OF 1624L/1624 Bus Chassis – Bodybuilding Guidelines

BHARATBENZ

Guidelines and Precautions

1904GL01H

Daimler India Commercial Vehicles Pvt. Ltd.,as the manufacturer of BharatBenz vehicles, publishes this body/equipment mounting directive to provide body manufacturers with important technical information about the basic vehicle. This information must be observed by the body manufacturer in the production of bodies and equipment, fittings and modifications for BharatBenz vehicles. Due to the large number of body manufacturers and body types, Daimler India Commercial Vehicles Pvt. Ltd., cannot take into account all the possible modifications to the vehicle, e.g. performance, stability, load distribution, center of gravity and handling characteristics, that may result from the design of attachments, bodies, equipment or modifications. For this reason, Daimler India Commercial Vehicles Pvt. Ltd., can accept no body manufacturer liability for accidents or injuries sustained as a result of such modifications to the vehicles if such modifications have a negative impact on the overall vehicle. Accordingly, Daimler India Commercial Vehicles Pvt. Ltd., will only assume liability as vehicle manufacturer within the scope of the design, production and instruction services which it has performed itself. The body manufacturer is bound to ensure that its bodies and equipment, fittings and modifications are themselves not defective, nor capable of causing defects or hazards to the overall vehicle. If this obligation is violated in any way, the body manufacturer shall assume full product liability.

Daimler India Commercial Vehicles Pvt. Ltd., does not issue body/equipment approval certificates for bodies not manufactured by BharatBenz. These directives only supply important information and technical specifications to body manufacturers explaining how to handle the product. These body/equipment mounting directives are primarily intended for the professional manufacturers of bodies, equipment, fittings and modifications for our vehicles. As a result, these body/equipment mounting directives assume that the body manufacturer has suitable background knowledge. If you intend to mount attachments, bodies and equipment on or carry out modifications to our vehicles, please be aware that certain type of work (e.g. welding work on chassis components) may only be carried out by qualified personnel. This will avoid the risk of injury while also ensuring that the degree of quality required for the attachments, bodies, equipment and modifications is given.

Illustrations and schematic drawings are examples only and serve to explain the texts and tables. References to regulations, standards, directives etc. are given in keywords and serve for information only. Additional information is available from any of the Daimler India commercial Vehicles Pvt Ltd authorized Dealers or Service Centers.

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Mechanical part

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- Cooling system
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- Brake system
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- Fuel system
- Gearbox & shifting system
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- Climate control
- Maintenance & access
- Ergonomics
- Miscellaneous

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1.Official approval

1.1 Dimensions

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For the dimensioning of the bodies, the following basic dimensions must be taken into account (values only for initial reference):

Tab1- Basic dimensions

(mm)	OF 1624/OF 1624L
Wheelbase	5950
Front overhang	2305
Rear overhang	3510
Overall length	11765

Important:

As a safety measure, the technical limitations of the chassis always prevail over local legal values for the application of ready-made vehicles.

For the approval of the body dimensioning (length, wheelbase and overhangs), it is necessary that the technical and legal limits of total and per axle load capacity of the chassis must not exceeded, considering all operating and loading conditions (dynamic and static). Refer to the chapter “Admissible Load per Axle” page 08.

These chassis has been developed to meet several body building conditions, making possible the best relations between the weights and the body dimensions. However, if it is necessary to change the dimensions of the wheelbase, it is mandatory to present a technical proposal for Daimler Buses India. approval in advance.

For the OF chassis, the rear overhang dimension is technically limited by 60% of the wheelbase value to ensure the vehicle drivability according to an adequate weight distribution.

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1.Official approval

1.1 Dimensions

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During the dimensioning of the front and rear overhangs take into consideration the legal limits and the local operation conditions in order to meet the approach and departure angles specifications.

Please refer to the proposal drawings specific for other dimensions.

As the proposal drawing numbers may include different versions of the same model chassis, we use the “ZGS” numbering to establish the difference between them. Always check if the proposal drawing corresponds to the version that will be assembled.

Drawings offered for reference:

OF 1624L	A 834 000 04 99

Remark:

Max. Body width allowed is 2600mm for OF1624/1624L Chassis
For other drawings contact BBA of Daimler Buses India

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1.2 Use of BharatBenz trademarks

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The “BharatBenz Logo”, and the written expression “BharatBenz” are Daimler Buses India trademarks. The following notes, referring to the use of these trademarks, embrace a worldwide level for body builders that install a body not made by Daimler on a BharatBenz chassis:

• The BharatBenz logo is to be attached only on the front of the body, centered at body height for the identification of the chassis. The name of the body maker has to be attached at a distance from the BharatBenz, referring to the body maker, and according to the drawings in the following pages.

• The written “BharatBenz letterings” has to be used for the identification of the chassis at the front & rear part, The name of the body maker has to be always attached at a distance from the written “BhararBenz expression” (see drawings).

Therefore, the BharatBenz chassis are always supplied with the chrome plated BharatBenz Logo and the chrome finish BharatBenz written expression for the identification of the chassis. This chrome finish logo is attached by the body maker, to the body front end at chassis height, in name of Daimler Buses or its affiliated companies. The same applies to the attachment of the written BharatBenz expression to the rear body end at a height below the rear glass. (see drawings)

The BharatBenz trademarks cant be used to identify the chassis, if the complete vehicle does not comply with the quality specifications contained in the Daimler Buses guidelines, for body makers.

• Specific Daimler buses names, as Mercedes-Benz, CITARO, TRAVEGO, SHD etc., for example, cant be attached to the body. The body maker can only use his own type designation, which should not permit any confusion with the specific Daimler Buses names.

• The BharatBenz key, Fuel caps and steering wheel are marked with the BharatBenz by the manufacturer and are part of the chassis delivery scope. Interior elements (for ex., seats, ashtrays, roof interior, etc.), which are not integrated by the chassis manufacturer, are forbidden to be marked with BharatBenz trademarks.

Official approval

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The bodybuilders not authorized to use the original design for the body, or to copy the original design or elements of the original design. The body maker will have to create an independent design, whose appearance cant be confused with the original Daimler design. The use of original BharatBenz parts, with significant design, such as mirrors, headlights and other elements, require, therefore, the express approval from Daimler Buses or from its affiliated companies.

• The bodybuilder commits himself to permit the necessary monitoring of the product and process of the bus body quality, by a consultant of the Daimler Buses body builder/Affiliated company. The acceptance of the body by the body maker consultant is not to be considered, under any circumstances, as a reduction of responsibility of the body maker on the product/ legislation/liability on the body. The maker of the body will also be made responsible for the chassis, under the aspects of responsibility on the product, should he not attain himself to the Daimler body building guidelines and, thus, compromising the performance of the chassis.

Any and all markings of bus bodies, with BharatBenz trademarks, that exceed these marking guidelines, require a separate trademark licensing agreement with Daimler Buses and a written authorization from Daimler Buses.

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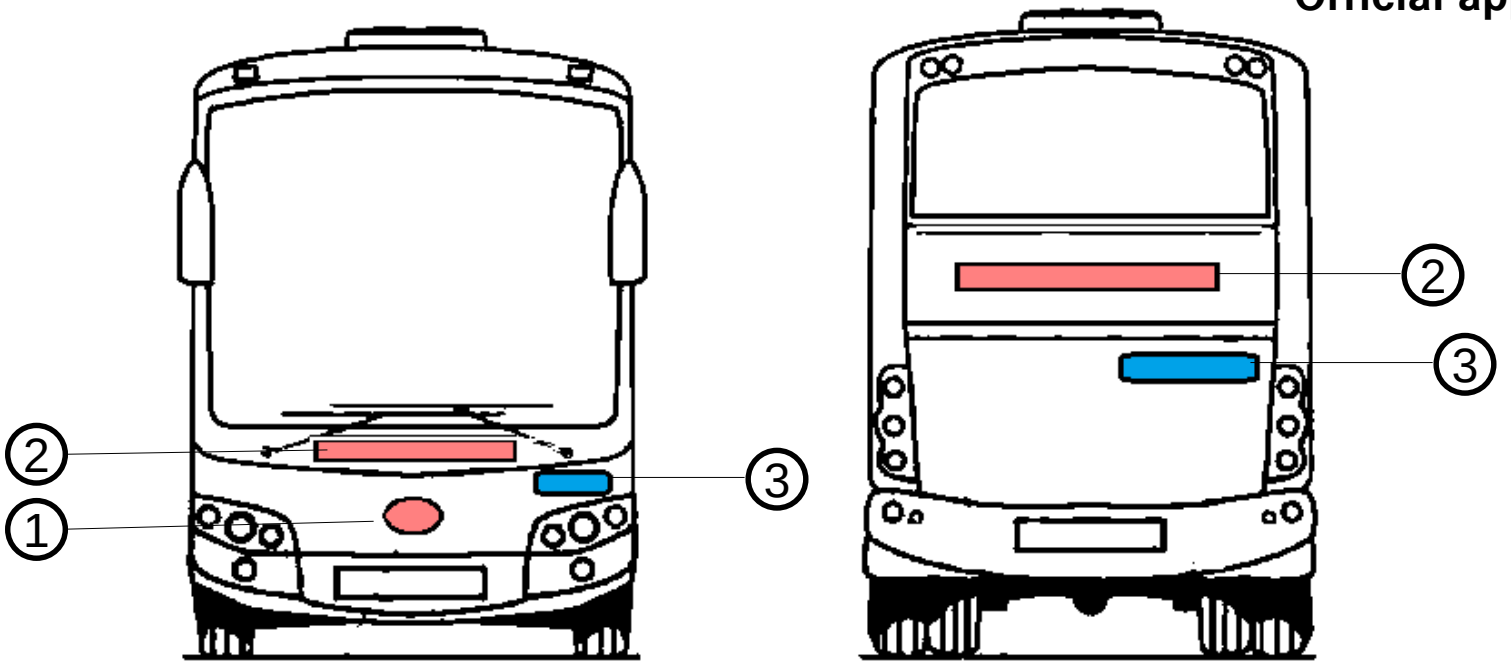
Official approval



Front View

Rear View

Pink colored area: Protected area for BharatBenz trademark.
This space is not to be used for the attachment of any other designations.

1- Recommended position for the BharatBenz Logo.
2- Recommended position for the BharatBenz Letters.
3- Recommended position for the Bodybuilder trademarks.

Blue colored area: The space other than protected areas (pink color) can be used by the body builder for Body Manufacturer logo/ trademark within the scope of the brand directives.

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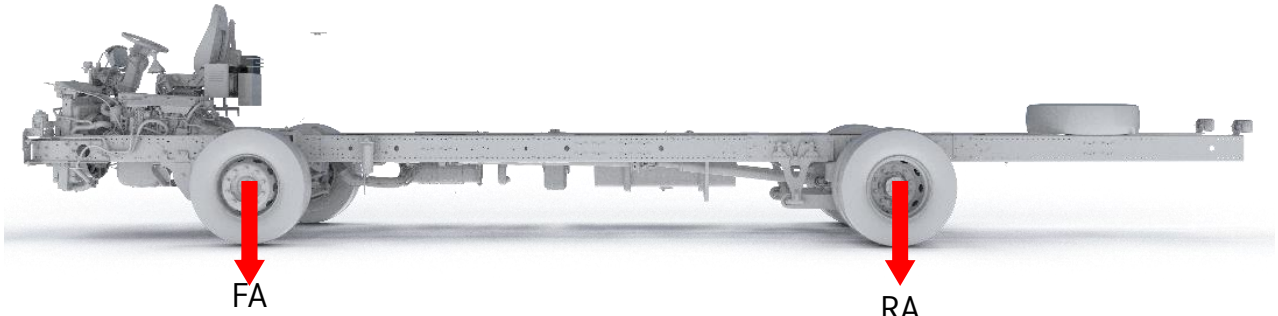
2 Chassis weight

The weight values presented below are only for reference. For the adequate dimensioning of the body, the correct weight values must be established according to the chassis composition.



Frame weightB00.01-0142-10
FA - Front axle
RA - Rear axle

***Tab2*- Weight reference values BSVI chassis**

Chassis	Front axle (kg)	Rear axle (kg)
OF 1624L (Non-Retarder)	3225	2425
OF 1624L (Retarder)	3375	2525

OF1624/1624L: Without body, with full 380ltr. fuel reservoir, with G86 SAEIII gearbox, without driver, without spare wheel, without fire extinguisher and toolbox, with "AdBlue®" 51ltr. tank (holding capacity of tank is 35 liters).

Remark:

Reference values: may vary due to the installed accessories or to the chassis composition

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3 Loads allowed per axle

3.1 Loads allowed per axle

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The OF chassis frames are dimensioned to form a "single" structural set together with the body. The joining points between the body and the chassis must be distributed to avoid concentration of tensions, and that duly absorbs all the strains applied on the set.
The Body Builder must ensure that all the interface points and those that are subject to strains are built duly embedded pursuant to the guidelines issued by Daimler Buses India
The admissible technical loads per axle for the chassis are as follows:

Tab3- Allowed technical loads

[kg]	OF 1624	OF 1624L
Front axle	6500	6500
Rear axle	10200	10200
Total	16700	16700

For the use of other types of tires, please check the Chassis manufacturer's specifications with regard to the load capacity limit and inflation pressure.

The Body Builder must also observe the weight specifications mentioned in the corresponding law. When the technically admissible values and the legal admissible values differ, the one that presents the smallest value must prevail.

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Gross Vehicle Weight Rating (GVWR) = Chassis + Body + Load (passengers + luggage)

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3 Loads allowed per axle

3.2 Admissible loads per axle

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To ensure the drivability of the vehicles in all operation conditions: unladen, with partial loads or fully loaded at its GVWR limit, the Body Builder must plan and ensure the building of the body with a load distribution plan that makes possible that the static load on the front steering axle(s), is equal or higher than the one specified in the table presented below.

Tab 4 - Admissible loads per axle

Parameter	Description	**OF (All)**
Unladen	with the vehicle empty/without any load	25%
Laden (GVWR)	with the vehicle completely loaded /GVWR	25%

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4 Chassis frame

4.1 Arrangement

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The OF chassis have a single frame concept, of the "ladder type" and with cross members fastened by rivets or bolts.

Chassis frame B31.00-0999-22

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4 Chassis frame

4.2 Chassis material

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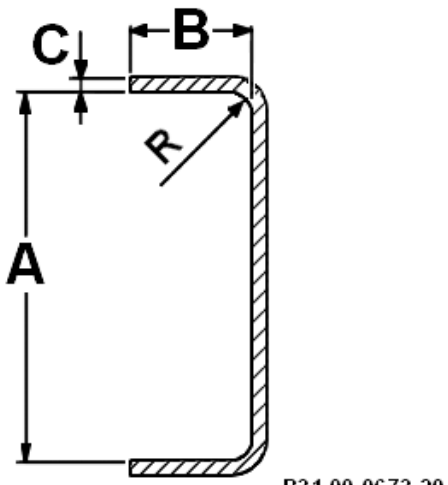
The OF chassis have a single frame concept, of the "ladder type" and with cross members fastened by rivets or bolts.



Side member dimensions

Dimensions

A. 241 mm
B. 66,5 mm
C. 7 mm
R 9 mm

Structure materials:

Tab5- Structure materials

Chassis	Material	Equivalent
OF All	BSK 46 Stahl EN10149-2 1.0984	NBR 6665 LNE 50

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5 Chassis modifications and adjustments

5.1 First cross member adjustment

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No changes or repositioning are possible for the first cross member of the OF chassis.

Remark:

The first crossmember was not designed to attach towing hitch/hook

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5 Chassis modifications and adjustments

5.2 Driver's Cockpit

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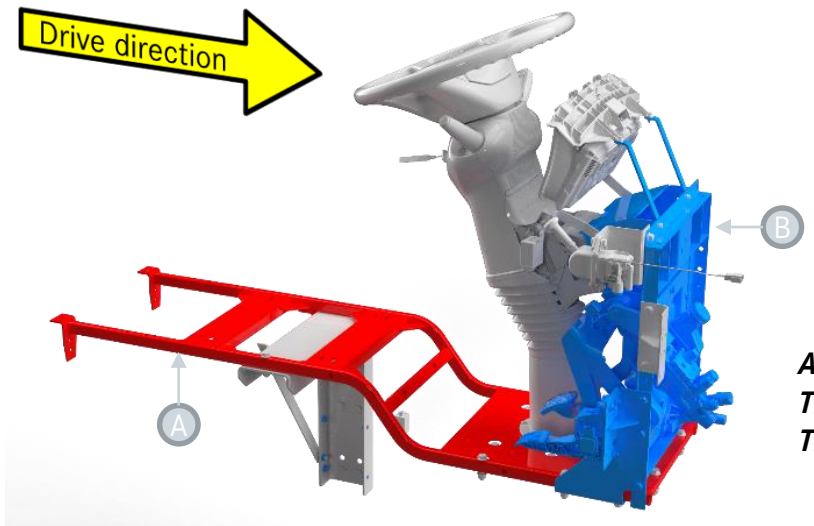
The OF chassis do not make possible alterations in the driver ergonomics or its position.

Remark:

Integrate the front panel (B) and the floor (A) of the podest to the body structure:



Driver cockpit

Arrow - Direction of travel
The red area - May be modified or replaced by the Body Builder
The blue area - Must not be modified or replaced by the Body Builder

5 Chassis modifications and adjustments

5.3 Vertical adjustment of front overhang

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The longitudinal members are fixed and cannot be adjusted.

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5 Chassis modifications and adjustments

5.4 Wheelbase modification

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Wheelbase modifications are not allowed for OF 1624L/1624 chassis.

Remark:

Regarding OF chassis, the removal of the central part of the vehicle frame is not allowed to install the feed-through type luggage compartment in the wheelbase region.

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5 Chassis modifications and adjustments

5.5 Rear overhang extension

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The extension of the rear overhang of the OF chassis is allowed within the admissible weight limits are observed (legal and technical) and the constructive limits for the rear overhang. Take into consideration that the departure angle must be kept within the established limits.

Remark:

A cross member must be mounted at the rear end, even if the frame extension and/or towing coupling have not been planned..

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The extension of the vehicle frame must be done according to the following technical prescriptions:

- In the preparation of the extension, the Body Builder must provide the addition of cross members, in adequate quantity and distribution to keep unchanged the vehicle frame rigidity.
- The material used for the frame extension and for the preparation of the new cross members, fastening plates and reinforcement pieces, must have thickness and quality equivalent to those of the original vehicle frame, as described in the chapter “Chassis Material” page ***.
- The welding must be carried out as recommended in the chapter 3.13 - Welding techniques/welding methods - of the manual Guidelines for Body Building - “General Manual".
- After welding the vehicle frame longitudinal members, apply reinforcements symmetrically in both sides of the frame. To avoid cracks in the spot weld and to preserve the longitudinal members elasticity, weld or bolt the reinforcement pieces to the frame in the shape of beveled corner plates and, at the ends, forming a common face with the upper or lower tabs of the longitudinal member. Keep enough distance between the longitudinal member web and the upper and lower reinforcement corner plates.

6 Chassis alignment and leveling

6.1 Chassis Levelling:

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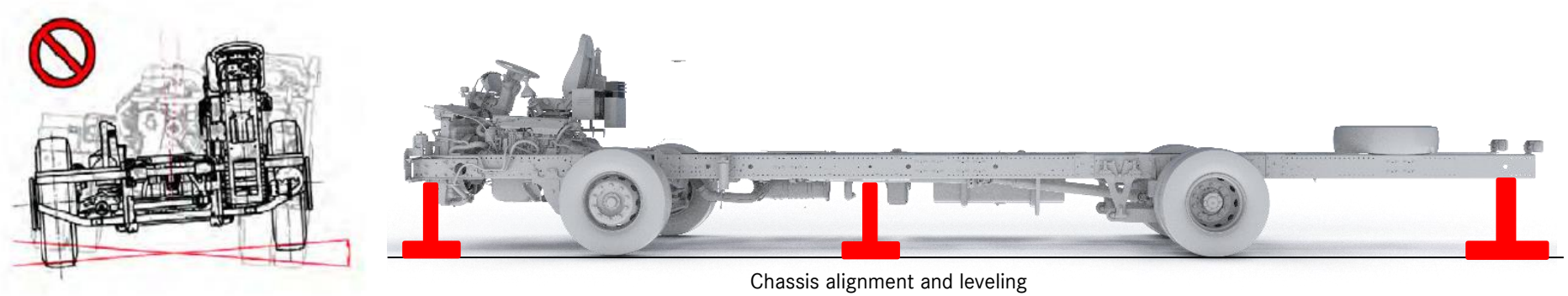
The OF chassis must be supported on a flat horizontal floor, duly with chokes and supported on racks as per the figure below. They must not be subject to strains and stresses caused by the weight of the engine and the transmission.

The figure below is illustrative.

The necessary quantity and the arrangement of the devices must be established by the Body Builder, in such a manner that the chassis alignment conforms the respective proposal drawings.



Chassis alignment and leveling

During the leveling process the chassis must be leveled with reference to the corresponding proposal drawing.
The devices must be supported exclusively on the vehicle frame longitudinal members. The use of mechanic components such as those is not allowed: engine, transmission, axles, articulations, etc. Cross members and wings must not be used as support points.
The devices used in the leveling process must be rigid enough to ensure that the movements of people on the chassis or dimensional variations due to its own weight, transport and storage do not compromise the process. These devices must not be removed until the complete fastening of the body structure on the vehicle frame.
The chassis leveling must be ensured in other directions, the longitudinal and the transverse direction.

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6 Chassis alignment and leveling

6.2 Chassis Alignment:

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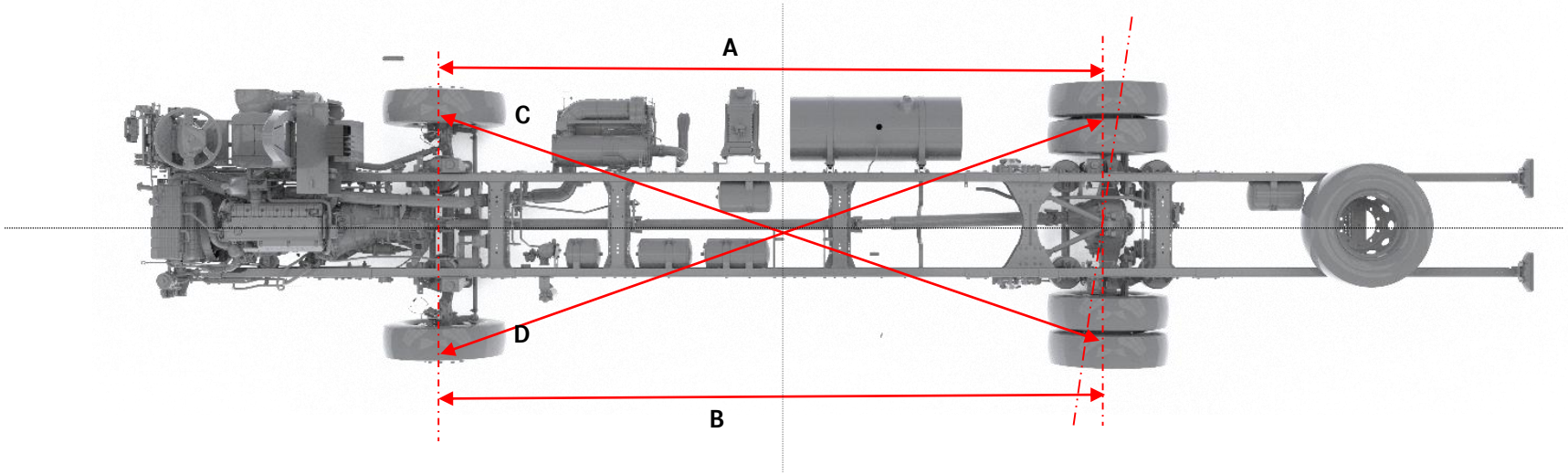
The Body Builder must ensure the frame alignment.
For complete vehicles, it must be ensured that the misalignment between the axles does not exceed the maximum values indicated below:

Chassis alignment:
(A - B) = 10mm maximum
(C - D) = 15mm maximum



Frame alignment

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It is the manufacturer's responsibility to prevent that the misalignment of the axles does not exceed the specified maximum values, to ensure the perfect driveability and stability conditions.

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7 Interface Between the Body & Chassis

7.1 Areas for body fastening

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All OF chassis are not self-supporting. The assurance of its integrity is shared with the body structure.

The correct fastening of the body to the chassis is extremely important to keep the structural stability of the set, avoiding concentration of tensions.
The body structure must be designed and assembled in such a way that they ensure the structural stability of the bus set (chassis + body) consistent with the dimension values specified in the proposal drawings of the focused chassis, and/or other technical information made available by Daimler Buses India.
During the development of the body, the Body Builder must pay attention to the correct applications and to the legal and technical limits of the final bus set (chassis + body).
“L” shaped supports bolted to the longitudinal member are available to facilitate the fastening of the body during the body building process to the OF chassis equipped with air suspension.
* Use of U-type Contraction is not recommended for OF 1624 Air suspension chassis.

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Welding or drilling holes in the longitudinal member and frame cross members are not allowed.

Important:

Daimler Buses India does not interfere in the structural project of the body, which is sole responsibility of its manufacturer. Daimler Buses India makes available fastening locations and relevant guidance to make possible the interface between the body and the chassis.

The Daimler Bus chassis have been designed, tested and produced to meet the requirements of the relevant applications.

7 Interface Between the Body & Chassis

7.1 Areas for body fastening

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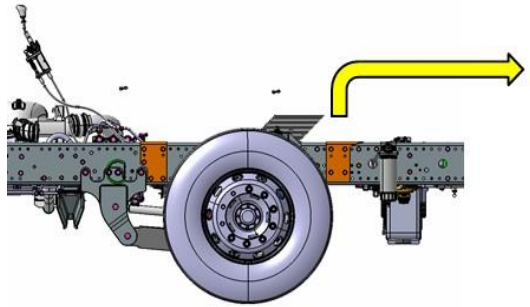
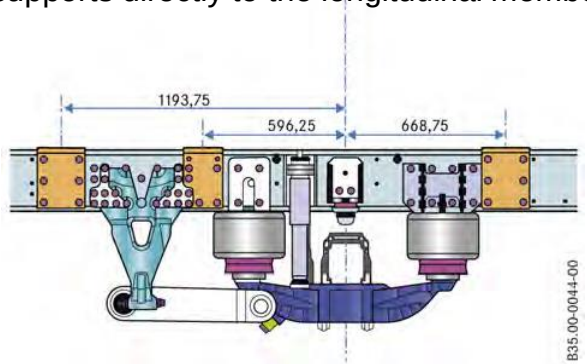
In order to make the body building process easier, interface bolted “L” shaped brackets are available in the frame for this purpose.
The fastening of the body structure have to be carried out directly onto these brackets with the utilization of welding processes. If, for some reason, these “L” shaped brackets are rendered useless, the fastening of the body have to be mandatorily bolted on the frame rails.
New brackets may be added to the chassis frame for body fastening, provided that they are assembled according to the Body Building Directives.
In the rear axle region, it is not allowed to insert fixed supports directly to the longitudinal members.



Body attachment plates- Front



Body attachment plates-Rear

The fastening of the body structure must be made directly on these supports by using welding processes. If the “L” shaped supports are scrapped, the body fastening should be compulsorily bolted to the longitudinal members.
For the adaptation of the body drawing, new supports can be inserted in the vehicle frame, following the other instructions available in the body building guidelines, specific for each chassis model.

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Further to the essential points (indicated in “orange”), for the body structuring and body support, the Body Builder must evaluate the needs of his project, and add the necessary quantity of fastening points to the chassis.

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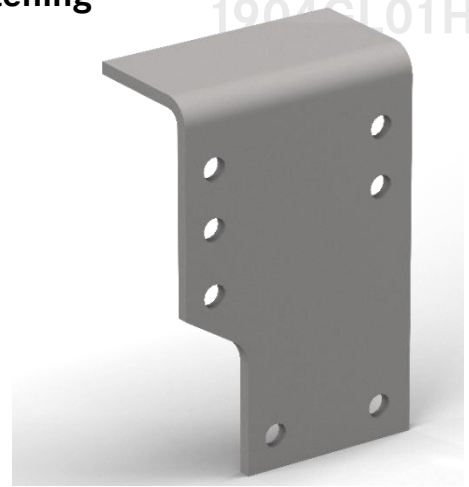
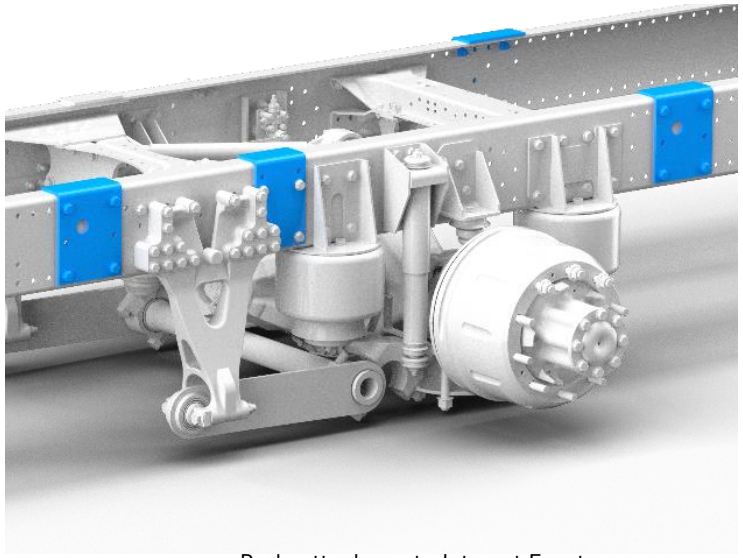
7 Interface Between the Body & Chassis

7.1 Areas for body fastening



Body attachment ‘L’ plate



Body attachment plates at Front

It is essential that the whole available area on the support, highlighted in blue color in the figure, is used to avoid deformation of the interface supports and consequently of the longitudinal members ("spring" effect) and to provide an adequate interface between the body structure and the vehicle frame

On these supports, the cross members (or extensions) of the body base structure must be welded to the upper part, associated to the "wings" that join the body lateral parts (side cross members or their supplementary components).

The supports assembled at the front of the rear suspension, together with the internal reinforcements of the longitudinal members, must not be eliminated. If the new supports must be changed to adapt them to the body structure drawing, they must be produced in a single plate (without splicing) with the same material (steel NBR6656 LNE500) and minimum thickness of 6mm. For the fastening, use 06 (six) M14x1.5x40 – 10.9 bolts (MBB N 000000 005514) and M14x1.5 – 10 nuts (MBB N 000000 005662), all flanged. Use a tightening torque of 172 ± 13 Nm for the fastening and carry out the control and recording in the internal documentation. If the supports thickness is changed by more than 6mm, the bolts length must be increased to meet the requirements of this installation.

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7 Interface Between the Body & Chassis

7.2 Inadequate Regions for the Body Fastening

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The chassis numbering, during the entire body building process must be properly protected.

When a supporting base and/or additional fastenings are necessary due to concentration of loads or additional strains, in order to supplement the fastening of the body structure to the vehicle frame, remember that some areas of the vehicle frame are not appropriate for welded fastenings. If such areas are used and this damages the vehicle frame, such damages are not covered by the warranty granted by Daimler Buses India. Under no circumstances may the Body Builder use such areas for directly welded fastenings. Any undue use of welding in these regions may cause the loss of the rights to the warranty and transfer of the liability.

In some areas, the fastenings may be bolted to the vehicle frame.

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Welding or drilling holes in the longitudinal members tabs and mobile frame cross members are not allowed.

7 Interface Between the Body & Chassis

7.2 Inadequate Regions for the Body Fastening

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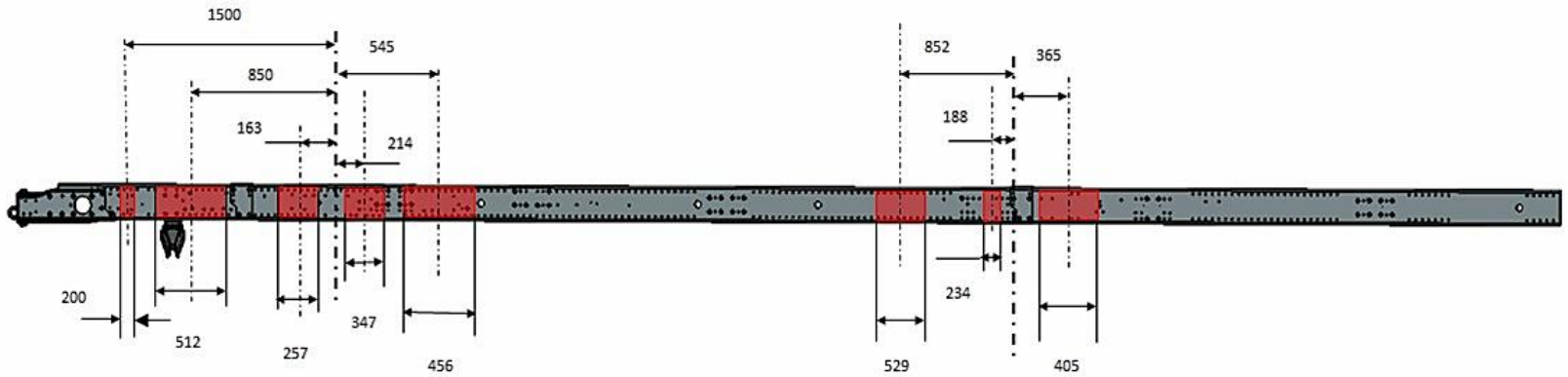
Below follows the indication of chassis locations where the fastening of supports is not permissible by means of welding, being mandatory the utilization of bolts to attach supports to side members.



OF1624 chassis Unsuitable areas for fastening

Critical areas on frame:

- Steering box bracket
- Spring bracket
- Stabilizer
- Bump Stop
- Shock absorber
- Cross member
- Engine mount

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Modifications to the frame are not permitted in the highlighted areas. Welding operation is not permitted throughout the frame.

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7 Interface Between the Body & Chassis

7.3 Frame ends

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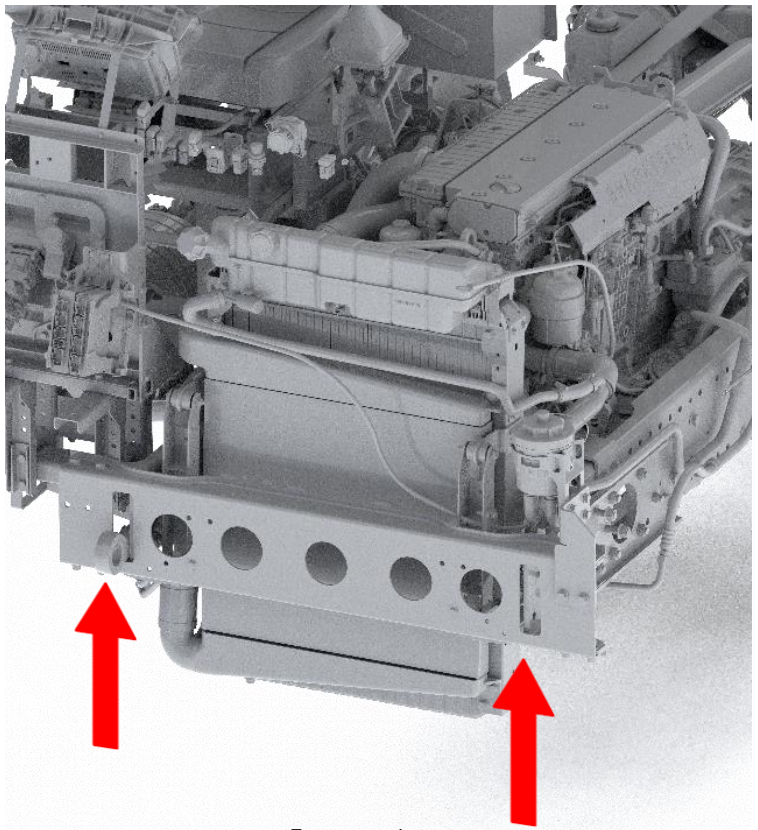
Due to the arrangement of the power train set at the front part of the OF chassis, changes of the front overhang are not allowed.
The rear overhang may be altered as explained in chapter 5.5 “**Rear Overhang Extension**” page 16.



Frame ends

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7 Interface Between the Body & Chassis

7.4 Wheelhouses

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The wheelhouses must make possible the free movement of the wheels, i.e., the wheels must not have their movement prevented when they are fully turned or during the flexure of the suspension system. Foresee clearances for the steering system movements.
The dimensions of the wheelhouses, indicated in the respective offer drawings, must be considered as minimum reference values. When the wheelhouses is designed, please take into account the tires dimensions, the possible use of anti-skid chains and the ventilation.

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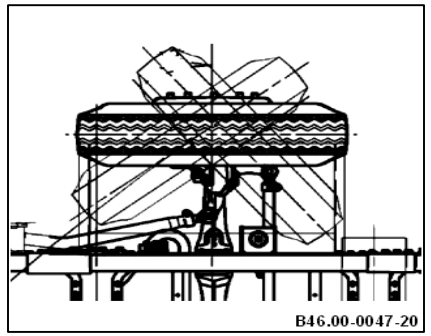
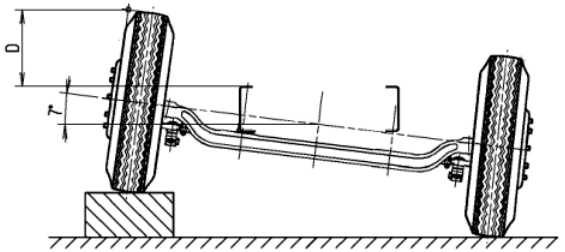
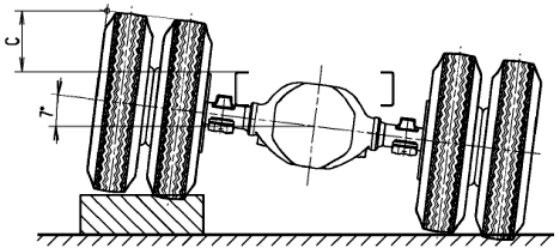


Wheelhouse clearance lateral



Front axle



Rear axle

Remark:
Refer to the height (C and D) updated values in the respective offer drawings, according to the adopted versions.

7 Interface Between the Body & Chassis

7.5 Central Unit Structure

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Not applicable.

Remark:
Regarding OF chassis, the removal of the central part of the vehicle frame is not allowed to install the luggage compartment in the wheelbase.

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8 Cooling system

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The radiators must be kept in their original positions, so that their attachment cushions can work freely. The radiators shall be properly protected before carrying out any service in order to prevent damages to the fins. Do not paint the radiator.

To ensure enough air flow for the coolers, do not put stickers, plates or other adornment pieces.

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The coolers must be kept in their initial position, in such a manner that the fastening mounts may operate freely. The air cooler must be protected before the execution of any services, to avoid damages to the fins. The cooler must not be painted.

Remark:
The support structure of the cooling system is self-standing, i.e, they do not need to be tied to the body. Drilling holes, trimming and welding are not allowed to be done in this structure and also in their support points.

