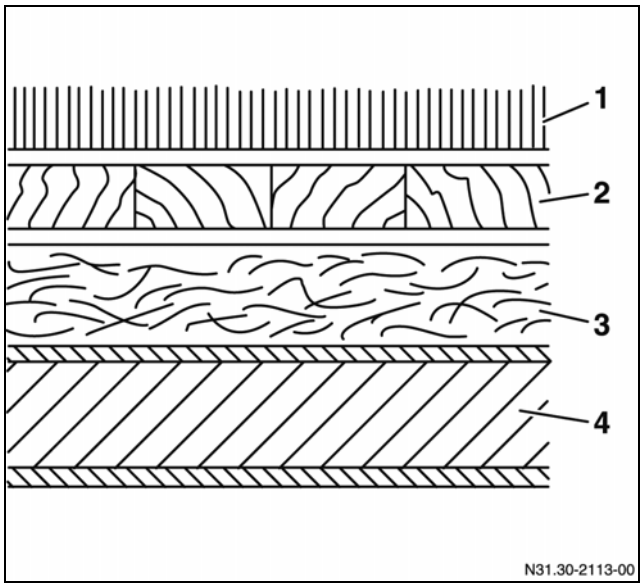
7.4.3. Reducing noise in the vehicle interior

To reduce the noise level in the vehicle interior, flame retardant noise insulating materials may be installed.

Floor area

A structure as shown in the illustration is recommended for insulation and soundproofing. An additional covering with heavy-duty insulating foil may be provided in the area of the wheel wells. 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 (bonded underside)
2 Wooden floor (12mm - .5in plywood)
3 Heavy-duty insulation material (8 to 10kg/m^2 / 1.6 to 2lbs/ft^2)
4 Supporting construction

Roof and side panels

Rock wool, glass wool, fibrous web or soft, open pore PE or PU – based foam are effective insulation materials. The inside must be covered with a sound-transmitting material (perforated card, plastic, fabric cover).

Warning

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

Seals

Openings, gaps and slots between the engine compartment, the underside of the vehicle, the front bulkhead and the vehicle interior must be carefully sealed with anti-corrosion protection or a permanently elastic material following treatment. Air vents must not be fitted in the immediate vicinity of sources of noise or exhaust fumes.

In addition, manufacturers or suppliers of sound proofing materials should be consulted.

They will be able to provide you with suggestions on how to design optimum noise insulation for your particular body.

7.4.4. Ventilation

The passenger compartment and the driver's seat must have adequate ventilation with provision for air to enter and exit.

The windscreen and side window demisting function must remain operational, especially if the driver's area forms part of the passenger compartment or if the layout and design of the interior does not correspond to that of the standard equipment.

New vehicles can be supplied from the factory with the optional equipment "Controlled air conditioning/in addition in rear compartment" under options H08.

When retrofitting assemblies, please refer to the "additional Equipment" section (→ chapter 7.5).

7.5. Additional equipment

If additional equipment is fitted, factory-fitted power take-offs must be used.

7.5.1. Retrofitting an air-conditioning system

All electrical equipment fitted must be tested in accordance with FMVSS/CMVSS standards.

When retrofitting air-conditioning systems, we recommended the “Rear-compartment air-conditioning system” option H08 which can be obtained from the factory as optional equipment.

The requirements of the equipment manufacturer must be observed if you intend to retrofit any other air-conditioning system. The following points must be observed to ensure compatibility with the basic vehicle:

- Do not tie in the OEM A/C system
- 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 protections for the air-conditioning power circuit
- Air-conditioning compressors must be attached using the equipment carrier provided.
- The additional equipment for driving air-conditioning compressors is available from the factory as optional equipment under Option N63 (maximum output 8kW).
  Ensure that wires and electrical lines (→ chapter 7.3.5) 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 equipment must be supplied on handing over the vehicle.
  There should be no impairment of the required engine air supply and cooling (→ chapter 7.3.3)

7.5.2. Auxiliary heating

The floor of the vehicle must be air-tight if exhaust gases are routed out under the vehicle. Openings in the vehicle floor provided for control elements must be sealed with rubber sleeves. The following auxiliary heating system is available from the factory as optional equipment:

Description	Option
auxiliary heater front	H12
auxiliary heater rear	H13

More information is contained in the Special Equipment Book from your authorized SPRINTER dealer.

7.5.3. Power take-offs

General

Engine power take-off at front of engine only.

Power take-off versions available from the factory. These power take-offs can be obtained from the factory as optional equipment.

The following codes are available for power take-offs:

Code N62	Additional alternator
Code N63	Refrigerant compressor

These power take-offs can be obtained from the factory as optional equipment.

The maximum power output is:

Code N62	8.5 kW (11.4 hp)
Code N63	8.0 kW (10.7 hp)

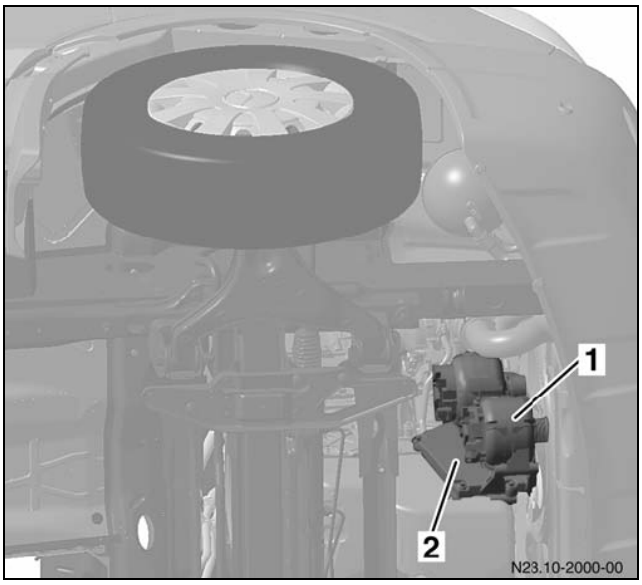
The additional pulley is located in the second belt plane (belt width 12.7mm, effective diameter 128.2mm).

Code N62	Poly-V-belt pulley, 50 mm external diameter, 6 grooves
Code N63	Poly-V-belt pulley, 120 mm external diameter, 6 grooves.

We recommend using the following genuine DG SPRINTER belts

For option:	MB part #
Code N62	A001 993 47 96
Code N63	A001 993 37 96

Additional equipment can be mounted on an equipment carrier fixed to the engine.



Additional equipment on engine-resident equipment carriers

1 Additional equipment
2 Equipment carrier

Maximum weight of additional equipment

Code N62	7.3 kg (16.1 lbs)
Code N63	6.5 kg (14.3 lbs)

7.6. Attachments

Make sure that you adhere to the permissible axle loads in all cases.

Attachments must not impair the function of vehicle parts.

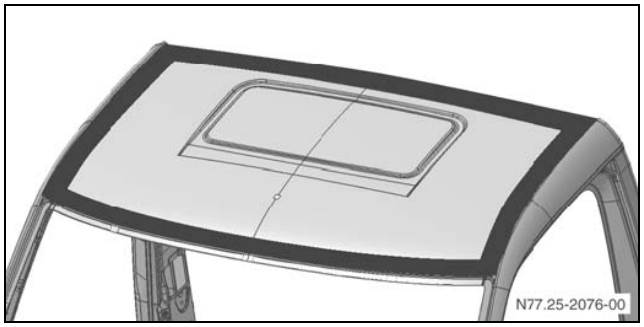
Comply with all applicable FMVSS/CMVSS requirements. Do not attach a winch to the front section of the frame.

Winches behind the cab

If winches are attached behind the cab, they must be mounted on a mounting frame of sufficient size and strength.

7.6.1. 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 first roof arch (level with the B-pillar). The load applied by air resistance and contact pressure must be taken into consideration. The deflectors must only be fitted in such a way that the basic vehicle is not damaged.



Adhesive for fitting wind deflectors should be applied in the area shown

No further holes should be drilled in the cab roof for fixing additional attachments.

If other roof attachments are fitted, please consult with SEC.

7.6.2. Attachment above cab

- The permissible center of gravity location and the front axle load must be observed (→ chapter 4).
- The attachment to the roof must be designed as described in the “Bodyshell” section (panel van roof) (→ chapter 7.2).

7.6.3. Roof racks

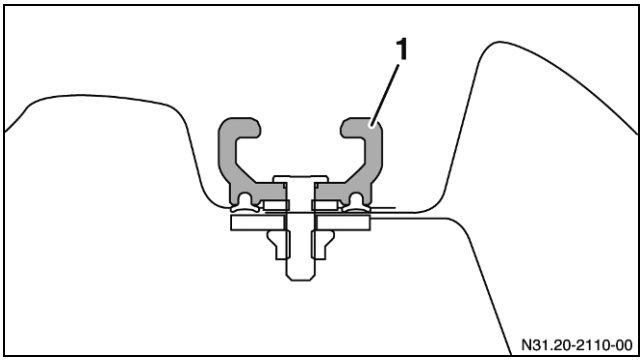
SPRINTER – Cargo vans and Passenger vans:

- Make sure that the load is distributed evenly across the entire roof area
- We recommend the use of an anti-roll bar at the front axle
- Support feet must be spaced at regular intervals. 110 lbs per pair of feet and strut is recommended as a basic rule.
- With shorter roof racks, the load must be reduced proportionally.

