Nutzfahrzeuge

Body assembly guidelines Volkswagen Nutzfahrzeuge

The Transporter T4

The following pages contain technical guidelines for custom body manufacturers/ coachwork specialists for construction and assembly of custom body-related parts and conversions.

The body assembly guidelines should be strictly adhered to if modifications are made with the intention of doing so.

Included in the Volkswagen body assembly guidelines are also the body dimension plans for our commercial vehicles Crafter, Transporter T4 and T5, Caddy and LT. These can be installed in 3 formats (TIF, DXF, IGES) for CAD programs and as PDF files.

Advice: If further technical queries about the series production vehicle arise over and beyond these guidelines, please contact your local conversion expert at your importer.

Volkswagen Nutzfahrzeuge
Brieffach 2965/5
Postfach 21 05 80
D - 30405 Hannover
Fax. +49 (0)511 / 7 98 - 85 00

Online contact: http://www.vwn-aufbaurichtlinien.de/de/kontaktformular

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http://www.vwn-aufbaurichtlinien.de

Data status October 2009

3.1 Roof Rack, Rear Luggage Carrier/Rear Ladders, Flatbed w. Tarpaulin Bow

Roof rack
Roof loads raise the centre of mass of the vehicle and lead to a high dynamic axle-load shift and tilting of the vehicle on bumpy lanes and in bends. The road behaviour is considerably impaired. For this reason, roof loads should be avoided, if possible.

Depending on load distribution, at least 2 base carriers are required which are to be mounted in the pillar area, if possible.

Roof loads (only for standard vehicles):

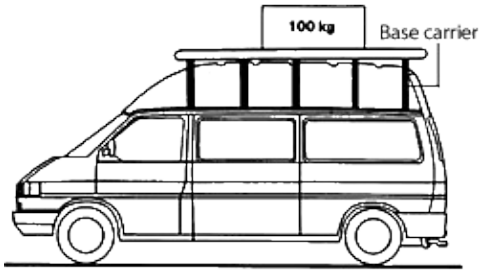
Vehicles with high-space roof 100 kg

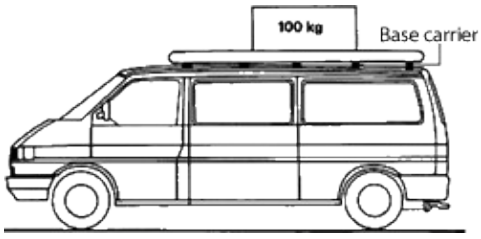
Vehicles with standard roof 100 kg

Double cab 75 kg

Driver s cab 50 kg

Pop-up top 50 kg





Rear luggage carriers/rear ladders
The rear luggage carrier or the rear ladder must be executed in such a way, that, after having been mounted, no vertical static or dynamic loads are working on the tailboard or rear double-wing doors. In combination with the currently available hatchback lid hinges, rear luggage carriers (for max. 4 bicycles, equivalent to a weight of 75 kg) must not be propped up on the rear bumpers. Since the beginning of the great product upgrading (January 1996), rear luggage carriers **may no longer** be propped up on the rear bumpers.

Load of tailboards/rear double-wing doors
Since the beginning of series production of the T4 (1990), the tailboard is provided with the shown hatchback lid hinge (figure 1).

If rear luggage carriers for bicycles (max. 4 bicycles, equivalent to 75 kg) are mounted, it is required to relieve the tailboard. This is achieved by propping up the rear luggage carrier on the rear bumper. Afterwards, the hatchback lid hinges need only to carry the horizontal force component, thus preventing that the rear luggage carrier is tilting to the back. Since the currently available hatchback lid hinges (figure 2) are being used, it is no longer necessary to relieve the tailboard by propping it up on the rear bumper. However, this option is still possible. Since the great product upgrading (January 1996), new bumpers are in use which may no longer be used for supporting the rear luggage carriers, due to their construction, but which is, however, no longer necessary. A fatigue loading of the rear bumpers may lead to permanent bumper distortions!

