

Body builder guidelines 2008



Commercial  
Vehicles

# Body builder guidelines Crafter





## **Body assembly guidelines Volkswagen Nutzfahrzeuge**

### **The Crafter**

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.

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

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Data status September 2008

## 1.1 Body conversion guidelines

The body conversion guidelines contain technical guidelines for custom body manufacturers/coachbuilders for construction and assembly of body attachments, installations and conversions for the Volkswagen Crafter.

The "Volkswagen body conversion guidelines for the Crafter" must be adhered to without fail if the vehicle is to be altered with intent. For all modifications, make absolutely sure that the functional safety of all components of the running gear, the body and the electrical system remains intact. These modifications should only be carried out by trained specialists in accordance with recognised technical trade skills.

Modifications that affect the vehicle's general certificate of roadworthiness must be presented to an authorised testing centre for validation. It is recommended that such modifications are agreed upon in advance with the relevant authority.

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## 1.2 Warranty and liability of custom body manufacturer/coachbuilder

For the items supplied by the custom body manufacturer/coachbuilder, their warranty conditions apply. Warranty claims made from complaints relating to these items supplied can therefore not be pursued within the scope of the warranty for the Volkswagen Crafter.

The responsibility for construction and assembly of body attachments and conversions lies with the custom body manufacturer/coachbuilder exclusively. With regards to the diversity of alterations and the different operating conditions, the remarks from Volkswagen AG are given with the understanding that they have conducted no trials of the altered vehicles.

Alterations can result in changes to the properties of the vehicle. For reasons of liability, it is therefore necessary for the custom body manufacturer/coachbuilder to inform his/her customer in writing with the following:

Alterations\* to your Volkswagen Crafter have affected the properties of the vehicle.

Please understand that Volkswagen AG accepts no liability for any negative effects that may be caused from the alterations\*.

- \* Instead of "alterations", more detailed information can be added here, e.g. "installation of camping equipment", "extension of the wheelbase", "installation of a box body".

**The alterations/body attachments on standard production vehicles must be entered in the service booklet (remark from custom body manufacturer).**

Volkswagen AG reserves the right in certain circumstances to request confirmation of this information from the customer.

There are generally no legal rights for issue of a body approval certificate, even if such an approval certificate was issued in the past.

With regards to whether the body attachments, installations or conversions meet the guidelines presented, a special permit from Volkswagen AG for submission to the vehicle inspectorate is not necessary.

The accident prevention regulations from the relevant authorities and EU machinery guidelines must be adhered to.

For alterations, it is essential that all applicable legal vehicle technology regulations and guidelines are adhered to.

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## 1.3 Supply programme

Angebotspalette LT3

GG	Radstand (mm)	PKW		LKW						
		Kombi Flachdach	Kombi Hochdach	Kasten Flachdach	Kasten Hochdach	Kasten Super-Hochdach	Fahrgestell Einzelkabine	Fahrgestell Doppelkabine	Pritschenwagen Einzelkabine	
3,0t	3.250									
	3.695									
3,5 t	3.250									
	3.695									
	4.125									
	4.325L									
5,0t 5+5 (4,6-1,3)	3.695									
	4.205									
	4.325L									
5,0t	3.695									
	4.325									
	4.325L									

Motorenprogramm:  
 PKW (3,0t u. 3,5t)  
 NFZ (3,0t u. 3,5t)  
 (5,0t u. 5,0t 5+5)

65 kW / 80 kW / 100 kW / 120 kW TDI  
 65 kW / 80 kW / 100 kW / 120 kW TDI  
 60 kW / 100 kW / 120 kW TDI

Die zehn Ziffern bedeuten die zelle Basizezeichnung, die sich nur durch unterschiedliche Maßangaben unterscheiden können.

Angebotspalette LT3 = LT3 range on offer

PKW = Pass.veh.

LKW = LCV

Radstand (mm) = Wheelbase (mm)

Kombi Flachdach = Kombi flat roof

Kombi Hochdach = Kombi high roof

Kasten Flachdach = Box van flat roof

Kasten Hochdach = Box van high roof

Kasten Super-Hochdach = Box van super high roof

Fahrgestell Einzelkabine = Single cab chassis

Fahrgestell Doppelkabine = Crew cab chassis

Pritschenwagen Einzelkabine = Single cab dropside

Pritschenwagen Doppelkabine = Crew cab dropside

Motorenprogramm = Engine programme

NFZ = LCV

The same figures mean the same basic reference, which can only be differentiated by different dimension details.

**Important special equipment:**

- Side exhaust pipe
- Uprating front axle load
- Reduction in overall weight
- Exterior noise insulation Heat insulation
- Uprating 3.88t
- Exterior mirrors (extension frame)
- Battery output/ 2nd battery
- Damping for high body attachments
- Engine speed regulator
- Tachograph
- Alternator output/ 2nd alternator
- Rear axle gear ratio selection
- Refrigerant compressor
- Power take-off from manual gearbox
- Spare wheel/ bracket
- Tail light cluster wiring extension
- Tail light cluster preparation
- Anti-roll bars
- 12 V sockets
- Chocks
- Front surround lights, preparation at rear
- Hazard warning lights, warning triangle and first aid box
- Scuttle/step version
- Additional heating (coolant/air circulation heating)
- Preparation for rear camera
- Preparation for hydraulic pump
- Preparation for mileage recording equipment
- Preparation for roof load carrier (panel van)
- Preparation for 3-sided tipper
- Preparation for siren/fanfare
- Preparation for surround marker lights
- Preparation for electric liftgate
- Yellow surround marker lights
- Electrical interface (programmable)
- Removal of cab back panel/roof
- Fuel tank with 100 litre capacity
- Speed warning system

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## 1.4 The conceptual advantages of the new Crafter

- Comprehensive range of derivatives
  - ◆ 3 increased wheelbases; panel van with additional rear overhang extension
  - ◆ Super high roof available as third roof variant
- 1.30m wide sliding door from medium wheelbase
- Ergonomic and comfortable layout of cab with joystick gear selection, relaxed seating possible even for large persons / good access to rear
- Comprehensive, purpose built and spacious stowage concept means cockpit has good overview
- An all round safe concept (ABS, ESP and driver airbag as standard, co-driver airbag, curtain and side-airbags available as an option, load securing with lashing points as standard)
- Top engines with powerful, economic and environmentally friendly TDI engines, diesel particulate filter as standard (Euro 4/EU 4)
- Shiftmatic (semi-automatic gearbox) as an option to relieve workload of driver by optimised gear selection and economical driving
- Long service intervals
- Trend-setting, clever basic concept offers optimum opportunities for manufacturers of body attachments and installations
  - ◆ Scuttle and step version available
  - ◆ Comprehensive options for application of PTO systems
  - ◆ Electronic module, available as electrical interface, programmed in accordance with customer requirements
  - ◆ Higher load rating of occupant cell
  - ◆ High load bearing, torsionally rigid hat profile section frame with smooth upper strap and consoles for fixing body attachment
- High trailer load
- Decal-friendly, large sidewalls on panel van
- Volkswagen quality

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## 1.5 Adherence to environmental rules and regulations

The custom body manufacturers and coachbuilders ensure that the orders and regulations pertaining to environmental protection are adhered to with regards to body attachments and installations (conversions), in particular EU directive 2000/53/EC concerning end-of-life vehicles and EU directive 2003/11/EC concerning the introduction and use of certain hazardous materials and preparations.

The conversion assembly documents are to be kept by the vehicle operator and, in the event of the vehicle being scrapped or broken for spares, should be handed over with the vehicle to the company tasked with the like. In this way, environmentally compatible recycling will be assured for vehicles that have been converted/customised as well.

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## 1.6. Accident prevention

Body manufacturers must ensure that the add-ons, extensions and bodies (conversions) comply with the applicable legislation and ordinances as well as health, safety and accident prevention regulations, safety rules and codes of practice of accident insurance companies.

All technical possibilities must be used in order to avoid uncertainties in operation.

National laws, directives and registration provisions must be complied with.

The body or equipment manufacturer is responsible for complying with these laws and regulations.

Information on commercial goods traffic in the Federal Republic of Germany is provided by:

**Berufsgenossenschaft für FahrzeughaltungFachausschuss "Verkehr"**  
**Sachgebiet "Fahrzeuge"**  
**Ottenser Hauptstraße 54**  
**D-22765 Hamburg**  
Homepage: [www.bfg.de](http://www.bfg.de)  
E-Mail: [info\(at\)bfg.de](mailto:info(at)bfg.de)

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## 2.1 Weights/axle loads

The weights and axle loads (permissible/unladen) for the Crafter body variants - panel van, vehicle chassis with cab/crew cab can be gleaned from the illustrations in the download area. For the chassis with wind deflector (without roof and partition), a minimum weight of approx. 50 kg should be applied compared to the chassis with cab.

### **Warning:**

In order to assure sufficient steerability of the vehicle, the minimum front axle load must be 25% of the overall weight.

The unladen weight specifications refer to the standard vehicle equipment (inc. driver, tools and filled tank). Weight tolerances of + 5% are permissible, as per German road traffic regulations, and should be taken into consideration where appropriate.

If special equipment is installed, the unladen weight will be increased. If necessary, the final unladen weight should be checked on a weighbridge or similar.

	Wheelb.	GVW	Perm. FA	Perm. RA	Unl. w.	Unl. w. FA	Unl. w. RA	Payload
Box van	3250	3000	1650	1800	1948	1205	743	1052
Box van	3665	3000	1650	1800	2016	1231	785	984
High roof box van	3665	3000	1650/1800	1800	2052	1242	810	948
Box van	3250	3500	1650/1800	2250	1961	1215	746	1539
Box van	3665	3500	1650/1800	2250	2029	1241	788	1471
High roof box van	3665	3500	1650/1800	2250	2065	1252	813	1435
High roof box van	4325	3500	1650/1800	2250	2199	1291	908	1301
High roof box van long	4325	3500	1650/1800	2250	2251	1282	969	1249
Super-high roof box van	3665	3500	1650/1800	2250	2101	1263	838	1399
Super-high roof box van	4325	3500	1650/1800	2250	2226	1299	927	1274
Super-high roof box van long	4325	3500	1650/1800	2250	2279	1288	991	1221
Supersingle box van	3665	4600	1850/2000	3200	2309	1336	973	2291
High roof Supersingle box van	3665	4600	1850/2000	3200	2345	1347	998	2255
High roof Supersingle box van	4325	4600	1850/2000	3200	2511	1406	1105	2089
Super-high roof box van Supersingle	3665	4600	1850/2000	3200	2381	1358	1023	2219
Super-high roof box van Supersingle	4325	4600	1850/2000	3200	2538	1414	1124	2062
Super-high roof box van long Supersingle	4325	4600	1850/2000	3200	2586	1408	1178	2014
Box van	3665	5000	1850/2000	3500	2309	1336	973	2691
High roof box van	3665	5000	1850/2000	3500	2345	1347	998	2655
High roof box van	4325	5000	1850/2000	3500	2511	1406	1105	2489
High roof box van long	4325	5000	1850/2000	3500	2558	1402	1156	2442
Super-high roof box van	3665	5000	1850/2000	3500	2381	1358	1023	2619

# VW Nutzfahrzeuge Aufbaurichtlinien



Super-high roof box van	4325	5000	1850/2000	3500	2538	1414	1124	2462
Super-high roof box van long	4325	5000	1850/2000	3500	2586	1408	1178	2414

	Wheelb.	GVW	Perm. FA	Perm. RA	Unl. w.	Unl. w. FA	Unl. w. RA	Payload
Chassis with cab	3250	3000	1650	1800	1695	1191	504	1305
Chassis with cab	3665	3000	1650	1800	1712	1217	495	1288
Chassis with cab	3250	3500	1650/1800	2250	1708	1201	507	1792
Chassis with cab	3665	3500	1650/1800	2250	1725	1227	498	1775
Chassis with cab	4325	3500	1650/1800	2250	1755	1278	477	1745
Chassis with Supersingle cab	3665	4600	1850/2000	3200	1950	1297	653	2650
Chassis with Supersingle cab	4325	4600	1850/2000	3200	1988	1358	630	2612
Chassis with cab	3665	5000	1850/2000	3500	1950	1297	653	3050
Chassis with cab	4325	5000	1850/2000	3500	1988	1358	630	3012
Chassis TC	3250	3000	1650	1800	1893	1289	604	1107
Chassis TC	3665	3000	1650	1800	1915	1331	584	1085
Chassis TC	3250	3500	1650/1800	2250	1906	1299	607	1594
Chassis TC	3665	3500	1650/1800	2250	1928	1341	587	1572
Chassis TC	4325	3500	1800	2250	1956	1400	556	1544
Chassis TC Supersingle	3665	4600	1850/2000	3200	2171	1435	736	2429
Chassis TC Supersingle	4325	4600	1850/2000	3200	2185	1522	663	2415
Chassis TC	3665	5000	1850/2000	3500	2171	1435	736	2829
Chassis TC	4325	5000	1850/2000	3500	2185	1522	663	2815

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## 2.2 One-sided weight distribution

Under no circumstances should

- permissible **overall weight**
- permissible **front axle load**
- permissible **rear axle load** be exceeded.

When drawing up plans for custom body parts/conversions, ensure that one-sided weight distribution is avoided, in particular with permanently fitted custom body parts. If this cannot be avoided, the one-sided load should not result in a greater difference between the wheel pairs of max. 8%.

### Warning:

Observe tyre load capability!

Example:

Perm. axle load	2.000 kg
Theor. wheel load, left/right	1.000/1.000 kg
4% of this wheel load	40 kg
Perm. wheel load distr.	1.040 kg/960 kg

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## 2.3 Dimensions

The dimensions of the vehicle chassis can be gleaned from the diagrams. To support your custom conversion plans, illustrations and diagrams are available in the "download" area.

Selection of tyre sizes other than those stipulated for standard use can affect the vehicle and chassis frame height above ground level. Please take this fact into consideration in the planning phase.

### Important note:

- The minimum distance between cab and body must be at least 50 mm.
- The rear overhang of the custom/body attachments should not exceed the following specifications.
- The rear overhang of the custom/body attachments should not exceed the following specifications.

### Custom body exterior lengths and vehicle overhangs for vehicle chassis with single/crew cab:

- Zu der Überhanglänge des Fahrzeugs gehört der Gesamtüberhang bezogen auf die Hinterachse einschließlich Rahmenüberhangsverlängerung sowie Auf- und Anbauten.
- Bei der Auslegung der Überhänge sind die gesetzlichen Vorgaben für den Unterfahrschutz zu beachten, ggf. ist die Position nach hinten zu versetzen.
- Die Befestigung muß der des Grundfahrzeuges entsprechen.
- Nach allen Arbeiten am Fahrzeug ist der Korrosionsschutz und die Lackierung nach den Richtlinien des Fahrzeugherstellers auszuführen. (Siehe hierzu die technische Hinweise im Reparaturleitfaden!)
- Werden die folgenden Überhanglängen sowie die maximale Hinterachslast eingehalten, bleibt die ursprüngliche Anhängelast erhalten und die Funktion des ESP wird nicht beeinflusst.
- Wird der Fahrzeugüberhang verändert, ist dies nur unter Berücksichtigung der zulässigen Achslasten und der Mindest-Vorderachslast möglich.
- Bei Fahrzeugen mit geschlossenem Aufbau (Kombi- oder Kastenwagen) ist eine Überhangverlängerung nur nach Rücksprache der zulässigen Abteilung der VW AG zulässig.
- Der Rahmenüberhang ist entsprechend zu verstärken.
- Die zulässigen Achslasten, die zulässigen Schwerpunktlagen und die Mindest-Vorderachslast ist in allen Belastungszuständen einzuhalten (siehe 2.3.1.).

### Die maximalen Fahrzeugüberhanglängen betragen:

Radstand 1 [mm]	Überhanglänge x [mm]
3250	1650
3665	1850
4325	2200

Bei Fahrgestellen mit Doka sind größere Fahrzeugüberhänge nur nach Rücksprache mit der Volkswagen AG zulässig.

Bei jeder Änderung der Fahrzeulgänge ist die Einhaltung der Mindest-Vorderachslast und der zulässigen Achslasten anhand einer Gewichtsbilanz nachzuweisen.

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## 2.4 Passenger compartment (Kombi)

### 2-seater bench in 1st row of the passenger compartment

#### Function

On the left hand side in driving direction is a 2-seater bench in the first row of the passenger compartment installed. This 2-seater bench allows the loading up to the passenger seat in driver cabin. Both seats of the bench are equipped with 3 point seat belts.

The remaining load area behind the seat bench has the following dimensions:

3.250 mm wheelbase: 1.658 mm

3.665 mm wheelbase: 2.323 mm

4.325 mm wheelbase: 3.358 mm

4.325 mm wheelbase: 3.758 mm

### 3-seater bench narrow in 1st row of the passenger compartment

#### Function

On the left hand side in driving direction is a 3-seater bench in the first row of the passenger compartment installed. All three seats of the bench are equipped with 3 point seat belts.

The remaining load area behind the seat bench has the following dimensions:

3.250 mm wheelbase: 1.658 mm

3.665 mm wheelbase: 2.323 mm

4.325 mm wheelbase: 3.358 mm

4.325 mm wheelbase: 3.758 mm

### 2-seater bench in 2nd row of the passenger compartment

#### Function

On the left hand side in driving direction is a 2-seater bench in the second row of the passenger compartment installed. Both seats of the bench are equipped with 3 point seat belts.

The remaining load area behind the seat bench has the following dimensions:

3.250 mm wheelbase: 800 mm

3.665 mm wheelbase: 1.465 mm

4.325 mm wheelbase: 2.500 mm

4.325 mm wheelbase: 2.900 mm

### 3-seater bench in 2nd row of the passenger compartment

#### Function

On the second row of the passenger compartment is a 3-seater bench installed. All three seats of the bench are equipped with 3 point seat belts.

The remaining load area behind the seat bench has the following dimensions:

3.250 mm wheelbase: 800 mm

3.665 mm wheelbase: 1.465 mm

4.325 mm wheelbase: 2.500 mm

4.325 mm wheelbase: 2.900 mm

## 3-seater bench in 3rd row of the passenger compartment

### Function

On the third row of the passenger compartment is a 3-seater bench installed. All three seats of the bench are equipped with 3 point seat belts.

The remaining load area behind the seat bench has the following dimensions:

3.665 mm wheelbase: 607 mm

4.325 mm wheelbase: 1.642 mm

4.325 mm wheelbase: 2.042 mm

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## 3.1 Vehicle chassis transfer

For the transfer of vehicle chassis to customer axles, a wide range of regulations must be met:

- Wheel covers
- Balance weight for braking
- Side impact protection
- Lighting equipment

These parts were not developed and are not available and would make transfer of vehicle chasses to customer axles unnecessarily expensive. For this reason, provision is no longer made for customer collection of vehicle chasses. Supply of these vehicles should be per rail/road freight transport.

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## 3.10 Liftgate

For installation of a liftgate, observe the following:

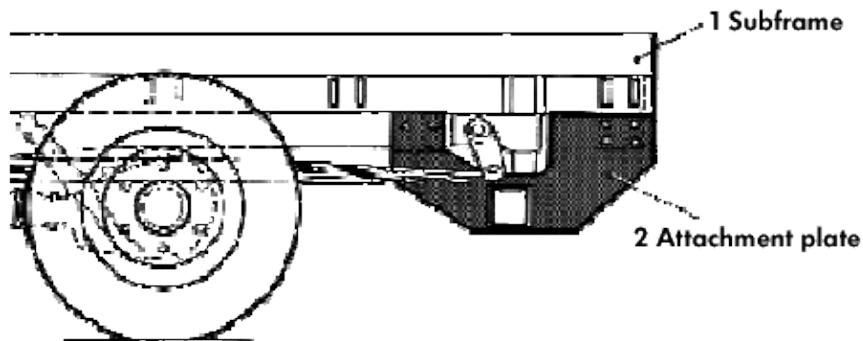
- The permissible rear axle load must not be exceeded.
- Observe minimum front axle load of 30% of overall vehicle weight.
- Check stability.
- Calculate load distribution with all special equipment.
- Shorten body lengths and rear overhang as necessary.
- Mount subframe as close to front as possible and join to vehicle chassis frame with positive-type connection.
- No subframe is necessary on series production panel vans.
- An anti-roll bar is required for the front and rear axle.
- Only use hydraulic support devices where possible. Do not raise the vehicle with a hydraulic support device (frame damage).
- Load spacing max. 500 mm.
- Safety
  - The accident prevention regulations and the EC machinery guidelines must be observed. Observe requirement for underbody guard and lighting equipment.
- The standard vehicle can be equipped ex-factory with the necessary special equipment.

On vehicles with crew cab, the installation of a liftgate is only permissible in special cases with approval from Volkswagen AG.

### Maximum load capability and section dimensions:

Models	Wheelbase(mm)	Lifting force up to KN	Minimum dimensions of subframe longitudinal members
Crafter 30 3,0t -Chassis	3250	5	80 x 45 x 3
	3665	5	80 x 45 x 3
Crafter 35 3,5t - Chassis	3250	5	80 x 45 x 3
	3665	5	80 x 45 x 3
Crafter 50 5,0t Chassis	4325	5	120 x 50 x 4
	3665	7,5	120 x 50 x 4
	4325	7,5	140 x 60 x 5
	3665	7,5	120 x 50 x 4
Crafter 30 3,0t Panel van	4325	7,5	140 x 60 x 5
	3665	10	140 x 60 x 5
	4325	10	160 x 60 x 5
	3250	5	-
Crafter 35 3,5t Panel van	3665	5	-
	3250	5	-
	3665	5	-
	4325	5	-
Crafter 50 5,0t Panel van	3250	5	-
	3665	5	-
	4325	5	-
	3250	5	-

The specified minimum dimensions are based on normal operating conditions and without overhang extension.



## 3.10.1 Longitudinal member reinforcement on unladen front axle

With lifting platforms (cherry pickers), for example, the whole vehicle is raised on 4 hydraulic supports during operation, whereby the wheels no longer have contact with the ground.

Due to the heavy weight at the front end of the vehicle, unacceptable levels of stress are imparted on the frame longitudinal members in the area of the front supports.

The force distribution of the supports must be between the first and second body console.

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## 3.11 Loading crane

For design of loading crane structures, take into consideration the necessary stability and connection of the loading crane to the vehicle chassis (item 3.3).

- Maximum crane moment ( $kN \times l$ ): 25 kNm
- The vehicle may only be used on hard, level standing.
- Determine the flat bed length in accordance with the load crane.
- A frame extension may be necessary due to the load distribution.
- A permit is required for abnormal crane designs.
- For crane operation, stability is to be assured by side projecting support feet.
- The necessary support devices should be actuated hydraulically.
- Do not lift vehicle on support device (damage to frame).
- Crane bodies and support devices must not impair other assemblies and their function.
- Loading crane bodies must meet the accident prevention regulations and the EU machinery guidelines.
- The minimum front axle load of 25% must be adhered to in any load status.

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## 3.12 Position lamps (clearance lamps)

In accordance with European Union directives EU 76/758 and ECE R7 (as well as §51 b. STVZO in the Federal Republic of Germany, **vehicles with a width greater than 2,100 mm** must be equipped with position lamps.

All chassis and chassis with platform body are not equipped with position lamps as standard (standard vehicle width 1,922 mm or 1,990 mm).

