OF 917/1017 Bus Chassis -Bodybuilding Guidelines

BHARATBENZ

Guidelines and Precautions

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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Revision Control

0822AU01A – 07/22 – OF917 Related updates **0123JA01A – 01/23 – FPS/FAS Connections Updated (7.21 Chapter)** **0123JA02A – 04/23 – OBD II related General Updates** **0124JA01A – 01/24 – FAS/FPS Standards (E/7.13 - pg. 143); Pneumatic Auxiliary connections (M/11.1 - pg.48) updates**	

Mechanical part

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- Weights & dimensions
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- Gearbox & shifting system
- Suspensions system
- Climate control
- Maintenance & access
- Ergonomics
- Miscellaneous

1.1 Dimensions

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 917	OF1017
Wheelbase	4,250	5,300
Front Overhang	1,193	1,193
Rear Overhang	1,940	2,000
Overall Length	7,383	8,493

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 OF 10T Chassis Body width has been limited to 2400 mm maximum.

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 are not exceeded, considering all operation and load conditions (dynamic and static). Refer to the chapter “Admissible Load per Axle” page 8.

These chassis have 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 for approval in advance.

Official approval

Important:

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.

For the OF 917/1017 chassis, the dimension of the rear overhang is technically limited to 60% of the wheelbase value, in order to ensure the vehicle's driveability in accordance with adequate weight distribution.

Please refer to the offer drawings specific for other dimensions.

Drawings offered for reference:

- OF 1017 5300WB A 831 000 35 99
- OF 917 4250WB A 831 000 49 99

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Official approval

1.2 Use of BharatBenz trademarks

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.

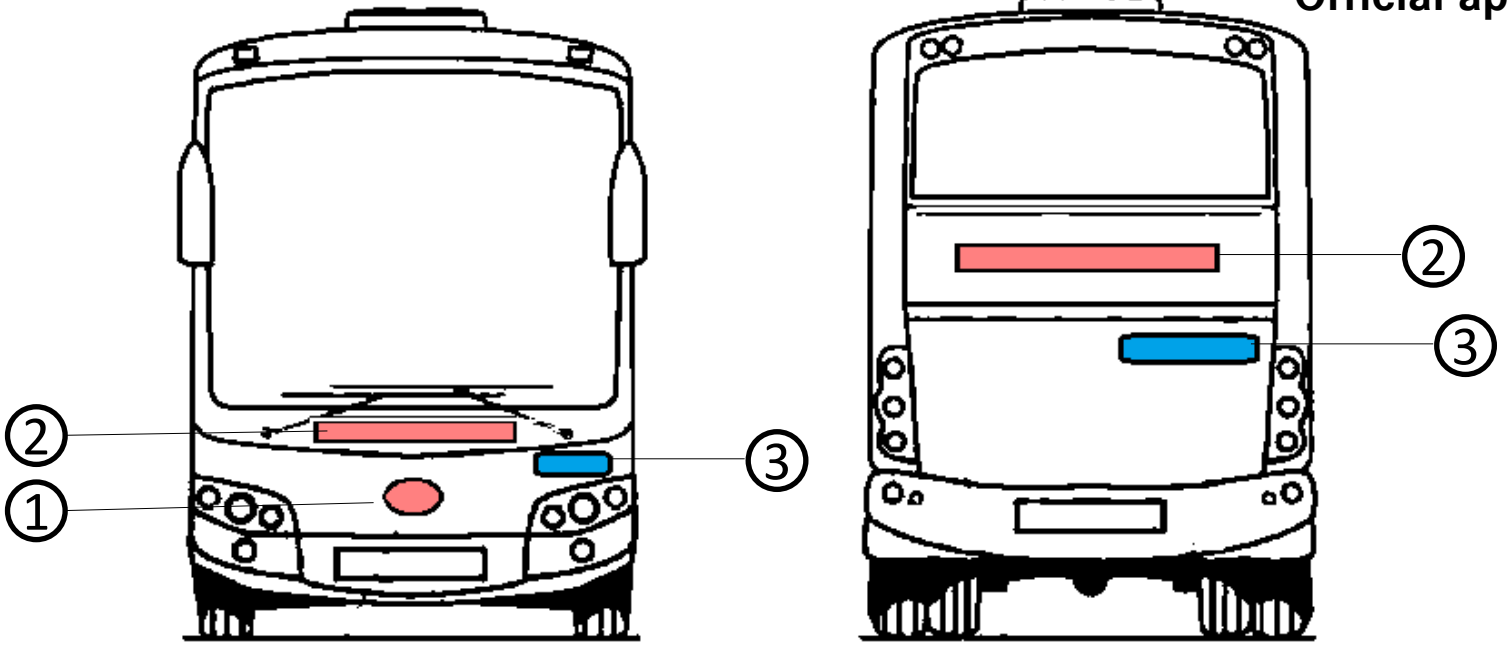
Official approval

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.

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.

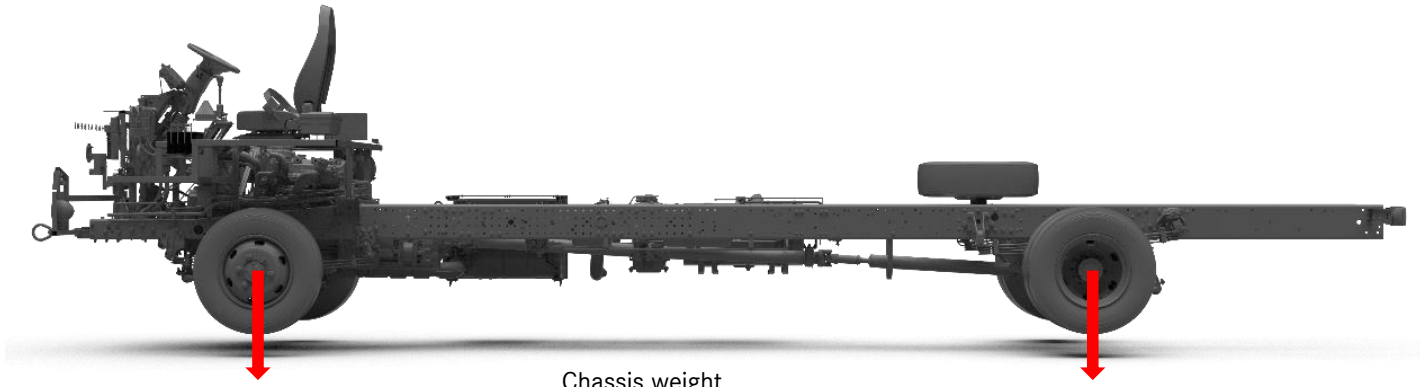
1- Recommended position for the BharatBenz Logo.
2- Recommended position for the BharatBenz Letters.
3- Recommended position for the Bodybuilder trademarks.

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.

Chassis Weight

2.1 Reference Values

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.



Chassis weight
FA - Front axle
RA - Rear axle

***Tab2- Weight* Reference values**

Chassis	Wheelbase	Front Axle (kg)	Rear Axle (kg)
OF 917 BSVI	4,250	1700	1405
OF 1017 BSVI	5,300	1810	1370

OF 1017 5300WB: Weights: chassis without body, without driver, with toolbox, with spare wheel type 235/75R17.5 tires, with fuel tank full, with rear axle AAM 7.14 and front axle IF 3.6, these weights can vary according to the optional fitments.

OF 917 4250WB: Weights: chassis without body, without driver, with toolbox, with spare wheel type 235/75R17.5 tires, with fuel tank full, with rear axle AAM 7.14 and front axle IF 3.6, these weights can vary according to the optional fitments.

2.2 Chassis Weight

OF 1017 5300WB: Weights: chassis without body, without driver, with toolbox, with spare wheel type 235/75R17.5 tires, with fuel tank full, with rear axle AAM 7.14 and front axle IF 3.6, these weights can vary according to the optional fitments.

OF 917 4250WB: Weights: chassis without body, without driver, with toolbox, with spare wheel type 235/75R17.5 tires, with fuel tank full, with rear axle AAM 7.14 and front axle IF 3.6, these weights can vary according to the optional fitments.

3 Admissible loads per axle

The OF 917/1017 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 frame.

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*- Admissible loads per axle**

[Kg]	OF 917 4250 WB	OF 1017 5300 WB
Front Axle	3600	3600
Rear Axle	6000	7000
Total	9600	10600

When the gross weight total of front and rear axles exceed "Technical limit" value of the vehicle, axle maximum values can not be used simultaneously.

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.
No complete vehicle may delivered with a GVW that exceeds the one indicated by the manufacturer.

i

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

3.1 Admissible loads per axle

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.

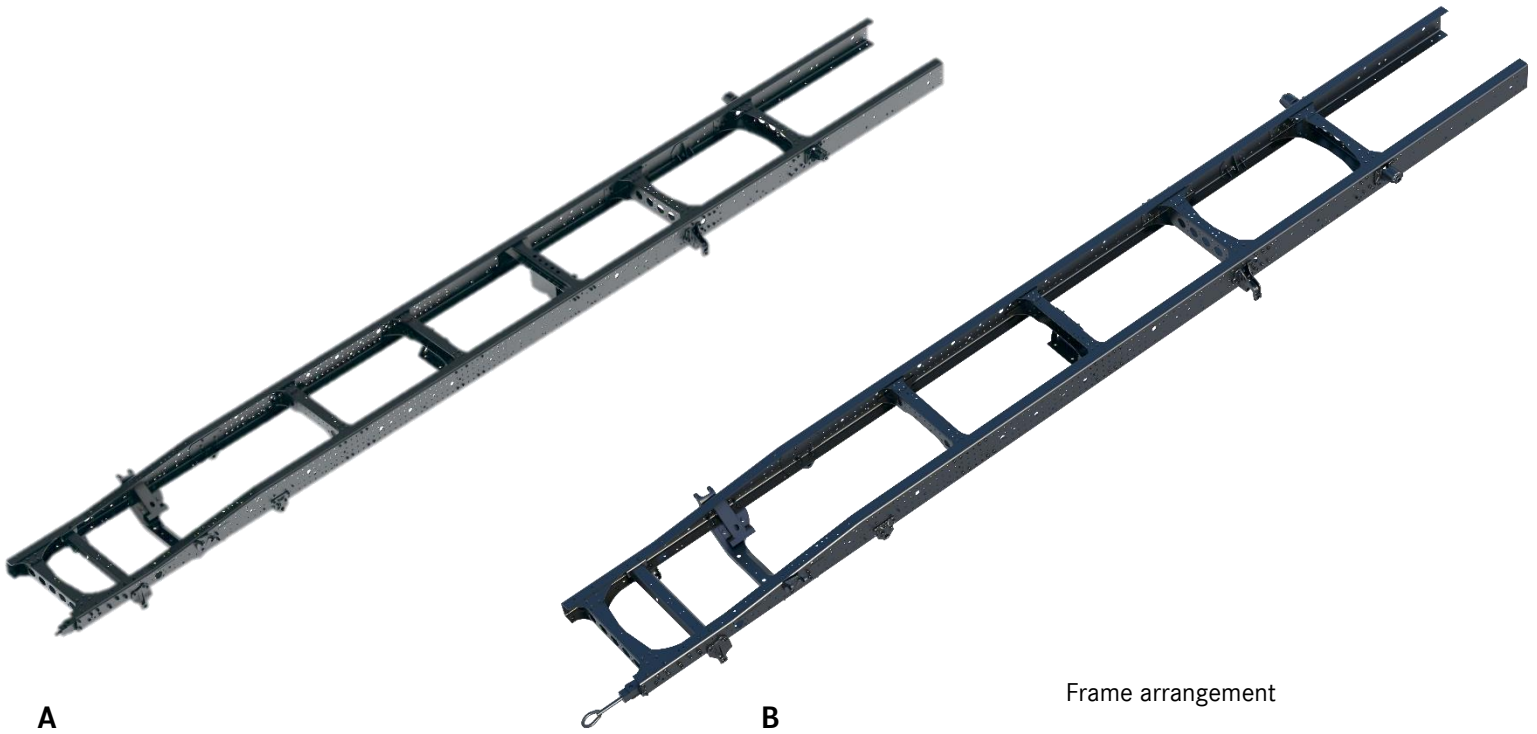
***Tab4*- Admissible loads per axle**

Parameter	Description	OF (All)
Unladen	With the empty vehicle, without any load	25%
Laden (GVW)	With the loaded vehicle/GVW	25%

4.1 Frame arrangement

The OF 917/1017 chassis has a single frame concept, of the "ladder type" and with cross members fastened by bolts & rivets.

Alteration or removal of any cross member fastener or rivet is not allowed.



A

B

Frame arrangement

A: 4,250 mm wheelbase frames.

B: 5,300 mm wheelbase frames.

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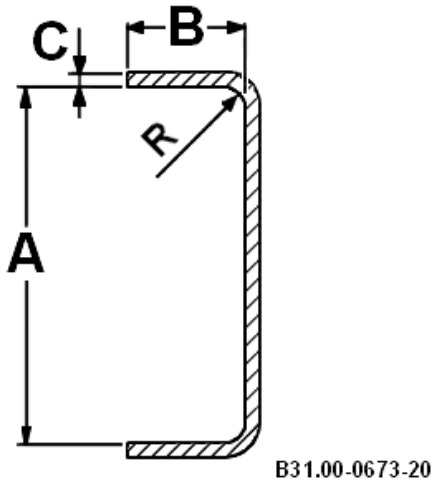
4.2 Chassis materials

***Tab5*- Structure materials**

Chassis	Material	Equivalent
OF 917/1017	BSK 46	NBR 6665 LNE 50



Long member dimensions

A 216 mm
B. 80 mm
C. 6 mm
R 12 mm

Chassis modifications and adjustments

5.1 First cross member adjustment

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

Remark:

The first cross member is not designed to receive the towing hook installation or loads.

5.2 Driver's Podest

The OF 917/1017 chassis are delivered with a structural frame platform called as the driver's podest.

In the upper and lower areas, body builder must connect fastening elements to the podest frame with the body lateral structure.

Chassis are supplied with the driver's podest placed in a final position.

In order to facilitate the body assembly, depending on the body design, the driver's podest can be welded or it's components be disassembled (e.g. Electric switches, hand brake lever, instrument cluster, electrical cables etc.) without disturbing the steering column original geometry, pedal positions and driver's ergonomics.

Drivers podest is fastened to chassis frame by means of rigid brackets, modifications to its original geometry are not permitted.

It is mandatory that all modification to the chassis original configuration must be coordinated and approved by the BBA Daimler Buses India in order to protect Warranty Conditions.

Remark:

The driver cockpit should be integrated to body structure through definitive joints because it is not self supporting.

5.3 Vertical adjustment of front overhang

Not applicable.
The longitudinal members are fixed and cannot be adjusted.

Chassis modifications and adjustments

5.4 Wheelbase modifications

Not applicable.
No wheelbase modifications are allowed.

5.5 Rear overhang extension

Extension of the rear overhang of the OF chassis is allowed as long as the admissible weight limits are observed (legal and technical) and the constructive limits for the rear overhang.

The departure angle must be kept within the established limits.

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 for the additional cross members, in adequate quantity and distribution to keep unchanged the vehicle frame rigidity.
- The material used for the frame extension and for 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 17.
- The welding should 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.
- For OF chassis, the rear overhang dimension is technically limited to 60% of the wheelbase value to assure vehicle drivability according to the proper weight distribution

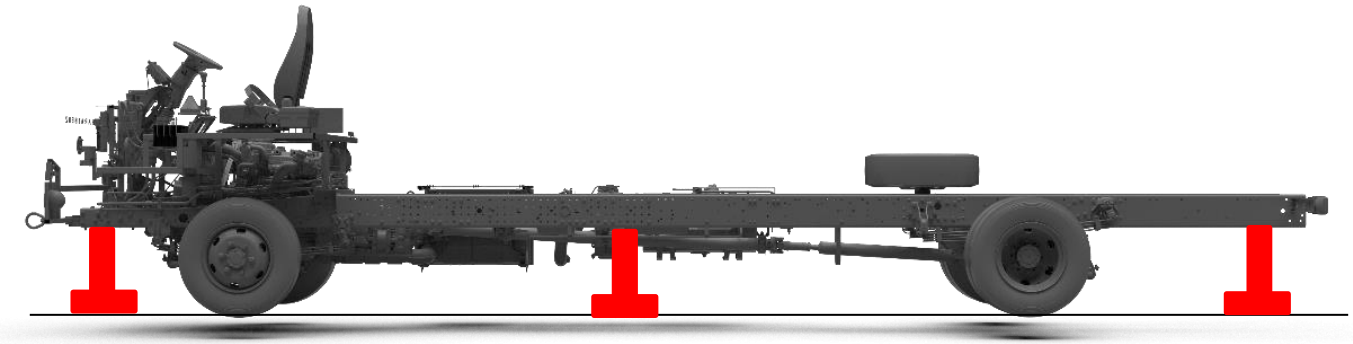
Remark:

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

Chassis modifications and adjustments

6.1 Chassis alignment and leveling

The OF chassis should 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 should be established by the Body Builder, in such a manner that the chassis alignment conforms the respective offer drawings



Chassis alignment and leveling

During the leveling process the chassis must be leveled with reference to the corresponding proposal offer.

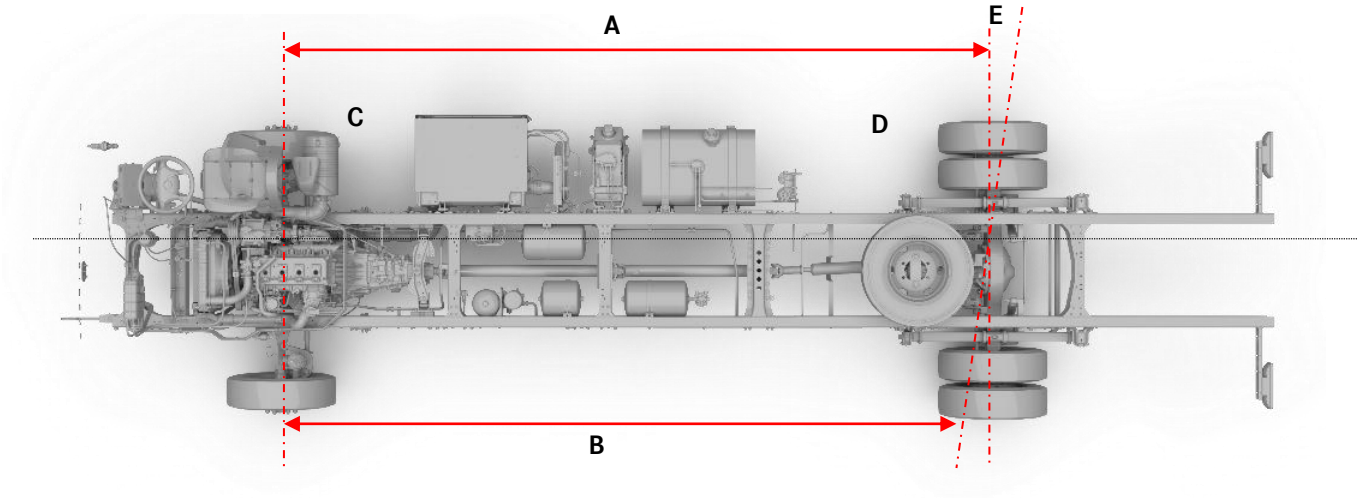
The devices must be supported exclusively on the vehicle frame longitudinal members. The use of mechanic components such as those is not allowed: engine, transmission, axles, articulations, etc. Cross members and wings must not be used as support points.

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.

6.2 Chassis alignment

For complete vehicles, it must be ensured that the misalignment between the axles does not exceed the maximum values indicated below:



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Chassis alignment

(A - B) or (B - A) = maximum 5 mm

E°= 0 ± 15’

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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 drivability and stability conditions.

Interface Between the Body and Chassis

7.1 Areas for body fastening

The OF chassis are not freestanding. 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 and dynamic loads.

!

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

To fasten the body on the chassis, it is mandatory to use bolt elements. Periodic maintenance must be carried out for tightening of loosened body connections during service intervals.

The body structure must be designed and assembled in such a manner that they ensure the structural stability of the bus set (chassis + body) pursuant to the dimension values
specified in the offer drawings of the focused chassis, and/or other technical information made available by Daimler Buses India.

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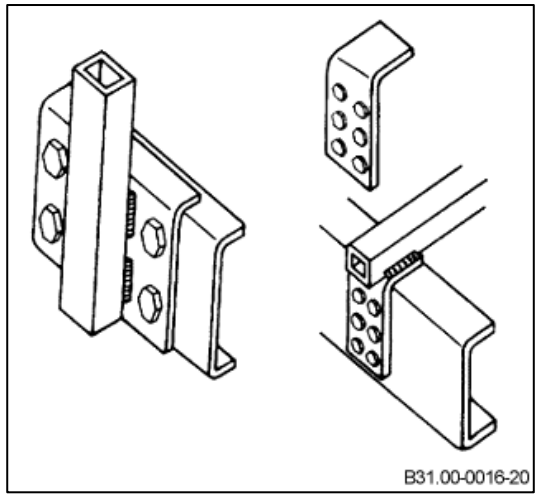
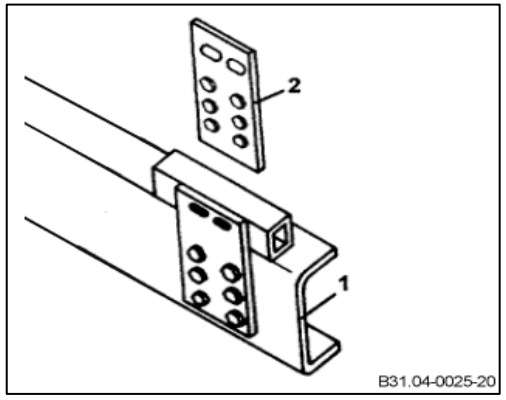
Daimler Buses India does not interfere in the structural project of the body, which is sole responsibility of its manufacturer. Daimler Buses India makes available fastening points and relevant guidance to make possible the interface between the body and the chassis. The Daimler Buses India chassis have been designed, tested and produced to meet the requirements of the relevant applications.

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).

Interface Between the Body and Chassis

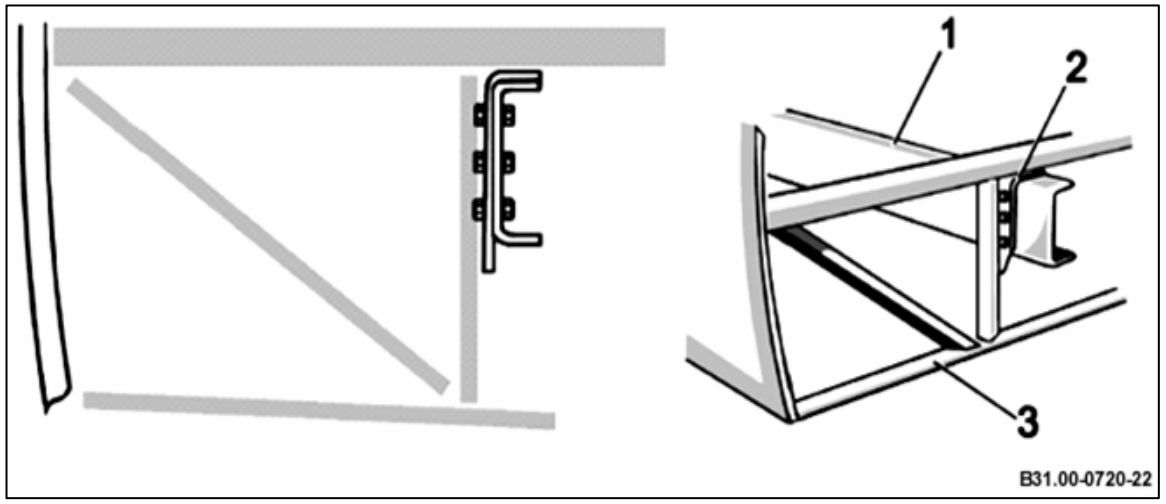


Body fastening by means of corner plates



Body fastening by means of corner plates

7.1 Areas for body fastening



Body fastening by means of corner plates

1 Chassis rail
2 Fastening corner plate
3 Auxiliary structure

The plate must be fastened to the chassis rail exclusively by ISO 8765 class bolts with a minimum rating of 10.9. Rivets for fastening cross members may be replaced for this purpose by bolts of suitable length and the aforementioned classification.

The profiles used for fastening the structure to the chassis frame must be made of bent or stamped sheet steel with the same thickness as the chassis rail and mechanical properties compatible with those indicated in chapter “Chassis material”

For examples of body fastening to chassis frame, see illustrations.

Important:

Body builder is solely responsible for Body plate Materials selection; However BharathBenz recommends use of 6mm thick plate with Min yield strength of 460mpa

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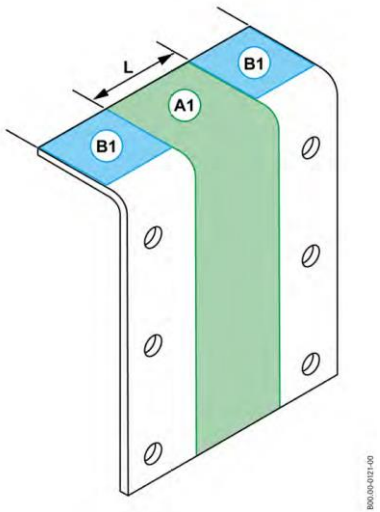
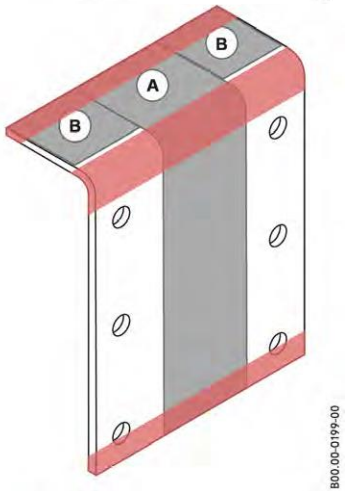
7.1 Regions for the Body Fastening

Interface Between the Body and Chassis





Not adequate areas for welding

Support for the Interface Between the Body and Chassis Structures:

A1 - (“green” area) Area serving as interface for the Body Builder
B1 - (“blue” area) The Body Builder decides whether this area will be used for body structuring
L - The value must ensure the access and the integrity of the fastening bolt heads that serve to fasten the plates to the longitudinal members webs.

It is essential that the whole available area on the support, highlighted in green color in the figure in the previous page, 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).
Welding's should not be applied next to upper and lower ends of the holder as well as they can not be used in the bending radius area.

- If body structure requires additional and/or New Body plates, then they must be produced in a single plate (without splicing) with the material of Yield Strength 460mpa (**BSK46 or Equivalent**) and **minimum thickness of 6mm.**
- For the fastenings screwed between the holder and the vehicle frame of the longitudinal member, **use bolts with flange M14x1.5-10.9. Apply a torque of 172 ± 13 Nm.**
- Use at least four bolts in each holder observing the minimum distance of 50 mm between the holes.
- To avoid interferences in all operation conditions, the Body Builder should foresee the movements between the axles, steering system, suspension etc during the development and assembly of the holders.
- Trimmings are not allowed in the longitudinal members, except for the trimmings aiming at rear overhang dimension adequacy.
- In case new holes in the longitudinal members are necessary, **they should be drilled as per chapter 3.10 Chassis Drilling in the Guidelines for Body Building - “General Manual”.**
- It is not allowed the installation of feed-through type luggage compartment in the wheelbase area due to the propeller shaft arrangement.

7.2 Unsuitable areas for body fastening

!

Drilling holes in the longitudinal members and frame cross members tabs are not allowed.

Weld fastenings are not allowed on the vehicle frame..

Important:

Due to possible harm to the chassis structure, weld application on the vehicle frame will lead to warranty void.

Important:

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

Daimler recommends Torque check for bolts in body plates at set interval as mentioned in OSB manual, it is recommended that bodybuilder should follow the same

In some areas of the chassis, no fastening type can be introduced:

- In the longitudinal members area where the following items are fastened:
  - Cross member of the transmission.
  - Steering gearbox
  - Mounts of the power train (Engine, Gearbox, transmission shaft)
  - Fuel tank.
  - Spring fastening holders.
  - Stabilizer bar holders.
  - On chassis numbering.
  - On cross member of the chassis frame.
  - On the supporting structure of the coolers set.
  - On longitudinal members tabs.