Roof rack limiting values (laden)

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

To make it possible to fit roof racks, the SPRINTER must be equipped with C-rails (Option D13, for Cargo Vans only). C-rails can be retrofitted.



Roof rack mounting
1 C-rail (roof rack)

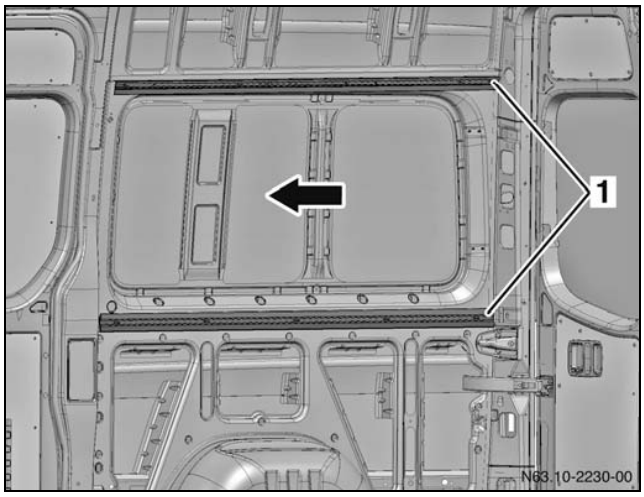
7.6.4. Fitted shelving/installations

Fitted shelving must:

- be sufficient strong and self-supporting
- rest on the cross and longitudinal members of the vehicle floor
- distribute forces evenly
- it is preferable to make attachments at the points of the load rails and lashing eyelets.

Do not transfer loads only to the vehicle side walls. For a favorable force transfer, we recommend the use of load rails available as optional equipment or their entire contact area in the body shell:

	Max rated tensile force
Code VC4 on roof frame	150 daN [33 lbf]
Code V42 on waist rail	250 daN [56 lbf]

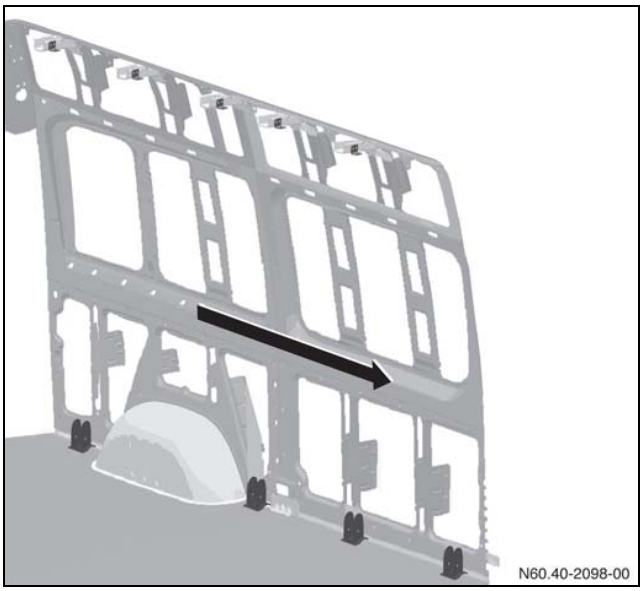


Load rails in the panel van
1 Load rails
Arrow Front of vehicle

For further information about the side wall
(→ chapter 7.2.5)

Fittings for fitted shelving

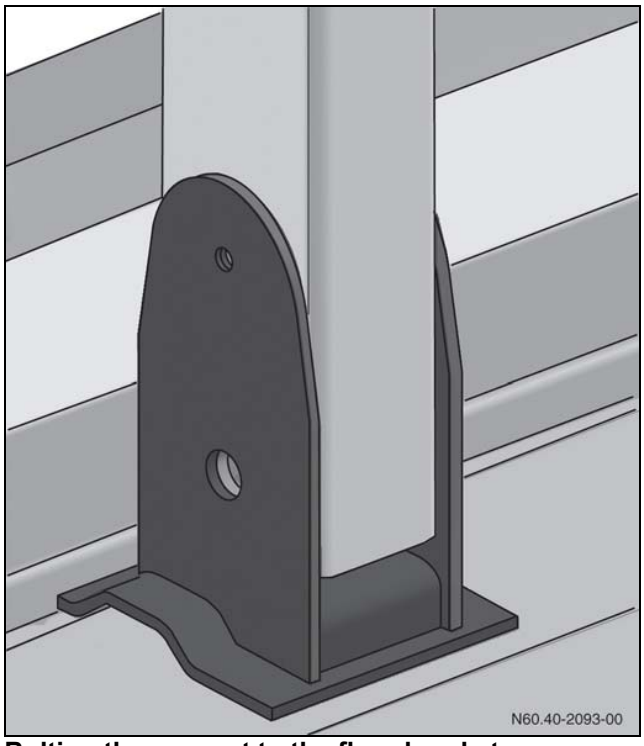
Code ZE6 “Shelving Prep” is available from the factory to facilitate the retrofitting of shelves. The package includes angles attached to the roof arches and body support brackets mounted on the floor.



ZE6 package contents in shaded areas
Arrow front of vehicle

The following must be observed when using the shelf fittings:

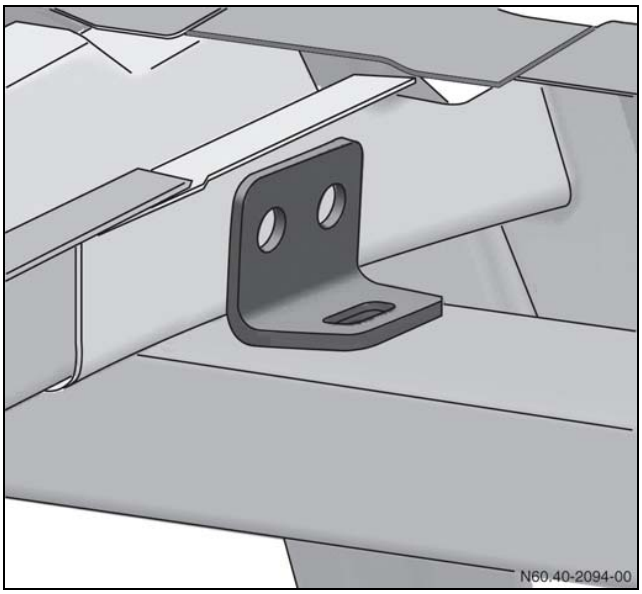
- Shelves must not be wider than 450 mm [17.5inch]
- The max load-bearing capacity is 80 kg/m [50 lbs/ft]
- The shelf support must be made of steel with a minimum cross section of 60x40x3mm [2.25”x1.5”x1/8”] (length x width x thickness).
- The shelf supports are bolted to the floor bracket.



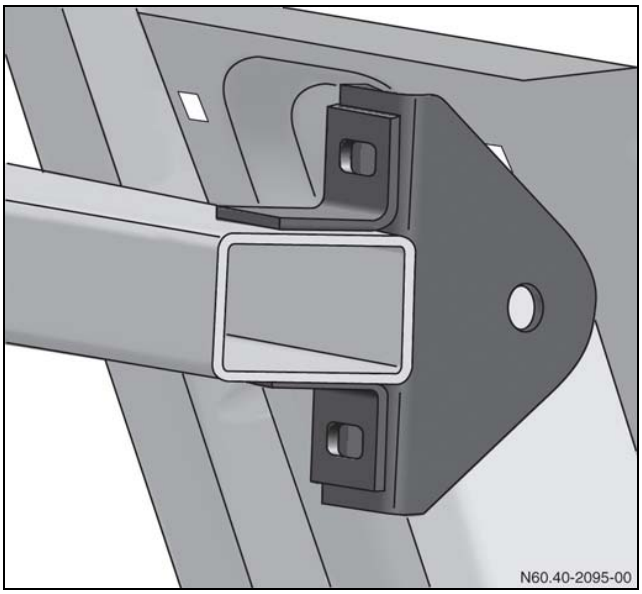
Bolting the support to the floor bracket

- To fix the wooden floor, 2 angles per support must be mounted at the bolt connection between the support and the bracket (contact surface per angle at least 1,200mm^2 [186 in^2], dimension 60mm x 20mm [2.5in x 0.8in])

- A steel tube with a rectangular profile measuring 60mm x 40mm x 3mm [2.25”x1.5”x1/8”] is bolted onto the brackets on the roof arches. The shelf supports are bolted to the rectangular profile at the top.