The specified vehicle width (standard width: 2,120 mm) is exceeded by the following chassis in the VW Crafter range: chassis with single cabs and double cabs, as well as Crafter 5.0 t chassis and double cabs with platform body. Position lamps are mounted on the vehicles at the front sides on the cab roof and the external units of the 6-unit lamps at the rear of the vehicle are configured as position lamps (standard equipment: PR no. 6S3).

Position lamps for the front and rear must be ordered as well when ordering a chassis intended for a body with a width greater than 2,100 mm (PR no. 6S3).

If the body manufacturer installs the rear position lamps on a vehicle intended to have a width greater than 2,100 mm, it is only possible to order position lamps on the roof at the front (PR no. 6S3). (Deletion of combination tail, brake, reversing and turn indicator lamps in PR no. 8SZ; combination tail, brake, reversing and turn indicator lamps preparation).

**Note:** Subject to errors and technical amendments. The electronic version of the body guidelines is the decisive source of up-to-date data on body guidelines (online body guidelines). Data status August 2007

## 3.13 Side marker lights/reflectors

In accordance with § 51 STVZO, vehicles with a length greater than 6 m on the long sides must be equipped with yellow side marker lights visible from the side and side reflectors visible from the rear.

From the VW Crafter supply programme, only the vehicles with long wheelbase exceed the specified vehicle lengths.

All series production vehicles are equipped where necessary with side marker lights.

All chassis cabs with long wheelbase are prepared in the factory for side marker lights (wiring harness).  
The custom body manufacturer/coachbuilder must fit side marker.

**Note:** Subject to errors and technical amendments. The electronic version of the body guidelines is the decisive source of up-to-date data on body guidelines (online body guidelines). Data status February 2008

## 3.14 Direction indicator

In accordance with § 14 of the STVZO, motor vehicles must be fitted with side repeaters in the front third part of the vehicle along the sides.

From a permissible overall weight of more than 3.5 t, the light output of these side repeaters must be min. 50 cd and max. 200 cd.

**Note:** Subject to errors and technical amendments. The electronic version of the body guidelines is the decisive source of up-to-date data on body guidelines (online body guidelines). Data status August 2007

### **3.15 Interior mirror/body width**

In accordance with EU guideline 76/756 EC and §56 of the STVZO, vehicles in Germany must be fitted with mirrors that are designed and attached so the vehicle operator can view the traffic situation, relevant to his/her driving conditions, at the rear and sides - even if a trailer is attached.

All VW Crafter models are equipped as standard with an exterior mirror - for a max. body width up to 2,190 mm.

For body widths greater than 2,190 mm to 2,360 mm, mirror extensions (normal/large extension) are available.

**VW Crafter exterior mirror availability** (See also sales handbook):

- Standard mirror (series production)
  - Body widths up to 2,190 mm
- Exterior mirror extension, normal (standard on Crafter 50 with drop-side)
  - Body widths greaterthan 2,191 mm to 2,300 mm
- Exterior extension mirrors, large
  - Body widths greater than 2,301 mm to 2,360 mm.

**Note:** Subject to errors and technical amendments. The electronic version of the body guidelines is the decisive source of up-to-date data on body guidelines (online body guidelines). Data status August 2007

### **3.16 Tyres/ wings/ wheel housings**

The custom body manufacturer/coachbuilder must assure that

- the largest permissible tyre size can be fitted
- the distance from tyre to wing or wheel housing is sufficient even when snow chains or similar are fitted, and full one-sided/two-sided spring compression is sufficient.

Observe dimensions in chassis illustrations.

#### **LT wheels/tyres/allocation**

##### **Single wheel rear axle**

	<b>Disc wheel</b>	<b>Tyre</b>
Crafter 30 (3,0t)	5,5 J x 16 H2 (ET 51 mm)	205/75 R 16 C 110/108 R
Crafter 35 (3,5t)	6,5 J x 16 H2 (ET 62 mm)	235/65 R 16 C 115/113 R
Crafter 50 (4,6t)	5,5 J x 16 H2 ET 51 8,5 J x 16 H2	Front 205/75 R 16 C 110/108 R Rear 285/65 R 16 C 128 N (118 R)

##### **Twin wheel rear axle**

Crafter 50 (5,0t)	5,5 J x 16 H2	
Optional	5,5 J x 16 H2	205/75 R 16 C 110/108 R

**Note:** Subject to errors and technical amendments. The electronic version of the body guidelines is the decisive source of up-to-date data on body guidelines (online body guidelines). Data status August 2007

## 3.17 Spare wheel/holder

The Crafter is equipped as standard with the tyre mobility set.

The spare wheel position can be ordered as an option for an additional fee and is located behind the rear axle under the frame.

**Note:** Subject to errors and technical amendments. The electronic version of the body guidelines is the decisive source of up-to-date data on body guidelines (online body guidelines). Data status August 2007

### **3.18 Rear underbody guard**

In accordance with EU guideline 70/221 EU and § 32 of the STVZO, vehicles in Germany, on which the distance from the rear end to the rear axle is more than 1,000 mm, and on which in unladen state either the rear chassis in its entire width or the main parts of the body require a head clearance of more than 700 mm above the road surface, must feature an underbody guard.

On all VW Crafter vehicles, the main parts of the body are less than 700 mm above the ground. An underbody guard is therefore not necessary on series production vehicles. All Crafter 50 5.0t chassis models (with/without drop-side body) are fitted as standard with a rear underbody guard.

The distance from the rear edge of the structure to the main parts of the body (the bulb carrier on chassis cabs) must not exceed 400 mm. If the 400 mm limit is exceeded, the custom body manufacturer/ coachbuilder must build a suitable underbody guard.

To achieve this on the frame side, the bolting points for the tow hitch should be used.

**Note:** Subject to errors and technical amendments. The electronic version of the body guidelines is the decisive source of up-to-date data on body guidelines (online body guidelines). Data status August 2007

### **3.19 Side protection device**

In accordance with EU guideline 89/297 EC and § 32 c of the STVZO, vehicles in the Federal Republic of Germany must be equipped with a side protection device, on which the permissible overall weight is greater than 3.5 t and the main parts of the body have a head clearance of more than 500 mm above the road surface. Tractor units, working machines and special vehicles are excluded if their intended use cannot be fulfilled with the installation of a side protection device.

All Crafter 50 5.0t drop-side models are equipped as standard with side protection devices. On the Crafter chassis models (single/crew cab without drop-side body) there are no side protection devices fitted. The side protection devices must be built and fitted in relation to the structure by the custom body manufacturer/coachbuilder in accordance with the EU guideline.

**For retrofitting of side protection devices, observe the following:**

- Components such as battery box, air tank, fuel tank, lighting, reflectors, spare wheels and tool boxes may not be installed unless the prescribed spacing dimensions can be met. Brake, air or hydraulic lines and other parts may not be attached to the side protection device.
- The function and accessibility of all vehicle-installed assemblies must not be impaired.

**Note:** Subject to errors and technical amendments. The electronic version of the body guidelines is the decisive source of up-to-date data on body guidelines (online body guidelines). Data status August 2007

## 3.2 Treatment of vehicles with long periods out-of-use

For treatment of vehicles with long periods out-of-use, there are clear instructions from the Service Department (see Technical Service Handbook, volume: Inspection and maintenance, item 3.2.4, Storage of factory new vehicles), which should be applied. The following should be observed with regards to the tachograph: If the test certificate is older than half a year, the tachograph should be re-inspected for type approval.

**Note:** Subject to errors and technical amendments. The electronic version of the body guidelines is the decisive source of up-to-date data on body guidelines (online body guidelines). Data status August 2007

## 3.20 Electrical interface for external use (CAN bus information)

### Overview of functions - Version 1.1

Table of contents

- 3.20.1 General
- 3.20.2 Precondition for use
- 3.20.3 Block diagram of PSM control unit
- 3.20.4 Signal concept
- 3.20.5 Inputs
- 3.20.6 Outputs
- 3.20.7 Global parameter setting options
- 3.20.8 Signal types
- 3.20.9 Signal sources
- 3.20.10 Interfaces
- 3.20.11 Vehicle functions
- 3.20.12 Internal functions
- 3.20.13 Engine functions
- 3.20.14 Body manufacturer (BM) CAN bus
- 3.20.15 PLC function
- 3.20.16 Predefined parameter sets (presets)
- 3.20.17 Version history
- 3.20.18 Appendix

This document provides an overview of the most important functions of the control unit. It does not deal with programming and individual configuration or the resulting boundary conditions!

### 3.20.1 General:

The PSM (Parametrisable Special Module) control unit forms the interface between the vehicle and the body manufacturer.

Functions specific to the body manufacturer (e.g. working engine speed control) that are not implemented in other control units are implemented in the PSM.

The PSM has 10 inputs and 20 outputs that can also be used as inputs.

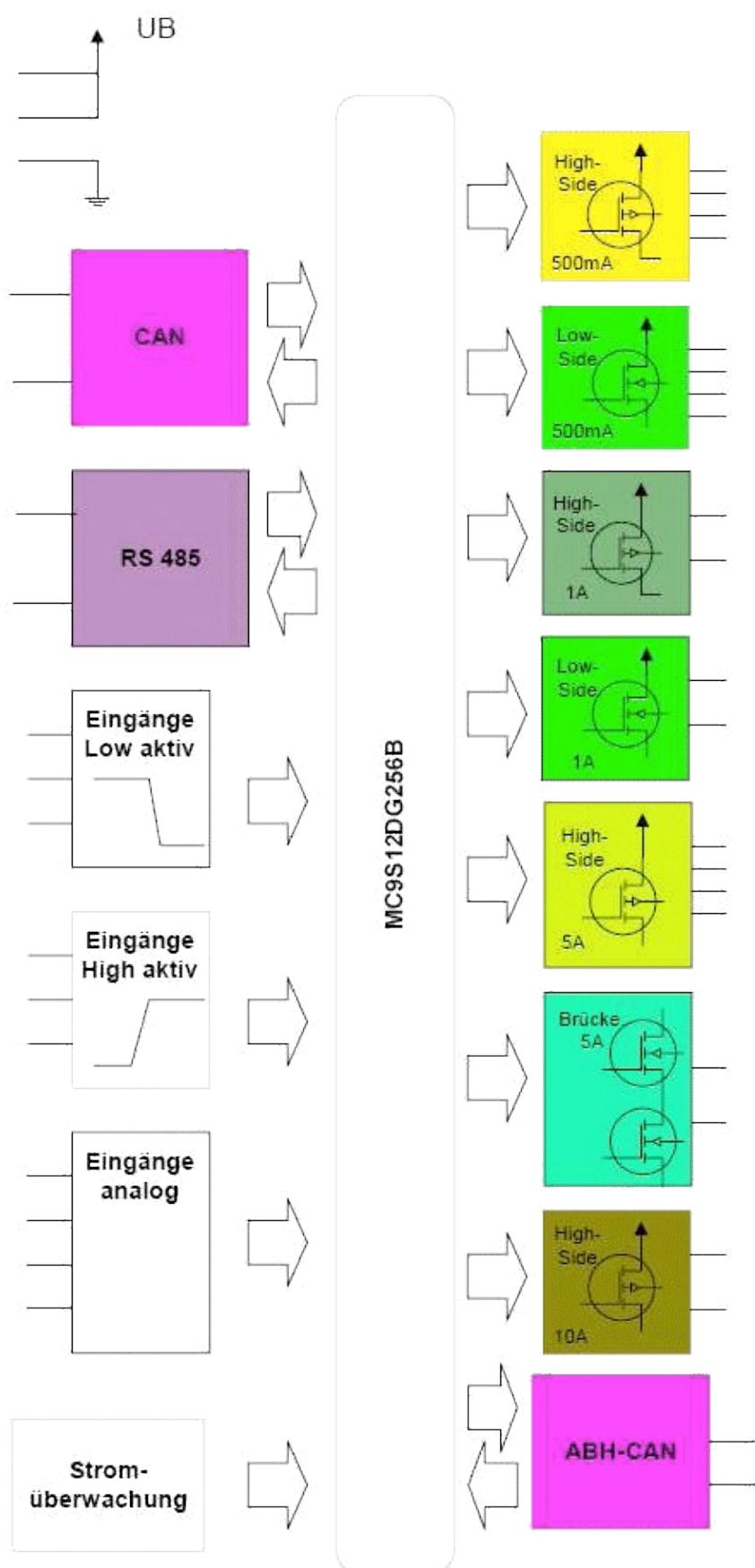
Complex bodies that require more inputs / outputs should be connected to the PSM via the BM CAN.

### 3.20.2 Precondition for use:

The current hardware and software status is important so that the functions of the PSM can be used in full! (From HW: 0523 and SW: 0545, the full scope is available!)

The engine control unit (ECU) must be released / coded accordingly and the VAS (5051/2) tester should have a version V10.x or newer (VAS 5063 from version 6.130 or newer!)

### 3.20.3 Block diagram of PSM control unit



Eingänge Low aktiv = Inputs low active  
Eingänge High aktiv = Inputs high active  
Eingänge analog = Analog inputs  
Stromüberwachung = Current monitoring  
Brücke = Bridge  
ABH = BM

## 3.20.4 Signal concept:

The signals are managed in a signal pool in the PSM. A signal may also be dependent on other signals, e.g. terminal15. Currently, the I-CAN, the discrete inputs and outputs, the internal function units and the body manufacturer CAN are used as sources or outputs.

## 3.20.5 Inputs:

In total, 10 inputs are available:

- 3x high active
- 3x low active
- 4x analog (can also be set as digital inputs in the parameters)

### Inputs 1, 2 and 3 (high active)

(Switch to terminal 30, terminal 15)

- Int. pulldown resistor when control unit active!
- Individual wake-up function can be set in the parameters
- Status is stored in the signal pool

### Inputs 4, 5 and 6 (low active)

(Switch to terminal 31)

- Int. pullup resistor, can be set individually in the parameters
- Individual wake-up function can be set in the parameters
- Status is stored in the signal pool

### Inputs 7, 8, 9 and 10 (analog)

(Switch to terminal 30, terminal 15 or terminal 31)

- Int. pullup resistor (100 k, 1.2 kohm)
- Wake-up function for 7 and 8 can be jointly set in the parameters
- Digital value or analog value is stored in the signal pool

**Parameter setting option:** Input as switch or button

## 3.20.6 Outputs:

### In total, there are 20 outputs available:

The individual outputs can be outputs switching to terminal 30 (+12 V) or earth.

- 4x high side 500 mA
- 4x low side 500 mA
- 2x high side 1 A
- 2x low side 1 A
- 4x high side 5 A
- 2x half-bridge 5 A
- 1x high side 10 A

### The following applies in general to the outputs:

- Short-circuit detection
- Statuses of the outputs are stored in the signal pool
- On high-side outputs, the load is applied by the PSM with terminal 30, i.e. the earth must be connected to the body earth or battery earth.

### Options that can be set in the parameters:

- Dependency on vehicle status
- Use as output or input

#### Output 1 and 2 (half-bridge 5 A)

- Use as low side or high side
- Open load detection  
(Application: e.g. for motor right/left running)

#### Output 3, 4 and 5, 6 (high side 10 A and 5 A)

- Options that can be set in the parameters: Internal pullup, wake-up function, open load detection  
(Application: e.g. for switching on external consumers, 12 V socket)

#### Output 7 and 8 (high side 5 A)

- Options that can be set in the parameters: Internal pullup, open load detection  
(Application: e.g. for switching on external consumers)

#### Output 9 and 10 (high side 1 A)

- Options that can be set in the parameters: Internal pullup, open load detection, softstart
- Use as PWM output (500 mA)

(Application: e.g. as control signal for external components, switches to terminal 30)

#### Output 11 and 12 (LOW side 1 A)

- Options that can be set in the parameters: Open load detection

(Application: e.g. as control signal for external components, switches to earth)

#### Output 13, 14, 15 and 16 (high side 0.5 A)

(Application: e.g. as control signal for external components, switches to terminal 30)

## Output 17, 18, 19 and 20 (low side 0.5 A)

(Application: e.g. as control signal for external components, switches to earth)

### Options that can be set in the parameters for the outputs

- Open load detection (only A01-A12)
- Short-circuit monitoring
- Wake-up function (only A03, A04, A05 and A06)
- Input / output (all outputs can also be set in the parameters as inputs)
- PWM softstart
- PWM output (switch or PWM output)
- High side / low side (half-bridge A01 and A02)
- ICAN error
- PSM global undervoltage
- Terminal 61 (output is only active when terminal 61 ON)
- Terminal 15 (output is only active when terminal 15 ON)
- Terminal 15R (output is only active when terminal 15R ON)
- Terminal 15C (output is only active when terminal 15C ON)
- ZV open
- PSM run-on (global run-on or lifeguarding function can be set in the parameters)

## 3.20.7 Global parameter setting options

- Global PSM run-on time (ensure after ZV closed via external)
- Global PSM undervoltage, thresholds (100 mV) and response time (100 ms) (only for discrete and PLC outputs, functional undervoltage and overvoltage detection is not cancelled).
- Current switch-off thresholds on outputs with wake-up functions set in the parameters (output 3, 4, 5 and 6)

## 3.20.8 Signal types:

Each signal has a unique identification in the form of a signal number.  
The signals are used by setting the parameters of the individual functions.

- Bit information (e.g. terminal 15, signal ID 1018)
- 1-byte information (e.g. vehicle speed, signal ID 2014)
- 2-byte information (e.g. engine speed, signal ID 3001)
- Multi-byte information as pointer (e.g. VIN, signal ID 4000)

## 3.20.9 Signal sources:

- I-CAN
- BM CAN

- Discrete inputs
- PSM to I-CAN
- Internal signals
- A/D converter

## 3.20.10 Interfaces

### I-CAN

The interior CAN is the vehicle CAN bus system by means of which the comfort control units communicate with one another.

### BM CAN

The body manufacturer CAN (BM CAN) serves as the communications basis for BM control units.

### RS-485 SOFA bus

The PSM has a serial interface to other control units such as taxameter, card reader Baud rate : 19600 bit/s, Data direction : Bi-directional, half-duplex mode Master : PSM Voltage : 5V

## 3.20.11 Vehicle functions

The following vehicle functions can be controlled via the PSM.

- Vehicle status (terminal 15, terminal 61, ZV )
- Lamp status (LDS and LSS requirements)
- Window status (windows wiping / heating)
- Central locking
- Alarm functions (alarm flashing, warning flashing .)
- Lamp control (parking lamps, marker lamps )
- Sliding roof
- Various functions (buzzer in combi, charging active )
- Combi warning signals (PSM defective, PSM undervoltage )

Refer to the signal list for a detailed presentation.

### Parameter setting options of the vehicle functions

- Alarm flashing (priority and wake-up function)
- Steering angle reset (the function of the indicator reset by the steering angle can be switched on with this bit for the indicator outputs)
- Switch / button evaluation

## 3.20.12 Internal functions

### Parameter setting of undervoltage detection

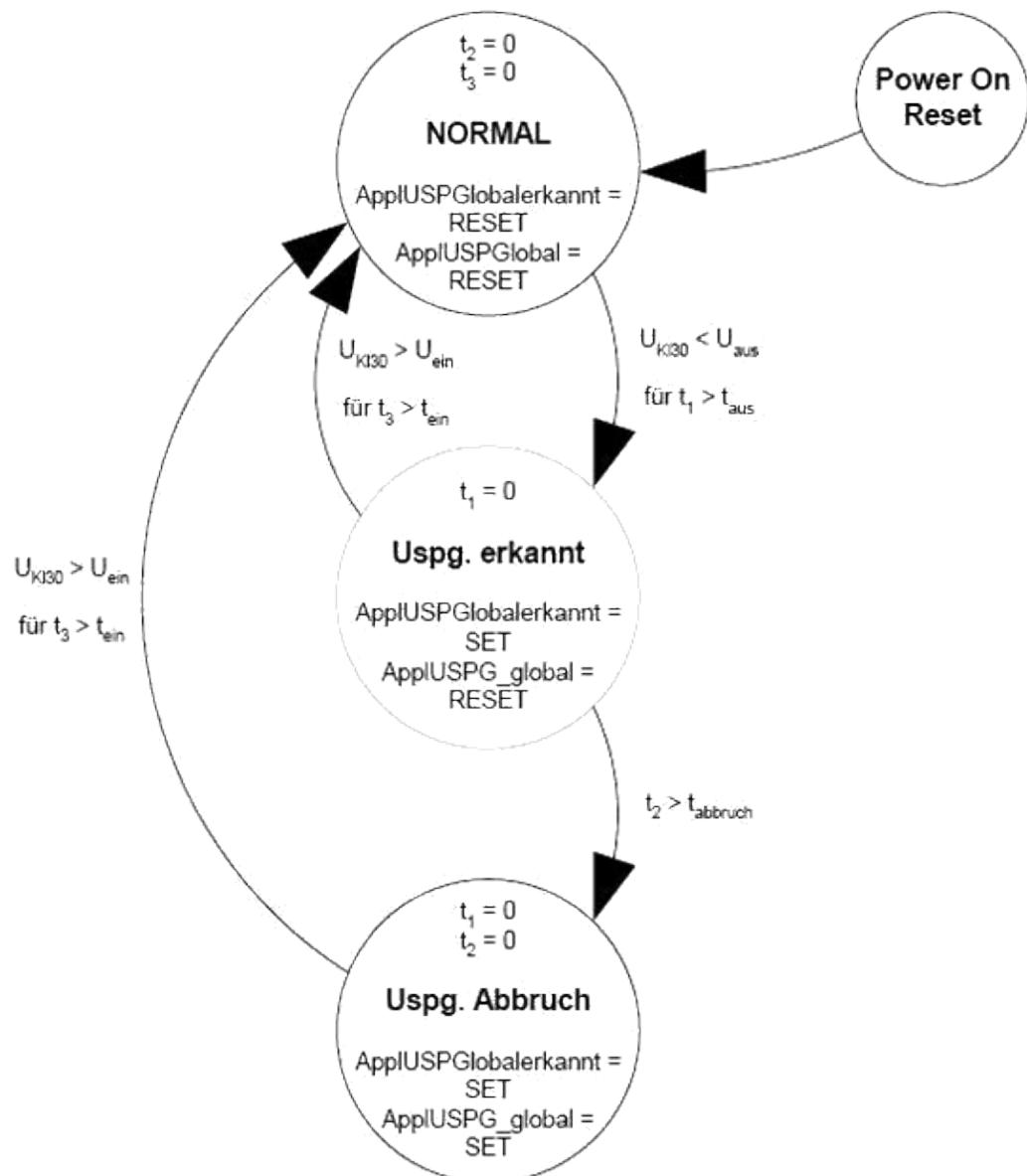
The undervoltage detection that can be set in the parameters (thresholds and times are in LID \$33) makes it possible to

make functions of the control unit independent from the vehicle electrical system voltage. This undervoltage detection does not revoke the function of hardware undervoltage detection in the control unit; instead, it should be viewed as a configurable supplement to this function.

The evaluation of the vehicle electrical system voltage is always performed on the larger of the two terminal 30 connections of the control unit. This means the function of undervoltage detection is ensured even if a connection fails. The following signals are generated:

ApplUSPglobal: This is set if the status changes to Uspg.Abruch. Use as condition on outputs with vehicle status dependency that can be set in the parameters.

ApplUSPglobalerkannt: This is set if the status changes to Uspg.erkannt. This can be set in the parameters as a set condition for the PSM\_USPG I-CAN signal, for example.