Interface Between the Body and Chassis

7.3 Frame ends

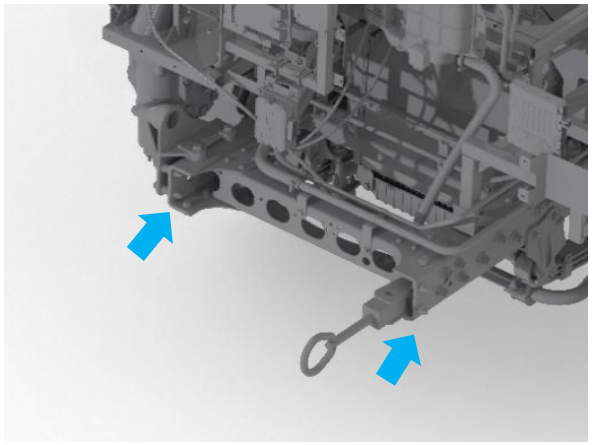
Due to the arrangement of the power train set in the OF chassis front area, changes to the front overhang are not allowed.

The rear overhang may be altered as explained in chapter “Rear Overhang Extension” page 29.

At the end of the front overhang, an additional 80 mm are available to fasten the body structure.

Body fastening in this area can be done exclusively using bolts, welding is not allowed. Use at least three bolts with flange M14x1.5-10.9 and apply torque of 172 ± 13 Nm.

Drill holes as per chapter 3.10 Chassis Drilling of the manual Guidelines for Body Building - “General Manual".



Frame ends- Front

Important:

When positioning body supports in the suspension area, spring travel must be taken into consideration.

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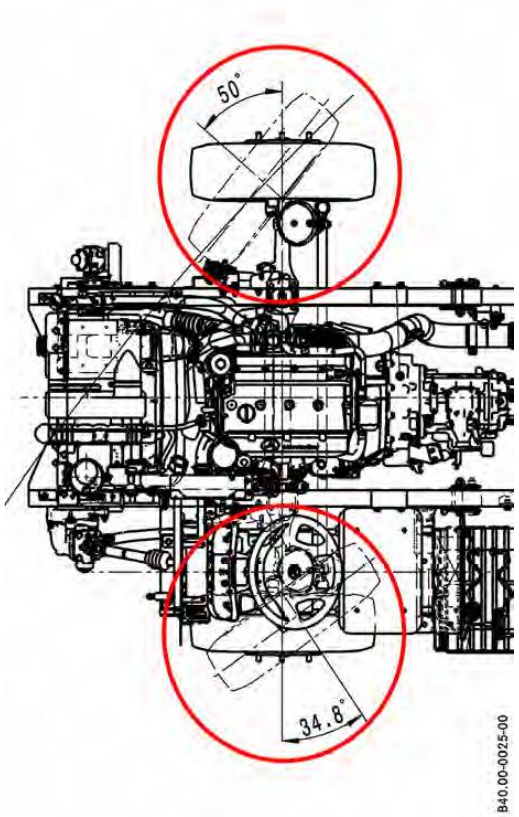
7.4 Wheelhouses

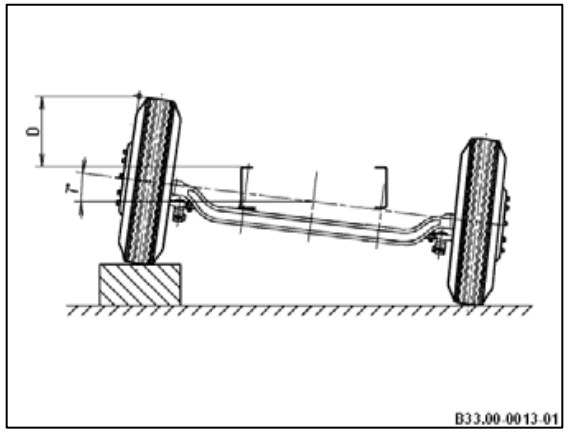


The wheelhouses must make possible the free movement of the wheels, i.e., the wheels must not have their movement prevented when they are fully turned or during the flexure of the suspension system. Foresee clearances for the steering system movements.

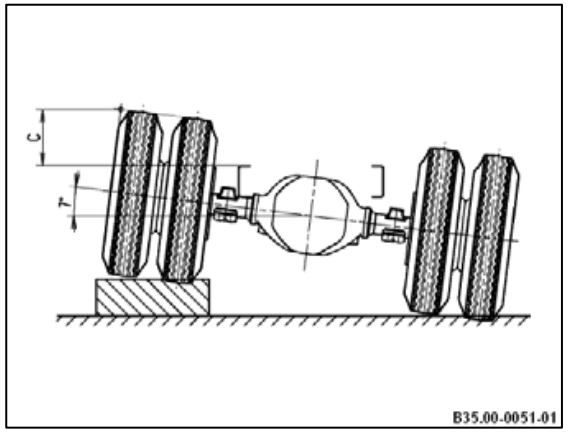
The dimensions of the wheelhouses, indicated in the respective offer drawings, must be considered as minimum reference values. When the wheelhouses is designed, please take into account the tires dimensions, the possible use of anti-skid chains and the ventilation

Remark:

Check height values "C" and "D" updated values in the respective offer drawings, according to the adopted versions.



Front axle



Rear axle

7.5 Central Unit Structure

Not applicable.

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.

8 Cooling system

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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.

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

!

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.

A clearance larger than 50 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 area that make it impossible or difficult to carry out the maintenance services, they must be produced in a manner that renders them removable..

8.1 Radiators fixation structure

Sustaining structures of the radiators

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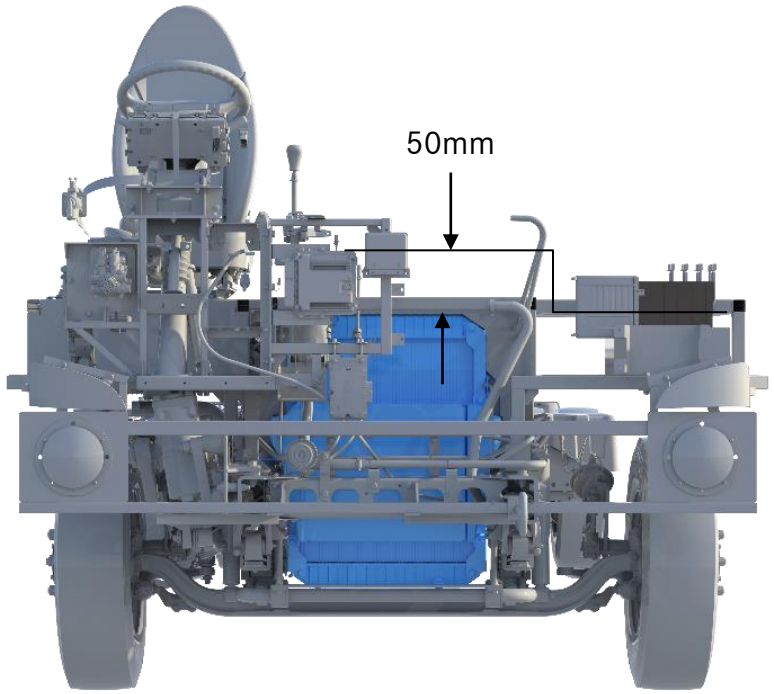
Fastenings of the body to the coolers support structure are not allowed.

Cooling System

Ensure a minimum clearance of a minimum of 50 mm between the radiators support structure and the front panel and/or the body front structure.



Min. gap between cooling system

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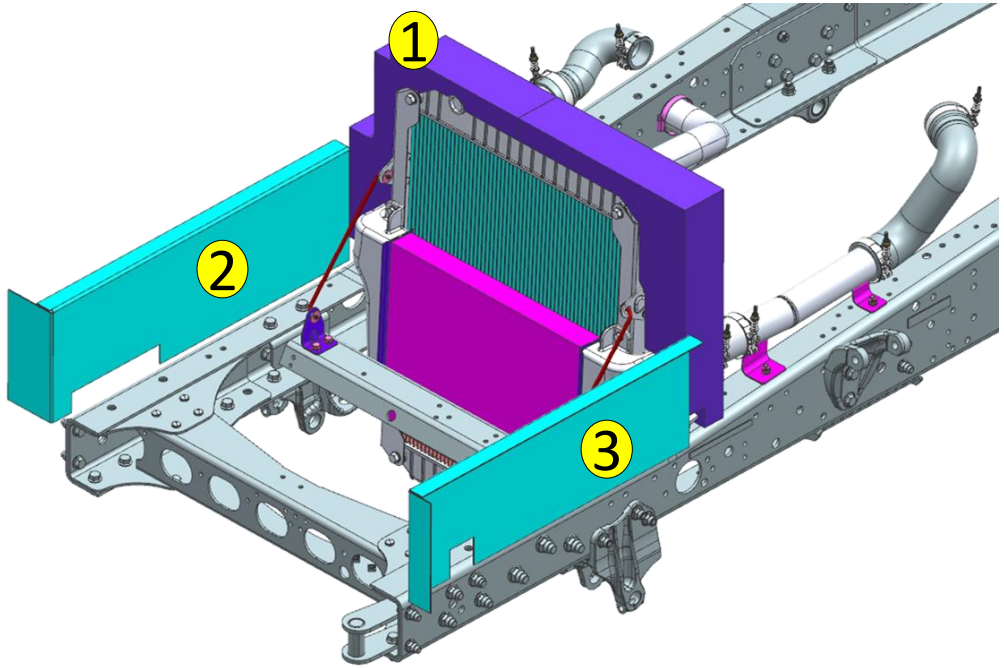
8.2 Radiators' compartment

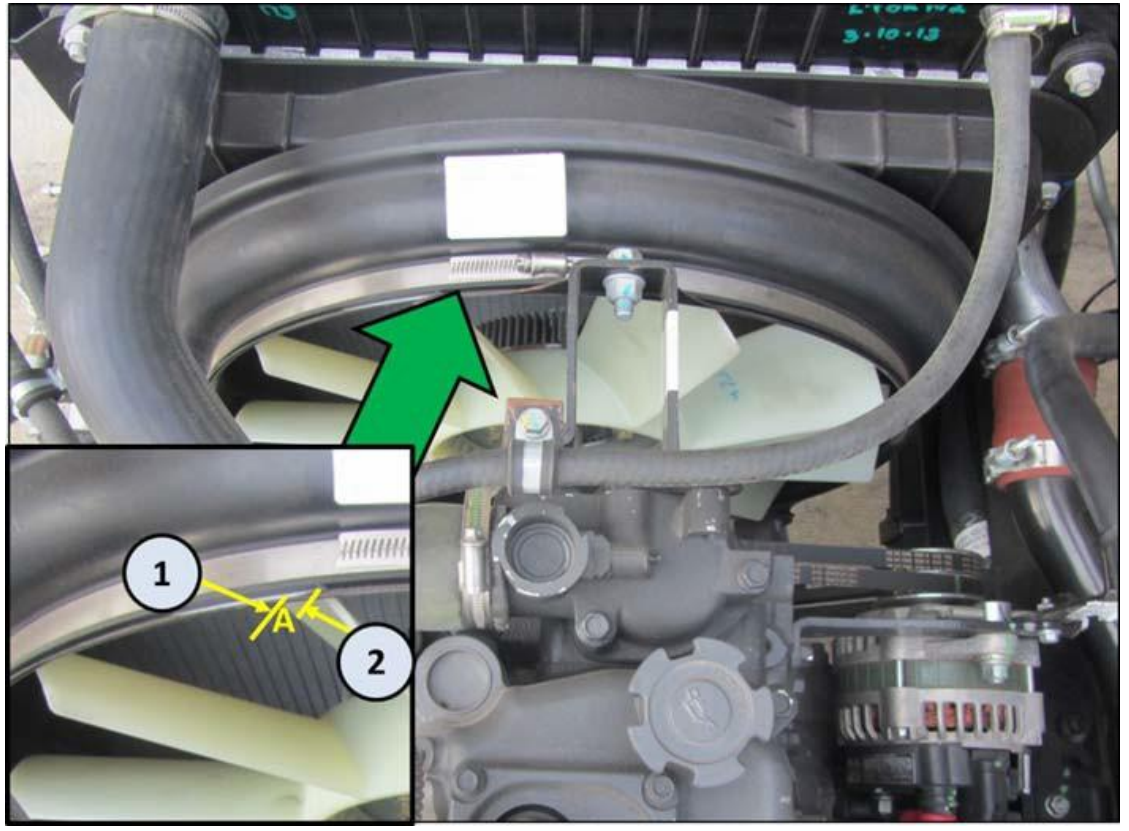
The original configuration used in the cooling system of the chassis requires the body builder of assembling additional deflectors between the radiators' set and the engine. also, the body needs to have openings at the radiators' front part, as described in "Cooling system openings" page 33.



Radiator sealing

8.3 Radiators' fan and air deflector

It is necessary to centralize the wind deflector with regard to the fan, with a minimum distance "A" in the radius between the deflector and the tip of the fan propeller, as shown



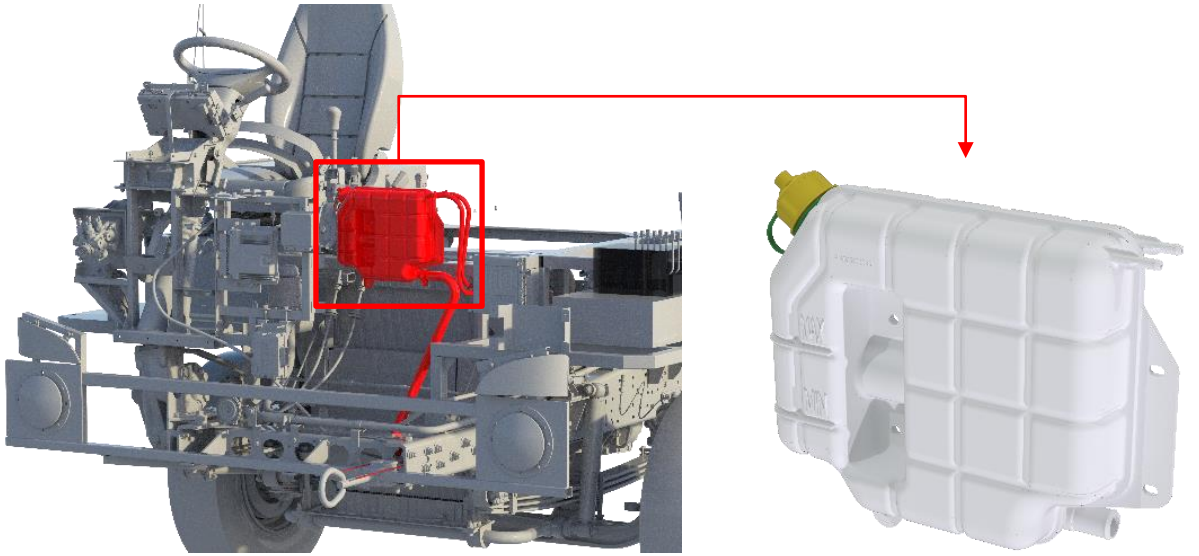
Fan blade positioning

1 Sealing shroud
2 Fan blade
A Minimum clearance = 5 to 7 mm

8.4 Expansion tank

The expansion tank must be kept, whenever possible, in its original position. However, it can be mounted on body structure keeping same height with respect to radiator. If it is mounted on body structure, height from radiator top tank to DAT must be ensured as original position. Reposition on body must be approved by Daimler Buses India.

Expansion tank Temporary position



Expansion tank

Body builder can use the same support structure for mounting expansion tank which is provided with the chassis, but further strengthening is mandatory as this structure is meant for transportation usage.
Repositioning of expansion tank, if necessary, must be previously approved by Daimler Buses India.
The expansion tank mouth must permit free access for its replenishment with a watering can and/or automatic equipment (pistol with flow control).

Expansion tank caps are also pressure regulating valves and must not be exchanged or modified.

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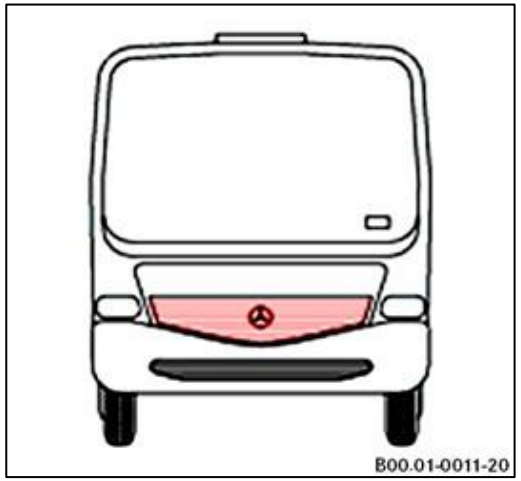
8.5 Cooling system openings

The frontal area for the radiators cooling must have free aspiration, located just in front and centered to the radiators and have a minimum opening as mentioned below.



Free area for Cooling System

Variant	Frontal Opening
OF 917 BSVI	35dm2
OF 017 BS VI	35dm2

!

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

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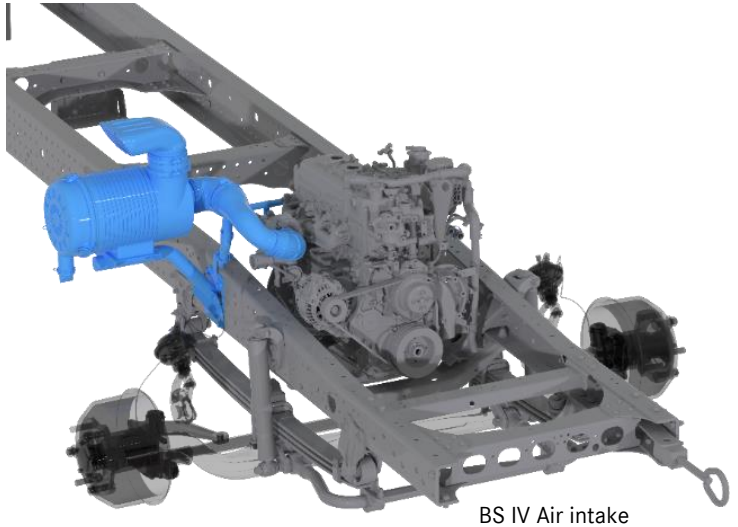
9.1 Engine Air Intake System

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 intake system is dimensioned and designed in such a manner that satisfies these needs.
During the body building process, the whole intake air system must be protected from impacts or paint residues.



BS IV Air intake

!

The air filter assembly must not be repositioned.

!

If necessary, disassemble the air filter snorkel (suction mouth))during the body building process, the connection hose between the air filter and the engine Turbo 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.

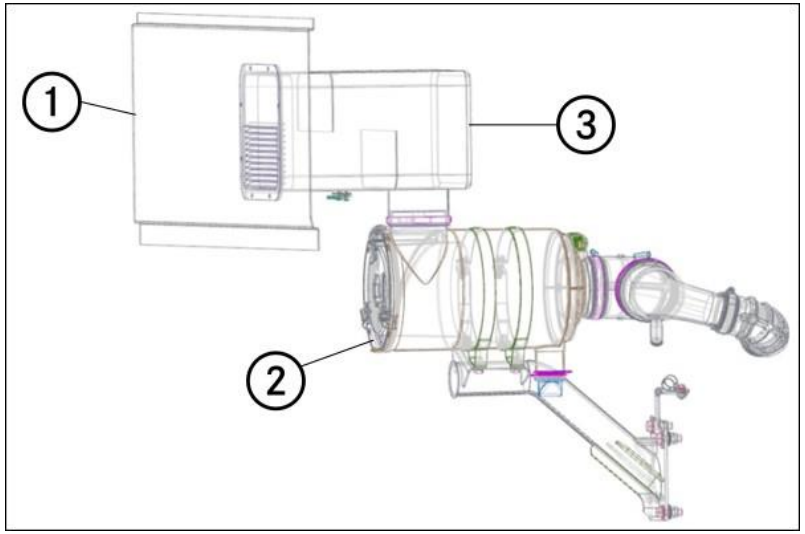
Engine Air Intake System

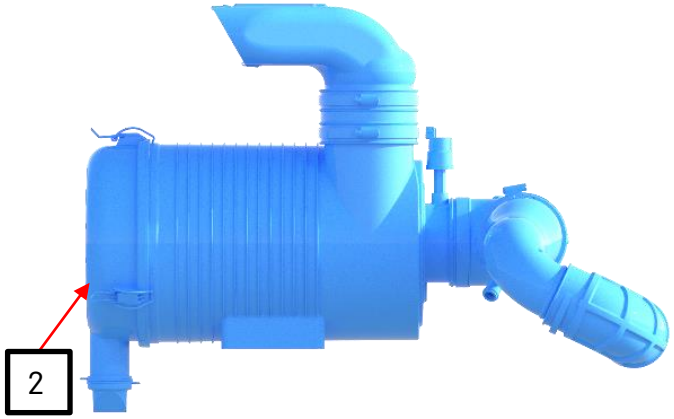
9.2 Air intake box

The OF 917/1017 chassis are originally delivered with an air intake filter in the final position, and must not be changed without prior written technical approval from BBA, Daimler Buses India.

The air intake box can be disassembled to prevent damages during the process of coupling chassis/body, however The air filter inlet should be sealed in order to avoid residues getting in.

It must be ensured that maintenance access is provided in the body to inspect the air intake system.





Air intake box

1 Body panel
2 Air filter
3 Air intake box

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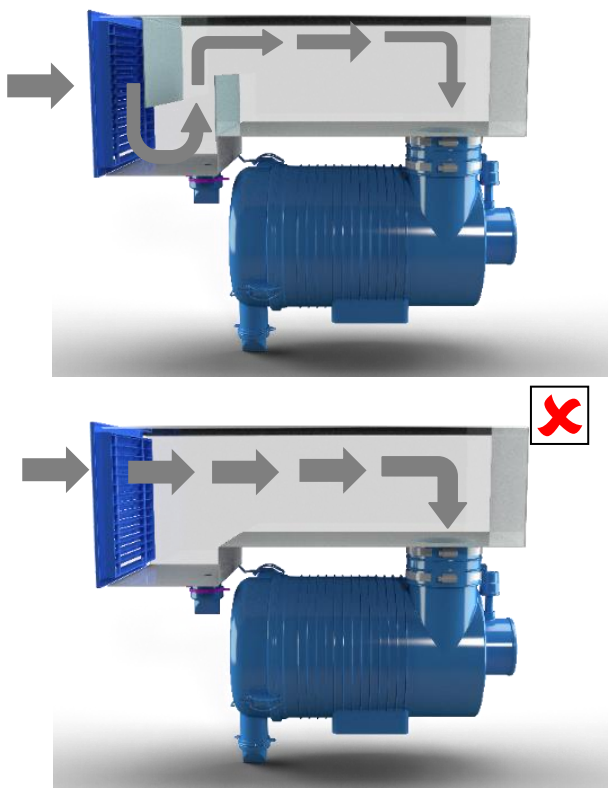
Engine Air Intake System

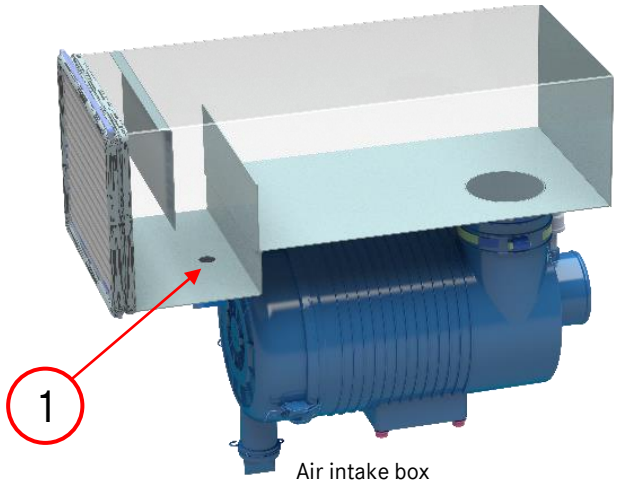
9.2 Air intake box

Air intake boxes must be provided in the front area (next to the air filter), according to the following instructions:

•Air intake box should be provided with sidewall openings;



Air intake box



Air intake box
1 Drain hole

•Air intake boxes must be provided with internal drains to avoid water and residue accumulation;

•It is recommended that the lower part of the air intake box be slightly tilted to allow draining, and that it be positioned at a level between 50 and 100 mm below the air intake opening of the filter.

•Internal drain in air intake box lower part to avoid accumulation of water.

If there is any possibility of water reaching the filter element (while washing the vehicle, for example), deflectors must be installed to separate the water, observing full load maximum restriction value of 25 mbar measured at the air filter outlet (maintenance and indicator nozzle) as per description in chapter 3.21 Air intake system restriction - Body Building Directives.

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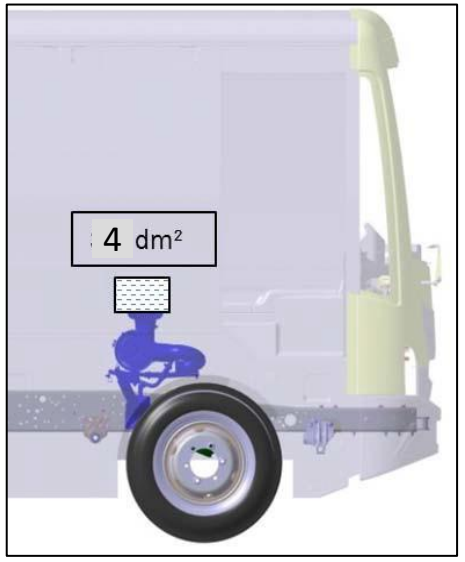
9.3 Air intake opening

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

***Tab6*- Air intake opening**

Chassis	Filter position	Minimum area (dm²)
OF 917	Right-hand side	4
OF 1017	Right-hand side	4



Air intake opening

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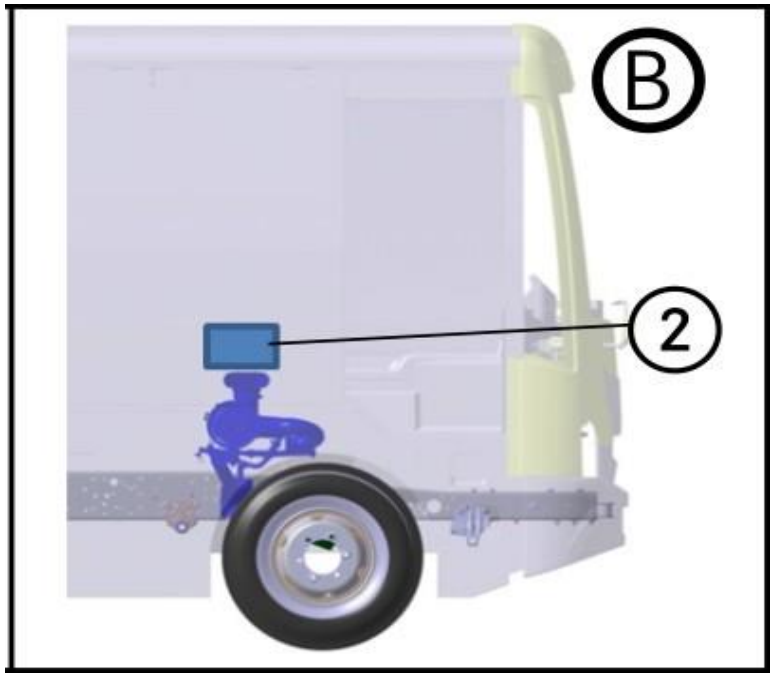
9.4 Air intake position

OF917/1017chassis equipped with position "B" need to be provided with an air intake box, according to construction details contained in chapter “Air intake box” page 37.



B Positioned at rear of front axle
2 Air intake box

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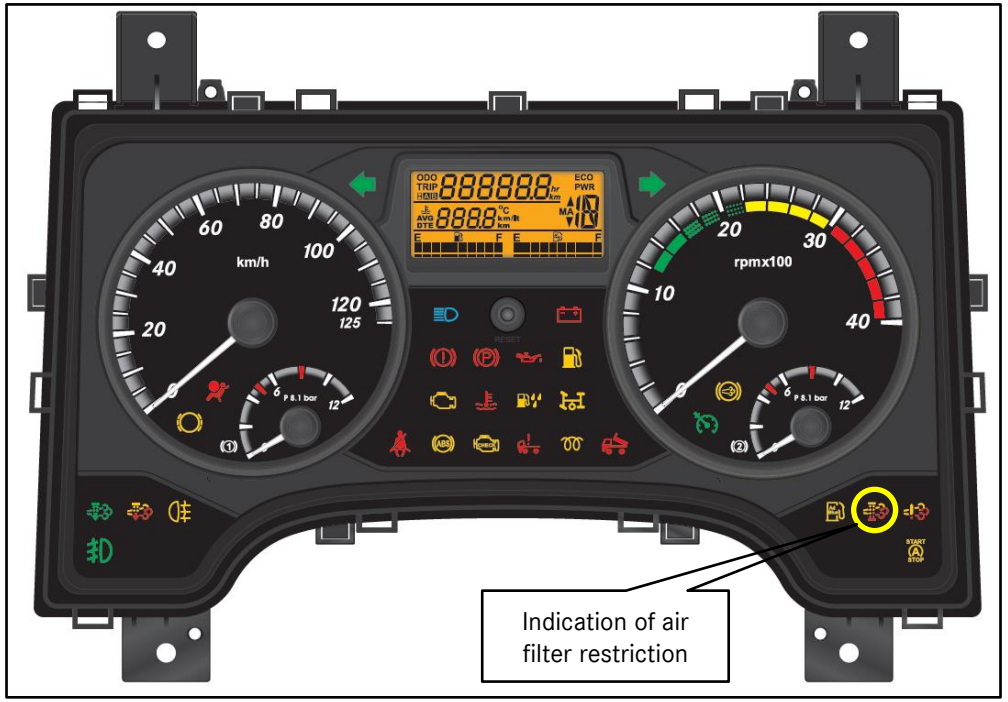
9.5 Air filter restriction level sensor

The chassis OF 917 / 1017 are equipped with electronic sensor with indication of air filter restriction. During the body building process, the sensor must be protected against impacts or painting residues to prevent dirty from entering in the air inlet.