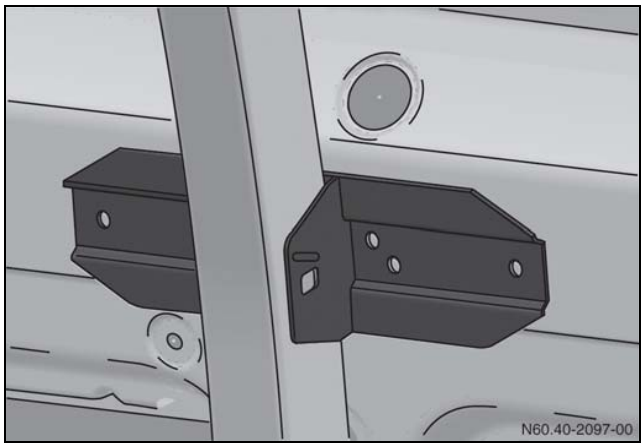


Bolting the longitudinal tube to the roof arch



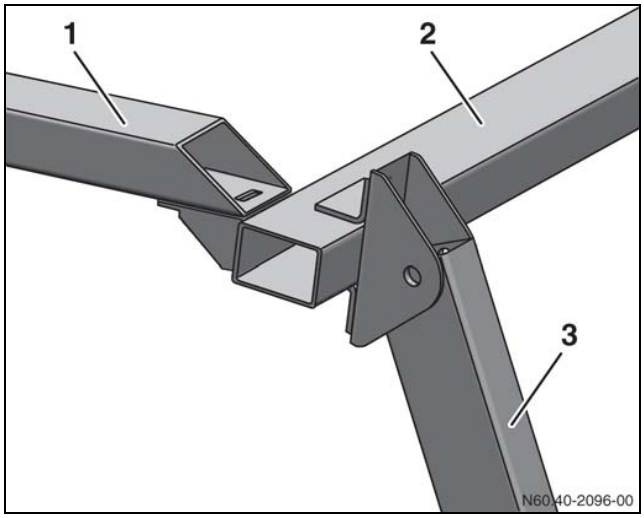
Connecting the longitudinal tube to the support

- The longitudinal tube must not be connected with the partition or the rear door.



Suggestion for bracket on waist rail

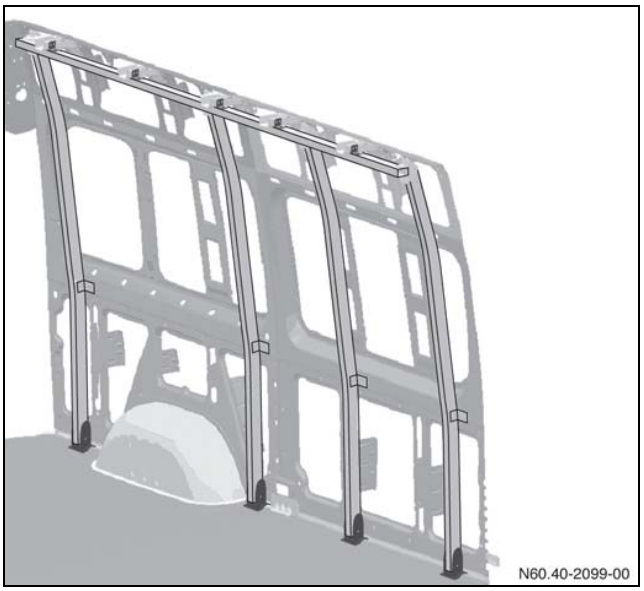
In addition to fixing the self support to the floor and to the roof arches, it is necessary to fix them to the waist rail using a bracket. The connection must be made by bonding and riveting. A minimum bonding surface of 7,000 mm^2 [10.0 in^2] is required.



Additional connecting of the longitudinal tubes

1 connecting rail
2 longitudinal tube
3 support

if the first or last support is more than 300mm [12 in] away from each roof arch, the longitudinal tubes must be connected together.



Suggested attachment with ZE6

7.6.5. Loading cranes

The size of the crane must be selected in accordance with the chassis size.
Loading cranes must be secured on a mounting frame to relieve the load on the frame (→ chapter 8.1) The permissible axle loads must be verified by calculating a weight balance.
The vehicle's stability must be ensured by the body builder. The slewing range of the crane must be limited accordingly.
Loading cranes mounted on vehicles must comply with all applicable accident prevention regulations.

Comply with all legal requirements.

The mounting instructions of the crane manufacturer must be observed.

If additional platform or tipper bodies are mounted, the dimensions of the longitudinal mounting frame member must be taken from the table for platform bodies (→ chapter 8.5) or tipper bodies.

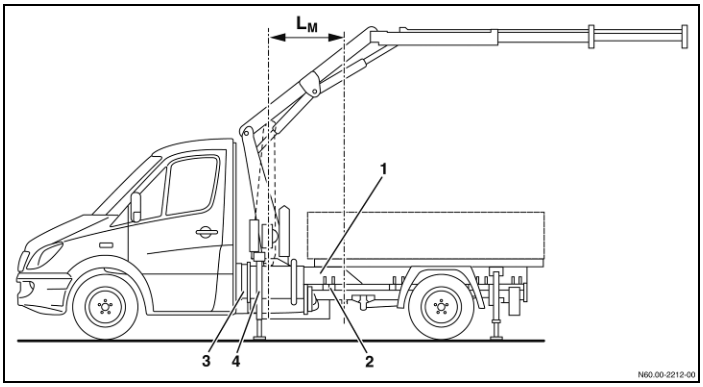
Outriggers must be provided for every loading crane. We recommend using hydraulic supports. The vehicle must not be raised using the outriggers, as this would damage the frame

Loading cranes behind the cab

Loading cranes and outriggers must not impair the function of other equipment.

Mounting frame

- Maximum crane load moment (kN x l) / 25 kNm
- Moment of resistance (Wx) for longitudinal mounting frame members: 45cm^3 / [2.75 in^3]
- Section dimensions of mounting frame longitudinal members (→ chapter 7.2).
- While the crane is in operation, vehicle stability must be ensured by extending outriggers.
- Outriggers extending beyond the vehicle when stationary must be made easily distinguishable by conspicuous colors, reflectors and warning lights.
- The platform length depends on the position and weight of the loading crane and must take into consideration the permissible axle loads.
- The vehicle may only be used on flat, paved roads.
- Due to the vehicle's load distribution, a frame extension may be required.
- If a stronger mounting 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 mounting frame (see illustration below). The short chamfered mounting frame must have a length of L_M>35% of the wheel base.
- This attachment required approval from SEC.



Loading crane

1	Loading crane mounting frame
2	Body support brackets
3	Loading crane attachment
4	Outrigger
L_M	Length of loading crane mounting frame

Loading crane mounted at end of frame

Warning

The minimum front axle load (→ chapter 4) must be complied with in all load states. Otherwise, adequate driving stability is no longer guaranteed.

- Loading cranes must be secured to a mounting frame made of steel
- Maximum crane load moment (kN x l):25 kNm 18,439ftlbs
- Moment of resistance (W_x) for longitudinal mounting frame members: 45 cm^3 [2.75 in^3]
- Section dimensions of mounting frame longitudinal members (→ chapter 7.2).
- While the crane is in operation, vehicle stability must be ensured by using extending outriggers.

7.6.6. Loading tailgate (lifting platform)

Please consult SEC if you intend to retrofit a lifting platform to SPRINTER models. If a lifting platform is being fitted, observe the following:

An auxiliary battery (Option E28) must be fitted if an electro-hydraulic lifting platform is fitted. The deep discharge battery with higher capacity (Option ED4) is highly recommended.

- Lifting platforms must comply with all applicable legal requirements
- The permissible rear axle load must not be exceeded
- The minimum front axle load must be complied with in all load states.
- Vehicle stability must be ensured by the body builder in all operating states.
- Calculate the vehicle's load distribution. This calculation must take all special equipment into consideration.
- If necessary, shorten the body length and the rear chassis overhang accordingly (Chassis Cab series).
- We recommend the use of only hydraulic supports.
- Maximum load distance 600mm [24 inches] relative to the standard rear portal / standard rear cross member.
- Vehicle stability when loading and unloading the vehicle must be ensured by the user.
- The maximum lifting force must not be exceeded.

Lifting platform attachment

The attachment of a lifting platform must be desiged as described in the "Attachment to the rear frame section" (→ chapter 7.2.2).

Additional torque support must be provided by means of at least two bolted connections fitted with spacer bushings (e.g. on the mounting frame).

- Extend the mounting frame as far forwards as possible and attach it with a non-positive connection to the chassis frame.
- No mounting frame is required on vehicles with a standard Cargo van body.