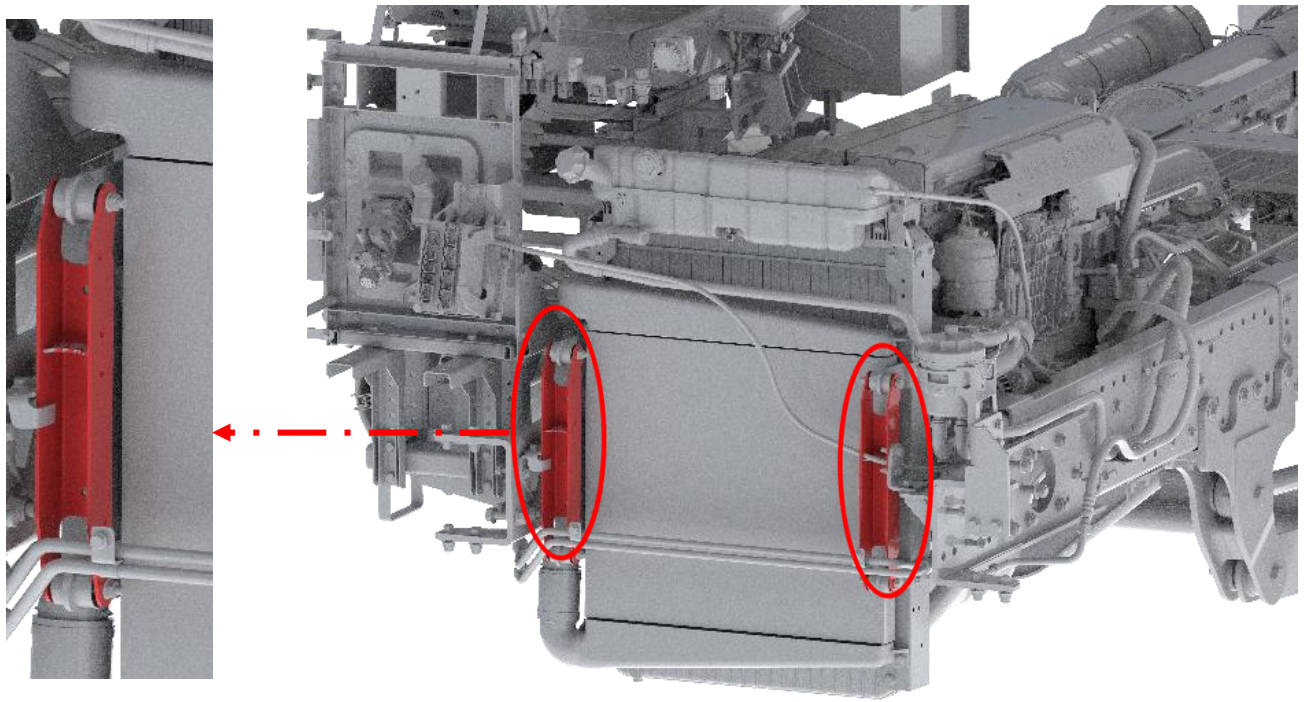
1904GL01H

8 Cooling system

8.1 Radiator fixation structure

1904GL01H

To assure enough air passage to the radiator, do not put labels, plates and adornment pieces.



Sustaining structure of the radiators

!

The support structure of the cooling system doesn't need attaching to the body, in other words, it is self-supporting. Drillings, cuts and welding are not allowed on this structure and on its fixing points.

1904GL01H

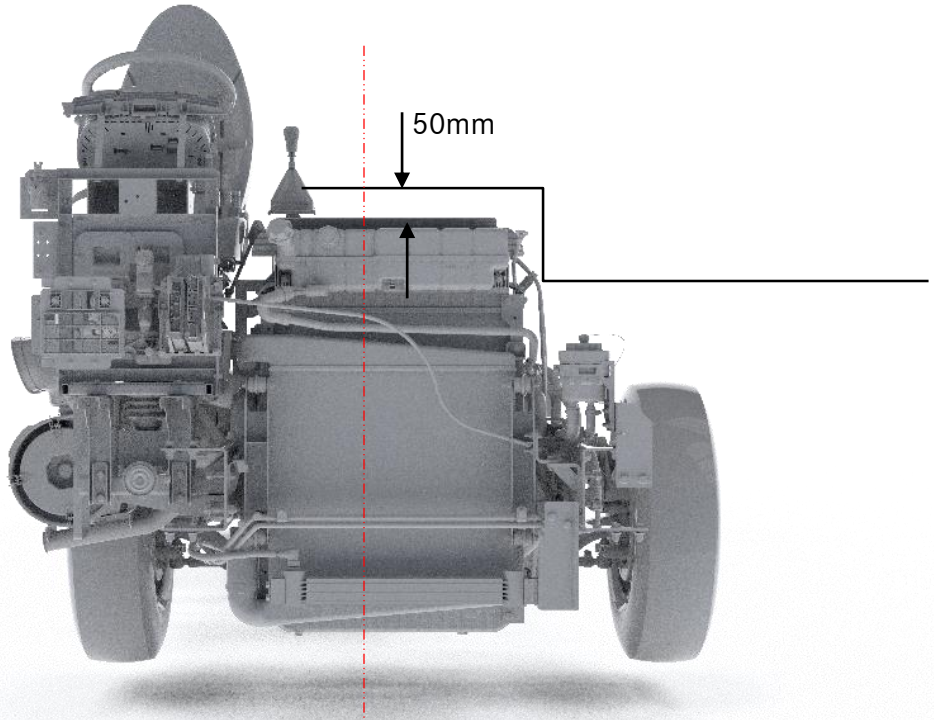
8 Cooling system

8.1 Radiator fixation structure

1904GL01H

Foresee a clearance higher than 50 mm between the radiator's support structure (cooling cage and all components) and body (front panel/structure, engine cover, side panels, etc.) to attend possible variations in manufacturing.

A flap with enough size has to be provided in the body to allow maintenance access to the cooling system, including the radiators replacement. The body must permit the engine and radiators removal through the vehicle front part. Any reinforcements of the body that may exist in this area should be removable.

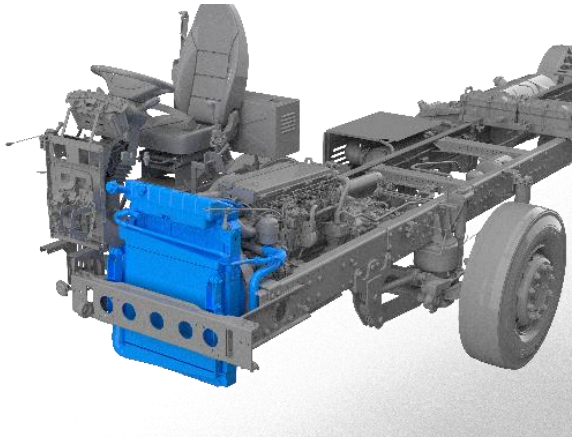


1904GL01H

8 Cooling system

8.2 Radiator compartment

1904GL01H



Deflecting plates

Due to the original configuration used in the cooling system of the OF chassis the Body Builder does not have to install additional deflectors between the coolers set and the engine, however, the body must have front openings for the coolers, as described in the chapter “Cooling System Openings” page 35.

The baffle plates have as purpose to prevent the recirculation of hot air that comes from the engine compartment.

If this requirement is not complied with, the effectiveness of the engine cooling system may be compromised.

Not satisfying this requirement results in the compromising of the engine cooling system performance.

During the production of air baffle plates, the following points must be taken into consideration:

Due to the movements of the cooling system, it is important to use rubber profiles and/or similar pieces to carry out the sealing and avoid damages to the coolers.

- The plates must be detachable and the access for the maintenance of the periodical maintenance items must be ensured.
- Linings or rubber elements must not be supported directly on the cooler honeycomb to avoid damages.
- Do not carry out rework services in the cooler support structure.

!

Ensure the sealing between the coolers compartment and the engine to avoid the recirculation of hot air. Linings or rubber elements must not be supported directly on the cooler lines, to avoid damaging them. Hot air from the engine compartment must not flow into the cold air environment where the coolers are located.

Remark:

During the manufacturing of the bodies for the OF chassis, the Body Builder can install air baffle plates at the upper and lower part of the cooling unit, in order not to affect the cooling system performance.
The baffle plates purpose is to avoid the recirculation of hot air in the engine compartment.

1904GL01H

8 Cooling system

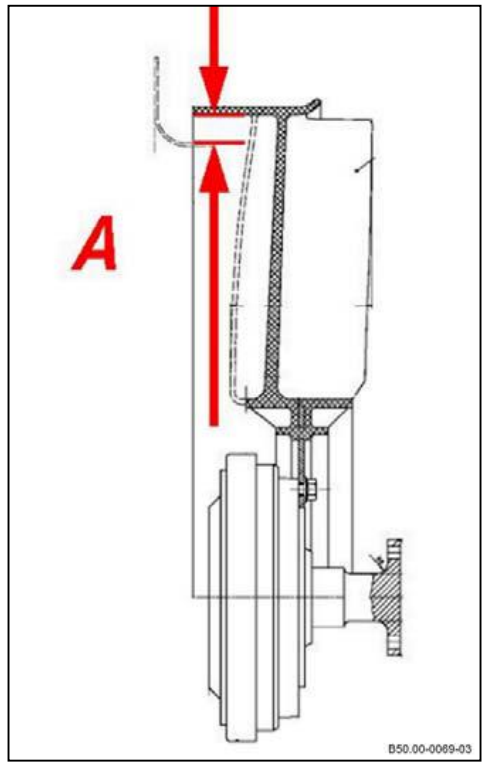
8.3 Radiator fan and air deflector

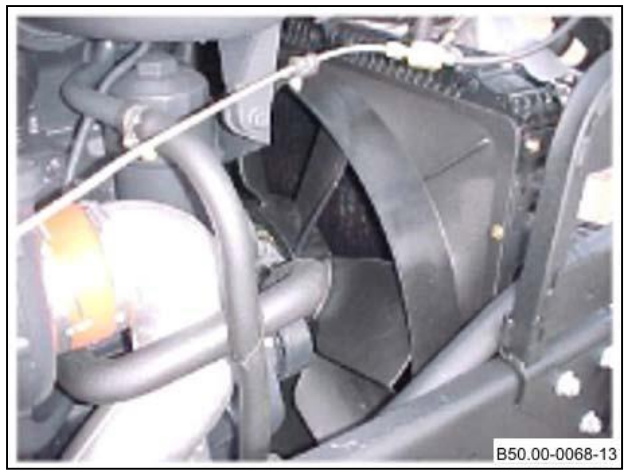
1904GL01H

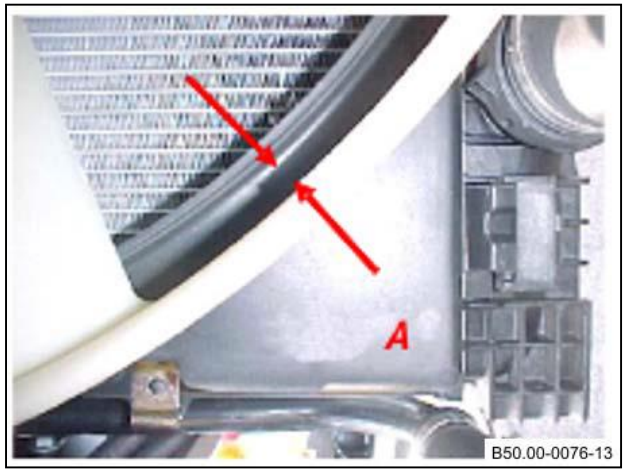
A clearance larger than 20 mm must be kept between the surface of the coolers set support structure (“cage”, including its components) and the body parts (engine cover, side panel, etc.), to meet the requirements of possible manufacturing variations .

The body must be equipped with an access cover to the cooling system, big enough to make possible the maintenance of the coolers (including replacement works).

When the body has cross members in this region that make it impossible or difficult to carry out the maintenance services, they must be produced in a manner that renders them removable.







Fan blade positioning
Deflector
1 Fan blade
Minimum clearance, A = 25 mm

1904GL01H

8 Cooling system

8.4 Expansion tank (Coolant reservoir)

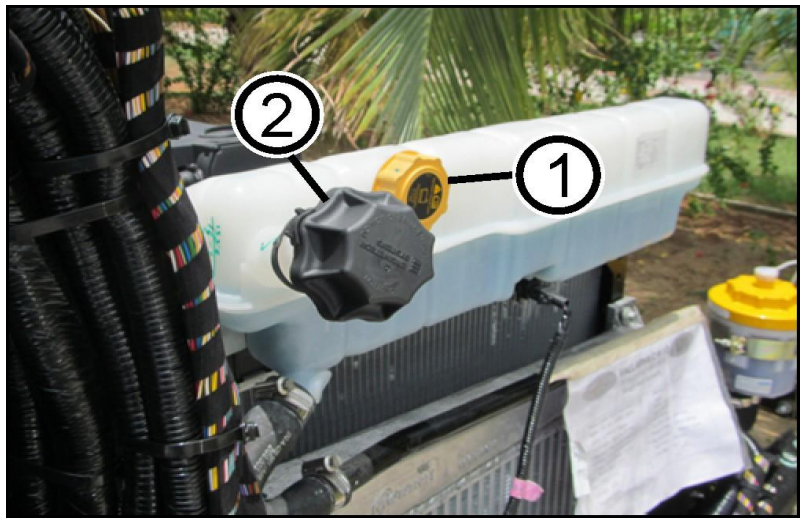
1904GL01H

!

The expansion tank (coolant reservoir) must be kept in the original position.

The expansion reservoir filler neck must allow free access for the refuel with a watering can, and/or automatic equipment (gun with flow control).

In case extension to filling neck, the proposal must be pre-evaluated & authorized by Daimler Buses India.



2 Expansion tank
Pressure valve
1 Filler neck

!

The pressure valve of the expansion reservoir must not be modified or removed. Its seal must remain unbroken and the refuel must be made through the reservoir filler neck.

1904GL01H

8 Cooling system

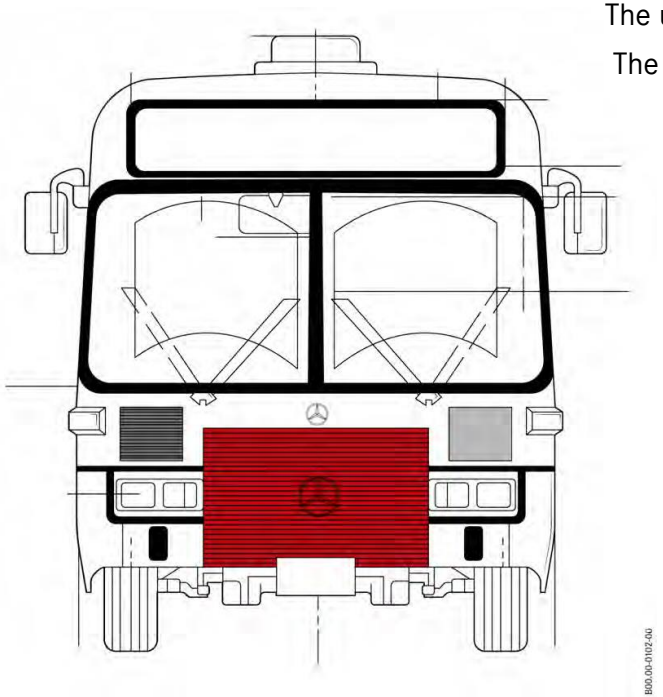
8.5 Cooling system openings

1904GL01H

Free area of air pickup

The unobstructed air intake area must be positioned immediately in front of the radiators.

The illustration beside shows the radiator air pick-up grille for chassis with front engine.



Cooling system Openings

***Tab6*- Free area of air pickup**

Chassis BSVI	Minimum area (dm²)
OF1624/OF1624L	30*
* Free openings shall be maintained relative to radiator position of the chassis.	

1904GL01H

9 Engine air intake system

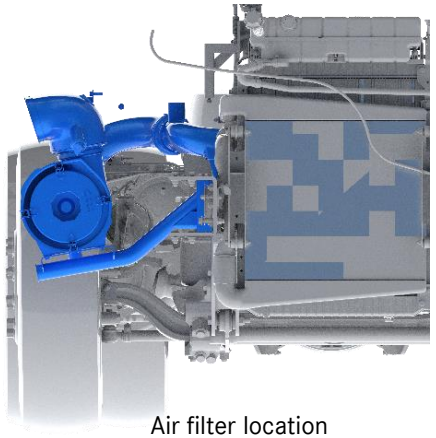
9.1 Engine air intake system

1904GL01H

It is highly important that the engine receives enough air quantity for the combustion and such air must be free of dust and impurities.
It is important that the Body intake duct is dimensioned and designed in such a manner that satisfies engine air intake needs.
During the body building process, the whole intake air system must be protected from impacts or paint residues.

!

Do not disassemble the Air intake system, If its is necessary, disassemble the air filter during the body building process, the connection hose between the air filter and the engine turbine must be immediately sealed after the removal of the air filter and kept that way during the entire body building process. Remove the seals only during the air filter installation.



Air filter location

Air filter

!

Compressed air must not be used to clean the filter element to avoid damages.
Modifications of the air filter and air intake system lines position are not allowed, it may void the warranty of affected systems.

1904GL01H

9 Engine air intake system

9.2 Air Intake Box

1904GL01H

For the OF chassis (right-hand drive vehicle), the air intake box must be produced as per guidance described in the chapter “Air intake position” page 36.
Seal the air intake box opening with the lateral of the body to ensure the air flow.
The air intake box may be disassembled to avoid damages during the chassis and body coupling process. The air filter intake must be sealed to avoid the penetration of residues.

9.3 Air intake opening

The body opening for air intake to the engine must have a minimum area :

Tab7- Minimum area for air intake

Chassis	Air intake box	Minimum area (dm^2)
OF1624/1624L	RHD	4.0

The body opening for engine air intake shall be located in front of the filter air intake and allow free of dust or dirt air inlet in a satisfactory amount for combustion, as well as ensure longer filter element durability.

1904GL01H

9 Engine air intake system

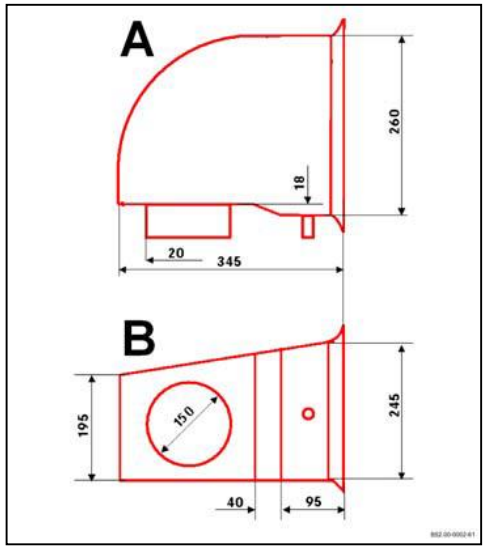
9.4 Air intake position

1904GL01H

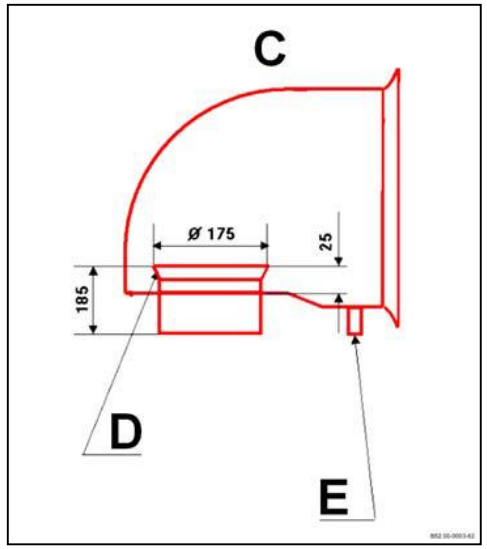
The opening in the body that serves for the air intake for the engine must be positioned right in front of the filter air intake and make possible the entry of air free of dust or impurities in a quantity enough for the combustion, as well as to ensure a longer durability of the filtering element.

A new air intake box must be built and installed at the right side of the bus body. Please see the proposal below:

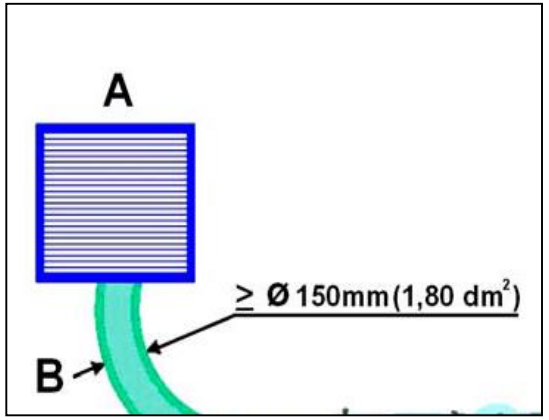
A Side view
B Bottom view
C Inside view
D 15 mm radius
E Drain



Proposed pick-up box

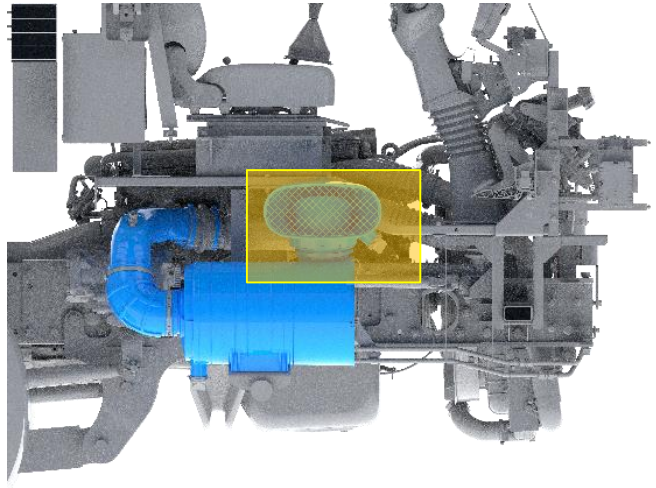


Proposed pick-up box



Pipe between the box and the air cleaner

A Air pick-up (4.0 dm² free area)
B Pipe



Air intake position

1904GL01H

9 Engine air intake system

9.5 Air filter restriction level sensor

1904GL01H

The chassis are equipped with an electric sensor that indicates the restriction of the air intake system (dirty filter) with indication at the instrument cluster.

OF chassis are equipped with an electronic sensor for the indication of the air filter restriction level.

During the body building process, it is necessary to protect it against impacts and paint residues to avoid the air intake occurs without filtering.

Air filter restriction sensor

Instrument cluster BS VI

- For BS VI vehicles the indication is given as a pop up notification on the LED screen

1904GL01H

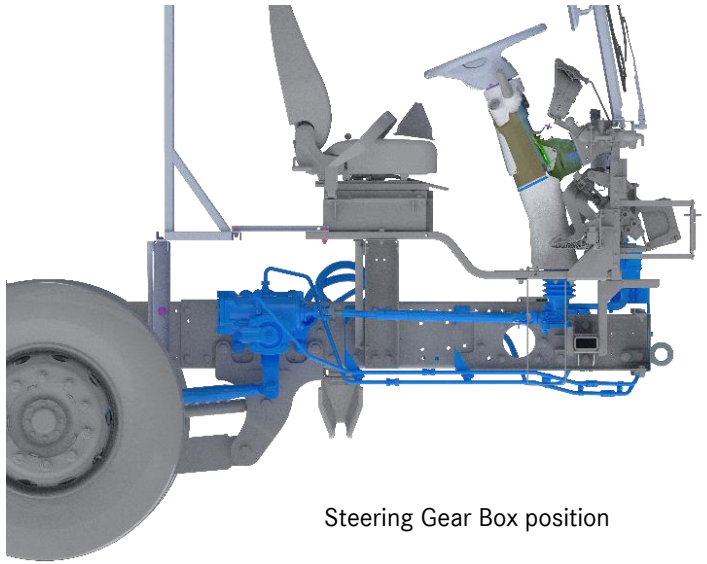
10 Steering system

10.1 Steering system

No alteration must be made to the fastening of the steering to the chassis structure. The structure supports, and its respective consoles, are integral parts of the officially approved steering set.

The upper part of the front panel must be integrated to the body to avoid steering wheel vibrations.

Modifications in the angular transmission box structure are not allowed.



Steering Gear Box position

Special Care with the Steering System During the Body Building Process:

- The steering components must be adequately protected during the welding and painting process.
- The use of steering system components to carry out tests of welding electrodes and/or to connect to ground the welding equipment is strictly forbidden.
- During the drilling and trimming operations, take care not to damage the hydraulic line. Check for leaks the power steering system, mainly round the connections, when completing the installation of the body.

10 Steering system

10.2 Power steering oil tank

1904GL01H

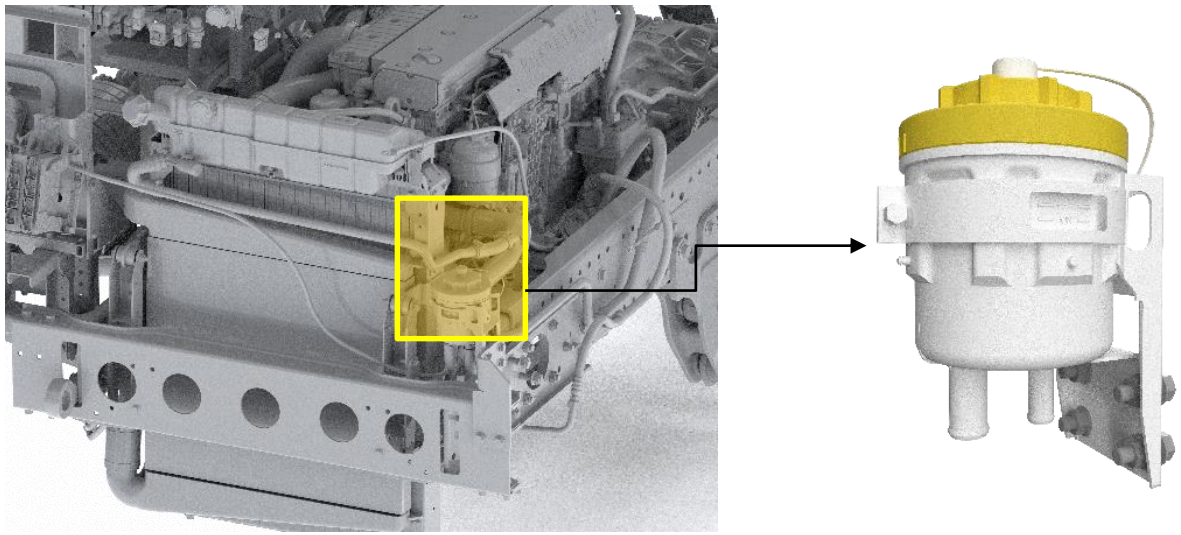
Do not reposition the power steering oil reservoir as changing the original engine supports is not allowed.

It is not allowed to change the positioning and fastening of the power steering oil reservoir & its hoses, their routing as it is installed in its final position.

If It is necessary to ensure the refueling access through the front cover/lid of the vehicle.

1904GL01H

Power steering oil tank



Steering Oils reservoir position

10 Steering system

10.3 Adjustable Steering Column

1904GL01H

!

Check the updated values in the respective proposal drawings, according to the adopted versions.

The OF 1624/1624L chassis are equipped with adjustable steering column, aiming and adjusting it to the driver cockpit.

When the chassis has this feature, the Body Builder must plan the layout of the dashboard at an appropriate distance from the steering column to make all the adjustment positions possible.

The body panel must have a minimum clearance of 5 mm with regard to all the steering column adjustment positions.

The adjustment dimensions of the steering wheel are indicated in the respective proposal drawings, and must be considered as minimum reference values.

1904GL01H

11 Pneumatic system

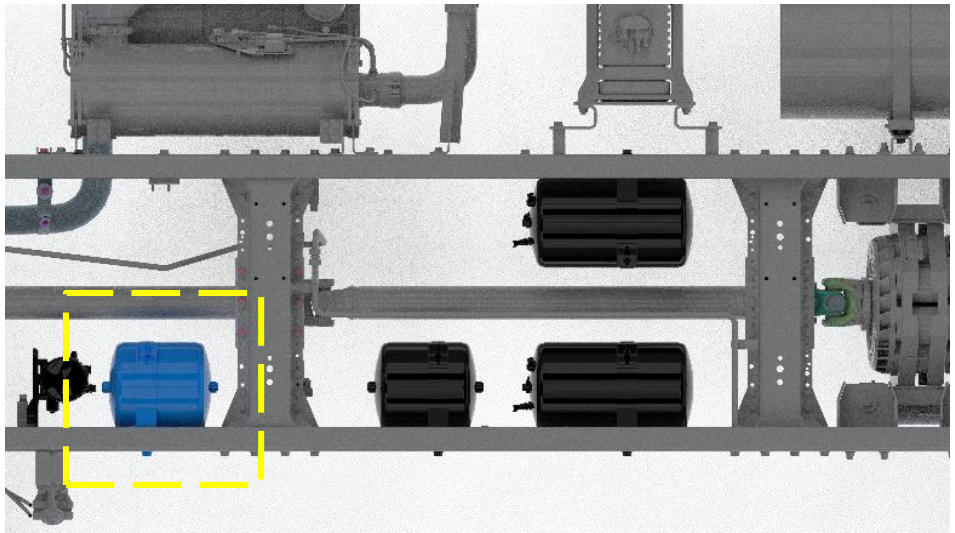
11.1 Pneumatic outlet for auxiliary services

1904GL01H

The body accessories that are pneumatically actuated such as the horn, the doors actuation and other pneumatic devices, must not be connected directly to the service or parking brake circuits, or their air reservoirs.

The location of the Auxiliary compressed air tank for the accessories is highlighted in below picture for OF1624 chassis.

Bodybuilder must assemble the multiport connector or suitable adapter while taking air supply to auxiliary devices.



Positioning of the Auxiliary tank on chassis

1904GL01H

11 Pneumatic system

11.2 Pneumatic hosing (connection plates)

1904GL01H

!

Not applicable.

1904GL01H

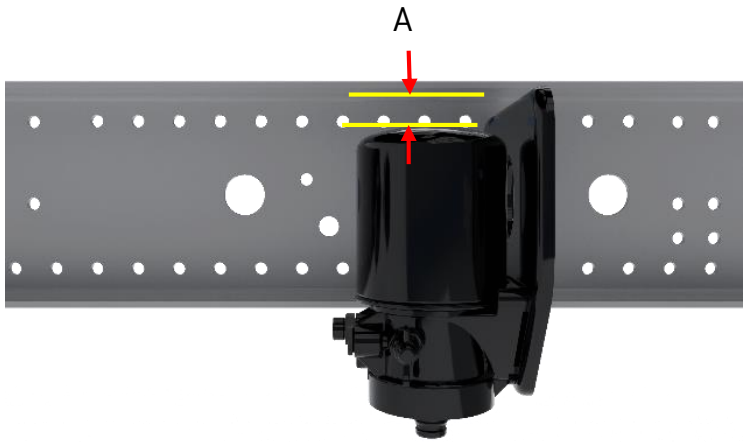
11 Pneumatic system

11.3 APU (Air Processing Unit)

1904GL01H

The position of the APU (Air Pressure Unit) set is the definitive one, and must not be altered. Prepare access for the removal, to facilitate the maintenance.

Provide an “A” clearance of 30mm on the APU set to make its removal possible



Clearance over APU

A Clearance of 30mm

!

Do not start the engine while the APU (Air Pressure Unit) control pipe is removed.

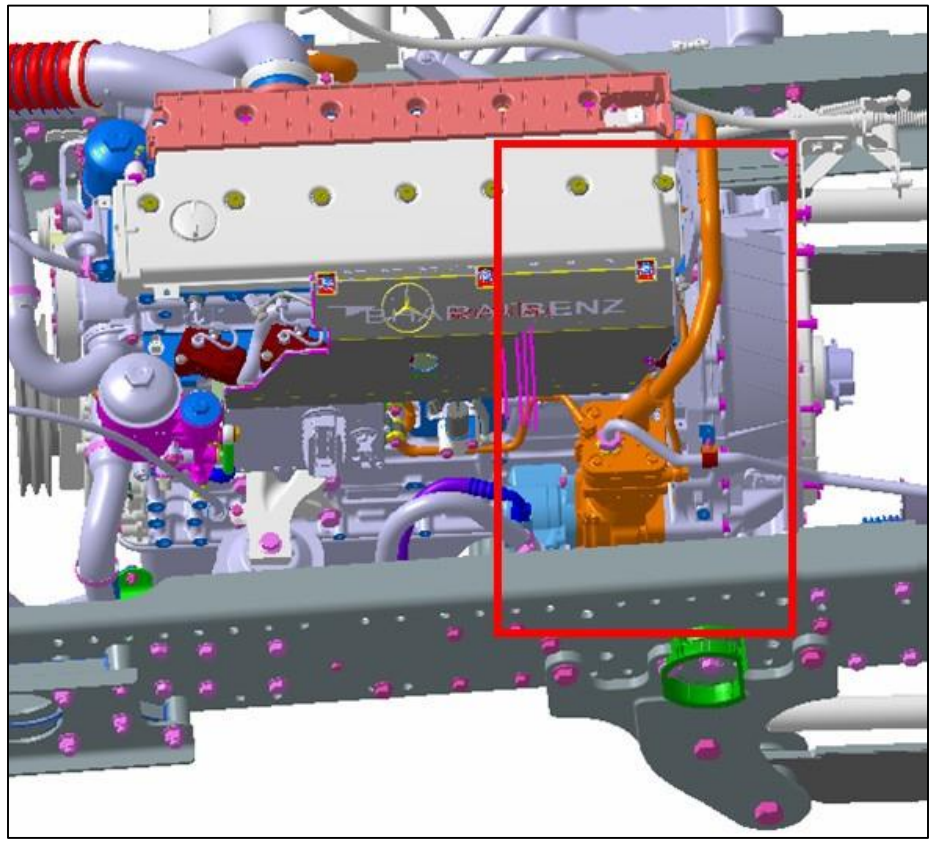
1904GL01H

11 Pneumatic system

11.4 Compressors

1904GL01H

The chassis compressors are actuated by gears and are coupled to the engine.
In the production of the engine cover/hood, it is necessary to provide access to the upper part of the compressor.

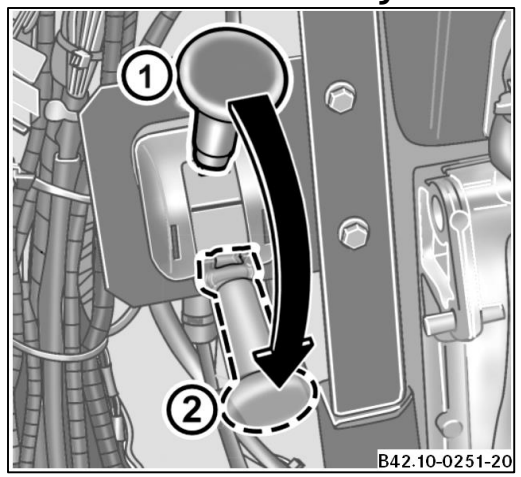


Air compressor

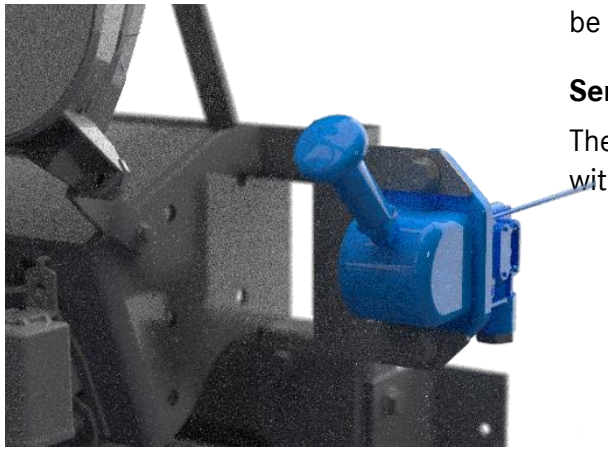
1904GL01H

12 Brake system

12.1 Brake system



Parking brake lever
1. Actuated brake
2. Released brake



Parking brake lever position

The chassis brake system must not be changed.
During the body building processes, the systems must be duly protected.

Do not insert derivations in the brake circuits, as the use of the connections previously made available in the chassis for the actuation of the pneumatic components as described in the chapter “Pneumatic Connection for auxiliary service” page 44 is compulsory.

The Body Builder must carry out inspections to identify possible leakage and/or damages in the components after the completion of the body installation process.

Before the dynamic assessments are carried out, all the systems must be duly reviewed and corrected as a safety measure. If doubts arise, contact Daimler Buses India.

Parking Brake Adjuster Lever

The parking brake actuation lever is supplied in the chassis in a provisional position. The Body Builder must provide for its fastening in a visible and practical place, of easy access to the driver, foreseeing also the need to use it in emergency cases.

It must also be positioned in a place that makes impossible its accidental or undue access. The complete travel of the lever must be free from interferences.

Service Brake Pedal

The service brake pedal is assembled in its definitive position in the chassis, however the Body Builder must ensure its free travel, without interferences such as from wiring harnesses, lines, trim parts, floor, etc.

12 Brake system

12.2 Retarder

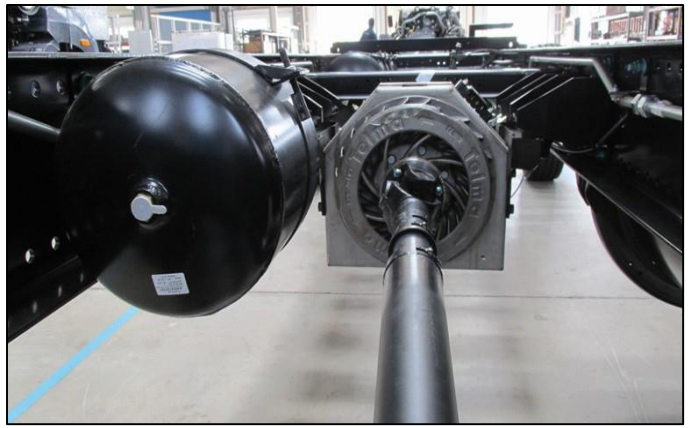
The chassis may be equipped with Electromagnetic retarder (Telma) as a special variant.

It is an aggregate particularly suitable for vehicles that operate in hilly regions or places that have mixed topographic conditions. Its application will result in a significant increase in the durability of the brakes system (mainly the brake pads and linings) and mechanical components in general.

During the installation of the instrument cluster of chassis equipped with retarder, the position of the actuation controls must be planned taking into consideration in such a manner that the driver is able to reach them easily avoiding ergonomic problems and interferences.

It's operation must not interfere with the Body dashboard or any component near by.

Actuation of the retarder



Retarder

In the assembly of Tourist coaches, the luggage compartment structure or Sheet metal panels or Body floor (Plywood) must be at least 100mm above the Chassis longitudinal members.

Thermal isolation materials must also be added to the Right, Left and Top sides and on the retarder.

1904GL01H

12 Brake system

!

Add thermal isolation to the wiring harnesses, lines, and other components of the body that are susceptible to high temperatures.

!

The fuel lines must not be positioned in the inner part of the vehicle frame in the retarder region. Ensure that the fuel lines routes are kept at the external part of the frame as installed in the original chassis keeping them at a safe distance from the heat sources.

!

Information related to the fastening of the electronic control unit and other instructions related to the electric part, are included in the manual “Body Building Guidelines” – Specific electric/electronic Part, in the chapter 17 – “Telma Retarder”.

!

The batteries compartment must be placed behind the front axle.