Air filter restriction indication on instrument cluster

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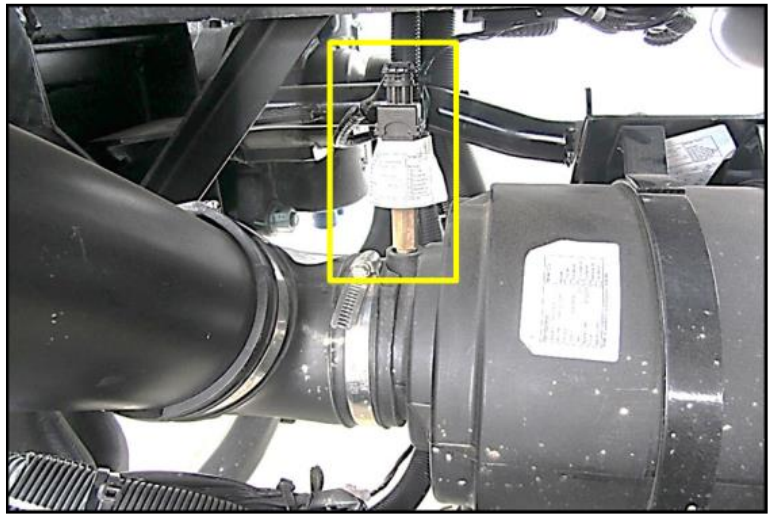
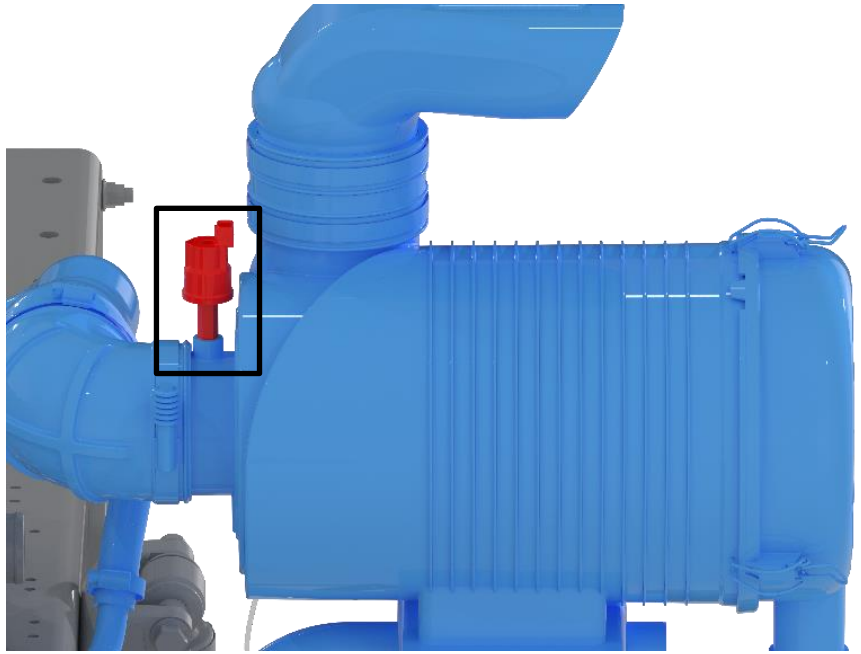
9.5 Air filter restriction level sensor

The chassis OF917/1017are equipped with electronic sensor with indication of air filter restriction. During the body building process, the sensor must be protected against impacts or painting residues to prevent dirty from entering in the air inlet.



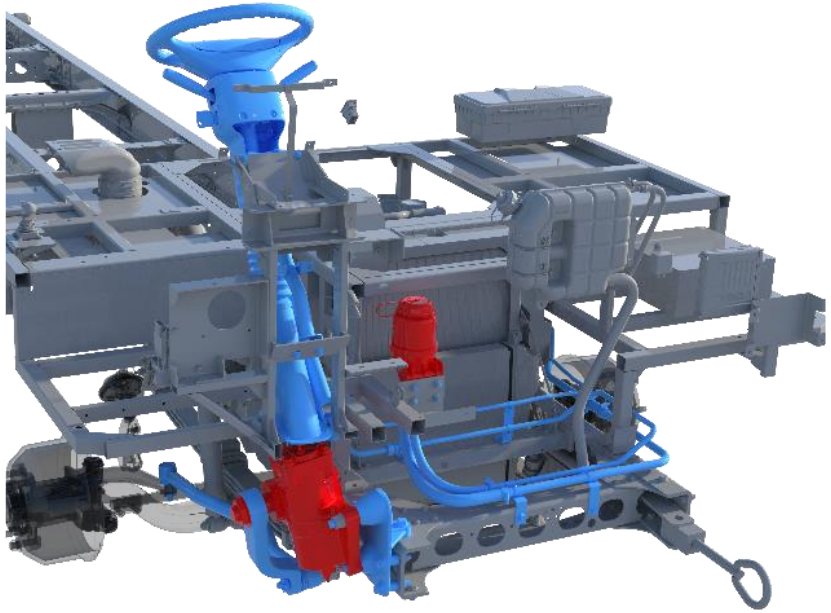
Air filter restriction sensor- BS Chassis



Air filter restriction sensor- BS6 Chassis

10.1 Steering system

The position of the steering gear and transfer box consoles must not be altered.



Steering gear position

Special care with steering system during the body mounting 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.
- During the drilling and trimming operations, take care not to damage the hydraulic line.

Check for leaks the power steering system, mainly around the connections, when completing the installation of the body.

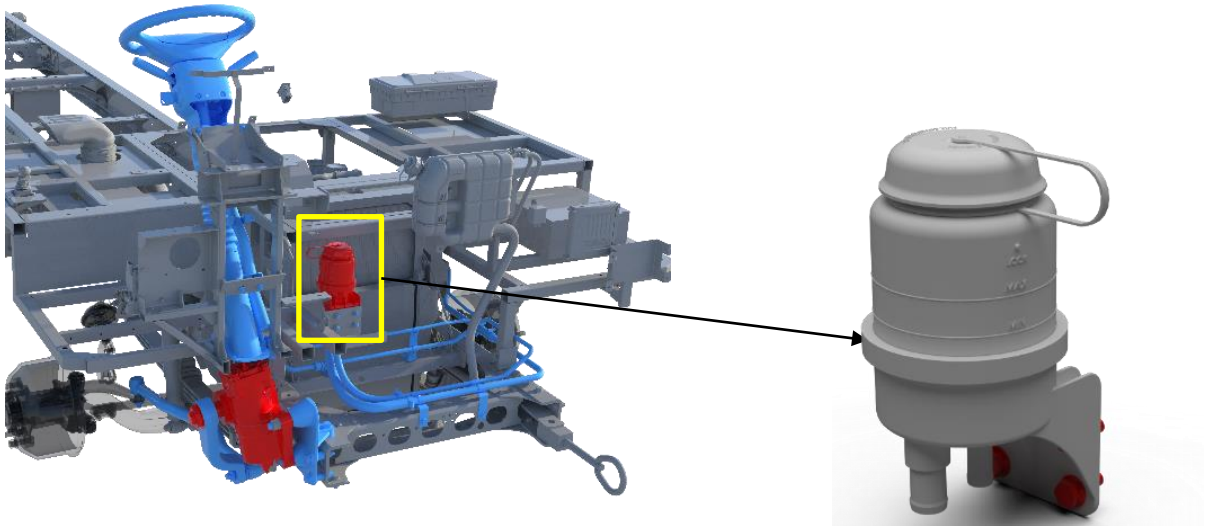
10.2 Power steering oil reservoir

Do not reposition the power steering oil reservoir as changing the original pre-molded hoses of the chassis is not allowed.

It is necessary to ensure the access to refuel through the front cover, or through the upper part, inside the vehicle.

Power steering oil reservoir must be protected against painting overspray.

Power Steering Oil reservoir position



Steering system

Steering oil reservoir

!

Disassembly of Alterations on hydraulic piping are not allowed.

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10.3 Adjustable steering column

The OF 917/1017 chassis are fitted with adjustable steering column, with the objective of its adaptation to the driver position. the body builder will have to foresee, while building of the vehicle's dashboard, a distance to the steering column that enables all assembly conditions.
The body dashboard will need to have a minimum clearance of 5 mm for all steering column adjusting positions.
The steering wheel adjusting positions are indicated in the respective offer drawings, they should be considered minimum values.

Modifications or disassembly of steering column to it's mounting brackets and steering gearbox is not permitted during body assembly process.

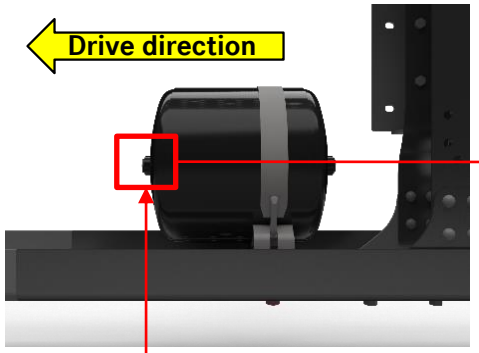
Remark:
Do not Disassemble the steering column or any of its mounting brackets.
For adjustment the steering column refer the respected chassis offer drawing.

Pneumatic System

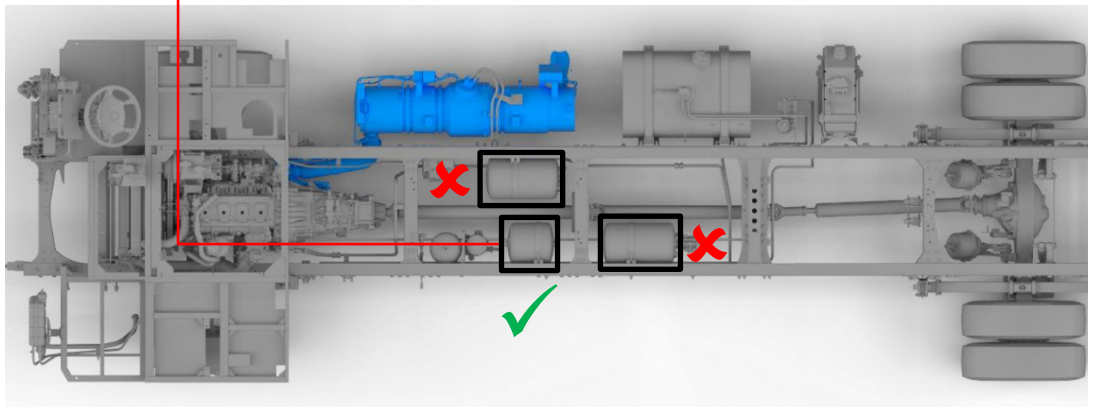
11.1 Pneumatic connection for auxiliary services OF1017 BSVI Chassis

Air actuated body accessories such as horn, door operation, etc., must not be, in any way, connected directly to the parking or service brake circuit as well as the air tanks (capacity 25 L).

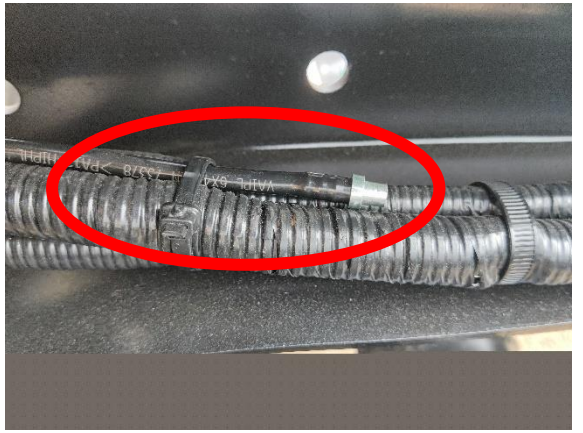
The air supply shall be exclusively taken from auxiliary tank (capacity 15 L) as shown below, which is foreseen for driving auxiliary equipment for OF 1017 Chassis.



Auxiliary tank B42.00-1010-01
Position of auxiliary tank on the chassis



Position of Air tank on OF 1017 chassis



Dummy connector for front passenger door

✘ — Compressed air tank for Service Brakes
Not suitable for additional pneumatic connections

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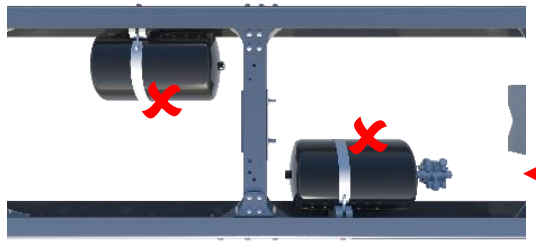
11.1 Pneumatic connection for auxiliary services OF917 BSVI Chassis

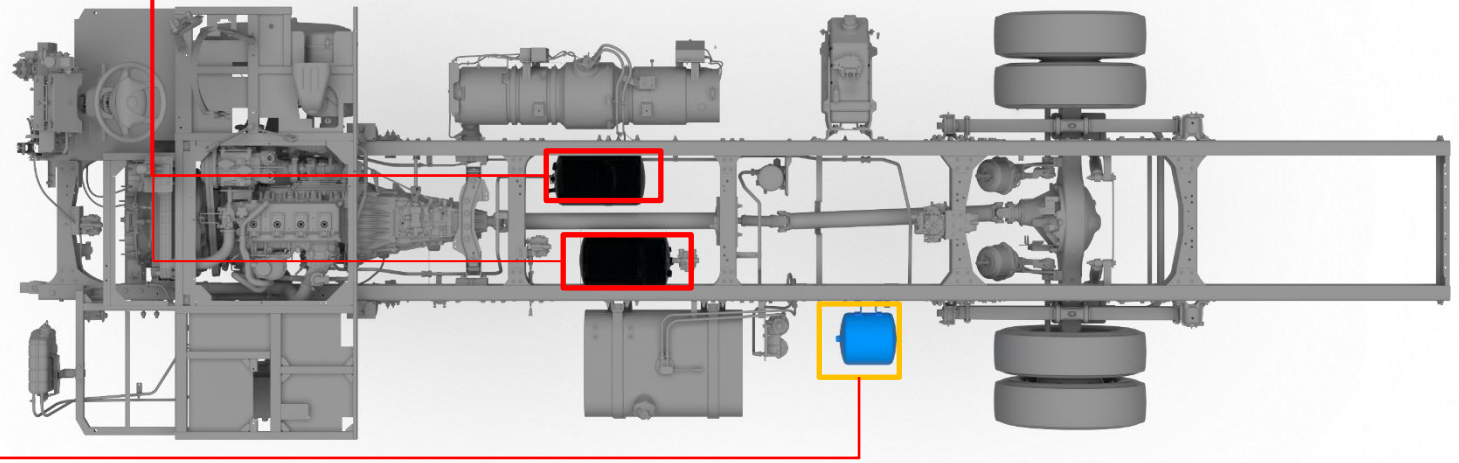
Drive direction



Position of compressed air tank for Service Brakes
Not suitable for additional pneumatic connections

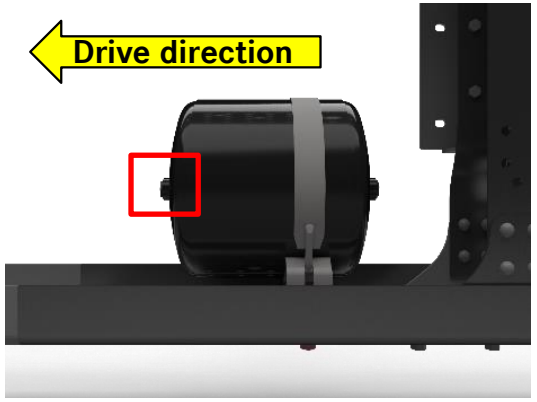
Air actuated body accessories such as horn, door operation, etc., must not be, in any way, connected directly to the parking or service brake circuit as well as the air tanks (capacity 25 L).

The air supply shall be exclusively taken from auxiliary tank (capacity 15 L) as shown below, which is foreseen for driving auxiliary equipment for OF 917 Chassis.



Position of Air tank on OF917 4250WB chassis

Drive direction



Auxiliary tank B42.00-1010-01
Position of auxiliary tank on the chassis, suitable for additional pneumatic connections

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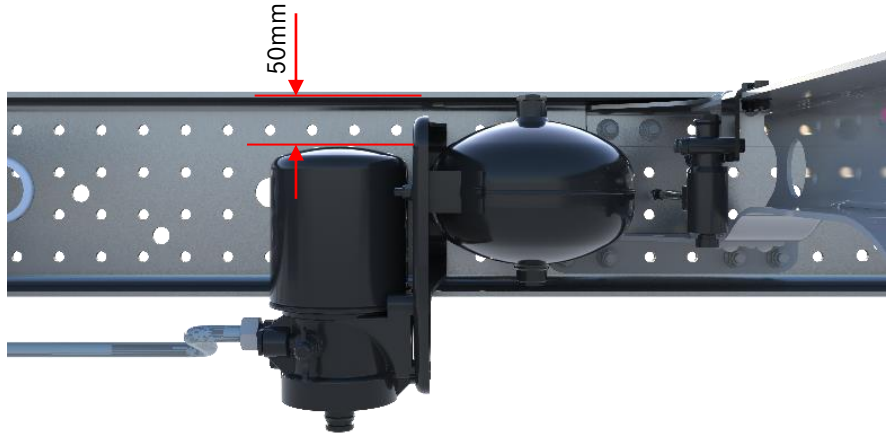
11.2 Pneumatic piping (connection plates)

Not applicable.
Exclusive item for the buggy-type chassis.

11.3 APU (Air Pressure Unit)

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 50mm on the APU set to make its removal possible



APU assembly location
Min. distance between body = 30mm

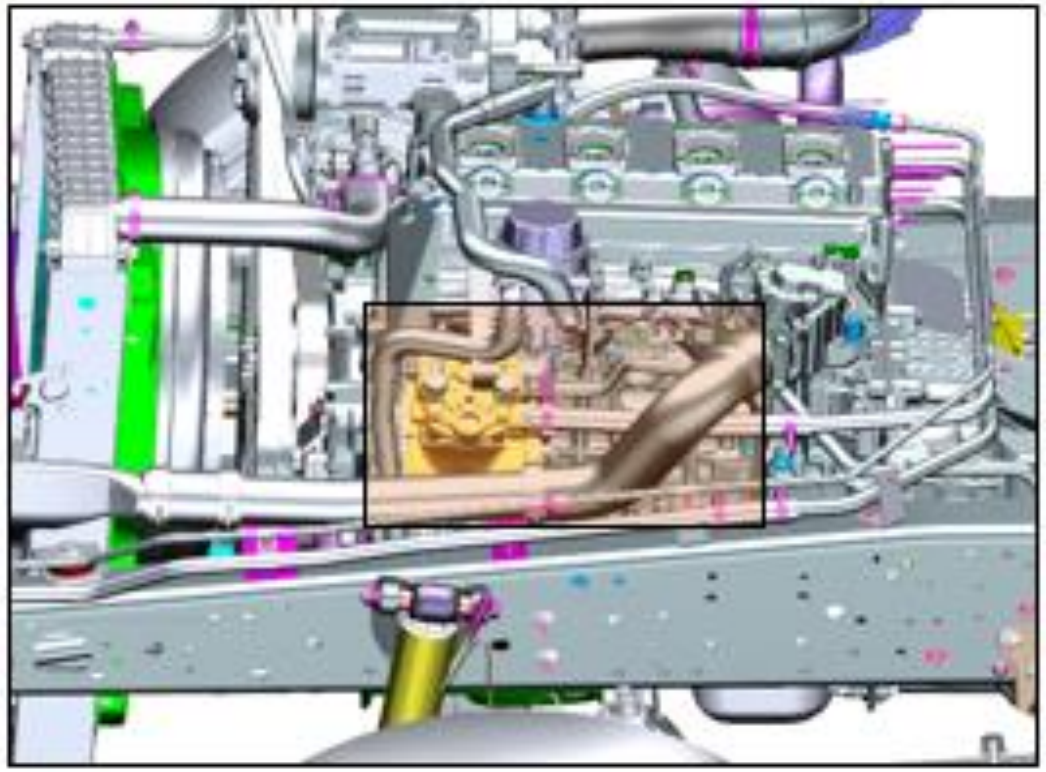
!

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

11.4 Compressors

The chassis compressors are actuated by gears and are coupled to the engine.

While manufacturing the engine cover, it is necessary to consider access to the upper part of the compressor.



Air compressor

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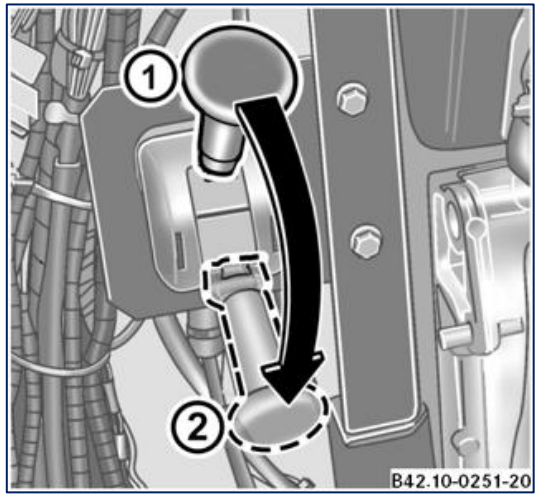
12 Brake system



Parking brake lever
1. Actuated brake
2. Released brake

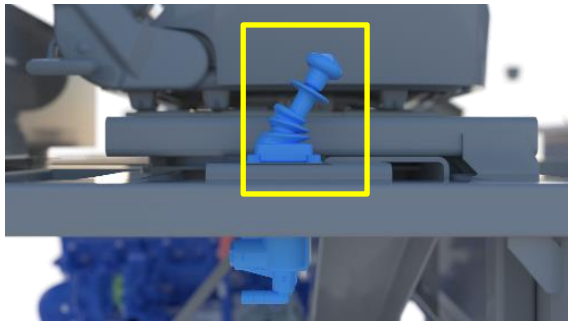
The chassis brake system must not be changed.
During the body building processes, the systems must be duly protected.

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 “Compressed-air Connection for Accessories” page 63 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, Daimler Buses India must be referred to.

Parking brake 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.

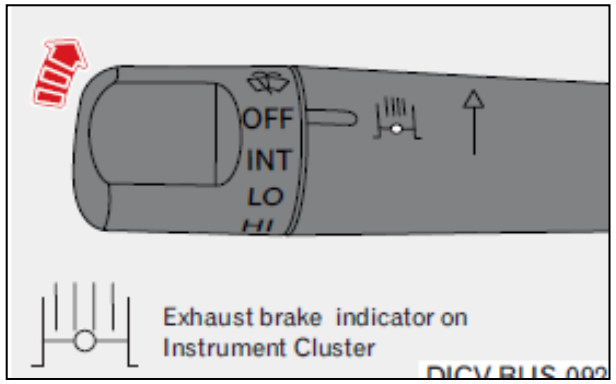
12.2 Retarder

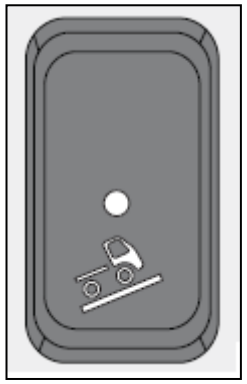
Not applicable.

12.3 Exhaust Brake

Exhaust brake operation

The chassis OF 917/1017 are equipped with 'exhaust brake system' for enhanced braking performance and improved service brake life.





Exhaust brake
1 Combination Switch
2 Override Switch

Exhaust brake can be engaged by shifting the wiper combination switch towards dashboard or pressing service brake.
Below condition is true, exhaust brake will be engaged.

Input

- Combination lever switch should be in ON condition. (or) Override switch should be OFF.
- (and) Brake pedal should be pressed condition.

Condition

- Accelerator pedal should be in released condition.
- Engine RPM should be more than 1000.
- Clutch pedal should be in released condition/Clutch should be engaged.

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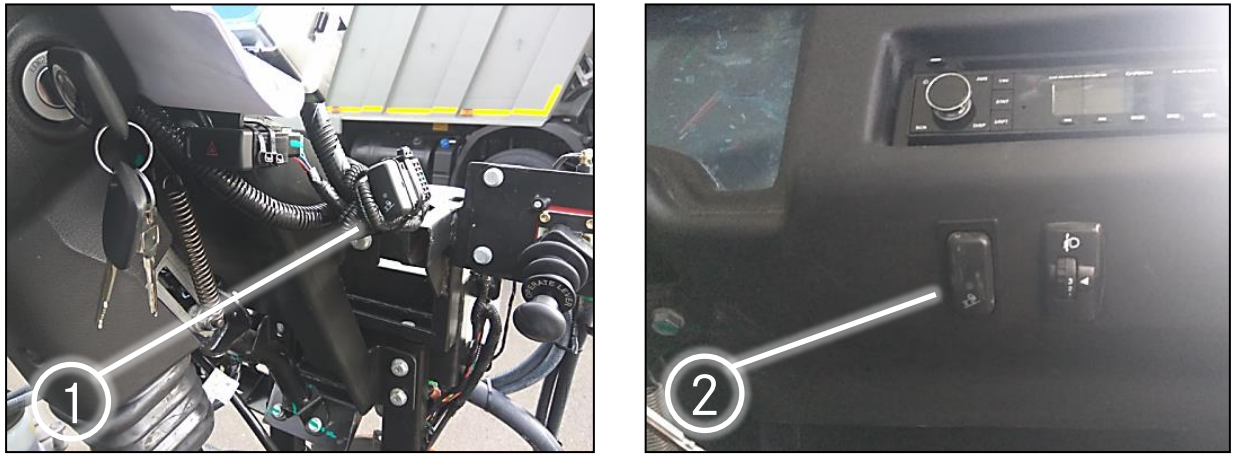
12.3 Exhaust Brake

12.2.2 Exhaust brake override switch

The ‘Exhaust brake override switch’ is delivered in a provisional location on the chassis. body manufacturer must foresee the interference free operation of the actuation controls such as operating lever and easy access to override switch, that enable easy and practical reach by the driver, avoiding ergonomic problems and interference.

It should also be installed in a way to prevent improper or accidental use.



Exhaust brake
1. Provisional location on chassis Ref.
2. location on body panel

13.1 Exhaust system counter pressure

The genuine part of the chassis, engine until the muffler/catalytic converter (including) should not be changed or altered.

In case of original exhaust output pipe change, counter-pressure measurements shall be carried out and the resulting values shall be lower than **130 mbar**.

> i
>
> For more information, please refer to the manual Guidelines for Body Building - "General Manual", in chapter 3.23 - Exhaust system.

13.2 Exhaust outlet position

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 minimum radius required to bend the additional pipe should be 2.5 times the average diameter of the pipe.

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” page 71.

For the assembly of horizontal outlet, the bumper layout project must foresee an orifice for the exhaust pipes, with minimum clearance of 10 mm to avoid possible interferences. According to the material used in the production of the bumper, it is necessary to study the necessity of adopting protections to avoid damages by heating.
In the production of line extension, the movements of some components must be taken into account, such as: axles, transmission shafts, etc.

!

The pipe material does not need to be of stainless steel.