Uspg. erkannt = Undervoltage detected

Uspg. Abbruch = Undervoltage cancel

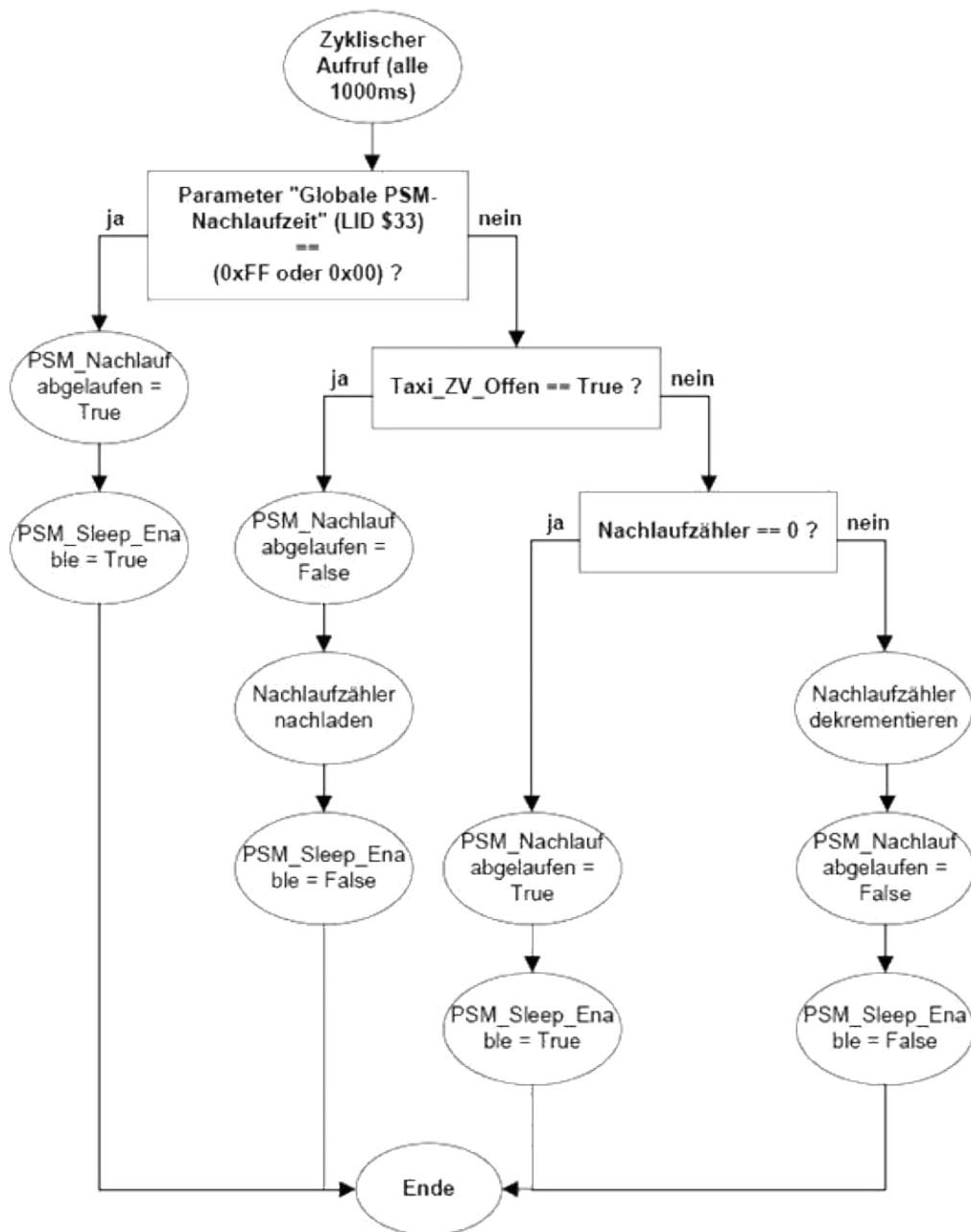
für = for

## Run-on time can be set in the parameters

The PSM variables parameter set (LID \$33) contains the "global PSM run-on time" variable. It contains the adjustable run-on time of the control unit. This time is specified in minutes.

The run-on time expires when "ZV open" is reset. The run-on time is re-initialised when "ZV open" is set and reset. After the run-on time set in the parameters has expired, the control unit can enter SLEEP mode if it is not kept active by other conditions, e.g.: individual discrete outputs are active.

During the run-on time, all functions of the control unit can still be operated providing they do not require information from the I-CAN.



Zyklischer Aufruf (alle 1000 ms) = Cyclical call (every 1000 ms)

ja = yes

Parameter "Globale PSM-Nachlaufzeit" (LID \$33) = Parameter "Global PSM run-on time" (LID \$33)  
(0xFF oder 0x00) = (0xFF or 0x00)

"PSM\_Nachlauf abgelaufen = False" = "PSM\_Nachlauf expired = False"

nein = no

"Nachlaufzähler = 0" = "Run-on counter = 0"

Nachlaufzähler dekrementieren = Decrement run-on counter

Nachlaufzähler nachladen = Reload run-on counter

Ende = End

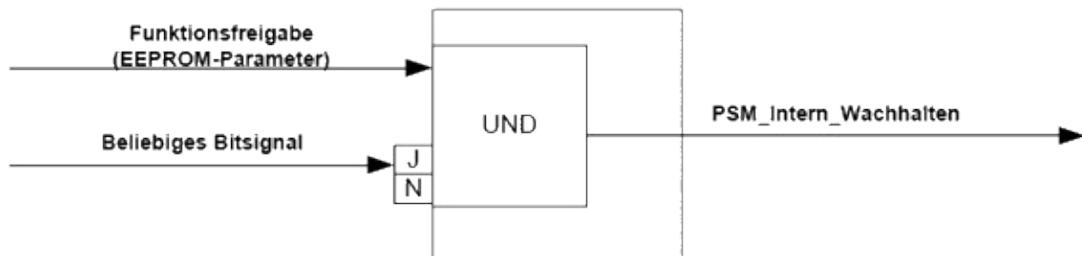
## Internal lifeguarding functions in PSM that can be set in the parameters

The PSM can be kept active by the application / parameter settings using this function module. This means it is possible to prevent the PSM going into SLEEP mode even though all the internal conditions necessary have been met. This possibility is important for functions that require the PSM to remain active throughout and for which the time restrictions of the normal PSM run-on are not sufficient.

**Important: If using correctly, the PSM cannot enter SLEEP mode and this results in increased idle current consumption!**

In order to activate the function, it is necessary to set the "PSM lifeguarding active" 0x01 in parameter set PSM variables (LID \$33).

Following this, the function can be switched on using any bit signal from the signal pool (e.g. PLC output, discrete input, etc.).



Funktionsfreigabe (EEPROM-Parameter) = Function enable (EEPROM parameter)

Beliebiges Bitsignal = Any bit signal

UND = AND

## 3.20.13 Engine functions

The PSM offers the possibility of influencing the engine control unit externally. Several function modules with variable parameters have been implemented for this purpose to ensure correct operation of the engine control unit.

The working engine speed control function enables the actual engine speed of the engine to be controlled.

It is possible to specify 3 set engine speeds that can be activated using a switch or rocker.

In addition, it is possible to use a hand-operated accelerator to set the engine speed, as well as with the accelerator pedal or the BM CAN bus.

ADR ensures that the minimum and maximum engine speeds set in the parameters cannot be exceeded. Torque limits and speed limits can be set in the parameters.

Working engine speed control enables the body manufacturer to influence the engine speed.

ADR requires the following input conditions for internal function enable:

- ADR module activated (parameter)
- Engine speed output permitted (parameter)
- Terminal 15 active + normal voltage
- Gearbox in neutral (output)
- Engine idling (output)
- Parking brake applied (output)
- Brake applied (output)

- Speed not too high (parameter)
- Clutch disengaged (output)
- Any I-CAN signal active (output + parameter)
- Function enable time expired (output + parameter)

If these conditions are met, internal function enable can be activated using output "ADR request discrete" or BM.

Some of these conditions can be deactivated in the parameter settings.

If the conditions are not met, event 950D is stored in the error memory. The missing conditions are stored in the environment data.

## Any I-CAN signal

- Any signal from the signal pool
- Can process bit information or an analog value
- Processing type can be configured

## Engine speed variation (DZA)

Function module for engine speed variation

## Pulse and ramp mode (PUR)

Function module for ramp mode

This operating mode has the lowest priority and can only be activated if neither a set engine speed or the hand-operated accelerator are active.

Ramp mode can be activated using a cruise control lever, discrete inputs on the PSM or the BM CAN.

## Engine speed limit (DZB)

Function module for engine speed limiting

## Set engine speed selection (FDZ)

Function module for specifying the set engine speed

## Set engine speed and limiting enable (FDZB)

Function module for enabling the set engine speed and limiting

Up to 3 different engine speeds can be set in the parameters.

## Power take-off (PTO)

The power take-off function controls activation of the power take-off.

## Speed limiting (VBEG)

Speed limiting makes it possible to switch on a speed limit set in the parameters.

## Remote engine start and stop

The engine start / stop function enables the engine to be started and stopped by the PSM.

(Only in conjunction with ADR)

## 3.20.14 Body manufacturer (BM) CAN bus

### BM CAN

- CAN class C
- Baud rate can be set in the parameters 125/250 kbaud
- Extended identifier 29-bit
- Transceiver Error tolerant (TJA 1041)
- Terminating resistor 120 ohm
- Nominal voltage 5V

- Standard software driver
- Application can be set in the parameters No BM CAN / FMS / ISO11992 / auxiliary
- 4 user-definable messages

All bus content can be separated by the parameter settings and activated independently:

- FMS (only send direction)
- ISO11992-2 and 3 (excerpts)
- User-definable messages (J1939)

## FMS

The fleet management system (FMS) only contains messages to be sent by PSM.

The content includes vehicle information (speed, engine values and driver information).

Engine values: Engine speed, oil temperature or water temperature

Driver information: Check lamps, warning messages

WIV data is currently not held in the data pool.

## ISO11992-2

This standard contains send and receive messages. The send messages contain similar information as the FMS, with the addition of some engine information. The signals received by PSM are stored in the signal pool and can be used by ADR, for example.

## User-definable messages

- 4 messages in send direction (GPM\_1H, GPM\_1I, GPM\_1J, GPM\_1K)
- 4 messages in receive direction (GPM\_2H, GPM\_2I, GPM\_2J, GPM\_2K)
- Send signals are sent from the signal pool (outputs)
- Receive signals are stored in the signal pool
- Cycle times of the messages 2x with 100 ms, 1x with 500 ms, 1x with 1000 ms
- Structure of the messages:
  - 8 bit signals
  - 2 byte signals
  - 2 2-byte signals

BM CAN signal list / see appendix for description!

## 3.20.15 PLC function

PLC functions are provided in PSM for the LT3/Crafter. These functions should enable the customer to implement straightforward logical operations between signals in the PSM signal pool.

It should be possible to set the parameters of the PLC functions, i.e. the customer has a free choice of the origin of the PLC functions' input signals. The parameters are set via the diagnostic interface.

In addition, it is possible to set parameters such as thresholds and times for some block.

The following logical blocks are provided:

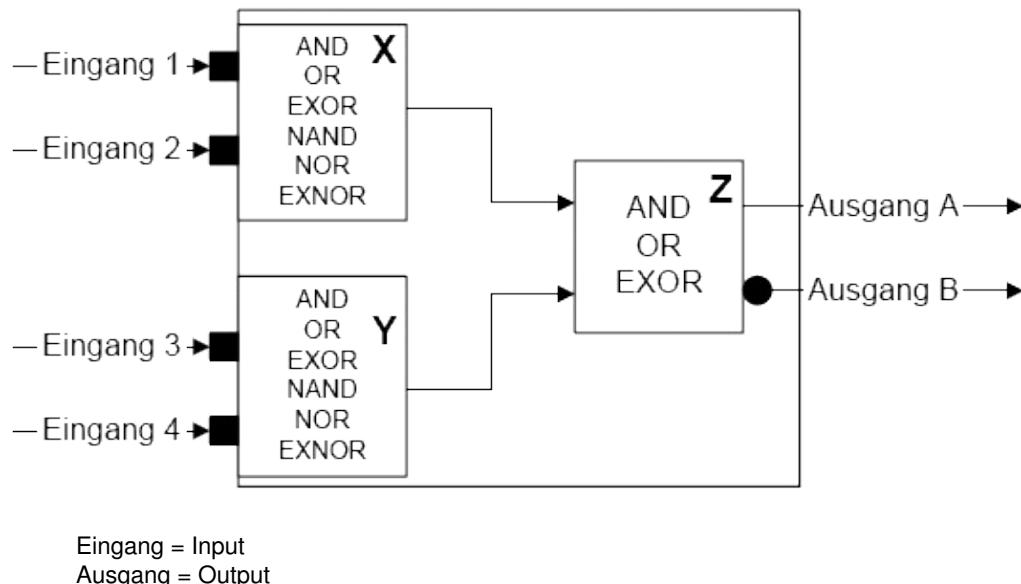
- 16 AND/OR/EXOR/NOR/NAND/EXNOR operation
- 8 RS and D flipflops
- 4 re-triggerable / non re-triggerable timers
- 4 threshold value switches with 4 stages
- 4 hysteresis elements with adjustable hysteresis thresholds
- 4 counter blocks

## Activation of PLC groups

Processing of each of the total 4 groups can be activated or blocked by the module activation PLC parameter set, irrespective of the other groups.

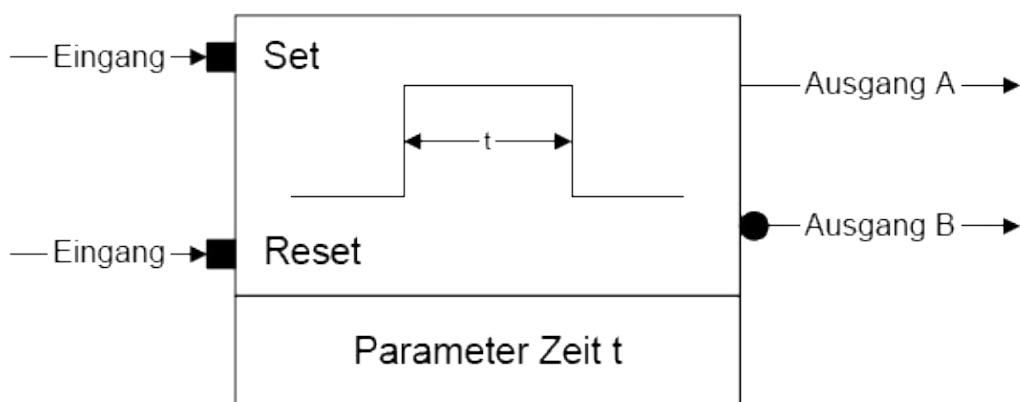
## Block with logical operations

A logical block has 4 digital inputs and 2 digital outputs, in which case the 2nd output is always the inversion of the 1st.



## Timer block

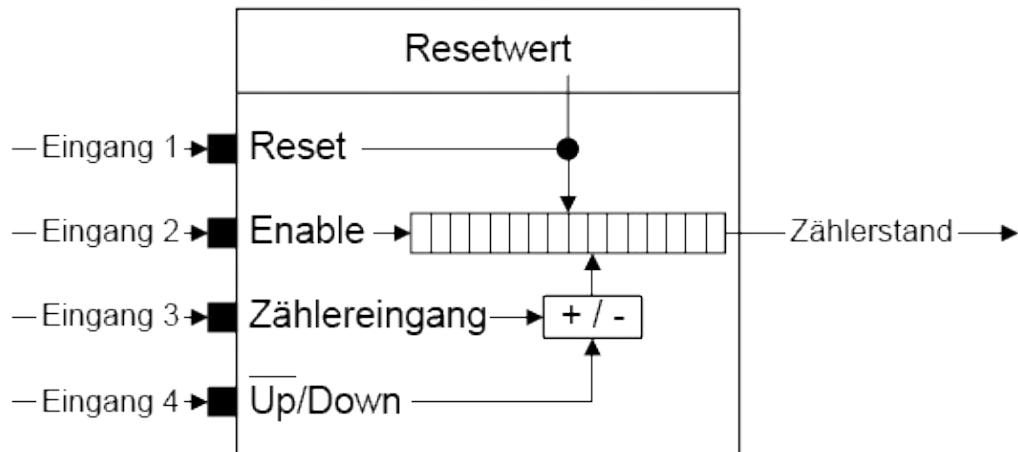
The timer block has a digital trigger input and 2 digital outputs, in which case the 2nd output is always the inversion of the 1st output.



Eingang = Input  
 Ausgang = Output  
 Parameter Zeit t = Parameter time t

## Counter block

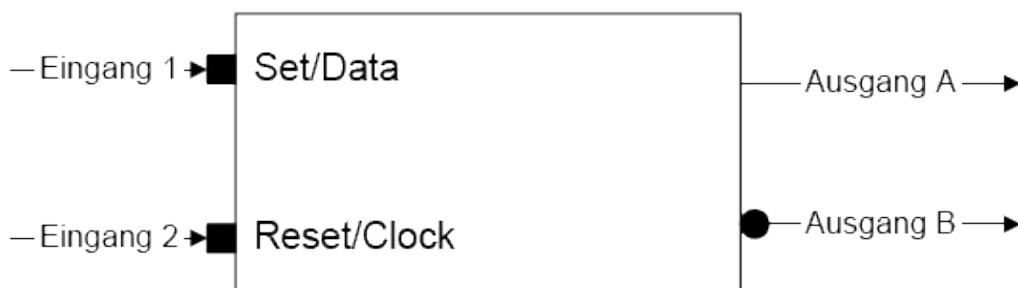
The counter block is an element for counting edge changes. When the positive edges are counted!



Eingang = Input  
 Ausgang = Output  
 Resetwert = Reset value  
 Zählereingang = Counter input  
 Zählerstand = Counter value

## Flipflop block

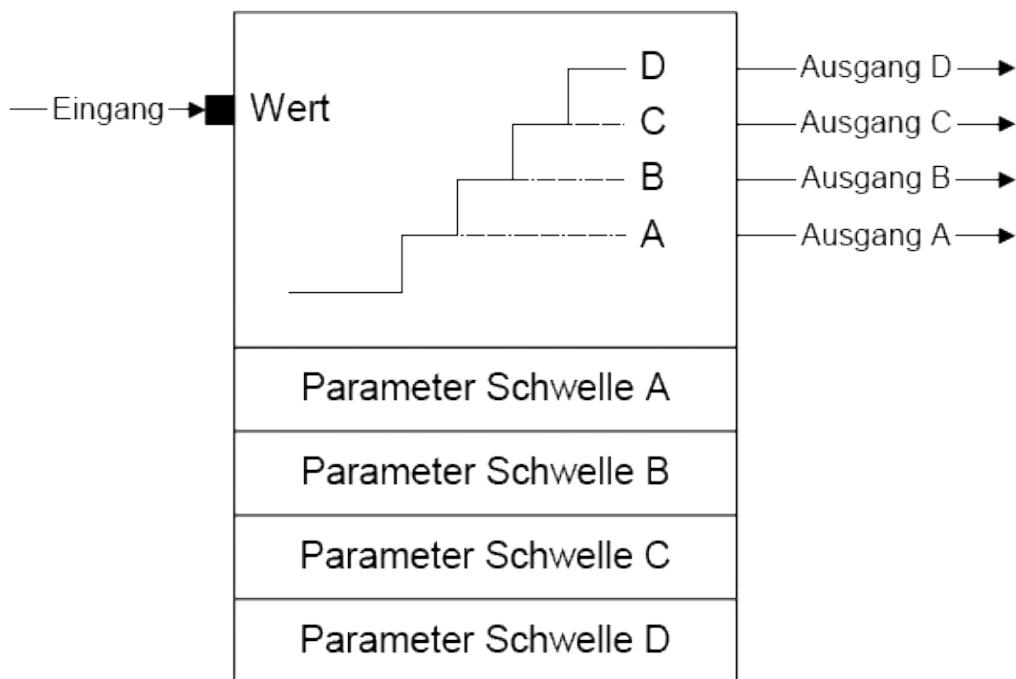
The flipflop block has a digital input (reset/clock), an analog input (set/data), an analog output A and a digital output B, in which case the digital output is always the inversion of the analog output.



Eingang = Input  
 Ausgang = Output

## Threshold value switch

The threshold value switch has an analog input that can process a signal with max. 16-bit width, as well as 3 digital outputs. The input value is compared with up to 4 threshold values and the corresponding output is then set.



Eingang = Input

Ausgang = Output

Wert = Value

Parameter Schwelle = Parameter threshold

For this block to function correctly, make sure that the values set in the parameters for the thresholds comply with the following condition:

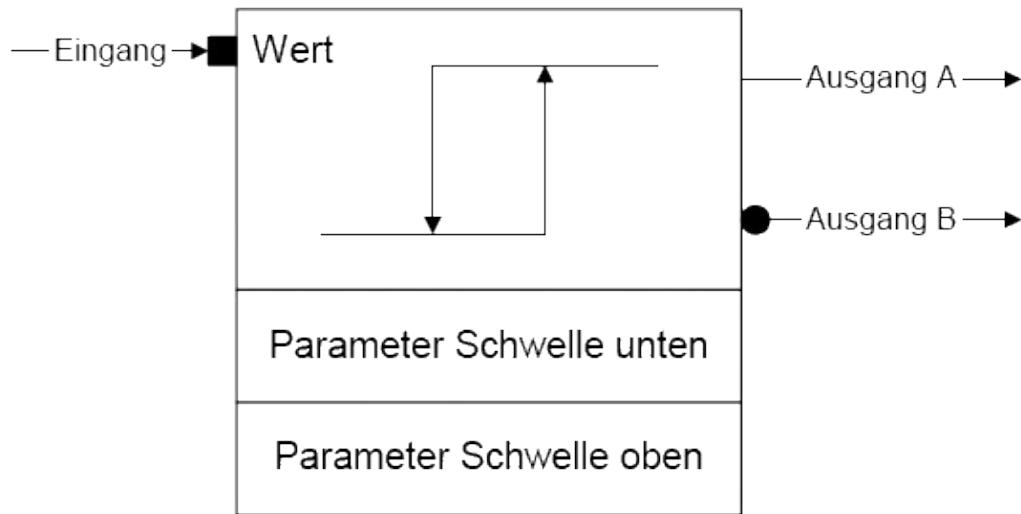
Threshold A < threshold B < threshold C < threshold D

The parameters of the inputs of the block are set in the same way as the parameters for the ADR function blocks for the discrete outputs.

## Hysteresis block

The threshold value switch has an analog input that can process a signal with max. 16-bit width, as well as 2 digital outputs, in which case the 2nd output is the inversion of the 1st output.

This block makes it possible to convert an analog signal with a Schmitt trigger into a digital signal. The switching thresholds can be set in the parameter settings.