13 Exhaust system

13.1 Exhaust system

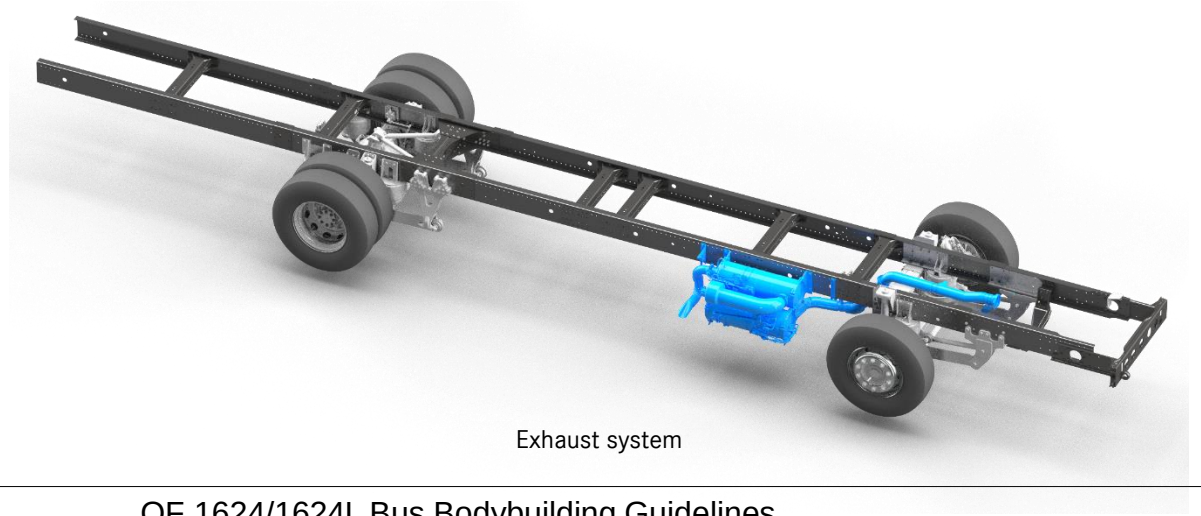
The genuine part of the chassis, from the engine until to the muffler/catalytic converter (including), must not be changed.

13.2 Exhaust System counter Pressure

Carry out the counter-pressure measurement, in the case the original exhaust pipes length is extended, and the values obtained must be smaller than:

- 280 mbar for chassis with BSVI engines.

! Further information is described in the Body Building Directives - General Part, in chapter 3.23 - Exhaust System.



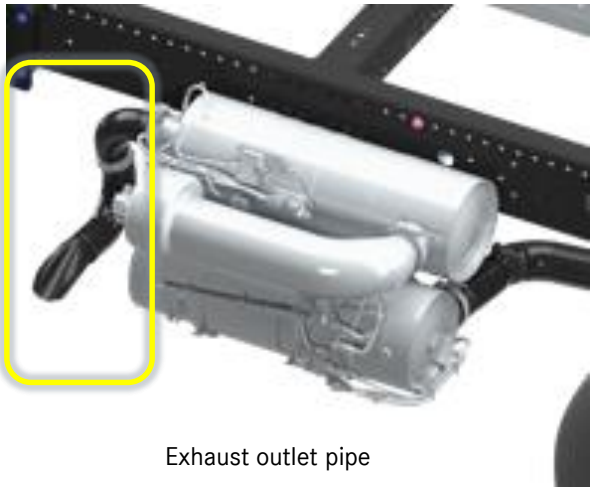
Exhaust system

1904GL01H

13 Exhaust system

13.3 Exhaust outlet position

1904GL01H



Exhaust outlet pipe

OF 1624L BSVI chassis exhaust system does not requires any tail pipe extension by Bodybuilder until unless local legislation demands or situation prevails.

In the case of exhaust pipe extension, the pipe added by the Body Builder must have a diameter equal or greater than the one of the genuine component.

The fastening of such extension to the body must be made by means of elastic elements identical to the original ones supplied with the chassis.

When extending the pipes, it is necessary to take care to prevent that the exhaust gases back pressure does not exceed the established limit, according to “Exhaust System”.

For the assembly of Exhaust outlet, the body project must foresee an orifice for the exhaust pipes, with minimum clearance of 20 mm to avoid interferences. According to the material used in the production of the body structure, it is necessary to study the necessity of adopting protections to avoid damages caused by heat.

In the production of line extension, the movements of some components must be taken into account, such as: axles, transmission shafts, etc.

!

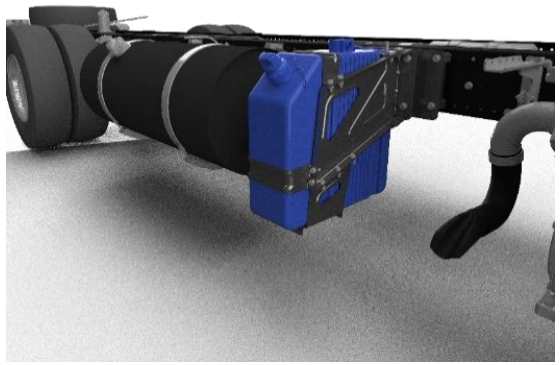
Do not reposition or rotate the exhaust tail pipe orientation.

1904GL01H

13 Exhaust system

13.4 Exhaust gas treatment system

1904GL01H



BS 6 chassis are equipped with an "AdBlue®" tank

13.4.1 AdBlue®" Tank

The Euro 5/ BS 6 chassis are equipped with an "AdBlue®" tank plus a pump, necessary to meet the legislation requirements.

When necessary, the "AdBlue®" line and pump may be removed during the body building process and must be properly stored and identified.

13.4.2 Protection of "AdBlue®" Tank

To avoid system contamination, it is mandatory that contaminants do not come in contact with the solution. It is necessary to carefully preserve the after treatment system and related components during the installation of the implements and bodies to avoid contact with contaminants.

During the installation of bodies, the system should remain closed (including breathers) to preserve covers, nozzles, and connections. Protective plugs (rubber) can be used on genuine covers, improving security against damages to system components.

During the handling of after treatment system components, they should remain closed and protected (with genuine covers and other protections).Besides, they should be kept away from contaminants such as fuel, oil, grease, dust, dirt, metal residues and detergents.

!

The catalytic converter must not be removed during the body building process.

During the body building the catalytic converter must be protected from mechanical impacts to avoid damaging the sensors etc.

After treatment systems are extremely sensitive to potential impurities contained in "AdBlue®" solution.

To avoid the contamination during the vehicles' refuel or utilization, properly protect the "AdBlue®" tank fitting to avoid residue built-up by installing access covers on the side and on the mud flap.

1904GL01H

13 Exhaust system

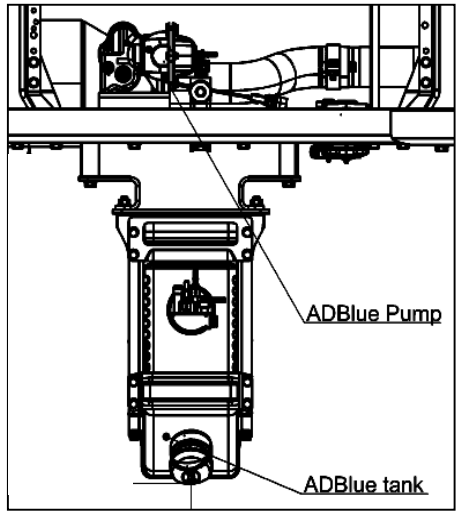
13.4 Exhaust gas treatment system

1904GL01H

13.4.3 “AdBlue ®” Pump

The "AdBlue®" pump must not be removed from its original position, even if changes in the "AdBlue®" tank position occur.

The connection hoses between the tank, the pump and the metering valve have been defined with specific lengths for this purpose and their replacement is not necessary.



Arrangement of the **AdBlue** ® Pump

!

The "AdBlue®" pump must not be changed from its initial position, If damages occur during the body building process, the line must be replaced, and the same original material characteristics must be kept.
"AdBlue®" lines must not have joints

1904GL01H

13 Exhaust system

13.4 Exhaust gas treatment system

1904GL01H

!

The "AdBlue®" pump must not be changed from its initial position, If damages occur during the body building process, the line must be replaced, and the same original material characteristics must be kept.
"AdBlue®" lines must not have joints

!

The "AdBlue®" is a chemical product (urea diluted in water) of synthetic origin, used to reduce the pollutant emissions of heavy vehicles that use the SCR (Selective Catalytic Reduction) system.

The "AdBlue®" fluid is produced by synthetic means, and is a transparent, basic, colorless and odorless product and is not toxic. It is not a dangerous substance and fits into the 1 category of danger, i.e., the lowest risk category. however, it is very corrosive when in contact with some metals, including the carbon steel and presents high capillarity.

!

In Brazil, the chemical product (urea diluted with water) is called Arla 32 (NOx Liquid Automotive Reducing Agent), in European countries it is called "AdBlue®", and in the USA, DEF..

!

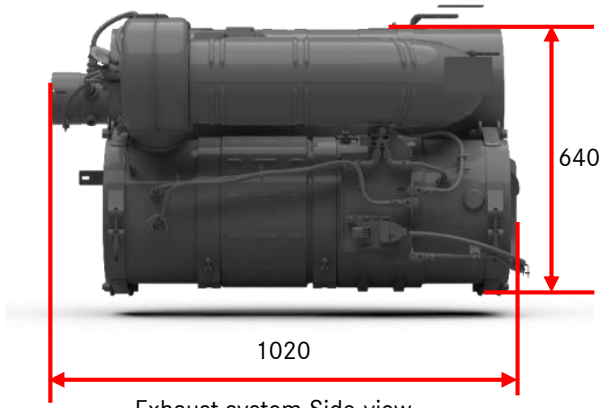
When the "AdBlue®" reservoir line and pump connections are disassembled, it is necessary to protect them from damages and contaminations.

1904GL01H

13 Exhaust system

13.4 Exhaust gases treatment system BS6

1904GL01H



Exhaust system-Side view

13.4.4 “After treatment system”- OF 1624L/BS 6

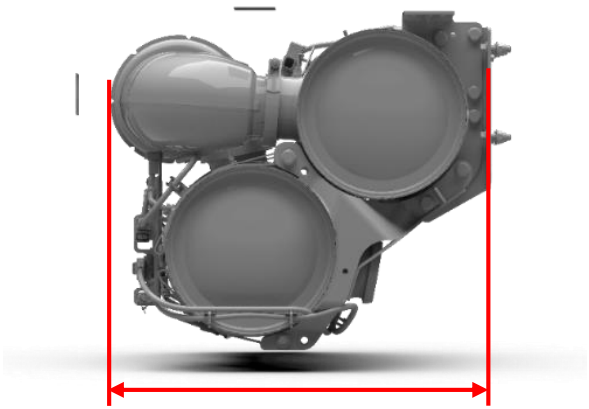
OF1624L chassis are equipped with "SCR“ system component, required to comply with the legislation BSVI.

The position for OF1624L BS VI Fuel tank, exhaust muffler and Ad-Blue system are positioned based on ATS packaging and should not be disturbed by bodybuilder.

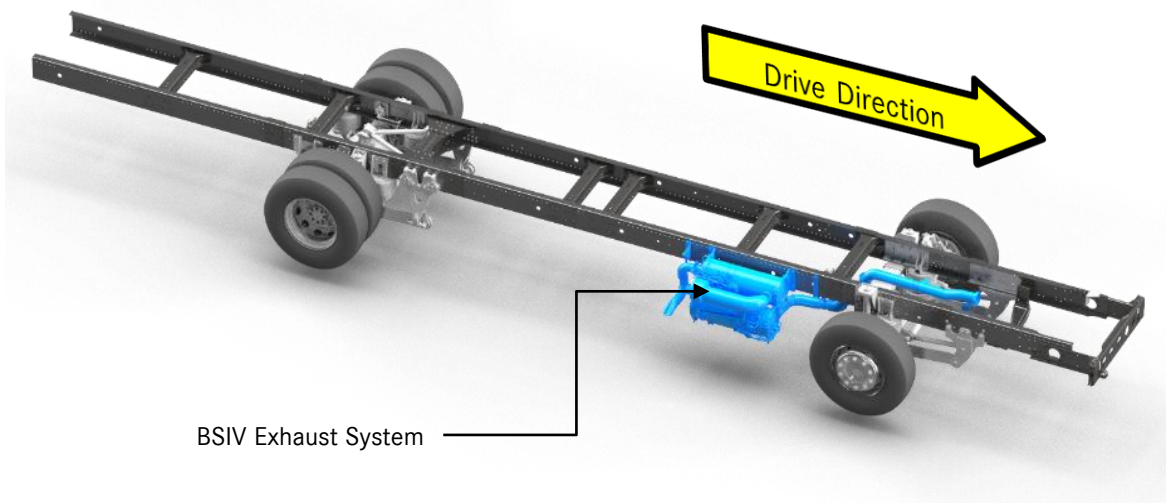
13.4.5 Exhaust treatment system openings-

A minimum opening of 25dm^2 to be provided in the Body for efficient cooling of the Exhaust system, The Perforations to be given on the body skirt panel/flap, its position must be exactly on the side of the muffler.

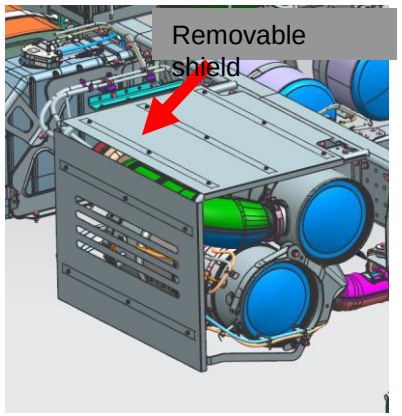
To avoid heat & Noise transfer to Body or its components Thermal insulation to be provided.
Minimum of 300mm to be available between the exhaust system and body structure/ floor.



Exhaust system-Front view



Exhaust system- Complete view



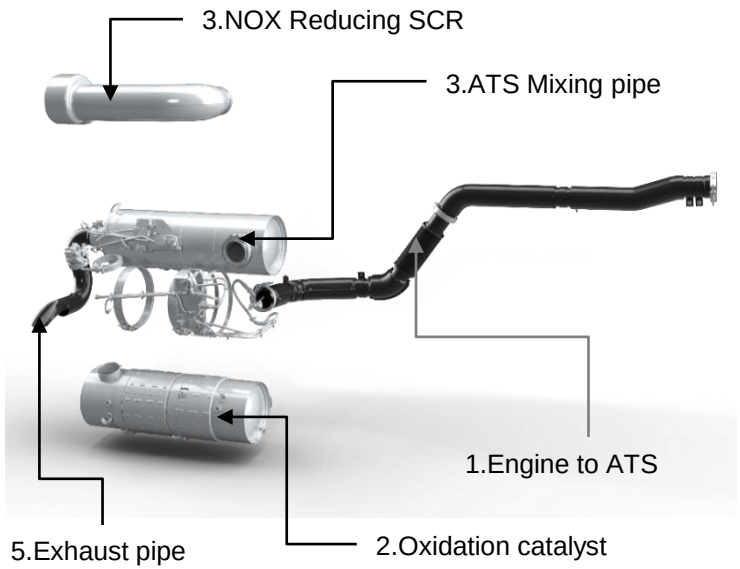
1904GL01H

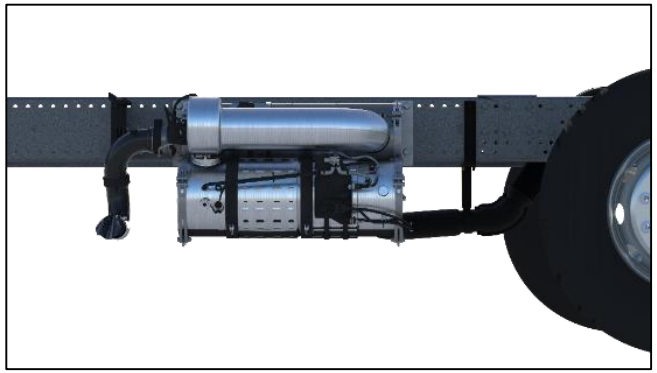
13 Exhaust system

13.5 Exhaust gases treatment system BS6

13.4.6 Catalyst

1904GL01H





SCR system

1904GL01H

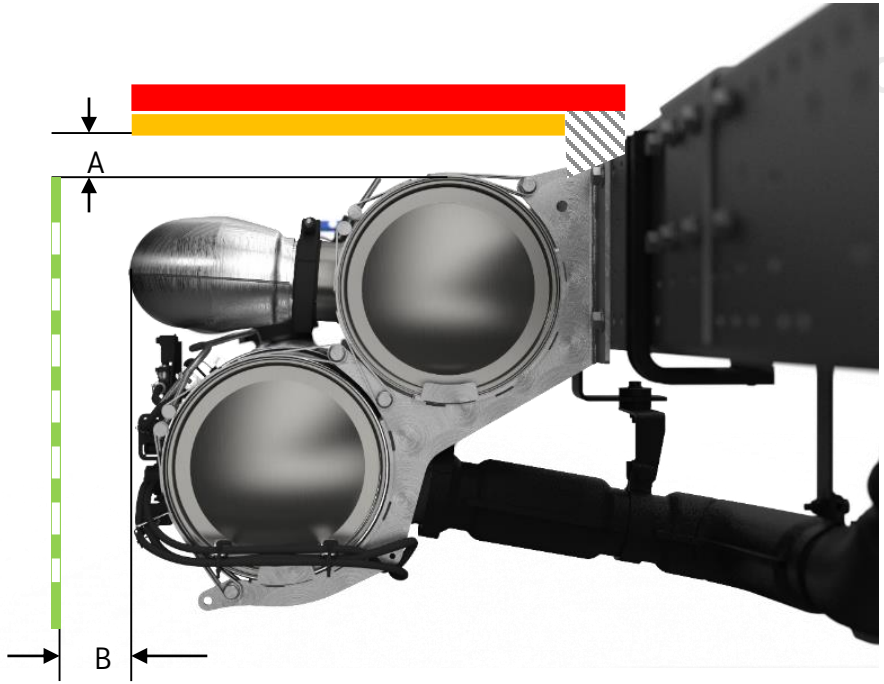
!

The catalyst/SCR system should not be removed in the body building process. During the body assembling process, the catalyst must be protected against mechanical impacts in order to prevent damages to the sensors, etc.

13.4.7 Turbocharger heat shield

On the OF chassis with OM926 engine it is necessary to ensure a minimum clearance of 70mm at the engine cover to permit the removal of the turbocharger's heat shield.

13.3 Exhaust unit insulation



A – 400 mm min.

B – 100 mm

Fig. ATS View from front

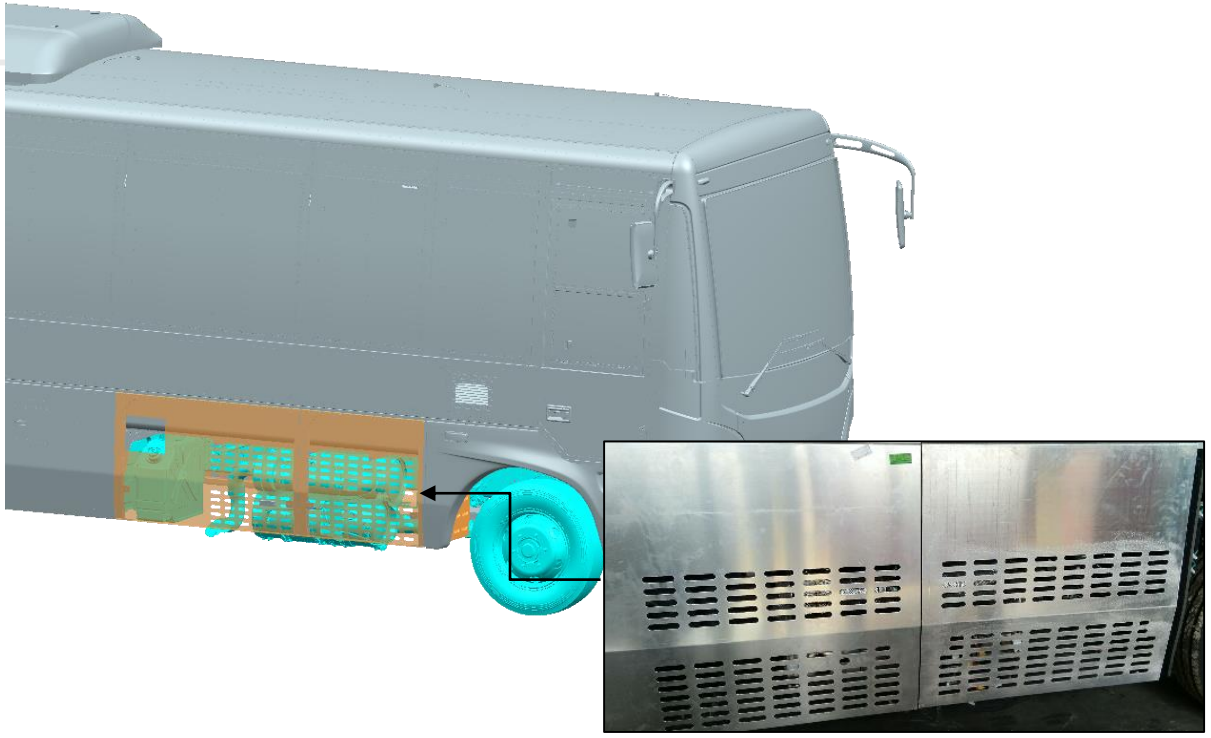
Insulation: Superwool plus 1200 with AL foil
Density : 128 Kg/m3
Source; (Murugappa Morgan Thermal Ceramics Ltd.)

Plywood

Skirt panel

Body support structure

Exhaust system



ATS Body side panel with 20 dm^2 Openings

- The ATS unit and Exhaust pipe should not be relocated from the original position
- The body components near BS6 exhaust unit should be well insulated, There must be a gap between the top of the ATS and Body (A), as shown.
- Similarly, There should be a minimum gap of 100mm from the muffler and body in the lateral direction (B);
- The body skirt panel on ATS should have an perforations of minimum 20dm^2 opening positioned exactly in front of the ATS to allow free flow air for cooling of the ATS.

1904GL01H

14 Fuel system

14.1 Fuel reservoir

1904GL01H

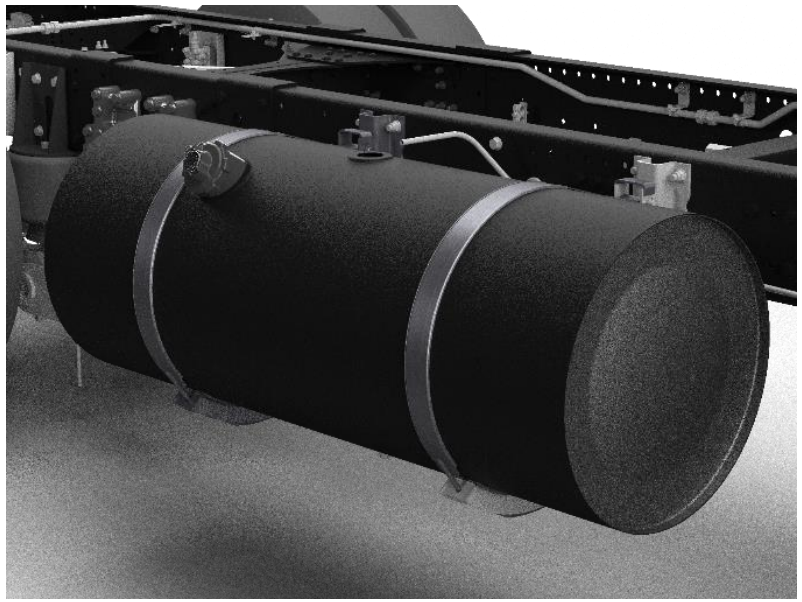
The chassis are supplied with the fuel tanks in their permanent position.

It's repositioning is not permitted. In exempted cases prior evaluation & approval of the repositioning is necessary from Body Building Advisory, Daimler buses India.

The fuel reservoirs installed by the body builders must follow the building norms and safety tests established for the purpose, in force in the respective countries, as well as the prescriptions contained in this chapter.

For the all the OF 16T chassis, we recommend the utilization of the original Daimler (A 400 470 1101) fuel reservoirs of 380L holding capacity.

1904GL01H



Fuel Tank

14 Fuel system

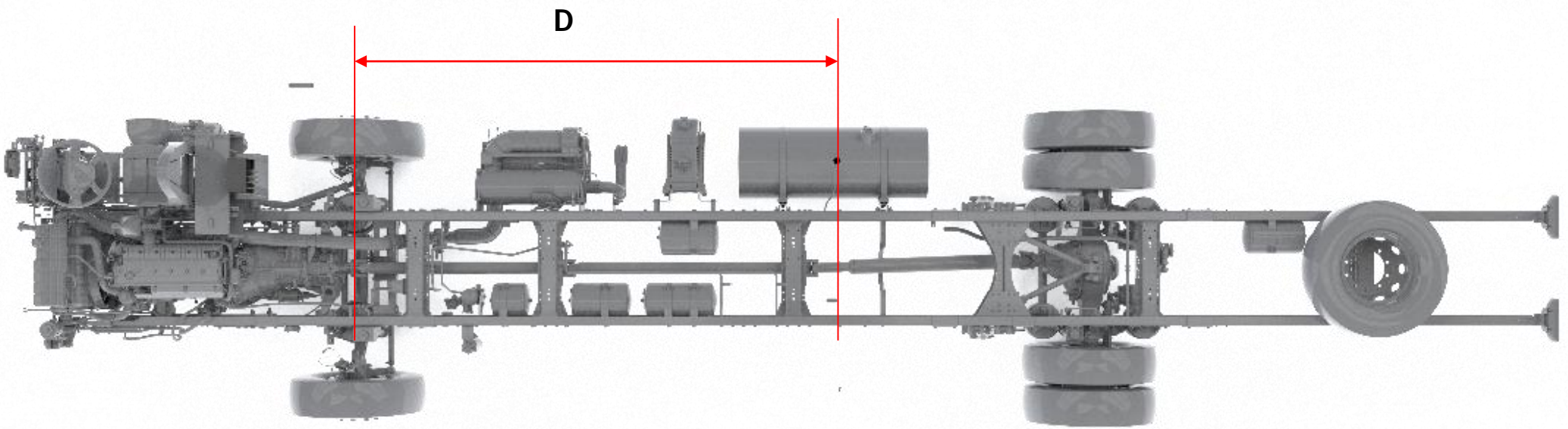
14.1 Fuel reservoir

14.1.1 Fuel reservoir position

1904GL01H

Tab8- **Original fuel reservoir position**

Fuel reservoir/Chassis	380L
OF 1624/1624L	4130 mm



OF 1624L Position of the reservoirs

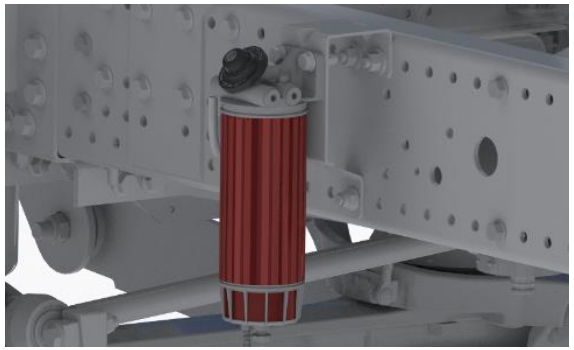
1904GL01H

14 Fuel system

14.1 Water Separator

1904GL01H

14.1.2 Water separator filter



Water separator filter

The fuel system has a water separator filter, which has as function to improve the quality of the fuel, making possible a better performance and increasing the durability of the engine.

The body manufacturer must foresee in the Body Development project an easy access for the view and maintenance.

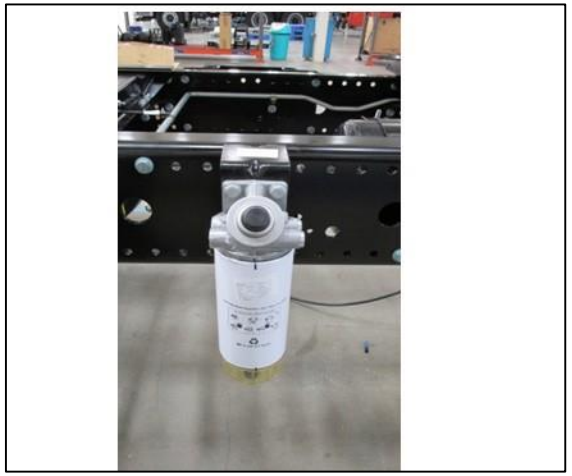
If the repositioning of the separator filter is necessary during Bodybuilding process, Kindly contact Daimler Buses India with relocation proposal.

This new location must not make possible oil spillage on components such as the belts, exhaust pipe, cooler and other peripheral components, during the removal for cleaning.

The maintenance services must be carried out according to the "Mercedes-Benz Maintenance Plan" or whenever a high concentration of water in the fuel is present.

!

Bodybuilder must keep easy access for viewing its condition and maintenance access, side cover or flap must be openable type.
Do Not combine Water separator and Battery Box, they must be separated & drain hole to be provided in its compartment.



Water separator filter

14.1.3 Fuel System Bleeding

It is not necessary to release or disconnect the connections and lines to bleed the fuel system. If the lines between the nozzle and the diesel injection unit is removed, replace them with new lines to avoid leaks.

The incorrect installation of the lines in the nozzles and/or injector units may cause diesel leakage, and consequently, the risk of fires.

1904GL01H

14 Fuel system

14.1 Water Separator

1904GL01H

Water separator filter

14.1.4 Bleeding Procedure

- Pump the fuel, using the manual pump handle 1, until you notice a strong resistance caused by the increase of the system pressure.
- Actuate the starter motor, without accelerating. If the engine does not start within 20 seconds, interrupt the starter motor actuation and wait for at least a minute before trying again. If the engine does not start to operate, repeat the bleeding process.
- Let the engine continue to operate for approximately 1 minute to eliminate completely the air from the system by the self-bleeding process.

1904GL01H

14 Fuel system

14.2 Central fuel tank

1904GL01H

Not applicable.

1904GL01H

15 Manual gearbox

15.1 Care with the Transmission Control System

1904GL01H

The chassis are delivered with the final configuration of the gear shifting system, no changes are allowed.

Change sin original position may cause hard gear shifting, more efforts to driver & other ergonomics issues.

During development of engine hood and front panel, lever and gear shifting assembly movements shall be foreseen, taking into consideration all gear shifts, as well as the cushioning system clearances of powertrain unit, thus avoiding interference.

In the shifting lever area, the assembly of the finishing pieces must be foreseen, in order to avoid the noise, heat and impurities penetration.

1904GL01H

15 Manual gearbox

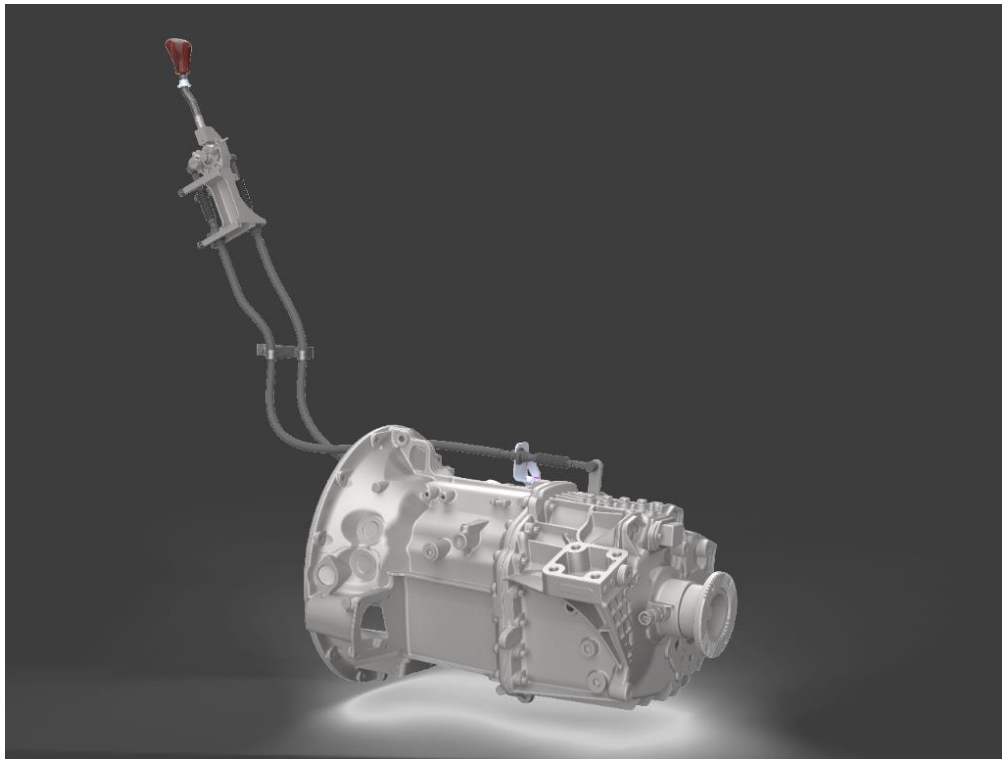
15.2 Gear shifting system cables length

1904GL01H

The gear shifting system cables are delivered in definitive length, and must not be changed.

The Body Builder must also ensure to keep a minimum distance of 50 mm between the powertrain set (engine and transmission) and the body all over its perimeter.

Transmission control system movements must be foreseen in the development of the body floor structure including all possible gear shifts, as well as the clearance of the power train mount systems to avoid interferences.



Cable shifting system

1904GL01H

15 Manual gearbox

15.3 Gearshift cables - disassembly and assembly

1904GL01H

The gear shifting system cables must not be disassembled during body assembly process.

15.4 Gearbox linkage cable adjustment

!

Not applicable.

1904GL01H

15.5 Positioning of shifting lever support

The shift gate frame is supplied already in its definitive position, there are no adjustment options.

The repositioning is not allowed.

15.5 Positioning of shifting lever support

The propeller shaft must not be painted or covered with anti-resonance material.

Changes in the propeller shaft are not allowed.

16 Automatic gearbox

1904GL01H

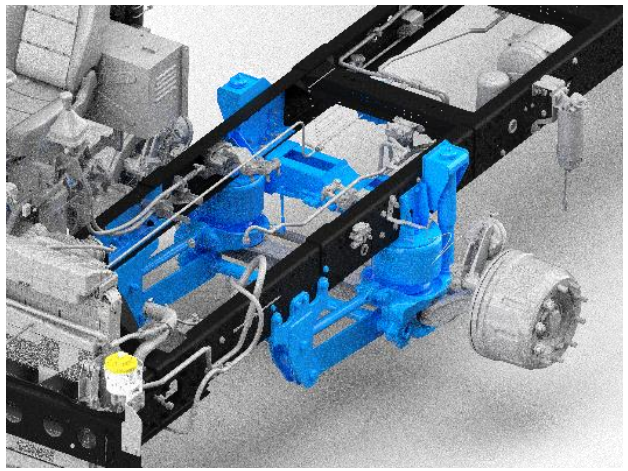
Not applicable.

1904GL01H

17 Suspension system

17.1 Care with suspension system

1904GL01H



Front Air Suspension

Take the due precautions with the suspension when you carry out body installation works to avoid damaging the suspension components. During the painting and eventual welding processes, the wiring harnesses, springs, air bellows, lines, and pneumatic valves must be protected.

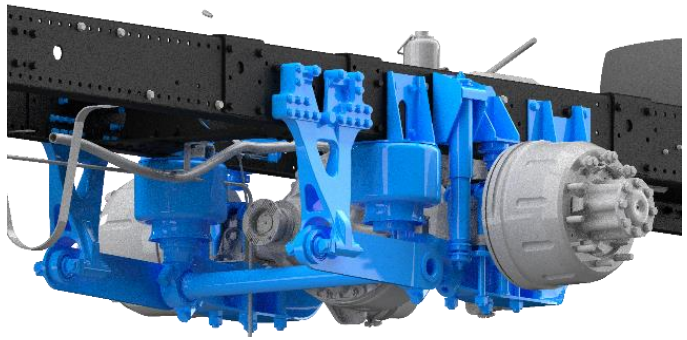
The use of suspension components (such as springs, bellows, shock absorbers and its supports) in the welding equipment electrodes tests is not allowed.

Take the due precautions with the compressed-air line of the suspension while cutting or drilling to avoid damaging them.

Check whether there are leaks at the compressed-air line of the suspension, mainly at the connection region, after completing the body building.

!

Do not disable the air suspension level regulating valve rods during the transport.



Rear Air Suspension

!

The body must make possible the removal and installation of the leaf spring of the front and rear suspension.

1904GL01H

17 Suspension system

17.2 Suspension height

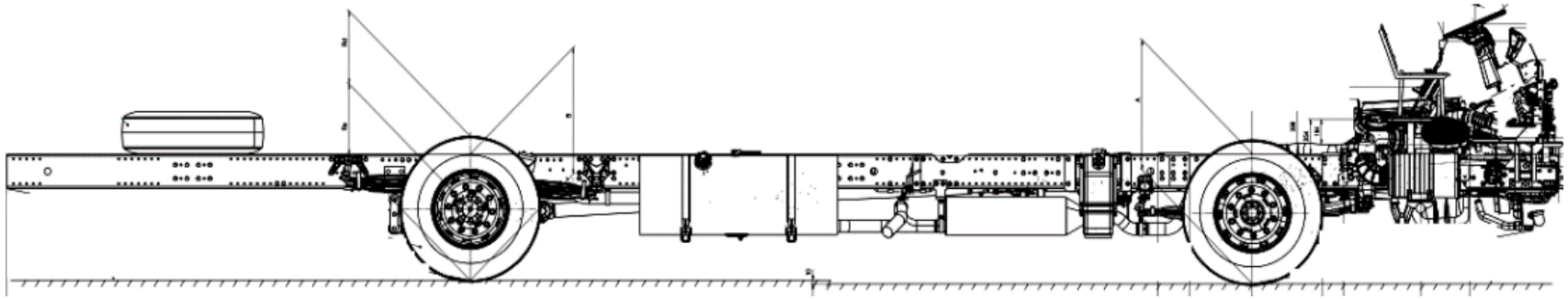
17.2.1 Steel springs suspension

1904GL01H

To determine the height of the first step of the body and the height of the floor with regard to the ground, it is necessary to check the height of the chassis with regard to the ground for the several foreseen loads.

In the offer drawings the heights “A” and “B” of the chassis in the unladen condition (series version – without optional items) and loaded condition (GVWR).

1904GL01H



Chassis height

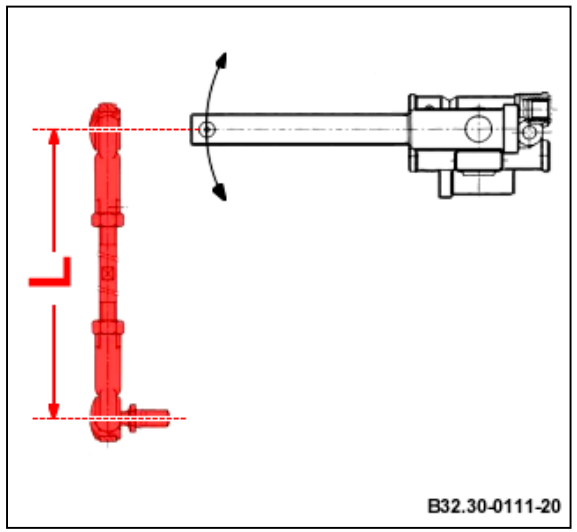
A Chassis height to ground level-front axle
B Chassis height to ground level-rear axle

17 Suspension system

17.2 Suspension height

17.2.2 Pneumatic springs suspension

1904GL01H



Actuation rod

For chassis equipped with air suspension, the height from the ground with regard to the structure (frame) varies according to the pressure at the bellows (air bellows) and also according to the tires' diameter. The level adjustment valves pressurize and de-pressurize the bellows automatically during the vehicle operation. The valves level and increase the smooth operation in irregular ground or irregular surface roads. Therefore, it is necessary to establish a standard height to serve as standard reference height for the level adjustment valves.