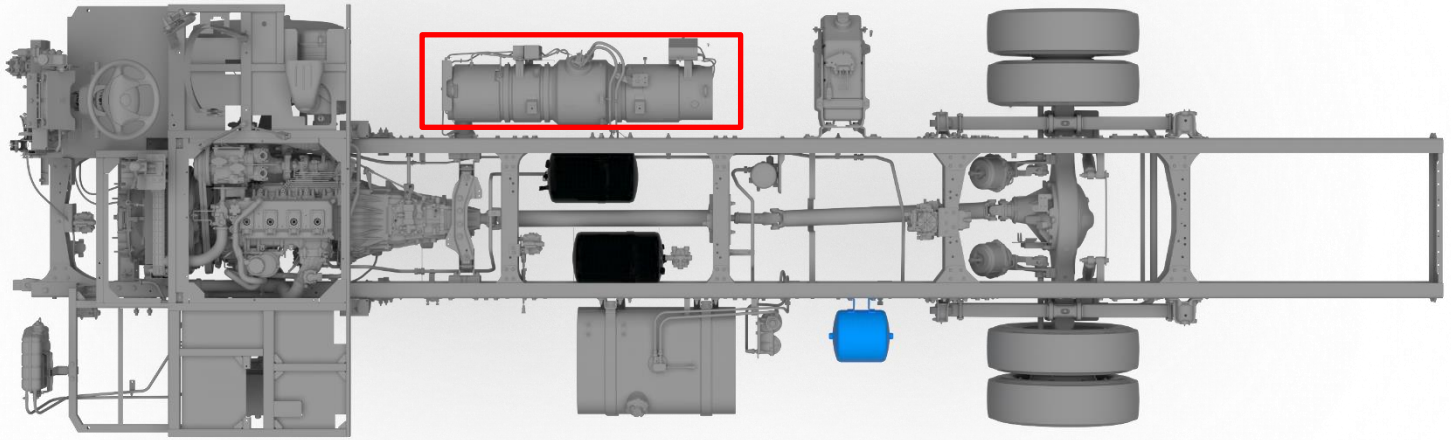
13.2 Exhaust outlet position

Exhaust system

BS VI OBDII Exhaust
The chassis OF 917/1017 are equipped "SCR“ system, required to comply with the BSVI OBDII legislation.

No change in the exhaust position should be done by the body builder.

A minimum opening of **25dm²** to be provided in the Body for efficient cooling of the Exhaust system, The Perforations to be given on the body flap on side of the muffler .Thermal insulation to be provided, Minimum of 50mm gap to be available between the exhaust system and body panel/Insulation.



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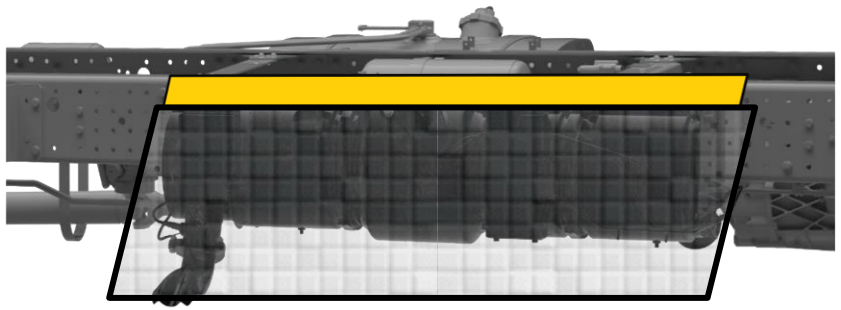
!

Care is to be taken to ensure that ATS system is protected from welding spots and paint overspray during Bodybuilding.

13.3 Exhaust unit insulation



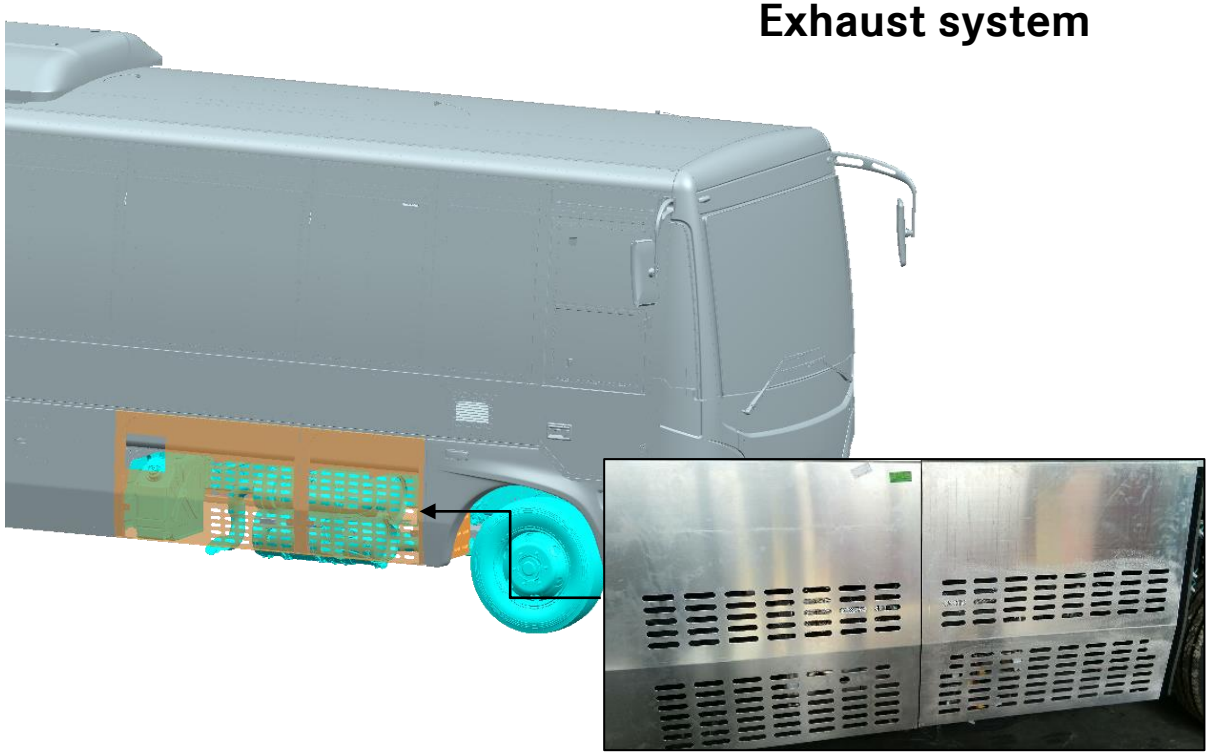
Clearance of Min 50mm to be maintained above the ATS area

Fig. ATS View from front

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

Skirt panel

Exhaust system



ATS Body side panel with 25 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 of minimum 50mm between the top of the ATS and floor Insulation
- The body skirt panel on ATS should have an perforations of minimum 25dm^2 opening positioned exactly in front of the ATS to allow free flow air for cooling of the ATS.

!

The ATS Side Insulation and the Top insulation should have a minimum 50mm clearance from the Exhaust to avoid contact.

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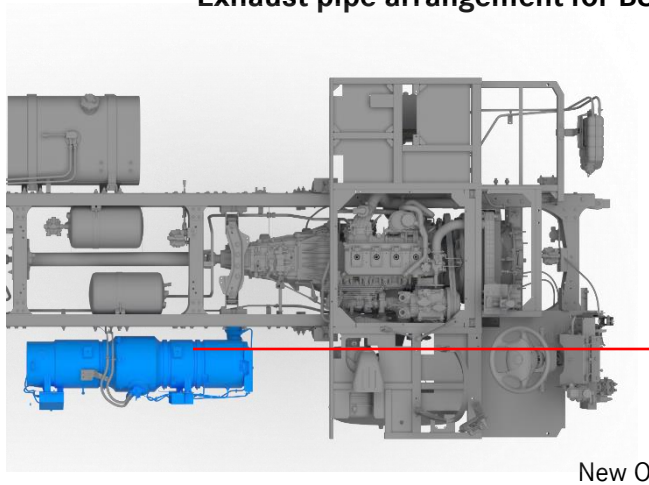
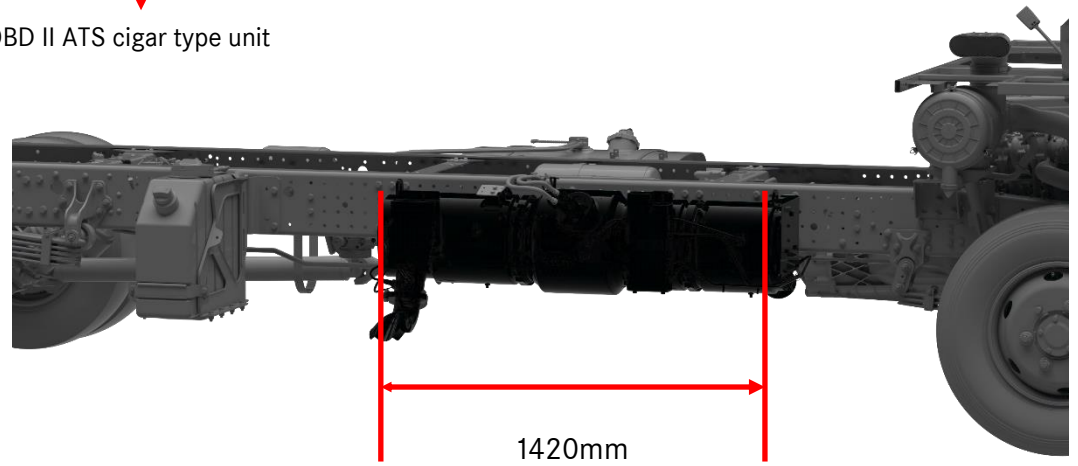
13.3 Exhaust outlet position

Exhaust pipe arrangement for BSVI OBD II variants



New OBD II ATS cigar type unit

BS VI exhaust system



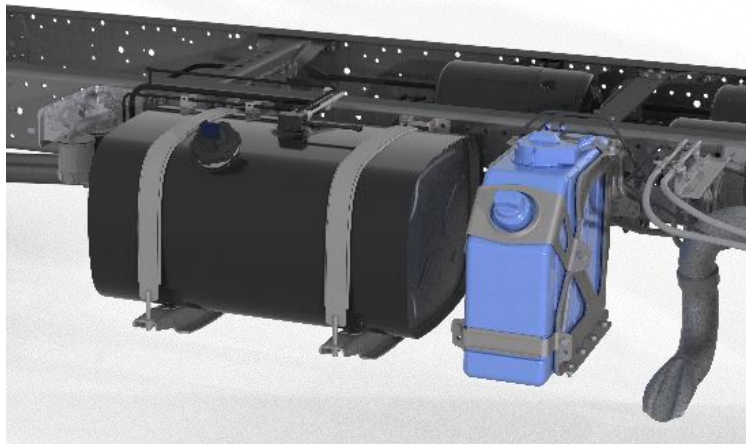
13 Exhaust gases treatment system

Exhaust System

“AdBlue” tank and pump

The chassis OF 917/1017 are equipped with AdBlue® tank, "SCR“ system component, required to comply with the Emission norms of BSVI.

“AdBlue®” reservoir and the pump should have not their original positions changed and piping should not have any joints. If damages occur during the body building process, the entire line must be replaced with the same original material specifications..
If necessary, the AdBlue® pipes and the pump can be removed during the body assembling process however they must be properly stored and identified.



AdBlue tank BSVI
OF1017/14

During the Body Building assembly, the system shall remain closed (including the breather) to preserve covers, filler necks and connections. Protective rubber plugs can be used on the original covers enhancing the safety against damages to system components.
During the handling of after treatment system components, they should remain closed and protected (with its original covers and other protection). Besides, they should be kept away from contaminants, such as fuel, oil, grease, water, dust, dirt, metal residues and detergents.

13.4 Exhaust gases treatment system

“AdBlue®” Metering Device

For BSVI chassis, “AdBlue®” metering device is located in front of the catalytic converter. The body structure should allow free access to the metering device.

For BSVI chassis, “AdBlue®” metering device is located on the right side of the engine next to the turbocharger. The body structure should allow free access to the metering device through the inspection cover (hood).“.

“AdBlue®” Pump

The “AdBlue®” pump must not be removed from its original position, even if changes in the “AdBlue®” reservoir position occur.
The connection hoses between the tank, the pump and the metering valve have been sized for this purpose and their replacement is not necessary.

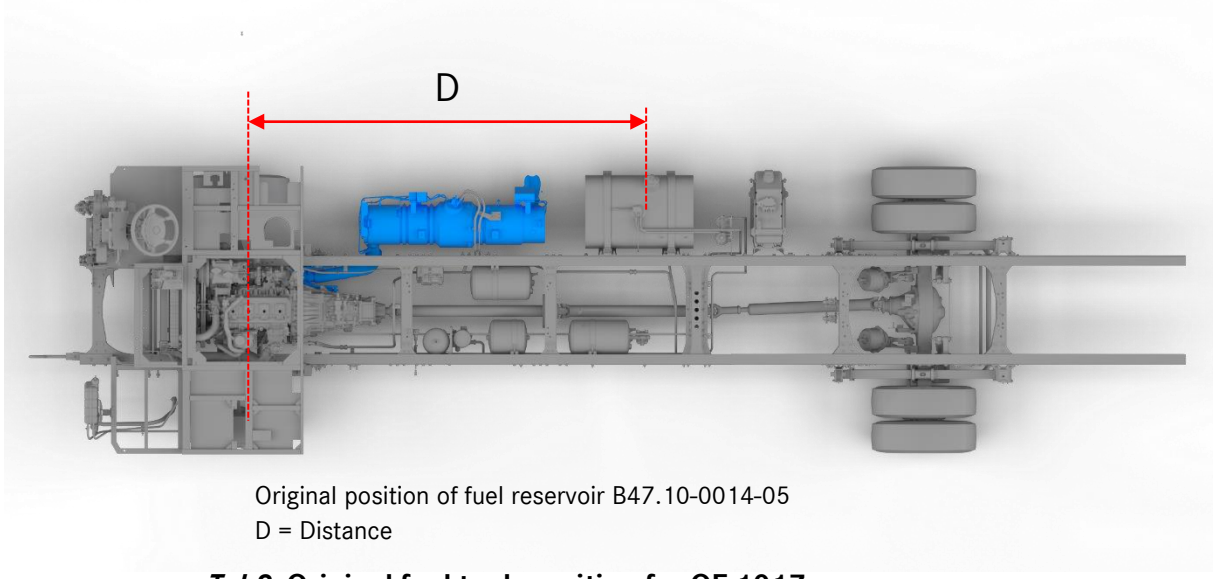
14.1 Fuel reservoir

The OF 917/1017 chassis are supplied with 160L capacity fuel reservoirs at their definitive positions, alterations are not allowed.

Protection for fuel reservoir & it's hoses shall be applied during bodybuilding processes, do not spray paint the fuel tank & any fuel hoses.

Please refer chassis specific offer drawing for exact fuel tank location.

OF 1017



Original position of fuel reservoir B47.10-0014-05
D = Distance

***Tab8*- Original fuel tank position for OF 1017**

Fuel tank/Chassis	OF 1017 5300 WB
160L/RHD	D = 3200mm

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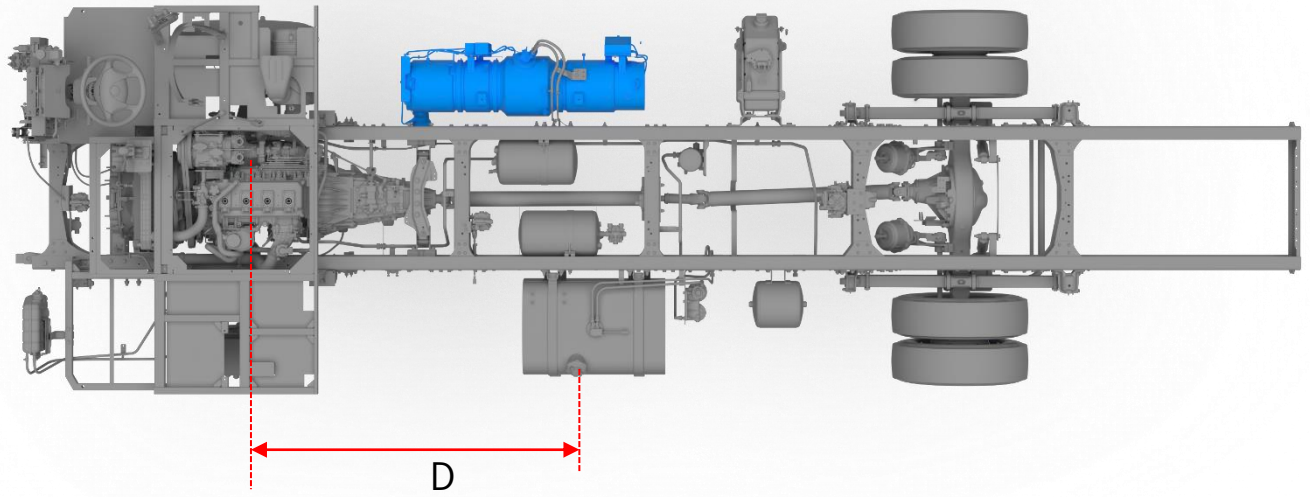
14.1 Fuel reservoir

Please refer chassis specific offer drawing for exact fuel tank location.

OF917 4250WB



Original position of fuel reservoir B47.10-0014-05
D = Distance

***Tab8*- Original fuel tank position for OF917 250WB variants**

Fuel tank/Chassis	OF 917 4250 WB
160L/RHD	D = 1862mm

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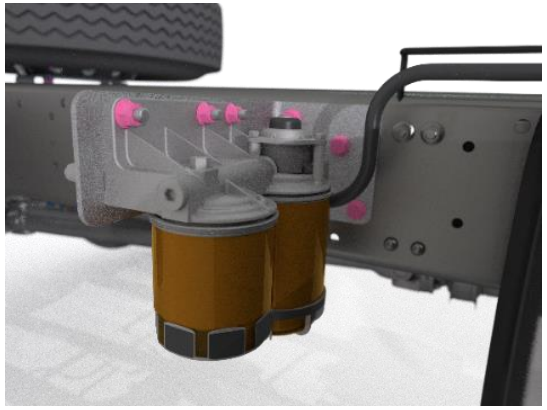
Fuel System



Water separating filter BS VI

Water separating 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 project an easy access for the view and maintenance.

If the repositioning of the separator filter is necessary, please previously contact Daimler Buses India. The access must be easy for view and maintenance purposes.

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.

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..

!

This new position must not allow oil spills to occur on engine components such as drive belts, exhaust pipes, radiator, etc., on removal for cleaning.

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

Bleeding Procedure

- Pump the fuel, using the manual pump handle, 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.

14.2 Central fuel tank

Not applicable.

15.1 Care with the Transmission Control System

Chassis are supplied with the transmission control system in its definitive configuration, and its change is not necessary.

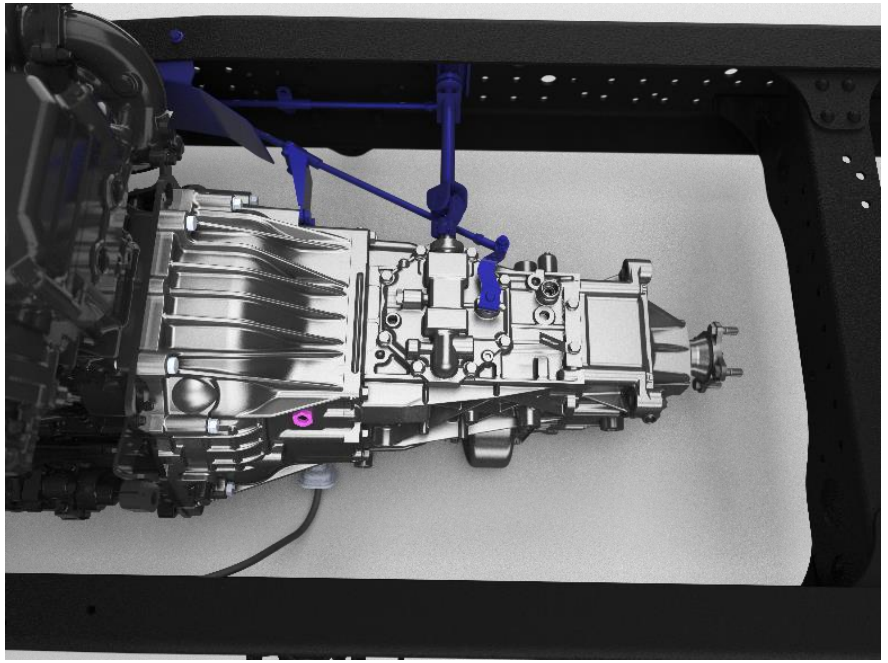
Transmission control system and lever movements must be foreseen during the development of the hood and the front panel, considering all possible gear shifts, as well as the clearance of the power train mount systems to avoid interferences.

In the area of the gearshift lever, foresee the assembly of finishing parts to avoid noises, heat and impurities.

Cable shifting system

15.2 Shifting system cables length

The transmission control system cables feature the correct length and can not be changed..



Transmission system cables

15.3 Gearshift cables - disassembly and assembly

Transmission control system cables can not be removed during body building.

15.4 Gear shifting cables adjustment

Not applicable.

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15.5 Positioning of the shifting lever support

i

The shifting lever is supplied in its definitive position, without adjustment options. Its repositioning is not allowed.

15.6 Propeller shaft

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

Changes in the propeller shaft are not allowed.

16. Automatic gearbox

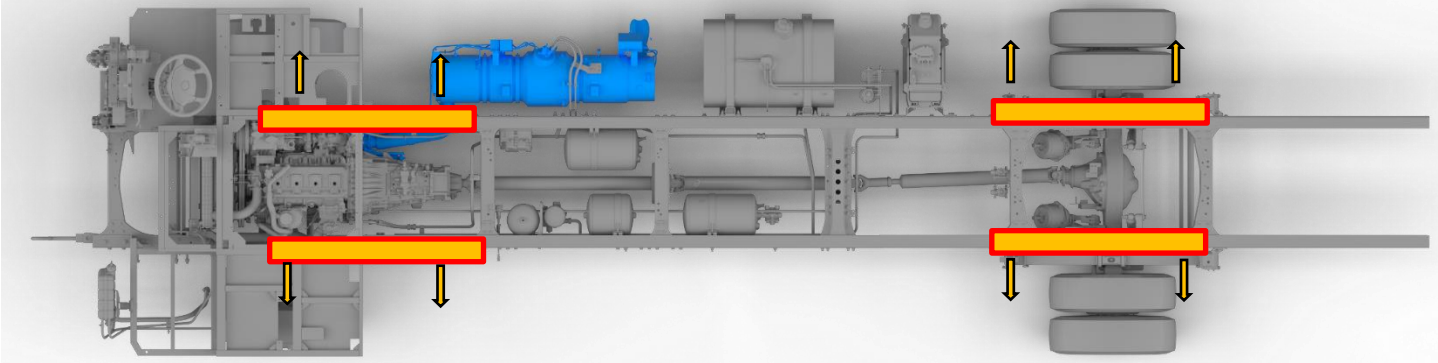
!

Not Applicable

17.1 Suspension system

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, shock absorbers and its holders) in the welding equipment electrodes tests is not allowed.



Room for disassembling suspension springs

Check the possibility of disassembling the front and rear suspension springs, as shown in the figure.

!

The body must allow the removal and installation of the leaf spring of the front and rear suspension

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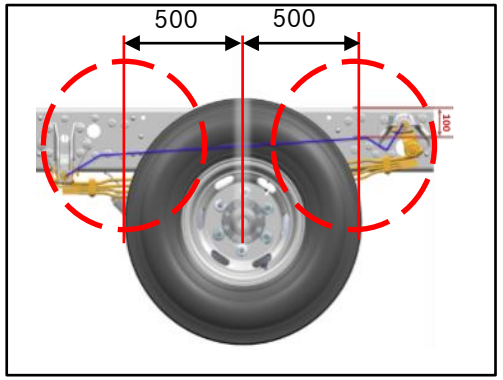
17.1 Suspension height

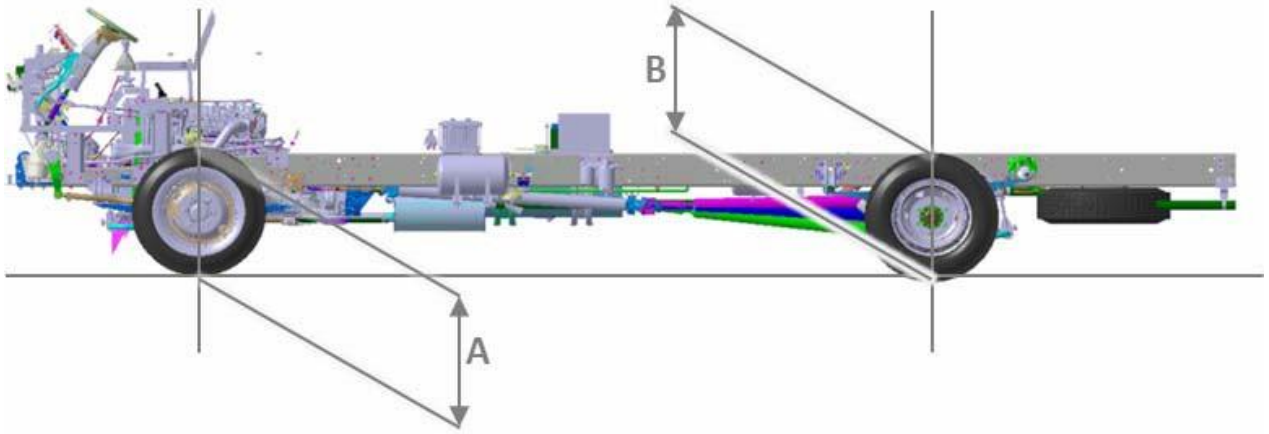
To determine the height of the first step of the body and the height of the floor with regard to the ground, it is necessary to check the height of the chassis with regard to the ground for the several foreseen loads.

Offer drawings show chassis heights as per tires dimensions.
Always use the most updated offer drawing.

Chassis rear spring deflection OF and OF 1017



Rear spring deflection



Chassis height
A Frame height near front axle, to ground level
B Frame height near rear axle, to ground level

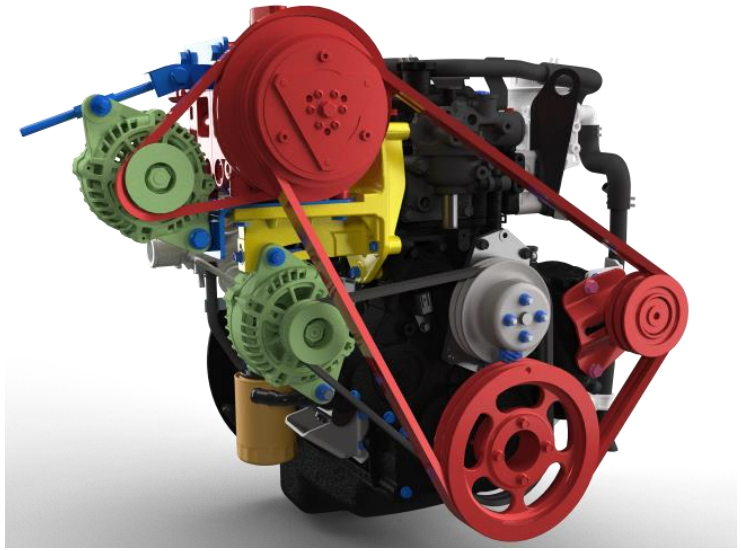
During the body development, foresee the extreme condition of bending of chassis rear springs, condition of metallic stop.
The figure below contains the relative dimensions between upper leaf springs and the upper trim of the longitudinal member.

18.1 Air conditioner

Only the OF 1017/917 AC variant chassis are factory-equipped with air conditioning system

TM-43 AC Compressor, additional alternator & bigger engine pulley for the air conditioning system in 1017

TM-31 AC compressor, additional alternator & bigger engine pulley for the air conditioning system in 917



TM 43 Air conditioner set up

!

If the chassis is not equipped with the factory fitted Air conditioning components, then it is meant for only Non AC application

Note:

Suitable roof air conditioning unit to be checked before installation, for technical support BBA Daimler Buses India can be contacted.

18.2 Heating system

!

Not Applicable

19.1 Maintenance accesses

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 covers 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.

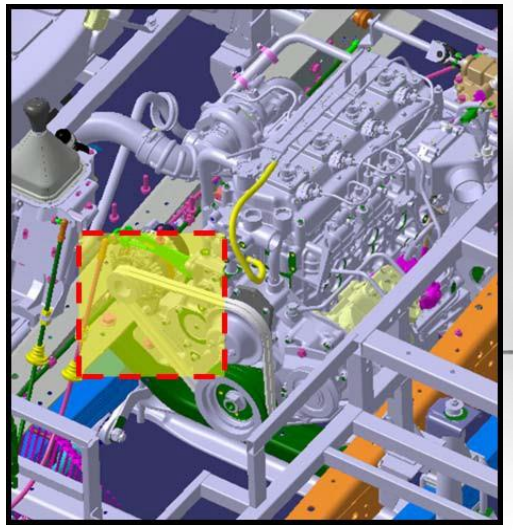
Note:
The vehicles equipped with optional items (for example, retarder, automatic transmission, and fuel tank) must have covers that enable easy access for maintenance.

The Body Builder must install means of access to the Radiator set, Coolant reservoir, fuel filter, steering system reservoir, clutch fluid reservoir and other reservoirs, as well as making possible to see the air filter cleaning condition indicator.