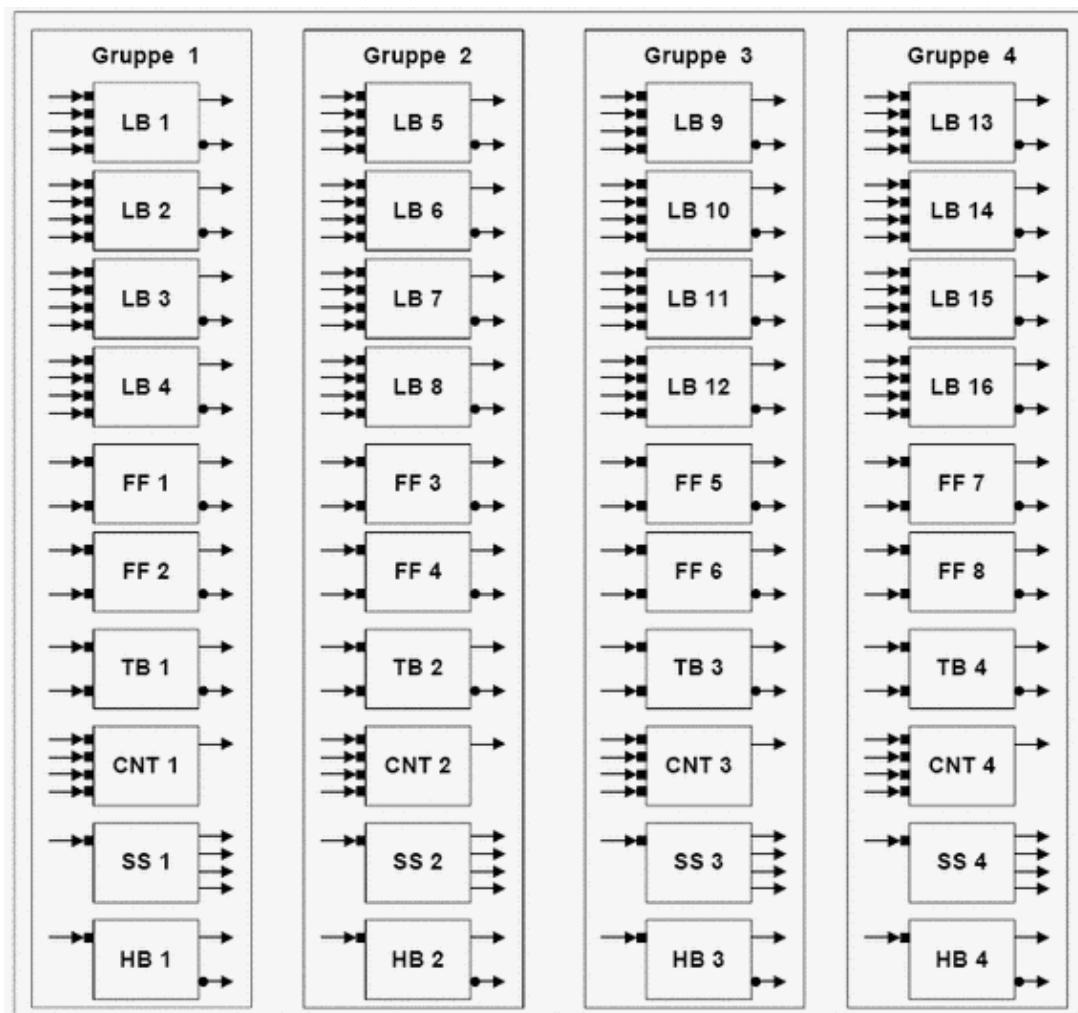


Eingang = Input  
 Ausgang = Output  
 Wert = Value  
 Parameter Schwelle unten = Parameter threshold top  
 Parameter Schwelle oben = Parameter threshold bottom

The parameters of the inputs of the block are set in the same way as the parameters for the ADR function blocks for the discrete outputs.

#### **Internal structure of the PLC blocks**

Each of the 4 blocks contains 4 logic blocks, 1 timer block, 2 flipflop blocks, 1 threshold value switch and one hysteresis block



Gruppe = Group

The system processes the groups in following sequence: First group 1, then group 2, group 3 and finally group 4. It takes about 200 µs computing time to process a group.

All groups are processed in a 20 ms time window, however. During this processing, no signals can be modified in the signal pool by external sources (I-CAN, discrete inputs, etc.), therefore ensuring that all PLC groups have the same input information.

At the end of processing of a PLC group, the outputs of the individual blocks of the group are put in the signal pool. This is important so that these results will be available for processing of the subsequent groups, and therefore in order achieve short cycle times.

**IMPORTANT: Regular processing of the PLC groups in a 20 ms grid is no longer assured during active diagnosis and, in particular, during parameter settings!**

## 3.20.16 Predefined parameter sets (presets)

Various presets are contained in the flash memory for setting the PSM. Each of the active outputs are listed below. The outputs not listed here have their signals set with the OutPortAus signal.

When a parameter set is selected, the parameter settings of both the discrete outputs and the I-CAN outputs are copied. The copying process is only performed on request in diagnostic mode.  
If a parameter set is copied from the flash memory into the RAM, this will no longer be contained in the RAM after a reset.

- 1 basis status
- 2 input on output
- 3 lamps 1 (LDS)
- 4 lamps 2 (LSS)
- 5 alarm lamps (wake-up with CAN)
- 6 indicator lamps (without CAN wake-up)
- 7 LSS functions
- 8 ADR
- 9 ADR + PTO

The 9 presets set the parameters of a:

- I-CAN outputs
- Discrete outputs
- ADR and PTO functions
- PLC functions
- PSM variables
- Signal times
- ADR/PTO/VBEG/MSTART/MSTOP parameters
- PLC parameters
- BM CAN parameters

## 30.12.17 Version history

Version 1.0, 28.07.2006

Version 1.1, 01.08.2006 Precondition for use for ADR, remote engine start and stop

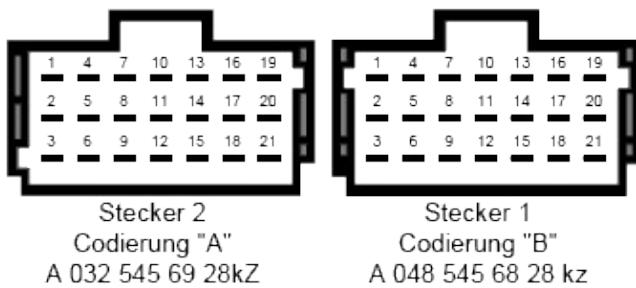
## 3.20.18 Appendix

### BM CAN signal list / description

Signal name	Signal ID	Signal type	default / comment
Body CAN bus data: Start inhibit requested	1185	Bit	0
Body CAN bus data: "Engine start"	1186	Bit	0
Body CAN bus data: "Engine stop"	1187	Bit	0

Body CAN bus data: Pedal plate actuated	1188	Bit	0
Body CAN bus data: Control panel switched on	1189	Bit	0
Body CAN bus data: Status 1 for power take-off	118A	Bit	0
Body CAN bus data: Status 3 for power take-off	118B	Bit	0
Body CAN bus data: Status 1 for enginedependent power take-off	118C	Bit	0
Body CAN bus data: "Engine speed increase" requested	118D	Bit	0
Body CAN bus data: "Engine speed reduction" requested	118E	Bit	0
Body CAN bus data: Switch off engine speed control	118F	Bit	0
Body CAN bus data: Enable for working engine speed control requested	1190	Bit	0
Body CAN bus data: Activation of set engine speed 1 requested	1191	Bit	0
Body CAN bus data: Activation of set engine speed 2 requested	1192	Bit	0
Body CAN bus data: Activation of set engine speed 3 requested	1193	Bit	0
Body CAN bus data: Maximum engine speed limit 1 requested (working engine speed control)	1194	Bit	0
Body CAN bus data: Maximum engine speed limit 2 requested (working engine speed control)	1195	Bit	0
Body CAN bus data: Maximum engine speed limit 3 requested (working engine speed control)	1196	Bit	0
Body CAN bus data: Shift to neutral requested	1197	Bit	0
Body CAN bus data: Warning buzzer requested	1198	Bit	0
Body CAN bus data: AuxBit1_1	1199	Bit	0
Body CAN bus data: AuxBit1_2	119A	Bit	0
Body CAN bus data: AuxBit1_3	119B	Bit	0
Body CAN bus data: AuxBit1_4	119C	Bit	0
Body CAN bus data: AuxBit1_5	119D	Bit	0
Body CAN bus data: AuxBit1_6	119E	Bit	0
Body CAN bus data: AuxBit1_7	119F	Bit	0
Body CAN bus data: AuxBit1_8	11A0	Bit	0
Body CAN bus data: AuxBit2_1	11A1	Bit	0
Body CAN bus data: AuxBit2_2	11A2	Bit	0
Body CAN bus data: AuxBit2_3	11A3	Bit	0
Body CAN bus data: AuxBit2_4	11A4	Bit	0
Body CAN bus data: AuxBit2_5	11A5	Bit	0
Body CAN bus data: AuxBit2_6	11A6	Bit	0
Body CAN bus data: AuxBit2_7	11A7	Bit	0
Body CAN bus data: AuxBit2_8	11A8	Bit	0
Body CAN bus data: AuxBit3_1	11A9	Bit	0
Body CAN bus data: AuxBit3_2	11AA	Bit	0
Body CAN bus data: AuxBit3_3	11AB	Bit	0
Body CAN bus data: AuxBit3_4	11AC	Bit	0
Body CAN bus data: AuxBit3_5	11AD	Bit	0
Body CAN bus data: AuxBit3_6	11AE	Bit	0
Body CAN bus data: AuxBit3_7	11AF	Bit	0
Body CAN bus data: AuxBit3_8	11B0	Bit	0
Body CAN bus data: AuxBit4_1	11B1	Bit	0
Body CAN bus data: AuxBit4_2	11B2	Bit	0
Body CAN bus data: AuxBit4_3	11B3	Bit	0
Body CAN bus data: AuxBit4_4	11B4	Bit	0
Body CAN bus data: AuxBit4_5	11B5	Bit	0
Body CAN bus data: AuxBit4_6	11B6	Bit	0
Body CAN bus data: AuxBit4_7	11B7	Bit	0
Body CAN bus data: AuxBit4_8	11B8	Bit	0
Body CAN bus data: Requested maximum torque for working engine speed control	202F	Byte	0
Body CAN bus data: Requested maximum speed for working engine speed control	2030	Byte	0
Body CAN bus data: AuxByte1_1	2031	Byte	0

Body CAN bus data: AuxByte1_2	2032	Byte	0
Body CAN bus data: AuxByte2_1	2033	Byte	0
Body CAN bus data: AuxByte2_2	2034	Byte	0
Body CAN bus data: AuxByte3_1	2035	Byte	0
Body CAN bus data: AuxByte3_2	2036	Byte	0
Body CAN bus data: AuxByte4_1	2037	Byte	0
Body CAN bus data: AuxByte4_2	2038	Byte	0
Body CAN bus data: Requested engine speed for working engine speed control	3023	Word	0
Body CAN bus data: Requested maximum engine speed limit for working engine speed control	3024	Word	0
Body CAN bus data: Requested minimum engine speed limit for working engine speed control	3025	Word	0
Body CAN bus data: AuxWord1_1	3026	Word	0
Body CAN bus data: AuxWord1_2	3027	Word	0
Body CAN bus data: AuxWord2_1	3028	Word	0
Body CAN bus data: AuxWord2_2	3029	Word	0
Body CAN bus data: AuxWord3_1	302A	Word	0
Body CAN bus data: AuxWord3_2	302B	Word	0
Body CAN bus data: AuxWord4_1	302C	Word	0
Body CAN bus data: AuxWord4_2	302D	Word	0



### Contacting and plug assignment

Stecker 2 = Plug 2  
Codierung = Coding

# VW Nutzfahrzeuge Aufbaurichtlinien



Nutzfahrzeuge

Pin Nr.	Kürzel	Verwendung und alternative Verwendung	Interne Bezeichnung	Proz. Ausgang	Proz. Eingang
1		Nicht belegt/Reserve	-		
2	A18N005	Ausgang 18 (negativ/0,5A)	A_05_MIN_2_PIN	A_05_MIN_2	RL_05_MIN_2
3	KL30.1	Klemme 30.1	KL30.1		
4	A07P050	Ausgang 7 (positiv/5A)	A_5A_1	OUT_5A_1	IN_5A_1
5	A17N005	Ausgang 17 (negativ/0,5A)	A_05_MIN_1_PIN	A_05_MIN_1	RL_05_MIN_1
6	KL30.1	Klemme 30.1	KL30.1		
7	A08P050	Ausgang 8 (positiv/5A)	A_5A_2	OUT_5A_2	IN_5A_2
8	A09P010PWM	Ausgang 9 (positiv/1A, PWM-fähig)	A_1A_1	OUT_1A_1	IN_1A_1
9	A16P005	Ausgang 16 (positiv/0,5A)	A_05_POS_4_PIN	A_05_POS_4	RL_05_POS_4
10	A05P050W	Ausgang 5 (positiv/5A, wakeup-fähig)	A_5A_WAKE_1	OUT_5A_WAKE_1	IN_5A_WAKE_1
11	A10P010PWM	Ausgang 10 (positiv/1A, PWM-fähig)	A_1A_2	OUT_1A_2	IN_1A_2
12	A15P005	Ausgang 15 (positiv/0,5A)	A_05_POS_3_PIN	A_05_POS_3	RL_05_POS_3
13	A06P050W	Ausgang 6 (positiv/5A, wakeup-fähig)	A_5A_WAKE_2	OUT_5A_WAKE_2	IN_5A_WAKE_2
14	A11N010	Ausgang 11 (negativ/1A)	A_1A_3	OUT_1A_3	IN_1A_3
15	A14P005	Ausgang 14 (positiv/0,5A)	A_05_POS_2_PIN	A_05_POS_2	RL_05_POS_2
16	A03P100W	Ausgang 3 (positiv/10A, wakeup-fähig)	A_10A_WAKE_1	OUT_10A_WAKE_1	IN_10A_WAKE_1
17	A12N010	Ausgang 12 (negativ/1A)	A_1A_4	OUT_1A_4	IN_1A_4
18	KL30.2	Klemme 30.2	KL30.2		
19	A04P100W	Ausgang 4 (positiv/10A, wakeup-fähig)	A_10A_WAKE_2	OUT_10A_WAKE_2	IN_10A_WAKE_2
20	A13P005	Ausgang 13 (positiv/0,5A)	A_05_POS_1_PIN	A_05_POS_1	RL_05_POS_1
21	KL30.2	Klemme 30.2	KL30.2		

Signal assignment plug 1

Nr.	Kürzel	Benennung und alternative Verwendung	Interne Bezeichnung	Proz. Ausgang	Proz. Eingang
1	E06N	Eingang 6 (low-aktiv)	E_EMIN3	-	E_MIN_3
2	E04N	Eingang 4 (low-aktiv)	E_EMIN1	-	E_MIN_1
3	KL31	Klemme 31	KL31		
4	E01P	Eingang 1 (high-aktiv)	E_EPOS1	-	E_POS_1
5	E05N	Eingang 5 (low-aktiv)	E_EMIN2	-	E_MIN_2
6	E02P	Eingang 2 (high-aktiv)	E_EPOS2	-	E_POS_2
7	E03P	Eingang 3 (high-aktiv)	E_EPOS3	-	E_POS_3
8	E07A	Eingang 7 (analog)	E_EANA0	-	E_ANA_0
9	ICAN-L	Innenraum-CAN L	CANL		
10	E09A	Eingang 9 (analog)	E_EANA2	-	E_ANA_2
11	E08A	Eingang 8 (analog)	E_EANA1	-	E_ANA_1
12	ICAN-H	Innenraum CAN-H	CANH		
13	A01B050	Ausgang 1 (H-Brücke/5A)	H_Bruecke_Plus	OUT_BRIDGE_1_POS, OUT_BRIDGE_1_NEG	IN_BRIDGE_1, IN_BRIDGE_1
14	E10A	Eingang 10 (analog)	E_EANA3	-	E_ANA_3
15	ACAN-L	Aufbauhersteller-CAN L	ABH_CANL		
16	A02B050	Ausgang 2 (H-Brücke/5A)	H_Bruecke_Minus	OUT_BRIDGE_2_POS, OUT_BRIDGE_2_NEG	IN_BRIDGE_2, IN_BRIDGE_2
17	A20N005	Ausgang 20 (negativ/0,5A)	A_05_MIN_4_PIN	A_05_MIN_4	RL_05_MIN_4
18	ACAN-H	Aufbauhersteller-CAN H	ABH_CANH		
19	A19N005	Ausgang 19 (negativ/0,5A)	A_05_MIN_3_PIN	A_05_MIN_3	RL_05_MIN_3
20	RS485P	RS485, positiver (nichtinvertierender) Ein- und Ausgang	RS485_E		
21	RS485N	RS485, negativer (invertierender) Ein- und Ausgang	RS485_A		

Signal assignment plug 2

## Translation for graphics

Pin no.	Abbreviation	Name and alternative use	Internal name	Proc. output	Proc. input
1		Not used/spare			
2		Output 18 (negative/0.5 A)			
3		Terminal 30.1			
4		Output 7 (positive/5 A)			

5	Output 17 (negative/0.5 A)
6	Terminal 30.1
7	Output 8 (positive/5 A)
8	Output 9 (positive/1 A, PWM-capable)
9	Output 16 (positive/0.5 A)
10	Output 5 (positive/5 A, wake-up-capable)
11	Output 10 (positive/1 A, PWM-capable)
12	Output 15 (positive/0.5 A)
13	Output 6 (positive/5 A, wake-up-capable)
14	Output 11 (negative/1 A)
15	Output 14 (positive/0.5 A)
16	Output 3 (positive/10 A, wake-up-capable)
17	Output 12 (negative/1 A)
18	Terminal 30.2
19	Output 4 (positive/10 A, wake-up-capable)
20	Output 13 (positive/0.5 A)
21	Terminal 30.2

Pin no.	Abbreviation	Name and alternative use	Internal name	Proc. output	Proc. input
1		Input 6 (low active)			
2		Input 4 (low active)			
3		Terminal 21			
4		Input 1 (high active)			
5		Input 5 (low active)			
6		Input 2 (high active)			
7		Input 3 (high active)			
8		Input 7 (analog)			
9		Interior CAN L			
10		Input 9 (analog)			
11		Input 8 (analog)			
12		Interior CAN H			
13		Output 1 (H-bridge/5 A)			
14		Input 10 (analog)			
15		Body manufacturer CAN L			
16		Output 2 (H-bridge/5 A)			
17		Output 20 (negative/0.5 A)			
18		Body manufacturer CAN H			
19		Output 19 (negative/0.5 A)			
20		RS485, positive (noninverting) input and output			
21		RS485, negative (inverting) input and output			

Note: Subject to errors and technical amendments. The electronic version of the body guidelines is the decisive source of up-to-date data on body guidelines (online body guidelines). Data status August 2007

## 3.21 Boom supported working platform (boomlift, cherry picker)

### Assembly frame

For installation of boomlifts on vehicle chassis a sufficiently sized assembly frame is required.

Version	Resistance torque WW per side member in cm <sup>3</sup>
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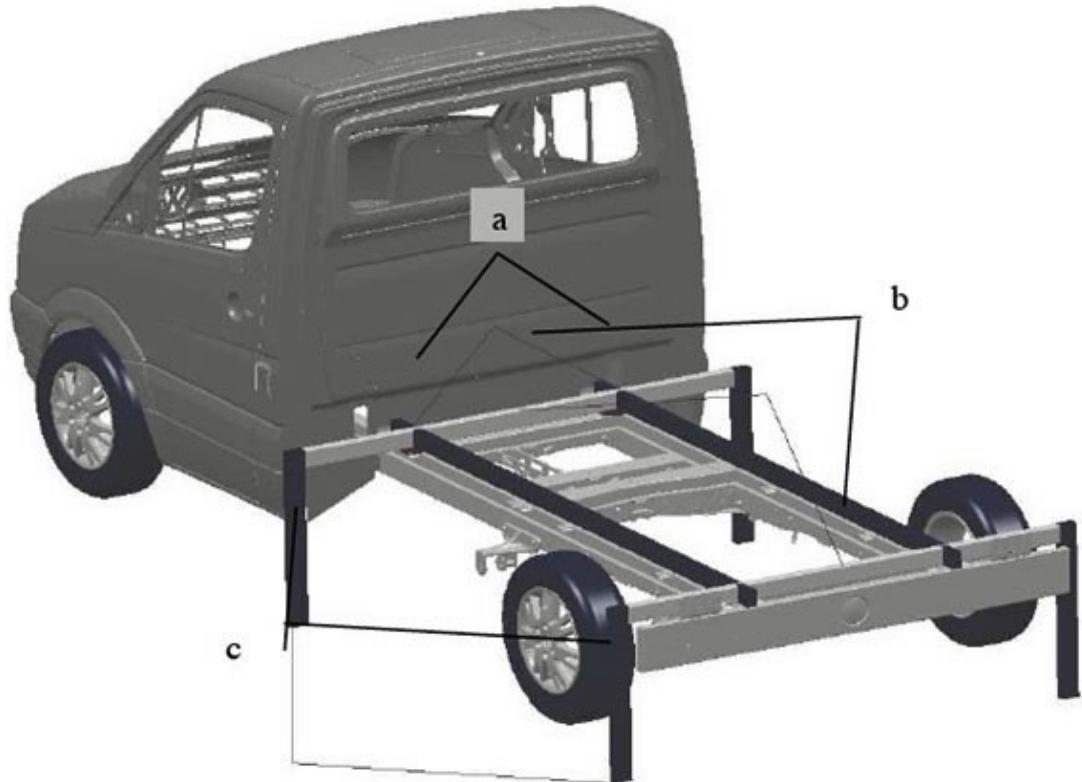
3,5	30
4,6 and 5,0	40

Balanced connection of the assembly frame to all body consoles is required.

Connection of the first and additional console must be of the elastic type of sufficient dimensions (see item 3.4).

The spread of force into the assembly frame through the supports must be central between the standard double console pairs behind the cab.

In the area where force is introduced into the assembly frame through the supports, a sturdy cross member (front and rear) must protect the assembly frame adequately against torsion.



Connection of assembly frame to body consoles

a Area of additional consoles

b Necessary assembly frame cross members in area where force is spread on supports

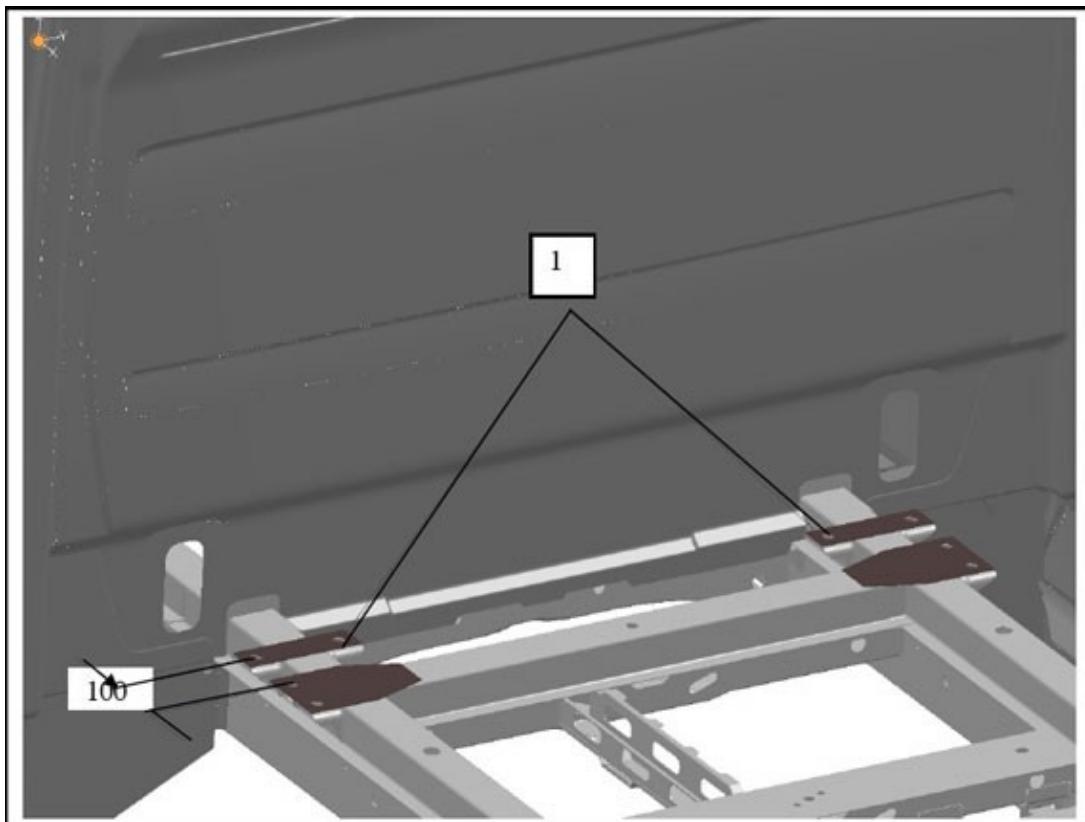
c Support connection assembly frame to body consoles

### Necessary additional body console

For balanced spread of force across the vehicle chassis frame, an additional body console is required per frame side member in the area behind the cab.