The height adjustments are carried out by changing the length of the suspension level control valves actuation stems: To increase the vehicle height, increase the rod length. Conversely, to lower the vehicle, the length of the rod should be reduced.

At the front part, only a valve controls the air suspension bellows of the front axle.

At the rear part, one or two valves control the bellows of the rear drive axle set.

Remarks:

A peculiarity of the level regulating valves is that each of them has its own established position, number and side.

Do not change the leveling stem height without consent from Daimler Buses technical team, it can greatly affects the ride & handling of the Bus.

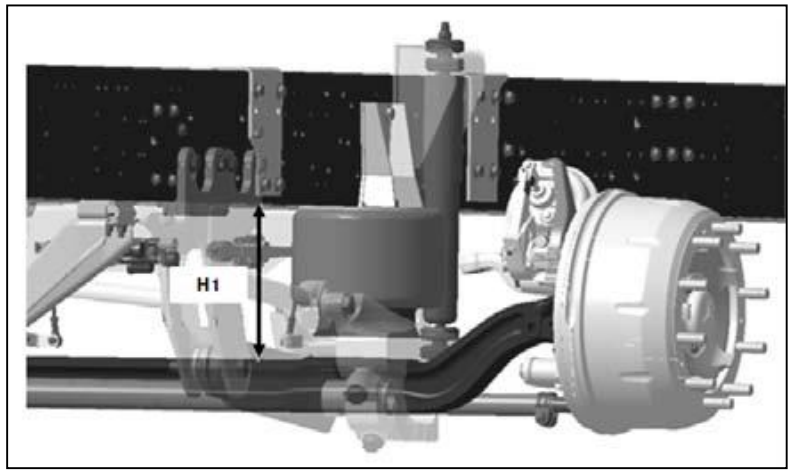
1904GL01H

17 Suspension system

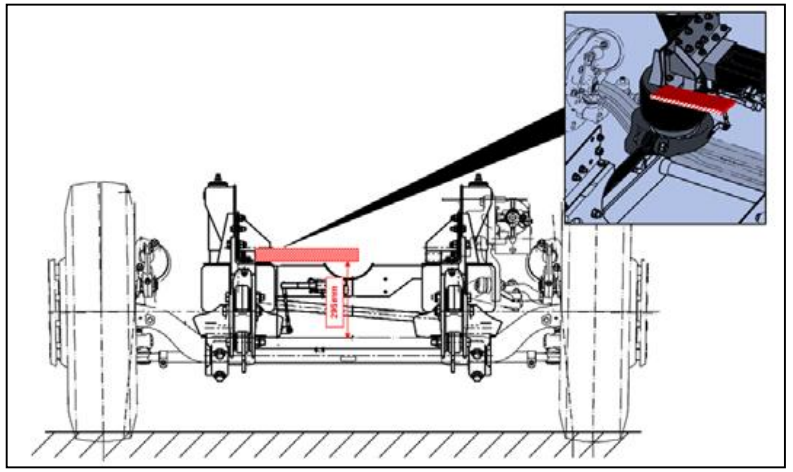
17.2 Suspension height

17.2.2 Pneumatic springs suspension

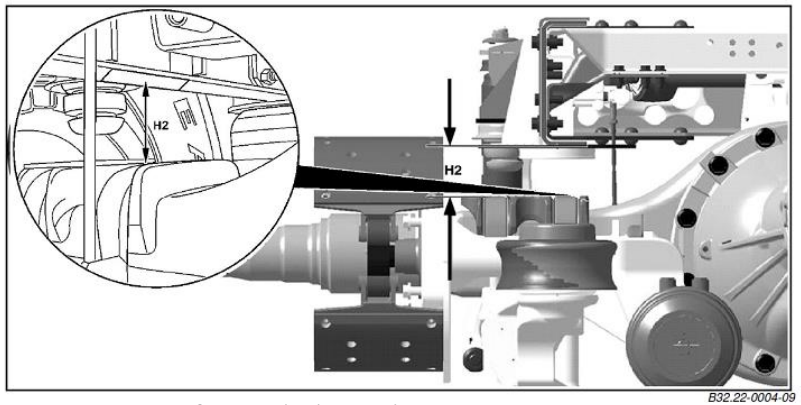
1904GL01H



Suspension's H1 distance (Front axle)



Suspension's H1 distance



Suspension's H2 distance (Rear Axle)

H1 = 295 mm (distance between the side rail bottom face and the front axle beam top face).

H2 = 96 mm (distance between the side rail bottom face and the clamps of the bellows bottom base).

Remarks:
The "H1" and "H2" heights does not change by the tires' diameters. The overall distance from the ground up to the chassis structure varies according to the tires, without interfering in the suspension adjustment height.

1904GL01H

17 Suspension system

17.2 Suspension height

1904GL01H

Height adjustment of the conventional pneumatic suspension

- Adjustment of the Conventional Air Suspension Height
- Reference height for the adjustment of the front and rear suspensions.
- With the vehicle on a leveled ground, the level control valves remain inoperative with their levers in neutral. Upwards, the lever pressurizes the bellows and, down, it depressurizes.

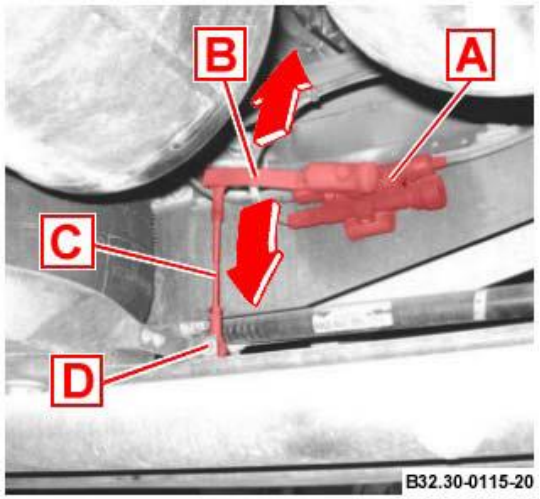
Preliminary conditions:

- Vehicle positioned on a flat and leveled ground, preferably over a ditch.
- Parking brake activated and wedge-type shims under the wheels.
- Tires calibrated at the working pressure recommended by the manufacturer.
- Level control valves and tight pneumatic system (no leakage).
- Front and rear air suspensions normally pressurized.
- If the vehicle is equipped with a lifting system, the system must be inactivated.
- Ball heads of the lever rods must be in good conditions.

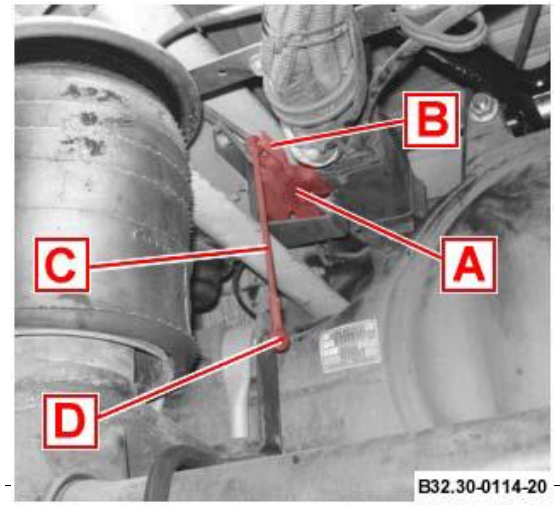
1904GL01H

17 Suspension system

17.2 Suspension height



Front suspension leveling valve



Rear suspension leveling valve

A Leveling valve
B Leveling lever
C Adjustable rod
D Articulation ball joints

Important:
At the front suspension, only a single valve controls the two bellows.
The level control valve (A) with its lever (B) released remain in the “neutral” position.
After 6 mm of the lever travel to each side, the valve starts to operate (175 mm lever).

Note:
By actuating the lever (B) up, the pressure in the bellows increases and the structure goes up.
By actuating the lever (B) down, the pressure in the bellows decreases and the structure goes down.

- **Adjusting procedures**
- Disconnect the actuation rod (C) at the ball head (D) leaving the lever of the level control valve (B) free and in the neutral position.
- Pressurize the air system fully.
- Establish clearly the H1 height measurement point for the front suspension or H2 for the rear suspension.
- Actuate the lever (B) of the level control valve and establish the H1 (front) or H2 (rear) adjustment dimension. Do not exceed during the lifting, as the lever will be without Control
- Adjust the actuation rod (C) until it matches with the “neutral” point of the level control valve lever (B). At this point, connect the rod to the ball head, taking care to tighten the rod adjustment nut.
- To confirm the adjustment, it is recommended to disconnect the lever from the rod again, de-pressurize manually the bellows, connect the lever, pressurize the vehicle system and wait until the H1 or H2 height get automatically established.
- If the front and rear suspensions are already regulated, we suggest that a test drive is done preferably in a place where the paving is irregular and uneven. Later, put the vehicle over a ditch and confirm the adjustment heights H1 in the front, and H2 in the rear

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17 Suspension system

17.2 Suspension height

1904GL01H

Body Building Process

During the body building of vehicles with NR, the suspension height adjustment is not necessary because all chassis are supplied for bodybuilding with pre-established calibration by Daimler Buses, which takes into consideration the body weight.

Deactivate the sensors during the transport to the body manufacturer to avoid reading errors that could block the system operation.

After the body building, follow this procedure to activate the sensors to enable the system to operate normally:

- Connect the height sensor rod to the axle.
- The system operation keys must be installed in such a manner that the driver is able to access them easily.
- Only after the installation of the other components, the system control unit must be connected to the main harness.

Note:
As the system is calibrated after its installation on the chassis, the components are not exchangeable. Therefore, the exchange of control units among the vehicles without recalibration is not allowed.

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17 Suspension system

17.2 Suspension height

1904GL01H

The control unit must only be connected after body building conclusion of the chassis and the installation of the other system components.

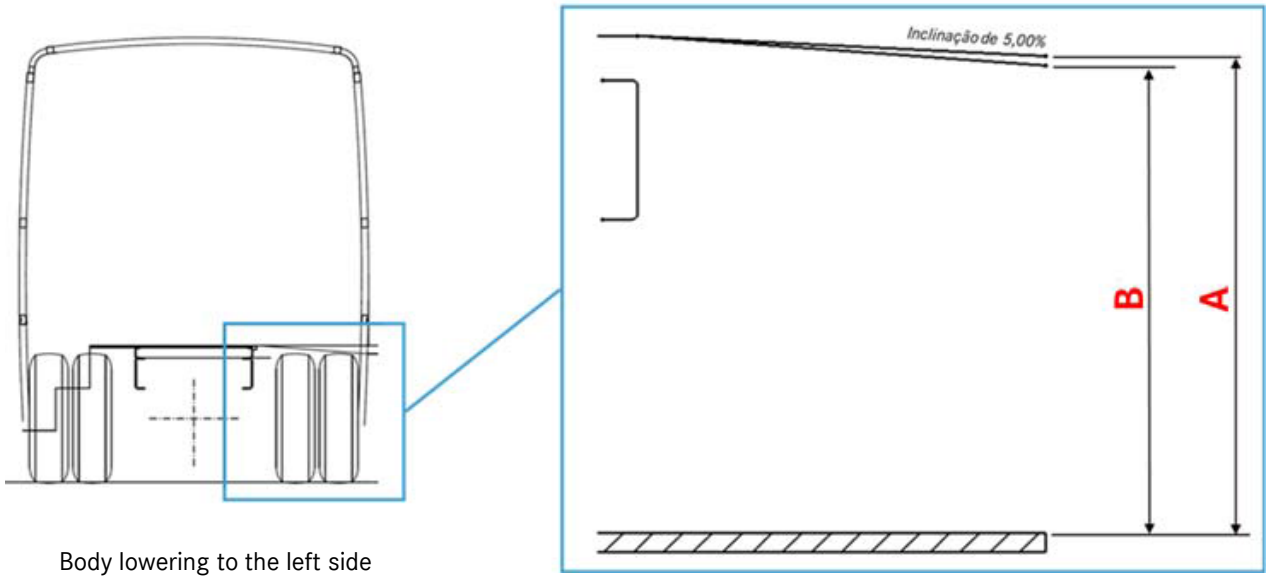
The system does not make possible to carry out settings without the use of adequate equipment, and must not, therefore, be changed during the body building process.

Suspension Levels Variation for Chassis Equipped with the "NR" Suspension Electronic Control System.

Reference values for the project, considering a body width of 2,600 mm.

Lowering of the body to the left side - boarding platform

The actuation of the electronic suspension control system makes possible to lower the vehicle at the left side, approximately 28mm (considering a body width of 2,600 mm).



Body lowering to the left side

1904GL01H

17 Suspension system

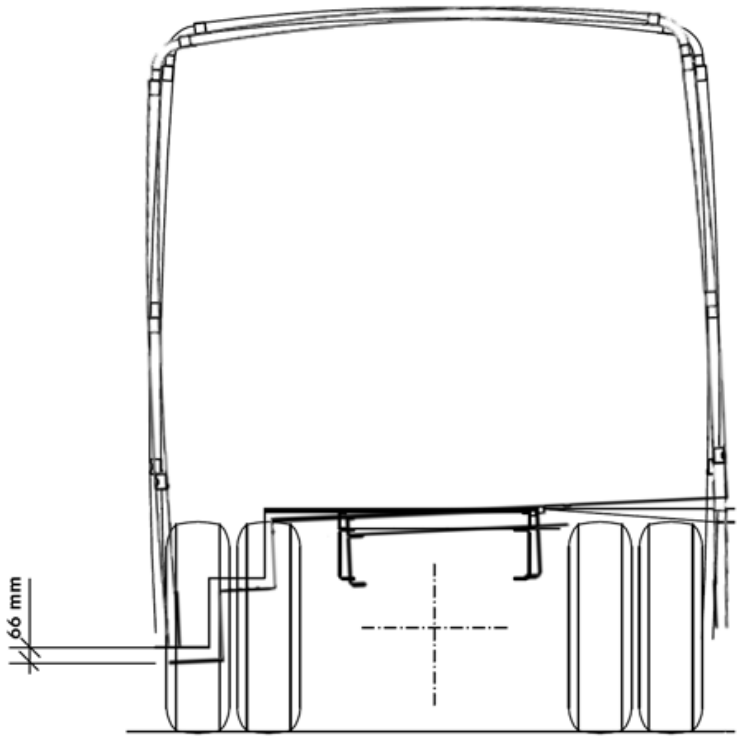
17.2 Suspension height

1904GL01H

Lowering of the body to the right side - boarding steps

The actuation of the electronic suspension control system makes possible to lower the vehicle at the right side, approximately 66 mm (considering a body width of 2,600 mm).

1904GL01H



Body lowering to the right side

18 Climate control

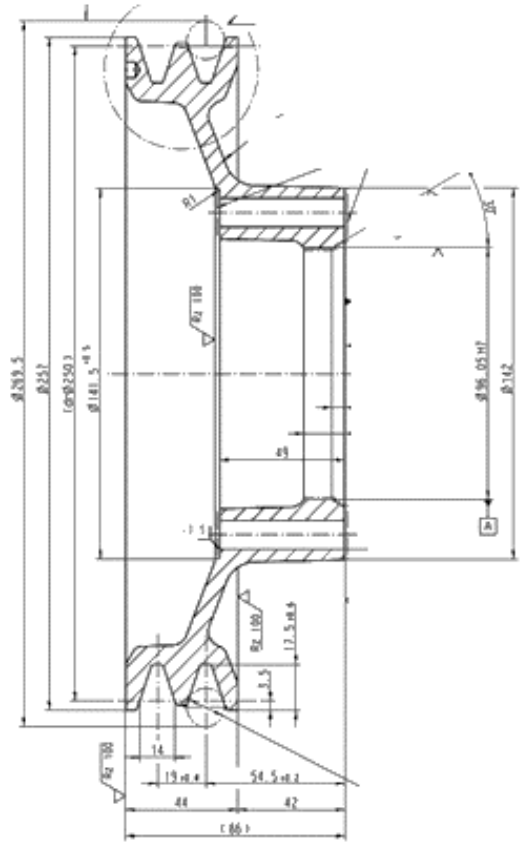
18.1 Air conditioner

1904GL01H

The chassis are equipped from the plant with a special version (SA) “Preparation for the installation of air conditioning” which is formed by the installation of the additional pulley **A9042340212** for the actuation of the air conditioning system compressor, duly approved in agreement with Daimler Buses India.

This pulley has a 250 mm diameter with double "V" channel, with a B profile, assembled between the front end of the crankshaft and the fan.

The air conditioning compressor base and additional alternator must be fastened to the vehicle frame (longitudinal members). The fastening of these components to the engine is not allowed.

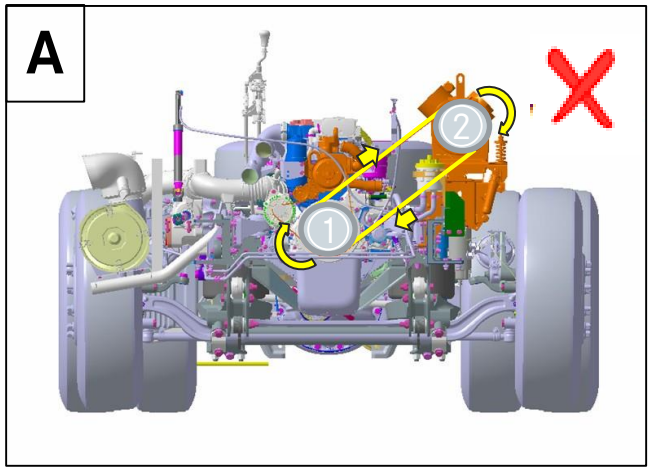


Compressor drive pulley

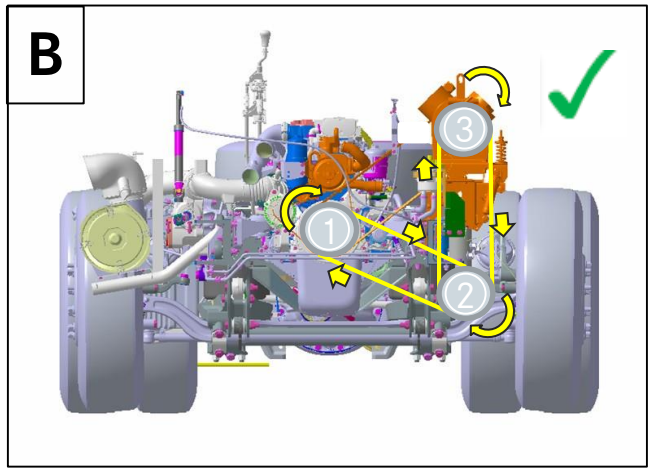
1904GL01H

18 Climate control

18.1 Air conditioner



Compressor fixation on top side



Compressor drive pulley

The correct operation and durability of the air conditioning installations on the Daimler bus chassis are the Body Builders' responsibility or their Implementers', as the processes adopted are not controlled by Daimler Buses India.

The air conditioning belts tensioning system must foresee the relative movements of the engine, by adopting systems with shock absorbers (for example, by using pneumatic or hydraulic cylinders).

The rigidity of the tensioning system may cause vibrations inside the vehicle compromising the comfort of the bus passengers as well as reducing the durability of the set.

The whole set must be properly equipped with mounts to minimize the problems due to vibrations.

The Body Builder or the Implementer responsible for the air conditioning installation must install pulleys of the "tensioning roll" type to avoid the belts flotation. We suggest to “divide the space between the pulleys in two parts” by the insertion of tensioning rolls.

Drive arrangement seen in (A), direct drive layout can interfere with cooling and steering system pipes hence modifications to any of the chassis components and hydraulic pipes are not allowed.

We emphasis that compressor installation must be carried at higher position with the support of idler pulley shown beside (B) which connects AC compressor belt drive to main engine pulley without disturbing chassis hydraulic pipes.

1. Engine Pulley
2. Idle Pulley
3. compressor Pulley

18 Climate control

18.1 Air conditioner

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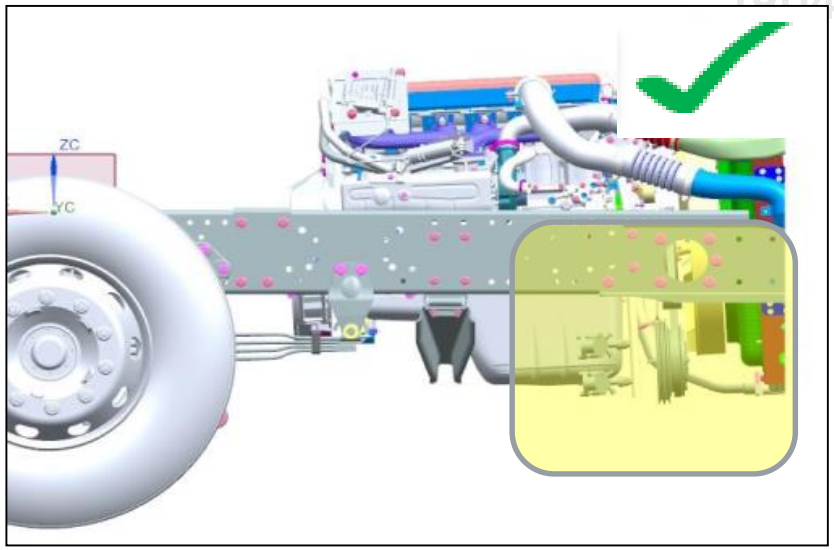

Compressor drive direct arrangement
(TM 65)

We highlight that the air conditioner installation without idle pulley can also be possible on lower side of the frame connecting direct drive for AC compressor pulley to engine pulley.

The base of the air conditioning compressor and additional alternator can be to fastened to the chassis frame (side rails). The fastening of these components to the engine is not allowed.

For the air conditioner compressor system sizing, it should be considered the customer operation characteristics, complying with the engine sizing limits:

***Tab9*- Speed Specifications of OM 906 Engine**

Engine	OM926 240hp BS 6
Idle speed	650 rpm
Maximum torque rotation	1200 – 1600 rpm
Maximum power rotation	2200 rpm
Maximum rotation	2750 rpm
Maximum free rotation	2750 rpm

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18 Climate control

18.2 Heating system

The chassis can be equipped from the factory with a special version (SA) “Preparation for the installation of the heating system”, since the programming is done at Daimler Buses India plant.

Below you can see the arrangement of outlet points and heater water return of the engine for the heating system:

Arrangement of the space heating tap

WARNING!

OF 1624L chassis is compatible with heating system for driver compartment and windshield de-mister only, use for entire passenger salon heating system is not permitted,

Un-authorized implementation of passenger saloon heating system may cause void warranty of Engine, cooling system & related systems.

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18 Climate control

18.2 Heating system

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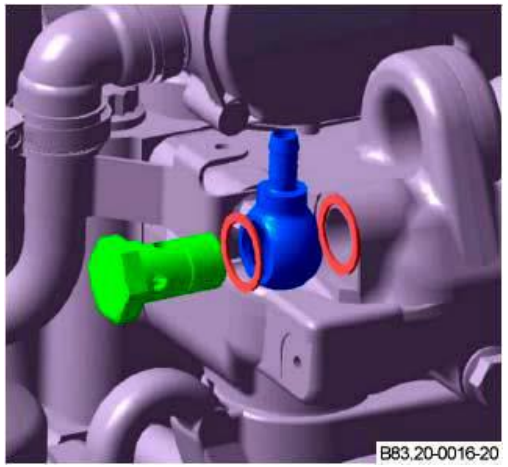
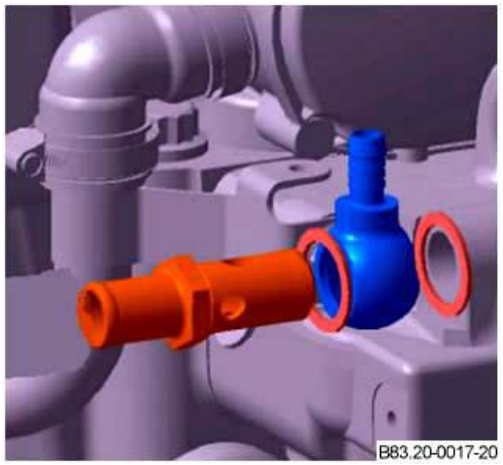


Hollow bolt



Connecting Plug

The chassis have in the engine front end a coolant outlet for the space heating system. For vehicles that will have heating, the hot water intake should derivate exclusively from this connection.

1. For the tapping of hot coolant for space heating, it will be necessary the body builder's action in
2. the replacement of the hollow bolt (**A000 997 56 01**) for the space heating connection (**A904 997 00 72**) and the sealing rings (**N000 000 00 10 72**) that will have to be procured in the Daimler Buses authorized Dealership.
3. Apply 40±4Nm tightening torque on the heating connection after the final assembly.
4. Follow the heating system assembling according to project specific of each body builder.

***Tab10*- Components for the hot water heater outlet**

Component	Part no	Quantity
Hollow bolt(Replace)	A000 997 56 01	1 Part
Sealing ring(Replace)	N000 000 00 10 72	2 Part
Engine Deceleration eyelet(Keep)	A001 990 86 88	1 Part
Heating connection(include)	A904 997 00 72	1 Part

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18 Climate control

18.2 Heating system

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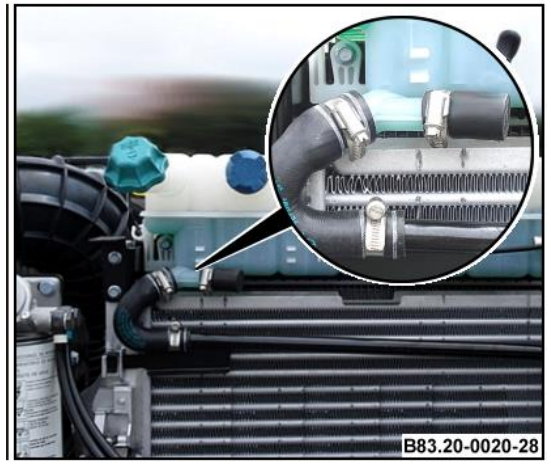

Return of the heating coolant

The coolant will have to be replenished following instructions in 3.22.2 Regulation of the coolant - A – in Body building Directives General Part.

To eliminate air from the system, the following procedure should be adopted:

1 After refueling the system, let the engine operate for approximately 10 minutes.

2 Check the coolant level and refuel if necessary.

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19 Maintenance accesses

19.1 Maintenance accesses

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The Body Builder must foresee in the projects, the free access for the maintenance services (lubrication, repairs, adjustments, etc.), as well as making possible the removal and installation of any component of the vehicle, such as: engine, transmission, etc.

Bodybuilder must foresee also easy access to check refuel level of the coolant expansion reservoir, power steering fluid reservoir and clutch operation system.

Whenever necessary, the Body Builder should install removable covers and/or lids that make possible the easy execution of the several maintenance and repair services in the vehicle (for example: access cover to the upper part of the transmission).

Arrangement of the Inspection and Maintenance Covers

In the figures below, we give examples of the external and internal covers for the focused chassis. The dimensions must ensure easy access for the inspection and maintenance of the vehicle.

The Body Builder must install means of access to the Radiators, expansion tank, fuel filter, steering system reservoir, clutch fluid reservoir and other reservoirs, as well as making easy to see the air filter restriction indicator. If it is not possible the access from the front part, provide internal access covers.

Note:

The vehicles equipped with optional items (for example, retarder, automatic transmission, and fuel tank) must have covers that enable easy access for maintenance.

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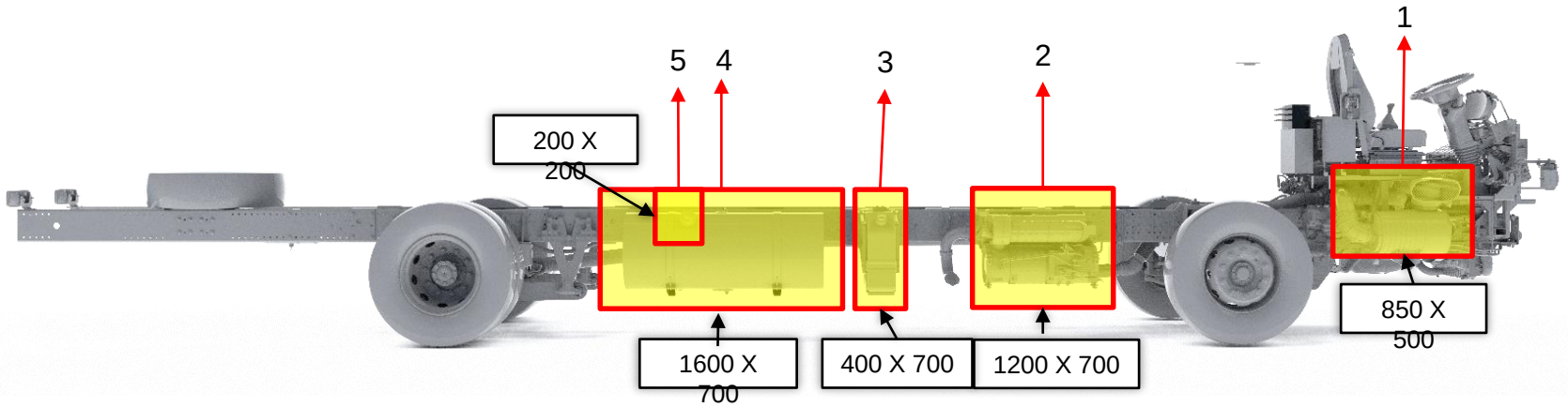
19 Maintenance accesses

19.1 Maintenance accesses

1904GL01H



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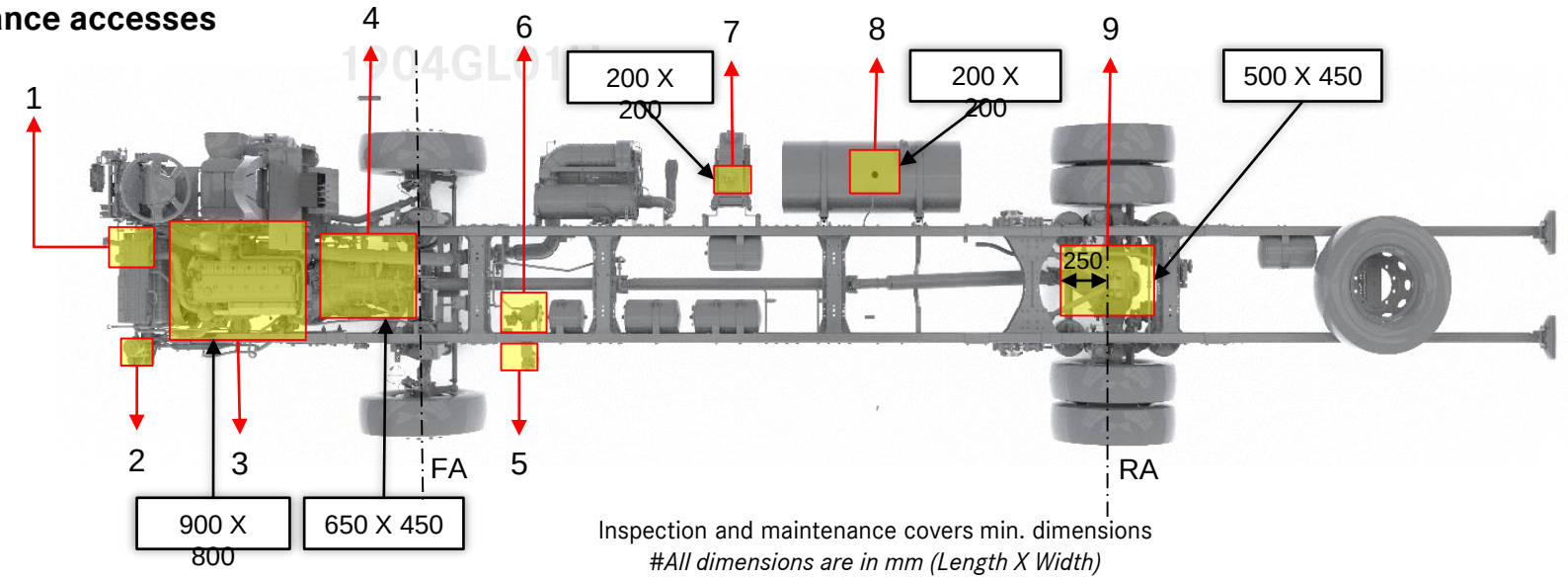
Inspection and maintenance covers

1 Air filter (800X450)
2 ATS system
3 AdBlue® Tank filler neck
4 Fuel reservoir
5 Fuel reservoir filler neck

19 Maintenance accesses

19.1 Maintenance accesses



Inspection and maintenance covers min. dimensions
#All dimensions are in mm (Length X Width)

Expansion tank/reservoirs/engine filters - Reservoirs such as clutch fluid, coolant, steering oil, windscreen washer fluid etc. must have proper access to visually inspect the levels (Max and Min marks must be properly visible).
The cut-outs/ flaps must have adequate space for filling and draining.

1. Radiator tank
2. Power steering oil reservoir
3. Engine
4. Gearbox
5. Water separator/Fuel filter
6. APU
7. Ad-Blue reservoir float
8. Fuel reservoir float - Provision for removal of fuel gauge float unit must be provided.
9. Rear axle (Cut out must be positioned at the center of the V-rod fixation)

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19 Maintenance accesses

19.1 Maintenance accesses

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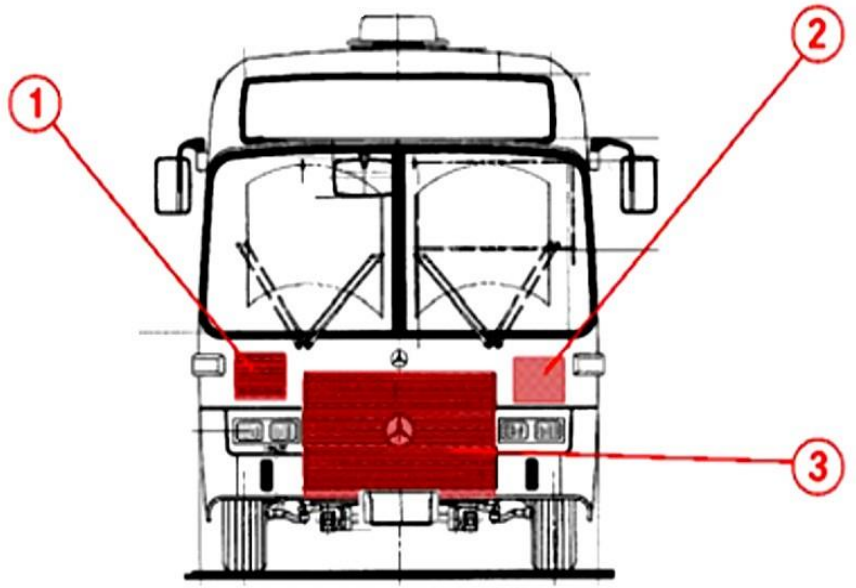

Accesses for inspection and maintenance

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Access to pedals, clutch fluid reservoir - Adequate space for access to all the three pedals for play adjustments must be provided

1. Access to Clutch fluid reservoir
2. Access to Power steering reservoir
3. Access to radiators

Access covers exclusive for the leaf spring eyelets, pneumatic system valves set, fuel filters and engine lubricating oil, etc. are not necessary however, the access for the maintenance of these components and other mechanic and electric components of the chassis must be foreseen.

19 Maintenance accesses

19.1 Maintenance accesses

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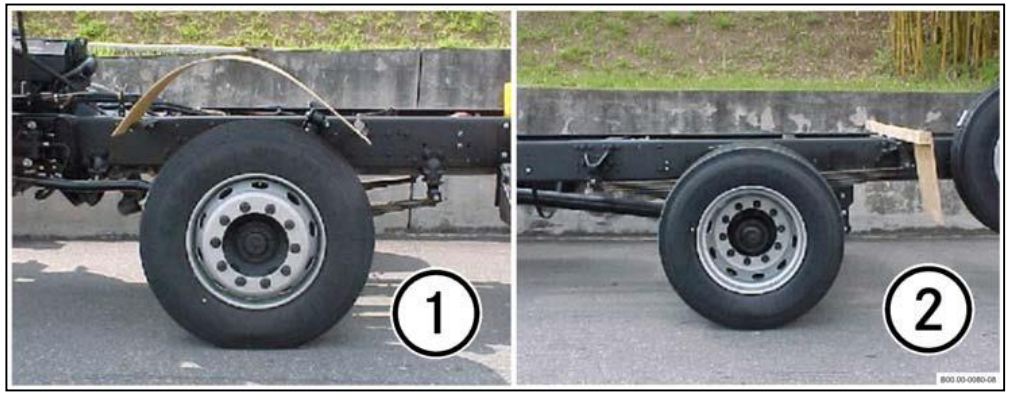
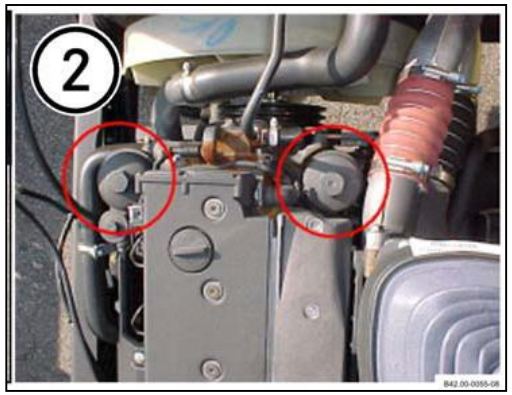
Access must be preserved for the mechanical springs, dampers , greasing points and other chassis components



Access to chassis components

1. Front axle
2. Rear axle



Access to valves and filters

1. Access to the pneumatic valves assembly
2. Access to the engine filters (engine oil and fuel)

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19 Maintenance accesses

19.1 Maintenance accesses

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Foresee access to the batteries, according to the body arrangement.

Poles, connectors and/or cables of the batteries and supports must not contact the body and/or its components during the installation and assembly to avoid possible short circuits, and consequently the risk of fire. It is necessary to isolate the poles, connectors and cables of the batteries.

- Access cover for spare tire – Tire compartment and a top hinged hatch should be provided by the bodybuilder to facilitate easy removal and refitting of the tire from the exterior.

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20 Thermal acoustic insulation

20.1 Thermal acoustic insulation

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!

There are no specific information related to the subject for these chassis.
For general information on the correct execution of the body building, refer to the manual Guidelines for Body Building - “General Manual" Chapter 3.17 Thermal acoustic isolation.

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21 Ergonomics

21.1 Driver's seat

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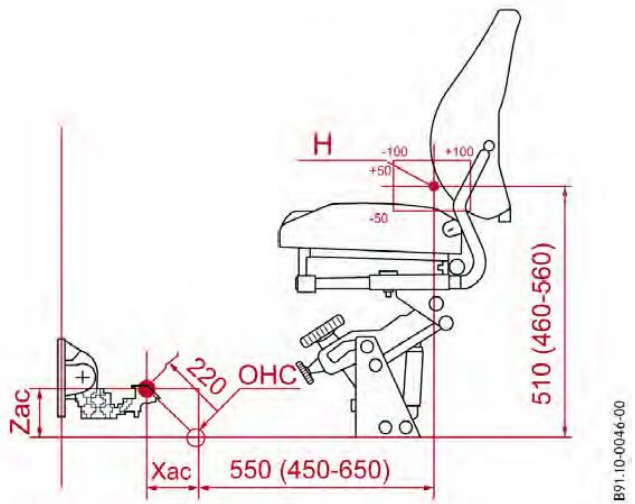
For the correct positioning of any seat model, the Body Builder must use as reference the x and z distances between the OHC (accelerator foot heel point) and the H point (driver's hip articulation), as established in the ergonomic requirements of vehicles standards (ISO/DIS 16121-1 Standard: Road vehicles – Ergonomic requirements for driver's workplace in line-service buses).