If modifications are required to the under ride guard due to the attachment of a lifting platform, the strength and bending strength of the under ride guard must not be changed. The vehicle must not be raised using the outriggers, as this would damage the frame.

Model	Wheel base [in]	Maximum lifting force (kN)/[lbs]		Minimum dimension of mounting frame longitudinal member (mm)/[in]
		Chassis Cab	Cargo	
SPRINTER 2500 8550 GVWR	144	-	5 / [1124]	80x45x3 / [3.1 x 1.8 x 1/8]
	170	-	5 / [1124]	80x45x3 / [3.1 x 1.8 x 1/8]
	144	-	5 / [1124]	80x45x3 / [3.1 x 1.8 x 1/8]
	170	-	5 / [1124]	80x45x3 / [3.1x 1.8 x 1/8]
SPRINTER 3500 9990 & 11030 GVWR	144	10 / [2248]	5 / [1124]	120x50x4 / [4.75 x 2 x 5/32]
	170	10 / [2248]	5 / [1124]	120x50x4 / [4.75 x 2 x 5/32]

7.6.7. Trailer hitch

- We recommend the use of trailer hitches that have been approved by MB and attached to the special mounting points on the body shell (rear longitudinal member)
- Access to the spare wheel must be guaranteed if a trailer hitch with non-detachable ball neck is fitted (especially with a fully laden vehicle).
- Fitting the trailer hitch must comply with all applicable regulations.

Never attach a trailer hitch to the end cross member of the frame.

Information is available from your authorized SPRINTER dealer.

Clearance dimensions, trailer hitch

The height of the trailer hitch above the ground must be between 300mm [11.75 in] and 450mm [18 in] when the vehicle is laden to the permissible gross vehicle weight.

The reliable operation of the hitch must not be impaired.

Do not install an open-jaw hitch fitted to the front of the vehicle.

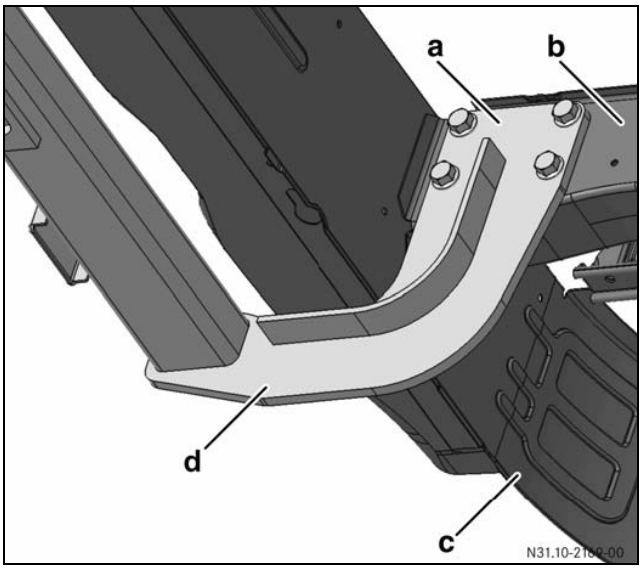
The specified clearances must be maintained.

Warning

If the towing vehicle is unladen, only an unladen trailer may be towed. If the trailer hitches have removable ball hitches, 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 and mounting plates to the special mounting points on the body shell (rear longitudinal member). In addition, Cargo vans require an additional attachment as support on the rear cross member of the vehicle frame.



Inside view

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

If the frame needs extending, spacer bushings must be fitted to the frame to attach the mounting plate or the rear cross member. They may lead to a reduction in the towing weight or the tongue weight.

You will find whole patterns with dimensions for securing the trailer hitch in the “Technical details” section.

Depending on the model series, the following optional equipment is available as an option from the factory to retrofit trailer hitches:

Chassis Cab

Option	Description
V08	Complete trailer tow group
E58	Complete trailer hitch wiring with 7 pin connector included at rear cross member

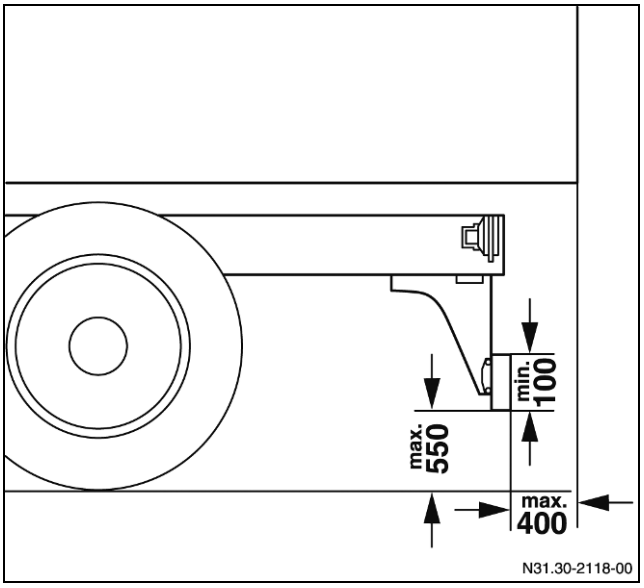
Cargo / Passenger Van

Option	Description
V08	Complete trailer tow group

Note:
Option V08 can not be ordered with rear step bumper W73.

7.6.8. Underride guard

If an under ride guard is required, it must comply with applicable legal requirements and its design drawings submitted by the body builder. The under ride guard must be mounted as far back as possible.



Side view Dimensions

- Maximum height of under ride guard (unladen vehicle) above road surface: 550mm [22 in]
- Width:
  - Maximum = width of rear axle (outer tire edge)
  - Minimum = width of rear axle less 100mm [4 in] on each side. The decisive factor is the widest axle
- The cross member must have a section height of at least 4 in.
- Edge radius at least 2.5mm [0.1 in].

Modification to the underride guard

If the under ride guard 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 under ride guard (e.g. due to the attachment of a lifting platform), the strength and bending strength of the under ride guard must not be modified. Any modifications to the under ride guard must comply with all applicable regulations.

8. Design of bodies

This section contains information concerning the body to be produced by the body manufacturer.

8.1. Mounting frame

All bodies require a mounting frame or a substructure that assumes the function of a mounting frame to ensure a reliable connection between the chassis and the body (except for self-supporting bodies and mounting frames acting as floor assemblies)

Attachment to the frame must run along the frame using the body support brackets attached to the frame at the factory (→ chapter 8.1.4).

Note:
All available body mounts and there attachment points must be used.

8.1.1. Material quality

Required moment of resistance[1] of mounting frame:	
Up to maximum standard Wheelbase	30 cm^3 / 1.8 in^3
Over maximum standard Wheelbase	> 34.5 cm^3 / 2.1 in^3

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

Material quality of specified mounting frame made of steel:

- Mounting frame with bracket mounting (non-positive) = H240LA or S235JRG2

- For H240LA or S235JRG2 steels complying with the DIN EN standard, analogous materials complying with the US SAE/ASTMJ403/J412/J413 standards.

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

- If high-strength steel is used for the mounting frames, their strength must be at least equivalent to steel mounting frames
- If aluminum mounting frames are used, their strength must be equivalent to steel mounting frames. Observe the specifications of the aluminum manufacturer.

8.1.2. Design

General
The mounting frame cross members must be located above the chassis frame cross members.

The mounting 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.

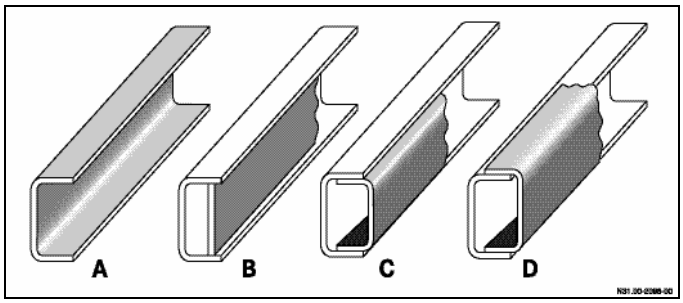
The body must have a torsion-free attachment to the body support brackets on the longitudinal frame member.

Place the vehicle on a flat, horizontal surface before mounting the body.

If very high longitudinal members are required or if the height of the frame needs to be small, the U-section can be designed as follows if the connections are non-positive:

- closed off like a box
- nested (inside overlapping U-section), or
- nested with an overlapping U-section

This increases the moment of resistance and torsional stability



Frame profile

A Open U-section
B Closed U-section
C Inside overlapping U-section
D Overlapping U-section

Mounting frame with offset frame

On vehicles with a pinched frame (permissible gross vehicle weight 11,030 lbs), the longitudinal mounting frame members can run continuously in a straight line.

8.1.3. Section dimensions / dimensioning

For the longitudinal members, use flanged U-sections or commercially available U-sections for vehicle design (not rolled steel sections). Box sections are also permitted as longitudinal member section.