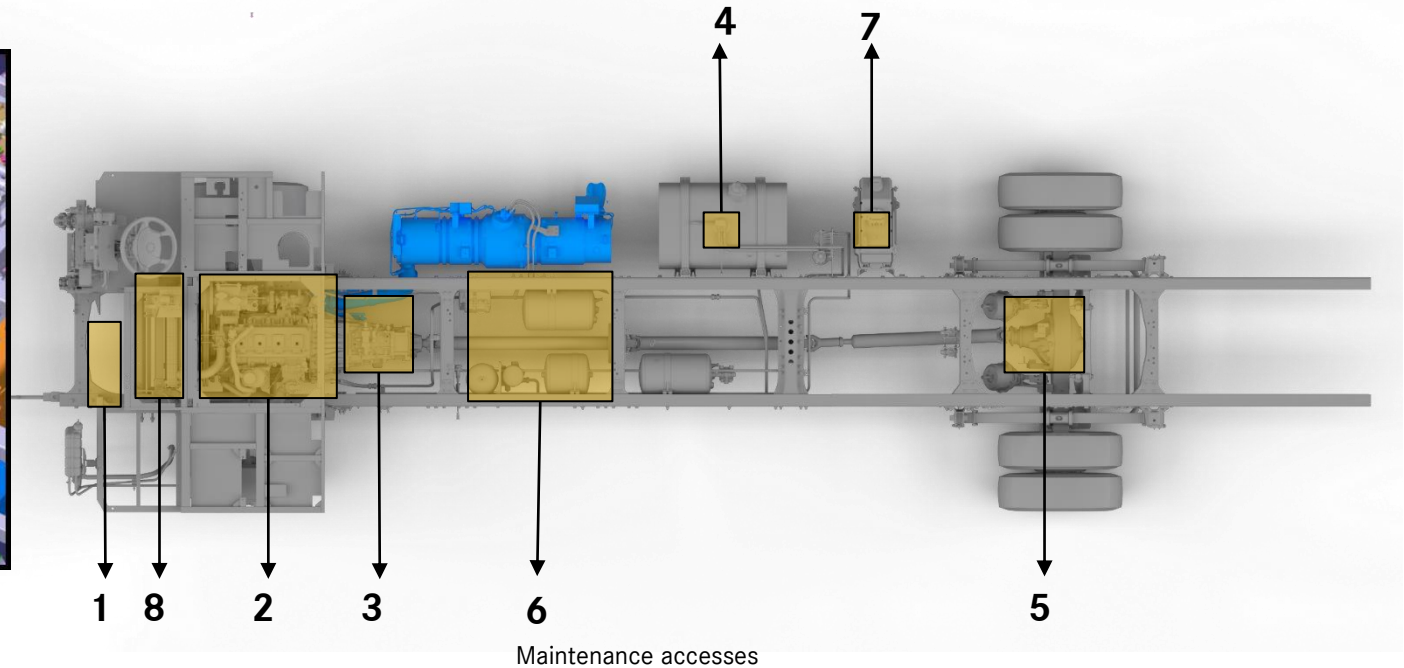
If it is not possible the access from the frontal part, provide internal access covers.

Maintenance Access

Maintenance access inside the Bus (BSVI) 1017 – 5300WB



Engine belt accessibility



Maintenance accesses

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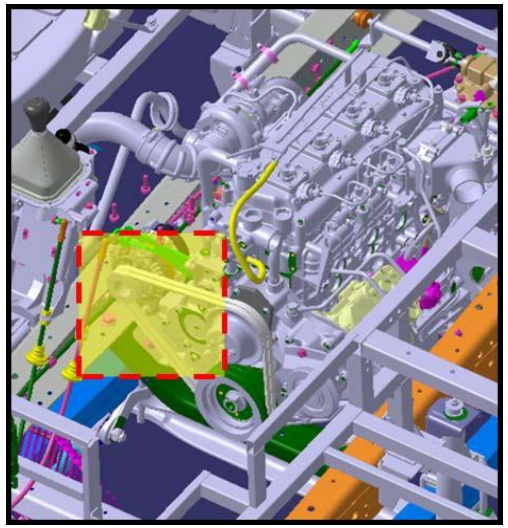
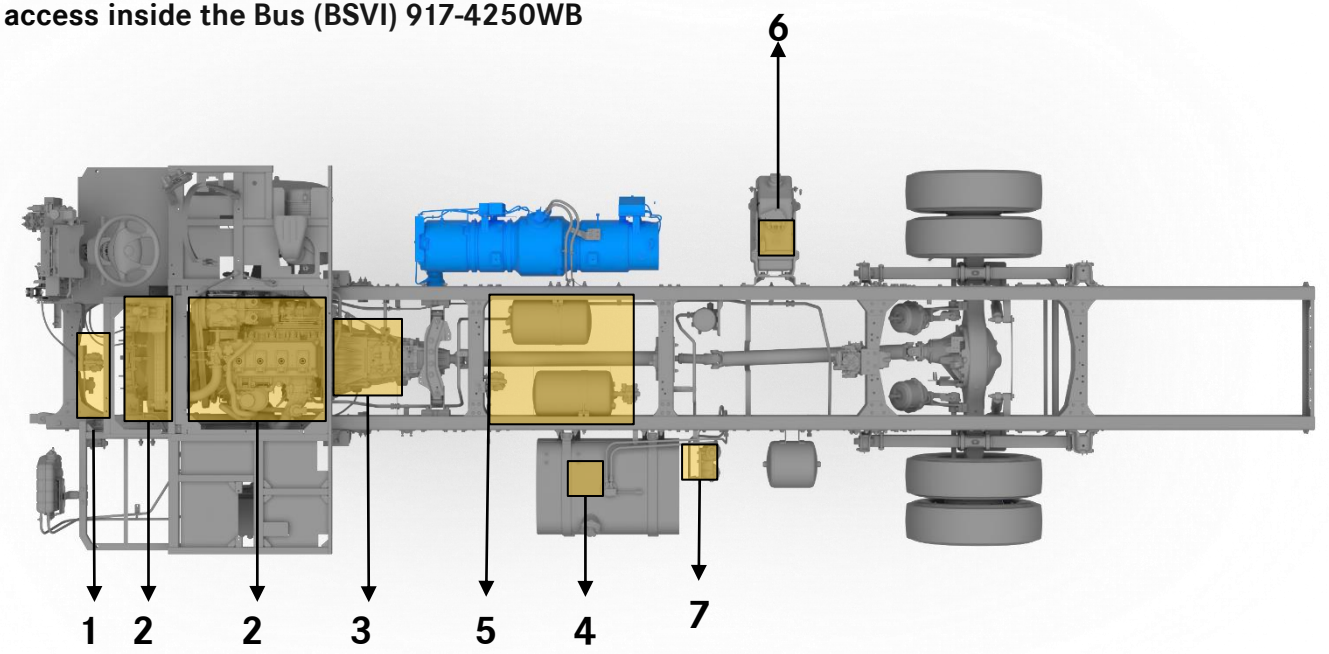
1. Access to the expansion tank upper part, hydraulic steering oil reservoir, clutch fluid reservoir, instrument cluster;
2. Access to the engine (engine head, lubricant oil filters, compressor, cooling hoses, engine belt tensioner etc.);
3. Access to the clutch, cushions bolts and gearbox;
4. Access to the fuel tank level sensor;
5. Access to the rear axle (lids not necessary);
6. Access to the air tanks and pneumatic valves (APU) (lids not necessary)
7. Access to Adblue level sensor
8. Access to Radiator and fan

Maintenance Access

Maintenance access inside the Bus (BSVI) 917-4250WB



Engine belt accessibility



Maintenance accesses

1. Access to the expansion tank upper part, hydraulic steering oil reservoir, clutch fluid reservoir, instrument cluster;
2. Access to the engine (engine head, lubricant oil filters, compressor, cooling hoses, engine belt tensioner etc.);
3. Access to the clutch, cushions bolts and gearbox;
4. Access to the fuel tank level sensor;
5. Access to the air tanks and pneumatic valves (APU) (lids not necessary)
6. Access to AdBlue level sensor
7. Access to water separating filter

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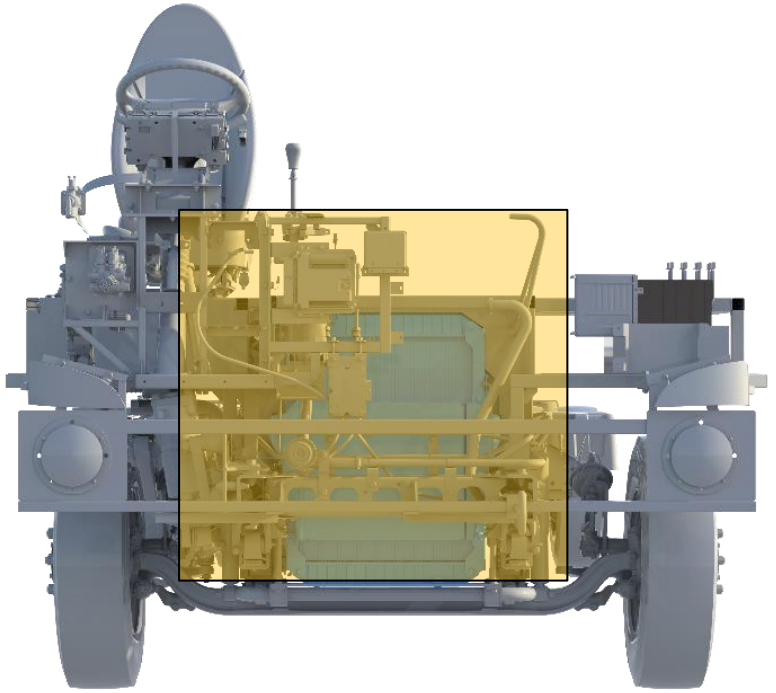
Maintenance Access



Access for frontal maintenance

Frontal lid with complete opening for cooling and air intake, with accesses to:
- Charged air cooler and water radiator;
- Pedal Valve assembly;
- Front towing hook;
- Hydraulic steering fluid reservoir;
- Clutch fluid reservoir;
- Expansion tank coolant reservoir;
- Horn

0124JA01A

20 Thermal and acoustic insulation

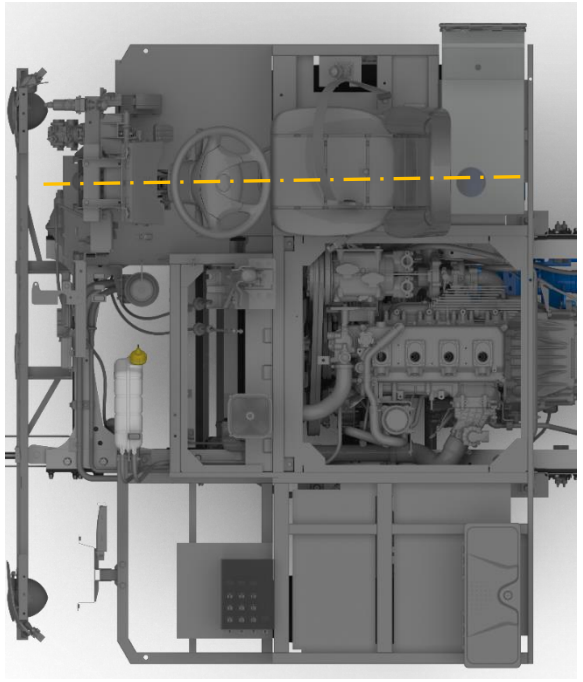
!

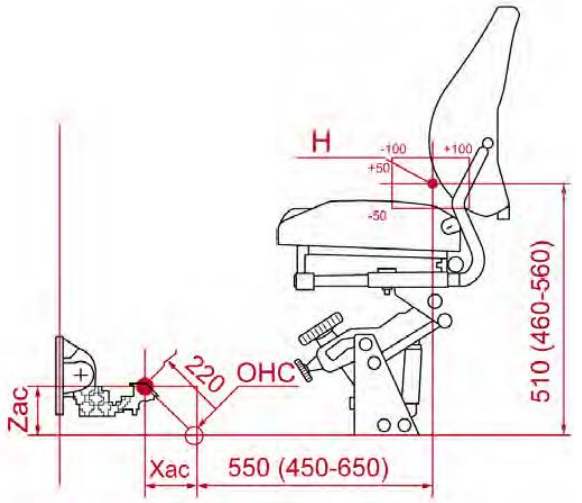
There is no specific information available on this chapter for this chassis.

21.1 Driver's seat

The original driver seat supplied with the Chassis should be retained and should be assemble post completion of bodybuilding to avoid damage to the Seats.

Bodybuilders should also ensure that the Driver seat is assembled in the original location on the Podest.





Driver's seat positioning

OHP accelerator heel point
Point H driver's hip joint point
X ac distance of accelerator center / OHP
Z ac height of the accelerator center

0124JA01A

21.2 Instrument cluster

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

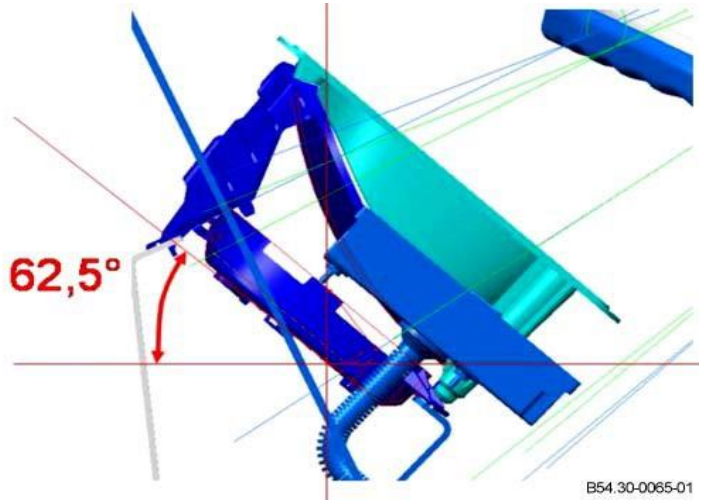
The Body Builder should observe the following items when positioning the instrument cluster in the vehicles according to the geometry:

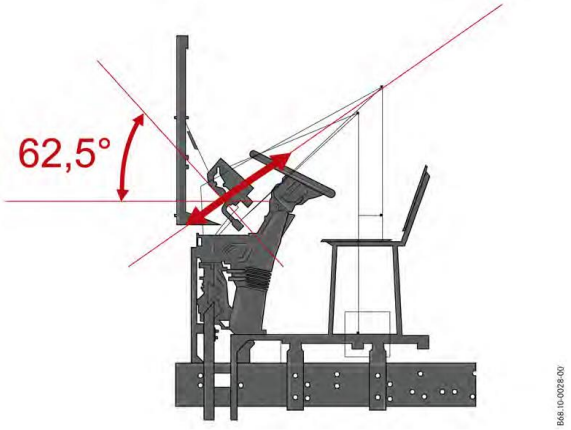
The Body Builder must ensure that the adopted positioning makes possible to see adequately, in all the steering wheel adjustment conditions, all the instrument cluster elements, including the indicator lamps. The line of sight cannot be cut by the rim or by the central area of the steering wheel.

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.

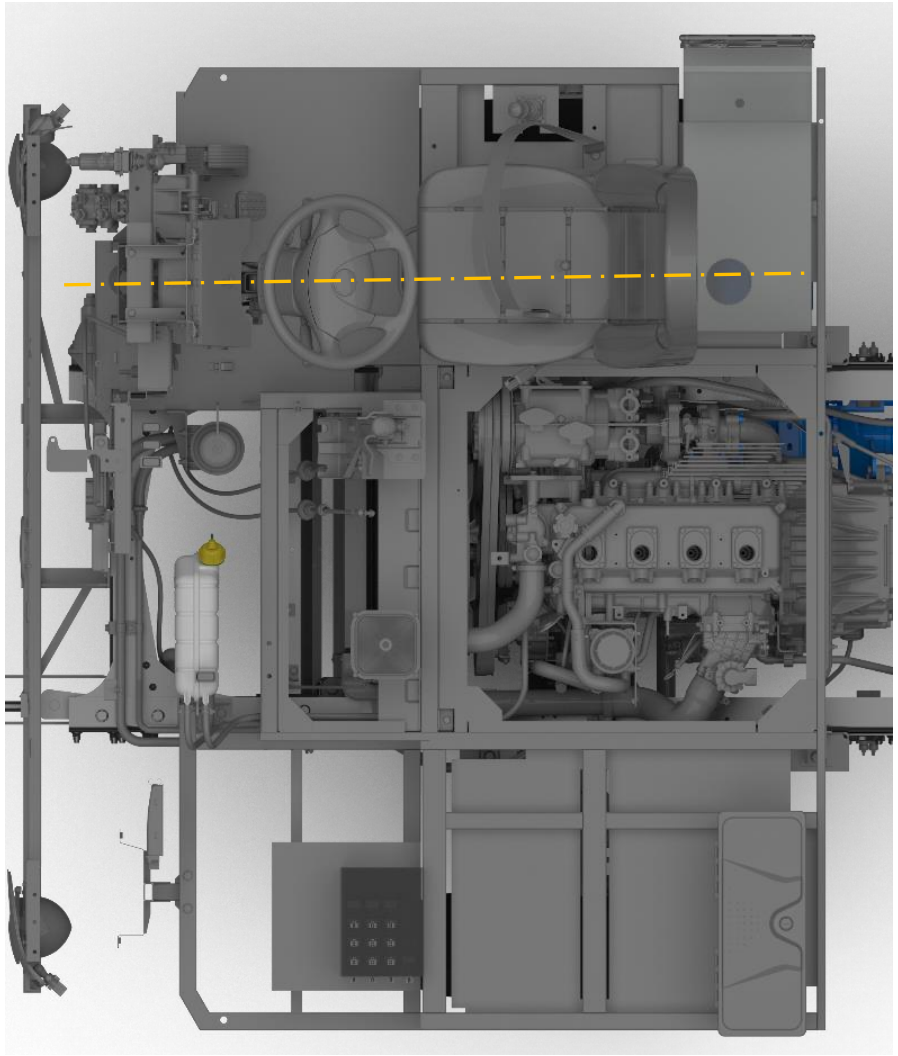
As a suggestion, the instrument cluster may be embedded in the trim piece. The instrument cluster painting is recommended to be made in black color to avoid reflection. Align the centers between the instrument cluster, steering wheel and driver's seat.





Ergonomics

The driver seat must be aligned with steering wheel & instrument cluster centerline.



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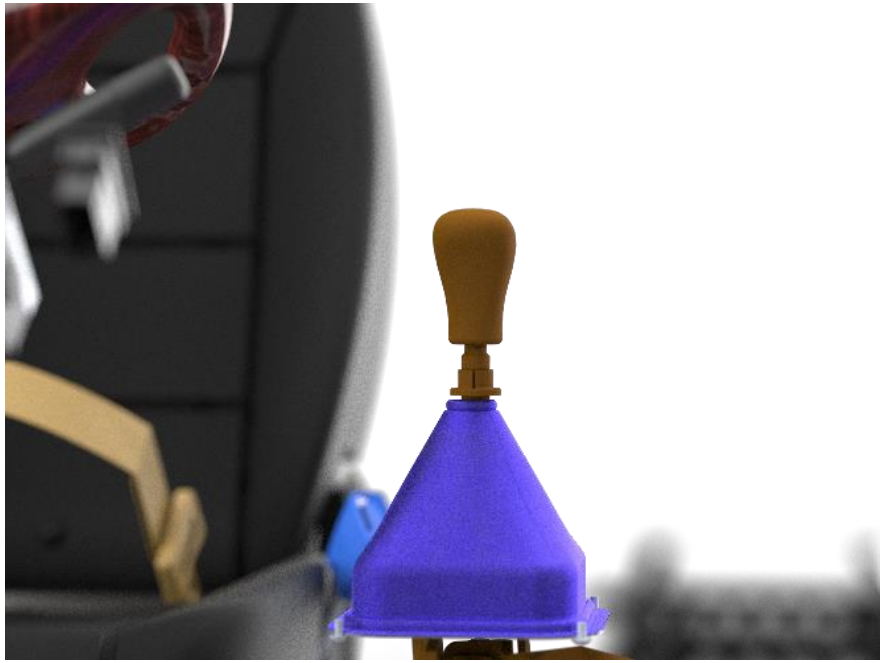
21.3 Gear shift lever

The chassis are supplied with the gearshift lever installed in it's final ergonomic position, reposition movements of the lever is not recommended.



Gear shift lever

22 Articulation

!

Not applicable. Exclusive item of articulated chassis.

23.1 Chassis transport procedures

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.

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.

Electric and Electronic part

Contents

- Technical Information
- Body building process –Disassembly & assembly of WH
- Podest & surrounding EE systems
- Combined instrument panel
- Electric center (ECU, Fuse, Relays…)
- Diagnostic plug
- Connector main board
- Body-chassis interface
- Ground point
- Battery compartment
- MR control unit
- Alternator

1.1 Technical data

Tab1 **Technical data – Non AC Variant**

	Specifications
Model	OF 917/1017
Nominal voltage	24V
Battery	2 x 12 volts , 75Ah
Alternator	1X 45A
Starter motor	3.7 Kw
Fuses	Littel Fuses
Horn	340 Hz

Tab2 **- Technical data – AC Variants**

	Specifications
Model	OF 917/ 1017
Nominal voltage	24V
Battery	2 x 12 volts , 120Ah
Alternator	80A + 80A (For normal AC) 120A+ 80A (for High power AC)
Starter motor	3.7 Kw
Fuses	Littel Fuses
Horn	340 Hz

2 Body building process

2.1 Disassembly of modules and wiring harnesses

All electronic modules must be removed before the body mounting process.

All electronic modules must stored in areas protected from dust, welding (high temperature, high current), paint and anti-corrosion materials.

Electronic modules must not be replaced due to the parameterizations to be specified by the chassis VIN.

Wire harnesses must be protected to prevent weld spatter, cutting or crushing.

Wire harnesses must not be sectioned as their design includes the necessary lengths for body construction; if additional cable length is absolutely necessary, Daimler Buses India must be consulted.

Use cable gauges compatible with the load to be installed.

Do not modify the original vehicle installation when performing maintenance procedures or additions. Maintain the same cable gauge in case of repair procedures. Do not make direct connections bypassing relays or other components; such procedures may compromise the entire electrical installation of the vehicle

Bodybuilders must carefully protect wire harnesses against welding and high temperatures during the body mounting process, in order to prevent damages and short-circuits.

It is essential to prevent the new wire harness guides from passing through areas with sharp edges or high temperatures, in order to prevent insulation damages.

Wire harnesses have “fixed points” throughout its lengths. Such fixed points are represented by colored bands identifying the area through which harnesses must be passed. This feature assists the mounting and standardization of components.

3. Podest

Plastic protective cover for Instrument panel and Electrical & electronic components

It consists of the combined instrument which is an independent instrument, main light switch and press button switches.

The components are attached to a support so that they can be transported with safety to avoid mechanical damage and/or short-circuits.

The panel is protected against water and dust by a cover that should be maintained in place from final inspection by Daimler buses until the beginning of body building. There is a transparent part in the protection cover that allows the driver to see the instruments without having to remove the cover every time the vehicle has to be driven

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.

Electric System

The OF 917/1017 vehicles have a central electric center with a fuse box system, protected against humidity by a plastic cover. The thickness of the protective cover is designed to allow removing and putting it back again as many times as needed without the risk of tearing it, so it is advisable always to use this cover to avoid damage to the electric unit due to moisture or excessive dirt accumulation.

!

Protect electric electronics equipment with protective covers.

Never remove protective covers before the body mounting procedure

3. Combined instrument

3.1 Combined instrument cluster

The Instrument cluster consists of speedometer, rev counter, fuel gauge, engine coolant temperature gauge, air brake pressure gauge, tell-tales and odometer display. Before the body mounting process, the combined instrument shall be removed from the panel and stowed away in a place safe against dust, solder (high temperature, high currents), painting and anticorrosive.

There shall be a track ability control during the body mounting process through some identification label because the instrument is parameterized at supplier end with vehicle-variant specific data and may not be mounted on another vehicle.

Combined instrument for OF 917/1017 Vehicles

Podest

***Tab3*- Instrument cluster Telltale**

INDICATOR	DEFINITION	INDICATOR	DEFINITION
	High Beam		DPF Generation
	Right Turn		DPF status Lamp
	Left Turn		Rear Fog lamp
	Cruise control		Engine Start & Stop
	Front Fog lamp		Low Fuel Level
	DPF Regeneration		Water separator
	Seat Belt Warning		Low AD Blue
	Engine Oil pressure		ABS
	Air Bag		PTO engaged
	Battery Charging		Exhaust Brake
	Air Brake pressure warning		Malfunction indicator lamp
	Parking Brake		Check Engine Lamp
	Coolant Temperature		Disc Brake warning
	Driver Inducement		EVSC

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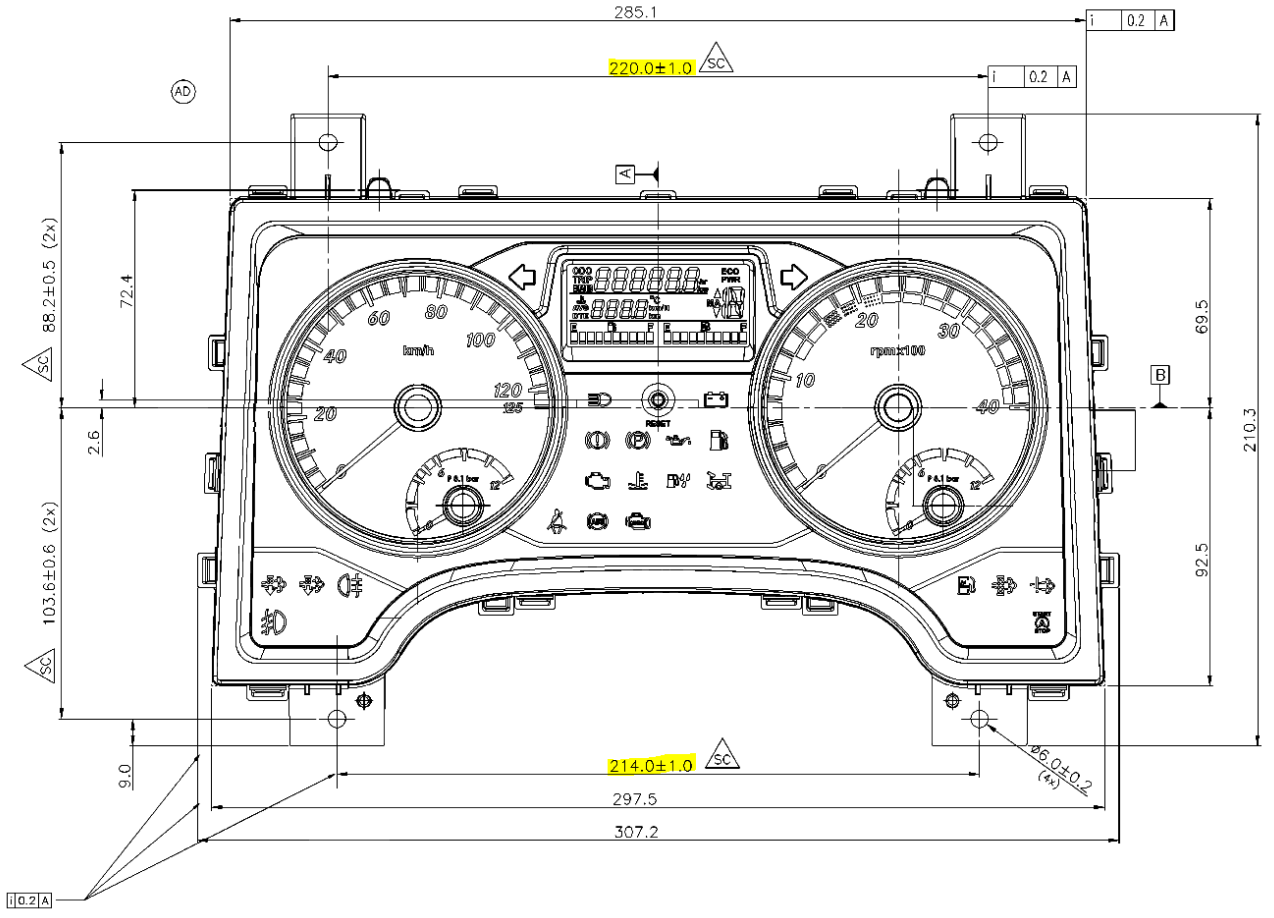
3.2 Combined instrument cluster dimensions

Please refer The Instrument cluster dimensions in Fig below



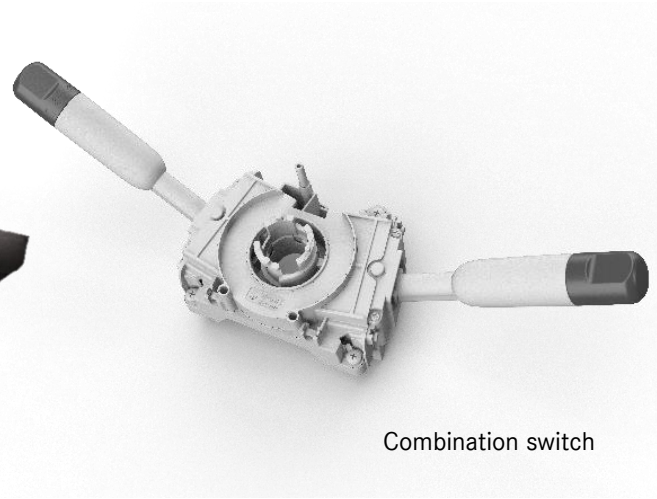
Combined instrument DImensions

3.2.1 Combined instrument cluster dismantling

- Release the connectors, with special attention to the internal panel connector.
- Loosen the 4 bolts of the instrument cluster.
- Place the instrument cluster in a protected area until the body mounting process is completed.
- Do not mix panels, since they have different configurations for each vehicle type.
- Do not change the internal panel switching configuration, since this will alter tachometer calibration (3 switches).