The figure indicates the horizontal and vertical distances recommended for the driver's seat, using as reference the center of the accelerator pedal and the H point of the seat.

The seat suppliers must inform in the technical drawings the x and z coordinates of the H point in relation to the fastening points of the seats, as well as the seat travel settings.

It is important to emphasize that the ISO/DIS 16121-1 standard establishes as minimum seat travel settings, 200mm for the horizontal and 100mm for the vertical travel setting.

The positioning shown below is valid only for seats with settings equal or greater than these.



OHC - accelerator foot heel point
H - driver hip articulation point
Xac - distance from the accelerator center/OHC
Zac - accelerator center height

Driver's seat Ergonomics

21 Ergonomics

21.1 Driver's seat

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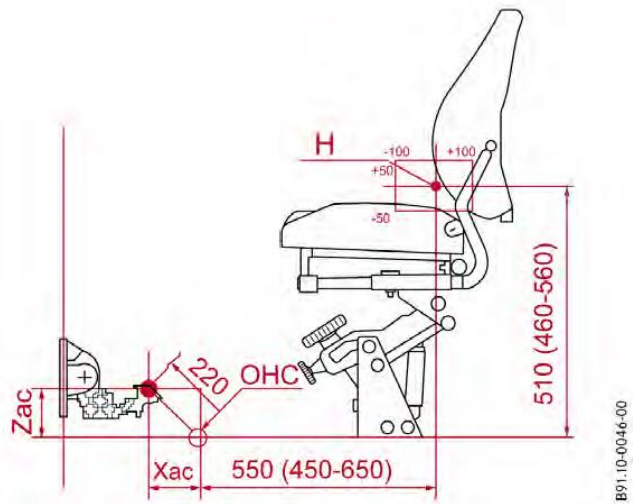
OHC : Vehicle floor point measured 220 mm far from the accelerator center.

H : The seat suppliers must inform the Body Builders the correct H point positioning.

Zac : Accelerator height.

Zac : Varies according to the body floor between 100 and 120 mm, and this is why the Xac dimension may also vary.

Zac	Xac
100	173
120	160



OHC - accelerator foot heel point
H - driver hip articulation point
Xac - distance from the accelerator center/OHC
Zac - accelerator center height

Driver's seat

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21 Ergonomics

21.2 Instruments cluster

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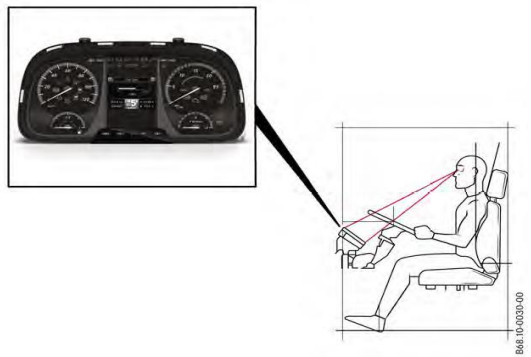

Instrument cluster

The instrument cluster is supplied in the chassis in an ergonomically adequate position and the Body Builder must use definitive supports to install the instrument cluster in the body.

The Body Builder should observe the following items when positioning the instrument cluster in the vehicles according to the geometry:

The Body Builder must ensure that the adopted positioning makes possible to see adequately, in all the steering wheel adjustment conditions, all the instrument cluster elements, including the indicator lamps. The line of sight cannot be cut by the rim or by the central region of the steering wheel.

The inclination of the panel should be 62.5° to eliminate the possibility of reflections due to the curvature of the front lens.

If it is necessary for the Body Builder to reposition the instrument cluster, its displacement must be carried out exclusively in the center line of the average height driver's view point, keeping its 62.5° inclination.

As a suggestion, the instrument cluster may be embedded in the trim piece. The instrument cluster painting is recommended to be made in black color to avoid reflection. Align the centers between the instrument cluster, steering wheel and driver's seat.

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21 Ergonomics

21.2 Instruments cluster

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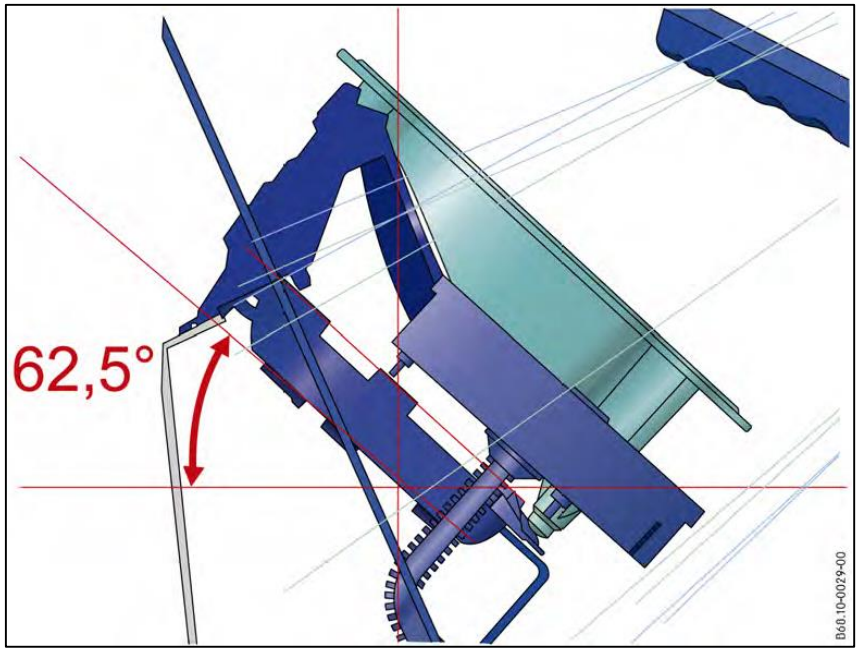
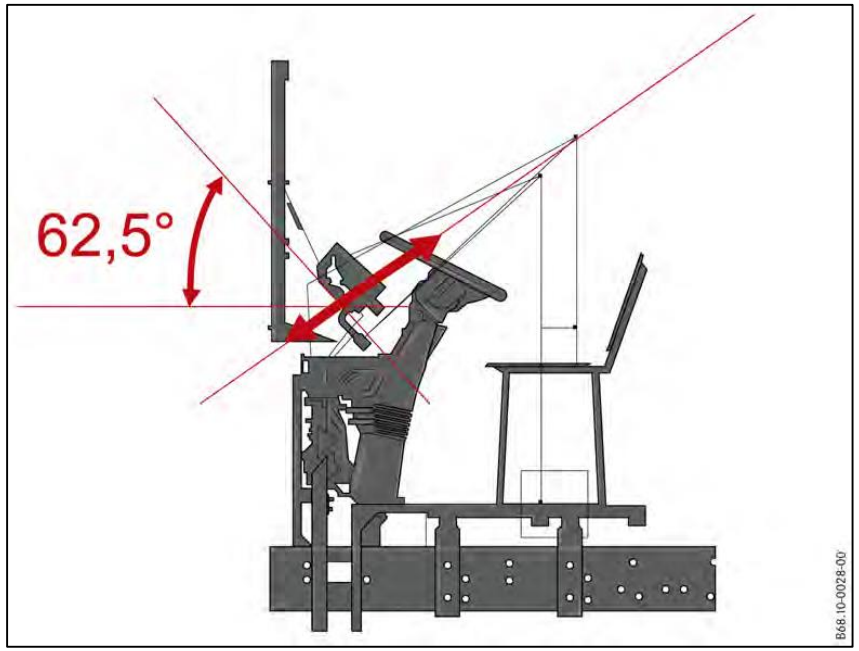
The inclination of the instrument cluster will have to be of 62.5° to eliminate the possibility of reflexes from the front lens curvature.



Instrument cluster inclination



Instrument cluster inclination

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21 Ergonomics

21.3 Gearshift lever

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The chassis are supplied with the gearshift lever installed in the definitive place, without available adjustment settings.

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22 Articulation

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!

Not applicable.

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23 Procedures for the chassis transport

OF Chassis are prepared for normal road traffic and with the necessary equipment according to urban and road traffic regulations, The max. speed of driving should not be exceeded 40kmph.

Important:

When perform loading and unloading maneuvering in semi-trailers, the vehicle must not exceed the speed of 20 km/h.

Chassis Towing

The first and last cross members of the chassis are not prepared aiming at being used in direct towing operations. The Body Builder must assemble a mechanism appropriate for this purpose, according to its operational needs, foreseeing the adaptation to the body.

Important:

For towing a chassis with automatic gearbox, the drive shaft must be disconnected. See chapter “Automatic gearbox” page 64.

!

The chassis must be parked in a flat floor place, avoiding possible twists that may cause permanent deformations in its structure.

The chassis have plastic covers for the protection of the instrument cluster, electrical center, batteries, and other electric and electronic components.

If such covers are removed during the transfer of the vehicle, take care for them to be put again and be correctly fastened to avoid damages to the mentioned electric and electronic components.

For further information, refer to the manual Guidelines for Body Building - “General Manual", chapter 3.6 Chassis transportation.

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Electric and Electronic part

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Contents

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- Introduction
- Body building process –Disassembly & assembly of WH
- Podest & surrounding EE systems
- Combined instrument panel
- Electric centre (ECU, Fuse, Relays…)
- Diagnostic plug
- Connector main board
- Body-chassis interface
- Ground point, battery compartment
- MR control unit/alternator

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1.Official approval

1.1 Dimensions

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***Tab1*- OF technical data – Standard (Non-Retarder chassis)**

	Standard			
Model	**1624L**		**1624**	
Nominal voltage	24 volts			
Battery	2 x 12 Volts, 200 Ah			
Alternator	1 x 100 A	1 x 100 A	1 x 100 A	1 x 100 A
Starter Motor	5,5 kW	5,5 kW	5,5 kW	5,5 kW
Fuses	Safety fuses			
Horn	335 Hz			

***Tab1*- OF technical data – Optional (Retarder chassis)**

	Optional			
Model	**1624**		**1624L**	
Battery	2 x 12 Volts, 200 Ah			
Alternator	2 x 100 A	2 x 100 A	2 x 100 A	2 x 100 A
Fuses	Safety fuses			

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2.Body building Process

2.1 Disassembly of modules and wiring harnesses

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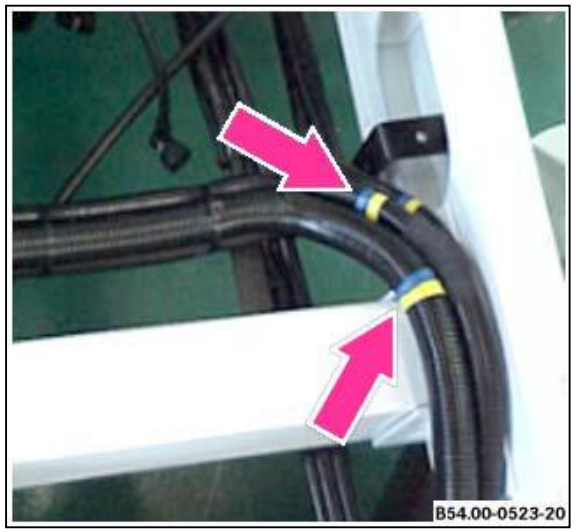
2.1.1 Preventing damage to electrical systems (General)



Fixing point on cross member

- All electronic modules are to be removed before starting the process of bodybuilding.
- All electronic modules must be placed away from, and protected against dust, soldering work (high temperatures, high electric current), paint and anti-corrosive agents.
- Because of the specific parametrization per chassis FZ, the electronic modules must not be swapped.
- Wiring harness must be protected against Welding splash, cutting or drilling operations.
- No electric wiring harness is to be cut, because it has been designed with enough length for the bodybuilding, if it become necessary to increase its length, it must be consulted prior with BBA, Daimler Buses India.
- Use wire gauges that are compatible with the loads to be installed.
- In the case of complementation or maintenance, do not modify the original vehicle wiring. Maintain the same wire gage in the case of a repair. Do not make direct connections by eliminating relays or other components, because these procedures may jeopardize the vehicle's complete installation
- In the process of bodybuilding care needs to be exercised in the protection of the electric wiring harnesses, from welding and high temperature, in order not to be damaged and causing short circuit.
- The new routing of the wire sets should be carefully executed in order to avoid their passage through areas with sharp edges or high-temperature regions so that their insulation is not damaged.
- Wire harnesses have “fixing points” along their length. These fixing points are colored marks to indicate the areas through which the wiring is to be directed. This feature is helpful during assembly and for standardizing wire lengths.

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Preventing damage to electrical systems

- The earth of electrical consumers does not return via the vehicle frame (current- free frame), but via the earthing points on the frame connected by wires.
- Incorrect supply voltage polarization can destroy the control units.
- Never start the engine unless the battery is securely connected (battery terminals tightened).
- The engine can be jumpstarted from another vehicle's battery, if the battery is flat. Observe vehicle Operating Instructions. Do not use quick-chargers for jump-starting.
- Only tow-start the vehicle when the battery is connected.
- Quick charge batteries only after disconnecting them from the bus electrical system. Both positive and negative terminals must be disconnected. Observe vehicle operating Instructions.
- Do not remove or connect control unit connectors while batteries are connected.
- Cables which are routed near the exhaust system must have fire-resistant sheathing.
- Route cables avoiding chafing points, particularly at joints and sharp edges. If necessary, use wiring ducts or conduit.
- The body-building support department must be contacted if the retrofitting of a battery isolating switch is needed.
- To take measurements in the electrical system use suitable test lines.
- The chassis wiring can not be enlarged without permission of the body-building support(BBS) department.

Electromagnetic compatibility (EMC)

- Electrical interference occurs in vehicle electrical circuits because of the various consumers. Electrical and electronic devices built in to the bus must demonstrate or guarantee electromagnetic compatibility and resistance to interference between themselves and also in respect of devices located outside the vehicle. Non-observance of this requirement may result in the vehicle's operating permit being invalidated (EUDirective2004/104/EC).
- The electromagnetic compatibility of electrical and electronic systems being retrofitted must have been granted type approval in accordance with EC Directive95/54/EEC and must bear the "e"mark.

2.Body building Process

2.2 Fuel system

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Fuel tank and filler must be designed so as to prevent electrostatic energy on their entire surface (EU Directive 70/221 EEC). Make sure the filler is connected to the metal chassis structure by means of an appropriate ground connection rod.
For OF chassis it is not necessary to any alterations for electrostatic discharge.

2.3 Fuel sensor

!

Not applicable.

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3.Podest

3.1 Combined instrument

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Consists of the combined instrument, tachograph which is an independent instrument is applicable only for Euro3/4/5 variants, main light switch and press button switches.

The components are secured to a support bracket so their transportation can be safely carried out preventing mechanical damage and/or short-circuits.

To inhibit weather action (water, dust and sunshine), the dashboard is protected with a cover that has to be kept in place from the final Daimler Buses India.. inspection up to the beginning of the bodybuilding.

It is extremely important that the cover continues to be used to protect the instruments, switches, accelerator pedal and steering wheel against water and dust infiltration during the period the vehicle is being transported or while it is parked in the yard.

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!

Protect electric electronics equipment with protective covers. Never remove the protection covers before body building.

3.Podest

Drw.Pos:	Description:	Daimler ID:	Color:
1	Traction Control	L14	Amber
2	ABS	L32	Amber
3	ESP	L102	Amber
4	Tire Failure	L112/L113	Amber/Red
5	Worn Brake Linings	L83	Amber
6	Activate Brake	L47	Amber
7	Left Turn	L1	Green
8	Left Turn Trailer	L3	Green
9	Rear axle second speed	L174	Green
10	Passenger Stop	L173	Green
11	Right Turn Trailer	L4	Green
12	Right Turn	L2	Green
13	Not used		
14	Not used		
15	Engine protection (engine stop)	L171	Red
16	General Red Warning	L129	Red
17	Not used		
18	Not used		
19	Not used		
20	Not used		
21	Not used		
22	Tachograph	L111	Amber
23	General Yellow Warning	L136	Amber
24	Not used		
25	Not used		
26	Not used		
27-28	Fuel/Low Fuel	L105/L38	White/Amber
29	Not used		
30	ABA Off	L103	Amber
31	ESP Off	L101	Amber
32	Low Air	L104/L6	Amber/Red
33	High Beam	L15	Blue
34	Not used		
35	Photo Sensor		
36	Parking Brake	L7	Red
37	Low Beam	L16	Green
38	MIL	L8	Amber
39	DPF	L13/L100	Amber/Red
40	Driver Inducement	L114	Amber
41	Regen DPF	L11	Green
42	Air pressure circuit 1	L176/L175	Red/White
43	Air pressure circuit 2	L178/L177	Red/White
44-47	AdBlue level 1-4	L154-L157	Blue

3.1 Instrument cluster for BS-VI

The instrument panel is a device combination of display and control systems, mounted on the dashboard.

The new combined instrument comprises the speedometer, rev counter, fuel gage, engine temperature gage, air pressure gage of the brake circuits, warning lights, diagnosis display and odometer display.

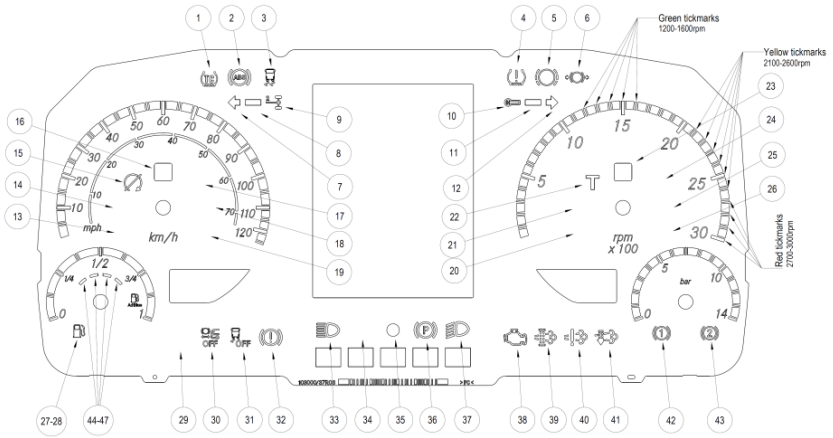
The information coming from the IES-CAN is translated and displayed. The displays can be graphics, icons, shown individually or in combinations.

Furthermore, the audible signals (buzzers) in the instrument panel, the indicator lamps in the light panel and the function lighting for various switches are controlled from here.

Every fault in the electronic system is displayed with a message on the display. Depending on the priority of the fault, it can be displayed as yellow or red. An "On-Board“. Diagnosis can be done via the OBD button.

Before the bodybuilding process, the combined instrument will have to be removed from the dashboard, and be placed in a location protected from dust, welding (high temperature, high current), enamel and anti-corrosive substances.

There must be a tracking system control, in the bodybuilding process, by means of the use of some identification label, as the same is parameterized with specific data of the vehicle, and it cannot be installed in another vehicle.



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3.Podest

3.2 Combined Instrument Cluster

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- Loosen the connectors, especially taking care with the dashboard's inner connector.
- Loosen the 4 screws from the instrument cluster.
- Keep the instrument cluster in a protected location until the body building is finished.
- Do not interchange the Instrument cluster because they have different configurations for each type of vehicle. It will cause the vehicle speed error

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!

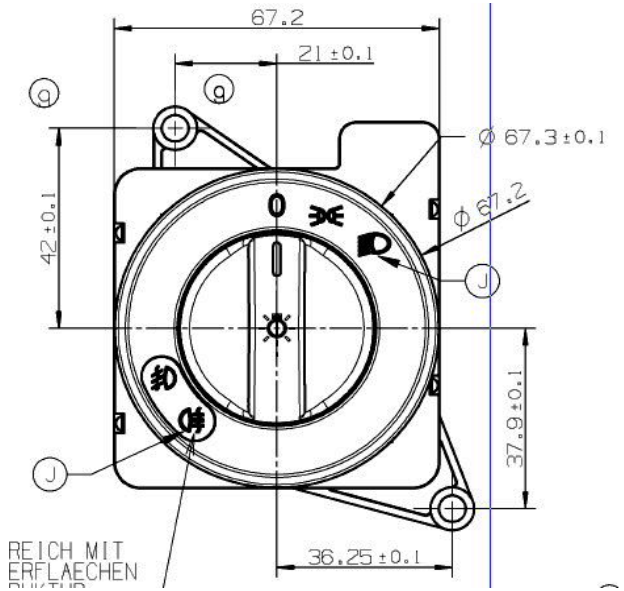
Disassemble the dashboard carefully and do not switch with other chassis VIN because it changes the calibration of the revolution meter and the speedometer.

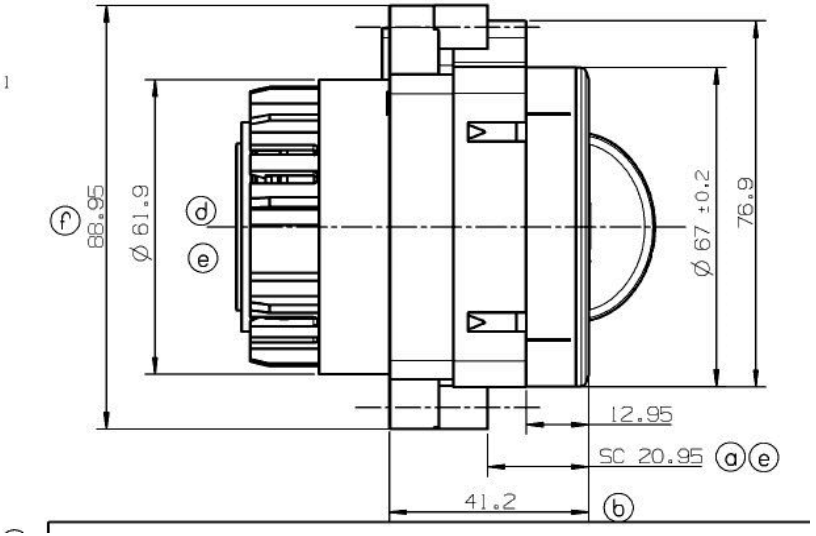
3.Podest

3.3 Illumination Main Switch

1904GL01H

Headlight main switch





1904GL01H

3.Podest

3.4 Combination switch for Chassis

1904GL01H

The OF1624L Chassis uses a new Combination switch is mounted on the steering column, for activation of various lighting & wiping controls also the retarder.

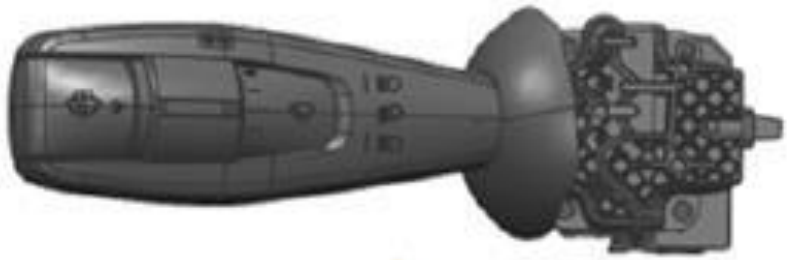
The switch can control the following access

LH side combination switch functions:

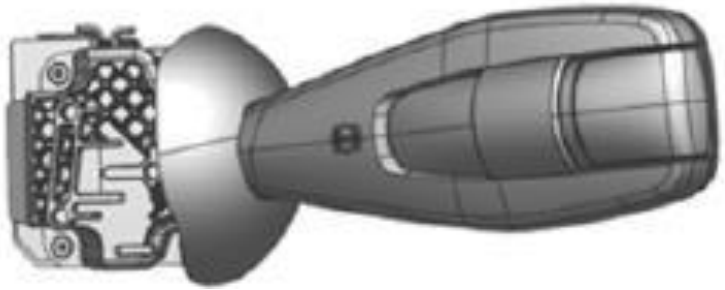
1 Turn Indicator RH
2 Turn Indicator LH
3 High Beam
4 Low beam
5 Pass Beam
6 Horn
7 Wiper intermittent
8 Wiper low speed
9 Wiper high speed
10 Wiper washer

RH side combination lamps functions:

1. Retarder activation



Combination switch LH



Combination switch RH

Note:
The pass by beam activates as long as the combination switch is held In the position .

1904GL01H

3.Podest

3.4 Combination switch for Chassis

1904GL01H

Turn Indicator

Move the combination switch to the position ‘1’ to turn ON the right turn indicator, and to the position ‘2’ to turn ON the left turn indicator.

Note :

Utilize only for setting the head lamp levelling of the switches. For the lighting connection of the bodybuilder keys the signal (KL 58a) is available in the spare connector for the bodybuilding X2811 (cavity 3).

Wiper

The wiper has two speeds (Low & High), which can be controlled by rotating the wiper control knob to attain the required speed.
Intermittent Wiping –

Low Speed – I
High Speed - II

Washer To activate the automatic windshield wiping with water Push the wiping control knob towards ‘A’ position for the duration till washing is completed, so it can return to it’s normal position automatically).

1904GL01H

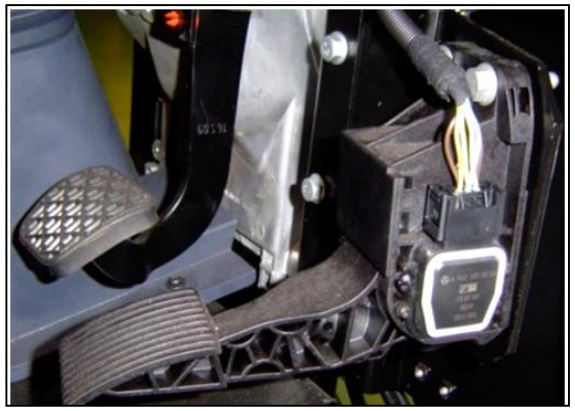
3.Podest

3.5 Accelerator Pedal

1904GL01H

The OF 1624 chassis are equipped with an electronic accelerator pedal. Its fastening is designed according to the driver's ergonomics, should be kept at original orientation.

Disconnect the electronic accelerator pedal during Welding work on the chassis to protect the electronic accelerator circuit.



Electronic accelerator pedal

!

Do not swap pedals, every pedal is calibrated in accordance with each chassis. A defective pedal must be replaced by a new one which has to be calibrated by means of the vehicle's instruments or by “Star Diagnosis” (diagnose equipment for Daimler vehicles).

!

The ignition must not be turned ON before connecting the accelerator pedal, otherwise an electronic module malfunction will be indicated by the instrument panel. To solve the problem, an authorized dealer or service station must be consulted.

1904GL01H

3.Podest

3.5 Tachograph

1904GL01H

!

Not applicable.

1904GL01H

OF 1624/1624L Bus Bodybuilding Guidelines

3.Podest

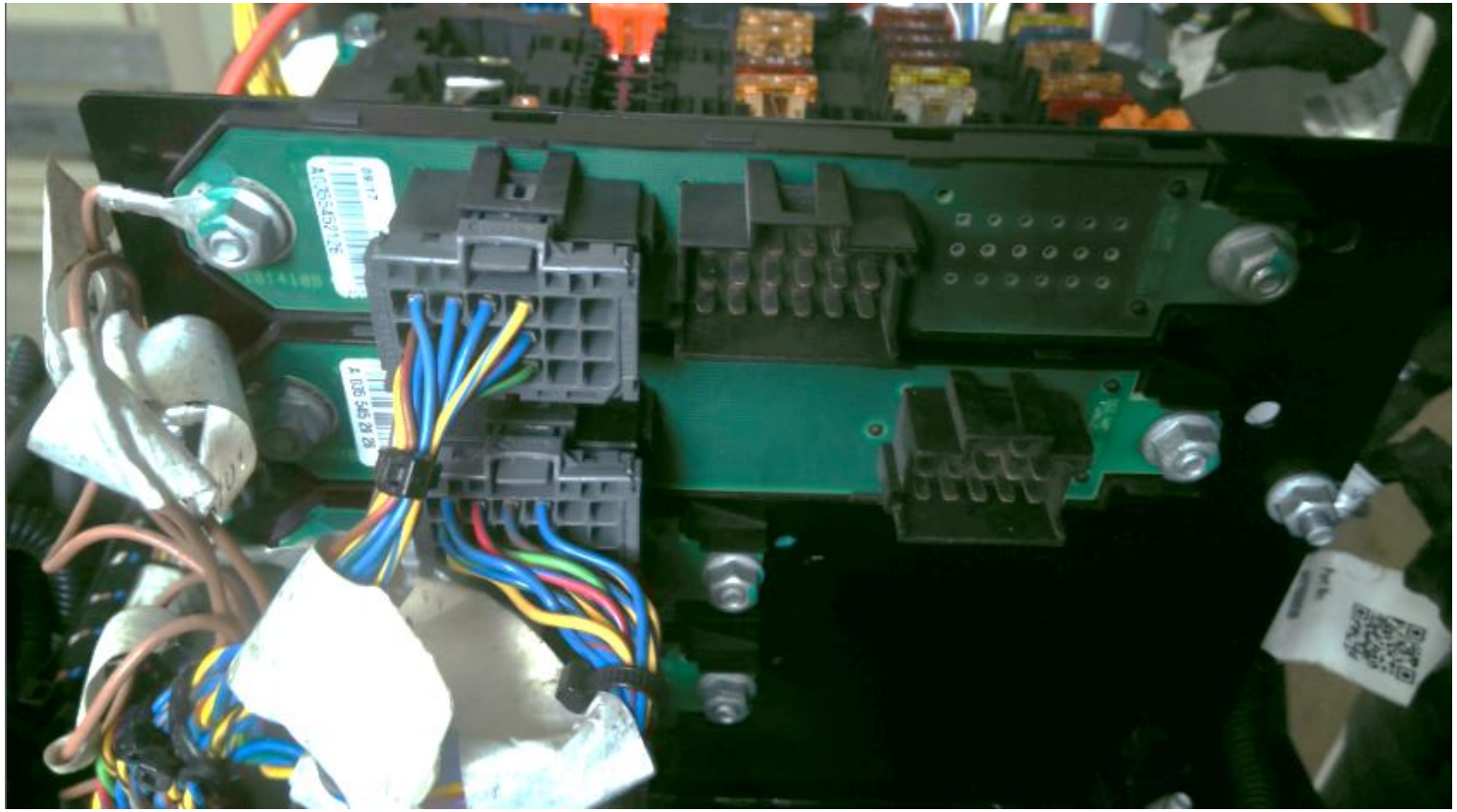
3.6 Star Point (CAN)

1904GL01H

This is a CAN interconnection center between all electronic control units. This component is necessary to allow the electronic control units to share data.

It must be installed in a place of easy access for maintenance and must be protected from water, dust, welding (high temperatures), enamel and anti-corrosive substances.

Neutral point



1904GL01H

OF 1624/1624L Bus Bodybuilding Guidelines

3.Podest

3.6 Star point (CAN)

3.6.1 CAN System 1904GL01H

The CAN system is defined as a data communication digital interface between electronic control units. It is a communication “network” that handles and distributes information and data control in real-time.
The CAN communication speed is “High speed” and with 5V tension. In order not to have loss of information between the modules, their distance to the “star point” is restricted to 2.5m.In case of welding jobs on the vehicle, all modules must be disconnected to avoid damage to the circuits.

Note:

The branching of the electric wiring harnesses are no to be spliced under any circumstances.

The purpose of the CAN system is to intelligently enhance data handling and acquisition, also reducing the number of connections and wires between the systems.

The CAN system permits the reduction of wires and increases the safety of the whole system.

The bodybuilder cannot manipulate the CAN. There are special pins, where the bodybuilder can obtain some specific signals.

The faults of the electronic system are displayed in the instrument cluster via the CAN. These faults are also saved. The faults that arise during the bodybuilding are to be removed from the memory. They can be erased on the instrument panel display. Enter the “Diagnosis” menu and click “Clear all events”.

1904GL01H

3.Podest

3.7 NR system

1904GL01H

!

Not applicable.

1904GL01H

OF 1624/1624L Bus Bodybuilding Guidelines

3.Podest

3.8 Converter

1904GL01H

!

Not applicable.

1904GL01H

3.Podest

3.9 Flame start system

1904GL01H

!

Not applicable.

1904GL01H

OF 1624/1624L Bus Bodybuilding Guidelines

3.Podest

3.10 Horn

1904GL01H

Location of the electric horn:

The final location of the horn is the bodybuilder's responsibility and has to ensure the spread of the sound, complying with the law in force in the country and protected from floods.

1 Electric horn

1904GL01H

3.Podest

3.11 Outside air temperature sensor

1904GL01H

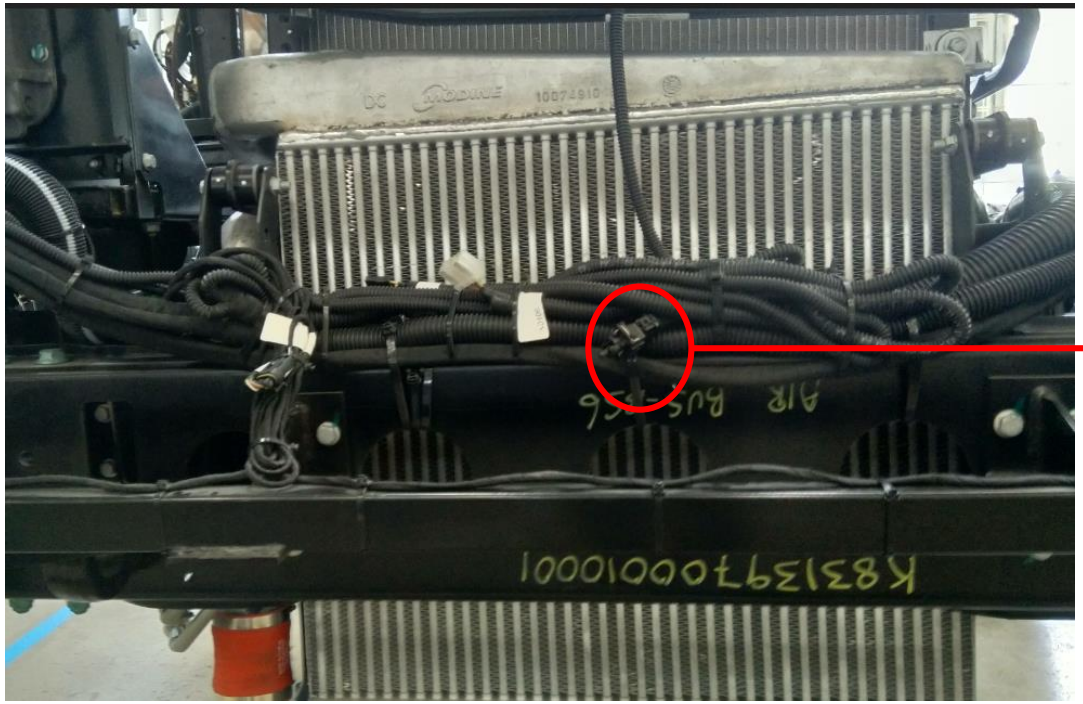
Temporary location :

The outside air temperature sensor is located near driver podest temporarily located at the first cross member with additional length of wire to reposition during bodybuilding process.

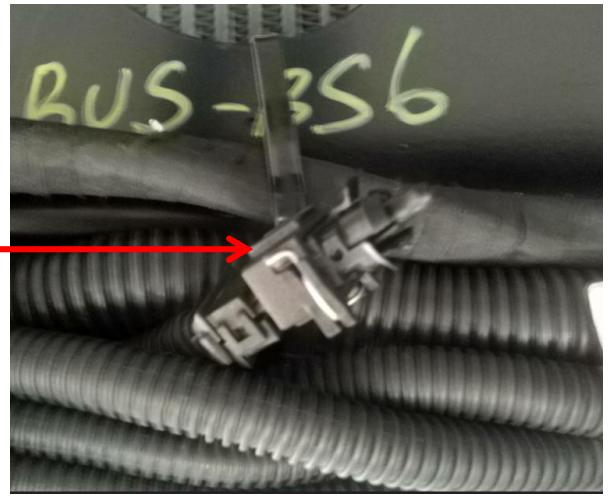
Final mounting location :

The Ambient Air temperature sensor will have to be relocated in the vehicle front where it is adequately exposed to ambient air and is easy to access during maintenance.

1904GL01H



Ambient air temperature sensor Location

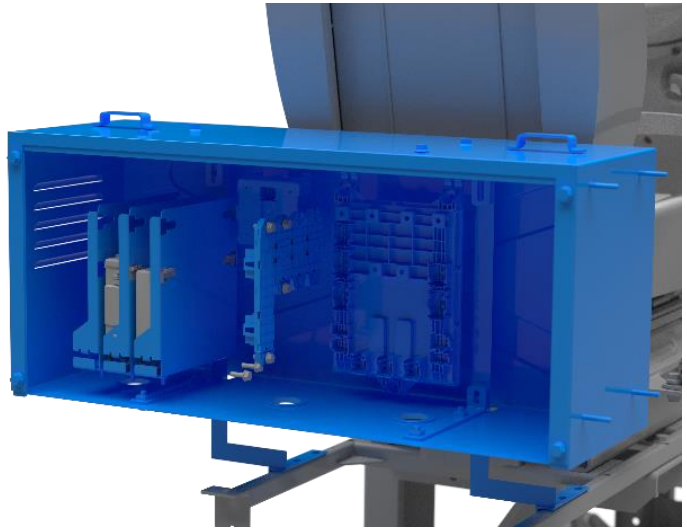


Ambient air temperature sensor

4. Electric Center

4.1 Electronic control unit main cabinet

The OF1624 BS VI Chassis are fitted with a rack for Electrical & Electronic Control Centre behind driver seat, it is necessary to reposition firmly the BOX from driver platform to Body structure or on the partition behind driver seat within available additional wiring harness length, however internal rack changes or reposition of ECU, Fuse box or interconnector board is not allowed.



BSVI Electronic control unit main cabinet

Electronic control unit main cabinet

The set of cables has an over-length, so that it is possible to place the electrical main panel on the side or behind the driver's seat and also at the roof or at the drivers entrance The control units are mounted separately from the main electrical panel. The cable set enables the assembly of the control units next to the driver's place (max. 4 meters from instrument cluster)

Note:
Kindly ensure the driver seat adjustment in back & Forth with reclining, the ECU cabinet or rack must not interfere with driver seat adjustment and must allow easy access to it’s components during maintenance.
it must be protected from water, dust & Hot temperature.