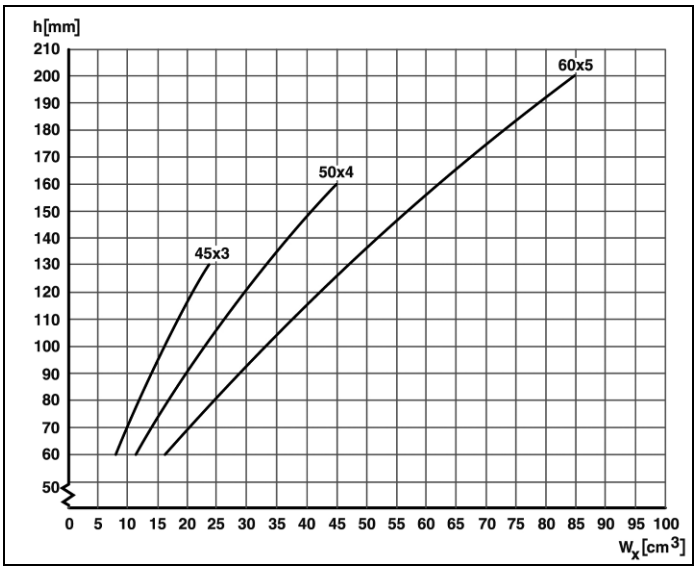
The dimensions of the longitudinal members are a function of the moment of resistance (W_x) required for the body and the chassis.

If more than one body is mounted on the same chassis (e.g. platform and lifting platform), the larger of the specified moments of resistance must be taken to determine the mounting frame.

The specified moments of resistance 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 mounting frame longitudinal members (open section).

The mounting frame and the chassis frame should have approximately the same flange with.



Longitudinal member dimensioning

h: Section height in mm
W_x: Moment of resistance in cm^3

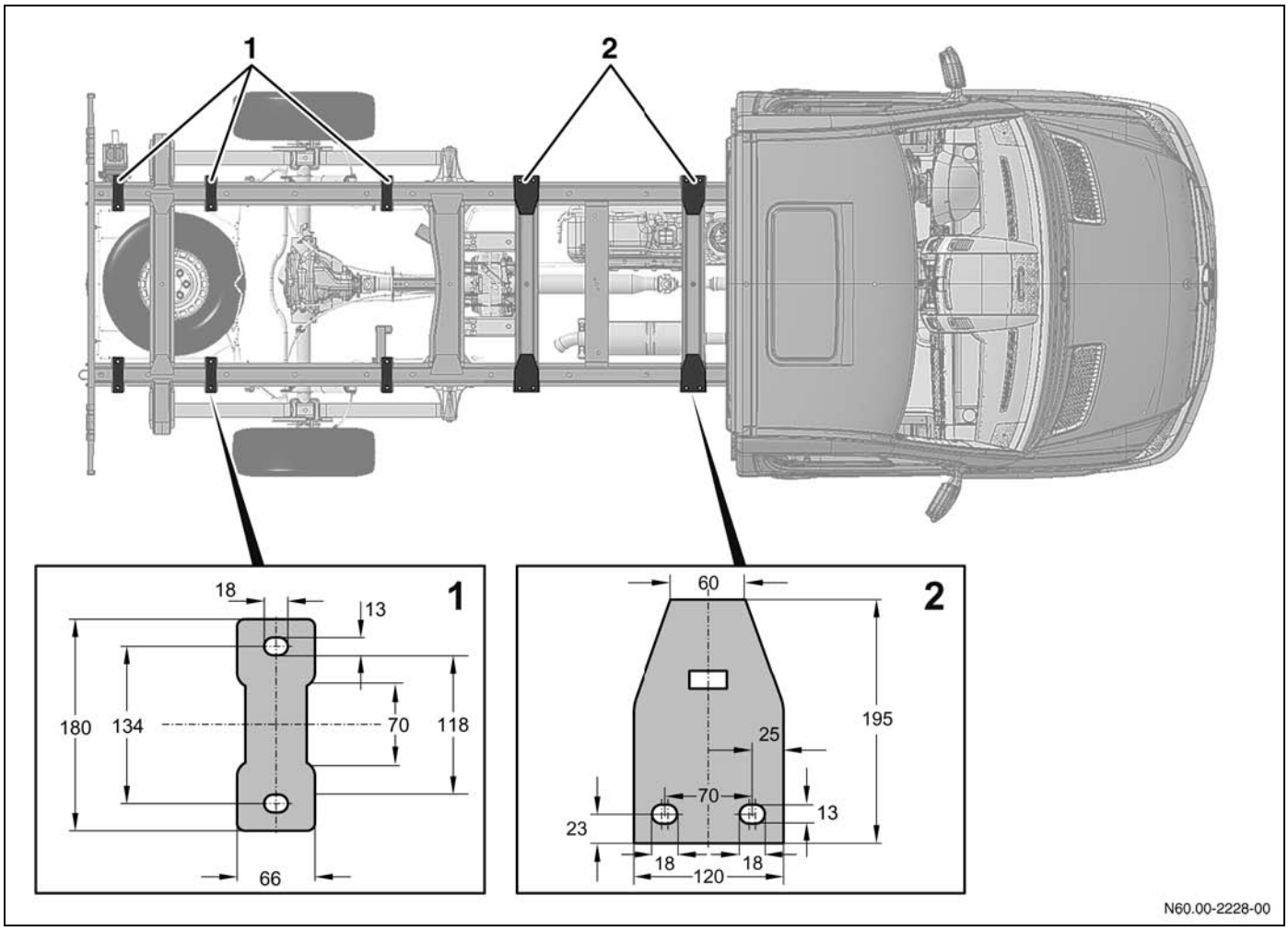
8.1.4. Attachment to the frame

All body support brackets fitted at the factory must be used for attaching bodies to the vehicle frame. The brackets are located on the longitudinal frame members.

The minimum distance between the body and the cab must be >50mm [2 inches]. Single rear wheel SPRINTER Chassis Cab are not available in the U.S or Canada and is for illustration purposes only.

If prefabricated mounting frames are used, the production tolerances of the chassis frame with (maximum +6/-3mm) [+0.24/-0.12 in] must be taken into consideration.

The positions for the body support brackets are indicated in the 2D drawings depending on the model series.



Types of frame fastening points (mm)

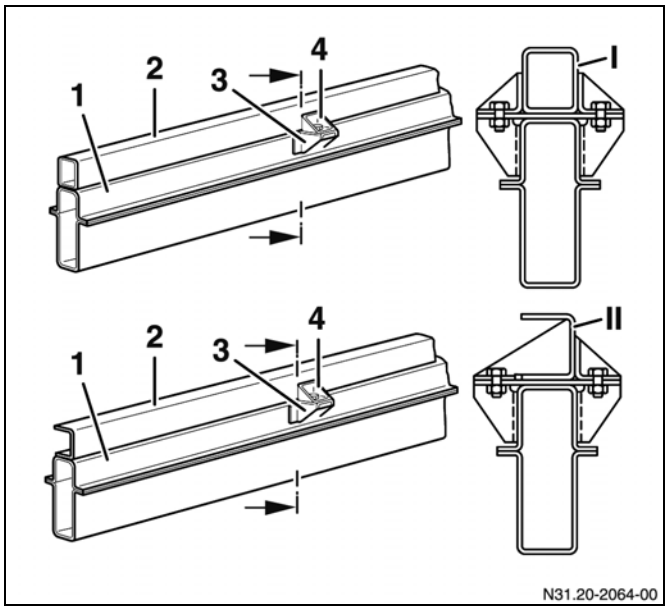
Note:
All available body mounts and there attachment points must be used.

Additional body support brackets

If it is necessary to fit additional body support brackets, contact SEC for directives (→ chapter 2.7).

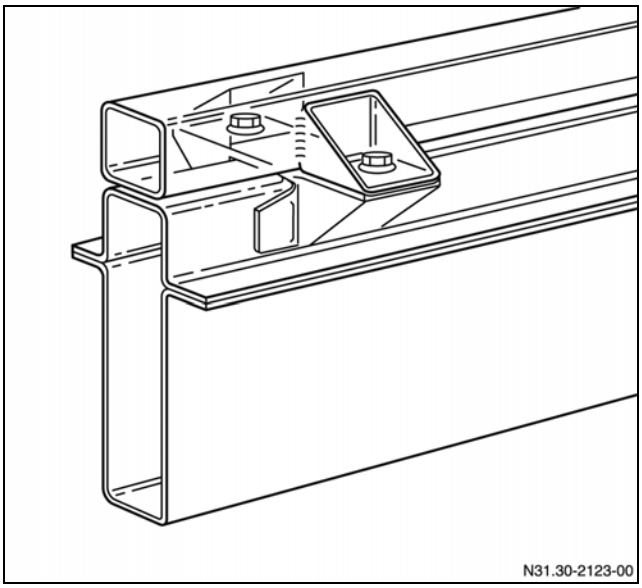
The body support brackets must be attached using two bolts for each body support bracket.