3.3 Combination switch

LH Side Combination switch



Combination switch

RH Side Combination switch

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The Combination switch is mounted on the steering column, The switch can control the following accessories,

- To the right side of the driver.
  - Parking lamp can be switched “ON” by rotating the knob in  this position
  - Head lamp can be switched “ON” by rotation the Knob in  this position
- To the Left side of the driver.
  - Wiper can be switched “ON” by
  - wiper has three speeds (intermittent, low and high), which can be controlled by rotating the wiper control knob.

3.3 Combination switch

Exhaust brake

Exhaust brake can be engaged by use of switch proved with wiring harness, it should be mounted in the dashboard (accelerator pedal must be in released position).

Exhaust brake

!

Do not switch on the exhaust brake during normal driving conditions. It is to be used only when driving downhill for optimum performance.

3.3 Combination switch

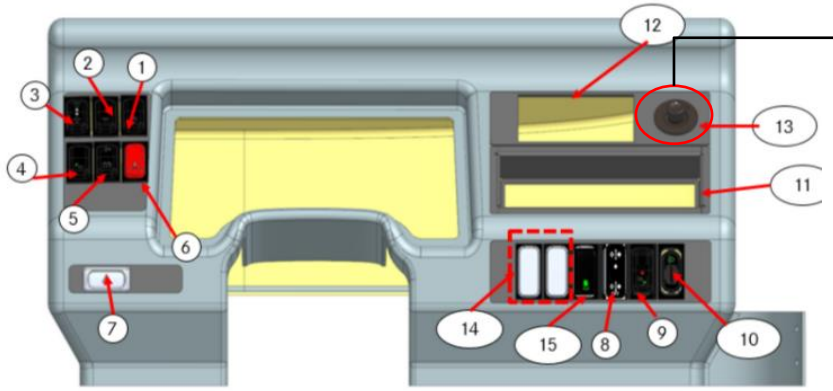
Podest

MDM Switch

The OF chassis Models are now capable of MDM(multi Drive modes), Vehicle is provided with a mode selection switch which the driver can select manually on need basis. Mode selection switch is a rotary switch consisting of **two positions**. this switch should be mounted on the Dashboard in a easy to access area as shown below

POWER (mode 1); Vehicle will perform normally. This is the default

ECO (mode 2); In this mode, the vehicle shall experience a slightly sluggish vehicle behavior compared to power mode. Excess fuel wasted due to rapid acceleration in the normal driving condition shall be saved with sluggish acceleration thereby improving the fuel efficiency of the
vehicle..



SWITCH NUM	DESCRIPTION
1	SALLON LAMP SWITCH
2	DRIVER CAB LAMP SWITCH
3	DOOR OPEN / CLOSE SWITCH
4	NIGHT LAMP SWITCH
5	AIR FILTER AND SECOND ALTERNATOR FILTER
6	EMERGENCY DECLARATION SWITCH
7	HAZARD SWITCH
8	DPF REGENERATION SWITCH
9	EXHAUST BRAKE OVERRIDE SWITCH
10	HEAD LAMP LEVELLING SWITCH
11	DVD / AMPLIFIER
12	AC CONTROLLER
13	MDM ROTARY SWITCH
14	DUMMY SWITCH
15	ESP SWITCH

MDM switch

0124JA01A

3.4 Accelerator pedal

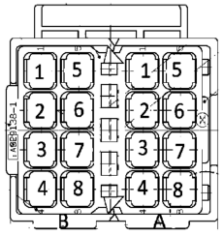
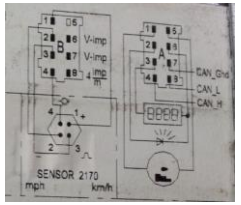
The OF 917/1017 RF chassis have an electronic accelerator pedal. It is connected to the electrical wiring harness by means of a yellow connector which on completion of body construction, should be attached under the Dashboard to be protected against water when the bus is washed.

Its attachment is designed according to the driver's place ergonomics. Disconnect the electronic accelerator pedal during soldering work on the chassis to protect the electronic accelerator circuit.

Electronic accelerator pedal

3.5* Tachograph

Applicable as optional feature, Hardware not included in chassis supply condition only interface is provided.

P1 Tachograph A+B	
Chassis side Connector	**Component side**
MB Part no:	**MB Part no:**
Secondary lock:	
TYCO 16 POLES: 929092-1	**TYCO 16 POLES:**
Tyco lock :	**Tyco lock:**
Color: Grey	**Color:**
	Interface at the component side " VDO MTC 1324" 

P1 TACHOGRAPH A+B											
Color-code	Circuit N.	Gauge (mm²)	pin	pin	Input/ Output	Potential	Max Current	Min Current	Function	Symbol	Description
R	TCOP	2	A1	A1	Input	(+VE) KL30			Battery Supply		
			A2	A2							
Y-G	TCOIG	0.85	A3	A3	Input	(+VE) KL15			Ignition Supply		
B	TCO CANHI	0.5	A4	A4		CAN			TACHOGRAPH CAN HIGH		
B	TCOE	2	A5	A5	Input	(-VE)			GROUND		
B	TCOE.1	2	A6	A6	Input	(-VE)			GROUND		
			A7	A7							
W	TCO CANLO	0.5	A8	A8		CAN			TACHOGRAPH CAN LOW		
			B1	B1							
			B2	B2							
Y-W	SS04S.2	0.85	B3	B3	Input	(+ve) C3 Speed Signal - 8V			Speed signal input to Tachograph		
			B4	B4							
			B5	B5							
			B6	B6							
			B7	B7							
			B8	B8							

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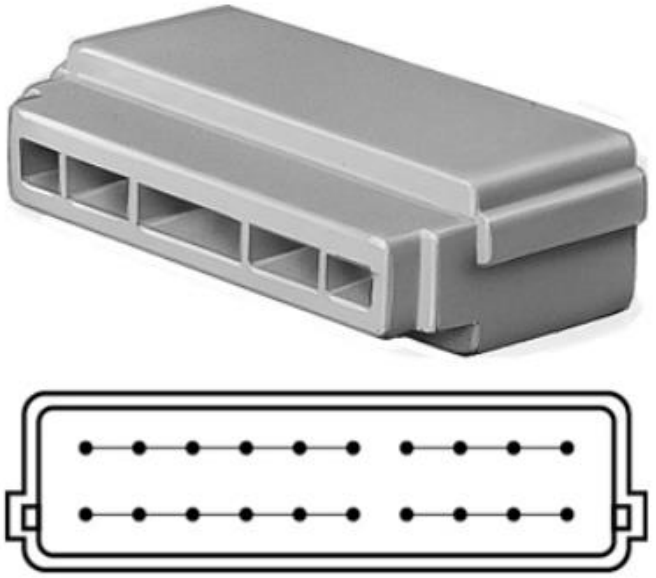
3.6 FR control unit

Not applicable.

3.7 Neutral point (CAN)

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

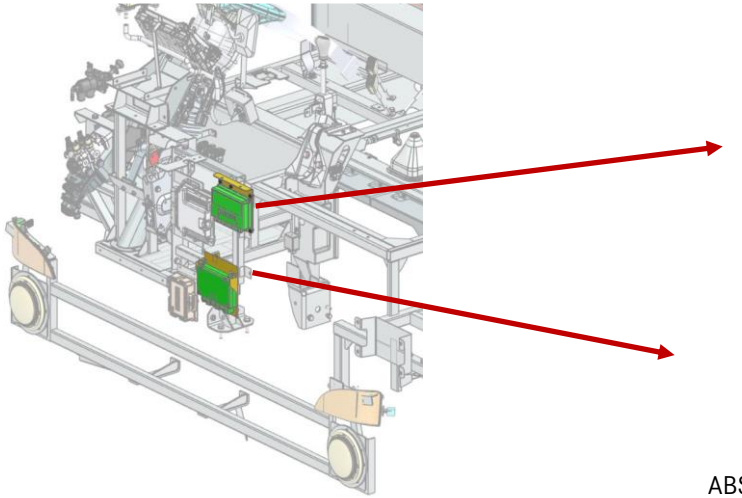
There are two CAN star points in BSVI vehicles. These must be installed in a place of easy access for maintenance & inside the closed area, should not be exposed to Water splashes, dust & hot air.



Neutral point

3.8 ABS/EVSC system

All OF chassis are equipped with ABS and EVSC systems.



EVSC Mux ECU

ABS + EVSC ECU

ABS & EVSC ECU

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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.

3.8 ABS/EVSC

3.8.1 EVSC

EVSC Tell Tales

The 917/1017 RHD chassis are supplied with **Electronic Vehicle Stability Control System (EVSC)**, as mandated by the "AIS-150" and should be fixed in the Body/chassis Post bodybuilding the following recommendation's are to be followed to ensure proper integration of the EVSC system.

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3.8.2 Components Present for EVSC Functionality in Chassis

S.No.	Component	Count	Chassis Location	Body builder Scope
1	ESC Module	1	In middle (center of Chassis)	No Reposition Allowed
2	SAS	1	Steering Panel	No reposition Allowed
3	Wheel Speed Sensor	4	Wheel Ends	No reposition Allowed
4	Digital Foot Brake Valve	1	Steering Panel	No reposition Allowed
5	Solenoid Valve	2	Front & Rear Chassis Cross members	No reposition Allowed
6	Modulator Valve	4	Near Front & Rear Axle	No reposition Allowed
7	EVSC Deactivation Switch	1	Near Instrument cluster	Bodybuilder to reposition in dashboard
8	ABS + EVSC ECU	1	ECU Rack	Bodybuilders to reposition the components as per Guidelines in **page 115**
9	EVSC CAN Gateway	1	ECU Rack	

i

Proper care to be taken for ECU and CAN gateway reposition, Deactivation switch must be placed in an area of accessibility to the Driver

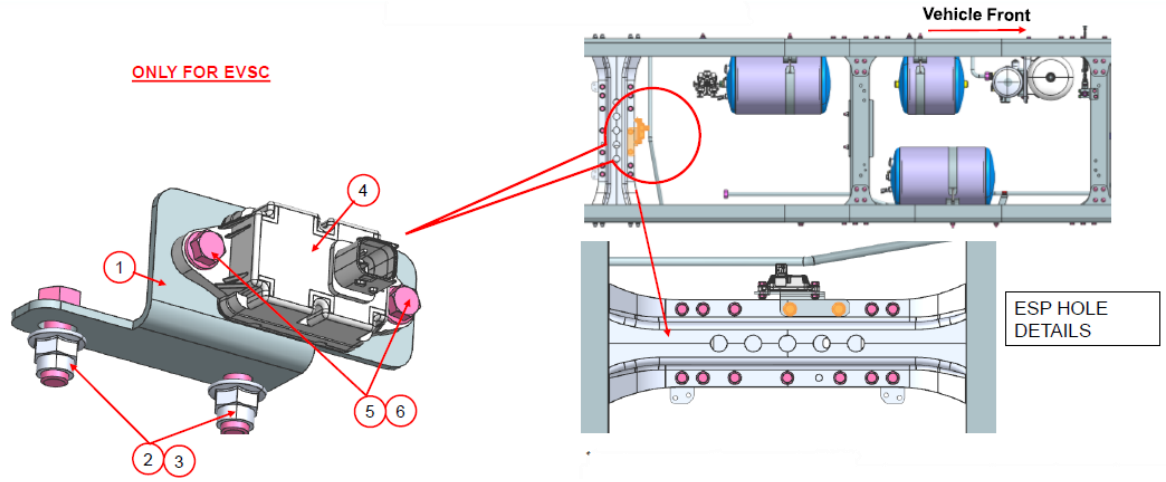
3.8 ABS/EVSC

3.8.3 ESC Module

The ESC Module is Fitted in the Middle of the chassis and is calibrated from the factory. Tampering, removing, repositioning the ESC module is not permitted.

- The position and Orientation of ESC Module should be as near as possible to CG.
- No wires should be removed in Ignition On Cycle.
- If Faulty ESC is replaced, Learning of ESC has to happen again.
- Interference with ESC Module is Not permitted; Under no circumstances during Body building.
- IP 67/ Proper Locking of connector to be ensured after bodybuilding job.
- It should be ensured by Bodybuilder to have easy access for maintenance and removal.
- The wiring Harness for ESC is Plant fitted and rerouting by Bodybuilder is not recommended.
- During Welding Job, Torch ground should not be connected to ESC Bracket.

S.No	Description
1	Bracket
2	Bracket mounting fasteners – M12x1.5x30 10.9 Grade Bolt
3	Bracket mounting fasteners – M12 Nut
4	ESC Module
5	ESC module mounting fasteners - M8x25 8.8 grade Bolt
6	ESC module mounting fasteners - M8 Nut



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3.8 ABS/EVSC

3.8.4 EVSC CAN Gateway

- 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
- If any Modification/Rework happened in Brake Light Circuit, working has to be ensured through 'EVSC CAN Gateway' in Diagnostic tool.

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3.8.5 Valves

- The position change of Digital Foot Brake Valve is not encouraged.
- The body Builder must ensure easy reach to the valve for Maintenance purpose.
- There should not be any change or sharp curve in the pneumatic circuit of Brakes and valve.
- Supply of air for auxiliary components such as Door, Horn should not be taken from the Brakes circuit.
- Ensure proper covering of Valves during Bodybuilding Process to protect from dust, dirt and water.
- The body parts and external panels should not interfere with the Pneumatic circuit and foot brake valve.
- Ensure valves to be leak-proof.

3.8 ABS/EVSC

3.8.6 EVSC Deactivation Switch

The EVSC system consists of a deactivation switch that is connected to the circuit and should installed in the dashboard with proper Visibility and reachability to the Drivers

- ESP can be switched off with Deactivation switch provided with wiring harness.
- Do not modify the power supply to the switch as it may affect the functionality.

3.8.7 ABS + EVSC ECU

- 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.
- Proper Locking of Connector to be ensured.

3.8.8 SAS module

The SAS Module is factory Fitted to the Steering column of the chassis and is calibrated from the factory Tampering, removing, repositioning the SAS module is not permitted

- The position and Orientation of SAS should not be changed. If changed, Steering Learning has to happen again for Diagnostic Tool.
- It should be made sure that adjustment in steering wheel column should not interfere with SAS.
- If faulty SAS is replaced, Steering Learning has to happen again.
- Wiring Harness of SAS is Plant Fitted, rerouting by Bodybuilder is not recommended.
- Disassembly or alteration of SAS is not allowed.

3.9 NR system

Not applicable.

3.10 Converter

Not applicable.

3.11 Flame start system

Not applicable.

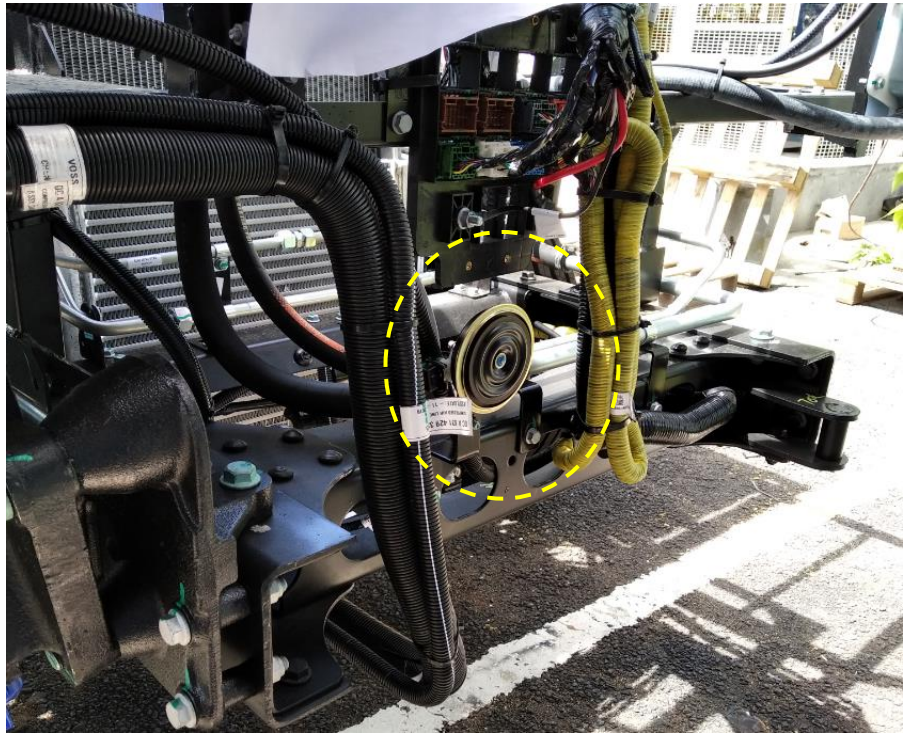
3.12 Outside air temperature sensor

Not applicable.

3.13 Horn

Electric Horn location:

The bodybuilder is responsible for the electric horn location to ensure proper sound propagation, as per applicable country laws, as well as due flood protection



Horn

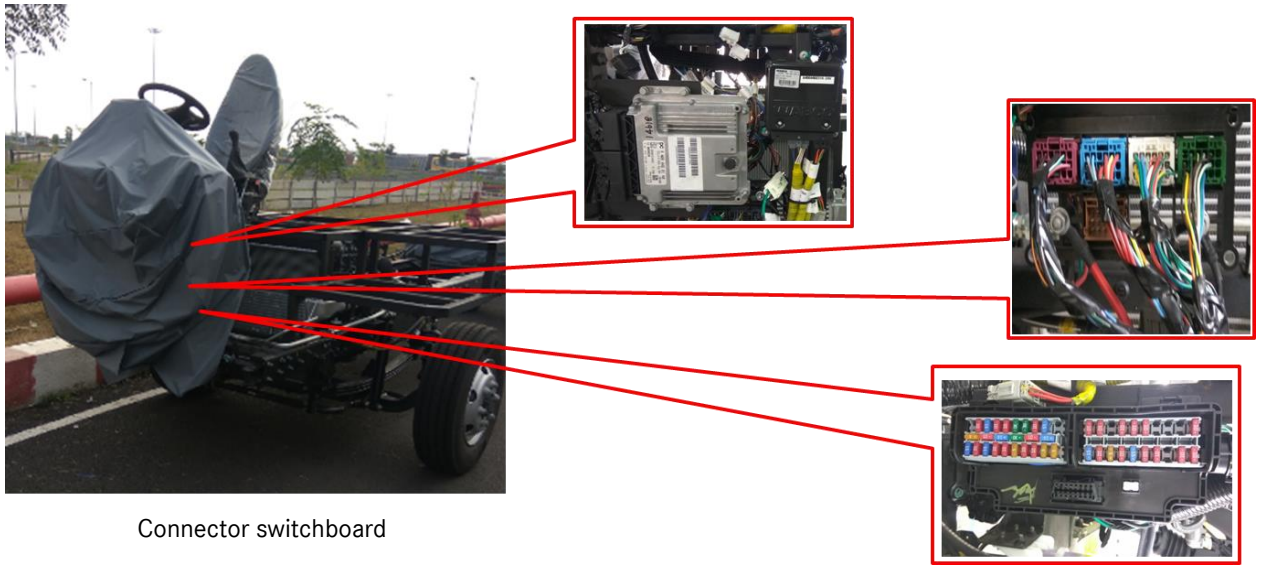
4 Electric Center

OF Chassis have an electric center with Fuse Box system protected by a plastic cover, in order to prevent exposure to moisture.

The thickness of the protective cover is designed to allow its application and removal as often as necessary without any risk of tearing; therefore, always use this cover to prevent electric center damages due to exposure to water or excessive dust accumulation.

The ABS module and the electric center must always be protected against the weather. Do not remove it before the body building.

Only remove the electric control center cover at the moment of body building, and ensure electrical control center is protected form humidity, high temperature, high current Etc.



Connector switchboard

The cabin Fuse box & Relay mounting bracket should be given by Bus body builder and should be enclosed to avoid damage.

4.1 Additional comments for handling Electrical center

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 location must be protected against water infiltration and impurities. The vertical position is the most suitable for the “fuse box”.

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.

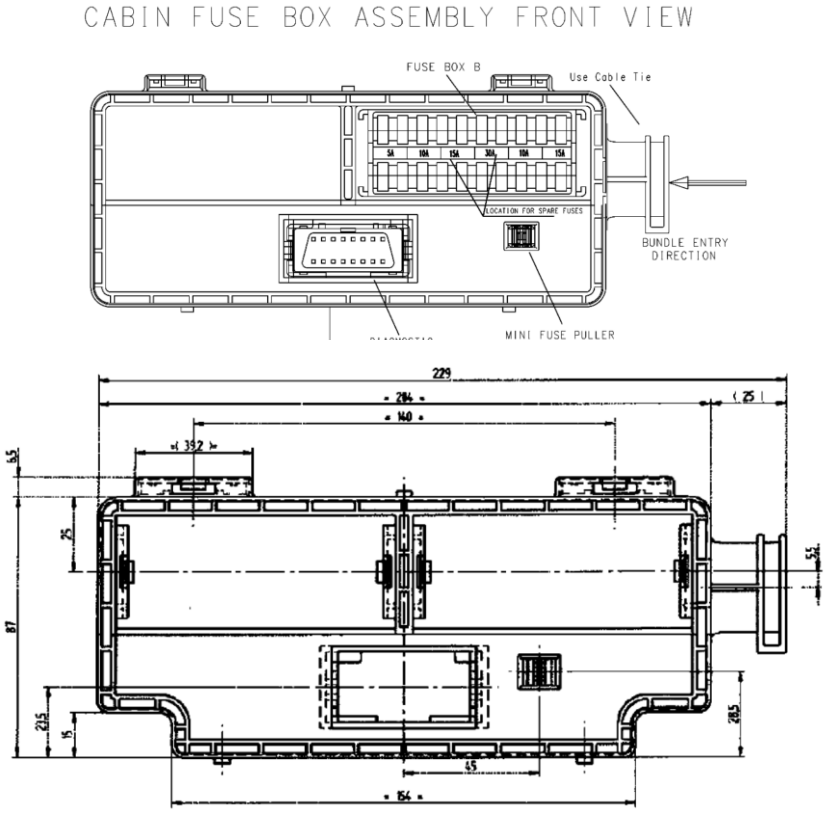
4.2 Fuse box Cabin fuse box

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

The layout and features of such components are detailed in the fuse label provided along with the toolbox.

This label must be attached next to the bus electric center to allow proper identification of components during eventual maintenance procedures. The disassembled Fuse Box must be stored in a secure location, duly protected from dust, welding (high temperature), paint and anticorrosion materials.

Cabin fuse box for 917/1017vehicles



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4.2.1 Fuse capacity

The fuses that are part of the fuse box switch cabinet of all Daimler India Bus chassis can be differentiated by their colors and their capacities:buses India

- Light brown - 5 Amperes
- Red - 10 Amperes
- Light blue - 15 Amperes
- Yellow - 20 Amperes
- Natural - 25 Amperes

In order to achieve a successful bodybuilding, we recommend that these instructions are followed to avoid any problem concerning the vehicle electrical wiring.

The electric center is located in a temporary position, and its final location will be determined during the bodybuilding. All the components which supply these vehicles are dimensioned to attend the electric loads for their original equipment.

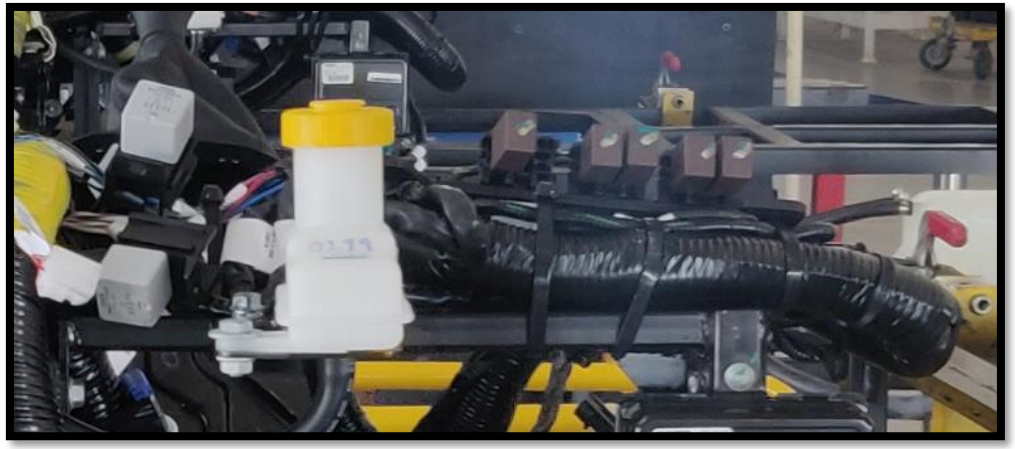
Fuse identification

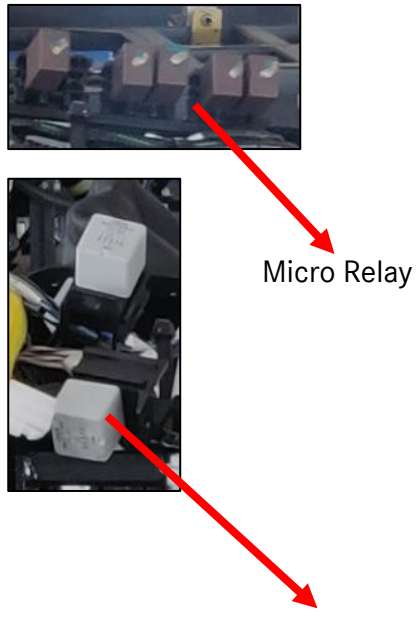
4.3 Relays

Connector Main Board

The relays assembled in the electric center (“FUSE-BOX”) of all Daimler India Bus chassis are color coded for each function; check the vehicle electric center label for more information.

Relay	Color	Type
K10 AC Control Switch & Start Coil Relay	Brown	Micro
K30 NOX/UQS Relay	Brown	Micro
K20 Exhaust Brake & Fog Lamp Relay	Brown	Micro
K7 Wiper high Relay	White	Mini
K24 Wiper Low Relay	White	Mini
K25 Washer Relay	White	Mini





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4.4 Diode capacity

Not applicable.

4.5 Electronic control unit

4.5.1 Main cabinet

Engine management system is the processor that manages the running of the engine. 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.

Electronic control unit

4.5.2 Temporary location

ECU temporary Location

For the mounting situation, ECU screwed with the wiring harnesses to the metal bracket, protection against the following environmental conditions are to be followed:

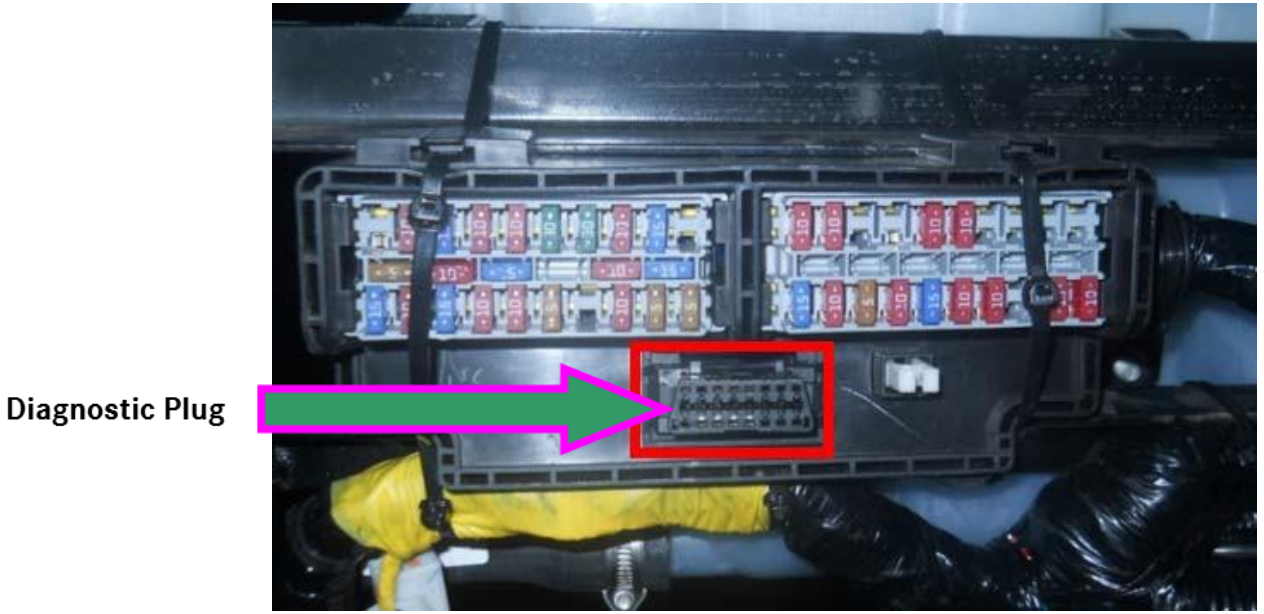
- Water and dust, especially the wiring harnesses that were routed through the top.
- Mechanical damage, especially the pressure compensation element and the male pins in the connector.
- In case of paintwork on the remaining vehicle, avoid paint on the ECU and its terminals.
- Electrostatic discharge.
- 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) 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 should be executed 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

5 Diagnostics plug

This plug is integrated in the cabin fuse box and its function is to allow “off board” diagnostics, or diagnostics with external test equipment. When disassembling for body mounting, care should be taken as to prevent infiltration of impurities (dust), welding (high temperature), paints and anticorrosive, because this would hamper its use.