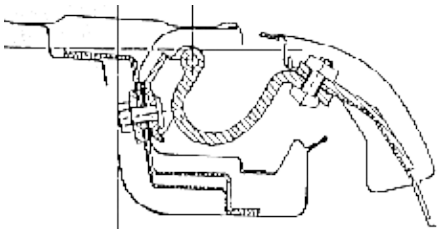


Fig. 1

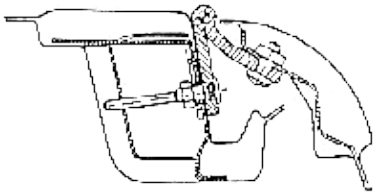


Fig. 2

Note: With the introduction of the currently available hatchback lid-hinge version, the air gap between roof and opened tailboard was considerably reduced. To prevent the top holding clamps of the rear luggage carrier from pressing onto the roof if the tailboard is being opened, it is required that they can be mounted directly next to the hatchback lid hinges!

Depending on the equipment scope of the tailboards (i. e. weight), appropriately strong gas springs are used. Within the scope of a subsequent retrofitting, the tailboard weight may increase, so that the tailboards then no longer can be opened up to the top limit-stop. The following table will help you to select appropriate gas springs.

Drawing No.:	Ejection force in N F_1	Insertion force in N F_4 max	Friction in N $F_R$max	Ejection speed in m/s v_{s8}	Identification (print)
	Statically measured force at +20°C				
701 829 331 Q	710±30	960	80	0,15...0,4	1 bar
701 829 331 R	770±30	1030	80	0,15...0,4	2 bars
701 829 331 S	830±30	1120	80	0,15...0,4	3 bars
701 829 331 AB	910±30	1200	80	0,15...0,4	4 bars

As before, rear double-wing doors may carry no additional loads!

250° hinges for the rear double-wing doors

Since calendar week 2/99, it is possible to supply the rear double-wing doors of box-type delivery vans and station wagons with both wheel bases, as well as with standard roof or standard high roof, with the above mentioned hinges ex works (PR-No. 5V4). The double-wing doors can first be opened up to 90° (as is the case with the 180° standard type). After taking the catch brackets off their hinges, it is possible to open the rear double-wing doors still further (up to approx. 250°). Each of them will then be held by a magnet buffer at the external side walls of the vehicle.

Boundary conditions:

- **Short wheel base** generally **not** in combination with a sliding door and/ or seats in the passenger compartment. In this case, the sliding-door opening of the right sliding door is only 680 mm, instead of 1020 mm.
- **Long wheel base** generally **not** in combination with seats in the 3rd row of seats.
- **Both wheel bases** generally **not** in combination with the swivel-mounted spare-wheel holding device outside at the rear (only concerns the syncro).
- Rear double-wing doors with 180° hinges **cannot be retrofitted**.

Flatbed with tarpaulin and bow(ex factory)
Apart from the tarpaulin, the bows must not be loaded with supplementary weights, such as ladders, etc...

3.10 Protection of the Car Battery During Longer Waiting Intervals

If a vehicle is not operated for a longer period, the battery is gradually completely discharged by consuming devices (clock, tachograph, cigar lighter or radio), thus being constantly damaged.

To avoid this damage, the line bundle is disconnected ex works using a plug-in connection which is reconnected when the vehicle is to be transferred, respectively by the delivery service.

If the vehicles are parked at attachment manufacturers for a longer time (shutdown period), it is required to disconnect the plug-in connection again.

3.11 Power Take-Offs (Engine)

Power output of the engine via V-belts
At the engine, the output can be decreased by max. 10 kW via V-belts, if the available flange points are being used.

The following power take-offs at the engine can be ordered ex factory if an air-conditioning system is available. However, a combination is not possible:

Engines	**Installation** Cooling compressor Sanden SD7 H15 (non-controlled)	**Preparation** Preparation of the installation Hydraulic pump, manufactured by ZF	**Installation** 2nd Generator Bosch 14 V 90 A
2,0l 62 kW petrol engine R 4	-	-	x
2,0l 62 kW petrol engine R 4 with catalytic converter	-	-	x
2,5l 81 kW petrol engine R 5 with catalytic converter	-	x	x
2,8l 103 kW petrol engine VR 6 with catalytic converter	-	-	-
1,9l 50 kW turbo diesel engine R 4 with catalytic converter	-	-	-
2,4l 55 kW diesel engine R 5 with catalytic converter	x	x	x
2.4l 57 kW diesel engine R 5 (for synchro)	x	x	x
2.5l 75 kW TDI engine R 5 with catalytic converter	x	x	x

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3.12 Brake System

An operating permit is available for the brake system of the vehicles. This licensing becomes invalid if the brake system is modified.