Attachment of the body support brackets

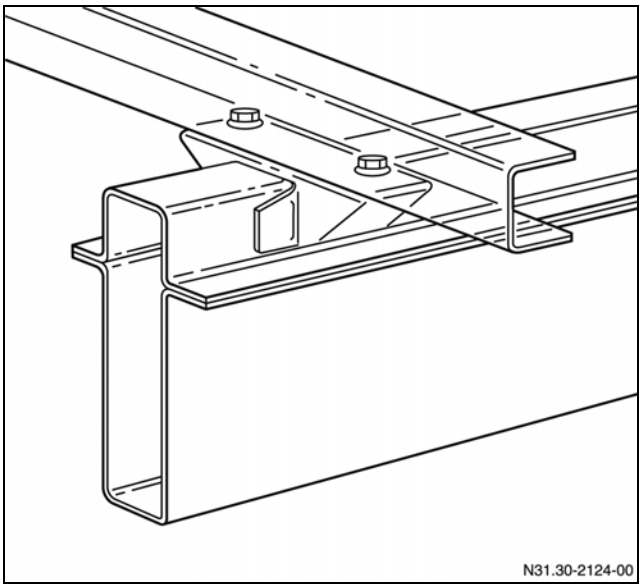


Example of a body bracket design

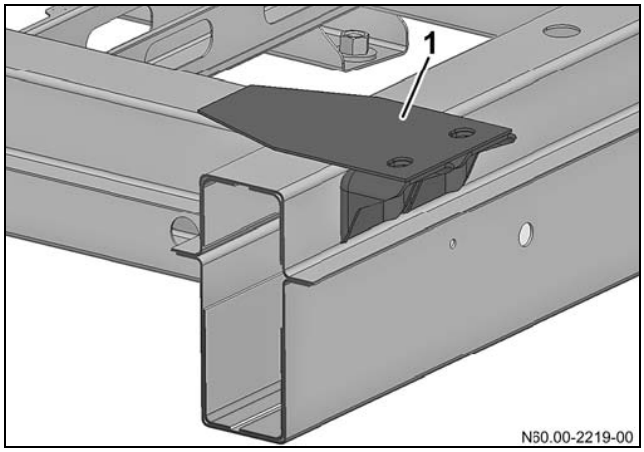
I Box section
II U-section
1 Chassis frame
2 Mounting frame
3 Standard mounting bracket
4 Bracket



Attachment to a longitudinal member



Attachment to a cross member



Body bracket with external bolted connection

1 Body bracket

Select the number of attachments to ensure sufficient transfer of all longitudinal and lateral forces.

Correct attachment is a decisive factor for:
- vehicle handling and operating safety
- the service life of the chassis frame and the body

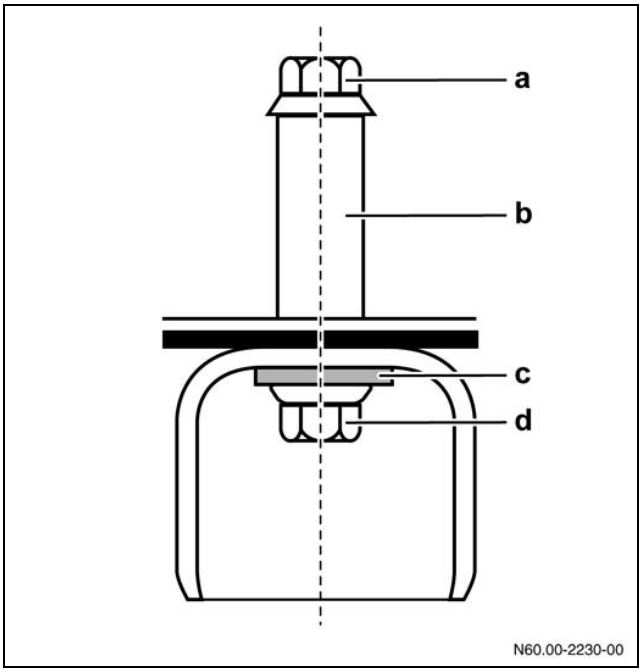
Rigid attachment

If the attachment is rigid, the mounting frame longitudinal member must be secured in both longitudinal and transverse directions. This will allow movement of the longitudinal mounting frame member only under specific conditions.

With rigid connections, a double support is required for each longitudinal frame member as depicted in the figure below.

Elastic connection

On rigid bodies (e.g. stiff cargo box, cargo box with cargo lift, refrigeration body etc.), bolted connections locked to prevent loosening and spacer sleeves must be provided at the first and second body brackets. The dimensions of the spacer sleeves must be adequate to ensure that they cannot deform.

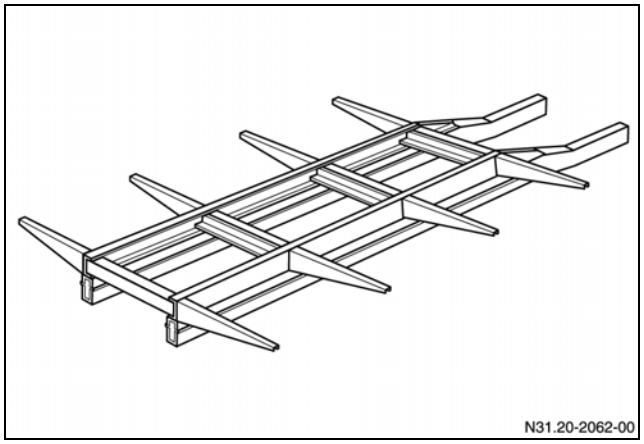


Suggested method for producing a bolted connection, locked to prevent loosing

a bolt with flange M12 x 90, strength Grade A
b spacer sleeve 22-13 x 50
c washer
d Nut with flange M12, strength Grade A

8.1.5. Mounting frame as floor assembly

A mounting frame with continuous longitudinal members is not required if the body floor assembly can assume the mounting frame function. The longitudinal members can also be integrated in the body. If the mounting frame longitudinal members are intersected by the cross members, the connection between the longitudinal and cross members must be rigid and resistant to torsion and bending.

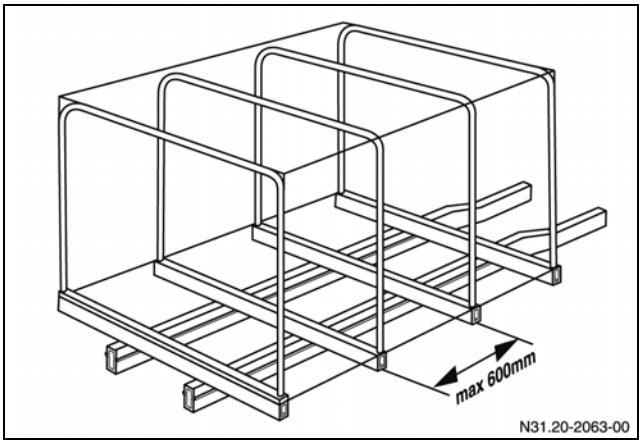


Example of a floor assembly

8.2. Self-supporting bodies

A mounting frame with continuous longitudinal members is not required if the body floor assembly can assume the mounting frame function.

Self-supporting bodies must have the same characteristics as the specified mounting frame. The body floor assembly must have the same rigidity and moment of resistance as a mounting frame.



Example of a body design

Spacing max 600mm [24inch]

8.3. Modifications to the interior

8.3.1. Retrofitting additional rear seats

When retrofitting rear seats, it is absolutely essential to keep to the H-point (hip point). You can obtain up-to-date documentation from SEC.

All applicable FMVSS/CMVSS regulations must be observed.

When re-installing seat belts, the specified bolts must be tighten to the original torque. 37NM / 27.3ftlbs

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 engage in the seat belt buckle correctly and in the event of an accident occupants may suffer severe injury or death.

Only the components of MB may be used for the installation of safety belts and seat belt buckles.

All applicable 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.

Warning

Never mount seats on the rear wheel wells. In the event of an accident, if the seats become detached from their anchorages may lead to severe injury or death.

8.4. Modifications to Cargo vans

Floor assembly/side panels

On Cargo vans, the body forms a self-supporting unit with the chassis frame. If body parts are modified or fitted, they must 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.

Cab rear panel

If there is an opening in the cab rear panel, a sectional frame must be fitted in the opening. The remaining braces and pillars must be reinforced by additional gussets and connected to the sectional frame (e.g. by bonding). Refer also to the "Modifications to cab" section.