The body consoles must have a minimum quality of the standard H240 LA material and a wall thickness of 3 mm.

The hole spacing of the additional body console to the adjacent hole of the existing body console must be 100 mm.



1 Additional body consoles

For the use of additional body consoles, we recommend genuine Volkswagen replacement parts. Further information about standard items and dimensions of body consoles can be obtained from item 6 Downloads.

## General

For body assemblies with moveable assembly parts, sufficient movement to the vehicle must be observed, otherwise collisions between the assembly parts and the vehicle will ensue, thereby causing damage.

Additional loads in or on the cab in raised state are not permissible. Otherwise damage will be caused to the frame.

If vehicles are equipped with boom supported working platforms (boomlifts, cherry pickers, etc), the following points must be observed due to the high loads in raised state:

- For retroinstallation of boom supported working platforms, a suitability certificate is required from the department responsible.
- For balanced spread of the load across the vehicle chassis, the body must be secured by way of an

- assembly frame.
- All body consoles must be connected to the assembly frame.
- Installation of an additional double body console per frame side member behind the cab (see example).
- Connection of the first and additional consoles must be of the elastic type, of sufficient dimension (see item 3.4)
- Additional loads in or on the cab in raised state are not permissible (abuse).
- The spread of force on the supports must be central between both standard double console pairs behind the cab on the assembly frame. In addition, the assembly frame must be protected sufficiently against torsion by a cross member in the area where force is introduced.

**Note:** Subject to errors and technical amendments. The electronic version of the body guidelines is the decisive source of up-to-date data on body guidelines (online body guidelines). Data status August 2007

## 3.22 Tail lights

The standard installed tail lights are designed exclusively for horizontal use.

There is a ventilation opening on the lower edge of the tail lights. If installed incorrectly, e.g. vertical fitting, there could be water ingress. Drainage of the water can then no longer be assured.

**Note:** Subject to errors and technical amendments. The electronic version of the body guidelines is the decisive source of up-to-date data on body guidelines (online body guidelines). Data status August 2007

### 3.23 Tow hitches

- The installation of tow hitches must comply with the regulations of the country in question. The standard is DIN 74 050 in Germany.
- Observe spacing dimensions\*. The standard is DIN 74 058 in Germany.
- In the event of deviations from the accident prevention regulations, a certificate of exemption and approval must be requested in the Federal Republic of Germany from the professional association with liability for industrial safety assurance with regards to vehicle ownership, 22757 Hamburg (tel. +49 40/38 10 91).
- If tow hitches are installed retroactively, only the makes and types approved by us and genuine Volkswagen cross member carriers may be used. Provision is already made for attachment points in our cross member carriers and/or longitudinal members.
- The size of the tow hitch is determined in accordance with the D value.

$$D = g_x \frac{m_k \cdot H \cdot m_a}{m_k + m_a} \text{ (kN)}$$

D = A-frame

mk = Max. permissible weight of pulling vehicle (Kfz) in t

mA = Max. permissible weight of trailer in t

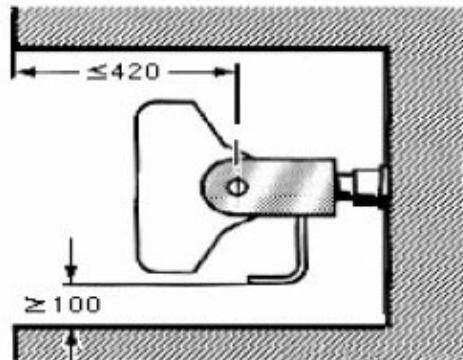
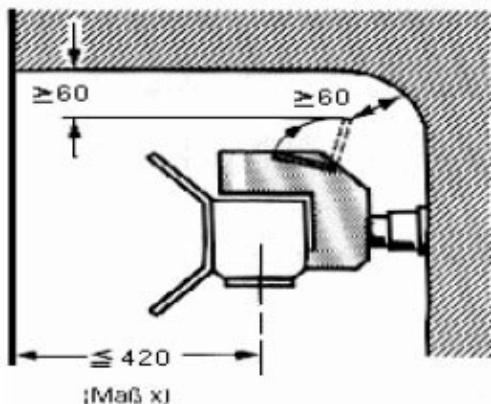
g = 9.80665 m/s<sup>2</sup>

The permissible trailer load can be gleaned from the official sales documents or the trailer operation guide. In order that trailers can be exchanged for border crossing traffic, the spacing dimension x must be max. 300 mm.

\* Where the base is extremely low down or the overhang large, and also following overhang extensions, the use of a tow hitch may not be possible. For this reason, the structural criteria must first be established.

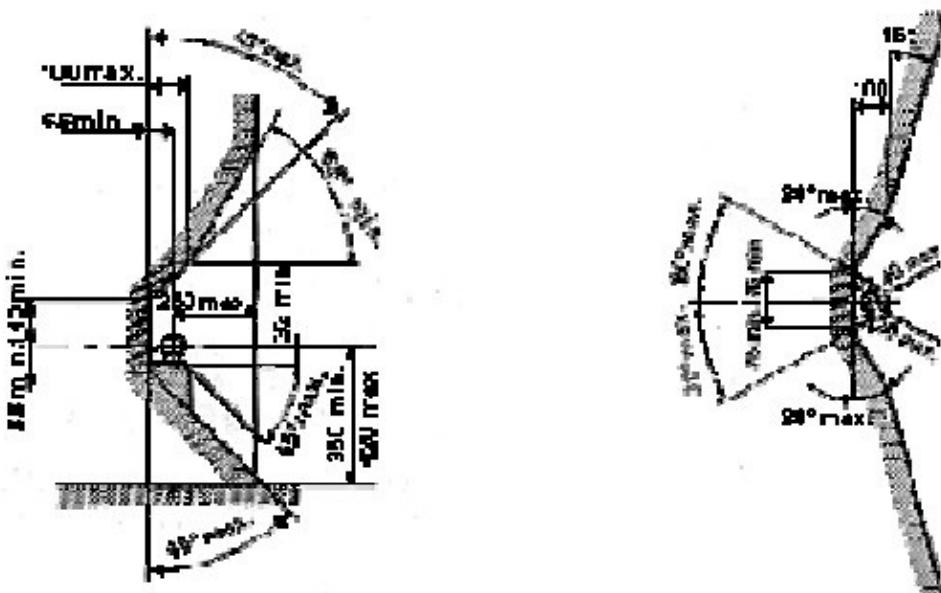
#### Jaw-type coupling (can be ordered direct from factory via PR no.1D5)

- Spacing from centre of coupling pin of tow hitch to end of body structure max. 420 mm. Maintain clearances.
- In exceptional circumstances, the spacing of 420 mm can be exceeded: Spacing maximum 650 mm on vehicles with tipping bodies or assemblies attached to the rear. Spacing of maximum 1320 mm if height clearance from ground to lower edge of body is at least 1150 mm. A suitable remote operating device for the coupling must be provided. Safe operation of the coupling must not be impaired.



## Fifth wheel coupling (can be ordered ex-factory via PR no. 1D1/1D2/1M0/1M4)

- Adhere to clearances.
- Installation only on type approved trailer bracket.
- Installation on underbody protection only is not permissible. Modifications to the underbody protection must be agreed upon with the Vehicle Inspectorate or technical inspection authority.



**Note:** Subject to errors and technical amendments. The electronic version of the body guidelines is the decisive source of up-to-date data on body guidelines (online body guidelines). Data status August 2007

## 3.24 Braking system/retarder

An operating permit has been granted for the vehicle braking system. This permit becomes void if any changes to the braking system are made. **Changes to the braking system are therefore not permissible.**

If wheelbase modifications result in a necessity to work on the braking system, the following points must be observed:

- Renew hydraulic brake lines completely
- Coil pipe dimension 4.75 x 0.7, synthetic lines not permissible
- Shape lines only in a bending device
- Bend radius 17.5 mm
- Clean lines from inside
- Maintain safe distance from heat sources, sharp and moving parts
- Attach with plastic loops, max. spacing 500 mm
- Have ALB regulator readjusted in VW workshop if weight is altered.

On completion of work measures, check braking system works correctly.

RetarderPreparation for installation of a retarder can be ordered ex-factory (PR no. 1H5). This special equipment option comprises of:

- Adapted cross member structure on underbody
- Wiring to beneath the vehicle
- Wiring of service switch, warning lamp and hand switch in cockpit.

The service switch and the hand switch are read by a parametering special module (PSM). The PSM transmits the signals to the interface under the vehicle to allow communication with the retarder control unit.

The warning lamp is actuated directly by the retarder.

For power supply to the retarder there is a terminal 30 connection on the underbody.

Any remaining wiring required under the vehicle, from the control unit to the retarder, and positioning of the components must be carried out by the custom body manufacturer/coachbuilder.

Retroactive installation of a retarder is only permissible on vehicles with PSM.

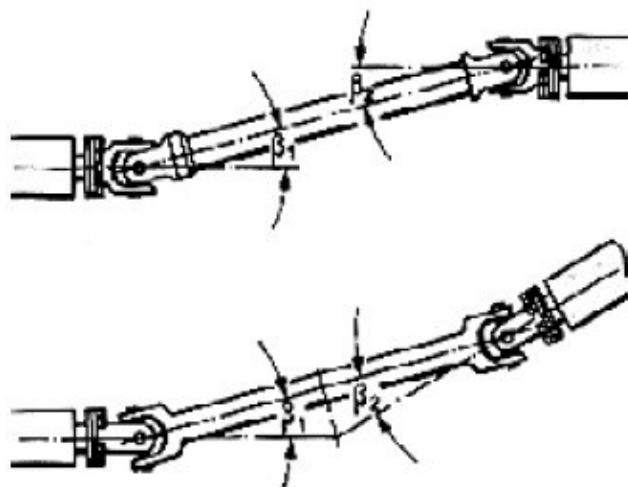
Install only in vehicles with sufficiently configured electrical system (alternator and batteries with sufficient capacity). Ensure the earth connection of the retarder is sufficient.

Due to the excess weight of the retarder, check weight distribution and adherence to permissible axle loads.

Ensure sufficient strength and stability.

### Drive shafts

- For wheelbase modifications, drive shaft allocation and drive shaft lengths must be configured as per comparable series production vehicles.
- The drive shaft tube must be the same in diameter and material thickness as the series production vehicle.
- If necessary, couple several drive shafts together with intermediate bearings.
- The flange surfaces must be completely flat.
- The bend angle ( $\beta_1 = \beta_2$ ) must not exceed a value of  $6^\circ$ . Deviations impair the service life and noise emissions.
- Balance drive shafts before installation.
- Volkswagen AG is not in a position to comment on road holding, braking and steering characteristics where extreme wheelbase modifications have been made.



Beugungsarten

**Note:** Subject to errors and technical amendments. The electronic version of the body guidelines is the decisive source of up-to-date data on body guidelines (online body guidelines). Data status August 2007

## 3.25 Auxiliary drive

### Drive from engine via V-belt

Provision can be made on the engine to drive ancillaries by means of a V-belt of max. 7 kW using the flange points already present.

#### Versions available from the factory:

- Servo pump/power steering pump as standard with option of:
- 2nd alternator, 140 A (PR no. 8HG)
- A/C compressor (PR no. 2AB) functional compressor installed in vehicle of type Denso 10S 17(unregulated)
- Preparation for installation of hydraulic pump (PR no. 2BH), Hydraulic pump is not included in delivery, separate purchase through customer service is necessary.

### Auxiliary drive from manual gearbox

Drive is via the layshaft of the gearbox

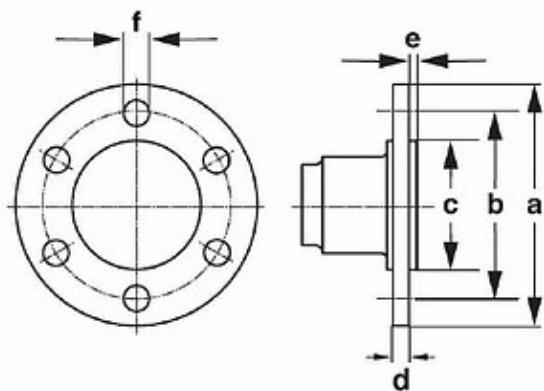
#### Versions available from the factory:

Assembly	PR number
Gearbox without auxiliary drive (NA), standard	0R0
Gearbox with auxiliary drive (NA)	0R1
Layshaft without flange	
Gearbox with auxiliary drive (NA)	0R3
Layshaft with flange	
Gearbox with auxiliary drive (NA)	0R6
Gear change lock, Layshaft without flange	
Gearbox with auxiliary drive (NA)	0R7
Gear change lock, Layshaft with flange	

#### Notes:

- The version of the auxiliary drive and selection of the ratio are dependent on the output and speed of the assembly to be driven.
- Gearbox dependent auxiliary drive systems may only be switched on and off when stationary.
- Details about maximum transferable torque figures (Nm) for individual auxiliary drive systems are benchmarks for jolt-free and vibration-free operation. The details were based on a durable splinetype connection and calculated service life in accordance with DIN 922 of at least 500 operating hours. Not taken into consideration are additional forces imparted on the assemblies to be driven.
- Select auxiliary drive ratio so that a minimum speed (engine) of 1,200 rpm can be maintained with the auxiliary drive under load. The power draw should be within the range of the maximum engine torque.
- Disconnected drive shafts, fan wheels or belt pulleys must be covered over.
- No belt or chain drive systems may be attached to the drive shaft or flange of auxiliary drive systems. Submit diagrams and the necessary data for approval of exceptions only where these are absolutely necessary.

#### Dimensions - coupling flange - auxiliary drive



Direction of rotation

a ø	b ø	c ø	d ø	e ø	f ø	Hole number
90	74,5	47 <sup>e8</sup>	6	2,1	8,0 <sup>A12</sup> <sub>2</sub>	6

## Technical data/information - auxiliary drive

- Max. auxiliary drive with jolt-free and vibration-free operation:  $M_d = 140 \text{ Nm}$
- Continual output at engine speed 2,500 rpm:  $N_{\max} = 28 \text{ kW}$
- Working speed of auxiliary drive  $M_{NA} = 0.687/0.704 \times n_{Mot}$

I	II	III	IV	V	VI	VII	A1	B1	B2	C1
65-100 kW	NSG 370-6	0R3/0R7	0,687	28/2500	140	b	639	131	151	125,8
120 kW	NSG 400-6	0R1/0R6	0,704	28/2500	140	b	745	127	147	125,5

## Key for auxiliary drive table Engine

II Gearbox

III Auxiliary drive reference (special equipment PR no.)

IV Transmission ratio i NA; drive speed of aux.drive  $n_{NA} \times N_{Motor}$

V Continuous output of auxiliary drive in kW at engine speed rpm

VI Maximum drive torque of auxiliary drive in Nm

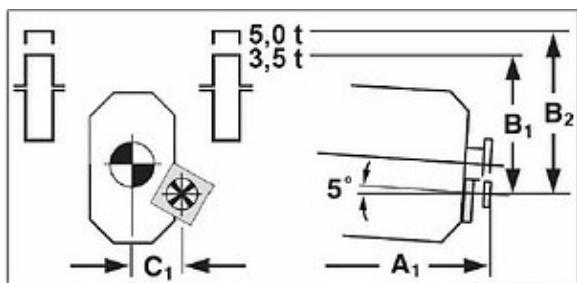
VII Direction of rotation as seen in direction of travel

- a) Anti-clockwise
- b) Clockwise

A1 Dimension from rear edge of coupling flange to centre of front axle in mm

B1 Dimension from centre of coupling flange to upper edge of chassis frame in mm

C1 Dimension from centre of coupling flange to centre of gearbox flange in mm



**Note:** Subject to errors and technical amendments. The electronic version of the body guidelines is the decisive source of up-to-date data on body guidelines (online body guidelines). Data status April 2008

## 3.3 Subframes

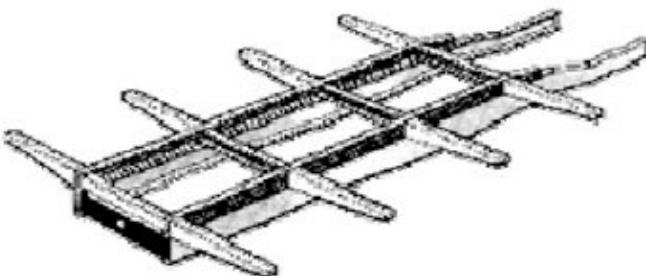
### General:

- For a secure connection between the vehicle chassis and body, a subframe or base structure which takes over the function of a subframe (with the exception of self-supporting custom bodies and subframes as floorpan assembly), is necessary for all custom bodies.
- The subframe longitudinal members should be level and rest on the upper belts of the vehicle chassis, following the run of the frame.
- For VW Crafter 5.0t models (twin wheel version):  
The vehicle chassis frame longitudinal members are offset inwards in the rear axle area. There is no necessity for the subframe longitudinal members to follow this angle and can be finished to run on in a straight line.  
Wooden strips between the vehicle chassis longitudinal members and subframe longitudinal members are not permissible. Console attachment is necessary in the area of the rear axle above the subframe cross member
- Position subframe cross members above vehicle chassis cross members.
- For the longitudinal members, use folded U section or commercial-type U section, as used in body assembly (do not use rolled steel section) Box sections are also permissible.
- The dimension of the longitudinal members is calculated from the required resistance moment ( $W_x$ ) for body and vehicle chassis. See diagram 3.3.2. The resistance moments and profile dimensions given are based on the frame longitudinal members being placed under the same load on both sides.

If more than one custom body is fitted to the chassis (e.g. drop-side and loading platform), the larger of the prescribed resistance moment figures must be applied for fixture of the subframe.

### Subframe as floorpan assembly:

A subframe with continuous longitudinal members is not necessary if the floorpan assembly of the body can take on the function of the subframe.



### 3.3.1 Material

#### Material qualities for prescribed subframes made of steel:

Design subframes with console attachment (positive connection) as H 240 2A or S235 JR 62 type.

Material	Pull strength N/mm <sup>2</sup>	Stretch limit N/mm <sup>2</sup>
H 240 LA DIN 10268-1,0480	350 -450 340-510	260 -340 <235

S235 JR 62  
DIN 10025-1.0038

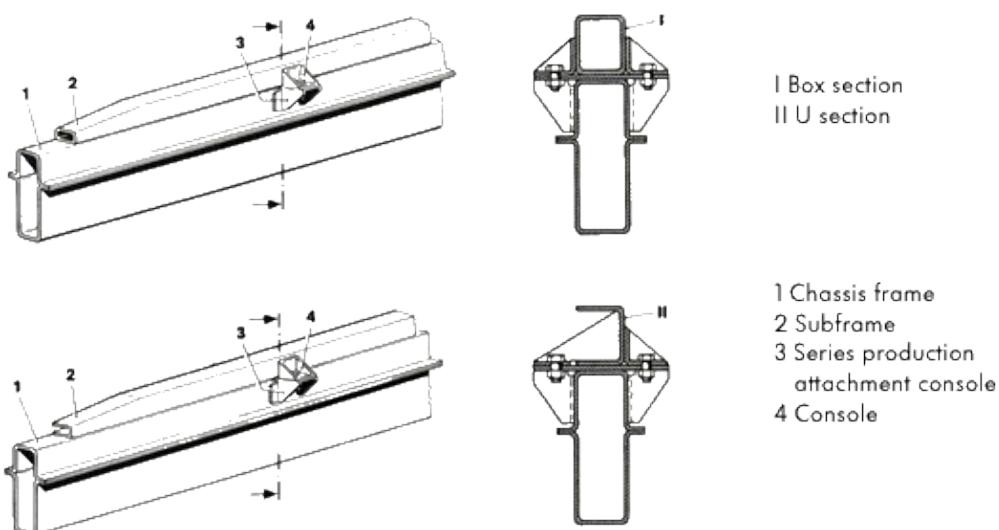
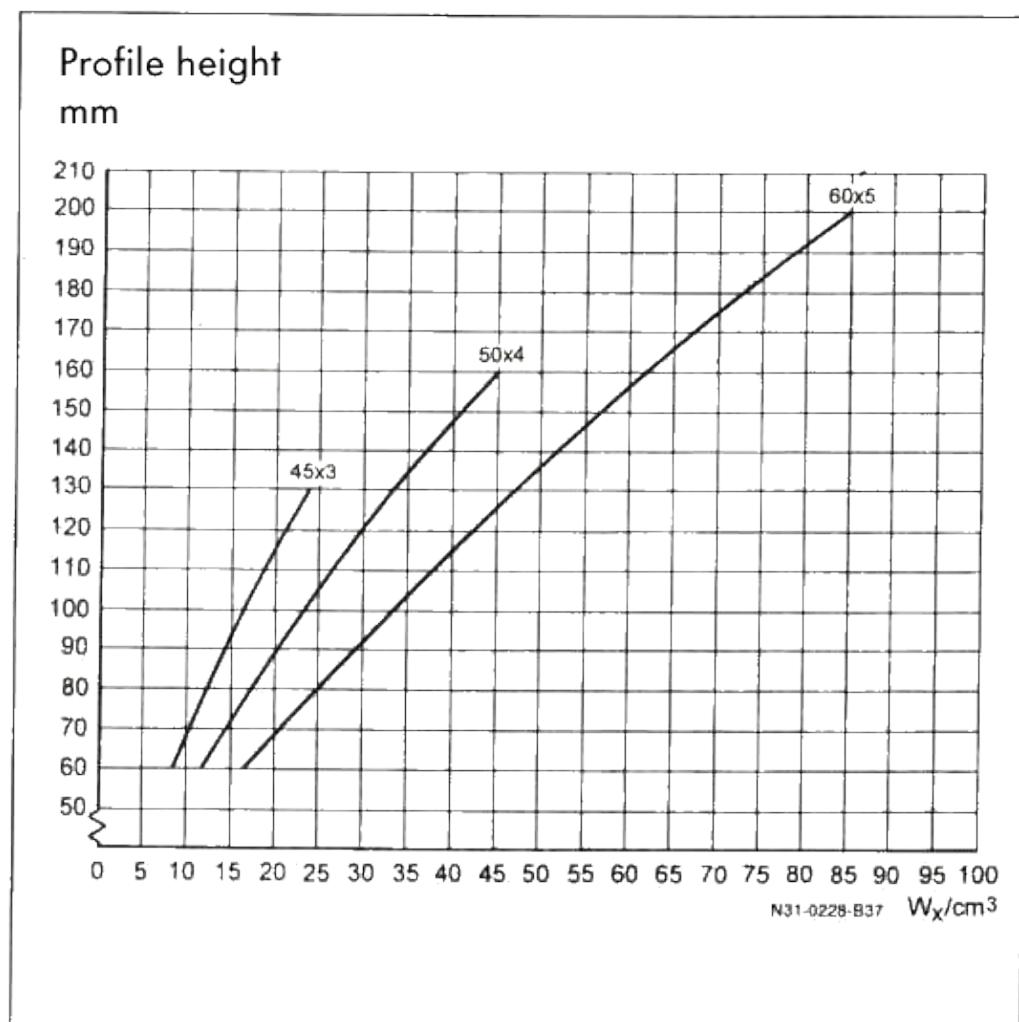
Subframes made from high tensile steels must be at least as stiff as steel subframes. Attachment must be of the positive type.