Load-related brake proportioning valve
(only for front-wheel drive)

The load-related brake proportioning valve is conceived for adjusting the brake pressure at the rear axle to the respective load condition and is controlled according to the spring suspension at the rear axle.

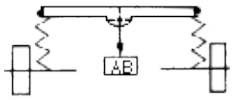
The load-related brake proportioning valve is provided ex-works with a regulation, based on a tension spring, relating to the unladen weight of the vehicle. Usually, it is not required to re-adjust this regulation - not even after mounting an attachment onto the chassis.

In special cases - for example retrofitting of reinforced springs, mounting of an unusually lightweight attachment - it is required to correct the regulation of the brake proportioning valve. The pressure check and regulation should be carried out at a Volkswagen dealer/workshop for utility vehicles. The regulation has to be performed in such a way that the balance beam is horizontal.

Modifications of the brake system are illegal!

Exceptions are the adaptation of the brake-pressure line and the handbrake cable in the scope of wheel base changes at chassis.

Volkswagen AG
Automatic brake pressure regulator



Check:	Inlet pressure on front axle wheel cylinder bleeder valva	Mean value from left and right
Test:	Outlet pressure on rear axle wheel cylinder bleeder valva	

Rear axle load (kg)	Input pressure (bar)	Output pressure (bar)
500	50	14±2
600	50	14±2
650	50	15±4
700	50	19±5/2
750	50	24±6/4

800	50	29±6/4
900	100	45±6/4
1000	100	53±8
1100	100	62±8
1200	100	69±10
1300	100	75±2
1400	120	82±10
1500	120	87±10
1600	140	97±122
1700	140	103±129
1800	140	108±135

For deviating axle loads, intermediate values are to be applied. For adjustment and function, refer to the operating instructions.

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3.13 Pressure Check and Regulation

Connect the pressure gauge to the wheel cylinder (rear). Unscrew the bleeder valve for this. Operate the brake pedal with enough pressure to achieve the inlet pressure (see signboard of braking force regulator), then adjust the outlet pressure. After the check, bleed the brake system. Tighten the bleeder valve by MA=4,9+1Nm.

With the specified axle loads, every pressure within the tolerance limits is permitted (e. g. 600 - 630 kg = 4-7 bar).

General note:
We recommend that the attachment manufacturers/equipment suppliers add appropriate service instructions and - if required - operating instructions to their supply scope of the vehicle.

3.14 Possibility to increase the load

Possibility to increase the load up to a permitted total weight of 2,890 kg for vehicles with short and long front section, with both wheel bases, based on individual acceptance.

1. Preconditions:

a. At vehicles with increased net load (PR-No. 0J3), it is required to convert the front-axle brake (standard: Ø 54 mm pin sliding calliper brake) to the Ø 54 mm frame calliper brake, including the internally ventilated brake discs. Vehicles that are provided with the Ø 57 mm pin sliding calliper brake (all vehicles with long front section, independent of the module variants and vehicles with TDI engine in short front section) additionally require a conversion of the main brake cylinder (currently used: Ø 25.4 mm; desired: Ø 23.81 mm). The mentioned conversions can be omitted, if the Ø 54 mm frame calliper brake was included in the vehicle order (with PR-No. 1LE).

b. Vehicles belonging to the net load class of PR-No. 0J2 are to be converted, **in addition** to the requirements of item 1a), to the state of PR-No. 0J3. **The load of vehicles whose load was already reduced (PR-No. 0J1) can no longer be increased!**

c. No light-alloy wheel rims! (No free movement for the frame calliper brake!).

d. Centre-of-mass positions of special attachments/upgrades according to the specifications of our attachment guidelines

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2. Boundary conditions::

2.1. The maximum permitted axle loads correspond to those of PR-Nr.0J3.

2.2. Closed attachments (box-type delivery van, station wagon, etc.)

a. **Wheel base 3320 mm**
No further boundary conditions apply to the short and long front section of vehicle and to all currently available modules/units- apart from those mentioned under item 2.1.

b. **Wheel base 2920 mm**

1. No further boundary conditions apply to the short front section of vehicle, apart from those mentioned under item 2.1., and provided that no TDI engine is used.
2. At the long front section version and at the short front section version with TDI engine, it is generally only possible to increase the load, if a calculation of weights is available for the upgraded special vehicle and if the brake calculation shows a positive result in the individual case.* Observe item 2.1!