Partitions

Partitions in Cargo vans may be totally or partially removed. The following partitions are available as optional equipment from the factory:

Option	Description
D50	Partition, continuous
D51	Partition, continuous with window
D53	Partition, continuous with a sliding window
D62	Provision for retrofitting partition
D64	Partition with sliding door
D93	Omission of partition

You can obtain more information about optional equipment from your authorized SPRINTER dealer, SEC or in the "Optional equipment" section) (→ chapter 3.9).

Vehicle roof

More information about the roof is contained in the "Cargo van / Passenger van roof" section.

8.5. Platform bodies

To ensure the uniform loading of the chassis frame, the body must be attached to the chassis frame by means of a mounting frame (U-section longitudinal members). 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 mounting the body:

- Weigh the chassis and define the body length.
- Reflectors and lights must be mounted on the body to comply with legal requirements per FMVSS/CMVSS regulations.

GVWR	Moment of resistance W_x for each longitudinal member in cm^3/[in^3]
11,030 lbs	30 / [1.83]

For the section dimensions of the longitudinal mounting frame member, see the section 8.1.3.

When bodies include attachments which move independently, ensure that there is adequate clearance between the attachments and the basic vehicle, otherwise they may collide with the basic vehicle, resulting in damage.

8.6. Cargo vans

To ensure the uniform loading of the chassis frame, the body must be attached to the chassis frame by means of a mounting frame (U-section longitudinal members).
On rigid bodies such as Cargo vans, the attachments behind the cab must be an elastic connection.

GVWR	Moment of resistance Wx for each longitudinal member in cm^3 / [in^3]
11,030 lbs	40 / 2.44

8.7. Refrigerated vehicles

Refer also to the following sections;

- "Retrofitting an air-conditioning system" (→ chapter 7.5.1)
- "Power take-offs" (→ chapter 7.5.3)
- "Attachment to the roof"
- "Retrofitting electrical equipment" (→ chapter 6.4.5)

On Cargo vans, easy access to the components of the door mechanism (e.g. guide rails and hinges) must be ensured so as not to hinder possible repair work.

On Cargo vans, the insulation increases the weight of the doors and therefore the load on the hinges, carriages and locking systems.

8.8. Dump bodies

Vehicles and dump bodies must comply with all applicable regulations and laws.

Make sure that you do not exceed the permissible axle loads.

Pivots

- The rear pivot on three-way and rear-end dump bodies must be positioned as close to the rear axle as possible.
- When the side gates or tailgate are folded down, they must not strike against the frame end, the light fittings or the trailer hitch.
- The front pivot must be provided with guide brackets so that the pivots can be guided when the dump body is lowered.

Restraining facilities

- Comply with all applicable laws and regulations
- Fit a support (folding support) to prevent the dump body from lowering
- Secure operating devices against accidental operation
- Connect a "dump body" indicator lamp to provide a visual warning that the dump body has not folded back completely (in driving position)

Lifting press

- The press carrier is attached to cross members in the mounting frame.
- The cross members of the mounting frame and the chassis must be placed on top of each other as far as possible forward.
- On three-way dump bodies, the application point of the lifting press must be in front of the center of gravity of the body and the payload.

Mounting frame

If chassis are provided with dump bodies, the mounting frame must have the correct dimensions to support the high loads to which the vehicle will be subjected.

Observe the following points:

- Attach the mounting frame to the body support brackets as described in the “Attachment to the frame” (→ chapter 7.2.2).
- Make sure that the steel longitudinal and cross members have the correct dimensions.
- Close off the rear area of the mounting frame towards the Cargo van and, if necessary, reinforce the mounting frame by installing a diagonal cross or by taking other appropriate measures.

Vehicles with dump bodies can only be used under normal operating conditions. If the vehicle is to be used in heavy-duty operating conditions, we recommend that you contact SEC (→ chapter 2.7).

GVWR	Moment of resistance Wx for each ongitudinal member in cm^3/[in^3]
11,030 lbs	40 / [2.44]

8.9. Rescue vehicles

Vehicles with bodies for rescue or recovery equipment must be attached with mounting frames of adequate dimensions. In addition, the bodies must be fitted with two rigid connections on each longitudinal frame member.

Refer to the “Winches” section for information on attaching winches.

Also observe the “Side under ride guards”

8.10. Torsional rigidity of body types

The bodies and mounting frames for torsionally rigid bodies (e.g. municipal vehicles, fire-brigade Cargo vans or street-cleaning vehicles) must be attached by means of elastic elements at the front of the frame. The body support brackets fitted at the factory must be used.

If required, the mounting frame must be additionally reinforced at the rear by fitting a diagonal cross.

Refer also to the “Retrofitting electrical equipment” section (→ chapter 4.6.2).

8.11. RV Conversion

Prior to conversion in an RV, please ensure the following important requirements:

- All applicable legal requirements are observed
- All applicable requirements for interior design and RV equipment are fulfilled
- 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.

Particular attention must be paid to the following sections of the body / equipment mounting directives:

- Dimensions and weights (→ chapter 4)
- Instructions on modifications to the basic vehicle
- Electrics/electronics (→ chapter 6)
- Mudguards and wheel wells (→ chapter 7.2.6)

Modifications of conversions to standard vehicles (e.g. the installation of a raised roof) may invalidate the certificate and warranty. Prior to convert a SPRINTER into an RV consult with SEC (→ chapter 2.7).

Never exceed the center of gravity limits.

We recommend fitting and additional anti-roll bar on the rear axle. This is available from the factory as optional equipment under Option V50. (→ chapter 3.9).

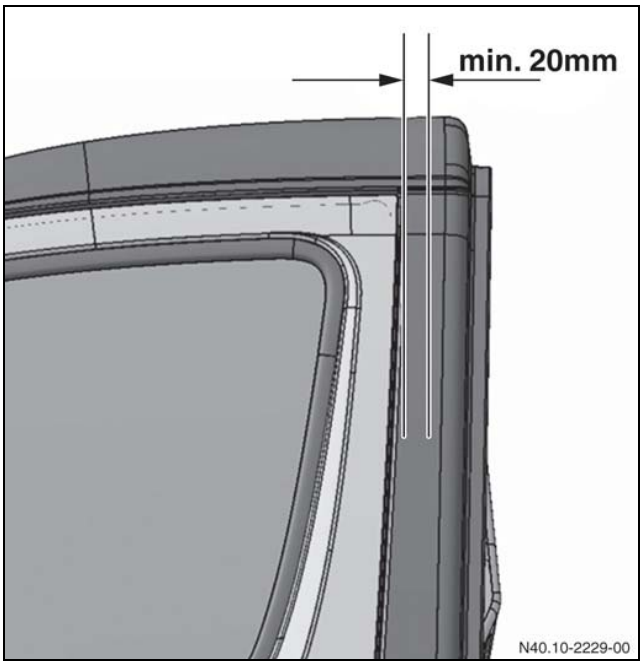
More information on electrics and additional equipment is contained in the “electrics/electronics” (→ chapter 6) and “Additional equipment” sections (→ chapter 7.5).

Warning

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 and B-pillar be covered with aftermarket paneling.

Attachment to the frame

- The body must be secured by using support brackets (→ chapter 8.12)



Minimum distance between rear door and integrated body

8.12. Integrated Bodies

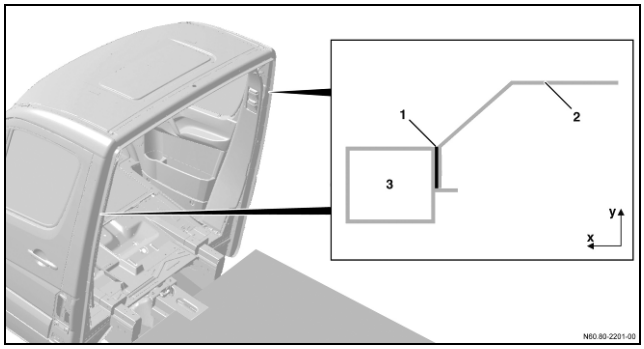
A non-positive connection between cab and body is required on vehicles with integrated bodies, e.g. RV's, integrated box bodies etc.

Attachment of cab rear panel to B-pillar (z-axis)

The body side wall must always be connected to the B-pillar. The connection between body and cab must be non-positive.
It must be assured that forces are transmitted between the body and B-pillar. This can be achieved by e.g.:

Variant 1

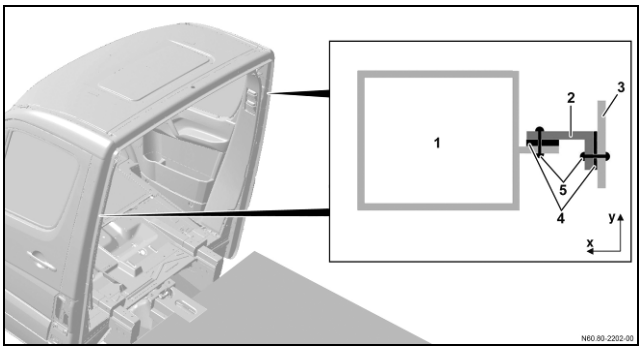
Attachment of body to B-pillar by means of a plate with t=2mm [3/32 in] angled at approx. 2x45º. The plate must be bonded across the entire surface area.