**Drop-side bodies with aluminium design**

- Observe information from aluminium manufacturer
- Longitudinal members, planked flooring, base plate and traverses must form one self-supporting unit.

**3.3.2 Creation / profile dimension**

The profile overhang at the front ends of the longitudinal members should be gradual. Profile dimensions  
Profiles for subframe longitudinal members (open profile), subframes and vehicle chassis frames should have  
approximately the same material thickness and flange width.

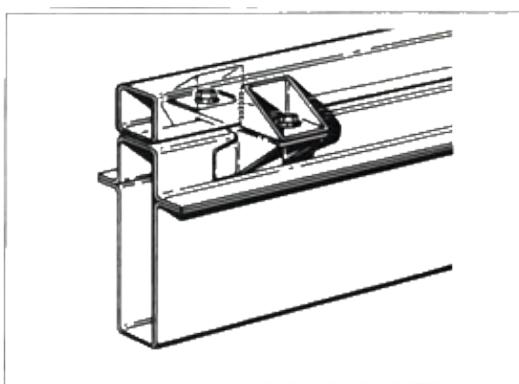


If very high longitudinal members are necessary or if low frame heights are aimed for, the U section on positive connections can be

- closed on panel vans
- boxed inside each other
- boxed.

In this way, the resistance moment is raised and also the torsional strength. Ensure the transition is good from closed longitudinal member to open U section.

### 3.3.3 Fixture

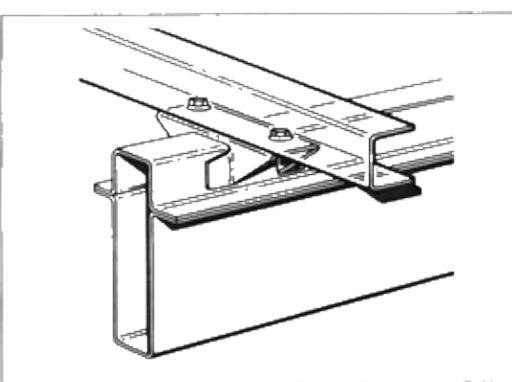


Console attachment with longitudinal member

Depending on vehicle type and intended body and also purpose for which vehicle is intended select means of fixture accordingly.

Install subframe on standard installed mounting consoles.

Determine the number of attachment points so that braking and side forces can be accepted.



Console attachment with cross member

The correct attachment is crucial for:

- Road handling and operational safety of the vehicle.
- The durability of the chassis frame and body.

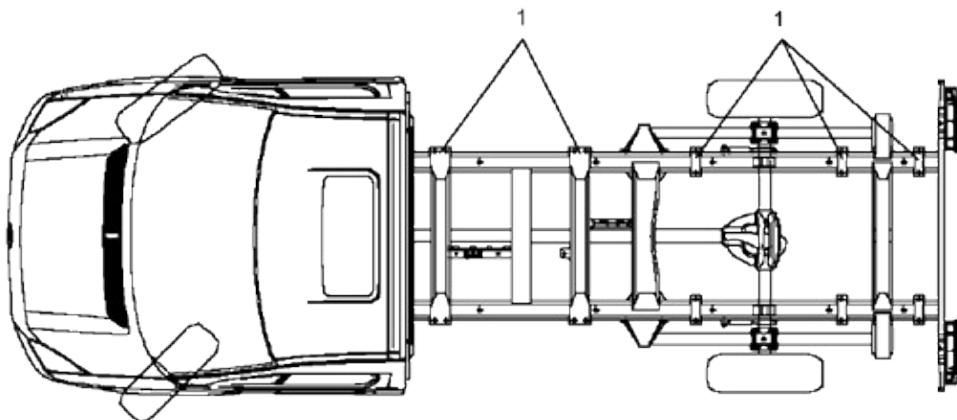
For positive connection, the longitudinal members must be fixed in longitudinal and transverse direction.

On prefabricated subframes, observe tolerances of chassis-frame width (max. +6 / -3 mm).

Compensate for production related frame bending (max. 6 mm) by using washers/shims/plates.

## Positive connection, console attachment

- Movement of the subframe longitudinal member against the chassis longitudinal member is permissible with restrictions.
- Carry out strength calculation for each longitudinal member separately.
- Apportion bending force in accordance with inertia forces.



1 Series production type  
attachment consoles  
(for quantity and weight  
see chassis diagrams)  
downloads

**Note:** Subject to errors and technical amendments. The electronic version of the body guidelines is the decisive source of up-to-date data on body guidelines (online body guidelines). Data status December 2007

## 3.4 Assembly frame

The assembly frame serves exclusively as a means of mounting custom body parts directly. Attachment of the assembly frame to the chassis frame is permissible only by means of bolted connections. The assembly frame must not cover the whole chassis frame as far as the cab - as on the subframe. (See item 3.3.3. Fig: Console attachment with cross member assembly frame).

There are no strength demands on the assembly frame for protection of the chassis frame.

**Note:** Subject to errors and technical amendments. The electronic version of the body guidelines is the decisive source of up-to-date data on body guidelines (online body guidelines). Data status August 2007

### 3.5 Centre of gravity heights

When the completed vehicle is presented for inspection, EC Brakes Directives 71/320/EEC demands computational proof of the centre of gravity height when the vehicle is laden. Stabilisers and reinforced shock absorbers (if available) must be provided for vehicles with a high centre of gravity. Volkswagen AG does not make any statements concerning driving, braking, steering and ESP control qualities of bodies for loads with an unfavourable centre of gravity (e.g. rear, high and side loads). The body manufacturer is responsible for the road safety of the vehicle in the case of such bodies.

The rear stabiliser (OBC) and reinforced shock absorbers are required if the centre of gravity is higher than 960 mm on the Crafter 30 / 35. Maximum permitted centre of gravity height 1050 mm. The reinforced rear stabilizer (OBD) is required in the Crafter 50 if the centre of gravity is higher than 1100 mm.

#### Centre of gravity heights with ESP

Total weight (kg)    Centre of gravity heights Z direction

3000	1100 mm
3500	1100 mm
5000	1100 mm

If  $Z_{SP} > 1100$  mm, ESP must be degraded.

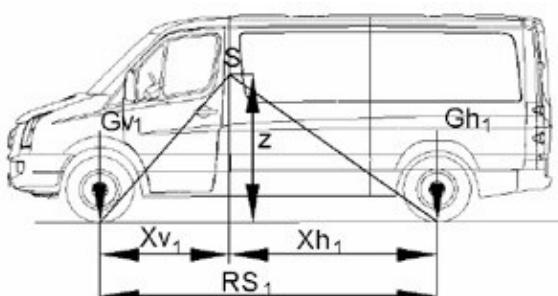
#### 3.5.1 Centre of gravity calculation

Following conversion or installation of the equipment, vehicles must be weighed on a weighbridge in two positions with a load secured and corresponding to the application.

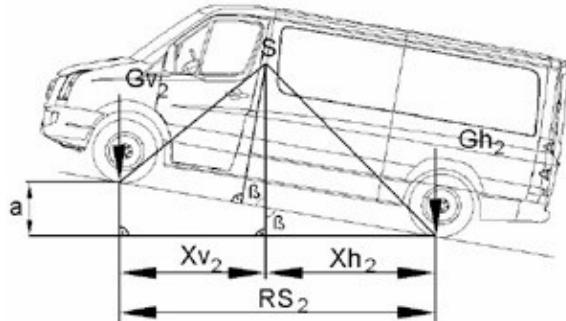
The calculated centre of gravity must not exceed the specified limit values (see point 3.5)

Inflate the tyres to maximum pressure and block the vehicle suspension at the front and rear axle before performing the measurement.

Measure the axle loads with the vehicle level ( $Gv_1$  and  $Gh_1$ ) and the axle loads with an axle raised (we recommend 500 mm) ( $Gv_2$  and  $Gh_2$ ). The wheelbase RS1 (3250 mm, 3665 mm or 4325 mm) is defined by the vehicle type (see order) or must be measured using a tape measure.



## Measurement 1



## Measurement 2

### Measurement with axle raised

$Xv_1, Xv_2$  = Distance from middle of front axle measurement 1 and 2

$Xh_1, Xh_2$  = Distance from middle of rear axle measurement 1 and 2

v = front axle

h = rear axle

### Formular for calculating the centre of gravity

The sum of all moments about a point is equal to zero.

This means:

$$M_h = 0$$

$$(Gv_1 + Gh_1) * Xh_1 = Gv_1 * RS_1 \quad (1)$$

$$Xh_1 = (Gv_1 * RS_1) / (Gv_1 + Gh_1) \quad (2)$$

The new wheelbase  $RS_2$  after raising an axle is calculated as follows:

$$RS_2 = (RS_1^2 - a^2)^{1/2} \quad (3)$$

$Xh_2$  is calculated in the same way as  $Xh_1$ :

$$Xh_2 = (Gv_2 * RS_2) / (Gv_2 + Gh_2) \quad (4)$$

The centre of gravity height z is calculated from:

$$Z = \tan \beta * y \quad (5)$$

The unknown angle  $\beta$  can be calculated from:

$$\cos \beta = a / RS_1 \quad (6) \text{ therefore, the value for } \beta \text{ is}$$

$$\beta = \cos^{-1}(a/RS_1) \quad (7)$$

The necessary y is given by the equation:

$$Y = Xh_1 - (u^2 + Xh_2^2)^{1/2} \quad (8)$$

The values for  $Xh_1$  and  $Xh_2$  have already been calculated with equations (2) and (4), the necessary  $u$  is calculated as follows:

$$a / RS2 = u / Xh2 \quad (9) \text{ and leads to the following equation}$$

$$u = a * Xh2 / RS2$$

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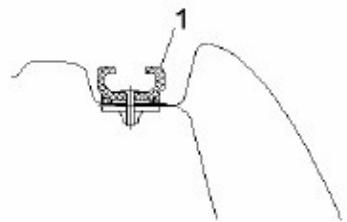
## 3.6 Cab roof design:

Changes to the cab should not impair the function and clearance of assemblies and control equipment, or the strength of supporting structures. If an installation is fitted above the cab, the permissible centre of gravity position and the permissible front axle load must be observed.

### Roof loads/roof load carriers:

#### Panel van and Kombi vehicles:

- Maximum 300 kg (vehicles with high roof 150 kg; none on super high roof) with equal load distribution across entire roof surface.
- **An anti-roll bar must be installed on the front axle.**
- Provision is made on each side of the roof for 6 attachment holes.



Aufnahme Dachträgersystem

For mounting of roof carrier systems, the Crafter can be equipped with C-rails (PR no. 3S4).

1 C-rail roof carrier

#### Vehicles with single or crew cab:

Maximum 100 kg with equal load distribution across entire roof surface.

**Warning:** Note on attachment refers only to panel van and Kombi.

### Roof height increase (synthetic roof):

- Install anti-roll bar on front axle.
- If roof skin and roof braces are cut through and no section frame is possible around the circumference, additional roof braces are necessary.

Quantity:

4 bracing members on wheelbase 3250 mm  
5 bracing members on wheelbase 3665 mm

6 bracing members on wheelbase 4325 mm

Location:

1. Behind cab doors (B-pillars)
2. To centre of sliding door (between B and C-pillar)
3. To centre of vehicle behind sliding door (C-pillar)
4. to 6. Between C-pillar and rear pillar

• Connection of the bracing members to the sidewalls must be in such a way that a positive connection is assured (rigid connection of bracing member and roof frame). The new roof structure must meet the same strength as the standard roof. Refer to the following table for the minimum required inertia moment  $I_x$  of the roof braces.

- In the event of deviations, a permit is required from the department responsible

Roof height	Inertia moment $I_x$ per brace
at same height	33.000 mm <sup>4</sup>
250 mm	40.000 mm <sup>4</sup>
400 mm	65.000 mm <sup>4</sup>
550 mm	86.000 mm <sup>4</sup>

The details were based on an E module of the synthetic roof of 7,000 N/mm<sup>2</sup> and a wall thickness of 4 m.

## Notes:

- Synthetic roofs have only restricted suitability for installation of roof hatches.
- The roof load is limited.

## Elevating roof

- For installation of an elevating roof, 2/3 of the original roof surface must remain in place.
- Do not remove cross members or structurally supporting parts.

## Air guides:

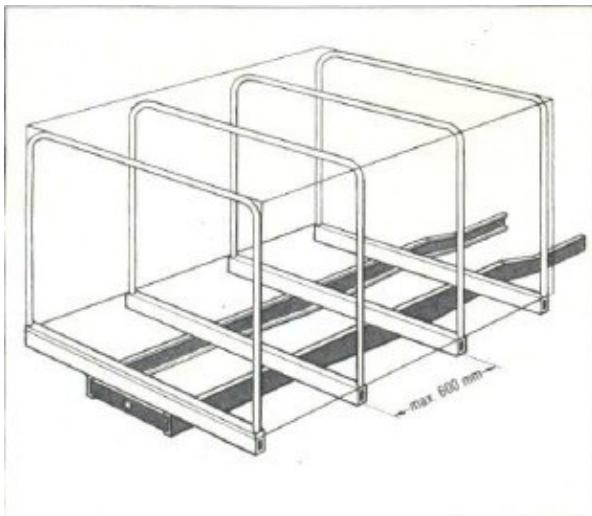
Air guides on the cab roof must be attached at the securing holes in the roof (observe dynamic load).

**Note:** Subject to errors and technical amendments. The electronic version of the body guidelines is the decisive source of up-to-date data on body guidelines (online body guidelines). Data status August 2007

## 3.7 Self-supporting body attachments

On self-supporting body attachments, a subframe with respective longitudinal members is not necessary if the cross members have a maximum clearance of 600 mm. This clearance can be exceeded in the rear axle area.

Self-supporting body attachments must be fixed at all available consoles on the chassis.



**Note:** Subject to errors and technical amendments. The electronic version of the body guidelines is the decisive source of up-to-date data on body guidelines (online body guidelines). Data status August 2007

### 3.8 Drop-side, panel van and box bodies

- The point-to-point transfer of forces should be distributed equally over the chassis via a subframe.
- To do this, it should not be prone to twisting, it should rest on the longitudinal members and run up to the cab (versions as per item 3.3).
- For chassis with crew cab, shortening of the rear frame overhang may be necessary. This should be checked with an axle load calculation.
- High centre of gravity points for custom bodies/body attachments and payload impair the driving and braking response of the vehicle. The chassis can be equipped in the factory with relevant anti-roll bars/shocks.
- There may be a necessity to alter the positions for lighting, markings and exterior mirrors due to width and length of body. These are listed under item 3.12 - 3.15.
- The necessary underbody guard or side protection device is described under item 3.18 and 3.19.

Resistance torque figures of subframe longitudinal members for drop-side bodies:

Model	$W_x$ / longitudinal member in $\text{cm}^3$	
Crafter 30 (3,0t)	17	For profile dimensions see diagram item 3.3.
Crafter 35 (3,5t)		The figures given refer to normal operating
Crafter 50 (5,0t)	30	conditions, without overhang extension.

**Note:** Subject to errors and technical amendments. The electronic version of the body guidelines is the decisive source of up-to-date data on body guidelines (online body guidelines). Data status August 2007

### 3.9 Tipper/tipper bodies

- The rear pivot bearings of the three-sided and rear tip bodies must be located close to the rear axle.
- Make provision for guide brackets for the pivot bearings, so the tipper is guided when lowered.
- The maximum pivot angles and tipper lengths, in consideration of max. body exterior dimensions, are derived from the axle load calculation.
- The ram carrier must be attached to the cross member in the subframe assembly.
- The subframe cross members should be located above the cross members of the vehicle chassis frame.
- On three-sided tipper bodies, the working point of the tipper ram should be placed where possible in front of the centre point of gravity of body and payload.
- Safety  
If necessary, prevent the tipper from creeping down. Prevent unauthorised operation. A control lamp must be connected in the cab as an optical warning (tipper not in driving position).
- Subframe  
The subframe must be manufactured with sufficiently dimensioned steel cross members throughout the structure. Finish rear area to box body and reinforce with diagonal cross. Join subframe relative to load to vehicle chassis frame as per item 3.3.3.
- To fix the sides of the subframe, weld guide plates in the area of the cross members on the subframe.
- Subframe resistance moment figures:

Model	$W_x$ /longitudinal member in cm <sup>3</sup>	
Crafter 30 (3,0t)	30	For profile dimensions see diagram item 3.3. The figures given refer to normal operating conditions, without overhang extension.
Crafter 35 (3,5t)		
Crafter 50 (5,0t)	40	

**Note:** Subject to errors and technical amendments. The electronic version of the body guidelines is the decisive source of up-to-date data on body guidelines (online body guidelines). Data status August 2007



## **Body assembly guidelines Volkswagen Nutzfahrzeuge**

### **The Crafter**

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>

Note: Subject to errors and technical amendments. The electronic version of the body guidelines is the decisive source of up-to-date data on body guidelines <http://www.vwn-aufbaurichtlinien.de>

Data status September 2008

## 4.1 General notes

### General

The damping characteristics, braking and steering system should not be modified. Exceptions must be authorised by Volkswagen AG prior to conversion measures.

### Note:

Changing the steering and braking forces for vehicle conversions for disabled persons is not possible.

### Airbag

In the event of intervention by the custom body manufacturer/coachbuilder in the structure of the vehicle, such as

- Changes to the front end, frame longitudinal members, integral axle carriers and 1st cross member
- Attachment of belt tensioners where there are no B-pillars
- Changes to floor structure in area of airbag triggering device
- Changes to seats and thereby the kinematics of the occupants
- Change to the wiring of the airbag system
- Modification of the system structure
- The gas generator of the curtain airbag can be found in the A-pillar (do not screw on handles or similar).
- Do not carry out any changes to the seat covers where seat airbags are installed
- No changes to the door panel trims (airbag sensors)

the safe function of the airbag and belt tensioner is no longer guaranteed. These components may only be installed if authorisation is given by Volkswagen AG.

### Emissions (exhaust emissions/noise)

In the event of changes to the exhaust emission and noise relevant components (e.g. engine/injection pump/control unit, exhaust system/catalyst, air intake system, tyres, etc.), exhaust gas and noise measurements must be carried out. Observe up-to-date country-specific regulations and directives when doing this.

Parts fitted as standard to reduce emissions should not be removed as a consequence or changed in any way as otherwise the operating certificate will become void.

**Note:** Subject to errors and technical amendments. The electronic version of the body guidelines is the decisive source of up-to-date data on body guidelines (online body guidelines). Data status August 2007

## 4.2 Enclosed panel vans

Body and platform form a self-supporting unit on the Kombi/panel van. Structural parts of this selfsupporting unit should not be removed without replacement. Partition walls do not have a structural function. Modifications other than complete removal are permissible. Only weld body parts for installation or conversion if a bonded connection is not possible.

- Sidewall apertures  
If sections are cut through for the apertures (windows, doors, flaps, ventilation outlets/inlets, etc.), the apertures must be reinforced with a surrounding frame and welded to the sections that have been cut through.
- Roof height increase (synthetic roof)  
see item 3.6 Roof design

### Seat securing points

Seat securing points cannot be retrofitted in the panel van, this is because the securing points lie in the longitudinal and/or cross member.

**Note:** Subject to errors and technical amendments. The electronic version of the body guidelines is the decisive source of up-to-date data on body guidelines (online body guidelines). Data status August 2007

## 4.3 Open panel vans

(Chassis with single/crew cab)

If the wheelbase is changed and in the event of overhang extensions, the material of the extension piece must be the same in quality and size as the vehicle chassis frame (St 12.03). Changes to the structure should not impair the function and clearance of assemblies and control equipment, or the strength of supporting structures.

Apertures in the cab partition must be fitted with a surrounding frame. The remaining struts and cross members must be reinforced with plates and welded to the inserted frame.

The distance between cab and body must be at least 50 mm.

### Frame modifications

- The permissible axle loads must not be exceeded and changes should not affect the minimum front axle load.
- Attach underbody guard in line with series production vehicle.
- Extend subframe up to end of frame.
- Check the function of the tow hitch.
- Reinforcements must be in place for tow hitches if desired.

### 4.3.1. Drilling in frame

The longitudinal members are of the hollow type (hat section). If holes need to be drilled in the members, it may only be done in the specified areas.

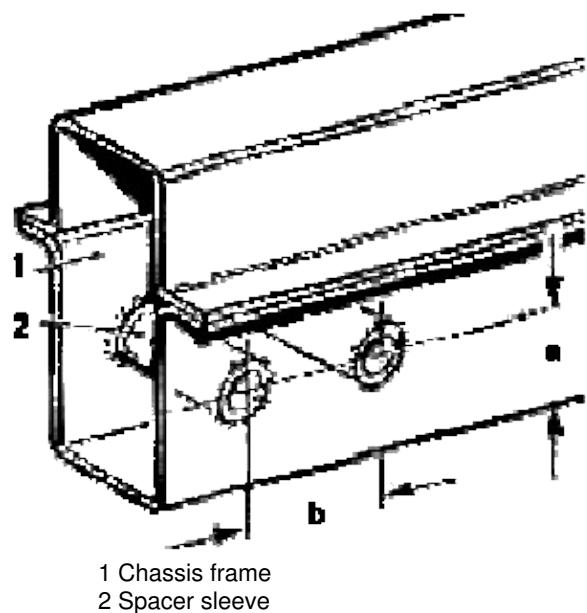
Do not drill:

- In the upper and lower belt of the chassis frame. Exceptions are holes in the rear frame end.
- However, they must not be in the area of parts that serve to support the rear axle and parts attached to the frame.
- In the area of section changes to the frame longitudinal members (frame angle and frame retraction).
- On load distribution points (e.g. in direct vicinity of spring brackets).

In exceptional cases, holes can be made in the web of the frame longitudinal members.

- Distance a: at least 20% of the frame height
- Hole spacing b: at least 50 mm
- Max. hole diameter: 15 mm

After drilling, deburr and ream. Before installation, spacer sleeves must be welded in.