2.3. Open attachments (standard chassis with driver's cab or double cab).

a. **Wheel base 3320 mm**
All currently possible modules/units and front section versions (long front section only for caravans) must have a minimum rear-axle load of 565 kg, to permit that they also can be driven without special attachment (caravan cabins, semi-trailers, etc.). Observe item 2.1.
In this context, it is not necessary to deal with the compliance with other possible regulations on driving

without special attachments.

b. **Wheel base 2920 mm**
These vehicles must have a minimum rear-axle load of 640 kg, to permit that they can also be driven without special attachment. In this context, it is not necessary to deal with the compliance with other possible regulations on driving.
1. No further boundary conditions apply to the short front section of vehicle, apart from those mentioned under item 2.1., and provided that no TDI engine is used.

2. At the long front section version (only available for caravans!) and at the short front section version with TDI engine, it is generally only possible to increase the load, if a calculation of weights is available for the upgraded special vehicle and if the brake calculation shows a positive result in the individual case.*
Observe item 2.1!

Import certificates
can be obtained from:
Volkswagen AG,
Department NE-GG,
Brieffach [pigeonhole] 1745,
Postfach [P.O. box],
38436 Wolfsburg, Germany
Fax +49-5361-972917

Time required for handling:approx. 20 days.

Preconditions:

a. It is required to forward a copy of the vehicle registration papers and documents. In addition: Specification of
- ♦ axle loads
- ♦ the currently used tyre type
- ♦ the centre-of-mass position of the base vehicle to be upgraded/modified
- ♦ the remaining net load.

b. A positive test result from our development department.

If an import certificate is already available for an upgrading/modification variant, please enclose a copy when requesting a further import certificate. (This will help to speed up the handling!).

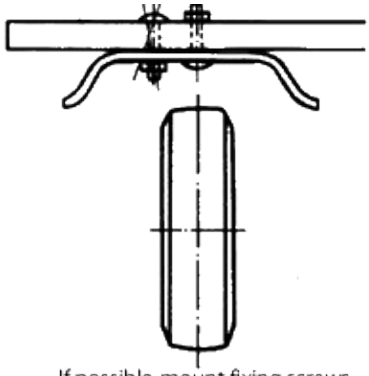
*) Due to capacity reasons, individual cases cannot be considered. **Alternative:** Please, use long wheel bases! In case of larger quantities, add a note on how many vehicles of this variant are to be constructed per annum.
At variants which are not mentioned here, a subsequent load increase is not possible. The same applies to load increases exceeding the above mentioned extent!

Additional information:
Only for camper vans and sales cars, there is a chassis with driver s cab available for both wheel bases with a permitted total weight of 3,300 kg. For these vehicles, only the **front-wheel drive version** is available for right-hand and left-hand drive vehicles. **The conversion to a syncro version is not permitted! No further possibility to increase the load! Trailing weights:** For all transporter variants, max. 4,500 kg, except for vehicles with a

- **1.9 l diesel engine** for which a trailing weight of **max. 4,000 kg** is permitted.
- **2,5 l TDI engine** for which a trailing weight of **max. 5,000 kg** is permitted.

3.2 Mudguards and Wheel Housings

The free space required for the wheels, including snow chains, must be considered. In the chassis drawings, the minimum distance between the top edge of the side rails and the wheel housings is indicated.



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3.3 Attachment of Additional Units/Modules

If additional modules, units, etc. are to be attached to the chassis, it is required to fix them with brackets which are welded to the side rail in the neutral zone. If it cannot be avoided to screw them directly on the frame, it is required that the rails are executed as hollow profiles on which also distance bushes are to be welded.