1904GL01H

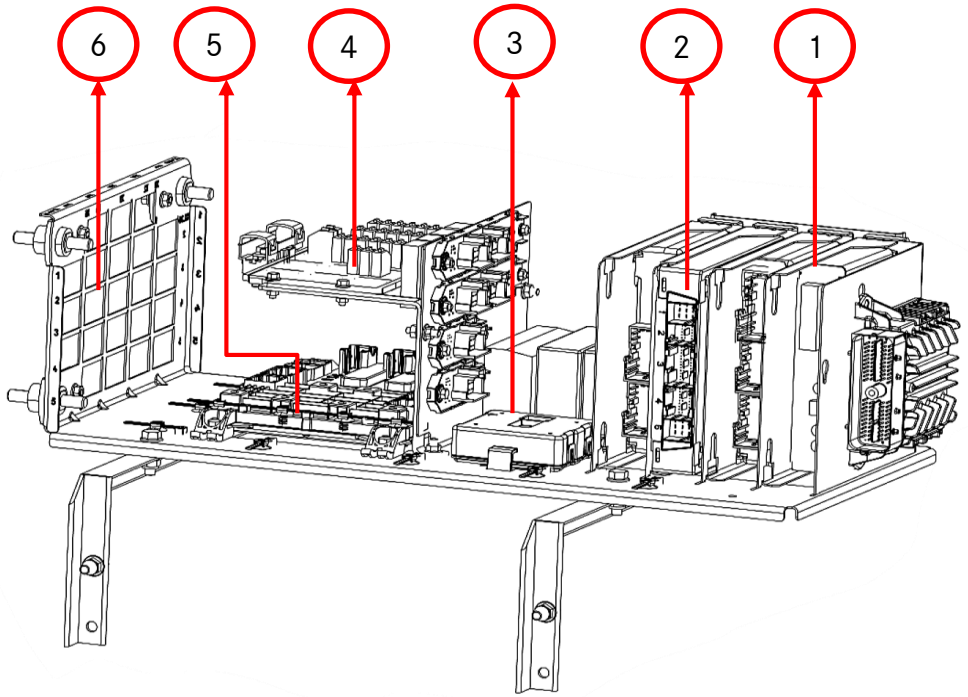
4. Electric Center

4.1 Electronic control unit main cabinet

1904GL01H

The Electronic Cabinet consist of

1. CPC ECU
2. ABS ECU
3. CGW
4. Fuse mounting
5. ASAM ECU
6. Interconnector assembly



1904GL01H

!

The CPC5 module is factory fitted on the chassis electrical rack

OF 1624/1624L Bus Bodybuilding Guidelines

4. Electric Center

4.1 Electronic control unit main cabinet

1904GL01H

4.1.1 CPC5 module

”CPC” ECU

The CPC5 module is ***unique for BSVI variants*** has been developed to establish the communication between the MR (PLD) engine management module and the several vehicle equipment.

The basic function of drive control (CPC) is to calculate and transmit the relevant engine target torque to the engine control unit (MCM). The control process is transmitted via the

"single-wire" engine CAN bus. The engine target torque is calculated according to the position of the electronic accelerator pedal sensor. Other required data or control intervention activities are sent by all authorized systems to the CPC via the vehicle IES-CAN.

Speed controllers, e.g. idle speed limiter or torque limiters can be configured in the drive control unit. The statutory speed limiter and convenience features for controlling the speed are integrated into the CPC. Various physical variable (e.g. outside temperature) are recorded for other systems (e.g. INS) and placed on the vehicle CAN bus.

Note:

- Never assemble or disassemble any connection if they are powered. Switch off the vehicle to disconnect or connect the module.
- Never measure the connections when they are on by using probes or cables ends. Never remove the connectors pulling them by the wires. After unlatching them, lift them out pulling at the same connector body.
- To remove the connector from the module, press the side latch and remove it. Never install additional equipment on the chassis “fuse-box” switch cabinet. The bodybuilder must install a second switch cabinet for the body.

!

The modules are to be installed in a place of easy access for maintenance.

1904GL01H

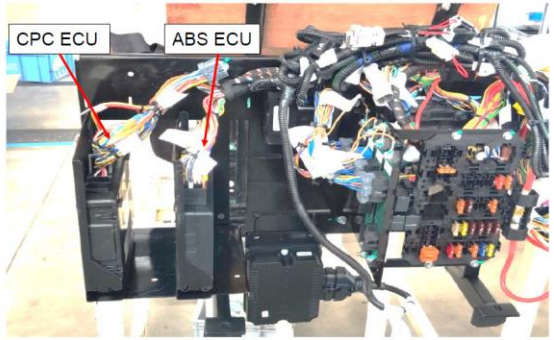
4. Electric Center

4.1 Electronic control unit main cabinet

1904GL01H

4.1.2 ABS Module

All OF chassis are equipped with ABS systems.



ABS Module

Note:

- Never assemble or disassemble any connection if they are powered. Switch off the vehicle to disconnect or connect the module.
- Never measure the connections when they are on by using probes or cables ends. Never remove the connectors pulling them by the wires. After unlatching them, lift them out pulling at the same connector body.
- To remove the connector from the module, press the side latch and remove it. Never install additional equipment on the chassis "fuse-box" switch cabinet. The bodybuilder must install a second switch cabinet for the body.

!

The modules are to be installed in a place of easy access for maintenance.

1904GL01H

4. Electric Center

4.1 Electronic control unit main cabinet

1904GL01H

4.1.3 CGW Module

CGW(Central Gate way) Is the ECU will centralize the different CAN network in the vehicle.

In this vehicle Different EUCs are connected together in different network, All the network centralized through CGW to share the CAN information's.

CGW Module

Note:

- Never assemble or disassemble any connection if they are powered, Switch off the vehicle to disconnect or connect the module.
- CGW ECU is configured all information about vehicle configuration, During body building Don’t uninstall the ECU from the RACK, instated of that complete RACK assembly can be uninstall and reinstall from the vehicle only if necessary.

!

The modules are to be installed in a place of easy access for maintenance.

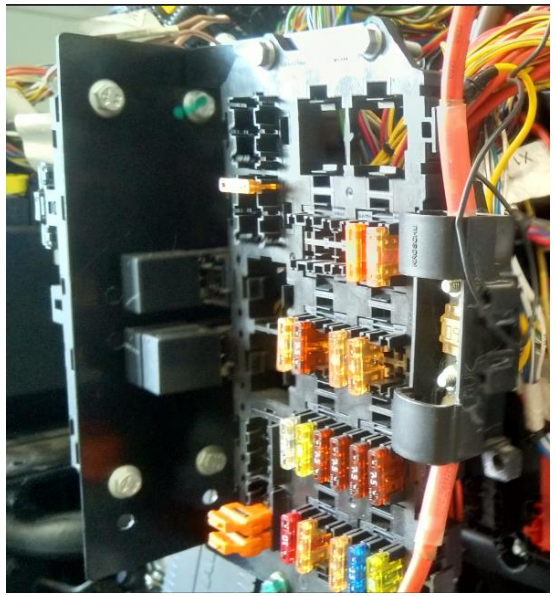
1904GL01H

4. Electric Center

4.1 Electronic control unit main cabinet

1904GL01H

4.1.4 Fuse box Cabin fuse box



Cabin fuse box

"Fuse box" is a cabinet containing relays, protection fuses, diodes and resistors.

Arrangement and characteristics of these components are shown on the label **A 831 584 0308** which is supplied together with the tool box.

The label should be placed near the bus switch cabinet to allow the identification of the components during a possible maintenance job. Once removed, the "Fuse Box" must be stored in a safe place protected from dust, welding splashes (high temperature), paint and anti-corrosives.

For OF1624/1624L vehicles, optional automatic circuit breakers are available.

Note:

- Never assemble or disassemble any connection if they are powered. Switch off the vehicle to disconnect or connect the module.
- Never install additional equipment on the chassis "fuse-box" switch cabinet. The bodybuilder must install a second switch cabinet for the body.

!

The modules are to be installed in a place of easy access for maintenance.

1904GL01H

4. Electric Center

4.1 Electronic control unit main cabinet

1904GL01H

4.1.4.1 Fuse box Cabin fuse box

The fuses which are part of the electric center fuse box for all Daimler vehicles are distinguished in their ratings by means of colors:

Fuse identification

For a successful bodybuilding we recommend to follow these instructions in order to avoid any inconveniences in the vehicle's electric wiring.
The electric center is located in a provisional position, the final location will be defined at the bodybuilding.
All the components which supply these vehicles are dimensioned to attend the electric loads for their original equipment.

***Tab8*- Fuse identification**

Color	Rating	Color	Rating
Violet	3 A	Light Blue	15A
Light Brown	5A	Yellow	20A
Brown	7.5A	Natural	25A
Red	10A	Green	30A

1904GL01H

4. Electric Center

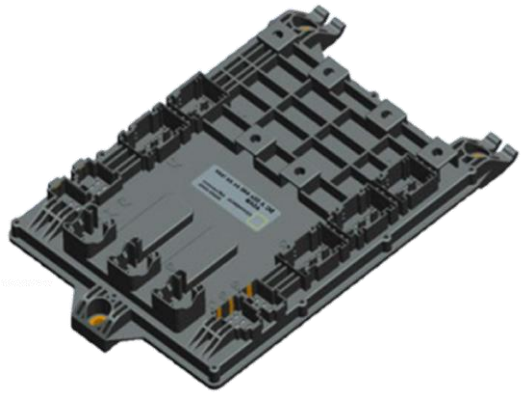
4.1 Electronic control unit main cabinet

1904GL01H

4.1.5 ASAM Module

ASAM(Advanced sensor Actuator module) receive the inputs from switches, sensors and CAN signals from other vehicle ECUs and control the vehicle actuators.

ASAM transmit and receive the CAN signals to other bus body ECUs.



ASAM Module

Note:

- Never assemble or disassemble any connection if they are powered, Switch off the vehicle to disconnect or connect the module.
- All the input and output characteristics are configured in the ASAM ECU, always body builders has to refer the bus body electrical connector interface detail to connect the inputs and output loads.
- Excessive load will create the Error in the ECU and Continues excessive load may damage the ECU.
- During body building Don't uninstall the ECU from the RACK, instated of that complete RACK assembly can be uninstall and reinstall from the vehicle only if necessary,
- Never install additional equipment on to this ECU, The bodybuilder must install a second switches for the body loads.
- Use only bus body builder interface and through Hardwire and CAN interface.

!

The modules are to be installed in a place of easy access for maintenance.

1904GL01H

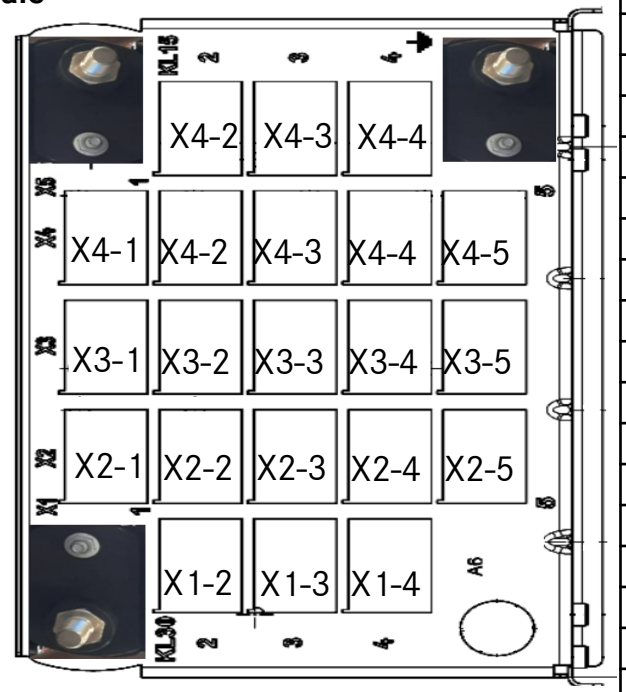
4. Electric Center

4.1 Electronic control unit main cabinet

1904GL01H

4.1.6 Interconnector Module

Interconnector Board



Interconnector Board connectors position

!

The modules to be placed in a place of easy access for maintenance.

Connector main board				
Function	Coordinate	Color	Cavity	Description
X0202	X1-1(KL30)			Terminal 30 Distribution
X0210	X1-2	Gray	21	Chassis Interface connection
X0221	X1-3		21	Not connected
X0214	X1-4	White	21	Chassis Interface connection
	X1-5			
X2811	X2-1	Gray	21	Spare Connector for Bodybuilder
X0232	X2-2			Not connected
X0222	X2-3		21	Not connected
X0215	X2-4	Gray	21	Chassis Interface connection
X0211	X2-5	Blue	21	Chassis Interface connection
X2812	X3-1	Blue	21	Spare Connector for Body builder
X0231	X3-2		21	Not connected
X0223	X3-3		21	Not connected
X0216	X3-4	Blue	21	Chassis Interface connection
X0212	X3-5	White	21	Chassis Interface connection
X0229	X4-1			Not Connected
X0228	X4-2			Not connected
X0224	X4-3	Blue	21	Chassis Interface connection
X0220	X4-4	White	21	Chassis Interface connection
X0213	X4-5	Gray	21	Chassis Interface connection
X0204	X5-1(KL15)			KI15 Main distribution
X0227	X5-2			Not connected
X0226	X5-3	Gray		Chassis Interface connection
X0225	X5-4	Blue		ABS Interface connection
W0201	X4-5(KL-31)			Ground main control panel

Interconnector Board connectors description

1904GL01H

4. Electric Center

4.2 Electronic control unit main cabinet

1904GL01H

4.21 Relays

The relays installed in the electric board (“fuse box”) of all Daimler Bus chassis are identified through colors for every function, check the label of the electric board that is supplied with the vehicle.

Relay board

***Tab 7*- Relay identification**

Relay	Colour
Direction indicator	Black
Wiper timer	Black
Mini Relay	Black
Micro	Black

1904GL01H

4. Electric Center

4.3 Overall comments

1904GL01H

Always refer to the chassis wiring diagram before any repair or change of components. Always use auxiliary relays to activate any equipment to be installed, mainly if it is via ignition or start key.

Always install fuses on the systems according to the need of the equipment. Only the auxiliary relay coil must be actuated by the ignition key.

The electric center (All ECU‘s , Fuses, and Relays and it’s components) final location in the bus body must be protected against water infiltration and impurities.

The Electric center must be mounted in vertical or horizontal position to avoid accumulation of water, dust or any other impurities.

In case any complementation or maintenance is required, do not change the vehicle original electrical wiring. Keep the same cable gauge if a repair is needed. Do not make direct connections eliminating relays or other components. These procedures will put into risk the whole vehicle electrical wiring.

Make sure that electrical wiring does not rub against cutting edges on the vehicle's metal structure, because this is one of the main short-circuit and fire risk factors.

Damaged fuses must be replaced with others with the same rating. If there is frequent fuse burn out, detect the cause. Never replace a fuse with a different rating, and never insert clamps or other objects into the fuse holders with the purpose of replacing them under an emergency condition and/or temporarily.

All electronic modules must be installed in an easily accessible place for maintenance, protected against water infiltration and impurities. They must never be repaired but, instead, they must be replaced by new parts because they are safety items.

1904GL01H

4. Electric Center

4.4 Capacity of the Diodes

1904GL01H

!

Not applicable.

1904GL01H

OF 1624/1624L Bus Bodybuilding Guidelines

4. Electric Center

4.5 Electronic control unit

1904GL01H

4.5.1 Main cabinet

ECU Cabinet BS VI variants

Electronic control units (ECU) are the processors that manages the running of the engine & brake system. This module receives the signals from all engine and vehicle sensors and identifies the operation regimen. It is installed in such a way that it remains in vertical position at all times during vehicle operation.

Before the body mounting process, the ECU should be removed from the main cabinet and kept in cover, protected from dust, water, welding splashes (high temperature), paints and anticorrosive. A traceability control must be available since the units are parameterized with vehicle specific data so as to prevent interchange. Never use high-pressure washing equipment on the connectors.

ECUs should be disconnected at all times during welding. It should be connected only after connecting all sensors, actuators, entire cabin/chassis wiring harness, engine and vehicle connector before battery connection. After ensuring all the connections, vehicle should be cranked and checked for any fault codes.

Never assemble or disassemble any connection if they are powered.

Switch off the vehicle to disconnect or connect the ECUs.

Never make any measurements on powered connections using test leads or cable ends. Use appropriate test leads. Never remove the connectors pulling them by the wires.

1904GL01H

4. Electric Center

4.6 Electronic control unit

1904GL01H

4.6.2 ECU location

ECU Cabinet for BS VI variants

For chassis delivery condition, ECUs are fixed with the plastic bracket, it must be protected against the following environmental conditions are to be followed:

- Water and dust, especially the wiring harnesses that were routed through the top.
- Mechanical damage, especially the pressure compensation element and the male pins in the connector.
- In case of paintwork on the remaining vehicle, avoid paint on the ECU and its terminals.
- Electrostatic discharge.
- Contamination with the media's whose tubes are beside the ECU.
- The protection should be executed with a plastic foil which protects the ECU and, in parallel, the wiring harness. Material of the foil: polypropylene conductible plastic.

While transporting the chassis or shifting in a container (for approx. 1-2 months duration) protection against the following must be ensured:

- Environmental conditions: heat, water and dust.
- Mechanical damage, especially on the pressure compensation element and the male pins in the connector.
- In case of paintwork on the remaining vehicle, avoid paint on the ECU and its terminals.
- Electrostatic discharge.
- Contamination with the media's whose tubes are beside the ECU.
- Relative humidity higher than 60% could cause corrosion.
- The protection is recommended with a plastic foil which protects the ECU and, in parallel, the wiring harness. Material of the foil: polypropylene conductible plastic which has some additional VCI corrosion protection. Example see link: http://www.excor.de/vci/index.html

1904GL01H

5.Diagnostic Plug

5.1 Diagnostics plug

1904GL01H

This plug is located in the switch cabinet and its function is to allow “off board” diagnostics, or diagnostics with external test equipment. When removed for bodybuilding, attention is to be given in order not to permit the infiltration of impurities (dust), welding (high temperature), enamel and anti-corrosive substances, as this could impair its utilization.

After the bodybuilding, the diagnosis socket has to be attached to a sheet metal surface, so the connector can be firm, and avoid short-circuit or damages to the same, besides facilitating the connection of the diagnosis equipment “plug”, as “Star Diagnosis” for example.

Diagnosis socket 16-way - diagnosis for:

- INS – Instrument cluster
- ABS/ASR
- Telma retarder
- MR – Engine management
- FR/CPC - Engine / vehicle interface

Diagnostic plug

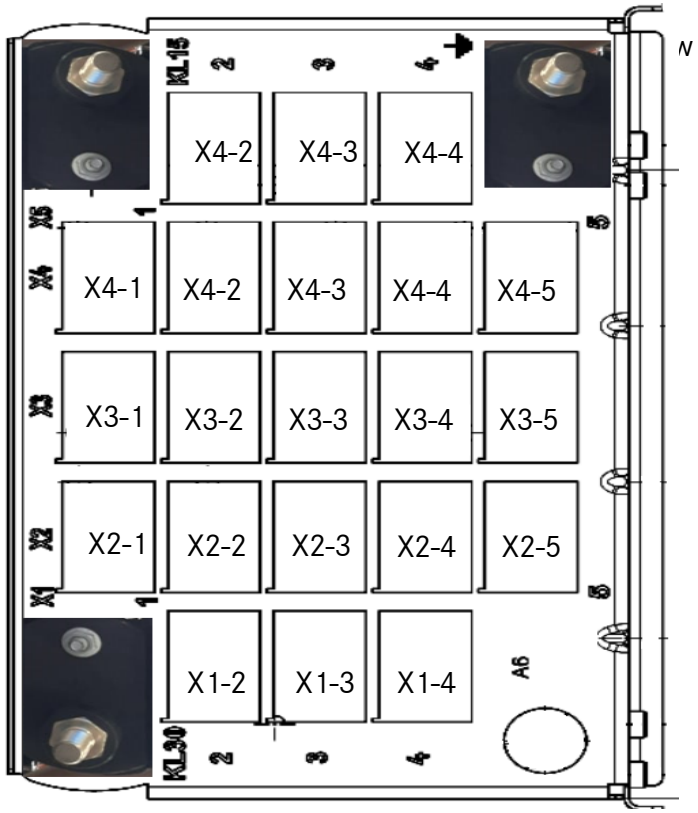
1904GL01H

6. Connector Main Board

6.2 Connector main board

1904GL01H

All connections between wire sets are made in this main cabinet. The purpose is to concentrate every connection in a single board, thus making maintenance easy, standardizing connectors and providing a specific location for bodybuilders to add their wire set connections, achieving savings in space inside the bus switch cabinet compartment.



Connector switchboard

ɴ is the arrangement of the connectors and their respective functions, as well as the spare connectors for the bodybuilding:

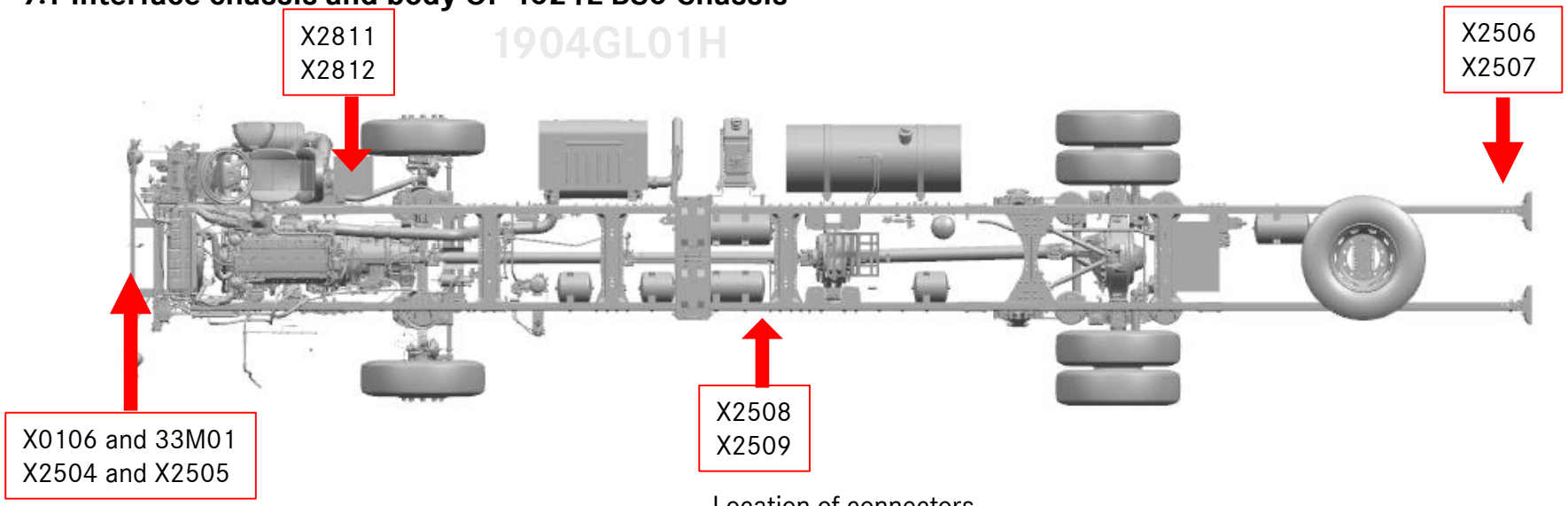
***Tab8* – Connector Main board Details**

Connector main board				
Function	**Coordinate**	**Color**	**Cavity**	**Description**
X0202	+30	—	—	Terminal 30 Distribution
-	-	—	—	-
X0215	X1-1	Gray	21	Chassis/Instrument panel
X0216	X2-1	Blue	21	Chassis/Instrument panel
X0220	X3-1	White	21	Chassis/Instrument panel
X0217	X2-3	Gray	6	Center/ABS and ASR systems
X2811	X2-(+15)	Gray	18	Ignition Power supply for Body Loads
X2517	X3-(+30)	Gray	18	Battery power supply for Body for Body Loads

1904GL01H

7. Interface chassis and body

7.1 Interface chassis and body OF 1624L BS6 Chassis



Location of connectors

Location of the Interface connections – OF 1624L BS6

X2811 = Body builder interface
X2812 = Body builder interface
X0106 = Windshield wiper stand connector
33M01 = Windshield wiper pump standby connector
X2504 = Front Headlamp/Indicator connector left
X2505 = Front Headlamp/Indicator connector Right
X2508 = Side marker connector Left
X2509 = Side marker connector Right
X2506 = Taillights connector left
X2507 = Taillights connector Right

1904GL01H

7. Interface chassis and body

7.2 Color codes of wires

1904GL01H

For wire colors, please refer to the table below:

***Tab9* - Color code**

Color code	Color description
B	Black
Br	Brown
Ch	Chocolate
Dg	Dark green
G	Green
L	Blue
Lg	Light green
O	Orange
P	Pink
R	Red
Sb	Sky blue
V	Violet
W	White
Y	Yellow
Gr	Gray

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7.3 Bus body interconnector

The standby connector functions for body mounting located in the switch cabinet, as well as the Daimler and AMP connector number to be used by the bodybuilder, are listed in the table below.

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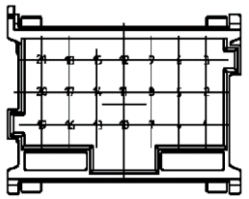
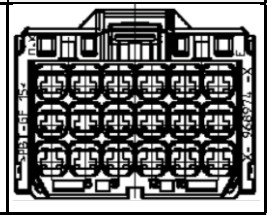
***Tab10*- Bus body interconnector Connection X2811**

Electric center - X2811 CONNECTOR	
Chassis side Connector	Bus Body builder side connector
MB Part no: A 036 545 31 28	MB Part no: A 013 545 65 26
Secondary lock: A 000 542 16 73	NA
TYCO 21 POLES: 1-967630-2	TYCO 21 POLES: 8-968975-2
Tyco lock : 967635-1	NA
Color: Glay Brawn	Color: Glay Brawn
Coding : "A"	Coding : "A"
Latching mechanism = 'B-C'	Latching mechanism = 'B-C'
	

Bus Body Interconnector

X2811												
Color-code	Wire N.	Circuit N.	Gauge (mm²)	pin	pin	Input/ Output	Potential	Max Current	Min Current	Function	Symbol	Description
GN/RT	191	6107	0.8	1	1	Input	(-ve)	-	-	Open door luggage compartment signal		Displays a telltale in the instrument cluster when signal is active
GR/GE	192	4117	0.8	2	2	Input	(-ve)	-	-	Stop request signal		Displays a telltale in the instrument cluster when signal is active
GR/BL	193	4119	0.8	3	3	Input	(-ve)	-	-	Open door signal Passenger/ Emergency		Displays a telltale in the instrument cluster when signal is active
GN/BL	194	4632	0.8	4	4	Input	(-ve)	-	-	Hazard lights activation	No	The hazard lights will start to flash when this pin is active
GN/GR	195	1223	0.8	5	5	Input	(-ve)	-	-	A/C RPM (High-idle RPM) signal		The engine speed will be increased to a fixed value and the symbol a telltale will be displayed in the instrument cluster
GR	196	3021	0.8	6	6	Output	24V (+ve)	1A	-	Distribution KL.58.1(Parking illumination)	No	Signal informing if parking illumination is on
BR/WS	197	1218	0.8	7	7	Output	24V (+ve)	0.7A	-	Start auxiliary (KL.50) Cranking signal	No	Signal is active when the vehicle is cranking
GE/RT	198	3043	0.8	8	8	Output	24V (+ve)	2A	-	Backup lights signal	No	Signal is active when the reverse gear is engaged
RT/GN	232	3335	0.8	9	9	Output	24V (+ve)	2A	-	Lighting Signal	No	Signal is deactivate when the vehicle is cranking
GN/BR	200	3194	0.8	10	10	Output	24V (+ve)	0.7A	-	Safety System Activated	Not Available	Not Available
GN/WS	201	3242	0.8	11	11	Input	(-ve)	-	-	Washer Fluid Level		Provide information of shortage washer fluid
GE/GR	187	8167	0.8	12	12	Input	(-ve)	-	-	Seat Belt Driver	Not Available	Not Available
~~VI/GN~~	~~188~~	~~6229~~	~~0.8~~	13	13	-	-	-	-	NA	NA	NA
				14	14	-	-	-	-	NA	NA	NA
RT	153	0033	0.8	15	15	Output	24V (+ve)	1A	-	KL 30 Signal(Battery unstitched +ve)	No	Positive signal from the battery
GN	288	6016	0.8	16	16	Output	24V (+ve)	1A	-	KL 15 Signal(Battery switched +ve)	No	Positive signal from first position of the ignition switch
GE	314	1127	0.8	17	17	Output	24V (+ve)	5A	-	D+ Signal (In engine running condition)	No	Provide signal in engine running condition
WS/BL	260	0002	0.8	18	18	Output	24V (+ve)	0.01A	-	W Signal	No	Signal providing the alternator speed (W)
VI/WS	189	6098	0.8	19	19	Output	PWM		-	Speed signal C3 output	No	Available only in vehicles with tachograph
BL/WS	190	6012	0.8	20	20	-	-	-	-	NA		
WS/BL	155	6030	0.8	21	21	-	-	-	-	NA		

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7.3 Bus body interconnector

The standby connector functions for body mounting located in the switch cabinet, as well as the Mercedes-Benz and AMP connector number to be used by the bodybuilder, are listed in the table below.

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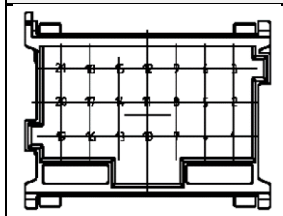
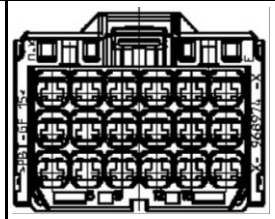
Tab11- Bus body interconnector Connection X2812

Electric center - X2812 CONNECTOR	
Chassis side Connector	Bus Body builder side connector
MB Part no: A 053 545 07 28	MB Part no: A 020 545 47 26
Secondary lock: A 000 542 16 73	NA
TYCO 21 POLES: 3-967630-1	TYCO 21 POLES: 6-968975-1
Tyco lock : 967635-1	NA
Color: Light Blue	Color: Light Blue
Coding : "C"	Coding : "C"
Latching mechanism = 'B-D'	Latching mechanism = 'B-D'
	

Bus Body Interconnector

X2812												
Color-code	Wire N.	Circuit N.	Gauge (mm²)	pin	pin	Input / Output	Potential	Max Current	Min Current	Function	Symbol	Description
VI/WS	250	4232	0.75	1	1	Input	(-ve)	-	-	Bus Stop Brake		In parallel to the doors status, this pin brakes the vehicle when active and displays the telltale in the instrument cluster
BR/GR	267		0.75	2	2	CAN		-	-	BodyBuilder CAN GND	No	Only for Bodybuilder interface with CAN
GE/RT	252	4394	0.75	3	3	Output	24V(+ve)	0.75A	-	Signal >5Km/h	No	This pin is active when the vehicle is over 5km/h
WS/GE	253	4395	0.75	4	4	Output	24V(+ve)	0.5A	-	Parking Brake Status	No	This pin is active when the park brake lever is engaged
BL	254		0.5	5	5	CAN		-	-	BodyBuilder CAN H	No	Only for Bodybuilder interface with CAN
GE	255		0.5	6	6	CAN		-	-	BodyBuilder CAN L	No	Only for Bodybuilder interface with CAN
BL/WS	256	8165	0.75	7	7			-	-	NA		
WS/GE	257	8164	0.75	8	8			-	-	NA		
WS/RT	246	6074	0.75	9	9			-	-	NA		
RT/BL	247	6199	0.75	10	10			-	-	NA		
RT	78		0.5	11	11			-	-	NA		
GW/SW	79		0.5	12	12			-	-	NA		
BL	76		0.5	13	13			-	-	NA		
BR	77		0.5	14	14			-	-	NA		
				15	15			-	-	NA		
GR/RT	221	3037	0.75	16	16	Output	24V(+ve)	1A	-	Front Position lamp left & right(LEDs Possible)	No	Exterior Lighting
GR/WS	343	3049	0.75	17	17	Output	24V(+ve)	1A	-	Rear Position lamp left & Right(LEDs Possible)	No	Exterior Lighting
GE/GN	199	3055	0.75	18	18	Output	24V(+ve)	2A	-	Upper brake lamp left & right	No	Exterior Lighting
GE/WS	294	3053	0.75	19	19	Output	24V(+ve)	3.5A	-	Upper left rear indicator lamp (LED possible)	No	Exterior Lighting
GE/WS	347	3054	0.75	20	20	Output	24V(+ve)	1A	-	Upper right rear indicator lamp (LED possible)	No	Exterior Lighting
RT/GN	344	6229	0.75	21	21	Output	24V(+ve)	3A	-	5th stop lamp(LED)	No	Exterior Lighting

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7.4 Headlight and other front light connections LH

Below are the connection details for Front left side headlight, located in the first cross member of the module 1.

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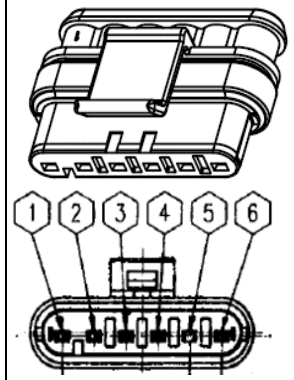
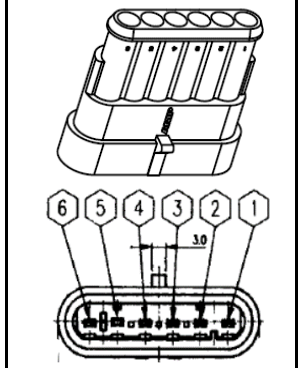
Front Left Lamp Interconnector X2504(X1)	
Chassis side Connector	Bus Body builder side connector
MB Part no: A 693 545 39 26	MB Part no: A 693 545 40 26
TYCO 6 POLES: 282090-1	TYCO 6 POLES: 282108–1
Color: Black	Color: Black
	

Tab12- **Front left lamp interface connector X2504(X1)**

Front Left Lamp Interconnector X2504(X1)										
Color-code	Wire N.	Circuit N.	Gauge (mm²)	pin	pin	Input/ Output	Potential	Max Current	Min Current	Function
GR/BL	262	3039	0.75	1	1	Output	24V(+ve)	3.0A	0,2A	Low Beam, left, LED or Xenon possible
WS	264	3101	0.75	2	2	Output	24V(+ve)	3.0A	0,5A	High Beam, left, LED or Xenon possible
GR/VI	327	3039	0.75	3	3	Output	24V(+ve)	1.0A	50mA	Turn Left Front Headlamp(LED Possible)
WS	270	3026	0.75	4	4	Output	24V(+ve)	1.0A	-	Front Side Position Light
BR	352		1.5	5	5	Output	(-ve)	-	-	Ground
BL/GE	268	3475	0.75	6	6	Output	24V(+ve)	3.0A	-	DRL (Daytime Running Light), left

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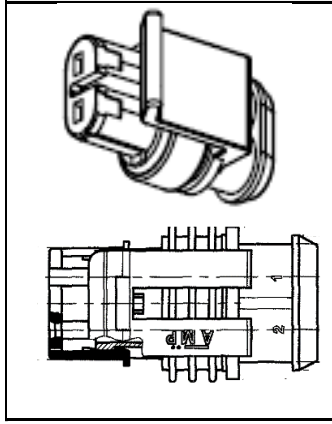
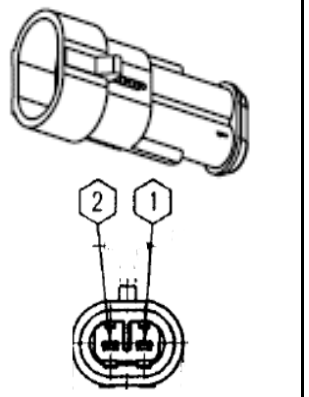
7.4 Front Fog light connection LH

Below are the connection details for front left Fog lamp connector

Front Left Lamp Interconnector X2504(X2)	
Chassis side Connector	Bus Body builder side connector
MB Part no: A 015 545 55 26	MB Part no: A 693 545 33 26
TYCO 2 POLES: 282080-1	TYCO 6 POLES: 282104–1
Color: Black	Color: Black
	

Tab13- **Front left lamp interface connector X2504(X2)**

Front Left Lamp Interconnector X2504(X2)										
Color-code	Wire N.	Circuit N.	Gauge (mm²)	pin	pin	Input/ Output	Potential	Max Current	Min Current	Function
WS/GN	266	3035	0.75	1	1	Output	24V(+ve)	3.0A	-	Fog Lamp, front left (LED possible)
BR	353		1.5	2	2	Output	(-ve)	-	-	Ground

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7.4 Headlight and other front light connections RH

Below are the connection details for Front right side headlight, located in the first cross member of the module 1.