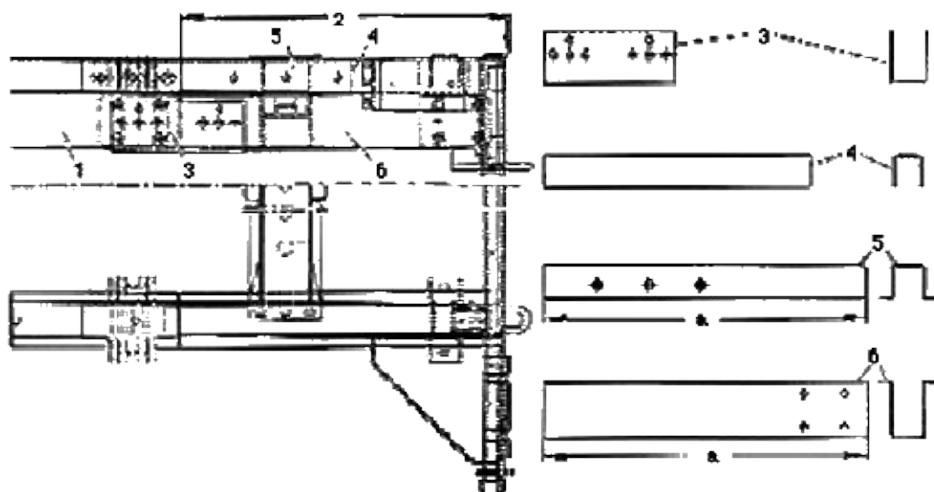
### 4.3.2. Overhang extension

The max. permissible overhang (in relation to wheelbase and permissible overall weight) must be adhered to as per item 2.3.

To achieve this, observe the following:

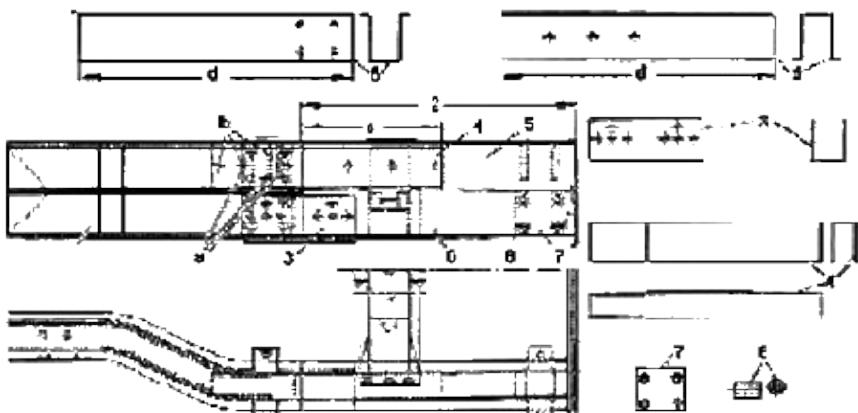
- On frame extensions longer than 350 mm, an additional cross member must be installed.
- The permissible trailer load (as per vehicle registration document) must be checked and reduced as necessary.
- Extend overhang using illustration.

As a preparatory measure ex-factory, extension of the tail light cluster wiring (PR no. 8SE) is available.



## **Crafter 30 3,0t / Crafter 35 3,5t**

- 1 Chassis frame longitudinal member  
 2 Frame extension  
 3 Reinforcement outer  
 4 Reinforcement inner  
 5 Body carrier extension  
 6 Chassis frame longitudinal member extension  
 a dimension determined by custom body manufacturer



Crafter 50 4.6t / 5.0t

- 1 Chassis frame longitudinal member
  - 2 Frame extension
  - 3 Reinforcement outer
  - 4 Reinforcement inner
  - 5 Body carrier extension
  - 6 Chassis frame longitudinal member extension
  - 7 Reinforcement plate at least 2mm
  - 8 Spacer sleeve Rahr 24x4 M-steel or ST 35 NBK
  - a Holes wheelbase 3,550mm
  - b Holes wheelbase 4,025mm
  - c 350mm (wheelbase 3,550mm), 300mm (wheelbase 4,025mm)
  - d Dimension determined by custom body manufacturer

### 4.3.3 Wheelbase modifications

Wheelbase modifications on vehicles with electronic stabilisation programme (ESP) are not permitted.

Extend the wheelbase from the longest standard version. Shorten the wheelbase from the longest standard version. Reinforce the cutting point with panel blocks.

**Wheelbase modifications by offsetting the rear axle are not permissible.**

Cutting points must not be made in the areas of:

- Load distribution points
- Axle guide and axle suspension
- Profile section changes (frame offset, frame retraction)

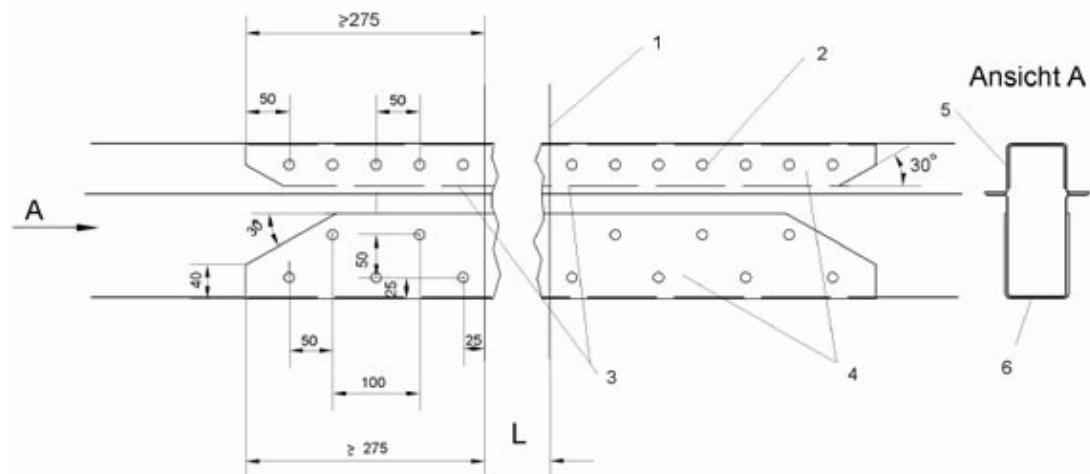
Following wheelbase modifications, the chassis must be reinforced with a subframe throughout the structure.

Resistance moment figures necessary for the subframe:

- Up to max. series production wheelbase 30 cm<sup>3</sup>.
- Increase above max. series production wheelbase by at least 15%.

The wheelbase modification results in alterations to the turning circle and weight specifications.

Wheelbase modifications that lie in the frame of the smallest or largest series production wheelbase need not be submitted for approval.



#### Inserting inlays in frame

1. Separation points welded all round

2. Plug weld, hole diameter 12 mm
3. Material quality of hat profile used
4. Inlay material at least St 12.03, Material thickness 2 - 3 mm
5. Upper belt inlay (inner)
6. Lower belt inlay (outer)

If the overhang extension also involves extension of the assembly frame, the weld seams must be offset by at least 100 mm in line with series production (see illustration).

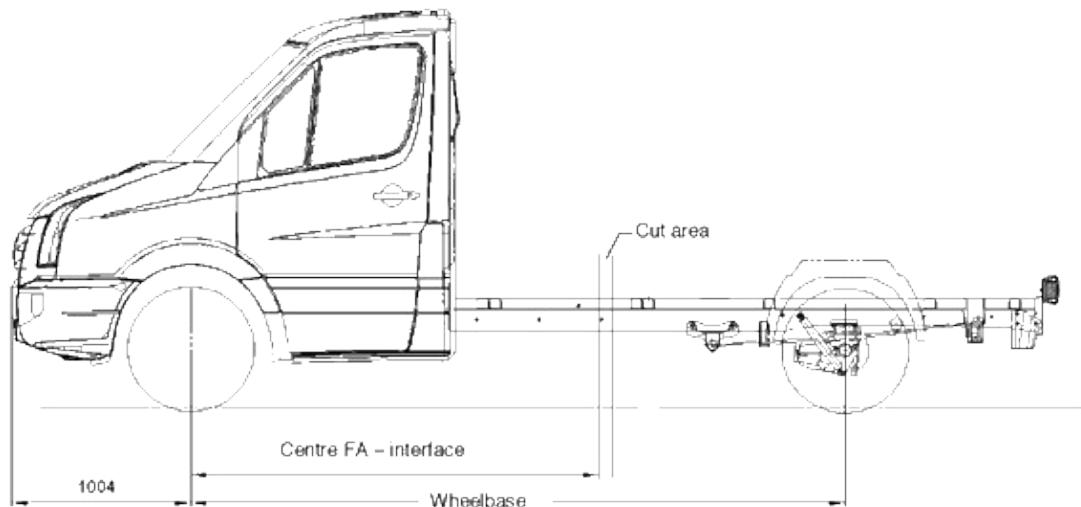
On change to wheelbase, ensure that end of tail pipe is not aimed towards a tyre.

Following wheelbase modifications, the chassis must be reinforced with a full assembly frame.

## Cut area of frame

Figures refer to chassis with cab Distance from centre of front axle

Wheelbase (mm)	Perm. overall weight (kg)	Dimensions (mm)
3665	3500	2285 - 2360
4325	3500	2285 - 2360
3665	4600 / 5000	2205 2905
4325	4600 / 5000	2205 2905



**Note:** Subject to errors and technical amendments. The electronic version of the body guidelines is the decisive source of up-to-date data on body guidelines (online body guidelines). Data status January 2008

## 4.4 Welding on the vehicle/frame

### General

Observe the following when welding with electric equipment:

- Welding on the vehicle chassis frame may only be carried out by specialist personnel.
- Positive and negative terminals of the batteries must be disconnected and covered.
- The earth clamp of the welding unit must be connected directly to the part to be welded. Warning! Do not connect the earth clamp of the welding unit to the assemblies (engine, gearbox, axles, etc.).
- Do not come into contact with electronic component housings (e.g. control units) and electrical wiring with the welding electrode or the earth clamp of the welding unit.
- Connect earth clamp of welding unit to cab where cab is insulated.

Before commencing welding work, cover springs to protect from welding splashes, do not touch springs with weld electrodes or welding tongs

### Warning!

Do not weld:

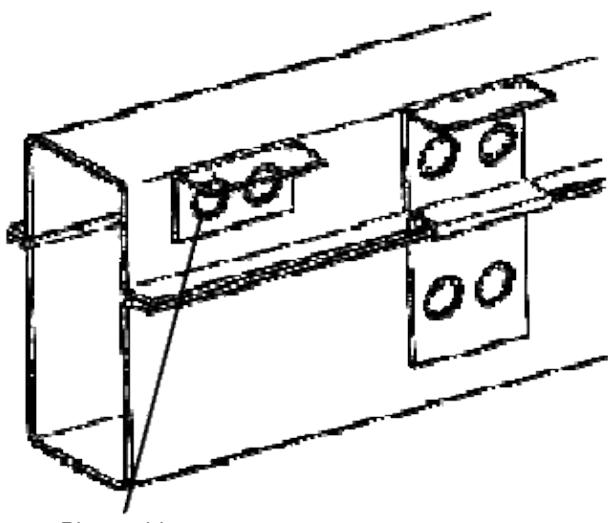
- On assemblies, such as engine, gearbox, axles, etc.
- On vehicle chassis frame (with exception of wheelbase and frame modifications).

### Welding on vehicle frame

Do not weld on the upper and lower belt of the vehicle chassis frame (with exception of wheelbase modifications and frame extensions).

Connect the earth clamp of the welding unit directly to the vehicle part to be welded.

- Use only dry electrodes with lime-based shroud. Electrode diameter 2.5 mm.
- Current rating per mm of electrode diameter maximum 40 A.
- The electrodes may only be welded with direct current via the positive terminal. Welding work should be performed as a rule from the bottom up.
- Shielded-arc welding is permissible.
- Welding rod thickness 1 to 1.2 mm.
- The welding material must have at least the same stretch limit and pulling resistance as the material it is being welded to.
- In order to avoid notches forming as a result of welding burns, grind down weld seams and reinforce with angled section. Avoid weld seams in curve radii. The distance from the weld seams to the outer edges should be at least 15 mm.
- Plug seam welding is only permissible in the neutral zone.
- When work is complete, corrosion protection must be restored.



Plug weld

**Note:** Subject to errors and technical amendments. The electronic version of the body guidelines is the decisive source of up-to-date data on body guidelines (online body guidelines). Data status January 2008

## 4.5 Air intake, exhaust gas recirculation, cooling

### Air intake

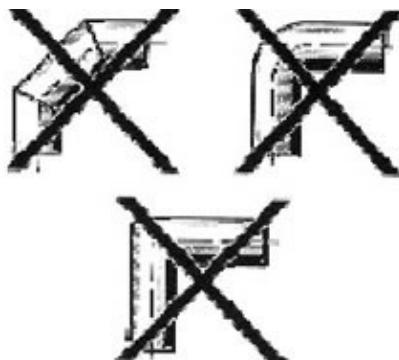
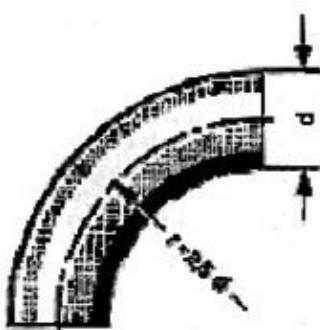
Observe the following if modifications to the engine air intake system are necessary:

- To guarantee the function, the series production parts, such as air cleaner, hoses, mountings (vibration insulation), etc. must be fitted so the series production standard is reached.
- The clean air side and the service indicator connection point must not be altered.
- In the area of the intake opening, do not modify the installation proportions.
- The flow rates in the intake area, in front of and in the air intake channel may not be increased. Do not narrow the free cross section.
- The water separator of the engine air intake system can be affected by even the smallest changes to the area of the intake opening (e.g. radiator grille). Therefore, modifications to this area make it necessary to obtain approval in all instances from the department responsible.

### Exhaust gas recirculation/exhaust system

For changes to the exhaust system, we recommend the use of Volkswagen genuine parts.

- Length and installation position of bendable metal hoses between exhaust manifold and exhaust pipe must not be changed.
- The free cross section of the exhaust pipe after the silencer must not be reduced.
- Maximum pipe bend 90°
- Avoid additional bending of the pipe
- Bend radii 2.5 d.



- Minimum distance from plastic lines, electric cables and spare wheels:  
200 mm on exhaust systems without heat shields,  
80 mm on systems with heat shield plates,  
40 mm on systems with heat shield plates and additional measures.

Additional heat deflection measures are necessary:

- in the area of control elements
- in the area of assemblies, body attachments and installations if they are not made of heat resistant material.

## Cooling:

The cooling system (radiator, radiator grille, coolant circuit, etc.) may not be modified. Sufficient flow of cooling air must be assured.

- Keep air inlet for radiator clear
- Do not attach warning notices, signs, labels or trim parts to the area in front of the radiator.

Make provision for additional assembly cooling equipment.

- Operation at outside temperatures above 35 C°.
- On stationary vehicle and applications where long running times are expected.

## Disc brakes

- The cooling must not be impaired by spoilers beneath the bumper, additional wheel trims or brake disc covers, etc.

## Preparation for 2nd heat exchanger (PR no. 6AF)

It should be noted that if a heat exchanger is retrofitted, the cooling system of the vehicle must be bled completely. A heat exchanger with the following specifications must be used:

Heat output: 8.7 kW

Air mass flow: 360 kg / h

Volumetric flow: 1500 l / h

**Note:** Subject to errors and technical amendments. The electronic version of the body guidelines is the decisive source of up-to-date data on body guidelines (online body guidelines). Data status August 2007

## 4.6 Electrical system

### General information

- With the engine running, do not loosen or remove battery connection terminals.
- Tow vehicle only with batteries connected.
- Batteries should not be charged with a quick charger device unless they have been disconnected from the vehicle electrical system. Positive and negative terminal clamps must be removed.
- Observe operating instructions!
- Installation of electrical consumers.
- Cables routed in the vicinity of exhaust systems must be shrouded to protect against fire.
- Cables must be routed so there is no risk of abrasion.

**Electromagnetic compatibility** In vehicle electrical systems, electrical disturbances are caused by the individual consumers. At Volkswagen AG, the electronic components installed in the factory are checked in the vehicle for their electromagnetic compatibility. If retrofitting electrical or electronic systems, their electromagnetic compatibility should also be checked. The following industrial standards provide the necessary details:

- DIN 40839
- DIN 57879, part 3
- VDE 0879, part 3
- VWTL 965
- VWTL 82066
- VWTL 82166
- VWTL 82366

Furthermore, EMC guideline EC 72/245 version 95/54 EC should be observed.

Further information is available from the department responsible.

**Current draw of auxiliary consumers** If auxiliary consumers are installed retroactively, observe the following:

- Make provision for batteries and alternators available as an option with higher output.
- Do not connect additional consumers to fuses already assigned for another purpose.
- Do not connect additional leads to leads already assigned for another purpose (e.g. with insulation cutting clips).
- Install fuse protection for consumers with additional fuses of sufficient quantity.

**Retroactive installation of auxiliary battery** An auxiliary battery may only be installed in conjunction with an isolator relay and fuses in accordance with the charge current. Auxiliary batteries > 100 Ah must not be connected to the vehicle electrical system. This battery must be assigned exclusively to specific auxiliary consumers, such as auxiliary heater, loading platform or electrical equipment in campers (refrigerator, etc.). If the auxiliary battery is installed in the passenger compartment, venting per central gas ventilation hose must be to the open. If an auxiliary battery is already installed in the base vehicle, no other auxiliary batteries may be connected in parallel.

### Electrical wiring

If extending electrical leads, observe the following:

- Use only FLKR leads with the same cross section and same colour as the series production leads.
- The leads must be shrouded with an insulation hose (with a corrugated hose on HAZMAT vehicles).
- Only attach genuine Volkswagen connectors to the ends of the wires.
- Connection of the electrical lines may be only be carried out using splitter boxes.

- ABS cables may only be extended using genuine Volkswagen cable sets.
- If the structure of the vehicle is modified, routing of the electrical lines must be restored as closely as possible to the original condition.
- If routing modifications become necessary, crossing over sharp edges and routing in enclosed cavities and in the vicinity of moving parts should be avoided.
- Stressing the wiring harness by stretching must be avoided.
- Grommets for cables that pass through equipment, junction boxes or similar components outside the passenger compartment must be watertight.

**Risk of accident** By incorrect intervention in electronic components and their software, these can no longer operate in the way intended. Due to networking of the electronics, other systems may also be affected that were not modified. Malfunctions in the electronics can seriously impair the operational safety of your vehicle. Have work or modifications to electronic components carried out by a qualified specialist workshop that has the necessary skills and knowledge to perform such tasks. Volkswagen recommends a VAG partner for this purpose. Work on safety-relevant systems, in particular, must only be carried out by a qualified specialist workshop. Some safety systems only work when the engine is running. When driving, do not switch the engine off.

## Current draw

The connection of additional, electrical consumers must be by way of the terminal strip for ancillaries installed in the factory (PR no. UF3).

The terminal strip is attached on the inside to the driver seat box (front right as seen in direction of normal travel) and has three connections.

1. Term. D+ 12 V / 10 A
2. Term. 30 12 V / 25 A
3. Term. 15 12 V / 15 A

**Note:** Subject to errors and technical amendments. The electronic version of the body guidelines is the decisive source of up-to-date data on body guidelines (online body guidelines). Data status December 2007



## **Body assembly guidelines Volkswagen Nutzfahrzeuge**

### **The Crafter**

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.

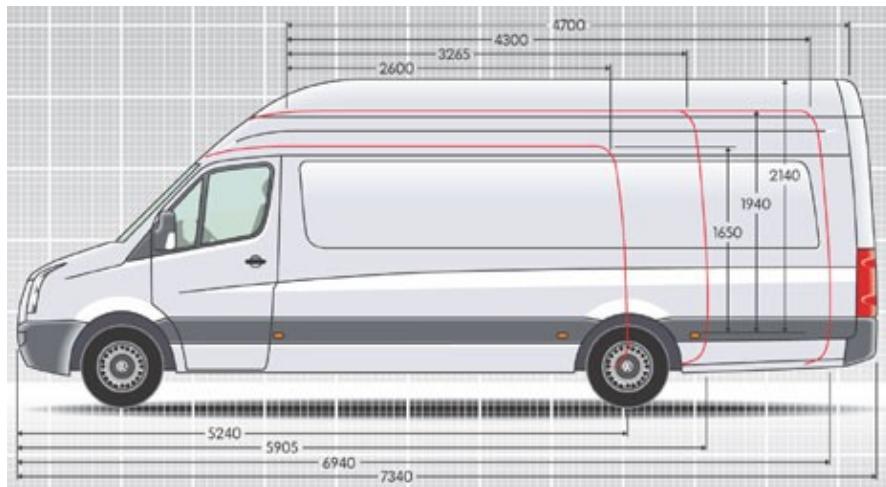
Volkswagen Nutzfahrzeuge  
Brieffach 2965/5  
Postfach 21 05 80  
D - 30405 Hannover  
Fax. +49 (0)511 / 7 98 - 85 00

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

Note: Subject to errors and technical amendments. The electronic version of the body guidelines is the decisive source of up-to-date data on body guidelines <http://www.vwn-aufbaurichtlinien.de>

Data status September 2008

## 5.1 Short wheelbase box van



The individual dimensional drawings are in formats DXF, IGES and TIF. All files are packed in a zip archive. The files can be unpacked using Winzip (PC) or ZipIt (MAC).

Click on the link in question to save the selected file directly to your computer. You can then view and print out the dimension drawing using appropriate software (e.g. CAD system).

### Designation Construction dimensional drawing

Wheelbase 3.250 mm

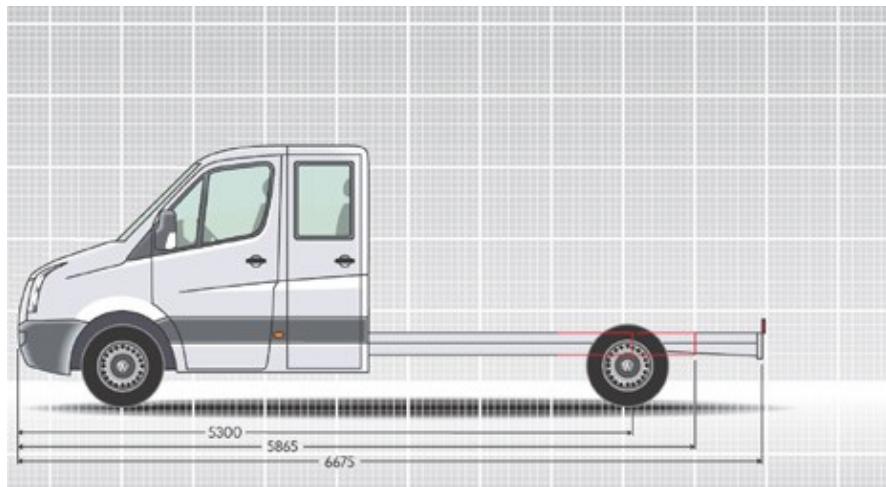
TIF [2E1\\_000\\_011](#), 584 kB

DXF [2E1\\_000\\_011](#), 728 kB

IGES [2E1\\_000\\_011](#), 696 kB

**Note:** Subject to errors and technical amendments. The electronic version of the body guidelines is the decisive source of up-to-date data on body guidelines (online body guidelines). Data status August 2007

## 5.10 Chassis with twin cab and single tyres, medium wheelbase



The individual dimensional drawings are in formats DXF, IGES and TIF. All files are packed in a zip archive. The files can be unpacked using Winzip (PC) or ZipIt (MAC).

Click on the link in question to save the selected file directly to your computer. You can then view and print out the dimension drawing using appropriate software (e.g. CAD system).