Note:

- General instructions on chassis modifications
- Drilling at the chassis frame

If attachments are to be added or to be installed, it is required to adhere to the instructions of the relevant module/unit/equipment manufacturers.

3.4 Attachment of a Loading Crane

Instructions on the attachment of a loading crane
Since a power take-off from the transmission is not available, the crane can only be operated with an electrical pumping unit (reinforced battery and generator required) or a hydraulic pump (hydraulic pump required at the engine).

When projecting the loading crane attachments, the required stability of the loading crane is to be considered. As a result of the load-distribution calculation to be performed, flatbed modifications using baffles or extensions/shortenings may be necessary.

3.5 Attachment of a Loading Tailboard

Instructions on the attachment of a loading tailboard
Before attaching a loading tailboard, it has to be checked (by means of a load-distribution calculation) whether the permitted rear-axle load and the minimum front-axle load are kept.

It is not permitted to attach a loading tailboard to standard box-type delivery vans without the approval of the relevant manufacturer. It is possible to attach a swinging lift with a load-carrying capacity of max. 300 kg.

When ordering a chassis which is to be equipped with an electrohydraulic loading tailboard, we recommend the following options: reinforced generator and reinforced battery.

For the attachment of the loading tailboard, the chassis has to be provided with a mounting frame (see note on mounting frames).

3.6 Trailer Couplings/Free Space according to DIN 74058

Only couplings which are approved by us may be used as trailer couplings. The following trailer couplings can be ordered ex works as special equipment:

Spherical coupler - order code:
1D6: For trailing loads up to max. 2 000 kg during braking, with 12% angle of gradient.

The permitted externally applied load is 100 kg.

The permitted max. total weight indicated in the car documents must not be exceeded. **The actual weight of the trailing load must be lower than that of the trailing vehicle.**

Adhere to the following instructions when a trailer coupling is to be retrofitted:

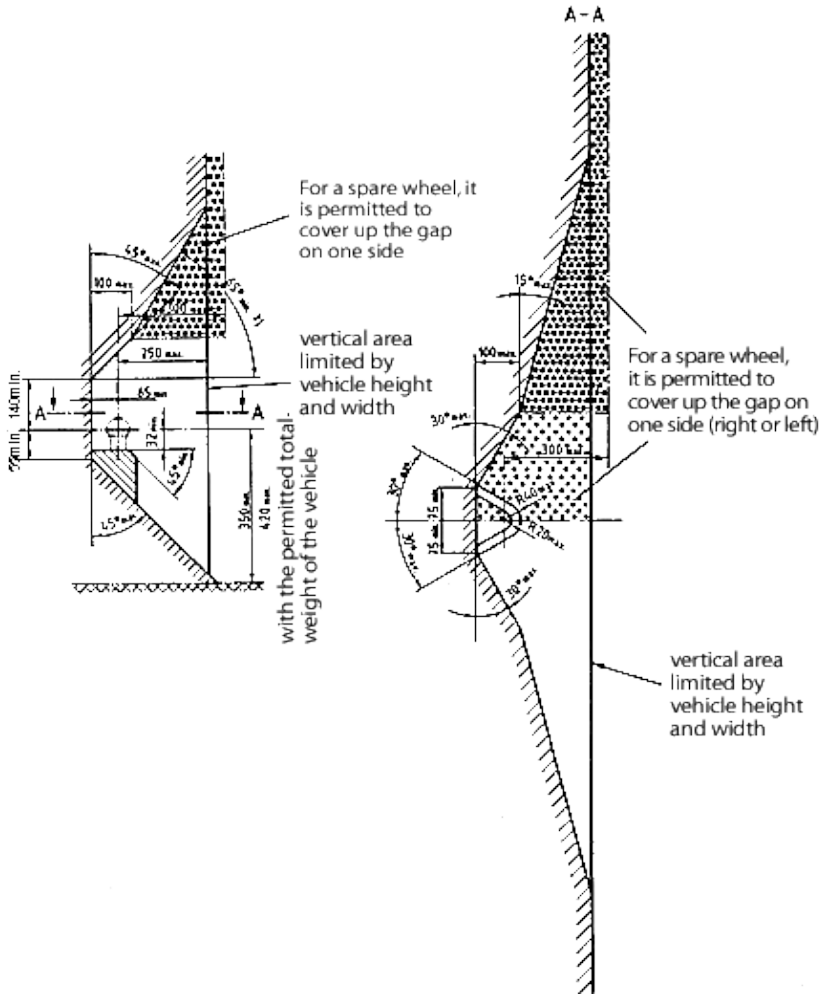
- The specific national regulations are to be considered
- It has to be ensured that the required freedom of operation of the trailer behind the tractive unit is maintained (DIN 74058)
- The standard radiator and fan has to be replaced by reinforced variants (according to PR-No. 1D7)
- The vehicle has to be tested by the responsible technical testing authority for motor traffic.