Diagnostic plug for NON multiplexed chassis

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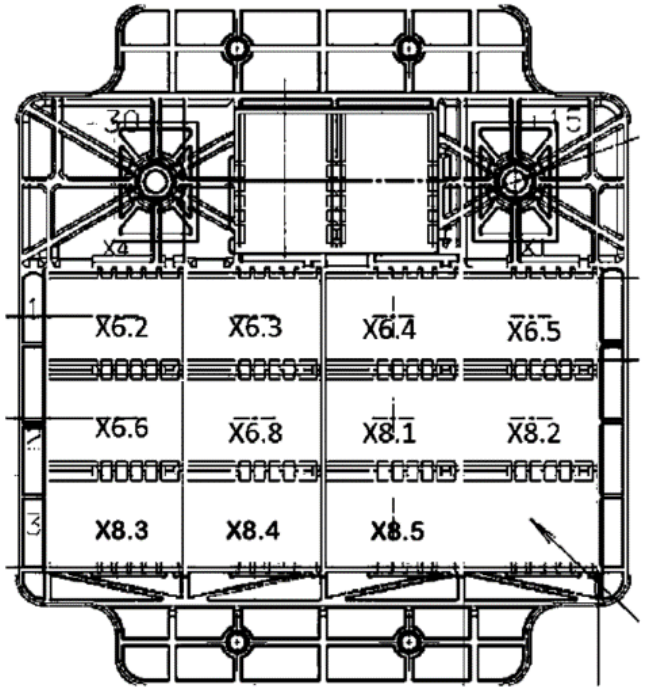
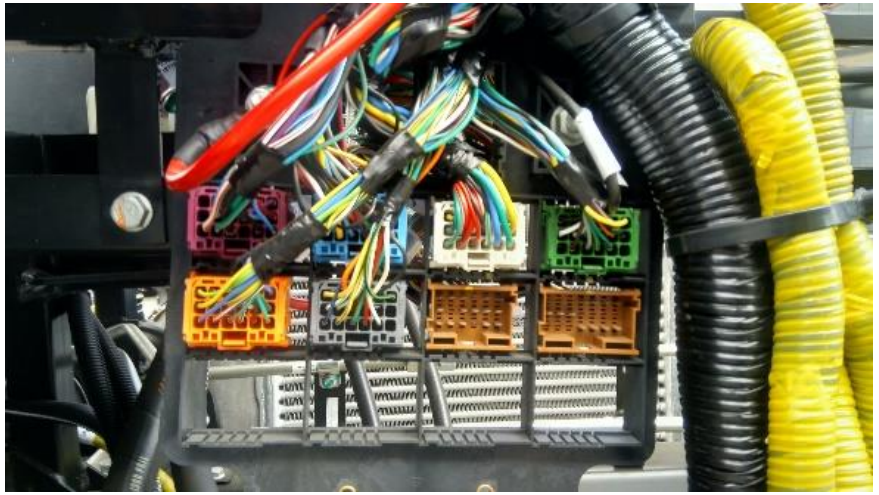
6 Connector Main Board OF 917/1017

Connector Main Board

All connections between wiring harnesses for OF 917/1017 chassis 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 wiring harnesses connections, achieving savings in space inside the bus switch cabinet compartment.

The connector arrangement and their respective functions, as well as the standby connectors for body mounting, are listed below





Connector Main Board

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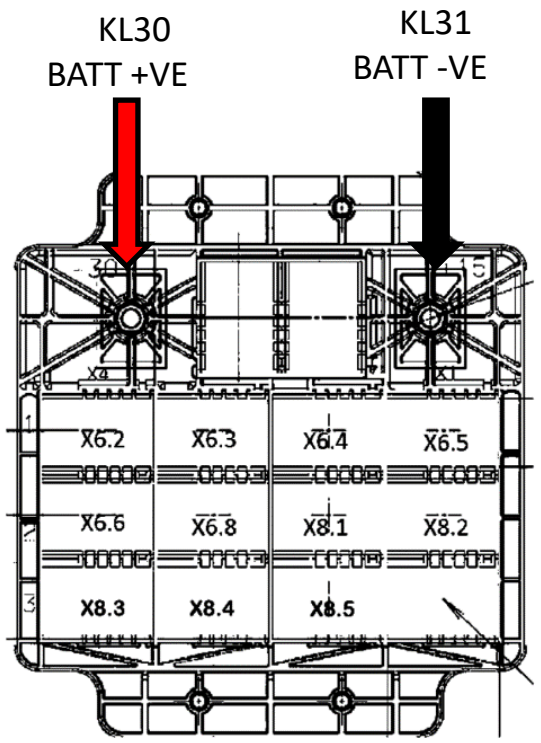
6 Connector Main Board Description



Connector main board

KL30: (+VE)
X6.1 – CHASSIS INTERCONNECTOR
X6.9 – CHASSIS INTERCONNECTOR

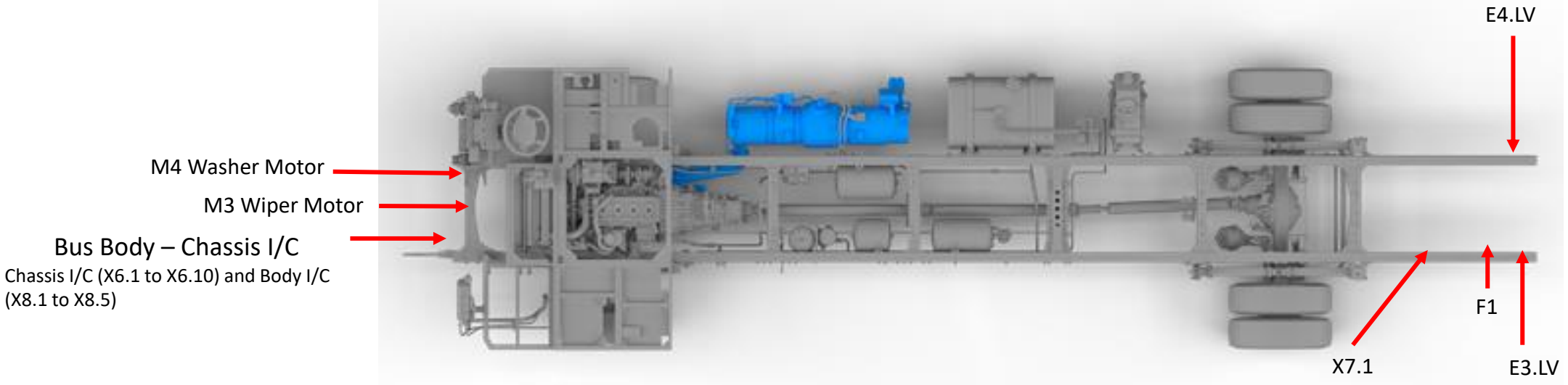
KL31:(-VE)
CHASSIS EARTH
X6.10 – CHASSIS INTERCONNECTOR

***Tab1*- Connector main board Details OF 917/1017**

Connector main board				
Function	**Coordinate**	**Color**	**Cavity**	**Description**
X6.2	X1-1	Glared violet	18	Chassis interconnector
X6.3	X1-2	Light blue	18	Chassis interconnector
X6.4	X1-3	Natural	18	Chassis interconnector
X6.5	X1-4	Green	18	Chassis interconnector
X6.6	X2-1	Orange	18	Chassis interconnector
X6.8	X2-2	Stale grey	18	Chassis interconnector
X8.1	X2-3	Brown	18	Body interconnector
X8.2	X2-4	Brown	21	Body interconnector
X8.3	X3-1		6	Body interconnector
X8.4	X3-2	Rape Yellow	9	RPAS interconnector
X8.5	X3-3		12	Body Interconnect External lamp
EARTH	—	—	—	Chassis/Body

7.1 Interface chassis and body OF 917/1017

7.1.1 Interface connections location



Location of Interface Connections → OF 10T/9T BS6

Bus Body – Chassis I/C – Interface connectors.
M3 – Wiper Motor.
M4 – Washer Motor.
X7.1 –Load Body I/C
F1 – Rear Fog Lamp.
E4.LV – Comb Lamp RH.
E3.LV – Comb Lamp LH.

Color codes of wires

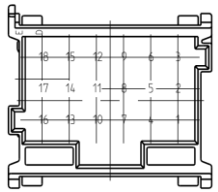
For wire colors, please refer to the table below:

***Tab5*- 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

7.2 Bus body interconnector

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

Electric center - X8.1 Bus Body Interconnector	
Chassis side Connector	Bus Body builder side
MB Part no:	MB Part no:
Secondary lock:	
TYCO 18 POLES: 1-	TYCO 21 POLES: 1-
Tyco lock : 967634-1	Tyco lock: 967634-1
Color: Clay Brown	Color: Clay Brown
Coding : "A"	Coding : "A"
Latching mechanism = 'B-C'	Latching mechanism = 'B-C'
	

***Tab12*- Bus body interconnector X8.1 pin details for OF 917/1017 Variants**

X8.1 BUS BODY INTERCONNECTOR											
Color-code	Circuit N.	Gauge (mm²)	pin	pin	Input/ Output	Potential	Max Current	Min Current	Function	Symbol	Description
R	DCLI	0.85	1	1	Output	(+ve)	1		DRIVER CABIN LAMP		This is protected circuit from the MUX and the SW to be provided by the body bulider for Driver cabin lamp.
G/R	IL01	0.5	2	2	Output	(+ve) KL58	0.5		PARKING ILLUMINATION ON		Parking lamp is in ON Condition (Top marker & Body SW illumination will turn ON)
R/Y	RLI	1	3	3	Output	(+ve) D+ ON	1		READING LAMP ON		This is protected circuit from MUX and the SW to be provided by the body bulider for Reading lamp.
R/G	SLI1	1.25	4	4	Output	(+ve) KL15	4		SALOON LAMP ON		This is protected circuit from MUX and the SW to be provided by the body bulider for saloon lamp.
L	FSL01	0.85	5	5	Output	(+ve) KL15	1		DOOR OPEN SIGNAL		This is protected circuit from MUX and the SW to be provided by the body bulider for Door Open/Close. Whenever the Door opens, Foot strp lamp will turn
L-R	BUZI	0.85	6	6	Output	(+ve) ACC ON	1		ACC ON + Emergecny door switch ON + Foot Step Switch ON + Bus Stop Switch ON +		Whenever any of the function ON buzzer will get continous beep sound.
			7	7							
R/Y	BBIGN	1.25	8	8	Input	(+ve) KL15			IGNITION I/P TO VTS, MONITOR,DVD,STOP REQUEST SW AND AMBIENT SW POWER		Ignition supply to the Body builder for VTS, Monitor and DVD etc..
			9	9							
R/Y	ACCI	0.5	10	10	Input	(+ve)			AC COMPRESSOR STATUS		
G	ACD+	1.5	11	11	Output	(+ve) D+			POWER FOR AC CONTROLLER		
Y/W	SS04S	0.85	12	12	Output	(+ve) C3 Speed Signal - 8V			DOOR CONTROLLER , TACHO		
L	EDLO	0.85	13	13	Output	(+ve) KL30	1		B+ ON + Emergency Decleration Lamp Switch ON		This is the protected circuit from MUX and the SW to be provided by the body bulider.Whenever the Emergency declaration SW is ON, the lamp will glow with the sound which indicate the emergency.
			14	14							
Y-L	DOSS.1	0.85	15	15	Input	(+ve)			DOOR OPEN SIGNAL		
G	SLBB	0.5	16	16	Output	(+ve) KL15	3		IG ON + Brake Switch ON		Stop lamp ON when brake sw pressed
G-Y	BL01D.2	0.5	17	17	Input	(+ve)			Reverse signal Input		Reverse gear ON input goes to the MUX unit.
B	BBE	3	18	18	Gnd	(-ve)			Vehicle Ground		

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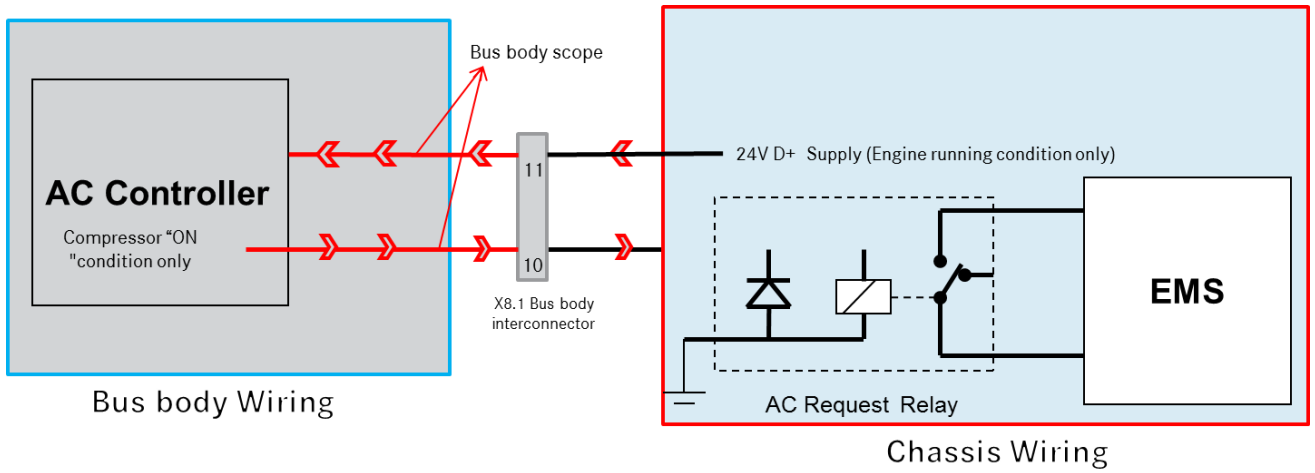
7.2.1 Bus body interconnection details for Air Conditioning interface for OF 1017/917 AC Variant chassis



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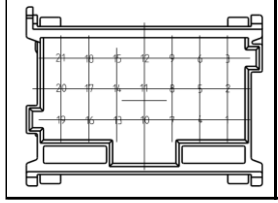
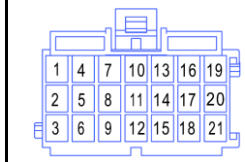
7.3 Bus body interconnector

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

Electric center - X8.2 Bus Body Interconnector	
Chassis side Connector	Bus Body builder side
MB Part no:	MB Part no:
Secondary lock:	
TYCO 21 POLES: 1-	TYCO 21 POLES: 1-
Tyco lock : 967635-1	Tyco lock: 967635-1
Color: Clay Brown	Color: Clay Brown
Coding : "A"	Coding : "A"
Latching mechanism = 'B-C'	Latching mechanism = 'B-C'
	

***Tab13- x8.2*Bus body interconnector pin details for OF 917/1017 Variants**

X8.2 BUS BODY INTERCONNECTOR											
Color-code	Circuit N.	Gauge (mm²)	pin	pin	Input/ Output	Potential	Max Current	Min Current	Function	Symbol	Description
L-W	BBA1.3	1.25	1	1	Output	(+ve) ACC	3		Door IC, Front Destination & Door Lamp for Non-AC		
			2	2							
B/Y	DCLSO	0.85	3	3	Input	(-ve)			Driver cabin lamp		This is the protected circuit from MUX and the SW to be provide by the body builder.
B/L	SLSO	0.85	4	4	Input	(-ve)			Saloon Lamp		This is the protected circuit from MUX and the SW to be provide by the body builder.
			5	5							
Y/R	DO1	0.85	6	6	Input	(+ve)			Door Open		This is the protected circuit from MUX and the SW to be provide by the body builder.
Y/W	DCl	0.85	7	7	Input	(+ve)			Door Close		This is the protected circuit from MUX and the SW to be provide by the body builder.
			8	8							
Y/B	DO2	0.85	9	9	Output	(+ve)	1		ACC ON + Door Open Switch ON		Door open symbol will display in the SW
Y/G	DC2	0.85	10	10	Output	(+ve)	1		ACC ON + Door Close Switch ON		Door close symbol will display in the SW
			11	11							
BR	FALO1	0.85	12	12	Input	(-ve)			Fire detection alarm input		
			13	13							
L	USBD+	0.85	14	14	Output	(+ve)	1		USB ON		D+ ON , USB power supply ON
			15	15							
			16	16							
BR	EFSPO	0.85	17	17	Input	(-ve)			Emergency Door switch, Foot step switch, Bus stop switch, NON AC Passenger door switch		
			18	18							
			19	19							
B/P	ELSO	0.85	20	20	Input	(-ve)			Emergency declaration lamp switch		This is the protected circuit from MUX and the SW to be provide by the body builder. Emg declaration lamp SW O/P goes to the
			21	21							

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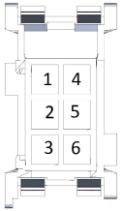
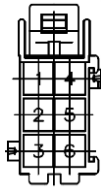
7.4 Bus body interconnector

Tab14- x8.3 **Bus body interconnector pin details for OF 917/1017 Variants**

X8.3 BUS BODY INTERCONNECTOR											
Color-code	Circuit N.	Gauge (mm²)	pin	pin	Input/ Output	Potential	Max Current	Min Current	Function	Symbol	Description
			1	1							
B	BBCANHI	0.5	2	2	CAN				Body Builder CAN		Only for Body Builder interface with CAN
W	BBCANLO	0.5	3	3	CAN				Body Builder CAN		Only for Body Builder interface with CAN
			4	4							
			5	5							
			6	6							

Electric center - X8.3 Bus Body Interconnector	
Chassis side Connector	Bus Body builder side
MB Part no:	MB Part no:
Secondary lock:	
TYCO 6 POLES: 1-965641-	TYCO 6 POLES: 1-965640-3
Tyco lock : 968271-1	Tyco lock: 968271-1
Color: Slate Grey	Color: Slate Grey
Coding : "A"	Coding : "A"
Latching mechanism = 'B-C'	Latching mechanism = 'B-C'
	

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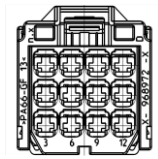
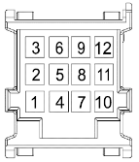
7.5 Body Interconnect External Lamp for OF 917/1017 Chassis

Tab15- Body Interconnect External Lamp for OF 917/1017 Variants

Electric center - X8.5 Body Interconnect	
Chassis side Connector	Bus Body builder side
MB Part no:	MB Part no:
Secondary lock:	
TYCO 12 POLES: 7-	TYCO 12 POLES: 2-
Tyco lock :	Tyco lock: 967632-1
Color: Natural	Color: Natural
Coding : "B"	Coding : "B"
Latching mechanism = 'A-C'	Latching mechanism = 'A-C'
	

X8.5 BODY INTERCONNECT EXTERNAL LAMP											
Color-code	Circuit N.	Gauge (mm²)	pin	pin	Input/ Output	Potential	Max Current	Min Current	Function	Symbol	Description
R-G R	LE01BY HLLL	0.5 1.25	1	1	Output	(+ve)	4		Head Lamp Low Beam LH		
R-L	HLLR.1	1.25	2	2	Output	(+ve)	4		Head Lamp Low Beam RH		
W	HL01HL.1	1.25	3	3	Output	Dicrete (Active high)	4		B+ ON + High Beam Switch ON Head Lamp High Beam LH		Tell tale will display in the instrument cluster
G-O	LE02	0.85	4	4	Output	(+ve)			Head Lamp Leveller		
B	HLE1LL	2.5	5	5	Output	(-ve)			Ground		
G-R	IL04R	0.5	6	6	Output	(+ve) KL58			Parking Lamp on		
G-W	DRL02	1.25	7	7	Output	(+ve)	1		Day time running Lamp ON		
Y-L	TR01FL	0.5	8	8	Output	(+ve)	3.8		Turn Lamp LH ON		
Y-R	TR01FR	0.5	9	9	Output	(+ve)	3.8		Turn Lamp RH ON		
R-W	FOG FR	1.25	10	10	Output	Discrete (Active high)			Front fog lamp ON		Tell tale will display in the instrument cluster
W	HL01HR	1.25	11	11	Output	(+ve)	4		Head Lamp High Beam RH		
			12	12							

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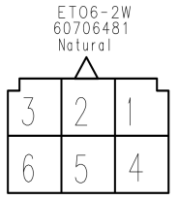
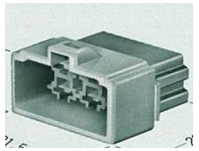
7.6 Wiper Motor Connection for OF 917/1017 chassis

Tab16- A9 Wiper Motor Connection

M3 WIPER MOTOR											
Color-code	Circuit N.	Gauge (mm²)	pin	pin	Input/ Output	Potential	Max Current	Min Current	Function	Symbol	Description
L-W	WI06INT	2	1	1	Output	(+ve)			Auto stop		
L	WI05	2	2	2	Input	(+ve)			Ignition supply to wiper motor		
B	WME1	2	3	3	Output	(-ve)			Ground		
L-B	WI03H	2	4	4	Output	(+ve)	0.4		Wiper High		
L-R	WILOP	2	5	5	Output	(+ve)	0.4		Wiper Low		
			6	6							

M3 WIPER MOTOR	
Chassis side Connector	Bus Body builder side
MB Part no:	MB Part no:
Secondary lock:	
SUMITOMO 6 POLES: 6070-	SUMITOMO 6 POLES: 6070-
Lock :	Lock:
Color: Natural	Color: Natural
	

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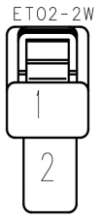
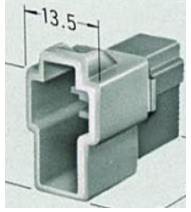
7.7 Washer Motor Connection for OF 917/1017 chassis

Tab17- E21 Washer Motor Connection

M4 WASHER MOTOR											
Color-code	Circuit N.	Gauge (mm^2)	pin	pin	Input/ Output	Potential	Max Current	Min Current	Function	Symbol	Description
L	WI08.1	0.85	1	1	Output	(+ve) KL15	1		Washer motor ignition supply		
B	WI09	0.85	2	2	Output	(-ve)			Ground		

M4 WASHER MOTOR	
Chassis side Connector	Bus Body builder side
MB Part no:	MB Part no:
Secondary lock:	
SUMITOMO 2 POLES: 6070-	SUMITOMO 2 POLES: 6070-
Lock :	Lock:
Color: Natural	Color: Natural
	

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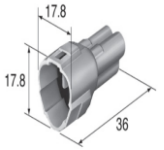
7.8 License Plate & Rear Roof Marker Lamp for OF 917/1017 chassis

Tab18- License Plate & Rear Roof Marker Lamp

X7.1 LOAD BODY											
Color-code	Circuit N.	Gauge (mm²)	pin	pin	Input/ Output	Potential	Max Current	Min Current	Function	Symbol	Description
G-W	TL01LC	0.5	1	1	Output	(+ve) KL58	2		License Plate Lamp		
G-R	TL01RC	0.5	2	2	Input	(+ve) KL58	4.2		Rear Roof Marker Lamp/ Side marker lamps		
B	EA15	0.85	3	3	Output	(-ve)			Ground		

X7.1 LOAD BODY	
Chassis side Connector	Bus Body builder side
MB Part no:	MB Part no:
Secondary lock:	
SUMITOMO 3 POLES:	SUMITOMO 3 POLES: 6187-
Lock :	Lock:
Color: Natural	Color: Natural
	

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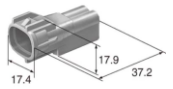
Tab19- F1 Rear Fog Lamp Interconnector

F1 REAR FOG LAMP INTERCONNECTOR											
Color-code	Circuit N.	Gauge (mm^2)	pin	pin	Input/ Output	Potential	Max Current	Min Current	Function	Symbol	Description
G-L	FOGROP	1.25	1	1	Output	(+ve) KL15	1		Rear Fog Lamp Ignition supply		
B	FOGE	1.25	2	2	Output	(-ve)			Ground		

F1 REAR FOG LAMP INTERCONNECTOR	
Chassis side Connector	Bus Body builder side connector
MB Part no:	MB Part no:
Secondary lock:	
SUMITOMO 2 POLES: 6189-	SUMITOMO 2 POLES: 6188-0266
Lock :	Lock:
Color: Gray	Color: Gray
	

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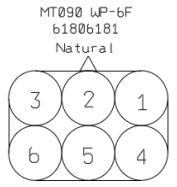
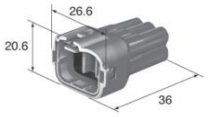
7.10 Comb Lamp LH for OF 917/1017 chassis

Tab20- E3.L Comb Lamp LH

E3.LV COMB LAMP LH											
Color-code	Circuit N.	Gauge (mm²)	pin	pin	Input/ Output	Potential	Max Current	Min Current	Function	Symbol	Description
W-G	SL01L	0.5	1	1	Output	(+ve)	3		Brake Lamp LH		
G-W	TL01.L	0.5	2	2	Output	(+ve)	2		Tail Lamp LH		
Y-L	TR01RL	0.5	3	3	Output	(+ve) Discrete	3.8		Left turn indicator	⇦	Tell tale will be displayed in Instrument Cluster
B	EA14L	0.85	4	4	Output	(-ve)			Ground		
			5	5							
R-L	BL01L	0.5	6	6	Output	(+ve)	4		Reverse Lamp LH		Whenever Reverse gear ON, Reverse buzzer will start to beep along with reverse light

E3.LV COMB LAMP LH	
Chassis side Connector	**Bus Body builder side**
MB Part no:	**MB Part no:**
Secondary lock:	
SUMITOMO 6 POLES:	**SUMITOMO 6 POLES: 6189-**
Lock :	**Lock:**
Color: Natural	**Color: Natural**
	

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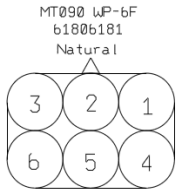
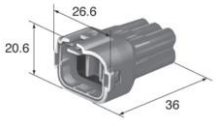
7.12 E4.L Comb lamp RH for OF 917/1017 chassis

Tab21- E4.L Comb lamp RH

E4.LV COMB LAMP RH											
Color-code	Circuit N.	Gauge (mm²)	pin	pin	Input/ Output	Potential	Max Current	Min Current	Function	Symbol	Description
W-G	SL01R	0.5	1	1	Output	(+ve)	3		Brake Lamp RH		
G-R	TL01.RD	0.5	2	2	Output	(+ve)	4.2		Tail Lamp RH		
Y-R	TR01RR	0.5	3	3	Output	(+ve) Discrete	3.8		Right turn indicator	⇨	Tell tale will be displayed in Instrument Cluster
B	EA14R	0.85	4	4	Output	(-ve)			Ground		
			5	5							
R-L	BL01R	0.5	6	6	Output	(+ve)	4		Reverse Lamp RH		Whenever Reverse gear ON, Reverse buzzer will start to beep along with reverse light

E4.LV COMB LAMP RH	
Chassis side Connector	**Bus Body builder side connector**
MB Part no:	**MB Part no:**
Secondary lock:	
SUMITOMO 6 POLES: 6180-	**SUMITOMO 6 POLES: 6189-6171**
Lock :	**Lock:**
Color: Natural	**Color: Natural**
	

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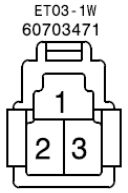
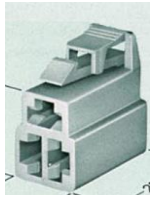
7.13 Head Lamp Leveling Switch for OF 917/1017 chassis

Tab25- S26 Head lamp leveling switch

S26 HEAD LAMP LEVEL SWITCH											
Color-code	Circuit N.	Gauge (mm²)	pin	pin	Input/ Output	Potential	Max Current	Min Current	Function	Symbol	Description
B	LEE1	0.5	1	1	Output	(-ve)			Ground		
R-G	LE01BY	0.5	2	2	Input	(+ve)			Ignition Supply		
G-O	LE02	0.85	3	3	Output	(+ve)			Head Lamp Leveller		

S26 HEAD LAMP LEVEL SW	
Chassis side Connector	Bus Body builder side connector
MB Part no:	MB Part no:
Secondary lock:	
SUMITOMO 3 POLES: 6070-3471	SUMITOMO 3 POLES: 6070-3481
Lock :	Lock:
Color: Natural	Color: Natural
	

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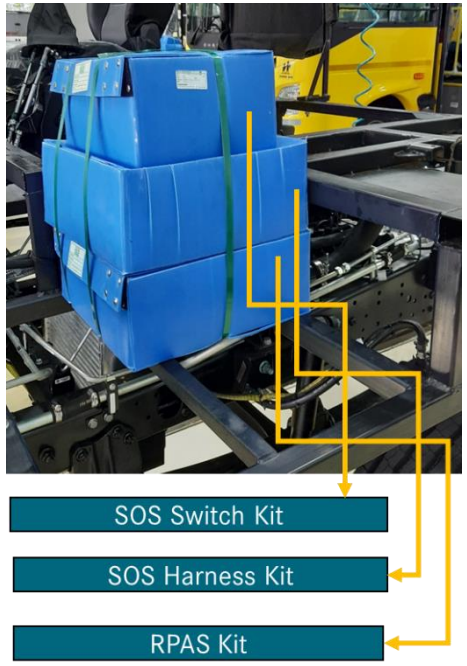
7.14 Rear parking sensor for OF 917/1017 chassis

The 'RPAS' equipment to fulfill **'AIS 145'** requirements is now supplied with all Daimler India Commercial Vehicles Pvt. Ltd., OF 10T & 9T Bus chassis toolkit as standard,

- The Wiring harness for the RPAS will be Factory fitted and shouldn't be replaced or Rerouted by body builder
- This approved AIS 145 compliant device (Sensors,ECU,buzzer) must be fitted by Bodybuilder during bodybuilding or after bodybuilding processes.