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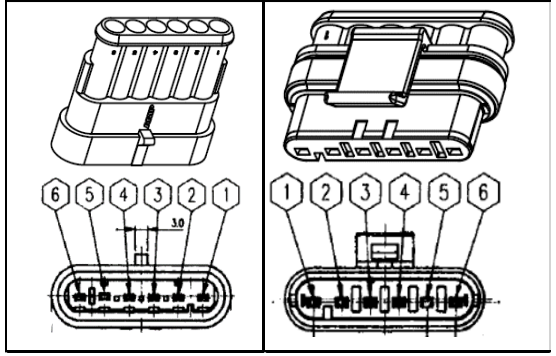
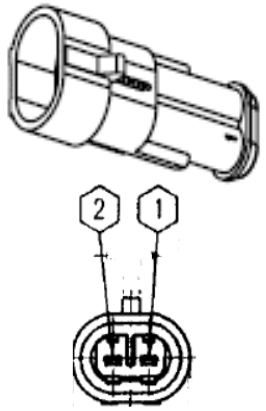
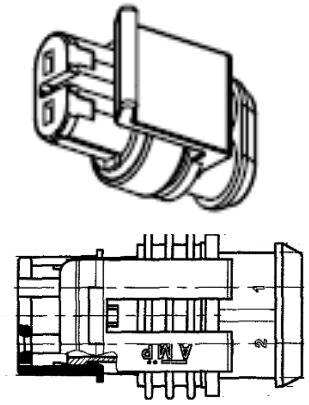
Front Right Lamp Interconnector X2505(X1)	
Chassis side Connector	Bus Body builder side connector
MB Part no: A 693 545 40 26	MB Part no: A 693 545 39 26
TYCO 6 POLES: 282108–1	TYCO 6 POLES: 282090-1
Color: Black	Color: Black
	

Tab14- **Front Right lamp interface connector X2505(X1)**

Front Right Lamp Interconnector X2505(X1)										
Color-code	Wire N.	Circuit N.	Gauge (mm²)	pin	pin	Input/ Output	Potential	Max Current	Min Current	Function
BL/RT	261	3034	0.75	1	1	Output	24V(+ve)	3.0A	0,2A	Low Beam, Right, LED or Xenon possible
BL/SW	263	3102	0.75	2	2	Output	24V(+ve)	3.0A	0,5A	High Beam, Right, LED or Xenon possible
WS/BL	326	3040	0.75	3	3	Output	24V(+ve)	1.0A	50mA	Turn Right Front Headlamp (LED Possible)
GR/GN	271	3025	0.75	4	4	Output	24V(+ve)	0.5A	-	Front Side Position Light
BR	354		1.5	5	5	Output	(-ve)	-	-	Ground
BL/GN	267	3476	0.75	6	6	Output	24V(+ve)	1.0A	-	DRL (Daytime Running Light), right

7.4 Front Fog light connection RH

Below are the connection details for front right Fog lamp connector

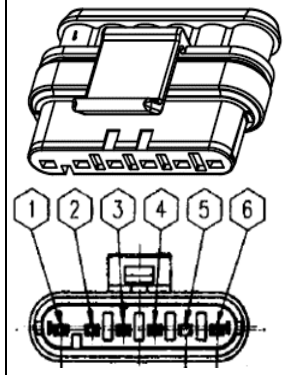
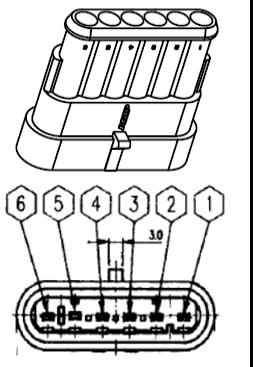
Front Right Lamp Interconnector X2505(X2)	
Chassis side Connector	Bus Body builder side connector
MB Part no: A 693 545 33 26	MB Part no: A 015 545 55 26
TYCO 6 POLES: 282104–1	TYCO 2 POLES: 282080-1
Color: Black	Color: Black
	

Tab15- **Front left lamp interface connector X2505(X2)**

Front Right Lamp Interconnector X2505(X2)										
Color-code	Wire N.	Circuit N.	Gauge (mm²)	pin	pin	Input/ Output	Potential	Max Current	Min Current	Function
WS/GN	266	3035	0.75	1	1	Output	24V(+ve)	3.0A	-	Fog Lamp, front right (LED possible)
BR	353		1.5	2	2	Output	(-ve)	-	-	Ground

7.5 Side marker & side Indicator connections LH

Below are the connection details for the LH side marker & LH side indicator connectors

Left side Lighting Interconnector X2508	
Chassis side Connector	Bus Body builder side connector
MB Part no: A 693 545 39 26	MB Part no: A 693 545 40 26
TYCO 6 POLES: 282090-1	TYCO 6 POLES: 282108–1
Color: Black	Color: Black
	

Tab16- **Side left lamp interface connector X2508**

Left side Lighting Interconnector X2508										
Color-code	Wire N.	Circuit N.	Gauge (mm²)	pin	pin	Input/ Output	Potential	Max Current	Min Current	Function
BL/WS	329	3101	0.75	1	1	Output	24V(+ve)	1.0A (21W) Single Bulb or Intelligent LED	-	Left front side direction indicator lamp
GE/GN	314	3430	0.75	2	2	Output	24V(+ve)	2.0A (7*5W) Bulb or Intelligent LED	-	Side marker lamp left
BR	356		1.5	3	3	Output	GND	-	-	Ground
GN	330	3421	0.75	4	4	Output	24V(+ve)	3.0A (21W) Single Bulb or Intelligent LED	-	Left rear side direction indicator lamp
				5	5				-	
				6	6				-	

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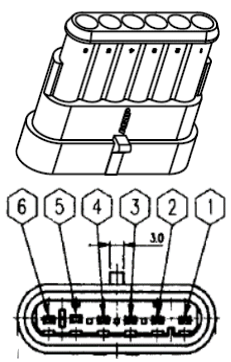
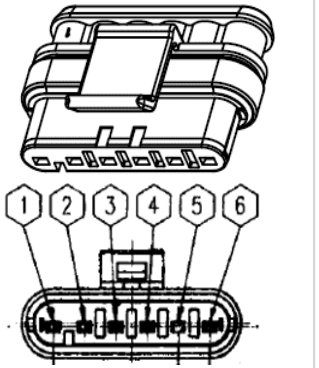
7.5 Side marker & side Indicator connections RH

Below are the connection details for the RH side marker & RH side indicator connectors

Side right Lamp Interconnector X2509	
Chassis side Connector	Bus Body builder side connector
MB Part no: A 693 545 40 26	MB Part no: A 693 545 39 26
TYCO 6 POLES: 282108–1	TYCO 6 POLES: 282090-1
Color: Black	Color: Black
	

Tab17- **Side Right lamp interface connector X2509**

Right side Lighting Interconnector X2509										
Color-code	Wire N.	Circuit N.	Gauge (mm²)	pin	pin	Input/ Output	Potential	Max Current	Min Current	Function
BL/GE	328	3102	0.75	1	1	Output	24V(+ve)	1A (21W) Single Bulb or Intelligent LED	-	Right front side direction indicator lamp
GE/GN	313	3074	0.75	2	2	Output	24V(+ve)	1A (7*5W Bulb or Intelligent LED	-	Side marker lamp Right
BR	356		1.5	3	3	Output	GND		-	Ground
GN/VI	331	3422	0.75	4	4	Output	24V(+ve)	3A (21W) Single Bulb or Intelligent LED	-	Right rear side direction indicator lamp
				5	5				-	
				6	6				-	

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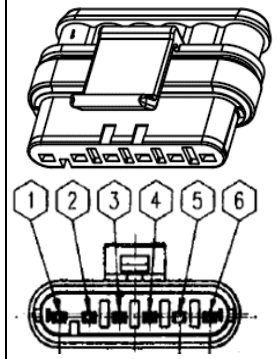
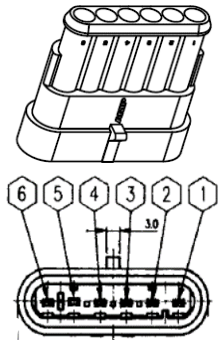
7.6 Rear lamp connections LH

Below are the connection details for LH tail light connectors

Left rear light assembly interface connector X2506(X1)	
Chassis side Connector	Bus Body builder side connector
MB Part no: A 693 545 39 26	MB Part no: A 693 545 40 26
TYCO 6 POLES: 282090-1	TYCO 6 POLES: 282108–1
Color: Black	Color: Black
	

Tab18 - **Left rear light assembly interface connector X2506(X1)**

Left rear light assembly interface connector X2506(X1)										
Color-code	Wire N.	Circuit N.	Gauge (mm²)	pin	pin	Input/ Output	Potential	Max Current	Min Current	Function
GN	350	3051	0.75	1	1	Output	24V(+ve)	3.0A	-	Stop Lamp, rear left lower
WS/GN	255	3132	0.75	2	2	Output	24V(+ve)	1.0A	50mA	Turn signal rear, left
GE/RT	324	3043	0.75	3	3	Output	24V(+ve)	1.5A	-	Backup lamp
BL	316	3041	0.75	4	4	Output	24V(+ve)	3.0A	-	Tail lamp left
GR/GE	309	3047	0.75	5	5	Output	24V(+ve)	1.0A	-	License Plate Lamp (First/Second)
BR	346		1.5	6	6				-	Ground

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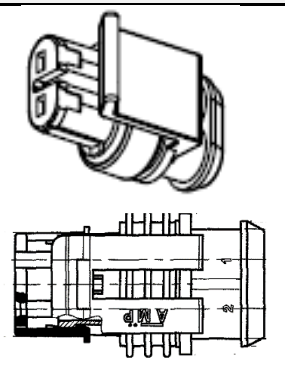
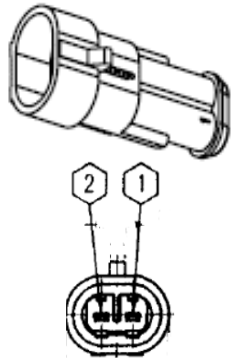
7.6 Rear Fog lamp connections LH

Below are the connection details for LH Fog lamp connectors

Left rear Fog light assembly interface connector X2506(X2)	
Chassis side Connector	Bus Body builder side connector
MB Part no: A 015 545 55 26	MB Part no: A 693 545 33 26
TYCO 2 POLES: 282080-1	TYCO 6 POLES: 282104--1
Color: Black	Color: Black
	

Tab19- **Left rear Fog light assembly interface connector X2506(X2)**

Left rear Fog light assembly interface connector X2506(X2)										
Color-code	Wire N.	Circuit N.	Gauge (mm²)	pin	pin	Input/ Output	Potential	Max Current	Min Current	Function
GE	338	3045	0.75	1	1	Output	24V(+ve)	1.0A	-	Fog Lamp, rear left
BR	348		0.75	2	2	Output	(-ve)	-	-	Ground

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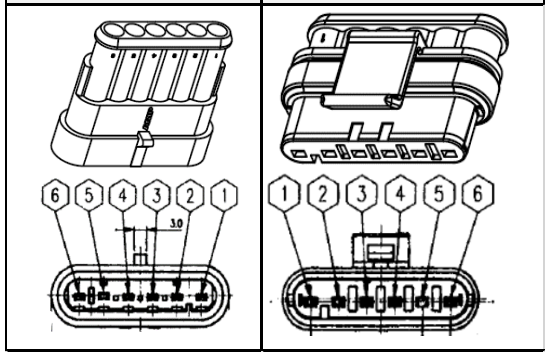
7.6 Rear lamp connections RH

Below are the connection details for RH tail light connectors

Right rear light assembly interface connector X2507(X1)	
Chassis side Connector	Bus Body builder side connector
MB Part no: A 693 545 40 26	MB Part no: A 693 545 39 26
TYCO 6 POLES: 282108--1	TYCO 6 POLES: 282090-1
Color: Black	Color: Black
	

Tab20- **Right rear light assembly interface connector X2507(X1)**

Right rear light assembly interface connectorX2507(X1)										
Color-code	Wire N.	Circuit N.	Gauge (mm²)	pin	pin	Input/ Output	Potential	Max Current	Min Current	Function
GN/BL	351	3052	0.75	1	1	Output	24V(+ve)	3.0A	-	Stop Lamp, rear right lower
WS/GE	169	3131	0.75	2	2	Output	24V(+ve)	1.0A	50mA	Turn signal rear, right
GE/RT	325	3043	0.75	3	3	Output	24V(+ve)	1.5A	-	Backup lamp
BL/GN	318	3042	0.75	4	4	Output	24V(+ve)	3.0A	-	Tail lamp right
				5	5				-	
BR	347		1.5	6	6	Output	(-ve)		-	Ground

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7.6 Rear Fog lamp connections RH

Below are the connection details for RH Fog lamp connectors

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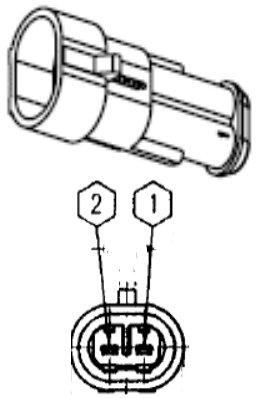
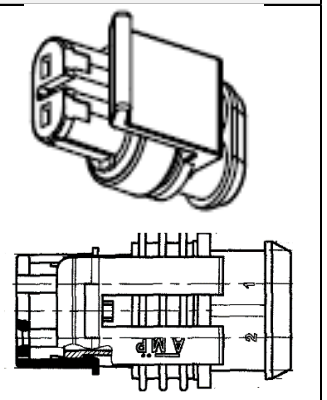
Right rear Fog light assembly interface connector X2507(X2)	
Chassis side Connector	Bus Body builder side connector
MB Part no: A 693 545 33 26	MB Part no: A 015 545 55 26
TYCO 6 POLES: 282104–1	TYCO 2 POLES: 282080-1
Color: Black	Color: Black
	

Tab21- **Right rear Fog light assembly interface connector X2507(X2)**

Right rear Fog light assembly interface connector X2507(X2)										
Color-code	Wire N.	Circuit N.	Gauge (mm²)	pin	pin	Input/ Output	Potential	Max Current	Min Current	Function
GE	339	3045	0.75	1	1	Output	24V(+ve)	1.0A	-	Fog Lamp, rear right
BR	349		0.75	2	2	Output	(-ve)		-	Ground

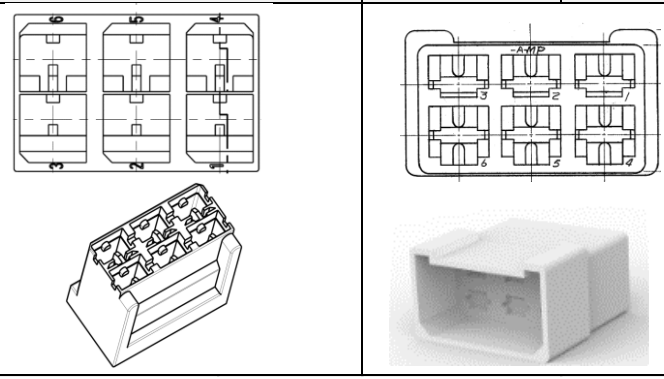
1904GL01H

7.7 Wiper motor connections

The Wiper system connectors for front windshield is located at the FIRST CROSSBEAM, original connector must be retained for body adaptation connector details to be used by the bodybuilder is listed in the table below.

***Tab22*- M4 washer motor Connection X0106**

Windshild Wiper motor-X0106			
Chassis side Connector		Bus Body builder side connector	
MB Part No	Supplier part No	MB Part No	Supplier part No
Connector: A 384 545 73 26	926330-3(Tyco)		171433-1(Tyco)
Terminal1: A 384 545 85 26	927852-3(Tyco)		928962-2(Tyco)
Terminal2 : A 384 545 82 26	880645-6(Tyco)		
Color: White			Color: White



Windshield Wiper Motor – X0106									
Color-code	Wire N.	Circuit N.	Gauge (mm²)	pin	pin	Input/ Output	Potential	Max Current	Function
WS	276	3082	0.75	1	1	Output	Gnd	Active low	Wiper Autostop input
BL	277	3405	2.5	2	2	Output	24V(+ve)	Active High(12A Max)	Wiper low speed
				3	3				
GE/BL	279	3404	2.5	4	4	Output	24V(+ve)	Active High(12A Max)	Wiper High speed
				5	5				
BR	278		2.5	6	6	Output	Gnd	Gnd	Gnd

!

Should the power of the windshield wiper motor, to be installed by the body maker be higher than specified, in order not to damage the chassis combined switch, auxiliary relays are to be installed in the circuits of stages 1 and 2 of the windshield wiper system. See below the spare connector table for the body maker X0106.

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7.8 Wiper pump connections

The Washer system connector for front windshield is located on the FIRST CROSSBEAM, the Daimler and AMP connector number to be used by the bodybuilder are listed in the table below.

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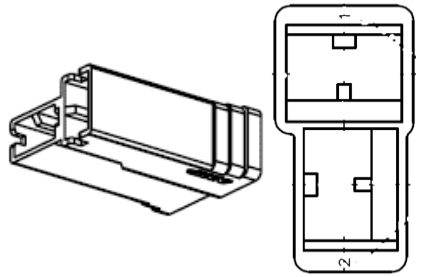
Windshield Wiper Pump Motor – 33M01			
Chassis side Connector		Bus Body builder side connector	
MB Part No	Supplier part No	MB Part No	Supplier part No
Connector: A 384 545 80 26	926522-1(Tyco)		1-180908-0
Terminal : A 384 545 82 26	880645-6(Tyco)		928962-2(Tyco)
Color: White			Color: White
			

Tab 23- **Windshield Wiper Pump Motor – 33M01**

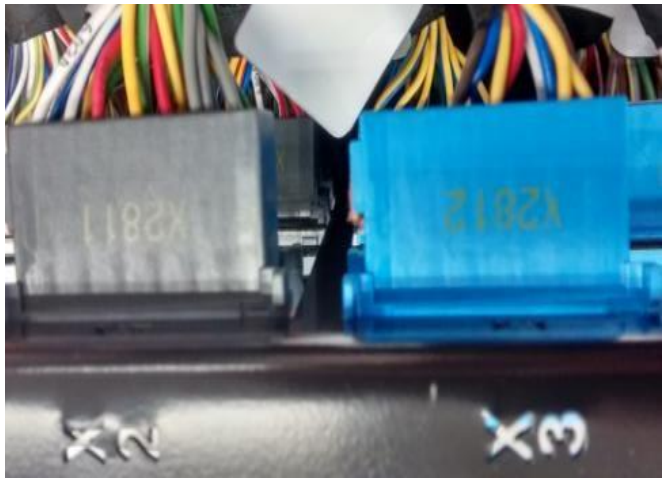
Windshield Wiper Pump Motor – 33M01									
Color-code	Wire N.	Circuit N.	Gauge (mm²)	pin	pin	Input/ Output	Potential	Max Current	Function
BR	280		1.5	1	1	Output	Gnd	Gnd	Gnd
GE/GR	281	3079	1.5	2	2	Output	24V(+ve)	6A Max	Wiper washer pump motor

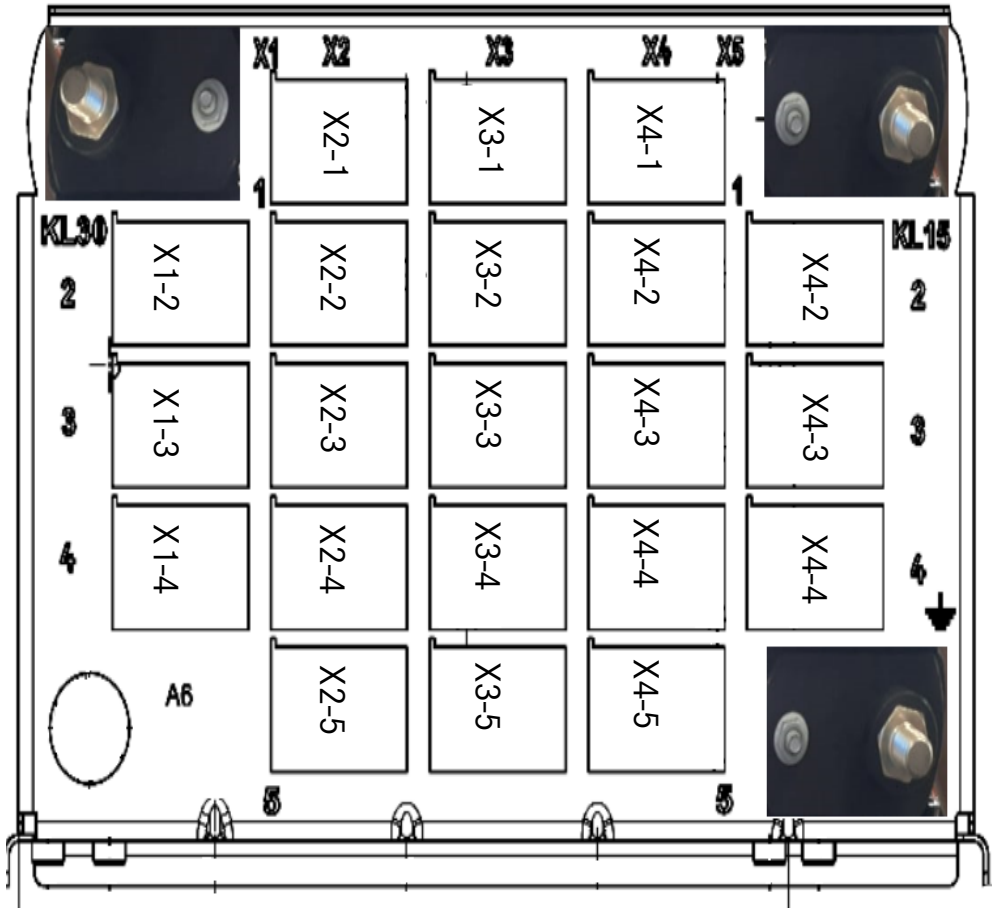
1904GL01H

7.9 Body builder inter Connectors

Two Body- chassis interface connectors (X2811 and X2812) positioning in the Rack.

1904GL01H





1904GL01H

8 Towing socket

8.1 Towing socket

At the front of the OF chassis there is, as an optional, an electric connector for towing in case of vehicle breakdown. This connector connects the direction indicator lights, brake lights and position lights.
It is equipped with the following outputs:

Tab19- **Outlet of the electric connector for towing EURO3/4/5**

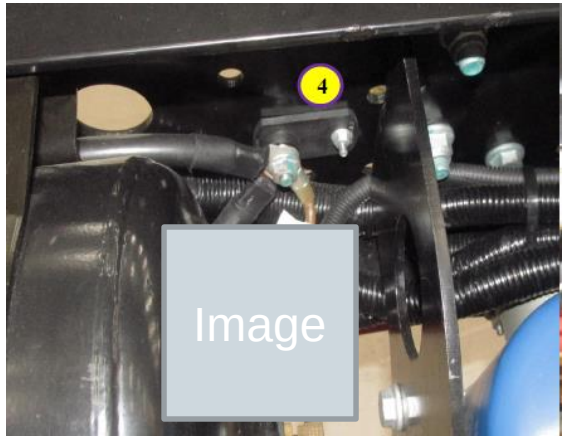
Towing socket											
MBB						Bodybuilder					
El-cod	Wire N.	Circuit N.	Gauge (mm²)	pic	pin	connector	pin	pic	Potential	Max Current	Function
	419	3033	1.5 gr		1		1		+24V I/P	-	Reverse warning signal
	192	3085	1.5 gn/rt		2		2		+24V I/P		Brake signal
	191	3034	1.5 gr/rt		3	02X05	3		+24V I/P	-	Right side parking
	189	-	2.5 w		4		4		+24V I/P	-	Ground
	188	3131	2.5 w/gn		5		5		+24V I/P	-	Right turn signal
	187	3132	2.5 w/ge		6		6		+24V I/P	-	Left turn signal

Install in easy accessible location on vehicle front.

1904GL01H

9 Ground point

9.1 Ground point



Isolated ground termination

Earthing points 1904GL01H

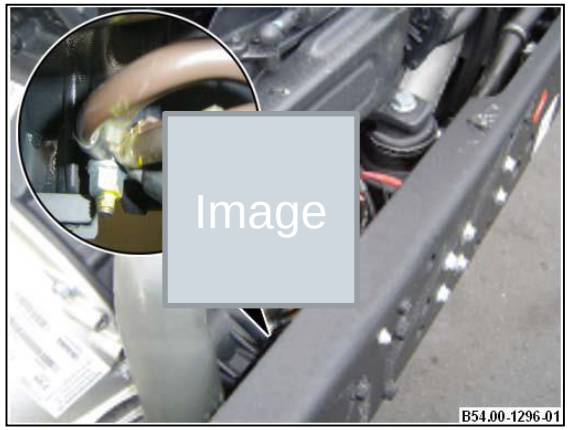
The chassis is delivered with 4 interconnected earthing points (driver's place, electrical main panel, engine and batteries).

Earthing point W1001 must be placed next to the batteries (existing earthing point at the central part of the chassis is only valid for transport). This earthing point must have electrical connection to the body-structure and an adequate size to conduct the earth current.

Avoid the connection of many cables to an earthing point, create an extra earthing point connected by wire to an existing earthing point.

The battery earthing point must be connected to other earthing points (engine and electrical main panel...) with the cables supplied with the chassis.

The cables at the earthing point must be well-tightened to avoid to get loose with the vehicle's vibrations. Poor contact at the earthing point can cause malfunction or damages in electric components.



Location on starter motor

WARNING

Poor contact at earthing points or missing earth cables can cause malfunction or damages electric/electronic components (risk of fire).

In All earthing points must be connected jointly by means of wires to conduct properly the electrical current.

No current should be conducted through the vehicle frame can cause Routing the earth return conductor via the vehicle frame damage to engine and transmission components and to the earth line.

9 Ground point

9.2 Grounding point located in the connections center

1904GL01H

Ground point Location on Electric center

1 Grounding point
2 Signal KL30

Daimler bus chassis with electronic engine have a particularity concerning the body grounding. Countless problems will occur in the case the body grounding interferes in the grounding of the chassis, such as: The engine may shutdown without any previous notice in the instrument cluster, defects without coherent explanations, random operation of other systems, etc.

The structure of the body is not to be utilized as grounding, i.e, the body will need to have its grounding project similar to the project developed in the vehicle chassis. For the chassis area, the specific point in the side rail has to be utilized, which we denominate: “Unified ground connection point”.

The grounding point which will be used by the body has to be derived from the unified grounding points because these points are interconnected to the battery's negative pole by means of electrical cables.

In the area of the instrument cluster there is a specific point to connect any grounding point, where practically only exist electrical signals, and not power wires.

This detail is because the EMC (Electrical Magnetic Compatibility) effect affects on the electronic equipment.

The grounding points are located in the chassis, at the left side close to the starter motor and in the connections center, they are directly derived from the negative battery post.

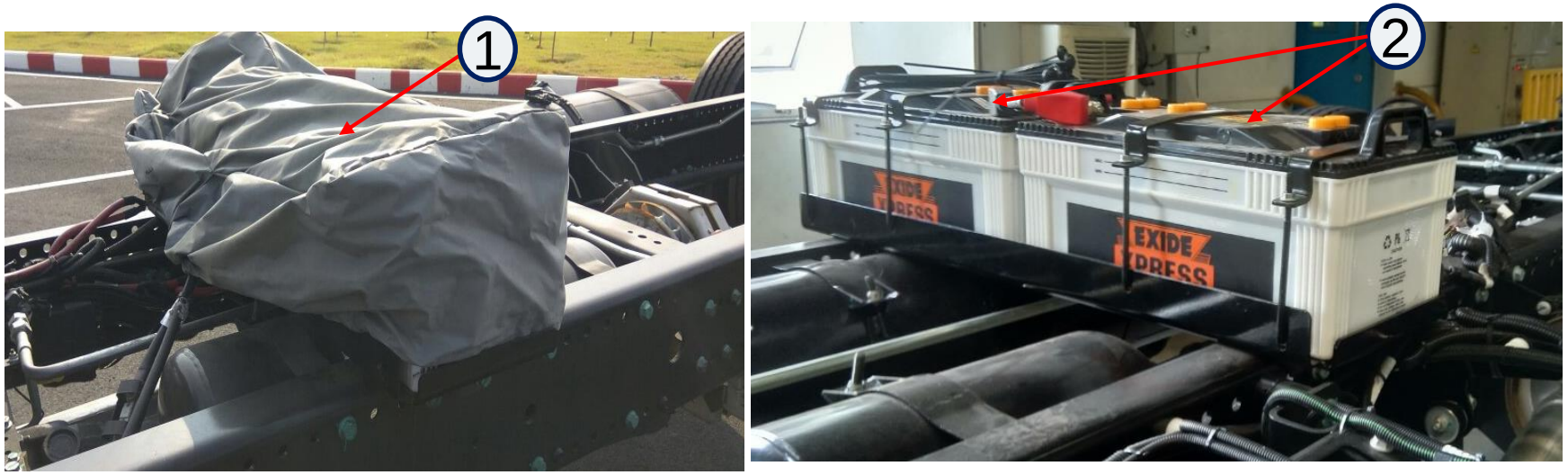
Grounding point on the starter motor.

1904GL01H

10 Battery compartment

10.1 Battery

OF chassis are delivered with two 12V-135Ah maintenance free batteries (24V system) or optionally, two 12V-170Ah batteries (24V system), placed on a metal bracket attached to the chassis frame. Never install 12V equipment connected to one of the batteries only. If necessary, utilize a 24V to 12V converter.



Battery compartment B54.10-0009-02
Electronic relays (arrows)
1 Plastic cover for battery protection
2 Protection removed from batteries

!

Do not remove the cover before the bodybuilding.

1904GL01H

Battery Handling & Precautions

Observe vehicle Operating Instructions. Remove and check the batteries on receipt of the chassis.

1904GL01H

If the acid density is below 1.20g/ml or open-circuit voltage is below 12,2 volts, recharge the batteries. The charging time is 24 hours. Batteries removed temporarily must be stored in a cool, dry place. Daimler Buses recommends to store the batteries in a suitable charging station.

The acid density or the open-circuit voltage must be checked every 3 months. If necessary, recharge the batteries using a suitable device. The charging time is 24 hours.

Check the batteries before delivering the vehicle. If necessary, recharge or replace the batteries. Protect the batteries from UV radiation. Provide a cover, Never place any metal objects or tools on the batteries.

There is a risk of short circuit if the positive terminal clamp on the connected battery comes into contact with vehicle parts. This could cause highly explosive gas mixture to ignite. You and others could be seriously injured as a result. When disconnecting the batteries, always disconnect the negative terminal clamp first and then the positive terminal.

Do not disconnect or remove the battery terminals while the engine is running.

Following safety precautions must be taken to ensure that electronic components are protected from overvoltage during welding work:

Disconnect the positive and negative battery terminals and cover them. Remove batteries. The main electrical panel and the battery electrical panel, as well as all electronic control units, must be removed before starting to work on the body structure. They may only be installed once all welding work and work on the shell has been completed,

All remaining electrical systems and lines must be protected from damage, e.g. from welding sparks, by taking the appropriate precautions (e.g. welding covers).

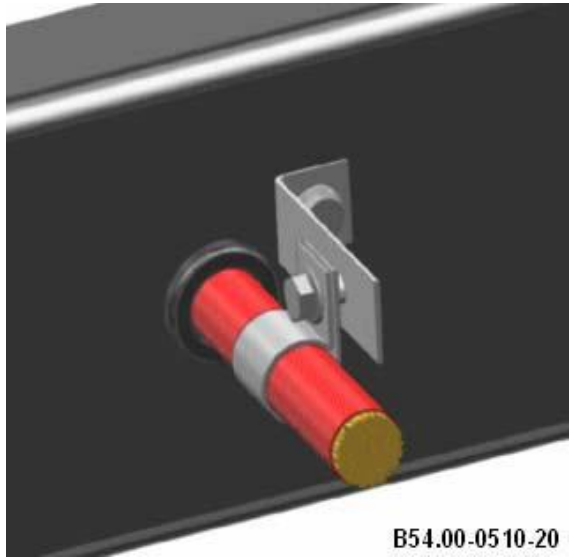
As the electronic control units are unique for every chassis, they must be marked with the vehicle identification number before removing them from the chassis. The storage place must be free of dust, heat, water and other environmental/industrial influences.

1904GL01H

10 Battery compartment

10.1 Battery compartment

1904GL01H



B54.00-0510-20

Cable support

The batteries compartment must be designed to be water and/or impurities proof. It should also be, well ventilated, where the section for gas ventilation / exhaust is not to be conveyed to the passengers cabin and to the baggage compartment, it should be located in an easily accessible compartment from the outside, and, for safety, at the opposite side of the driver, with sufficient room for battery removal without damaging the leads and the support.

The internal battery compartment temperature has to have a maximum limit of 50C°, as batteries are damaged if this limit is exceeded.
Never splice battery cables. Install and fasten them firmly.

Protect the electric wires from abrasion / mechanical rubbing against each other and other vehicle parts, besides protecting them from excessive heat, thus avoiding starting a fire. If there is damage risk from mechanical rubbing along its way, passing by beams or plates, these passages are to be protected with grommets. If necessary, utilize wiring ducts or conduits. However, it is better to attach the wires in this passage with a bracket to assure that no friction occurs.
The positive lead and the negative lead connecting the batteries to the starter and grounding point, have lengths and gauges according to the location of the batteries in the chassis and have been designed aiming at the chassis ferrying to the bodybuilder, with the batteries fastened onto a wooden board. The bodybuilder has to evaluate the need to change the leads, adapting them to the new length and gauge needs, without causing substantial voltage drop. In this case, the specifications of the following norms are to be observed:

– For the leads - MBN 22.004-B;
– For the terminals - DIN 46.234 (Crimped, without the utilization of solder).

The purpose of these norms is to use flexible wire with crimped terminal and flexible insulation tape between the cable ends and terminals (do not use solder on the terminals). Always keep the terminals clean and tightened.
The lengths of the battery leads are not to be changed without previous authorization of the Electric and Electronic Engineering Department of Daimler Buses India..

1904GL01H

10 Battery compartment

10.1 Battery compartment

1904GL01H

For testing and investigations, never cause short circuit between battery poles, alternator and starter terminals and other systems, to check the presence of electric tension or for other reason, as besides damaging the same components, with the large scale utilization of on-board electronics in the vehicles, this practice will cause irreparable damages.

Be careful with electric current leakage (it is the existing electrical consumption when the engine

and all electrical consumers are in switched-off condition. Ex.: radio memory, clock, GPS. etc) The smaller this consumption, the better.

We consider acceptable:

– 300mA for vehicles with 100Ah batteries;

– 500mA for vehicles with 135/170 or 220Ah batteries.

Recharge batteries only after disconnecting them from the electrical system of the bus, following the instructions of the battery manufacturer and those of the battery charger manufacturer. For battery recharging, considering a 60% charge state (between 12.35V and 12.45V),

Re recommend to apply a maximum of 02 recharges to each battery and that the respective recording is carried out in the bodybuilding check list.

The recharged batteries should not remain stored for over 60 days.

***Tab20*- Battery recharging**

Model	Recharging time	current	Maximum constant tension
100Ah	6 Hours	100A	14 Volts
135Ah		13.5A	
170Ah		17.0A	
220Ah		22.0A	
The values vary according to the battery charge state			

10 Battery compartment

10.1 Battery compartment

Should there be any trace of corrosion on the battery or battery terminals, detach the leads and clean with a wire brush. The acid can be neutralized with soda ash and water solution. Reattach the battery leads after having cleaned them.

As the original batteries are of the maintenance free type, it is not necessary to apply petroleum jelly / grease on the battery terminals / posts.

If the electrical tension of the batteries, measured in open circuit, is below 12.4 V, recharge the batteries. The recharging time varies according to the battery state of charge.

The batteries provisionally removed form the vehicles, are to be stored in a ventilated, dry and fresh location. We recommend to store batteries in an appropriate recharging station.

The electrical tension of the batteries (minimum value of 12.4 V) is to be checked every 2 months

If necessary, recharge them.

Protect the batteries against UV radiation. Utilize the protection cover whenever necessary. In emergency, if the charge of the vehicle batteries is not sufficient to crank the engine, auxiliary batteries, connected in parallel, can be utilized.

Do not utilize fast chargers for auxiliary starting.

The chassis are fitted with a master mechanical switch on the positive battery lead. It must be installed in a place of easy access. The mechanical master switch comes attached to a provisional support bracket. We recommend the support to be adequately used and attached to avoid shakings and/or short circuit risk.

!

For more details, ask for help referring to the battery manufacturer or the Electric and Electronic Engineering Department of Daimler India commercial vehicle.

1904GL01H

10 Battery compartment

10.1 Battery compartment

Every cable harness must be disconnected from the electronic modules before carrying out any welding work in the chassis. No cable harness must be cut and/or stretched.

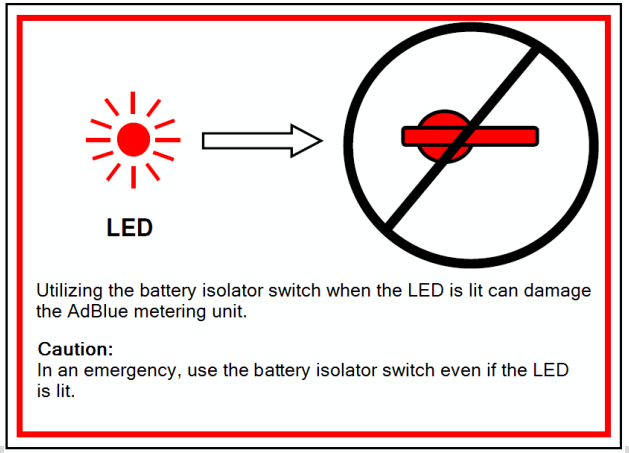
For chassis transport, the battery negative and positive cables up to the starter motor feature lengths and sizes according to the battery location in the chassis. These cables were designed only for the chassis transport with the batteries on the wood board, and the bodybuilder is in charge of evaluating these cables change to adapt them to the sizes.

The negative pole must be connected to the starter motor negative end. Never use the chassis frame or any other chassis or body metallic part as a conductor element (mass and/or grounding).

Adblue metering unit Warning LED must be always positioned near main Battery cut-off Switch

Battery cutoff Switch

Ad-Blue system Warning LED



Warning !

Turn off the MASTER SWITCH before starting the body building process, however, never with the engine running.

Parts of the exhaust treatment system are cooled with Adblue flow after the engine has been turned off. As long as the Adblue pump is working the LED is lit.

Do not open the battery isolator switch when the LED is lit. otherwise the Adblue metering unit could be damaged.

1904GL01H

10 Battery compartment

10.2 Main fuse

!

Position the batteries so that the MAIN SWITCH rod does not touch the battery negative and positive poles, when it is switched off.

Power Distribution Board
Main fuse box (1X 150A)

Battery panel (Power Distribution Board, PDB)

The battery panel contains the main fuses and ignition relay.

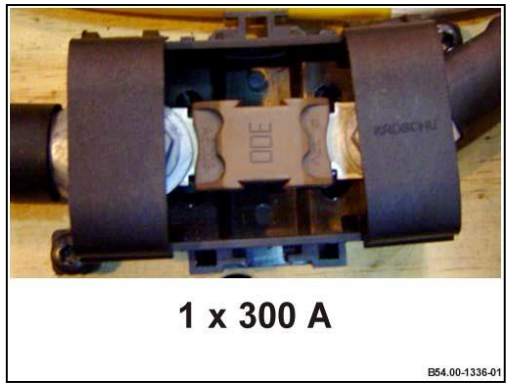
This panel must be mounted separately from the battery compartment, but as close as possible. The cables from +battery to motor starter through battery panel and battery isolator switch must be routed with special care (without tension, without rubbing),

The chassis main fuse has a 100 Amps capacity (for the terminal 15-optional signals and terminal 30 from the main switch cabinet) and another with a 300 Amps capacity (for the starter motor terminal 30 signal). In case of need, both 100 Amp fuses may be replaced by others with nominal current which is compatible with the complete bus design, keeping in mind the main feed wire gauge.

10 Battery compartment

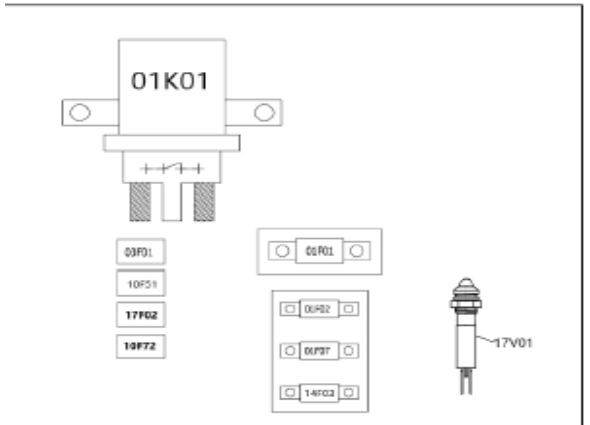
10.2 Main fuse

1904GL01H



Main fuse (1x300A)

Retarder Power supply fuse (1x150A)



NAME	RATING	FUNCTION
01F01	300A	Starter Motor fuse KL.30 Battery Box
01F02	100A	Main Fuse KL.15
01F07	100A	Main Fuse KL.30 Battery Box
14F03	150A	KL.30 power Supply reterder
03F01	5A(Oranch)	Main Security Switch Fuse
10F51	25A(White)	MCM (KL.30) Fuse
10F72	5A	ACM (KL.15) Fuse
17F02	30A(Green)	ACM (KL30) Main Fuse
17V01	LED(Red)	Exhaust After Treatment Lamp
01K01		KL.15 Signal Power Supply Relay

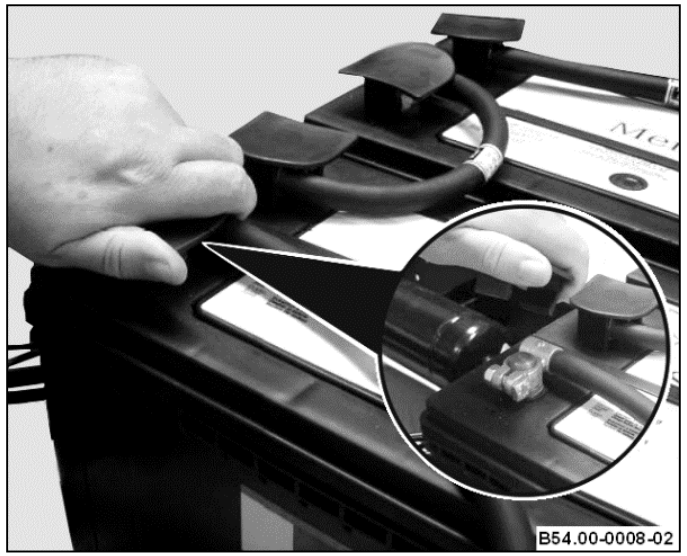
Power supply fuses

1904GL01H

10 Battery compartment

10.3 Terminal Protective cover

The chassis are supplied with protective covers on the battery poles, we recommend their utilization to prevent short circuit.