### Designation Construction dimensional drawing

Wheelbase 3.665 mm

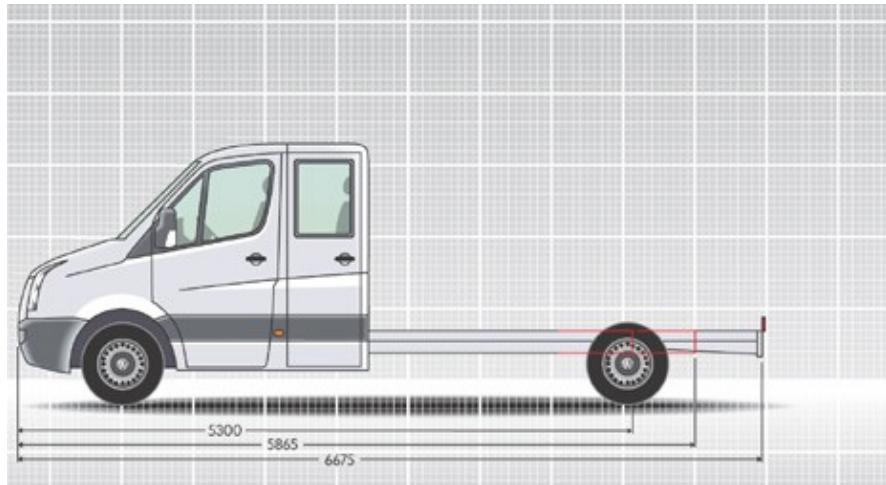
TIF [2E3 000 011 D](#), 384 kB

DXF [2E3 000 011 D](#), 800 kB

IGES [2E3 000 011 D](#), 936 kB

**Note:** Subject to errors and technical amendments. The electronic version of the body guidelines is the decisive source of up-to-date data on body guidelines (online body guidelines). Data status August 2007

## 5.11 Chassis with twin cab and single tyres, long wheelbase



The individual dimensional drawings are in formats DXF, IGES and TIF. All files are packed in a zip archive. The files can be unpacked using Winzip (PC) or ZipIt (MAC).

Click on the link in question to save the selected file directly to your computer. You can then view and print out the dimension drawing using appropriate software (e.g. CAD system).

### Designation Construction dimensional drawing

Wheelbase 4.325 mm

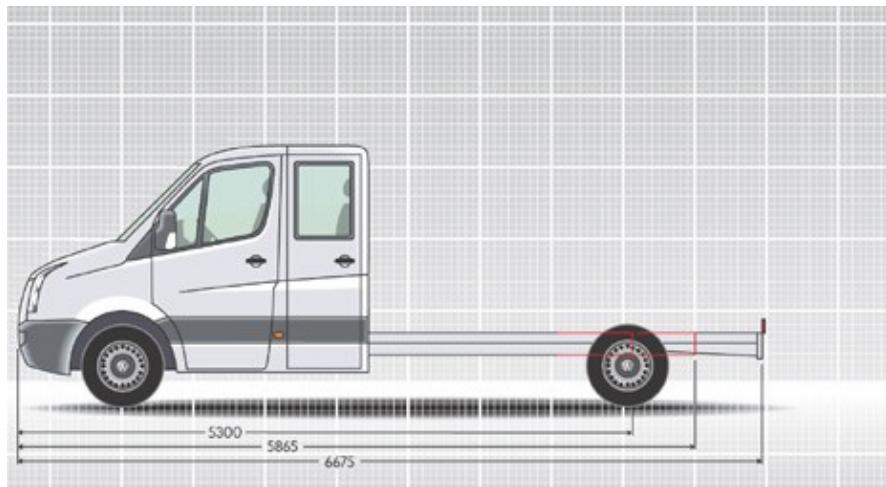
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DXF [2E3 000 011 E](#), 696 kB

IGES [2E3 000 011 E](#), 800 kB

**Note:** Subject to errors and technical amendments. The electronic version of the body guidelines is the decisive source of up-to-date data on body guidelines (online body guidelines). Data status August 2007

## 5.12 Chassis with twin cab and twin tyres, medium wheelbase



The individual dimensional drawings are in formats DXF, IGES and TIF. All files are packed in a zip archive. The files can be unpacked using Winzip (PC) or ZipIt (MAC).

Click on the link in question to save the selected file directly to your computer. You can then view and print out the dimension drawing using appropriate software (e.g. CAD system).

### Designation Construction dimensional drawing

Wheelbase 3.665 mm

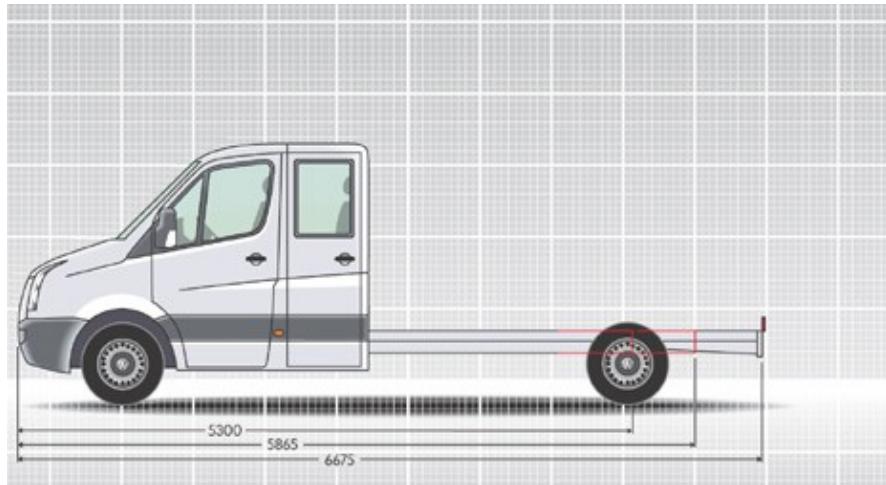
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DXF [2E3 000 011 L](#), 872 kB

IGES [2E3 000 011 L](#), 976 kB

**Note:** Subject to errors and technical amendments. The electronic version of the body guidelines is the decisive source of up-to-date data on body guidelines (online body guidelines). Data status August 2007

## 5.13 Chassis with twin cab and twin tyres, long wheelbase



The individual dimensional drawings are in formats DXF, IGES and TIF. All files are packed in a zip archive. The files can be unpacked using Winzip (PC) or ZipIt (MAC).

Click on the link in question to save the selected file directly to your computer. You can then view and print out the dimension drawing using appropriate software (e.g. CAD system).

### Designation Construction dimensional drawing

Wheelbase 4.325 mm

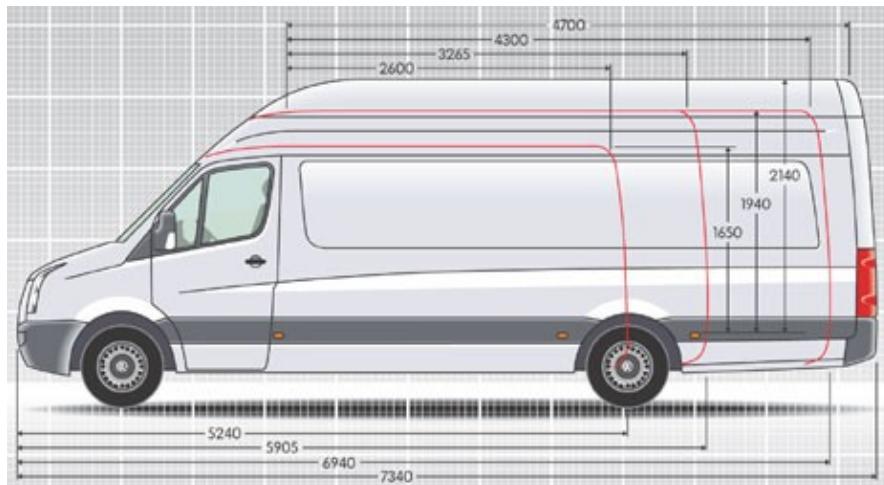
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DXF [2E3 000 011 M](#), 760 kB

IGES [2E3 000 011 M](#), 856 kB

**Note:** Subject to errors and technical amendments. The electronic version of the body guidelines is the decisive source of up-to-date data on body guidelines (online body guidelines). Data status August 2007

## 5.2 Medium wheelbase box van



The individual dimensional drawings are in formats DXF, IGES and TIF. All files are packed in a zip archive. The files can be unpacked using Winzip (PC) or ZipIt (MAC).

Click on the link in question to save the selected file directly to your computer. You can then view and print out the dimension drawing using appropriate software (e.g. CAD system).

### Designation Construction dimensional drawing

Wheelbase 3.665 mm

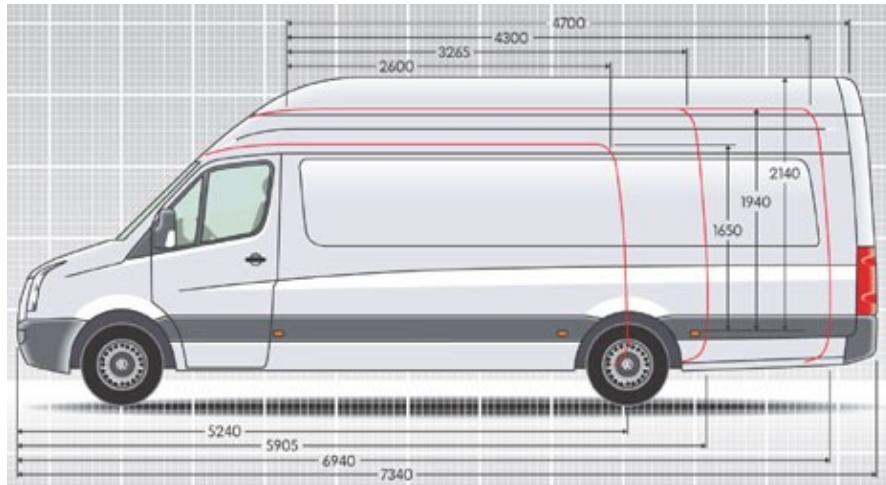
TIF [2E1\\_000\\_011\\_A, 640 kB](#)

DXF [2E1\\_000\\_011\\_A, 776 kB](#)

IGES [2E1\\_000\\_011\\_A, 736 kB](#)

**Note:** Subject to errors and technical amendments. The electronic version of the body guidelines is the decisive source of up-to-date data on body guidelines (online body guidelines). Data status August 2007

## 5.3 Long wheelbase box van



The individual dimensional drawings are in formats DXF, IGES and TIF. All files are packed in a zip archive. The files can be unpacked using Winzip (PC) or ZipIt (MAC).

Click on the link in question to save the selected file directly to your computer. You can then view and print out the dimension drawing using appropriate software (e.g. CAD system).

### Designation Construction dimensional drawing

Wheelbase 4.325 mm

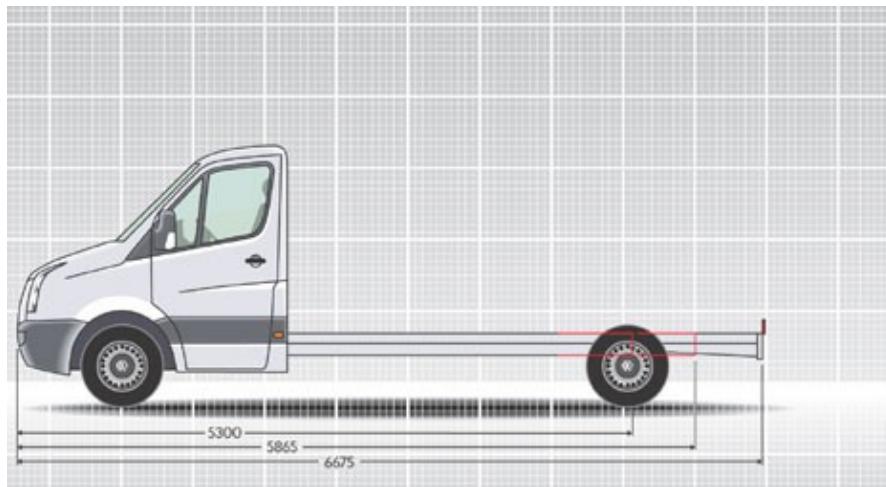
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DXF [2E1\\_000\\_011\\_B](#), 832 kB

IGES [2E1\\_000\\_011\\_B](#), 792 kB

**Note:** Subject to errors and technical amendments. The electronic version of the body guidelines is the decisive source of up-to-date data on body guidelines (online body guidelines). Data status August 2007

## 5.4 Chassis with single tyres, short wheelbase



The individual dimensional drawings are in formats DXF, IGES and TIF. All files are packed in a zip archive. The files can be unpacked using Winzip (PC) or ZipIt (MAC).

Click on the link in question to save the selected file directly to your computer. You can then view and print out the dimension drawing using appropriate software (e.g. CAD system).

### Designation Construction dimensional drawing

Wheelbase 3.250 mm

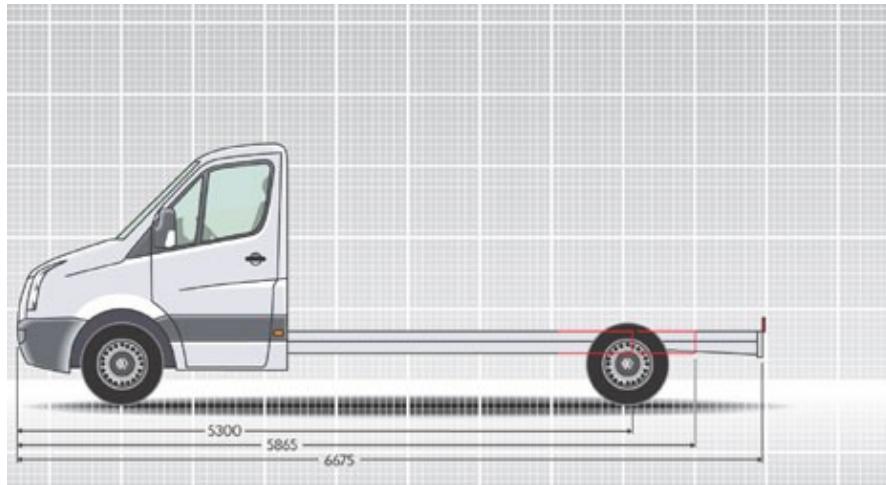
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DXF [2E3 000 011](#), 712 kB

IGES [2E3 000 011](#), 840 kB

**Note:** Subject to errors and technical amendments. The electronic version of the body guidelines is the decisive source of up-to-date data on body guidelines (online body guidelines). Data status August 2007

## 5.5 Chassis with single tyres, medium wheelbase



The individual dimensional drawings are in formats DXF, IGES and TIF. All files are packed in a zip archive. The files can be unpacked using Winzip (PC) or ZipIt (MAC).

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### Designation Construction dimensional drawing

Wheelbase 3.665 mm

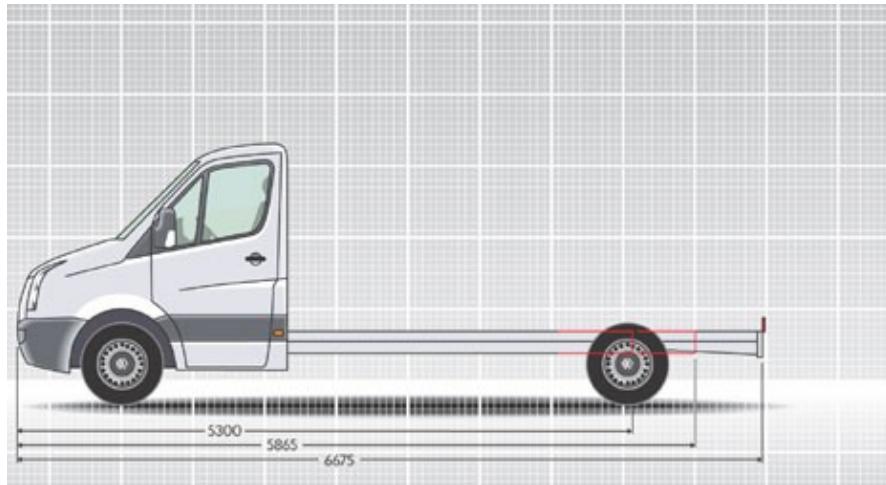
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IGES [2E3 000 011 A, 1 MB](#)

**Note:** Subject to errors and technical amendments. The electronic version of the body guidelines is the decisive source of up-to-date data on body guidelines (online body guidelines). Data status August 2007

## 5.6 Chassis with single tyres, long wheelbase



The individual dimensional drawings are in formats DXF, IGES and TIF. All files are packed in a zip archive. The files can be unpacked using Winzip (PC) or ZipIt (MAC).

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### Designation Construction dimensional drawing

Wheelbase 4.325 mm

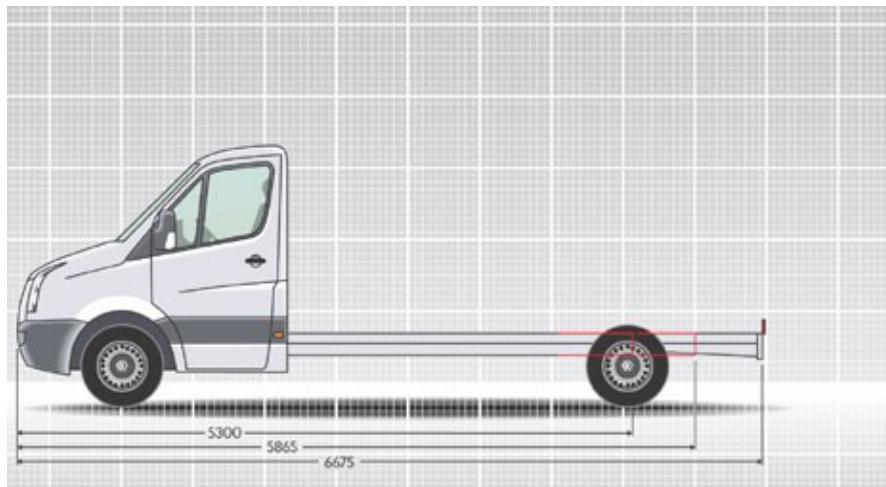
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DXF [2E3 000 011 B](#), 664 kB

IGES [2E3 000 011 B](#), 776 kB

**Note:** Subject to errors and technical amendments. The electronic version of the body guidelines is the decisive source of up-to-date data on body guidelines (online body guidelines). Data status August 2007

## 5.7 Chassis with twin tyres, medium wheelbase



The individual dimensional drawings are in formats DXF, IGES and TIF. All files are packed in a zip archive. The files can be unpacked using Winzip (PC) or ZipIt (MAC).

Click on the link in question to save the selected file directly to your computer. You can then view and print out the dimension drawing using appropriate software (e.g. CAD system).

### Designation Construction dimensional drawing

Wheelbase 3.665 mm

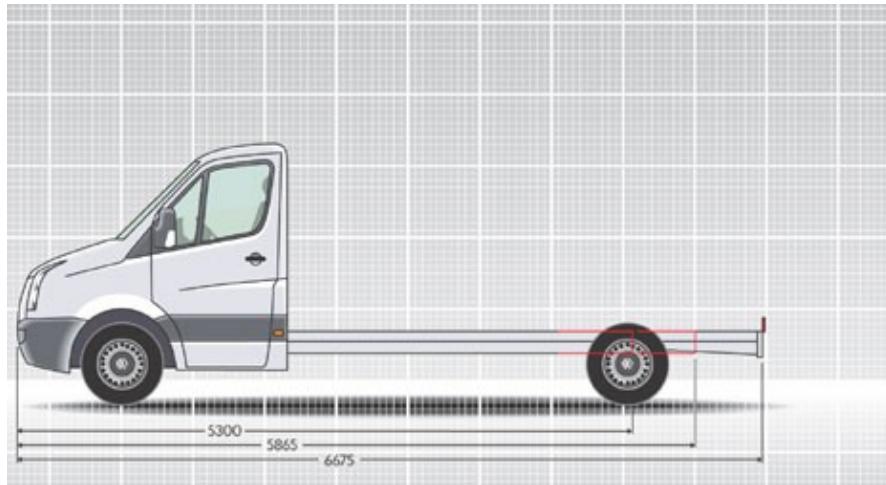
TIF [2E3 000 011 G, 384 kB](#)

DXF [2E3 000 011 G, 608 kB](#)

IGES [2E3 000 011 G, 696 kB](#)

**Note:** Subject to errors and technical amendments. The electronic version of the body guidelines is the decisive source of up-to-date data on body guidelines (online body guidelines). Data status August 2007

## 5.8 Chassis with twin tyres, long wheelbase



The individual dimensional drawings are in formats DXF, IGES and TIF. All files are packed in a zip archive. The files can be unpacked using Winzip (PC) or ZipIt (MAC).

Click on the link in question to save the selected file directly to your computer. You can then view and print out the dimension drawing using appropriate software (e.g. CAD system).

### Designation Construction dimensional drawing

Wheelbase 4.325 mm

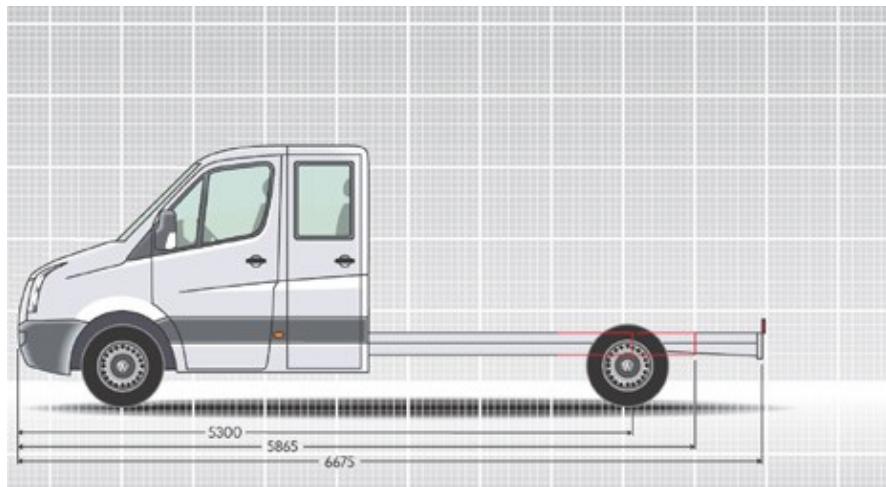
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DXF [2E3 000 011 H](#), 624 kB

IGES [2E3 000 011 H](#), 736 kB

**Note:** Subject to errors and technical amendments. The electronic version of the body guidelines is the decisive source of up-to-date data on body guidelines (online body guidelines). Data status August 2007

## 5.9 Chassis with twin cab and single tyres, short wheelbase



The individual dimensional drawings are in formats DXF, IGES and TIF. All files are packed in a zip archive. The files can be unpacked using Winzip (PC) or ZipIt (MAC).

Click on the link in question to save the selected file directly to your computer. You can then view and print out the dimension drawing using appropriate software (e.g. CAD system).

### Designation Construction dimensional drawing

Wheelbase 3.250 mm

TIF [2E3 000 011 C](#), 352 kB

DXF [2E3 000 011 C](#), 880 kB

IGES [2E3 000 011 C](#), 840 kB

**Note:** Subject to errors and technical amendments. The electronic version of the body guidelines is the decisive source of up-to-date data on body guidelines (online body guidelines). Data status August 2007

# **Body builder guidelines Crafter**

**Body builder guidelines**

**Subject to modifications**

**Edition September 2008**

**Internet: [www.volks-wagen-nutzfahrzeuge.de](http://www.volks-wagen-nutzfahrzeuge.de)**

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