Note:

1. Location points are available in the side rails of the vehicle.
2. If the attachment is positioned extremely low or if the attachment is extremely overlapping, it may be prohibited to use the coupling mounted ex works.
3. The permitted trailing weight (depending on the engine) has to be determined before the retrofitting is carried out.

Free space according to (Refer to "Trailer couplings" for continuation)
Details which are not specified are to be suitably selected.

Check
It is required to check dimensions and angles with suitable length measuring devices and protractor gauges.



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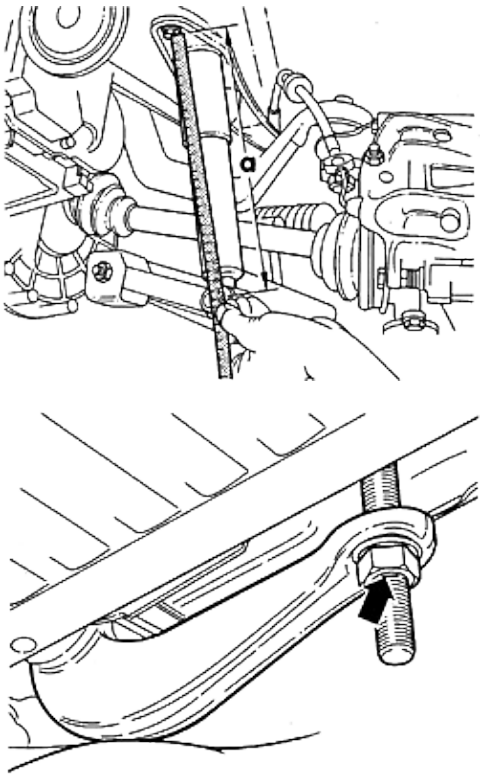
3.7 Standing Height Adjustment (Torsion Bar Spring)

If the unladen weight of the vehicle at which an attachment was installed is considerably increased, compared to the base vehicle, it is required to adjust the standing height at the front axle. This is the only way to avoid an excessively high torque-rod load at the top limit-stop.

Adjustment:
a) Determination of the axle load in unladen condition, at the front (without driver and with empty tank) on the ready vehicle
b) The vehicle must be perfectly aligned, deflected several times and swung out
c) Measure and adjust the standing height at the front axle



3.8 Electromagnetic Compatibility (EMC)

In motor vehicle power-supply circuits, the individual consuming devices cause electrical disturbance variables. Volkswagen AG checks whether electronic components (which are installed by the manufacturer) are electromagnetically compatible inside the vehicle.

If electrical or electronic systems are to be upgraded or retrofitted, it is also required to check their electromagnetic compatibility.

Setting values: Dimension a:

up to 1,100 kg front-axle load = 280 mm
1,100 kg to 1,200 kg = 273 mm
more than 1,200 kg = 265 mm

Dimension a is to be measured between the screw head of the damper reception (above) and the screw centre of the screw damper (below). If required, the prescribed standing height can be adjusted by turning the nut at the tension lever of the torque rod. (Arrow)

The following standards supply relevant information:

- DIN 40839
- DIN 57879, Teil 3
- VDE 0879, Teil 3
- VWTL 965
- VWTL 820 66
- VWTL 821 66
- VWTL 823 66

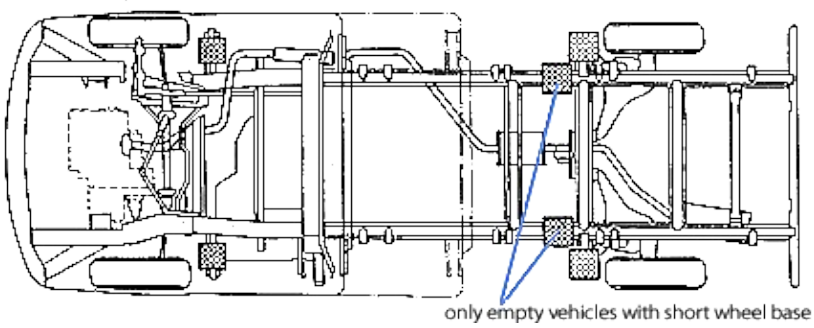
In addition, it is required to adhere to the EMC Directive 72/245 EC, version 95/54 EC.

3.9 Jacking the Vehicle

a) With lifting platforms
The vehicle may only be lifted at the location points provided for that purpose (see illustration). Only 2-pillar lifting platforms may be used.

b) With a lifting jack (up to a permitted total weight of 2,800 kg)
See operating instructions for procedure and location points for the jack at all vehicle versions.

c) With a lifting jack provided by the attachment manufacturer (applies to all chassis without serial attachments)The jack provided by the attachment manufacturer must match to the attachment (see separate marketing information). The location points for lifting platforms may be used (with large-surface supports). The standard lifting jack must not be used!



a) 4 location points are shown in front of the rear axle. The note "Only for empty vehicles with short wheel base" indicated below, only applies to the two location points at the side rails.
b) 3,3 t-Chassis delivered ex works have no jack! Therefore, attachment manufacturers must include a jack in their supply scope which has to match to the corresponding attachment. The standard jack location-points of the chassis can then no longer be used. However, it is possible to use the relevant platform location points. Notes on the jack selection (manufactured height, max. lift) are to be taken from our separately available marketing information.

Standard lifting jack for standard chassis (permitted max. total weight 2,800 kg)

Since the beginning of model year 2002 (**i. e. from KW18/01 onwards), all chassis variants** (cab and double cab) **without standard attachments** (flatbed) are **delivered with jack**.

Requirement: It must be possible to apply the jack without problems and safely to the positions provided by us, i. e. behind and below the bearing blocks, at the left-hand and right-hand side. If this is not possible, the standard jack must not be used. The jack is then to be provided by the attachment manufacturers (matching to the respective special attachment).

Note:

1. The standard jack location points at our base vehicles are not suitable for other jacks! **Optionally**, in this case the location points for lifting platforms may be used (except for the two location points at the two side rails **in front of** the rear axle), **in combination with large-surface supports**. See construction guideline!
2. If required, the attachment manufacturer must provide specific jack location points below his special attachment instead of the platform location points at the back provided by us! The platform location points at the front (below the driver s cab) must still be included!

3. If the loading is increased up to the permitted total weight of 2,890 kg, the permitted axle loads of PR.-No. 0J3 remain unchanged. Under these circumstances, the standard jack (considering the above mentioned boundary conditions) may also be used.

If the operators are procuring the jack themselves, it is required to adhere to the following instructions on jack selection:

a) The maximum permitted axle load for transporter chassis can be found under the specifications for the variant with a permitted total weight of 3,300 kg (applies **only** to sale cars and mobile homes!). In this case, the maximum permitted rear-axle load is 1,800 kg. The appropriate max. externally applied load at the previously mentioned platform location points (provided by us) and at the jack location points at the special attachments (determined by the attachment manufacturers), is to be determined by the attachment manufacturers.

b) The maximum permitted axle load for transporter chassis can be found under the specifications for the variant with a permitted total weight of 3,300 kg (applies only to sale cars and mobile homes!). In this case, the maximum permitted rear-axle load is 1,800 kg. The appropriate max. externally applied load at the previously mentioned platform location points (provided by us) and at the jack location points at the special attachments (determined by the attachment manufacturers), is to be determined by the attachment manufacturers.

c) For changing a wheel, the jack must be extendable up to a supporting height/total height of min. 470 mm, if the above mentioned platform location points are used to mount the spare wheel as a replacement of a damaged vehicle wheel