Battery connector protection cover B54.00-0008-02

!

Position the batteries so that the MAIN SWITCH rod does not touch the battery negative and positive poles, when it is switched off.

10 Battery compartment

10.4 Power supply fuse

1904GL01H

!

Fuses are to be located in easily accessible places for maintenance.

1904GL01H

11 MCM Electronic control unit

MR (PLD) module B15.00-0001-20
Located on the engine block side

- 1 MR (PLD) module
- 2 21-wire connector.
- 3 120-wire connector.

11.1 MCM Electronic control unit

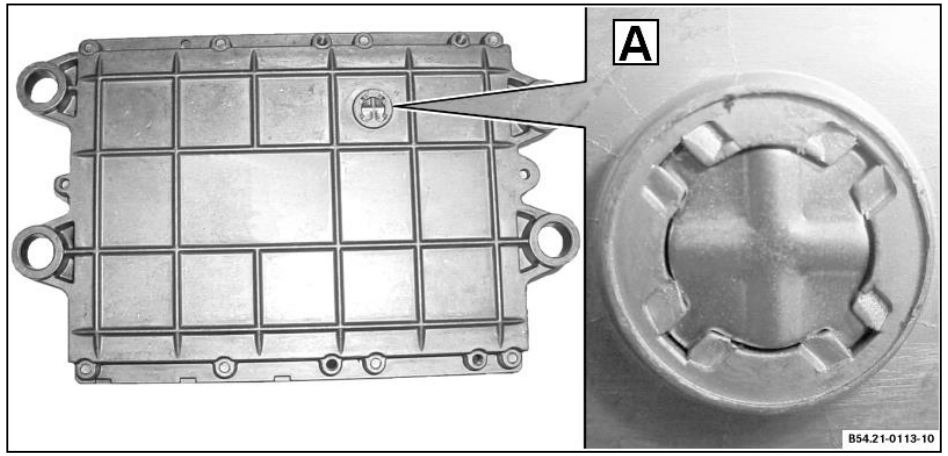
1904GL01H

The MCM control unit is mounted directly on the engine block and is programmed according the characteristics of the engine mounted on.

The MCM module(“PLD” engine management) is the processor that manages the running of the engine. The module has this name due to its association with the fuel system (pump/pipe/ nozzle).

This module receives the signals from all engine and vehicle sensors, identifies the operation regimen, determines the instantaneous need of fuel and controls the injection time in the injection units. This module is attached to the engine side. Connection to all the sensors installed in the engine is carried out by means of a 120-way connector. Connection to the vehicle is carried out by means of a 21-way connector. This module also has an atmospheric air pressure sensor installed over the electronic board, and for this reason, there is an air inlet in the module's rear part.

Never use high-pressure washing equipment on the connectors or on the air inlet.



MR (PLD) module rear part B54.21-0001-10
A-Atmospheric pressure sensor detail

1904GL01H

11 MCM Electronic control unit

11.1 MCM Electronic control unit

1904GL01H

21-wire connector

MCM (PLD) module connectors are weatherproof.
They are waterproof (high-pressure water jets are not advisable), they withstand diesel oil, dust, abrasion, engine compartment temperature, low temperatures (-40°C) and are not flammable, however, assembly and disassembly of the 55-wire and 16-wire connectors require a careful although simple and easy procedure, because otherwise the damage caused may be very expensive.

Follow these proceedings to connect and disconnect the 120-wire and 21-wire connectors

21-wire connector - Information connection (CAN) with the vehicle.

1 Push the yellow lock upwards, the connector will slide out.

2 Pull the connector away and protect the terminals until its reconnection.

1904GL01H

11.1 MCM Electronic control unit

120-wire connector

120-wire connector - Engine information connection.

1 Pull front lock upwards to make connector slide out.

2 Pull the connector away and protect the terminals until its reconnection.

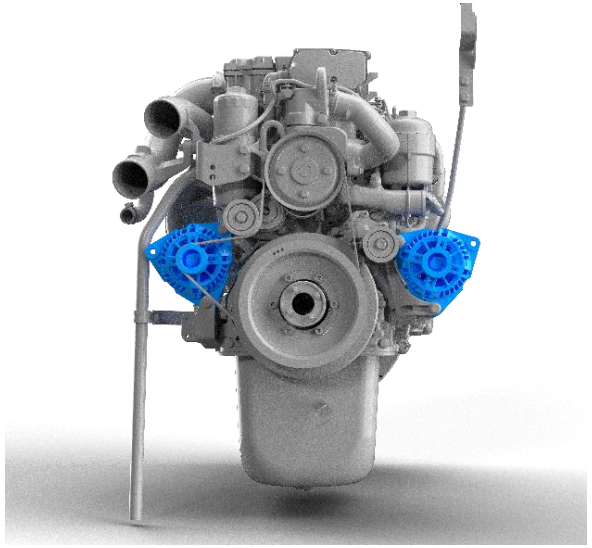
1904GL01H

12 Alternator

12.1 Alternator

OF vehicles are fitted with a 28V 100A alternator (2 No’s for retarder chassis)

The above mentioned alternators are equipped with rectified regulators with Zener diodes to avoid current noise harmful to electronic modules.



Vehicles equipped with TWO alternator 28V 100A

!

The association of different capacity and different make alternators (parallel connection) is not permissible, as it causes imbalance in the electric power generation system and, consequently the loss of the alternators guarantee.

!

It is not permitted to install alternators without being connected to the vehicle's batteries, as it causes electric over-tension that damages the electronic modules and, consequently the loss of warranty of the alternators and electronic modules.

1904GL01H

13 Rear start system

Not applicable.

14 Starter blocker

1904GL01H

!

Not applicable.

1904GL01H

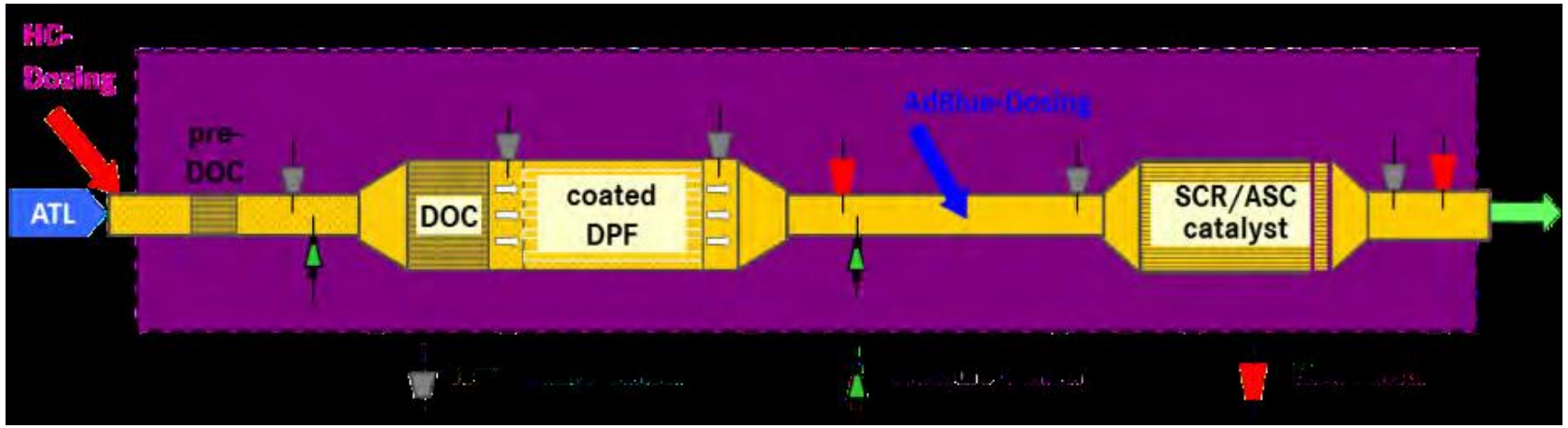
15 ATS system

15.1 Exhaust treatment system

1904GL01H

In order to fulfill the BSVI emissions requirements, the engine exhaust smoke is being treated inside the silencer before being released to the atmosphere. The silencer includes DOC (Diesel Oxidation Catalyst), DPF (Diesel Particle Filter) and SCR Catalyst.

The diesel particulate filter must be accessible for maintenance.
Do not assemble body-structure profiles in front of the DPF cover. If the profile is necessary it must be dismountable.



Note

- Do not open the DPF cover. This can be executed only by authorized personal.
- Avoid as far as possible during body-work the engine running at idle speed. At idle speed the diesel particulate filter gets clogged faster and in worst case a manual filter regeneration could be necessary (see following pages).

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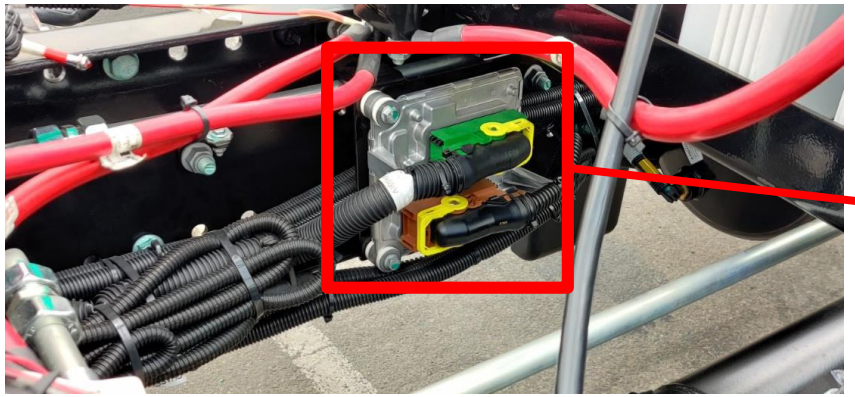
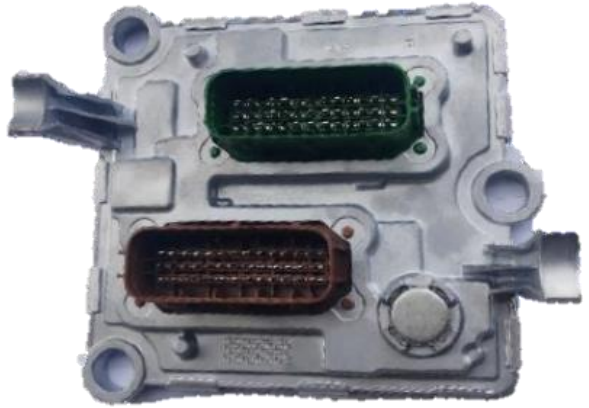
15 ATS system

15.1 Electric center of the “ATS” system

1904GL01H

The ACM2 ECU controls all the devices and sensors that are part of the exhaust after-treatment system. Following components are part of this system.





1904GL01H

WARNING !

Exhaust fumes can be very hot. Do not park the vehicle with running engine over dry scraps (leaves, paper,.) (Risk of fire)

Note

- Never assemble or disassemble any connection if they are powered, Switch off the vehicle to disconnect or connect the module.
- ACM ECU is parameterized with vehicle characteristics,
- During body builder this EUC must not to be uninstall from vehicle.

15 ATS system

15.2 Diesel Particulate Filter

1904GL01H

Under normal circumstances, automatic regeneration of the diesel particle filter is sufficient to avoid heavy soot loading of the filter. However, if the bus is predominantly driven short distances or with the engine under low load, it might not be possible for automatic regeneration to finish successfully.

An indicator lamp in the instrument cluster warns that the diesel particle filter is nearing a high load state and indicates that appropriate action needs to be taken. The on-board computer gives prompt warnings of emission-relevant malfunctions or user errors and displays their respective priority by means of yellow or red alerts.

If these messages are disregarded, there is a risk of engine power output being reduced and a need to exchange the diesel particulate filter prematurely.

WARNING !
If the yellow event window and its message are disregarded, there is a risk of engine power output being reduced and a need to exchange the diesel particulate filter prematurely).

1904GL01H

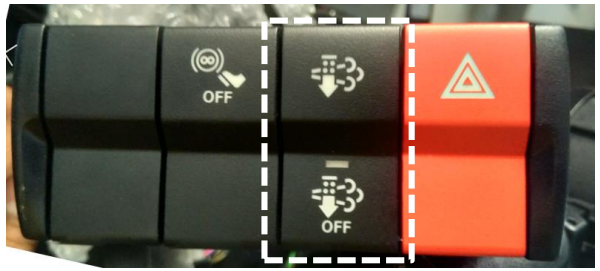
15 ATS system

15.2 DPF Regeneration

1904GL01H

Automatic diesel particulate filter regeneration

Whenever the green "Particle filter" indicator lamp in the instrument cluster lights up, this means that the diesel particle filter is undergoing automatic regeneration.
Automatic regeneration does not start unless all necessary operating conditions have been fulfilled, e.g. engine oil or exhaust gas temperatures sufficiently high and engine running.
In addition, automatic regeneration is not possible with the engine idling or running at an elevated idling speed. The regeneration cannot be finished without a good period of driving because this is the only time in which the necessary temperatures are reached in the exhaust system.
If regeneration is in progress and one of the operating conditions is no longer fulfilled, the green indicator lamp goes out prematurely and regeneration is aborted.
It restarts automatically when all necessary operating conditions are fulfilled again.



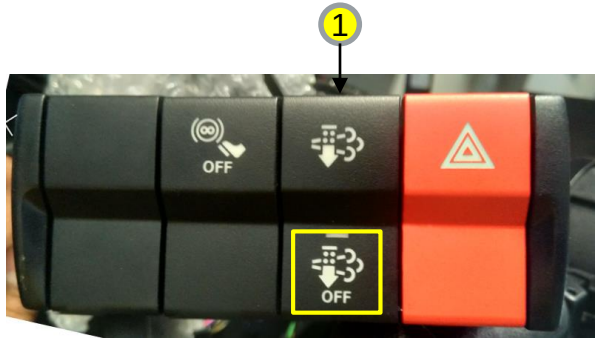
Regeneration control switch

Note
If possible, avoid interrupting a journey while the green "Particle filter" indicator lamp is lit. This will prolong the period of regeneration.

Inhibiting automatic regeneration of diesel particle filter

If the elevated exhaust gas temperatures associated with regeneration may present a danger, e.g. where the heat produced may jeopardize safety, it is possible to inhibit the regeneration process. Neither automatic nor manual regeneration can then be initiated and regeneration is stopped if it is already in progress.

- Press the lower section of pushbutton (1) to inhibit automatic regeneration of the diesel particle filter.
- To deactivate, press the lower section of inhibit pushbutton (1) again.



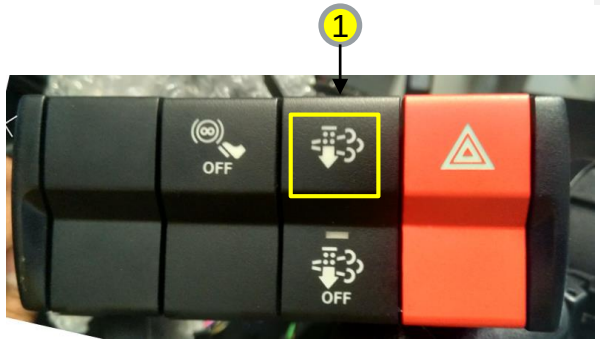
Inhibiting & Deactivation of Regeneration

Note
Indicator lamp lights up in the instrument cluster and no generation can be started

15 ATS system

15.2 DPF Regeneration

WARNING!
Leave the regeneration inhibitor activated only as long as the danger exists. Whenever you activate the regeneration inhibitor, regeneration will continue to be inhibited even after the next engine start.



Activation of Regeneration

Manual diesel particulate filter regeneration

Under normal circumstances, automatic regeneration of the diesel particle filter is sufficient to avoid heavy soot loading of the filter. However, if the bus is predominantly driven short distances or with the engine under low load, it might not be possible for automatic regeneration to finish successfully.
If the diesel particle filter load state becomes critical, an indicator lamp lights up in the instrument cluster.

This informs the driver that a manual regeneration must be started. The manual regeneration process lasts approximately 30 to no more than 60 minutes, depending on the temperature of the exhaust system.

Starting regeneration of diesel particle filter manually Pull over safely with regard for other traffic and leave the engine running. Park well clear of other vehicles, objects and all flammable materials.

- Apply the parking brake Shift the transmission to neutral N
- Take your foot off the accelerator pedal. If active, deactivate the regeneration inhibitor.
- Press and hold the upper section of "Manual regeneration"
- pushbutton (1) for approximately 4 seconds.
- The green indicator lamp in the instrument cluster comes on and engine speed is increased.
- When regeneration has finished, the green indicator lamp in the instrument cluster goes out and engine speed drops to idling speed.

15 ATS system

15.2 DPF Regeneration

1904GL01H

Note

Manual regeneration cannot be started unless the engine oil and exhaust gas temperatures are sufficiently high, the AdBlue® is not frozen and the system is functioning normally).

WARNING!

Regeneration will be aborted automatically if you engage a gear, release the parking brake or activate the regeneration inhibitor by pressing the lower section of the "Regeneration inhibitor" pushbutton.

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16 Fire sensor in engine compartment

1904GL01H

!

Not applicable.

1904GL01H

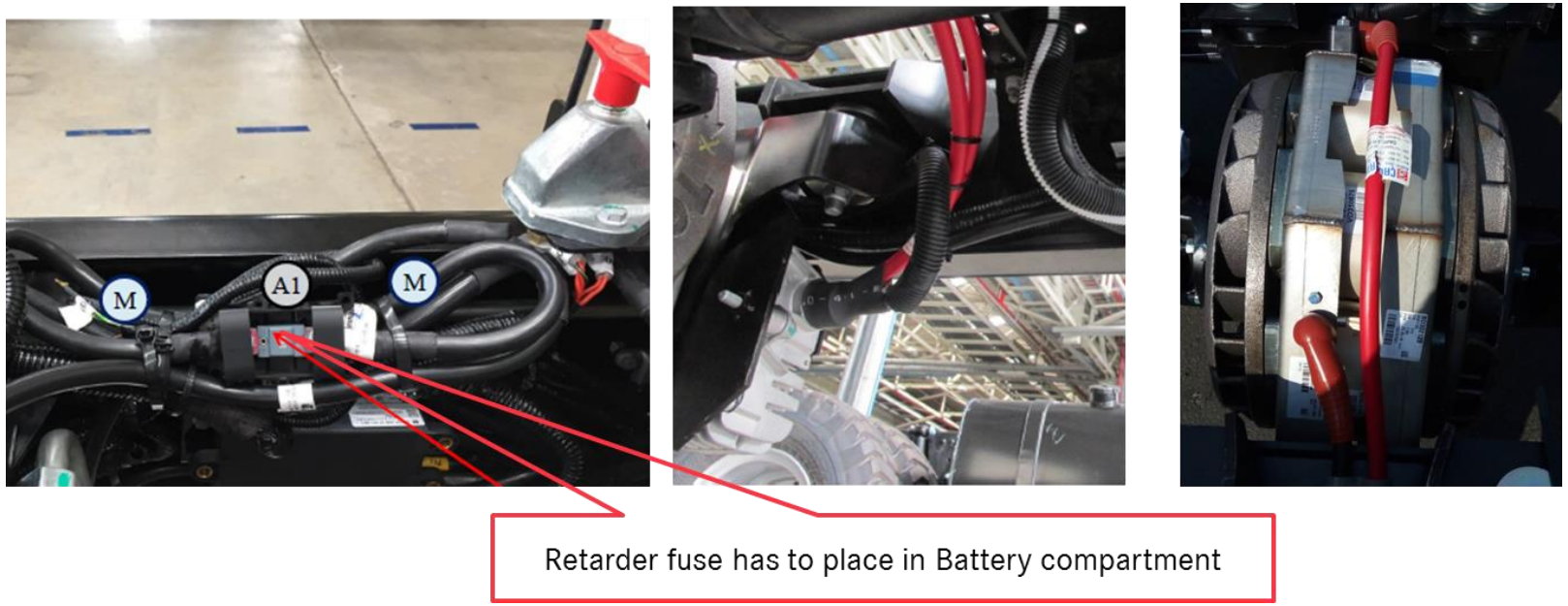
17 Retarder

17.1Retarder Telma

The OF Chassis are fitted with the (optional) Electro-Magnetic Telma retarder. In this case, some instructions should be observed.

Factory-supplied Telma Retarder with plastic protection for the electronics.

The retarder main fuse has 150 Amps capacity (for the Battery + ve supply from the main switch to Retarder ECU). In case of need, 150 Amp fuses may be replaced by others with nominal current which is compatible with the complete bus design, keeping in mind the main feed wire gauge.



Telma Retarder

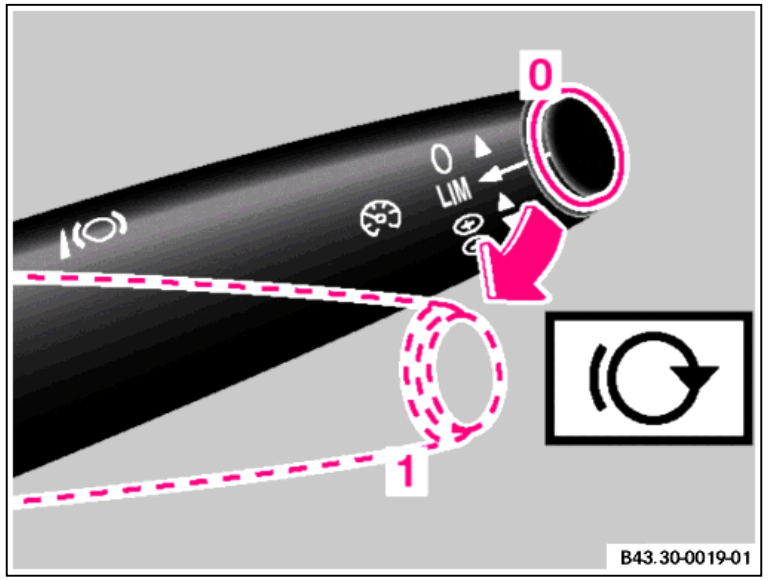
1904GL01H

17 Retarder

17.2 Assembly of the Telma Retarder actuation lever in the vehicle's dashboard.

1904GL01H

In the assembly of the instrument cluster of the bodies of chassis fitted with retarder, foresee the positioning of the actuation controls, according to version, that enable easy and practical reach by the driver, avoiding ergonomic and interference problems.



Retarder brake actuation
1 Retarder brake operating position

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18 Body load

18.1 Body electrical system

1904GL01H

The cable sets for the body electrical system shall be manufactured by the body manufacturer.

The following must be observed during connection and installation:

Connection to the chassis electrical system may only take place via the adapter connector in the central electrical compartment. The wires must be attached to the bus such that they cannot be damaged by kinking or vibration. Route cables in such way that scuffing can not occur, particularly at crossover points and sharp edges. If necessary, use cable ducts or guide pipes.

Data lines (CAN-wires) shall be laid in isolation from other current-carrying cables to prevent interference from electromagnetic effects.

IES-CAN data lines may not be extended (max. line length 2.5 m) since this can lead to faulty control unit signals.

In general, the cables routed to electronic components must not be modified.

Lines must be protected from heat by means of insulation. Route cables without tension.

OF chassis has designed considering Body Electrical loads. The Electrical load termination has to be taken from electrical center panel.

The Electrical Loads has to be used using relay for switching and fuse protection.

OF Chassis without retarder model : allowed max current for body builder : 50A

OF Chassis with retarder model : allowed max current for body builder : 50A

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18 Body load

18.2 Electricity consumption - auxiliary Loads

1904GL01H

Please note the following when retrofitting electrical consumers:

Higher-capacity batteries and an additional alternator are available from the factory as optional equipment.

Before starting work on the electrical system switch off all consumers and disconnect the negative terminals (-) from the batteries. Reconnect batteries only when all loosened cables are connected.

Do not connect additional consumers to fuses already assigned.

Do not connect additional wires (e.g with insulation piercing devices) to existing ones Ensure that retrofitted consumers have sufficient additional fuse protection. The size of the fuse must protect the cable and not the connected system. The sufficient protection against every malfunction without influencing the whole system.

For the supply of 12V devices only use 24V-12V converters. Power tapping directly at the battery or at the terminal clamps of the battery is not permitted.

Auxiliary consumers may only be electrically connected to the parts specified by Daimler AG, the central body manufacturer box and the positive power distribution board.

None of the existing electrical connections may be separated in order to connect auxiliary consumers.

An energy balance estimation of the whole vehicle's electrical system must be done by the bodybuilder to guarantee the expected lifetime of the batteries and alternators. Persistent overloaded electrical system must be avoided. Use engine running signal (D+) to prevent battery discharge while engine is stopped.

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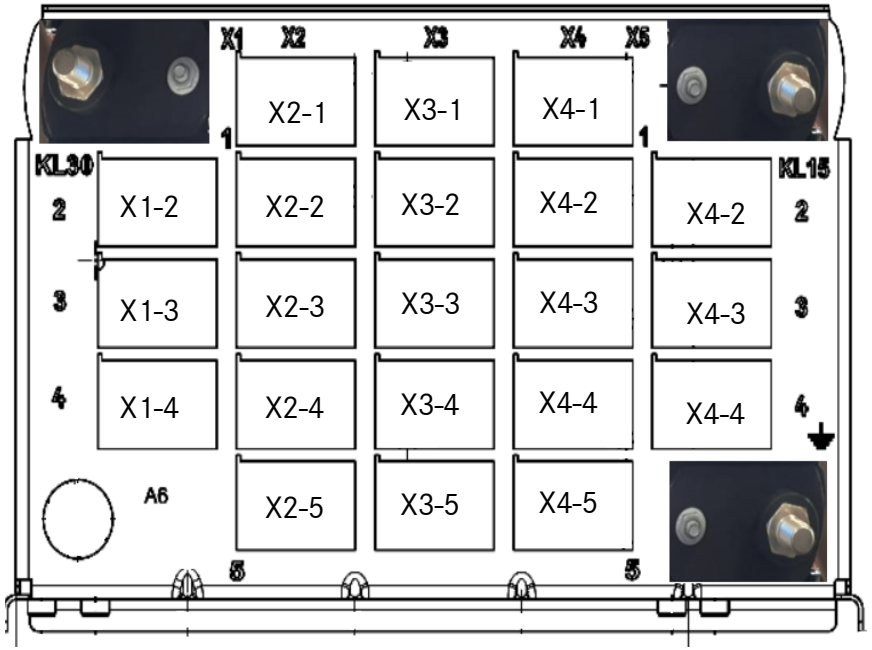
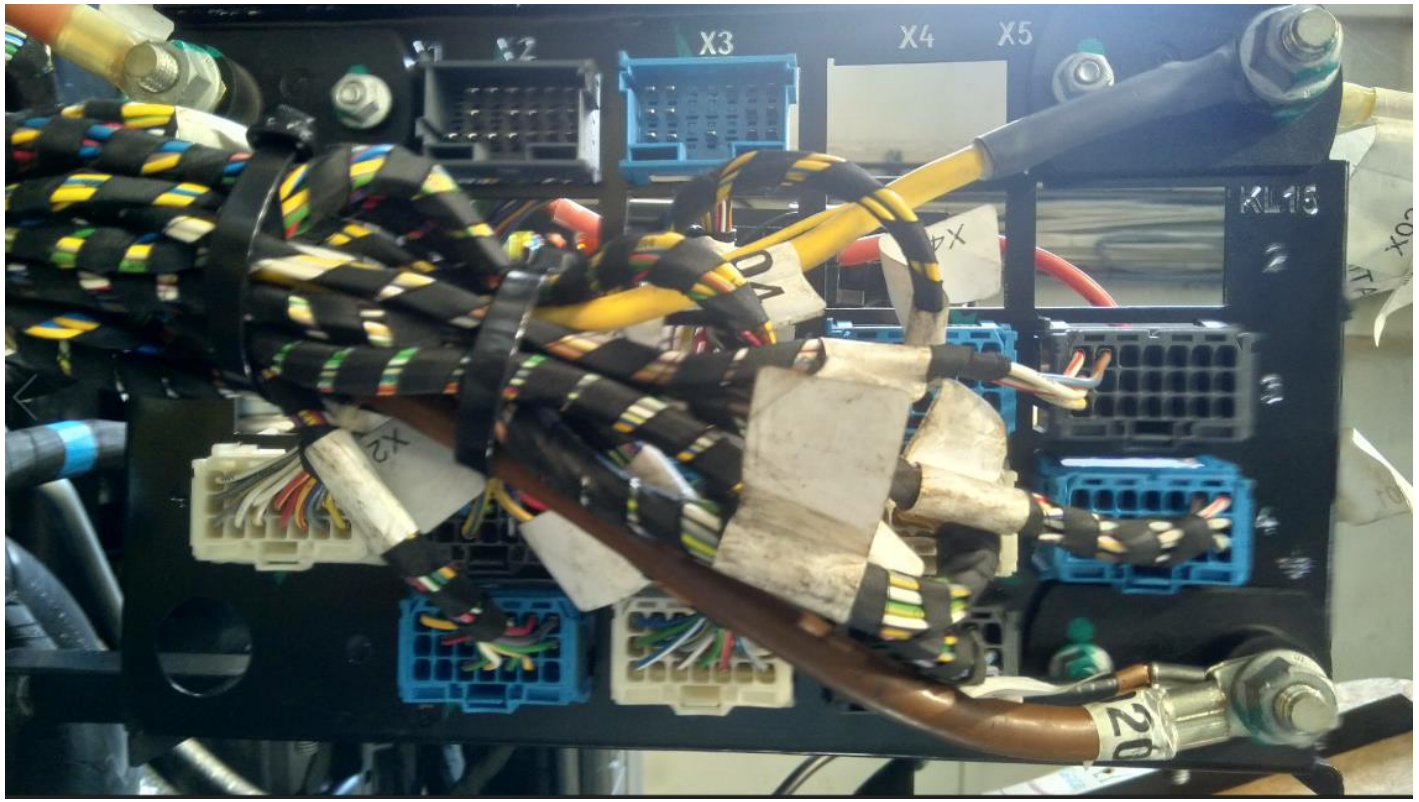
18 Body load

18.3 Interface connectors

1904GL01H

Following interface connectors in the main electrical compartment are used to control indicators and icons, and to activate previously prepared chassis functions. The interface also provides signals to the body electrical system.





1904GL01H

18.4 Power tapping for body loads

18.4.1 Electricity consumption - auxiliary Loads

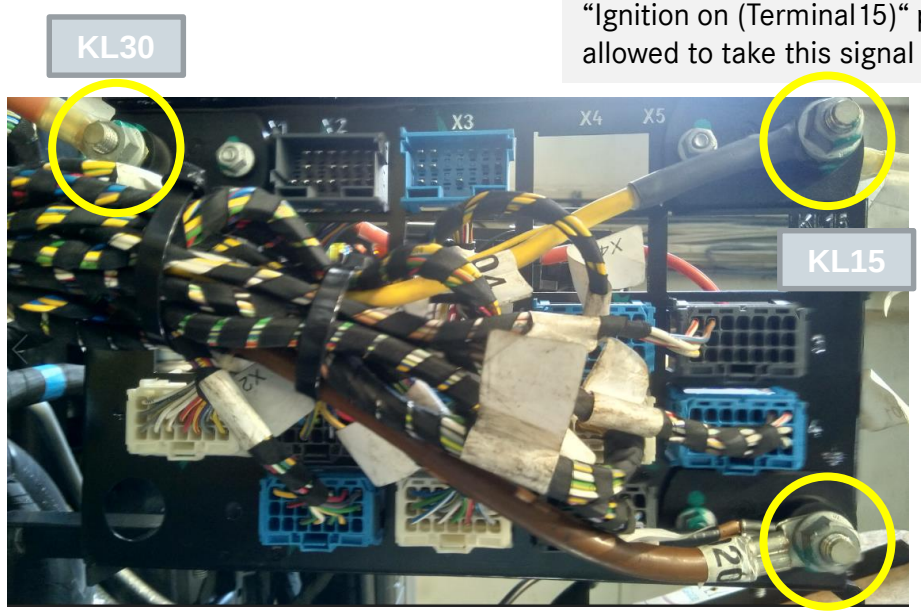
Electrical consumers up to 50A (Terminal 30 and Terminal 15) can be tapped from main distributors terminal at the main electrical panel.

WARNING!

The current draw of all body consumers connected to the distributors terminals must not exceed the given value. If this cannot be guaranteed, refer to following paragraph “Electrical consumers over 50A”

WARNING!

“Ignition on (Terminal15)“ power supply can be taken only from distributor X0204 or from the power distribution board. It is not allowed to take this signal directly from ignition switch, this can affect the electronic systems.



Connection Body									
El.-Code	Cable Number.	mm²/ colour	Type	Connector	Pin	Type	Potential	max. load	Function / Naming
01	0027	35 rd		X0202	M8		+24V	60A	Distributor main Term. 30
01	0026	35 ye		X0204	M8		+24V	60A	Distributor main Term. 15
01	—	120 br		W0201	M8		Ground	150A	Distributor main Ground

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18.5 Electrical consumers over 50A

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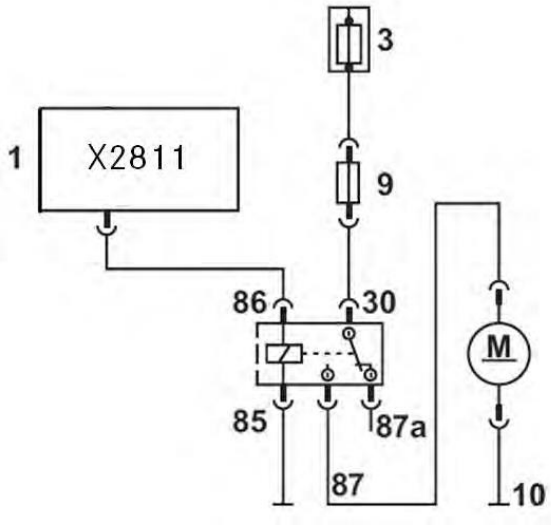
The power distribution board in the battery compartment is designated for the supply of power electrical consumers with a high current draw. There are empty fuse slots (see drawing below) where the body electrical consumers can draw the necessary current. Define fuse's properties according to the protected wire specification.

WARNING!

- There is a risk of fire if the cables are overloaded.
- Define fuse's properties according to wire specification.
- Ensure that cable and fuse connections are tightened properly to prevent malfunction and fire.



Daimler Buses recommends that big consumers are connected in accordance with following circuit diagram.
Use engine running signal (D+) to prevent battery discharge while engine is stopped.

1 Main electrical panel plug X2811 (pin assignment according consumer, Term.15, D+..., max 500mA)

3 Power distribution board (free slots)

9 Additional fuse, power distribution board

10 Ground terminal

19 Articulation

1904GL01H

!

Not applicable.

1904GL01H

20 Appendix

20.1 Chassis transport procedures

1904GL01H

For non transportation pack chassis, it is compulsory to use semi-trailers to transport the chassis that have the appropriate standard devices required for the transportation in urban lanes and highways.

Important:

Chassis should not be driven in streets or highways until unless transportation pack fitted to chassis, the vehicle speed should not exceed 40 km/h..

During maneuvers while loading and unloading on semi-trailers, the vehicle speed should not exceed 5 km/h..

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Chassis Towing

The first and last cross members of the chassis are not prepared aiming at being used in direct towing operations. The Body Builder must assemble a mechanism appropriate for this purpose, according to its operational needs, foreseeing the adaptation to the body.

Important:

It is necessary to remove the propeller shaft to tow the chassis with automatic transmission. For more information, refer to chapter “Automatic Transmission.” page 91.

!

The chassis must be parked in a flat floor place, avoiding possible twists that may cause permanent deformations in its structure.

20 Appendix

1904GL01H

The chassis have plastic covers for the protection of the instrument cluster, electrical center, batteries, and other electric and electronic components.
If such covers are removed during the transfer of the vehicle, take care for them to be put again and be correctly fastened to avoid damages to the mentioned electric and electronic components.
For further information, refer to the manual Guidelines for Body Building - "General Manual", chapter 3.6 Chassis transportation.

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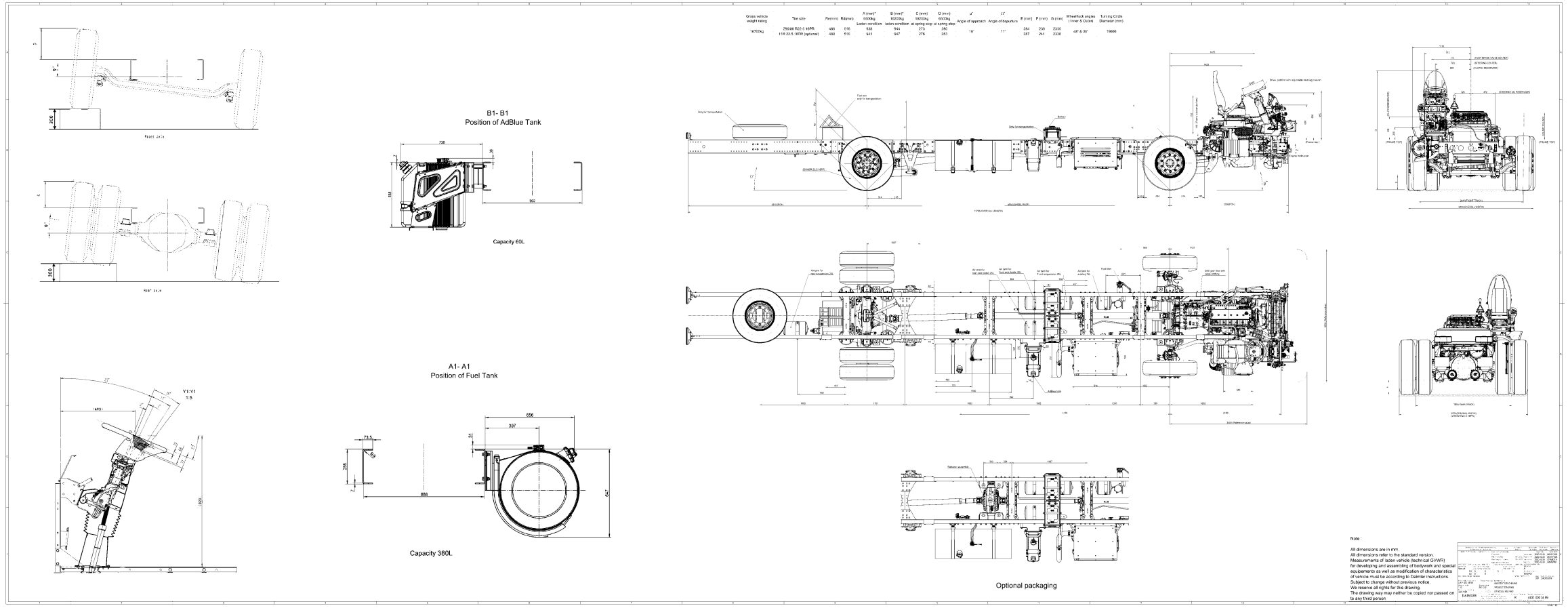

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21 Contact

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