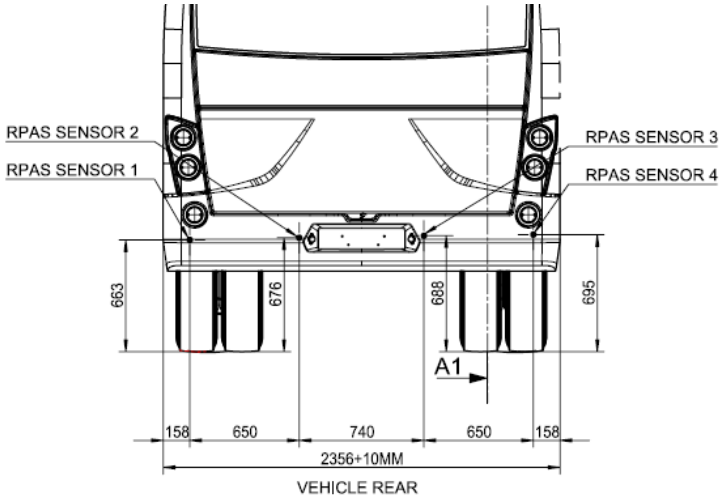


RPAS KIT in Chassis

7.14 Rear parking sensor for OF 917/1017 chassis

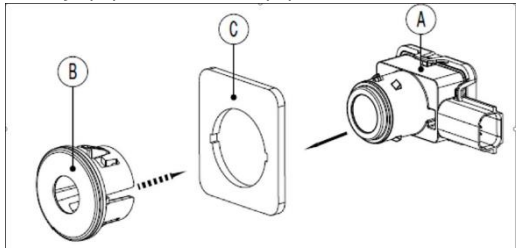
- The following steps are to be followed during RPAS installation.

1. The height at which the sensor has mounted from floor min 730 and max. 763 mm at un-laden condition



Dimension shown for refrence only

2. Install the RPAS sensor assembly (A) and Bezel (B) on the rear dome of Bus body using snap fit.



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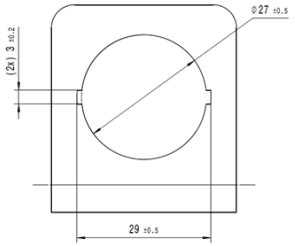
7.14 Rear parking sensor for OF 917/1017 chassis

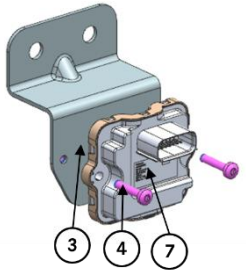
- The following steps are to be followed during RPAS installation.

3. The sensor bracket (C) shown in the drawing are for reference purpose and not part of the RPAS kit. Fig C for standard dimension of Bezel cutout. Sensor Bracket shall be insert molding/layering to rear bumper. Do not mount the bracket using bolt and nut with the FRP. Bumper.

Fig: C



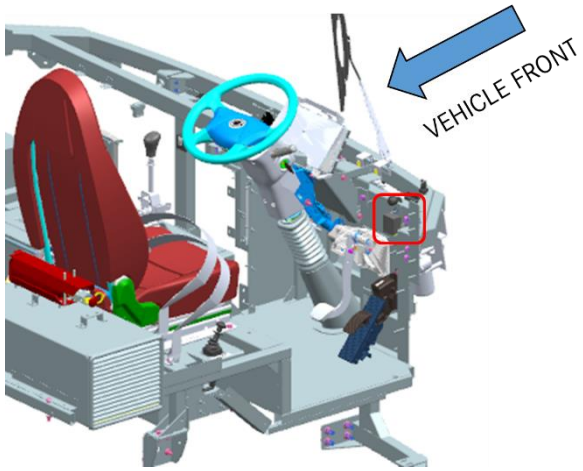
4. Install the RPAS ECU assembly to mount on cross member of under frame with M12 hexagonal bolt (5) using 16mm hexagonal socket and ratchet. Set the torque to 104 ± 10 Nm.
5. Install the RPAS ECU (3) to mount on bracket (2) with M6 Panhead Screws (4) using 5 size Allen Key. Set the torque to 8.4 ± 1 Nm.



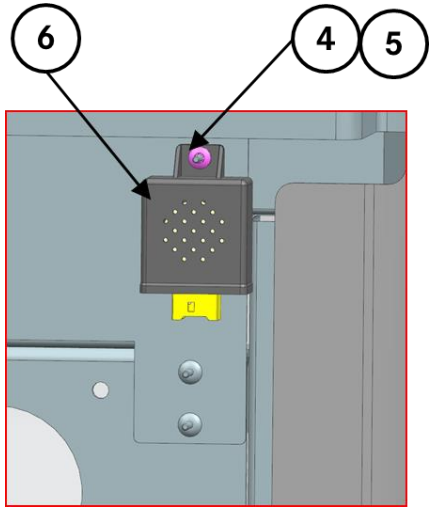
7.14 Rear parking sensor for OF 917/1017 chassis

- The following steps are to be followed during RPAS installation.

6. Identify the suitable position on the Dashboard or in driver cabin to mount the RPAS buzzer, the buzzer system should be mounted in a suitable location such a way that it is easily accessible and is exposed to passengers as well as the driver



7. Install the RPAS Buzzer (6) to mount on driver comportment with M6 Pan head Screws (4) using 5 size Allen Key. Set the torque to 7.8 ± 0.6 Nm.



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7.15 FPS/FAS System for OF 917/1017 School Buses

Fig :1

The 917/1017 RHD chassis are equipped with a mechanical main switch at the negative battery pole.

For FAS/FPS/FDSS system –Ve input from Battery cut off switch input side , Should be connected with Ring terminal (10 dia) as per **Fig : 2** (FDPW –VE)

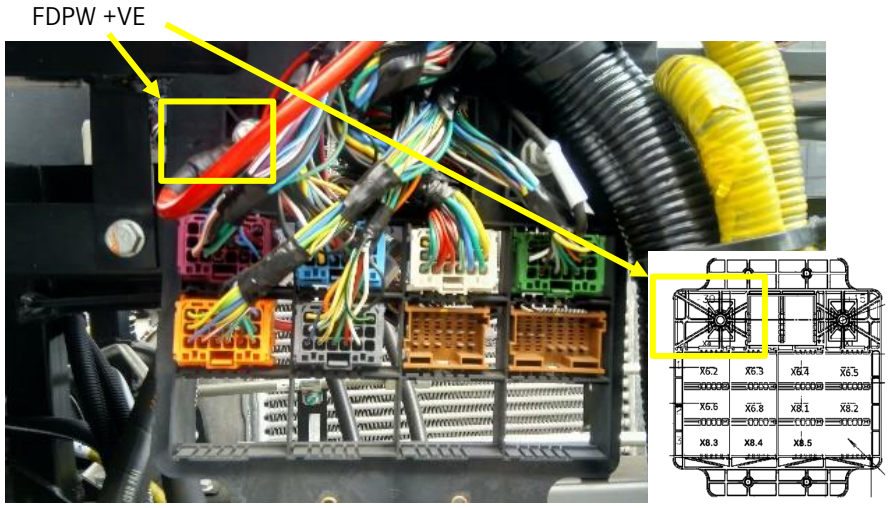
+V input to be taken from ECU center box as per **Fig :3** (KL 30) , Circuit to be protected inline with Fuse (5Amps)

Please proceed with suitable connector for power cable against to the supplier kit of FAS/FPS/FDSS.

Do not tamper vehicle wiring harness.

All wiring harness to be protect with sleeves

Please apply torque after power cable installation. –Ve Terminal (8.4+-1Nm) & +Ve Terminal (7.4+-1Nm)

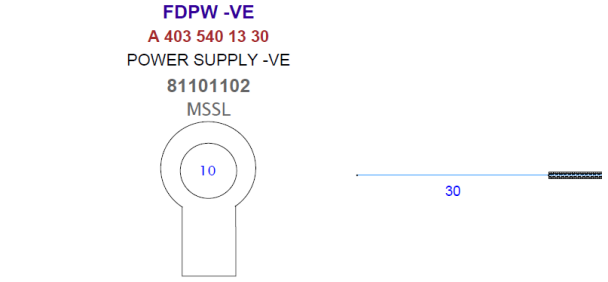


(7.4+-1Nm)

Fig :3

Main switch

Clockwise (ARROWS) - ON position



Cav	No.	Type	CSA	Col.	End	Cavity	Cavity Plug
1	PW-	FY-B	1	B	FDPW I/C	1	-

Type Code	Part Number	Qty.	Supplier part Number
HSS	A 400 542 00 85	1	38840821
LABL	A 400 584 24 08	1	44161200

Fig :2

- Bodybuilder must meet AIS 135 as per Homologation requirements.
- All the functions defined in the AIS 135 must meet entire life of the vehicle defined by regulation.

Recommendation :

- Ensure periodic maintenance to avoid malfunction of system at any point of time.
- Ensure particulate size of residual dirt maintained between 5 µm to 400 µm (DBL 6516.10).
- Ensure max allowed residual dirt coating <3 mg/1000cm² (VAM00328).

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7.15 FPS/FAS System for OF 917/1017 School Buses

7.15.1 FAS/FPS/FDSS – Hazard Activation

The 917/1017 RHD chassis are equipped with a Mux system

For Hazard activation, Take the signal from the FAS/FPS/FDSS Hooter/ Sounder output (Low side) and double crimping with X4.12 as shown in **Fig 4**

Do not tamper vehicle wiring harness.

All wiring harness to be protect with sleeves

Hazard Switch Input	Active low	Input 24	X4 12

MUX ECU

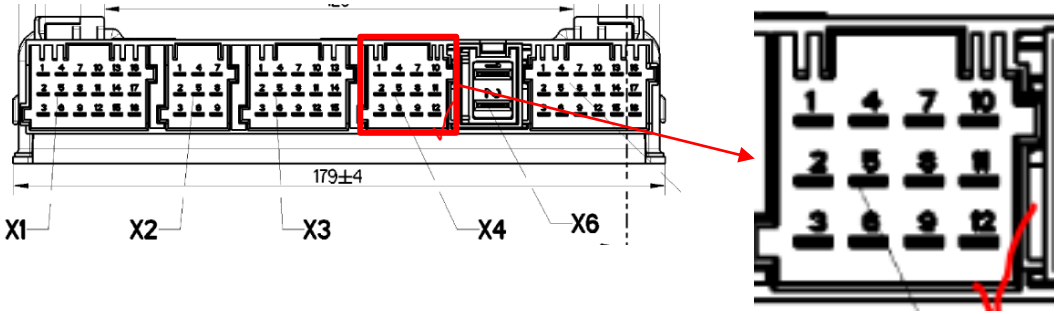

Fig :4

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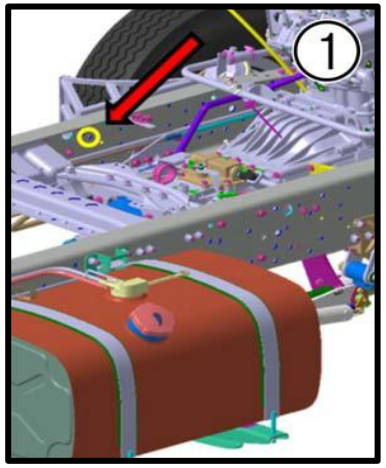
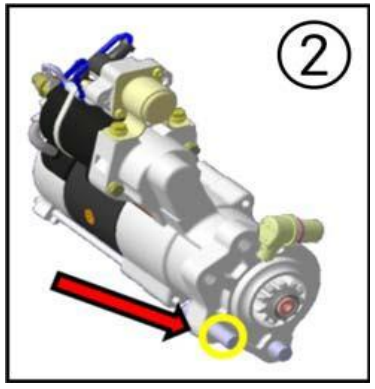
8 Ground point



Ground point Location 1



Ground point location 2

OF Chassis are equipped with electronic engines are designed with a specific body grounding feature. Several issues may be generated if the body grounding interferes with the chassis grounding, such as: the engine may go out without any previous sign in the panel; defects with no coherent explanations; random operation of other systems; etc.

The body structure cannot be used as ground ({i>i.e.<i} the body must have a similar grounding project than the vehicle chassis grounding project). A specific side member point must be used for the chassis area, which is known as: “Joint ground point”.

The ground point to be used in the body must arise from the joint ground points, since the points are interconnected to the negative battery terminal via power cables.

The grounding point must be connected to a specific point in the instrument cluster area, which virtually contains only electrical signals and no power cables.

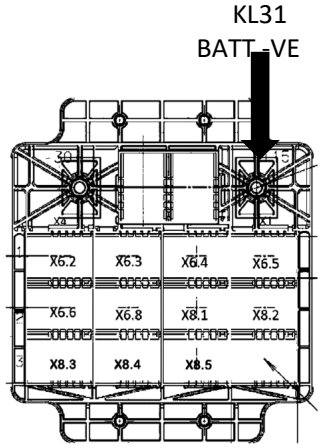
This is due to the interference of the EMC (Electrical Magnetic Compatibility) over electronic equipment.

The ground points are located in three locations on the chassis, at the left side near the starter motor, below the instrument panel and at the connection main cabinet.

1.Chassis earth;

2.Starter motor earth;

3.Bus body earth - dashboard wiring harness earth should be done in the bus body.



Ground point Location 3 (OF 917/1017)

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9 Battery compartment

The chassis is delivered with two 12V-75Ah/120Ah (24V system) mounted on a temporary bracket attached to the chassis frame. Never installed 12V equipment connected to only one of the batteries. Use a 24V-to-12V converter if necessary.

Temporary Battery location on chassis

!

Do not remove the cover before the body building or during Storage conditions.

9 Battery Compartment

In case of any sign of corrosion in the battery or terminals, remove the terminal cables and wipe them using a wire brush. Battery acid can be neutralized using a baking soda and water solution.

Reinstall the cables after wiping. Since the original batteries are maintenance-free, it is not necessary to apply Vaseline / grease over the battery terminals.

Recharge the batteries if their open-circuit voltage is below 12.4 V. The recharging time varies depending on the batteries' state of charge.

Batteries temporarily removed from vehicles must be stored in well-ventilated and dry areas. We recommend storing batteries in proper charging stations.

The batteries' voltage (minimum voltage of 12.4 V) must be checked every 2 months. Recharge the batteries if necessary.

Protect the batteries against UV radiation. Use the protective cover whenever necessary.

During emergencies, if the vehicle battery charge is insufficient to start the vehicle, auxiliary batteries connected in parallel may be used.

Do not use fast chargers for auxiliary starts.

9 Battery Compartment- Cut off main Switch

Main switch

Clockwise (ARROWS) - ON position

The OF917/1017 RHD chassis are equipped with a mechanical main switch at the negative battery pole. This switch must be mounted in an easily accessible area. The main mechanical switch is attached to a temporary bracket. We recommend properly securing and using the bracket to prevent impacts and/or risk of short-circuit.

Anticlockwise direction - Switch off MAIN SWITCH before starting body building process.

Hold the handle firmly and turn it anticlockwise to turn off the vehicle's main switch.

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11 Alternator

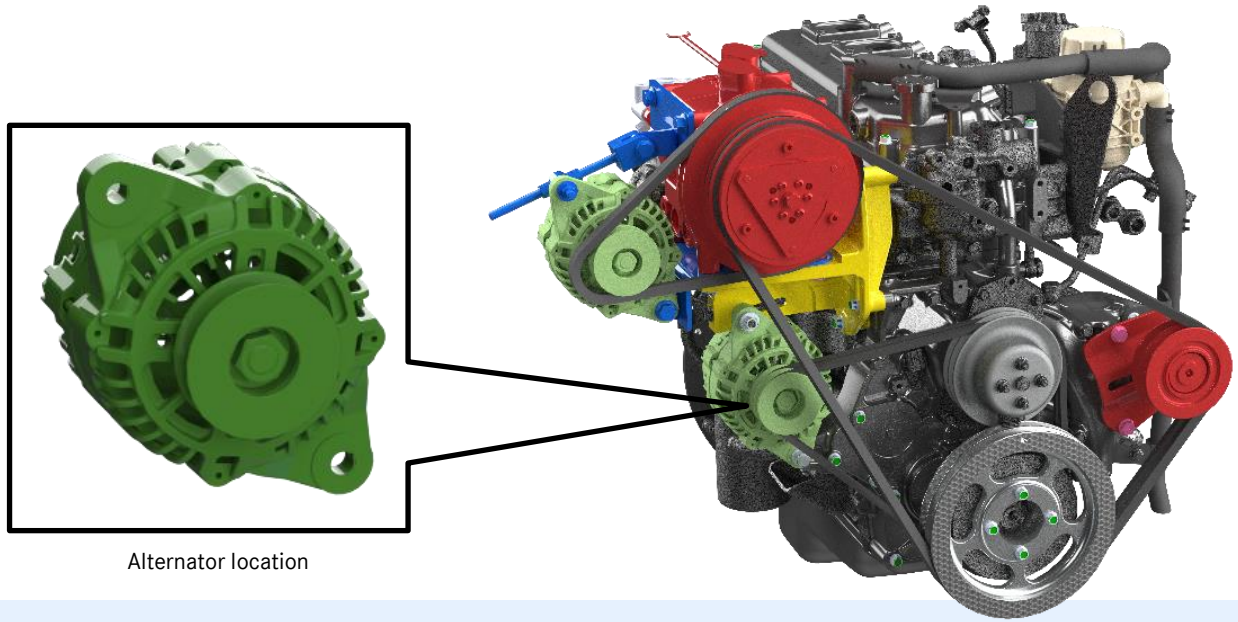
The OF 917/1017 Non AC chassis are equipped with a primary 24V 45A alternator;

OF 1017 chassis are primary equipped with 80A (For normal AC) or 120A (for High power AC) alternator.

Additional 80A or 120A alternator may be supplied for OF1017 chassis as chassis supplied AC compressor based on chassis variant.

The alternators are provided with rectified regulators with zener diodes in order to prevent harmful tension noises to the electronic modules.

After air conditioning unit assembly, 120A and 80A alternator must be connected with primary alternator.



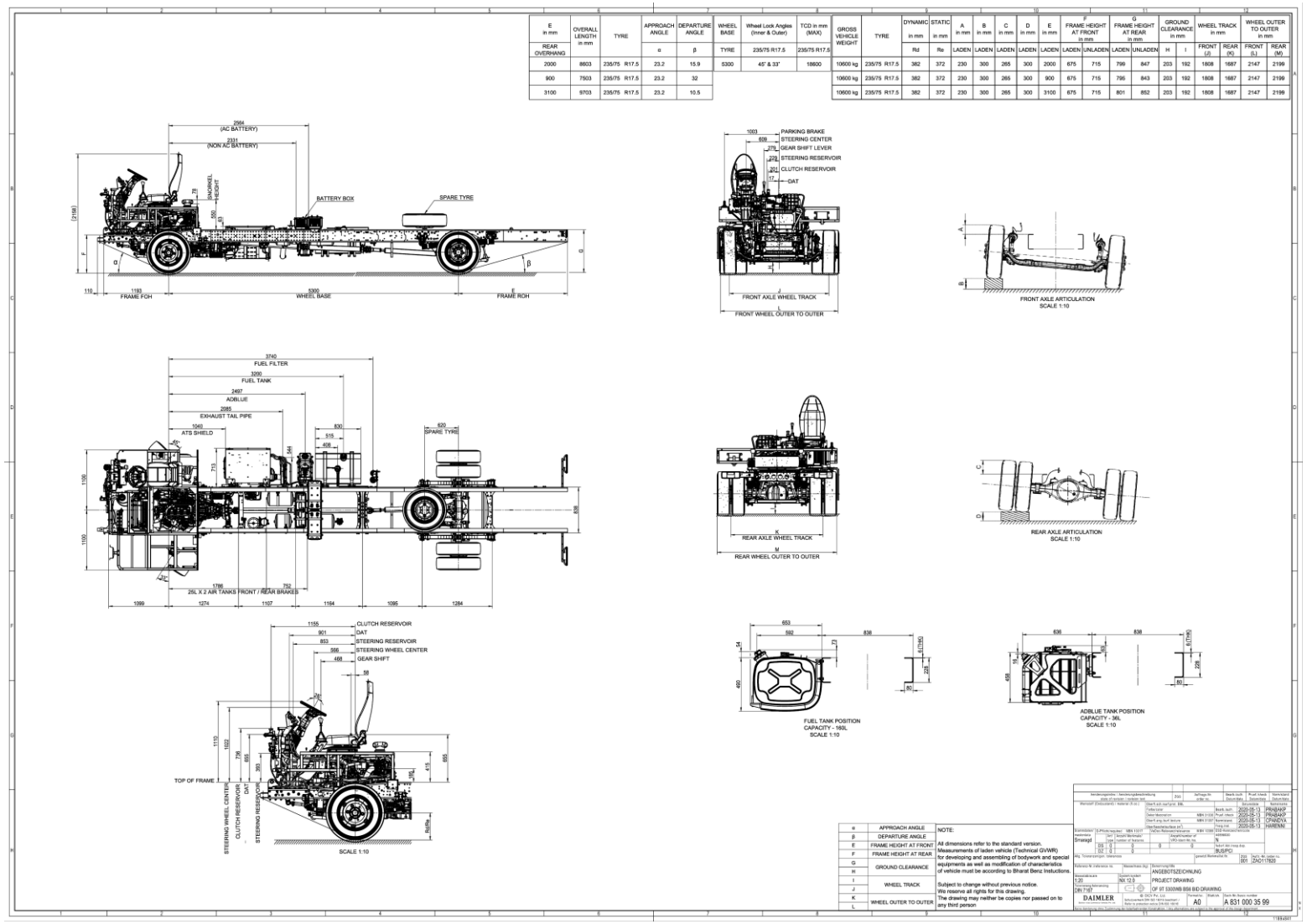
Alternator location

Alternators cannot be switched on before being duly connected to the vehicle's batteries, since this causes an electrical surge that damages electronic modules and voids the electronic module and alternator warranty, as a result.

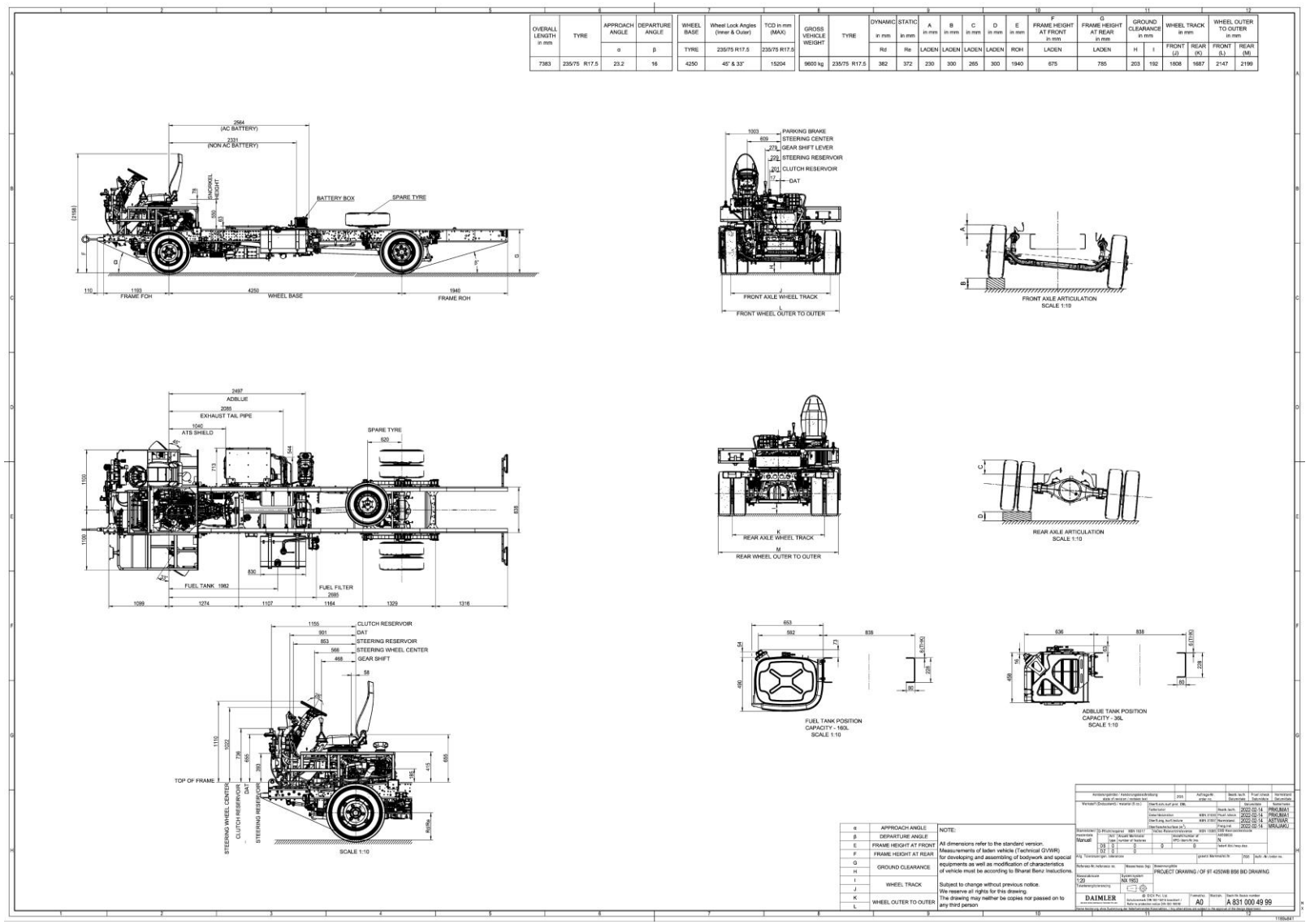
12 Body Electrical Loads

Note:

1. Bus Body Electrical load source has to be take from KL30 & KL31 terminal points, The same has been controlled through Each 80A fuse near battery compartment.
2. These two 80A Fuse is common for Chassis load and bus body loads
3. Separate control and protection circuit has to be made for bus body loads after power source termination from KL30 & KI15
4. The available load capacity is cumulative value of KL30 & KL15, Load sharing has to control by the body builder respectively
5. The available Electrical load capacity is Direct propionate to the engine RPM, see the below table with reference of different stage of engine RPM
6. Recommended to body builder to control the loads bus body load accordingly
7. All exterior lamp which is being control by the chassis system and wiper motor are considered as part of chassis load, the available load excluding those loads



OF 1017 Coach builder drawing



OF917 Coach builder drawing

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