Variant 1: Attachment of body to B-pillar with plate. Picture shows passenger side.
1 Bonding flange
2 Plate / Bracket
3 B-pillar

Variant 2

Attaching the body to the welding flanges of B-pillar with angle pieces.



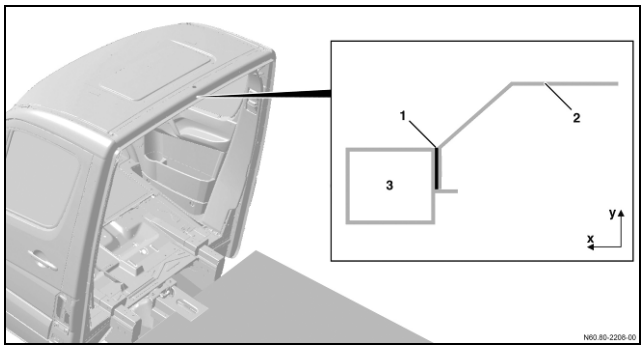
Variant 2: Attachment of body to B-pillar welding flanges with angle pieces.
Picture shows passenger side.
1 B-pillar
2 Angle piece
3 Front wall of upfitter body
4 Bonding flange
5 Rivet

Attachment of cab rear panel to roof bow (B-pillar) (y-axis)

In addition to the connection between body sidewalls and vehicle, it is necessary to form a non-positive connection between body and vehicle in the area of the B-pillar roof bow on vehicle with integrated bodies.
This can be achieved by e.g.

Variant 1

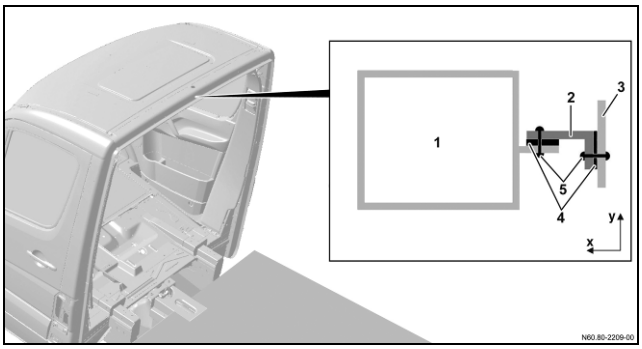
Attachment of body to B-pillar roof bow by means of a plate with t=2mm [3/32 inch] angled at approx. 2x45º. The plate must be bonded across its entire surface area.



Variant 1: Attachment of body to B-pillar with plate.
1 Bonding flange
2 Plate / Bracket
3 Roof bow (B-pillar)

Variant 2

Attaching the body to weld flange on roof bow with angle pieces



Variant 2: Attachment of body to roof bow welding flanges via angle pieces.
1 B-pillar
2 Angle piece
3 Front wall of upfitter body
4 Bonding flange
5 Rivet

9. Calculating the center of gravity

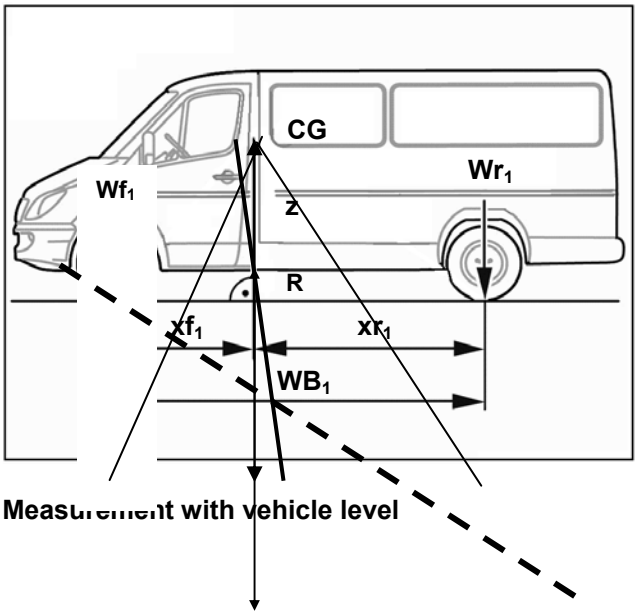
After installation or modification of the equipment, vehicles must be weighed on a scale in two different positions with a secured load appropriate to the area of vehicle applications.

The determined center of gravity must not exceed the specified limiting values (→ chapter 4).

Before the measurement is taken, the tires must be **inflated** to maximum pressure and the vehicle suspension at the front and rear axle must be **locked**.

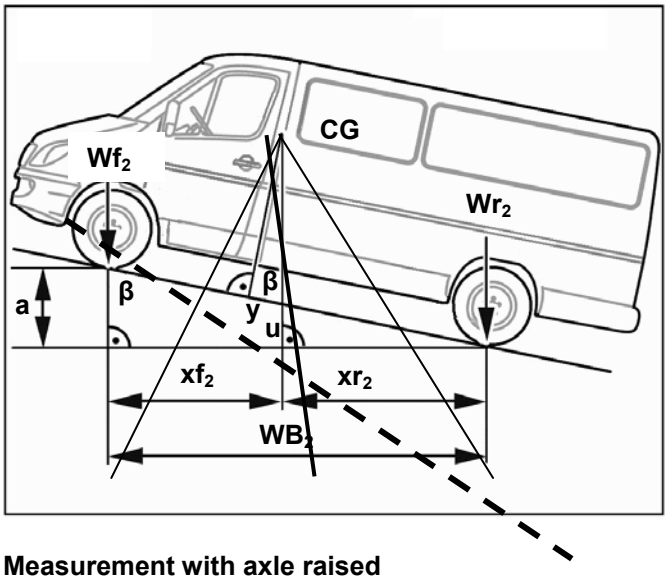
The axle loads must be weighed when the vehicle is horizontal (Wf_1 and Wr_1) and when one axle is raised by amount "a" (WF_2 and Wr_2); we recommend a = 500mm [20 in]. The wheelbase WB_1 (144.3 in or 170.3in) is defined by the vehicle model series (see ordering) or must be measured.

Measurement 1



Measurement with vehicle level

Measurement 2



Measurement with axle raised

Definitions:

CG	=	Center of Gravity
Wf	=	weight front
Wr	=	weight rear
W	=	total vehicle weight
WB	=	wheelbase
xf	=	distance from center to front axle
xr	=	distance from center to rear axle
z	=	Center of Gravity height
R	=	static radius height of front and rear wheels

$$z = R + \tan\left[\cos^{-1}\left(\frac{a}{WB_1}\right)\right] \cdot \left(\frac{Wf_1 \cdot WB_1}{W} - \frac{Wf_2 \cdot WB_1}{W}\right)$$

Formula center of gravity

The sum of all moments about a point is zero.

Therefore:

$$Mr = 0$$

$$(Wf_1 + Wr_1) \cdot xr_1 = Wf_1 \cdot WB_1 \quad (1)$$

$$xr_1 = \frac{Wf_1 \cdot WB_1}{Wf_1 + Wr_1} = \frac{Wf_1 \cdot WB_1}{W} \quad (2)$$

The new wheelbase WB_2 after raising one axle is calculated as follows:

$$WB_2 = \sqrt{(WB_1^{\,2} - a^2)} \quad (3)$$

xr_2 is calculated analogously to xr_1:

$$xr_2 = \frac{Wf_2 \cdot WB_2}{Wf_2 + Wr_2} = \frac{Wf_2 \cdot WB_2}{W} \quad (4)$$

$$z = \tan\beta \cdot y \quad (5)$$

The unknown angle β can be calculated from:

$$\cos\beta = \frac{a}{WB_1} \quad (6)$$

Therefore, the following results for β:

$$\beta = \cos^{-1}\left(\frac{a}{WB_1}\right) \quad (7)$$

The required y is obtained from the equation:

$$y = xr_1 - \sqrt{(u^2 + xr_2^2)} \quad (8)$$

The values for xr_1 and xr_2 are already known from equation (2) and (4). The required **u** is calculated using:

$$\frac{a}{WB_2} = \frac{u}{xr_2} \quad (9)$$

The results in the following equation:

$$u = \frac{a \cdot xr_2}{WB_2} \quad (10)$$

If equations (7) and (10) are used in equation (5) and are referred back to the given/measured values **a, WB_1, Wf_1, Wr_1, Wf_2** and **Wr_2**, the result for the height of the center of gravity **z** is:

$$z = R + \tan\left[\cos^{-1}\left(\frac{a}{WB_1}\right)\right] \cdot \left(\frac{Wf_1 \cdot WB_1}{W} - \frac{Wf_2 \cdot WB_1}{W}\right)$$